



TECHNICAL SERVICE BULLETIN

No.035700-13
Machine:5680/5700
System:FaST scrub-
bing system

FaST system operational training and troubleshooting.
This chart lists some useful information and part numbers.

Machine	Part Number	Description
5680/5700	1002856	Quick disconnect fitting for cold weather transit prep. See TSB 025700-12
5680/5700	63182	Hose to add add antifreeze for cold weather transit prep.
5680/5700	1002887	365 FaST detergent 2 box package
5680/5700	1010603	665 FaST detergent 2 box package

Use the following pages of information in diagnosing problems on machines equipped with the FaST system option.



On-Board Detergent

The FaST™ foam scrubbing system reduces cleaning costs by promoting reduction of both chemical and water use in automatic scrubbers. Cleaner, dryer floors makes the FaST™ system *the safe scrubbing alternative™* versus conventional scrubbers. Both FaST™ 365 Floor Cleaning Concentrate, and FaST™ 665 Heavy Duty Cleaner/Degreaser, share unique proprietary technology that provides many advantages.

Detergent Physical Data

Name:	FAST™ 365	FAST™ 665
FaST-PAK™ Size	2L (.53 gal)	2L (.53 gal)
Detergent Color	Light Tan	Blue
Packaging Coloration	Teal	Purple
Dilution Rate	1000:1	1000:1
Odor	Low	Low
pH	7.0 +/- 1.0	7.0 +/- 1.0
Phosphates	None	None
Solvents	None	None
Volatile Organic Compounds (VOC)	None	None
Ozone Depleting Compounds	None	None
Damage to Floor Finishes	None	None
Shelf Life	2 years	2 years

Detergent Features:

- Safe, versatile, environmentally responsible cleaners effective on a variety of surfaces
- Never leaves sticky or soapy residue that attract soils
- Fragrance free – low odor – pleasant to use
- High performance, non alkaline, solvent free



Container Features

- On-board container measures exact detergent-to-water concentration and completely eliminates operator over or under use of detergent.
- Highly concentrated formula to reduce packaging materials and costs associated with shipping, handling, and inventory. 1 container cleans up to 1-million square feet (93,000 square meters), and is equivalent of up to 35-gallons (133 L) of non-concentrated detergent.
- Small 2L (.53 gal) container eliminates heavy lifting of detergent containers by operator.
- Eliminates employee contact with chemical. It features unique quick snap-to-connect fittings between machine and FaST-PAK™ and no-leak check valves.
- Bag-in-box design allows a sealed system, ensuring purity of detergent. The flexible high-strength bag collapses as it empties, leaving little to no waste.
- Easy to handle 2 packs are easily shipped and stored. Both the corrugated cardboard shipping packaging and the corrugated plastic are made from recycled material and can be recycled.
- FaST-PAK™ labeling is color coded, uses a numbering system and is available in English and Spanish languages to help identify the products for safety and application purposes.

Application Chart

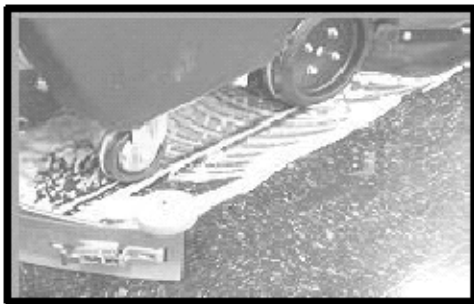
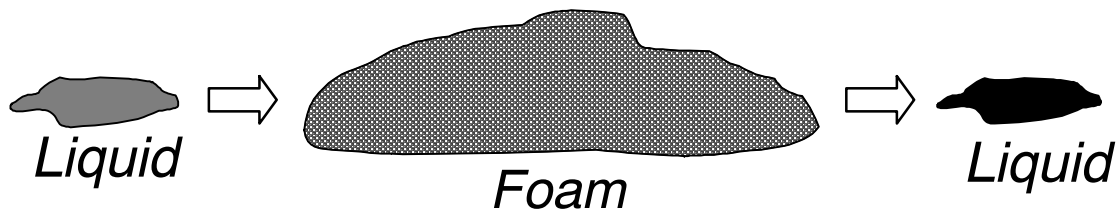
		Soil		
		Light	Medium	Heavy
FLOOR TYPE	Marble	365	365	665
	Terrazzo	365	365/665	665
	VCT	365	365/665	665
	Grouted Tile	365	365/665	665
	Sealed Concrete	365	365/665	665
	Unsealed Concrete	365	665	665
	Rough Concrete	665	C	C

Grease		
Light	Medium	Heavy
665	665	665
665	665	C
665	665	C
665	665	C
665	665	C
665	665	C
C	C	C

C = Conventional Scrubbing

What is *FaST*™ ?

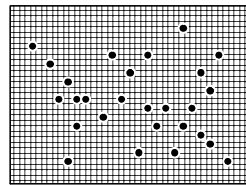
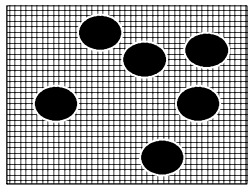
Foam Scrubbing Technology



Self-Collapsing Foam Technology

Why *FaST*™ Works

Increased Wetting and Surface Area using *FaST*™ technology



**Increased
Wetting**



Conventional

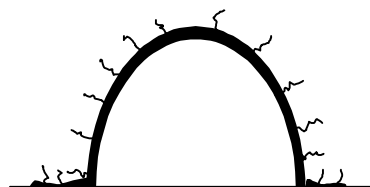


FaST

**Increased
Surface
Area**



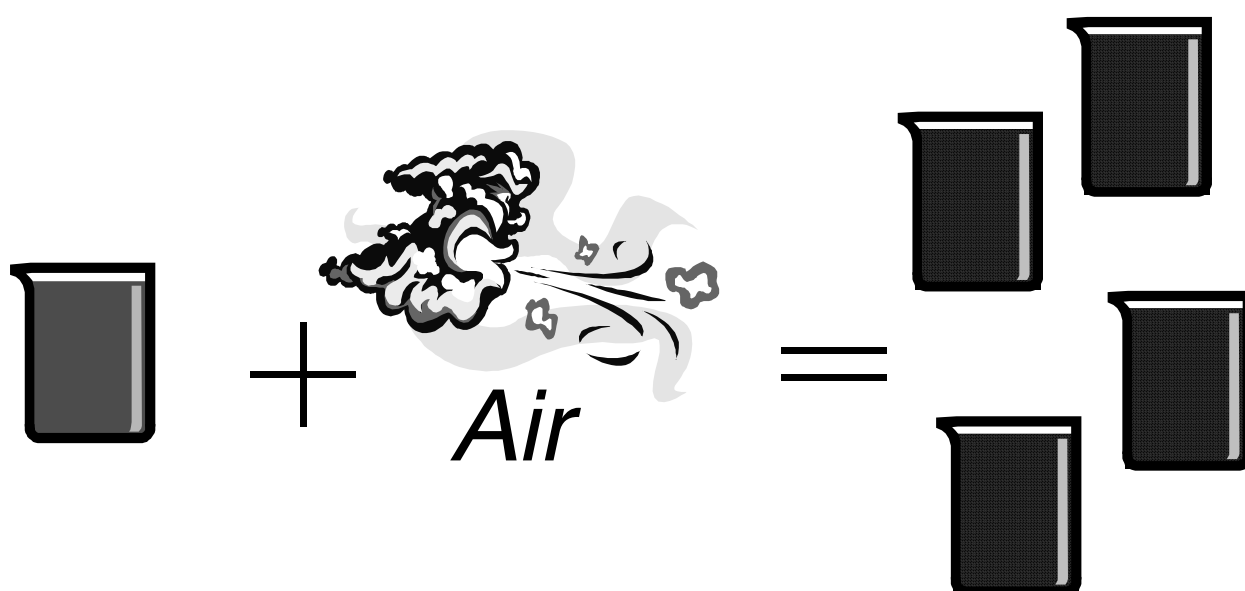
Conventional



FaST

How *FaST*™ Works:

Air Injection expands detergent/water solution to over four (4) times its original volume





FaST™ advantages

Less potential water left behind - reduced slip/fall



Conventional



FaST

Micro-dispersed bubbles allow FaST solution to dry quicker than conventional liquid.

Reduced detergent cost, waste, shipment cost, storage



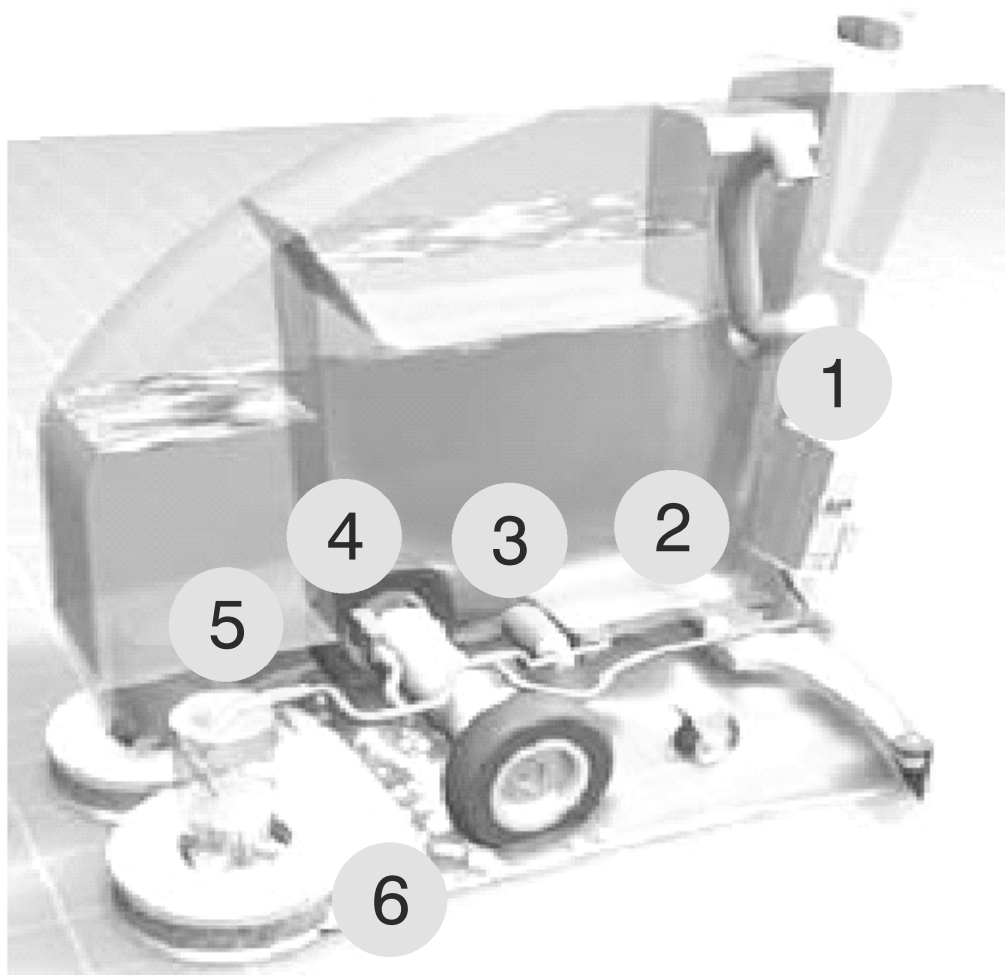
Conventional



FaST

- On-board detergent metering
- One container lasts weeks
- Just drain recovery tanks and fill solution tank with water - no chemical mixing
- Less water used/recovered solution to dispose of - environmentally friendly

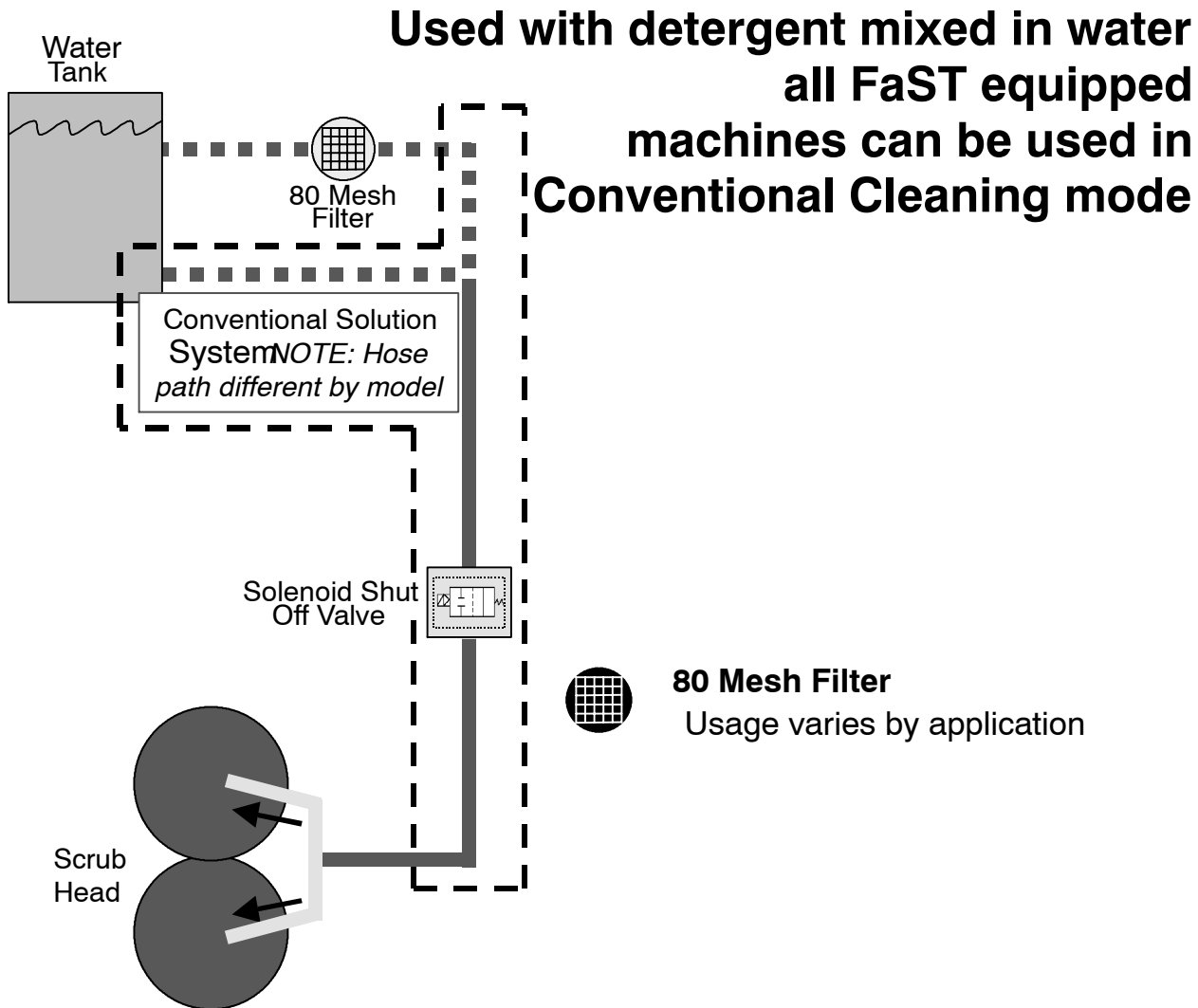
Product Overview:



- 1. Detergent Concentrate**
- 2. Detergent Pump**
- 3. Water Pump**
- 4. Air Compressor**
- 5. Mixing Chamber**
- 6. Application to floor**

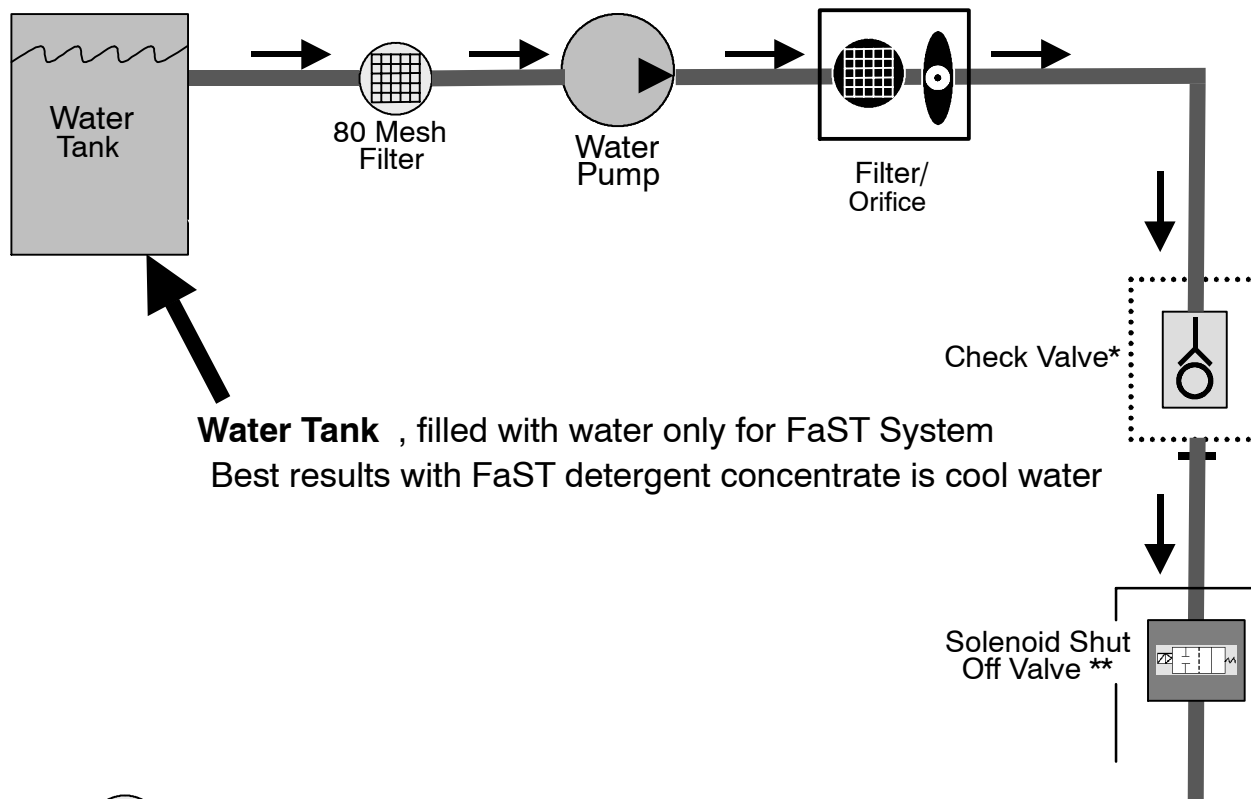
Major Systems

Conventional Solution System



Major Systems

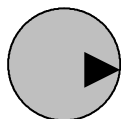
Water System



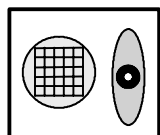
Water Tank , filled with water only for FaST System
Best results with FaST detergent concentrate is cool water



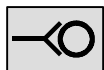
80 Mesh Filter , 0.005 Microns,
Located in bottom of solution tank or in line leading to water pump



Water Pump , 24 vDC or 36 vDC, depending on application
Pump runs continuously with FaST engaged
Pump has internal pressure relief valve set at 45 psi



Filter and Orifice , Orifice is 0.036 diameter
Filter prevents orifice from plugging
Lowers pressure to 2-3 psi and limits water flow after orifice
Assembly is: filter, washer, orifice in water flow direction



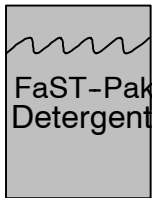
Check Valve , optional component depending on application



Shut Off Valve , 24 vDC or 36 vDC, depending on application
Located in pure water line or on water/detergent line
Valve is on with FaST engaged

Major Systems

Detergent System



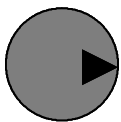
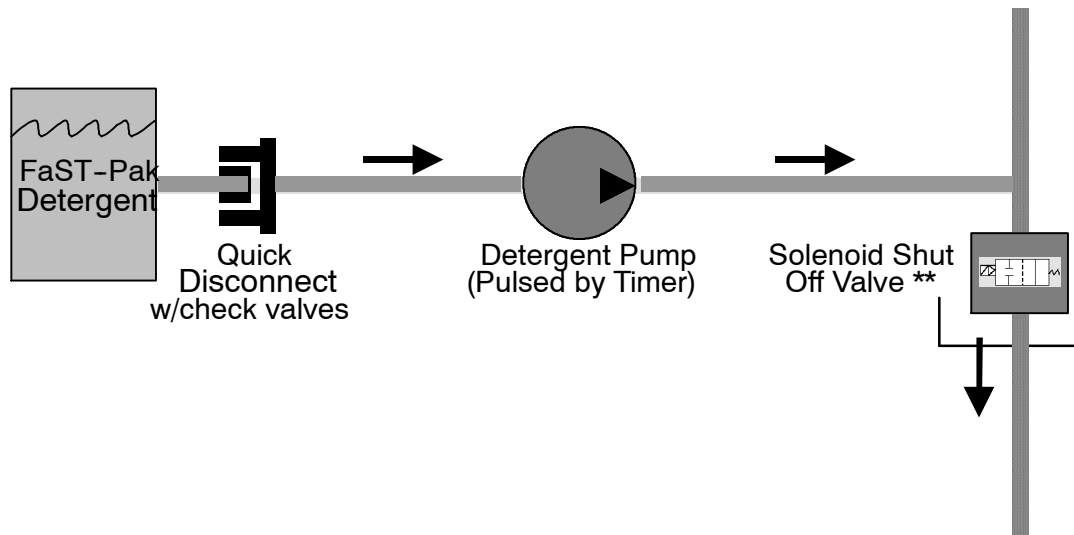
Detergent Concentrate

Tennant 365 detergent
FaST-Pak uses 1/2 of quick connector on each FaST-Pak
Check valve is internal with connector
Detergent will ☐thicken☐ if left exposed to air



Quick Disconnect

Detergent line is sealed when connector is disconnected from FaST-Pak
Connect this connector to the storage connector on the machine if the FaST system is not used for an extended period of time



Detergent Pump, 24 vDC or 36 vDC

Pump is pulsed by a blue timer at 0.5 hertz (once per every 2 seconds)
Timer pump is on with FaST engaged
(Note: You cannot tell if the pump is running by touch)
One of two pumps are used depending on application

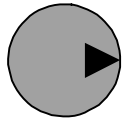


Shut Off Valve , 24 vDC or 36 vDC, depending on application

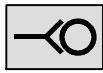
Located in pure water line or an water/detergent line
Valve is on with FaST engaged

Major Systems

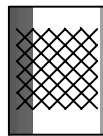
Solution Expansion



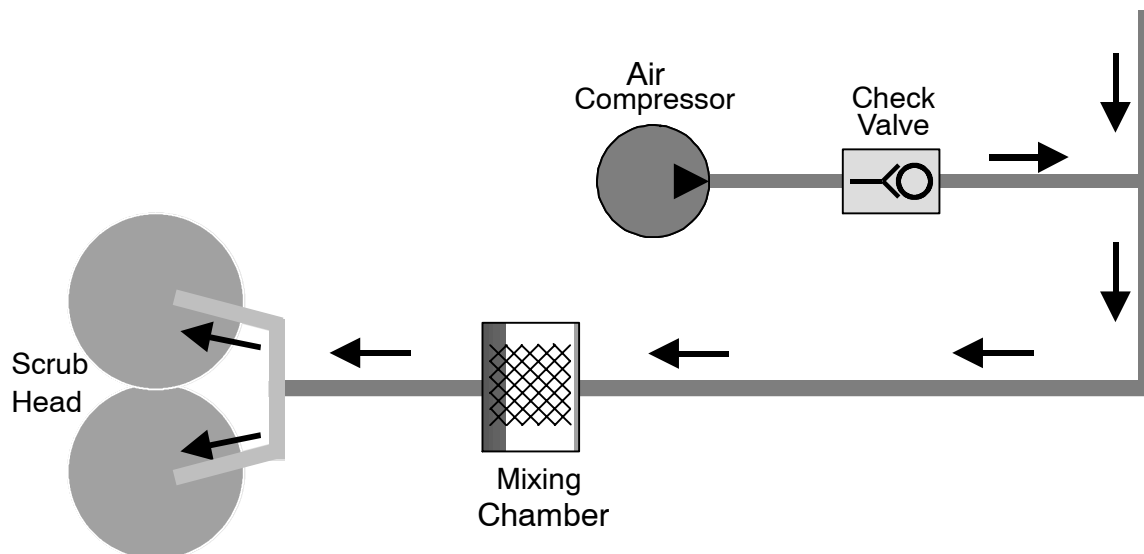
Air Pump, all 24vDC pumps, 36vDC FaST system(s) uses a power resistor
 Pump runs continuously with FaST engaged
 The air pump/compressor produces 20-30 psi, 20-25 inches of Hg
 By the use of added air to the detergent/water solution, the solution expands to over four (4) times its original volume after air is injected.



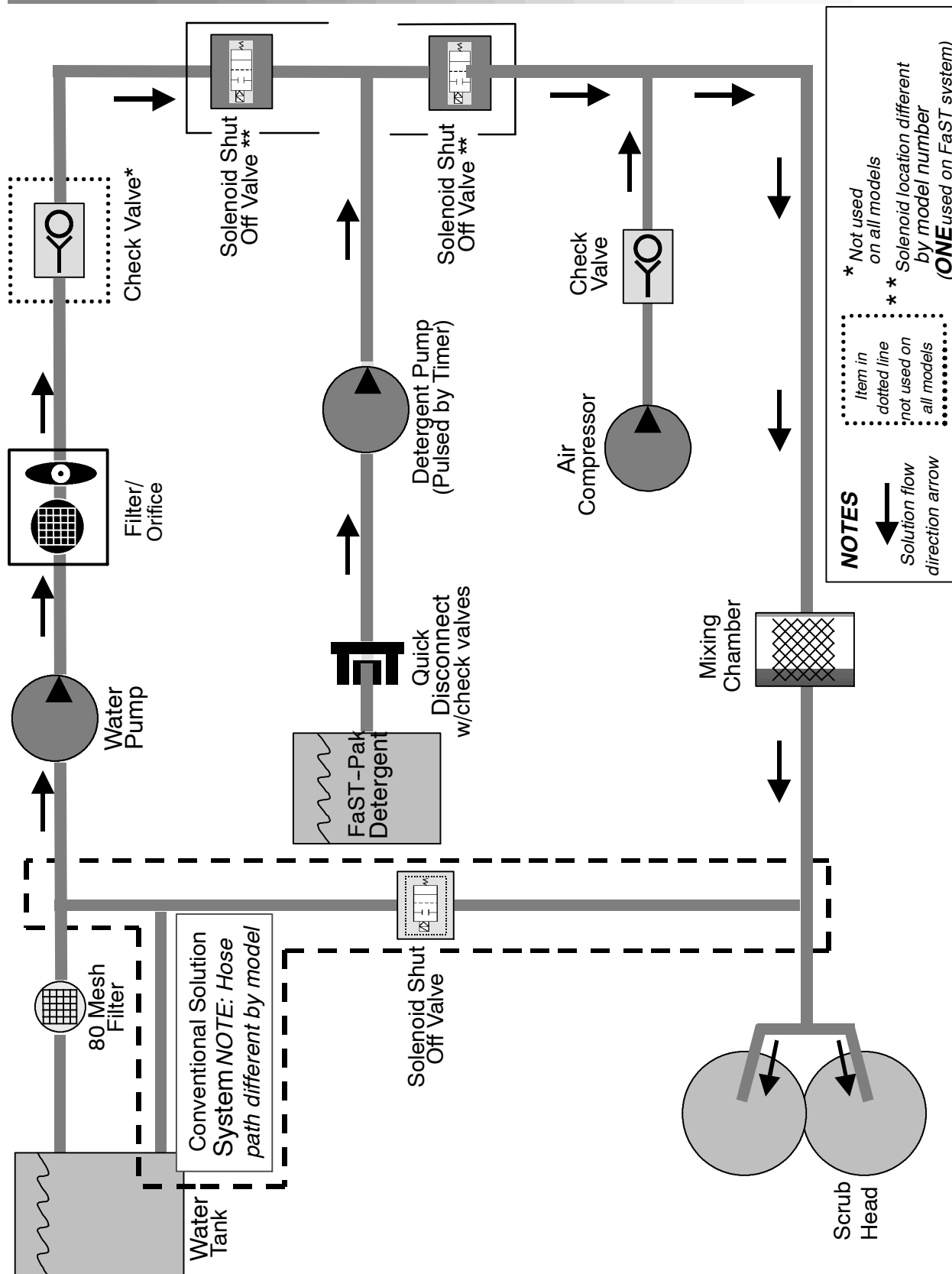
Check Valve
 Prevents detergent/water solution from entering the air compressor/pump



Mixing Chamber
 Ensures proper mixing of detergent/water solution
 A media similar to a 3M Red Pad is used



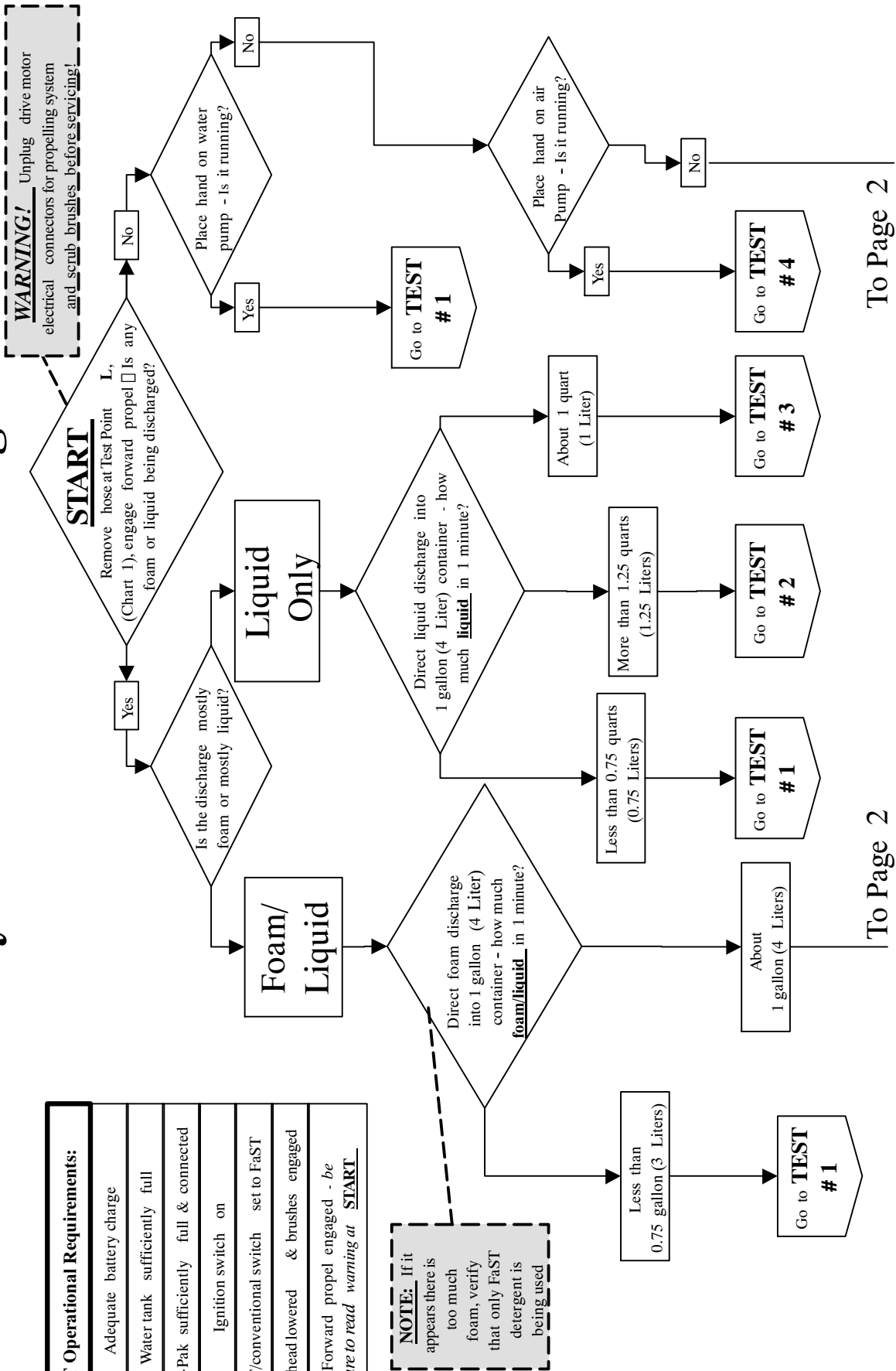
Schematic Operation Review



FaST Overall System Troubleshooting

Page 1 of 2

FaST Operational Requirements:	
Adequate battery charge	
Water tank sufficiently full	
FaST-Pak sufficiently full & connected	
Ignition switch on	
FaST/conventional switch set to FaST	
Scrub head lowered & brushes engaged	
Forward propel engaged - <i>be sure to read warning at START</i>	

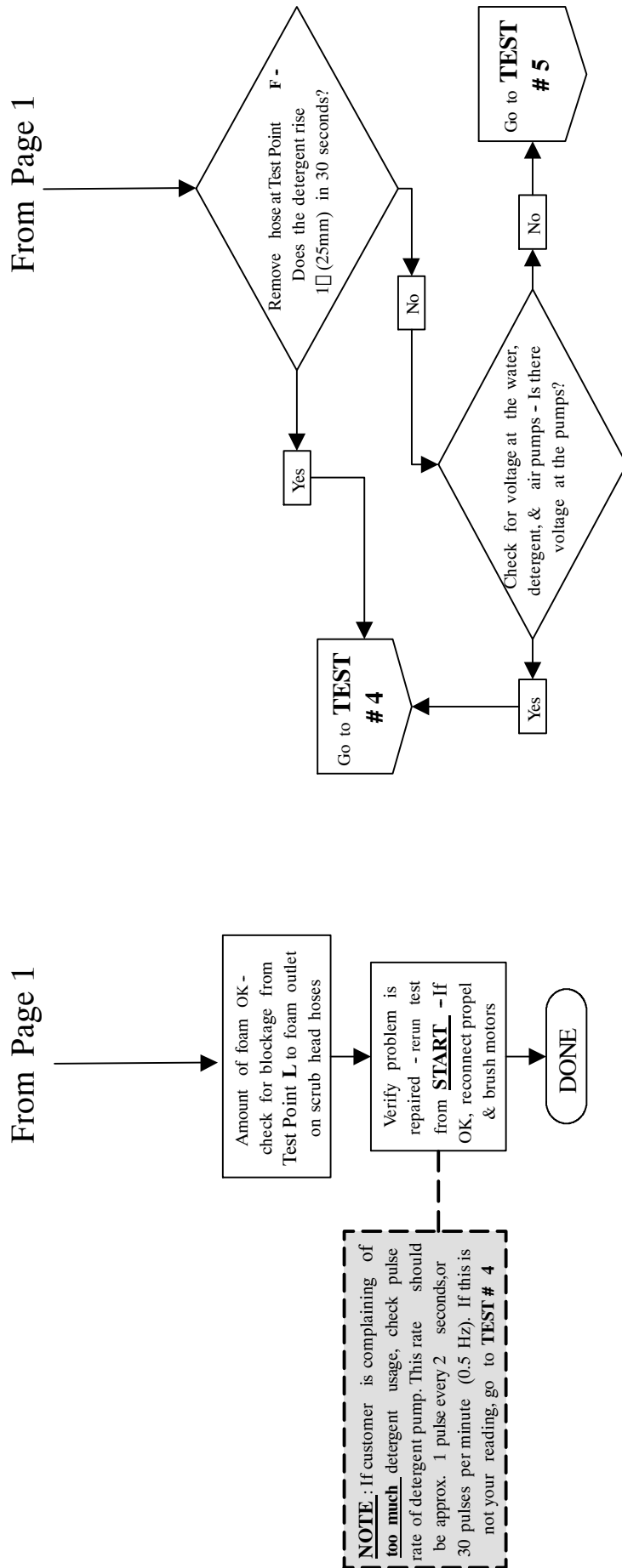


To Page 2

To Page 2

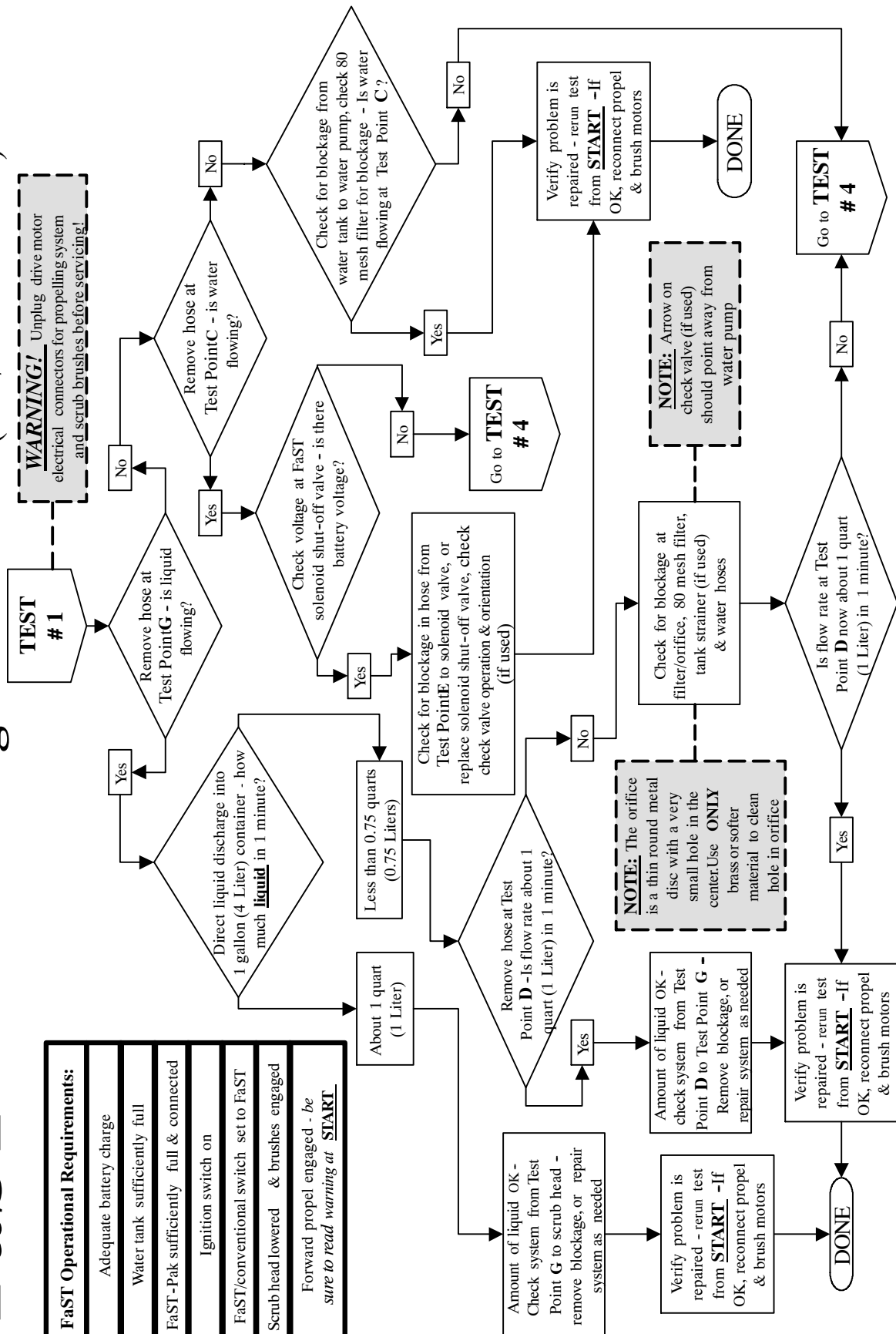
FaST Overall System Troubleshooting

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FaST Troubleshooting - TEST #1 (Low/no water or foam)

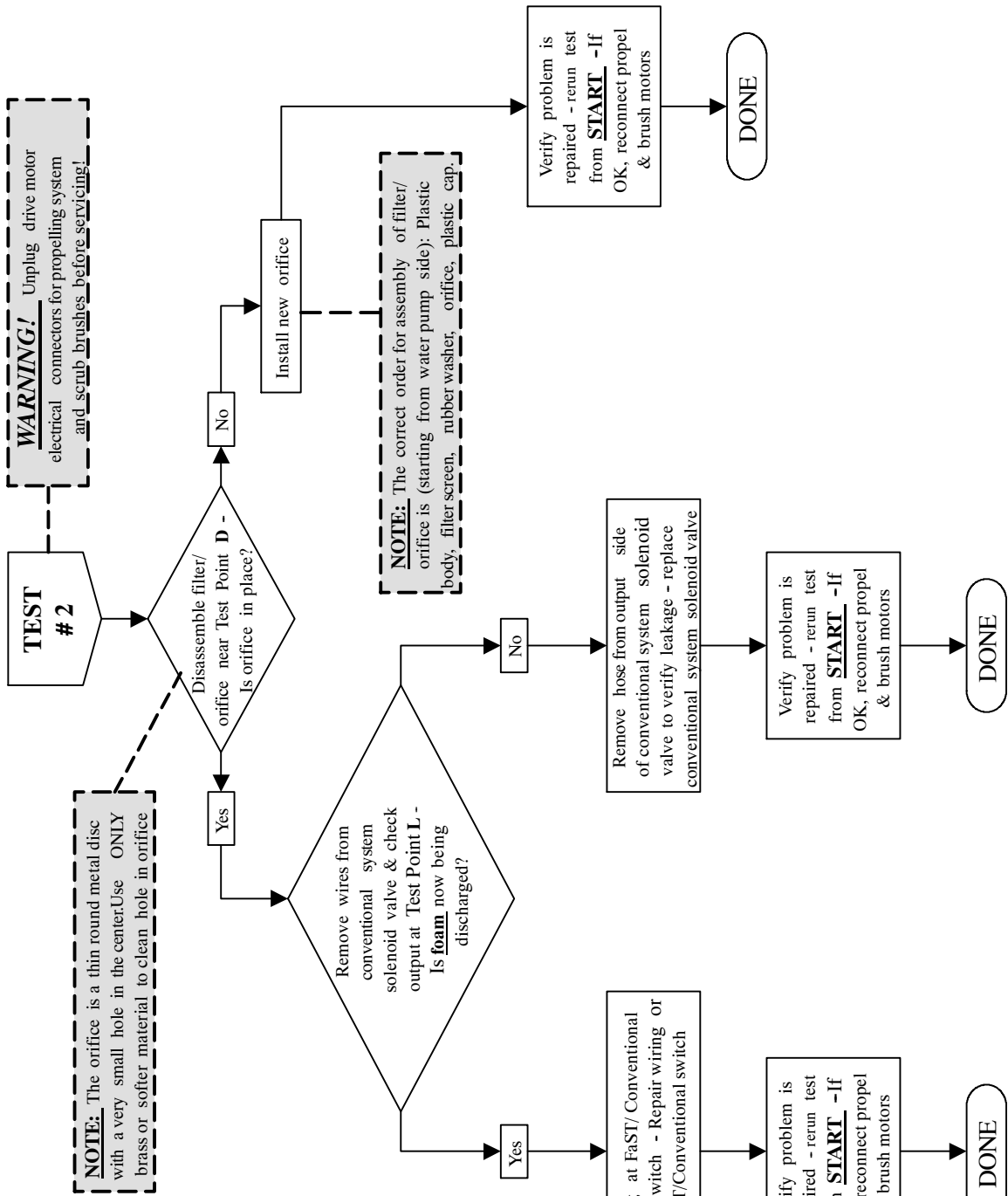
FaST Operational Requirements:
Adequate battery charge
Water tank sufficiently full
FaST-Pak sufficiently full & connected
Ignition switch on
FaST/conventional switch set to FaST
Scrub head lowered & brushes engaged
Forward propel engaged - <i>be sure to read warning at START</i>



FaST Troubleshooting - TEST #2

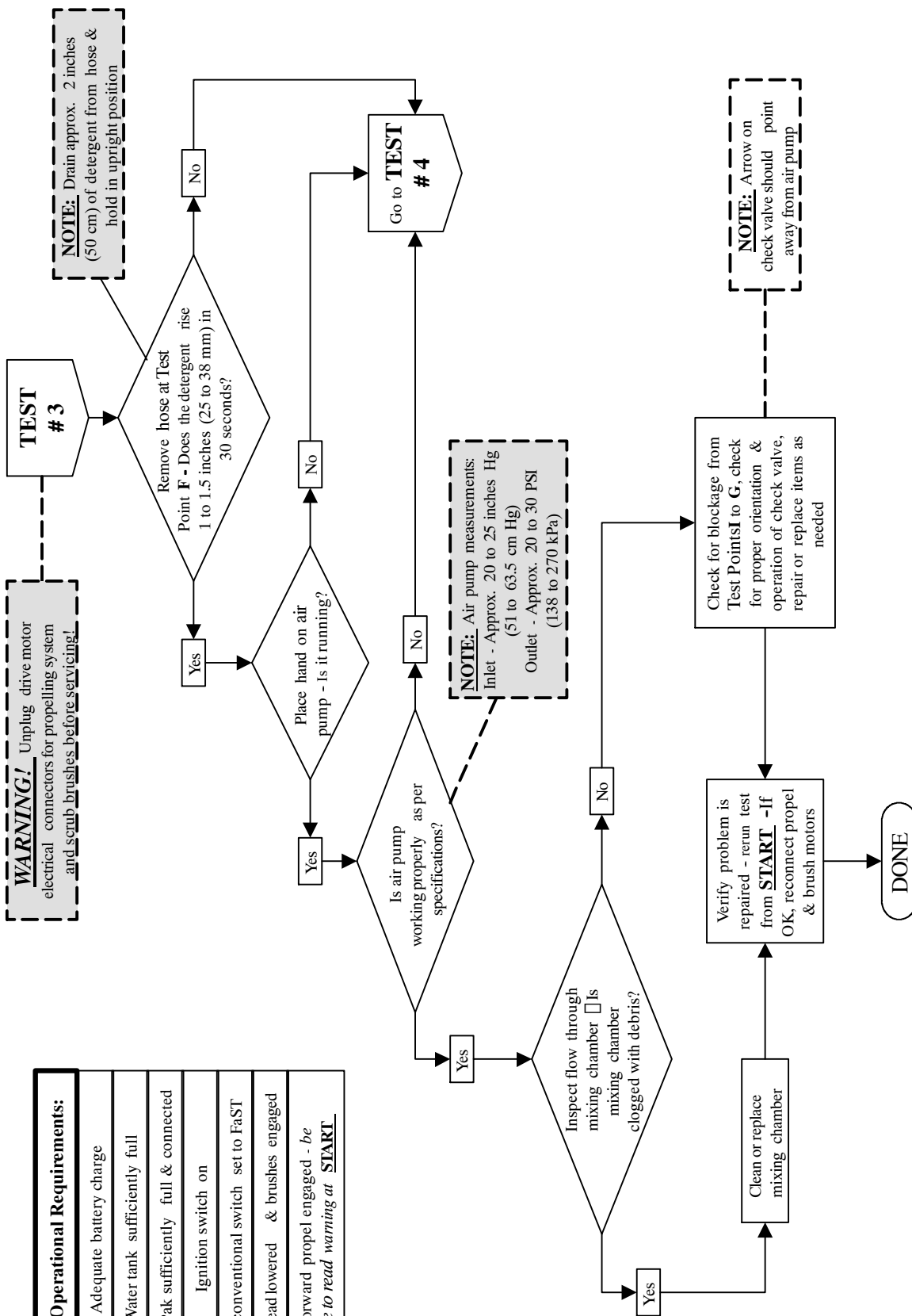
(Too much water and low/no foam)

FaST Operational Requirements:
Adequate battery charge
Water tank sufficiently full
FaST-Pak sufficiently full & connected
Ignition switch on
FaST/conventional switch set to FaST
Scrub head lowered & brushes engaged
Forward propel engaged - <i>be sure to read warning at START</i>



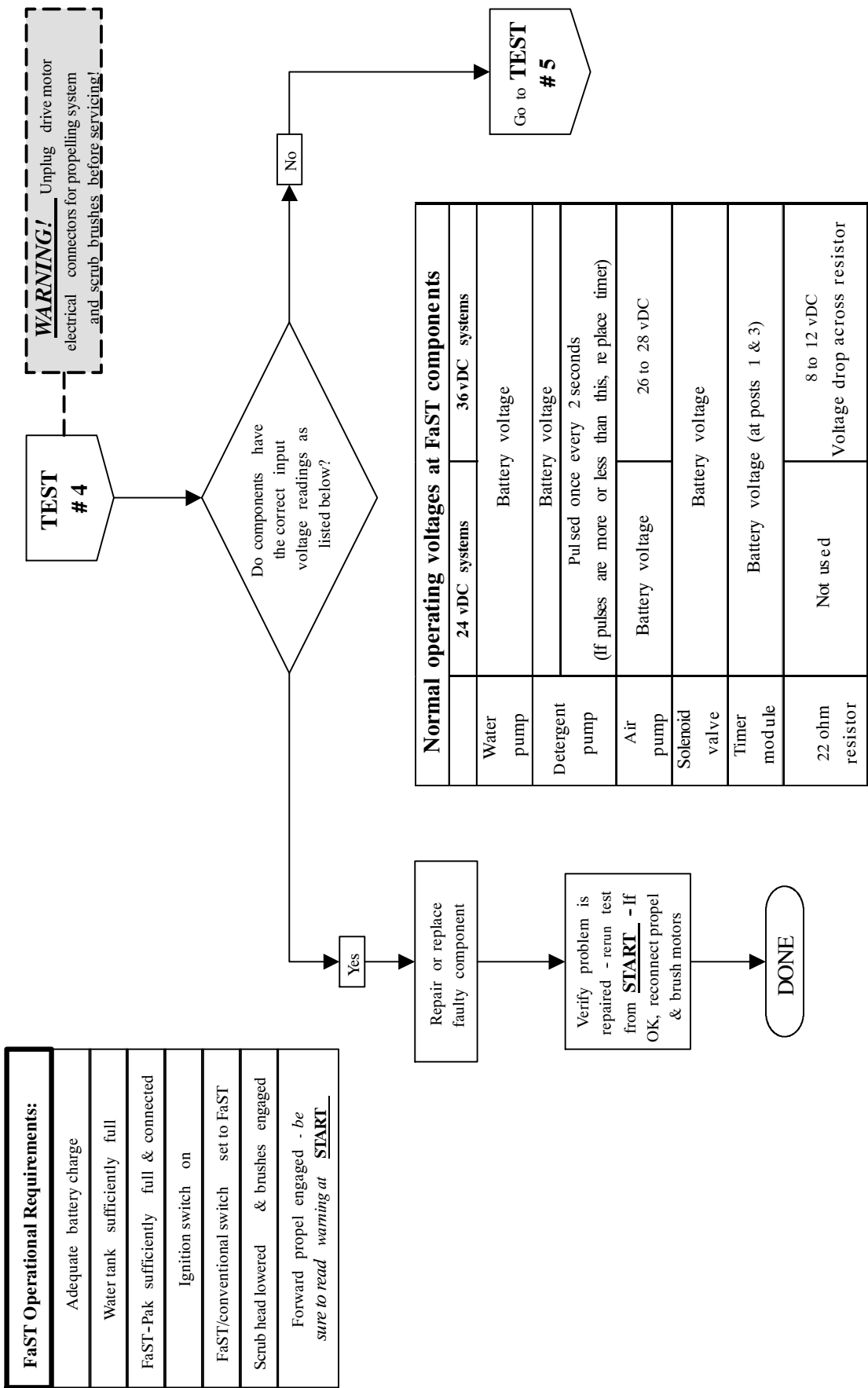
FaST Troubleshooting - TEST #3 (Water OK, no foam)

FaST Operational Requirements:	
Adequate battery charge	
Water tank sufficiently full	
FaST-Pak sufficiently full & connected	
Ignition switch on	
FaST/conventional switch set to FaST	
Scrub head lowered & brushes engaged	
Forward propel engaged - <i>be sure to read warning at START</i>	



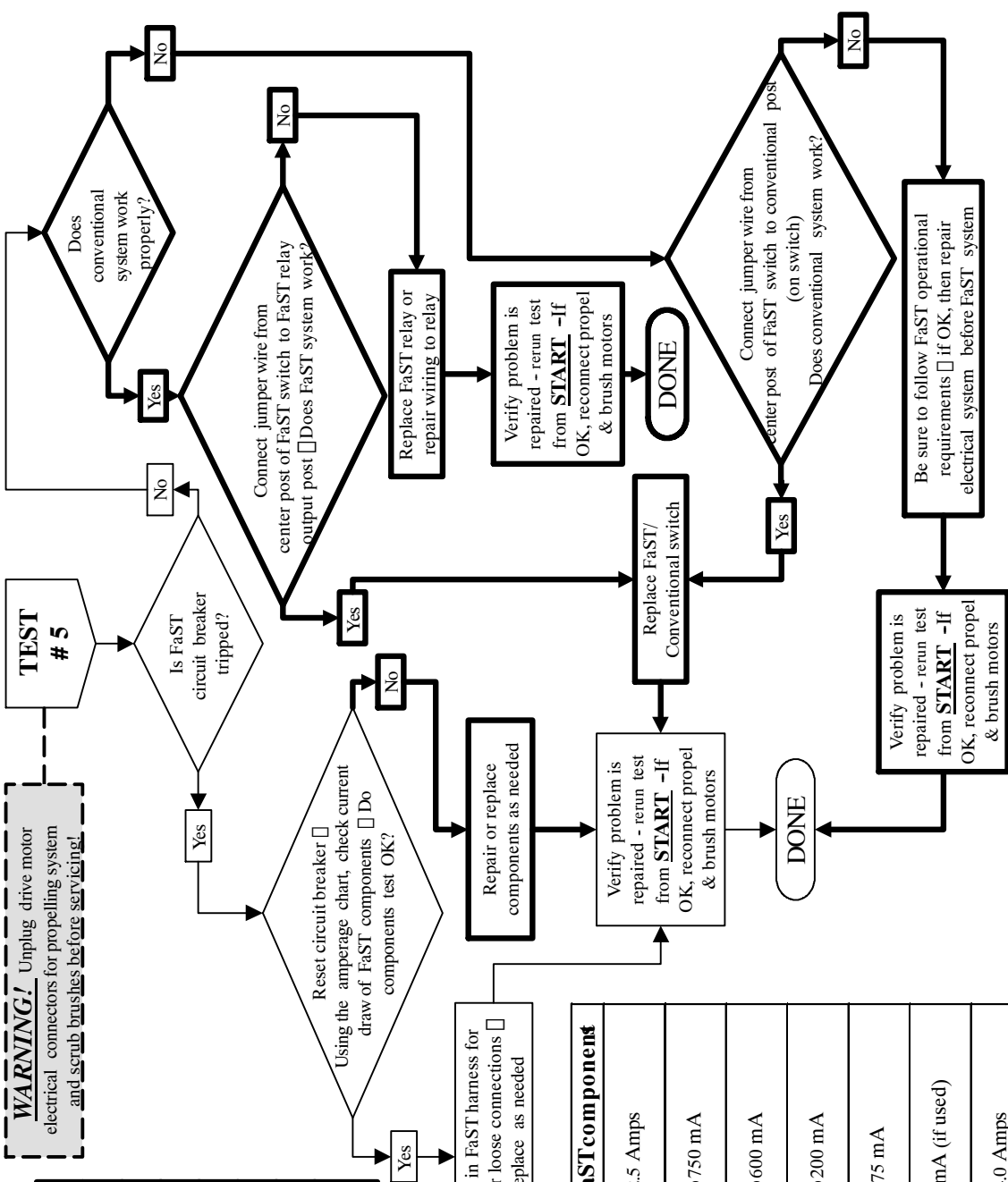
FaST Troubleshooting - TEST #4

(Individual component testing)



FaST Troubleshooting - TEST #5 (Overall electrical testing)

FaST Operational Requirements:	
Adequate battery charge	
Water tank sufficiently full	
FaST-Pak sufficiently full & connected	
Ignition switch on	
FaST/conventional switch set to FaST	
Scrub head lowered & brushes engaged	
Forward propel engaged - <i>be sure to read warning at <u>START</u></i>	



Normal operating amperages of FaST components	
Water pump	Approx. 1.8 to 2.5 Amps
Detergent pump	Approx. 250 to 750 mA
Air pump	Approx. 400 to 600 mA
Solenoid valve	Approx. 100 to 200 mA
Timer module	Approx. 5 to 75 mA
22 ohm resistor	Approx. 400 to 450 mA (if used)
System Total	Approx. 2.5 to 4.0 Amps

FaST Test Points - CHART #1

