



# SERVICE MANUAL

**MODEL: SF-150**



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## TROUBLESHOOTING

Symptom	Possible Cause	Corrective Action
1. Will not start.	Main electrical power circuit breaker tripped	Reset breaker
	Optional thermostat turned down or improperly installed/defective	Turn thermostat up, check for loose wires and test components and replace if needed.
	Primary control safety tripped/defective	Reset/test components, replace if needed
	Too much light showing on CAD cell/defective	Eliminate light to CAD cell/test component
	Tip switch contacts are closed	If plugged in, verify amber light is on. If not, it is a tip switch issue. Make sure SunFire unit is level. If level, tip switch may be defective and need replacement.
2. Attempts to fire but does not establish a flame	Low fuel	Add fuel to tank
	Contaminated fuel	Drain fuel by removing plug on bottom of fuel tank, clean, retighten plug, and fill with clean fuel.
	Dirty fuel filter	Clean or change filter
	Air bubble in fuel line	Can sometimes be cleared by attempting to start 1 - 2 times. Or fix using the following process. Step 1: Open the burner control housing. Step 2: Loosen copper fuel line on the side of burner. Step 3: Hold a rag around loosened copper line to catch fuel that will leak from the line. Step 4: Restart the unit by flipping switch the the "ON" position for 1 to 3 seconds and then shut off. Some fuel will drain, catch with rag. Step 5: Tighten copper fuel line, then close and secure burner housing. This process should remove the air bubble.

Symptom	Possible Cause	Corrective Action
2. Attempts to fire but does not establish a flame - cont'd	Transformer/electrodes not sparking	Test transformer/look for shorts & clean or replace electrodes/transformer.
	Combustion blower not properly adjusted or defective	See flame adjustment on page 3-4 regarding air band adjustment
3. Fires and then fails <u>Only if fails continually within 30 seconds</u>	CAD cell is dirty	Clean CAD cell with cloth. If issue still persists see below.
	CAD Cell is misaligned	Test CAD cell by slightly adjusting position a few times. If issue persists, see below.
	CAD cell is defective	Test by using a jump wire from terminal F1 to terminal F2 on the primary control with the following process. Step 1: Hook jumper to F1. Step 2: Start unit and wait until flame is present. Step 3: Then immediately hook jump wire to F2. If unit continues to run after 1 minute, CAD cell is defective and needs to be replaced. <b>WARNING: THIS IS FOR TESTING PURPOSES ONLY. FOR SAFETY, DO NOT CONTINUE TO OPERATE USING JUMP WIRES.</b>
	Burner settings may need adjustment.	Test burner. Remove burner housing panel to access the burner. Start the SunFire and view the LED lights to the right of the burner primary control. If green light continues to blink, an adjustment may be needed. Adjust the top fuel pressure screw along with very slight adjustments to the air band until a correct adjustment is achieved and the green light stays solid green.

Symptom	Possible Cause	Corrective Action
4. Fires and then fails <u>Other</u>	Contaminated fuel supply	Drain tank from side plug, clean, and fill with clean fuel.
	Dirty fuel filter	Clean and replace filter
	Improper air flow causing a poor flame. The CAD cell may shut unit off with a poor flame.	Adjust air band setting to 1.50 and test flame. See air band adjustment on Figure 3-1.
	Plugged nozzle or pre-heater assembly	Clean or replace nozzle
	Improper power supply	Check power supply. If using a generator, run generator for 20 minutes and retry. If using an inverter, try a clean power supply. Try different power supply.
5. Black smoke or whisking <u>Whisking - flames protrude through holes in dome face</u>	Nozzle is dirty or clogged	Replace nozzle
	Improper Air flow	Adjust air band to 1.5 position
	Improper fuel flow rate	Adjust fuel flow rate <u>Only after replacing nozzle</u>
6. Runs briefly on a generator and shuts off	Generator is low on charge	Run generator for 20 minutes, then plug in SunFire unit and restart.
7. Amber lamp does not light	Loose wires	Check all power and tip-switch wires for cut or loose wires and secure or fix if needed.
	Tip switch is closed	Level SunFire or replace tip switch.
	Bad Light	Replace light
	Defective primary control circuit board	Replace primary control
8. Won't fire <u>If using a thermostat</u>	Check temperature setting.	Set thermostat to a higher temperature if desired.
	Check for loose wires	Tighten wires for improved connection to thermostat.
	Defective thermostat	Replace thermostat. <u>Note: Thermostat must not require an external 24V power source - if used it will damage the primary.</u>

Symptom	Possible Cause	Corrective Action
9. No green light calling for heat when unit is turned on	Check the reset button	Push and hold the reset button
	If using thermostat	See #8 above
	Defective Primary	Replace primary
10. Bad flame	Clogged Nozzle	Soak Nozzle in parts cleaner/degreaser and blow it out. Or replace nozzle.
	Dirty/poor fuel	drain fuel and add new clean fuel.
	Clogged/dirty filter	Replace filter
11. Smoky flame	Open transformer lid	Make sure lid is closed
	Diesel treatment was used	Add clean fuel to decrease treatment ratio, or drain all fuel and replace with new fuel and clean diesel treatment.
	Air flow is restricted	Check air band and increase the air flow until smoke is no longer visible.
	Improper seal between fuel filter and filter assembly.	Check the seal on the fuel filter to make sure there are no obstructions between the filter and the filter assembly that could allow air to become mixed in the fuel, causing an improper fuel mixture.
	Bad fuel	Drain fuel from tank and add new clean fuel.
12. No flame	No fuel	Add fuel
	fuel is not spraying	There are multiple possibilities. Call your distributor or the manufacturer at (855) 251-1649 for instructions.
	Vaccum leak	Check hoses for leaks and tighten or replace.
Other issues	We are here to assist you.	Call us at (855) 251-1649

## HELPFUL SERVICE MANUAL IMAGES

**FIGURE 1-1** Burner Housing/Control Box



**FIGURE 1-2** Burner Pressure Valves



Note: Turn left for more fuel flow and right for less fuel.

**FIGURE 1-3** Igniter Assembly

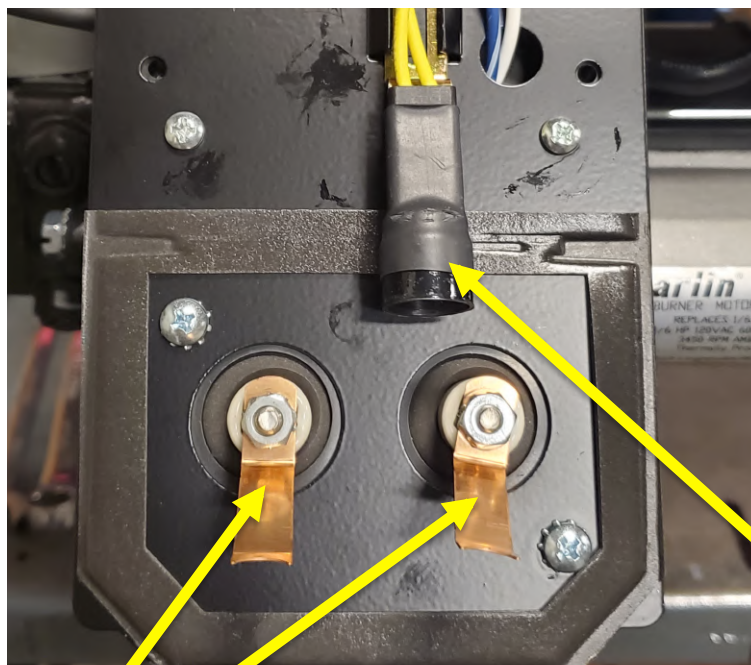


Note: Loosen screws and turn clamps to open igniter assembly.

**FIGURE 2-1 CAD Cell**



**FIGURE 2-2 Inside igniter box**

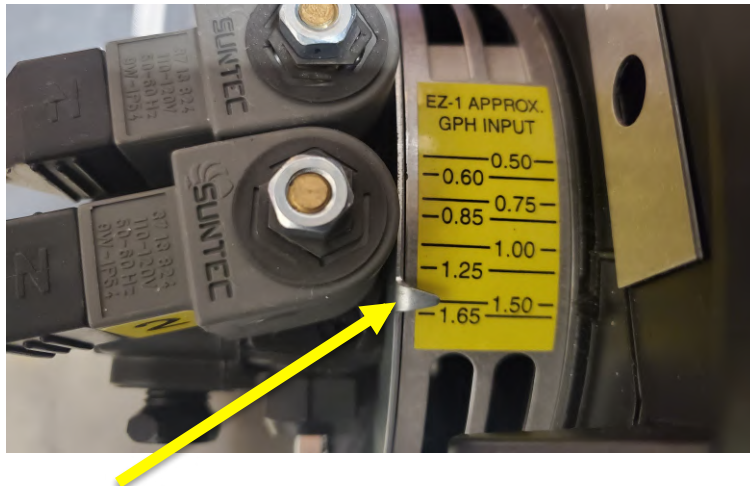


CAD Cell

Electrode Igniters

**Note:** If there is excessive dust while running the SunFire, the inside area of the igniter box should be inspected and cleaned periodically. Dust can build up and causing the unit to turn off prematurely from dust build up on the CAD cell, which will shut the unit off for safety as the flame will not be visible and the electrodes may not receive a proper spark If igniters are dirty. If dirty, simply clean with cloth.

**FIGURE 3-1 Air Band**



Air Band Setting

**Note:** The Air band should be set to approximately 1.25 - 1.5. Reducing the air band to a lower level will reduce the amount of airflow to the flame giving a higher concentration level of fuel that will raise the temperature of the SunFire. However, if reduced too low, it can cause whisking – see Figures 4-1&2 for examples. Reducing too low can become dangerous. This can easily be solved by increasing the amount of air within the flame by increasing the level of the air band.

If the air band level is set too low, upon start up, you may notice some smoke and a more noticeable smell of diesel.

**FIGURE 4-1 Primary Control**



Self Test LED

Note: Will blink for a second before the green flame sense light turns on. This simply let's you know the unit has been turned on and will be calling for heat to produce a flame.

**FIGURE 4-2 Primary Control**



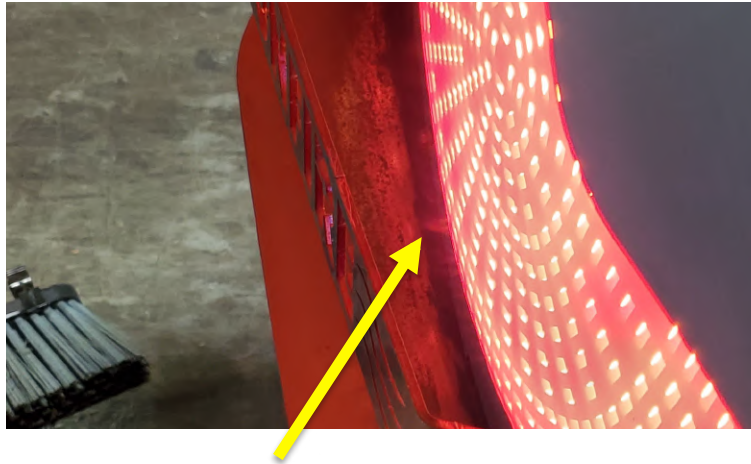
Note: If there are suspected issues with the flame because the unit has intermittently shut off, a green light that blinks indicates potential issues with the flame not running efficiently. Check symptoms and causes on previous pages. If green light remains solid, the flame is running correctly.

**FIGURE 4-3 Primary Control**



Note: If red "locked out" light is on, the control has failed to sense a flame after two attempts to fire and the reset button must be pressed before attempting to start again. When unit is turned on and does not fire on first attempts, this light will blink for 45 seconds. A 2<sup>nd</sup> attempt will be made and if no flame is sensed, the light will turn solid until the reset button is pushed.

**FIGURE 5-1 Minor Whisking**



Small flames escaping dome face

**Note:** It is recommended to increase the air band setting to approximately 1.50 and reduce the fuel flow on the high pressure valve if necessary.

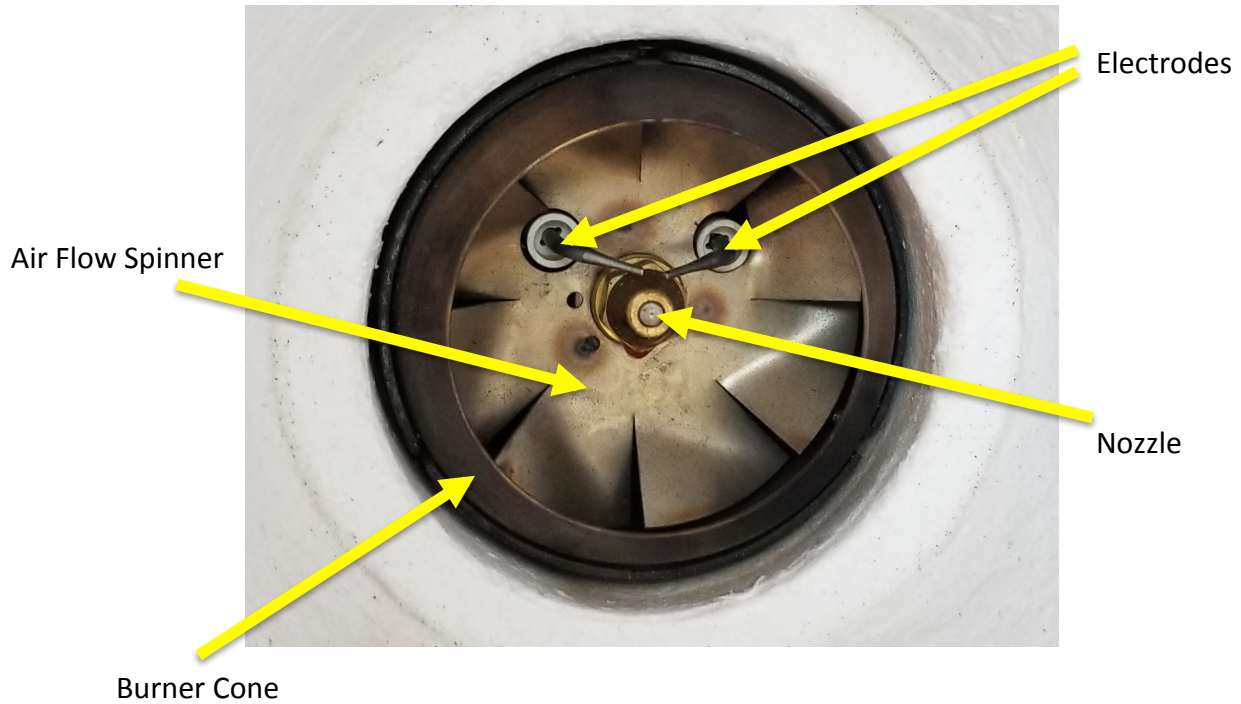
**FIGURE 5-2 Severe Whisking**



Large flames escaping dome face.

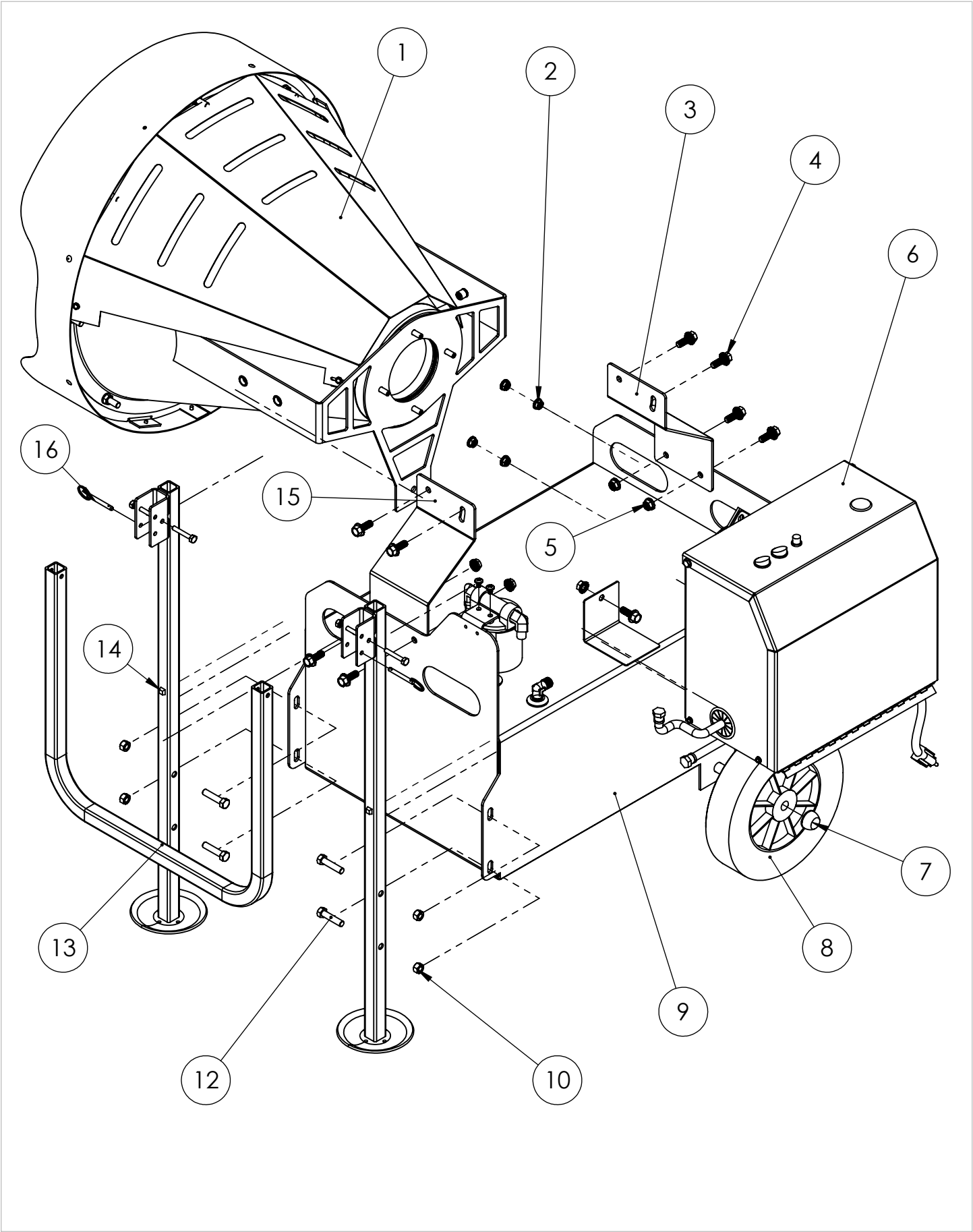
**Warning:** This is can be dangerous at these levels. It is recommended to immediately increase the air band setting to approximately 1.50 and reduce the fuel flow on the high pressure valve.

**FIGURE: 6-1** View Inside Cone of Nozzle/Flame Assembly

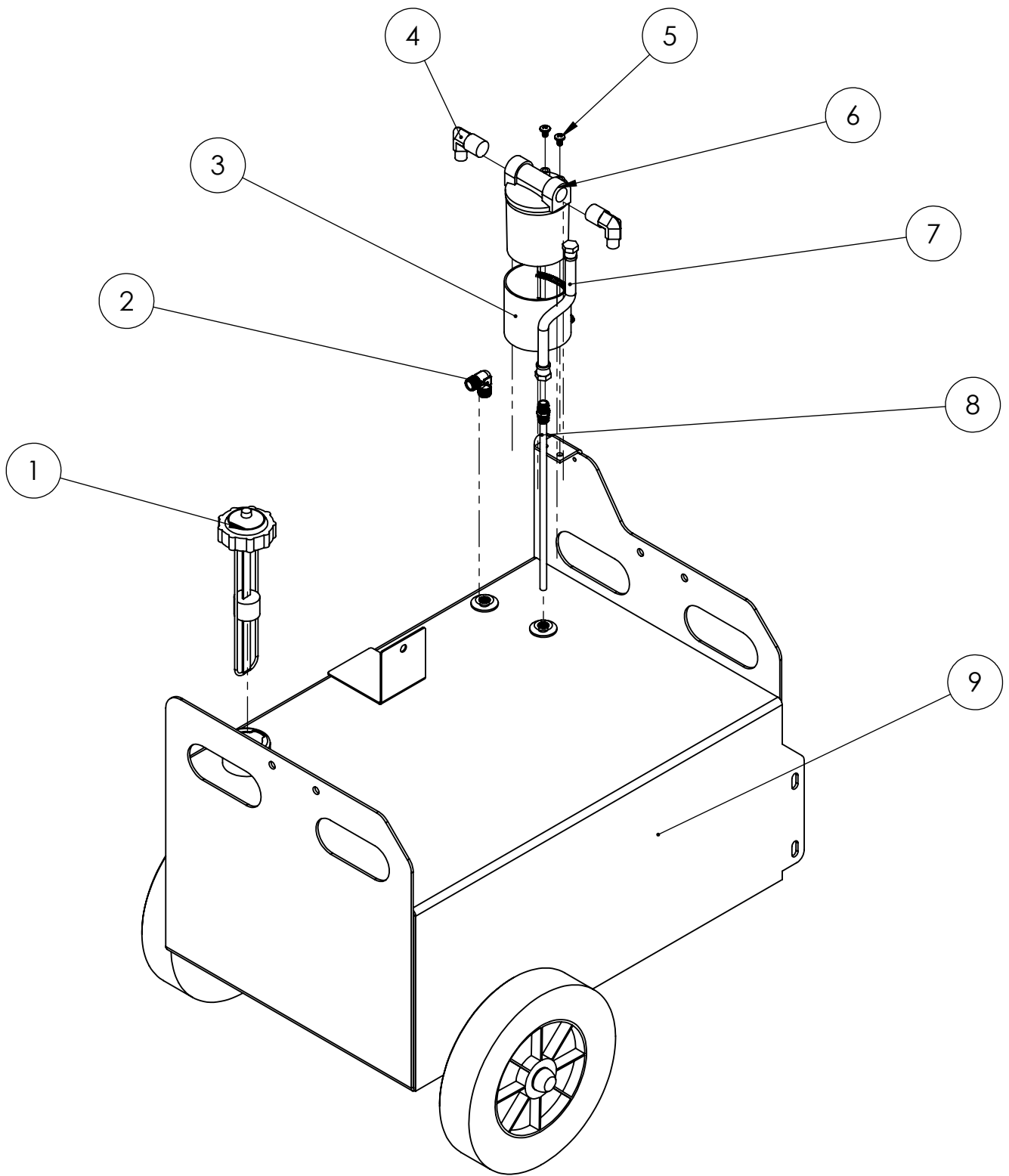


**Note:** It is important that the nozzle and electrodes remain free from excessive build-up. Clean if necessary or replace nozzle. It is critical to never run the unit without the burner cone in place to produce a proper flame.

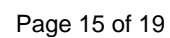
SCHEMATICS AND PARTS BREAKDOWN



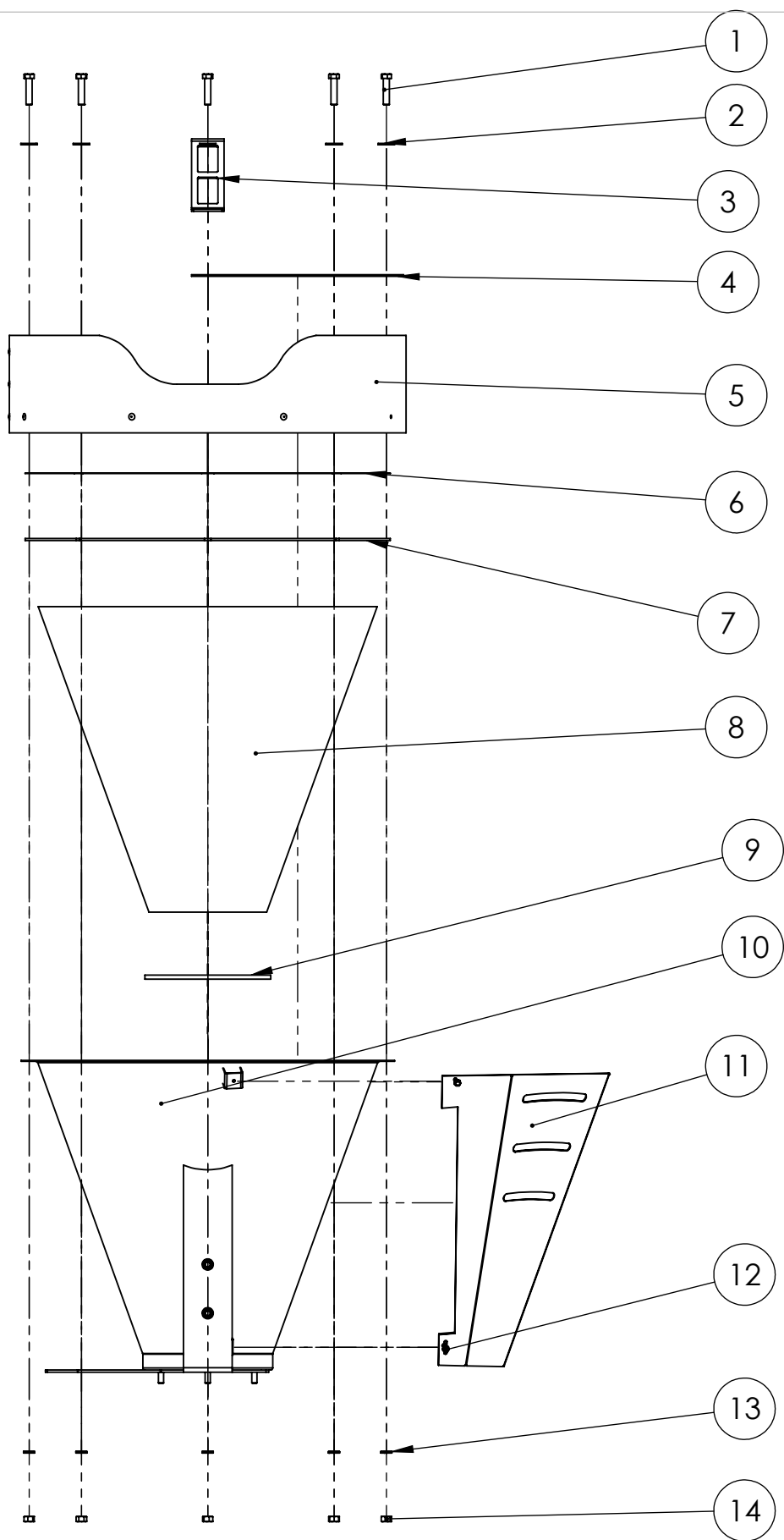
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	29462	SUNFIRE DOME ASSEMBLY	1
2	29515	NUT 5/16-18 SERR FLANGE	4
3	29468	SUNFIRE RIGHT LOWER STRAP	1
4	34502	SCREW 3/8-16X1" HEX	9
5	34503	NUT 3/8-16 FLANGE	4
6	29463	SF-150 BURNER	1
7	34505	5/8 PUSH ON WHEEL RETAINER	2
8	29518	WHEEL 10X2.75 HUB2.25	2
9	29467	SUNFIRE TANK ASSEMBLY	1
10	7202	NUT 3/8-16 HEX	4
11	29465	SUNFIRE LIFTING HANDLE ASSEMBL	2
12	34514	SCREW 3/8-16 X 1-1/2 HH ZN	4
13	29492	HINGE HANDLE	1
14	34516	BUMPER SELF ADHESIVE SF-150	2
15	29469	SUNFIRE LEFT LOWER STRAP	1
16	34515	PIN QUICK RELEASE 6MM DIA 40M	2



ITEM NO.	PART NUMBER	DESCRIPTION	BOTTOM HALF/QTY.
1	29506	CAP GAUGE COMBO RAD HEAT 8"	1
2	29411	FTNG,JIC,ST,H,90EL06MJ-06MJ	1
3	29402	FILTER HEATER	1
4	29407	FTNG,JIC,ST,H,90EL06MJ-08MP	2
5	91772A535	1/4-20 x 3/8"	2
6	29401	FILTER ASSEMBLY RADIANT HEATER	1
7	29511	SUCTION LINE HOSE 6"	1
8	29484	RAD HEAT TUBE DRAW ASSEMBLY	1
9	29467	SUNFIRE TANK ASSEMBLY	1



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	13154	NOZZLE W/CHECK VALVE	1
2	26669	RADIANT HEATER BURNER CONE	1
3	29418	SPINNER RAD HTR VERSION 2	1
4	29459	FLANGE GASKET RAD HTR	1
5	33189	ELECTRIC IGNITER	1
6	33404	SF-150 PRIMARY	1
7	29544	SUNFIRE BURNER BLOWER WHEEL	1
8	9502	MOTOR 1/6HP	1
9	29505	ELECTRODES	2
10	29450	SWITCH TIP RAD HEATER	1
11	29437	CORD POWER RAD HTR	1
12	33168	LED AMBER LIGHT	1
13	35408	PLUG RUBBER RESET RADIANT HEAT	1
14	33169	LED GREEN LIGHT	1
15	29449	SWITCH ON/OFF HI/LOW RAD HTR	2
16	29513	FILTER TO BURNER HOSE 10.5"	1
17	29512	RETURN FROM BURNER TO TANK 13.5"	1
18	29460	PUMP HEAD RADIANT HEATER	1
19	29523	COUPLER BURNER RAIDANT HEATER	1
20	8981	CAD CELL	1



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	34457	SCREW 3/8-16 X 1-1/2 HH	8
2	34400	3/8 FLAT WASHER - SS	8
3	29472	FLAME GUARD	1
4	29527	RING HEAT SHIELD SF150	1
5	29474	ROLLED SHROUD	1
6	29471	DOME PUNCHED FACE	1
7	29542	RADIANT HEATER TOP GASKET	1
8	29508	SUNFIRE INSULATION	1
9	29499	INSULATION LYTHERM SF150 DOME	1
10	29507	SUNFIRE SPUN DOME	1
11	29495	SF HEAT SHEILD	1
12	34116	10 X 5/8 HEX WASHER HEAD TEK Z	4
13	34399	3/8 SPLIT LOCK WASHER - SS	8
14	34010	3/8-16 BRASS HEX NUT	8

