# ACSI MODEL 1410 POWER SUPPLY
INSTALLATION INSTRUCTIONS

Features:

- For use with doors or groups of doors that must interlock with each other to regulate control of accessing one area from another, or to prevent the spread of contaminants to non-hazardous locations
- Applications include research laboratories, pharmaceuticals, detention centers, office buildings
- Separate plug-in "daughter" p.c. boards used to control interlocking doors – can be programmed for normally locked or normally unlocked operation
- Any one door can be programmed to be part of (common to) as many as three separate interlocking systems
- Inputs available for fire alarm and optional emergency release interface for overriding the interlocking systems
- Each power supply can control up to four doors, and can be expanded to control several more by linking power supplies together via a four-wire bus
- Filtered/Regulated 24 Volts DC
- Class 2 Rated Outputs
- Overload, over voltage, and short circuit protection
- Automatically accepts 120VAC or 240VAC input
- UL listed and Tested to 294 Standard for Access Control System Units with Security Levels Rated I for Physical Attack, IV for Endurance, I for Line Security, I for Standby Power
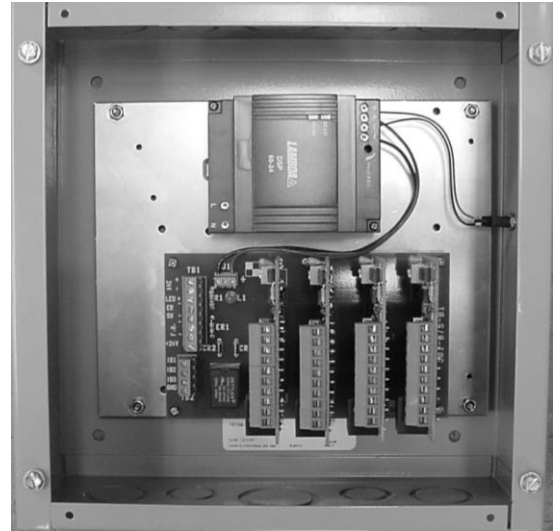
Installing the 1410

For UL installations, the product is to be used only with other UL Listed and compatible security products. The unit must be mounted indoors, avoiding moist or wet areas. Some common locations for mounting the 1410 enclosure would be in the plenum near the door containing the electric locking device, or in a nearby closet or electrical room.

When installing the unit in the plenum, wires must either be of plenum rating or contained inside conduit. The unit must be mounted in a vertical position with the power supply module located at the top, as shown in the photograph above. Four 1/4" holes are provided for mounting the box to the wall or other rigid surface. If the surface material is wood, it must be at least 1 inch thick. Use either a truss or pan head, 1 inch long sheet metal screw (#10 or larger) for fastening the box to the wood surface. When mounting the unit to 1/2 inch or 5/8 inch dry wall, it is recommended that 3/16 inch or 1/4 inch diameter toggle bolts be used for maximum support. Use the same size toggle bolts for mounting the unit to hollow concrete blocks. For mounting to concrete, solid block, or brick, it is recommended to use 1-3/4 inch long (minimum) x 1/4 inch diameter hex head bolt anchors (sometimes called power-bolts) in 18-8 stainless steel or Grade 5 zinc-plated steel. The sub plate can be removed from the box for easier access to the mounting holes. To remove the sub plate, locate the four #6 locknuts near each corner of the plate and remove. The 6-32 studs, from which the sub plate mounts to, are held in place to the box by threaded standoffs.

Wiring the AC Input

The 1410 power supply is rated for use with a 20 amp branch circuit and is capable of accepting either 120VAC or 240VAC input without the need for making any changes, or reconfiguring to convert from one input voltage to the other. Because the power supply module contains Class 2 double insulation, an earth ground wire is not required. For wiring 120VAC or 240VAC input, run 14 AWG 2-conductor to the power supply module's input terminals marked **L** (Line) and **N** (Neutral). Ensure that the conductors are fully inserted into the input terminals with no bare metal exposed. (Refer to the wire stripping instructions included on the wiring diagram attached to the cover plate of this power supply.)

> **CAUTION!** It is important to maintain separation between the primary (high voltage AC) wiring and secondary (low voltage DC) wiring as they are routed inside the power supply enclosure. The primary wiring must be run inside conduit; and the conduit must be connected to one of the knockouts located towards the left end of the top wall of the enclosure (above and to the left of the power supply module's input terminals). All secondary wiring must be routed through any one of the knockouts located along the bottom wall of the enclosure.

Note: This unit is not equipped with a battery standby power feature.

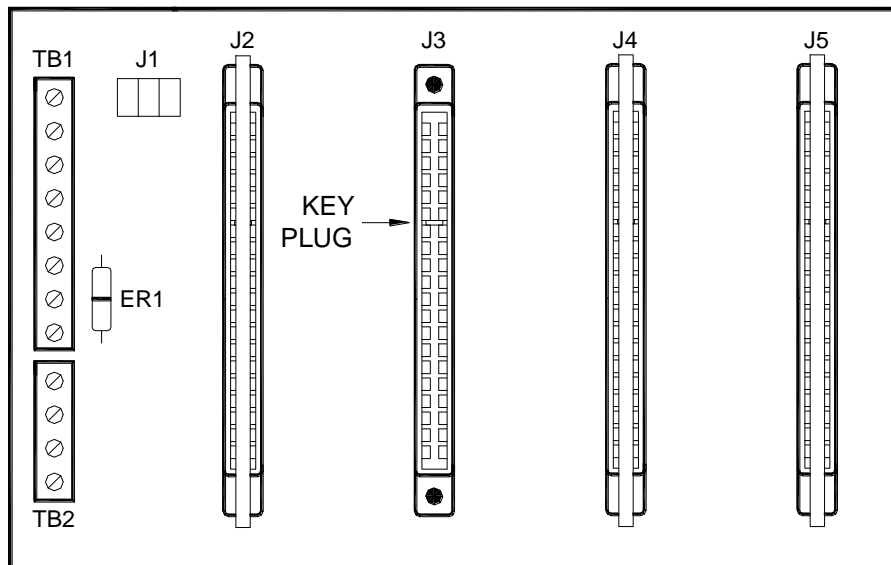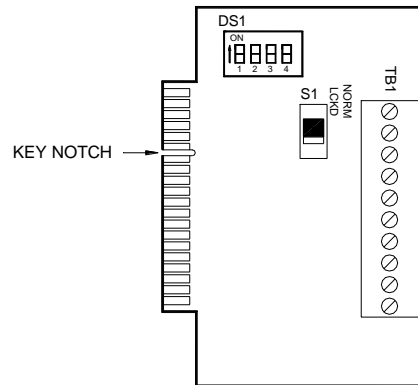## Door Interlock Plug-In "Daughter" Board

There must be one daughter board used for each door that is to be interlocked. The 1410 power supply can accommodate up to four daughter p.c. boards to provide for a 2-door, 3-door, or 4-door interlock system. All interlocking door components (electric

locking device, door position switch, control switch, status LEDs) are connected directly to Terminal block TB1 located along the edge of the p.c. board.

Note: All daughter boards must be field wired while unplugged from the mother board connectors (J2 – J5). This is the only way to access the terminal screw heads. **Before inserting or removing daughter boards from the mother board, remove the fire alarm connection or bypass jumper (whichever one is used) to the fire alarm input on TB1 of the mother board. (Refer to Note 2 from the illustration found on the power supply's removable cover for more information.)**

There is no order in which the daughter boards must be installed. Use any combination of card connectors available: J2, J3, J4, J5.

Each daughter board is keyed to prevent it from being inserted in the wrong direction. A key notch, located between the connector pins of the daughter board, must slip over a key plug positioned inside the motherboard connector to ensure that the board is fully seated into the connector.

The above example shows three door interlock daughter boards inserted into connectors J2, J4, and J5 for a 3-door interlock system. The three boards can be located adjacent to each other, or separated as shown above. Order of p.c. board placement has no effect on interlocking system operation.

Interlocking Systems – General Description

The concept of interlocking doors normally means that when one door within a group of interlocking doors becomes unsecure (unlocked or open), all remaining doors are electronically prevented from opening. No two or more doors are allowed to open at the same time. The reason for having interlocking doors is to normally prevent a direct path for something harmful in one room to enter into another room. There is usually a small room called an Airlock that is linked between one room containing hazardous fumes or contaminants and another room or corridor that must be kept safe at all times. The airlock prevents a direct path for dangerous fumes or contaminants from flowing from a hazardous area into a safe area by allowing only one door to open at a time. When one door is opened, the other door is temporarily prevented from opening until the door that had opened is closed again. Another use for interlocking doors would be a dark room application where light from a corridor, or another room, must be prevented from entering into the dark room. This can be accomplished with an airlock situated between the dark room and the lighted area, and by using interlocking doors on the dark room and lighted area sides of the airlock.

There are two types of interlocking doors used with interlocking systems. Each type is described below:

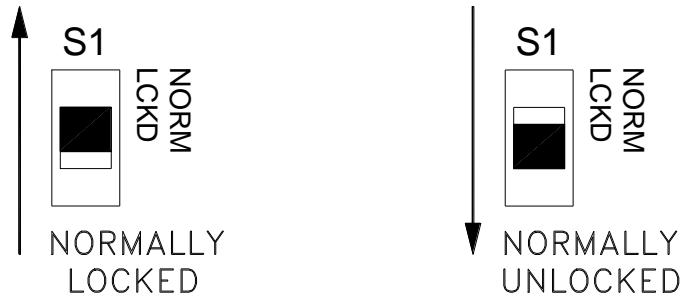Normally Unlocked Interlocking Doors

Doors within an interlocking system that are normally unlocked do not require any local controls. When there is a group of interlocking doors, and all of them are normally unlocked, opening one door within the group will electrically lock the rest of them. These doors will remain locked until the opened door closes. All doors then return back to normal "standby" operation, and any one door within the group can now be opened.

Normally Locked Interlocking Doors

Doors of this type are electrically locked until commanded to unlock by a local control device, such as a card reader or keypad. A request-to-exit push-button switch is often used on the egress side of the door. When a door from a group of normally locked interlocking doors becomes unsecure (unlocked or open), all remaining doors are electronically prevented from becoming unlocked by the decision making electronics inside the 1410 power supply. The "command to unlock" output signals that are initiated by the door's local control devices are temporarily disabled, and all doors remain locked. At the moment when the door which had previously become unsecure is fully closed and electrically locked, the rest of the doors within that interlocking group will then return back to normal "standby" operation and be allowed to become unlocked via their local control devices.

Each door interlock daughter board can be programmed as either a normally unlocked or normally locked interlocking door by making a selection using slide switch S1 (see illustration on removable cover of power supply). To select the normally locked type,

move the slide switch to the position labeled "NORM LCKD". Move the switch to the opposite position for selecting the normally unlocked type.

S1 — NORM LCKD — NORMALLY LOCKED

S1 — NORM LCKD — NORMALLY UNLOCKED

Note: It is not necessary to have all doors either normally unlocked or normally locked within a group of interlocking doors. Each group can contain a mix of either type of interlocking door.

Interlocking Doors Common to Multiple Interlocking Systems

It is possible for one interlocking door to be part of more than one interlocking system. When this situation occurs, all doors from each system respond when the common door is unlocked, or opened. Conversely, the common door will be affected by the unlocking or opening of any one door from each system.

The door interlock daughter board is provided with three dip switch settings for programming the door to be part of one interlocking system, two interlocking systems, or three interlocking systems. (Refer to the wiring diagram attached to the cover plate of this power supply.) By selecting any combination of dip switches (1 & 2, 1 & 3, 2 & 3, or 1, 2 & 3) to the "ON" position, the door can be programmed to be commonly used with two or three interlocking systems. Selecting just one of the three dip switches to the "ON" position will program that door to be part of only one interlocking system, and it will not be treated as a common interlocking door.

To get a better understanding of how this works, refer to the three example floor plans shown below. The floor plans used in Examples 1 through 3 show four doors labeled as Door A, Door B, Door C, and Door D. All doors are programmed for normally unlocked operation.

In Example 1, all four doors are part of a single interlocking system. When one door opens, the other three doors lock. Each of the four door interlock daughter boards would be programmed by placing dip switch #1 to the "ON" position. When programming boards for single interlock system use, any one of the three dip switches
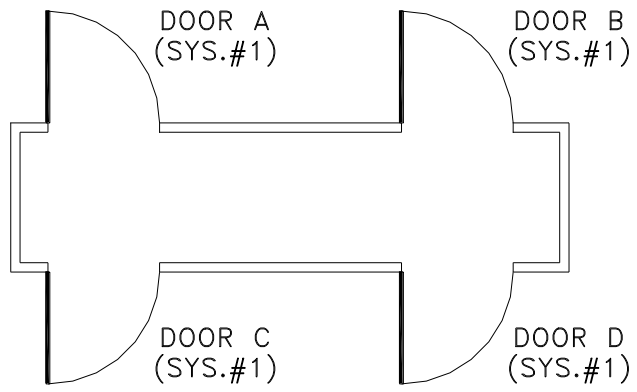
can be used, i.e., all interlock boards can either use dip switch #1 selected to "ON", or switch #2 or #3 selected to "ON".

Note: When programming doors to be part of a single interlocking system, dip switches 1 through 3 cannot be mixed. All boards must use the same number dip switch selected to the "ON" position (all boards using dip switch #1 selected "on", or all boards using dip switch #2 selected "on", etc).
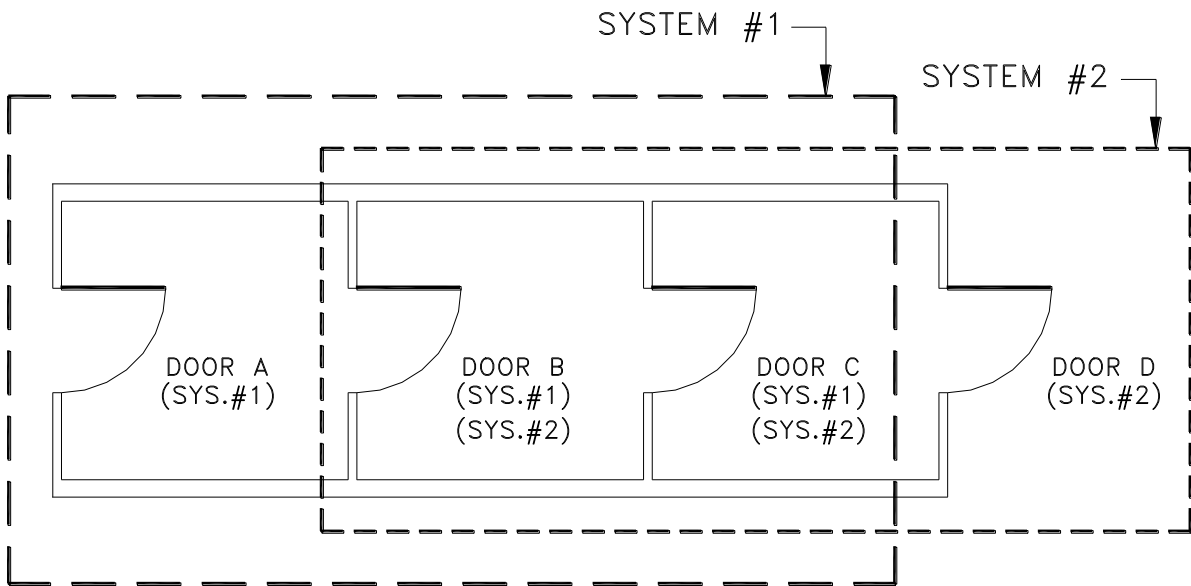
Example 2 shows four doors grouped into two interlocking systems. Doors A, B, and C are part of Interlock System #1, and Doors B, C, and D are part of Interlock System #2. In Interlock System #1, when Door A opens, Doors B and C lock; but Door D is not affected because it is part of Interlock System #2. When Door D from Interlock System #2 opens, Doors B and C lock; but Door A is not affected because it is part of Interlock System #1. Note that Doors B and C are both part of Interlock Systems #1 and #2. They both lock when either Door A from Interlock System #1 or Door D from Interlock System #2 opens. When Door B opens, Doors A, C, and D will lock because Door B is common to both interlock systems. Likewise, when Door C opens, Doors A, B, and D will lock because Door C is also common to both interlock systems. Follow these steps for programming the door interlock daughter boards for this scenario: The board representing Door A will have dip switch #1 set to the "ON" position (for Interlock System #1). The board for Door D will have dip switch #2 set to the "ON" position (for Interlock System #2). The boards used for Door B and Door C will each have both dip switches #1 and #2 set to the "ON" position since they are common to Interlock System #1 and Interlock System #2.

The third example illustrates an application involving three interlocking systems. Interlock System #1 includes Doors A, C, and D. Interlock System #2 includes Doors B and C. Interlock System #3 includes Doors C and D. Door A is not common to two or more systems; it is part of Interlock System #1 only. Set dip switch #1 to the "ON" position for this door. Door B is likewise not common to two or more systems, and is part of Interlock System #2 only. For this door, set dip switch #2 to the "ON" position. Door D is common to two interlocking systems: Interlock System #1 and Interlock System #3. Set dip switches #1 and #3 to the "ON" position for this door. Door C is common to Interlock Systems #1, #2, and #3. For this door, set dip switches #1, #2, and #3 to the "ON" position. When programmed this way, the interlocking sequence of operation for Doors A, B, C, and D are as follows:

Door A opens	Doors C & D lock
Door B opens	Door C locks
Door C opens	Doors A, B, & D lock
Door D opens	Doors A & C lock

DOOR A
(SYS.#1)

DOOR B
(SYS.#1)

DOOR C
(SYS.#1)

DOOR D
(SYS.#1)

EXAMPLE 1

SYSTEM #1

SYSTEM #2

DOOR A
(SYS.#1)

DOOR B
(SYS.#1)
(SYS.#2)

DOOR C
(SYS.#1)
(SYS.#2)

DOOR D
(SYS.#2)

EXAMPLE 2

SYSTEM #2

DOOR B
(SYS.#2)

DOOR C
(SYS.#1)
(SYS.#2)
(SYS.#3)

DOOR D
(SYS.#1)
(SYS.#3)

DOOR A
(SYS.#1)

SYSTEM #1

SYSTEM #3
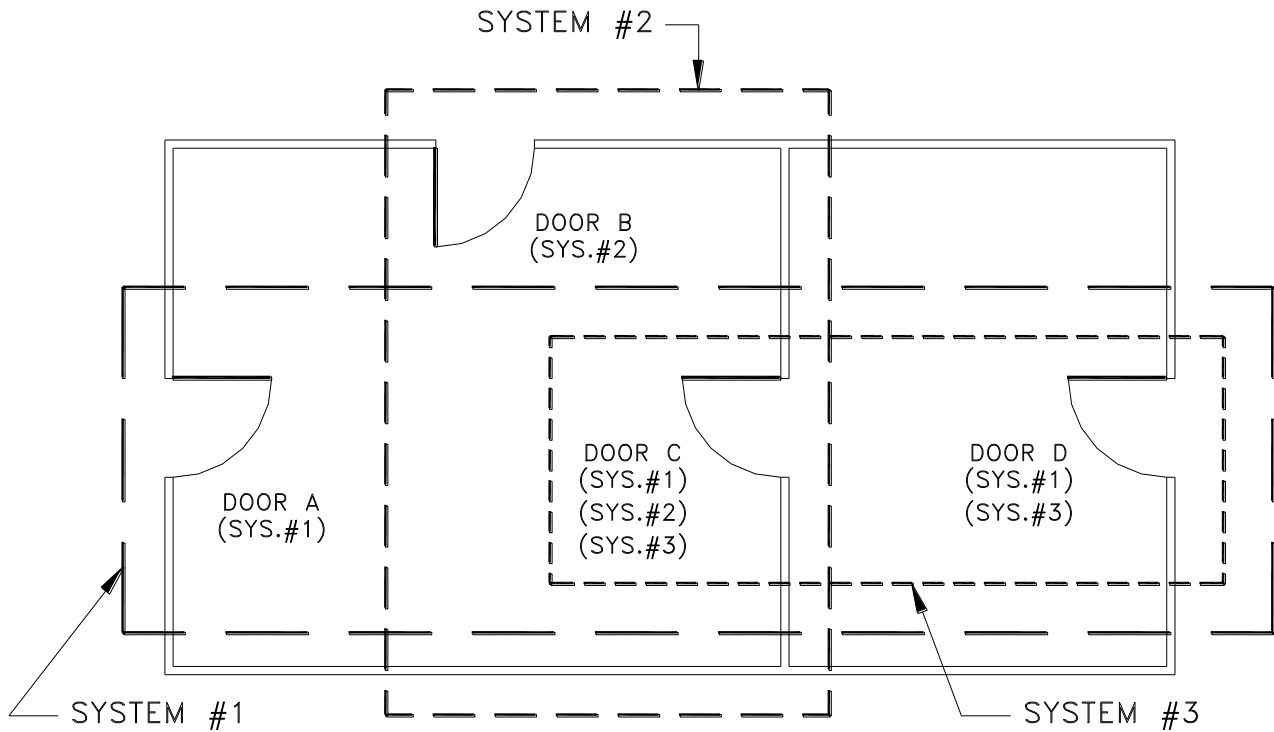
EXAMPLE 3

Inputs/Outputs – Door Interlock Daughter Board

Control Switch

For use on normally locked interlocking doors. The switch contacts must be normally closed for keeping the door locked. Opening the switch contacts will unlock the door. The most commonly used control devices for releasing interlocking doors are card readers and keypads. Occasionally, push-button switches are used. All doors become interlocked when the contacts of this switch remain in the open position.

TOP

DS1

ON

1 2 3 4

S1

NORM
LCKD

TB1

CONTROL SWITCH

8
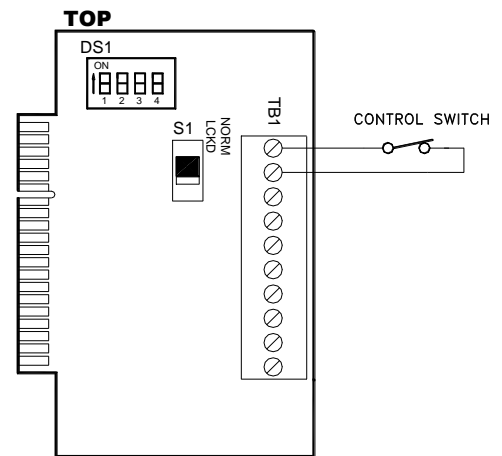
Door Position Switch

Used on both normally unlocked and normally locked interlocking doors. Open switch contacts signal an open door condition thereby locking out all other doors. The figures below show the proper connection to a board programmed for a normally locked door and for a normally unlocked door.

CLOSED LOOP DOOR POSITION SWITCH CONNECTION FOR A NORMALLY LOCKED DOOR

CLOSED LOOP DOOR POSITION SWITCH CONNECTION FOR A NORMALLY UNLOCKED DOOR
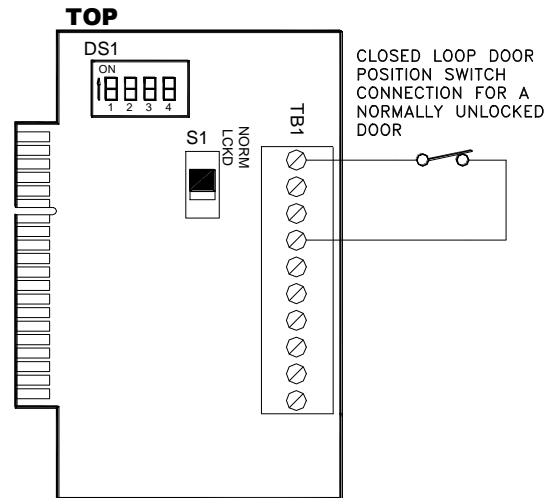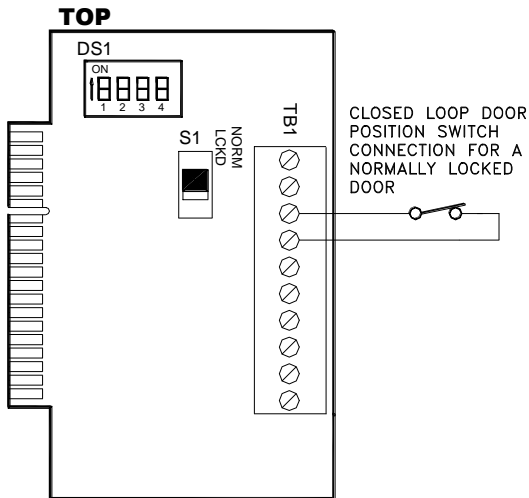
LED Status Indicators
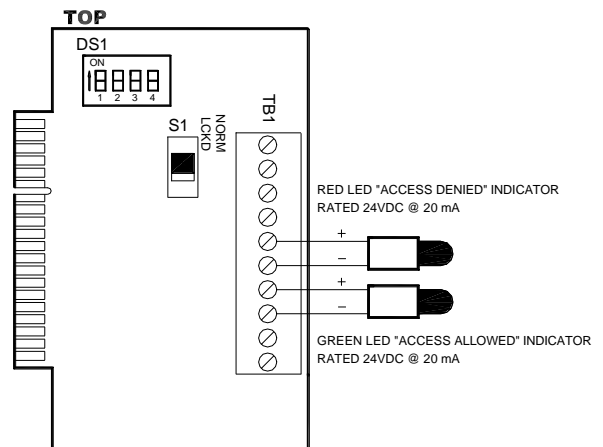
Outputs are provided on each door interlock daughter board for connection to two LED indicators for the purpose of monitoring the status of the interlocking system. A typical application would have a red and green LED indicator located on at least one side of each interlocking door. (It is recommended that LED indicators be located on both sides of each door.)

RED LED "ACCESS DENIED" INDICATOR RATED 24VDC @ 20 mA

GREEN LED "ACCESS ALLOWED" INDICATOR RATED 24VDC @ 20 mA

When all doors within an interlocking system are on standby (all doors closed and electrically locked for normally locked, or closed for normally unlocked), all green LED indicators will be turned on to signify that access is allowed through any one door within the interlocking system. When a door is opened, or is electrically unlocked, all LED indicators toggle from a lighted green to a lighted red indicator status. The change in status informs any person approaching a closed interlocking door that one of the doors associated with the interlock system is currently in use and access is denied. When the door-in-use eventually becomes secure, all status LEDs toggle back from a lighted red to a lighted green "standby" indication.

Electrified Locking Device

The most commonly used locking device
applied to interlocking systems is the
electromagnetic lock which bonds the door
on both sides when energized. Other
typical locking devices used are electrified
mortise and cylindrical locks. In most
cases, these locks are set up to lock the
door on both sides. All locking devices
must be rated 24 volts DC. The maximum
current rating for a locking device is 0.5
amp (500mA) per output. Two
electromagnetic locks, each with a
maximum rating of 0.25 amp (250mA), can
be connected to the output for pair door
applications.

Note: All electrified locking devices used
with the Model 1410 Power Supply must be
set up for Fail Safe function. Fail secure
electrified locking devices cannot be used
with this power supply.
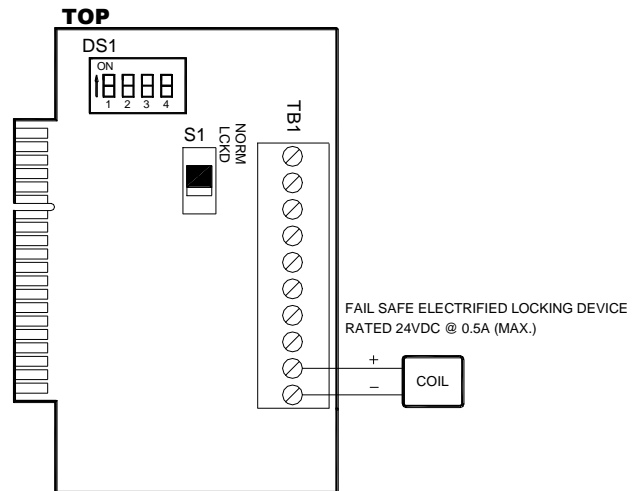
Time Delay Option for Normally Locked Doors

In most interlocking system applications using normally locked doors, the control devices
used for unlocking the doors are provided with a built-in programmable time delay for
keeping the door unlocked just long enough to open the door after becoming electrically
unlocked. Typical of these type devices are card readers and keypads. However, in some
applications the control devices used for unlocking doors lack a built-in time delay, such as
key switches or push-button switches. In cases such as these, the door interlock daughter
board can be programmed to provide an "unlock" time delay of 3 seconds by selecting dip
switch #4 to the "ON" position. (Refer to the wiring diagram attached to the cover plate of
this power supply.)

A "command to unlock" signal occurs every time the control switch contacts open. Unlock
time delay begins when the control switch contacts return to the normally closed position.
During this time delay period, all remaining doors within the same interlock system are
interlocked and will not return to the "standby " mode of operation until the unlock delay has
timed out.

Note: Since the door position switch is internally connected in series with the control switch
on the door interlock daughter board, all other doors will remain interlocked for 3 seconds
after the opened door has closed and electrically locked.

Inputs/Outputs – Mother Board

Auxiliary 24VDC Output

This constant voltage output can be used to power stand-alone control devices, such as keypads, motion detectors, key switches with time delay, etc., or various audio-visual status indicators rated 24 volts DC. The maximum current that can be drawn from this output is 100mA.
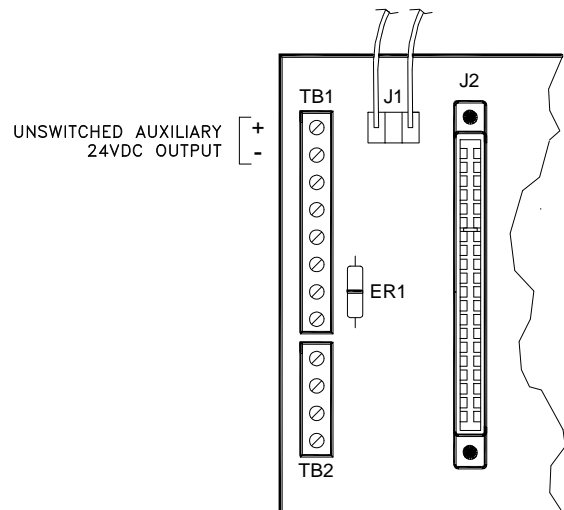
Emergency Release Switch With or Without LED Status Indicator

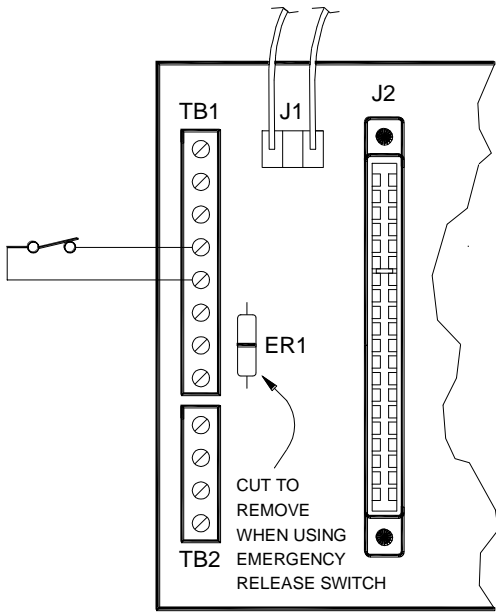Three input terminals are provided on the motherboard for connecting to one or multiple emergency release switches. The switch contacts must be maintain action to allow alternate "Normal Operation/Emergency Override" function. A contact closure, such as what is shown in the figures below, puts the system into normal interlock operation. When the switch contacts open during an emergency situation, DC power is removed from the entire system. As a result, all normally locked doors will immediately unlock, and any normally unlocked door that is currently locked out (due to another door being open) will also unlock immediately. When the system is in the emergency release mode, all doors that are part of the interlock can be opened at the same time for quick and immediate access. A third terminal is provided for connection to an optional LED status indicator. If there are multiple emergency release switches used on an interlocking system, the LED will conveniently inform security as to which emergency release switch out of the group has been activated.

The figures on the next page illustrate four ways in which to wire emergency release switches, either with or without the LED status Indicators.

Not all interlock system applications require emergency release switches. When they are required on a system, the Emergency Release Switch input must be enabled. To accomplish this, the jumper marked "ER1" must be removed by cutting it out with wire cutters. This procedure is illustrated on each of the figures below and also on the wiring diagram attached to the cover plate of the power supply.

Note: The emergency release input affects all interlocking systems that are powered and controlled by a single Model 1410 Power Supply, regardless if there is a single interlocking system or multiple systems involved.

11

TB1 J1 **J2**

ER1

CUT TO
REMOVE
WHEN USING
TB2 EMERGENCY
RELEASE SWITCH

SINGLE EMERGENCY RELEASE SWITCH

TB1 J1 **J2**

1 2 3 4

ER1

CUT TO
REMOVE
WHEN USING
TB2 EMERGENCY
RELEASE SWITCH

MULTIPLE EMERGENCY RELEASE SWITCHES

TB1 J1 **J2**

− +
24VDC LED

SPDT SWITCH

ER1

CUT TO
REMOVE
WHEN USING
TB2 EMERGENCY
RELEASE SWITCH
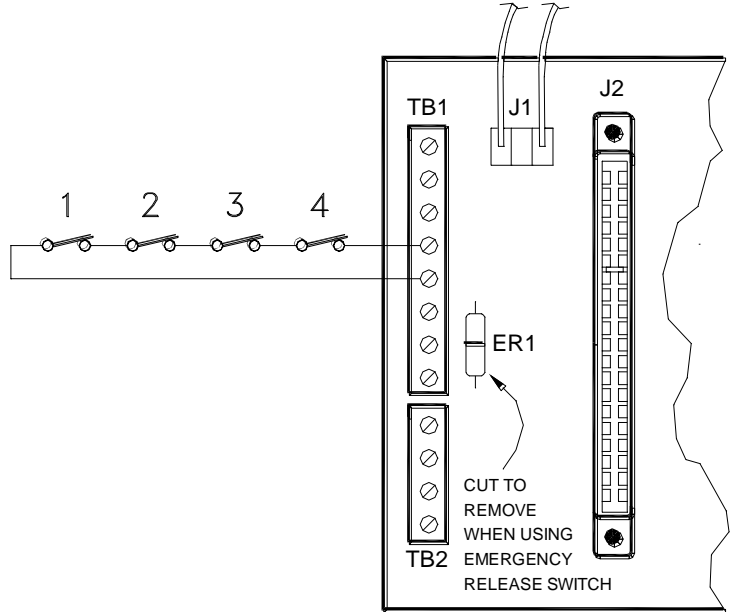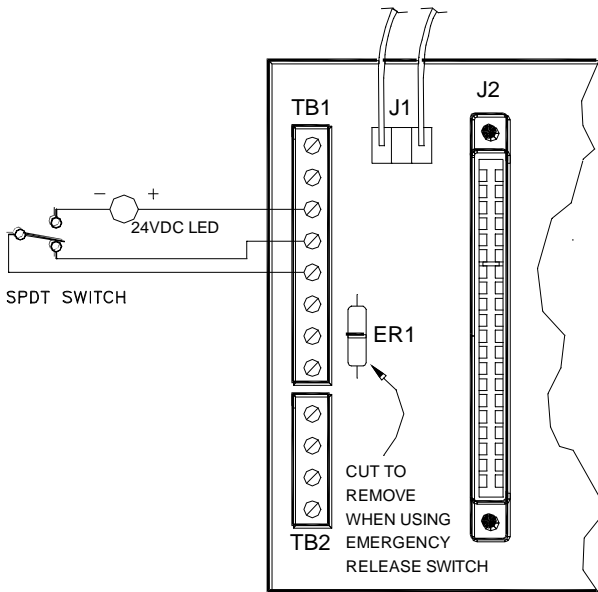
SINGLE EMERGENCY RELEASE SWITCH
WITH LED STATUS INDICATOR

+ + + +

1 2 3 4

TB1 J1 **J2**

ER1

CUT TO
REMOVE
WHEN USING
TB2 EMERGENCY
RELEASE SWITCH
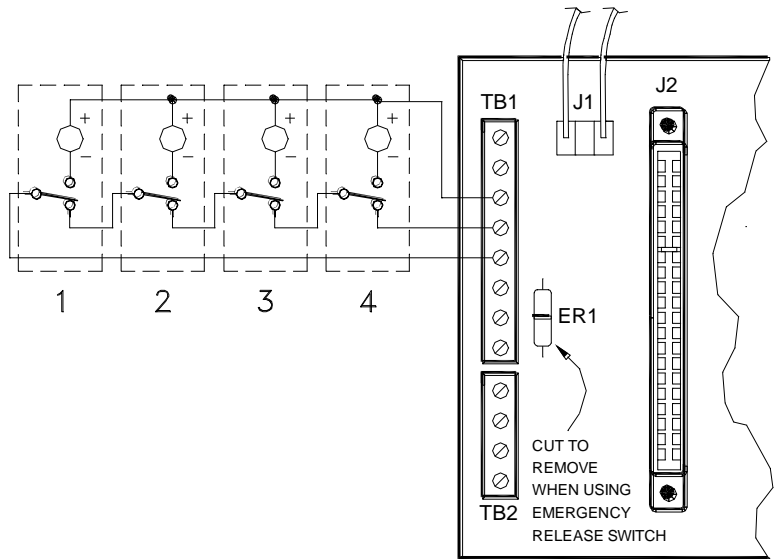
MULTIPLE EMERGENCY RELEASE SWITCHES
WITH LED STATUS INDICATORS

Fire Alarm Interface

Connect normally closed contacts of the fire
alarm relay to the terminals shown on the
right. In most cases, it is mandatory to have
the fire alarm wired in to the interlock
controller since all interlocking doors normally
are locked on both sides. When the contacts
of the fire alarm are opened during an alarm
condition, DC power is removed from the
entire system. All doors will unlock and
remain unlocked until the fire alarm is reset.

Note: If fire alarm interface is not required, it
will be necessary to install a jumper in place of
the normally closed fire alarm contacts.
Without this jumper installed, the interlock
power supply will be disabled.

Interlock Expansion

The Model 1410 Power Supply is provided with the capability of expansion when there
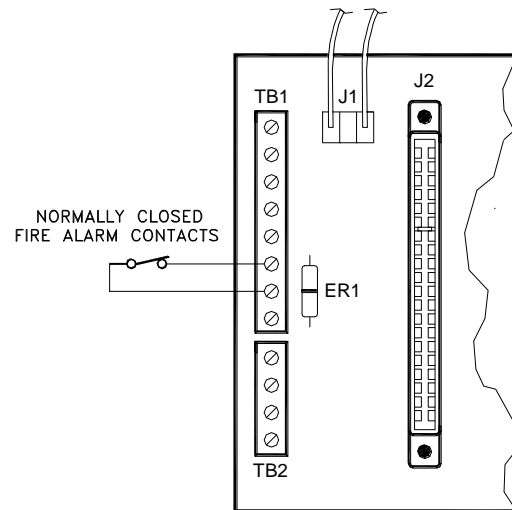comes a need for using more than four doors to an interlocking system, or group of
interlocking systems. Expanding interlocking doors involves running a four conductor
unshielded cable between two or more power supplies and making the appropriate
connections at terminal block TB2 located on the mother board. The expansion cable will
allow up to three separate interlocking systems to operate using more than four doors per
system. Doors can continue to be common to as many as three systems as discussed
earlier in this manual under "Interlocking Doors Common to Multiple Interlocking Systems",
but can be expanded to include a larger number of doors per system.

Using 18 gauge stranded wire per conductor for the four conductor cable, the figures below
show maximum length runs for up to five expanded power supplies.

13
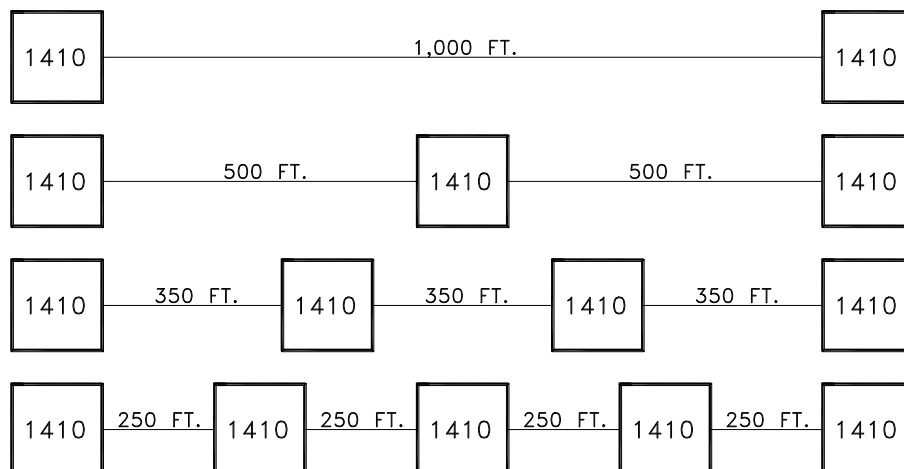
The expansion I/O terminals of each power supply are wired in daisy chain (parallel) fashion between power supplies, as shown below.
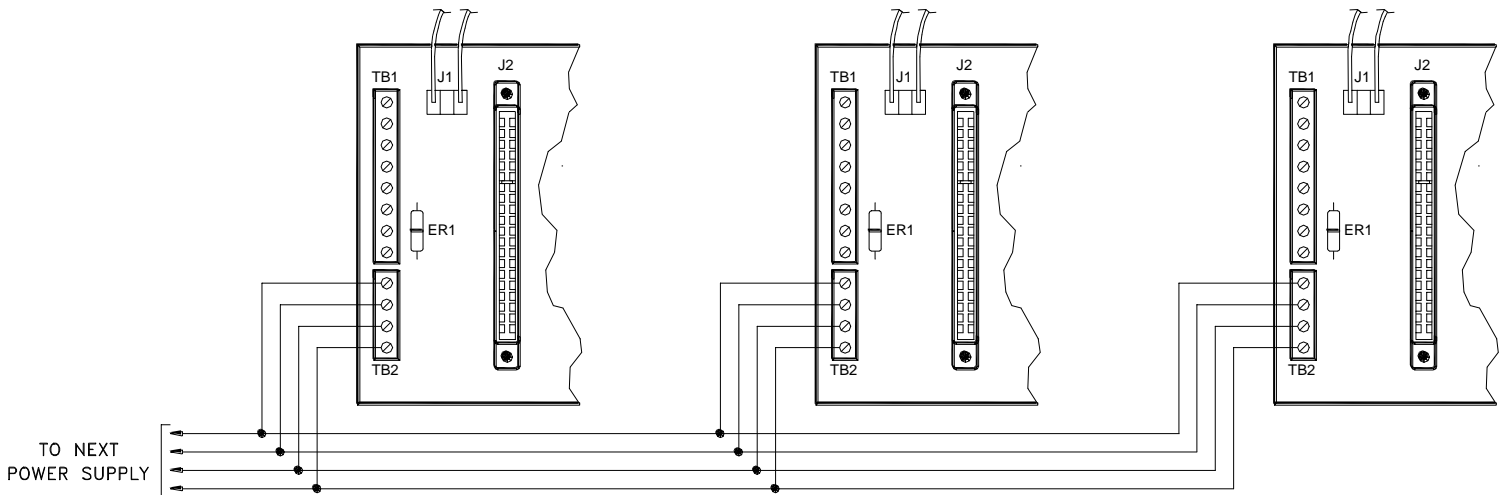
Application Drawings

At the end of this manual can be found an example of a complete set of drawings (riser diagram and point-to-point wire diagrams) showing field wire hookup to groups of interlocking systems involving a total of seven doors. Two Model 1410 power supplies will be required to power and control all of the doors. The scenario for this interlocking system complex is described as follows:

The application consists of three interlocking systems. System #1 includes Doors 101, 101A, 101B, 102A, and 103A. System #2 includes Doors 101B, 102, and 102A. System #3 includes Doors 101B, 103, and 103A. Doors 101A, 101B, 102, 102A, and 103A are normally unlocked. Accessing these doors only requires them to be opened when the interlocking system they belong to is currently on standby. Doors 101 and 103 are normally locked. Each door is controlled by a card reader on one side and a "request to exit" push-button switch on the other side.

All three systems are interlaced with each other as a result of certain doors being common to two or more systems. Doors 101 (System #1), 101A (System #1), 102 (System #2), and 103 (System #3) are unique to their system and are the only doors that are not common to two or more systems. They either affect or are affected by doors which are part of the same system they belong to. Door 102A is common to System #1 and System #2. This means that when Door 102A is opened, all doors that are a part of System #1 and System #2 will be interlocked. Conversely, when any one door from System #1 and/or System #2 is opened (or unlocked and opened), Door 102A will lock. Door 103A is common to System #1 and System #3. Therefore, when Door 103A is opened, all doors that are a part of System #1 and System #3 will be interlocked. Conversely, when any one door from System #1 and/or System #3 is opened (or unlocked and opened), Door 103A will lock.

Door 101B is common to Systems #1, #2, and #3. When Door 101B is opened, all doors that are a part of System #1, System #2, and System #3 will be interlocked. Conversely, when any one door from System #1, System #2, and/or System #3 is opened (or unlocked and opened), Door 101B will lock.

LED status indicators are located on both sides of each interlocking door. It is not always necessary to have status indicators on either side of a door if all interlocking doors can be seen from within the same area. For example, when standing inside the airlock of a two door interlock system, the "open/close" status of each door can normally be easily observed. Therefore, no status indicators are required on the airlock side of each door for monitoring door position. However, when standing in front of one door outside the airlock, status indicators will be required on this side because the position of the other door cannot be observed since it is not in view.

An emergency release switch with an LED status indicator is stationed at Doors 101B, 102A, and 103A. When any one of these switches is activated, all seven doors will unlock if currently locked, and will be prevented from locking when another door is opened. Any combination of two or more doors can be opened at the same time for quick and immediate access. Resetting the activated emergency release switch (identified by the lighted LED status indicator) will return all three systems to normal interlock operation.

The fire alarm will likewise accomplish the same results as the emergency release switch when activated. All three systems will return to normal interlock operation when the fire alarm is reset.

Since all electrified locking devices used with this power supply must function as fail safe, all interlocking doors will unlock in the event of a power failure.

Trouble Shooting Tips

Listed below are some problems that might be encountered during installation, or at any other time, and possible solutions for correcting them.

! CAUTION !

THIS UNIT CONTAINS AREAS OF EXPOSED HIGH VOLTAGE. ALL TROUBLE SHOOTING AND MAINTENANCE SHOULD BE PERFORMED BY A QUALIFIED ELECTRICIAN.

- **The interlocking doors do not lock or cannot be locked, nor do the red or green LED status indicators light up.**
  - Check to see if the LED power indicator L1 on the mother board inside the 1410 power supply is lit. If not, there may be a shorted output; or there may be no power being applied to the mother board from the power supply above.

- o Check for 120VAC across terminals of input to power supply module.
- o If 120VAC is present, disconnect field wires from all used outputs (locking device, LED status indicators) and measure for 24VDC across these terminals. Check to see if power indicator L1 has lighted.
- o If 24VDC is now present and L1 is lit, check for shorts across field wires for each output. If the load is an electrified locking device mounted in the door, check the electric hinge for pinched wires behind each leaf. Also check for shorted wires between the locking device and raceway in the door.
- o If 24VDC is not present across terminals marked "24V"on TB1 of the mother board (with field wires still disconnected from all outputs), and L1 is not lit, disconnect the red and black wire leads connected to the +,- terminals of the output to the power supply module and check for 24VDC at this output. If voltage is now present across the power supply module's output, it can be assumed that there is a short circuit somewhere on either the mother board or any one of the daughter boards and will need to be replaced. (Remove all of the daughter boards and see if L1 lights.) If voltage is still not present across the output to the power supply module, then it can be assumed the power supply module itself is damaged and must be replaced.
- o If power indicator L1 is lit, but there is still no power to the electric locking device and LED status indicator outputs, check to make sure that there is normally closed contacts from the fire alarm wired to the 1410 fire alarm input terminals on the mother board (see subheading "Fire Alarm Interface" under main heading "Inputs/Outputs – Mother Board"). If fire alarm interface is not required for the application, then a jumper must be installed in place of the fire alarm normally closed contacts. If emergency release switches are not used, then confirm that the internal jumper, labeled as "ER1" is installed on the mother board. If emergency release switches are used (jumper ER1 would have to be removed), ensure that there is a sound contact closure across the emergency release input terminals (refer to the subheading "Emergency Release Switch With or Without LED Status Indicator" under the main heading "Inputs/Outputs – Mother Board).

- **An interlocking door containing a card reader, keypad, or other local control device remains unlocked after the 1410 power supply is powered up. However, the same door will lock when another door unlocks or opens.**
  - o The "Normally Locked/Normally Unlocked" selection switch on the door interlock daughter board associated with this door is set to the normally unlocked position. Select the normally locked position.

- **An interlocking door with no local controls becomes locked when the 1410 power supply is powered up, and its associated green LED status indicator lights, signifying a "standby" condition.**
  - The "Normally Locked/Normally Unlocked" selection switch on the door interlock daughter board associated with this door is set to the normally locked position. Select the normally unlocked position.

- **Every time a door programmed for normally unlocked operation closes, there is a three second delay before the system returns to the standby mode (red LED status indicators remain lit for three seconds after the door closes).**
  - Dip switch #4 on the door interlock daughter board is set to the "ON" position for 3-second unlock time delay (for doors programmed for normally locked operation). To remove the delay, set this switch to the off position.

- **A door programmed for normally locked operation, and controlled by a simple push-button or key switch, unlocks when the switch is actuated, but immediately locks as soon as the switch is released. This does not allow enough time to open the door before it locks again.**
  - Dip switch #4 on the door interlock daughter board is set to the off position (3-second unlock time delay disabled). To add the delay, set this switch to the "ON" position.

- **The ACSI Model 1410 Power Supply can handle up to three systems, but what if there is a need for more than three systems?**
  - The three system design was intended to cover "common door" situations, allowing any door to be common to as many as three interlocking systems. However, more interlocking systems can be introduced by adding on more 1410 power supplies, but not linking them (via the four conductor expansion cable) with existing 1410 power supplies that are already controlling a three system interlock complex. For example, another separate grouping of 1410 power supplies can be linked together (if needed) to create System #4, or Systems #4 and #5, or Systems #4, #5, and #6.

- **When the 1410 power supply is powered up, all doors become interlocked instead of going on standby as expected. All red LED status indicators are lighted indicating an unsecure door condition even though all normally unlocked doors are closed, and/or all normally locked doors are closed and electrically locked.**
  - Verify that the door position switch contacts are closed when the door is in the closed position for all normally locked and normally unlocked doors. Also verify that the control switch used on all normally locked doors is normally closed when not actuated.

For trouble shooting assistance, contact ACSI Technical Support: 1-800-753-5558

SPECIFICATIONS:

Input Voltage: 120VAC/240VAC, 50/60Hz
AC Current: 900mA/120VAC, 600mA/240VAC
Output Voltage: 24VDC Filtered, Regulated
Output Current: 2.2A (MAX.)
Output Power: 53W
Protection: Overload, Over Voltage, Short Circuit

ACSI
ARCHITECTURAL
CONTROL SYSTEMS INC.

GROUP 1 INTERLOCK

2-18 AWG
2-18 AWG
2-18 AWG
2-18 AWG
4-18 AWG
4-18 AWG
4-18 AWG
4-18 AWG
4-18 AWG
4-18 AWG
4-18 AWG
4-18 AWG
3-18 AWG
7-18 AWG

10"x10"x4"
PULL BOX

(8)

⚠1

⚠5
⚠4
⚠3

4-18 AWG
2-18 AWG

DOOR 101

DOOR 101A

DOOR 101B
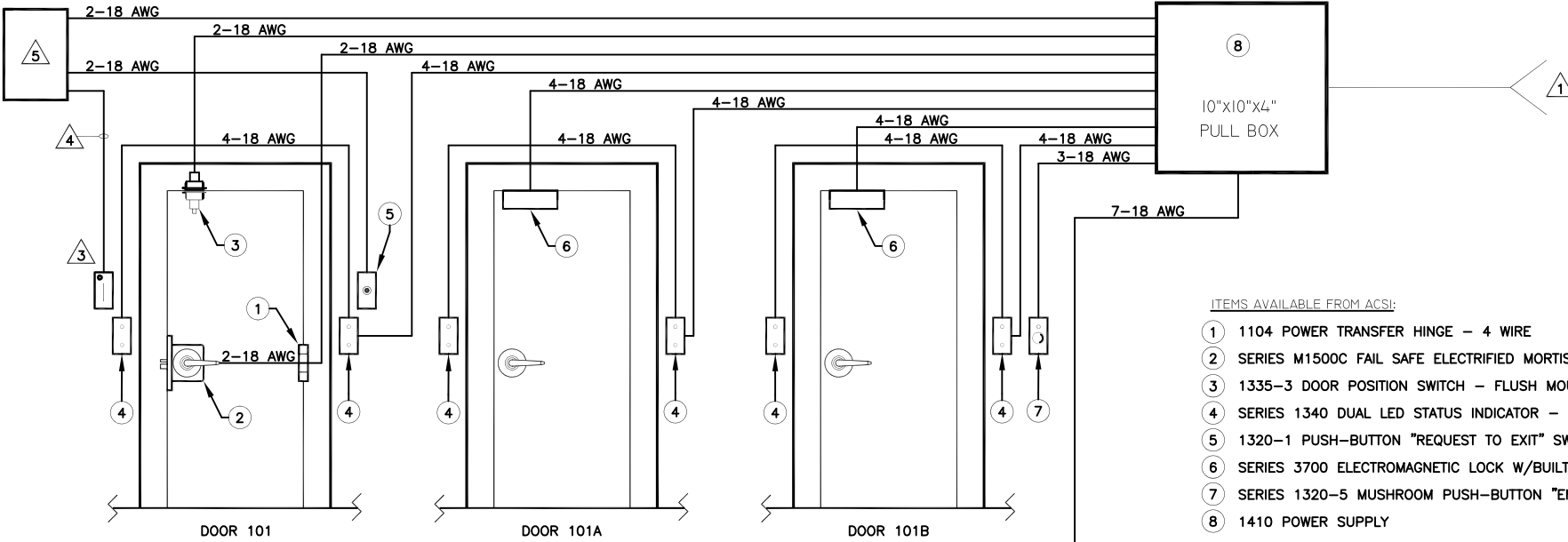
ITEMS AVAILABLE FROM ACSI:

(1) 1104 POWER TRANSFER HINGE – 4 WIRE
(2) SERIES M1500C FAIL SAFE ELECTRIFIED MORTISE LOCK – 24VDC
(3) 1335-3 DOOR POSITION SWITCH – FLUSH MOUNT
(4) SERIES 1340 DUAL LED STATUS INDICATOR – RED/GREEN
(5) 1320-1 PUSH-BUTTON "REQUEST TO EXIT" SWITCH – N.O., MOM.
(6) SERIES 3700 ELECTROMAGNETIC LOCK W/BUILT-IN DOOR POSITION SWITCH – 24VDC
(7) SERIES 1320-5 MUSHROOM PUSH-BUTTON "EMERGENCY RELEASE" SWITCH – MTN.
(8) 1410 POWER SUPPLY

⚠2 2-18 AWG

10"x10"x4"
PULL BOX

(8)

⚠1

GROUP 2 INTERLOCK

2-18 AWG
2-18 AWG
2-18 AWG
4-18 AWG
4-18 AWG
4-18 AWG
4-18 AWG
3-18 AWG
4-18 AWG
4-18 AWG
3-18 AWG
4-18 AWG
4-18 AWG
4-18 AWG
4-18 AWG
4-18 AWG

⚠5
⚠4
⚠3

4-18 AWG
2-18 AWG
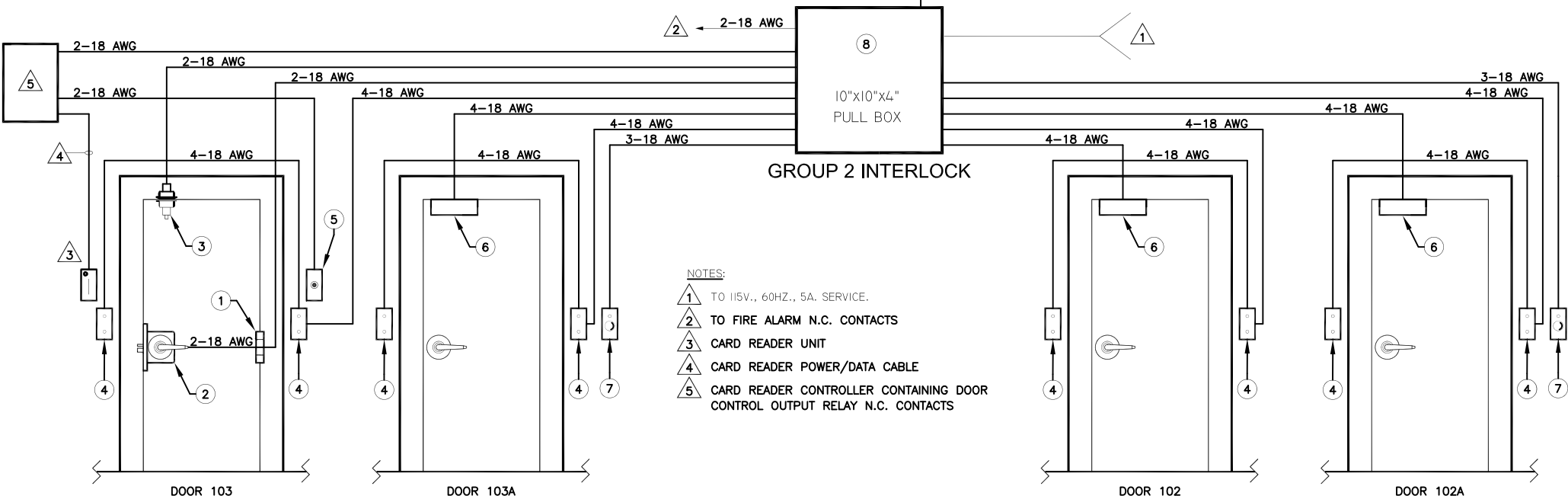
NOTES:

⚠1 TO 115V., 60HZ., 5A. SERVICE.
⚠2 TO FIRE ALARM N.C. CONTACTS
⚠3 CARD READER UNIT
⚠4 CARD READER POWER/DATA CABLE
⚠5 CARD READER CONTROLLER CONTAINING DOOR CONTROL OUTPUT RELAY N.C. CONTACTS

DOOR 103

DOOR 103A

DOOR 102

DOOR 102A

SYSTEM RISER

SWITCH SET FOR "NORMALLY LOCKED" MODE

TOP

DS1

ON
1 2 3 4

⚠2

S1 NORM LCKD

TB1

CARD READER CONTROLLER CONTROL OUTPUT RELAY N.C. CONTACTS ACTIVATED BY CARD READER UNIT OR 1320-1 "REQUEST TO EXIT" PUSH-BUTTON SW.

WHITE
BLACK
RED
NOT USED

⚠1 1335-3 DOOR POSITION SWITCH CLOSED LOOP SECURE CONTACTS

GREEN CABLE TIE
RED CABLE TIE

RED
BLACK
RED
BLACK

RED

SERIES 1340 DUAL LED STATUS INDICATORS (ENTRY SIDE)

GREEN

GREEN CABLE TIE
RED CABLE TIE

RED
BLACK
RED
BLACK

RED

SERIES 1340 DUAL LED STATUS INDICATORS (EXIT SIDE)

GREEN

WHITE
WHITE
COIL

SERIES M1500C FAIL SAFE ELECTRIFIED MORTISE LOCK – 24VDC

SWITCH #1 SET TO "ON" FOR ENABLING SYSTEM #1

DOOR 101
OF
GROUP 1 INTERLOCK

NOTES:

⚠1 DOOR POSITION SWITCH CONTACTS SHOWN WITH DOOR IN CLOSED POSITION.

⚠2 DOTS SHOWN ON DIP SWITCH DS1 INDICATE POSITION OF SWITCHES.

3.) —•— DENOTES A FIELD WIRE CONNECTION.

SYSTEM POINT-TO-POINT - FIG. 1

SWITCH SET FOR
"NORMALLY UNLOCKED" MODE

TOP

DS1

ON
1 2 3 4

S1 NORM LCKD

TB1

SERIES 3700 ELECTROMAGNETIC LOCK — 24VDC

WHITE
BLACK
NOT USED RED

BUILT-IN DOOR
POSITION SWITCH CLOSED
LOOP SECURE CONTACTS

COIL

RED
RED

GREEN CABLE TIE
RED CABLE TIE

RED
BLACK
RED
BLACK

RED
GREEN

SERIES 1340
DUAL LED STATUS
INDICATORS
(ENTRY SIDE)

GREEN CABLE TIE
RED CABLE TIE

RED
BLACK
RED
BLACK

RED
GREEN

SERIES 1340
DUAL LED STATUS
INDICATORS
(EXIT SIDE)

DOOR 101A
OF
GROUP 1 INTERLOCK

SWITCH #1 SET TO "ON"
FOR ENABLING SYSTEM #1

NOTES:

1. DOOR POSITION SWITCH CONTACTS SHOWN WITH DOOR IN CLOSED POSITION.

2. DOTS SHOWN ON DIP SWITCH DS1 INDICATE POSITION OF SWITCHES.

3.) —•— DENOTES A FIELD WIRE CONNECTION.

SYSTEM POINT-TO-POINT - FIG. 2

SWITCH SET FOR
"NORMALLY UNLOCKED" MODE

TOP

DS1

ON

1 2 3 4

/2\

S1

NORM
LCKD

TB1

SERIES 3700 ELECTROMAGNETIC LOCK — 24VDC

WHITE
BLACK
NOT
USED   RED

BUILT-IN DOOR
POSITION SWITCH CLOSED
LOOP SECURE CONTACTS

/1\

COIL

RED
RED

GREEN CABLE TIE
RED CABLE TIE

RED
BLACK
RED
BLACK

RED   SERIES 1340
DUAL LED STATUS
INDICATORS
GREEN (ENTRY SIDE)

GREEN CABLE TIE
RED CABLE TIE

RED
BLACK
RED
BLACK

RED   SERIES 1340
DUAL LED STATUS
INDICATORS
GREEN (EXIT SIDE)

DOOR 101B
OF
GROUP 1 INTERLOCK

SWITCH #1, #2, AND #3 SET TO "ON"
FOR ENABLING SYSTEMS #1, #2, AND #3

NOTES:

/1\ DOOR POSITION SWITCH CONTACTS SHOWN WITH DOOR IN CLOSED POSITION.

/2\ DOTS SHOWN ON DIP SWITCH DS1 INDICATE POSITION OF SWITCHES.

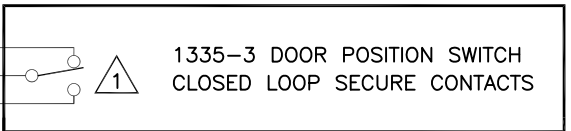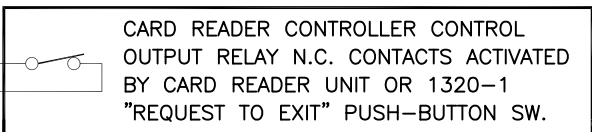3.) •——• DENOTES A FIELD WIRE CONNECTION.

SYSTEM POINT-TO-POINT - FIG. 3
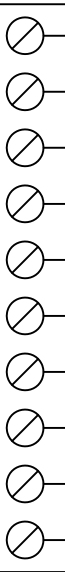
SWITCH SET FOR
"NORMALLY UNLOCKED" MODE

TOP

DS1

ON

△2

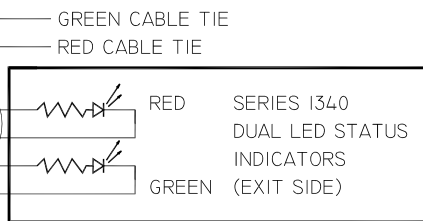1 2 3 4

S1   NORM   LCKD

TB1

SERIES 3700 ELECTROMAGNETIC LOCK — 24VDC

WHITE
BLACK
NOT
USED   RED

BUILT—IN DOOR
POSITION SWITCH CLOSED
LOOP SECURE CONTACTS

△1

COIL

RED
RED

GREEN CABLE TIE
RED CABLE TIE

RED

RED
BLACK
RED
BLACK

RED   SERIES 1340
DUAL LED STATUS
INDICATORS
GREEN   (ENTRY SIDE)

GREEN CABLE TIE
RED CABLE TIE

RED
BLACK
RED
BLACK

RED   SERIES 1340
DUAL LED STATUS
INDICATORS
GREEN   (EXIT SIDE)

SWITCH #2 SET TO "ON"
FOR ENABLING SYSTEM #2

DOOR 102
OF
GROUP 2 INTERLOCK

NOTES:

△1 DOOR POSITION SWITCH CONTACTS SHOWN WITH DOOR IN CLOSED POSITION.

△2 DOTS SHOWN ON DIP SWITCH DS1 INDICATE POSITION OF SWITCHES.

3.) ——•—— DENOTES A FIELD WIRE CONNECTION.
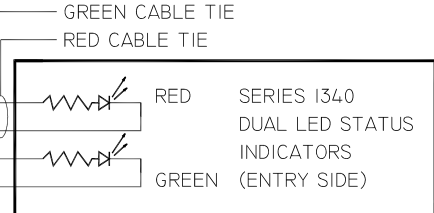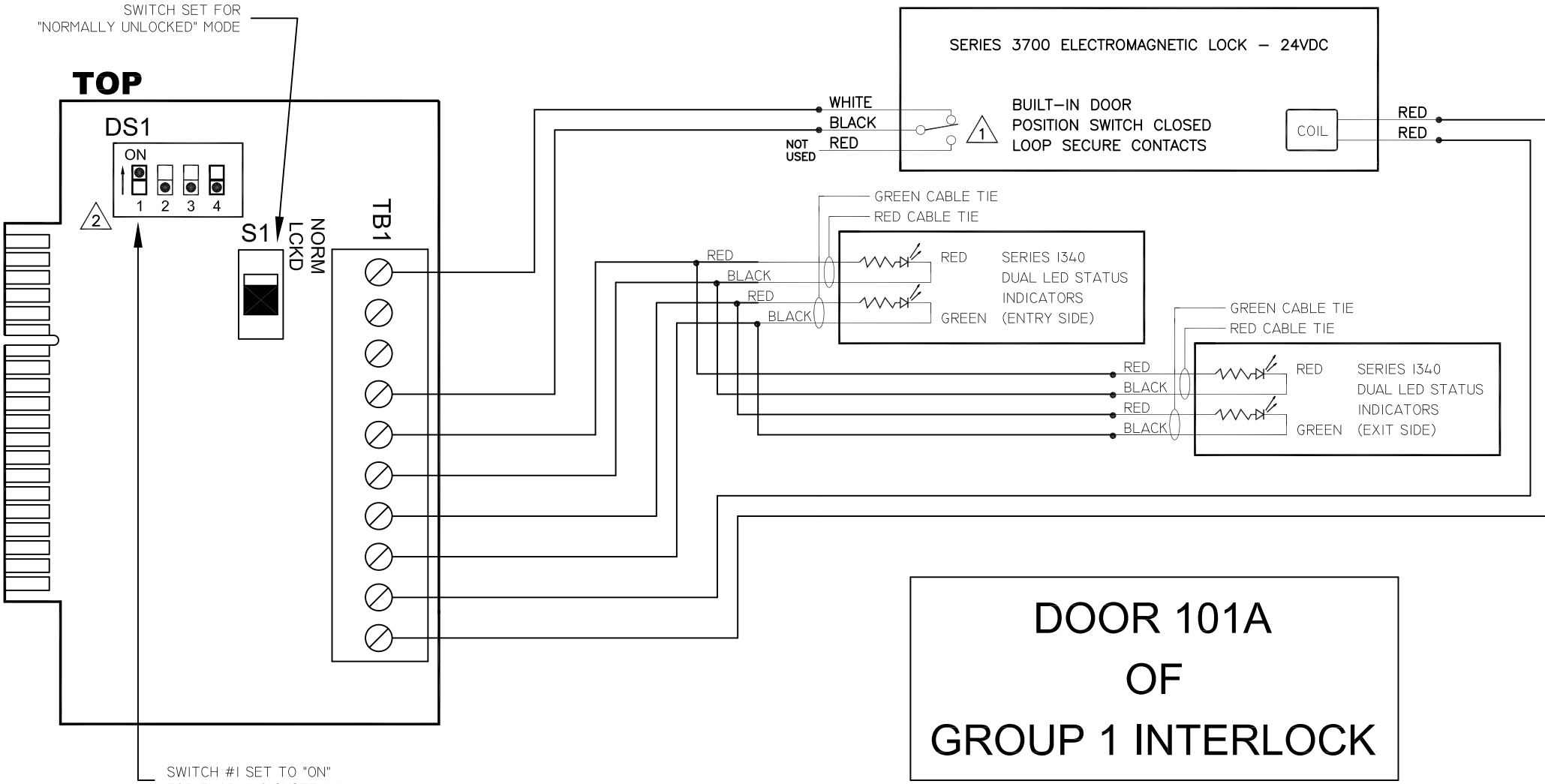
SYSTEM POINT-TO-POINT - FIG. 4

SWITCH SET FOR "NORMALLY UNLOCKED" MODE

TOP

DS1

ON

2

1 2 3 4

S1

NORM / LCKD

TB1

SERIES 3700 ELECTROMAGNETIC LOCK — 24VDC

WHITE
BLACK
NOT USED RED

BUILT-IN DOOR
POSITION SWITCH CLOSED
LOOP SECURE CONTACTS

1

COIL

RED
RED

GREEN CABLE TIE
RED CABLE TIE

RED
BLACK
RED
BLACK

RED   SERIES 1340
DUAL LED STATUS
INDICATORS
GREEN (ENTRY SIDE)

GREEN CABLE TIE
RED CABLE TIE

RED
BLACK
RED
BLACK

RED   SERIES 1340
DUAL LED STATUS
INDICATORS
GREEN (EXIT SIDE)

DOOR 102A
OF
GROUP 2 INTERLOCK

SWITCH #1 AND #2 SET TO "ON"
FOR ENABLING SYSTEMS #1 AND #2

NOTES:

1. DOOR POSITION SWITCH CONTACTS SHOWN WITH DOOR IN CLOSED POSITION.

2. DOTS SHOWN ON DIP SWITCH DS1 INDICATE POSITION OF SWITCHES.
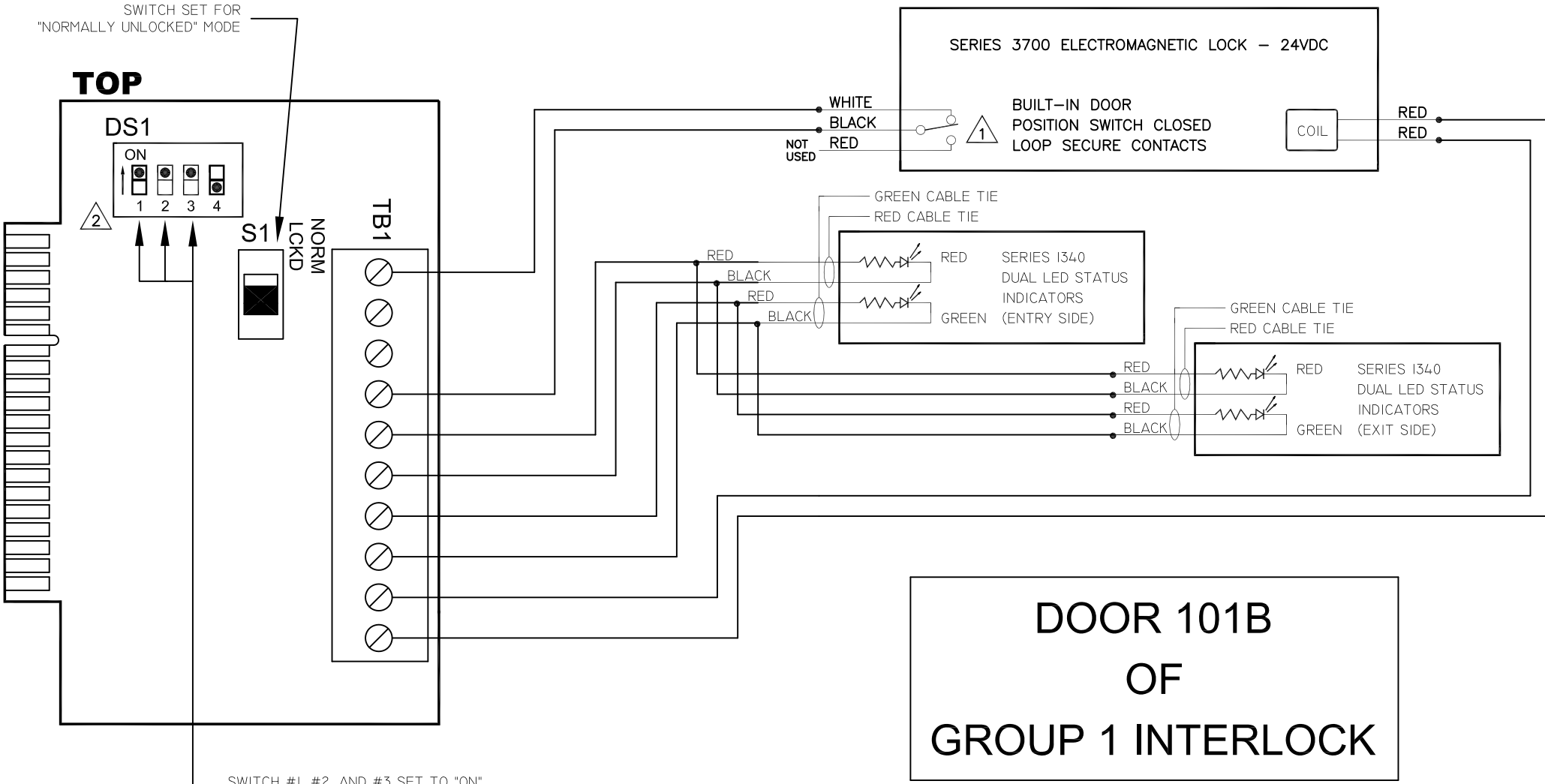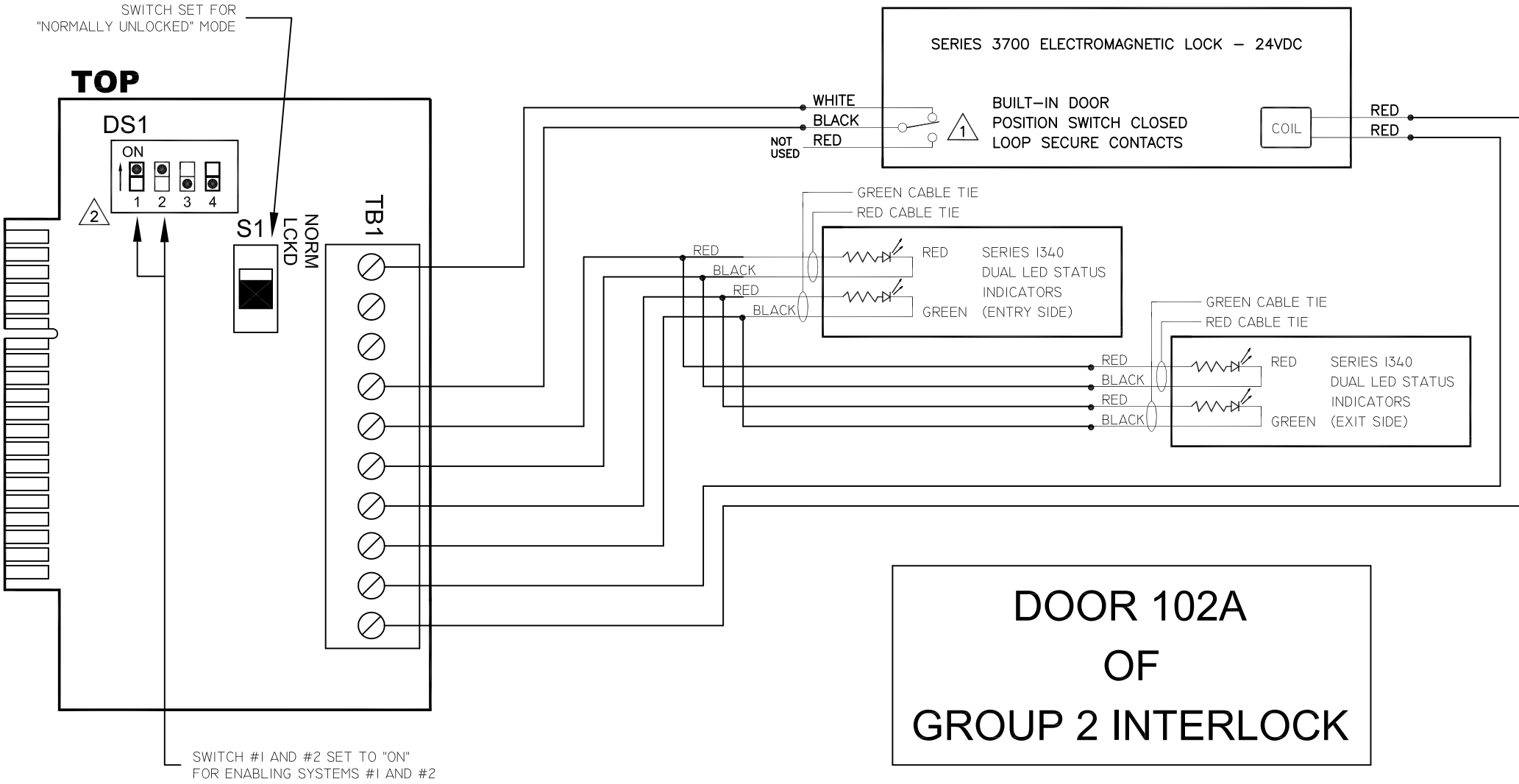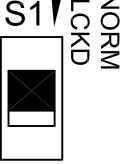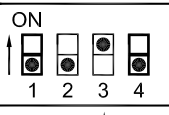
3.) ——•—— DENOTES A FIELD WIRE CONNECTION.

SYSTEM POINT-TO-POINT - FIG. 5

SWITCH SET FOR
"NORMALLY LOCKED" MODE

TOP

DS1

ON

1 2 3 4

S1

NORM
LCKD

TB1

SWITCH #3 SET TO "ON"
FOR ENABLING SYSTEM #3

CARD READER CONTROLLER CONTROL
OUTPUT RELAY N.C. CONTACTS ACTIVATED
BY CARD READER UNIT OR 1320-1
"REQUEST TO EXIT" PUSH-BUTTON SW.

WHITE
BLACK
NOT USED RED

1335-3 DOOR POSITION SWITCH
CLOSED LOOP SECURE CONTACTS

GREEN CABLE TIE
RED CABLE TIE

RED
BLACK
RED
BLACK

RED SERIES 1340
DUAL LED STATUS
INDICATORS
GREEN (ENTRY SIDE)

GREEN CABLE TIE
RED CABLE TIE

RED
BLACK
RED
BLACK

RED SERIES 1340
DUAL LED STATUS
INDICATORS
GREEN (EXIT SIDE)

WHITE
WHITE

COIL SERIES M1500C FAIL SAFE
ELECTRIFIED MORTISE LOCK — 24VDC

DOOR 103
OF
GROUP 2 INTERLOCK

SYSTEM POINT-TO-POINT - FIG. 6

SWITCH SET FOR
"NORMALLY UNLOCKED" MODE

TOP

DS1

ON

⚠2 1 2 3 4

S1 NORM LCKD

TB1

SERIES 3700 ELECTROMAGNETIC LOCK — 24VDC

WHITE
BLACK ⚠1 BUILT-IN DOOR
NOT RED POSITION SWITCH CLOSED
USED LOOP SECURE CONTACTS

COIL RED
RED

GREEN CABLE TIE
RED CABLE TIE

RED RED SERIES 1340
BLACK DUAL LED STATUS
RED INDICATORS
BLACK GREEN (ENTRY SIDE)

GREEN CABLE TIE
RED CABLE TIE

RED RED SERIES 1340
BLACK DUAL LED STATUS
RED INDICATORS
BLACK GREEN (EXIT SIDE)

SWITCH #1 AND #3 SET TO "ON"
FOR ENABLING SYSTEMS #1 AND #3

DOOR 103A
OF
GROUP 2 INTERLOCK

NOTES:

⚠1 DOOR POSITION SWITCH CONTACTS SHOWN WITH DOOR IN CLOSED POSITION.

⚠2 DOTS SHOWN ON DIP SWITCH DS1 INDICATE POSITION OF SWITCHES.

3.) ●—● DENOTES A FIELD WIRE CONNECTION.

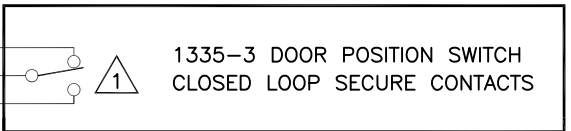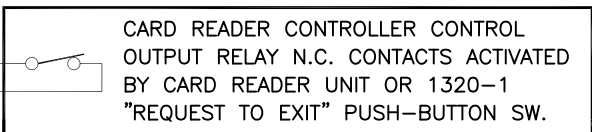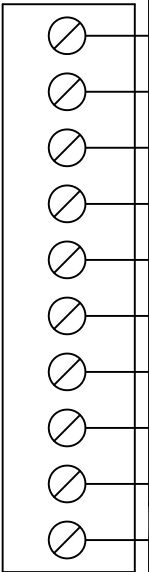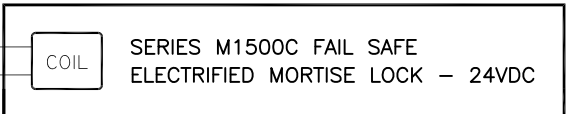**SYSTEM POINT-TO-POINT - FIG. 7**

GROUP 1 INTERLOCK

GROUP 2 INTERLOCK

AT DOOR 102A

RED
WHITE
BLACK

SERIES I320-5
MTN. ACTION
"EMERGENCY RELEASE"
MUSHROOM PB SWITCH

⚠1

AT DOOR 103A

RED
WHITE
BLACK

SERIES I320-5
MTN. ACTION
"EMERGENCY RELEASE"
MUSHROOM PB SWITCH

⚠1

N.C. FIRE ALARM

AT DOOR 101B

RED
WHITE
BLACK

SERIES I320-5
MTN. ACTION
"EMERGENCY RELEASE"
MUSHROOM PB SWITCH

⚠1

TB1
J1
J2

ER1

DO NOT
CUT THIS
JUMPER

TB2

1410 POWER SUPPLY

TB1
J1
J2

ER1

CUT TO
REMOVE
THIS JUMPER
FOR
EMERGENCY RELEASE

TB2
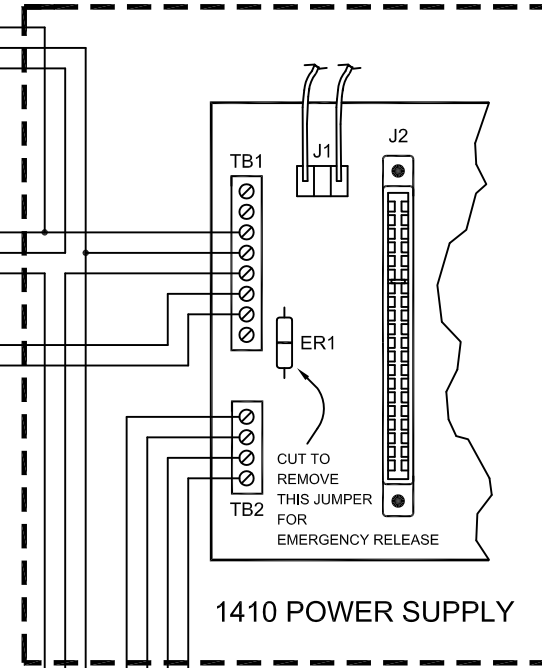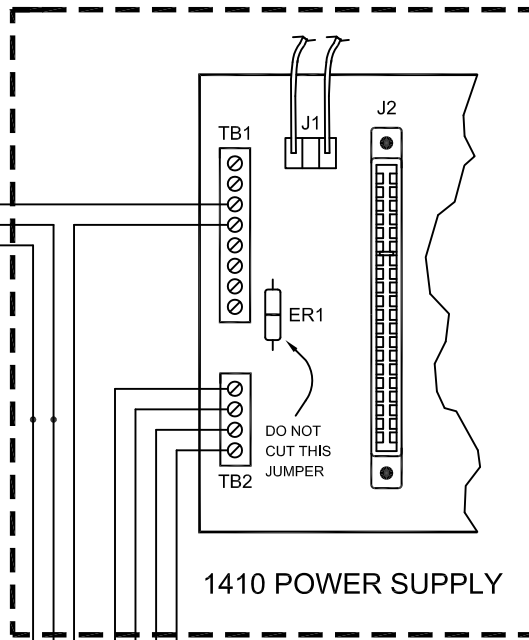
1410 POWER SUPPLY

WIRE CONNECTION FOR
EMERGENCY RELEASE, FIRE ALARM,
AND INTERLOCK I/O EXPANSION

NOTES:

⚠1 EMERGENCY RELEASE CONTACTS ARE POSITIONED
AS SHOWN WHEN NOT ACTIVATED.

2.) ●—● DENOTES A FIELD WIRE CONNECTION.

SYSTEM POINT-TO-POINT - FIG. 8

MODEL 1410 POWER SUPPLY

ACCESS CONTROL POWER SUPPLY
CLASS 2 OUTPUTS

SECURITY
UL
LISTED

EQUIPMENT
4M73

MFG. DATE:

SPECIFICATIONS:

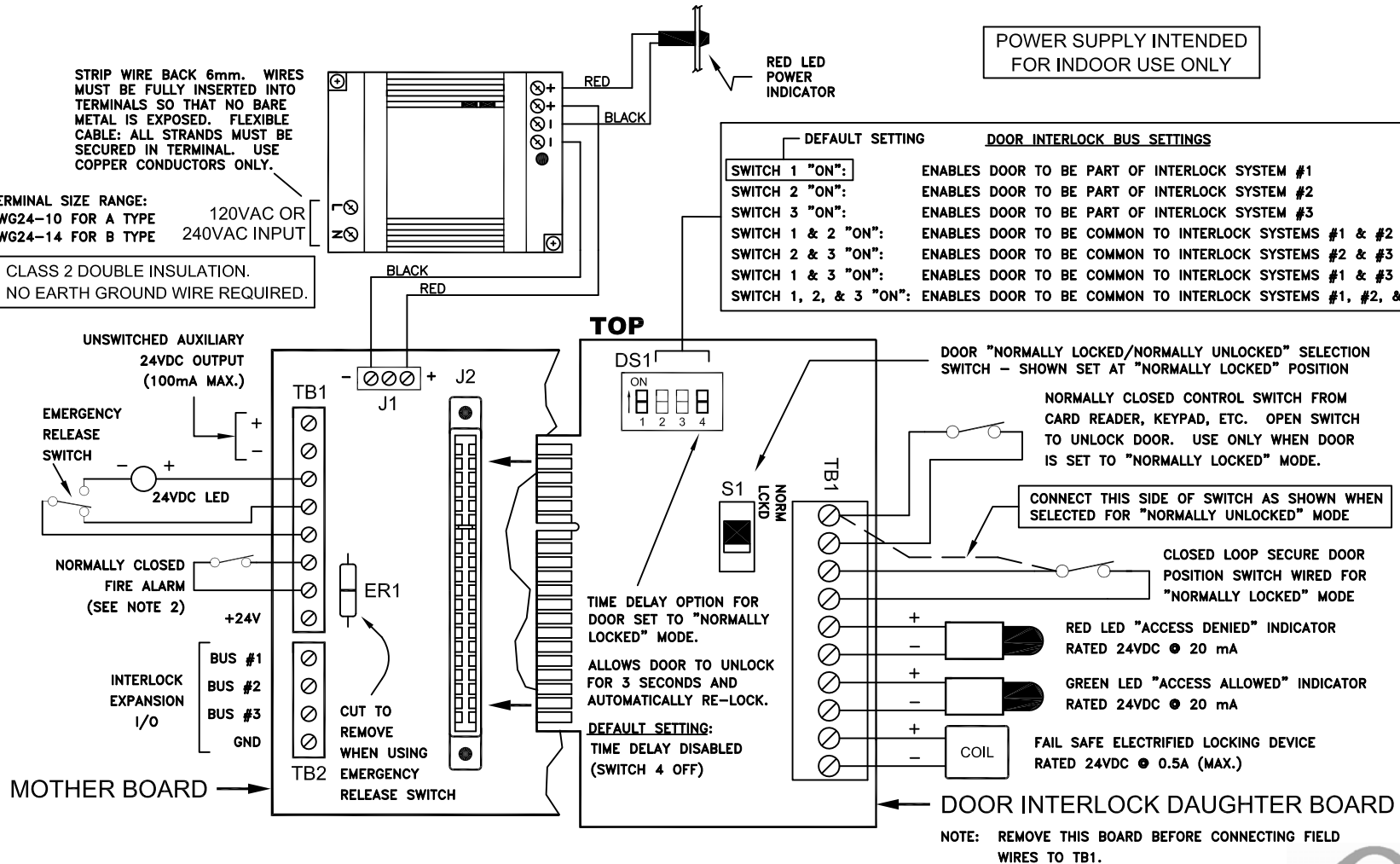|	
INPUT VOLTAGE:	120VAC/240VAC, 50/60Hz
AC CURRENT:	900mA/120VAC, 600mA/240VAC
OUTPUT VOLTAGE:	24VDC FILTERED, REGULATED
OUTPUT CURRENT:	2.2A
OUTPUT POWER:	53W
PROTECTION:	OVERLOAD, OVER VOLTAGE, SHORT CIRCUIT

USE INSTALLATION
INSTRUCTIONS
II - 1400-3

POWER SUPPLY INTENDED
FOR INDOOR USE ONLY

STRIP WIRE BACK 6mm. WIRES
MUST BE FULLY INSERTED INTO
TERMINALS SO THAT NO BARE
METAL IS EXPOSED. FLEXIBLE
CABLE: ALL STRANDS MUST BE
SECURED IN TERMINAL. USE
COPPER CONDUCTORS ONLY.

TERMINAL SIZE RANGE:
AWG24-10 FOR A TYPE
AWG24-14 FOR B TYPE

120VAC OR
240VAC INPUT

CLASS 2 DOUBLE INSULATION.
NO EARTH GROUND WIRE REQUIRED.

RED
BLACK
RED LED
POWER
INDICATOR

BLACK
RED

DOOR INTERLOCK BUS SETTINGS

DEFAULT SETTING

SWITCH 1 "ON":	ENABLES DOOR TO BE PART OF INTERLOCK SYSTEM #1
SWITCH 2 "ON":	ENABLES DOOR TO BE PART OF INTERLOCK SYSTEM #2
SWITCH 3 "ON":	ENABLES DOOR TO BE PART OF INTERLOCK SYSTEM #3
SWITCH 1 & 2 "ON":	ENABLES DOOR TO BE COMMON TO INTERLOCK SYSTEMS #1 & #2
SWITCH 2 & 3 "ON":	ENABLES DOOR TO BE COMMON TO INTERLOCK SYSTEMS #2 & #3
SWITCH 1 & 3 "ON":	ENABLES DOOR TO BE COMMON TO INTERLOCK SYSTEMS #1 & #3
SWITCH 1, 2, & 3 "ON":	ENABLES DOOR TO BE COMMON TO INTERLOCK SYSTEMS #1, #2, & #3

TOP

DS1

UNSWITCHED AUXILIARY
24VDC OUTPUT
(100mA MAX.)

EMERGENCY
RELEASE
SWITCH

24VDC LED

NORMALLY CLOSED
FIRE ALARM
(SEE NOTE 2)

TB1

J1

J2

+24V

INTERLOCK
EXPANSION
I/O

BUS #1
BUS #2
BUS #3
GND

ER1

CUT TO
REMOVE
WHEN USING
EMERGENCY
RELEASE SWITCH

TB2

MOTHER BOARD →

S1

NORM
LCKD

TIME DELAY OPTION FOR
DOOR SET TO "NORMALLY
LOCKED" MODE.

ALLOWS DOOR TO UNLOCK
FOR 3 SECONDS AND
AUTOMATICALLY RE-LOCK.

DEFAULT SETTING:
TIME DELAY DISABLED
(SWITCH 4 OFF)

DOOR "NORMALLY LOCKED/NORMALLY UNLOCKED" SELECTION
SWITCH - SHOWN SET AT "NORMALLY LOCKED" POSITION

NORMALLY CLOSED CONTROL SWITCH FROM
CARD READER, KEYPAD, ETC. OPEN SWITCH
TO UNLOCK DOOR. USE ONLY WHEN DOOR
IS SET TO "NORMALLY LOCKED" MODE.

TB1

CONNECT THIS SIDE OF SWITCH AS SHOWN WHEN
SELECTED FOR "NORMALLY UNLOCKED" MODE

CLOSED LOOP SECURE DOOR
POSITION SWITCH WIRED FOR
"NORMALLY LOCKED" MODE

RED LED "ACCESS DENIED" INDICATOR
RATED 24VDC @ 20 mA

GREEN LED "ACCESS ALLOWED" INDICATOR
RATED 24VDC @ 20 mA

COIL

FAIL SAFE ELECTRIFIED LOCKING DEVICE
RATED 24VDC @ 0.5A (MAX.)

← DOOR INTERLOCK DAUGHTER BOARD

NOTE: REMOVE THIS BOARD BEFORE CONNECTING FIELD
WIRES TO TB1.

NOTE 1: THE SUM OF ALL OUTPUTS CANNOT EXCEED 2.2 AMPS.
NOTE 2: DISCONNECT THE FIRE ALARM WHEN INSERTING OR REMOVING
DAUGHTER BOARDS. DISCONNECTING THE FIRE ALARM INPUT
REMOVES POWER FROM CARD EDGE CONNECTORS J2 - J5
FOR SAFE INSTALLATION OR REPLACEMENT OF DAUGHTER BOARDS.

FOR TROUBLE SHOOTING ASSISTANCE,
CONTACT ACSI TECHNICAL SUPPORT:
1-800-753-5558

REV. 06/15

ACSI
ARCHITECTURAL
CONTROL SYSTEMS INC.