COMPRESSOR CONTROLLER

Compressor Controller for Single and Duplex Pump Electric Compressors

Compressor Controller Installation Guide & Information

Compressor Controller Model **CCR100**
for reciprocating Single air compressors

Compressor Controller Model **CCR200**
for reciprocating Duplex air compressors

The Compressor Controller is simple to install, easy to use controller designed for electric single and duplex pump reciprocating air compressors. It's a true manager-in-a-box controller system that optimizes performance, reports conditions, and delivers savings at all times. It is a durable, real time computing system that uses feedback and analytics to control air compressors based on what is happening in the moment rather than the imprecise binary options provided by switches and timers. Proactive, self-learning control reduces energy consumption and lowers costs while improving the safety and reliability of compressed air systems making the Compressor Controller a purchase that pays for itself year after year.

- Intelligent air tank drain control reduces moisture content in compressed air
- Optimized automatic unloader management reduces pump oil contamination and lowers startup current
- Air line rupture detection and overrun prevention
- Intelligent overheat protection
- Precision pressure band gap all time
- Cycle and Hour usage meter for accurate maintenance recordkeeping
- Compressor-City:
  - Satisfy peak-demand air requirements
  - Build equal maintenance intervals for all compressors in-use

The Compressor Controller, a SAM Controllers product
engineered and manufactured in Pittsboro, North Carolina
919.442.8787 | SAMcontrollers.com | CompressorController.com

SAM CONTROLLERS

Table of Contents:

READ AND FOLLOW ALL INSTRUCTIONS AND THE
USER MANUAL BEFORE USING THIS PRODUCT

Please see the user manual (included as a digital link with your order at samcontrollers.com), quick start guide and the installation videos for more installation information. Per O.S.H.A. regulation 1910.147: The Control of Hazardous Energy Source (Lockout/Tagout), disconnect and lockout the main power source for compressor(s). Display a sign in clear view at the main power switch stating that the compressor is being serviced.

Installation Overview

Installing the Compressor Controller can be broken down to the following steps:

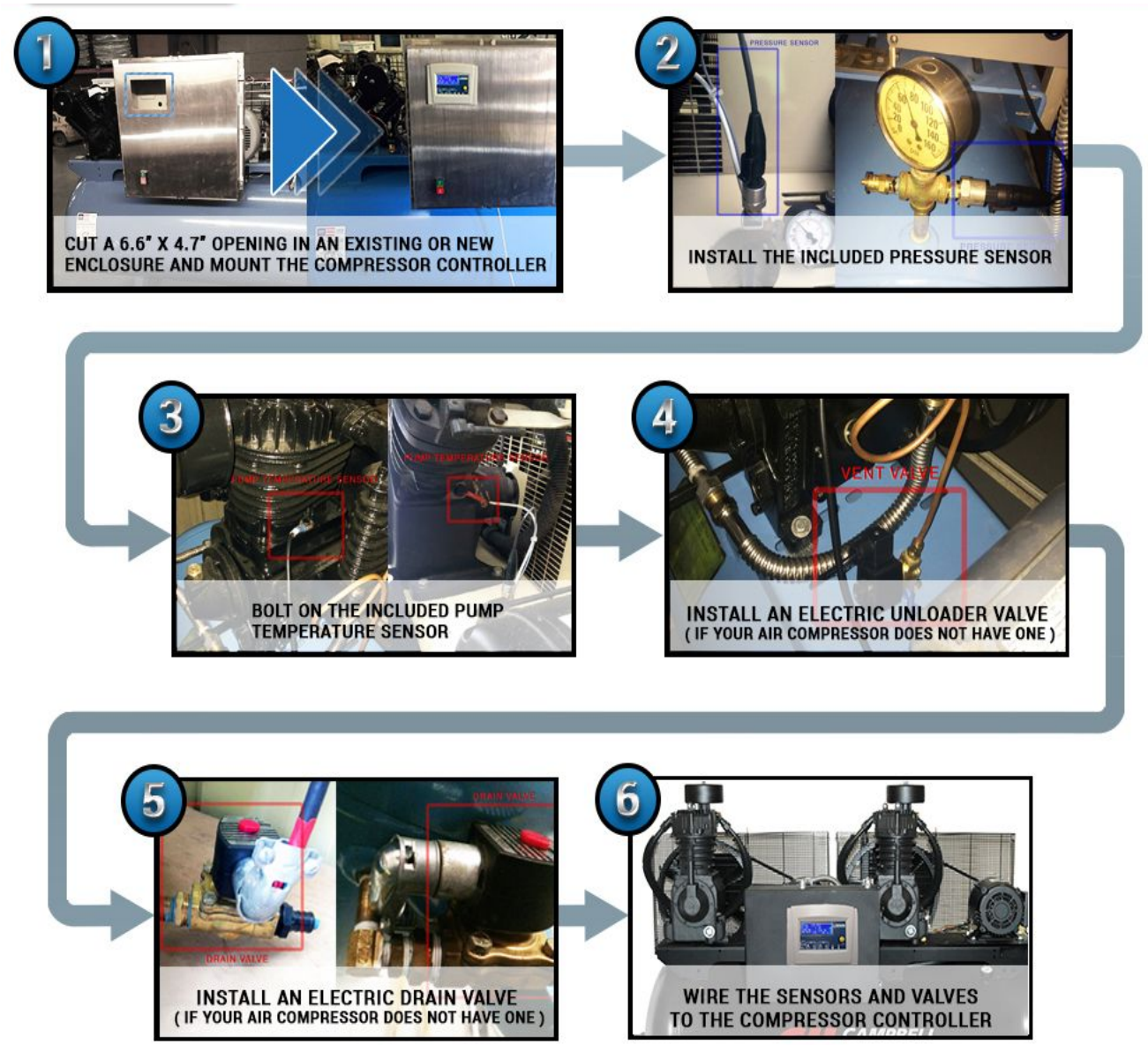
1. Cut an opening in an enclosure* to mount the compressor controller, temperature sensor, power supply, buzzer and magnetic starter * / Solid State Relay (SSR) * / Variable Frequency Drive (VFD) *.
2. Install the digital pressure sensor on the tank, often added to a tee where the original pressure gauge is located.
3. Remove a bolt that attaches the pump head to the pump base and install the pump temperature sensor much like a washer and reinstall the bolt.
4. Add an electrically operated unloader valve* if the unloader is operated mechanically or if an existing electrically operated valve is present it can be used. (check for electrical compatibility).
5. Add an electric valve* to the tank drain or if an existing electric valve is present it can be used (check for electrical compatibility).
6. Connect and check the wiring.

** Components that are not included with the compressor controller kit and may be needed*

Resources

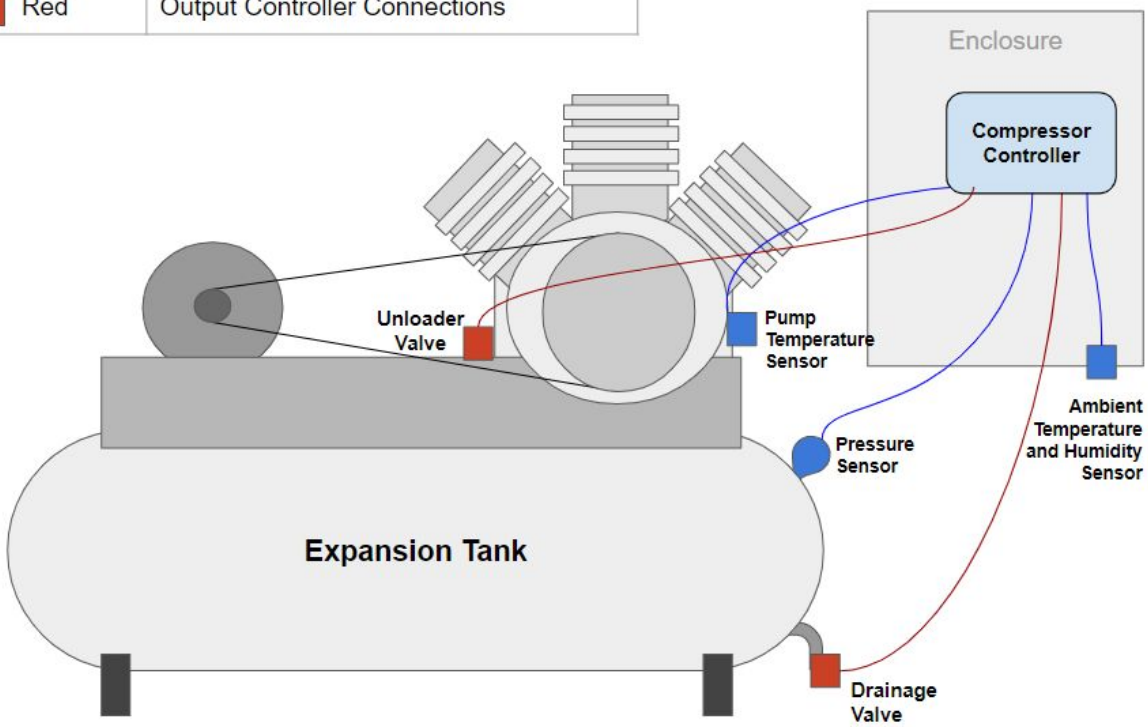
Installation Video	https://compressorcontroller.com/resources/installation-video/
14 Step Guide & Walkthrough	https://compressorcontroller.com/resources/compressor-controller-installation-quick-guide/
Vent / Unloader Valve Selection Guide	https://compressorcontroller.com/resources/unloader-valve-selection-guide/
TechTalk Support Portal & Community Post questions/comments with pictures to receive feedback from the community and SAM Staff	https://techtalk.samcontrollers.com/c/air-compressor-controls
Connection and Wiring Diagrams	https://samcontrollers.com/download/compressor-controller-model-r-connection-and-wiring-diagrams/

Illustrated Guide



Connections Overview Diagram

Color	Function
Blue	Sensor Connections
Red	Output Controller Connections



** Connections not pictured above:

Power In, Enclosure / Box fan, Buzzer / Alarm, Compressor Citty connection, Compressor run, AUX cooling fan, external halt / stop signal input

Connections

Sensor Connections The compressor controller uses the digital pressure sensor, pump temperature sensor and ambient temperature and humidity sensors, both are included with the compressor controller and all need to be properly installed

Name / Function	Required / Location	Typical Installation
Pressure Sensor Mesures real-time pressure	Yes, Located typically where the mechanical switch is installed onto the tank	Installed on air tank with a tee that connect to the manual pressure release valve and pressure gauge.
Pump Temperature Sensor Is a ring cable shoe thermocouple that Measures the real-time temperature of the air compressor pump	Yes. Tightened down by a bolt on the compressor pump(s) connection of the piston housing and pump base	Installed on to compressor pump head
Ambient Temperature and Humidity Sensor Measures the real time environmental temperature and humidity	Yes, Installed within an enclosure that is near the air compressor intake, protected from direct sun and rain	Installed at the bottom of the enclosure

Pressure settings The (low/on and high/off) pressure cut on / off settings are digitally set by user, on the back panel of the compressor controller and it can be set anywhere between the range of minimum and maximum, the standard Compressor Controller ships with the following pressure ranges:

Standard Pressure Range:	Minimum: **40PSI** Maximum: **160psi**

Other ranges are available (up to 5,000PSI) as custom order options, please contact SAM Controllers for more information.

Output Connections Normally Open and Normally Closed Relay outputs
Maximum Ratings AC/DC: (250VAC 10A / 24VDC up to 0.3A)

Name / Function	Required / Location	Typical Configuration
Unloader Valve, Controls unloader valve based on pump feedback	Yes. Located typically where your mechanical unload valve is installed Located typically at compressor pump output line and the compressor tank - can be manual or electrically actuated.	Normally open solenoid valve with an orifice (see manual for details) that provides depressurization of pump output
Drain Valve, Controls drain to minimize moisture content	Yes. Located at the bottom of the tank	Normally closed solenoid valve, with a line out to drain the compressor moisture. (please follow the appropriate disposal procedures & rules)
Compressor motor Control, On/Off compressor pump motor.	Yes. Located in an enclosure near / attached to the compressor.	Connected to a Solid State Relay (SSR), Magnetic starter or Variable Frequency Drive (VFD) that drives the electric motor.
Auxiliary Fan, Controls Fan to provide additional cooling to the pump	Optional. Location: Pump or intercooler.	Connected to a Solid State Relay (SSR) or Magnetic starter that drives an electric fan.

See the manual for further information about the Output Connections, Sensors and other connections: *power input, enclosure fan, buzzer / alarm, Compressor Citty connection, compressor run connection, aux. cooling fan connection and external halt / stop signal inputs.*

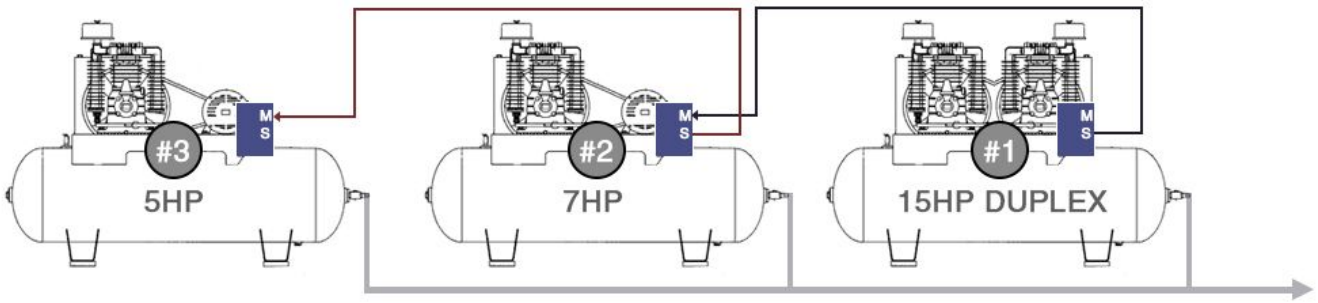
Compressor City Connection

The Compressor City network is created when a Compressor Controller is wired to another master or slave Compressor Controller (using two wires, polarity agnostic). This enables multiple compressors to work together to digitally maintain the desired level of pressure on air compressor systems. Controlling a network of single-pump, two-pump, three-pump or four-pump systems as one air network.

With the Compressor City connection, only the pumps necessary for operation will run and each pump will balance their run times. This intelligent operation of pumps will eliminate overload and equally distribute the wear and tear among all of the pumps in the Compressor City.

External Control Connection – This is designed to receive a control signal from the Master Compressor Controller (Slave input) and allows it to send a signal to a Slave controller (Master Output) to provide help on maintaining the appropriate CFMs. .

Example Compressor City connection diagram:



The Master Compressor is often a larger air compressor and the Slave Compressor is typically a smaller air compressor

Package Contents

The CCR100 Single / Simplex Standard Kit includes:

- 1x: CCR100 single Compressor Controller
- 1x: Pressure sensor
- 1x: Temperature / humidity sensor
- 1x Main power rocker switch
- 1x: Pump temperature sensor
- 1x: Buzzer
- 1x: Power supply

The CCR200 Duplex (Single Tank, Dual Pump) Standard Kit includes:

- 1x: CCR200 duplex Compressor Controller
- 1x: Pressure sensor
- 2x: Pump temperature sensor
- 1x: Ambient temp/humidity sensor
- 1x Main power rocker switch
- 1x: Buzzer
- 1x: Power supply

The Compressor Controller comes as a “Do-It-Yourself” kit that allows you to cater the form and functionality to your specific needs. *The enclosure does not come with the kit and some of the auxiliary functions require additional components such as valves, fans and starters.* Make certain that you have all of the necessary components for the functionality that you desire prior to installation.

Important Safety Information

⚠ DANGER

THIS PRODUCT CAN CAUSE SERIOUS INJURY OR DEATH IF NOT USED IN ACCORDANCE WITH THE FOLLOWING SAFETY INSTRUCTIONS. WE CAN NOT ANTICIPATE EVERY POSSIBLE CIRCUMSTANCE THAT MIGHT INVOLVE A POTENTIAL HAZARD. THE WARNINGS, CAUTIONS, DANGERS, AND SAFETY SUGGESTIONS ARE THEREFORE NOT ALL INCLUSIVE. AS THE OWNER YOU ARE RESPONSIBLE FOR THE SAFE OPERATION OF THIS EQUIPMENT. ALWAYS MAKE SURE THAT ANYONE USING THIS EQUIPMENT HAS READ THIS MANUAL AND FOLLOWS THE SAFETY WARNINGS TO HELP PREVENT THE POSSIBILITY OF PERSONAL INJURY TO THE OPERATOR OR ANYONE ELSE. IF ANY OPERATING PROCEDURE, INSTALLATION, MAINTENANCE, OR WORK METHOD NOT SPECIFICALLY RECOMMENDED IS USED, YOU MUST SATISFY YOURSELF THAT IT IS SAFE FOR YOU AND OTHER PERSONS. YOU MUST ALSO ENSURE THAT THE PRODUCT WILL NOT BE DAMAGED OR MADE UNSAFE BY THE PROCEDURE YOU CHOSE.

The compressor controller has a maximum standard pressure set at 160psi - the pressure band (low/on and high/off) can be digitally set (via the adjustment screw on the back panel at the top left corner) anywhere between the range of minimum: 40 psi to a maximum of: 160 psi. This maximum pressure setting is put into place as most standard reciprocating air compressors are not designed for pressures above this threshold and may cause safety issues if exceeded. If you would like to have a higher maximum pressure set-point please let us know by contacting customer support - we require a written liability release and the compressor controller will require to be serviced at the SAM factory.

In the event that an injury does occur, please seek medical attention at once since the equipment may cause injuries that are not initially recognized. Use proper electrical power. Connect unit to a dedicated circuit of the proper voltage, proper rated circuit breaker, and wired with the proper wire size and number of conductors. Use supply Wires suitable for 110°C Ensure that all connections are properly tightened. Improper connections could result, causing damage, injury, or death of the equipment operator. This machine must be connected in accordance with the National Electric Code (NEC) Article 422-4 - Ed-31, Except as provided for in NEC 90-4. This machine must be properly grounded to avoid fatal electrical shock in the event of an electrical malfunction. A ground connector screw should be fastened into the chassis to facilitate supplemental grounding as permitted by NEC 250-91. **! DANGER** Do not connect any other equipment to the electrical circuit serving this unit. Do not replace a fuse or circuit breaker with one of a higher rating without being certain the wire size is adequate to handle the increased electrical load. Keep all electrical connections dry and off of the ground. Observe all local and national codes for the installation and use of this type of equipment. Please use the following criteria for wire selection. • 0 to 25 Feet from Main Power Source - At least the same size wire. • 25 to 50 Feet from Main Power Source - At least one wire size larger. • 50 to 100 Feet from Main Power Source - At least two wire sizes larger. • 100 to 150 Feet from Main Power Source - At least three wire sizes larger. If the wire size being used is too small, the voltage drop will be high, and this will cause the motor to draw excessive current and overheat or fail. If there are any questions or problems with the electrical system being used please, do not hesitate in calling a local qualified electrician. **Wear proper protective clothing and equipment.** Wear full eye protection (preferably a face shield) while operating this product. The pressurized spray from the air compressor can cause severe injury to the eyes. It also may contain irritants, particles or caustic chemicals. Do not operate with protective covers or guards removed. The Compressor Controller unit may start and stop the air compressor, drain or release valve automatically when. Do not operate with any electrical panels or covers opened. Operating this unit with any of the electrical panels or covers opened may expose high powered electrical

connections and/or components which may come in contact with the operator. Contact with high powered electrical equipment by a person could result in serious injury or death. Do not operate this unit with any of the safety controls bypassed. This unit was designed with safety in mind. Never allow anyone to bypass, modify, or alter anything on this unit. If any parts appear to be dysfunctional, do not operate the unit and immediately contact a qualified technician. Do not operate or install any components rated less than the maximum operating pressure of the air compressor. The pressurized spray from the drain valve, unloader valve and air compressor can cause serious injury or death if sprayed at people, animals, or any living thing. It can inject air and/or harmful particles and chemicals into the skin and other soft tissues, and this can cause serious injury or death. If an accident occurs and the spray appears to have penetrated the skin, even if the injury appears to be minor, seek medical care immediately. Do not treat as a simple cut. Be prepared to tell a physician what particles and/or chemicals you are using. For treatment instructions, have your physician contact the nearest regional poison information center for more information. Unplug or disconnect unit before cleaning or servicing. To help prevent the risk of injury or death as a result of shock or electrocution or entanglement while this product is being cleaned, serviced, or repaired, electrical power must be removed. Unplug or disconnect the power cord or “lock out” the switch box that supplies power. For more details, please refer to U.S. Department of Labor, Occupational Safety and Health Administration, Regulation 29 CFR 1910.147, Control of Hazardous Energy Source (lockout/tagout). Only qualified personnel should attempt any electrical repairs or troubleshooting on the equipment. Serious injury or death could result from improper repairs and/or trouble shooting. Never modify or alter this unit. For your own safety as well as others, never allow this unit to be altered or modified. Modifying or altering equipment to operate in a fashion other than its original design may cause serious injury or death. Never exceed the factory pressure or temperature rating of the system. Be sure that all accessory equipment and system components meets or exceeds the pressures, specifications and temperatures of this unit.

Do not operate unit with damaged or worn hoses, fittings, clamps, or spuds. Always check the connection hose, control hoses, fittings, clamps, and spuds prior to operation. Replace all damaged or worn items with one which meets or exceeds the specifications of the original equipment. The use of an improper hose, fitting, clamp, or spud may cause the hose, fitting, clamp, or spud to rupture which could result in serious injury or death or damage to property. Do not repair damaged hoses or fittings. Replace all damaged hoses and/or fittings with ones which meet or exceed the specifications of the original equipment. Do not use the hose if cuts, leaks, abrasions, bulges, or coupling damage is evident. Never remove any hose or fitting while the unit is on. The risk of fluid injection is present.

Do not operate near flammable or combustible materials. This product is not intended for use in locations where fire or explosion hazards may exist due to the presence of flammable vapors, liquids or gases, or combustible dusts or fibers. Do not remove any air line or receiver connections before relieving air pressure in the entire air system and receiver tank(s). Always relieve the air pressure in the entire system and in the receiver tanks before removing any air lines or receiver connections. Do not operate at pressures, temperatures and rotational speeds in excess of the air compressor and connected equipment manufacturers recommendations.

Have the receiver tank(s) inspected for corrosion and/or damage periodically. Always ensure that the tanks are drained daily or after each use. If the receiver or any air lines develop leaks, immediately replace them. There is a risk of a violent tank or air line explosion which can cause damage to property and can injure or kill people nearby. All pressure vessels should be inspected once every year or more often depending on use. To find your state pressure vessel inspector, look under Division of Labor and Industries in the government section of a phone book. Never make modifications, weld, drill into, or attempt any repairs to compressor tanks. If modifications are necessary, take the tank to an A.S.M.E. certified coded pressure vessel shop that can perform these modifications. The shop will need an ASME “R” stamp. Never make adjustments and/or parts substitutions to alter the factory set operating pressures, temperatures, and volumes. Do not use in flammable or combustible atmosphere. This product is not intended for use in locations where fire or explosion hazards may exist due to the presence of flammable vapors, liquids or gases, or combustible dusts or fibers. Do not permit untrained personnel to maintain or make repairs on this unit. Only

qualified personnel should be permitted to make any type of repairs to this unit. Improper repairs may cause this unit to malfunction which could result in serious injury or death to the operator, repair person, or bystander.

Do not leave loose parts, rags, tools, and other foreign matter on the compressor, drive system, or fan blade. Loose parts, rags, tools, and other foreign matter can become entangled in the unit or be expelled from the machine at a high rate of speed. This can result in damage to the machine or serious injury or death to the operator, repair person, or bystander. All local code requirements for pressure vessels should be investigated to assure all requirements have been met. Pressure vessels such as the receiver may require additional ASME code stamping to meet local code(s).

Always wear hearing protection when operating or working near the unit. This unit is capable of producing noise that can be hazardous and can cause hearing loss. In order to avoid hearing loss, always wear hearing protection when operating or working near the air compressor. Do not pull on the hose to move the unit, untangle knots, or any other excessive pulling stress. Always release the system pressure prior to service, storage, daily shutdown, and/or disconnecting the hose or from the unit. Always release pressure prior to service, storage, daily shutdown, and/or disconnecting the hose from the unit. Pressure contained within the unit could be released unexpectedly and could cause injury. Never leave an operating machine unattended. Always shut off the machine and relieve the system pressure before leaving the unit. Never leave an operating machine unattended.

For portable (movable) equipment, to reduce the risk of electric shock or injury, do not expose to rain. Store indoors. For stationary equipment, to reduce the risk of electric shock or injury, use indoors only. Do not use below garage floor or grade level.

Never allow children or any unauthorized persons to operate the unit. Allow only personnel trained in the use of the equipment to operate the unit. Never allow children or unauthorized personnel to operate the unit. Keep all persons at a safe distance when the machine is being operated. Never exceed the pressure rating of air tools, spray guns, air operated accessories, tires and other inflatables could cause them to explode or fly apart.

Exceeding the pressure rating of air tools, spray guns, air operated accessories, tires and other inflatables could cause them to explode or fly apart. Always follow the manufacturers recommendations and never exceed the maximum allowable pressure ratings. Never use the compressor to inflate small low pressure objects such as children’s toys, footballs, basketballs, etc.

Contact Information:

SAM Controllers
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Email: power@samcontrollers.com
Web: https://samcontrollers.com

For product support and returns: Please use our Ticket System at: https://samcontrollers.com/support