

CAIRE® STROLLER

# Stroller



SERVICE  
MANUAL

# Sprint

- LED
- Spring Scale

## SERVICE MANUAL

# STROLLER

# SPRINT

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This manual covers use and maintenance of Stroller and Sprint units. It is intended for use by experienced personnel only.

No attempt should be made to use or maintain this equipment until both this manual and Patient Operating Instruction booklet have been read and fully understood.

The following abbreviations are used throughout this manual:

FCV — Flow Control Valve	QDV — Quick Disconnect Valve
LED — Light Emitting Diode	RA — Return Authorization
LPM — Liters Per Minute	RP — Repair Procedure
NER — Normal Evaporation Rate	RR — Removal and Replacement
POI — Patient Operating Instructions	SRV — Secondary Relief Valve
PRV — Primary Relief Valve	

### Definition of Terms

**WARNING** Description of a condition that can result in personal injury or death.

*CAUTION* Description of a condition that can result in equipment or component damage.

**NOTE** A statement containing information important enough to emphasize or repeat.

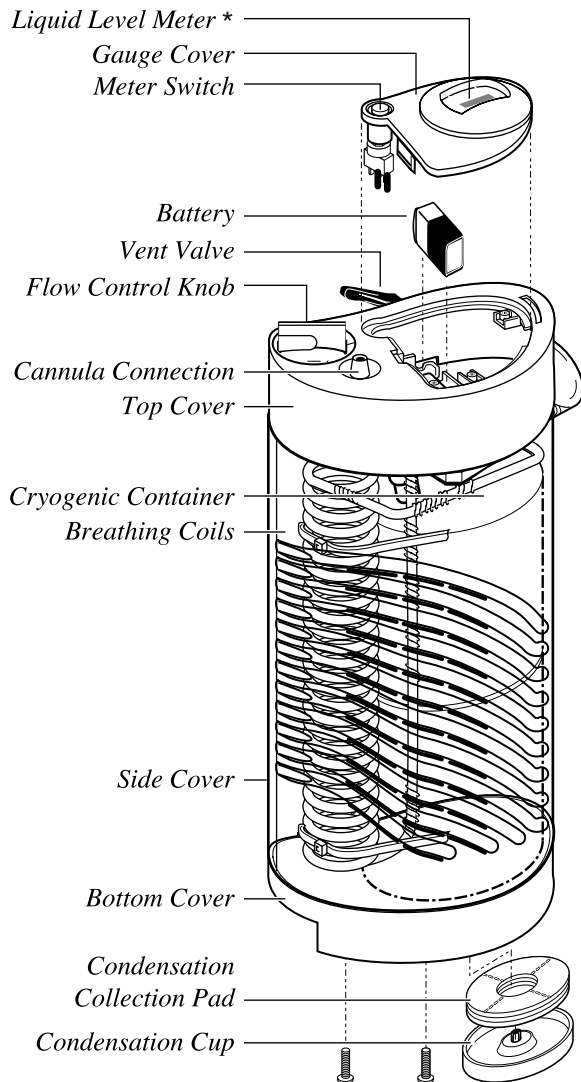
**(ITEM)** Item numbers used throughout this manual are shown in the illustrations beginning on page 28.

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# Equipment Description III



\* Spring Scale option not shown.

CAIRE's Stroller or Sprint is the portable component of the Liberator/Stroller supplementary oxygen system. Enclosed in a contoured light-weight case, the Stroller or Sprint incorporate a stainless steel cryogenic container with the valves, plumbing, and associated hardware required to deliver gaseous oxygen to the patient at near ambient temperature.

The Stroller and Sprint are comprised of five major assemblies. Grouped according to function, they are:

1. **Cryogenic Container** – This assembly is a double-walled, vacuum insulated dewar for storing liquid oxygen at approximately -300 degrees Fahrenheit.
2. **Breathing Circuit** – This circuit consists of the manifold assembly, fixed orifice rotary flow control valve, and a breathing coil. It utilizes liquid oxygen from the cryogenic container, warms it to near ambient temperature, and meters the oxygen gas to the patient.
3. **Case Assembly** – The case assembly consists of a top cover and side/bottom cover. This case houses and protects the cryogenic container, the breathing circuit, and the liquid level meter.
4. **Meter** – This system uses a capacitance probe and an electronic LED readout to measure and display the product contents at the touch of a button. Alternatively, the Stroller/Sprint are also available in a Spring Scale version.
5. **Filling Circuit** – This manual covers both the side fill Stroller/Liberator with the rotary quick disconnect valve and the top fill Liberator/Stroller with the push quick disconnect valve for filling.

# IV Specifications (Nominal Values)

	Stroller	Sprint
<b>Capacity</b>		
Pounds (L <sub>02</sub> ):	3.0	1.5
Liquid Liters:	1.25	0.63
Gaseous Liters:	1026	513
<b>Selectable Flow Rates</b>		
Liters per minute:	Off, .25, .5, .75, 1, 1.5, 2, 2.5, 3, 4, 5, 6	Off, .25, .5, .75 1, 1.5, 2, 2.5, 3, 4, 5, 6
<b>Flow Rate Accuracy</b>		
	± .1 liter per minute or ±10% of flow setting, whichever is greater	
<b>Normal Evaporation Rate:</b>		
Pounds per day:	1.2	1.2
<b>Operating Pressure</b>		
PSIG:	20 ± 2	20 ± 2
<b>Primary Relief Valve Setting</b>		
PSIG:	20	20
<b>Secondary Relief Valve Setting</b>		
PSIG:	30	30
<b>Filling Time</b>		
Minutes: Warm	2.0	1.5
Cold	1.0	0.75
<b>Height</b>		
Inches:	13.5	11.75
<b>Width</b>		
	Oval	Oval
<b>Weight</b>		
Empty (lbs.):	5.0	4.5
Full (lbs.):	8.0	6.0
<b>Filler Connector Type</b>		
	Male side mounted rotary coupling or female bottom mounted push on coupling.	

Oxygen, as it exists at standard atmospheric pressure and temperature, is a colorless, odorless, and tasteless gas. Oxygen constitutes 21% of the atmosphere, by volume. Aside from its well-documented ability to sustain life, oxygen also supports combustion, even though it is non-flammable. Many substances which will burn in air, burn at a faster rate and at a higher temperature in an oxygen-enriched atmosphere. A few materials that do not burn in air will burn as the oxygen concentration increases. Some greases and many liquid solvents become extremely hazardous materials when placed in an oxygen-enriched environment.

In its liquid form, oxygen is still odorless and tasteless, but is now pale blue in color. At an operating pressure of 20 psig, the temperature of liquid oxygen is about -280 degrees Fahrenheit. Skin exposed to such a low temperature can become severely frostbitten.

These hazards require that certain safety precautions be taken when working with or around gaseous and/or liquid oxygen:

1. Never permit combustible substances such as greases, oils, solvents, or other compounds not oxygen-compatible to contact any component of the unit exposed to higher-than-atmospheric concentrations of gaseous or liquid oxygen. This especially applies to tubing, fittings, and valves.
2. Keep the oxygen equipment away from open flames or electrical appliances such as heaters, stoves, toasters, and other devices with heating elements.
3. Never permit smoking in an area where oxygen equipment is repaired, filled, or used.
4. Always wear goggles, a face shield, and insulated gloves when working with or around liquid oxygen.

While CAIRE equipment is designed and built to the most rigid standards, no piece of mechanical equipment can ever be made 100% foolproof. Strict compliance with proper safety and handling practices is necessary when using a Liberator or Stroller. We recommend that our distributors emphasize safety and safe handling practices to their employees and customers. While safety features have been designed into the unit and safe operations are anticipated, it is essential that the distributor personnel carefully read and fully understand **WARNING: CAUTIONS**, and **NOTES** throughout the manual. Periodic review of this information is recommended.

**WARNING:** Excess accumulation of oxygen creates an oxygen-enriched atmosphere (defined by the Compressed Gas Association as an oxygen concentration above 23%). In an oxygen-enriched atmosphere, flammable items burn vigorously and may explode. Certain items considered non-combustible in air may burn rapidly in such an environment. Keep all organic materials and other flammable substances away from possible contact with oxygen; particularly oil, grease, kerosene, cloth, wood, paint, tar, coal dust, and dirt which may contain oil or grease. **DO NOT** permit smoking or open flame in any area where oxygen is stored, handled, or used. Failure to comply with this warning may result in serious personal injury.

**WARNING:** In the event a unit is dropped, tipped over, or unreasonably abused, immediately, but cautiously, raise the container to its normal vertical position. If substantial container damage has occurred, remove the liquid oxygen from the vessel in a safe manner. Purge the unit with an inert gas (nitrogen) and promptly return it to CAIRE for inspection. The container should be prominently marked "CONTAINER DROPPED, INSPECT FOR DAMAGE". Failure to comply with these procedures may result in personal injury and can seriously damage the container.

**WARNING:** Personnel must remove liquid oxygen and depressurize the Liberator or Stroller before removing parts or loosening fittings from a unit. Failure to do so may result in personal injury because of the extreme cold of the liquid oxygen and the pressure in the vessel. External valves and fittings can become extremely cold during liquid transfer.

**WARNING:** During transfer of liquid oxygen, components will become extremely cold. Care should be used to avoid any contact with these components; as serious burns may result.

**WARNING:** Keep filled unit upright at all times. Tip over of filled unit may result in liquid oxygen leakage and/or oxygen enriched atmosphere.

*CAUTION: Only use replacement equipment which is compatible with liquid oxygen and has been cleaned for oxygen use. Do not use regulators, fittings, hoses, etc., which has been previously used in a non-oxygen service.*

# VI Theory of Operation

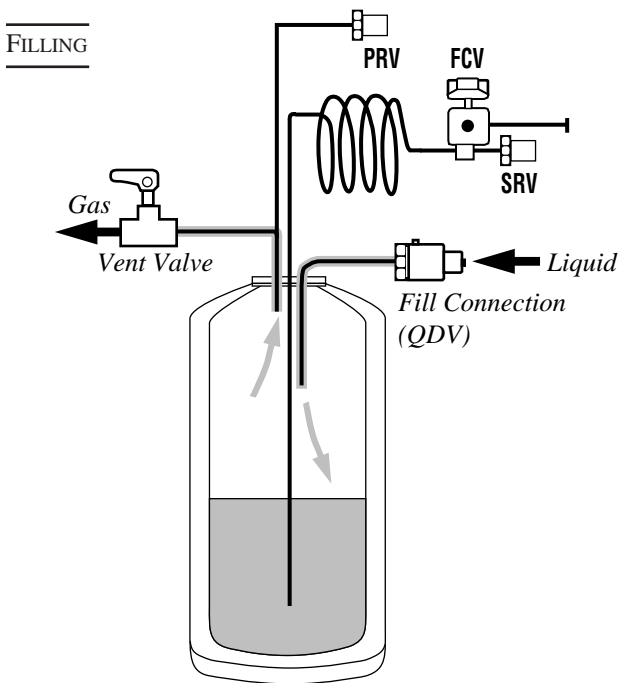
## Filling

### 1. Method

The Stroller or Sprint are portable units designed to be filled by the patient from a Liberator, Low Loss Reservoir, or Medi-Mite stationary unit.

The unit is filled by coupling the quick disconnect valve of the Stroller/Sprint with the quick disconnect valve on the Reservoir and opening the vent valve. Liquid oxygen is forced up the Reservoir fill tube, through the coupled quick connectors, and into the inner vessel of the Stroller/Sprint.

There will be some oxygen vaporized during filling. This gas is discharged through the vent valve. When the unit is full, liquid oxygen is expelled. Closing the vent valve and separating the units terminates the fill process.



### 2. Saturation Pressure

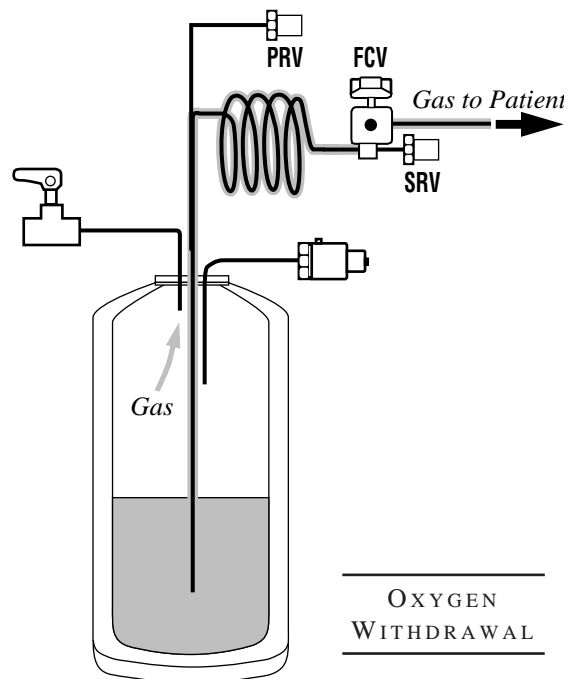
The liquid oxygen saturation pressure can seriously affect the overall efficiency and operation of the Stroller or Sprint.

- If the saturation pressure of the liquid in the fill source is greater than 30 psig, high filling losses and/or frozen open relief devices may result.
- If the saturation pressure of the liquid in the fill source is lower than 18 psig, below tolerance flow rates may result.

## Oxygen Withdrawal

With oxygen in the unit, and the vent valve closed, the pressure in the inner vessel will remain at or near the primary relief valve pressure of 20 psig.

At pressures of 20 and with the flow control valve at any setting other than Off, pressure forces liquid oxygen up the liquid withdrawal tube and into the breathing coil. In the breathing coil, liquid oxygen absorbs heat and vaporizes, warming to almost ambient temperature by the time the gas is dispensed by the flow control valve.



# Theory of Operation VI

## Liquid Level Measurement

### 1. Led

Strollers or Sprints are equipped with a unique liquid level measurement system. This system measures the level of liquid oxygen inside the unit with a capacitance-type probe and displays the liquid level via an LED bar-graph meter called Sur-Cal 3™.

The liquid level probe consists of two concentric stainless steel cylinders, which are inside the inner vessel. As the liquid oxygen level rises, the capacitance of this assembly goes up. The meter measures this capacitance and displays it on the LED bar graph.

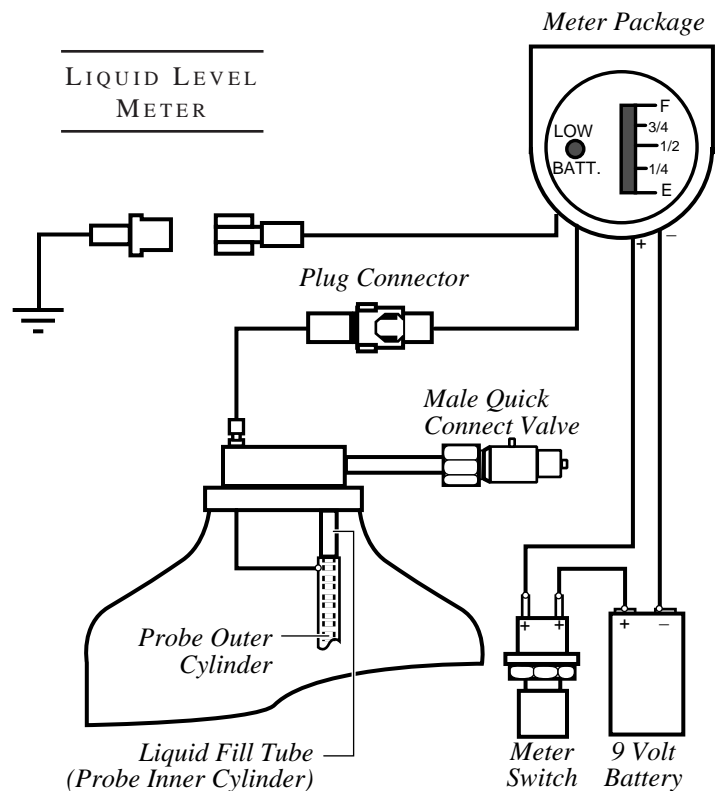
Electrical connection between the Sur-Cal 3™ meter and the probe is made via a single conductor plug connector. The male plug carries the coaxial cable from the meter. The female receptacle carries the same wire from the probe. A single ground wire is connected from the meter to a male spade terminal on the top bracket.

### 2. Spring Scale

Stroller or Sprints can also be equipped with a spring scale liquid level measurement system. This system measures the level of liquid oxygen inside the unit with a simple spring scale mechanism, which is incorporated into the strap assembly. The spring scale display is calibrated to read empty when only the weight of the portable unit is being hung by the strap. As liquid oxygen is placed into the portable, the weight increases and the spring scale displays the increase. The only adjustment to the scale is the zero or empty point.

The meter is powered by a nine volt battery. The meter has a low battery (LOW BATT) indicator which signals the need for battery replacement.

The Sur-Cal 3™ is equipped with a short-circuit indicator which turns all LED's "off" when capacitance above approximately 375 pF is reached.





# VII Unpacking and Setup

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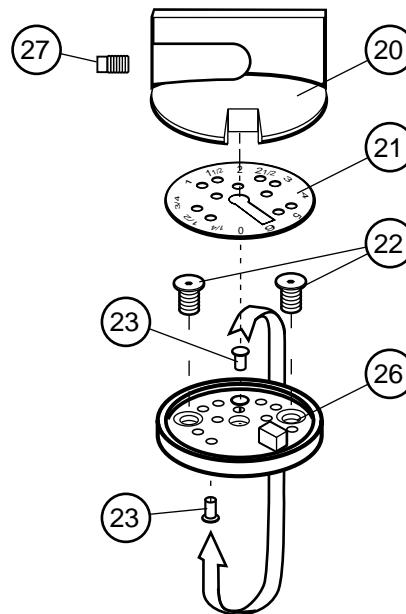
## Unpacking

1. Always inspect carton for shipping damage. Report any damage to freight company before signing a bill of lading.
2. Check description marked on carton against your order.
3. Unpack unit, including Patient Operating Instructions (POI).
4. Set aside several sets of packing materials in case a unit must be returned to factory.

## Setup

If desired, flow control knob (Item 20) can be adjusted so it will not exceed maximum prescribed flow rate.

1. Using hex key wrench, loosen setscrew (Item 27) in flow control knob (Item 20) and remove knob.
2. Remove flow rate decal number disc (Item 21).
3. Remove two hex head screws (Item 22) from flow lock plate (Item 26) and remove plate.
4. Remove locking pin (Item 23) from its storage position on flow lock plate and place in underside of hole corresponding to maximum allowable flow rate.
5. Replace flow lock plate (Item 26), number disc (Item 21) and knob (Item 20). Tighten screws (Item 22) to 4-6 inch-pounds. Verify flow lock is at correct position.



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## Operation VIII

Refer to Patient Operating Instructions Manual (POI).

# Routine Maintenance/Schedule A, Annual IX

There are two schedules for routine maintenance which the home health care distributor may follow. These schedules allow the distributor maximum flexibility while assuring that equipment is operating properly.

## Schedule A – Annual

### A. Introduction

Routine maintenance is a series of steps used to assure that equipment is functioning properly.

1. If a unit fails to pass a given test, one of two things may be done.
  - a. Refer to Troubleshooting/Repair (Section X) of this manual.
  - b. Return to CAIRE for repair.
2. Schedule A – Maximum of one year between routine maintenance testing. Unit should be tested when a problem is suspected.

### B. Procedure

Follow the steps in order listed. If the unit fails any step, refer to Troubleshooting/Repair (Section X) of this manual.

1. Visual Inspection:
  - a. Look for damaged or missing parts.
  - b. Dry condensation pad. Replace if soiled.
2. Fill Unit:
  - a. Fill full of LO<sub>2</sub>.
  - b. Check for audible or visual leaks in QDV and vent valve.
  - c. Verify that meter reads full (9 LED's).
3. Check Efficiency of Unit:
  - a. Allow bottle outer surface to stabilize after fill (10-15 minutes).
  - b. Inspect bottle for cold sweaty condition, and for excessive venting from relief valve (some venting is normal).
  - c. If either condition is observed, conduct NER test (see RP28 in this manual).

### 4. Flow Test:

- a. Set FCV to 6 lpm, run for at least 20 minutes.
- b. Check all flow settings to chart below and check pressure to be at least 18 psi.

Stroller/Sprint Flow Test	
FCV Setting	LPM
OFF	-0-
0.25	0.15 to 0.35
0.50	0.40 to 0.60
0.75	0.65 to 0.85
1.00	0.90 to 1.10
1.50	1.35 to 1.65
2.00	1.80 to 2.20
2.50	2.25 to 2.75
3.00	2.70 to 3.30
4.00	3.60 to 4.40
5.00	4.50 to 5.50
6.00	5.40 to 6.60

### 5. Prepare for Use:

- a. Empty contents by setting FCV at 6 lpm and running unit until dry and warm to room temperature (approximately two hours).
- b. Verify that meter reads empty (one LED) and that low battery LED is not lit.
- c. Clean case with household glass cleaner and lint free cloth (do not get in any valves).

# IX Routine Maintenance/Schedule B, Continuous

## Schedule B – Continuous

### A. Introduction

Continuous maintenance is a set of test or inspections done consistently to assure equipment is functioning properly. It can be done with equipment in service, by drivers or other personnel.

1. If a unit fails to pass a given test, it should be taken out of service and sent to the Repair Center/Department for further inspection.
2. Schedule B – Checks are made when the driver sees patient and when moving equipment between patients.

### B. Procedure

These inspections are to be performed by driver when Stroller is in use by the patient (LO<sub>2</sub> in the unit). Must be performed at least once per year.

1. Visual Inspection:
  - a. Case/flow control knob.
  - b. Condensation pad.
  - c. QDV pin not bent (side fill only).
2. Verify that meter reads a liquid level that makes sense. That is, “full” if just filled, “empty” if close to empty, etc.
3. Check prescription flow rate(s). Erie liter meter ( $\pm .25$  lpm) can be used.

These inspections/tests are done between patients.

1. Visual Inspection:
  - a. Broken case.
  - b. Condensation pad (replace if soiled).
  - c. QDV pin not bent (side fill only).
  - d. Inspect interior of unit for dirt or contaminants.
2. Verify that liquid level measurement reads empty (one LED or red stripe).
3. Fill Unit:
  - a. Verify that liquid level measurement reads full (9 LED's or FULL green stripe).
  - b. Check for audible/visual leaks in QDV and vent valves.

### 4. Flow Test:

- a. Set FCV to 6 lpm, run for at least 20 minutes.
- b. Check all flow settings to chart below and check pressure to be at least 18 psi.

Stroller / Sprint Flow Test	
FCV Setting	LPM
OFF	-0-
0.25	0.15 to 0.35
0.50	0.40 to 0.60
0.75	0.65 to 0.85
1.00	0.90 to 1.10
1.50	1.35 to 1.65
2.00	1.80 to 2.20
2.50	2.25 to 2.75
3.00	2.70 to 3.30
4.00	3.60 to 4.40
5.00	4.50 to 5.50
6.00	5.40 to 6.60

### 5. Prepare for Use:

- a. Empty contents by setting FCV at 6 lpm and running unit until dry and warm to room temperature (approximately two hours).
- b. Verify that meter reads empty (one LED) and that low battery LED is not lit.
- c. Clean case with household glass cleaner and lint free cloth (do not get in any valves).

# Troubleshooting (Table of Contents) X

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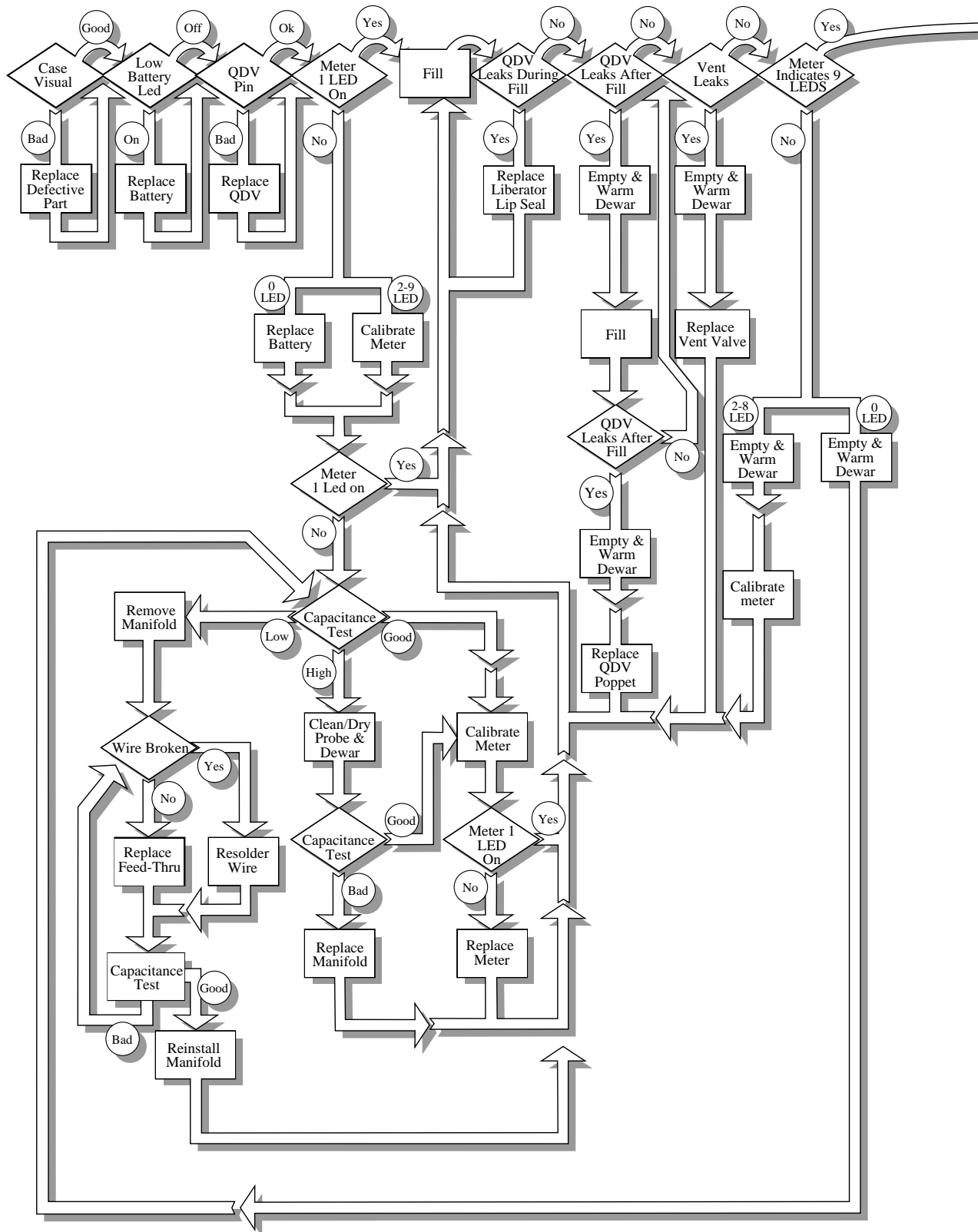
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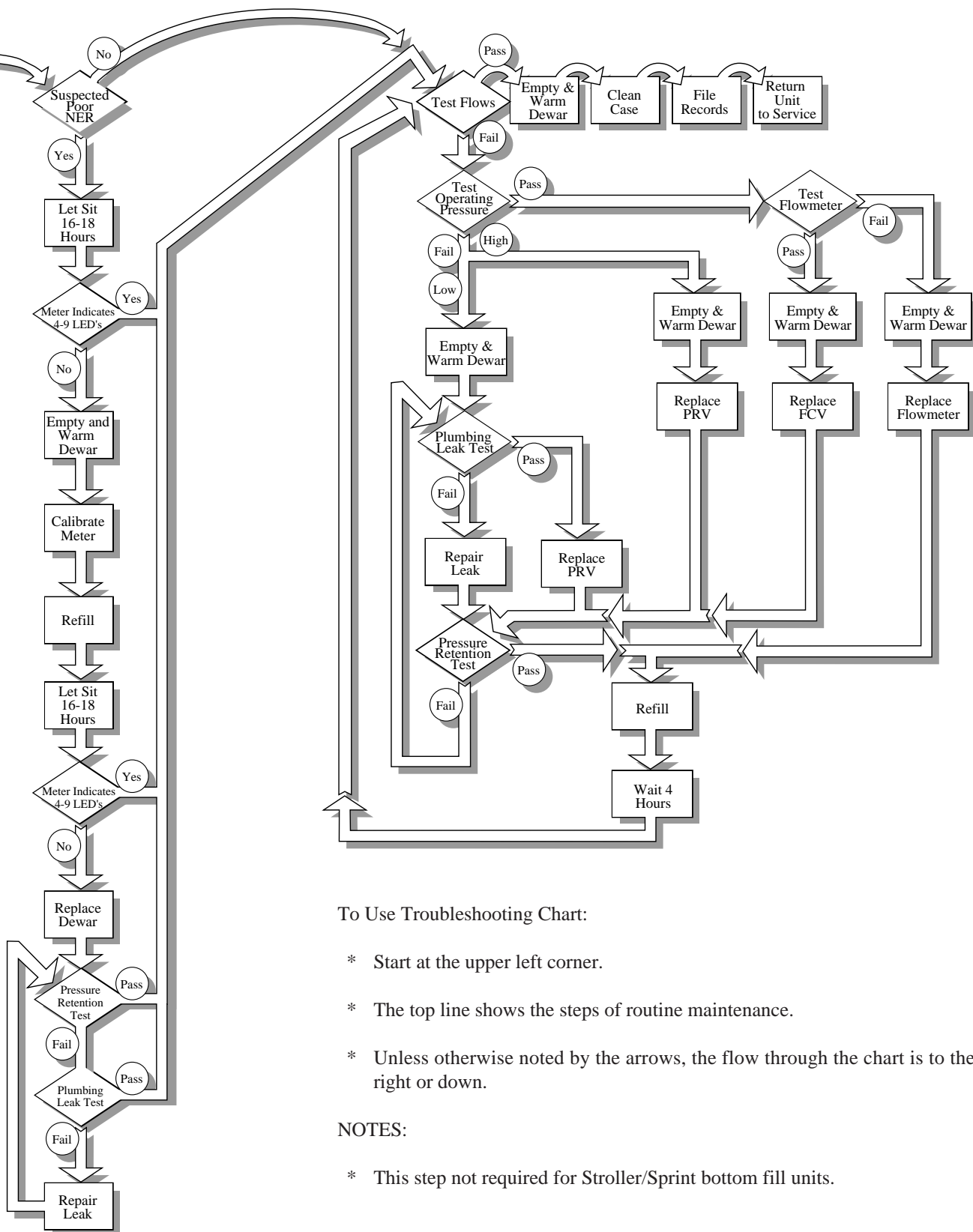
## Introduction

1. These procedures are designed to be performed only by qualified personnel with proper equipment.
2. Any failure during routine maintenance checks will refer you to this section. See Troubleshooting Chart for appropriate procedure.

# X Troubleshooting Chart



# Troubleshooting Chart X



To Use Troubleshooting Chart:

- \* Start at the upper left corner.
- \* The top line shows the steps of routine maintenance.
- \* Unless otherwise noted by the arrows, the flow through the chart is to the right or down.

NOTES:

- \* This step not required for Stroller/Sprint bottom fill units.

# X Repair Procedures

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## RP1 – General

The following procedures have been carefully prepared to allow proper removal and replacement of defective components, and should be used in conjunction with the Troubleshooting Chart and the tests in this section.

**WARNING: Make sure the unit is empty and vent valve is open before replacing any component, except shroud assembly components.**

**WARNING: The worker's hands, tools, and clothing should be free of all oils and greases.**

**WARNING: Parts that are welded in place must not be replaced in the field. Should these parts fail, return complete assembly or sub-assembly to factory for repair. DO NOT use solder or silver solder to repair broken welds.**

**WARNING: The manufacturer of Krytox warns users not to allow Krytox fluorolubricant to contaminate tobacco products. Wash Krytox from hands before smoking.**

**WARNING: Do not use glues, thread locking compounds or unapproved sealants on any repairs.**

*CAUTION: When replacing components, make sure that new part is oriented exactly the same as the original part prior to installation.*

*CAUTION: Some components require a specific amount of torque when assembling. Follow torque requirements where specified.*

NOTE: All replacement parts must be factory approved, cleaned for oxygen service, and stored in sealed plastic bags. The repair area must be clean and separate from other areas. Room air should be filtered, and as free from dust, soot, and other contaminants as possible.

NOTE: When replacing components with pipe threads, use TEFLON tape. Apply TEFLON tape as a sealant to threads near end of component, avoiding first thread.

NOTE: When assembling new compression fittings, tighten 3/16" tube nuts five flats after finger tight, and 1/4" tube nuts eight flats after finger tight. When reassembling previously used compression fittings, tighten nuts one to two flats after finger tight.

# Repair Procedures X

## RP2 – Battery R/R

- a. Remove Sur-Cal 3™ gauge cover assembly (Item 1) by inserting a flat blade screw driver into the slot (Item A) and lightly pushing over and up.
- b. Lift the battery (Item 4) from the top cover and unsnap the terminal clip.
- c. To replace battery, reverse the above procedure.

## RP3 – Top Cover Assembly R/R

- a. Remove Sur-Cal 3™ gauge cover assembly as described in RP2.
- b. Disconnect gauge plug (Item 5) and remove gauge cover (Item 1) with battery.
- c. Unscrew the three screws (Item 8) and lift top cover up.
- d. Remove the QDV alignment sleeve (Item 11) on side fill units by lifting up and out to disengage vent line; or the plug (Item 12) on bottom fill units, by lifting it straight up.
- e. Lift top cover (Item 10) straight up to remove.
- f. To replace, reverse the above steps.

## RP4 – Bottom and Side Cover R/R

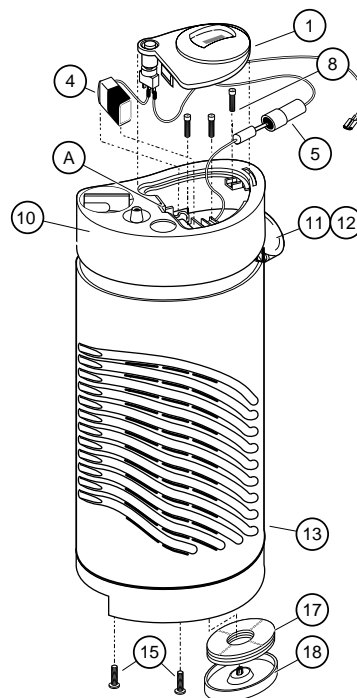
- a. If removing the entire unit case, remove the top cover (RP3) first.
- b. Invert Stroller. Remove condensation cup (Item 18) and Nomex pad (Item 17).
- c. Remove the two screws (Item 15) retaining bottom cover to Stroller dewar.
- d. Remove bottom/side cover (Item 13) by pulling straight down.
- e. To replace, reverse steps in above procedure. Be sure vaporizer coil is centered in case.

*CAUTION: Be careful not to pinch wires!*

## RP5A – Sur-Cal 3™ Meter Calibration

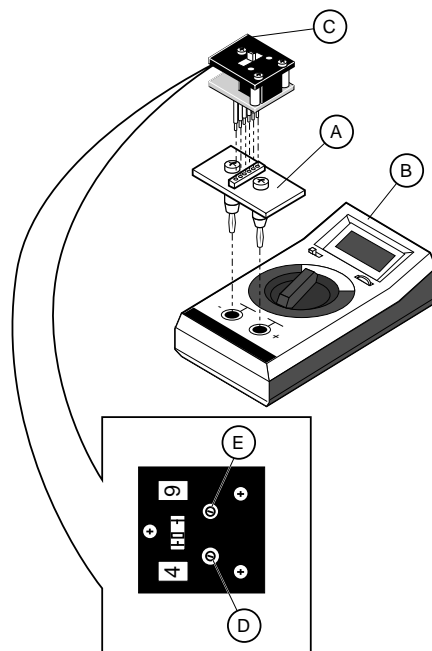
- a. Simulator Box Calibration Procedure:
  1. Connect adapter (Item A) to capacitance meter (Item B).
  2. Turn on capacitance meter and select 200 pF range.
  3. Move zero adjustment on front of meter (Item B) until display reads zero.
  4. Connect simulator (Item C) to the adapter (Item A).

ILLUSTRATION FOR RP 2, 3, & 4



**WARNING: The unit must be empty of liquid oxygen before inverting.**

ILLUSTRATION FOR RP 5A (section a)





# X Repair Procedures

**WARNING: The unit must be empty of liquid oxygen before attempting calibration.**

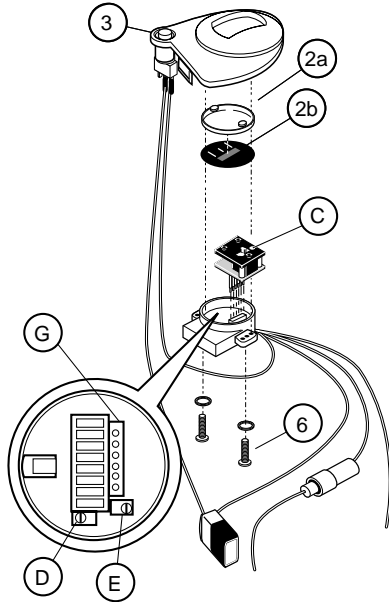


ILLUSTRATION FOR RP 5A (section b)

5. Set the capacitance for the 4th LED. The capacitance meter (Item B) should read value listed below. (Switch set to “4th LED”.)

Stroller	22.0pF ± 0.2pF
Sprint	16.2pF ± 0.2pF

6. If meter does not display correct reading, turn proper adjustment screw (Item D) through hole in top of simulator box (Item C).

7. Set the capacitance for the 9th LED. The capacitance meter should read value listed below. (Switch set to “9th” LED”.)

Stroller	58.0pF ± 0.2pF
Sprint	42.8pF ± 0.2pF

8. If meter does not display correct reading, turn proper adjustment screw (Item E) through hole in top of simulator box (Item C).

9. Disconnect simulator box (Item C) from female adapter.

10. Simulator box (Item C) is now properly calibrated.

b. Meter Calibration Procedure:

Note: Re-calibrate simulator box each day before using.

1. Remove Sur-Cal 3™ (RP 7, steps A, D, and E).
2. Check probe capacitance as required per RP6.
3. Remove twist-lock meter lens (Item 2a) by rotating it counterclockwise. Lift out decal (Item 2b).
4. Attach simulator box (Item C) to the Sur-Cal 3™ meter connector (Item G), LED display must be visible.
5. Switch simulator box to “4th LED”.
6. Verify that a good battery is connected to battery terminal on meter wiring.
7. Locate two adjustment screws (Item D & E) in meter case.
8. Holding meter switch (Item 3) down, turn screw (Item D) clockwise until 4th LED comes on. Turn it in opposite direction until 4th LED just goes off. Release meter switch.
9. Switch simulator box to “9th LED”.
10. Depress meter switch (Item 3) in top cover. Turn other adjustment screw (Item E) until 9th LED just comes on. Release push button.
11. Repeat step 5, then depress meter switch (Item 3) to verify that three LED’s are on.
12. Remove simulator box from the Sur-Cal 3™ meter. Press meter switch. One LED should come on.
13. Reapply a thin film of KRYTOX over the 6-pin connector to completely surround and cover the sockets making it waterproof.
14. Replace meter decal and lens. Reinstall the Sur-Cal 3™ meter into the gauge cover (See RP 7).
15. Replace gauge cover.

## RP5B – Sur-Cal 3.1 Meter Calibration

Requires Calibration Kit PN 10856013, Digital Voltmeter with high input impedance, display 1mV, and accuracy of ± 0.5%, and Capacitance Meter Ref 97403015 available from CAIRE.

1. Test the capacitance of the calibrator at least once daily. The reading should be between 62.0 pF and 63.8 pF. When testing the calibrator make sure a good contact is made between the meter and calibrator, and

# Repair Procedures X

that the calibrator is inserted into the meter exactly as illustrated in RB5B (Item F).

2. Remove the clear twist lens and the decal such that the meter face is exposed. The meter should be connected to the empty warm unit.
3. Connect the banana plug ends of the calibrator to a voltmeter.
4. Plug the calibrator (Item A) into the meter (Item B) as shown in RP5B. The two male pins of the calibrator should be inserted into the two female pins, near Pot Screw (Item C) (cable from the calibrator is facing the same direction as the cables of the meter).
5. Turn the meter on by depressing the meter switch. At the same time, adjust the other Pot Screw (Item D) until a voltage of  $0.000 \pm 0.010$  volts is obtained.
6. Remove the calibrator (Item A), flip it over (Item E), and plug into the meter as shown. Once again the cable from the calibrator is facing the same direction as the cables of the meter.
7. Turn the meter on by depressing the meter switch. At the same time, adjust Pot Screw (Item C) until the proper voltage for the model size is obtained (see Voltage Table for this value).
8. Repeat steps 4 through 7 as necessary. (Most likely will not need to be repeated.)

If the meter does not seem to calibrate easily, turn Pot Screw (Item C) 12 turns one direction, then 6 turns in the other and attempt again.

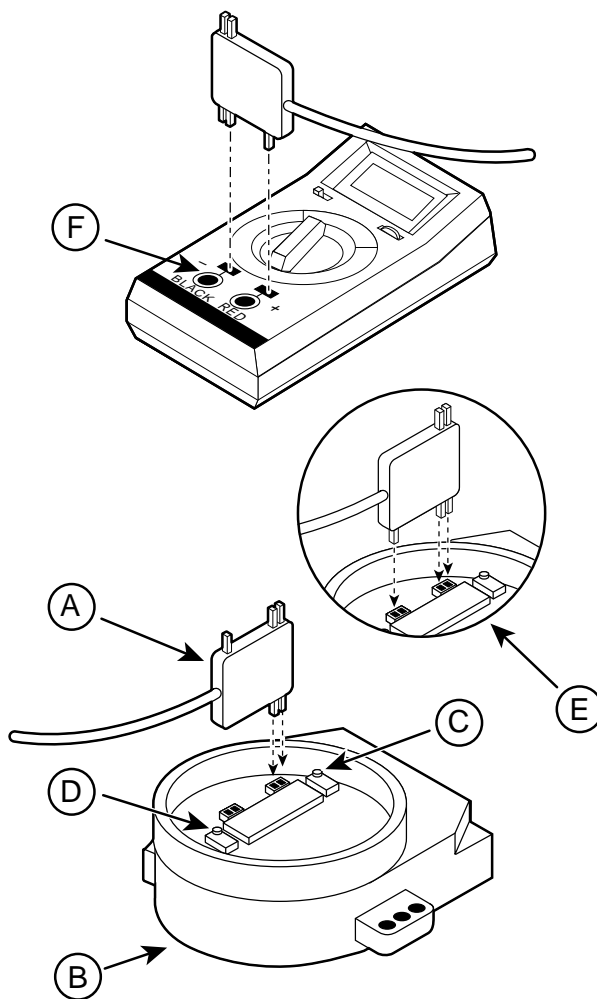


ILLUSTRATION FOR RP5B

<b>BROWN/TAN SHROUD</b>	<b>VOLTAGE</b>
Sprint	$3.555 \pm .020$ volts
Stroller	$2.657 \pm .020$ volts
Liberator 20	$2.972 \pm .020$ volts
Liberator 30	$2.736 \pm .020$ volts
Liberator 45	$2.736 \pm .020$ volts

<b>GENERATION 3</b>	<b>VOLTAGE</b>
Sprint	$3.240 \pm .020$ volts
Stroller	$2.657 \pm .020$ volts
Liberator 10	$3.400 \pm .020$ volts
Liberator 20	$3.200 \pm .020$ volts
Liberator 30	$3.100 \pm .020$ volts
Liberator 37	$3.035 \pm .020$ volts
Liberator 41	$3.077 \pm .020$ volts
Liberator 45 & 60	$2.736 \pm .020$ volts
Low Loss 32 & 41	$3.035 \pm .020$ volts

## Alternate Method for Generation 3.1 Liquid Level Meter Calibration Recommended for Units Using Messenger Option for Highest Accuracy

1. Follow steps 2-5 as described above on an empty unit.
2. Fill Reservoir with liquid oxygen per normal manufacturer recommendations.
3. Attach the calibrator per step 4 above.
4. Turn the meter on by depressing the meter switch. At the same time, adjust Pot Screw (Item C) until  $2.900 \pm 0.020$  volts is obtained. (All units, regardless of model type, should read  $2.900 \pm 0.020$  volts when filled with liquid oxygen.)

# X Repair Procedures

## RP6 – Manifold Capacitance Test

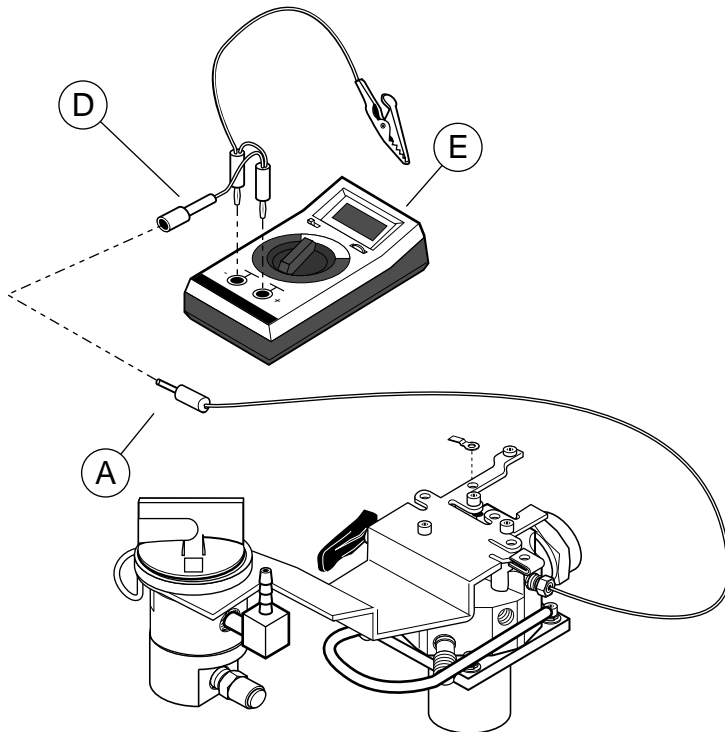


ILLUSTRATION FOR RP 6

### a. Capacitance Meter Setup:

1. Connect wire adapter with jumper wire, (Item D) to capacitance meter (Item E), following color code.
2. Turn on capacitance meter and select 200 pF range.
3. Move zero adjustment on front of meter until display reads zero.

### b. Capacitance Test:

**WARNING: Make sure unit is empty and at room temperature before testing.**

1. Remove top cover (RP 3).
2. Connect wire adapter (Item D) to manifold harness connection (Item A). Connect alligator clip to FCV mounting bracket.
3. Read manifold capacitance. May require changing meter range.
4. Manifold capacitance specifications:

Stroller	165-200pF
Sprint	125-155pF

## RP7 – Sur-Cal 3™ Meter R/R

- a. Remove the Sur-Cal 3™ cover assembly (RP 2).
- b. Remove meter switch cap (Item 71) from switch.
- c. Remove switch retaining nut and lockwasher (Item 72 and 73). Push switch through hole.
- d. Remove two meter mounting screws and washers (Item 6 and 7). Note position of meter wires.
- e. Remove meter assembly (Item 9) from top cover.
- f. Unplug the wiring connection (Item A).
- g. Disconnect ground wire spade terminals.
- h. To replace Sur-Cal 3™ meter, reverse above procedure. Wrap wires between meter and screws as noted in step d. Calibrate meter per RP5.

*CAUTION: Be careful not to pinch wires!*

## RP8 – Manifold Assembly R/R

**WARNING: The unit must be empty, warm, and vented before starting procedure.**

- a. Remove bottom/ side, and top cover (RP 2, 3 and 4).
- b. Loosen and disconnect the primary relief valve (Item 49) from the manifold fitting.
- c. Loosen breathing coil nut (Item 38) from liquid withdrawal fitting (Item 41). Be careful not to bend or kink TEFLON tubing. Remove breathing coil nut from FCV (Item 24).

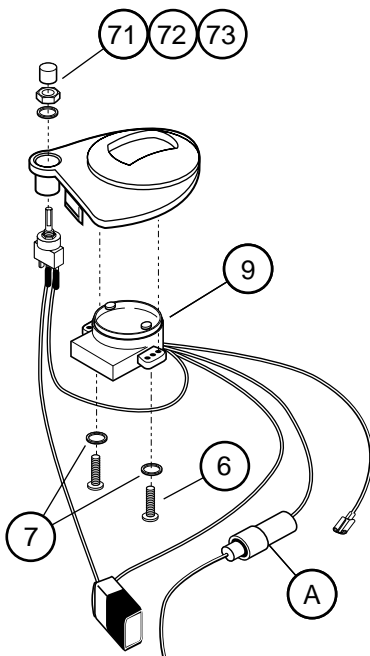


ILLUSTRATION FOR RP 7

# Repair Procedures X

- d. Remove the three screws (Item 29) that hold the bracket (Item 28) to the manifold.
- e. Lift bracket with FCV away from manifold.
- f. Loosen and remove the four manifold retaining screws and washers (Item 31).
- g. Remove manifold assembly by lifting straight up.

NOTE: If force is required, closely examine wire and probe for damage.

- h. To replace manifold assembly, reverse above procedure.

NOTE: Ensure proper seating of O-ring in dewar. Apply a small amount of Krytox to O-ring and manifold retaining screws before installing. Use cross-tightening of screws to assure manifold is assembled flat to flange. Torque screws to 20-22 inch-lbs.

## RP9 – Resolder Feed-Thru Wire

- a. Remove manifold assembly (RP 8).
- b. Strip approximately 1/8 inch of insulation from wire if necessary.
- c. Apply small amount of Stay-Clean flux to tinned area of probe using a cotton swab.
- d. Resolder probe wire (Item N) to tinned area of probe. Add small amount of 60/40 solid wire solder if necessary.
- e. Clean flux residue with distilled water and cotton swab.
- f. Replace manifold following listed procedure (RP 8).

## RP10 – Feed-Thru Harness R/R

- a. Remove manifold assembly (RP 8).
- b. Unsolder feed-thru wire (Item N) from probe.
- c. Loosen feed-thru nut (Item 52) and remove harness.
- d. To replace feed-thru harness, reverse above procedure. Torque feed-thru nut to  $40 \pm 2$  inch-lbs. Solder feed-thru wire following resolder procedure (RP 9). Blow off manifold with dry nitrogen gas before reinstalling. Replace manifold assembly.

## RP11 – Clean/Dry Probe and Dewar

### Procedure 1:

- a. Follow RP 17 steps A through E.
- b. Open vent valve (Item 50) and supply valves.
- c. Allow unit to vent for one hour minimum.
- d. After vent valve (Item 50) is thawed, if all moisture is not removed, go to procedure #2.

### Procedure 2:

- a. Remove manifold assembly (RP8).
- b. Blow off probe assembly with clean, dry nitrogen gas.

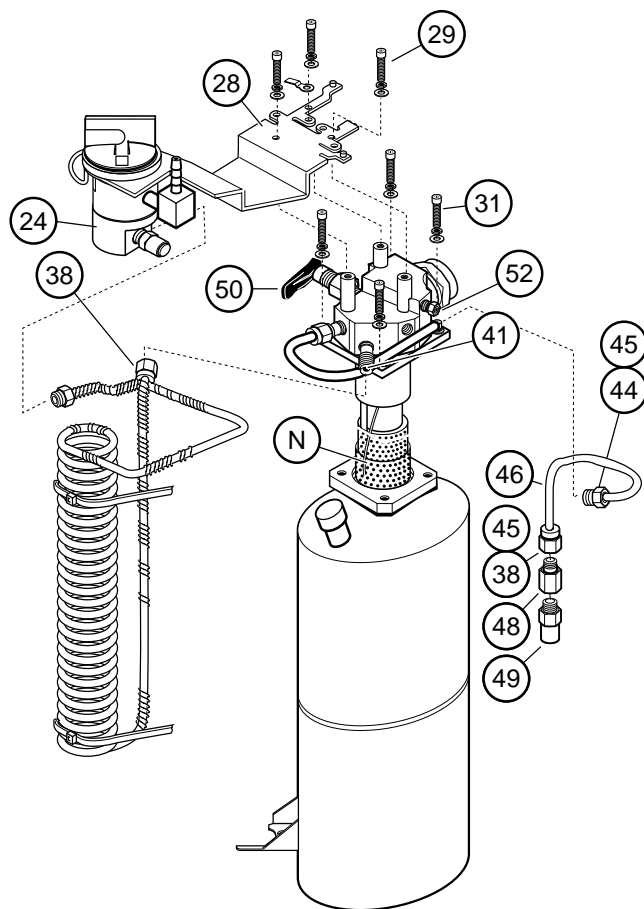
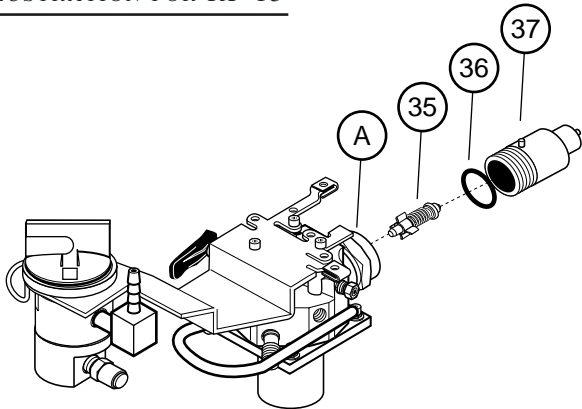


ILLUSTRATION FOR RP 8, 9, & 10

# X Repair Procedures

ILLUSTRATION FOR RP 15



- c. Invert dewar and blow out inside with clean, dry nitrogen gas until inside is clean and dry.
- d. Replace manifold assembly.

## RP12 – LO<sub>2</sub> Fill

Refer to POI for proper fill procedure.

NOTE: Filling source must contain a minimum of 5 liters (2 LED's on Liberator) of properly saturated LO<sub>2</sub>.

## RP13 – Liberator Lip Seal R/R (Side Fill)

Refer to Liberator Service Manual.

## RP14 – Empty and Warm

- a. Turn FCV knob to 6 liters per minute position.
- b. Allow unit to sit for 24 hours before proceeding.

## RP15 – QDV and/or Poppet R/R (Side Fill)

**WARNING: The unit must be empty of liquid oxygen before starting procedure.**

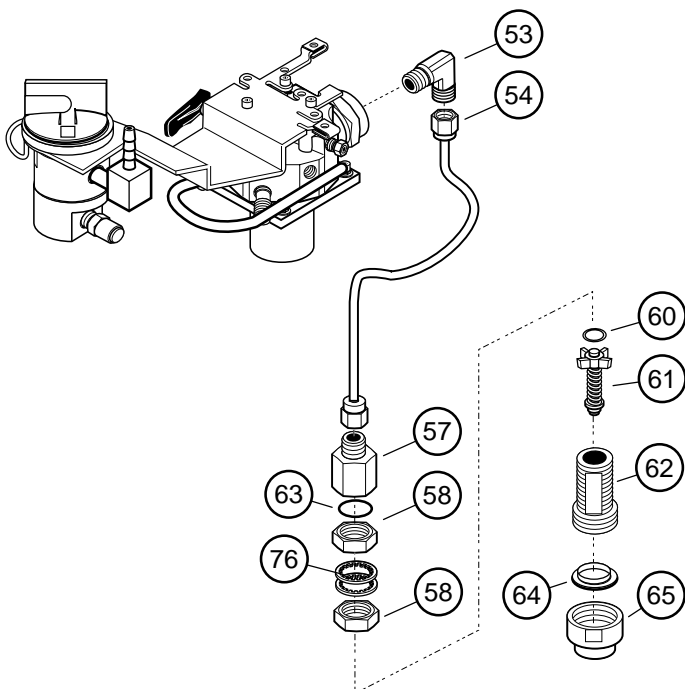
- a. Remove top cover (RP 3).
- b. Loosen retaining nut (Item A).
- c. Disassemble QDV (Item 37) and replace components (Items 35 and 36).
- d. To replace QDV, reverse above procedure, aligning pin in the upright position. Apply thin film of Krytox to O-ring (Item 36). Torque retaining nut to 140-150 inch-lbs.
- e. Replace top covers.

## RP16 – QDV, Poppet, and Lip Seal R/R (Bottom Fill)

**WARNING: The unit must be empty of liquid oxygen before starting procedure.**

- a. Remove bottom/side covers (RP 4).
- b. Remove two retaining nuts (Item 54) and lift bottom fill tube out of coil.
- c. Replace QDV by removing QDV (Item 62) and replace, tightening Item 57 to 140-150 inch/lbs. and Items 58 to 25 ft./lbs.
- d. Replace poppet by removing retaining ring (Item 60) and poppet assembly (Item 62). Insert new poppet and fully seat returning ring in place.
- e. Reassemble in the reverse order.
- f. Replace lipseal by removing Item 65 and Item 64. Apply a thin film of KRYTOX to new Item 64 and insert into QDV. Tighten Item 65 to 140-150 inch/lbs.

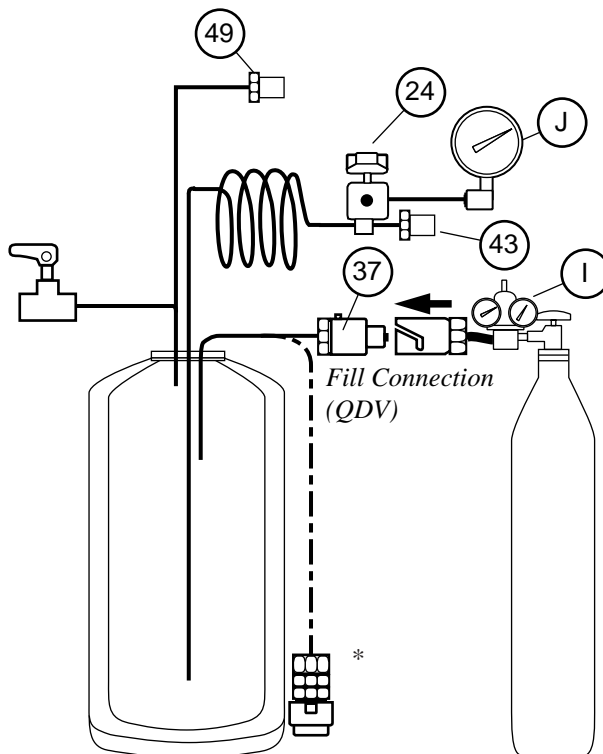
ILLUSTRATION FOR RP 16



# Repair Procedures X

## RP17 – Pressure Retention Test

- Assemble oxygen regulator, hose, and pneumatic adapter. Connect assembly to oxygen gas source.
- Assemble pressure gauge (Item J) and adapter assembly. Thread hose barb onto pressure gauge (use TEFLON tape). Push tubing onto hose barb and attach with clamp.
- Connect gauge assembly (Item J) to hose barb on FCV outlet and open FCV (Item 24) to 6 lpm setting.
- Connect the proper pneumatic adapter to QDV (Item 37) for side fill units or (Item 62) for bottom fill.
- Increase pressure to 19 psig.
- Remove pneumatic adapter from QDV.
- Turn FCV to Off position.
- Allow unit to sit undisturbed for 60 minutes.
- Turn FCV to 6 lpm position.
- If pressure (Item J) is at or above 10 psig, unit passes test.



\*Optional bottom fill QDV

## RP18 – Plumbing Leak Test

**WARNING: The unit must be empty and warm before starting procedure.**

- Remove bottom, side, and top covers (RP 2 & 3).
- Assemble oxygen regulator, hose, and pneumatic adapter. Connect assembly to oxygen gas source.
- Assemble pressure gauge and adapter assembly (Item J). Thread hose barb onto pressure gauge (use TEFLON tape). Push tubing onto hose barb and attach with clamp.
- Connect gauge assembly (Item J) to hose barb on the FCV outlet and open FCV (Item 24) to 6 lpm setting.
- Connect pneumatic adapter to QDV (Item 37) to side fill units of (Item 62) for bottom fill.
- Increase pressure to 19 psig.
- Leak test all connections, joints, and valves with leak test solution.

NOTE: PRV (Item 49) and SRV (Item 43) may leak slowly. Repair all other leaks first and retest for pressure retention before changing relief valves.

- Close FCV (Item 24) by turning to Off position. Remove pressure gauge assembly (Item J) from FCV hose barb.
- Disconnect pneumatic adapter from QDV.
- Leak test QDV poppet and FCV outlet.
- Repair all leaks by following appropriate R/R procedure.

ILLUSTRATION FOR RP 17 AND 18

# X Repair Procedures

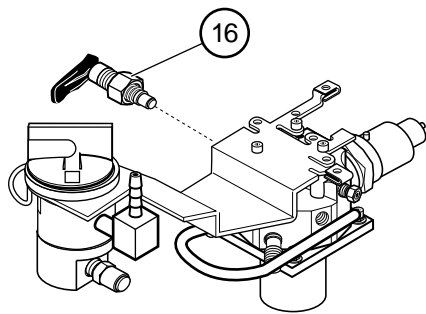


ILLUSTRATION FOR RP 19

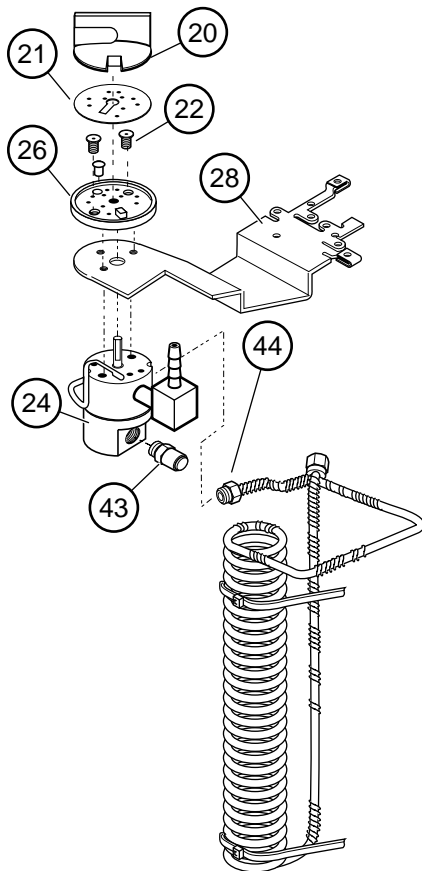


ILLUSTRATION FOR RP 20 & 21

## RP19 – Vent Valve R/R

**WARNING:** The unit must be empty, warm and vented before starting procedure.

- Remove bottom, side, and top cover (RP 2, 3 and 4).
- Open the vent valve.
- Remove vent valve (Item 16) by turning counter-clockwise.
- To replace vent valve, reverse above procedure. Torque nut to 90-100 inch-lbs.

## RP20 – FCV R/R

- Remove bottom, side and top covers (RP 2, 3 and 4).
- Disconnect coils from FCV inlet by loosening compression fitting (Item 44), and removing coils.
- Remove FCV knob (Item 20) and flow decal (Item 21).
- Disconnect and remove the FCV from bracket (Item 28) by removing two screws (Item 22).
- Remove SRV (Item 43) from FCV.
- To replace FCV, reverse above procedure. Tighten screws (Item 22) to 4-6 inch-lbs. Record FCV serial number.

## RP21 – SRV R/R

- Remove bottom, side, and top covers (RP 2, 3 and 4).
- Disconnect SRV (Item 43) from FCV (Item 24).
- Replace SRV in reverse order. When reassembling SRV, tighten approximately 10 to 20 degrees after the SRV contacts the FCV body, (20-30 inch-lbs. minimum).

# Repair Procedures X

## RP22 – PRV R/R

- Remove bottom, side, and top covers (RP 2, 3 and 4).
- Remove PRV (Item 49) while holding adapter (Item 48).
- Replace the PRV using two rounds of TEFLON tape on the threads.
- Reassemble in the reverse order.

## RP23A –Breathing Coil R/R (Side Fill)

- Remove bottom, side, and top covers (RP 2, 3 and 4).
- Loosen the two compression fitting nuts (Items 38 and 44) from liquid withdrawal fitting (Item 41) and FCV (Item 24). Disconnect breathing coil (Item 67), being careful not to kink breathing coil or internal TEFLON tube.
- Carefully remove breathing coil outlet from around top of dewar.
- To replace breathing coil, reverse above procedure.

*CAUTION: The vaporizer coil is fragile. Do not drop coil. Do not hit or mar coil with wrenches.*

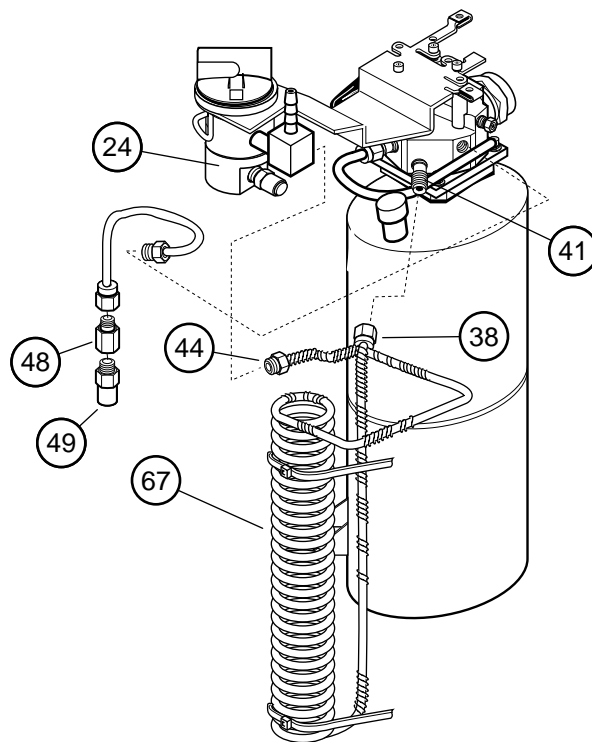


ILLUSTRATION FOR RP 22 & 23A

## RP23B –Breathing Coil R/R (Bottom Fill)

- Remove bottom, side, and top covers (RP 2, 3 and 4).
- Loosen the two compression fitting nuts (Item 44) from liquid withdrawal fitting (Item 41) and FCV (Item 24). Disconnect breathing coil (Item 67), being careful not to kink breathing coil or internal TEFLON tube.
- Loosen QDV tube (Item 56) nut.
- Loosen QDV jam nut (Item 58). Remove QDV (Item 62) from fill tube.
- Cut two cable ties holding coil in place. Remove breathing coil by sliding straight down from fill line. Be careful to properly remove breathing coil outlet from around top of dewar.
- To replace coil, reverse above procedure, tighten QDV jam nuts to 140-150 inch-lbs.

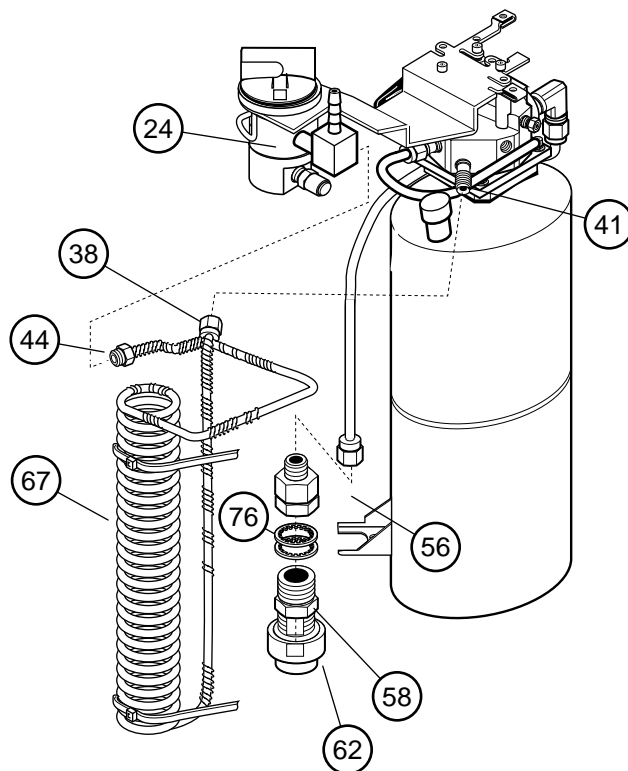
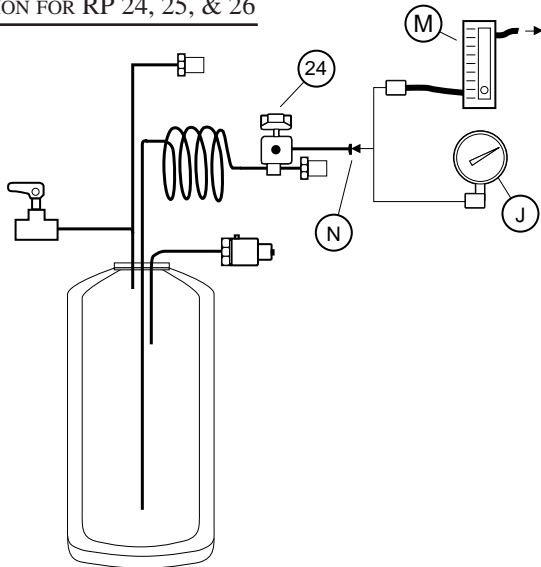


ILLUSTRATION FOR RP 23B



# X Repair Procedures

ILLUSTRATION FOR RP 24, 25, & 26



## RP24 – Flow Rate Testing

- Unit must be at least 1/2 full with correctly saturated LO<sub>2</sub>.
- Set FCV to 2 lpm setting and allow unit to operate for 20-60 minutes.
- Connect FCV outlet (Item N) to flowmeter inlet (Item M) with respiratory tubing. Make sure flowmeter outlet is open and unobstructed and flowmeter is properly positioned.
- Test flow rate at each FCV position. Record all flow rates.
- Flow rates must be nominal valves within tolerances listed in specification section of this manual or unit fails flow rate test.

NOTE: Be careful to allow for accuracy tolerances of flowmeter.

## RP25 – Operating Pressure Test

- Assemble pressure gauge and adapter assembly (Item J). Thread hose barb onto pressure gauge (use TEFLON tape). Push tubing onto hose barb and attach with clamp.
- Connect gauge assembly (Item J) to hose barb on FCV outlet (Item N). Open FCV (Item 24) to 6 lpm setting.
- Read operating pressure on pressure gauge.

NOTE: If testing operating pressure because of improper flow rates, test immediately after flow rate test.

- Operating pressure must be 18-22 psig or unit fails test.

## RP26 – Flowmeter Verification

- Flowmeter accuracy is best verified by calibration laboratory. Equipment should indicate liters per minute oxygen gas at 14.7 psia (0 psig) and 70 degrees F.
- Flowmeter accuracy may also be verified by comparison to one or more new, unused flowmeters. This method will increase confidence in accuracy of readings but not necessarily verify accuracy.

## RP27 – Case Cleaning

NOTE: Clean case only after unit is empty and warm. Do not clean in oxygen enriched atmosphere.

- Clean using household glass cleaner and lint-free cloth. Do not get glass cleaner inside case or onto any valves.
- Allow unit to dry thoroughly before using.

## RP28 – NER Test

- Fill unit following procedure found in POI.  
NOTE: Filling source must contain a minimum of 5 liters (2 LED's on Liberator) of properly saturated LO<sub>2</sub>.
- Push button and check that all 9 LED's are on.
- Check for leaks in QDV and vent valve.
- Let unit sit 16 to 18 hours.
- Make sure FCV and vent valves are closed.
- Do not move unit during this time.
- If four or more LED's (Stroller) are on after this time or any liquid remains in the Sprint, the unit passes. Maximum loss rate prior to dewar servicing is 1.75 lbs. / day.

## RP29 – Spring Scale Liquid Level Calibration

Note: Spring scale adjustments will only set the placement of the indicator and not the span (empty to full movement). The span adjustment is fixed by the design.

- Empty and warm portable unit (see RP14).
- Lift the portable by the strap (directly above the spring scale) and note the amount of misadjustment in the indicator.
- Use a flat blade screwdriver to adjust the internal spring scale calibration screw, which can be accessed at the base of the spring scale housing tube.
- Adjust the spring scale calibration screw until the empty red stripe indication is shown.
- Fill unit with liquid oxygen. Verify FULL green stripe indication is shown.

# Service Tools/Equipment/Supplies X

## Service Tools and Accessories available from CAIRE

### Required Tools

1. Hex Wrenches (various sizes)
2. Phillips Screwdriver
3. Flat Blade Screwdriver
4. 1/16" Nut Driver
5. 5/16" Nut Driver
6. 7/16" Nut Driver
7. 1/2" Open End Wrench
8. 9/16" Open End Wrench
9. 5/8" Open End Wrench
10. 1-1/4" Open End Wrench
11. Side Cutters
12. Pliers
13. Torque Driver/Wrench (5, 21-23, 40, 150 inch-lbs.)
14. Jeweler's Screwdriver

### Required Fixtures and Equipment

1. Capacitance Meter
2. Sur-Cal Simulator Box
3. Soldering Pencil
4. Oxygen Regulator/Hose Kit
5. Pressure Gauge
6. Pressure Gauge Adapter Assembly
7. Flowmeter
8. O<sub>2</sub> Gas Source (HP Bottle)
9. O<sub>2</sub> Liquid Source
10. N<sub>2</sub> Gas or Clean Dry Compressed Air Source
11. Tubing (O<sub>2</sub> compatible)
12. Vibrating Engraver

### Required Supplies

1. Stay-Clean Flux
2. Cotton Swabs
3. 60-40 Solid Wire Solder
4. Distilled Water
5. Household Glass Cleaner
6. Lint-Free Cloth
7. TEFLON Tape
8. Krytox
9. Leak Test Solution

## Part No Description

97112026	Female Side Fill Pneumatic Test Adapter
10679871	Male Top Fill Pneumatic Test Adapter
CA200071	Krytox 240 AC Lubricant
CA200072	"Snoop" Leak Detection Fluid (gallon)
97200076	Erie "Liter Meter"
CA400004	Replacement Filter/Male Transfer Line Adapter
97403577	0-60 psig Pressure Gauge
97217007	Pressure Gauge Adapter
97403016	Jeweler's Screwdriver
97403015	Capacitance Meter
97403574	Dewar Cap
97404539	Stroller Cart
97404564	Transfer Line Swivel Connector
97405147	0-45 psig Oxygen Regulator
97405177	Portable Carrying Handle
97405275	Wheelchair Bracket
97405277	Hand Truck w/o Chair Climber
97405278	Hand Truck w/ Chair Climber
97405279	Pneumatic Hose with DISS Fittings
97405590	Lip Seal Service Tool
10675765	Simulator Box Kit (Includes 10597921 & 10597912)
10597921	Sur-Cal 3™ Simulator Box w/Adapter
10597912	Sur-Cal 3™ Probe/Capacitance Meter Adapter
CA406308	150 psi Relief Valve Assembly
CA406310	TEFLON Tape
CA406398	150 psi Relief Valve only
97406471	Tandem Tee Kit
97405431	Liquid Oxygen Transfer Line – 6'
97406555	Super Flex Liquid Oxygen Transfer Line – 6'
97406630	Dual Fill Head Tee
10662631	Service Manual
10923600	Portable Carrying Bag

# XI Top Fill G3.0 Parts List

This section of the service manual contains lists and drawings useful in selecting Stroller or Sprint replacement parts and service equipment. The numbers encircled in the parts diagram on page 28 refer to specific replacement parts which are described on pages 26 and 27, section XI. Page 25 lists the special tools

and equipment required to service Strollers or Sprints, several of which are only available from CAIRE, Inc. All parts and equipment listed in this section can be purchased from CAIRE, Inc. The parts diagram on page 28 is an exploded view of a Stroller top fill unit.

Ref. No.	Part Number Stroller TF	Part Number Sprint TF	Description	Quantity
—	10564109	—	Stroller Top Fill Complete .....	A/R
—	—	10564096	Sprint Top Fill Complete .....	A/R
1	10542081	10542081	Dome, Blue .....	1
2	CA403406	CA403406	Lens, Meter .....	1
3	10578076	10578076	Decal, Meter .....	1
4	CA110060	CA110060	Battery .....	1
6	10577891	10577891	Screw, #4 .....	2
7	CA110079	CA110079	Washer, #4 .....	2
8	CA002305	CA002305	Screw, #6 .....	3
9	10856072	10855993	Sur-Cal 3™ Gen. 3 (includes lens & decal) .....	1
10	10564310	10564328	Cover, Top .....	1
11	10727561	10727561	Handle w/pin .....	1
12	10564361	10564361	Plug QDV, Blue .....	1
13	10665479	10665461	Case, Blue .....	1
14	10597904	10597904	Terminal, Male Spade .....	1
15	10621986	10621986	Screw, #8 .....	2
16	10564248	10564248	Vent Valve .....	1
17	10542209	10542209	Pad, Condensate .....	1
18	10542057	10542057	Cup, Condensate .....	1
19	11033895	11033836	Dewar .....	1
20	10542153	10542153	Knob .....	1
21	CA406436	CA406436	Decal, Flowrate .....	1
22	CA002876	CA002876	Screw, #6 .....	2
23	CA110071	CA110071	Rivet, Flow Lock .....	1
24	10665444	10665444	FCV Assembly RMI (includes bracket) .....	1
25	10542217	10542217	FCV Strap Bracket (RMI) .....	1
24	10665452	10665452	FCV Assembly (includes bracket) .....	1
25	10601432	10601432	FCV Strap Bracket .....	1
26	CA406438	CA406438	Lock Plate .....	1
27	CA405232	CA405232	Set Screw, Knob .....	1
28	10665436	10665428	Bracket Assembly .....	1
29	CA002305	CA002305	Screw, #6 .....	3
30	CA404996	CA404996	Washer, Lock #6 .....	1
31	CA404853	CA404853	Screw, #6 .....	4
32	CA404995	CA404995	Washer, Flat #6 .....	4
33	10665399	10665381	Manifold Assembly .....	1
34	CA404996	CA404996	Washer, Lock #6 .....	4
38	CA405087	CA405087	Nut, Tube 3/16" .....	1
40	10775820	10775820	Positioner, Handle .....	1
42	CA003830	CA003830	O-Ring, SRV .....	1
43	10491253	10491253	Relief Valve Secondary .....	1
44	CA404841	CA404841	Fitting, 3/16" Tube .....	1
45	CA405079	CA405079	Ferrule, 3/16" Tube .....	1

# Top Fill Parts List XI

Ref. No.	Part Number Stroller TF	Part Number Sprint TF	Description	Quantity
46	10656185	10656177	Tube, PRV .....	1
47	10665330	10656142	Vent Line .....	1
48	CA405446	CA405446	Connector w/Filter and Orifice.....	1
49	10528423	10528423	Relief Valve Primary .....	1
50	CA110033	CA110033	Grommet, Nylatch .....	1
51	CA110034	CA110034	Plunger, Nylatch .....	1
52	10665284	10665284	Feed-Thru Assembly .....	1
53	10501319	10501319	Elbow, Fill 90° .....	1
54	10760273	10760273	Nut, Tube 1/4" .....	1
55	CA405074	CA405074	Ferrule, Rear 1/4" .....	1
56	CA405072	CA405072	Ferrule, Front 1/4" .....	1
57	10656100	10656100	Fitting, Inlet QDV .....	1
58	10656097	10656097	Nut, Jam QDV .....	2
59	10656118	10656126	Tube, Fill .....	1
60	10656054	10656054	Ring, Retaining.....	1
61	10665292	10665292	Poppet, QDV .....	1
62	10665321	10665321	Body, QDV .....	1
63	10656071	10656071	Seal, Cap.....	1
64	CA110104	CA110104	Seal, Lip.....	1
65	10665313	10665313	Nosepiece, QDV .....	1
66	10564900	10564580	Label Set.....	1
67	10656169	10656151	Coil, Vaporizer .....	1
68	CA403730	CA403730	Strap, Coil.....	2
69	10579423	10579423	O-Ring .....	1
70	10584951	10584951	Strap Assembly, Complete .....	1
71	CA403182	CA403182	Button, Switch .....	1
72	CA406301	CA406301	Switch Jam Nut.....	1
73	10490381	10490381	Switch Lock Washer.....	1
76	10712052	10712052	Lockwasher QDV .....	2
77	10775838	10775838	Set Screw #4 .....	1
78	10721581	10721581	Clip, Strap.....	1
79	10656011	10656011	Strap, 5-1/2" .....	1
80	10566420	10566420	QDV Assy .....	1



# Side Fill G3.0 Parts List XI

This section of the service manual contains lists and drawings useful in selecting Stroller or Sprint replacement parts and service equipment. The numbers encircled in the parts diagram on page 31 refer to specific replacement parts which are described on pages 29-30, section XI. Page 25 lists the special tools and

equipment required to service Strollers or Sprints, several of which are only available from CAIRE, Inc. All parts and equipment listed in this section can be purchased from CAIRE, Inc. The parts diagram on page 31 is an exploded view of a Stroller side fill unit.

Ref. No.	Part Number Stroller SF	Part Number Sprint SF	Description	Quantity
—	10564125	—	Stroller Side Fill Complete .....	A/R
—	—	10564117	Sprint Side Fill Complete .....	A/R
1	10542081	10542081	Dome, Blue.....	1
2	CA403406	CA403406	Lens, Meter.....	1
3	10578076	10578076	Decal, Meter .....	1
4	CA110060	CA110060	Battery .....	1
6	10577891	10577891	Screw, #4 .....	2
7	CA110079	CA110079	Washer, #4 .....	2
8	CA002305	CA002305	Screw, #6 .....	3
9	10856072	10855993	Sur-Cal 3™ Gen.3 (includes lens & decal) .....	1
10	10564310	10564328	Cover, Top .....	1
11	10542137	10542137	Tunnel, QDV .....	1
12	10727561	10727561	Handle w/pin .....	1
13	10665479	10665461	Case, Blue .....	1
14	10597904	10597904	Terminal, Male Spade .....	1
15	10621986	10621986	Screw, #8 .....	2
16	10564248	10564248	Vent Valve .....	1
17	10542209	10542209	Pad, Condensate .....	1
18	10542057	10542057	Cup, Condensate .....	1
19	11033895	11033836	Dewar .....	1
20	10542153	10542153	Knob .....	1
21	CA406436	CA406436	Decal, Flowrate.....	1
22	CA002876	CA002876	Screw, #6 .....	2
23	CA110071	CA110071	Rivet, Flow Lock .....	1
24	10665444	10665444	FCV Assembly RMI (includes bracket) .....	1
25	10542217	10542217	FCV Strap Bracket (RMI) .....	1
24	10665452	10665452	FCV Assembly (includes bracket).....	1
25	10601432	10601432	FCV Strap Bracket .....	1
26	CA406438	CA406438	Lock Plate .....	1
27	CA405232	CA405232	Set Screw, Knob .....	1
28	10665436	10665428	Bracket Assembly.....	1
29	CA002305	CA002305	Screw, #6 .....	3
30	CA404996	CA404996	Washer, Lock #6.....	1
31	CA404853	CA404853	Screw, #6 .....	4
32	CA404995	CA404995	Washer, Flat #6.....	4
33	10665410	10665401	Manifold Assembly .....	1
34	CA404996	CA404996	Washer, Lock #6.....	4
35	10665372	10665372	Poppet .....	1
36	CA404838	CA404838	O-Ring .....	1
37	10665364	10665364	Body, Male QDV.....	1
38	CA405087	CA405087	Nut, Tube 3/16" .....	1
39	10665356	10665348	Tube, Vent .....	1
40	10775820	10775820	Positioner, Handle .....	1
42	CA003830	CA003830	O-Ring, SRV.....	1
43	10491253	10491253	Relief Valve Secondary .....	1

# XI Side Fill Parts List

Ref. No.	Part Number Stroller SF	Part Number Sprint SF	Description	Quantity
44	CA404841	CA404841	Fitting, 3/16" Tube.....	1
45	CA405079	CA405079	Ferrule, 3/16" Tube.....	1
46	10656185	10656177	Tube, PRV .....	1
48	CA405446	CA405446	Connector w/Filter and Orifice.....	1
49	10528423	10528423	Relief Valve Primary .....	1
50	CA110033	CA110033	Grommet, Nylatch .....	1
51	CA110034	CA110034	Plunger, Nylatch .....	1
52	10665284	10665284	Feed-Thru Assembly .....	1
53	CA404936	CA404936	Hex Coupler.....	1
66	10564900	10564580	Label Set .....	1
67	10656169	10656151	Coil, Vaporizer .....	1
68	CA403730	CA403730	Strap, Coil .....	2
69	10579423	10579423	O-Ring .....	1
70	10584951	10584951	Strap Assembly, Complete .....	1
71	CA403182	CA403182	Button, Switch .....	1
72	CA406301	CA406301	Switch Jam Nut.....	1
73	10490381	10490381	Switch Lock Washer.....	1
77	10775838	10775838	Set Screw #4 .....	1
78	10721581	10721581	Clip, Strap .....	1
79	10656011	10656011	Strap, 5-1/2" .....	1
80	10577866	10577866	QDV Assy.....	1





# XI Top Fill G3.1 & 3.2 Parts List

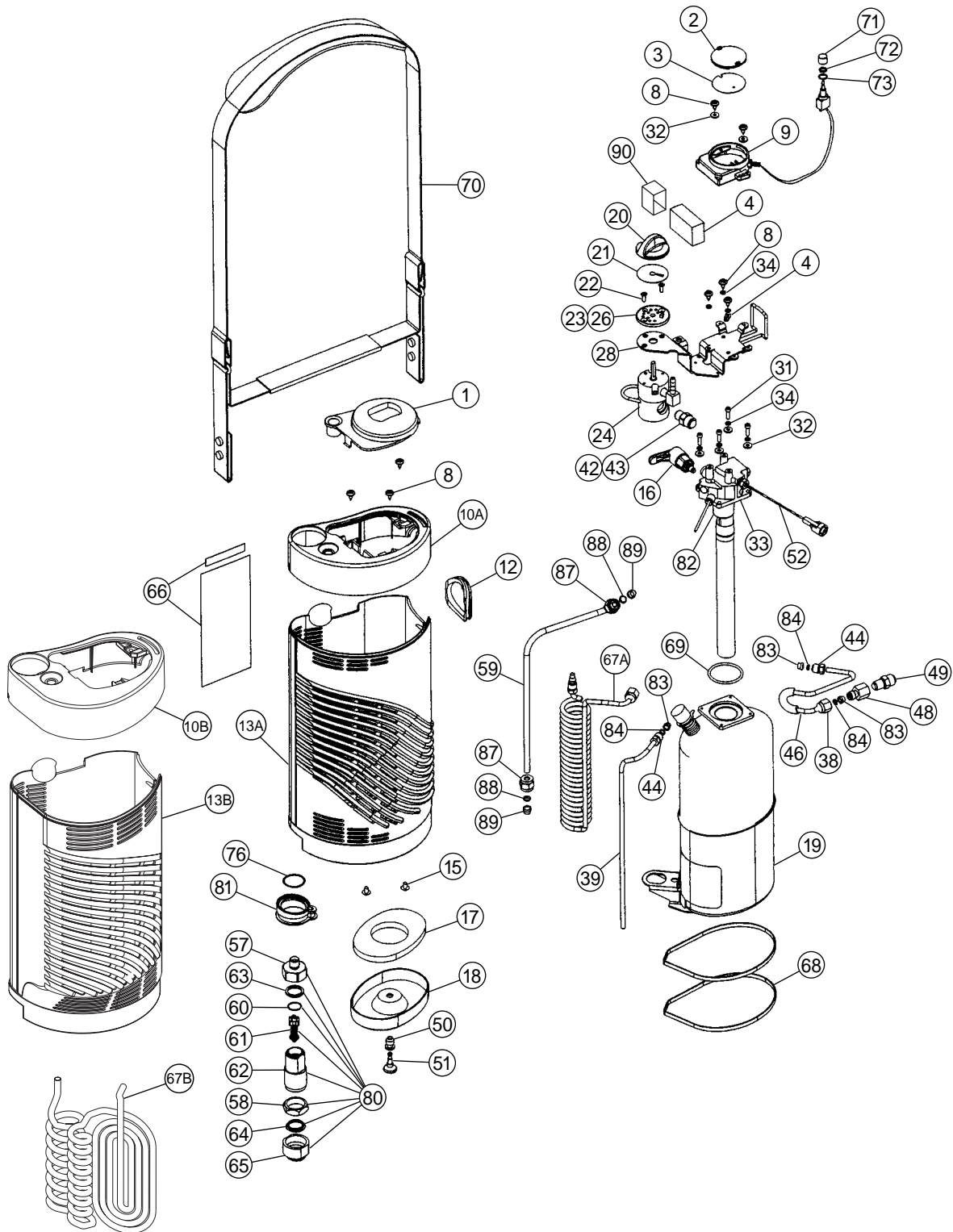
Ref. No.	Part Number Stroller TF	Part Number Sprint TF	Description	Quantity
–	10564109	–	Stroller Top Fill Complete	A/R
–	–	10564096	Sprint Top Fill Complete	A/R
1	10815801	10815801	Dome Gauge Electric Blue	1
2	CA403406	CA403406	Lens Twist Lock Meter	1
3	10578076	10578076	Decal Meter International Gen. 3	1
4	CA110060	CA110060	Battery 9 Volt 312/PK	1
8	CA002305	CA002305	PHPNHMS SS #6-32*3/8"LG	8
9	10856072	10855993	LED Meter Gen. 3.1 Kit	1
10A	10564310	10564328	Cover Top Blue	1
10B	11668313	—	Cover Top Blue 1.2L G3.2	1
12	10564361	10564361	Plug QDV (Blue)	1
13A	10665479	10665461	Case Assembly Blue	1
13B	11891099	—	Case Assembly Blue 1.2L G3.2	1
14	10597904	10597904	Terminal Male Spade – Portable	1
15	10621986	10621986	PHTHMS SS #8-32*1/4"LG	2
16	10564248	10564248	Valve Vent	1
17	10542209	10542209	Pad Condensate Gen. 3.1	1
18	10542057	10542057	Cup Condensate – Blue	1
19	11033895	11033836	Dewar (Domestic)	1
20	10542153	10542153	Knob FCV Portable Gen. 3	1
21	CA406436	CA406436	Decal Flow Rate	1
22	CA002876	CA002876	PHFHMS SS #6-32*.500"LG	2
23	CA110071	CA110071	Rivet, Flow Lock	1
24	10580424	10580424	FCV 20 PSI 0-6 LPM G3 (Side Inlet)	1
24	11014521	11014521	FCV 20 PSI 0-6 LPM G3 (Bottom Inlet)	1
26	CA406438	CA406438	Lock Plate	1
28	10861576	10861568	Top Bracket Assembly	1
31	CA404853	CA404853	SHCS SS #6-32*7/16"LG	4
32	CA404995	CA404995	Washer #6 ANSI Type A Plain	6
33	10665399	10665381	Manifold Assembly TF LED	1
34	CA404996	CA404996	Washer Lock SS #6	7
38	CA006292	CA006292	Nut Tube BRS 3/16 Gyrolok	2
39	10665330	10656142	Vent Outlet TF	1
42	CA003830	CA003830	O-Ring SRV	1
43	10491253	10491253	RV AL 30 PSI 7/16-20	1
44	CA404841	CA404841	Fitting Feed Thru	3
46	10656185	10656177	PRV Coil	1
48	10932098	10932098	Fitting Orifice/Filter Assembly	1
49	10528423	10528423	RV AL 20 PSI 1/8MPT	1

# Top Fill G3.1 & 3.2 Parts List XI

Ref. No.	Part Number Stroller TF	Part Number Sprint TF	Description	Quantity
50	CA110033	CA110033	Grommet Nylatch	1
51	CA110034	CA110034	Plunger Nylatch	1
52	10665284	10665284	Feed Thru Harness Assembly	1
57	10656100	10656100	Inlet Fitting TF QDV	1
58	10656097	10656097	Jam Nut QDV	1
59	10656118	10656126	QDV Fill Tube TF	1
60	10656054	10656054	Retaining Ring TF QDV	1
61	10665292	10665292	Poppet Assy TF QDV	1
62	10665321	10665321	Body TF QDV	1
63	10656071	10656071	Seal QDV Inlet Fitting	1
64	CA110104	CA110104	Lip Seal QDV	1
65	10655313	10655313	Nosepiece TF QDV	1
66	10564900	10564580	Label Set (English)	1
67	10656169	10656151	Vaporizer Coil G3.1 (Side Inlet)	1
67A	11033107	11033086	Vaporizer Coil G3.1 (Bottom Inlet)	1
67B	11891064	—	Vaporizer Coil 1.2L G3.2 (Bottom Inlet)	1
68	CA403730	CA403730	Coil Strap	2
69	10579423	10579423	O-Ring	1
70	10849569	10849569	Strap Assembly	1
71	10484432	10484432	Cap Push Button Green	1
72	CA406301	CA406301	Jam Nut Switch	1
73	10490381	10490381	Lock Washer Switch	1
76	10712052	10712052	Lockwasher TF QDV	1
80	10566420	10566420	QDV Female TF PB	1
80*	10743650	10743650	QDV Male TF Cryo-2 (*Not Shown)	1
80*	10743668	10743668	QDV Female TF Penox (*Not Shown)	1
81	10935117	10935117	Plug Portable TF	1
82	10656193	10656193	Heat Shield Assembly	1
83	CA006191	CA006191	Ferrule BRS 3/16 Front	5
84	CA006192	CA006192	Ferrule BRS 3/16 Rear	5
87	10760273	10760273	Nut Tube BRS 1/4	2
88	CA405074	CA405074	Ferrule BRS 1/4 Rear	2
89	CA405072	CA405072	Ferrule BRS 1/4 Front	2
—	10564387	10564387	POI TF Gen. 3 (English)	1
—	10565013	10564013	Canton Support Portable Gen. 3	2
—	10728396	10728396	Canton Support Pad	2
—	10491878	10491878	Canton Shipping Portable	1
90	11040690	—	Batteru Cover G3.2	1

# XI Parts Illustration

TOP FILL GEN 3.1 & 3.2



# Side Fill G3.1 & 3.2 Parts List XI

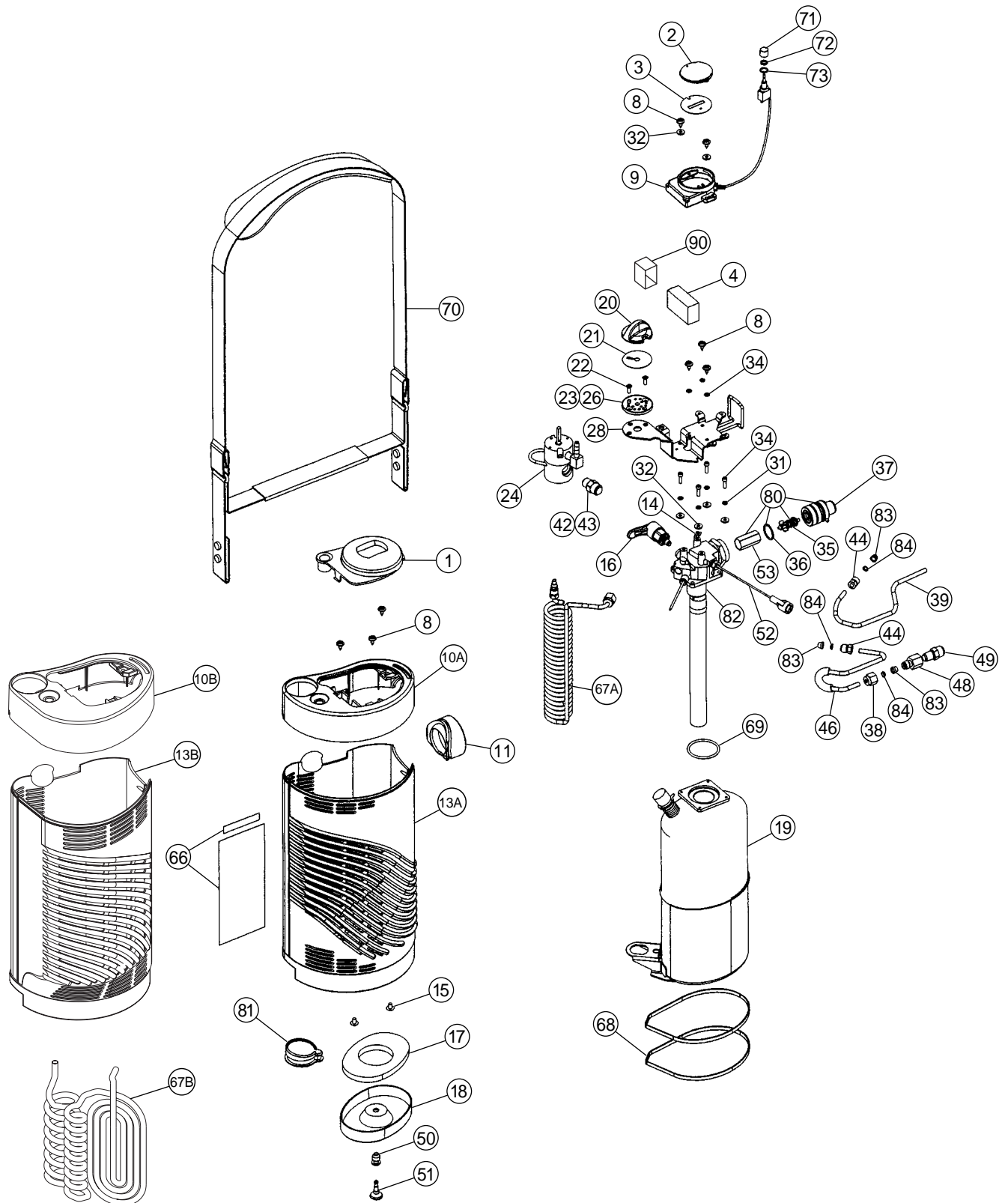
Ref. No.	Part Number Stroller SF	Part Number Sprint SF	Description	Quantity
–	10564125	–	Stroller Side Fill Complete	A/R
–	–	10564117	Sprint Side Fill Complete	A/R
1	10815801	10815801	Dome Gauge Electric Blue	1
2	CA403406	CA403406	Lens Twist Lock Meter	1
3	10578076	105788076	Decal Meter International Gen. 3	1
4	CA110060	CA110060	Battery 9 Volt 312/PK	1
8	CA002305	CA002305	PHPNHMS SS #6-32*3/8"LG	8
9	10856072	10855993	LED Meter Gen. 3.1 Kit	1
10A	10564310	10564328	Cover Top Blue	1
10B	11668313	—	Cover Top Blue 1.2L G3.2	1
11	10542137	10542137	Tunnel QDV CA-Clear	1
13A	10665479	10665461	Case Assembly Blue	1
13B	11891099	—	Case Assembly Blue 1.2L G3.2	1
14	10597904	10597904	Terminal Male Spade – Portable	1
15	10621986	10621986	PHTHMS SS #8-32*1/4"LG	2
16	10564248	10564248	Valve Vent	1
17	10542209	10542209	Pad Condensate Gen. 3.1	1
18	10542057	10542057	Cup Condensate – Blue	1
19	11033895	11033836	Dewar 0.6L (Domestic)	1
20	10542153	10542153	Knob FCV Portable Gen. 3	1
21	CA406436	CA406436	Decal Flow Rate	1
22	CA002876	CA002876	PHFHMS SS #6-32*.500"LG	2
23	CA110071	CA110071	Rivet, Flow Lock	1
24	10580424	10580424	FCV 20 PSI 0-6 LPM G3 (Side Inlet)	1
24	11014521	11014521	FCV 20 PSI 0-6 LPM G3 (Bottom Inlet)	1
26	CA406438	CA406438	Lock Plate	1
28	10861576	10861568	Top Bracket Assembly	1
31	CA404853	CA404853	SHCS SS #6-32*7/16"LG	4
32	CA404995	CA404995	Washer #6 ANSI Type A Plain	6
33	10665410	10665401	Manifold Assembly SF LED	1
34	CA404996	CA404996	Washer Lock SS #6	7
35	10665372	10665372	Poppet Assy SF QDV	1
36	CA404838	CA404838	O-Ring SF QDV	1
37	10665364	10665364	Body Male SF QDV	1
38	CA006292	CA006292	Nut Tube BRS 3/16 Gyrolok	2
39	10665356	10665348	Vent Outlet SF	1
42	CA003830	CA003830	O-Ring SRV	1
43	10491253	10491253	RV AL 30 PSI 7/16-20	1
44	CA404841	CA404841	Fitting Feed Thru	3

# XI Side Fill G3.1 & 3.2 Parts List

Ref. No.	Part Number Stroller SF	Part Number Sprint SF	Description	Quantity
46	10656185	10656177	PRV Coil	1
48	10932098	10932098	Fitting Orifice/Filter Assembly	1
49	10528423	10528423	RV AL 20 PSI 1/8MPT	1
50	CA110033	CA110033	Grommet Nylatch	1
51	CA110034	CA110034	Plunger Nylatch	1
52	10665284	10665284	Feed Thru Harness Assembly	1
53	CA404936	CA404936	Hex Coupler SF QDV	1
66	10564900	10564580	Label Set (English)	1
67	10656169	10656151	Vaporizer Coil G3 (Side Inlet)	1
67A	11033107	11033086	Vaporizer Coil G3 (Bottom Inlet)	1
67B	11891064	—	Vaporizer Coil 1.2L G3.2 (Bottom Inlet)	1
68	CA403730	CA403730	Coil Strap	2
69	10579423	10579423	O-Ring	1
70	10849569	10849569	Strap Assembly	1
71	10484432	10484432	Cap Push Button Green	1
72	CA406301	CA406301	Jam Nut Switch	1
73	10490381	10490381	Lock Washer Switch	1
80	10577866	10577866	QDV Male Side Fill	1
81	10821363	10821363	Plug Portable Bottom Cover	1
82	10656193	10656193	Heat Shield Assembly	1
83	CA006191	CA006191	Ferrule BRS 3/16 Front	5
84	CA006192	CA006192	Ferrule BRS 3/16 Rear	5
—	10564379	10564379	POI SF Gen. 3 (English)	1
—	10565013	10565013	Canton Support Portable Gen. 3	2
—	10728396	10728396	Canton Support Pad	2
—	10491878	10491878	Canton Shipping Portable	1
90	11040690	—	Battery Cover G3.2	1

# Side Fill G3.1 & 3.2 Parts Illustration XI

SIDE FILL GEN 3.1 & 3.2



# XI Top Fill G3.1 & 3.2 (Scale) Parts List

Ref. No.	Part Number Stroller TF	Part Number Sprint TF	Description	Quantity
–	10997991	–	Stroller Top Fill Spring Scale Complete	A/R
–	–	11493074	Sprint Top Fill Spring Scale Complete	A/R
1	11199511	11199511	Dome Gauge Scale Blue	1
8	CA002305	CA002305	PHPNHMS SS #6-32*3/8"LG	6
10A	10564310	10564328	Cover Top Blue	1
10B	11668313	—	Cover Top Blue 1.2L G3.2	1
12	10564361	10564361	Plug QDV (Blue)	1
13A	10665479	10665461	Case Assembly Blue	1
13B	11891099	—	Case Assembly Blue 1.2L G3.2	1
15	10621986	10621986	PTHMS SS #8-32*1/4"LG	2
16	10564248	10564248	Valve Vent	1
17	10542209	10542209	Pad Condensate Gen. 3.1	1
18	10542057	10542057	Cup Condensate – Blue	1
19	11033895	11033836	Dewar (Domestic)	1
20	10542153	10542153	Knob FCV Portable Gen. 3	1
21	CA406436	CA406436	Decal Flow Rate	1
22	CA002876	CA002876	PHFHMS SS #6-32*.500"LG	2
23	CA110071	CA110071	Rivet, Flow Lock	1
24	10580424	10580424	FCV 20 PSI 0-6 LPM G3 (Side Inlet)	1
24	11014539	11014539	FCV 20 PSI 0-6 LPM G3 (Bottom Inlet)	1
26	CA406438	CA406438	Lock Plate	1
28	10861576	10861568	Top Bracket Assembly	1
31	CA404853	CA404853	SHCS SS #6-32*7/16"LG	4
32	CA404995	CA404995	Washer #6 ANSI Type A Plain	4
33	11037546	11193151	Manifold Assembly TF Scale	1
34	CA404996	CA404996	Washer Lock SS #6	7
38	CA006292	CA006292	Nut Tube BRS 3/16 Gyrolok	2
39	10665330	10656142	Vent Outlet TF	1
43	10491253	10491253	RV AL 30 PSI 1/8MPT	1
44	CA404841	CA404841	Fitting Feed Thru	3
46	10656185	10656177	PRV Coil	1
48	10932098	10932098	Fitting Orifice/Filter Assembly	1
49	10528423	10528423	RV AL 20 PSI 1/8MPT	1
50	CA110033	CA110033	Grommet Nylatch	1
51	CA110034	CA110034	Plunger Nylatch	1
57	10656100	10656100	Inlet Fitting TF QDV	1
58	10656097	10656097	Jam Nut QDV	1
59	10656118	10656126	QDV Fill Tube TF	1
60	10656054	10656054	Retaining Ring TF QDV	1
61	10665292	10665292	Poppet Assy TF QDV	1

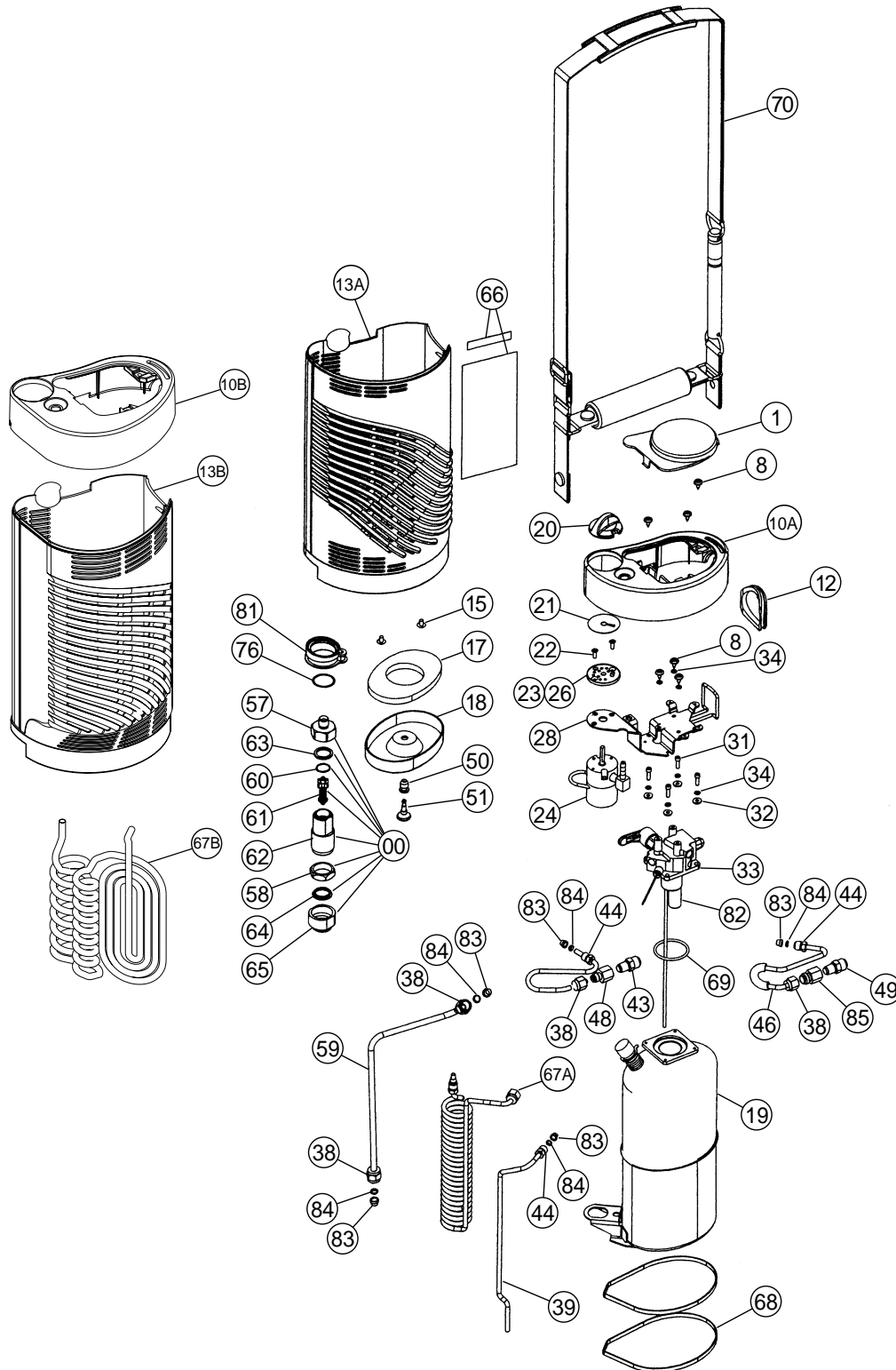
# Top Fill G3.1 & 3.2 (Scale) Parts List XI

Ref. No.	Part Number StrollerTF	Part Number Sprint TF	Description	Quantity
62	10665321	10665321	Body TF QDV	1
63	10656071	10656071	Seal QDV Inlet Fitting	1
64	CA110104	CA110104	Lip Seal QDV	1
65	10655313	10655313	Nosepiece TF QDV	1
66	10564900	10564580	Label Set (English)	1
67	10656169	10656151	Vaporizer Coil G3.1 (Side Inlet)	1
67A	11033107	11033086	Vaporizer Coil G3.1 (Bottom Inlet)	1
67B	11891064	—	Vaporizer Coil 1.2L G3.2 (Bottom Inlet)	1
68	CA403730	CA403730	Coil Strap	2
69	10579423	10579423	O-Ring	1
70	10985780	11013085	Strap Assembly	1
76	10712052	10712052	Lockwasher TF QVD	1
80	10566420	10566420	QDV Female TF PB	1
80*	10743650	10743650	QDV Male TF Cryo-2 (*Not Shown)	1
80*	10743668	10743668	QDV Female TF Penox (*Not Shown)	1
81	10935117	10935117	Plug Portable TF	1
82	10656193	10656193	Heat Shield Assembly	1
83	CA006191	CA006191	Ferrule BRS 3/16 Front	5
84	CA006192	CA006192	Ferrule BRS 3/16 Rear	5
85	CA405446	CA405446	Fitting Orifice/Filter Assembly	1
86	11037562	11037562	SRV Tube	1
87	10760273	10760273	Nut Tube BRS 1/4	2
88	CA405074	CA405074	Ferrule BRS 1/4 Rear	2
89	CA405072	CA405072	Ferrule BRS 1/4 Front	2
—	10564387	10564387	POI TF Gen. 3 (English)	1
—	10997983	10997983	POI Insert Spring Scale	1
—	10565013	10565013	Canton Support Portable Gen. 3	2
—	10728396	10728396	Canton Support Pad	2
—	10491878	10491878	Canton Shipping Portable	1



# XI Parts Illustration

TOP FILL G3.1 & 3.2 (SCALE)



# Side Fill G3.1 & 3.2 (Scale) Parts List XI

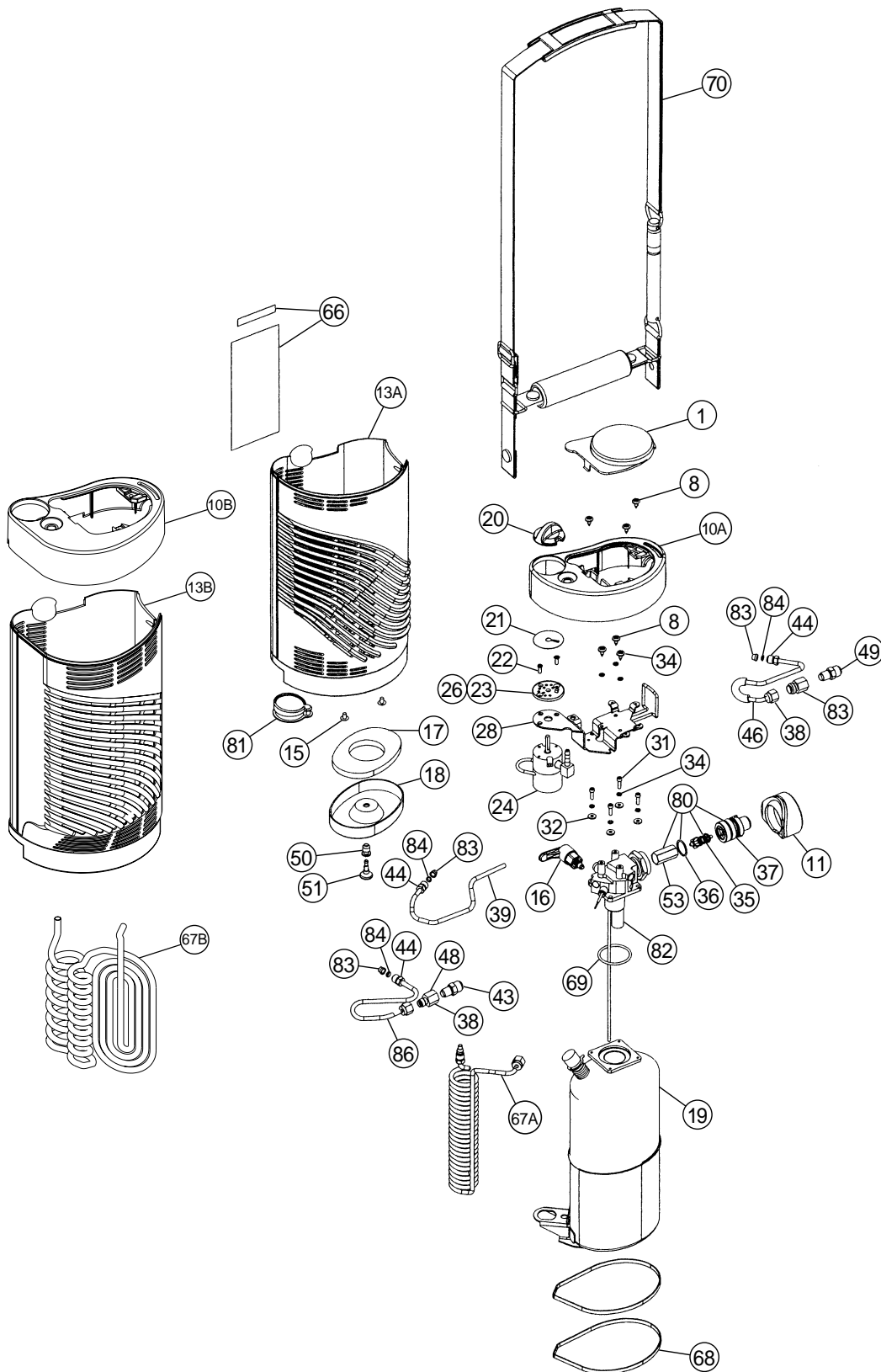
Ref. No.	Part Number Stroller SF	Part Number Sprint SF	Description	Quantity
–	10998054	–	Stroller Side Fill Spring Scale Complete	A/R
–	–	TBD	Sprint Side Fill Spring Scale Complete	A/R
1	11199511	11199511	Dome Gauge Scale Blue	1
8	CA002305	CA002305	PHPNHMS SS #6-32*3/8"LG	6
10A	10564310	10564328	Cover Top Blue	1
10B	11668313	—	Cover Top Blue 1.2L G3.2	1
11	10542137	10542137	Tunnel QDV CA-Clear	1
13A	10665479	10665461	Case Assembly Blue	1
13B	11891099	—	Case Assembly Blue 1.2L G3.2	1
15	10621986	10621986	PHTHMS SS #8-32*1/4"LG	2
16	10564248	10564248	Valve Vent	1
17	10542209	10542209	Pad Condensate Gen. 3.1	1
18	10542057	10542057	Cup Condensaate – Blue	1
19	11033895	11033836	Dewar 0.6L (Domestic)	1
20	10542153	10542153	Knob FCV Portable Gen. 3	1
21	CA406436	CA406436	Decal Flow Rate	1
22	CA002876	CA002876	PHFHMS SS #6-32*.500"LG	2
23	CA110071	CA110071	Rivet Flow Lock	1
24	10580424	10580424	FCV 20 PSI 0-6 LPM G3 (Side Inlet)	1
24	11014539	11014539	FCV 20 PSI 0-6 LPM G3 (Bottom Inlet)	1
26	CA406438	CA406438	Lock Plate	1
28	10861576	10861568	Top Bracket Assembly	1
31	CA404853	CA404853	SHCS SS #6-32*7/16"LG	4
32	CA404995	CA404995	Washer #6 ANSI Type A Plain	4
33	11037554	11193143	Manifold Assembly SF Scale	1
34	CA404996	CA404996	Washer Lock SS #6	7
35	10665372	10665372	Poppet Assy SF QDV	1
36	CA404838	CA404838	O-Ring SF QDV	1
37	10665364	10665364	Body Male SF QDV	1
38	CA006292	CA006292	Nut Tube BRS 3/16 Gyrolok	2
39	10665356	1065348	Vent Outlet SF	1
43	10491288	10491288	RV AL 30 PSI 1/8MPT	1
44	CA404841	CA404841	Fitting Feed Thru	3
46	10656185	10656177	PRV Coil	1
48	10932098	10932098	Fitting Orifice/Filter Assembly	1
49	10528423	10528423	RV AL 20 PSI 1/8MPT	1
50	CA110033	CA110033	Grommet Nylatch	1
51	CA110034	CA110034	Plunger Nylatch	1
53	CA404936	CA404936	Hex Coupler SF QDV	1

# XI Side Fill G3.1 & 3.2 (Scale) Parts List

Ref. No.	Part Number Stroller SF	Part Number Sprint SF	Description	Quantity
66	10564900	10564580	Label Set (English)	1
67	10656169	10656151	Vaporizer Coil G3 (Side Inlet)	1
67A	11033107	11033086	Vaporizer Coil G3 (Bottom Inlet)	1
67B	11891064	—	Vaporizer Coil 1.2L G3.2 (Bottom Inlet)	1
68	CA403730	CA403730	Coil Strap	2
69	10579423	10579423	O-Ring	1
70	10985780	11013085	Strap Assembly	1
80	10577866	10577866	QDV Male Side Fill	1
81	10821363	10821363	Plug Portable Bottom Cover	1
82	10656193	10656193	Heat Shield Assembly	1
83	CA006191	CA006191	Ferrule BRS 3/16 Front	5
84	CA006192	CA006192	Ferrule BRS 3/16 Rear	5
85	CA405446	CA405446	Fitting Orifice/Filter Assembly	1
86	11037562	11037562	SRV Tube	1
—	10564379	10564379	POI SF Gen. 3 (English)	1
—	10997983	10997983	POI Insert Spring Scale	1
—	10565013	10565013	Canton Support Portable Gen. 3	2
—	10728396	10728396	Canton Support Pad	2
—	10491878	10491878	Canton Shipping Portable	1

# Parts Illustration XI

SIDE FILL G3.1 & 3.2 (SCALE)



# XI Ordering Information

## Ordering Information

The following steps should be used when ordering a new Stroller or Sprint, or replacement parts for an existing unit:

1. **Compile a list of all equipment and replacement parts to be ordered.** An exploded view of assemblies for easy parts identification, along with parts/price lists can be found in this section of the Stroller/Sprint portion of this manual.

NOTE: Use the following numbers to order a complete unit:

<b>Sprint</b> Top Fill P/N10564096	<b>Stroller</b> Top Fill P/N10564109
<b>Sprint</b> Side Fill P/N10564117	<b>Stroller</b> Side Fill P/N10564125

2. **Fill out a purchase order containing the following information:**
  - a. Purchase order number.
  - b. Name and address of billing location.
  - c. Name and address of shipping location.
  - d. Quantity, part number, description, and unit cost for each item ordered.

## XII Return Policy

When a Stroller or Sprint is received, it should be inspected immediately, as outlined in Section VII, Unpacking and Setup Instructions.

If a problem with the unit should be encountered, reference should be made to the Troubleshooting Chart in Section X, page 12-13. If these procedures do not provide a solution for the problem, the following steps should be taken:

1. Call CAIRE, using one of the toll-free numbers, and request a Medical Technical Service Representative. State the problem with the unit. If it is determined that the problem cannot be solved by the distributor, a "Return Authorization Number" will be assigned to the unit or part(s). If a Purchase Order Number is to be referenced, please give this number to the Customer Service Representative at that time.
2. Carefully package the parts, or repack the unit in its original shipping container, precisely as shipped.
3. Write the Return Authorization Number on the top of the shipping container.
4. Return the unit or parts by professional carrier to:

**CAIRE, Inc.**  
**3505 County Road 42 West**  
**Burnsville, MN 55306-3803, USA**

All equipment returned to CAIRE must be shipped "prepaid".

3. **Telephone or fax CAIRE at one of the numbers listed below to begin immediate processing of the order:**

Toll Free Phone (U.S.A.): 1-800-48 CAIRE  
(1-800-482-2473)

Toll Free Fax (U.S.A.) 1-888-WE CAIRE  
(To place an order): (1-888-932-2473)

Phone: 1-952-882-5000

Fax: 1-952-882-5178

4. **Mail or fax the completed purchase order for confirmation to:**

CAIRE, Inc  
3505 County Road 42 West  
Burnsville, MN 55306-3803

All new equipment will be shipped either "prepaid", F.O.B. Burnsville, or collect, via your specified carrier. All replacement parts will be sent by UPS "prepaid", and the shipping charges for equipment and parts will be added to the final invoice. Payment for replacement parts is CAIRE invoice date. All shipments will originate from Burnsville, Minnesota. If a particular carrier or method of shipment is desired, specify when placing order.

When the defective item(s) is received at CAIRE, it will be serviced and returned to the distributor as soon as possible. A copy of the "Repair Cost Sheet" will be enclosed giving a detailed listing of any maintenance performed.

### Restocking Policy

If it becomes necessary to cancel an order with CAIRE after the shipment has been received, use the following "Restock Policy" procedure:

1. Notify the Customer Service Department at CAIRE using one of the toll-free numbers. When contacting Customer Service personnel, it will be necessary to relay the following information:
  - a. State the quantity and description of equipment to be returned.
  - b. Give the Serial Number of each unit to be returned.
  - c. State the equipment purchase date.
2. A Return Authorization Number will be issued in the name of the distributor by CAIRE for the equipment to be returned. When the equipment is shipped to the factory, the Return Authorization Number must appear on the packing slip.
3. All equipment must be returned "prepaid" to:

**CAIRE, Inc.**  
**3505 County Road 42 West**  
**Burnsville, MN 55306-3803, USA**

4. Finally, a "Credit Memo", will be issued to the distributor when all equipment has been received, inspected, and restocked by CAIRE.



CAIRE® INC.

3505 County Road 42 West  
Burnsville, MN 55306-3803, USA

Ref 10662631 Rev J 3/04

