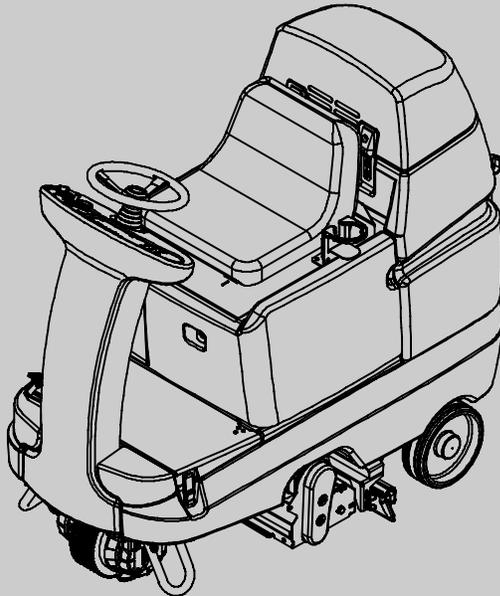




R14

Dual Technology Rider Carpet Cleaner

Service Information Manual



READY SPACE®

More than clean, it's ReadySpace.®

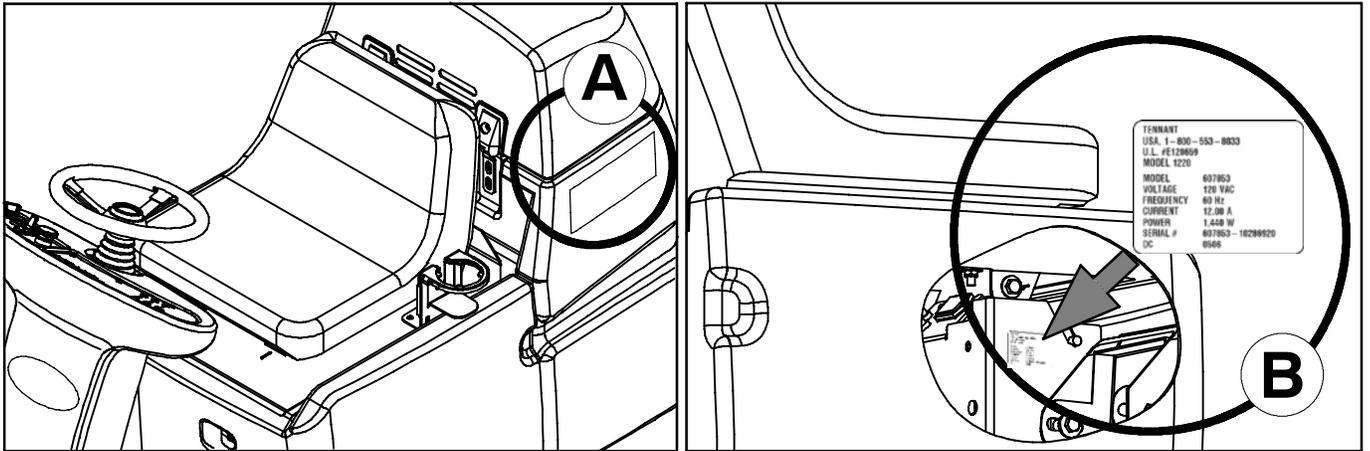
Hygenic® Fully Cleanable Tanks

North America

www.tennantco.com

1032129
Rev. 01 (12-2006)





FOR REPLACEMENT PARTS

Identify machine model and serial number.

1. **(A)** Identify the machine model.
2. **(B)** Identify the machine serial number from the data label.

Refer to the Tennant Parts Manual

NOTE: Only use TENNANT Company supplied or equivalent parts. Parts and supplies may be ordered online, by phone, by fax or by mail.

Tennant Company

PO Box 1452

Minneapolis, MN 55440

Phone: (800) 553-8033 or (763) 513-2850

www.tennantco.com

Specifications and parts are subject to change without notice.

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R14 Service Information Manual

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R14 Service Information Manual



BEFORE CONDUCTING TESTS:



- Read and Follow ALL Safety Warnings and Precautions in Operator's Manual
- Always use an ESD (Electrostatic Discharge) strap when working near the Control Board
- Be cautious when working near Control Board – Battery voltage is always present, even with Key OFF
- Always Disconnect Batteries when removing or replacing components

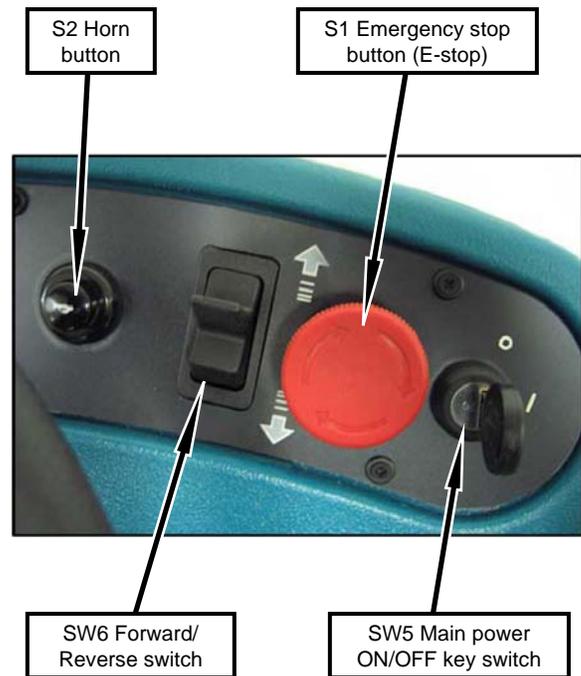
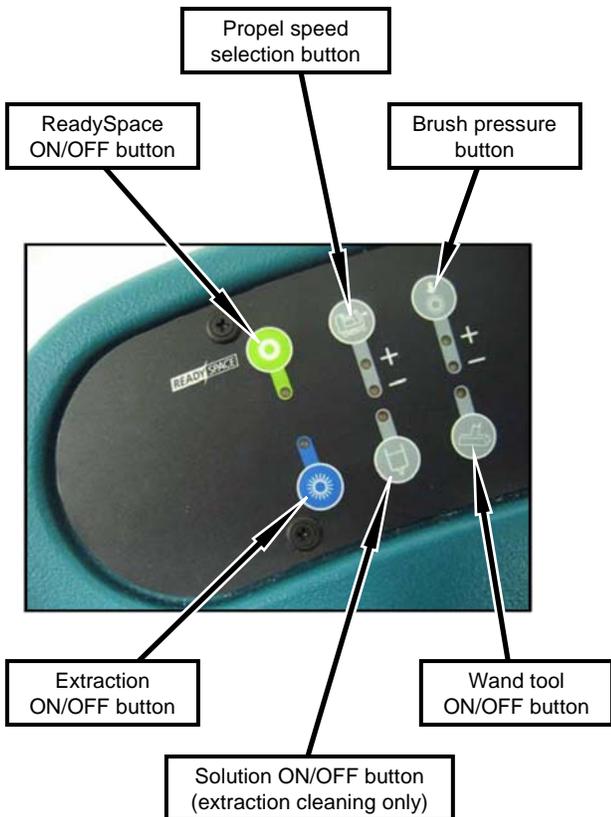
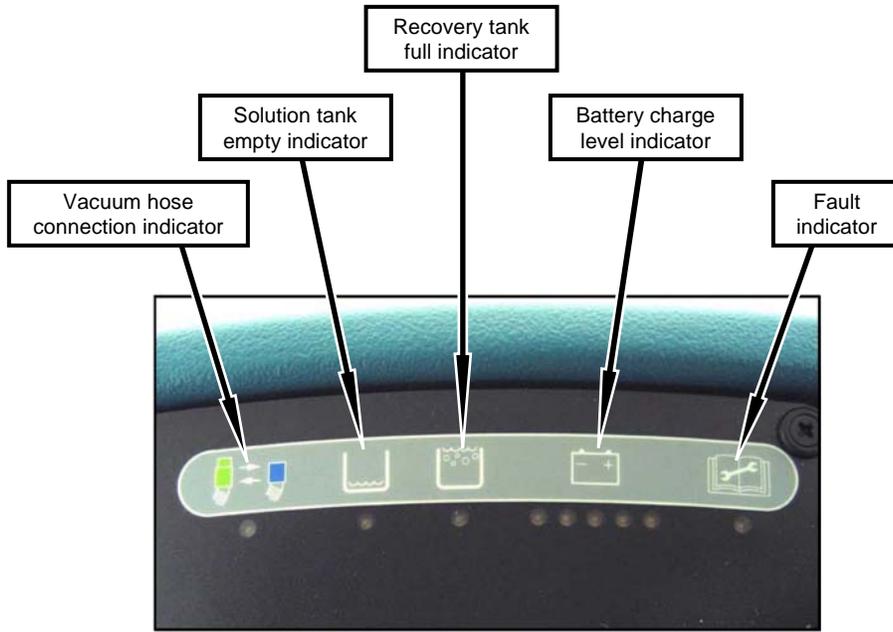
DURING TESTS:

- Call Technical Services if Diagnostic Time Exceeds One Hour with Unknown Cause or Course of Action

R14 – Component Locator

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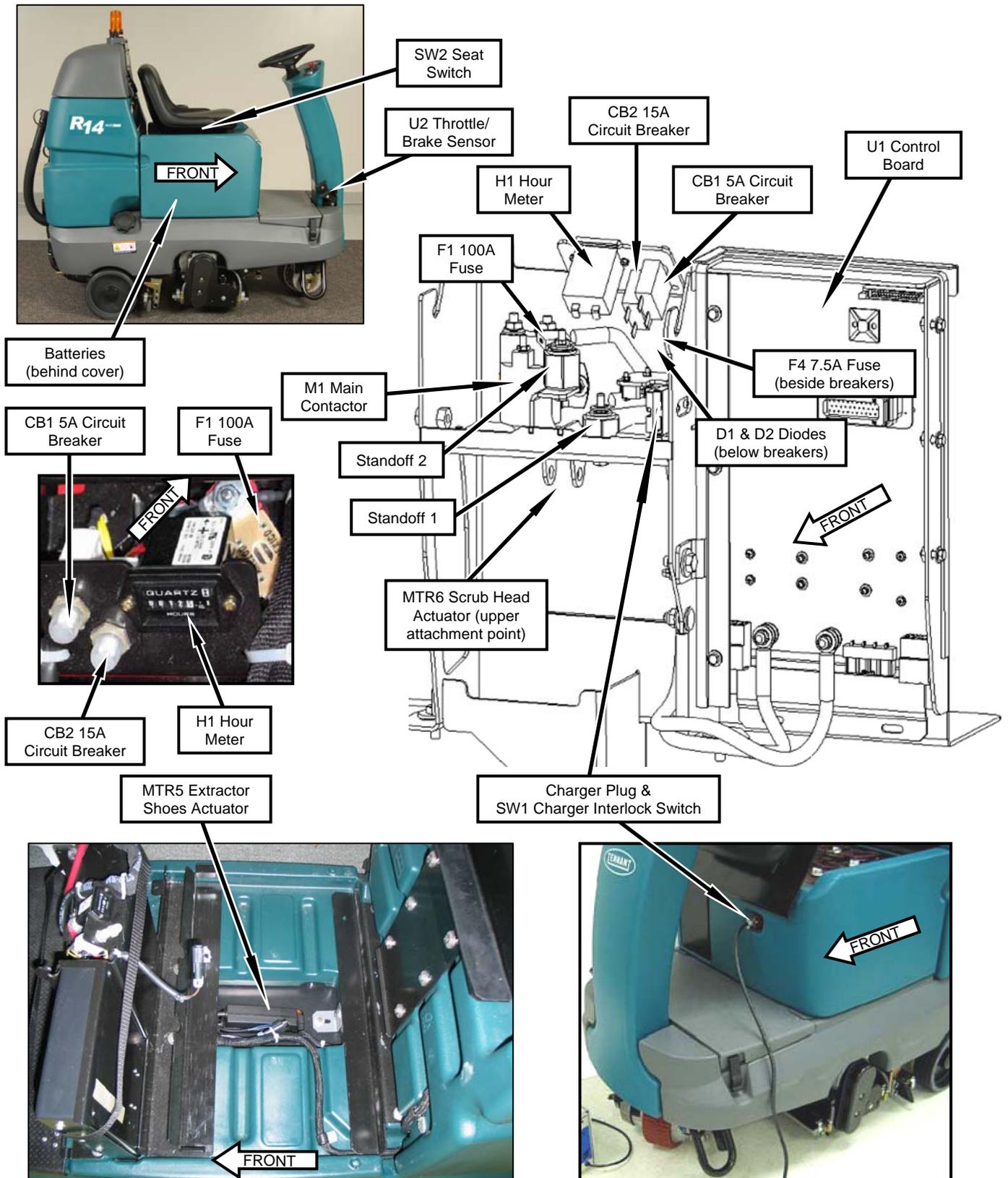
Control Panel Details



R14 – Component Locator

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Battery Compartment Area Details

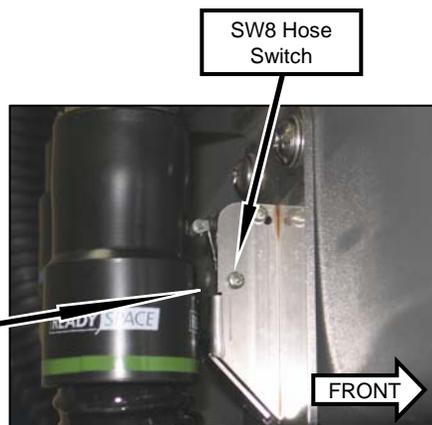
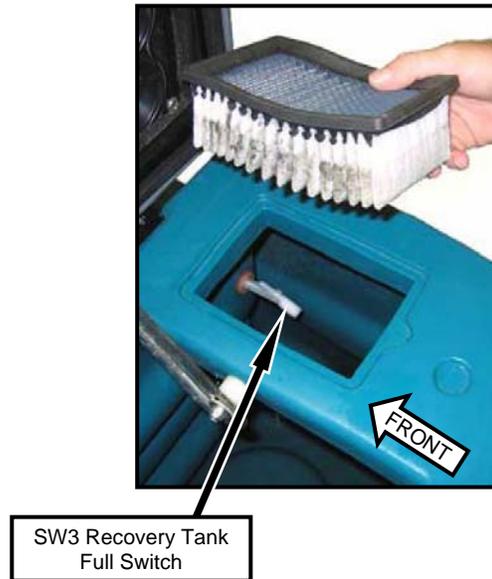
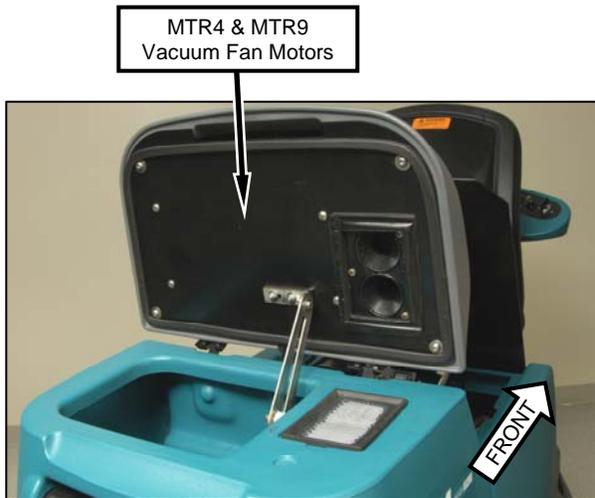
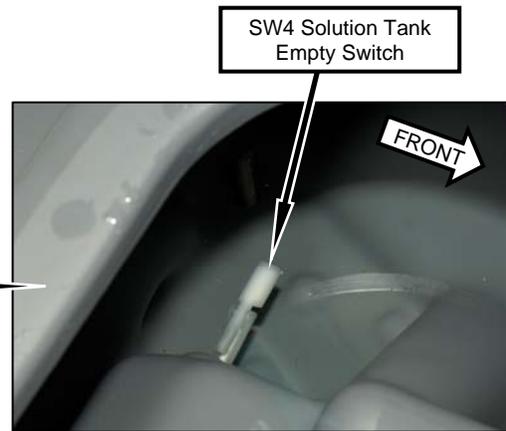


Shown with seat, cover, and batteries removed

R14 – Component Locator

(Page 3 of 4)

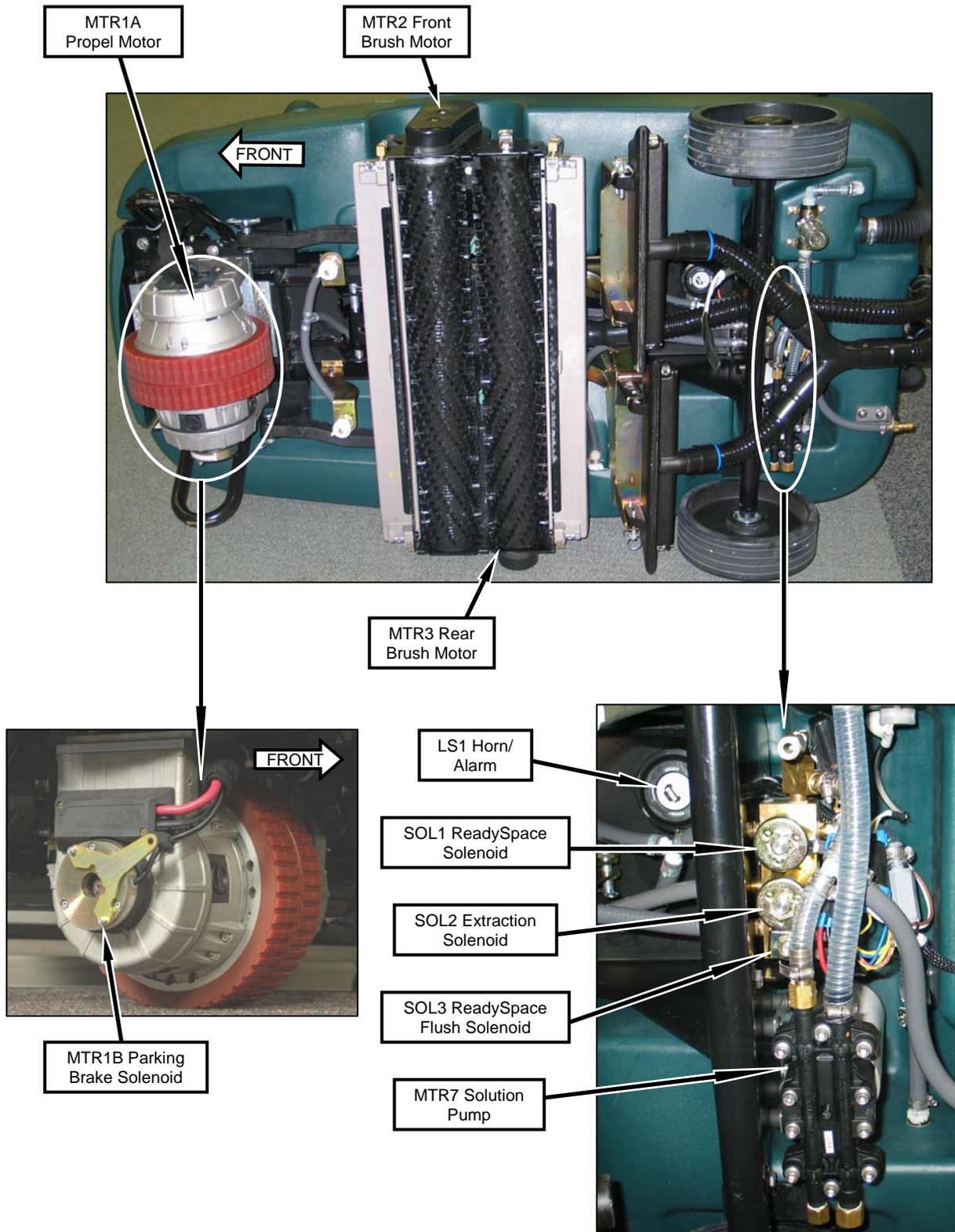
Rear Machine Area Details



R14 – Component Locator

(Page 4 of 4)

Underside Details



R14 Specifications

MACHINE SPECIFICATIONS

MODEL	R-14
Length	61.5 in / 1,560 mm
Width	32 / 813 mm
Height	52 / 1,325 mm
Minimum Aisle Turn	64 in / 1,630 mm
Weight - less batteries	835 lb / 380 kg
Weight - with batteries	1,225 lb / 560 kg
Solution tank capacity	32 gal / 121 L
Recovery tank capacity	28 gal / 106 L
Cleaning path width	27.5 in / 700 mm
Productivity rate (max)	ReadySpace cleaning-theoretical: 13,000 ft ² /hr / 1,208 m ² /hr
	ReadySpace cleaning-estimated actual: 10,000 ft ² /hr / 929 m ² /hr
	Restorative extraction cleaning-theoretical: 7,500 ft ² /hr / 697 m ² /hr
	Restorative extraction cleaning-estimated actual: 5,000 ft ² /hr / 465 m ² /hr
Travel speed	Transport forward: 290 ft/min / 88 m/min
	Transport reverse: 175 ft/min / 53 m/min
	ReadySpace cleaning - standard: 100 ft/min / 30 m/min
	ReadySpace cleaning - maximum: 150 ft/min / 46 m/min
	Restorative extraction cleaning - standard: 50 ft/min / 15 m/min
	Restorative extraction cleaning - maximum: 75 ft/min / 23 m/min
Maximum rated climb	Transporting (empty tanks): 11° angle / 19.25% grade
	Cleaning: 6° angle / 10.5% grade
Propel motor	Transaxle, 24 V, 62 A, 1.57 hp / 1153 kW
Brush motor	Two 24 V, 20 A, .54 hp / 0.40 kW
Brush/roller speed	270 rpm
Solution pump	24 V, 5 A, 1.3 gpm / 4.9 L/min, 250 psi / 17.25 bar
Solution pressure/spray rate	ReadySpace Cleaning: 30 psi / 2 bar at spray tips, 0.33 gal/min / 1.25 L/min
	Restorative extraction cleaning: 52 psi / 3.6 bar at spray tips, 1.24 gal/min / 4.69 L/min
Vacuum motor	Two 24 V, 23 A, .86 hp / 0.64 kW
Water lift-air flow	ReadySpace cleaning: 23.4 in / 594.4 mm - 55 cfm / 26 L/sec
	Restorative extraction cleaning: 59.4 in / 1,509 mm - 6.5 cfm 3.1 L/sec
Voltage DC	24 VDC
Total power consumption	ReadySpace cleaning: 60 A nominal
	Restorative extraction cleaning: 65 A nominal
Battery capacity	Four 6 V, 335 Ah/20 hr rate
Maximum run time	2.5 hours*
Battery charger	120 VAC, 60 Hz, 24 VDC, 30 A output
Decibel rating at operator ear, indoors	73 dBA**

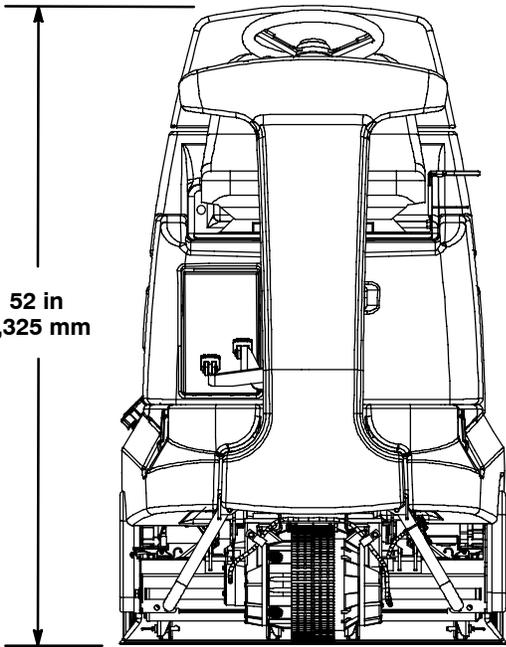
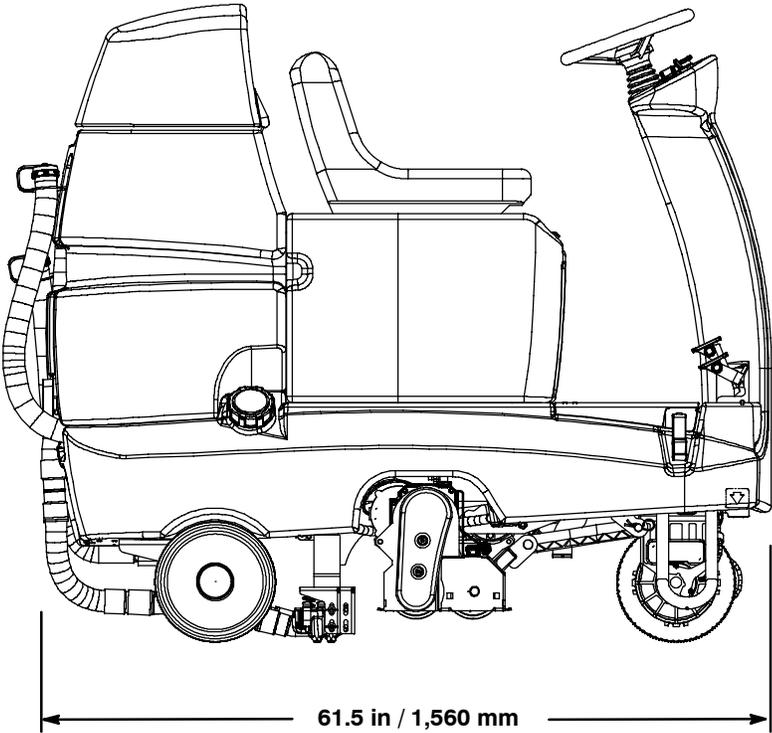
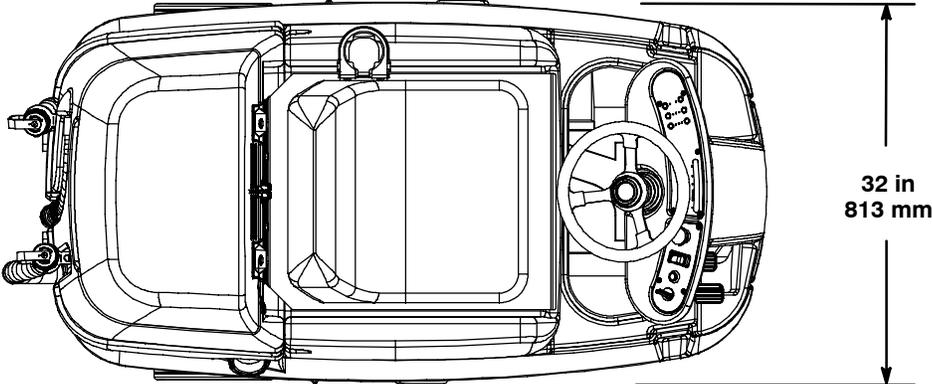
* Run times are based on Continuous Scrubbing Run Times.

** Sound pressure (ISO 11201) as recommended by the American Association of Cleaning Equipment Manufacturers (AACEM) and OSHA.

Specifications are subject to change without notice.

R14 Dimensions

MACHINE DIMENSIONS



CIRCUIT BREAKERS / FUSES

The machine is equipped with two resettable circuit breakers and two fuses to protect the machine from damage. If a breaker should trip, determine the cause, allow the motor to cool then reset the circuit breaker button.

The circuit breakers and the fuses are located inside the battery compartment near the hour meter (Figure 30). When replacing a blown fuse never substitute a higher amp rated fuse than specified.

CIRCUIT BREAKERS:

5 A - controller key switch input

15 A - solution pump/solution solenoid/ brake/horn/ hour meter (See page 30 for solution solenoid reference)

FUSES:

100 A - main (part no. 86379)

7.5 A - solution pump (part no. 1016039)

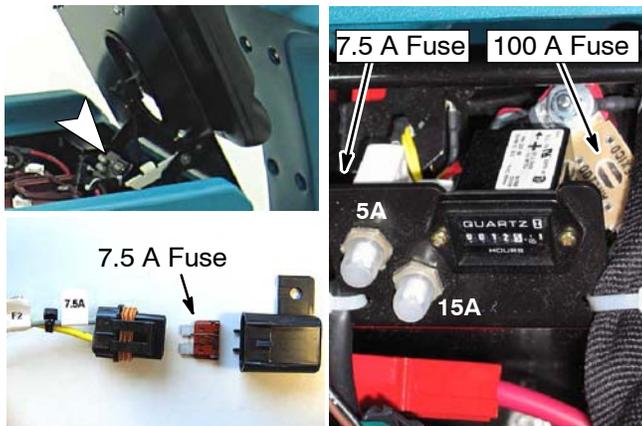


FIG. 30

CHARGING BATTERIES

ATTENTION: To prolong the life of the batteries only recharge the batteries if the machine was used for a total of 30 minutes or more. Do not leave batteries discharged for lengthy periods.

⚠ WARNING: Fire Or Explosion Hazard. Batteries Emit Hydrogen Gas. Keep Sparks And Open Flame Away. Keep Battery Compartment Open When Charging.

FOR SAFETY: When servicing batteries, wear protective gloves and eye protection when handling batteries and battery cables. Avoid contact with battery acid.

BATTERY CHARGER SPECIFICATIONS

- CHARGER TYPE:
 - FOR WET (Lead acid) BATTERIES
- OUTPUT VOLTAGE - 24 VOLTS
- OUTPUT CURRENT - 30 AMPS
- AUTOMATIC SHUTOFF CIRCUIT
- FOR DEEP CYCLE BATTERY CHARGING

1. Park the machine on a flat, dry surface and turn the key off. Make sure the area is well ventilated.
2. Tilt the seat forward for ventilation (Figure 39). Use the seat stand to hold the seat up.



FIG. 39

3. Check the battery fluid level before charging (Figure 40). The fluid level should slightly cover the battery plates. Add distilled water if low. **DO NOT OVERFILL.** The fluid will expand and may overflow when charging.

FOR SAFETY: When servicing batteries, wear protective gloves and eye protection when handling batteries and battery cables. Avoid contact with battery acid.

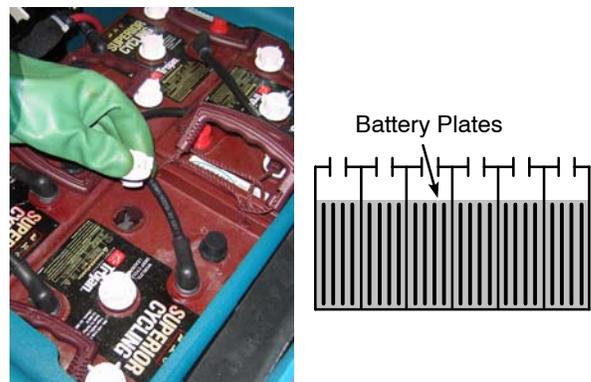


FIG. 40

4. Connect the charger's AC power supply cord into a properly grounded wall outlet.

5. Connect the charger's DC cord into the machine's battery charge receptacle (Figure 41).

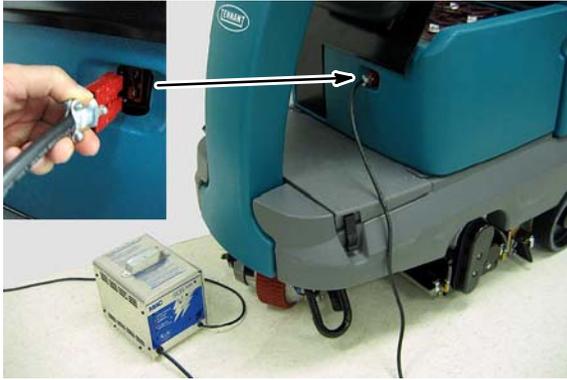


FIG. 41

6. The supplied charger will automatically begin charging and shut off when fully charged.

NOTE: The machine will not operate when charging.

ATTENTION: Do not disconnect the charger's DC cord from the machine's receptacle when the charger is operating. Arcing may result. If the charger must be interrupted during charging, disconnect the AC power supply cord first.

MACHINE MAINTENANCE

To keep the machine in good working condition, perform the following maintenance procedures.

FOR SAFETY: Before leaving or servicing machine, stop on a level surface and turn off machine.

⚠ WARNING: Electrical Hazard. Disconnect Battery Cables Before Servicing Machine.

ATTENTION: Contact an authorized service center for machine repairs. Machine repairs performed by other than an authorized person will void your warranty.

AFTER EVERY USE

1. Drain and rinse out the recovery tank (Figure 42).



FIG. 42

2. Rinse off the recovery tank float sensor (Figure 43).



FIG. 43

3. Clean the vacuum fan filter with low water pressure (Figure 44). Allow the filter to completely dry before reinstalling.



FIG. 44

4. Drain the solution tank (Figure 45).



FIG. 45

5. Clean the front and back half of the solution tank. Clean the solution tank sensor and filter (Figure 46).



FIG. 46

6. Clean the outside surface of the machine with an all purpose cleaner and damp cloth (Figure 47).

FOR SAFETY: When cleaning machine, do not power spray or hose off machine. Electrical malfunction may occur.



FIG. 47

7. Recharge the batteries if the machine was used for at total of 30 minutes or more (Figure 48).

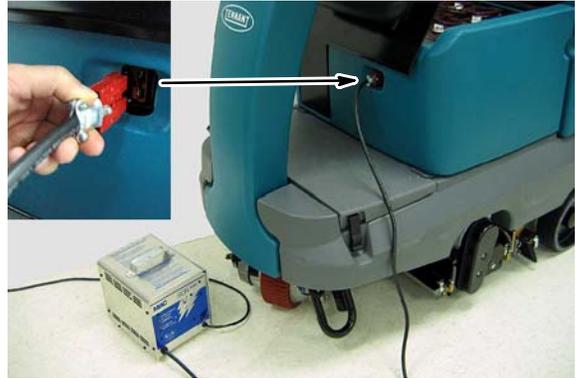


FIG. 48

AFTER EVERY 10 HOURS OF USE

1. Flip the ReadySpace rollers end-for-end every 10 hours (Figure 49). Replace the rollers if an air gap is visible between the two rollers. The roller life is rated at 100 hours of use under normal cleaning conditions. Always replace rollers as a set.



FIG. 49

2. Remove any entangled carpet fibers and debris from the extractor brushes (Figure 50). Replace the brushes if damaged or worn.



FIG. 50

- Clean the underside of the scrub head and the idler plate (Figure 51).



FIG. 51

- Remove the covers from the ReadySpace vacuum shoes and wipe out the debris build up (Figure 52). Remove the ReadySpace rollers and use a pointed object to clean vacuum shoe intake slot.

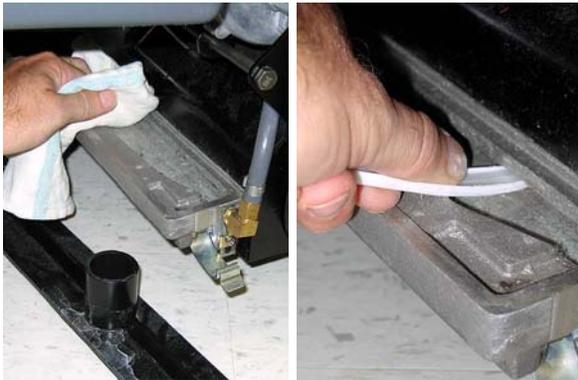


FIG. 52

- Remove the extraction vacuum shoes and rinse out the debris buildup (Figure 53). Use a pointed object to clean the vacuum shoe intake slot. (See Figure 54 for Extraction Vacuum Shoe Removal.)



FIG. 53

Extraction Vacuum Shoe Removal (Figure 54):

- With the scrub head in the up position, remove the two down pressure springs. Lower the scrub head after removing springs.
- Disconnect the vacuum hose.
- Pull the two mounting pins
- Remove shoe from scrub head.

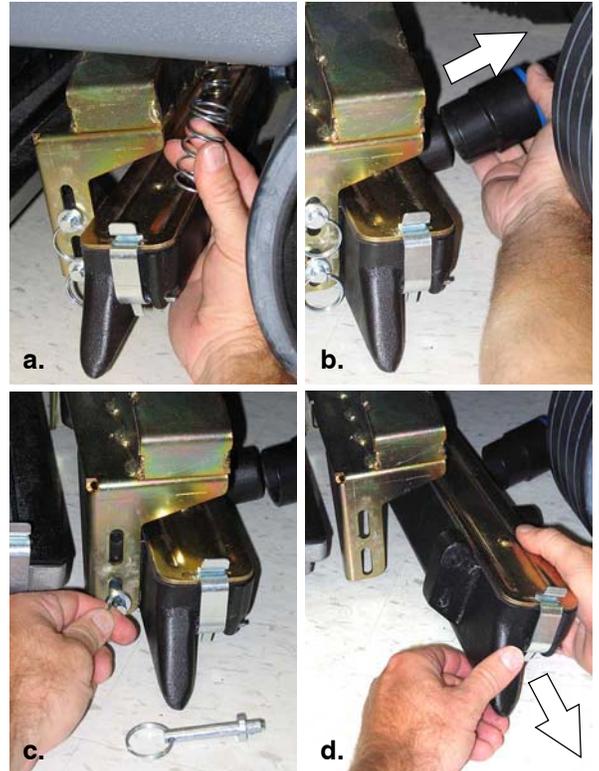


FIG. 54

AFTER EVERY 80 HOURS OF USE

1. Empty the solution tank and remove the solution tank filter from under the machine and rinse out the screen (Figure 55).



FIG. 55

2. Remove the two Restorative Extraction spray nozzles and soak the tips and screens in an acetic acid solution (Figure 56). Use a plastic bristle brush to clean clogged spray tips. Do not use a pointed object to clean tips, damage will occur.



FIG. 56

When replacing the extraction spray nozzles, turn the cap until it clicks into position. The position of the spray nozzles is set at a 3° angle (Figure 57).

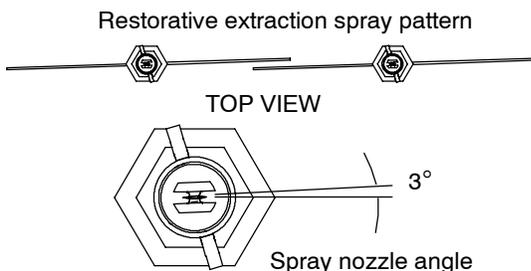


FIG. 57

3. Remove the two ReadySpace spray nozzles and soak the tips in an acetic acid solution (Figure 58). Use a plastic bristle brush to clean clogged spray tips. Do not use pointed objects to clean tips, damage will occur.



ReadySpace Spray Nozzle
GREEN CAP / TIP #11002 p/n 575283000

FIG. 58

When replacing the ReadySpace spray nozzles, turn the cap until it clicks into position. The position of the spray nozzles is set to spray directly between the two rollers (Figure 59).

ReadySpace Spray Pattern

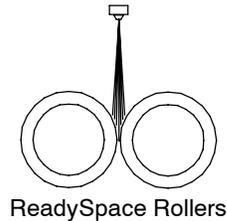


FIG. 59

4. Remove the two ReadySpace vacuum shoe flush lines and soak them in an acetic acid solution (Figure 60). Do not remove the tips from the flush lines.

NOTE: During ReadySpace operation the flush line spray tips will spray every 2½ minutes for 3 seconds.



Push retainer tab upward to release spray tip.

FIG. 60

5. Flush the plumbing system with an acetic acid solution to dissolve normal alkaline buildup. This procedure requires the machine to sit overnight.
 - a. Remove rollers/brushes from the scrub head.
 - b. Pour 3 gal / 11 L of hot water into the solution tank. Do not exceed 140°F / 60°C.
 - c. Add the acetic acid solution according to the mixing directions on the bottle.

FOR SAFETY: When using chemicals follow mixing and handling instructions on chemical containers.

- d. Place the machine in an area with a floor drain.
 - e. Operate both cleaning technologies for one minute each.
 - f. Turn the key off and let the machine sit overnight to allow the acetic acid solution to breakdown the alkaline buildup.
 - g. Next day, disperse the remaining acetic acid solution and rinse the solution system with 11 liters (3 gal) of clean water.
6. Check the belt tension on the two brush motors. Tighten the belt if able to twist it more than 90° at midpoint (Figure 61).

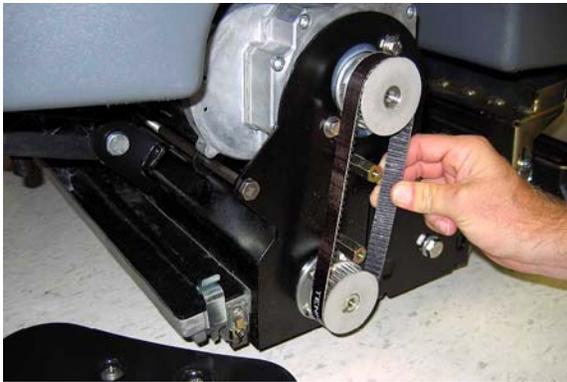


FIG. 61

FOR SAFETY: When servicing machine, disconnect the battery connections.

7. Clean the batteries and check the fluid levels (See BATTERY MAINTENANCE).
8. Check for loose or worn battery cables. Replace if worn.
9. Lubricate all pivot points with a water resistant grease.
10. Check the machine for water leaks.
11. Check the machine for loose nuts and bolts.

MOTOR MAINTENANCE

Contact an Authorized Tennant Service Center for carbon brush replacement.

Replace the carbon brushes as directed.

Carbon Brush Replacement	Hours
Propel Motor	750
Vacuum Motors	
Brush Motors	1000

⚠ WARNING: Electrical Hazard. Disconnect Battery Cables Before Servicing Machine.

BATTERY MAINTENANCE

⚠ WARNING: Fire Or Explosion Hazard. Batteries Emit Hydrogen Gas. Keep Sparks And Open Flame Away. Keep Battery Compartment Open When Charging.

FOR SAFETY: When servicing batteries, wear protective gloves and eye protection. Avoid contact with battery acid.

To prolong the life of the batteries only recharge the batteries if the machine is used for a total of 30 minutes or more. Never leave batteries discharged for lengthy periods.

1. Check battery fluid levels before and after charging. The fluid should be at the level shown (Figure 62). Add distilled water if low. **DO NOT OVERFILL.** The fluid will expand and may overflow when charging.



CORRECT BATTERY FLUID LEVEL:

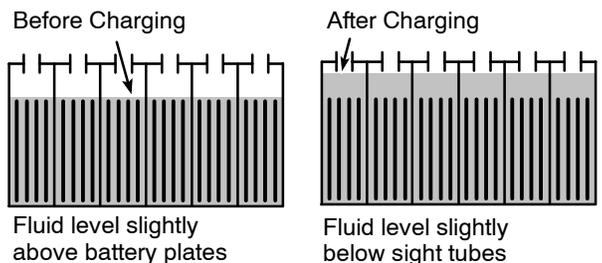


FIG. 62

2. Clean the batteries and terminals to prevent battery corrosion. Use a scrub brush with a mixture of baking soda and water (Figure 63).

ATTENTION: Do not allow the baking soda solution to enter the batteries.



FIG. 63

3. Check for loose or worn battery cables. Replace if worn.

PRIMING SOLUTION SYSTEM

To prime the machine's solution system, operate the ReadySpace technology for approximately one minute (Figure 64). Once primed, the machine can be used for restorative extraction cleaning.

If the solution system is completely dry or if you notice center streaking when restorative extraction cleaning, the solution system must be primed.



FIG. 64

MACHINE JACKING

Use the designated jacking locations for jacking up the machine (Figure 65). Empty the recovery and solution tanks before jacking. Use a jack capable of supporting the weight of the machine. Position the machine on a flat, level surface and block the tires before jacking.

FOR SAFETY: When servicing machine, jack machine up at designated locations only. Use jack or hoist that will support machine weight. Block machine up with jack stands.



FIG. 65

PUSHING, TOWING, AND TRANSPORTING MACHINE

PUSHING OR TOWING THE MACHINE

Before attempting to push or tow the machine, the brake must be disengaged. To disengage the brake, insert a small standard screwdriver between the electronic brake lever and the hub (Figure 66).

FOR SAFETY: When brake is disengaged, do not push or tow the machine on inclines.

FOR SAFETY: When brake is disengaged, do not operate machine.



FIG. 66

Only push or tow the machine on a level surface. Do not exceed 2 mph / 3.2 kph. When towing machine, only tow it from the front by the stabilizer arms (U-shape bars).

Immediately after pushing or towing the machine, enable the brake. Never operate the machine with the brake disabled.

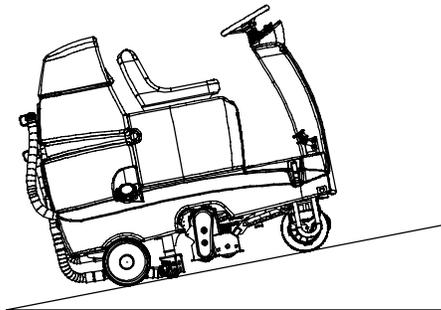
TRANSPORTING THE MACHINE

When transporting the machine by use of trailer or truck, carefully follow the loading and tie-down procedures:

FOR SAFETY: When transporting machine, go slowly on inclines and slippery surfaces.

1. Empty the solution tank and recovery tank.
2. Raise the scrub head to the up position.
3. Load the machine using a ramp that can support the machine weight and operator. Do not operate the machine on a ramp incline that exceeds an 11° angle (Figure 67). A winch must be used when ramp incline exceeds an 11° angle.

FOR SAFETY: When transporting machine, use a ramp that can support the machine weight and operator. Do not operate the machine on a ramp incline that exceeds an 11° angle. Use tie-down straps to secure machine to truck or trailer.



11° maximum ramp angle

FIG. 67

4. Once loaded, position the front of the machine up against the front of the trailer or truck. Lower the scrub head and turn the key off (Figure 68).
5. Place a block behind each wheel (Figure 68).

6. Secure the front and rear of the machine with tie-down straps (Figure 68). Route the front strap through the stabilizer arms (U-shape bars). Route the rear strap above the rear axle at center. It may be necessary to install tie-down brackets to the floor of your trailer or truck.

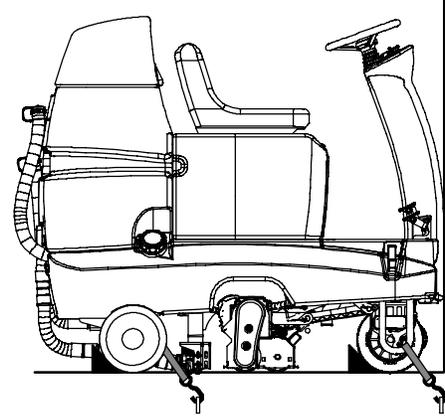


FIG. 68

NOTE: When transporting machine in freezing temperatures see *STORING MACHINE*, step 5.

STORING MACHINE

1. Charge the batteries before storing. Never store machine with discharged batteries.
2. Drain and rinse the tanks thoroughly.
3. Park the machine in a dry area with the scrub head in the raised position.
4. Open the recovery tank cover to promote air circulation.
5. If storing machine in freezing temperatures be certain to drain tanks, purge pump and remove the solution tank filter located under the machine at rear.

ATTENTION: Do not expose machine to rain, store indoors.

RECOMMENDED STOCK ITEMS

Refer to the Parts List Manual for recommended stock items. Stock Items are clearly identified with a bullet preceding the parts description. See example below:

26	1017380	(00000000-) • Hose, Drain, Assy, 1.5d X 29.5l, Blk,Flx
27	1008639	(00000000-) • Drain Assy
28	1019563	(00000000-) • Strap, Drain Cap
29	1008637	(00000000-) • O Ring, 1.48" Id, 1.76" Od

TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
No power	Key turned off	Turn key on
	Batteries discharged	Recharge batteries
	Loose or disconnected battery cable	Secure battery cable connections
	Circuit breaker tripped	Reset 5 A circuit breaker
	Main fuse blown	Replace 100 A main fuse
Fault indicator light is on or machine is beeping	Machine fault has been detected	See FAULT INDICATOR LIGHT/BEEP CODES
Machine does not propel	Operator not seated	Operator must be seated to operate machine
	Seat sensor wire harness plug is disconnected	Connect seat sensor wire harness plug
	Faulty control board	Contact Service Center
	Faulty drive motor or wiring	Contact Service Center
	Worn carbon brushes in motor	Contact Service Center
Brush motor(s) do not operate	Low voltage interrupt activated	Recharge batteries
	Loose or broken belt	Contact Service Center
	Faulty brush motor or wiring	Contact Service Center
	Worn carbon brushes in motor	Contact Service Center
Vacuum motor(s) do not operate	Low voltage interrupt activated	Recharge batteries
	Faulty vacuum motor or wiring	Contact Service Center
	Worn carbon brushes in motor	Contact Service Center
Scrub head will not lower.	Cleaning button not pressed	Press cleaning button
	Low voltage interrupter activated	Recharge batteries
	Full recovery tank	Empty recovery tank
No solution spray or solution spray is uneven (streaking occurs)	Solution system needs priming	Prime solution system (See PRIMING SOLUTION SYSTEM)
	Scrub head not lowered	Press cleaning button to lower head
	Solution switch is turned off (Extraction Cleaning)	Turn solution switch on
	Solution tank is empty	Refill solution tank
	Clogged spray tips	Clean spray tips
	Plugged solution tank filter	Clean solution tank filter
	Clogged solution line filter	Clean solution line filter
	Faulty pump or solution solenoid	Contact Service Center
	Clogged solution line	Flush plumbing system
Spray nozzle out of alignment	Realign spray nozzle	

TROUBLESHOOTING - Continued

PROBLEM	CAUSE	SOLUTION
Poor water pickup.	Worn ReadySpace rollers	Replace rollers
	Clogged vacuum shoes	Clean vacuum shoes
	Vacuum shoe springs missing (Extraction cleaning)	Replace vacuum shoe springs
	Loose recovery tank drain hose cap	Tighten cap
	Loose or disconnected vacuum hose	Connect hose cuffs securely
	Clogged vacuum hose	Remove clogged debris
	Defective vacuum hose	Replace vacuum hose
	Recovery tank cover not down	Close cover
	Worn tank cover gasket	Replace gasket
Excessive foam/cream appears on the floor during ReadySpace cleaning	Cleaning detergents were added to solution tank	Drain and rinse out solution tank and refill with water only. Do not add cleaning detergents
	Unapproved pre-treatment detergent used	Use approved pre-treatment detergent
Short run time	Low battery charge	Charge batteries
	Batteries need maintenance	See BATTERY MAINTENANCE.
	Faulty charger	Repair or replace battery charger
Spray nozzles drip when not in use (See SOLUTION FLOW DIAGRAM for reference)	Clogged spray tip filter/check valve (Restorative Extraction spray tips)	Clean or replace spray tip filter
	Clogged or faulty solution solenoid.	Clean or replace solution solenoid

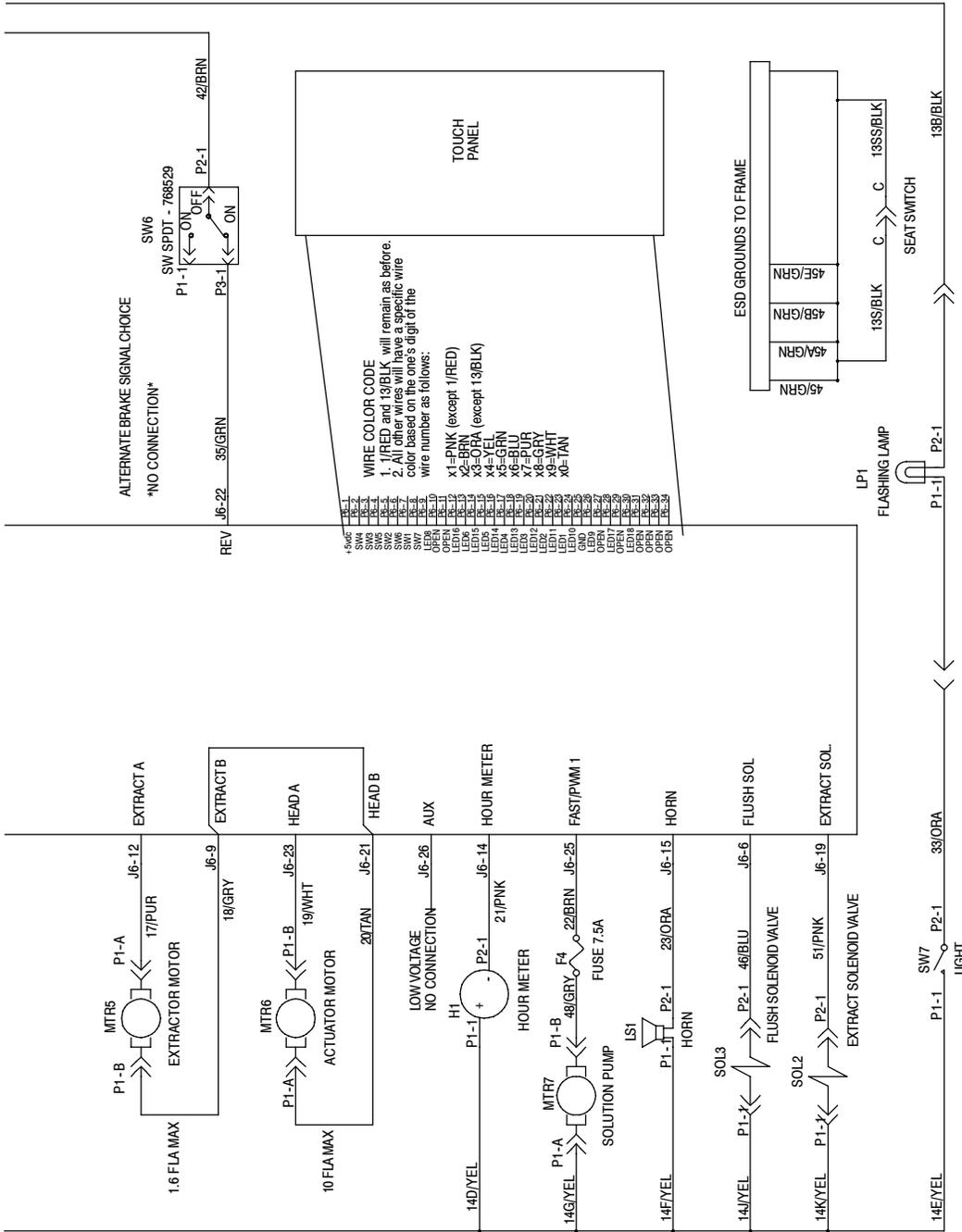
FAULT INDICATOR LIGHT/BEEP CODES

The fault indicator light will come on or the horn will beep if the machine detects a fault. Use the following fault codes to determine cause of fault.



REF.	FAULT LIGHT CODE	FAULT	SOLUTION
1	Fault light blinks	Propel motor overload Exceeded maximum incline	Avoid steep inclines. Restart key to reset. Contact Service Center.
1 & 2	Fault light and Speed (+) light blink	Rear brush motor overload	Inspect brush for obstruction. Contact Service Center.
1 & 3	Fault light and Solution light blink	Front brush motor overload	Inspect brush for obstruction. Contact Service Center.
1 & 4	Fault light and Extract light blink	Vacuum motor overload	Contact Service Center.
1 & 5	Fault light and Brush pressure (+) light blink	Scrub head actuator overload	Contact Service Center.
1 & 6	Fault light and Brush pressure (-) light blink	Extractor shoe actuator overload	Contact Service Center.

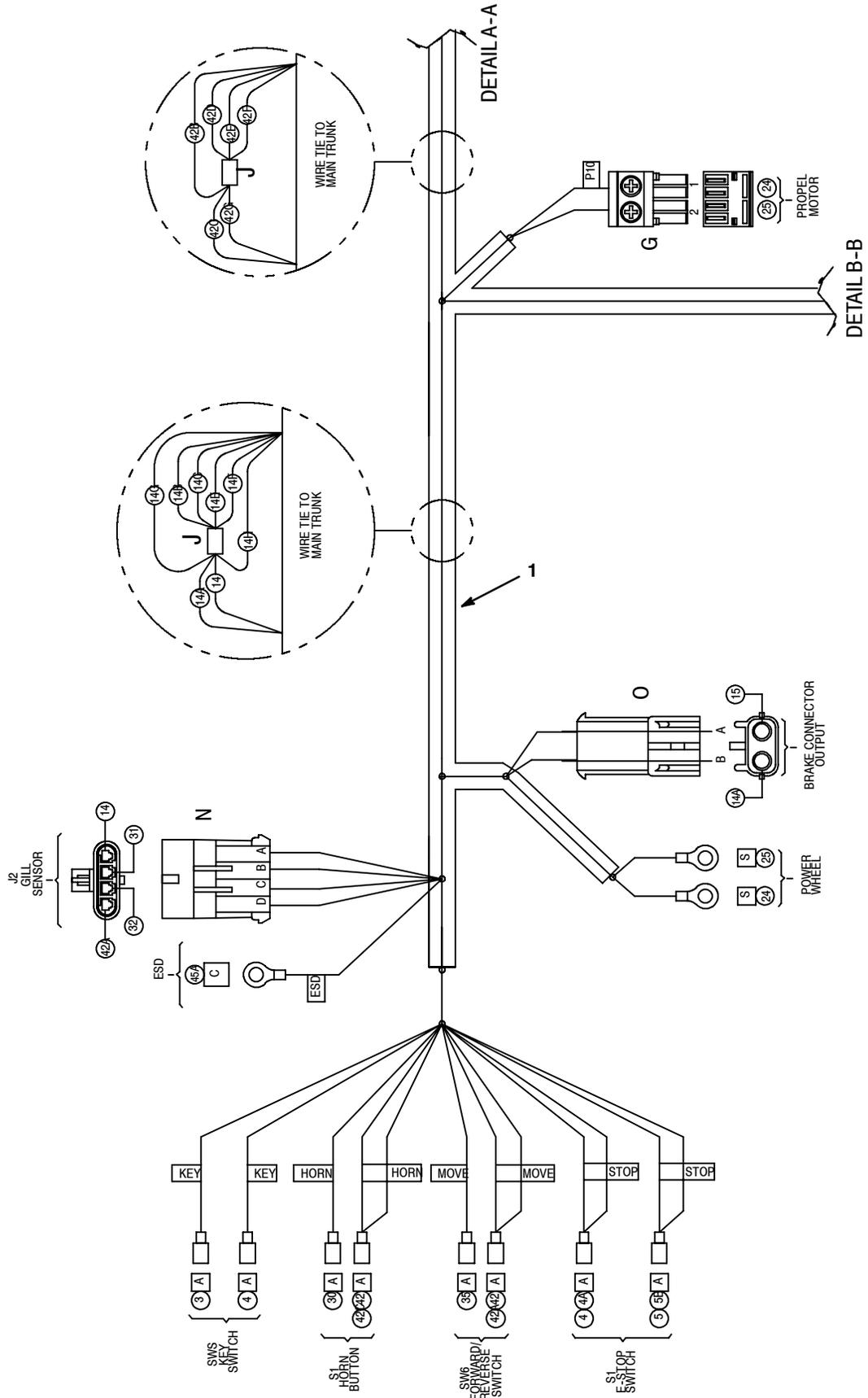
FAULT BEEP CODE	FAULT	SOLUTION
Horn repeatedly beeps two times	Propel pedal depressed without operator in seat	Operator must be seated to operate machine
Horn repeatedly beeps four times	Key switch turned on with propel pedal depressed	Release propel pedal before turning key on
Horn repeatedly beeps five times	Throttle system failure	Contact Service Center
Horn repeatedly beeps six times	Brake system failure	Contact Service Center
Horn repeatedly beeps seven times	Parking brake system failure	Contact Service Center
Horn repeatedly beeps eight times	Emergency stop button activated	Turn button clockwise and restart key to reset
Horn repeatedly beeps nine times	Key switch turned on with battery charger plugged into machine	Unplug battery charger before starting machine



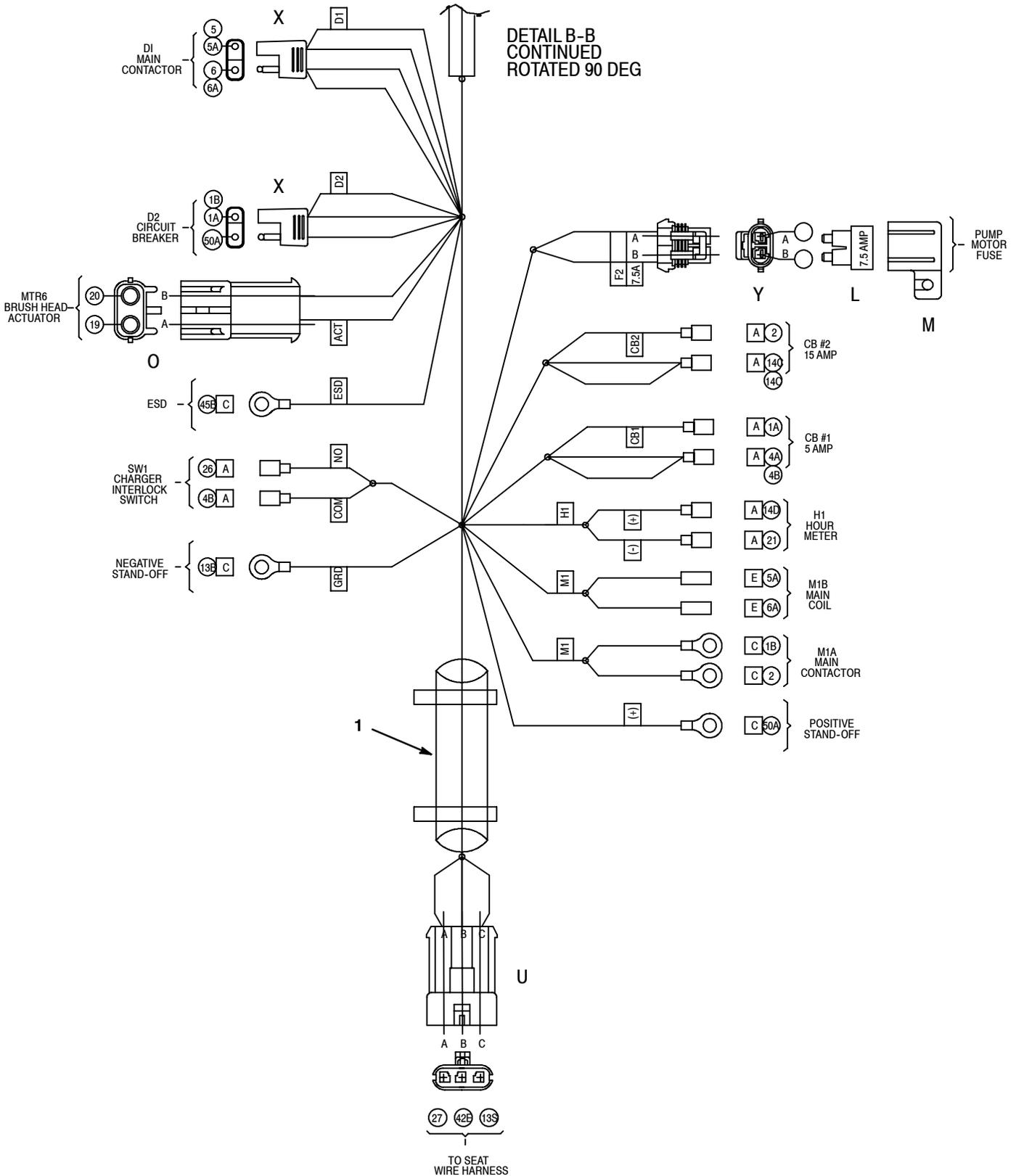
LEGEND

- | | | |
|-----------------------------------|--|---|
| CB1 = CIRCUIT BREAKER 5A #383720 | MTR3 = REAR BRUSH MOTOR #1023355 | SOL3 = FLUSH SOLENOID VALVE #1023693 (3 STATION / #1025177 (2 STATION)) |
| CB2 = CIRCUIT BREAKER 15A #383722 | MTR4 = VACUUM MOTOR 1 #1013432 | SW1 = CHRGR INTRLCK SWITCH #600437 |
| D1 = DIODE #222290 | MTR5 = EXTRACTOR MOTOR (PM) #1023355 | SW2 = SEAT SWITCH #223078 |
| D2 = DIODE #222290 | MTR6 = ACTUATOR MOTOR (PM) #1010895 | SW3 = SOL REC FULL FLOAT SWITCH #385685 |
| F1 = FUSE 100A #86379 | MTR7 = SOLUTION PUMP #1022343 | SW4 = SOL LOW FLOAT SWITCH #602919 |
| F2 = FUSE 7.5A #1016039 | MTR9 = VACUUM MOTOR 2 #1013432 | SW5 = KEY SWITCH #1016789 |
| H1 = HOUR METER #377433 | S1 = EMERGENCY SWITCH #1011735 | SW6 = DIRECTIONAL SWITCH #1013763 |
| LP1 = FLASHING LAMP #1015170 | S2 = HORN SWITCH PUSH BTN #1014832 | SW7 = LIGHT SWITCH #1023308 |
| LS1 = HORN #1018505 | SOL1 = RS SOLENOID VALVE #1023693 (3 STATION / #1025177 (2 STATION)) | U1 = CONTROL BOARD #1024921 |
| M1A = CONTACTOR #02424 | SOL2 = EXTR SOLENOID VALVE #1023693 (3 STATION / #1025177 (2 STATION)) | U2 = GILL SENSOR #1011562 |
| MTR1A = PROPEL MOTOR #1024247 | | = TOUCH PANEL #1024154 |
| MTR1B = PARKING BRAKE #372869 | | |
| MTR2 = FRONT BRUSH MOTOR #1023355 | | |

ELECTRICAL WIRE HARNESS GROUP - SECTION 1 OF 5



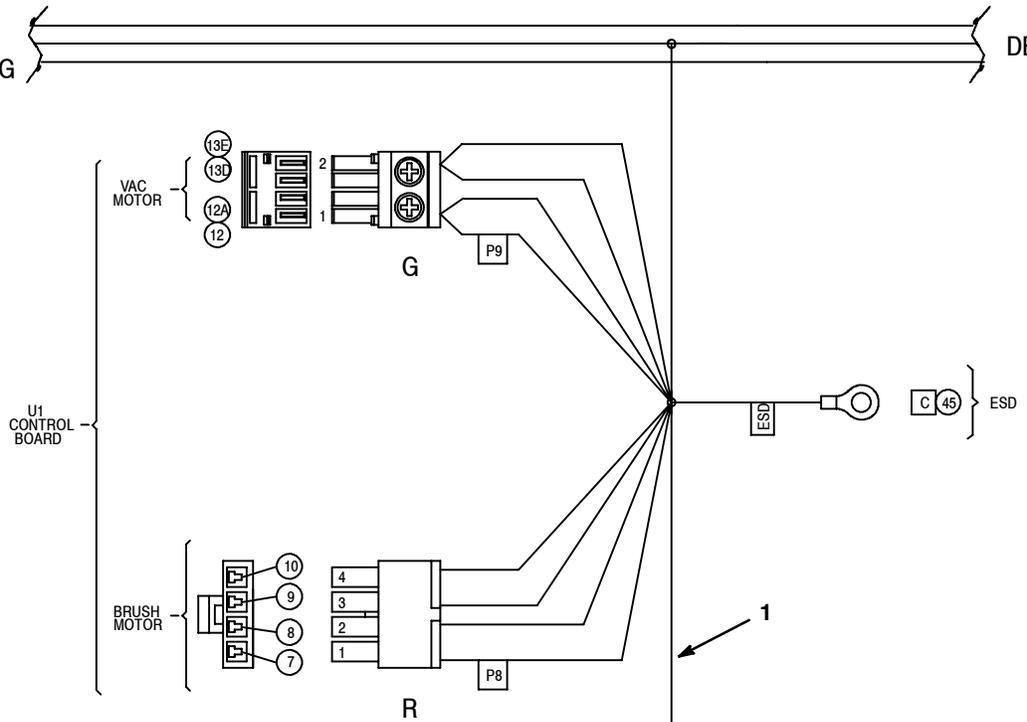
ELECTRICAL WIRE HARNESS GROUP - SECTION 2 OF 5



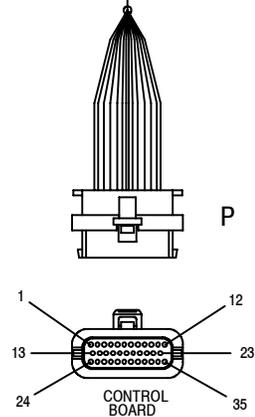
ELECTRICAL WIRE HARNESS GROUP - SECTION 3 OF 5

DETAIL A-A
CONTINUED
ROTATED 90 DEG

DETAIL C-C

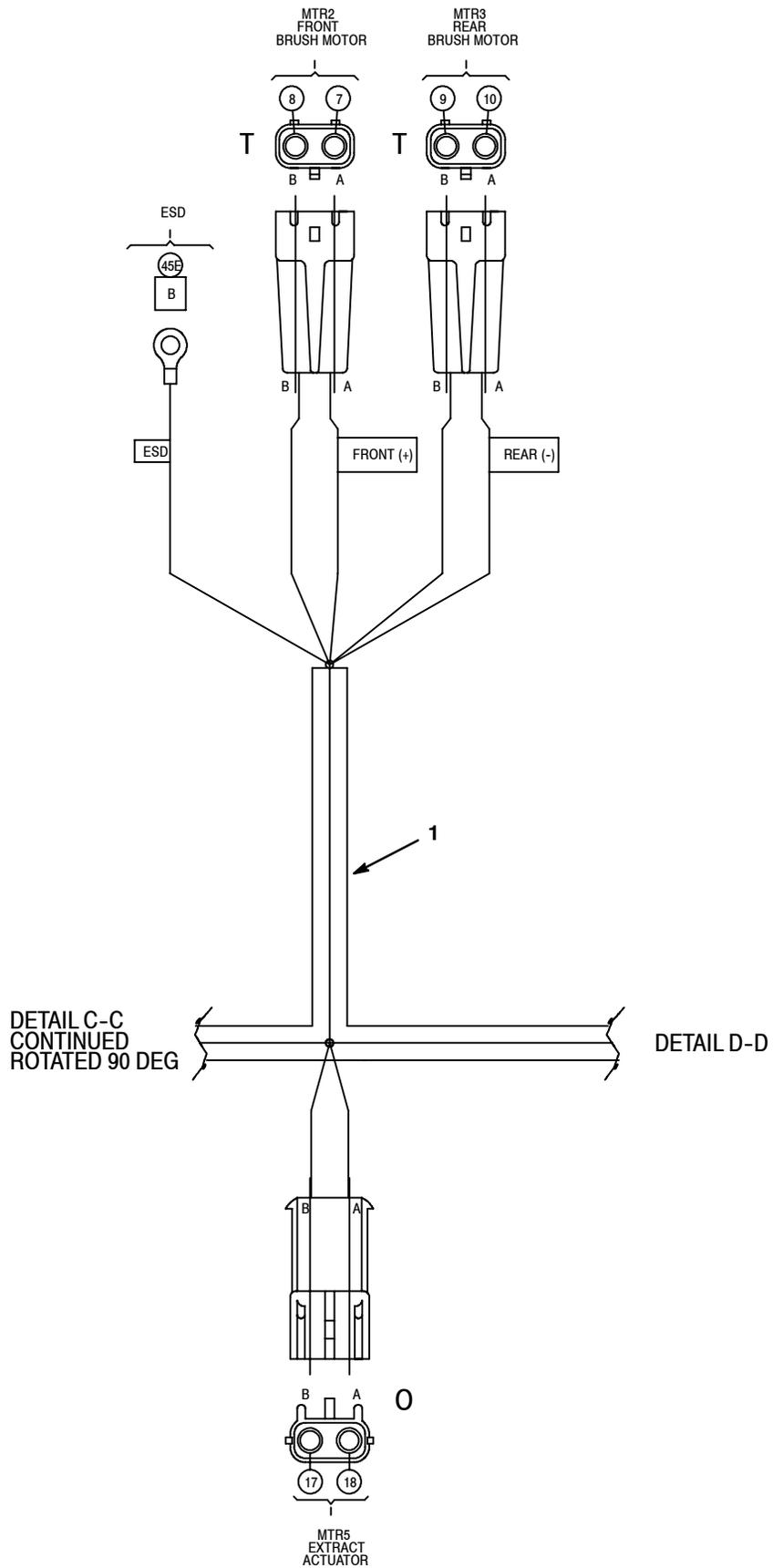


SOCKET NO.	WIRE NO.	SOCKET NO.	WIRE NO.	SOCKET NO.	WIRE NO.
1	PLUG CAVITY	13	14B	24	3
2	PLUG CAVITY	14	21	25	22
3	PLUG CAVITY	15	23	26	PLUG CAVITY
4	16	16	PLUG CAVITY	27	15
5	6	17	5B	28	PLUG CAVITY
6	46	18	26	29	PLUG CAVITY
7	27	19	51	30	PLUG CAVITY
8	29	20	28	31	PLUG CAVITY
9	18	21	20	32	PLUG CAVITY
10	30	22	35	33	32
11	47	23	19	34	31
12	17	-	-	35	42D

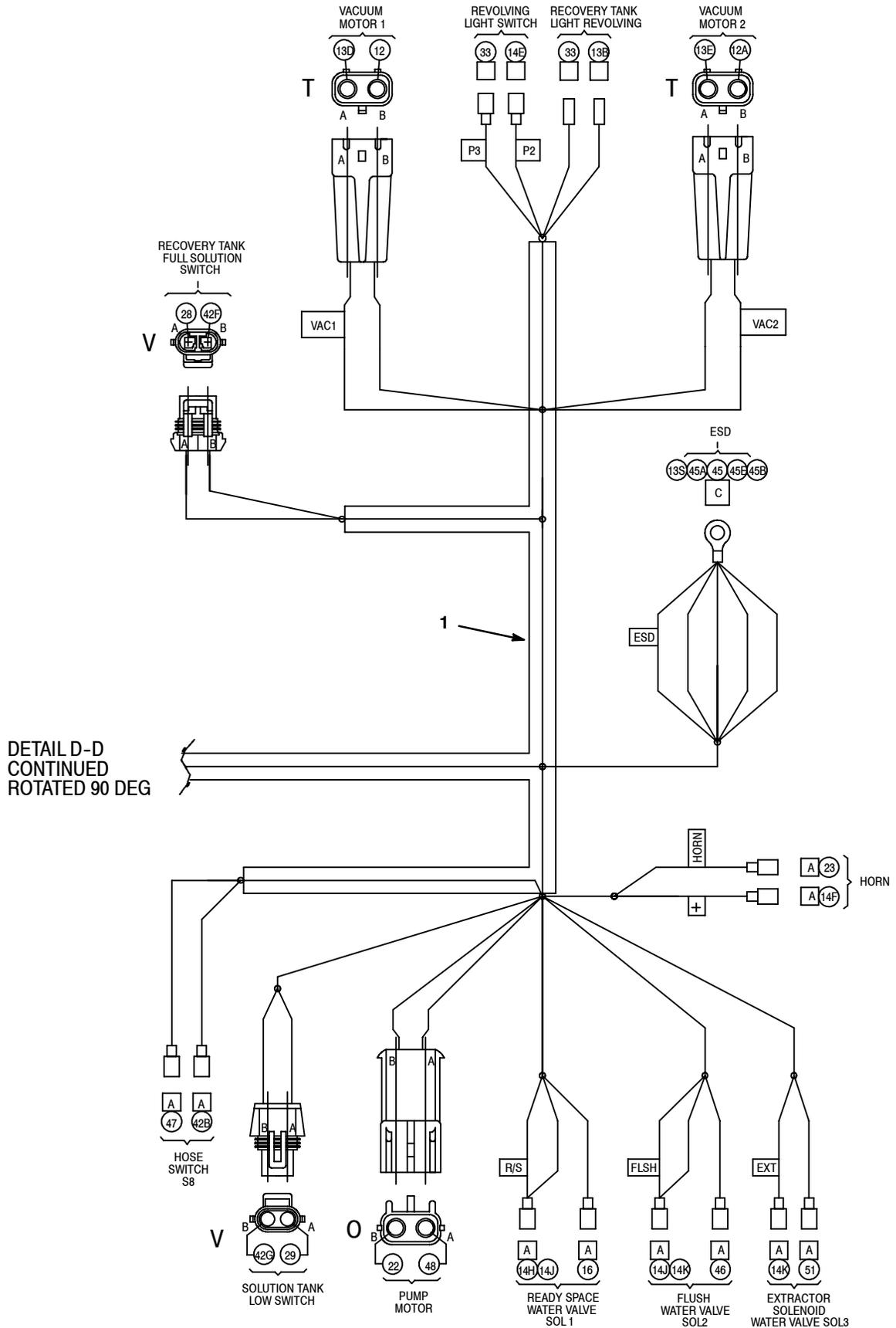


Ref.	Serial Number	Description	Qty.
1	(00000000-)• Harness, Wire, Main [Readyspace Rider]	1

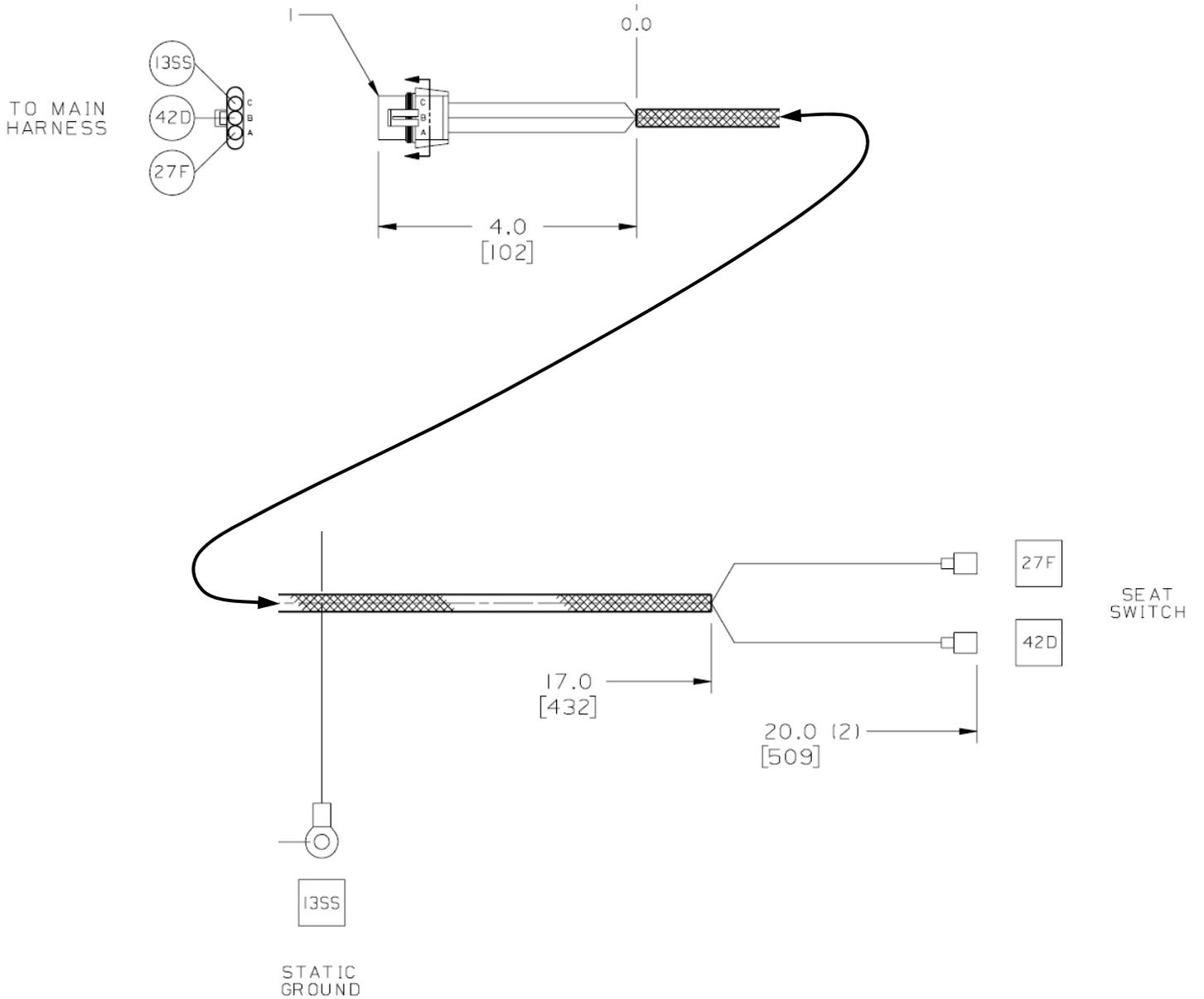
ELECTRICAL WIRE HARNESS GROUP - SECTION 4 OF 5



ELECTRICAL WIRE HARNESS GROUP - SECTION 5 OF 5

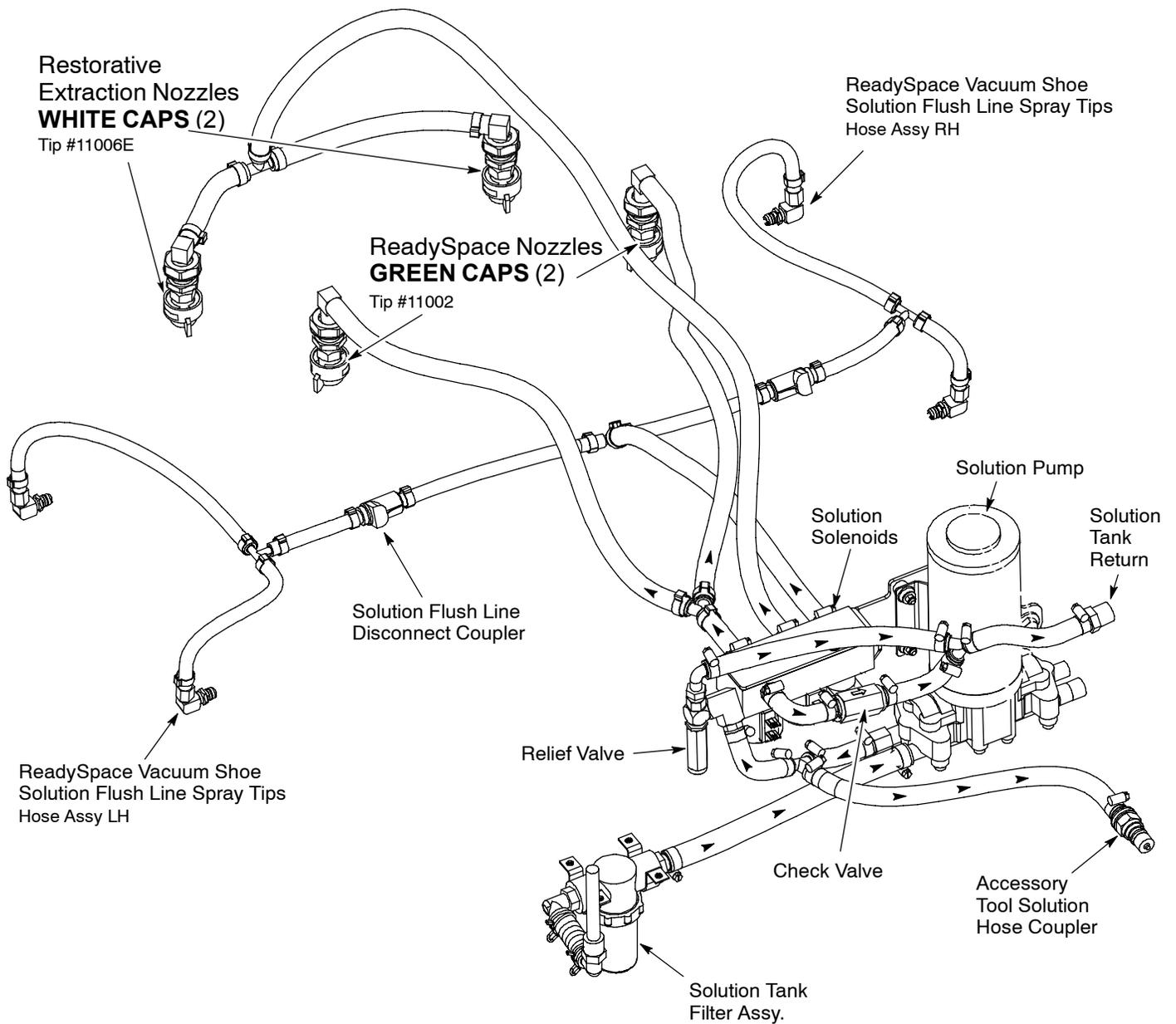


ELECTRICAL WIRE HARNESS GROUP - SEAT HARNESS



Ref.	Serial Number	Description	Qty.
1	(00000000-)• Harness, Seat [ReadySpace Rider]	1

R14 – ReadySpace & Extraction Plumbing Diagram

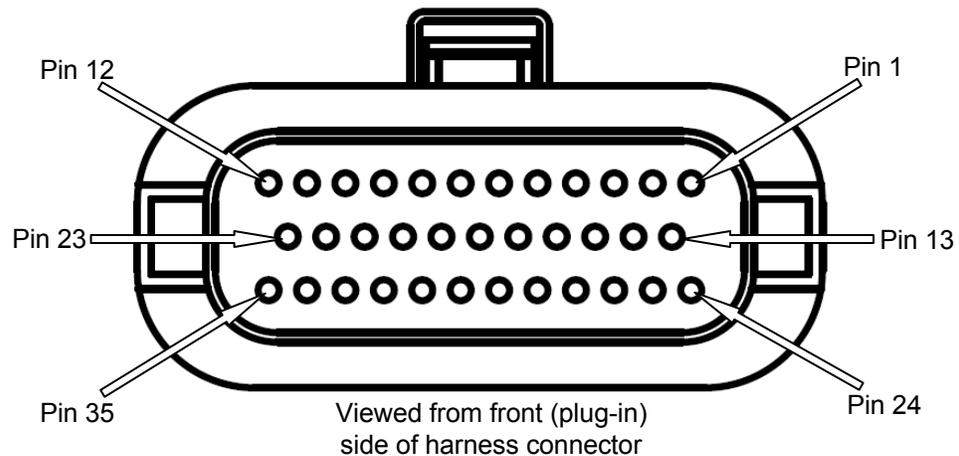


R14 – Main Harness to Control Board 35 Pin Connector Detail

pin #	wire #	input or output	active voltage	inactive voltage	function/component
1	empty	x	x	x	x
2	empty	x	x	x	x
3	empty	x	x	x	x
4	16	output	B-	B+	SOL1 ReadySpace solenoid valve
5	6	output	B-	B+	M1A Main contactor
6	46	output	B-	B+	SOL3 ReadySpace flush solenoid valve
7	27	input	B-	open	SW2 Seat switch
8	29	input	B-	open	SW4 Solution tank low switch
9	18	output	B+ or B-	open	MTR5 Extractor shoes actuator
10	30	input	B-	open	S2 Horn switch
11	47	input	B-	open	SW8 Hose switch
12	17	output	B+ or B-	open	MTR5 Extractor shoes actuator
13	14B	input	B+	open	Fly back path
14	21	output	B-	B+	H1 Hour meter
15	23	output	B-	B+	LS1 Horn
16	empty	x	x	x	x
17	5B	input	B+	open	Battery positive power supply
18	26	input	open	B+	SW1 Battery charger interlock switch
19	51	output	B-	B+	SOL2 Extraction solenoid
20	28	input	B-	open	SW3 Recovery tank full switch
21	20	output	B+ or B-	open	MTR6 Scrub head actuator
22	35	input	B-	open	SW6 Reverse switch
23	19	output	B+ or B-	open	MTR6 Scrub head actuator
24	3	input	B+	open	SW5 Key switch
25	22	output	B-	B+	MTR7 Solution pump motor
26	empty	x	x	x	x
27	15	output	B-	B+	MTR1B Parking brake solenoid
28	empty	x	x	x	x
29	empty	x	x	x	x
30	empty	x	x	x	x
31	empty	x	x	x	x
32	empty	x	x	x	x
33	32	input	1.5 to 4.0V	less than 1.5V	U2 Brake input signal
34	31	input	1.3 to 4.0V	less than 1.3V	U2 Throttle signal input
35	42D	output	B-	open	Switches & sensors battery negative

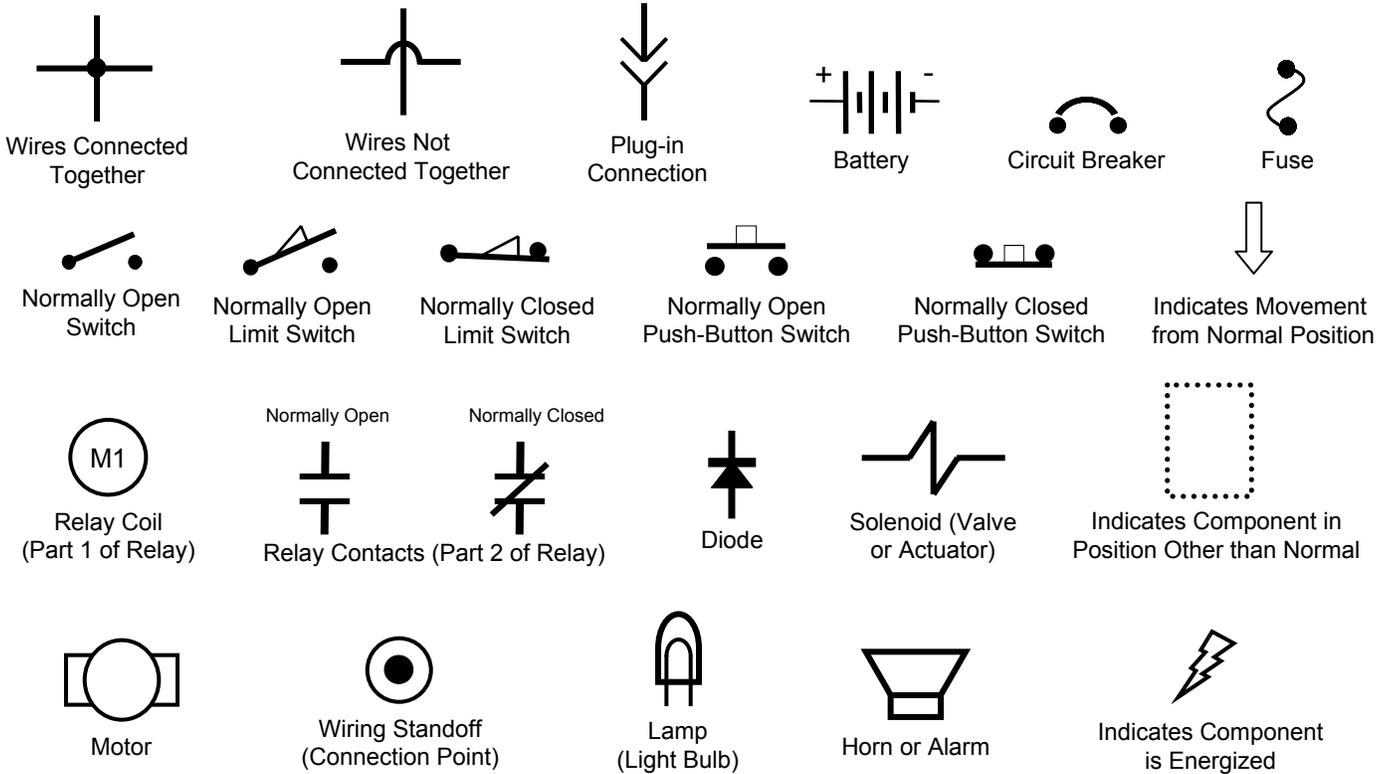
Wiring Color Codes
(Unless otherwise marked)

Right Most Digit of Wire Number	Color of Wire
0	Tan
1	Pink
2	Brown
3	Orange
4	Yellow
5	Green
6	Blue
7	Purple
8	Gray
9	White



Commonly Used Electrical Symbols & Terms

NOTE: The term "NORMALLY" refers to the components' "at rest" or "de-energized" position



Terms & Abbreviations

BDI – Battery Discharge Indicator

Dynamic Braking – A method of using the generating nature of an electric motor to slow the machine

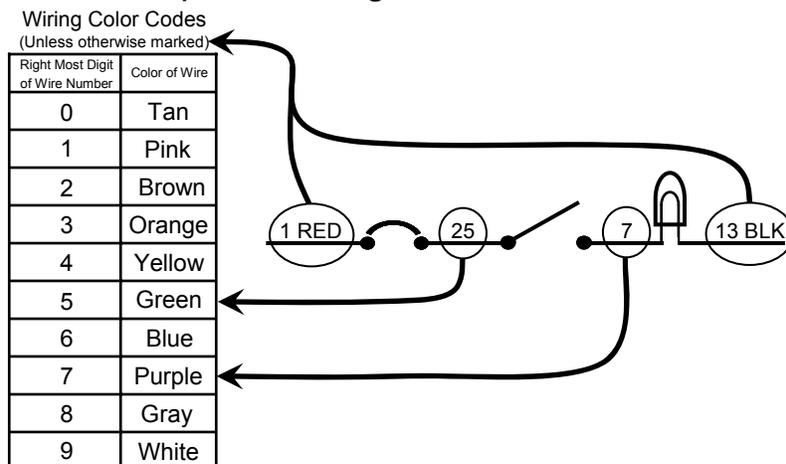
Hall Effect – A voltage developed as a result of current flow in the presence of a magnetic field

LED – Light Emitting Diode

PM – Permanent Magnet

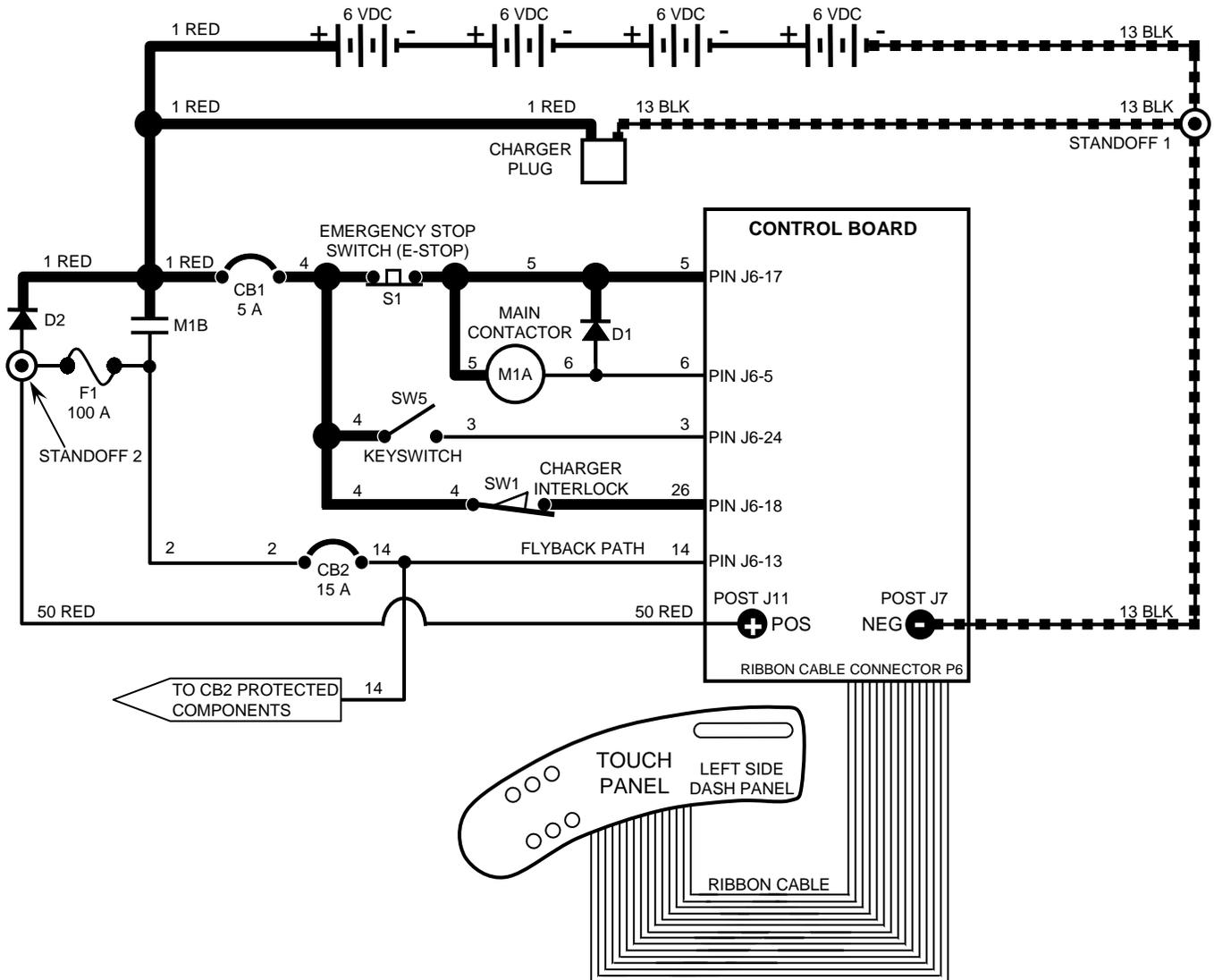
PWM (Pulse Width Modulation) – A method of using controlled on/off times to regulate the voltage and current supplied to an electrical device

Example of Wiring Numbers & Colors:



R14 - Key OFF Power Distribution

CONDITIONS: Key OFF, battery charger **NOT CONNECTED** to charger plug



Wiring Color Codes
(Unless otherwise marked)

Right Most Digit of Wire Number	Color of Wire
0	Tan
1	Pink
2	Brown
3	Orange
4	Yellow
5	Green
6	Blue
7	Purple
8	Gray
9	White

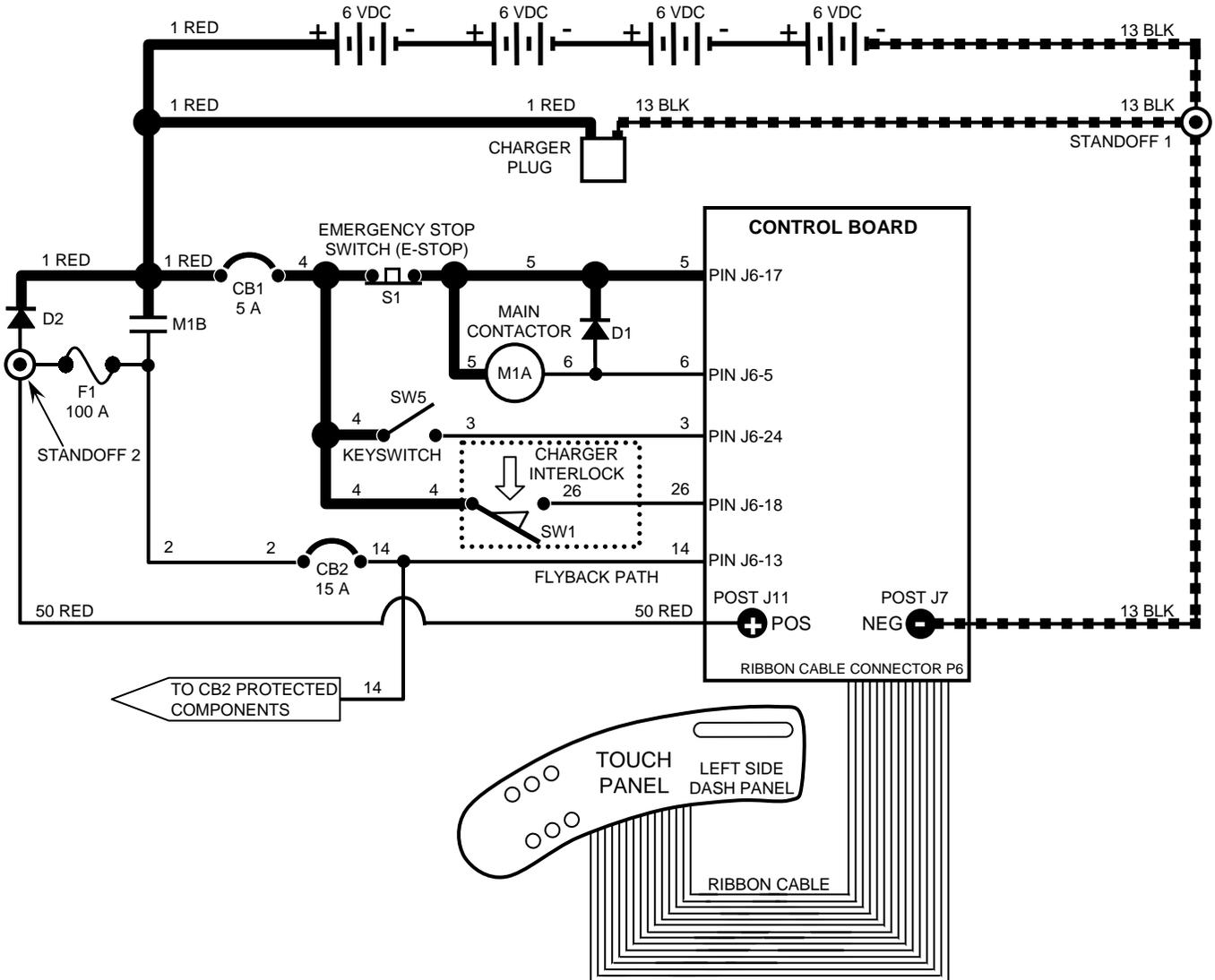
**Be cautious when working near Control Board -
Battery voltage is always present, even with Key OFF**

If Charger Plug is connected to battery charger, ALL machine functions will be disabled when Key Switch is turned ON
The Flyback Path prevents high voltage spikes when a component is turned OFF

--- = Battery Negative or Logic Ground
 ——— = Battery Positive or Positive Output

R14 - Key OFF Power Distribution

CONDITIONS: Key OFF, battery charger **CONNECTED** to charger plug



Wiring Color Codes
(Unless otherwise marked)

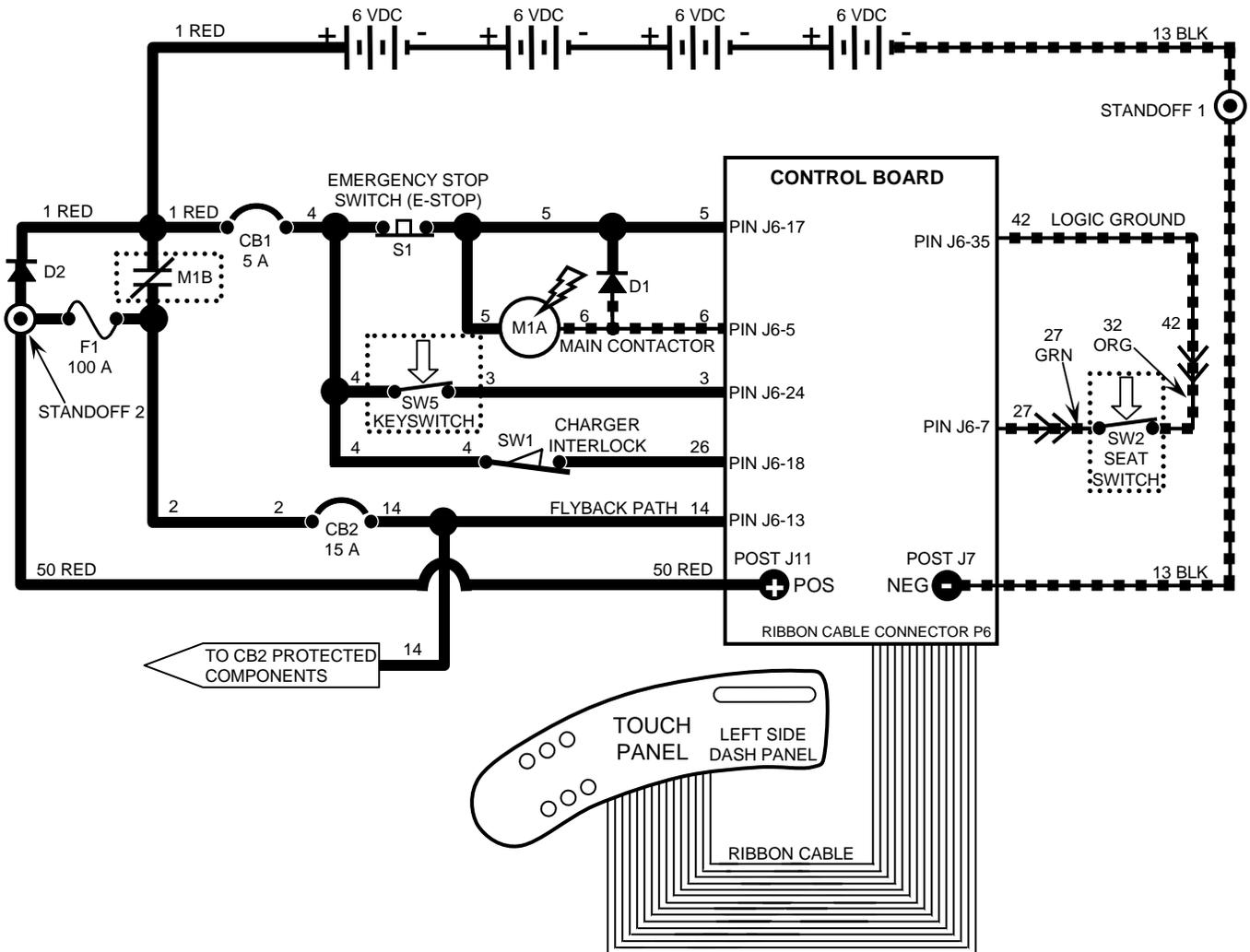
Right Most Digit of Wire Number	Color of Wire
0	Tan
1	Pink
2	Brown
3	Orange
4	Yellow
5	Green
6	Blue
7	Purple
8	Gray
9	White

- = Battery Negative or Logic Ground
- = Battery Positive or Positive Output

**Be cautious when working near Control Board -
Battery voltage is always present, even with Key OFF**

If Charger Plug is connected to battery charger, ALL machine functions will be disabled when Key Switch is turned ON
The Flyback Path prevents high voltage spikes when a component is turned OFF

R14 - Key ON, Operator on Seat

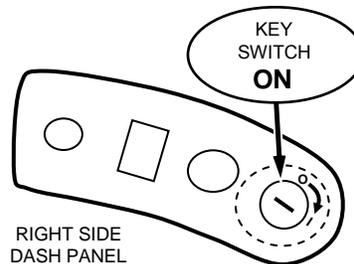


Wiring Color Codes
(Unless otherwise marked)

Right Most Digit of Wire Number	Color of Wire
0	Tan
1	Pink
2	Brown
3	Orange
4	Yellow
5	Green
6	Blue
7	Purple
8	Gray
9	White

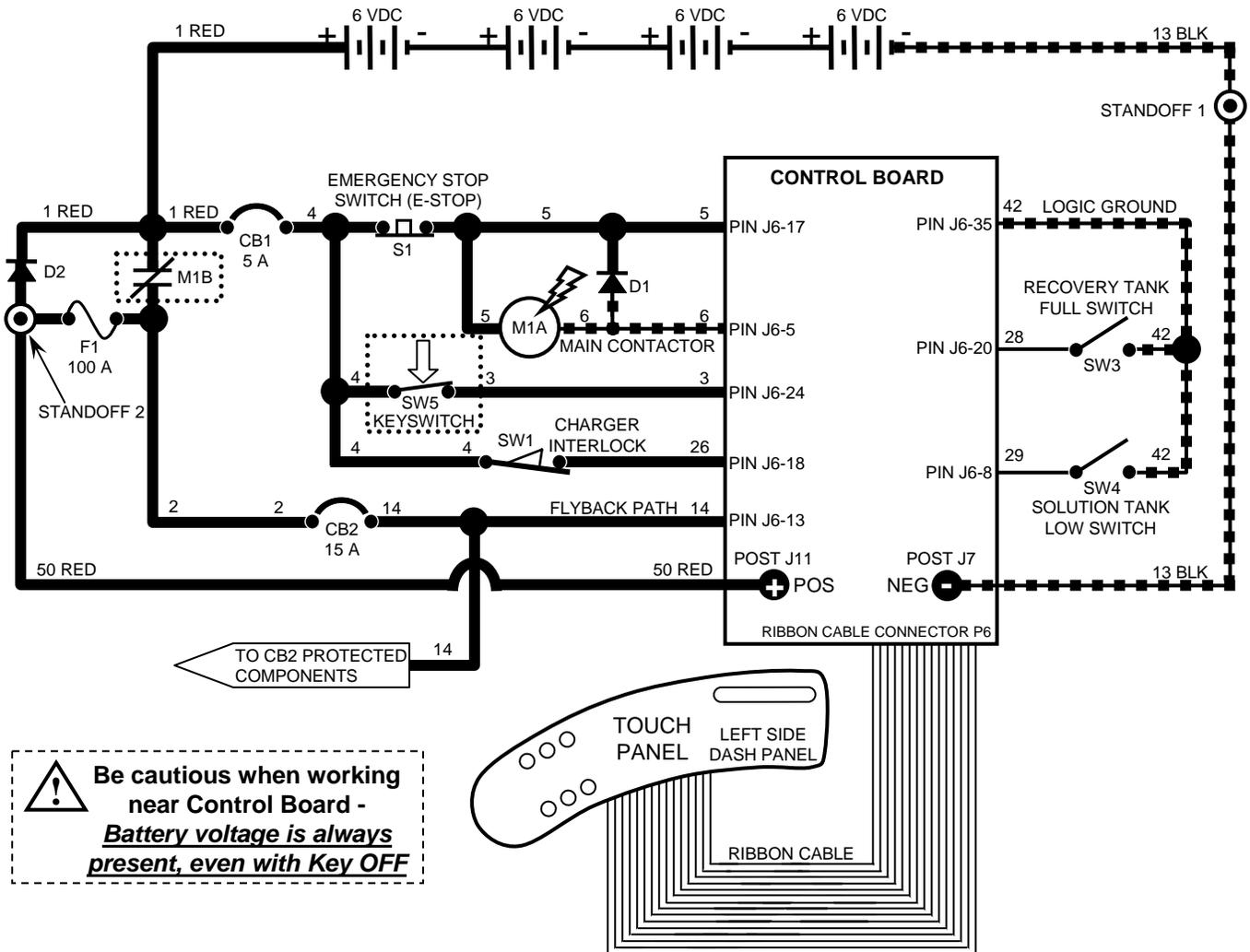
- = Battery Negative or Logic Ground
- = Battery Positive or Positive Output

Be cautious when working near Control Board - Battery voltage is always present, even with Key OFF



R14 - Tank Level Switches

CONDITIONS: Key ON, operator on seat



Be cautious when working near Control Board - Battery voltage is always present, even with Key OFF

Tank Level Switches Logic Chart

switch	tank full	tank empty	switch OPEN	switch CLOSED	indicator
Solution Tank	X			X	Solution Tank Empty LED OFF
		X	X		Solution Tank Empty LED ON
Recovery Tank	X			X	Recovery Tank Full LED ON
		X	X		Recovery Tank Full LED OFF

Recovery Tank Full Switch closes when recovery tank is full
Solution Tank Low Switch opens when solution tank is low
 Tank Level Switches are ALWAYS in the OPEN position with low or empty tank
 Tank Level Switches are ALWAYS in the CLOSED position with full tank

Wiring Color Codes (Unless otherwise marked)

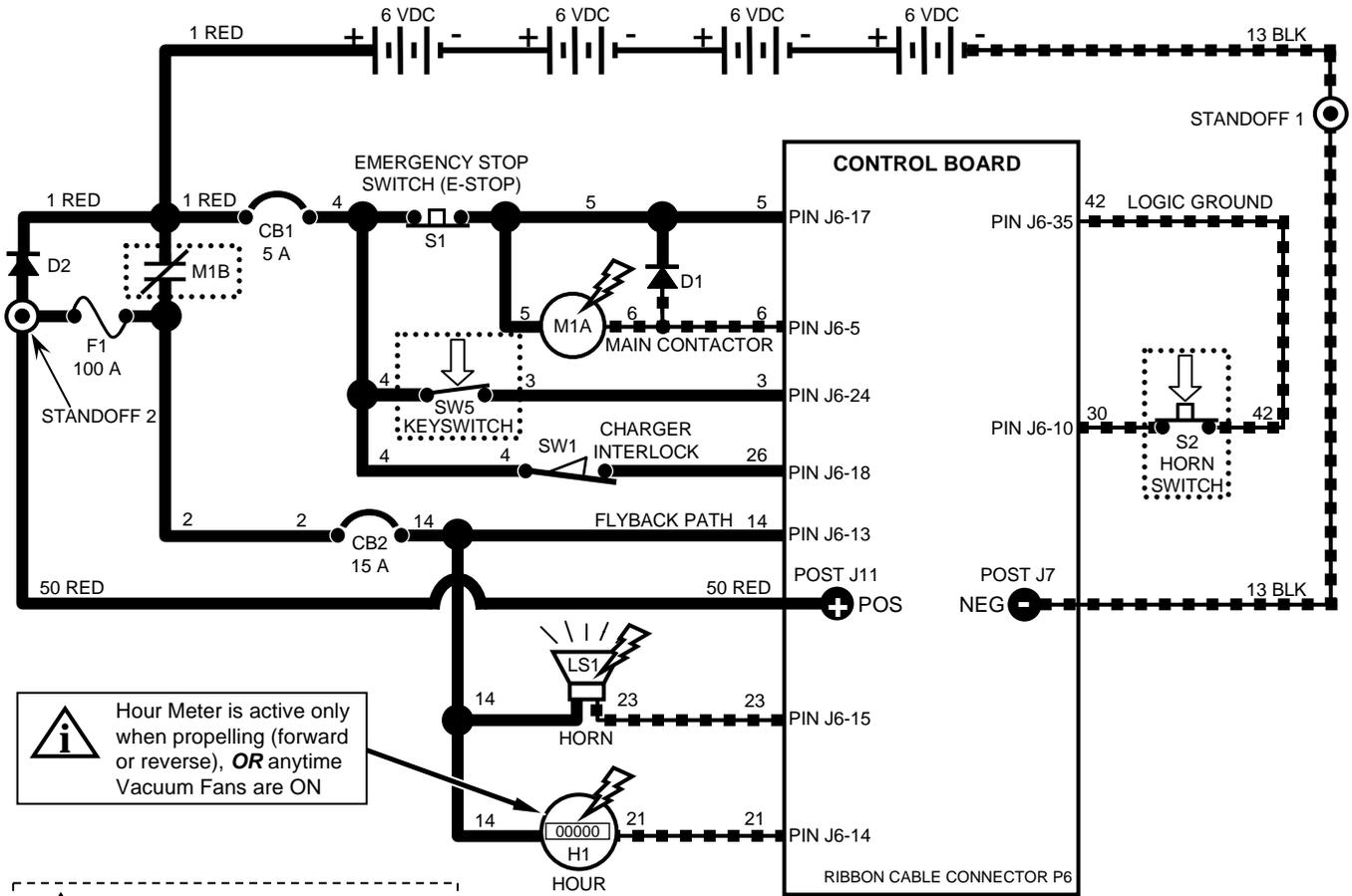
Right Most Digit of Wire Number	Color of Wire
0	Tan
1	Pink
2	Brown
3	Orange
4	Yellow
5	Green
6	Blue
7	Purple
8	Gray
9	White

--- = Battery Negative or Logic Ground
 — = Battery Positive or Positive Output

R14 - Horn & Hour Meter

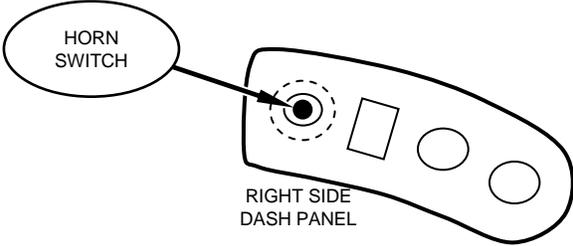
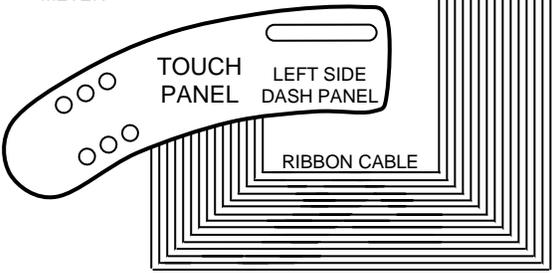
CONDITIONS (Horn): Key ON, horn switch depressed

CONDITIONS (Hour Meter): Key ON, operator on seat, Propel Pedal depressed **OR** Vacuum Fan running



i Hour Meter is active only when propelling (forward or reverse), **OR** anytime Vacuum Fans are ON

! Be cautious when working near Control Board - **Battery voltage is always present, even with Key OFF**



Wiring Color Codes (Unless otherwise marked)

Right Most Digit of Wire Number	Color of Wire
0	Tan
1	Pink
2	Brown
3	Orange
4	Yellow
5	Green
6	Blue
7	Purple
8	Gray
9	White

= Battery Negative or Logic Ground
 = Battery Positive or Positive Output

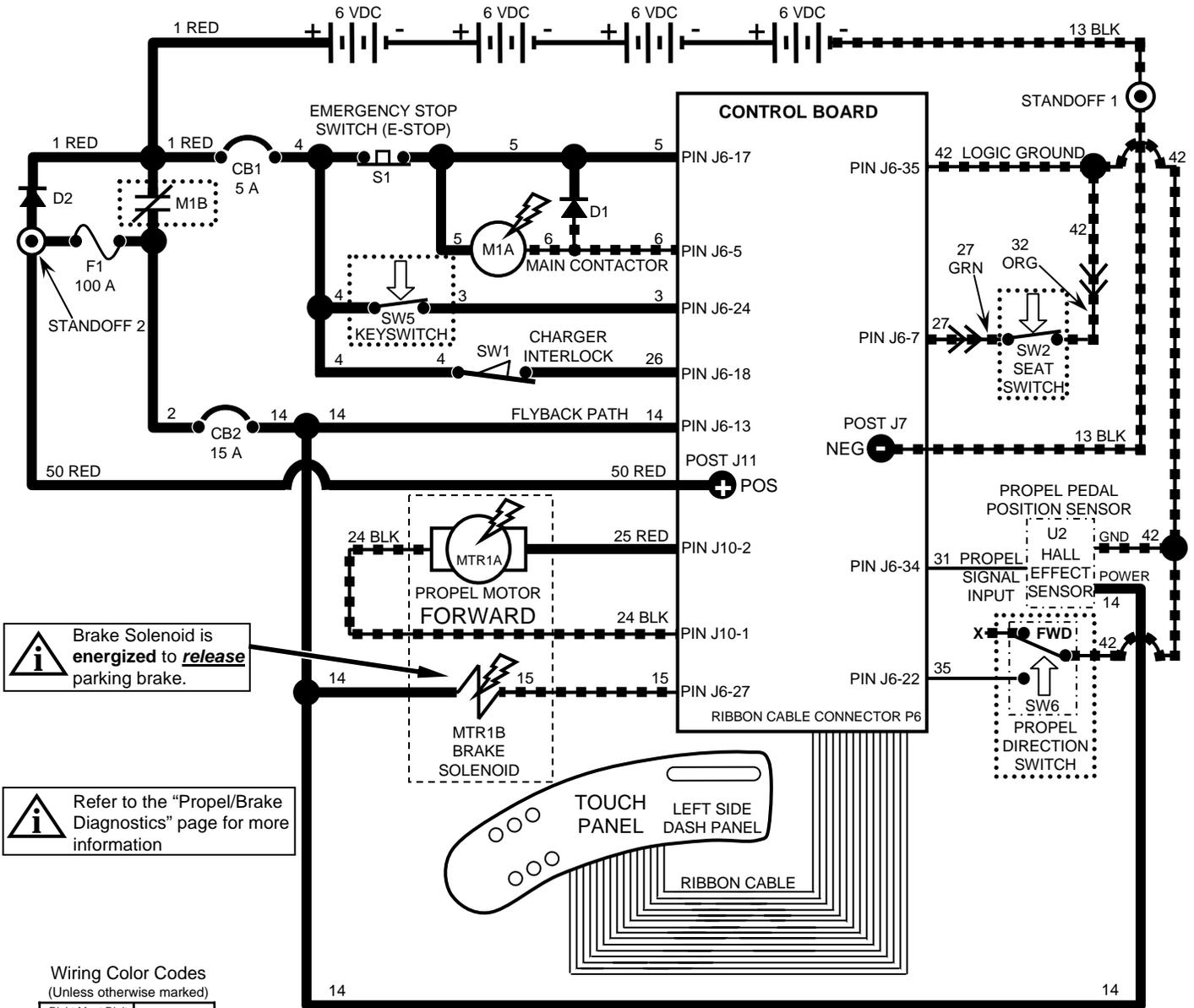
i Horn pulses ON & OFF when Directional Switch is in REVERSE

Hour Meter is ON only when propelling (forward or reverse), or anytime Vacuum Fans are ON

Horn pulses when a fault is detected (Directional Switch must be in FORWARD Position) – refer to “Diagnostic/Beep Code” chart

R14 - Propel Forward System

CONDITIONS: Key ON, operator on seat, directional switch in FORWARD position, propel pedal depressed



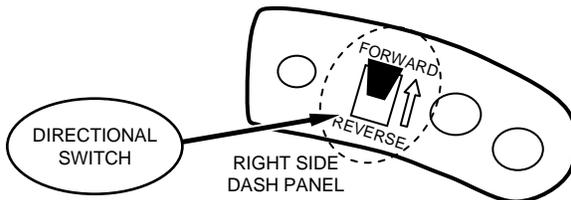
! Brake Solenoid is energized to release parking brake.

! Refer to the "Propel/Brake Diagnostics" page for more information

Wiring Color Codes (Unless otherwise marked)

Right Most Digit of Wire Number	Color of Wire
0	Tan
1	Pink
2	Brown
3	Orange
4	Yellow
5	Green
6	Blue
7	Purple
8	Gray
9	White

= Battery Negative or Logic Ground
 = Battery Positive or Positive Output

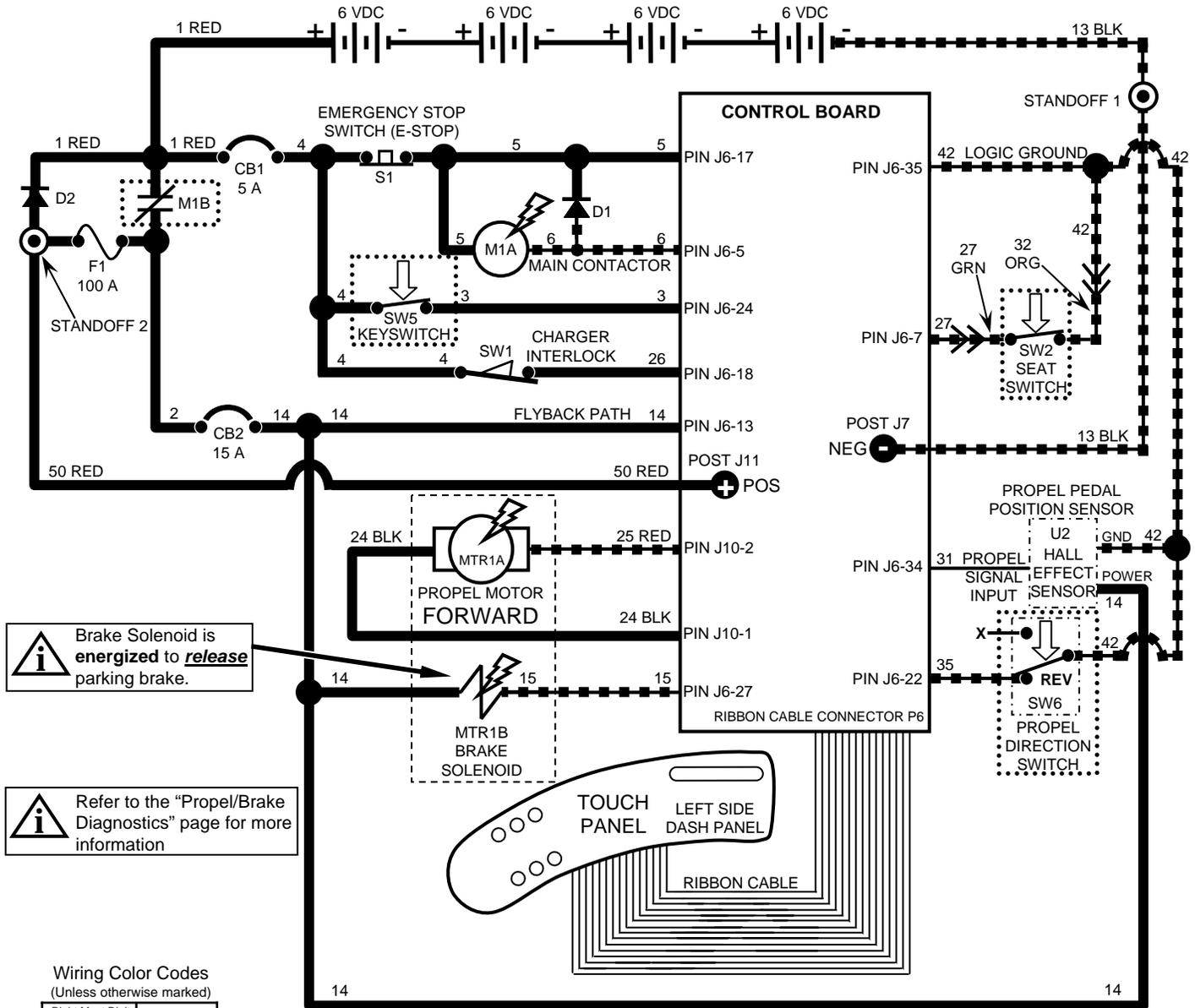


! Be cautious when working near Control Board - **Battery voltage is always present, even with Key OFF**

! Typical Propel Motor Current Draw: 1 to 20 Amps in motion, higher at start-up
 Propel Motor Voltage: 0 to 24 VDC - FORWARD
 0 to approx. 17 VDC - REVERSE
 Propel Motor is controlled by PWM (Pulse Width Modulation)
 The Propel Pedal Position HALL EFFECT Sensor sends a varying voltage signal (1 to 4 Volts) to control board, based upon position of the propel pedal

R14 - Propel Reverse System

CONDITIONS: Key ON, operator on seat, directional switch in REVERSE position, propel pedal depressed



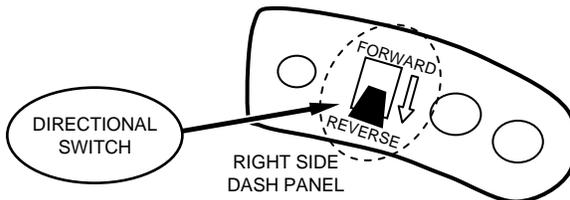
! Brake Solenoid is energized to release parking brake.

! Refer to the "Propel/Brake Diagnostics" page for more information

Wiring Color Codes (Unless otherwise marked)

Right Most Digit of Wire Number	Color of Wire
0	Tan
1	Pink
2	Brown
3	Orange
4	Yellow
5	Green
6	Blue
7	Purple
8	Gray
9	White

= Battery Negative or Logic Ground
 = Battery Positive or Positive Output

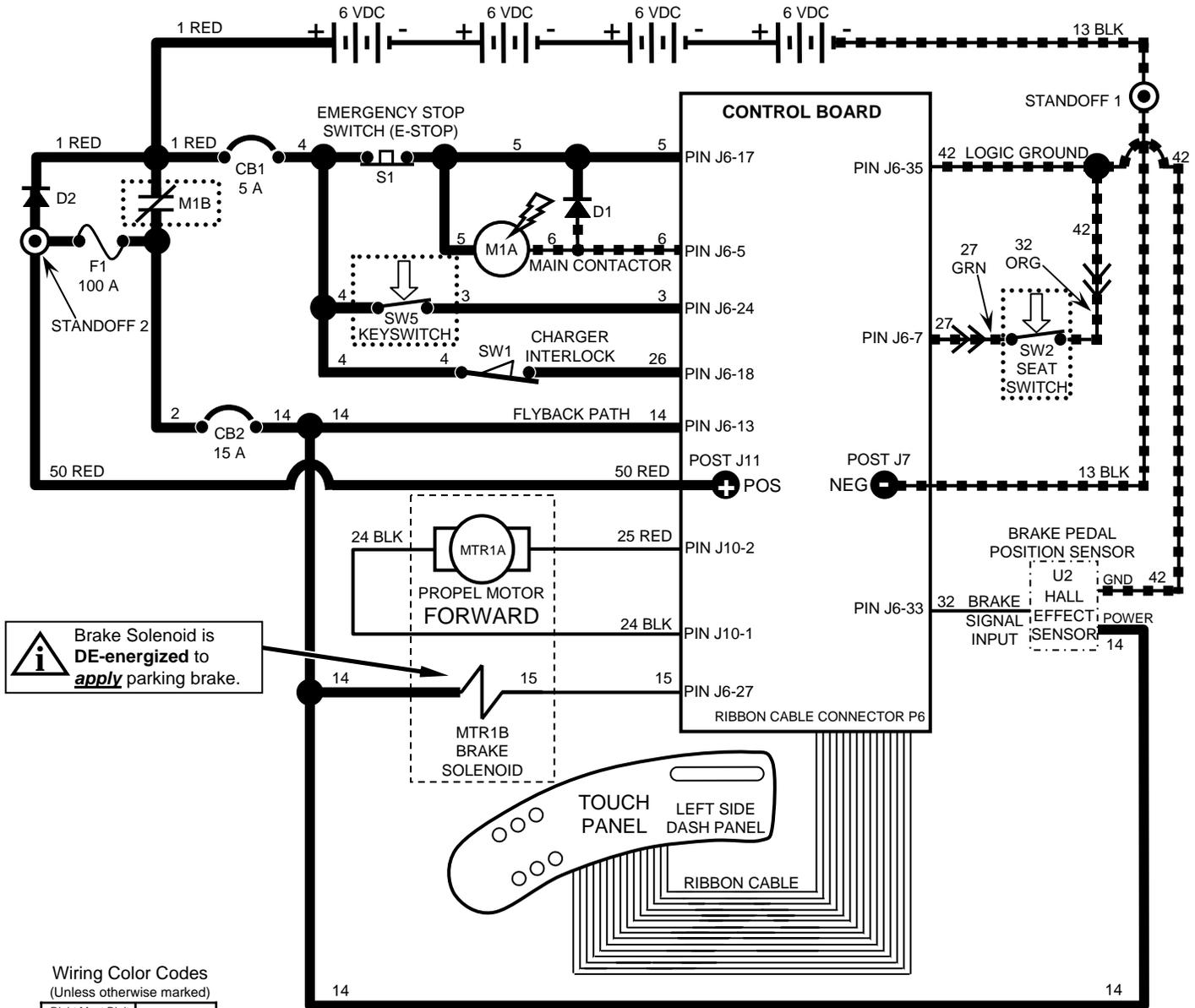


! Be cautious when working near Control Board - **Battery voltage is always present, even with Key OFF**

! Typical Propel Motor Current Draw: 1 to 20 Amps in motion, higher at start-up
 Propel Motor Voltage: 0 to 24 VDC - FORWARD
 0 to approx. 17 VDC - REVERSE
 Propel Motor is controlled by PWM (Pulse Width Modulation)
 The Propel Pedal Position HALL EFFECT Sensor sends a varying voltage signal (1 to 4 Volts) to control board, based upon position of the propel pedal

R14 – Braking System

CONDITIONS: Key ON, operator on seat, brake pedal depressed



! Brake Solenoid is **DE-energized** to **apply** parking brake.

! Be cautious when working near Control Board - **Battery voltage is always present, even with Key OFF**

! The brake pedal position HALL EFFECT sensor sends a varying voltage signal (1 to 4 Volts) to control board, based upon position of the brake pedal
 Brake Solenoid is **DE-energized** to **apply** parking brake.
 Dynamic Braking will occur before Brake Solenoid is de-energized.
 Refer to the "Propel/Brake Diagnostics" page for more information

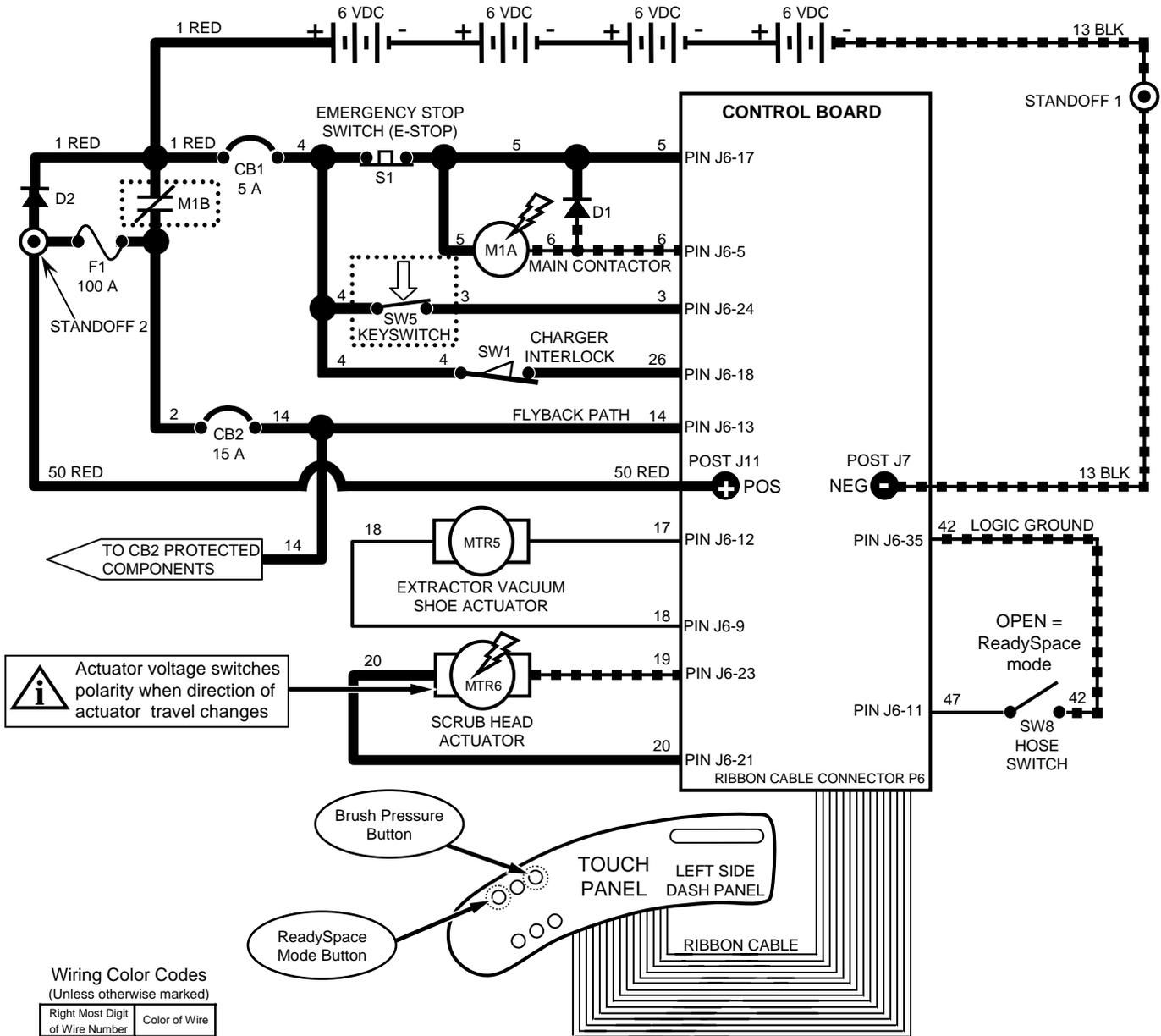
Wiring Color Codes
(Unless otherwise marked)

Right Most Digit of Wire Number	Color of Wire
0	Tan
1	Pink
2	Brown
3	Orange
4	Yellow
5	Green
6	Blue
7	Purple
8	Gray
9	White

--- = Battery Negative or Logic Ground
 — = Battery Positive or Positive Output

R14 – Lower Scrub Head (ReadySpace Mode)

CONDITIONS: Key ON, operator on seat, ReadySpace button activated



! Actuator voltage switches polarity when direction of actuator travel changes

Wiring Color Codes
(Unless otherwise marked)

Right Most Digit of Wire Number	Color of Wire
0	Tan
1	Pink
2	Brown
3	Orange
4	Yellow
5	Green
6	Blue
7	Purple
8	Gray
9	White

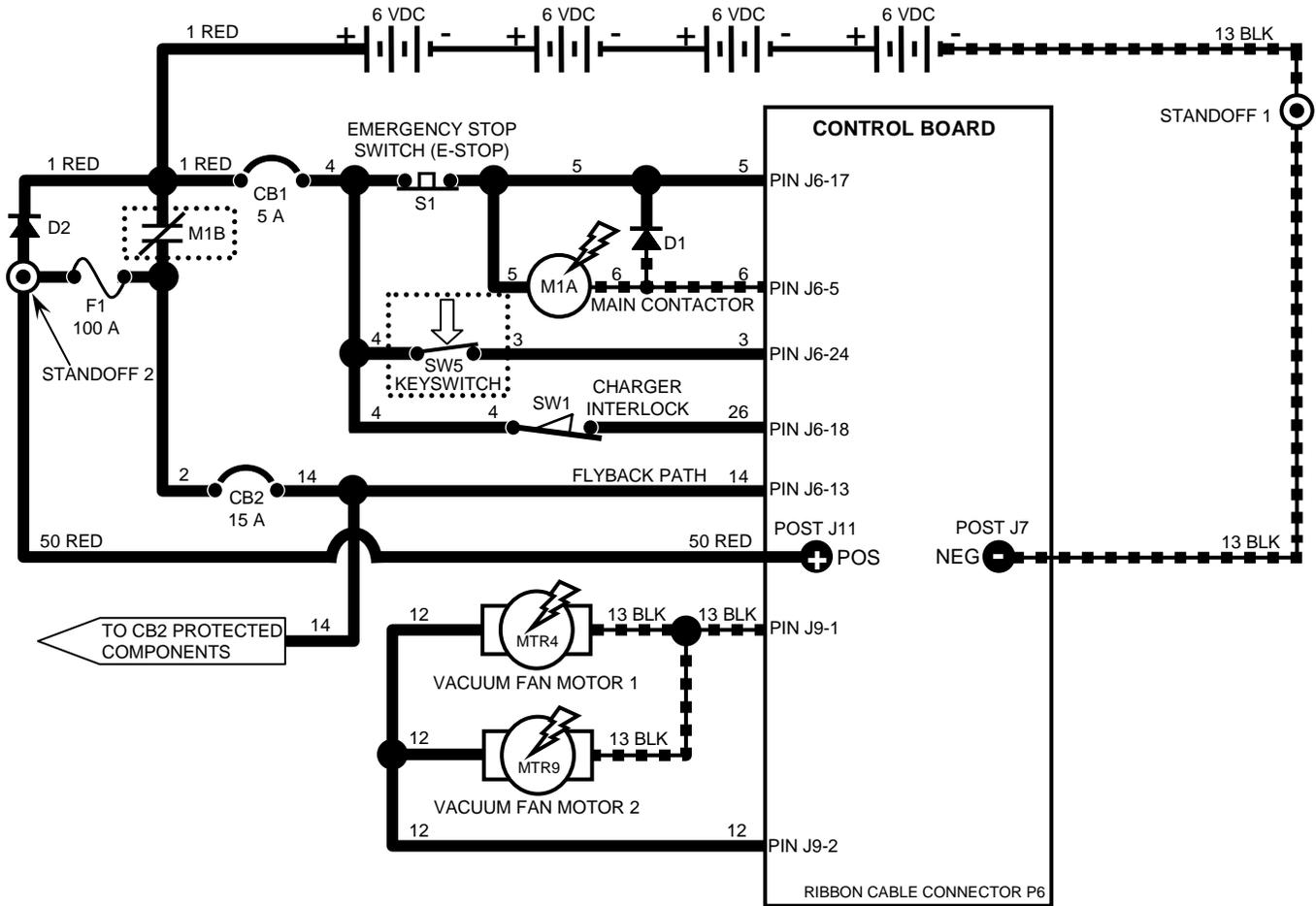
--- = Battery Negative or Logic Ground
 — = Battery Positive or Positive Output

! Be cautious when working near Control Board - *Battery voltage is always present, even with Key OFF*

! Scrub Head actuator travel is controlled by monitoring actuator current In upward travel and brush motor current in downward travel
 Hose Switch is **OPEN** when ReadySpace hose is attached
 Hose Switch is **CLOSED** when Extraction hose is attached
 Either hose can be attached when using the Wand tool or when transporting machine (not cleaning)

R14 – Vacuum Fan Motors

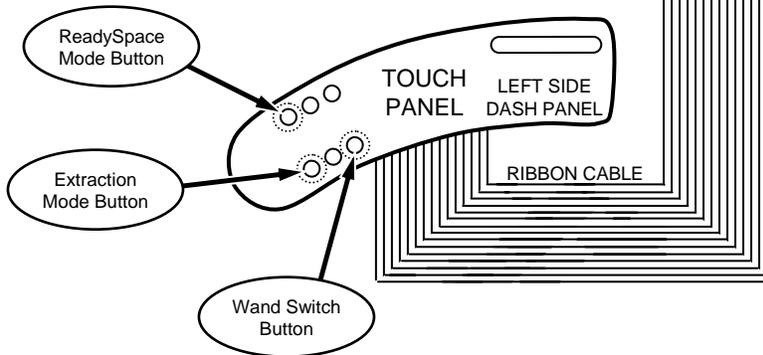
CONDITIONS: Key ON, ReadySpace OR Extraction OR Wand Switch button activated



Wiring Color Codes
(Unless otherwise marked)

Right Most Digit of Wire Number	Color of Wire
0	Tan
1	Pink
2	Brown
3	Orange
4	Yellow
5	Green
6	Blue
7	Purple
8	Gray
9	White

= Battery Negative or Logic Ground
 = Battery Positive or Positive Output

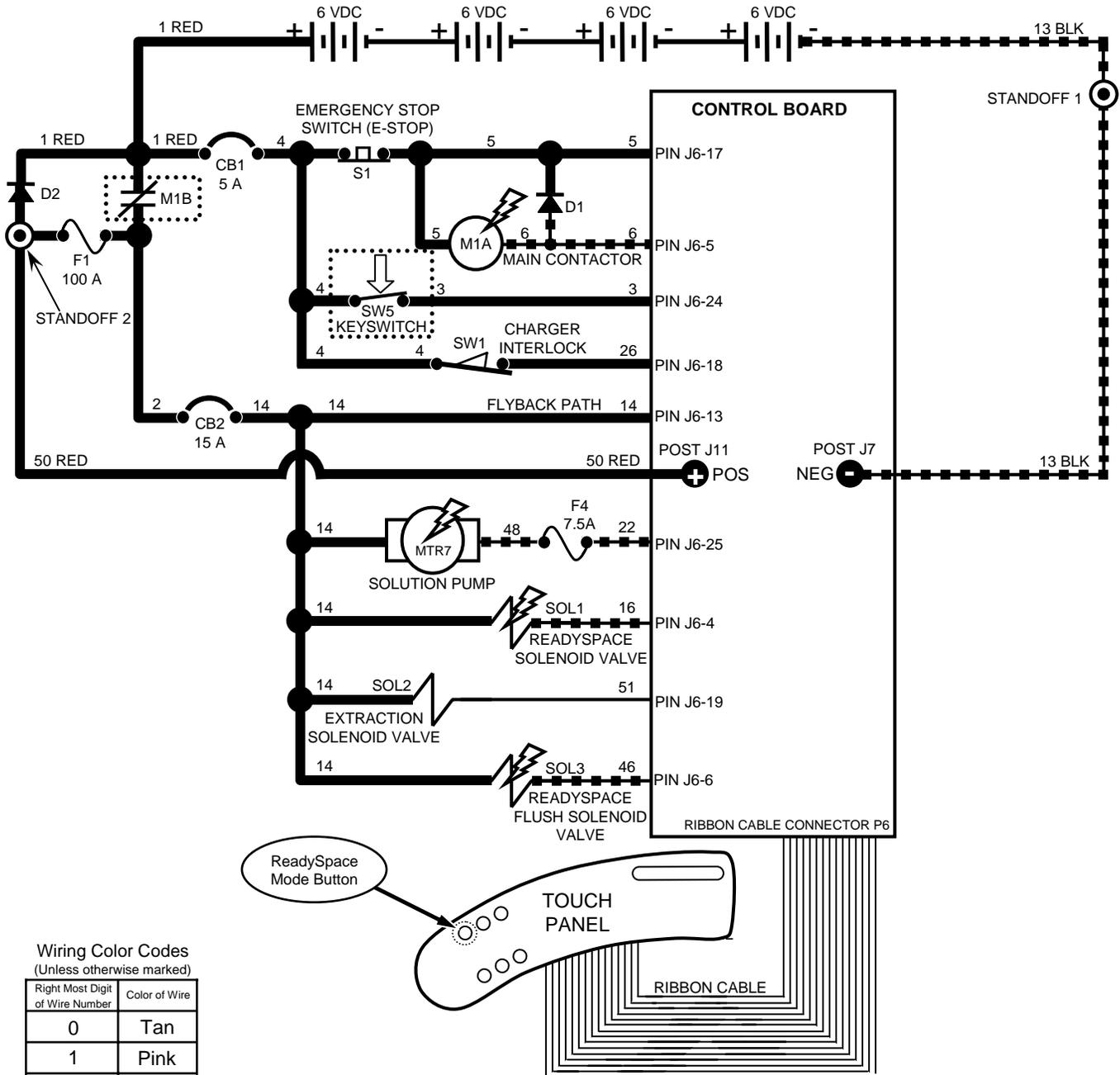


Be cautious when working near Control Board - Battery voltage is always present, even with Key OFF

Vacuum Fan Motors Current Draw: Approx. 36 to 42 Amps (combined)
 Vacuum Fan Motors are controlled by PWM (Pulse Width Modulation)
 Pressing the ReadySpace or Extraction button will activate Vacuum Fans
 Vacuum Fans can also be operated by pressing the Wand Switch button, without operating scrub brushes, but **propel system will be disabled**

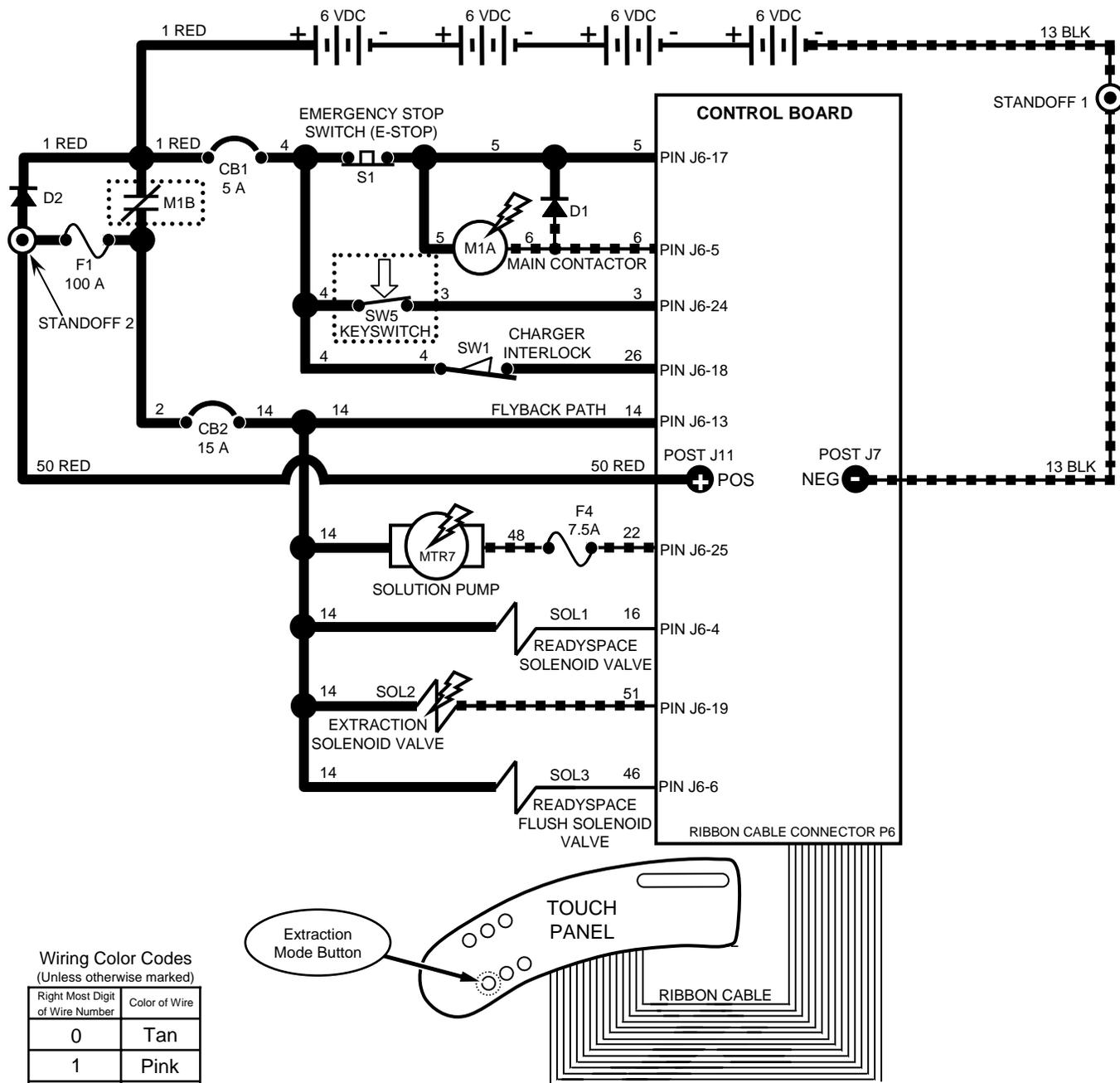
R14 – Solution Pump & Solenoid Valves (ReadySpace Mode)

CONDITIONS: Key ON, ReadySpace button activated, propel pedal depressed



R14 – Solution Pump & Solenoid Valves (Extraction Mode)

CONDITIONS: Key ON, Extraction button activated, propel pedal depressed



Wiring Color Codes
(Unless otherwise marked)

Right Most Digit of Wire Number	Color of Wire
0	Tan
1	Pink
2	Brown
3	Orange
4	Yellow
5	Green
6	Blue
7	Purple
8	Gray
9	White

- = Battery Negative or Logic Ground
- = Battery Positive or Positive Output

Be cautious when working near Control Board - Battery voltage is always present, even with Key OFF

R14 – Operational Modes & Interlocks

Mode	Entry Sequence	Indicator	Function
Forward	-Directional Switch Forward -Propel Pedal Depressed	-Directional Switch in Forward position	Forward movement of machine
Reverse	-Directional Switch Reverse -Propel Pedal Depressed	-Directional Switch in Reverse position -Horn Sounding continuously ON & OFF (except in "Hospital" mode)	Reverse movement of machine
ReadySpace Mode	-Press ReadySpace Button (ON)	-ReadySpace LED ON	Activate Soil Transfer Rollers, Vacuum Fans & Solution Flow operations
Extraction Mode	-Press Extraction Button (ON)	-Extraction LED ON	Activate Extractor brushes, Vacuum Shoes, Vacuum Fans & Solution Flow operations
Cleaning Speed - Standard (Recommended cleaning speed)	-ReadySpace or Extraction mode selected -Forward mode enabled	-ReadySpace or Extraction LED ON -One (1) Propel Speed LED ON	Limits maximum forward propel speed during cleaning
Cleaning Speed - Fast	-ReadySpace or Extraction mode selected -Press Propel Speed Button -Forward mode enabled	-ReadySpace or Extraction LED ON -Two (2) Propel Speed LED's ON	Allows faster than Standard forward propel speed during cleaning
Solution OFF Mode (Extraction Mode ONLY)	-Press Extraction Button (ON) -Press Solution Flow Button (OFF)	-Extraction LED ON -Solution Flow LED OFF	Disable solution spray in Extraction Mode
Wand Mode (Optional feature)	-Press Wand Button (ON)	-Wand LED ON	Collect solution on floor with Off-Aisle Wand attachment (Propel is disabled while in Wand Mode)
Normal Down Pressure Mode	-ReadySpace or Extraction mode selected -Propel Pedal Depressed	-ReadySpace or Extraction LED ON -One (1) Brush Pressure LED ON	Limits maximum scrub head down pressure during cleaning
Heavy Down Pressure Mode	-ReadySpace or Extraction mode selected -Propel Pedal Depressed -Press Brush Pressure Button	-ReadySpace or Extraction LED ON -Two (2) Brush Pressure LED's ON	Allows heavier than Normal scrub head down pressure during cleaning
Solution Tank Empty	-Solution Tank Empty (Float Switch Open)	-Solution Tank Empty LED ON	Disables Cleaning function one minute after indicator is lit
Recovery Tank Full	-Recovery Tank Full (Float Switch Closed)	-Recovery Tank Full LED ON	Disables Cleaning function one minute after indicator is lit
Battery Discharged	-Battery voltage at or below full discharge voltage	-Red LED (on Battery Gauge) blinking	Disables Cleaning function
Brush Motor Over Current Fault	-Controller sensed an Over Current condition in a Brush Motor(s)	-Fault LED ON and: Solution LED Blinking (Front Brush Motor) <u>and/or</u> Propel Speed (+) LED Blinking (Rear Brush Motor)	Prevent damage to Scrub Brush Motors – Cleaning function shuts OFF

R14 – Diagnostic & Fault Alarms

Alarm Codes

Mode	Entry Sequence	Alarm Sequence	Function
Back-Up Alarm	Directional switch placed in REVERSE	Horn sounds 1 beep cycle (repeats)	Alerts nearby persons of machine backward movement (Note: Back-up alarm will not sound when machine is placed in "Hospital" mode)
Propel Interlock: Seat Switch Released	Propel Pedal depressed with operator NOT on seat	Horn sounds 2 beep cycle (repeats)	Prevents movement of machine when operator is not on seat
Propel interlock: High Pedal Disable	Key switch turned ON with Propel Pedal engaged	Horn sounds 4 beep cycle (repeats)	Prevents movement of machine when key switched ON while throttle depressed
Propel Interlock: Throttle Fault	Controller sensed an out-of range Throttle signal	Horn sounds 5 beep cycle (repeats) (Also FAULT LED blinks)	Prevents movement of machine with invalid throttle voltage. Cleaning function shuts off.
Propel Interlock: Parking Brake Fault	Controller sensed an out-of range Brake signal	Horn sounds 6 beep cycle (repeats) (Also FAULT LED blinks)	Prevents movement of machine with invalid brake voltage. Cleaning function shuts off.
Propel Interlock: Parking Brake Unplugged	Controller sensed open circuit on parking brake	Horn sounds 7 beep cycle (repeats) (Also FAULT LED blinks)	Prevents movement of machine with ineffective parking brake. Cleaning function shuts off.
Propel Interlock: Emergency Stop Switch Activated	Controller sensed open circuit on Emergency Stop Switch circuit	Horn sounds 8 beep cycle (repeats)	Disables all functions (Note: To reset, key switch must be cycled OFF and ON after the Emergency Stop switch has been reset)
Propel Interlock: Charger Plugged In	Battery charger plugged into machine with Key Switch ON	Horn sounds 9 beep cycle (repeats)	Prevents movement of the machine with charger plugged in

High Current Faults

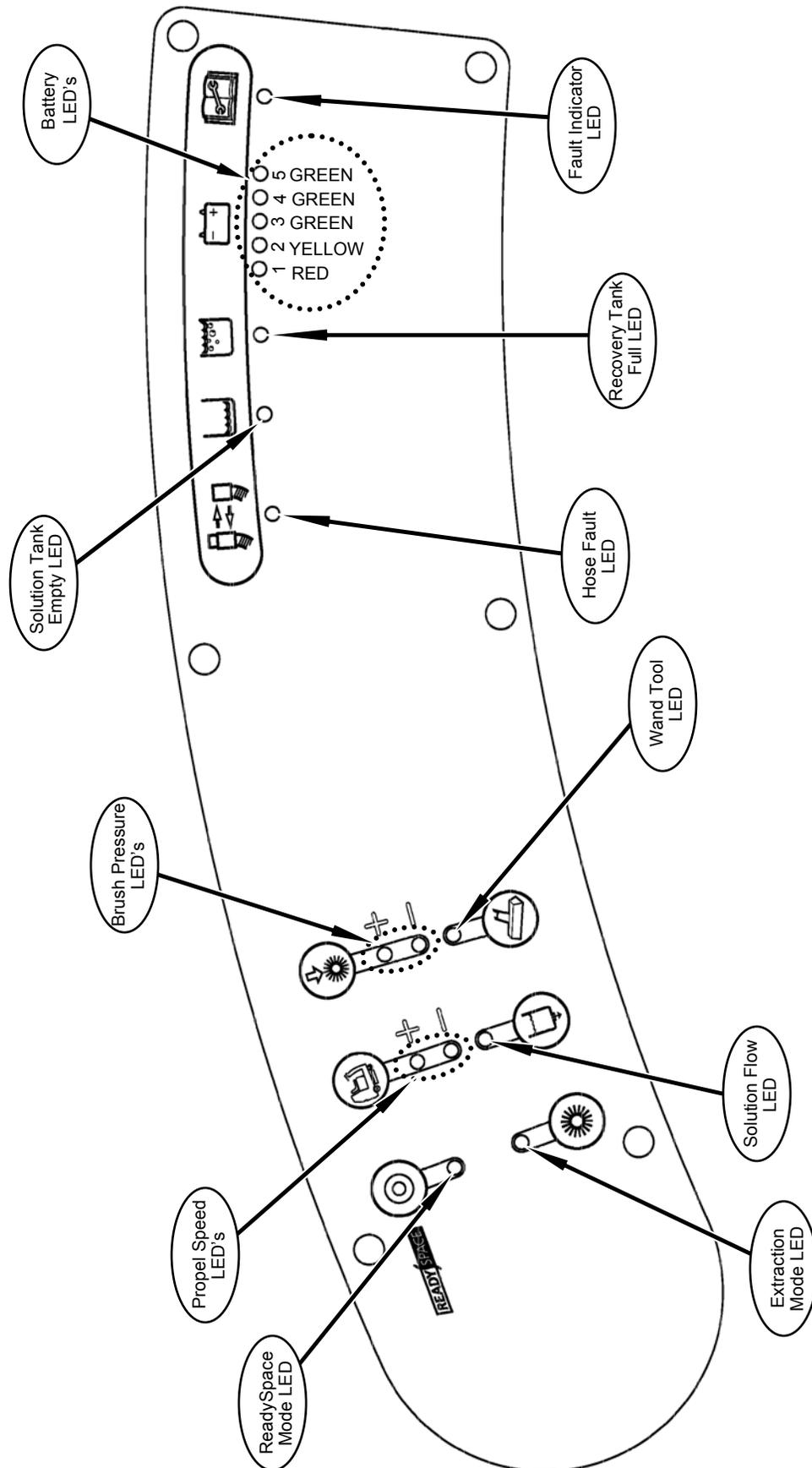
(Refer to page 46 for LED locations)

Fault	Entry Sequence	Indicator
Excessive Propel Motor Current	68 to 70 Amps for 4 min. OR higher than 70 Amps for 15 seconds	Blinking FAULT LED for 10 seconds, then Propel disabled
Excessive Front Brush Motor Current	Front brush motor current higher than 29 Amps	Blinking FAULT LED, Blinking Solution LED
Excessive Rear Brush Motor Current	Rear brush motor current higher than 29 Amps	Blinking FAULT LED, Blinking Speed (+) LED
Excessive Vacuum Fan Motors Current	Vacuum Fan Motors (combined) current higher than 60 Amps	Blinking FAULT LED, Blinking Extraction LED
Excessive Scrub Head Actuator Motor Current	Scrub head actuator current 8 Amps or higher	Blinking FAULT LED, Blinking Brush Pressure (+) LED
Excessive Extraction Shoes Actuator Motor Current	Extraction Shoes actuator current 8 Amps or higher	Blinking FAULT LED, Blinking Brush Pressure (-) LED

R14 – Diagnostic & Configuration Modes

Mode	Entry Sequence	Indicator	Function
Display Software Revision Mode (Refer to page 47 for detailed instructions for this mode)	Press and hold ReadySpace Button, turn key switch ON, wait 10 seconds, release ReadySpace Button	Upper Speed (+) LED blinks Tens of day of month, Upper Brush Pressure (+) LED blinks Single day of month	Blinking LED's indicate software revision date
		Lower Speed (-) LED blinks Tens of month, Lower Brush Pressure (-) LED blinks Single month	
		Solution Flow LED blinks Tens of year, Wand Tool LED blinks out Single year	
Self Test Mode (Refer to page 48 for detailed instructions for this mode)	Press and hold the ReadySpace and Extraction Buttons, turn key switch ON, release buttons after the relay clicks	Start of test - Front Brush motor turns ON End of test - Horn sounds	All Battery LED's flashing indicate OK, A Flashing LED (other than Battery LED's) indicates an OPEN Fault, A Solid lit LED indicates a SHORT Fault
Input Display Mode (Refer to page 49 for detailed instructions for this mode)	Press and hold Wand Tool Button, turn key switch ON, release button after forth battery LED starts to blink	#4 battery LED blinks	Shows state of control board inputs from various switches and sensors
Manual Mode (Refer to page 50 for detailed instructions for this mode)	Press and hold Solution Flow Button, turn key switch ON, release after third Battery LED starts to blink.	#3 Battery LED blinks	Allows operation of individual functions without the safety interlocks affecting or controlling them
Propel/Brake Diagnostic Mode (Refer to page 51 for detailed instructions for this mode)	Press and hold ReadySpace and Speed Buttons, turn key switch ON, release after battery LED's are OFF	ReadySpace LED ON if in Forward OR Extraction LED ON if in Reverse - Brush Pressure and Wand Tool LED's display position of Propel Pedal, Speed and Solution Flow LED's display position of Brake Pedal, Battery LED's display Propel Motor current level	Provides information regarding brake pedal signal, propel pedal signal, and propel motor current
Reverse Alarm Select Mode (Refer to page 53 for detailed instructions for this mode)	Put directional switch in Reverse, press & hold Horn Button, turn key switch ON	Horn sounds or is silent	Allows enable/disable of Backup alarm (Hospital Mode)

R14 – LED Locations & Descriptions



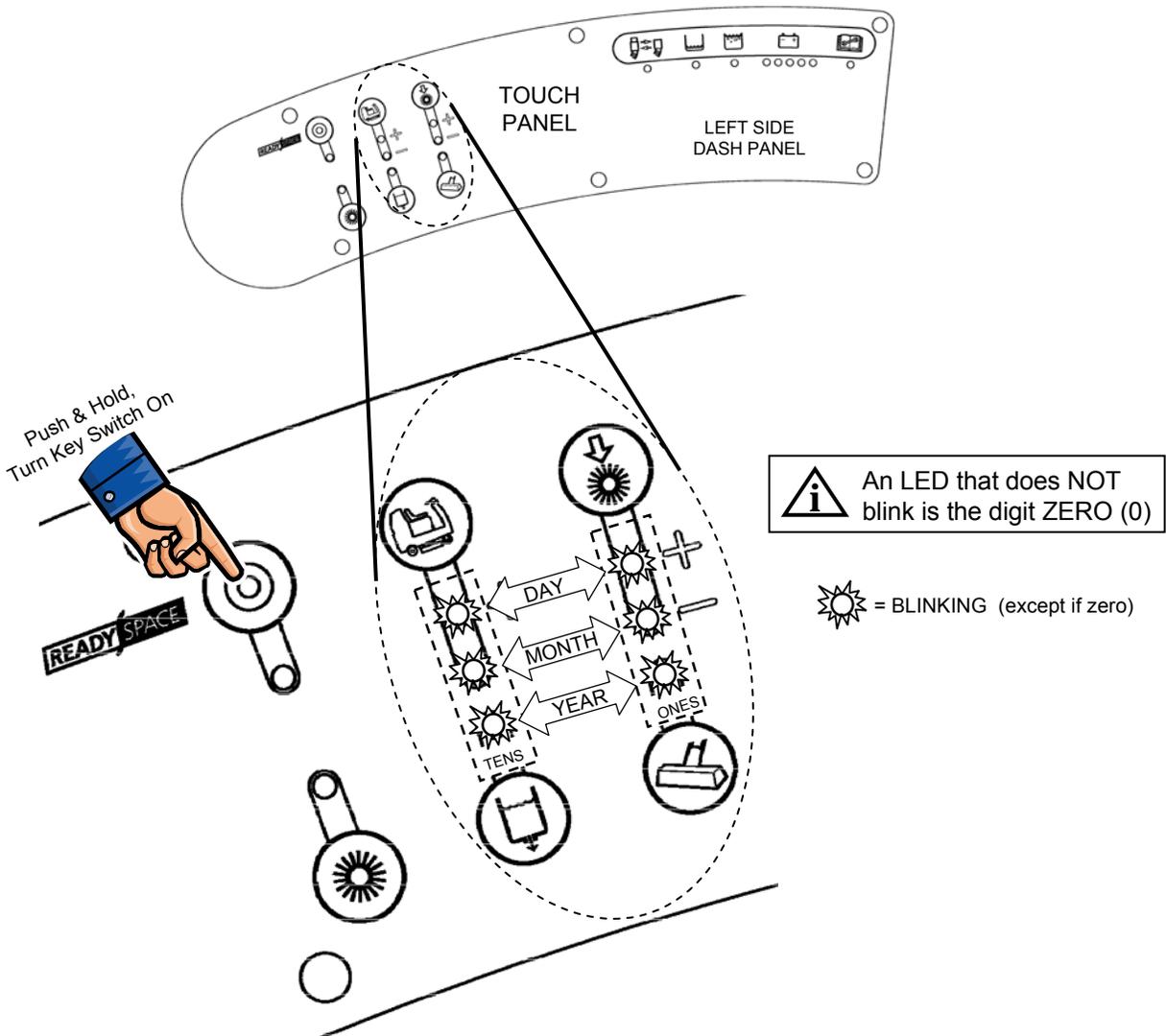
R14 – Display Software Revision Mode

TO ENTER:

- Press and hold ReadySpace Button
- Turn key switch ON, wait 10 seconds
- Release Button

READING THE SOFTWARE REVISION:

- Upper Speed (+) LED blinks Tens of DAY of month, Upper Brush Pressure (+) LED blinks Single DAY of month
- Lower Speed (-) LED blinks Tens of MONTH, Lower Brush Pressure (-) LED blinks Single MONTH
- Solution Flow LED blinks Tens of YEAR, Wand Tool LED blinks out Single YEAR



Example	TENS LED's	# of Blinks	ONES LED's	# of Blinks	Revision Date
Day	Upper Speed (+) LED	2	Upper Brush Pressure (+) LED	9	29th
Month	Lower Speed (-) LED	0 (LED OFF)	Lower Brush Pressure (-) LED	9	September
Year	Solution LED	0 (LED OFF)	Wand LED	6	2006

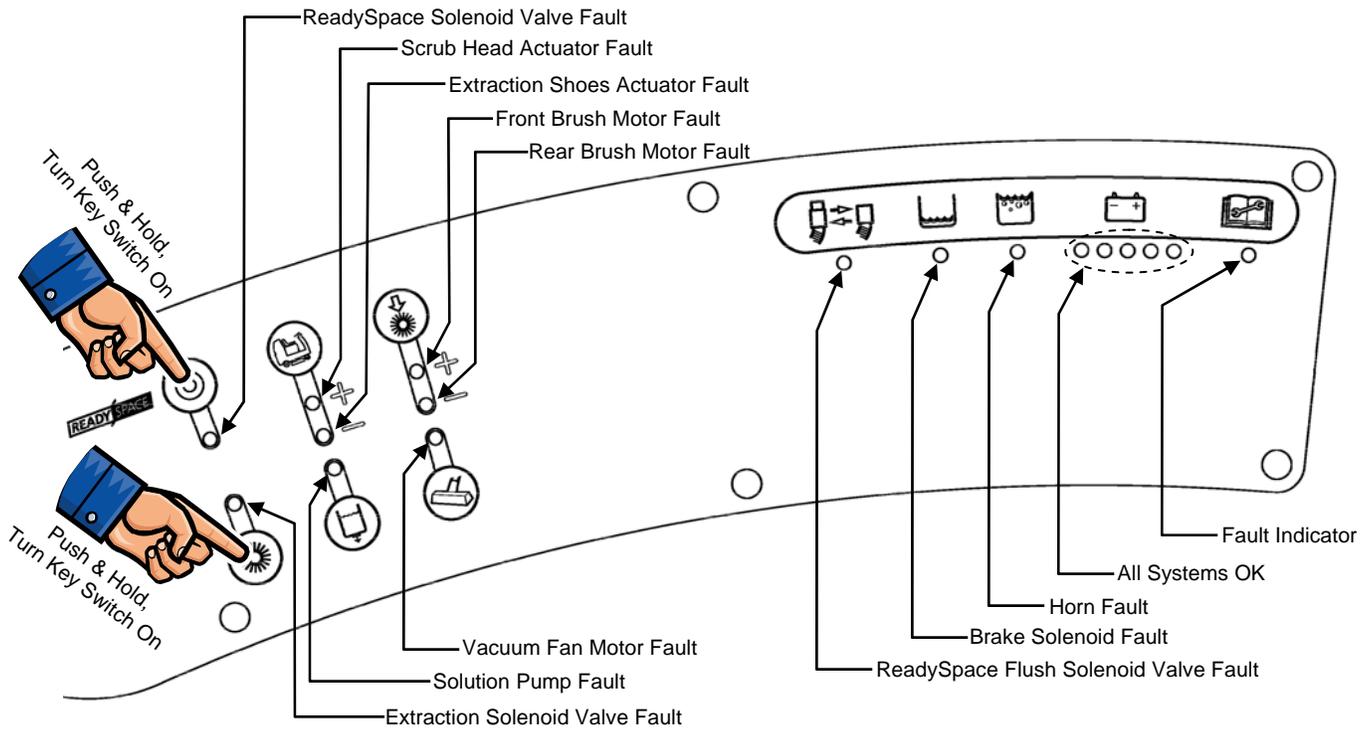
R14 – Self Test Mode

TO ENTER:

- Press and hold ReadySpace & Extraction Buttons
- Turn key switch ON
- Release Buttons after the relay clicks
- The entire Self Test takes approximately 40 seconds
- At the Start of the Self Test, the Front Brush motor turns ON
- At the End of the Self Test, the Horn sounds

AFTER THE SELF TEST IS COMPLETE:

- If the Battery LED's are blinking, NO FAULTS were found
- If any LED is blinking (other than Battery LED's), an OPEN FAULT was found (refer to diagram below)
- If any LED is lit solid, a SHORT FAULT was found refer to table below (refer to diagram below)



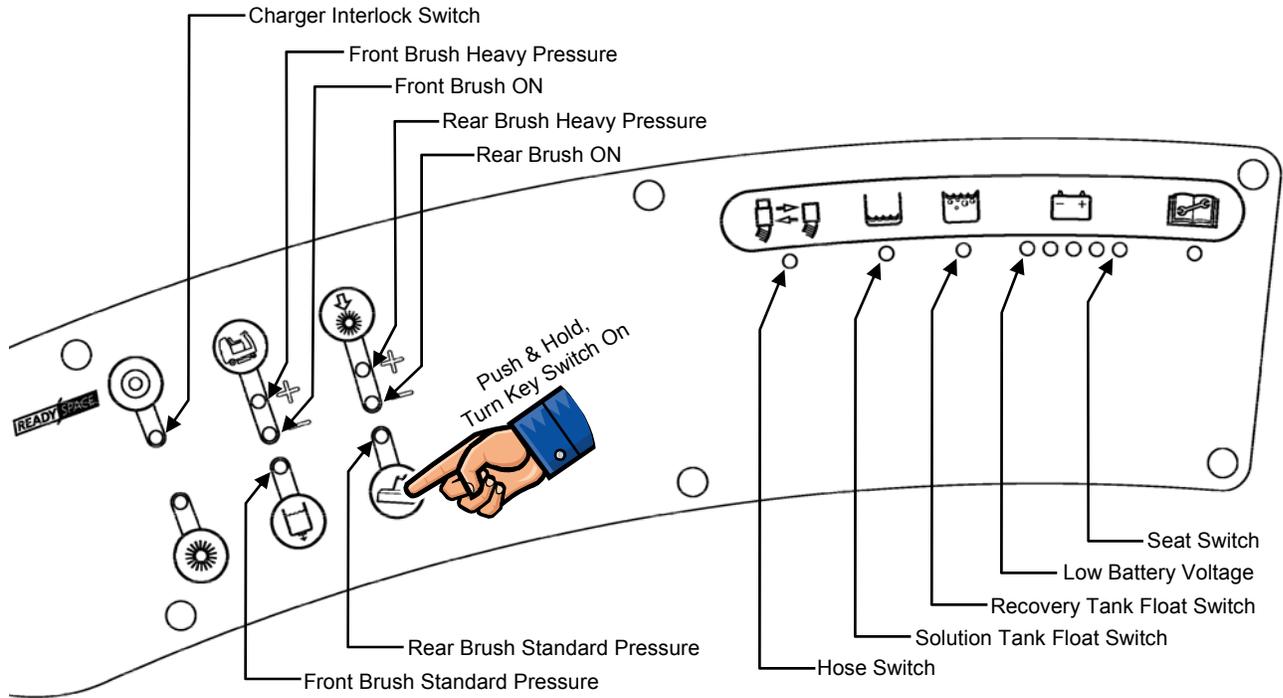
LED (Flashing = OPEN, Solid = SHORT)	System at Fault
Battery LED's Flashing	No Faults Found
ReadySpace LED	ReadySpace Solenoid Valve
Extraction LED	Extraction Solenoid Valve
Upper Speed (+) LED	Scrub Head Actuator
Lower Speed (-) LED	Extraction Shoes Actuator
Solution LED	Solution Pump
Upper Brush Pressure (+) LED	Front Brush Motor
Lower Brush Pressure (-) LED	Rear Brush Motor
Wand LED	Vacuum Fan Motor
Hose LED	ReadySpace Flush Solenoid Valve
Solution Tank Empty LED	Brake Solenoid
Recovery Tank Full LED	Horn/Back-up Alarm

R14 – Input Display Mode

The purpose of the Input Display Mode is to show the condition of various control board inputs

TO ENTER:

- Press and hold the Wand Button
- Turn key switch ON
- Release Button after the # 4 Battery LED blinks



INPUT	ASSOCIATED LED(s)	LED IS ON WHEN:	LED IS OFF WHEN:	NOTES
Charger Interlock Switch	ReadySpace LED	Battery charger IS NOT plugged in (switch is CLOSED)	Battery charger IS plugged in (switch is OPEN)	ReadySpace system will still operate, but without indicator
Seat Switch	# 5 (Green) Battery LED	Operator IS NOT sitting on seat (switch is OPEN)	Operator IS sitting on Seat (switch is CLOSED)	
Recovery Tank Float Switch	Recovery Tank Full LED	Recovery tank IS FULL (switch must be CLOSED for 5 to 7 seconds)	Recovery tank IS NOT FULL (switch is OPEN)	
Solution Tank Float Switch	Solution Tank Empty LED	Solution tank IS EMPTY (switch must be OPEN for 5 to 7 seconds)	Solution tank IS NOT EMPTY (switch is CLOSED)	
Emergency Stop Switch	none	N/A	N/A	Horn will repeat 8 beep cycle when Emergency Stop Switch is activated
Battery Voltage	# 1 (Red) Battery LED	Battery needs charging (LED is BLINKING)	Battery has sufficient charge level	
Hose Switch	Hose switch LED	ReadySpace hose is NOT connected (switch is OPEN)	ReadySpace hose IS connected (switch is CLOSED)	
Front Brush Pressure	Speed & Solution LED's	Lower Propel Speed (-) LED is ON when Front Brush is running; Upper Propel Speed (+) LED is ON when Heavy Brush pressure is selected; Solution LED is ON when Standard Brush Pressure is selected		
Rear Brush Pressure	Brush Pressure & Wand LED's	Lower Brush Pressure (-) LED is ON when Rear Brush is running; Upper Brush Pressure (+) LED is ON when Heavy Brush pressure is selected; Wand LED is ON when Standard Brush Pressure is selected		

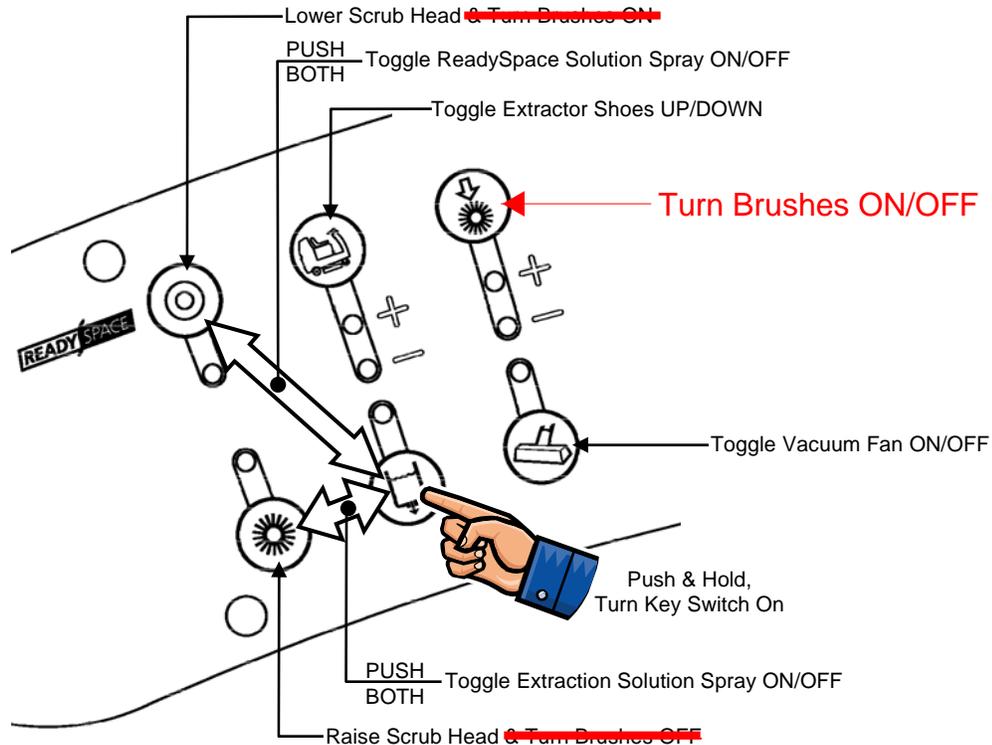
NOTE: For Propel & Brake signal troubleshooting, refer to the Propel Diagnostics Mode page

R14 – Manual Mode

The purpose of the Manual Mode is to allow the technician to exercise individual cleaning functions on the machine. In Manual Mode, most of the Normal mode interlocks are disabled. All Propel functions are disabled in Manual Mode. **Extreme care must be exercised when operating the machine in this mode.**

TO ENTER:

- Press and hold the Solution Button
- Turn key switch ON
- Release Button after # 3 Battery LED blinks



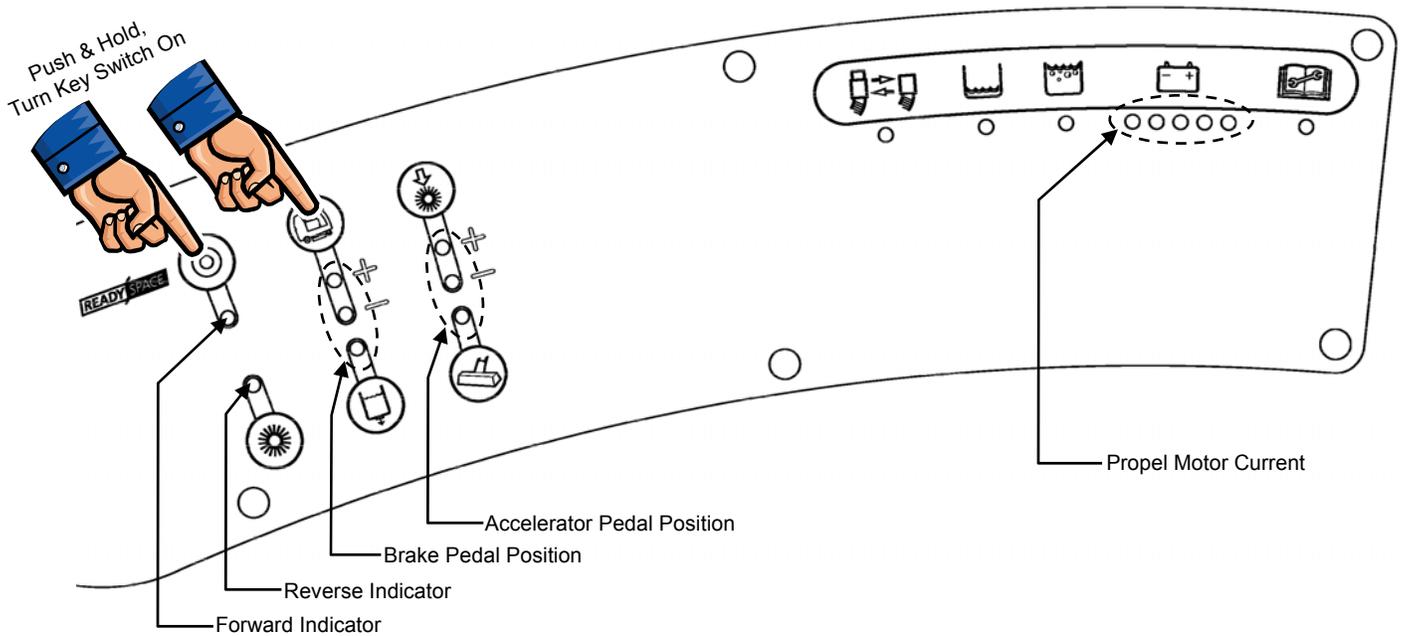
FUNCTION	BUTTON(S)	ACTION	INDICATOR	NOTES
Lower Scrub Head	ReadySpace	Press & Hold	Scrub head lowers	Scrub head will continue to lower as long as button is held
CAUTION: Do not hold ReadySpace Button down too long - actuator stall will occur, possibly damaging actuator or control board				
Scrub Brushes On/Off	Brush Pressure	Press & Release	Scrub brushes turn ON or OFF	Scrub brushes can be turned On & Off by pressing the Brush Pressure button
Turn OFF Scrub Brushes and Raise Scrub Head	Extraction	Press & Hold	Scrub head raises	Scrub head will continue to raise as long as button is held
Raise/Lower Extractor Shoes	Propel Speed	Press & Release	Extractor shoes raise or lower	Extractor Shoes can be toggled UP & DOWN by pressing the Propel Speed button
Vacuum Fan	Wand	Press & Release	Wand LED	Vacuum Fan can be toggled ON & OFF by pressing the Wand button
ReadySpace Solution Spray	Solution & ReadySpace	Press & Release	Solution & ReadySpace LED's	Solution Pump & ReadySpace valves can be toggled ON & OFF by pressing the Solution & ReadySpace buttons
Extraction Solution Spray	Solution & Extraction	Press & Release	Solution & Extraction LED's	Solution Pump & Extraction valves can be toggled ON & OFF by pressing the Solution & Extraction buttons
ADDITIONAL NOTES				
<ul style="list-style-type: none"> • When the Recovery Tank Full switch is CLOSED (tank full), the Recovery Tank Full LED will light • When the Solution Tank Empty switch is OPEN (tank empty), the Solution Tank Empty LED will light • For safety considerations, the Propel functions are disabled 				

R14 – Propel/Brake Diagnostics

(Page 1 of 2)

TO ENTER:

- Press and hold ReadySpace & Propel Speed Buttons
- Turn key switch ON
- Release Buttons after ReadySpace LED (if in Forward) or Extraction LED (if in Reverse) is lit



TEST	ACTION	INDICATOR	NOTES
Directional Switch - Forward	Place Directional Switch in Forward Propel position	ReadySpace LED ON	LED will be illuminated if the controller senses the Directional Switch in Forward Position - Machine will not propel if any of the Brake LED's are illuminated
Directional Switch - Reverse	Place Directional Switch in Reverse Propel position	Extraction LED ON	LED will be illuminated if the controller senses the Directional Switch in Reverse Position - Machine will not propel if any of the Brake LED's are illuminated
Brake Pedal	Depress Brake Pedal	Propel Speed & Solution LED's	LED's will display the sensed position of the brake pedal - No LED's indicate pedal is released, 3 LED's indicate that the pedal is fully depressed
Accelerator Pedal	Depress Accelerator Pedal	Brush Pressure & Wand LED's	LED's will display the sensed position of the accelerator pedal - No LED's indicate the pedal is released, 3 LED's indicate that the pedal is fully depressed
Propel Motor Current	Depress Accelerator Pedal	Battery LED's	Battery gauge LED's display the current level being drawn by the Propel Motor - Each LED represents 7 Amps of current (ex: 3 LED's = 21 Amps)

R14 – Propel/Brake Diagnostics

(Page 2 of 2)

Propel & Brake Pedal Data

Pedal	LED group	Lit LED's	Pedal Position	Input Voltage Level	Notes
Propel	Brush Pressure & Wand LED's	0	Released	below 1.3 VDC	Machine must be in Propel Diagnostic Mode when testing; LED's will display the sensed position of the pedal; No LED's indicate pedal is released; 3 LED's indicate pedal is fully depressed
		1	Slightly Depressed	1.3 to 1.89 VDC	
		2	Halfway Depressed	1.89 to 2.27 VDC	
		3	Fully Depressed	2.27 to 4.0 VDC	
Brake	Propel Speed & Solution LED's	0	Released	below 1.5 VDC	
		1	Slightly Depressed	1.5 to 1.89 VDC	
		2	Halfway Depressed	1.89 to 2.27 VDC	
		3	Fully Depressed	2.27 to 4.0 VDC	

Propelling System Data

Mode	Direction	Wire #	Color	Polarity	Notes	
Transport	Forward	25	Green	-	Voltage during FORWARD travel will vary from 0 to 24 VDC	
		24	Yellow	+		
	Reverse	25	Green	+		Voltage during REVERSE travel will vary from 0 to approximately 17 VDC
		24	Yellow	-		
ReadySpace, High Speed, Heavy Down Pressure	Forward	25	Green	-	Voltage during FORWARD travel will vary from 0 to 12 VDC, with a maximum of 11 Amps	
		24	Yellow	+		
Extraction, High Speed, Heavy Down Pressure	Forward	25	Green	-	Voltage during FORWARD travel will vary from 0 to 6 VDC, with a maximum of 20 Amps	
		24	Yellow	+		

NOTE: Output to propel motor is PWM (Pulse Width Modulated)

R14 – Reverse Alarm Select Mode

Reverse Alarm Select Mode allows enabling or disabling of the Backup Alarm

TO ENTER:

- Put directional switch in Reverse
- Press & Hold Horn Button
- Turn key switch ON
- If Back-up Alarm is silent, Hospital (Quiet) Mode has been selected
- If Back-up Alarm is sounding, Normal Mode has been selected
- Cycle key switch OFF, then ON again
- Verify correct mode has been chosen

