DO NOT EXCEED

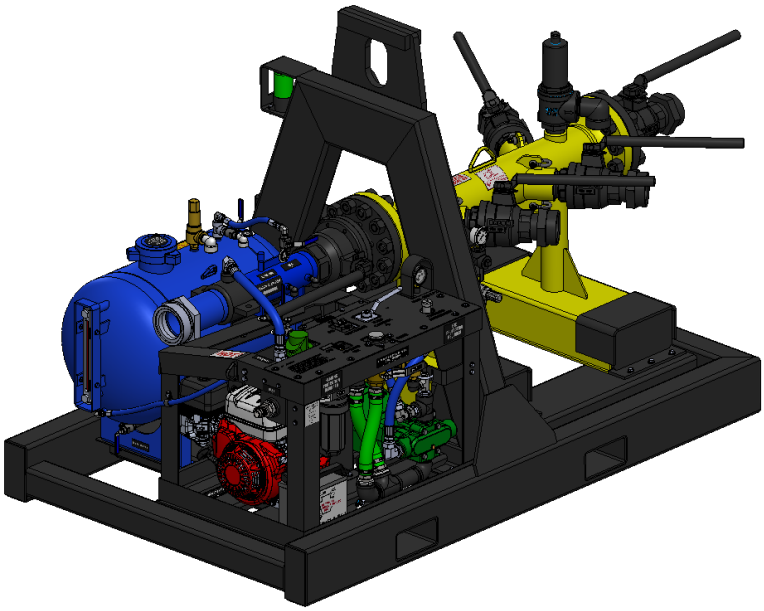
Maximum Working Pressure: 600 PSI

Maximum Temperature: 300°F

OPERATION & SAFETY MANUAL

KEYSTONE SUPPORT MODULE (NEW)

- **LOCALIZED CONTROLS ALLOW A MORE EFFICIENT AND SAFER WORKING ENVIRONMENT**
    - **CONVIENENT REGULATED AIR SUPPLY FOR AIR TOOLS, DEBRIS REMOVAL FROM DRILLING EQUIPMENT, ETC.**
- **THREE COLOR TOWER LIGHT FOR AIR PRESSURE STATUS WITH ADJUSTABLE SET-POINT**
    - **LOWER FILL HEIGHT OF LUBRICATOR WITH EASY-TO-READ SIGHT GAUGE**
- **MORE VERSATILE LIFTING POINT**



24 HOURS A DAY
7 DAYS A WEEK

Any questions regarding operation, safety or capabilities of this support module should be directed to:

Keystone Drill Services, Inc.
184 Alisa Street
Somerset, PA 15501
Ph# 800-221-0586
Ph# 814-443-2670
Fax# 814-443-6974
E-mail: sales@keystonedrill.com
www.keystonedrill.com

11/2023 REV. 00

WARRANTY

KEYSTONE DRILL SERVICES, INC. WARRANTS THAT EACH ITEM OF EQUIPMENT MANUFACTURED BY IT AND DELIVERED HEREUNDER TO THE INITIAL USER WILL BE FREE OF DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF (1) ONE YEAR FROM THE DATE OF SHIPMENT TO THE INITIAL USER.

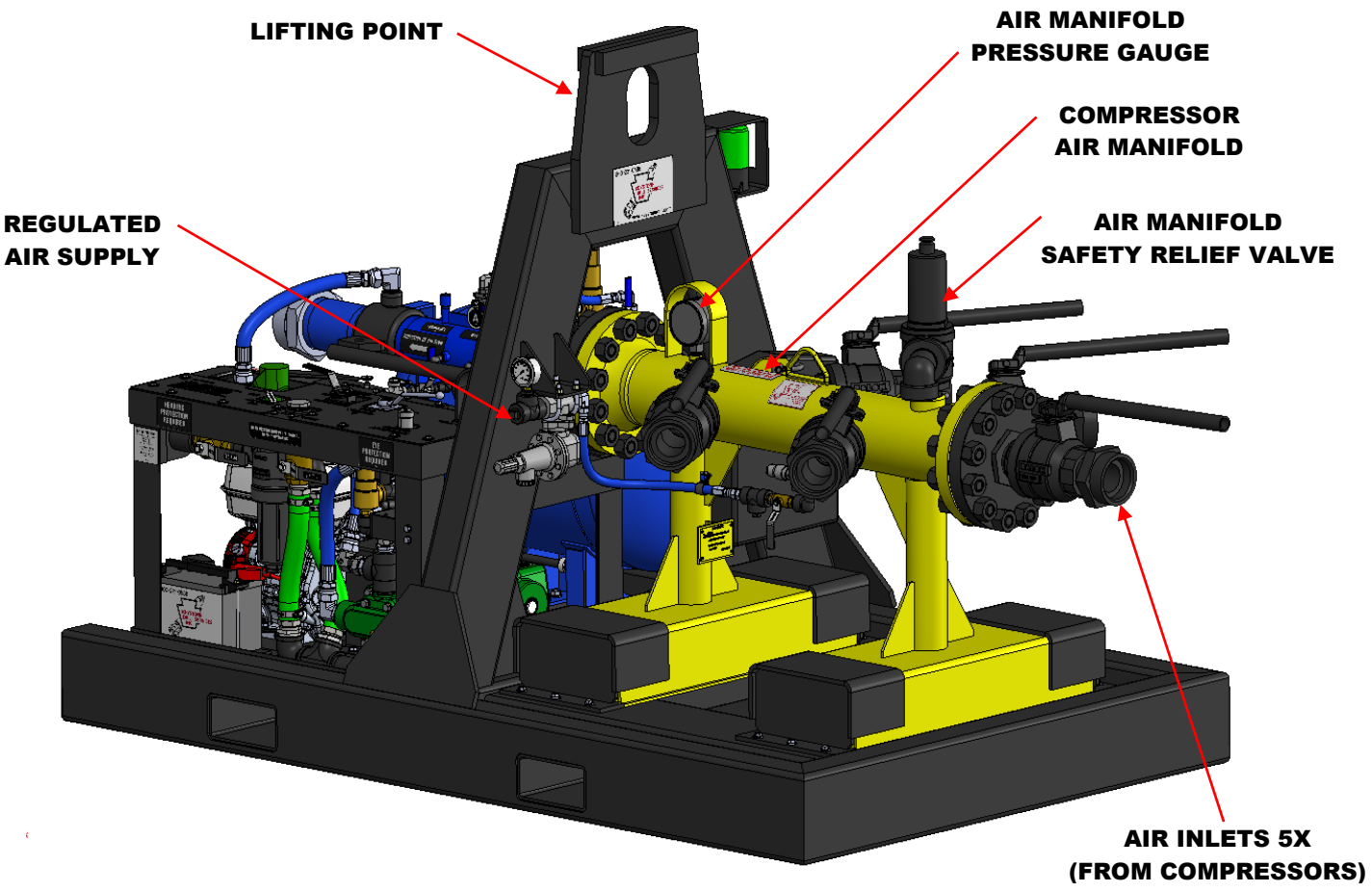
THIS WARRANTY DOES NOT APPLY TO FAILURES OCCURRING AS A RESULT OF ABUSE, MISUSE, NEGLIGENT REPAIRS, CORROSION, EROSION AND NORMAL WEAR AND TEAR, ALTERATIONS OR MODIFICATION MADE TO THE PRODUCT OR FAILURE TO FOLLOW THE RECOMMENDED OPERATING PRACTICES AND MAINTENANCE PROCEDURES AS PROVIDED IN THE PRODUCT'S OPERATING AND MAINTENANCE PUBLICATIONS.

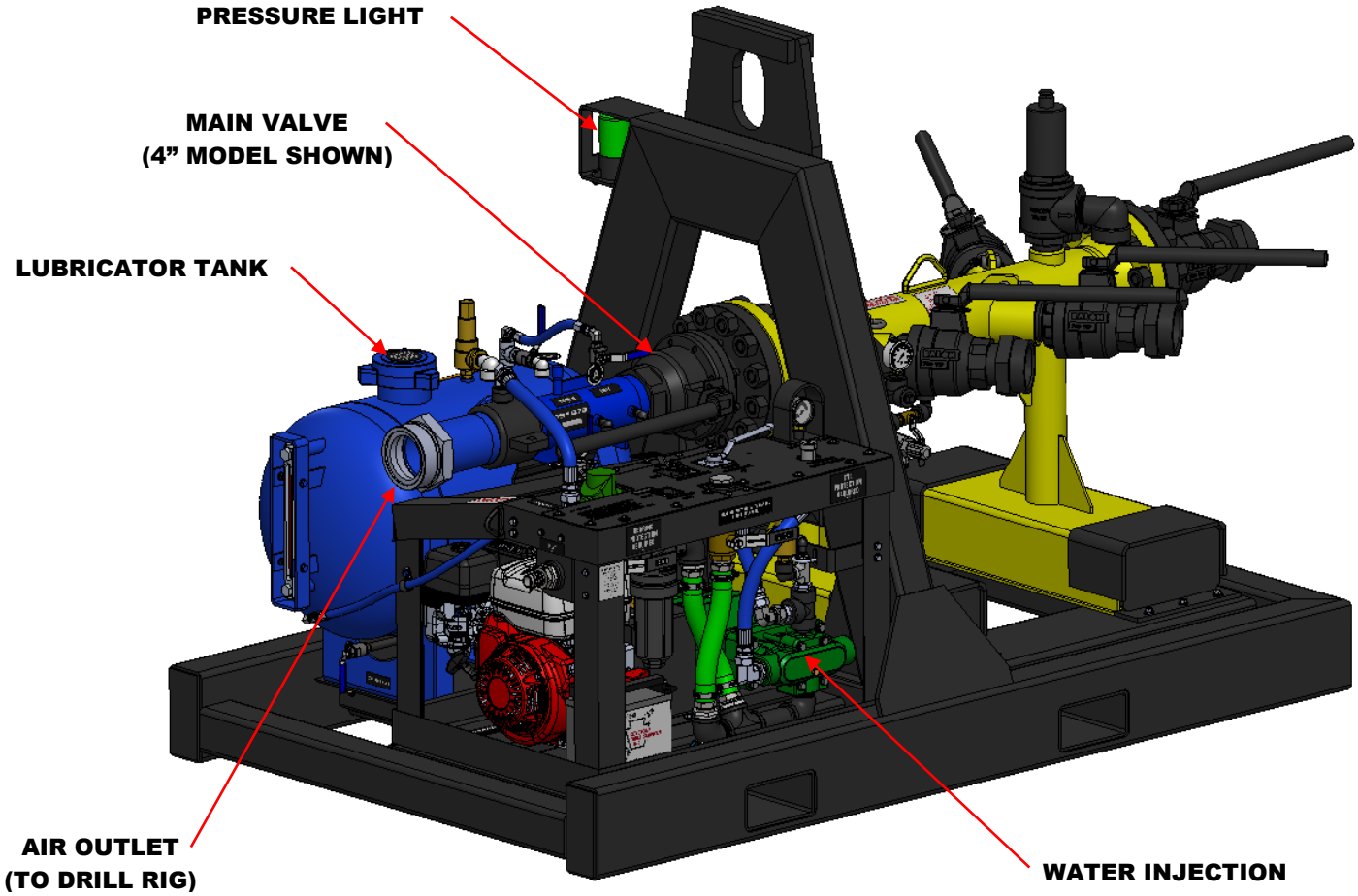
KEYSTONE DRILL SERVICES, INC. IS NOT LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES. THE TOTAL EXTENT OF OUR WARRANTY IS LIMITED TO THE REPLACEMENT VALUE OF THE LUBRICATOR. KEYSTONE DRILL SERVICES, INC., AT ITS DISCRETION, MAY ELECT TO REPAIR OR REPLACE THE DEFECTIVE PART OR PARTS.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES (EXCEPT OF TITLE), EXPRESSED OR IMPLIED, AND THERE ARE NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, AND THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

SUPPORT MODULE SAFETY

- Ensure that the operator, maintenance/service and all relevant personnel read, understand and follow all information that is provided in all manuals before operating, servicing and/or maintaining the support module.
- Ensure that operator and maintenance personnel are competent and have been adequately trained.
- Never operate the support module without first observing all safety warnings and decals. Operators, maintenance/service and all relevant personnel must understand all decals and safety warnings.
- Do not paint over safety warnings or instructional decals. If safety warning decals become illegible or missing, immediately order replacements from the factory.
- All federal, state, local and site ordinances, rules, and regulations must be followed.
- High Pressure air can cause serious injury or death. Relieve pressure before removing hoses, filler plugs/caps, fittings or covers or performing any maintenance or service work.
- Do not alter or modify any pressure vessel present on the support module.
- Do not operate support module with safety devices bypassed or disconnected.
- Disconnected air hoses whip and can cause serious injury or death. Always use approved whip check/cable on hose ends to prevent whipping.
- Do not operate the support module at pressures in excess of its Maximum Allowable Working Pressure (M.A.W.P.) rating as indicated on the ASME data plates of the lubricator and air manifold. The M.A.W.P. (Maximum Allowable Working Pressure) of the support module should be known to all relevant personnel.
- Avoid bodily contact with compressed air. Do not engage in horseplay with air hoses as death or serious injury may result.
- Keep personnel out of line with and away from the discharge opening of hoses, tools, or other points of compressed air discharge.
- When replacement parts are required for this support module, Keystone recommends using genuine parts from the original manufacturer or parts with equivalent specifications including, but not limited to physical dimensions, type, strength and material. Failure to heed this warning can lead to premature failures, product damage, and/or personal injury or death.


LIFTING POINT
AIR MANIFOLD
PRESSURE GAUGE
COMPRESSOR
AIR MANIFOLD
REGULATED
AIR SUPPLY
AIR MANIFOLD
SAFETY RELIEF VALVE
AIR INLETS 5X
(FROM COMPRESSORS)

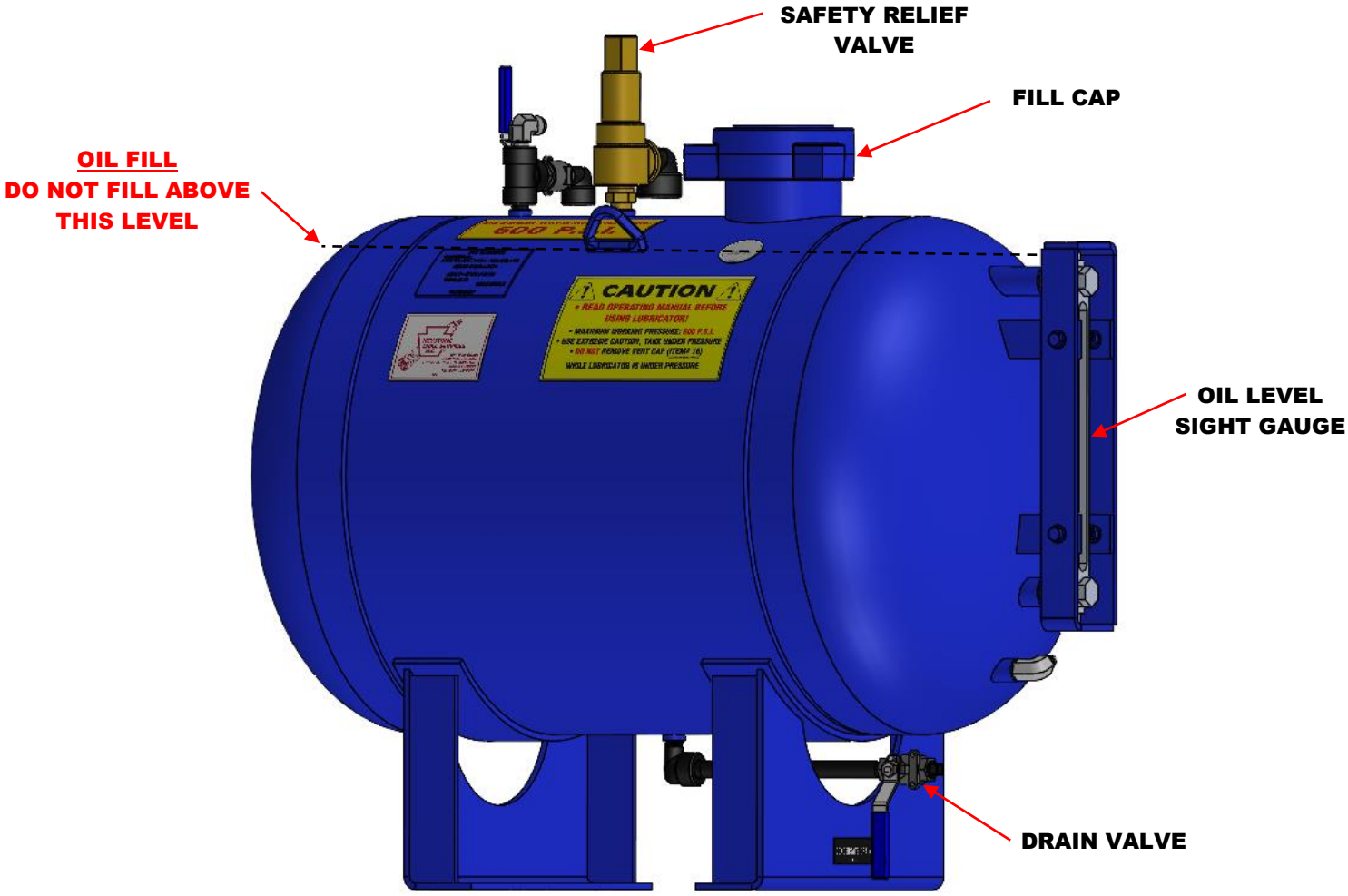

PRESSURE LIGHT
MAIN VALVE
(4” MODEL SHOWN)
LUBRICATOR TANK
AIR OUTLET
(TO DRILL RIG)
WATER INJECTION

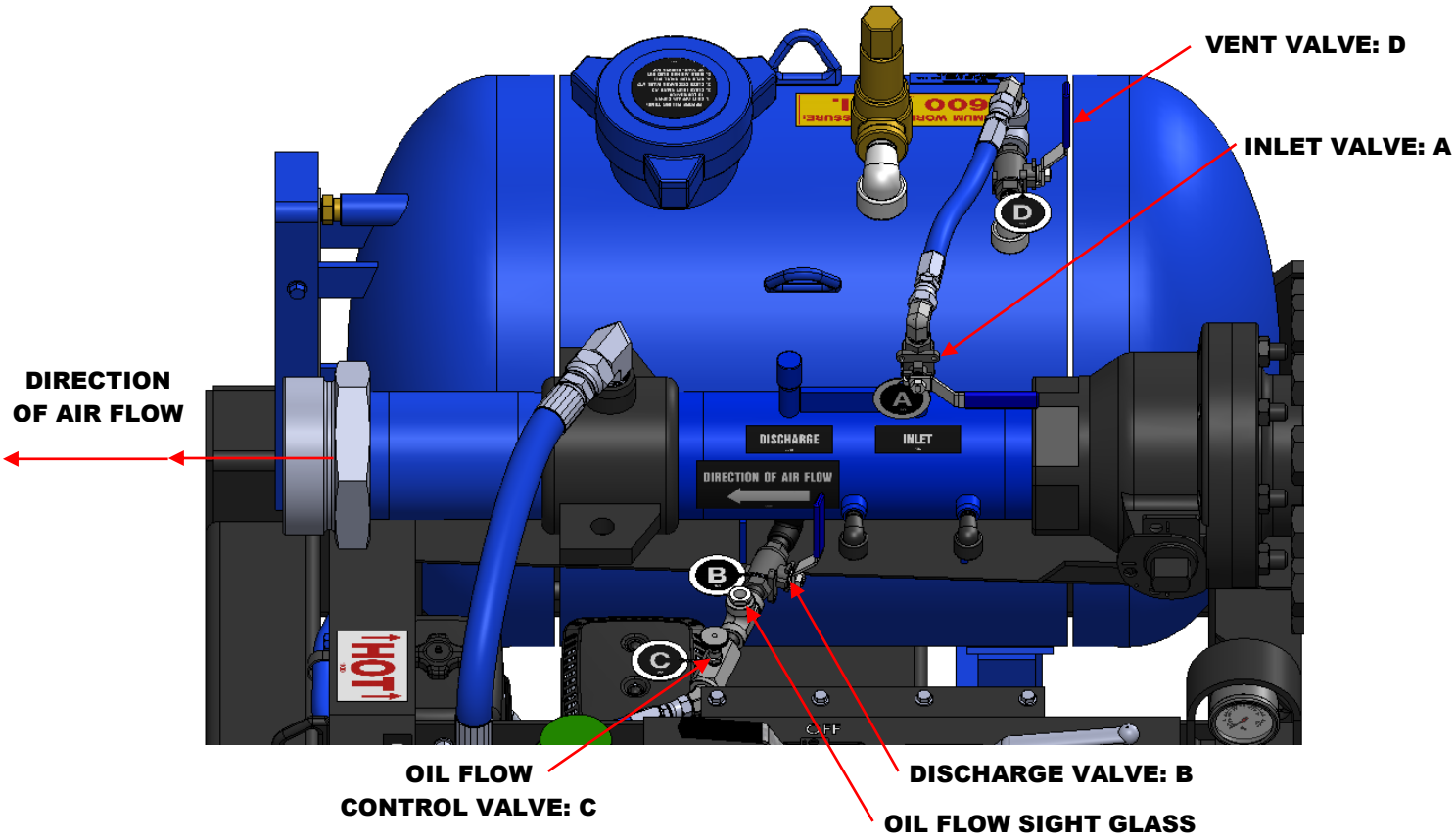
OPERATING INSTRUCTIONS

1) **Place Support Module on as level of ground as possible**
2) **Any additional injected fluids such as mud, foam, etc. must be added downstream from Support Module.**
3) **Make sure Support Module main valve and all valves at compressor inlets are CLOSED prior to making any hose connections.**
4) **Install air hoses from compressor to inlet locations and from outlet location to drilling equipment. Air hose whipsocks must be installed at tie-off locations provided at each hose connection to Support Module.**

LUBRICATOR PREPARATION:

5) **Next, the Lubricator tank may be filled and valves set for correct operation. See images and instructions shown below.**
6) **BEFORE removing Lubricator fill cap, make sure Inlet Valve: A and Discharge Valve: B are CLOSED. OPEN Vent Valve: D to purge any remaining air pressure from Lubricator. Serious injury may occur if fill cap is removed while Lubricator is under pressure.**
7) **Remove fill cap and fill Lubricator with appropriate weight rock drill oil for drill site and weather conditions. Do not overfill Lubricator.**
8) **Replace fill cap. Make sure o-ring is in place.**

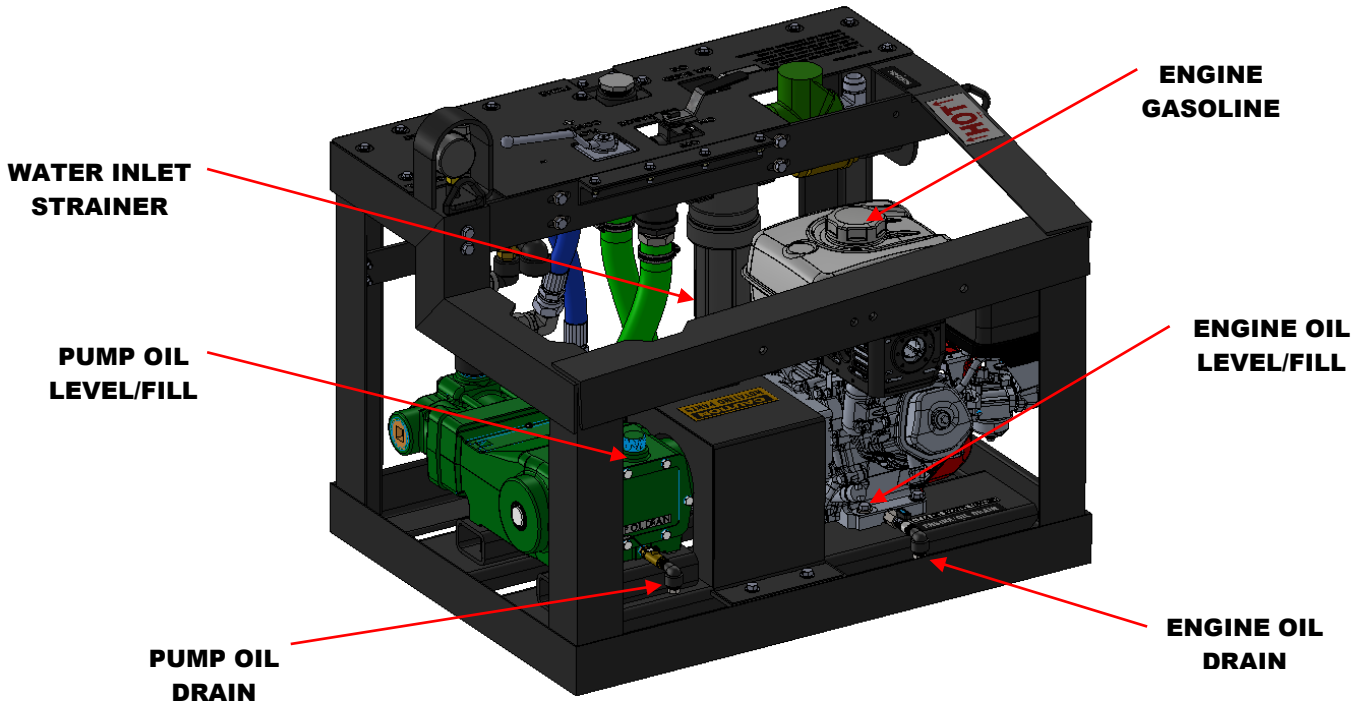




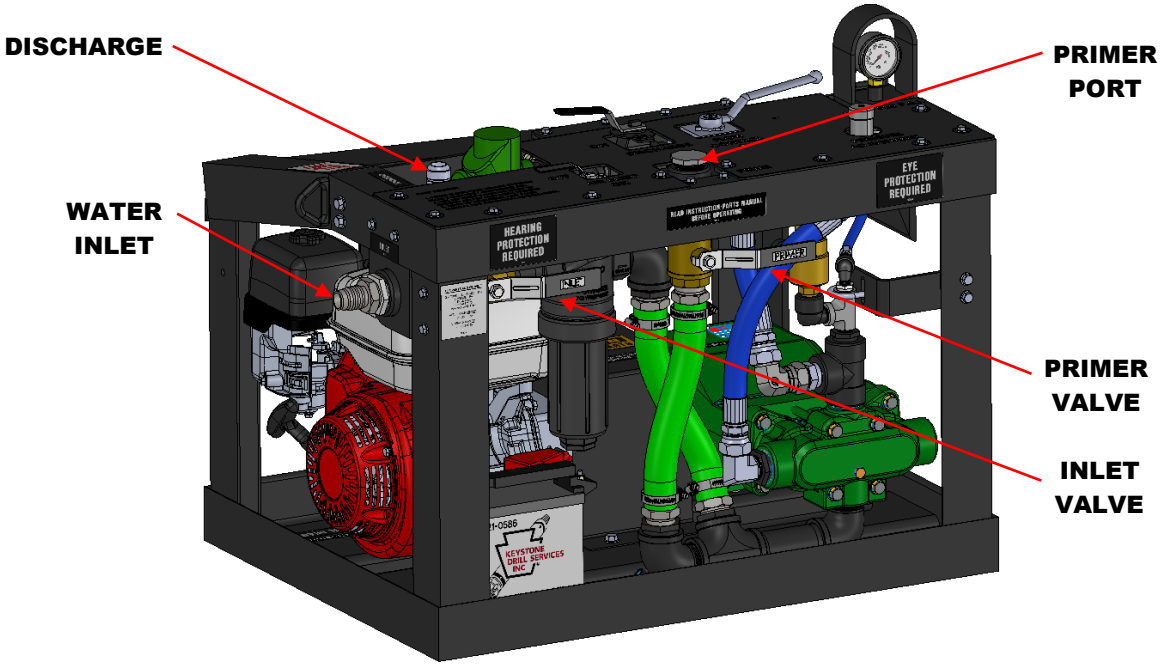
9) Close vent valve: D
10) Open oil flow control valve: C four complete turns and lock in place.
11) Compressors may be started and allowed to warm-up. Support Module main valve and inlet valves are to remain **CLOSED**.

WATER INJECTION START-UP:

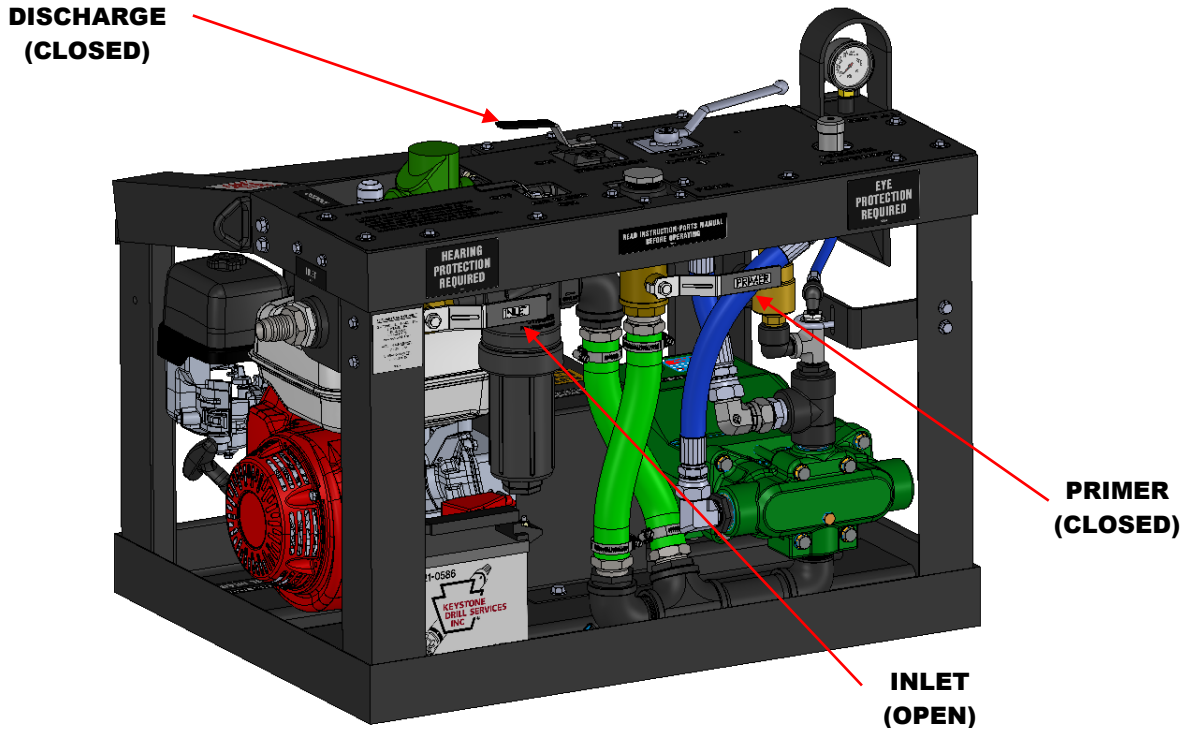
12) Check oil levels in Pump and Engine. Check gasoline level in Engine. Check Water Inlet Strainer for debris.



13) **Connect water inlet to clean water source and open Inlet Valve and Primer Valve (remove PVC plug) to bleed air from system.**

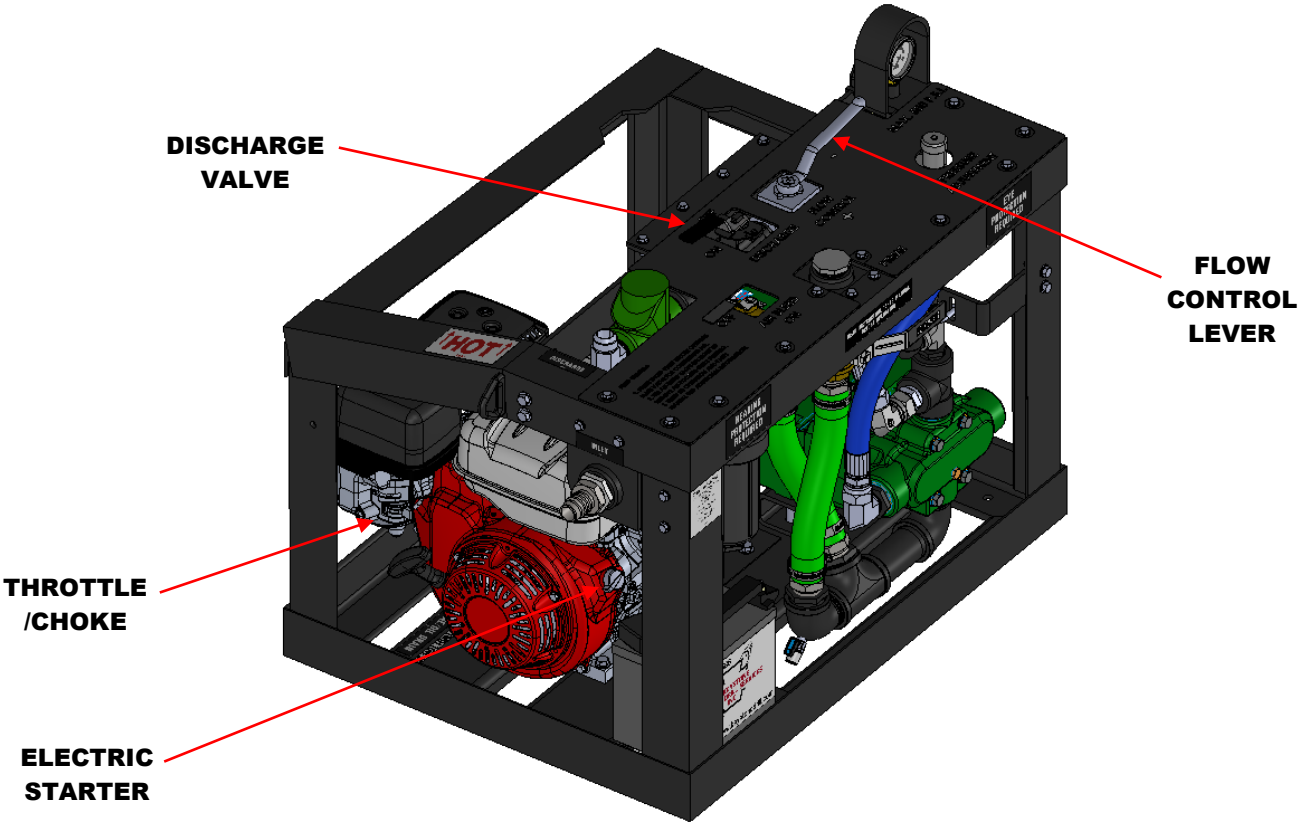


14) **Close Primer Valve after air is bled from system or water is seen in Primer Port. If there is no head pressure from the water supply, add water to Primer Port to prime the pump.**



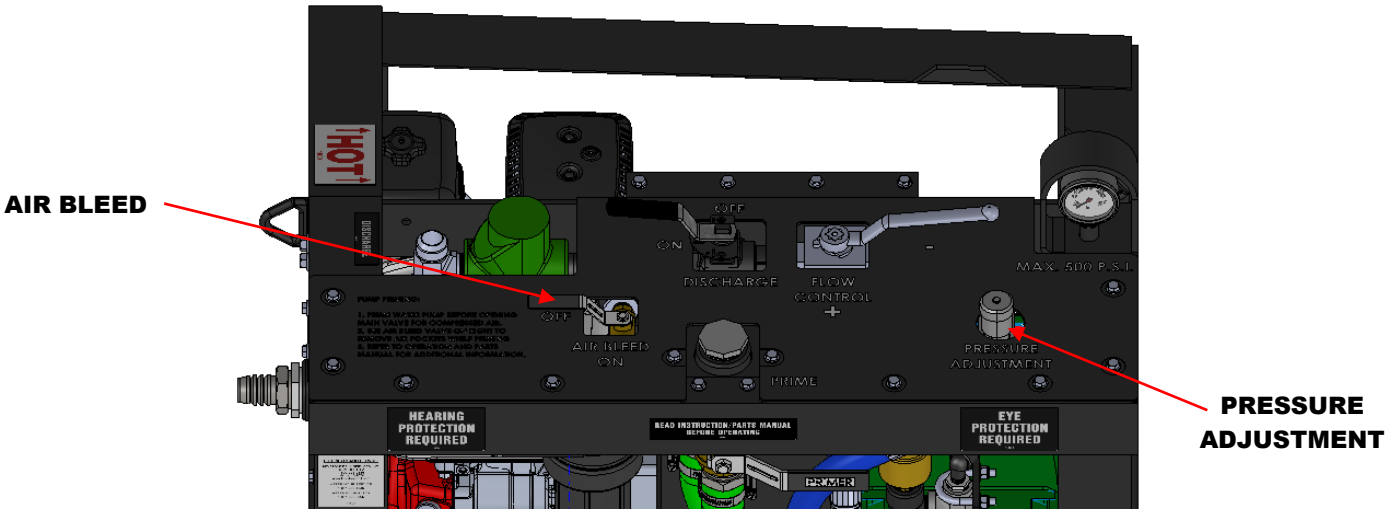
15) **Verify valve positions shown above.**

16) **Adjust Choke and set Throttle to idle. Start engine with Electric Start. Let engine idle a few minutes to warm up.**



17) **Set Flow Control Lever to midway and open Discharge Valve to purge remaining air in system then close Discharge Valve.**

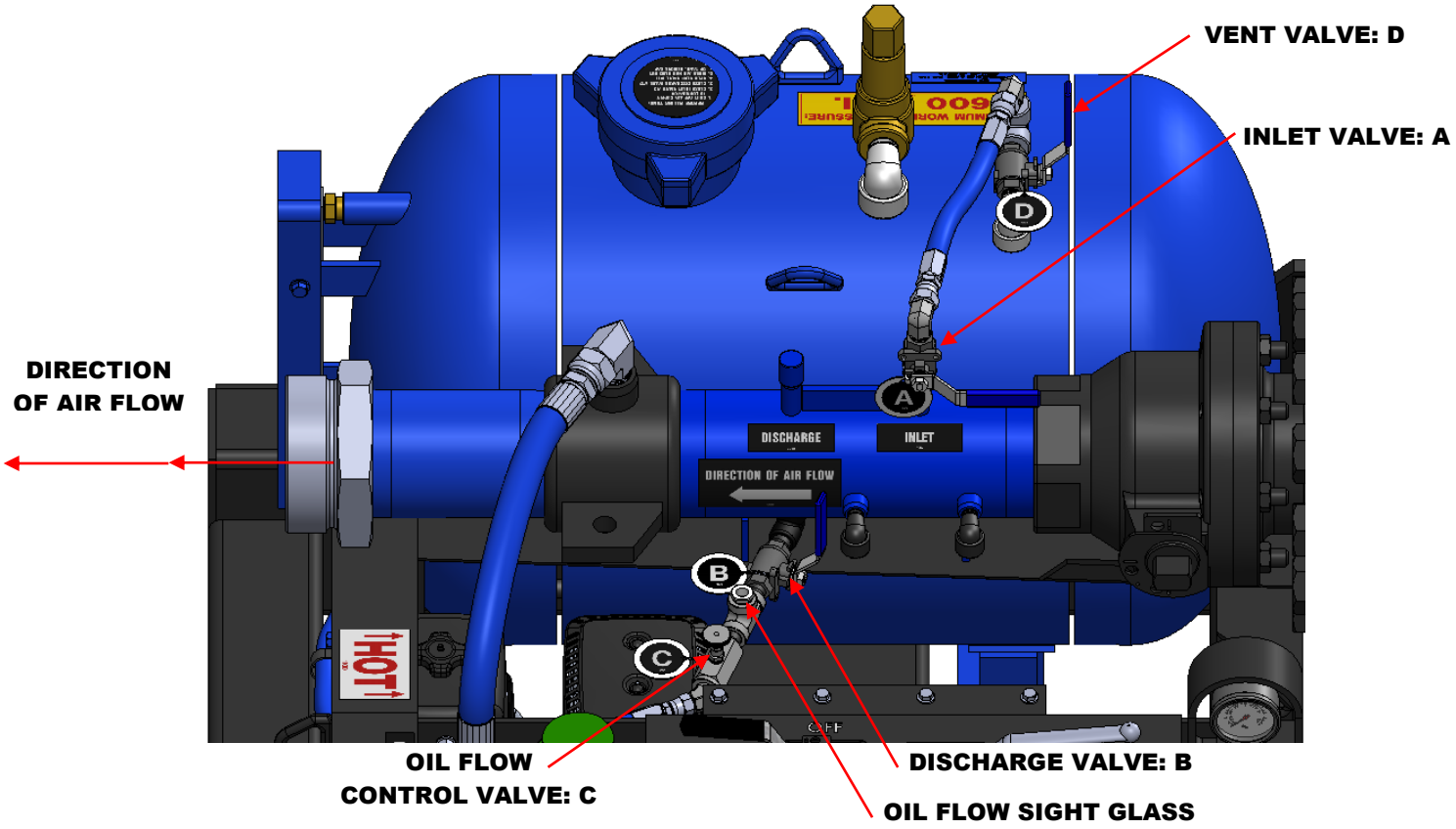
18) **With Discharge Valve closed and Flow Control Lever midway, throttle engine up and check system pressure on gauge. Pressure should be around 50psi higher than air pressure (Safety Relief Valve set to 500psi). Pressure can be adjusted by turning knob marked pressure adjustment (clockwise increases pressure). Factory pressure is set to 200 PSI.**



19) **Once pressure is set, completely open Discharge Valve and adjust flow with the lever on the Flow Control Valve.**
20) **If there is difficulty getting water to the compressed air stream, open the Air Bleed valve to purge any trapped air between Discharge Valve and Check Valve. Close Air Bleed once a steady stream of water is viewed.**

ADDING COMPRESSED AIR – LUBRICATOR OPERATION:

21) **Open each compressor inlet valve one at a time. If an inlet location on air manifold is NOT used, inlet valve must remain CLOSED or serious injury to personnel could result.**
22) **Next, open the Support Module main valve.**
23) **After opening main valve, open air inlet valve: A**



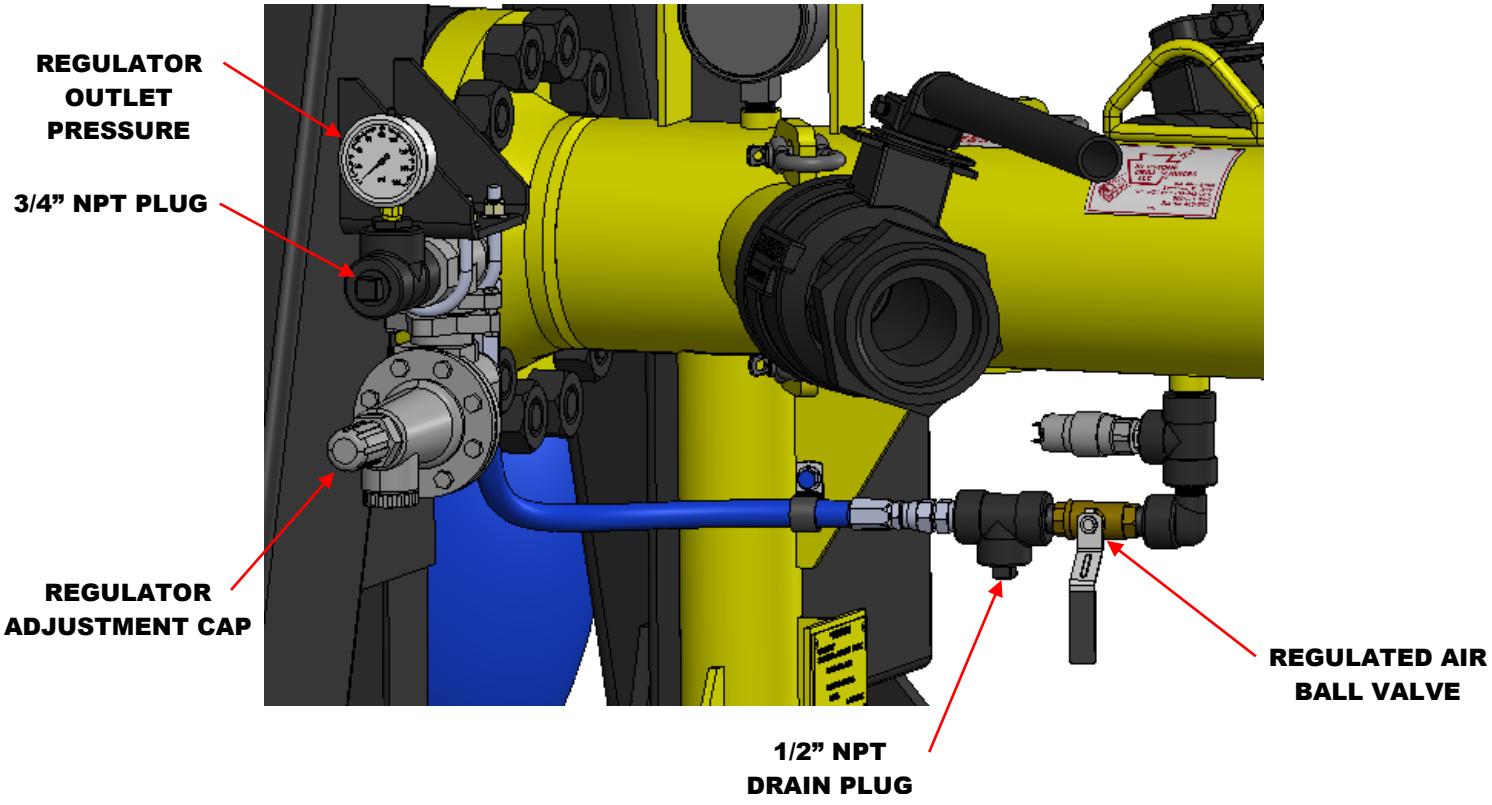
24) **Open discharge valve: B**
25) **Oil flow can be viewed at oil flow sight glass located between oil flow control valve: C and discharge valve: B**
26) **Operate hammer and check if bit is wet. A properly lubricated tool will be wet but not dripping oil.**
27) **To control lubricating, adjust oil flow control valve: C counter-clockwise to increase oil, clockwise to decrease. With correct adjustment, tighten nut and continue drilling.**
28) **To FILL WHILE YOU DRILL, repeat steps 6 – 9 above. Open inlet valve: A and discharge valve: B to continue injecting oil into compressed air.**

SHUTDOWN PROCEDURE:

29) To stop Lubricator, close air inlet valve: A, then close discharge valve: B
30) Open vent valve: D to purge remaining compressed air from Lubricator.
31) Use throttle to idle water injection engine for a minute followed by closing Water Injection discharge valve.
32) Shut engine off, then close Water Injection inlet valve.
33) Close Support Module main valve to shut air off to downstream equipment.
34) Next, close each compressor discharge valve.
35) At this point, compressors are "boxed in" with air pressure remaining in the air hoses and the yellow Air Manifold.
36) Support Module main valve can now be reopened to purge air pressure remaining in air hoses and Air Manifold.
37) It is required that each compressor go through the shutdown/blowdown procedure to relieve all air pressure before breaking air hose connections at Air Manifold inlet valves.
38) Double check pressure light is out and that pressure gauge on Air Manifold reads 0 psi before breaking any air hose connections to support module.

REGULATED AIR SUPPLY:

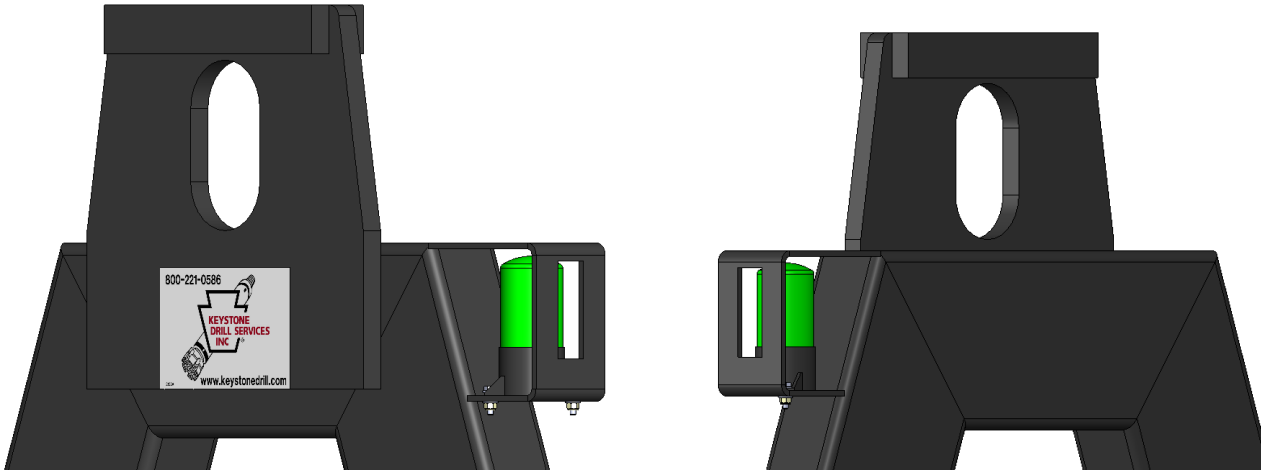
A regulated air supply is included with every new Support Module. This will allow compressed air to be used at a lower pressure (150 p.s.i. maximum) for cleaning debris from drilling equipment, operation of air tools, etc. at the drill site.



1) **Remove 3/4 npt plug located on tee fitting. Install appropriate fitting for the air tool or hose being used. All fittings, hoses, etc. installed to the regulator must be rated 150 p.s.i. MAWP or higher.**
2) **Next, open ball valve located underneath yellow air manifold to supply compressed air to regulator.**
3) **Regulator outlet pressure can be adjusted by removing the adjustment cap. Next, use a 3/4" wrench to loosen the jamb nut, followed by a 1/2" wrench to turn the adjustment screw. When desired pressure is reached, lock the adjustment screw with jamb nut and replace cap.**
4) **Remove 1/2" npt plug located in regulator supply hose to drain any condensate buildup in yellow air manifold.**

PRESSURE LIGHT:

A 3-color flashing light is included on each new Support Module. This light enables the rig operator to view air pressure status at-a-glance while drilling. It also serves as a safety device, indicating to job site personnel that Support Module is pressurized.



PRESSURE LIGHT COLOR KEY:

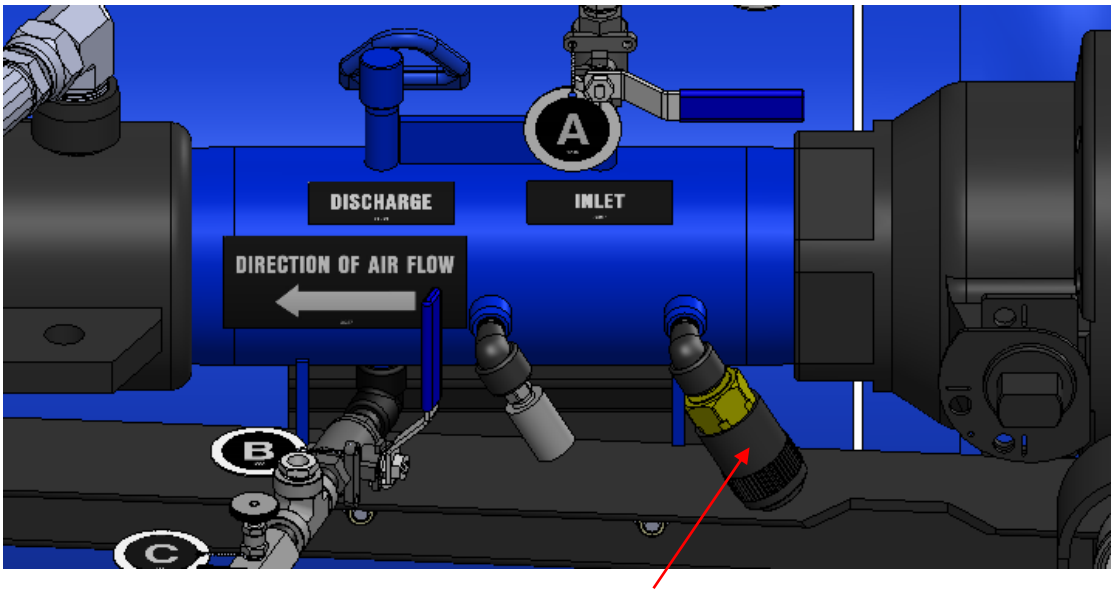
RED: Support Module main valve CLOSED and air pressure is present in yellow air manifold. Pressure must be released before any hose connection is broken.

AMBER: Main valve OPEN and air pressure is present throughout the entire Support Module and at downstream drilling equipment. When drilling, this also indicates air pressure is less than required for ideal hammer operation.

GREEN: Main valve OPEN and air pressure is equal to or above required pressure for ideal hammer operation. The pressure set-point for green light is adjustable as explained on next page. Factory setting for green light is 100 p.s.i.

CLEAR (NO ILLUMINATION): All air pressure has been released from Support Module. It is now safe to break any hose connections downstream.
IF COMPRESSORS ARE RUNNING, HOSES MAY BE PRESSURIZED UPSTREAM FROM SUPPORT MODULE. DO NOT BREAK CONNECTIONS IF PRESSURIZED.

ADJUSTING GREEN FUNCTION OF PRESSURE LIGHT:



GREEN LIGHT
PRESSURE SWITCH

1) **Locate the pressure switch shown above. It can be found on the water injection side of the lubricator manifold.**
2) **Use a 1/16" allen wrench to loosen the two set screws in the black knob of the pressure switch.**
3) **Tighten the pressure switch knob to increase the activation pressure; loosen it to decrease activation pressure.**
4) **After adjustment, tighten set screws to ensure the green light function accurately represents required air pressure.**

WINTERIZING UNIT (WATER INJECTION)

1) **Once verifying pressure is out of the system, disconnect discharge line and water source.**
2) **Open Pump Drain while engine is running.**
3) **Alternate opening Discharge Valve and adjusting Flow Control Lever until water stops venting from the Drain and Discharge.**
4) **Turn off engine and close Pump Drain Valve.**
5) **Remove plug from Water Inlet Strainer and drain water. Replace plug.**
6) **Circulate biodegradable antifreeze through system via the Primer Port.**
7) **Run engine until antifreeze emerges from discharge.**
8) **Turn off engine.**

MAINTENANCE SCHEDULE (WATER INJECTION)

1)	**Check Gasoline Level:**	**Every Hour**
2)	**Check Water Supply Level:**	**Every 2 Hours**
3)	**Check Pump and Engine Oil:**	**Every 8 Hours**
4)	**Check Engine Air Filter:**	**Daily**
5)	**Check/Clean Inlet Strainer**	**Daily**