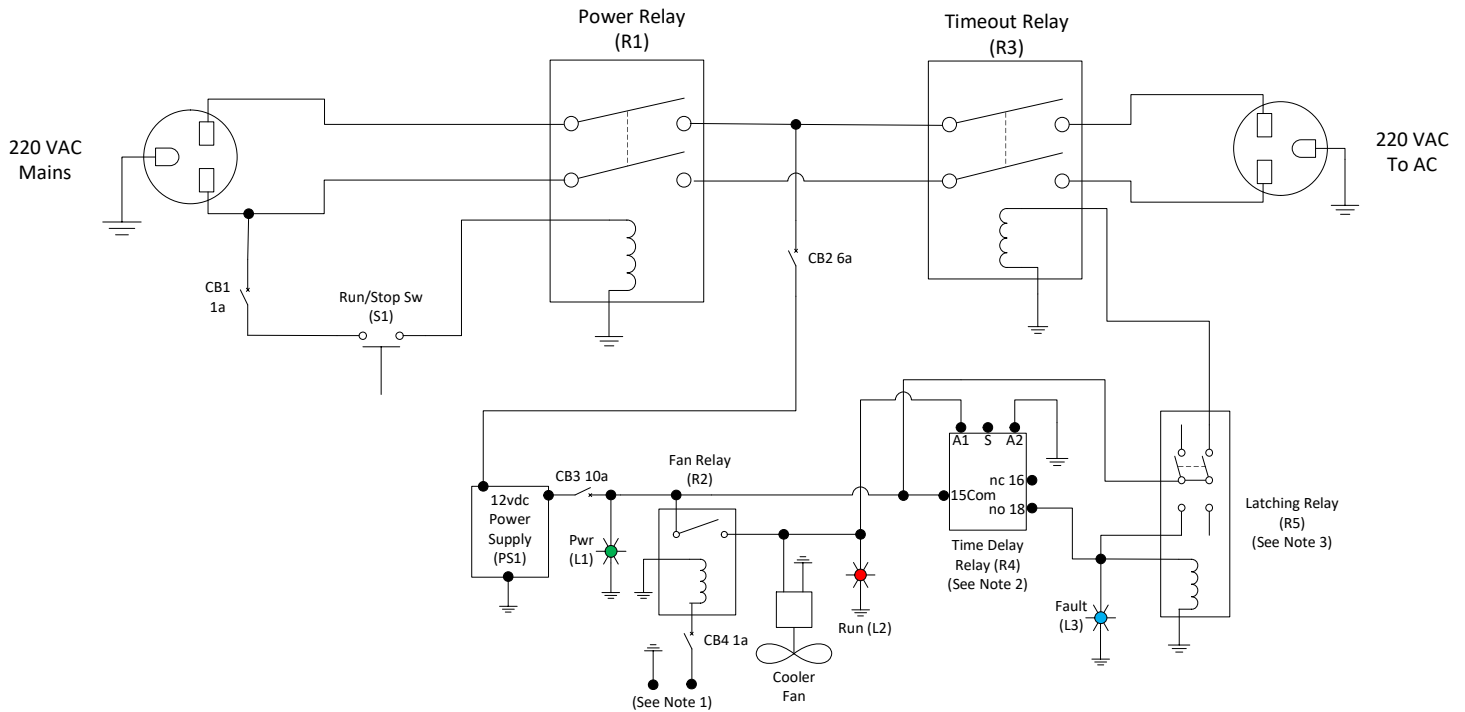


QST 30/60 Air Compressor Mods

Control Wiring



Parts List

Notes:

- 1 – Connects to make side of AC pressure switch relay (110 VAC).
- 2 – Sets max run time-out for compressor.
- 3 – R5 is used as a latching relay. See note 5 for more info.
- 4 – CB3 is a DC circuit breaker. CB1,2,4 are AC circuit breakers.
- 5 – See page 2 for Theory of Operation discussion.

Revision History

A – Added delay time-out feature (8/5/2022).

ITEM	QTY.	PART NO.	DESCRIPTION
CB1,4	2	1 amp	Din Rail AC circuit breaker
CB2	1	6 amp	Din Rail AC circuit breaker
CB3	1	10 amp	Din Rail DC circuit breaker
L1,2,3	3	12 VDC	LED panel light
PS1	1	12 VDC 15 amp	Switching Power Supply
R1	1	115vac 40 amp	Din Rail Contactor
R2	1	115vac 20 amp	Din Rail Contactor
R3	1	12 VDC 25 amp	Din Rail Contactor
R4	1	GRT8-M-1-W240	Din Rail Time Delay Relay (function 'J')
R5	1	DPDT 12 VDC	Miniature PCB Relay
S1	1	Start/Stop Switch	Emergency stop switch

TITLE	DESCRIPTION		FILENAME
Control Box Wiring	QST 30/60 Air Compressor Mods		QST3060_COOLER_MODS(A).VSD
DRAWN BY	DATE	REVISED	PAGE
Steve Nance	7/19/2022	8/20/2022	1 OF 2

Theory of Operation

Introduction

- Add a method to remove moisture from the air supply. Dry air is required for many processes in the shop including:

- Painting
- Media blasting
- Air tools
- Lubricators
- Coolant misting systems

- Add a method to limit the working hours that the compressor is enabled. Having a hose or line failure during non-working hours is something you don't want, as the compressor can be damaged or fail if left to run continually.

- Add a method to disable the compressor if a hose or line failure happens during working hours. This has the same results as the item above which can result in serious compressor damage.

Moisture Elimination

An after cooler was added to reduce the moisture from the compressed air. This was done by adding a fan-cooled automotive oil cooler in-line with the compressed air before it enters the storage tank. Additionally a water trap and coalescing oil trap were added in the cold side of the compressed air line to collect the condensed water and oil. Also, a desiccant filter was added in-line with the shop air main line to trap any remaining moisture.

Working Hours Timer

In order to control when the compressor has power applied a timer was added to only allow mains voltage to be applied to the compressor during normal working hours (7am-5pm). This is a standard pool type timer in-line with the compressor input cable.

Compressor Run Timer

A run-time timer was added to shut the compressor off in case an air line ruptures during working hours. This system consists of a time delay relay (R4) that is set to a predetermined time (~ 30 minutes) the compressor is allowed to run. When this time is reached the relay fires and a latching relay (R5) activates opening relay (R3) which eliminates supply voltage from the compressor. Additionally, a fault light on the front of the control box illuminates to alert there is a problem. To clear the fault condition and restore compressor operation the main power must be removed from the compressor. This is done by cycling the emergency stop switch on the front of the control box.

Note: The latching relay (R5) is required because when the timer fires, the trigger voltage from the compressor to R2 is removed which would allow R3 to close which would create a cycle of applying/removing power to/from the compressor.

Conclusion

While these mods are not necessary for air compressor operation, they add a degree of safety, add improvements and give me some piece of mind.