SAFE WATER TECHNOLOGIES, INC.

EXPANDED TROUBLESHOOTING GUIDE

TROUBLESHOOTING & ERROR CODE GUIDE

FOR

TECH CONTROL VALVES

(1.5 INCH, 2 INCH, and 2 INCH QC)

FILTERS, SOFTENERS, CONDITIONERS

1.5 INCH TECH-EE SERIES CONTROL VALVE MODEL: WS1.5EE

2 INCH TECH-EE SERIES CONTROL VALVE MODEL: WS2EE

2 INCH QC TECH-EE SERIES CONTROL VALVE MODEL: WS2QCEE

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Troubleshooting

Problem	Possible Cause	Solution
1. No display on PC board.	a. No power at electric outlet.	a. Repair outlet or use working outlet.
	b. Control valve power adapter not plugged into outlet or power cord end not connected to PC board connection.	b. Plug power adapter into outlet or connect power cord end to PC board connection.
	c. Improper power supply.	c. Verify proper voltage is being delivered to PC board.
	d. Defective power adapter.	d. Replace power adapter.
	e. Defective PC board.	e. Replace PC board.
2. PC board does not display correct time of day.	a. Power adapter plugged into electric outlet controlled by light switch.	a. Use uninterrupted outlet.
	b. Tripped breaker switch and/or tripped GFI.	b. Reset breaker switch and/or GFI switch.
	c. Power outage.	c. Reset time of day. If PC board has battery backup present, the battery may be depleted. See “Front Cover and Drive Assembly” drawing for instructions. [1]
	d. Defective PC board.	d. Replace PC board.
3. Display does not indicate that water is flowing.	a. Bypass valve in bypass position.	a. Turn bypass handles to place bypass in service position.
	b. Meter is not connected to meter connection on PC board.	b. Connect meter to three-pin connection labeled METER on PC board.
	c. Restricted/stalled meter turbine.	c. Remove meter and check for rotation or foreign material.
	d. Meter wire not installed securely into three-pin connector.	d. Verify meter cable wires are installed securely into three-pin connector labeled METER.
	e. Defective meter.	e. Replace meter.
	f. Defective PC board.	f. Replace PC board.
4. Control valve regenerates at wrong time of day.	a. Power outage.	a. Reset time of day. If PC board has battery backup present, the battery may be depleted. See “Front Cover and Drive Assembly” drawing for instructions. [1]
	b. Time of day not set correctly.	b. Reset to correct time of day.
	c. Time of regeneration set incorrectly.	c. Reset regeneration time.
	d. Control valve set at “on 0” (immediate regeneration).	d. Check programming setting and reset to NORMAL (for a delayed regen time).
	e. Control valve set at “NORMAL + on 0” (delayed and/or immediate).	e. Check programming setting and reset to NORMAL (for a delayed regen time).
5. Time of day flashes on and off.	a. Power outage.	a. Reset time of day. If PC board has battery backup present, the battery may be depleted. See “Front Cover and Drive Assembly” drawing for instructions. [1]

1. Refer to Tech 1.5, 2, 2QC Control Valves Service Manual.

Troubleshooting (Continued)

Problem	Possible Cause	Solution
6. Control valve does not regenerate automatically when the REGEN button is depressed and held.	a. Broken drive gear or drive cap assembly.	a. Replace drive gear or drive cap assembly.
	b. Broken piston rod.	b. Replace piston rod.
	c. Defective PC board.	c. Replace PC board.
7. Control valve does not regenerate automatically but **does** regenerate when the REGEN button is depressed and held.	a. Bypass valve in bypass position.	a. Turn bypass handles to place bypass in service position.
	b. Meter is not connected to meter connection on PC board.	b. Connect meter to three-pin connection labeled METER on PC board.
	c. Restricted/stalled meter turbine.	c. Remove meter and check for rotation or foreign material.
	d. Incorrect programming.	d. Check for programming error.
	e. Meter wire not installed securely into three-pin connector.	e. Verify meter cable wires are installed securely into three-pin connector labeled METER.
	f. Defective meter.	f. Replace meter.
	g. Defective PC board.	g. Replace PC board.
8. Hard or untreated water is being delivered.	a. Bypass valve is open or faulty.	a. Fully close bypass valve or replace.
	b. Media is exhausted due to high water usage.	b. Check program settings or diagnostics for abnormal water usage.
	c. Meter not registering.	c. Remove meter and check for rotation or foreign material.
	d. Water quality fluctuation.	d. Test water and adjust program values accordingly.
	e. No regenerant or low level of regenerant in regenerant tank.	e. Add proper regenerant to tank.
	f. Control fails to draw in regenerant.	f. Refer to Problem 12 (page 4).
	g. Insufficient regenerant level in regenerant tank.	g. Check refill setting in programming. Check refill flow control for restrictions or debris and clean or replace.
	h. Damaged seal/stack assembly.	h. Replace seal/stack assembly.
	i. Control valve body type and piston type mix matched.	i. Verify proper control valve body type and piston type match.
	j. Fouled media bed.	j. Replace media bed.
9. Control valve uses too much regenerant.	a. Improper refill setting.	a. Check refill setting.
	b. Improper program settings.	b. Check program settings to make sure they are specific to the water quality and application needs.
	c. Control valve regenerates frequently.	c. Check for leaking fixtures that may be exhausting capacity, or system is undersized.

Troubleshooting (Continued)

Problem	Possible Cause	Solution
10. Residual regenerant being delivered to service.	a. Low water pressure.	a. Check incoming water pressure (water pressure must remain at a minimum of 25 psi).
	b. Incorrect injector size.	b. Replace injector with correct size for the application.
	c. Restricted drain line.	c. Check drain line for restrictions or debris and clean.
11. Excessive water in regenerant tank.	a. Improper program settings.	a. Check refill setting.
	b. Plugged injector.	b. Remove injector and clean or replace.
	c. Drive cap assembly not tightened in properly.	c. Retighten the drive cap assembly.
	d. Damaged seal/stack assembly.	d. Replace seal/stack assembly.
	e. Restricted or kinked drain line.	e. Check drain line for restrictions or debris and/or remove kink from drain line.
	f. Plugged backwash flow controller.	f. Remove backwash flow controller and clean or replace.
	g. Missing refill flow controller.	g. Replace refill flow controller.
12. Control valve fails to draw in regenerant.	a. Injector is plugged.	a. Remove injector and clean or replace.
	b. Faulty regenerant piston.	b. Replace regenerant piston.
	c. Regenerant line connection leak.	c. Inspect regenerant line for air leak.
	d. Drain line restriction or debris cause excess back pressure.	d. Inspect drain line and clean to correct restriction.
	e. Drain line too long or too high.	e. Shorten length and/or height of drain line.
	f. Low water pressure.	f. Check incoming water pressure (water pressure must remain at minimum of 25 psi).
13. Water running to drain.	a. Power outage during regeneration.	a. Upon power being restored, control will finish the remaining regeneration time. Reset time of day.
	b. Damaged seal/stack assembly.	b. Replace seal/stack assembly.
	c. Piston assembly failure.	c. Replace piston assembly.
	d. Drive cap assembly not tightened in properly.	d. Retighten the drive cap assembly.

Troubleshooting (Continued)

Problem	Possible Cause	Solution
14. E1, Err – 1001, Err – 101 = Control unable to sense motor movement.	a. Motor not inserted fully to engage pinion, motor wires broken or disconnected.	a. Disconnect power, make sure motor is fully engaged, check for broken wires, make sure two-pin connector on motor is connected to the two-pin connection on the PC board labeled MOTOR. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position, or disconnect power supply from PC board for 5 seconds and then reconnect.
	b. PC board not properly snapped into drive bracket.	b. Properly snap PC board into drive bracket. Then press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position, or disconnect power supply from PC board for 5 seconds and then reconnect.
	c. Missing reduction gears.	c. Replace missing gears.
15. E2, Err – 1002, Err – 102 = Control valve motor ran too short and was unable to find the next cycle position and stalled.	a. Foreign material is lodged in the control valve.	a. Open up control valve and pull out piston assembly and seal/stack assembly for inspection. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position, or disconnect power supply from PC board for 5 seconds and then reconnect.
	b. Mechanical binding.	b. Check piston and seal/stack assembly, check reduction gears, check drive bracket and main drive gear interface. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position, or disconnect power supply from PC board for 5 seconds and then reconnect.
	c. Main drive gear is too tight.	c. Loosen main drive gear. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position, or disconnect power supply from PC board for 5 seconds and then reconnect.
	d. Improper voltage being delivered to the PC board.	d. Verify that proper voltage is being supplied. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position, or disconnect power supply from PC board for 5 seconds and then reconnect.

Troubleshooting (Continued)

Problem	Possible Cause	Solution
16. E3, Err – 1003, Err – 103 = Control valve motor ran too long and was unable to find the next cycle position.	a. Motor failure during a regeneration.	a. Check motor connections. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position, or disconnect power supply from PC board for 5 seconds and then reconnect.
	b. Built-up foreign matter on the piston and stack assemblies creates enough friction and drag to time-out the motor.	b. Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position, or disconnect power supply from PC board for 5 seconds and then reconnect.
	c. Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface.	c. Snap drive bracket in properly. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position, or disconnect power supply from PC board for 5 seconds and then reconnect.
17. E4 = Control valve does not regenerate.	a. Interruption or disruption to the nonvolatile memory.	a. Press and hold SET and DOWN buttons for 3 to 5 seconds to reset and clear, or disconnect power supply from PC board for 5 seconds and then reconnect.
18. Err – 1004, Err – 104 = Control valve motor ran too long and timed out trying to reach home position.	a. Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface.	a. Snap drive bracket in properly. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position, or disconnect power supply from PC board for 5 seconds and then reconnect.
19. Err – 1006, Err – 106, Err – 116 = MAV/ SEPS/ NHBP/ AUX MAV valve motor ran too long and unable to find the proper park position. **NOTES:** MAV = Motorized Alternating Valve SEPS = Separate Source NHBP = No Hard Water Bypass AUX MAV = Auxiliary MAV	a. Control valve programmed for ALTA, ALTb, nHbP, SEPS, or AUX MAV without having a MAV or NHBP valve attached to operate that function.	a. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position, or disconnect power supply from PC board for 5 seconds and then reconnect. Then reprogram valve to proper setting.
	b. MAV/ NHBP motor wire not connected to PC board.	b. Connect MAV/ NHBP motor to PC board two-pin connection labeled DRIVE. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position, or disconnect power supply from PC board for 5 seconds and then reconnect.
	c. MAV/ NHBP motor not fully engaged with reduction gears.	c. Properly insert motor into casing. (DO NOT force into casing.) Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position, or disconnect power supply from PC board for 5 seconds and then reconnect.
	d. Built-up foreign matter on the piston and stack assemblies creates enough friction and drag to time-out the motor.	d. Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position, or disconnect power supply from PC board for 5 seconds and then reconnect.

Troubleshooting (Continued)

Problem	Possible Cause	Solution
20. Err – 1007, Err – 107, Err – 117 = MAV/ SEPS/ NHBP/ AUX MAV valve motor ran too short (stalled) while looking for proper park position. **NOTES:** MAV = Motorized Alternating Valve SEPS = Separate Source NHBP = No Hard Water Bypass AUX MAV = Auxiliary MAV	a. Foreign material is lodged in MAV/ NHBP valve.	a. Open up MAV/ NHBP valve and check piston and seal/stack assembly for foreign material. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position, or disconnect power supply from PC board for 5 seconds and then reconnect.
	b. Mechanical binding.	b. Check piston and seal/stack assembly, check reduction gears, drive gear interface, and check MAV/ NHBP black drive pinion on motor for being jammed into motor body. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position, or disconnect power supply from PC board for 5 seconds and then reconnect.

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