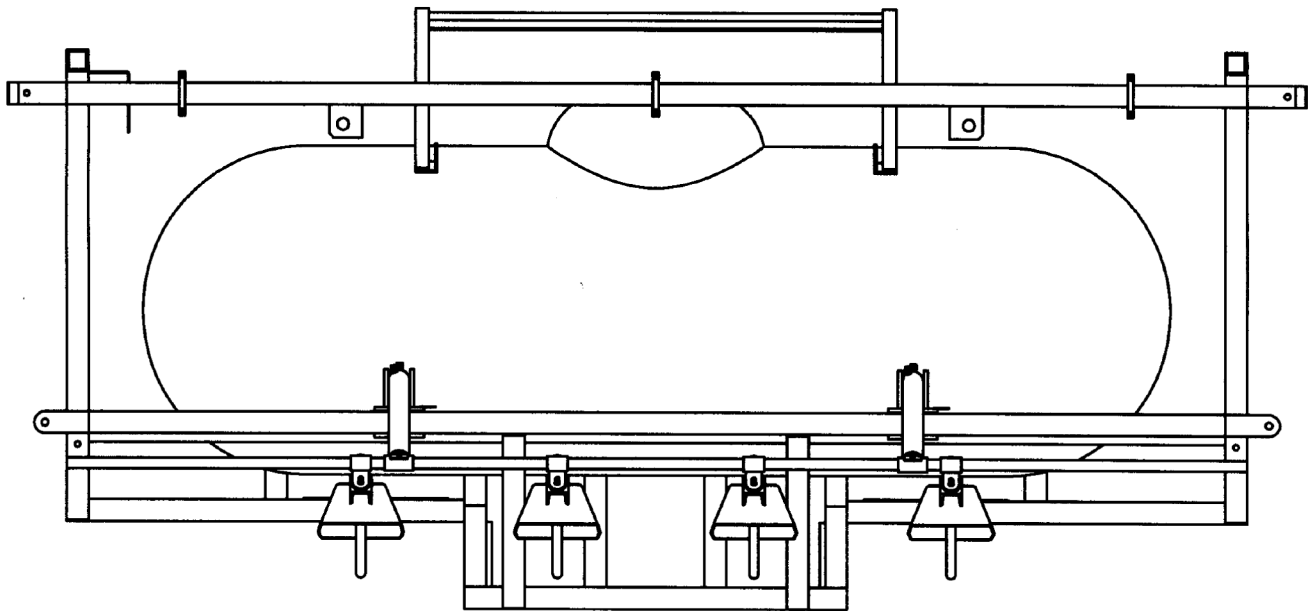




Red Dragon Vegetable Bed Flamer Unit



Owners Manual

(For Unit Numbers 2-VBF)

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Red Dragon Vegetable Bed Flamer Unit Parts List

(For Complete Units **2-VBF**.)

Check Off List	Part Number	Part Description	QTY 2-VBF
	RU-1	Tank Valve Guard	1
	RU-2	Standard Frame	1
	RU-3	36" Frame Stand	2
	RU-4	31" Frame Stand	2
	G-20	Retaining Pins For RU-3 & RU-4	4
	100-118-064-71	Tank Cable	2
	RU-11	Tool Bar Bracket W/ Bolts (Three 7/16" x 3 1/2")	2
	PRU-5	Tool Bar Leg W/ Brass Crosses, Flares & Ball Valves	2
	V-326	Ball Valve	2
	LT 2x8	Liquid Torch	4
	LT-6	LPS Bracket on Torch	4
		102" Torch Bar	1
	100-117-012	1/4" x 6" Nipple with Flare	4
	HP2SS	1/4" Stainless LPG Hose 2'	4
	HP65T	1/4" LPG Hose 6.5'	2
	CS601-2-4	Control Box W/ Switches	1
	C 12 WP	Control Assembly	1
		Assembly Packet	1
		Packet Includes:	
		Slick-Tite Thread Compound	
		Zip Ties	
	L2001*	Spark Lighter	1
		T-Wrench	1
	HP303	Hitch Pin	1
		3-Point Hitch Pin	2
		Instruction/Operation Manual	1
	VT 2 1/2-24 CE	Complete Vapor Torch Kit for Lighting Burners	1
	LD-1	Leak Detector	1

Red Dragon Vegetable Bed Flamer Unit

Assembly Instructions

(Unit Numbers 2-VBF)

IMPORTANT!

Always start with a clean LP-Tank & use a fuel strainer!

NOTE: All “Right” Side or “Left” Side indications are made as if facing the tool bar side of tank frame. All “Front” indications refer to the 3-point adaptor side of tank frame. All “Back” indications refer to the tool bar side of tank frame.

1. Unpack all parts and check against parts list. Refer to illustrations for part numbers and positions.
2. Attach your tractor to the three point hitch and raise the fuel tank frame (RU-2) to a raised position. Lower the fuel tank frame leg stands (RU-3 rear and RU-4 front) to the storage position (extended downward) and pin with retaining pins (G-20). Lower the frame so it will rest on the legs.
(See Assem. Diagram A, Pg. 5)
3. When installing the fuel tank to the frame, position the tank so it will be centered.
4. Place valve protector on fuel tank and secure by using the two cables. Install bolt ends of cable into the holes on front of the tank frame and secure with 1/2” lock-nuts. Run cables up through the cable brackets on the valve guard and down the back side of the tank through the cable holes on the back side of the tank frame. Secure with 1/2” lock-nuts. Tighten the cables as needed. **(See Assem. Diagram B, Pg. 6)**
5. Lay out the tool bar brackets (RU-11). Mark, on the tool bar, your field rows (up to 36” on center). As you face the tool bar the U-shaped tool bar bracket is placed on the tool bar so the bolt holes are towards you. Bolt with 7/16” x 3 1/2” bolts, lock-washers, and nuts in the anticipated position. Some adjustment may be required in the field. **(See Assem. Diagram D, Pg. 10)**
6. Lay out the legs (PRU-5). Place the leg in the yoke of the tool bar bracket (RU-11). Align the bolt hole in the leg with the front bolt hole in the yoke. Slide 7/16” x 3 1/2” bolt through and tighten with lock-washer and nut. **DO NOT OVER TIGHTEN!**
(See Assem. Diagram D, Pg. 7)
7. Slide the torch bar or bars through first leg (PRU-5) ring bracket and slide bar through two torches. Repeat this until the bar is through the designated number of legs. Install a torch on each end of torch bar. Do not tighten torch bracket set screws until you have the torches at the spacing you require and at the angle you require. **(See Assem. Diagram E, Pg. 8 For Torch Bar(s) Layout)**
8. Mount the control head assembly to the control head mounting bracket on the top left side of the frame and mount the manifold assembly to the center control manifold mount on the back of the frame.
(See Assem. Diagrams A, B & D Pg. 5-7)
9. Number the outlet ports of the control head starting from the left most port being #1.
(See Control Head Assem. Diagram & Hose Assem. Diagram, Pgs 9-10)

10. Attach hoses as follows, using pipe compound or Teflon® Tape.
(See Hose Assem. Diagram, Pg 9-10)
11. Route hoses to legs in sequence. Number one port would be the left most torch position. Attach hoses to flared brass crosses on legs (no teflon® tape or pipe compound needed).
(See Control Head Assem. Diagram & Hose Assem. Diagram, Pgs 9-10)
12. Install 2 foot hoses (HP-2SS) from the brass cross outlets on the leg (PRU-5) using pipe compound or teflon® tape to the brass flare on the torch (no pipe compound or tape needed). Repeat for each torch.
13. Make sure switches are turned “OFF” on control box and that regulators are closed.

All procedures from this point should be done outside, in a well ventilated area.

14. Open supply tank slowly one turn. Check for leaks up to the first solenoid with soapy water or a leak detector solution. If a leak is detected, shut off gas and repair. Check again until no leaks are present.
15. Shut off gas and hook-up shut down switch (CS-601) to a 12 volt battery. White wire to ground and black to positive. Run wires down to solenoids. Shorter wire to the master solenoid by the strainer and the longer ones to the solenoid on the control head.
16. Make sure rocker switches are in off position. Open tank one turn. Press master switch button (Red). Red light should come on. Test for leaks up to regulators. Adjust pilot regulator to 15 PSI. Test all pilot fittings. Adjust main regulator to 15 P.S.I. Turn main green rocker switch ON. Test for leaks through the entire system. Correct leaks if any are present. Adjust to working pressure. Test for leaks again. Shut off tank.

WARNING

**Use Extreme Caution - Do Not Operate this unit when leaks are present.
Use only in well ventilated areas. Do Not Operate this unit when any
flammables are present.**

**Flames produced by this unit can reach 2,000° and may cause serious
burns and possibly death.**

Daily Start Up Procedure: Leak Test and Primary Torch Adjustment

1. Check to make sure fuel supply tank valve is in Off position.
2. Make sure pilot valve is Off. (Turn in a clockwise direction until tight.)
3. Make sure all ball valves are Off.
4. Adjust regulator(s) to Off position. (Turn in a counter clockwise direction.)
5. Check control switch. It should be in an Off position.
6. Check Battery Connections.
7. Turn fuel tank valve On.
8. Check for leaks from fuel tank to the first solenoid valve. Use provided leak detector. If leaks are present shut off tank and correct all leaks immediately. If no leaks are found, proceed.
9. Press red master switch to on. **Red light will indicate power.** Test for leaks to second solenoid valve. If leaks are present shut off tank and correct all leaks immediately. If no leaks are found, proceed.
10. Adjust regulator to 65 PSI. Open pilot valve slightly 1/2 to 1 turn (more if windy). Test for leaks to all ball valves. If leaks are present shut off tank and correct all leaks immediately. If no leaks are found, proceed. Open one ball valve at a time and light the torches fed by this valve with a hand held torch such as a VT 3-30 C, VT 2 1/2-30 C or similar torch set up. Repeat until all torches are lit.
11. Test each connection and component from the tank to all the torches with leak detector. Shut off tank immediately if leaks are present. Correct all leaks before continuing. Repeat steps 1 through 10 until no leaks are present.
12. Once the system is leak free, run the system at full flame. Check regulator pressure while the system is running and adjust it to 65 PSI. You are now ready to use the equipment in the field.
12. Remember the flames from these burners are nearly invisible and produce a flame temperature of 2,000° F. All work around the unit should be done by a qualified LP Gas technician.
13. Shut down system by turning off tank valve and allowing fuel to burn out of lines and controls.

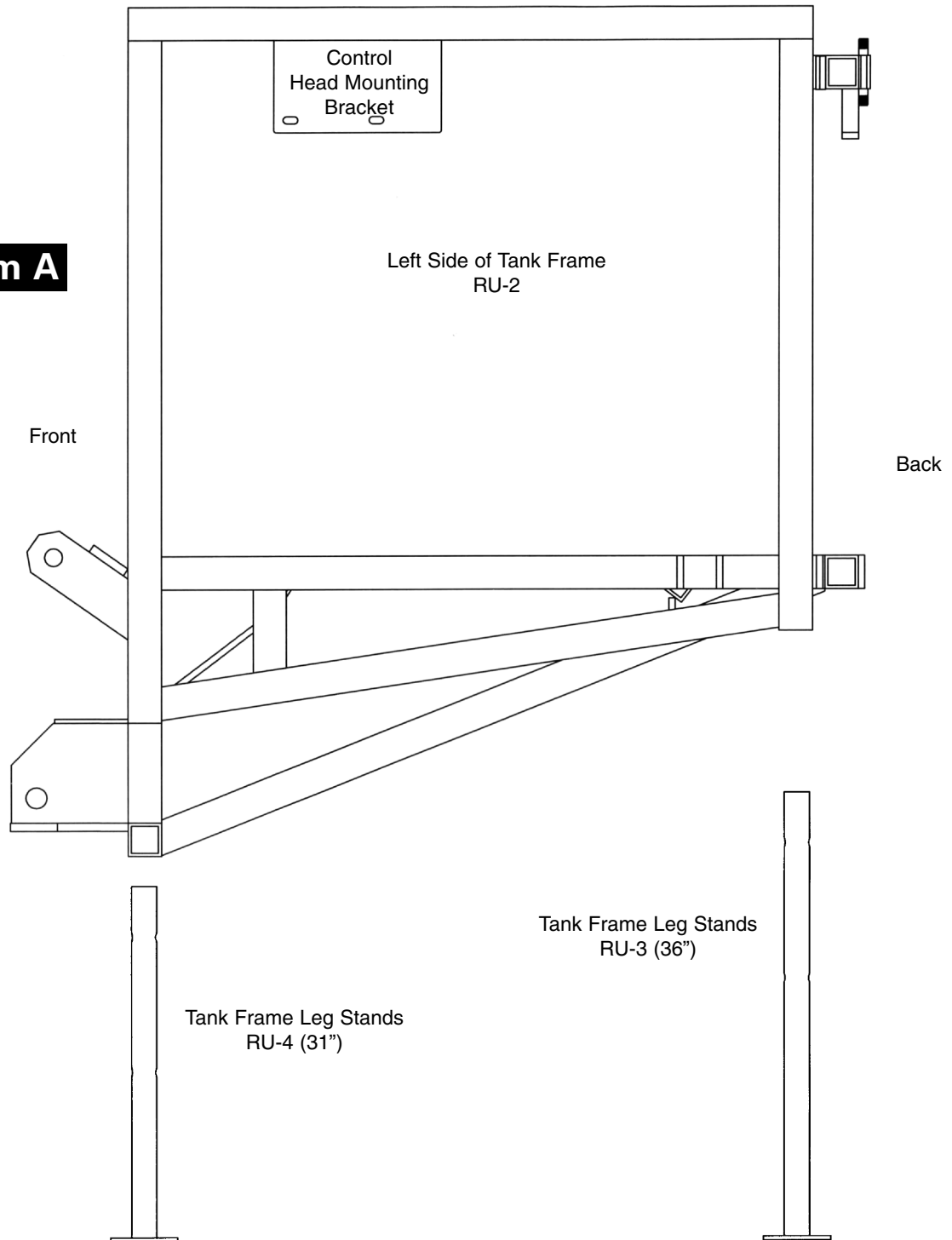
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Assembly Diagrams

Diagram A

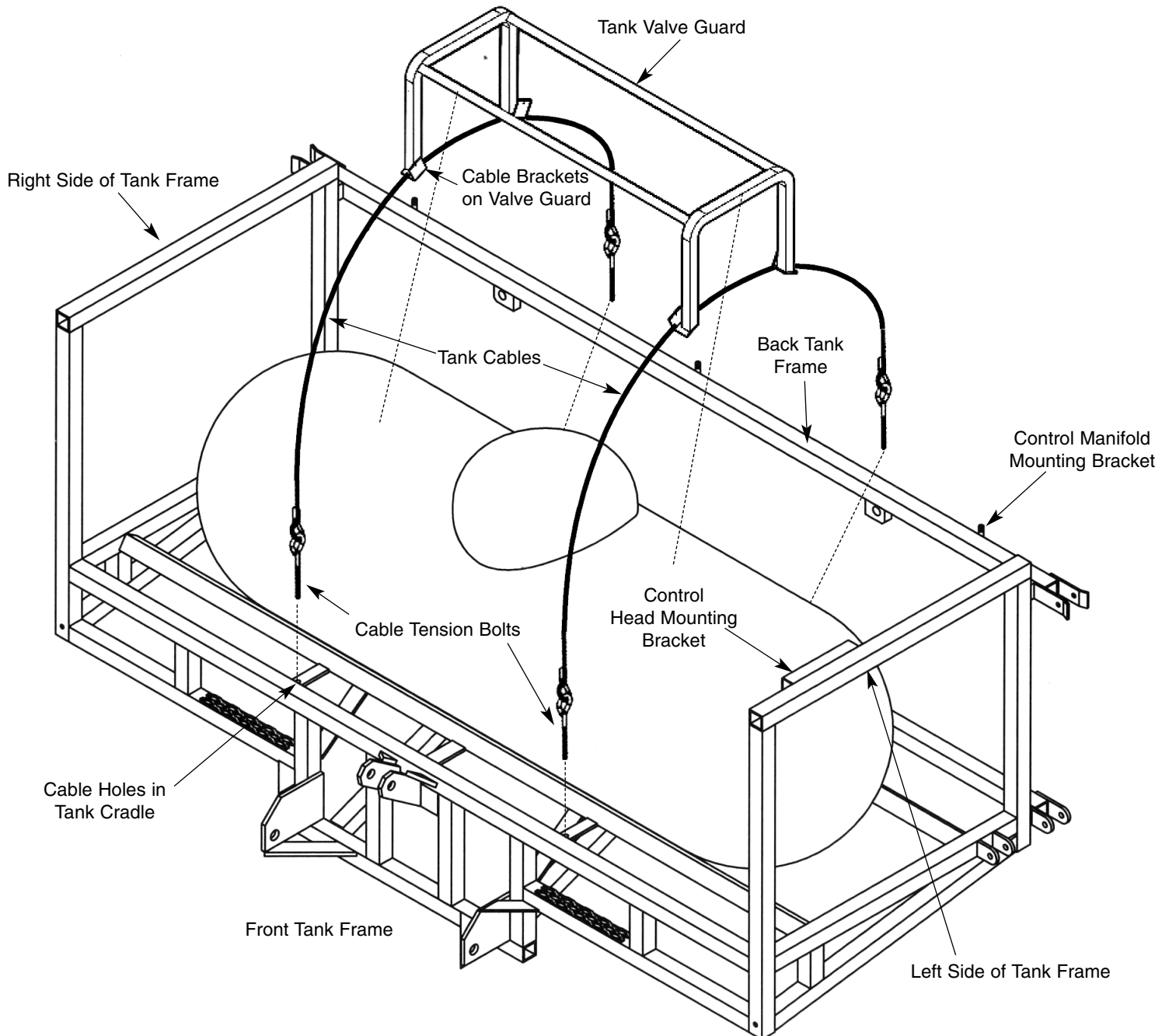


NOTE: All Front indications refer to the 3-point adaptor side of tank frame. All Back indications refer to the tool bar side of tank frame.

All Right side or Left side indications are made as if facing the Back side of tank frame.

Assembly Diagrams

Diagram B



Assembly Diagrams

Diagram C

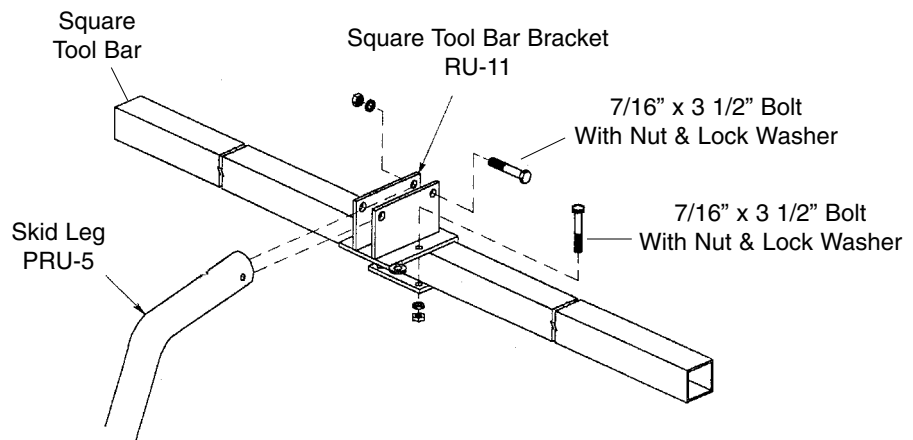
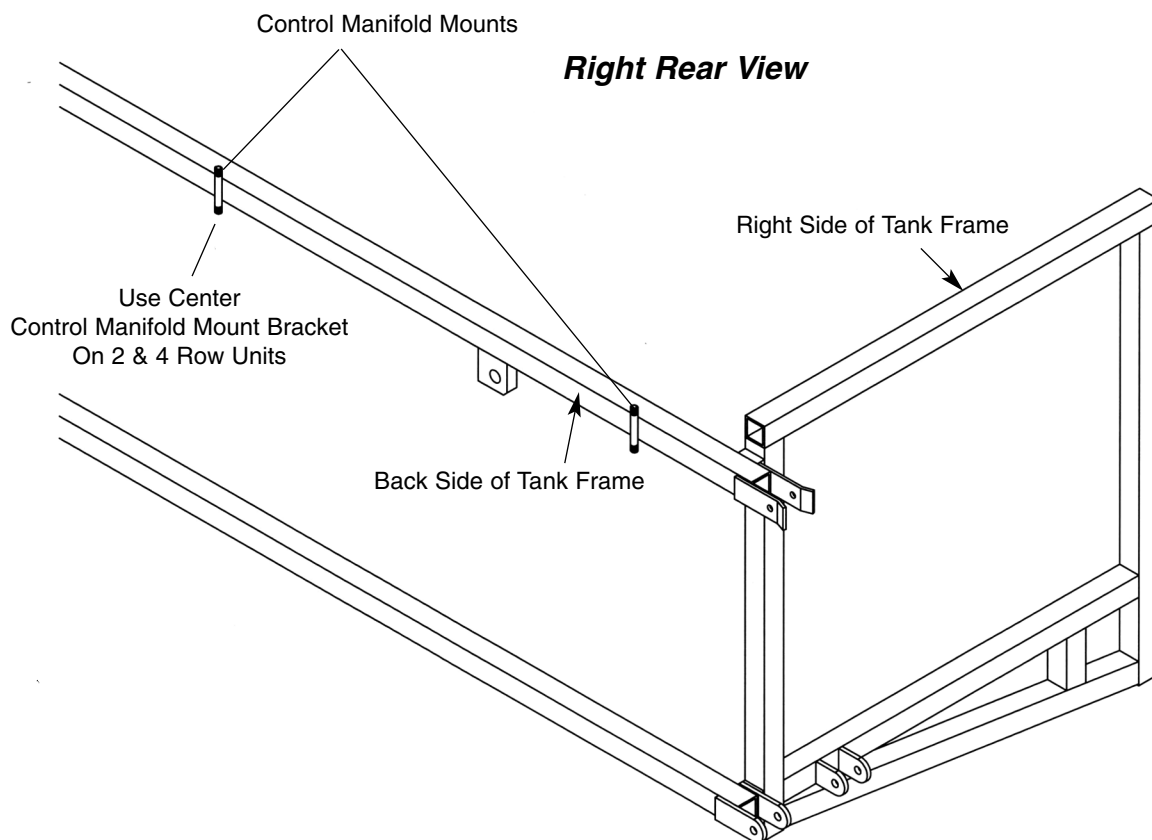


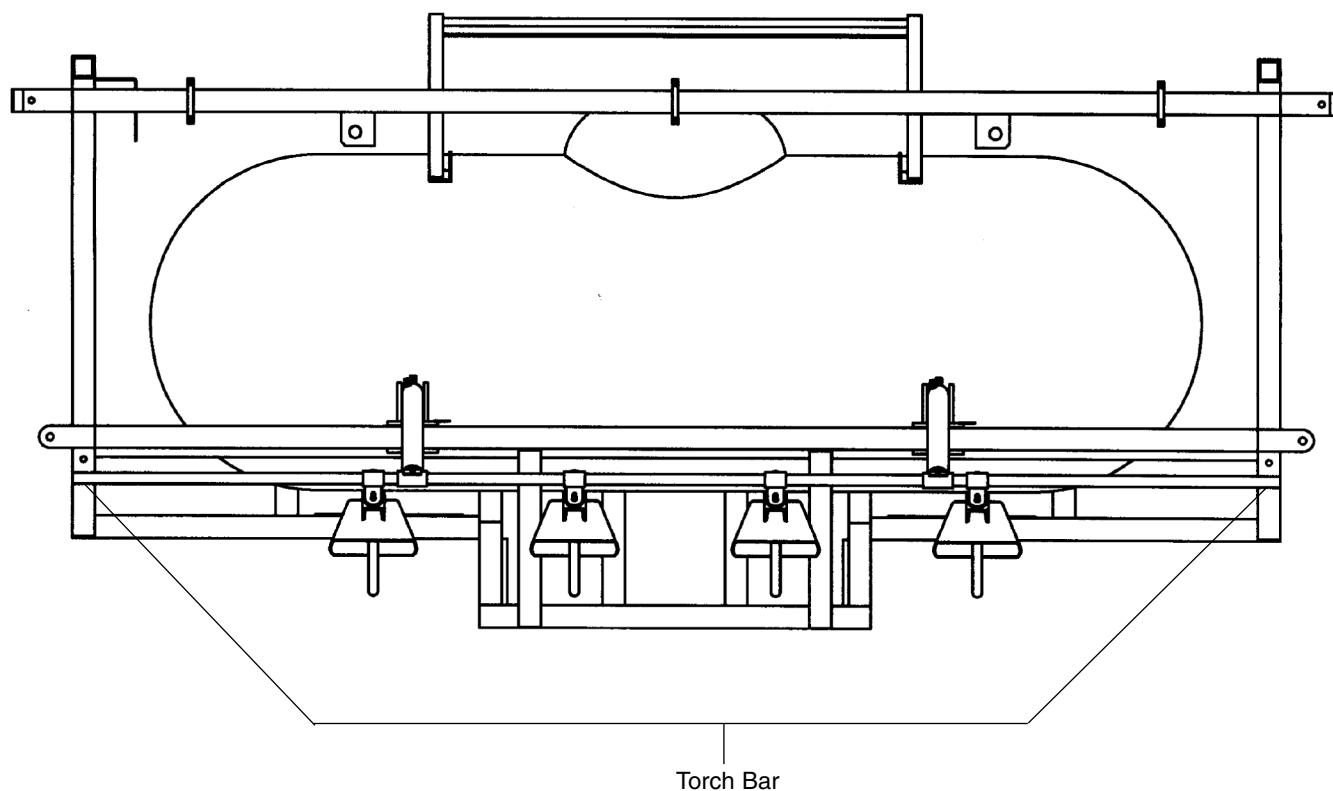
Diagram D



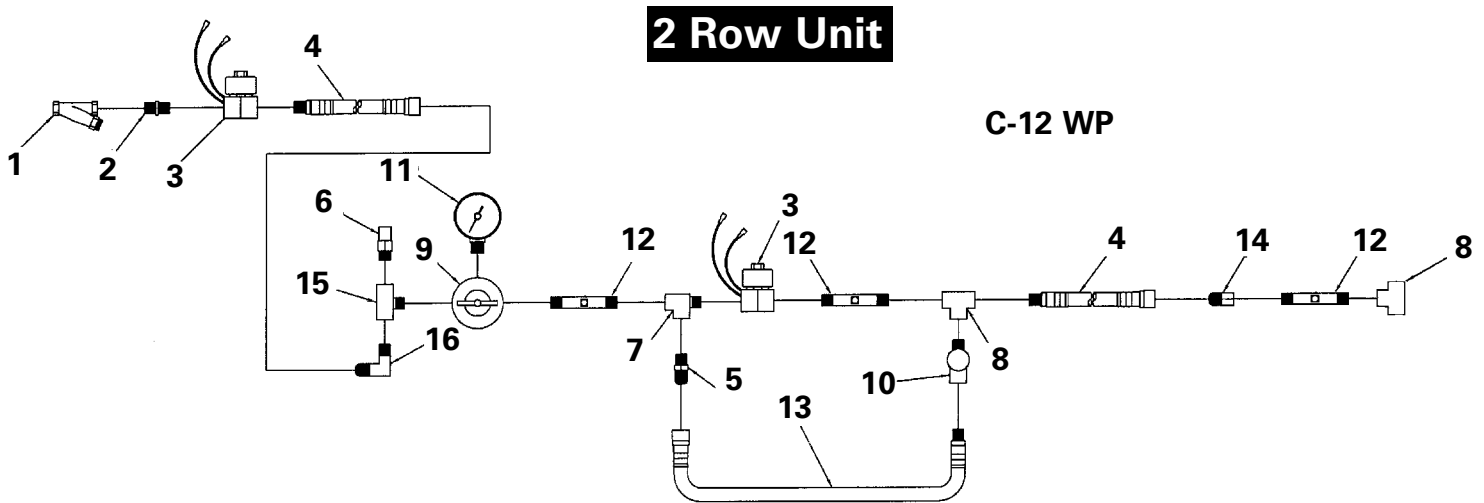
Torch Bar/Torch Layout Assembly Diagrams

Diagram E

2-VBF Rear View



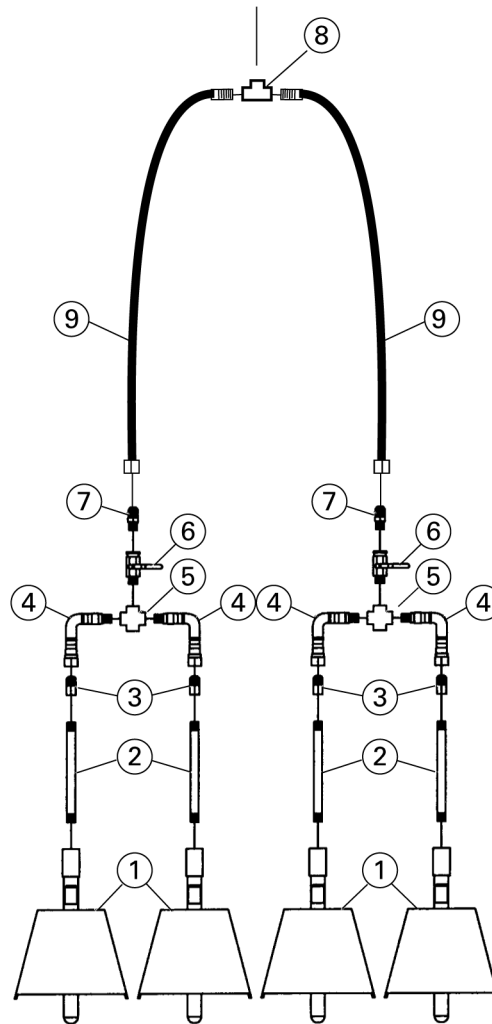
Control Head Assembly Diagram



Parts List For 2 Row Unit Control Head C-12 WP

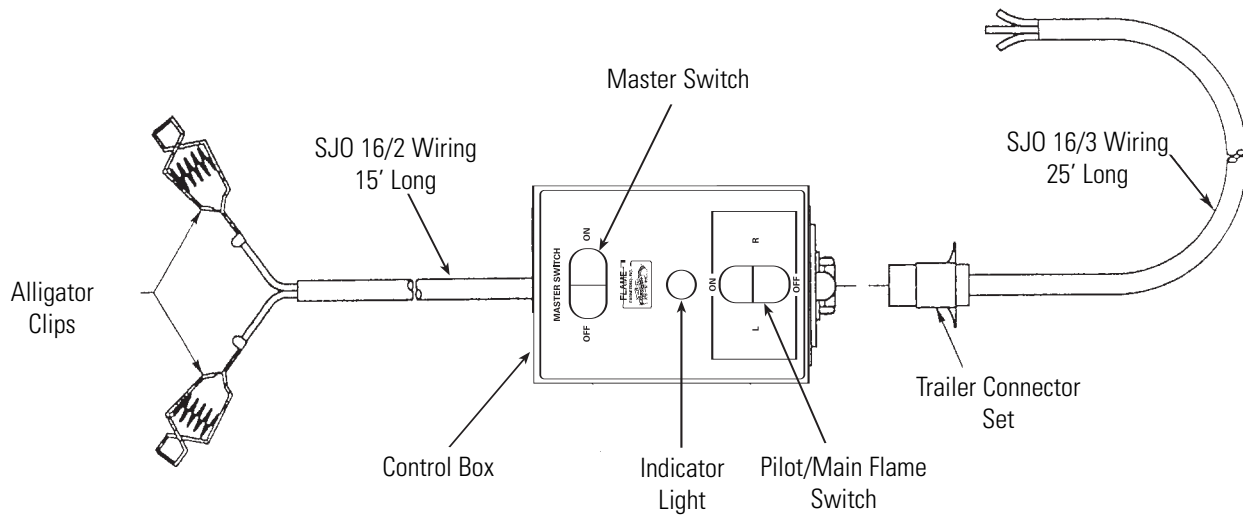
No.	Part No.	Description
1.	S-710	1/4" Fuel Strainer
2.	F-222	1/4" Hex Nipple
3.	S-121	12 Volt 1/4" Solenoid
4.	HP65T	5.5' Fuel Supply Line
5.	A-408	Male Adaptor
6.	H-400	Pressure Relief Valve
7.	#127	Bar Stock St. Tee
8.	F-522	1/4" Brass Female Tee
9.	R-499	Regulator
10.	V-334	By-pass Valve
11.	G-25	Pressure Gauge
12.		Nipple Bracket (3" Nipple & Bolt)
13.	HP1S	1 Ft. LPG Hose
14.	A-406	1/4" Female x 3/8" Male Flare
15.		1/4" Male x 1/4" Female Tee
16.		1/4" Male x 3/8" Male Flare 90° Elbow

LT Torch/ Hose Layout/Assembly Diagram



NO.	QUAN	PARTS NO.	DESCRIPTION
1	4	LT 2x8	Torch
2	4	100-117-012	1/4" x 6" Black Pipe Nipple T.B.E.
3	4		1/4" Female x 3/8" Male Flare
4	4	HP-2SS	1/4" Male Stainless Hose (2')
5	2		1/4" Brass Cross
6	2	V-326	1/4" Male x 1/4" Female Ball Valve
7	2		1/4" Male x 3/8" Male Flare
8	1	F-522	1/4" Brass Female Tee
9	2	HP65T	1/4" LPG Hose 6.5'

Control Switch Assembly Drawing



2-VBF
CS601-2-4

Proper Purging Of LP-Gas Container

The Importance of Purging

A very important step which must not be overlooked by LP-Gas distributors is the importance of properly purging new LP-Gas containers. Attention to this important procedure will promote customer satisfaction and greatly reduce service calls on new installations. Consider the following:

- Both ASME and DOT specifications require hydrostatic testing of vessels after fabrication. This is usually done with water.
- Before charging with propane, the vessel will contain the normal amount of air.

Both Water and Air are Contaminants

They seriously interfere with proper operation of the system and the connected appliances. If not removed, they will result in costly service calls and needless expense far exceeding the nominal cost of proper purging.

Neutralizing Moisture

Even if a careful inspection (using a pen flashlight) reveals no visible moisture, the container must still be neutralized, since dew may have formed on the walls; additionally, the contained air may have relative humidity up to 100%.

IMPORTANT - If a tank is allowed to run completely out, alcohol must be added when refilled. Propane is -44° F. If the ambient air temperature is higher, there will be a thermal transfer of latent heat, hot to cold, until the temperature equalizes. This will cause icing in the system if not neutralized with methanol.

A rule of thumb for neutralizing moisture in an ASME container calls for at least 1 pint of genuine absolute anhydrous methanol* (99.85% pure) for each 100 gallons of water capacity of the container. On this basis, the minimum volumes (US measurements) for typical containers would be as shown to the right:

Container Type	Minimum Volume Methanol Required
100 LB ICC Cylinder	1/8 pt. (2 fl. oz.)
500 gal. tank	5 pts. (2-1/2 qts.)
1000 gal. tank	10 pts. (1-1/4 gal.)
2000 gal. tank	20 pts. (2-1/2 gal.)

IMPORTANT - Avoid substitutes - they will not work. The secret of the effectiveness of methanol over all other alcohols is its high affinity for water plus a boiling point lower than all other alcohols, and most important: a boiling point lower than water.

The Importance of Purging Air

If the natural volume of atmosphere in the vessel is not removed before the first fill, these problems will result:

- Installations made in the spring and summer will experience excessive and false container pressures. This will cause the safety relief valve to open, blowing off the excess pressure.
- The air mixture present in the vapor space will be carried to the appliances. This may result in as many as 5 or more service calls from pilot light extinguishment.
- If a vapor return equalizing hose is not used, the contained air will be compressed above the liquid level, resulting in slow filling.
- If a vapor equalizing hose is used, the air and any moisture it contains, will be transferred from the storage tank to transport.

Additionally, if atmospheric air is properly purged from the storage tank;

- transfer will be faster,
- the pump will not stall,
- less energy will be required to fill the container.

Never Purge With Liquid

The wrong way of course is the easiest way. Never purge a container with liquid propane. To do so causes the liquid to flash into vapor, chilling the container, and condensing any moisture vapor on the walls where it remains while the pressure is being blown down. Additionally, less than 50% or as little as 25% of the air will be removed by this easy but wrong method.

Vacuum Pre-Purged Domestic Tanks

Read This Before Initial LP-Gas Filling of a Vacuum Pre-Purged Domestic Tank

This new container has been vacuum purged of air in accordance with the NPGA Safety Bulletin #133-89 (a). The service valve, vapor return valve and the fill valve have been equipped with tamper evident seals to indicate if the valve(s) have been opened. If the tamper evident seals have been violated, THE CONTAINER MUST BE REPURGED in accordance with NPGA Safety Bulletin #133-89 (a). (See Proper Purging)

Failure to properly purge a container can result in increased pressure, improper burning fuel mixture and odorant fade. Any of these conditions can result in personal injury, property damage or death.

Vacuum Verification Process:

To verify that a vacuum is present, remove the plastic wrap from the service valve, verify that the service valve hand wheel is close. Connect a vacuum pressure gauge to the service valve outlet connection and open the hand wheel. Visually check the vacuum pressure gauge dial for the presence of a vacuum. Close the service valve and disconnect the vacuum gauge. If the vacuum is not in accordance with NPGA Safety Bulletin #133-89 (a), THE CONTAINER MUST BE REPURGED.

Methanol Injection Process:

Inject methanol into the container through the service valve (before filling the container with LP-Gas) using the service valve outlet connection. Attach the POL connection to the service outlet connection. The POL connection should have a low pressure rubber hose extend into a container of methanol.

Slowly open the service valve to allow the vacuum in the vessel to pull the methanol into the vessel.

The container of methanol should NOT be allowed to run dry and pull air into the vessel.

- The presence of a vacuum in the container does not eliminate the need for the introduction of methanol into the container.
- The rule of thumb for neutralizing moisture in an ASME container is to introduce at least one pint of genuine absolute anhydrous methanol (99.85% pure) for each 100 gallon of water capacity of the container.

LP-Gas Injection Process:

After the completion of the methanol injection process, connect a hose from a source of LPG to the POL connection of the service valve. This hose can be used to inject either liquid or vapor product into the vessel. The appropriate amount of LPG to neutralize the vacuum pressure in the container will vary depending on the volume of the vessel. If liquid is used, 1 to 4 gallons of LPG is required for all vessels up to 1000 wg. If vapor is used, wait until there is no longer an audible transfer of vapor from the source of the LPG to the vessel.

Filling Process:

After the completion of the LP-Gas injection process, close the service valve and disconnect the POL connection. Remove the plastic wrap from the filler connection, remove the yellow cap and connect your filler hose to the vessel and proceed to fill in the normal manner.

If You Have Questions

Installation Problems:

If you have problems, questions, or feel you are missing a part during installation, please call Flame Engineering toll free at 1-800-255-2469 and our trained staff will gladly help you.

Operation Problems:

If you have problems during operation, please check the following trouble shooting guidelines first. If you use this guide and still have problems call Flame Engineering and our staff will try to help remedy the situation.

Trouble Shooting Tips *(Read This First Before Calling the Factory)*

START WITH A NEW CLEAN TANK

Always begin with a clean, purged, liquid tank, capable of delivering liquid to the torches.

DO NOT use a vapor withdrawal tank. Use clean fuel to avoid line/torch blockage.

IF YOU EXPERIENCE FLAME OUT

Check the fuel strainer if you are experiencing flame out. Clean accordingly. If tank debris is found in strainer or torches shortly after use, begin again with a new, clean, scrubbed and purged tank. (See Your LP-Gas Dealer) Have you added methanol? (1 pt per hundred gal) If your tank runs out of propane, a thermal transfer of latent heat will occur. Heat transfers from hot to cold. Inside the tank it is -44°, outside ambient air is much higher, so warm moist air will transfer until temperature is equalized. You can also get moisture from the bulk tank hose or tank. It is recommended that whenever there is a flow problem, add methanol. Adding methanol every 3-4 tanks is a good plan.

IF YOU ARE GETTING A LOW FLAME

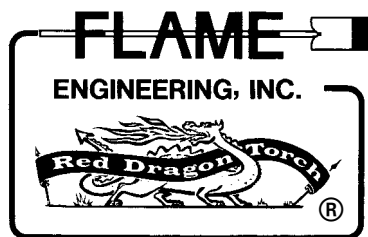
Check torch orifices for blockage. Clean thoroughly if necessary.

IF YOU HAVE AN OLD TANK

Older tanks may require cleaning as mentioned above. Through time, debris settles at bottom of the tank, where liquid is to be withdrawn through the wet leg and can cause blockage to torches. See your LP-Gas dealer for suggestions.

IF NO FUEL IS GETTING THROUGH TO THE TORCHES

Check electrical connections to the battery, then solenoids and make certain all valves are free and clear of tank debris.



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