



GFS SERIES DUAL PRESSURE FLARE INSTALLATION & OPERATIONS MANUAL

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Vaprox Installation, Operations and Maintenance Manual

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We at Vaprox, wish to thank you for allowing us the opportunity to provide your firm with one of the industry's most reliable and versatile dual pressure flare systems.

Regulatory - With ever stringent demands placed by state and federal regulatory bodies you have a vapor destruction product that meets and/or exceeds current guidelines while providing the ability to add additional components that may be required in the future (ie: continuous pilot, flow measurement, air assist connection, etc.) without having to replace the entire system. This "plug & play" approach gives you, the operator, one less thing to worry about in our ever-changing environment.

Safety – Vaprox has designed your vapor destruction system for safe operation by your firm's field personnel. All electrical components are housed in NEMA rated enclosures, sealed junction boxes, rigid and flexible conduit systems. This helps reduce the chance for accidental injury to personnel and/or property caused by unshielded and/or sealed electrical systems.

Fluid management systems have visual sight glasses, pneumatic and/or electric level controls and high liquid level safety switches.

Reliability – Vaprox has designed and constructed your vapor destruction system with quality raw materials and components assembled by skilled professionals. Components subject to heat deterioration have been designed with specialty metals, component heat shields and high temperature insulation systems to help extend the life and reliability of the overall system.

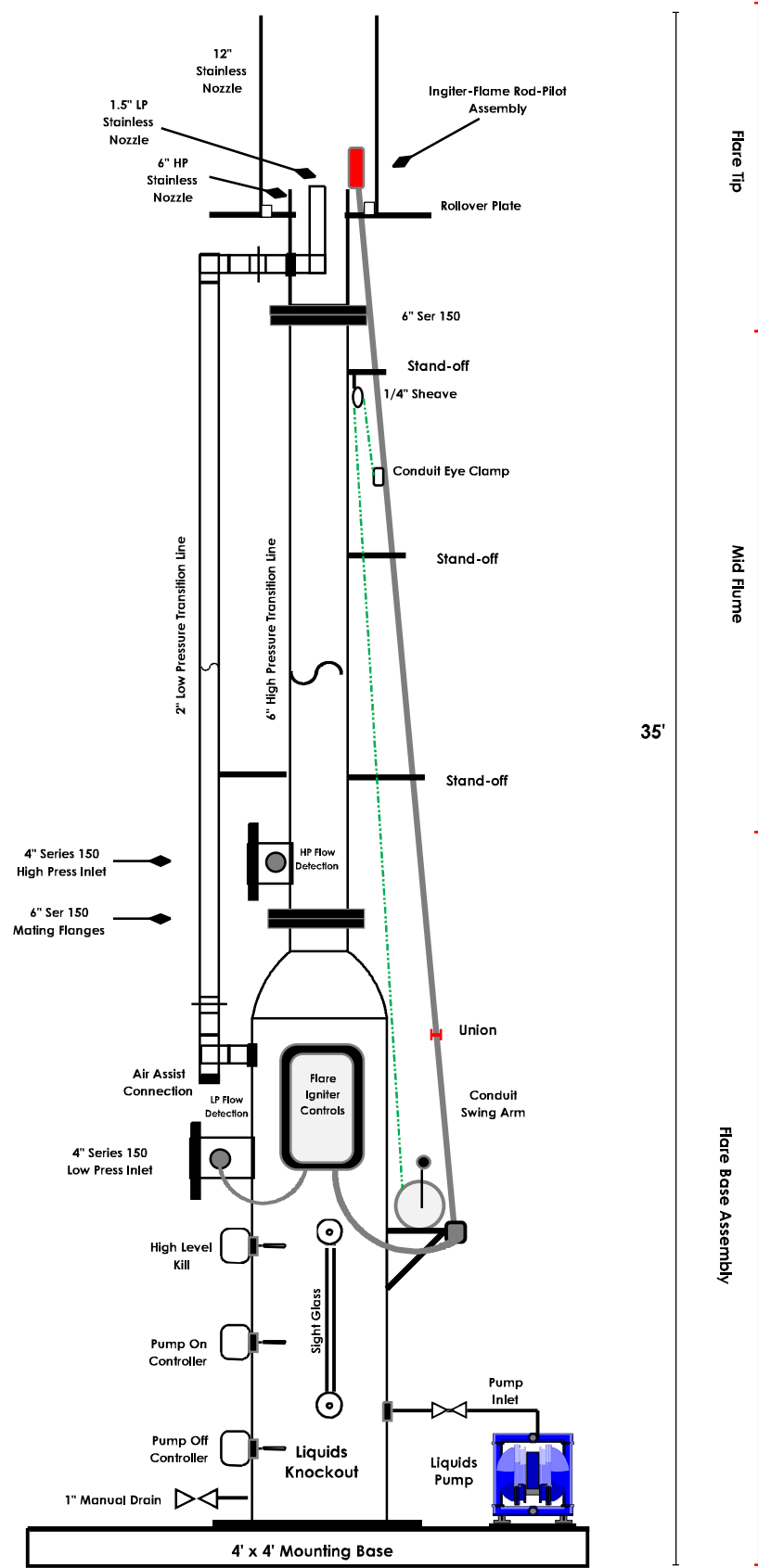
Serviceability – A leader in "Ground Field Service" GFS technology Vaprox has designed your vapor destruction system for ease of service and maintenance. The igniter, flare rod, thermocouple and pilot assembly are quickly and safely accessed without special tools and/or costly man lift systems. These same systems have their respective wiring, conduit and piping systems in a ridged configuration, which assists in eliminating leaks and potential future maintenance issues that are typically found on "railed" systems.

Again, we say *"Thank You"* for choosing Vaprox for your vapor destruction and vapor capture requirements.



Products & Services

- 🔥 Single Pressure Flare System
- 🔥 Dual Pressure Flare System
- 🔥 Enclosed Ground Flare (aka Tank Vapor Combustor) System
- 🔥 Flare Pre-Separators
- 🔥 Flare & Combustor Flame Arrestors
- 🔥 Fuel Gas Scrubbers
- 🔥 BTEX-VOC Condenser Units
- 🔥 Vapor Recovery Units
- 🔥 Solar Powered Invertor Skids
- 🔥 Field Services – Vapor Destruction & Vapor Recovery Systems



TITLE	Vaprox Dual Pressure Flare - Standard Configuration					
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DATE	1-19-2015	SHEET	1	OF	1	
REVISION	Revision 1E © Copyright 2015 - All Rights Reserved Vaprox , LLC					

~ NOTICES ~

The information provided in this manual provides basic instructions and recommendations for the installation of the equipment described herein. At no time is this information to be used in violation of any local, state, federal or company guideline and/or specification. As each installation site and application varies it is the responsibility of the purchaser to verify that the equipment is adequate for their particular application and being operated in a safe manner.

Installing and operating with this type of equipment is potentially hazardous. Use extremely caution when installing and operating this equipment and at all times use required PSE (Personal Safety Equipment) in accordance with company and OSHA policies and guidelines.



Suggested PSE's, hardhat, gloves, steel toed boots, safety glasses, fire retardant clothing, gas monitors (H₂S), ear protection, etc. For a complete list of safety precautions please discuss with your firm's safety department or refer to OSHA guidelines.

If at any time you have questions regarding the installation and operation of the equipment described herein please contact the seller at the contact numbers provided in the Troubleshooting section of this manual.

Vaprox Dual Pressure Flare

Assembly & Installation Instructions

The Vaprox GFS Series Dual Pressure Flare is shipped disassembled and will come with the following components;

- Flare Base Assembly - The base assembly will come pre-assembled with separator manual drain, liquids pump and interconnecting piping systems, liquid level control, sight glass with isolation valves, electronics control box, flow detection device (pre-wired), igniter winch assembly, igniter extension arm with 1/2" conduit tee and union.



- 6" Flanged Flume Stack & Flare Tip Assembly – The flare stack is bolted to the flare tip with the low pressure piping already installed on this segment and the igniter assembly conduit strapped to the conduit standoffs.



- 🔥 Shipping Container (Strapped to Skid of Flare Base Assembly) - The shipping container comes with the following items;; (1) 6" Series 150 Metal Flange Gaskets, (8) 6" Series 150 Flange Studs, (16) Flange Stud Nuts, (3) Wire Rope Guide Wires, Shackles and Anchors, Flare Igniter and Flame Rod Assembly (with electrical wiring), Flame Arrestors (optional) and Control Panel "plug-in" modules. These will vary according to the options provided.



To assemble flare;

1. Prepare a level, well drained pad and install a 5' x 5' concrete pad or 6' concrete piers to serve as the foundation for the flare assembly.
2. Take the Flare Base Assembly and place on the foundation. Put a level on the top 6" flange and check for level. Adjust flare foundation as required to correct level if necessary. Take care to insure proper orientation of the flare for the incoming flare lines, guide wire placements and prevailing wind direction (back of igniter away from prevailing wind).
3. Take the 6" Flanged Flume Stack / Flare Tip combination and locate the three (3) guide wire eyelets located at the top end of the assembly. Install the guide wires per the attached guide wire installation guide (see attached directions and diagram)
4. On the 6" Flanged Flume Stack / Flare Tip combination locate and remove the black zip ties securing the 1/4" wire rope assembly "**except**" at the coil of wire that has the snap hook which is located at the tallest standoff. This last zip tie will be removed later.
5. Take the 6" Flange Flume Stack / Flare Tip combination and install on top of the Flare Base aligning the 2" low pressure piping and the flange bolt holes. Before assembling insert a 6" Series 150 flextaulic flange gasket and bolt the two assemblies together. The 2" low pressure piping is connected with the pre-installed hex union.
6. **Vaprox offers install/startup of the flare assembly "free of charge" from this point forward in the ignitor and electrical installation. Please call Vaprox @ 885-582-7769 for startup**

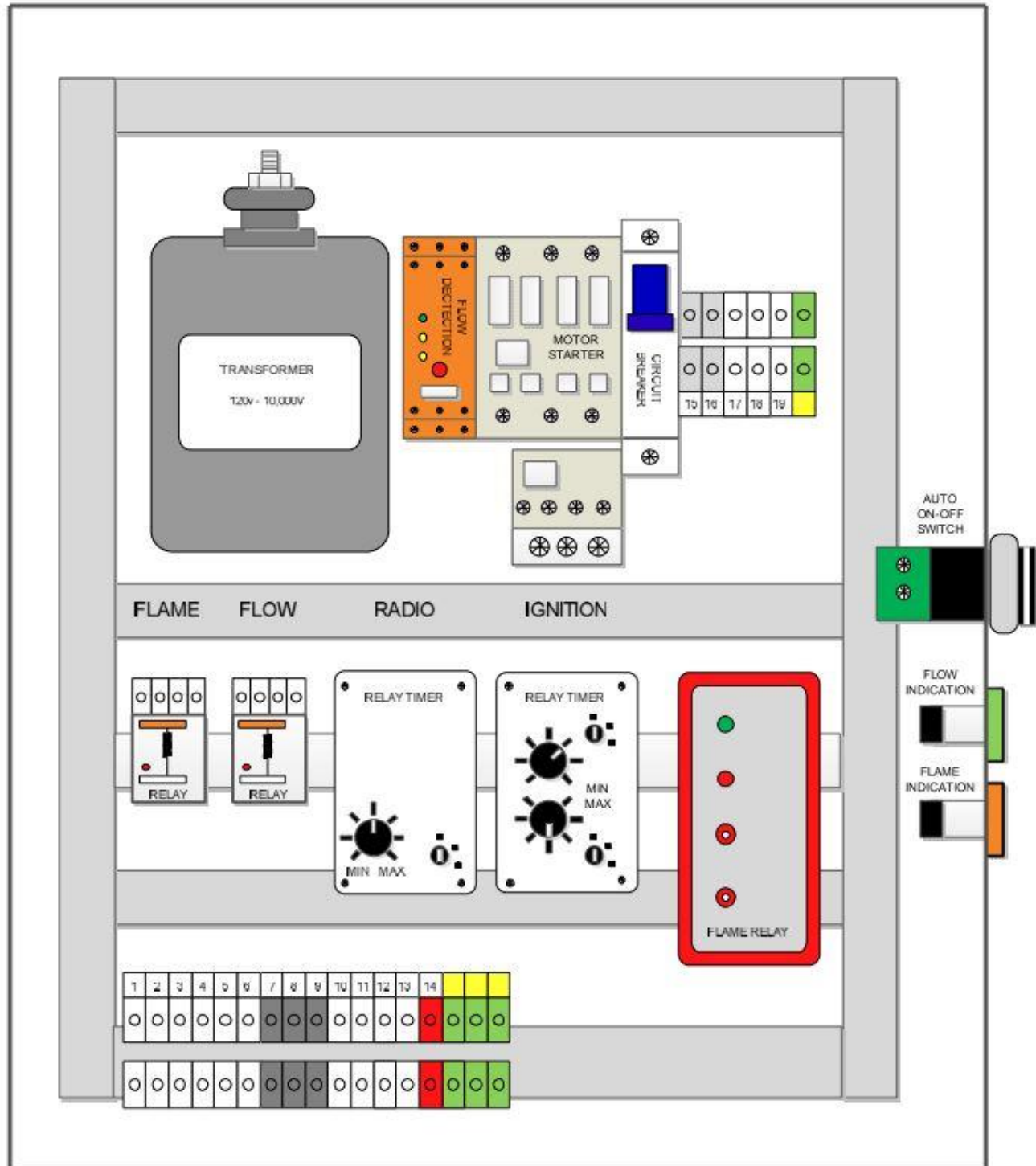
assistance. For further instructions in finalizing the install please go to paragraph 7 and read further.

7. Take the Igniter/Flame Rod assembly with yellow and tan cables from the shipping container (Note: take care not to strike or drop this assembly as ceramics are used in the insulators) and the 3/4" galvanized conduit section. Carefully thread the yellow and tan cables into the 3/4" conduit piping starting at the end with the eye clamp assembly (Note: don't push against the igniter assembly, hold the cable and feed through by hand). Continue threading until all of the cable has been pushed through to the other end of the conduit. If you have difficulty in getting the cables through slightly rotate the conduit while pushing cable as the cable connectors may catch on the threads of the center or end couplings. Once all of the cable has been threaded through the conduit carefully thread the igniter head onto the 3/4" conduit. Make sure the cables are turning freely during this process so damage does not occur to the igniter connection. If the cable is not turning get assistance by having someone slowly turn the cabling as the igniter head is being threaded. The proper alignment of the igniter head will be when the eye clamp facing on the conduit is in line with the center of the smaller curve of the igniter assembly.
8. Locate the igniter pivot arm (square tubing in front of winch) on the Flare Base Assembly. Carefully lower the pivot arm (Caution: there is an inner square tube that may slide out when the arm is lowered). At the end of the pivot arm is a 1/2" conduit "T" assembly. Remove the weather cover from the "T" assembly. With assistance pick up the igniter / conduit assembly and thread the yellow and tan cables into the top opening (top has union half) of the "T" and out the weather cover opening. Once all of the cabling is pulled through the "T" opening attach the igniter/conduit assembly to the "T" using the two union halves. With the pivot arm laying out (extended) the small curve of the igniter plate should face up as well as the conduit eyelet. Rest the igniter conduit pivot arm assembly so that the igniter does not touch the ground or has any pressure applied to the igniter assembly.
9. Locate the coil of 1/4" wire at the tall standoff on the 6" Flanged Flume Stack. While holding onto the wire (both ends) cut the last zip strap. Secure the snap hook and then take the loose end and re-connect it to the hand winch. Once secured take the snap hook and attach it to the clamp eyelet located on the conduit below igniter assembly. Once secured return to the hand winch and place tension of the 1/4" line while spooling up the line until the winch is holding the weight of the igniter assembly about 4-5' off of the ground. Make sure that the winch lock has been activated to keep the wire from free spooling when the hand crank is released.
10. At the 3/4" conduit "T" opening re-insert the cabling back into the "T" and into the opening connected to the Seal-tite flexible conduit. The flexible conduit is connected from the "T" and to the bottom of the control panel. If you have difficulty getting the wiring to go into the control box, remove the lock nut on the 3/4" conduit connector on the bottom of the control box and insert wiring through conduit. Once this has been completed you can re-insert and fasten the 3/4" conduit connector back into the bottom of the control box assembly.
11. Final wiring of the flame rod and igniter systems will be performed by the manufacturer's representative upon initial startup.

12. Your electrician can bring 120VAC power into the control box to the designated terminals located in the upper right hand corner going into the top of the circuit breaker. The flare skid must be grounded by the electrician by means of a ground rod device.
13. If using a gas operated diaphragm liquids pump, the system is pre-piped at the factory. You will need to bring a 1" liquids drain line to the discharge of the pump and make connection. Please insert a discharge check valve at the connection point. The diaphragm pump will require a supply of clean – dry gas and/or air to operate the system at a pressure between 65-85 psig. It is recommend that a 3/8" (minimum) line be brought to the liquid level switch and an isolation ball valve be installed between the level switch and the supply gas. If the gas stream is composed of "field gas" it is recommended that a small liquids pot be installed prior to the liquid level switch to assist in dropping out liquid hydrocarbons, water and/or salt. Introduction of any of these contaminants may lead to the system becoming inoperable.

When ready for initial startup of the flare assembly please contact Vaprox at 885-582-7769 to schedule a technician to assist. There is no charge for initial startup of the system. 2-3 days advanced noticed is appreciated. If you have any questions regarding installation and/or wish to schedule a startup or service please call 1-855-582-7769

GFS Series Flare Control Panel Layout



GFS Series Flare Igniter Assembly



The Vaprox GFS Flare has a stainless steel igniter assembly that fits into the bottom of the flare tip (under the rollover wind guard). This assembly consists of the igniter manifold with an integral wind guard. The igniter manifold is pre-made with connection ports for 1). Flame Rod, 2). Thermocouple, 3). Pilot Burner Assembly, and 4). Spark Igniter. The flare is built with the options that you require at the time of order and can easily be upgraded at a later date for a minimal upcharge.

The igniter head can be serviced, when required, at ground level with standard Ground Field Service hoisting system. The igniter head and junction box should be serviced only by trained technicians. Opening of the junction box can lead to operational damage caused by excessive heat if the multilayer heat dispersion materials are not properly re-installed.

The Vaprox GFS igniter assembly is built to withstand the demanding requirements of high temperature and all-weather operations.

GFS Series Flare Startup Procedures

The following procedures should be followed during startup of the GFS series flares and combustors;

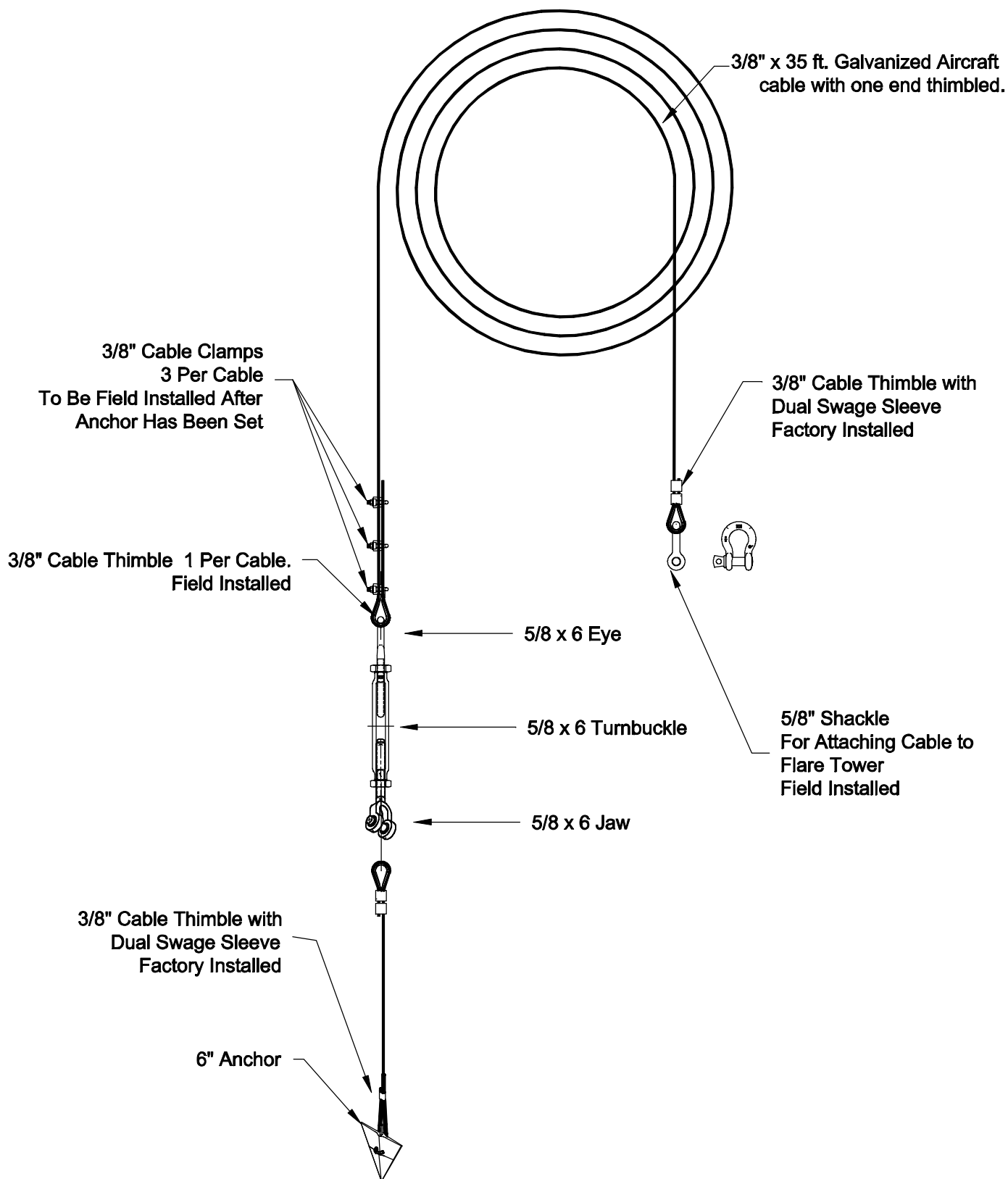
- ✿ The following hazards should be observed while starting the combustor system;
Hot Surface Hazard - Pressure Hazard - Electrical Hazard - Fire Hazard
Proper use of Personal Safety Equipment (PSE) is recommended.
- ✿ Verify that all personnel safety guards and flame arrestors are in place and clear of all debris and combustibles.
- ✿ Verify that all pressure connections are tight.
- ✿ Verify that all bolted members are properly tightened.
- ✿ Verify that the inlet vent line and any supply gas/air for diaphragm pump have been purged and are clear of any debris and fluids.
- ✿ Verify that the power source (ie: 120VAC utility, solar pack or solar skid) are properly attached to the control panel. If solar power option verify that the 12VDC battery pack has a full charge (this can be verified from display on regulator)
- ✿ Verify that the flare base skid has been properly grounded.
- ✿ Verify that the supply gas/air is open to the level switch actuator for the diaphragm pump and the operating pressure is no greater than 90 PSIG. Manually activate the level switch to test that diaphragm pump is properly operating. If an electric pump, test in the same manner once the control panel is energized.
- ✿ Open the isolation ball valves on the external sight glass assemblies and open the gauge cock valves to allow fluids to enter the sight glass assembly.
- ✿ Verify that the liquids drain line is "open" to the liquids pump.
- ✿ Verify that the control panel circuit breaker is in the "OFF" position.
- ✿ Verify that the control panel external operator switch is in the "OFF" position.
- ✿ Remove inlet power "lock-out tag-out" device per required procedures and activate power to the control panel.
- ✿ Open the control panel and turn the circuit breaker to the "ON" position and secure the control panel door.
- ✿ Turn the exterior control panel operator switch to "HANDS". This will start the manual or test igniter sequence. You will hear the igniter energizing inside of the control panel.
- ✿ Slowly open the block valve(s) installed on the inlet of the flare inlet separator(s). Once pressure has been equalized fully open the inlet suction valve. At this time if any liquid has accumulated in the sight glass manually test the liquids pump and evacuate the vessel.
- ✿ It is not uncommon for there to be a period of time before the combustor initially ignites as the system is being purged of air. Once a combustible mixture of gas exits the burner assembly the igniter system will light the burner automatically.
- ✿ The inlet flow detections system will show a lighted scale when flow is detected. The higher the scale the stronger the flow. No lights indicate, no flow. The flow detection sensitivity is pre-set

at the factory, but is field adjustable as the application requires. When the flow detection is activated it will send a signal to the igniter relay timer to start an ignition sequence.

- 🔥 The igniter activation duration is controlled by the relay timer. This timer allows the operator to determine the length of time that the igniter spark is activated as well as the intervals between igniter sequences. The relay timer is pre-set at the factory, but is field adjustable as the application requires. Excessive igniting can lead to low power levels on solar systems and accelerated wear of the igniter assembly.
- 🔥 The flame detection is designed to monitor whether the combustor is burning. If the flame rod indicates that the combustor is burning it will cause the igniter relay to stop activating the ignition sequence. The sequence will be blocked until the burner is extinguished. The ignition sequence will only begin again once the flow detection gives a signal to the igniter relay to re-start the ignition sequence. The flame detection also operates on a relay timer that is pre-set by the factory, but is field adjustable as the application requires. The flame rod reduces the excessive draw of power from the system by allowing ignition only when required.
- 🔥 Once the system has been tested and verified the operator switch on the control panel can be switched to the "AUTO" position. When in the "AUTO" position the flare will operate automatically according to the flow and demand that the system is sensing through its control devices.



Operator "HANDS – "OFF" – "AUTO" Switch
Flow and Flame Indicator Lights



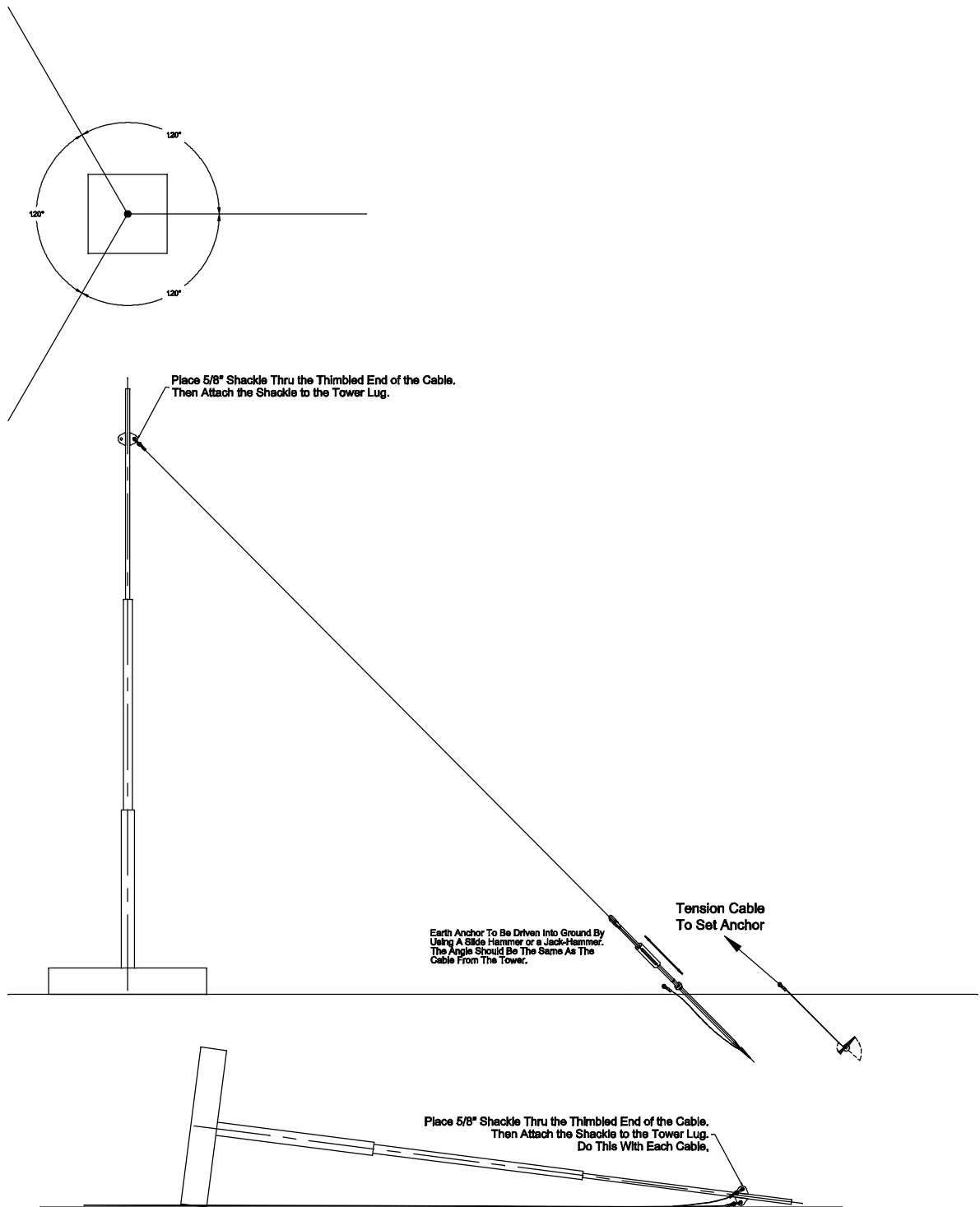
MilSpec Earth Anchors

NAME: EARTH ANCHOR FIELD ASS'Y

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06-18-2012



MilSpec Earth Anchors

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