

MC521 PRO CONTROL BOX SWING AND BIFOLD DOORS Installation and Operation Manual

Stanley Part Number 204090

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Table of Contents

General Description	2
Intended Use	2
Applicability	2
Precautions.....	2
Features and Functions	3
Wiring Instructions	4
Evaluate Power Requirements	4
Connecting Main Power Wiring	4
Connecting Breakout Status Signal Wiring (Magic-Swing Operators)	4
Connecting Breakout Status Signal Wiring (Magic-Force Operators).....	6
Wiring the Operator Switch Module (Magic-Force Operators).....	7
Wiring the Operator for Required Handling (Magic-Force Operators).....	8
Wiring the "On/Off/Hold Open" Switch and Power Switch	8
Wiring the Door Activation or Safety Device.....	8
Wiring Sentrex™	9
Wiring Bodyguard	9
Wiring Superscan.....	9
Wiring Holding Beam.....	9
Tune-In Instructions	10
Initial Tune-In Settings.....	10
Tuning In the MC521 PRO Controller Using a "Handheld Device".....	10
Tuning in the MC521 PRO Using the Controller Pushbuttons.....	13
Index Tables	14
Final Tune-In Adjustments	18
Spare Parts List	19
Attachments	20
Attachment 1: Breakout Status Wiring for Magic Swing Operators	20
Attachment 2: Magic-Force Wiring Diagram.....	21
Attachment 3: Magic-Force Wiring Diagram.....	22
Attachment 4: Magic-Swing Wiring Diagram	23
Attachment 5: MC521 PRO Terminal Block Connections	24
Attachment 6: MC521 PRO Controls and Indicators.....	25
Attachment 7: ANSI/BHMA and UL Compliance Requirements.....	27
Attachment 8: Hand held Device Troubleshooting Aid.....	29
Attachment 9: Recommended Values	30
Attachment 10: MC521 Pro Controller Fine Tuning.....	36

1 GENERAL DESCRIPTION

Intended Use

This manual provides abbreviated descriptive information, wiring instructions, and tune-in instructions for the MC521 PRO controller used with Magic-Swing™, Magic-Force™, and Bifold operators. The manual is intended as a quick-reference guide. Attachment 6 illustrates the MC521 PRO controller controls and indicators.

Applicability

This manual is applicable on MC521 PRO control box used with Magic-Swing™, Magic-Force™, and Bifold operators.

Precautions

The Magic-Touch time delay must be greater than 5 seconds to ensure compliance with ANSI A156.19 or most current ANSI/BHMA standards, "American National Standard for Power Assist and Low Energy Power Operated Doors," specifications.

All ANSI/BHMA and UL Requirements in Attachment 7 must be met before the door is put into operation.

Features and Functions

Magic-Touch™: A feature that allows the door to be actuated by a slight manual movement of the door-without the need for an approach sensor. The MC521 PRO control box controls the Magic-Touch hold-open time delay. Magic-Touch can be used with press plates or a radio control system, providing the system with two separate time delays. Magic-Touch is not recommended for use with a dual door system using Sentrex™. With dual door systems, Magic-Touch can be selected to open doors independently only.

Reverse On Obstruction: A reverse-on-obstruction feature causes the door to reverse motion if an obstruction is met during door opening or closing. It does not however reverse on obstruction while opening until the activation sensor and safety sensor stop detecting.

Safety Check: This feature monitors the safety signal activation on every open cycle. If a safety carpet or overhead safety sensor fails “open” or can no longer detect a pedestrian, the door stays open for 12 seconds to indicate that there is a problem.

Emergency Breakout: Disconnects power to the motor when the door is manually pushed in the emergency-out direction. The operator then automatically resets and power is resumed.

2S Logic: Used in trained-traffic applications and is not compatible with sensors. Allows door to open when switch is pushed and door to close when the next sequential switch is pushed. 2S can be used with a safety sensor.

Low- and High-Energy Operation: Allows selection of low-speed range (low-energy applications) or high-speed range (full-energy and all dual-operator applications).

Bifold Safety Sensor Logic: Allows selection of bifold logic versus carpet or timer logic. Used in bifold door systems, it eliminates the need for a lockout relay for the overhead safety sensor.

Single- or Dual-Door Selection: Allows selection of single- or dual-door operation.

Opening Speed Adjustment: Permits adjustment of door opening speed.

Closing Speed Adjustment: On Magic-Force operators, a dual-adjustment closing speed control with two rheostats permits independent adjustment of door closing speed and closing check speed. On Magic-Swing operators, provisions are provided for the installation of an optional single-adjustment closing speed control.

Open Check Speed Adjustment: Permits adjustment of door open check speed.

Torque Adjustment: Allows adjustment of the door opening force. Open torque, check torque, and stall torque are independent adjustments.

Stall Logic: Used with a door-mounted sensor system to stop door motion when a pedestrian or object is present.

One-Piece Switch Module: On Magic-Force operators, the individual breakout, breakout status, close check, and auxiliary switches have been replaced with a single one-piece switch module.

No Reverse on Obstruction: Used in Low Energy applications and only while closing. When this option is set to True, then if the door is obstructed before reaching full closed the door shall “rest” on the object impeding the door motion. The purpose is to prevent manual door users from being subjected to an obstruction recycle from a previous user push plate activation.

Delay before Door Motion: Used on automatic flush bolt applications. This parameter controls how long a door must wait until it moves after the activation signal. Usually used with pairs of doors with flush bolts.

Lock Logic: Can be set for a fail safe or fail secure lock/electric strike.

Lock Delay: Will delay door motion to give a lock time to disengage up to 5 sec. in 0.1 sec intervals.

Manual Mode Sensor Override: Can not be used with “Magic Touch”. When set to “On” the door sensors will only be activated when a push plate or other knowing act activation signal is used. This allows the door to be used as a manual door and will not power open when pushed. When tuning Sentrex and Swing-Guard, this must be set to off. After Sentrex and Swing-Guard are tuned, this can be then turned on.

Open Check Boost: This parameter controls the transition between braking and check speed.

Off Mode: Set off mode to 01, door closes with sensors active. Function switch must be OFF for door to close.

Unlock Time: Time that electric strike is unlocked. Time starts when door begins to open. Total time that the electric strike is unlocked is the lock delay plus the unlock time.

2 WIRING INSTRUCTIONS

Evaluate Power Requirements

EVALUATE door system power requirements as follows:

- ENSURE power source is a dedicated 115 VAC, 50/60 Hz source with 20A circuit rating per two controllers.
- ENSURE power source is not shared with other equipment, i.e., cash registers, EAS systems, or other electromagnetic interference generators.

Connecting Main Power Wiring

Warning: To prevent injury to personnel, incoming electrical power to header must be deenergized before connecting control box electrical harness to electrical service.

- DEENERGIZE incoming electrical power to header.
- Refer to Attachments 2, 3, and 4, and using the wire nut provided, CONNECT ground wire assembly (P/N 711527) to electrical service ground wire.
- In a concealed location inside the header (not visible from the exterior of the header), DRILL a hole for a No. 8 screw.
- INSTALL ground wire ring terminal and star washer onto the No. 8 screw provided, and FASTEN screw, star washer, and ground wire to header.
- In a concealed location inside the header, DRILL a second hole for a No. 8 screw.
- INSTALL power line harness 412544 ring terminal and star washer onto the No. 8 screw provided, and FASTEN screw, star washer, and ground wire to header.
- Using the wire nuts provided, CONNECT power line harness 412544 to electrical service as follows:
 - CONNECT power pigtail assembly black wire to black (line) service wire.
 - CONNECT power pigtail assembly white wire to white (neutral) service wire.

Connecting Breakout Status Signal Wiring (Magic-Swing Operators)

Warning: To prevent injury to personnel and damage to equipment, control box power must be deenergized before connecting breakout status signal wiring.

Caution: If the motor is running and the breakout status switch is **not** connected, arcing across the breakout switch contacts can occur. This will result in damage to the breakout switch. To prevent damage from switch contact arcing, the breakout status switch must **always** be connected.

Notes:

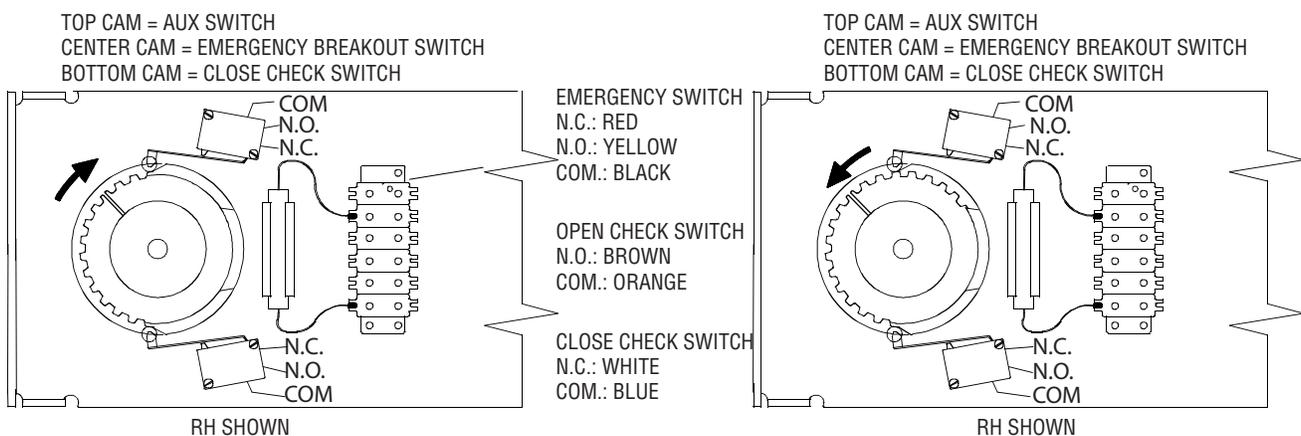
The breakout status switch should be used in all applications where there is no positive door stop in the breakout direction.

The auxiliary switch is the breakout status signal switch. The auxiliary switch was formerly the open check switch on the operator switch plate (top cam).

- Refer to Attachment I, and CONNECT breakout status wiring.
- REMOVE quick-connect terminal (brown wire) from the normally open terminal of the auxiliary switch (formerly open check switch), and INSTALL onto normally closed terminal.

- Repeat for second door operator: CONNECT yellow jumper wires installed on the single/dual motor harness as follows:
 - a. INSTALL stripped end of first jumper wire (from position 3 of the 8-pin connector on operator harness) into terminal 9 of control box connector TB3.
 - b. INSTALL stripped end of second jumper wire (from position 5 of the 8-pin connector on operator harness) into terminal 10 of control box connector TB3.
 - Repeat for second door operator: SET the auxiliary cam for approximately 3° activation (toward breakout direction), and ADJUST cam as necessary to trip the corresponding microswitch prior to activation of the breakout switch.
- Note:** In a dual-door application, the breakout switches of each operator need to be wired in series to ensure that the control box will not open the doors if either breakout status switch is activated.
- IF application is a pair of doors, PERFORM the following:
 - a. REPEAT the previous two steps for the second door operator.
 - b. CONNECT stripped end of one yellow jumper wire from each operator to terminals 9 and 10 of control box connector TB3.
 - Using a wire nut, CONNECT remaining wire from first operator to remaining wire on second operator.
 - VERIFY breakout status/breakout cam is properly set as follows:
 - a. Refer to Figure 1, and visually INSPECT cams for proper setting.

Figure 1. Breakout Status/Breakout Cam Settings (Magic-Swing Operators)



- b. UNPLUG TB3 from control box.

Note: When checking breakout status switch continuity, the switch is first checked with the door closed, then again with the door in the breakout (negative 3°) position. In a dual-door application, both doors can be tested at the same time in the closed position. However, the doors must be tested **individually** when checking switch continuity with the doors in the breakout (negative 3°) position.

- c. ENSURE door is in the closed position.
- d. Using a multimeter, CHECK continuity between TB3 terminals 9 and 10, and ENSURE there is continuity.
- e. PUSH door in the breakout direction, and HOLD door at approximately the negative 3° position.
- f. Using a multimeter, CHECK continuity between TB3 terminals 9 and 10, and ENSURE there is an open circuit.
- g. RELEASE door.
- h. PLUG TB3 into control box.

Connecting Breakout Status Signal Wiring (Magic-Force Operators)

WARNING To prevent injury to personnel and damage to equipment, control box power must be deenergized before connecting breakout status signal wiring.

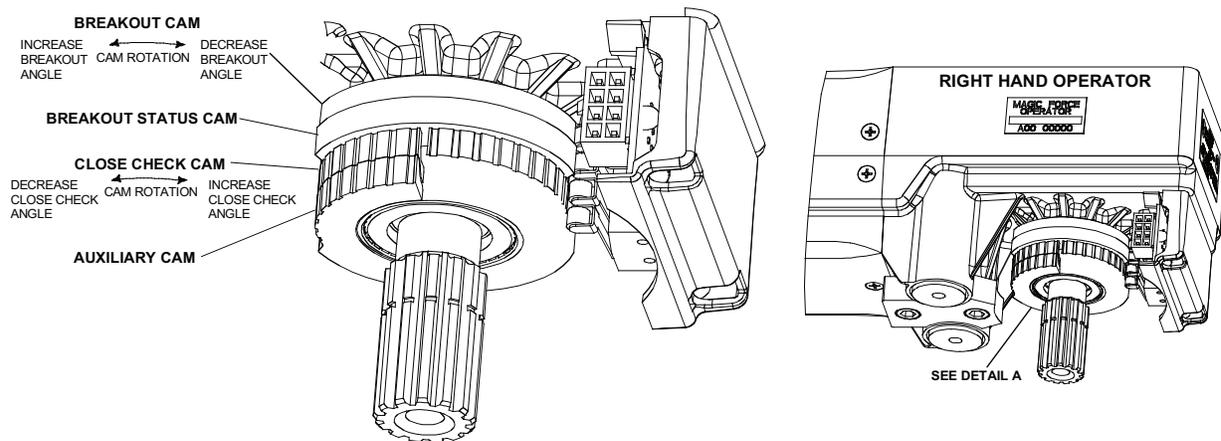
CAUTION If the motor is running and the breakout status switch is **not** connected, arcing across the breakout switch contacts can occur. This will result in damage to the breakout switch. To prevent damage from switch contact arcing, the breakout status switch must **always** be connected.

- SET "POWER" switch to **OFF**.
- IF single-operator application, PERFORM the following:
 - a. INSTALL one breakout status switch wire to terminal 9 of control box connector TB3.
 - b. INSTALL second breakout status switch wire to terminal 10 of control box connector TB3.
- IF dual-operator application, PERFORM the following to put the breakout switches in series:
 - a. INSTALL one breakout status switch wire from one operator to terminal 9 of control box connector TB3.
 - b. INSTALL one breakout status switch wire from second operator to terminal 10 of control box connector TB3.
 - c. CONNECT remaining two yellow breakout status switch wires together with a wire nut.
- VERIFY breakout status/breakout cams are properly set as follows:
 - a. Refer to Figure 2, and visually INSPECT cams for proper setting.
 - b. UNPLUG TB3 from control box.

NOTE: When checking breakout status switch continuity, the switch is checked twice; first with the door closed, then with the door in the breakout (negative 3°) position. In a dual-door application, both doors can be tested at the same time in the closed position. However, the doors must be tested **individually** when checking switch continuity with the doors in the breakout (negative 3°) position.

- c. ENSURE door is in the closed position.

**Figure 2. Breakout Status/Breakout Cam Settings - Magic Force Operators
(Continued next page).**



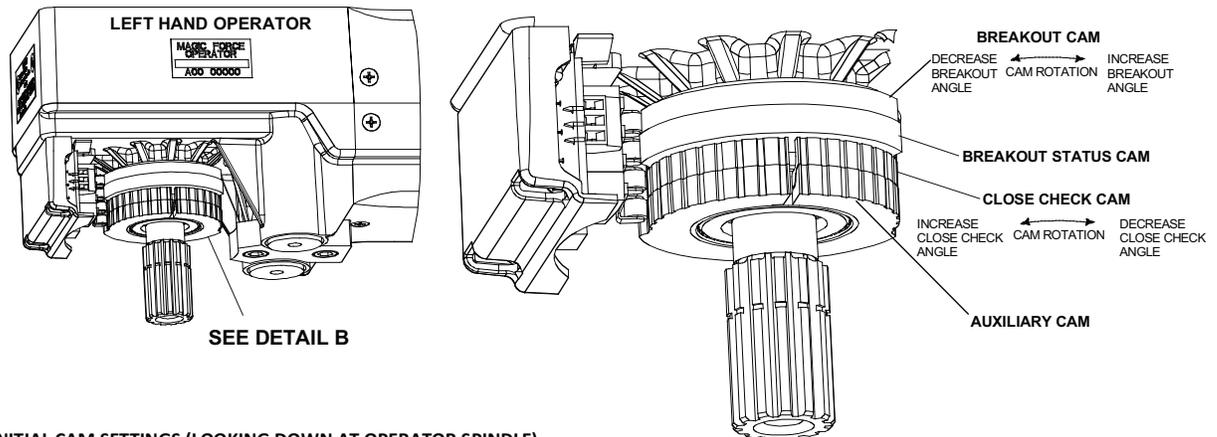
INITIAL CAM SETTINGS (LOOKING DOWN AT OPERATOR SPINDLE)

ROTATE BREAOUT CAMS COUNTER-CLOCKWISE UNTIL RAISED PORTION OF BREAOUT STATUS CAM JUST CONTACTS SWITCH ROLLER.

ROTATE CLOSE CHECK CAM CLOCWISE UNTIL RAISED PORTION OF CAM ACTUATES SWITCH, THEN ROTATE CAM 10 EGREES COUNTER-CLOCKWISE.

ROTATE AUIILIARY CAM AS DESIRED.

Figure 2. Continued.
Breakout Status/Breakout Cam Settings - Magic Force Operators



INITIAL CAM SETTINGS (LOOKING DOWN AT OPERATOR SPINDLE)

ROTATE BREAKOUT CAMS CLOCKWISE UNTIL RAISED PORTION OF BREAKOUT STATUS CAM JUST CONTACTS SWITCH ROLLER.

ROTATE CLOSE CHECK CAM COUNTERCLOCKWISE UNTIL RAISED PORTION OF CAM ACTUATES SWITCH, THEN ROTATE CAM 10 DEGREES CLOCKWISE.

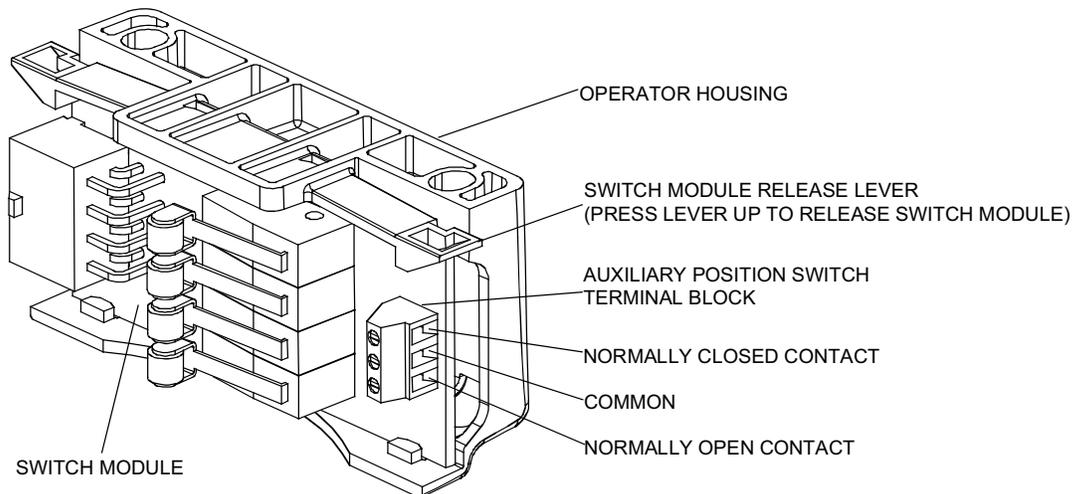
ROTATE AUXILIARY CAM AS NEEDED

- d. Using a multimeter, CHECK continuity between TB3 terminals 9 and 10, and ENSURE there is continuity.
- e. PUSH door in the breakout direction, and HOLD door at approximately the negative 3-deg. position.
- f. Using a multimeter, CHECK continuity between TB3 terminals 9 and 10, and ENSURE there is an open circuit.
- g. RELEASE door.
- h. PLUG TB3 into control box.

Wiring the Operator Switch Module (Magic-Force Operators)

- Refer to Attachment 2 or 3 as applicable, and CONNECT switch module harness 413791 to dual-adjustment closing speed control connector J4.
- IF auxiliary position switch will be used, refer to Figure 3, and PERFORM the following:
 - a. LIFT switch module release lever up, and SLIDE switch module out of operator housing.

Figure 3. Wiring the Auxiliary Position Switch (Magic-Force Operators)

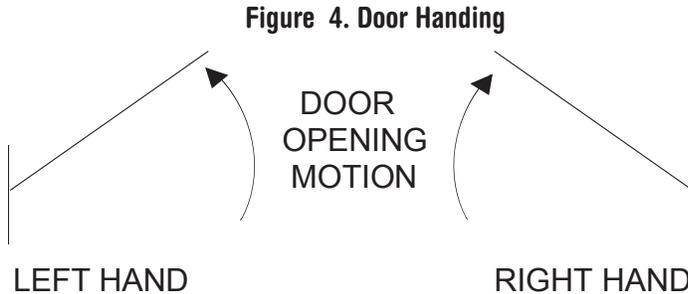


- b. CONNECT wiring to auxiliary position switch terminal block as shown.
- c. SLIDE switch module into operator housing until switch module release lever snaps into place.

Wiring the Operator for Required Handling (Magic-Force Operators)

Note: Operator cams are factory-set for right hand operation.

- Refer to Figure 4, and DETERMINE door handing.



- CONNECT encoder cable adapter 415001 from encoder to control box encoder 1 and encoder 2 connectors, if applicable.
- If Sentrex™ is installed with a left hand Magic-Force operator, refer to Attachment 2 or 3 and INSTALL encoder handing harness (part No. 413767).
- CONNECT operator harness from close speed module to control box motor 1 and motor 2 connectors, if applicable

Wiring the “ON/OFF/HOLD OPEN” Switch and Power Switch

- Refer to Attachment 5, and CONNECT “ON/OFF/HOLD OPEN” switch wiring as follows:

TB2 Terminal	Connection	Switch Wire Color
1	Hold Open	Yellow
2	Common	Orange
3	Automatic On	Violet

- SET “POWER” switch to “OFF.”
- CONNECT “POWER” switch harness 516857-1 to power harness 415000.
- CONNECT line connect harness 412544 to power harness 415000.

Wiring the Door Activation or Safety Device

Note: Attachments 2, 3, and 4 illustrate typical wiring for various devices. Though the specific device may not be shown, this attachment can be used as a general guide. Specific wiring instructions from the manufacturer must also be consulted.

- Refer to Attachment 2, 3, or 4 and applicable manufacturer’s instructions, and CONNECT door activation or safety device.

Wiring Sentrex™

Caution: Do Not connect Sentrex Microboard or Sensors until control box is fully tuned.

Note: Select Sentrex when in step 9 of Table 1 if tuning with pushbuttons, even though Sentrex has not been connected at this time. If tuning with 'Hand held device', select Sentrex for Safety Logic in Step 6. For left hand Magic Force Operators, add encoder handing jumper between encoder and encoder cable adapter.

- Refer to Attachment 2, 3, or 4, and CONNECT Sentrex³ as follows:

TB1 Terminal	Connection	Sentrex ³ Wire Color
1	VSX (+) Power for Sensor Head	Red
2	Serial Communication	Green
3	Serial Communication	White
4	GND (-) Ground for Sensor Head	Black

Wiring Bodyguard

Note: The Bodyguard does not require a lockout relay for use with the MC521 PRO control box. The MC521 PRO control box generates the data signals for door open, closing, and closed positions. Refer to Attachment 2, 3, or 4 as applicable for wiring connections. Program the Bodyguard Relay Output to #2.

Wiring Superscan

Refer to Attachment 2, 3, or 4 as applicable for wiring connections. To inhibit the Stall Superscan, a switch is required in series with the Stall output.

Wiring Holding Beam

The Holding Beam input is used in applications when there is a rail-mounted holding beam. When the door is closing and the beam is obstructed, the door will not open until the door is completely closed and the header-mounted sensor becomes active. When the door is open and the beam is obstructed, the door will remain open. Refer to Attachment 2, 3, or 4 as applicable for wiring connections.

4 TUNE-IN INSTRUCTIONS

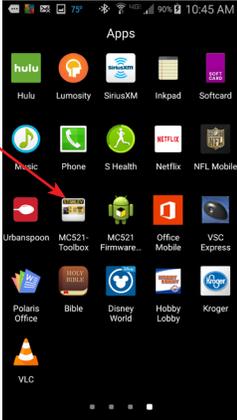
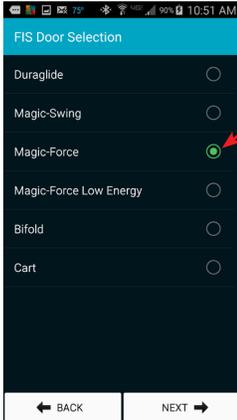
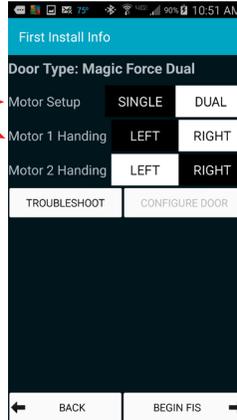
Initial Tune-In Settings

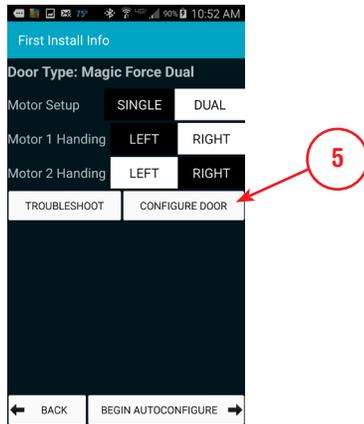
- SET “ON/OFF/HOLD OPEN” switch to “OFF.”
- SET “POWER” switch to “ON.”

Tuning In the MC521 PRO Controller Using a “Handheld Device”

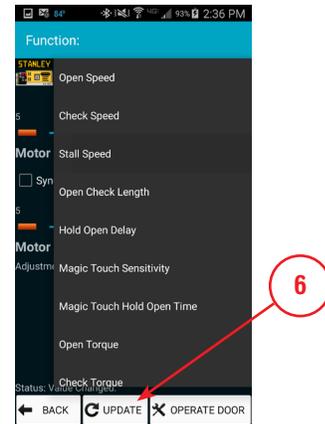
Warning: To prevent injury to personnel and damage to equipment, the following settings must be made before using the door.

Note: The following steps provide instructions for tuning the MC521 PRO controller using the ‘Hand held device. MC521 PRO application software is required. The screen shots are for reference only and may vary from device to device.

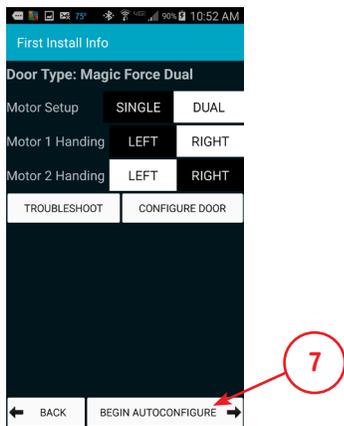
 <p>Step 1: Select MC521 PRO Toolbox from the list of applications.</p>	 <p>Step 2: Select RESTART FIS on the Main Selection menu (FIS = First Install Sequence).</p>
 <p>Step 3: Select door type.</p>	 <p>Step 4: Setup the Door Type, the Motor Setup and the Motor Handling. Press BEGIN FIS when finished.</p>



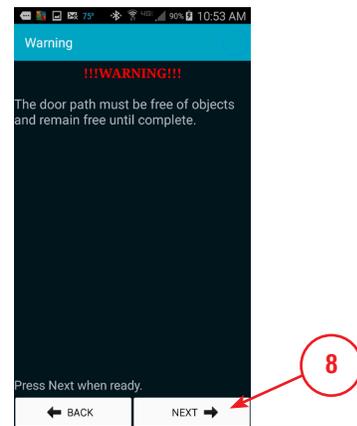
Step 5: If additional configuration is needed press **CONFIGURE DOOR**.



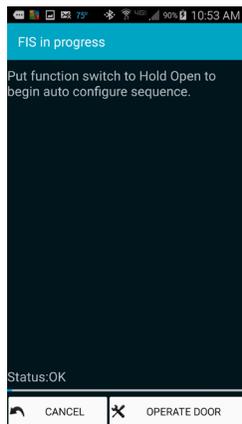
Step 6: Configure additional settings and press **UPDATE** after each setting has been changed. Once completed press **BACK** to return to the Main Selection menu. Motor 1 and Motor 2 have independent settings.



Step 7: Press **BEGIN AUTOCONFIGURE**.



Step 8: Press **NEXT**.



Step 9: Put Function switch to **Hold Open** momentarily and then back to **Closed**.

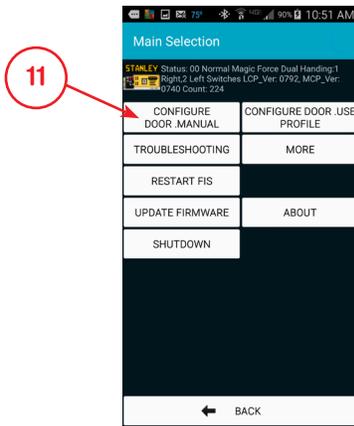
Step 10: Door will go through a learn sequence to configure itself. The door will perform the following operations in learn mode:

- Open fully at check speed
- Close fully

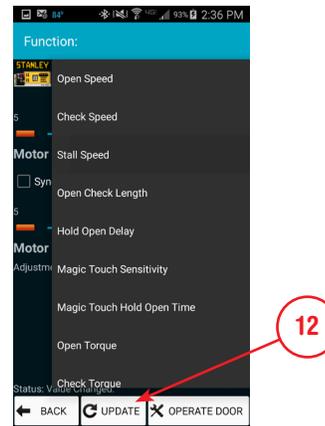
WARNING

During this sequence the sensors are inactive and the door has **NO SAFETY**.

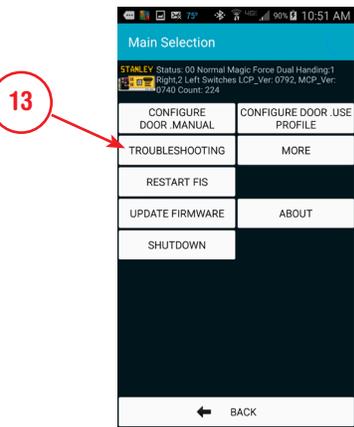
To stop the door, **TURN POWER OFF**.



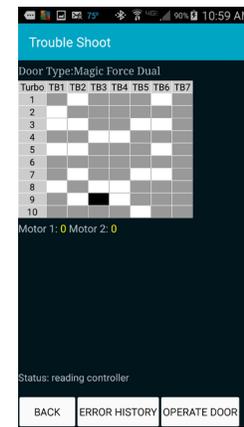
Step 11: If the door requires additional changes to be made to the settings, select **CONFIGURE DOOR .MANUAL**.



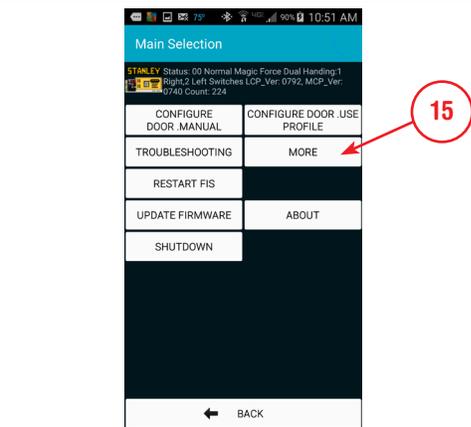
Step 12: Configure settings as needed and press **UPDATE** after each settings has been changed. Once completed, press **BACK** to return to the **Main Selection** menu. Door must be cycled to **Full Open** for changes to be stored in permanent memory.



Step 13: If the door is not operating correctly press **TROUBLESHOOTING** to enter the Troubleshooting menu.

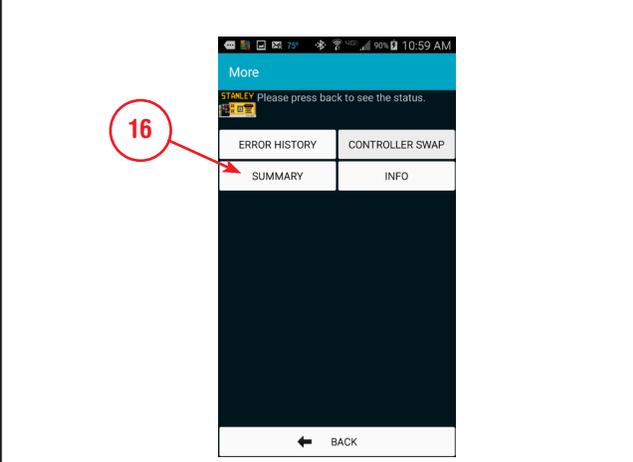


Step 14: View the I/O grid to verify the sensors and inputs. Dark indicates input/output contact is closed. Light indicates input/output contact is open. Gray never changes.



Step 15: Press **MORE** to access more functions.

Continued Next Page.



Step 16: Press **SUMMARY** to view all current settings for Motor 1 and Motor 2.



Step 17: Review the information on the **Summary** listing.

Tuning in the MC521 PRO Using the Controller Pushbuttons

1. To change the INDEX:
 - Hold ENTER switch while pressing UP or DOWN to get to desired INDEX
2. To change a VALUE:
 - Unlock the keypad by setting index 99 to value 00.
 - After the desired INDEX is selected, release ENTER and within 2.5 seconds press UP or DOWN to get the desired VALUE. (If the the UP or DOWN buttons are not pressed within 2.5 seconds of releasing the ENTER button, the display will change from the VALUE back to the STATUS.)
3. To display STATUS CODE:
 - A few seconds after the VALUE is selected, the display indicates the STATUS CODE
4. To show the INDEX and VALUE
 - To show the INDEX, hold ENTER. Once ENTER is released the display will show the VALUE of that INDEX.
5. Read the descriptions entirely before performing each step. Check the INDEX and VALUE after each step.
6. To store changes in permanent memory:
 - Cycling door open one time will store changes.
7. To lock keypad:
 - Lock keypad by setting index 99 to value 01 or by turning power OFF and then ON.
8. To access the door cycle counter function:
 - a. Ensure that the keypad is locked by setting index 99 to 01.
 - b. Ensure that the index is set to any index but 99.
 - c. Press the up or down key to access the door cycle counter.
 - d. The display will show “dc” followed by four pairs of digits, followed by “dc”. For example, if the door count was 12345678 cycles the door will display “dc” “12” “34” “56” “78” “dc.”

Table 1. FIS Procedure Using Pushbuttons

Step	Description	Display		
		Index	Value	Status Code
1	Set Function switch to “Closed”			
2	Turn power on.			
3	Unlock keypad.	99	00	00
4	Restart FIS	96	01	A0
5	Select door type (Refer to Table 2)	00	Refer to Table 2	A0
6	Select Motor 1 handling	01	00 = Right hand 01 = Left hand	A0
7	Select Motor 2 handling	02	00 = Right hand 01 = Left hand	A0
8	Accept FIS. As soon as the VALUE is changed to 01, display will go to INDEX 00 (Open Speed Value) and then to A1. (Note: 09 is the default value for low energy)	03	01	A1
9	Make changes: Safety Logic (Note: If there are no sensors connected, leave at default value of 00.)	11	00 = Sensor 01 = Sentrex 02 = Carpet 03 = Carpet 12 sec. 04 = Bifold	A1
10	Function switch: Switch to OPEN, momentarily, then CLOSED/LOCKED. Wait for the learn sequence to end. Display will show <u>A2</u> when finished.			A2
11	Lock keypad	99	01	00
12	Final Tune in			

Table 2. MC521 PRO Mode Values

Code	MC521 PRO Operational Mode
01	Dura-Glide door style—Single Motor
02	Dura-Glide door style—Dual Motor
03	Magic-Swing Door Style—Single Motor
04	Magic-Swing Door Style—Dual Motor
05	Magic-Force Door Style—Single Motor
06	Magic-Force Door Style—Dual Motor
07	Magic-Force Door Style—Single Motor Low Energy
08	Magic-Force Door Style—Dual Motor Low Energy
09	Bifold door style--Single Motor
10	Bifold door Style--Dual Motor

Table 3. Index List

Index	Description
00-89	API Mode Specific Door Operational Values - These depend upon the mode selected
90-95	Reserved
96	Command - Restart FIS. Entering 01 will cause FIS to restart.
97	Reserved
98	Command – RESTART AUTOCONFIGURATION, Entering 01 will cause auto configuration. Entering “01” will cause auto configuration.
99	Command – Lock. Entering “01” will lock all VALUE inputs except this INDEX. This prevents inadvertent changes to input values. VALUES may be unlocked by entering “00” in this INDEX. Keypad is automatically locked upon normal door motion.

Table 4. Magic Force/Magic Swing Configuration Codes -- Motor 1

Index	Min. Value	Max. Value	Description	Defaults	
				Low Energy	Full Energy
00	05	35	Open speed, revolutions per second	06	25
01	03	12	Check speed, revolutions per second	04	04
02	05	40	Stall speed, percent of PWM counts	15	15
03	00	99	Open check length	20	45
04	00	99	Magic Touch sensitivity (00 = OFF, 01-99 = sensitivity) (01 = max. sensitivity)	00	00
05	01	99	Magic Touch hold open time (25 sec. max. = 99%)	22	16
06	01	99	Hold-open delay in percent (25 sec. max. = 99%)	21	06
07	05	75	Open torque	25	75
08	05	75	Check torque	25	40
09	05	75	Stall torque	25	25
10	00	20	Open Check Boost	09	12
11	00	04	Safety Logic (00 = Sensor, 01 = Sentrex, 02 = Carpet, 03 = Carpet 12 Sec., 04 = Bifold)	00	00
12	00	01	2S Operation, 00 = OFF, 01 = ON	00	00
13	01	60	Obstruction Time (percent) (60 = 1.5 seconds)	20	20
14	20	60	Open Acceleration Slope	60	60
15	20	40	Open Braking Slope	35	35
16	00	50	Delay of door motion. Motor 1 (0.1 sec. increments: 5.0 sec. max.)	00	00
17	00	01	No Reverse on Obstruction (00 Off, 01 On)	NA	NA
18	00	50	Lock Delay (0.1 sec. increments, 5.0 sec. max.)	00	00
19	00	01	Manual Mode sensor override (00 Off, 01 On)	00	00

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Table 5. Magic Force/Magic Swing Configuration Codes -- Motor 2

Index	Min. Value	Max. Value	Description	Defaults	
				Low Energy	Full Energy
20	05	35	Open speed, revolutions per second	06	25
21	03	12	Check speed, revolutions per second	04	04
22	05	40	Stall speed, percent of PWM counts	15	15
23	00	99	Open check length	20	45
24	00	99	Magic Touch sensitivity (00 = OFF, 01-99 = sensitivity) (01 = max. sensitivity)	00	00
25	00	99	Magic Touch hold open time (25 sec. max. = 99%)	22	16
26	00	99	Hold-open delay in % (25 sec. max. = 99%)	21	05
27	05	75	Open torque, percent of full torque	25	75
28	05	75	Check torque, percent of full torque	25	40
29	05	75	Stall torque, percent of full torque	25	25
30	00	20	Open Check Boost, transition speed between braking and check	09	12
31	00	01	Sensor Off Mode, 00 - On , 01 Off, Ignores sensors when the function switch is off	00	00
32	00	01	Lock Logic – 00 Failsafe , 01 Fail secure – Electric Strike lock logic	01	01
33	01	60	Obstruction time in % (60 = 1.5 seconds)	19	19
34	00	60	Open Acceleration Slope	60	60
35	20	40	Open Braking Slope	35	35
36	00	50	Delay before door motion. Motor 2 (0.1 sec. increments: 5.0 sec. max.)	00	00
37	01	99	Unlock time - E-Strike (99=unlocked until full closed)	10	10

Table 6. Status Codes

Status Code	Description
00	Normal operation—All OK
20	Breakout
55	Stall state
A0	First installation sequence (FIS)
A1	Auto-configuration sequence
A2	Auto-configuration confirmation sequence
b0	Invalid mode
b1	Encoder error
dc	Display door cycle counter
0b	Obstruction after Learn Mode
E3	Door length error -- cycle door to clear or re-FIS

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Table 7. Door States

Door State	Description
00	Door State is Closed
02	Door State is Opening
04	Door State is in Open Check
06	Door State is Full Open
09	Door State is in Close Check
15	Door State is in Open Stop
16	Door State is in Close Stop

NOTE:

- If the current status code is “Normal operation—All OK”, the MC521 Pro will show the current door state. Otherwise, the MC521 Pro alternates between showing the current status code and the door state.
- **d1** and **d2** displayed when controlling more than one door. Any state that follows d1 is referencing door #1. Any state that follows d2 is referencing door #2

Final Tune-In Adjustments

- Refer to ANSI/BHMA A156.10, “American National Standard for Power Operated Doors” or ANSI/BHMA A156.19 or most current ANSI/BHMA standards, “American National Standard for Power Assist and Low Energy Power Operated Doors” and Attachment 7, and DETERMINE ANSI and UL door operating requirements.
- CYCLE and RECYCLE door several times to verify proper speeds and forces, and PERFORM adjustments in the following order:

- a. ADJUST close check cam.
- b. ADJUST open speed.
- c. ADJUST open check speed.
- d. ADJUST “CLS” (close speed) rheostat.
- e. ADJUST “CK” (close check speed) rheostat.

Note: Adjustments to the “CK” (close check) rheostat also affect closing speed. Closing speed must always be checked after adjusting close check speed.

- f. ADJUST “CLS” (close speed) rheostat.

Caution: To prevent motor overheating and premature motor failure, stall speed must not be set too high.

- g. ADJUST stall speed.
- h. ADJUST torque.
- i. ADJUST time delay.

Warning: The Magic-Touch time delay must be set to at least 5 seconds to ensure compliance with ANSI/BHMA A156.19 or most current ANSI/BHMA standards. “American National Standard for Power Assist and Low Energy Power Operated Doors” specifications.

- j. ADJUST Magic-Touch™ time delay.
- k. ADJUST breakout and breakout status cams.
- l. Refer to Attachment 7, and ENSURE all ANSI/BHMA, and UL compliance requirements are met.
- m. POWER DOWN the door, POWER UP the door, and ENSURE that all settings have been stored in the controller.

Please refer to Attachment 10 MC521 Pro Controller Fine Tuning for adjustment recommendations.

5 SPARE PARTS LIST

Table 7 Shows the spare parts for the MC521 PRO control box used with Magic-Swing™, Magic-Force™, and Bifold operators.

Table 8. Spare Parts

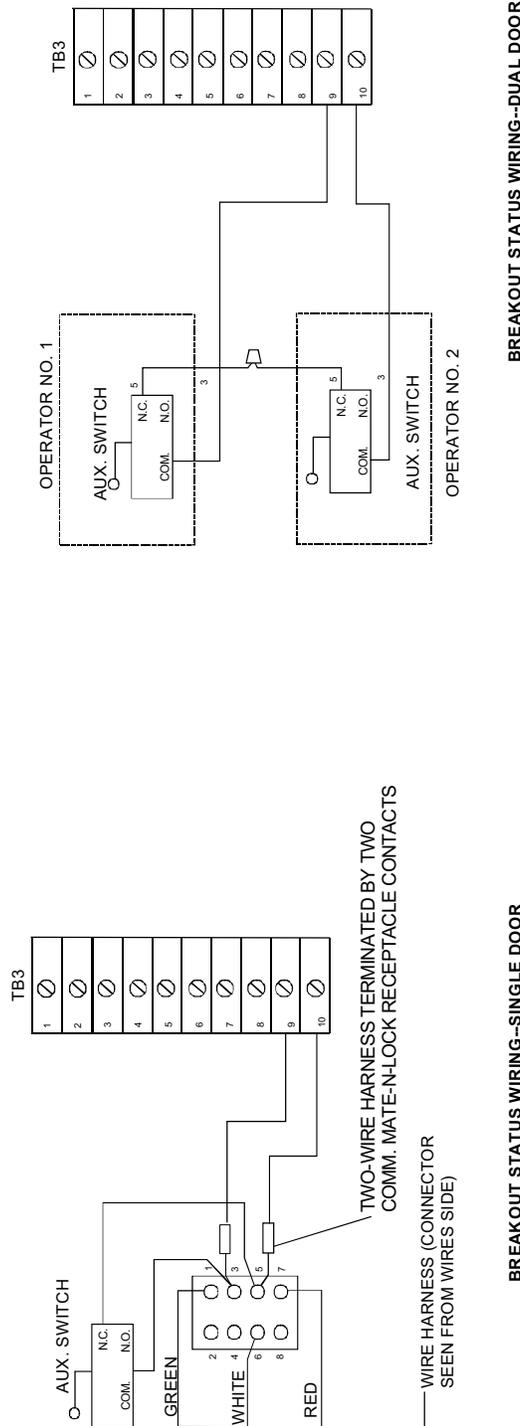
Description	Part Number
MC521 PRO Controller and 4 terminal blocks	314117
MC521 PRO Controller Manual	204090
Power and Function Switch Assembly 8 feet	516857-1
Power and Function Switch Assembly 15 feet	516857-2
Harness Encoder Handing	413767
Harness Line	412544
Harness Power 18 inch	415000
Harness Phone Cord 50 feet	713911
Harness Phone Cord 25 feet	713911-1
Adapter Female DB9 to RJ11	516826
Terminal Block Plug 10 position	714055
MC521 PRO New Palm Cable	314103
Bluetooth Adapter Kit	314215

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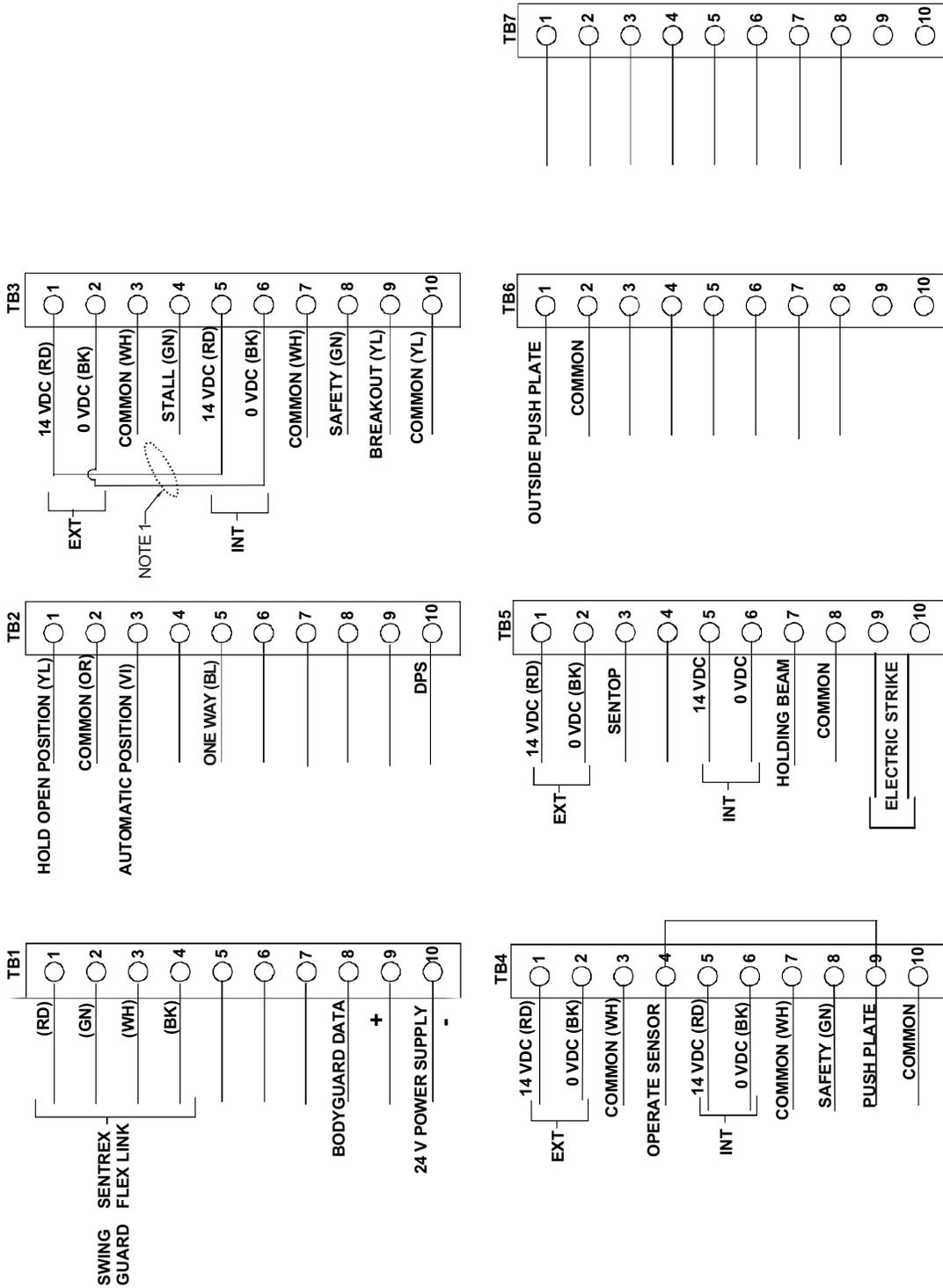
5 ATTACHMENTS

Attachment 1 Breakout Status Wiring for Magic-Swing Operators (Sheet 1 of 1)



Attachment 5

MC521 PRO Terminal Block Connections—TB1 through TB7 (Sheet 1 of 1)

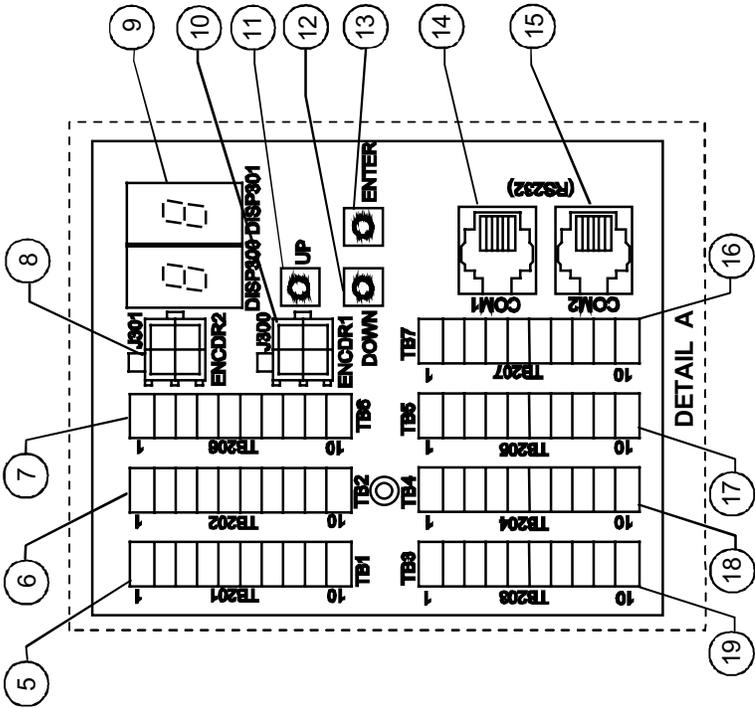
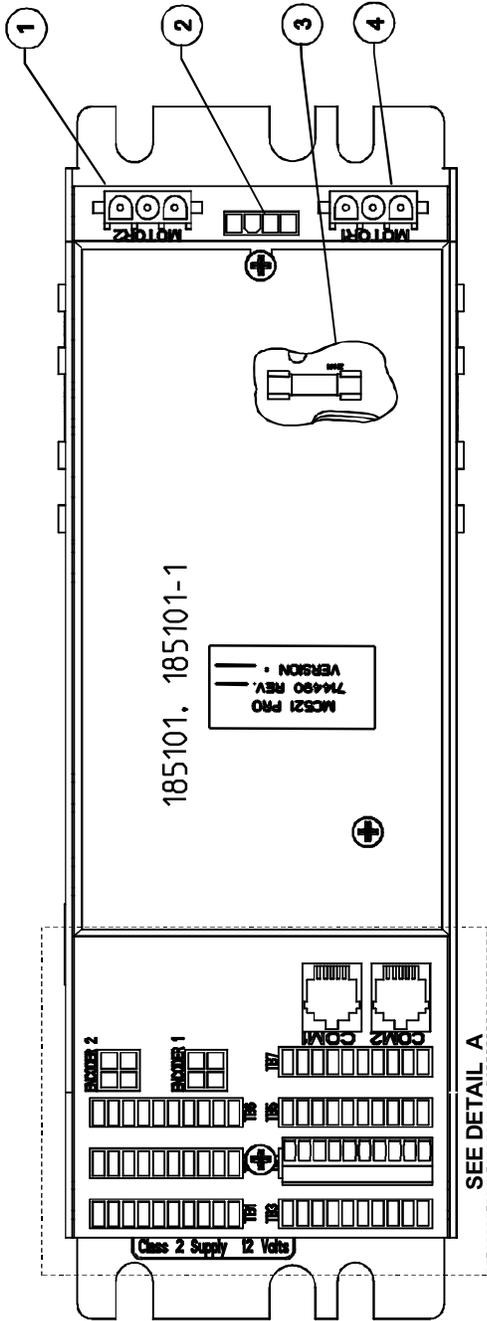


NOTES:

1. REMOVE IF EXTERNAL POWER SUPPLY IS USED.
2. TB6 HAS SPARE I/O AND AUX DC SUPPLY.
3. TB7 HAS RS485 AND AUX DC SUPPLY.
4. TB1 POSITIONS 9 AND 10 ARE FOR ELECTRIC STRIKE POWER SUPPLY CONNECTION, SHOWN WITH 24 VDC.
5. TB5 POSITIONS 9 AND 10 ARE FOR ELECTRIC STRIKE CONNECTION. DC CURRENT OUTPUT RATED FOR 0.75 A MAX.

Attachment 6
 MC521 PRO Controls and Indicators
 (Sheet 1 of 2)

Note: See next page for indicators and descriptions



Attachment 6
MC521 Pro Controls and Indicators
(Sheet 2 of 2)

ITEM	CONTROL/INDICATOR	DESCRIPTION
1	Motor 2 Connector P402	Motor No. 2 connector.
2	Power Connector J500	Connection point for incoming line, neutral, and common power wiring.
3	Fuse F500	Controller fuse-- 5 Amp, 250V.
4	Motor 1 Connector P401	Motor No. 1 connector.
5	Terminal Block Connector TB1	Connection point for bodyguard, 24V power supply (Sentrex and Swing Guard).
6	Terminal Block Connector TB2	Connection point for function switch (rotary or rocker). Closed door function switch.
7	Terminal Block Connector TB6	Push plate outside.
8	Encoder 2 Connector J301	Encoder # 2 Connector.
9	Two Digit Display	Displays Controller Status. Also serves as the display for tune-in by push-button switches and indicates encoder movement.
10	Encoder 1 Connector J300	Connection point for motor encoder No. 1.
11	Up Pushbutton Switch SW300	Used manual setup and tuning of door when PDA is not available.
12	Down Pushbutton Switch SW301	Used for manual setup and tuning of door when PDA is not available.
13	Enter Pushbutton Switch SW302	Used for manual setup and tuning of door when PDA is not available.
14	COM1 Jack	RS232 COM1 connector. Connection point for PDA harness.
15	COM2 Jack	RS232 COM2 connector. Not used.
16	Terminal Block Connector TB7	Includes RS485 and AUX DC supply. Do not populate TB7 until further notice.
17	Terminal Block Connector TB5	Hold Beam, Electric Strike, Sentrex operate signal.
18	Terminal Block Connector TB4	Connection point for operate sensor, safety sensor and push plate.
19	Terminal Block Connector TB3	Connection point for Stanguard, safety sensor, stall sensor, and breakout switch. Using jumper wires across TB3 terminals 1 to 5 and 2 to 6, internal transformer supplies power to multiple external sensors.

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Attachment 7
ANSI/BHMA and UL Compliance Requirements for Swinging and Folding Doors
(Sheet 1 of 2)

Final adjustment and proper operation of the door system must be and shall be performed in the field.

Note: These instructions are for informational purposes and do not substitute for review against the current revision of the referenced standards. Where a requirement exists in multiple standards, such as the ANSI/BHMA standard and the UL standard, the more restrictive condition applies. Other local codes and fire codes likely exist, and must also be followed.

ANSI/BHMA A156.10 Full/Standard Power Swinging and Folding Door Systems

Full/standard power swinging and folding door systems must be installed and adjusted for compliance with the current version of ANSI/BHMA A156.10, “American National Standard for Power Operated Pedestrian Doors”.

Critical aspects of the installation for compliance with A156.10 include:

- Guide rail size, location, and type.
- Control mat size, layout, molding height, active areas and sensitivity.
- Sensor pattern size, sensitivity, and function.
- Knowing Act guidelines, secondary activating zones and double egress swing door requirements.
- Entrapment protection rules including door speeds, forces, and time delays.
- Signage. (Decals and application instructions are provided with the door operator.)

ANSI/BHMA A156.19 Low Energy Swinging Door Systems

Low energy swinging door systems must be installed and adjusted for compliance with the current version of ANSI/BHMA A156.19, “American National Standard for Power Assist and Low Energy Power Operated Doors”.

Critical aspects of the installation for compliance with A156.19 include:

- Opening times and force.
- Closing times and force.
- Manual opening force.
- Time delay.
- Signage. (Decals and application instructions are provided with the door operator.)

UL 325 Compliance

All power operated door systems must be installed in compliance with the current edition of UL 325, “Standard for Safety for Door, Drapery, Gate, Louver, and Window Operators and Systems”.

Attachment 7
ANSI/BHMA and UL Compliance Requirements for Swinging and Folding Doors
(Sheet 2 of 2)

Wiring

- To reduce the risk of electric shock proper and reliable grounding is mandatory. See **Main Power Wiring** instructions and **Wiring Diagrams** in this guide for grounding techniques.
- Permanent wiring is to be employed as required by the National Electrical Code and/or local codes.
- Connection of external devices is shown in the wiring diagrams and terminal block layouts elsewhere in this guide. Refer to these figures for proper wiring of external devices to ensure compliance with UL 325.

Knowing Act

Doors activated by a manual switch (Knowing Act switch in ANSI/BHMA terms) must have the switch installed in a location from which operation of the door can be observed by the person operating the switch.

Attachment 8
 'Hand held device' Troubleshooting Aid—Swing/Bifold
 (Sheet 1 of 1)

Terminal and Pin	Description	State
TB1-5	External Cycle Counter Output	Dark = low (counter increments)
TB1-8	Bodyguard Data Output	
	Bodyguard	Light = door closed

Function Switch States for TB2

	Hold Open	OFF	Auto ON	One Way
TB2-1				
TB2-3				
TB2-5				

TB3-4	Stall Input (Swing)	Dark = detecting
	Stanguard (Fold)	Dark = triggered or detecting
TB3-8 & TB4-8	Safety Input	Dark = detecting
TB3-9	Breakout Input	Dark = no breakout
TB4-4 & TB4-9	Operate Sensor Input & Push Plate Input (connected internally)	Dark = detecting
TB4-8 & TB3-8	Safety Input	Dark = detecting
TB4-9 & TB4-4	Push Plate Input & Operate Sensor Input (connected internally)	Dark = detecting
TB5-3	Sentrex Operate Internal From MicroBoard	Dark = detecting
TB5-7	Holding Beam	Dark = detecting
TB5-10	Spare	

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Values shown as grayed out do not affect motion of the door and may need to be adjusted to suit the application

Attachment 9
Table 1 Recommended Values for Concealed Doors - Motor 1

Index	Description	Light Weight Door (100lbs)				Heavy Weight Doors (350lbs)			
		Single		Pair		Single		Pair	
		Low Energy	Full Energy	Low Energy	Full Energy	Low Energy	Full Energy	Low Energy	Full Energy
00	Open speed, revolutions per second	09	35	09	35	06	25	06	25
01	Check speed, revolutions per second	04	07	05	07	05	04	05	5
02	Stall speed, percent of PWM counts	See Attachment 10							
03	Open check	20	40	20	35	25	45	25	45
04	Magic Touch sensitivity	00	00	00	00	00	00	00	00
05	Magic Touch hold open time	HH=55 KP=22	HH=40 KP=16	HH=55 KP=22	HH=40 KP=16	HH=55 KP=22	HH=40 KP=16	HH=55 KP=22	HH=40 KP=16
06	Hold-open delay	HH=55 KP=22	HH=15 KP=06	HH=55 KP=22	HH=15 KP=06	HH=55 KP=22	HH=15 KP=06	HH=55 KP=22	HH=15 KP=06
07	Open torque, percent of full torque	25	75	25	75	25	75	25	75
08	Check torque, percent of full torque	25	40	25	40	25	75	25	75
09	Stall torque, percent of full torque	25	25	25	25	25	25	25	25
10	Open Check Boost	09	10	09	12	09	12	9	14
11	Safety Logic	00	00	00	00	00	00	00	00
12	2S Operation	00	00	00	00	00	00	00	00
13	Obstruction Time	HH=50 KP=20	HH=50 KP=20	HH=50 KP=20	HH=50 KP=20	HH=50 KP=20	HH=50 KP=20	HH=50 KP=20	HH=50 KP=20
14	Open Acceleration Slope	60	60	60	60	60	60	60	60
15	Open Braking Slope	35	20	20	20	35	35	35	35
16	Delay of door motion. Motor 1	00	00	00	00	00	00	00	00
17	No Reverse on Obstruction	00	NA	00	NA	00	NA	00	NA
18	Lock Delay	00	00	00	00	00	00	00	00
19	Manual Mode sensor override	00	00	00	00	00	00	00	00
31	Off Mode	00	00	00	00	00	00	00	00
32	Lock Logic	01	01	01	01	01	01	01	01
37	Unlock Time	10	10	10	10	10	10	10	10

HH = Hand Held
KP = Key Pad

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Values shown as grayed out do not affect motion of the door and may need to be adjusted to suit the application

Attachment 9
Table 2 Recommended Values for Concealed Doors - Motor 2

Index	Description	Light Weight Door (100lbs)				Heavy Weight Doors (350lbs)			
		Single		Pair		Single		Pair	
		Low Energy	Full Energy	Low Energy	Full Energy	Low Energy	Full Energy	Low Energy	Full Energy
20	Open speed, revolutions per second			9	35			09	25
21	Check speed, revolutions per second			5	7			05	5
22	Stall speed, percent of PWM counts	See Attachment 10							
23	Open check			20	35			20	45
24	Magic Touch sensitivity			00	00			00	00
25	Magic Touch hold open time			HH=55 KP=22	HH=40 KP=16			HH=55 KP=22	HH=40 KP=16
26	Hold-open delay			HH=55 KP=22	HH=15 KP=06			HH=55 KP=22	HH=15 KP=06
27	Open torque, percent of full torque			25	75			25	75
28	Check torque, percent of full torque			25	40			25	75
29	Stall torque, percent of full torque			25	40			25	25
30	Open Check Boost			10	12			09	12
33	Obstruction time			HH=50 KP=20	HH=50 KP=20			HH=50 KP=20	HH=50 KP=20
34	Open Acceleration Slope			60	60			60	60
35	Open Braking Slope			35	20			20	20
36	Delay before door motion. Motor 2.			00	00			00	00

HH = Hand Held

KP = Key Pad

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Values shown as grayed out do not affect motion of the door and may need to be adjusted to suit the application

Attachment 9
Table 3 Recommended Values for Single Out-Swing Doors

Index	Description	Light Weight Door (100lbs)				Heavy Weight Doors (350lbs)			
		Low Energy		Full Energy		Low Energy		Full Energy	
00	Open speed, revolutions per second	09		35		05		25	
01	Check speed, revolutions per second	04		05		04		06	
02	Stall speed, percent of PWM counts	See Attachment 10							
03	Open check	20		40		23		50	
04	Magic Touch sensitivity	00		00		00		00	
05	Magic Touch hold open time	HH=55 KP=22	HH=40 KP=16	HH=55 KP=22	HH=40 KP=16	HH=55 KP=22	HH=40 KP=16	HH=55 KP=22	HH=40 KP=16
06	Hold-open delay	HH=55 KP=22	HH=15 KP=06	HH=55 KP=22	HH=15 KP=06	HH=55 KP=22	HH=15 KP=06	HH=55 KP=22	HH=15 KP=06
07	Open torque, percent of full torque	25		75		25		75	
08	Check torque, percent of full torque	25		40		25		75	
09	Stall torque, percent of full torque	25		25		25		25	
10	Open Check Boost	09		14		09		10	
11	Safety Logic	00		00		00		00	
12	2S Operation	00		00		00		00	
13	Obstruction Time	HH=50 KP=20	HH=50 KP=20	HH=50 KP=20	HH=50 KP=20	HH=50 KP=20	HH=50 KP=20	HH=50 KP=20	HH=50 KP=20
14	Open Acceleration Slope	60		60		60		60	
15	Open Braking Slope	35		35		35		40	
16	Delay of door motion. Motor 1	00		00		00		00	
17	No Reverse on Obstruction	00		NA		00		NA	
18	Lock Delay	00		00		00		00	
19	Manual Mode sensor override	00		00		00		00	
31	Off Mode	00		00		00		00	
32	Lock Logic	01		01		01		01	
37	Unlock Time	10		10		10		10	

HH = Hand Held
KP = Key Pad

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Values shown as grayed out do not affect motion of the door and may need to be adjusted to suit the application

Attachment 9
Table 4 Recommended Values for Single In-Swing Doors

Index	Description	Light Weight Door (100lbs)		Heavy Weight Doors (350lbs)	
		Low Energy	Full Energy	Low Energy	Full Energy
00	Open speed, revolutions per second	10	35	06	25
01	Check speed, revolutions per second	04	04	04	04
02	Stall speed, percent of PWM counts	See Attachment 10			
03	Open check	40	45	25	45
04	Magic Touch sensitivity	00	00	00	00
05	Magic Touch hold open time	HH=55 KP=22	HH=40 KP=16	HH=55 KP=22	HH=40 KP=16
06	Hold-open delay	HH=55 KP=22	HH=15 KP=06	HH=55 KP=22	HH=15 KP=06
07	Open torque, percent of full torque	09	75	11	75
08	Check torque, percent of full torque	20	40	25	75
09	Stall torque, percent of full torque	25	25	25	25
10	Open Check Boost	05	08	04	10
11	Safety Logic	00	00	00	00
12	2S Operation	00	00	00	00
13	Obstruction Time	HH=50 KP=20	HH=50 KP=20	HH=50 KP=20	HH=50 KP=20
14	Open Acceleration Slope	60	60	60	60
15	Open Braking Slope	20	20	35	35
16	Delay of door motion. Motor 1	00	00	00	00
17	No Reverse on Obstruction	00	NA	00	NA
18	Lock Delay	00	00	00	00
19	Manual Mode sensor override	00	00	00	00
31	Off Mode	00	00	00	00
32	Lock Logic	01	01	01	01
37	Unlock Time	10	10	10	10

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KP = Key Pad

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Values shown as grayed out do not affect motion of the door and may need to be adjusted to suit the application

Attachment 9

Table 5 Recommended Values for Dual Egress Swing Doors with Motor 1 as In-Swing

Index	Description	Heavy Weight Doors (350lbs)	
		Low Energy	Full Energy
00	Open speed, revolutions per second	06	25
01	Check speed, revolutions per second	05	08
02	Stall speed, percent of PWM counts	See Attachment 10	
03	Open check	23	45
04	Magic Touch sensitivity	00	00
05	Magic Touch hold open time	HH=55 KP=22	HH=40 KP=16
06	Hold-open delay	HH=55 KP=22	HH=15 KP=06
07	Open torque, percent of full torque	25	75
08	Check torque, percent of full torque	25	75
09	Stall torque, percent of full torque	25	25
10	Open Check Boost	12	14
11	Safety Logic	00	00
12	2S Operation	00	00
13	Obstruction Time	HH=50 KP=20	HH=50 KP=20
14	Open Acceleration Slope	60	60
15	Open Braking Slope	20	20
16	Delay of door motion. Motor 1	00	00
17	No Reverse on Obstruction	00	NA
18	Lock Delay	00	00
19	Manual Mode sensor override	00	00
31	Off Mode	00	00
32	Lock Logic	01	01
37	Unlock Time	10	10

HH = Hand Held

KP = Key Pad

Values shown as grayed out do not affect motion of the door and may need to be adjusted to suit the application

Attachment 9
Table 6 Recommended Values for Dual Egress Swing Doors with Motor 2 as In-Swing

Index	Description	Heavy Weight Doors (350lbs)	
		Low Energy	Full Energy
20	Open speed, revolutions per second	07	25
21	Check speed, revolutions per second	06	05
22	Stall speed, percent of PWM counts	See Attachment 10	
23	Open check	20	45
24	Magic Touch sensitivity	00	00
25	Magic Touch hold open time	HH=55 KP=22	HH=40 KP=16
26	Hold-open delay	HH=55 KP=22	HH=15 KP=06
27	Open torque, percent of full torque	23	75
28	Check torque, percent of full torque	25	75
29	Stall torque, percent of full torque	25	25
30	Open Check Boost*	09	14
33	Obstruction time	HH=50 KP=20	HH=50 KP=20
34	Open Acceleration Slope	60	60
35	Open Braking Slope	20	35
36	Delay before door motion. Motor 2.	00	00

HH = Hand Held

KP = Key Pad

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Attachment 10 MC521 Pro Controller Fine Tuning (PAGE 1 OF 1)

Match your actual door to one from the list of doors described in the attachment. Start by installing these settings. Use the guide below to make adjustments to these settings.

SWING DOOR:

If the door:	
OPENS TOO SLOWLY If it remains still is too slow If it remains too slow	Increase Open Speed . Maximum setting is 35
	Increase Open Torque
	Increase Open Acceleration
<p>** Open Torque is also used to set the door open force.</p> <p>** Open Speeds and Force must comply with UL and ANSI/BHMA A156.19 or 156.10 requirements.</p>	
HITS THE OPEN STOP too hard	Increase Open Distance to 45
	Increase Open Brake until there is good braking.
	Increase or decrease Open Check Boost until there is good motion entering and in Open Check is satisfactory.
When the door braking and motion are under control, reduce the Open Check length as desired.	
STALLS during opening without any mechanical reason Continues to stall and seems to happen at the transition from Open Brake to Open Check	Increase Obstruction Time from .5 seconds to 1.0 seconds
	Make small increases to Open Check Boost
SPEEDS UP during Open Check	Open Check Boost is set too high. Reduce one count at a time until door motion is suitable.
CREEPS CLOSED from Full Open	Increase Stall Speed one count at a time until the Open Position is stable. To verify new setting, door must be cycled fully closed and back to Full Open .