Stanley Access Technologies

Magic-Swing™, Magic-Force™, and Bifold
MC521 Control Box
Quick-Reference Guide
204027

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1. PURPOSE

1.1 **Discussion**

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

1.2 **Applicability**

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

1.3 **Features and Functions**

1.3.1 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 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 or simultaneously.

1.3.2 Reverse On Obstruction: A reverse-on-obstruction feature causes the door to reverse motion if an obstruction is met during door opening or closing.

1.3.3 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.

1.3.4 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.

1.3.5 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.

1.3.6 Automatic Open-Check Calculation: Open-check position—the area where the door slows down before fully open—is calculated for approximately 80° in the opening direction during first install sequence (FIS). Open-check length can be adjusted using a Palm Pilot or the controller pushbuttons.

1.3.7 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).

1.3.8 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.

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

1.3.10 Opening Speed Adjustment: Permits adjustment of door opening speed.

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1.3.11 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.

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

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

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

1.3.15 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.

2. PRECAUTIONS

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

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

3. WIRING INSTRUCTIONS

3.1 **Evaluating Power Requirements**

3.1.1 EVALUATE door system power requirements as follows:

- ENSURE power source is a dedicated 117 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.

3.2 **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.

3.2.1 DEENERGIZE incoming electrical power to header.

3.2.2 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.

3.2.3 In a concealed location inside the header (not visible from the exterior of the header), DRILL a hole for a No. 8 screw.

3.2.4 INSTALL ground wire ring terminal and star washer onto the No. 8 screw provided, and FASTEN screw, star washer, and ground wire to header.

3.2.5 In a concealed location inside the header, DRILL a second hole for a No. 8 screw.

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3.2.6 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.

3.2.7 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.

3.3 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.

NOTE

1. The breakout status switch should be used in *all* applications where there is no positive door stop in the breakout direction.
2. 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).

3.3.1 Refer to Attachment 1, and CONNECT breakout status wiring.

3.3.2 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.

3.3.3 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.

3.3.4 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.

3.3.5 IF application is a pair of doors, PERFORM the following:

a. REPEAT steps 3.3.3 and 3.3.4 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.

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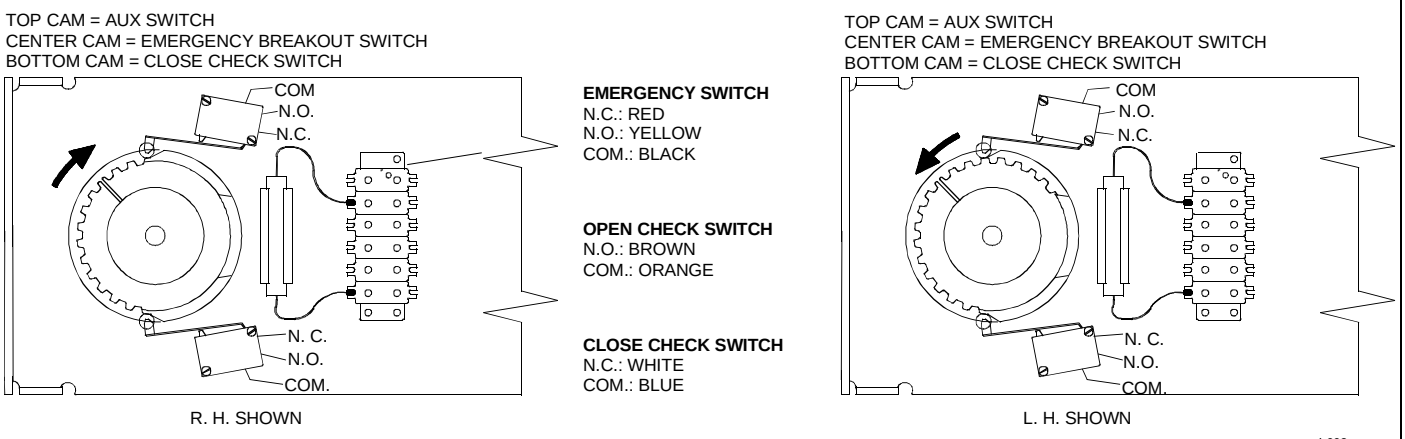
3.3.6 Using a wire nut, CONNECT remaining wire from first operator to remaining wire on second operator.

3.3.7 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.

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3.4 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.

3.4.1 SET "POWER" switch to "OFF."

3.4.2 IF single-operator application, PERFORM the following:

- INSTALL one breakout status switch wire to terminal 9 of control box connector TB3.
- INSTALL second breakout status switch wire to terminal 10 of control box connector TB3.

3.4.3 IF dual-operator application, PERFORM the following to put the breakout switches in series:

- INSTALL one breakout status switch wire from one operator to terminal 9 of control box connector TB3.
- INSTALL one breakout status switch wire from second operator to terminal 10 of control box connector TB3.
- CONNECT remaining two yellow breakout status switch wires together with a wire nut.

3.4.4 VERIFY breakout status/breakout cams are properly set as follows:

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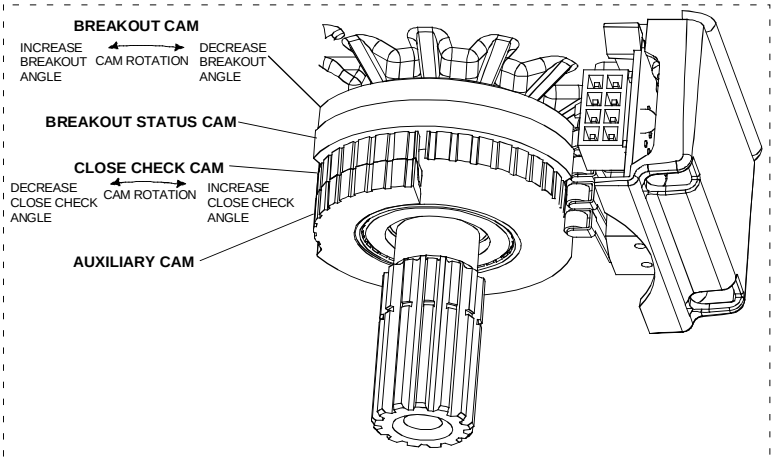
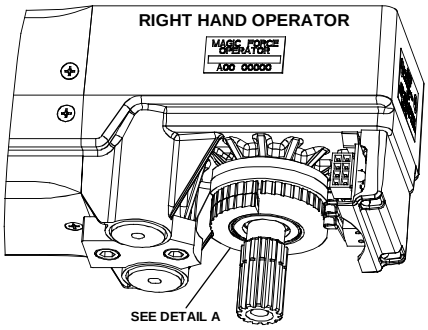
a. Refer to Figure 2, and visually INSPECT cams for proper setting.

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





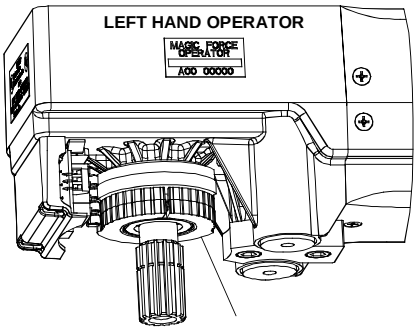
INITIAL CAM SETTINGS (LOOKING DOWN AT OPERATOR SPINDLE)

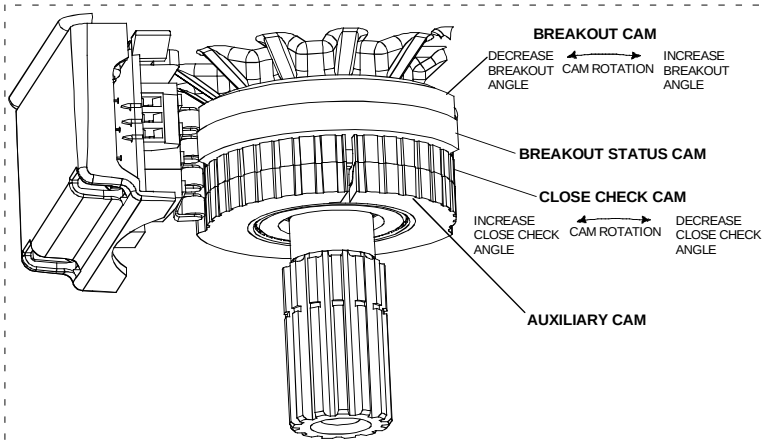
ROTATE BREAKOUT CAMS COUNTERCLOCKWISE UNTIL RAISED PORTION OF BREAKOUT STATUS CAM JUST CONTACTS SWITCH ROLLER.

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

ROTATE AUXILIARY CAM AS DESIRED.

DETAIL A: RIGHT HAND OPERATOR CAM SETTINGS





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 DESIRED.

DETAIL B: LEFT HAND OPERATOR CAM SETTINGS

MF0026

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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.

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.

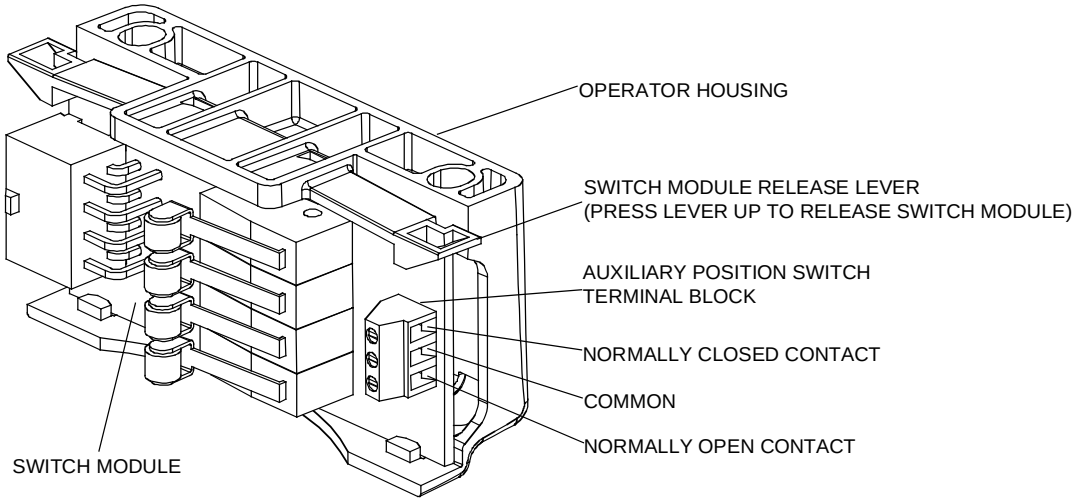
3.5 Wiring the Operator Switch Module (Magic-Force Operators)

3.5.1 Refer to Attachment 2 or 3 as applicable, and CONNECT switch module harness 413791 to dual-adjustment closing speed control connector J4.

3.5.2 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.

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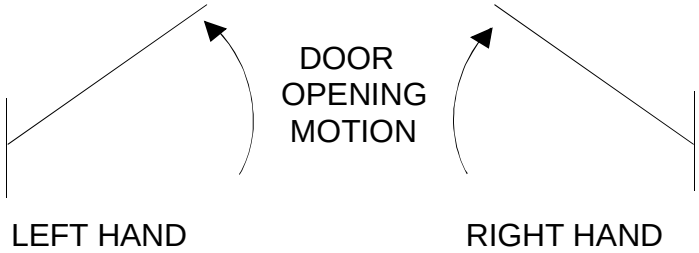
3.6 Wiring the Operator for Required Handing (Magic-Force Operators)

NOTE

Operator cams are factory-set for right hand operation.

3.6.1 Refer to Figure 4, and DETERMINE door handing.

Figure 4. Door Handing



3.6.2 CONNECT encoder cable adapter 415001 from encoder to control box encoder 1 and encoder 2 connectors if applicable.

3.6.3 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).

3.6.4 CONNECT operator harness from close speed module to control box motor 1 and motor 2 connectors if applicable

3.7 Wiring the "ON/OFF/HOLD OPEN" Switch and Power Switch

3.7.1 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	Violet

3.7.2 SET "POWER" switch to "OFF."

3.7.3 CONNECT "POWER" switch harness 516857-1 to power harness 415000.

3.7.4 CONNECT line connect harness 412544 to power harness 415000.

3.8 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.

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

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3.9 **Wiring Sentrex[3]**

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 PDA, select Sentrex for Safety Logic in Step 6. For left hand Magic Force Operators, add encoder handing jumper between encoder and encoder cable adapter.

3.9.1 Refer to Attachment 2, 3, or 4, and CONNECT Sentrex[3] 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

3.10 **Wiring Bodyguard**

NOTE

The Bodyguard does not require a lockout relay for use with the MC521 control box. A 300-ohm 5-watt resistor is needed. Part Number 516861 provides the resistor and terminal block. The MC521 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.

3.11 **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.

3.12 **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.

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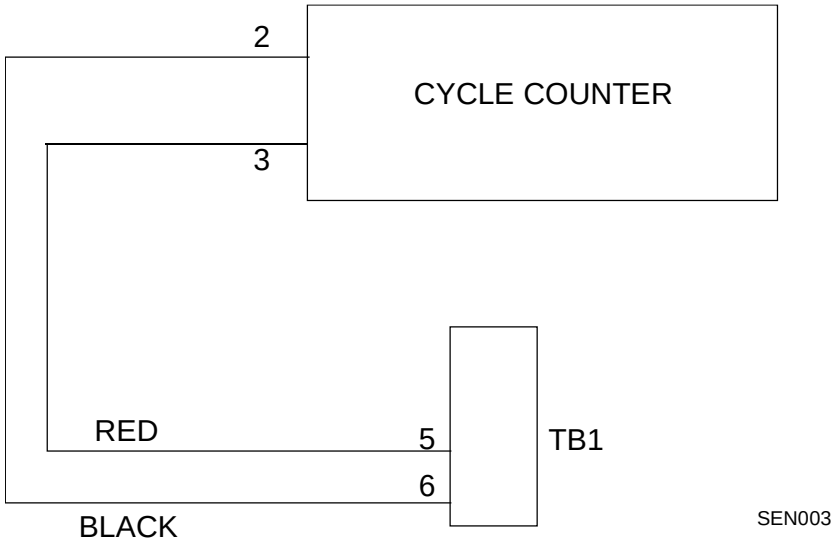
3.13 **Wiring the Cycle Counter**

NOTE
Cycle counter 413787 is optional.

3.13.1 Refer to Figure 5, and CONNECT wiring for cycle counter.

Figure 5. Cycle Counter Wiring



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4. TUNE-IN INSTRUCTIONS

4.1 Initial Tune-In Settings

4.1.1 SET “ON/OFF/HOLD OPEN” switch to “OFF.”

4.1.2 SET “POWER” switch to “ON.”

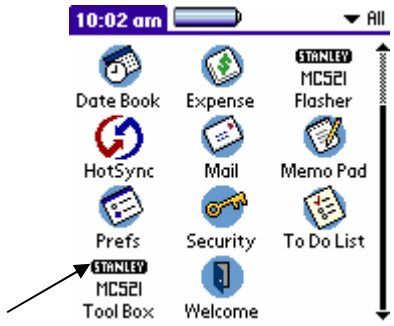
4.2 Tuning In the MC521 Controller Using the Palm Pilot

WARNING

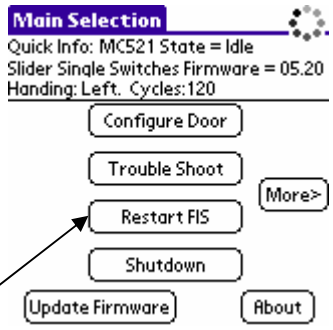
To prevent injury to personnel and damage to equipment, the following settings must be made *before* using the door.

NOTE

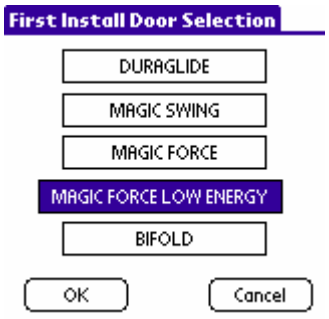
The following steps provide instructions for tuning the MC521 controller using the Palm Pilot. MC521 application software is required.



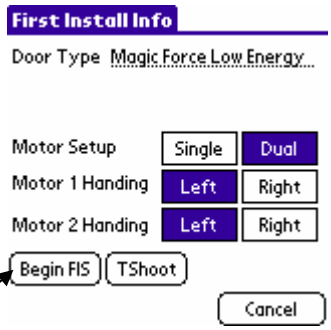
Step 1: Select **MC521 Tool Box** from the list of applications.



Step 2: Select **Restart FIS** on the Main selection menu. (**FIS** = First Install Sequence)



Step 3: Select door type.



Step 4: Setup the door type, the motor configuration, and the handing. Press **Begin FIS** when finished.

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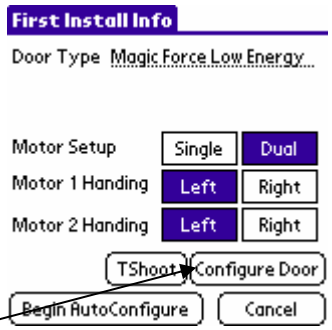
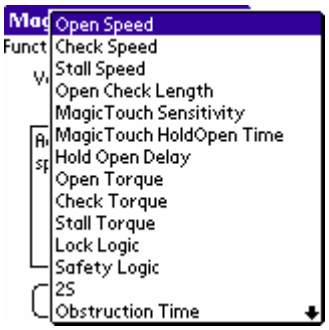
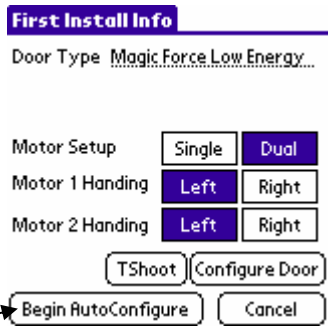


Step 5: If additional configuration is needed press **Configure Door**.



Step 6: Configure additional settings and press **Update** after each setting has been changed. Once completed, press **Cancel** to go back to the Main selection menu. Motor 1 and Motor 2 have independent settings.



Step 7: Press **Begin Auto Configure**.

Step 8: Press **OK**.

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 partially to learn stall
- Close fully
- Open halfway at open speed and stop
- Close fully

WARNING:

During this sequence the sensors are inactive and the door has no SAFETY. To stop the door, turn power off.

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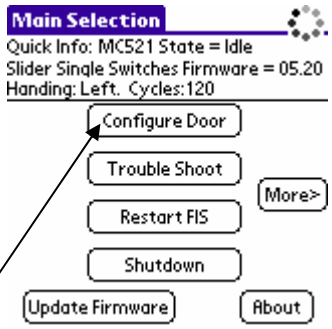
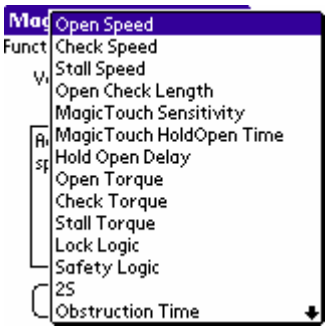
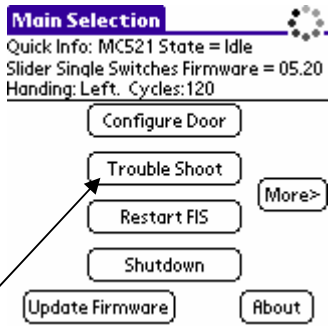


Step 11: If the door requires additional changes to be made to the settings, select **Configure Door**.

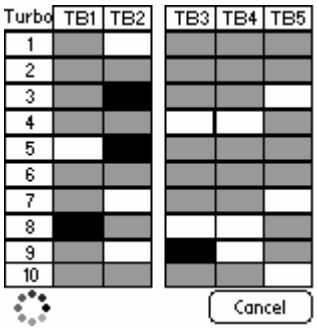


Step 12: Configure settings as needed and press **Update** after each setting has been changed. Once completed, press **Cancel** to go back to the Main selection menu.

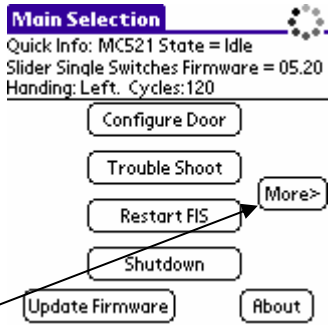
Door must be cycled to full open for changes to be stored in permanent memory.



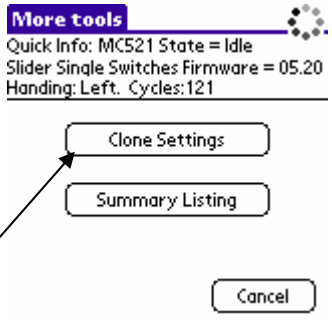
Step 13: If the door is not operating correctly press **Trouble Shoot** to enter the Trouble Shooting menu.



Step 14: View the I/O grid to verify the sensors and inputs.



Step 15: Press **More>** to access more functions.



Step 16: Press **Clone Settings** to pull all of the settings out of one controller and put them into another door.

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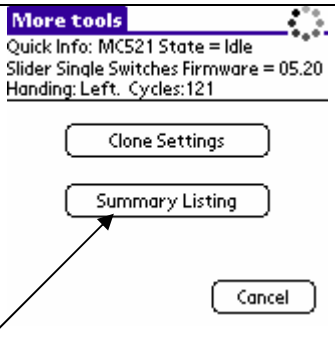
Step 17: To pull all of the settings out of one controller and put them into another door, press **Fetch Settings**.

To put the settings into another controller plug the Palm into the other controller and press **Push Settings**. Note: Push Settings feature will not work if both doors are not the same or if the software version between the two doors is different.



Step 18: Press **Summary Listing** to view all current settings for Motor 1 and Motor 2.

Step 19: Review the information on the summary listing.

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4.3 Tuning In the MC521 Controller Using the Controller Pushbuttons

NOTE

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 01.

   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 handing	01	00 = Right hand 01 = Left hand	A0

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Step	Description	Display		
		Index	Value	Status Code
7	Select Motor 2 handing	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 A2 when finished.			A2
11	Lock keypad	99	01	00
12	Final Tune in			

Table 2. MC521 Mode Values

Code	MC521 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.

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Index	Description
	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	09	20
01	03	12	Check speed, revolutions per second	04	04
02	05	40	Stall speed, percent of PWM counts	N/A	N/A
03	00	99	Open check length, percent of full opening	N/A	N/A
04	00	99	Magic Touch sensitivity (00 = OFF, 01-99 = sensitivity) (01 = max. sensitivity)	00	00
05	00	99	Magic Touch hold open time (25 sec. max. = 99%)	21	15
06	00	99	Hold-open delay in percent (25 sec. max. = 99%)	21	05
07	05	99	Open torque, percent of full torque	33	33
08	05	99	Check torque, percent of full torque	23	23
09	05	99	Stall torque, percent of full torque	23	23
10			Reserved	NA	NA
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	00	99	Obstruction Time (percent) (2.5 sec. max. = 99%)	19	19
14	00	60	Open Acceleration Slope	07	07
15	00	99	Open Braking Slope	15	40
16	00	01	Magic touch mode (Dual = 00, Single = 01)	01	01
17			Reserved	NA	NA

Note: Door must be cycled open for changes to be stored in permanent memory.

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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	09	20
21	03	12	Check speed, revolutions per second	04	04
22	05	40	Stall speed, percent of PWM counts	N/A	N/A
23	00	99	Open check length, percent of full opening	N/A	N/A
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%)	21	15
26	00	99	Hold-open delay in % (25 sec. max. = 99%)	21	05
27	05	99	Open torque, percent of full torque	33	33
28	05	99	Check torque, percent of full torque	23	23
29	05	99	Stall torque, percent of full torque	23	23
30			Reserved	NA	NA
31			Reserved	NA	NA
32			Reserved	NA	NA
33	00	99	Obstruction time in % (2.5 sec. max. = 99%)	19	19
34	00	60	Open Acceleration Slope	07	07
35	00	99	Open Braking Slope	15	40
36			Reserved	NA	NA
37			Reserved	NA	NA

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
EE	Obstruction in Learn Mode
0b	Obstruction after Learn Mode

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4.4 **Final Tune-In Adjustments**

4.4.1 Refer to ANSI/BHMA A156.10, "American National Standard for Power Operated Doors" or ANSI/BHMA A156.19, “American National Standard for Power Assist and Low Energy Power Operated Doors” and Attachment 7, and DETERMINE ANSI and UL door operating requirements.

4.4.2 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, “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.

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5. SPARE PARTS LIST

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

Table 7. Spare Parts

Description	Part Number
MC521 Controller and 3 terminal blocks	313969
MC521 Controller Manual	204027
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 New Palm Cable	415044
Harness Encoder Cable Adapter 12 inch.	415001
Resistor Assembly, Bodyguard	516861

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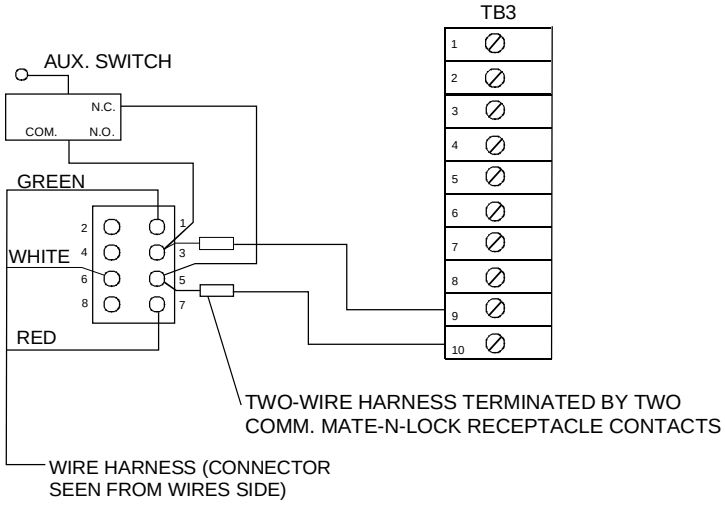
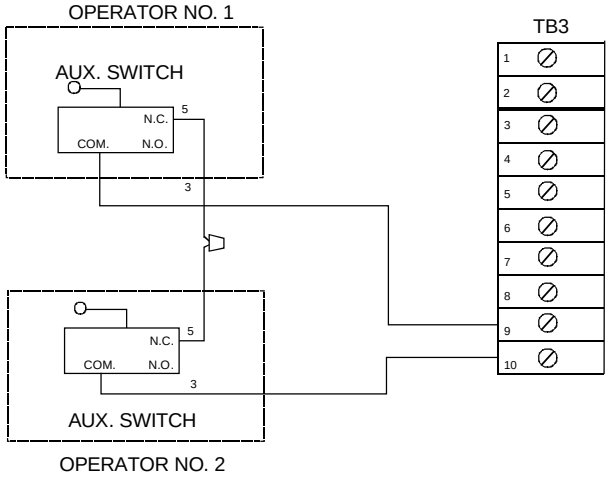
Attachment 1
Breakout Status Wiring for Magic-Swing Operators
(Sheet 1 of 1)



BREAKOUT STATUS WIRING--SINGLE DOOR



BREAKOUT STATUS WIRING--DUAL DOOR

MCBA017A

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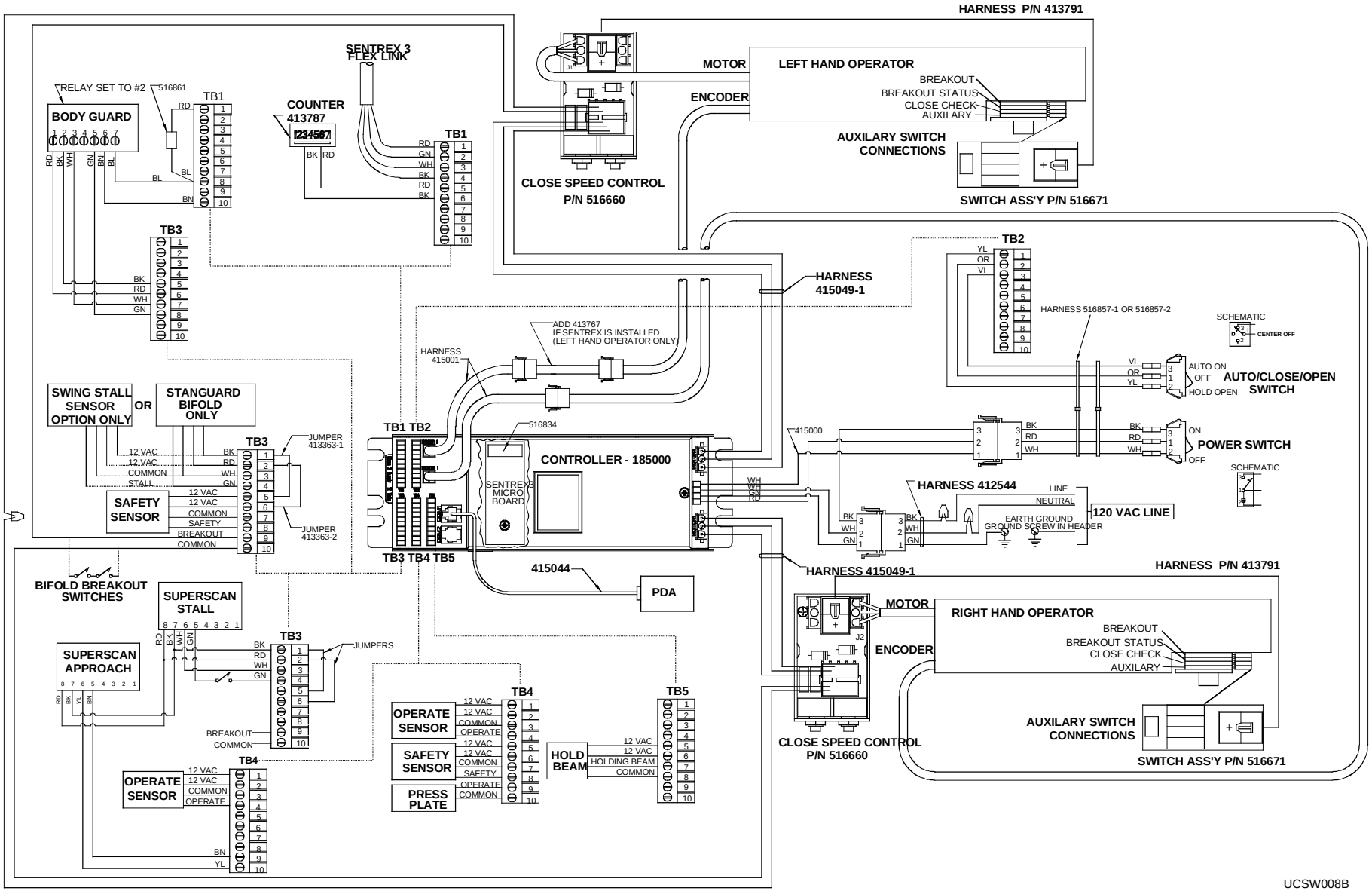
Attachment 2
Magic-Force Wiring Diagram—MC521
(Sheet 1 of 1)



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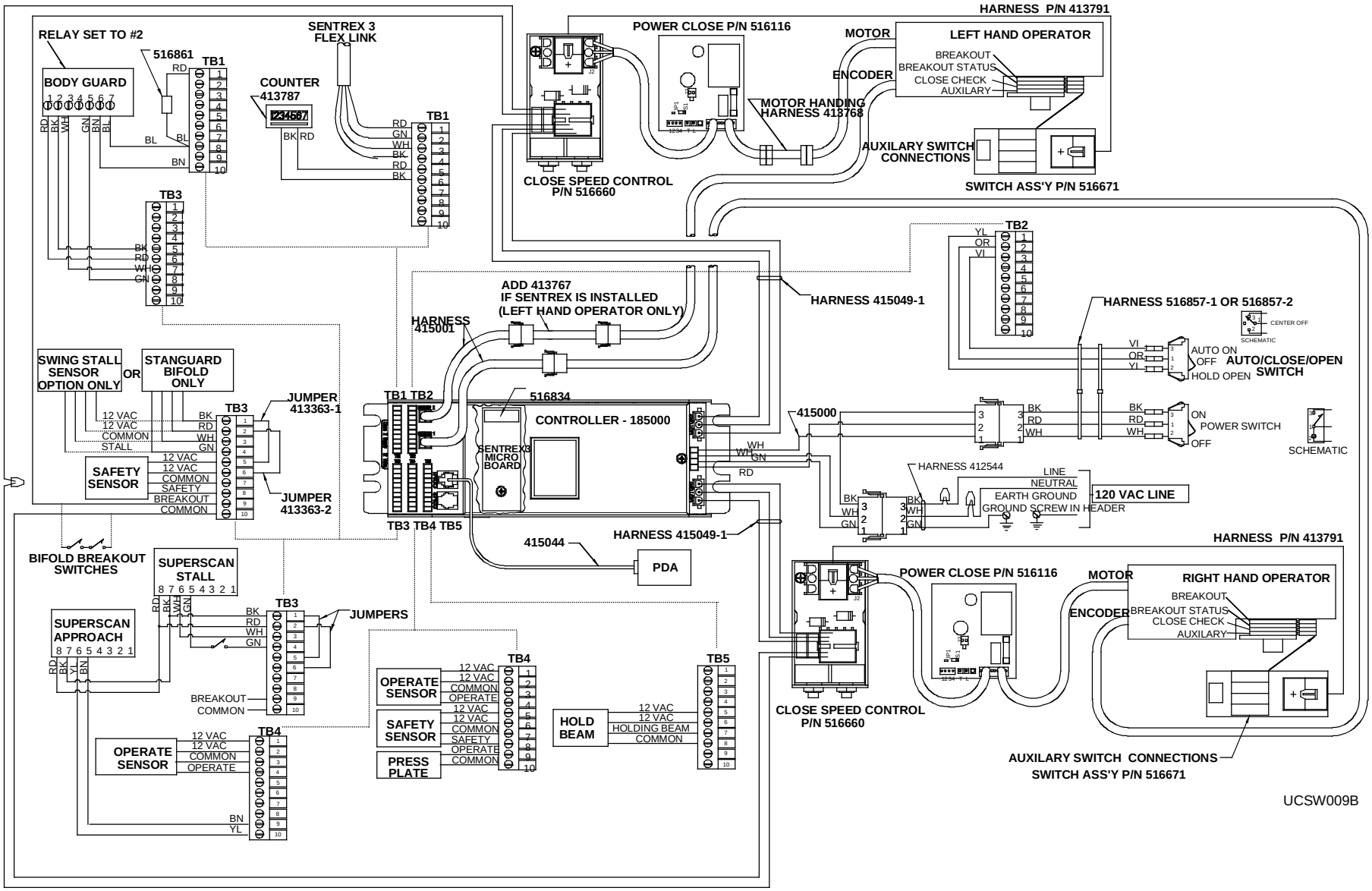
Attachment 3

Magic-Force Wiring Diagram—MC521 With Power Close Option

(Sheet 1 of 1)



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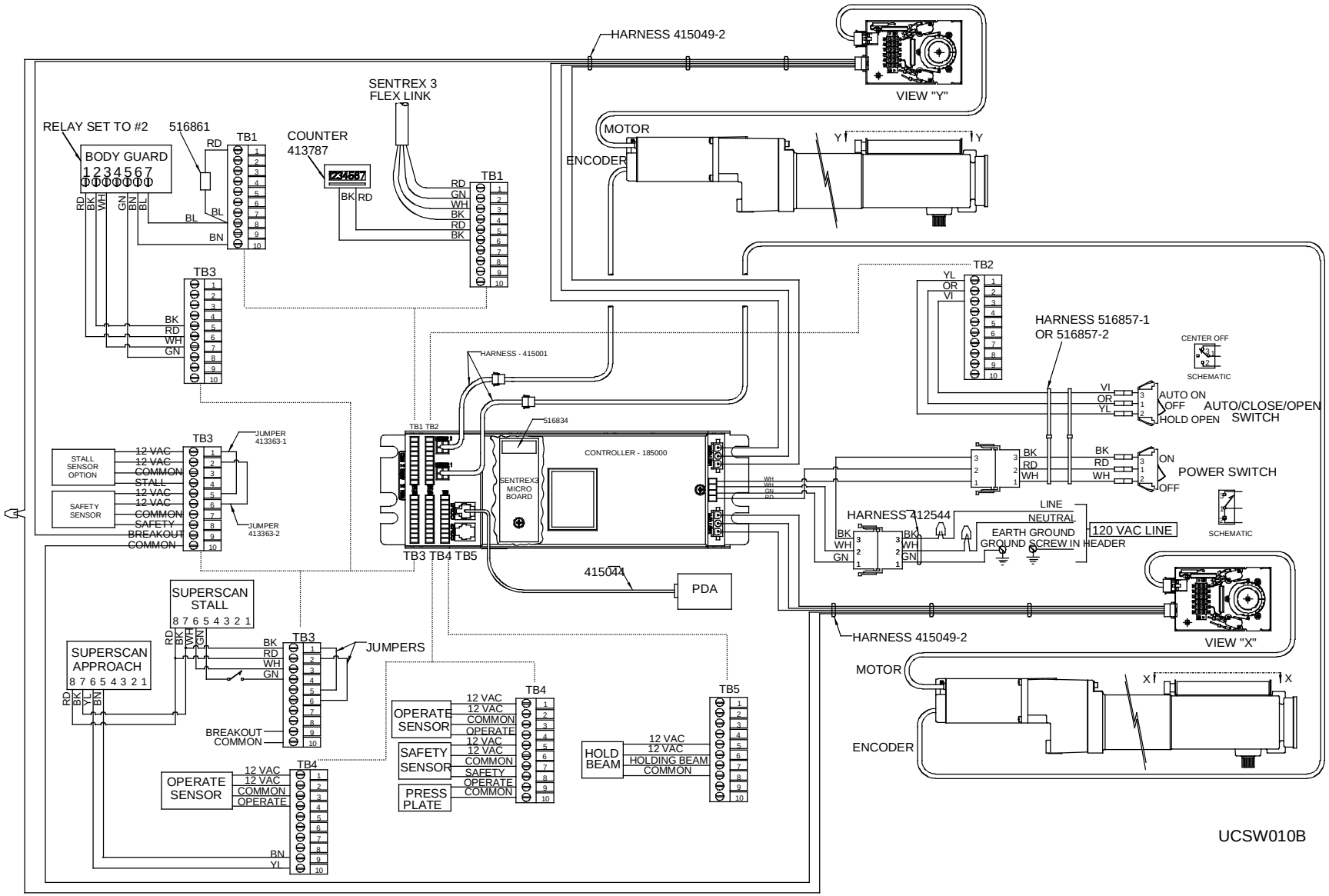
Attachment 4

Magic-Swing Wiring Diagram—MC521

(Sheet 1 of 1)



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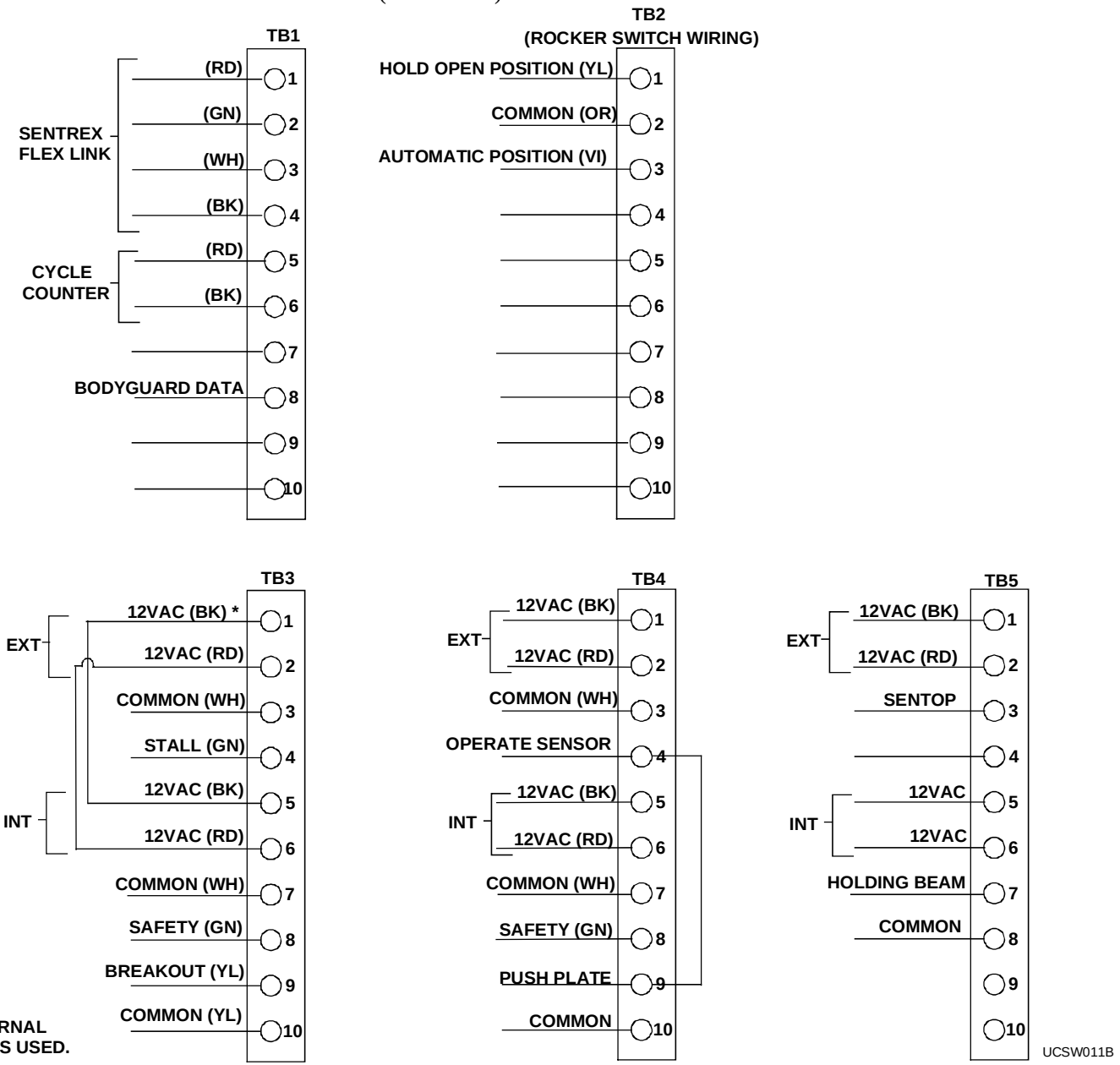
Attachment 5

Terminal Block Connections —TB1 through TB5

(Sheet 1 of 1)



*** REMOVE IF EXTERNAL POWER SUPPLY IS USED.**

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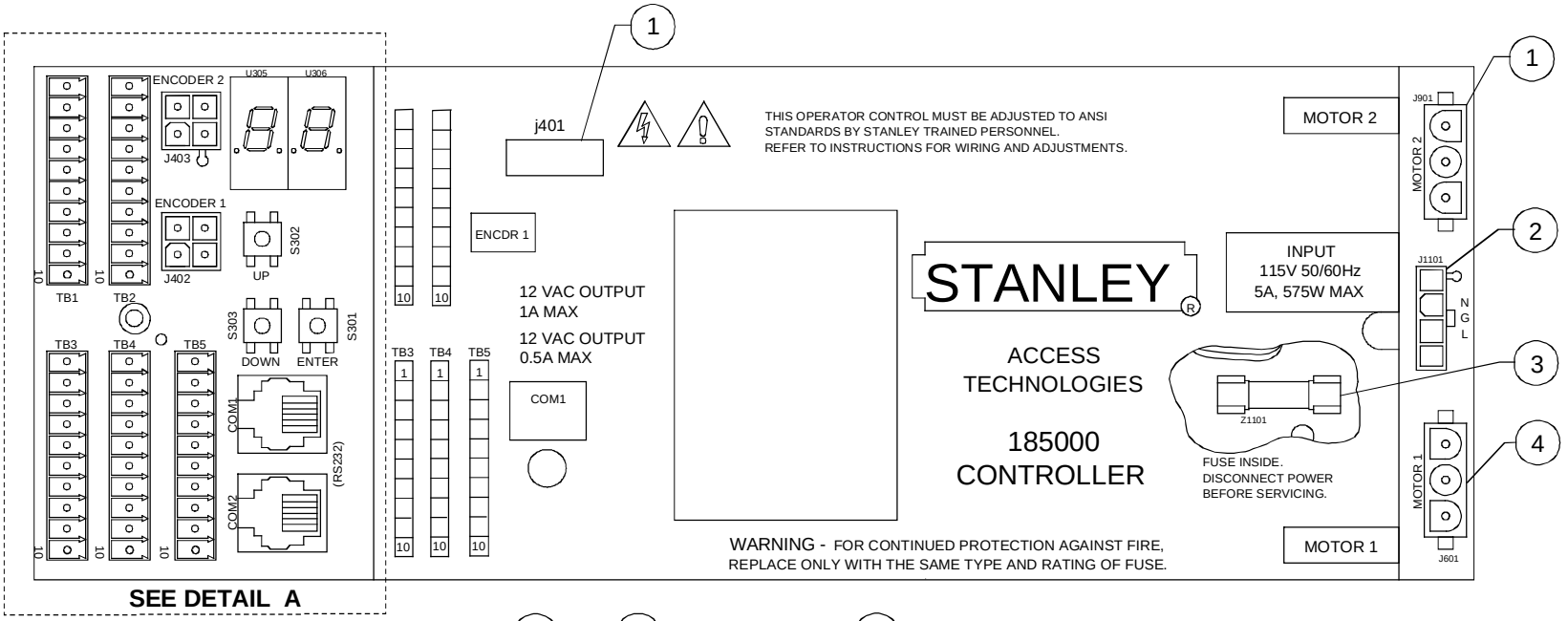
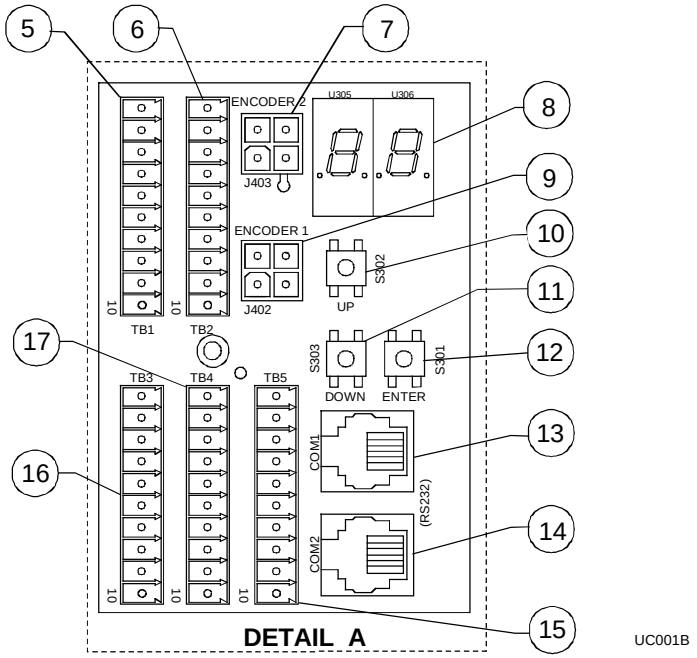
Attachment 6

MC521 Controller Controls and Indicators

(Sheet 1 of 2)





UC001B

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Attachment 6

MC521 Controller Controls and Indicators

(Sheet 2 of 2)

ITEM	CONTROL/ INDICATOR	DESCRIPTION
1	Motor 2 Connector J109	Motor No. 2 connector.
2	Power Connector J1101	Connection point for incoming line, neutral, and common power wiring.
3	Fuse Z1101	Controller fuse-- 5 Amp, 250V
4	Motor 1 Connector J601	Motor No. 1 connector.
5	Terminal Block Connector TB1	Connection point for door cycle counter and Sentrex.
6	Terminal Block Connector TB2	Connection point for function switch (rocker).
7	Encoder 2 Connector J403	Connection point for motor encoder No. 2.
8	Two Digit Display	Displays Controller Status. Also serves as the display for tune-in by pushbutton switches.
9	Encoder 1 Connector J402	Connection point for motor encoder No. 1.
10	Up Pushbutton Switch S302	Used manual setup and tuning of door when PDA is not available.
11	Down Pushbutton Switch S303	Used for manual setup and tuning of door when PDA is not available.
12	Enter Pushbutton Switch S301	Used for manual setup and tuning of door when PDA is not available.
13	COMM1 Jack	RS232 COMM1 connector. Connection point for PDA harness.
14	COMM2 Jack	RS232 COMM2 connector. Future provision.
15	Terminal Block Connector TB5	Not used.
16	Terminal Block Connector TB4	Connection point for operate sensor, safety sensor, and push plate.
17	Terminal Block Connector TB3	Connection point for stall sensor, safety 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.
18	J401	Connection point for Sentrex microboard.

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Attachment 7

ANSI/BHMA and UL Compliance Requirements for Swinging and Folding Doors

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.

1.0 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.)

2.0 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.)

3.0 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".

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

3.1 Wiring

3.1.1 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.
3.1.2 Permanent wiring is to be employed as required by the National Electrical Code and/or local codes.
3.1.3 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.

3.2 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.

3.3 Entrapment - Swinging Doors

To ensure that a **swinging** door operates in accordance with UL 325 entrapment protection criteria the following must be established:

- Manual opening force or breakout force with power on or off must be less than 50 lbf (222.4 N).
- Closing force must be less than 40 lbf (177.9 N) at the lock/latch stile.
- Closing time through the final 10 degrees must be greater than 1.5 seconds.
- Maximum recommended door weight:
  Magic-Access Operator = 250 lbs (115 kg)
  Magic-Force Operator = 350 lbs (160 kg)
  Magic-Swing Operator = 700 lbs (320 kg)

3.4 Entrapment – Folding Doors

To ensure that a **folding** door operates in accordance with UL 325 entrapment protection criteria the following must be established:

- Breakout force with power on or off must be less than 50 lbf (222.4 N).
- Closing force must be less than 30 lbf (133.4 N) between fully open and latch check.
- Closing time through the final 2 inches of closing (latch check) must be greater than 1.5 seconds measured at the lead edge of each FX (fold slide) panel.
- Maximum recommended door weight:
  Bifold Door = 100 lbs (45 kg) each panel

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Attachment 8

Palm Troubleshooting Aid—Swing/Bifold

(Sheet 1 of 1)

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

Function Switch states for TB2

	Hold Open		Off		Auto On
TB2-1	■				
TB2-3					■

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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