

WELCOME TO

Understanding Electrical Troubleshooting on Refrigeration Systems

LET'S GET A CONVERSATION GOING.





REFRIGERATION
MENTOR

Refrigeration Electrical Troubleshooting

How to stop guessing and start proving



Most electrical issues are misdiagnosed





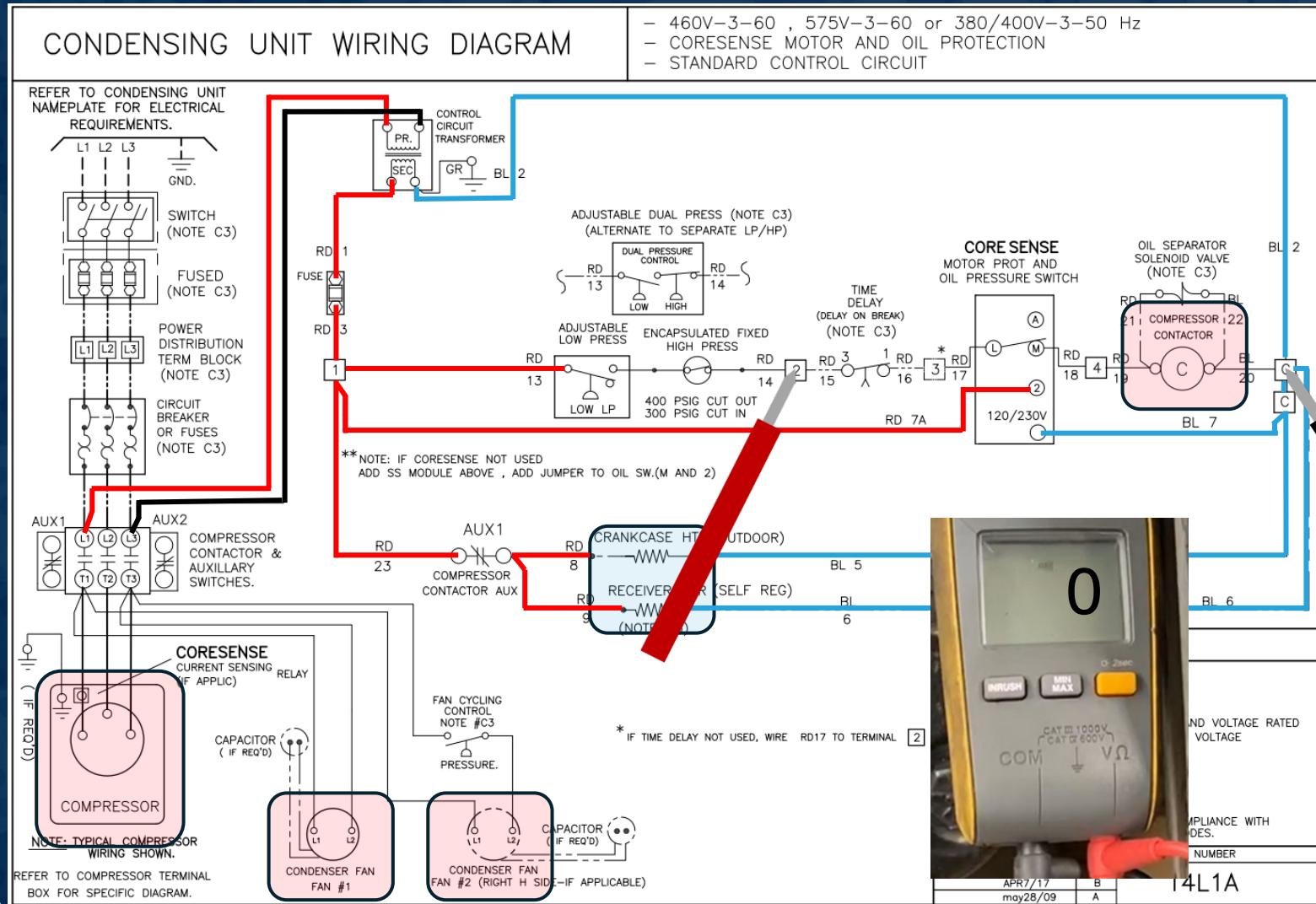
Parts Changing Is Not Troubleshooting

Guessing costs time, money, and confidence

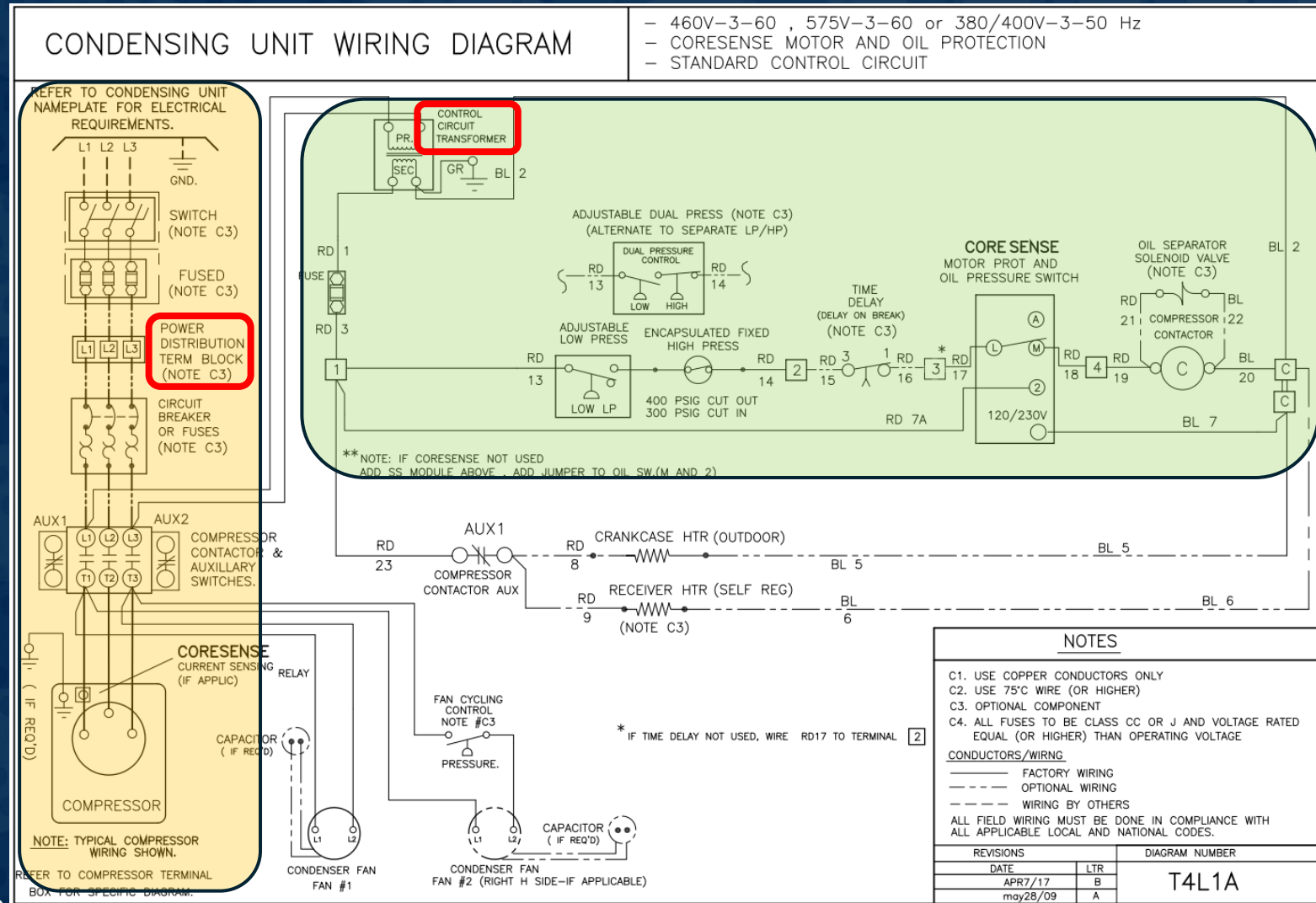




Find where voltage disappears

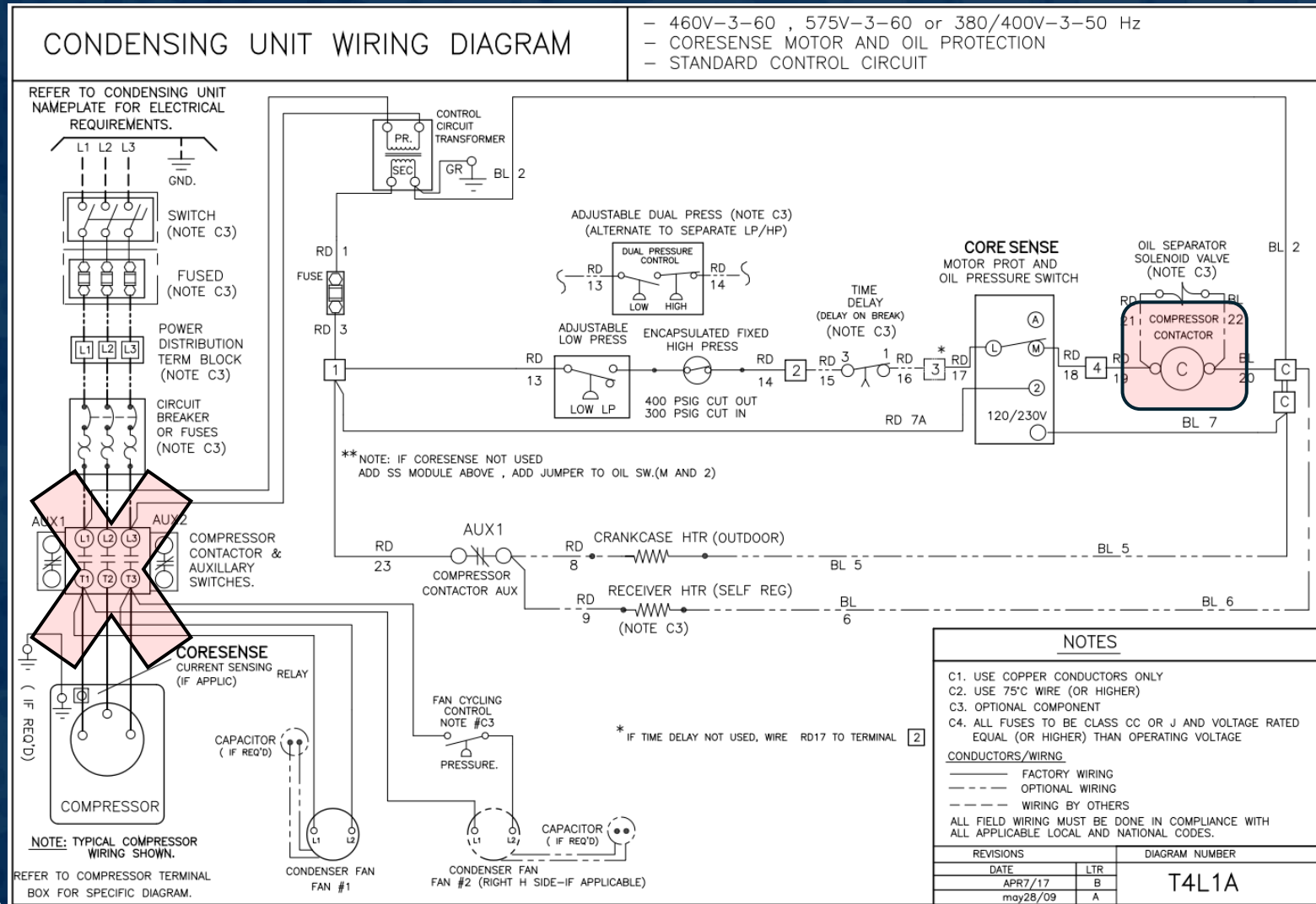


Power circuits and control circuits



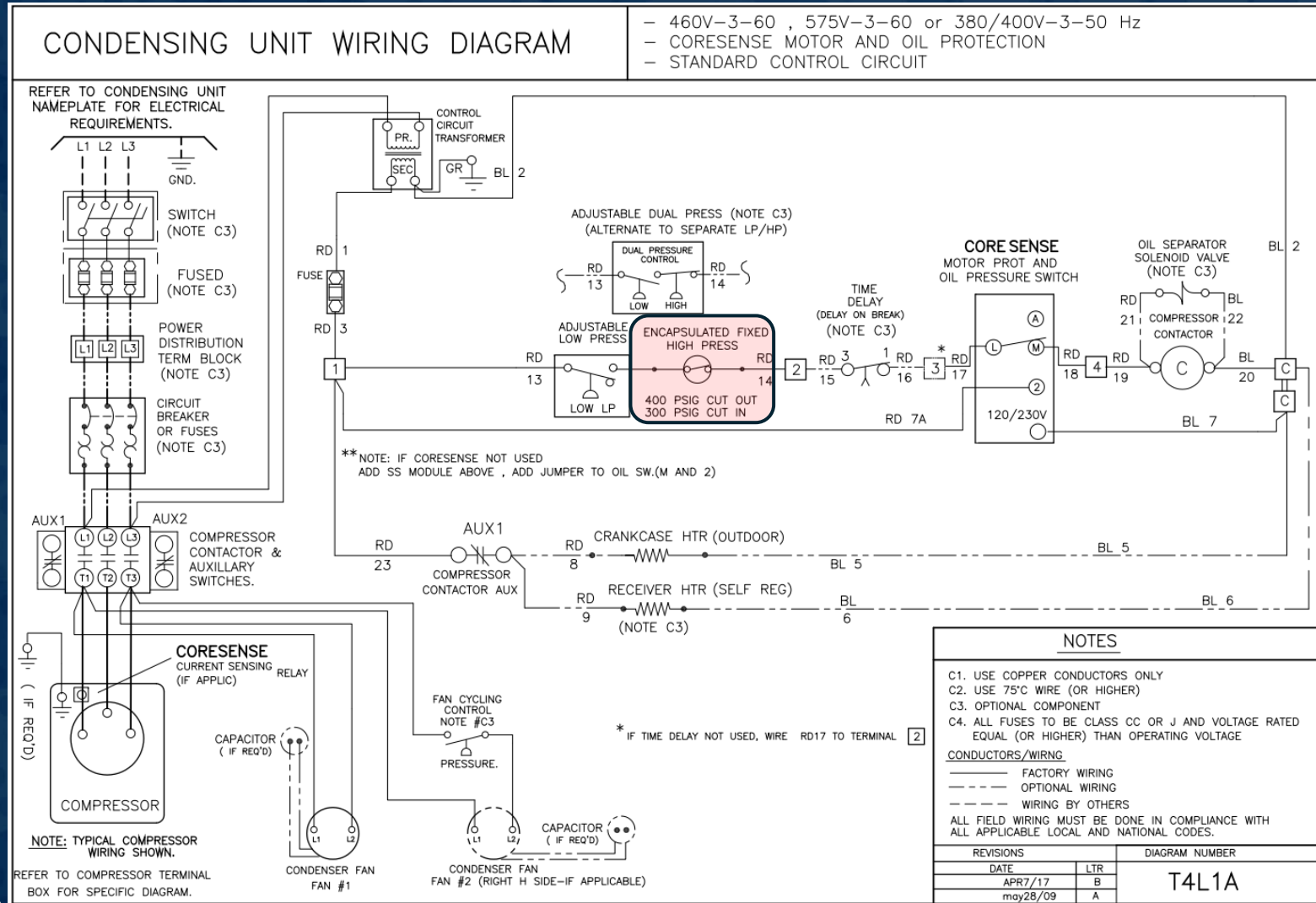


They allow or block power



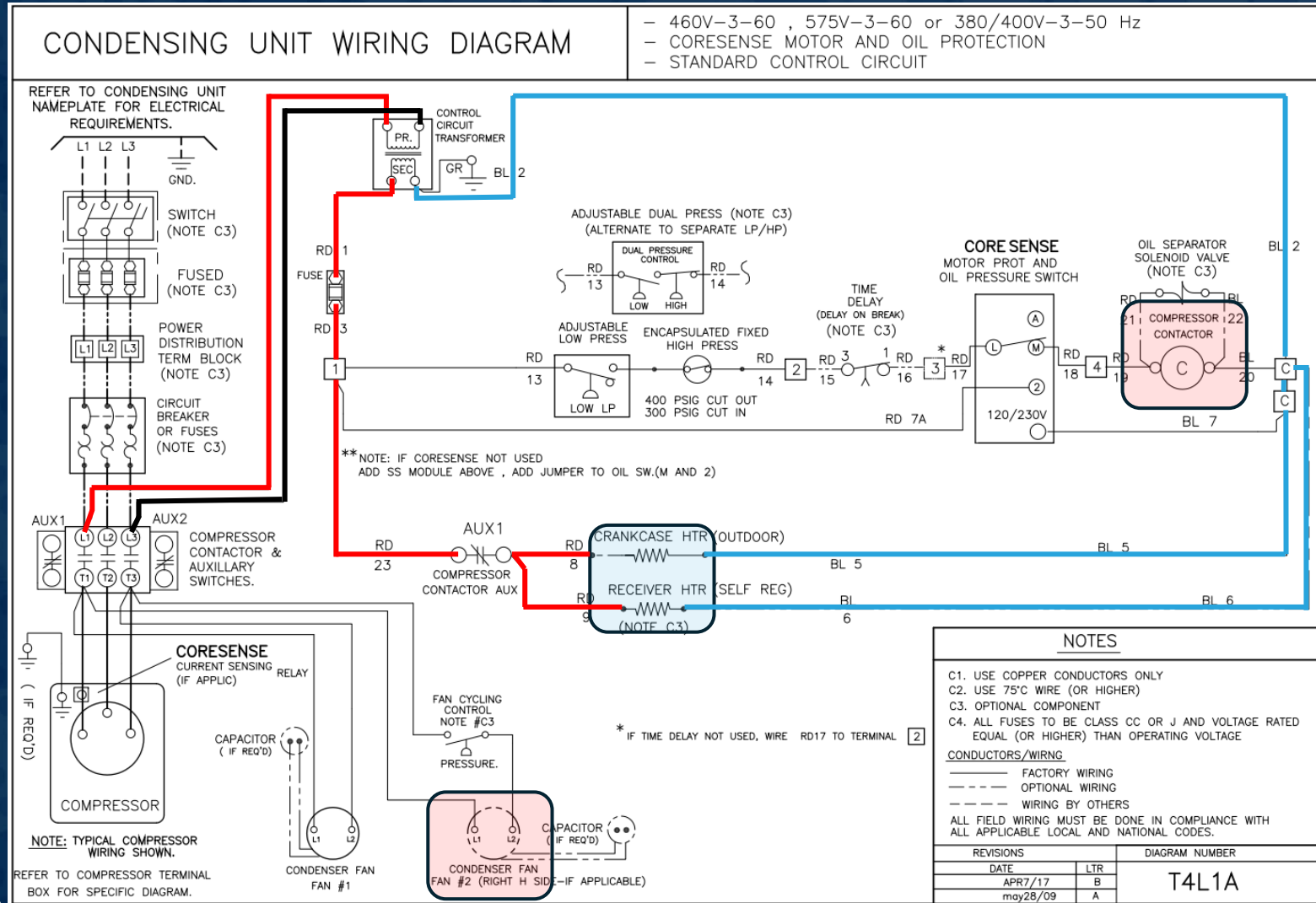


One open stops everything



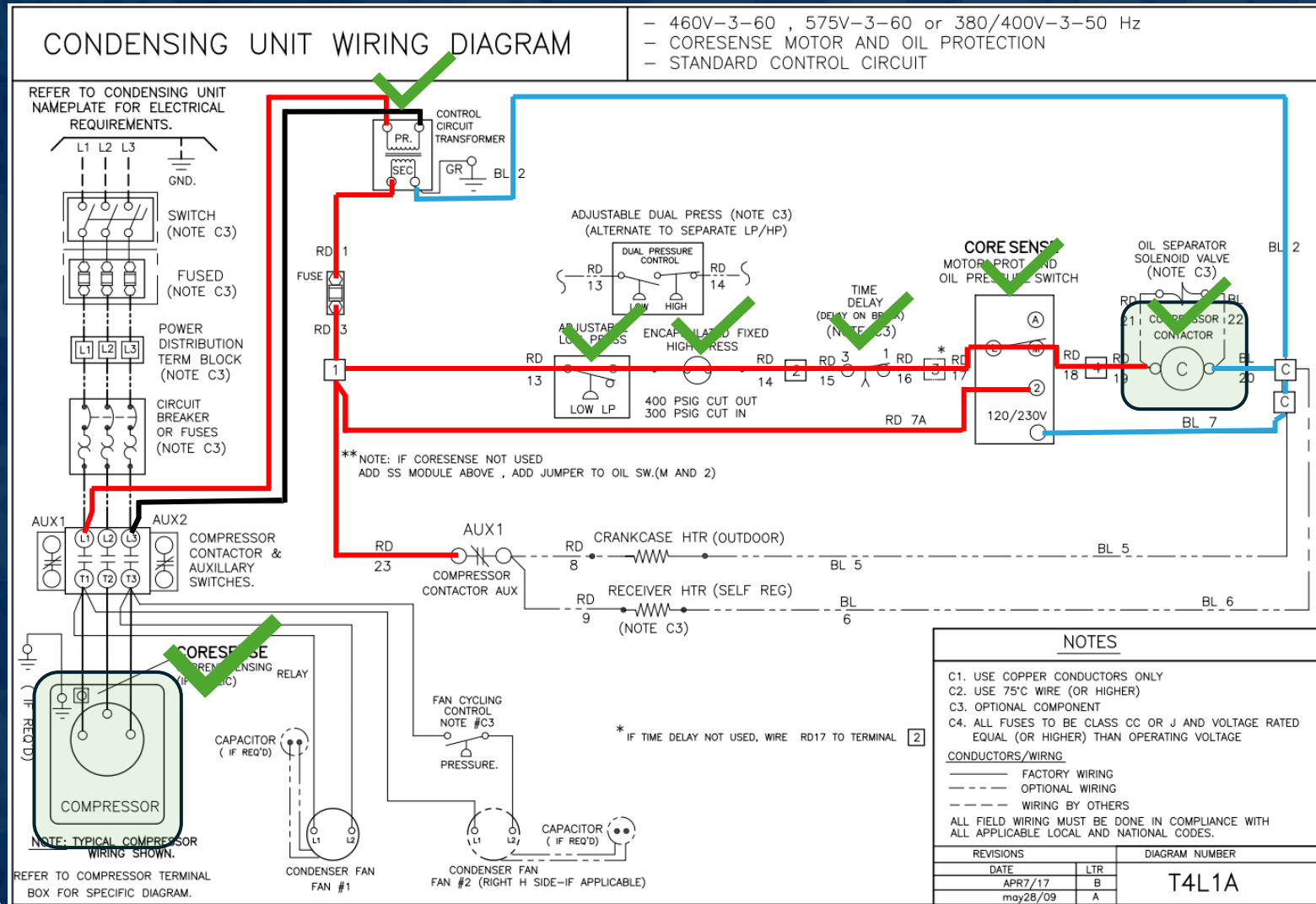


Loads can run independently



What a Diagram Really Shows

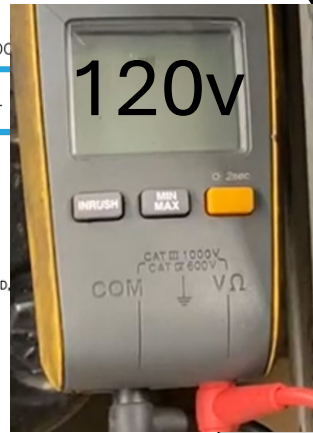
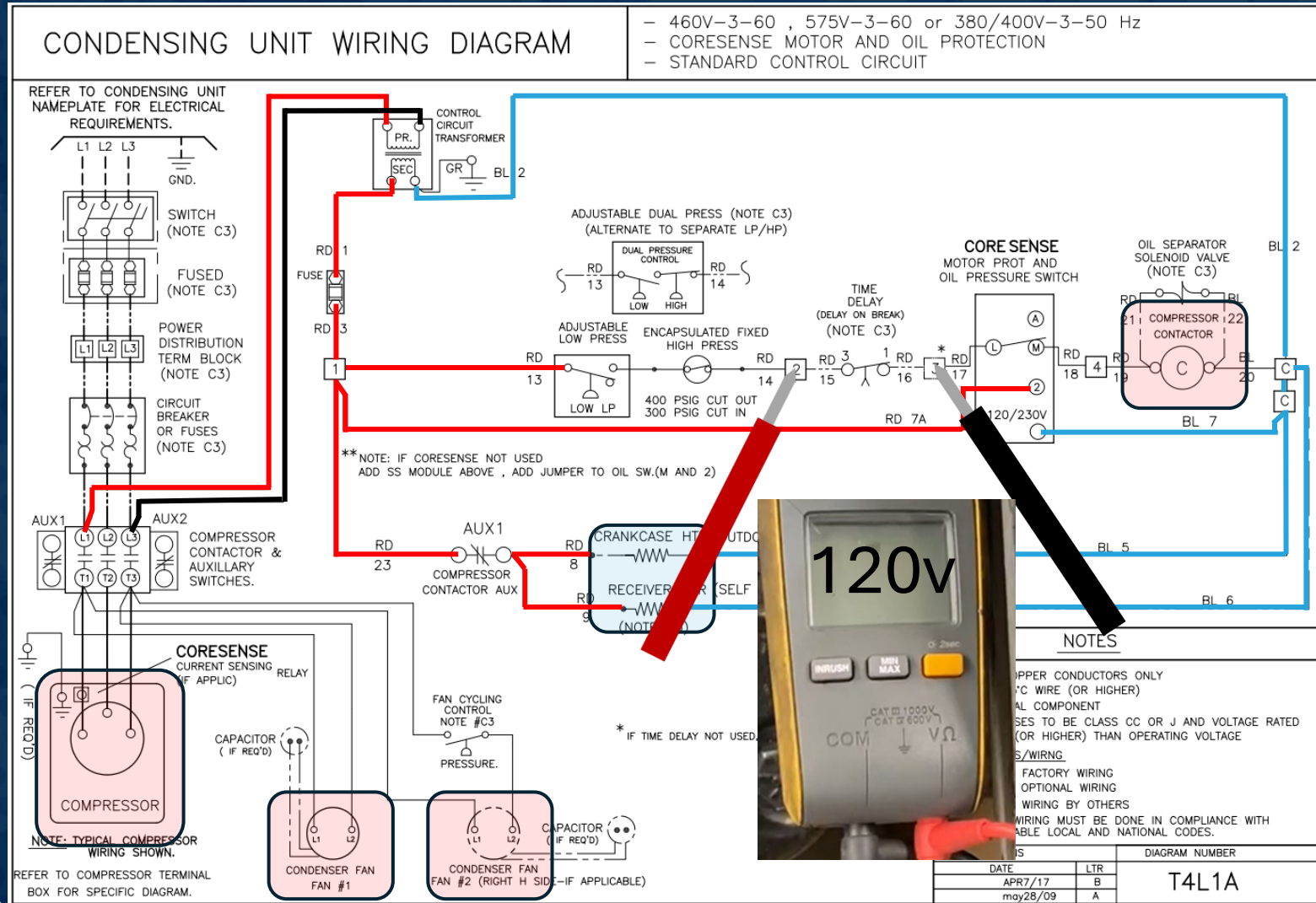
Logic, not physical layout



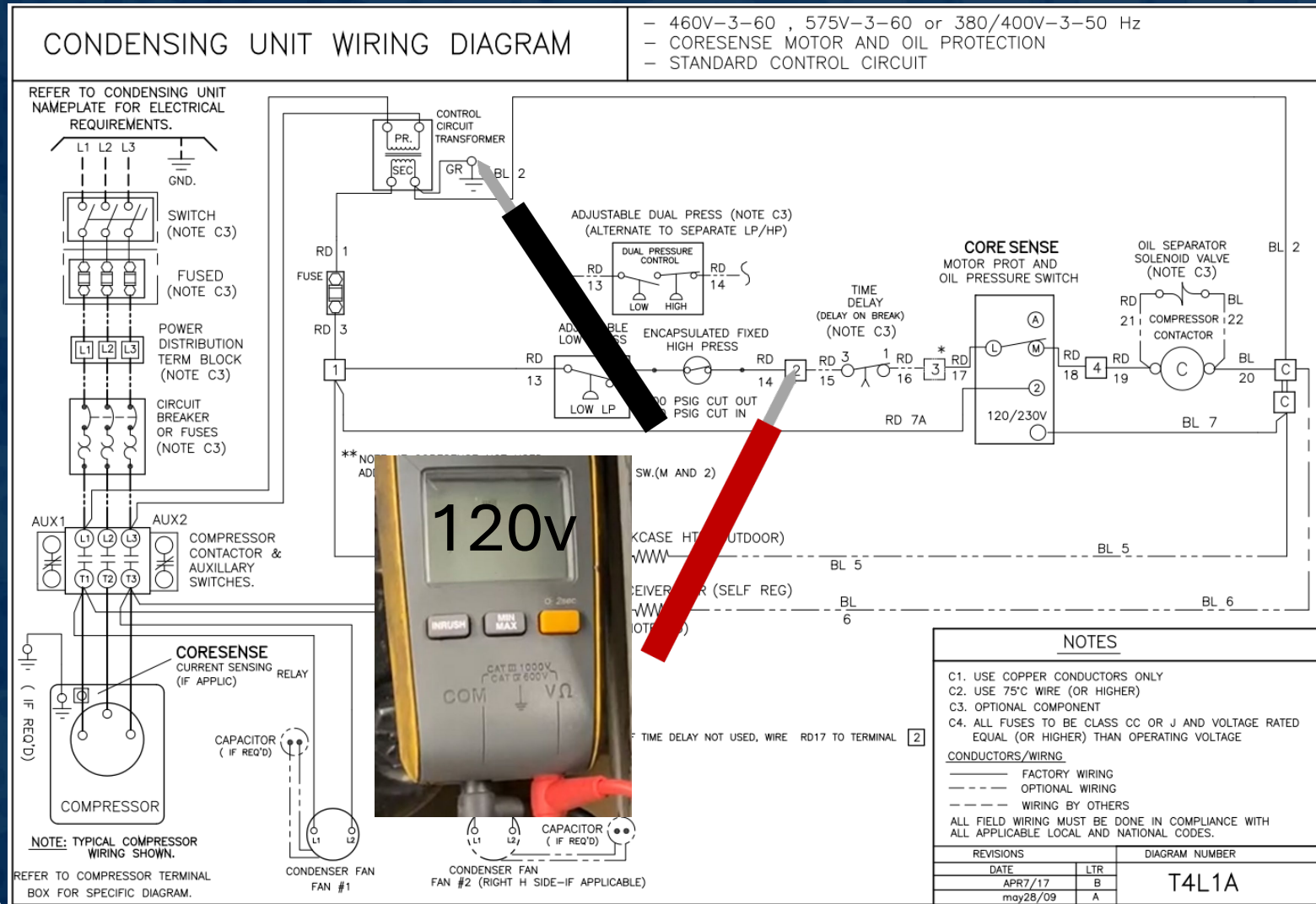


REFRIGERATION MENTOR Every Electrical Problem Fits One Bucket

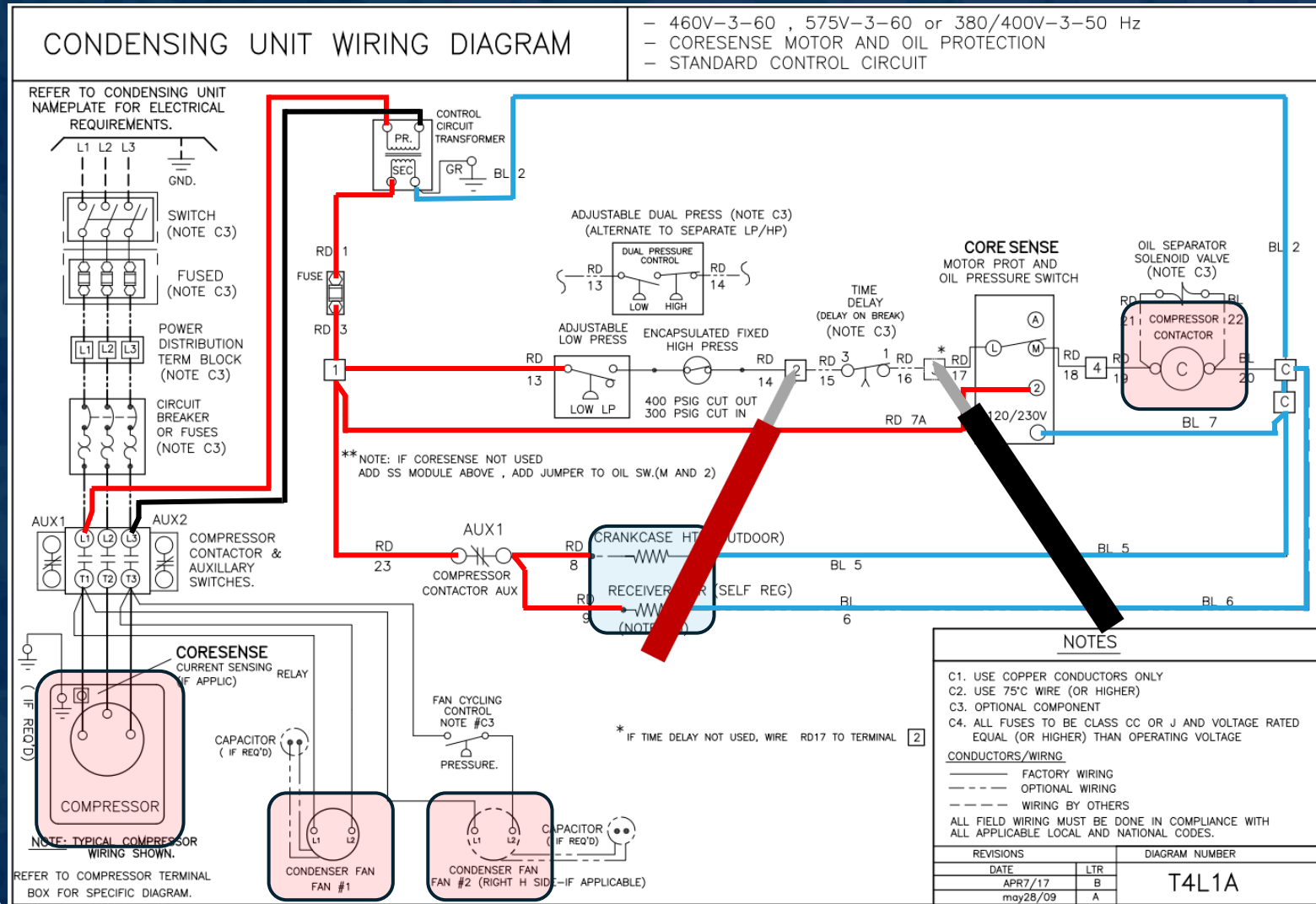
No power, blocked power, failed load



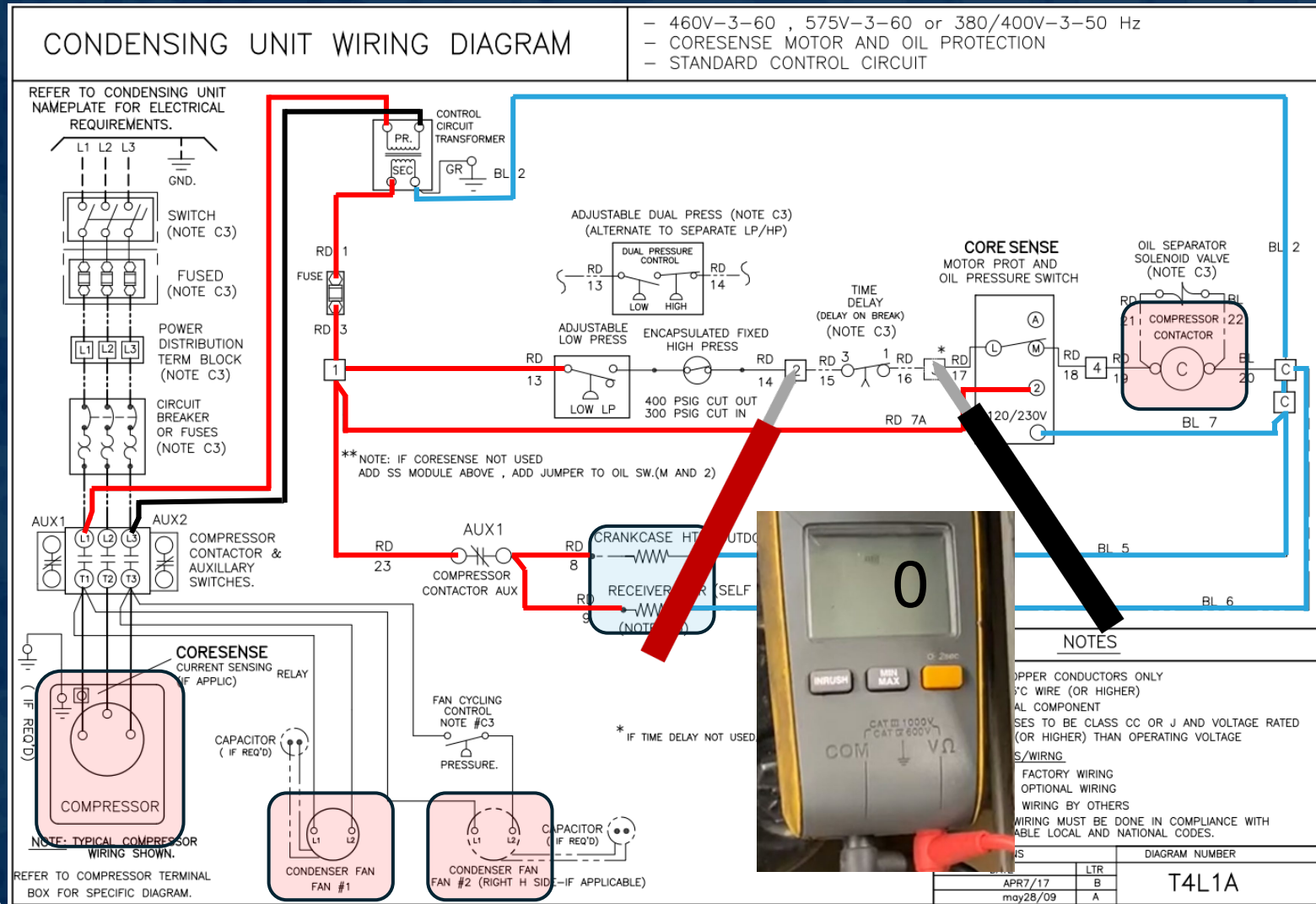
Ground lies



Measure across the component

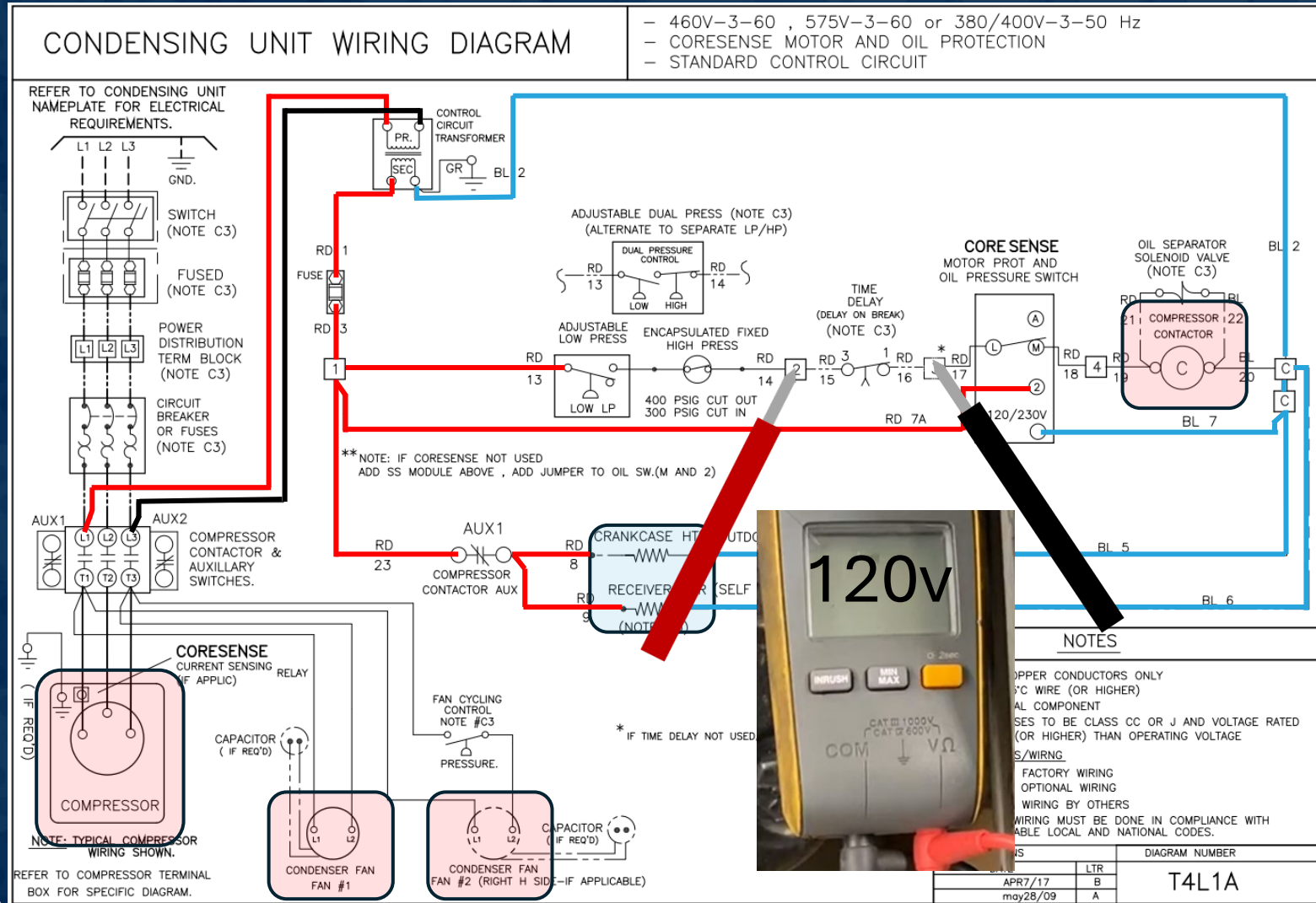


Zero volts across it

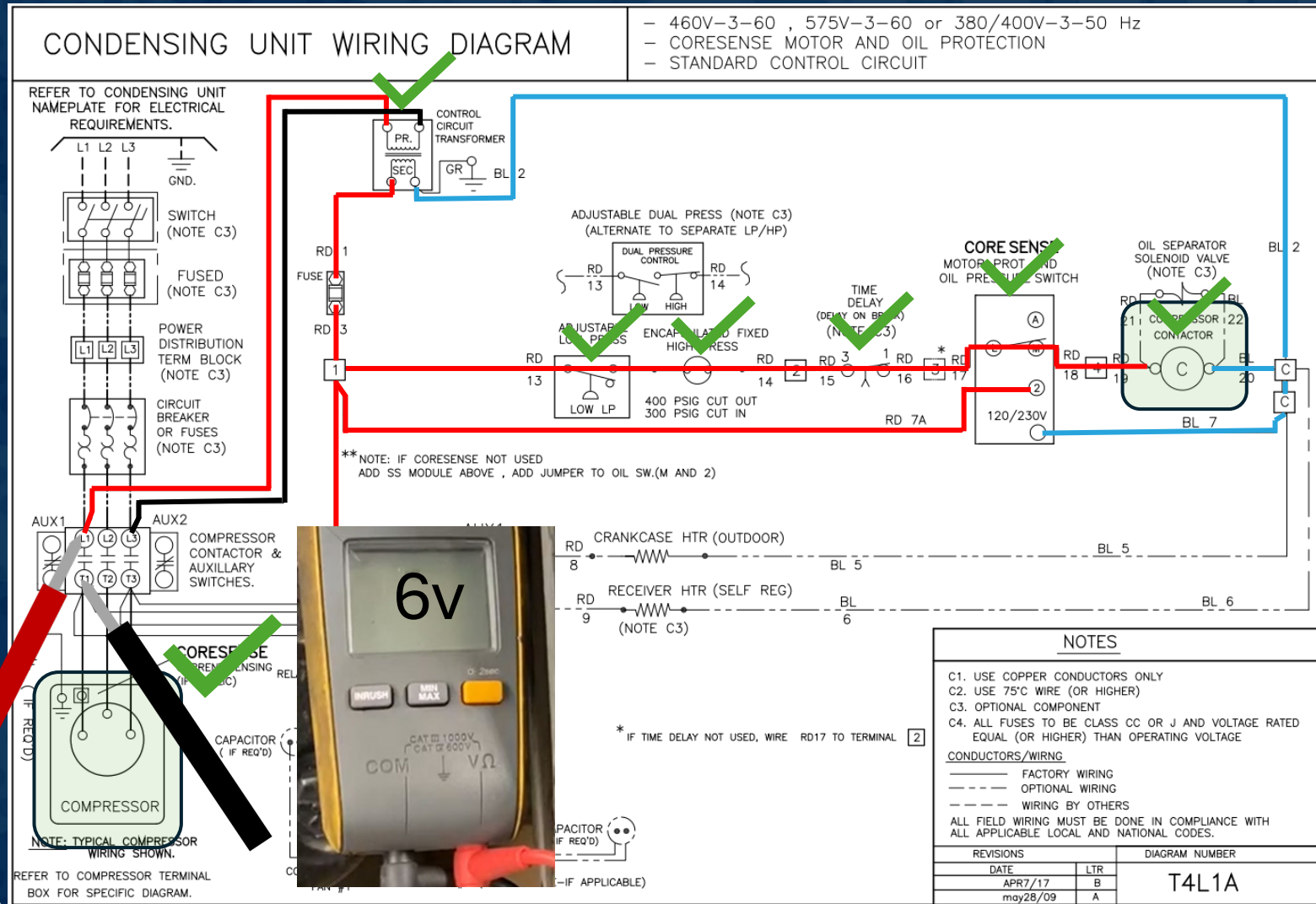




Voltage appears across it



Especially on contactors





Coil Pulled In, Load Dead

Where did voltage stop?

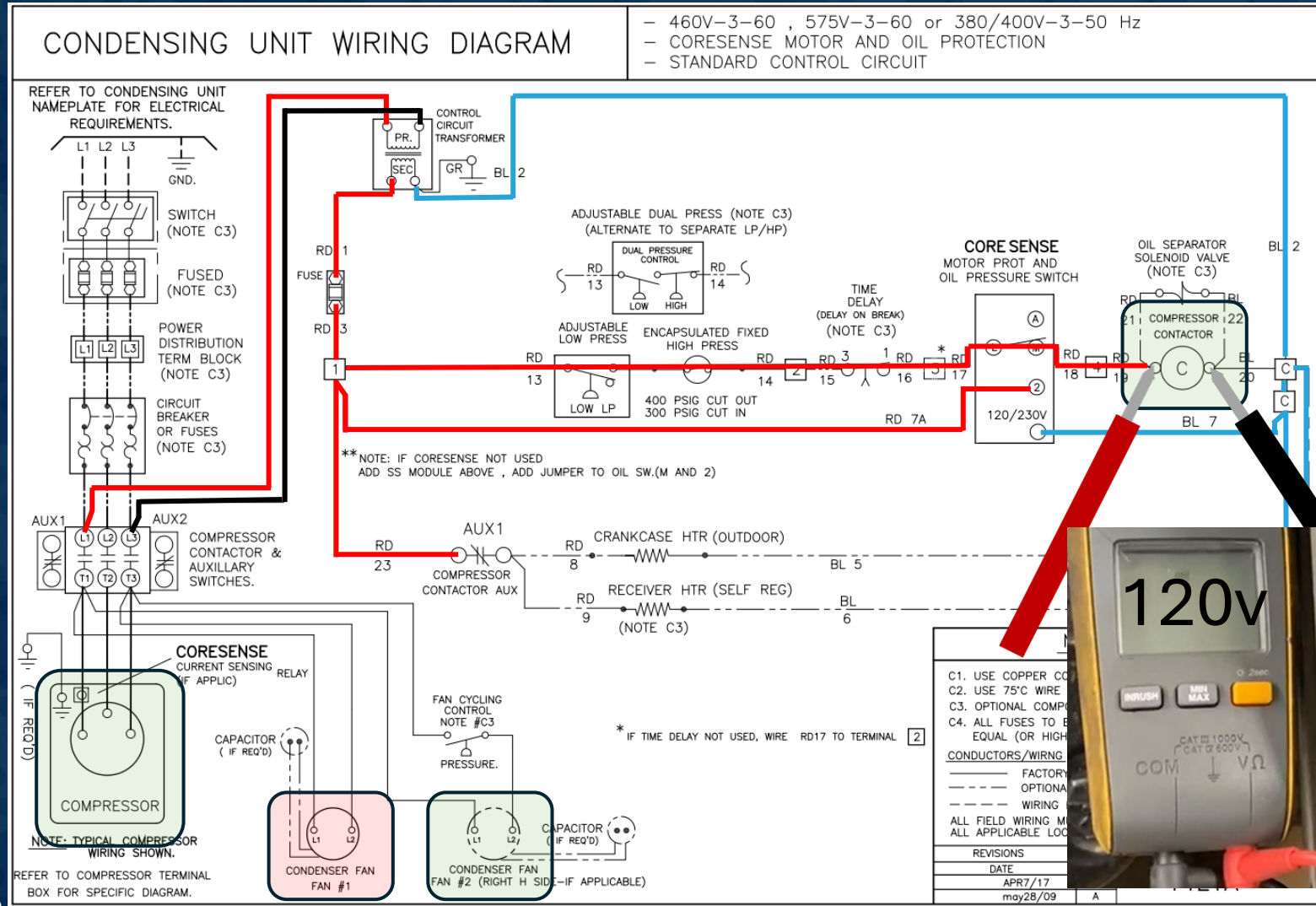
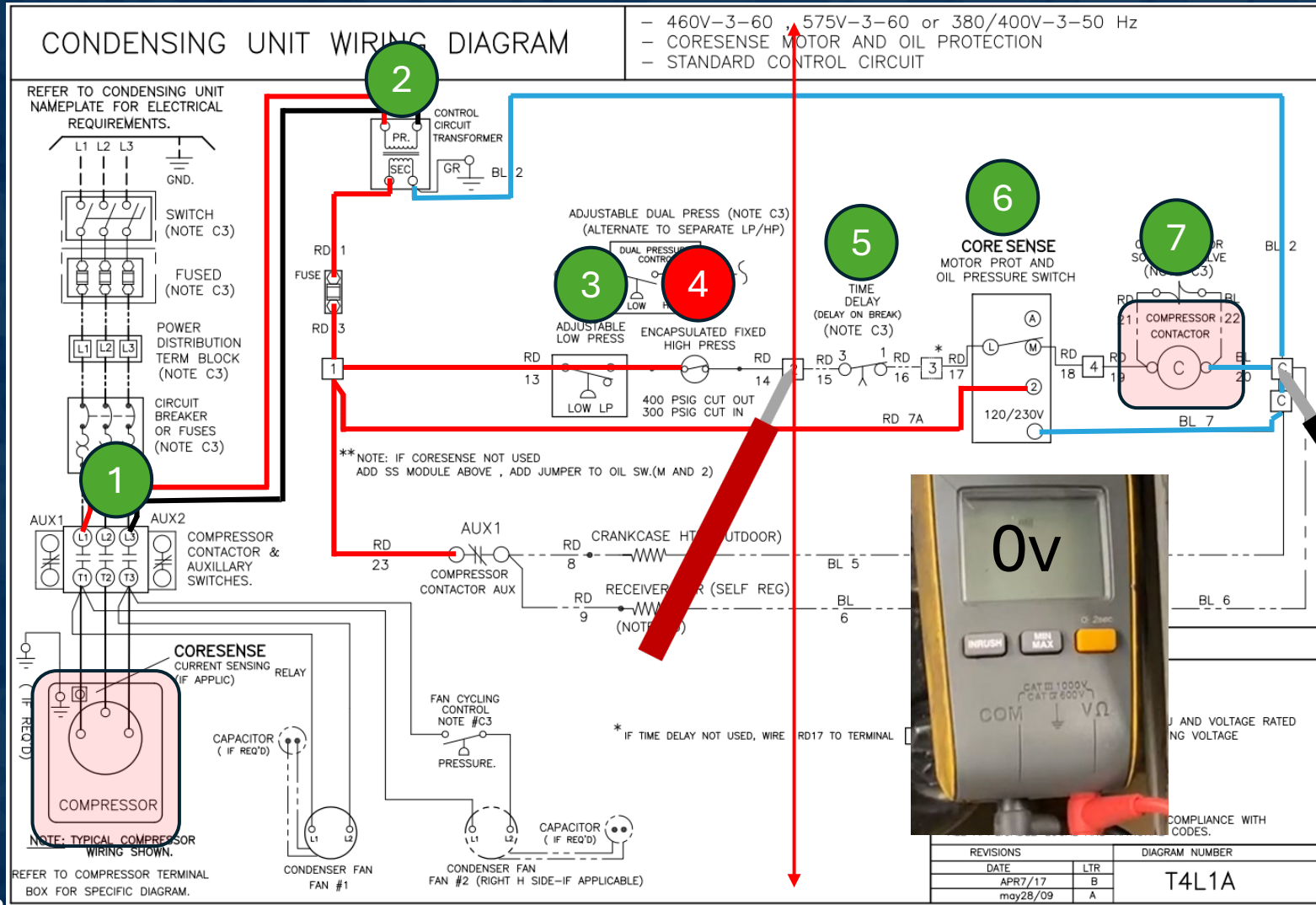


Diagram Courtesy of Keeprite



Check halfway first

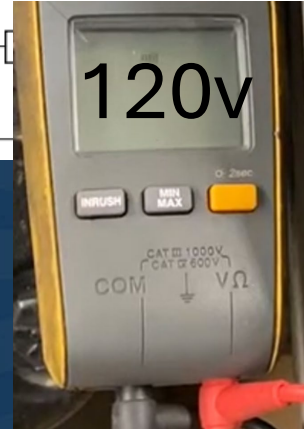
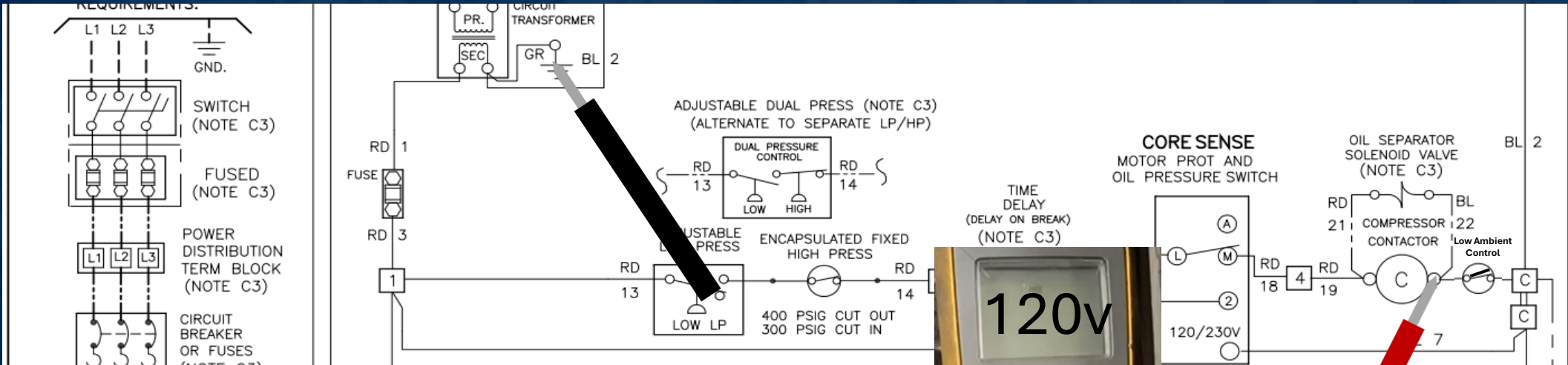


COMPLIANCE WITH CODES.



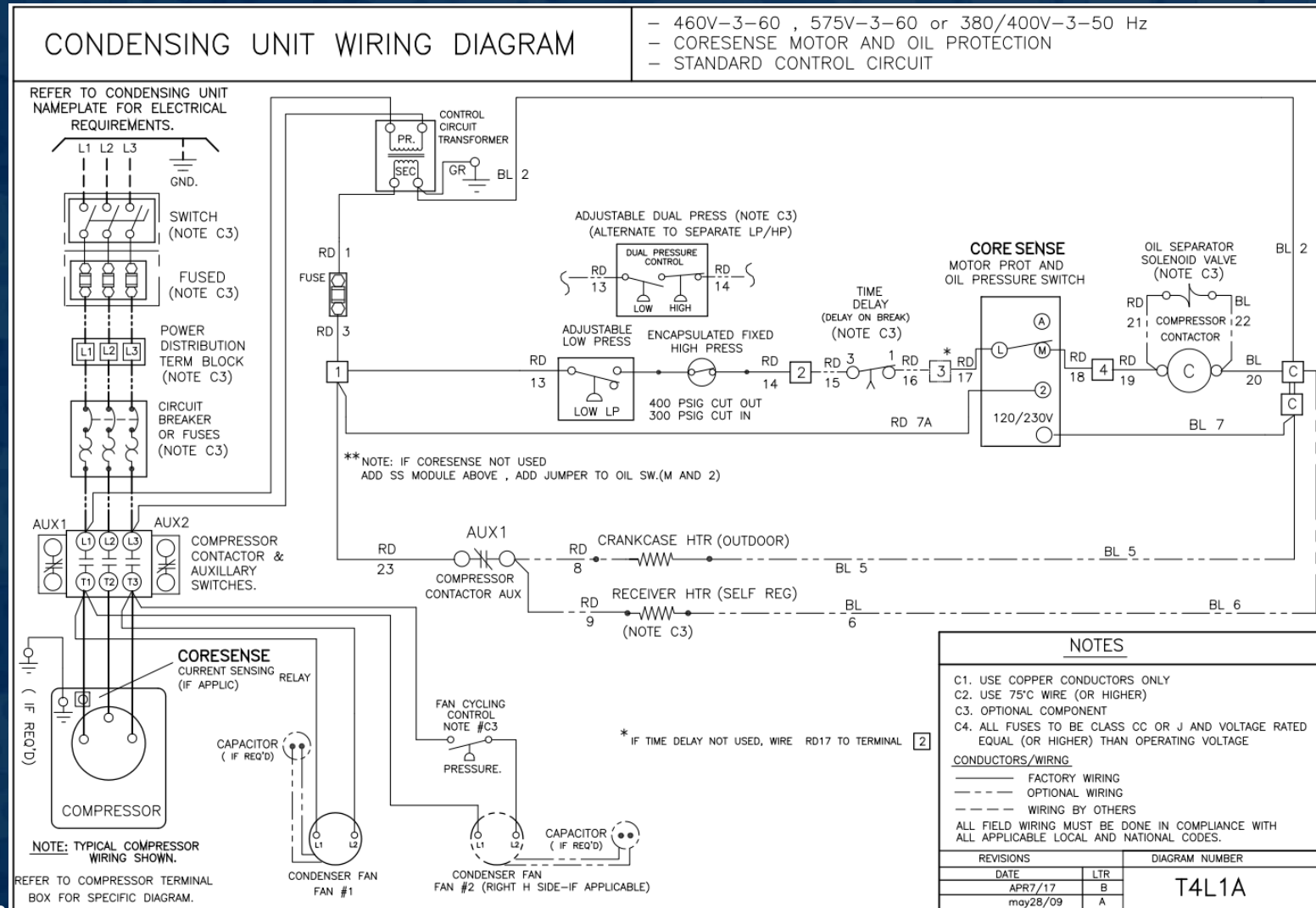
Why Techs Miss This

They check presence, not loss



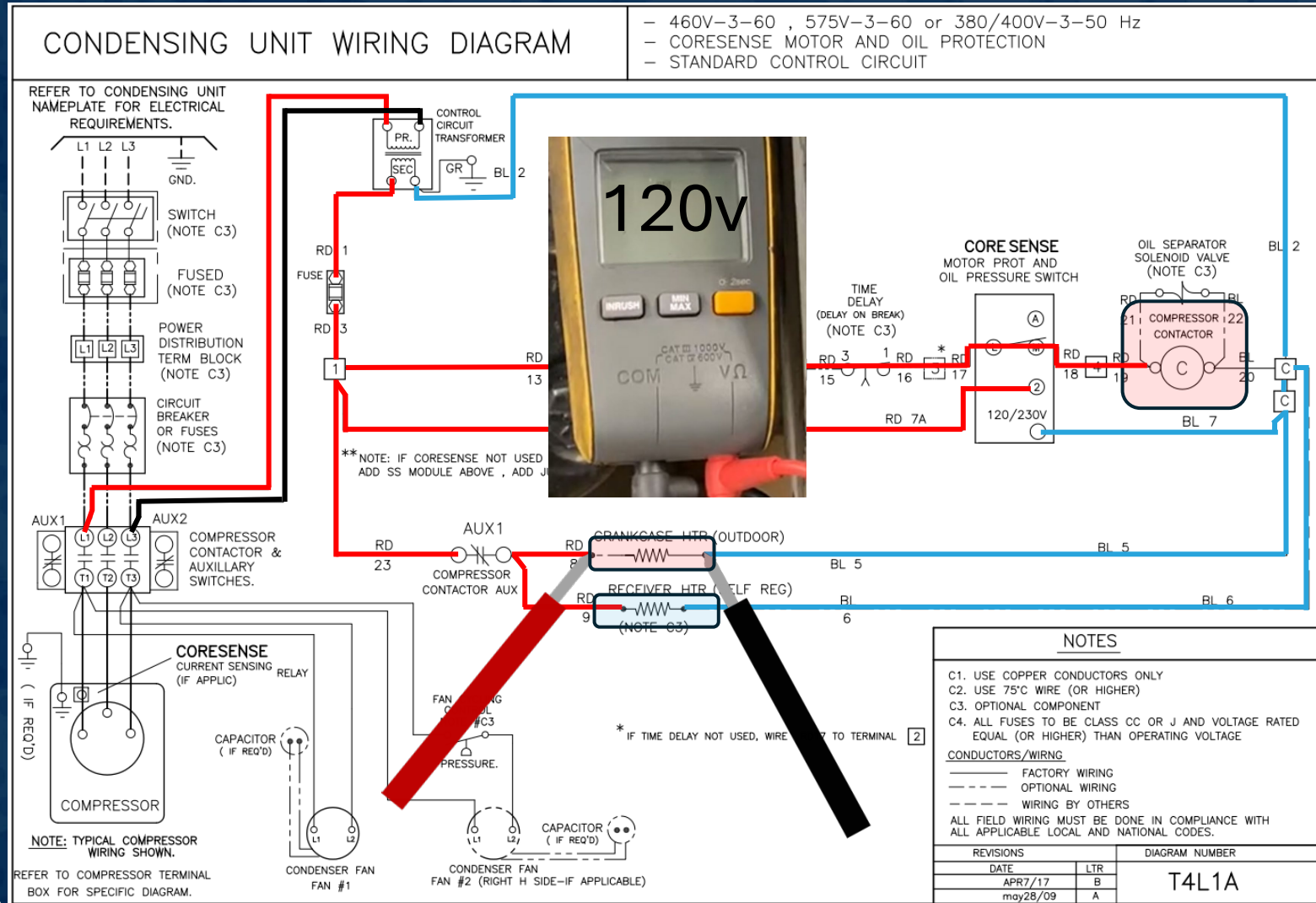
Real Condensing Unit Diagram

Looks complex, follows simple rules

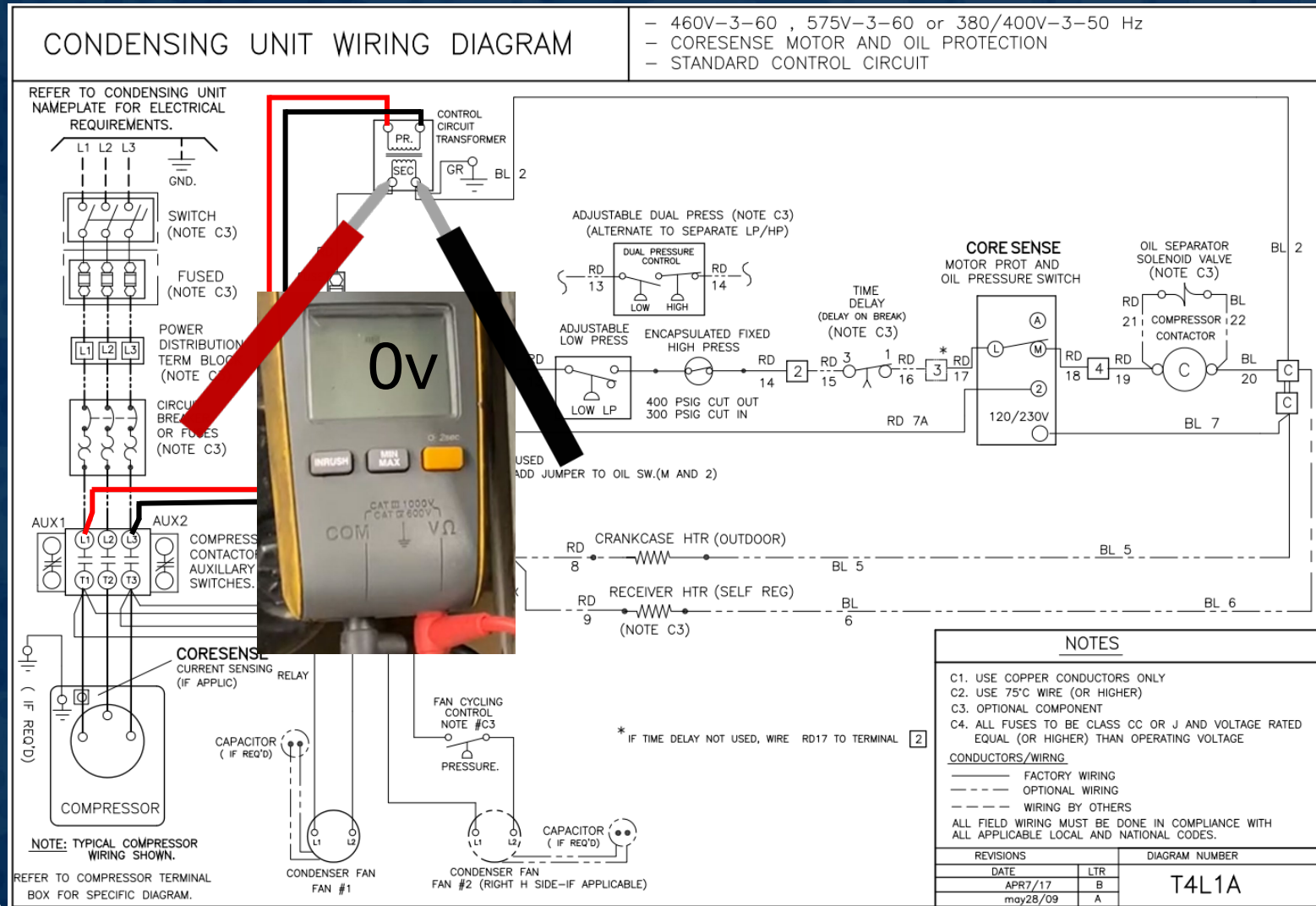




Ignore everything else

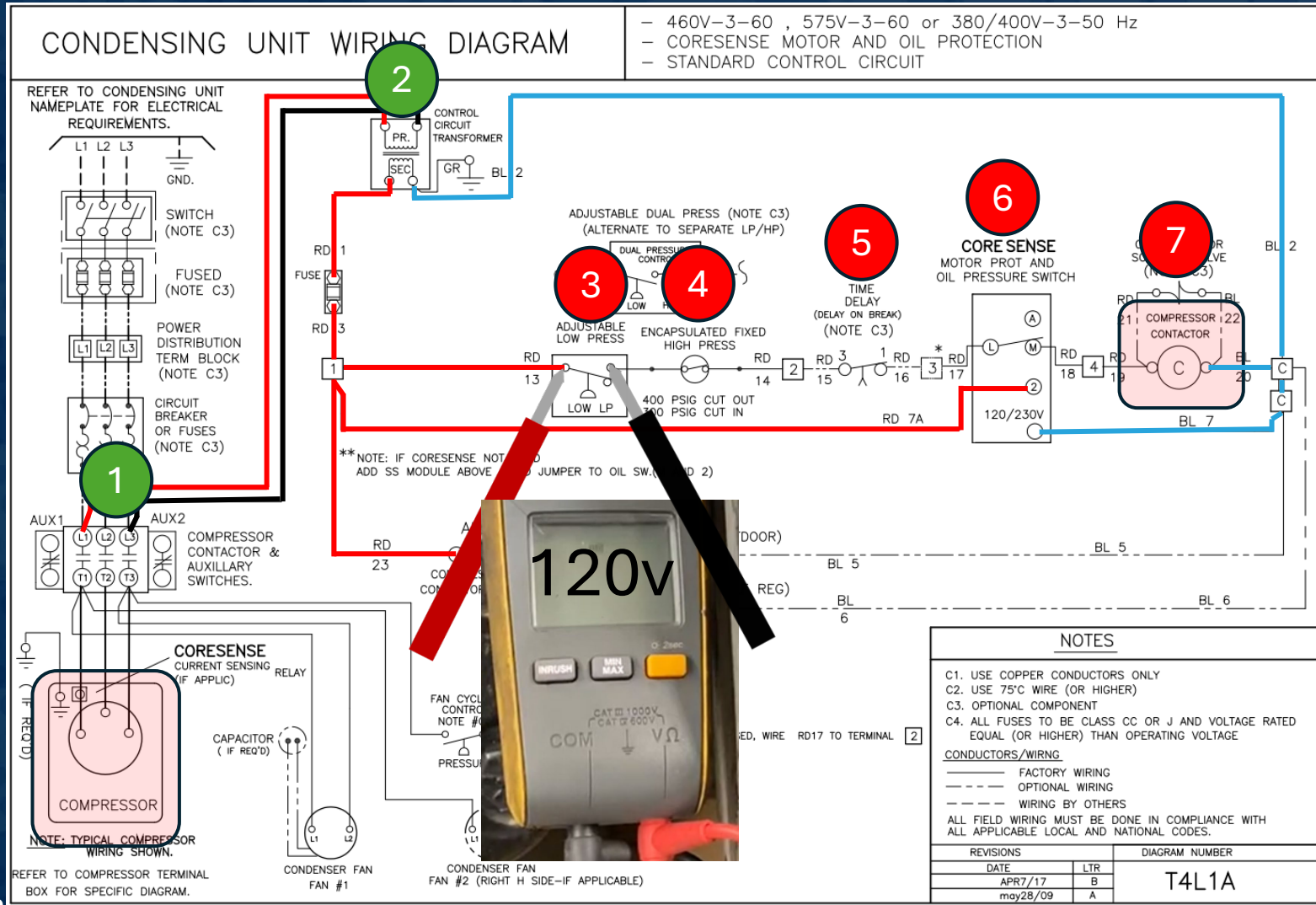


Control voltage origin

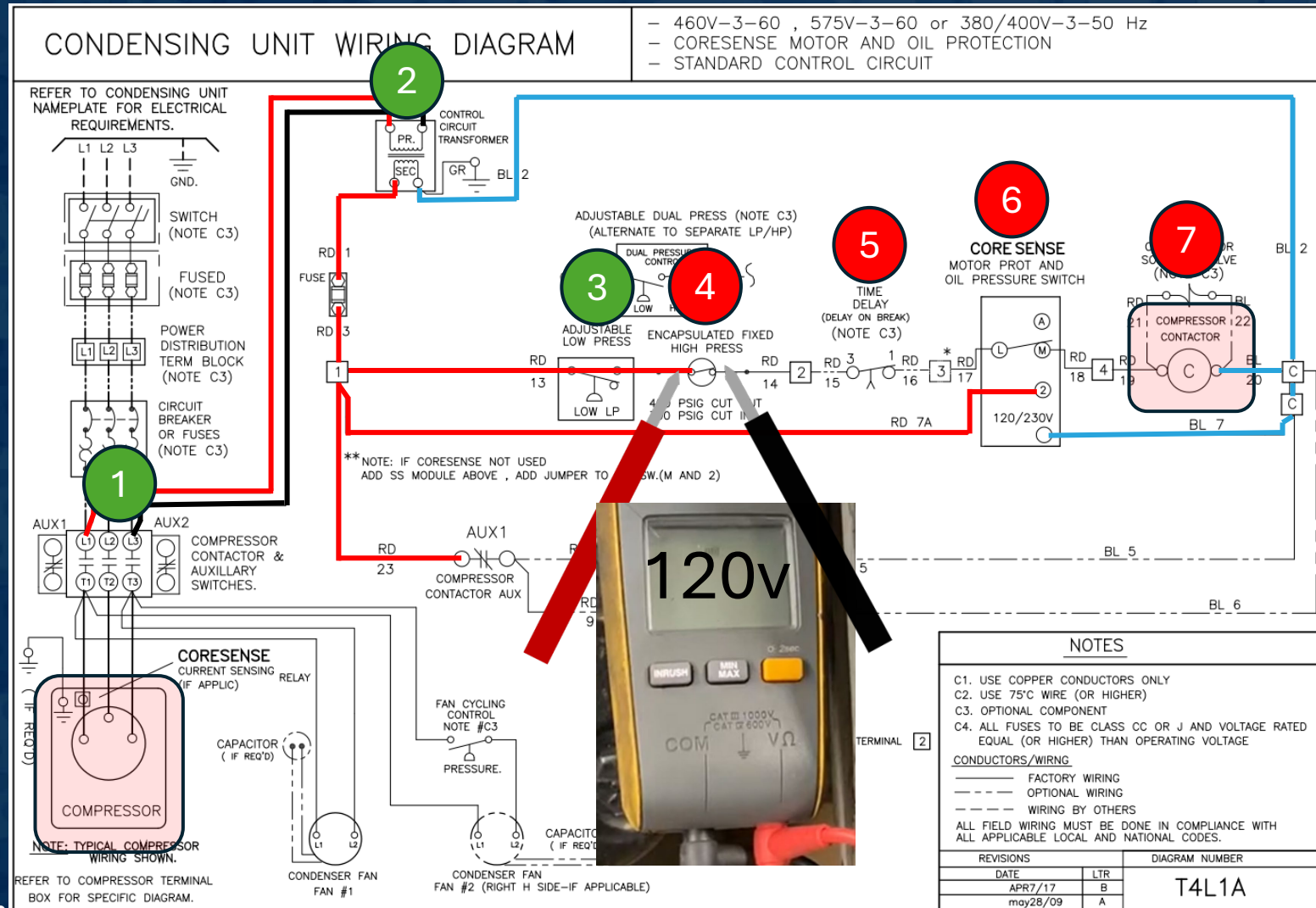




Open on drop

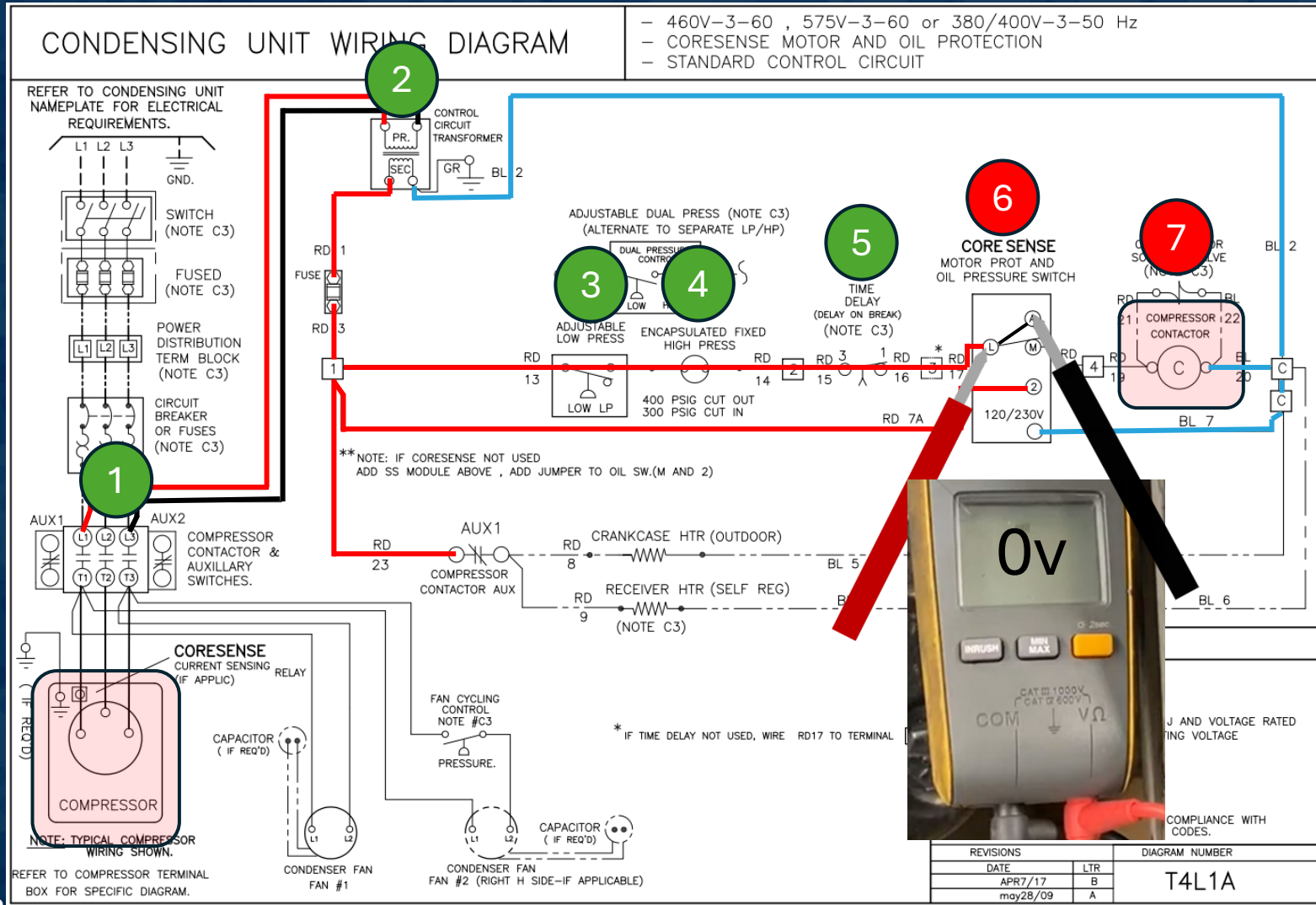


Open on rise



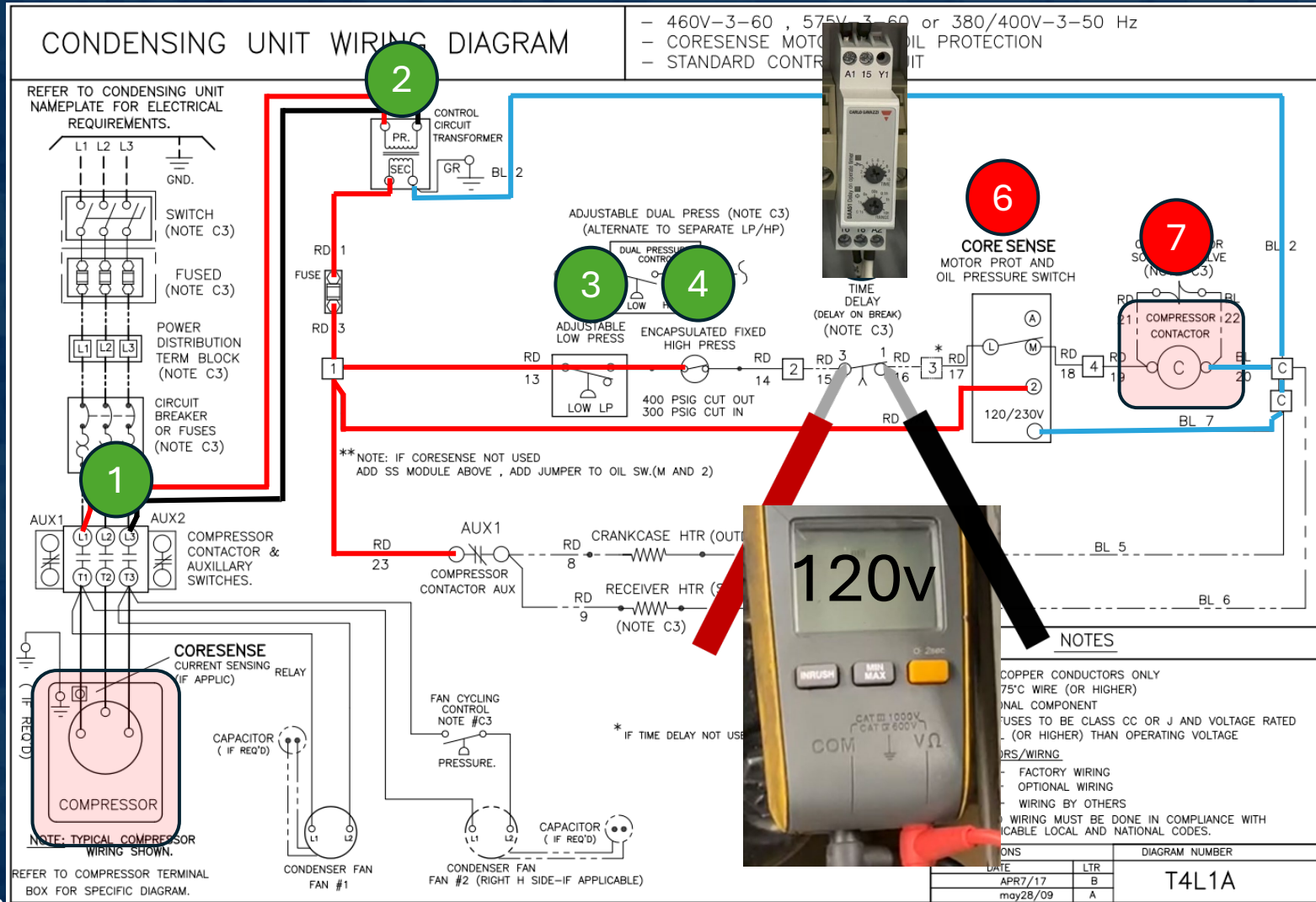


Differential pressure plus time



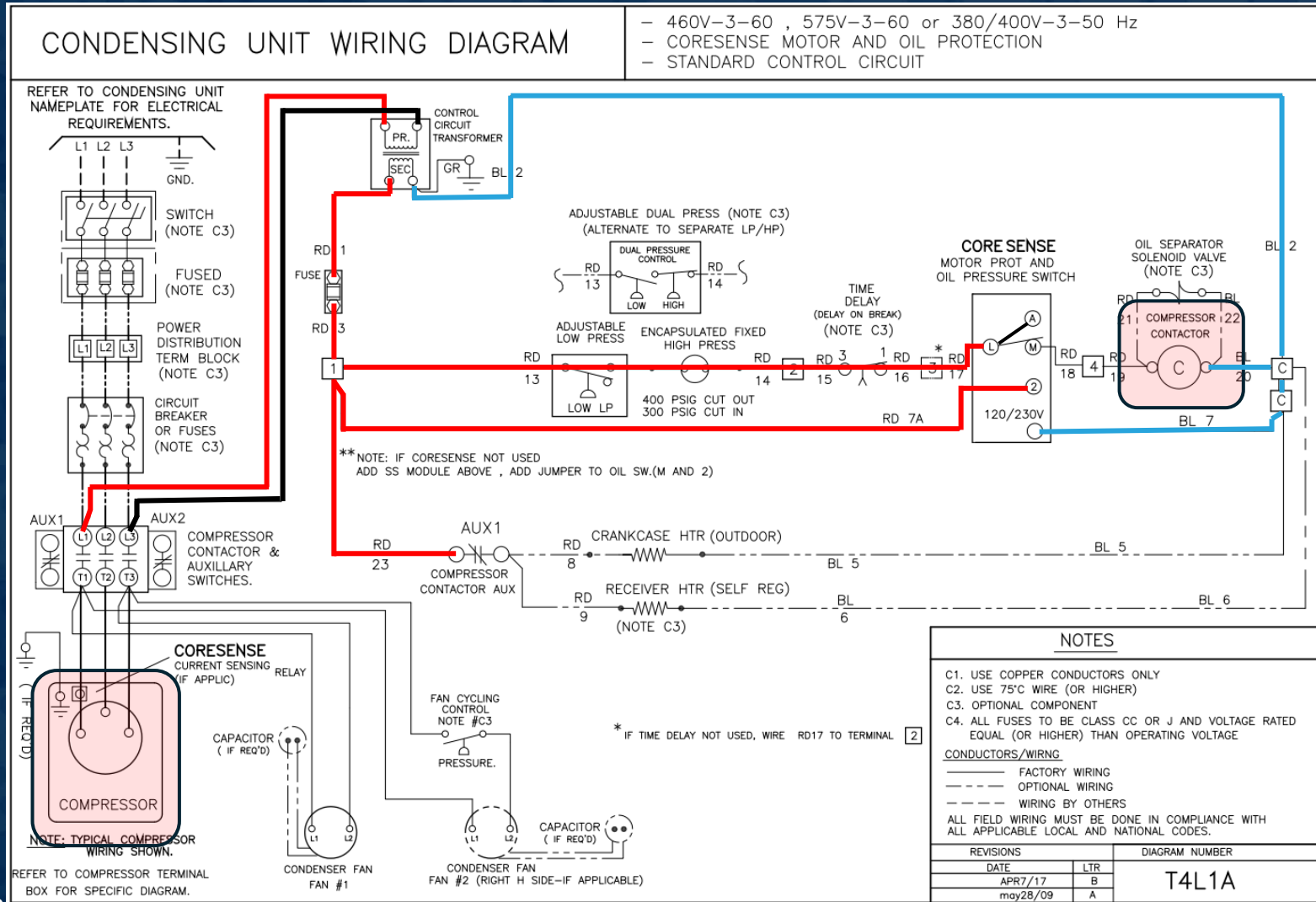


Protection with consequences



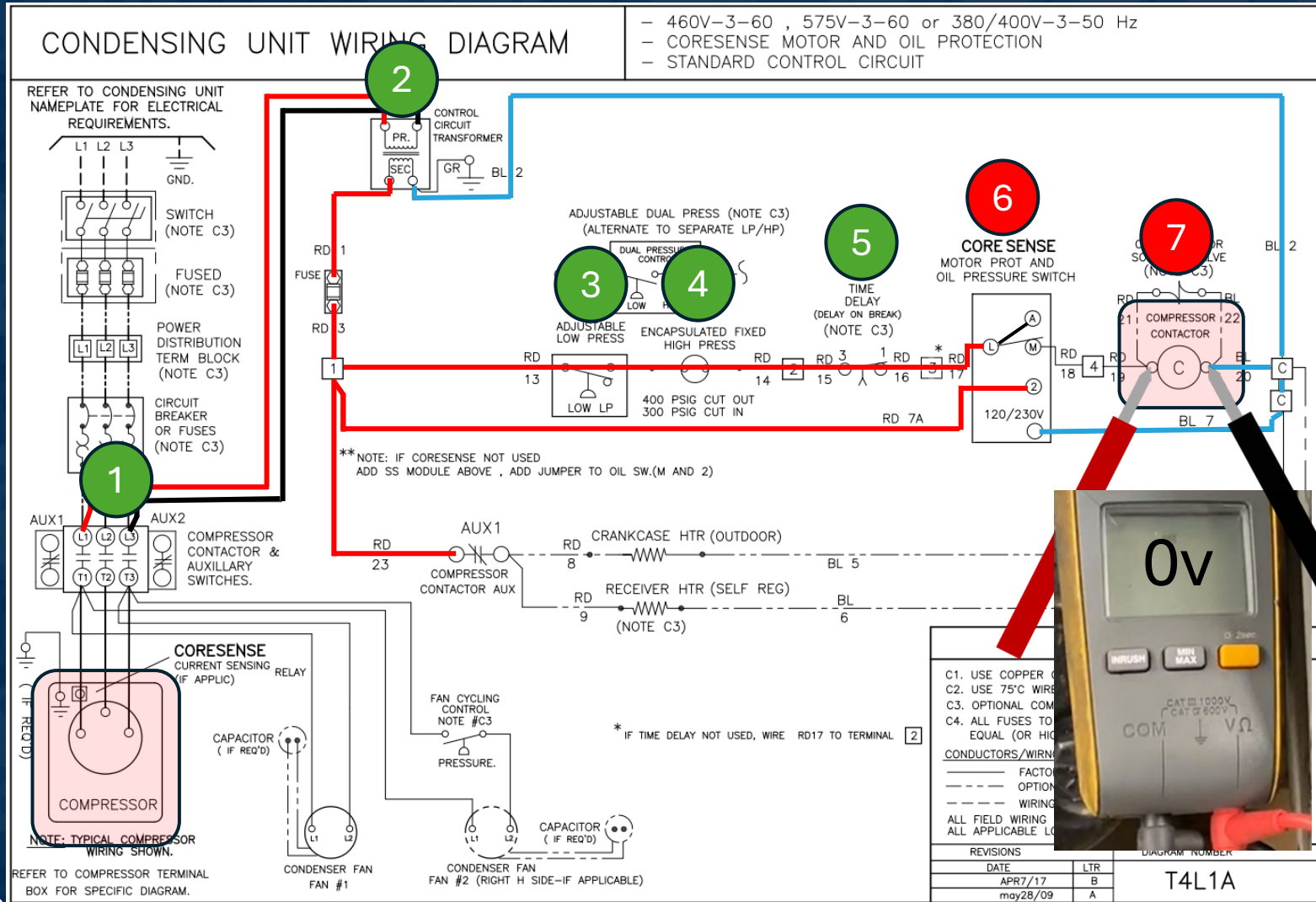


The gatekeeper



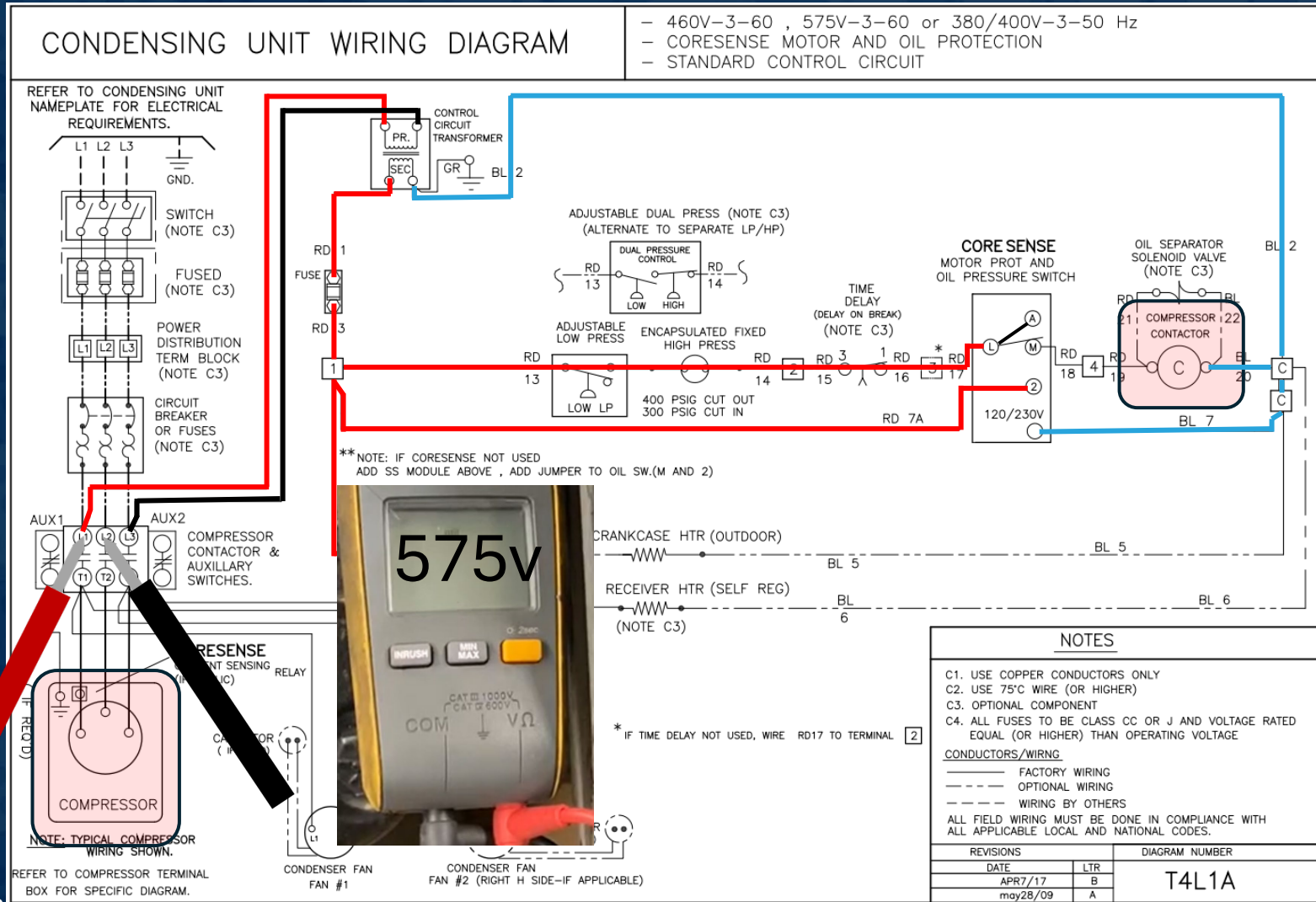


Measure across the coil



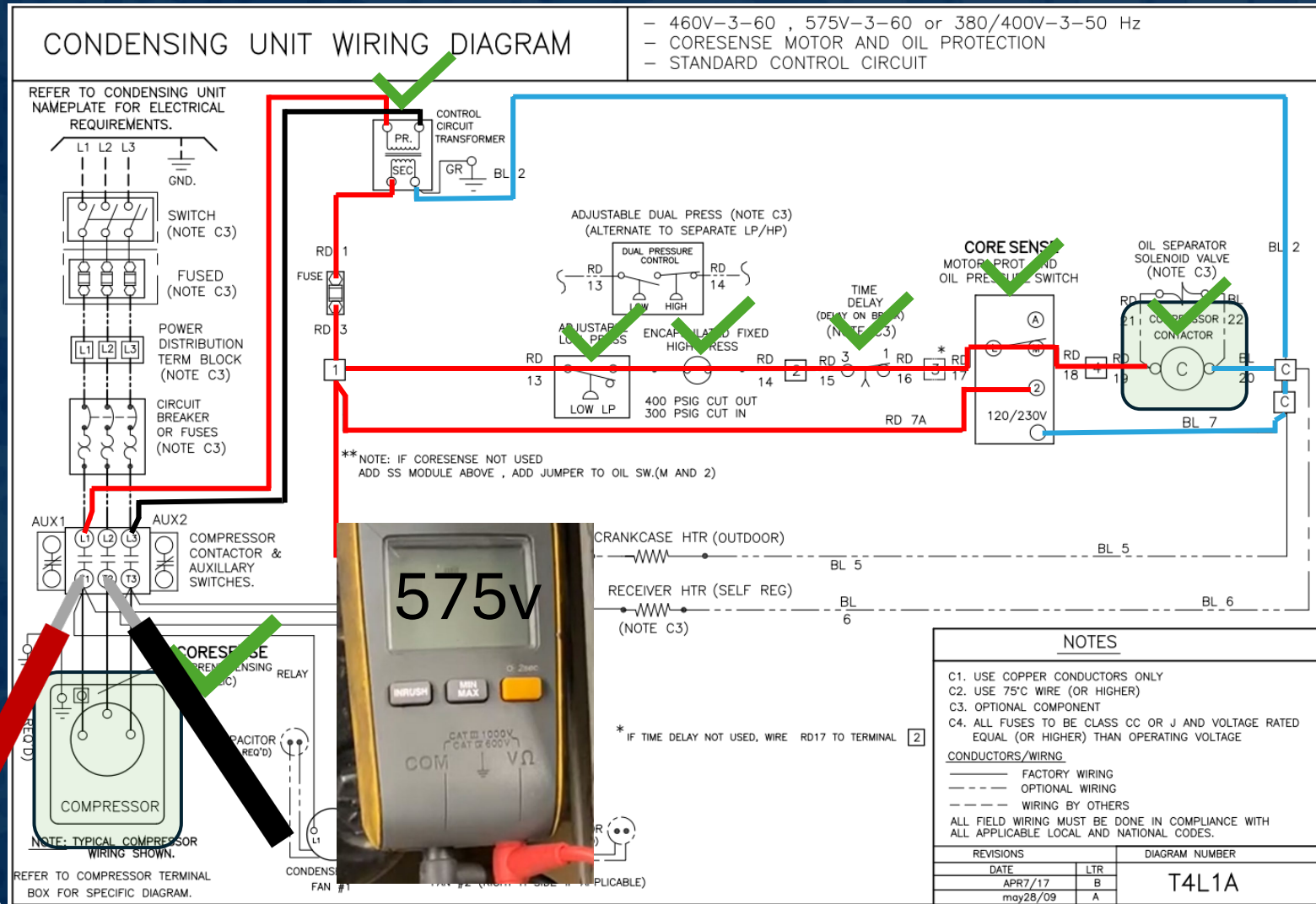


Line power doesn't equal operation

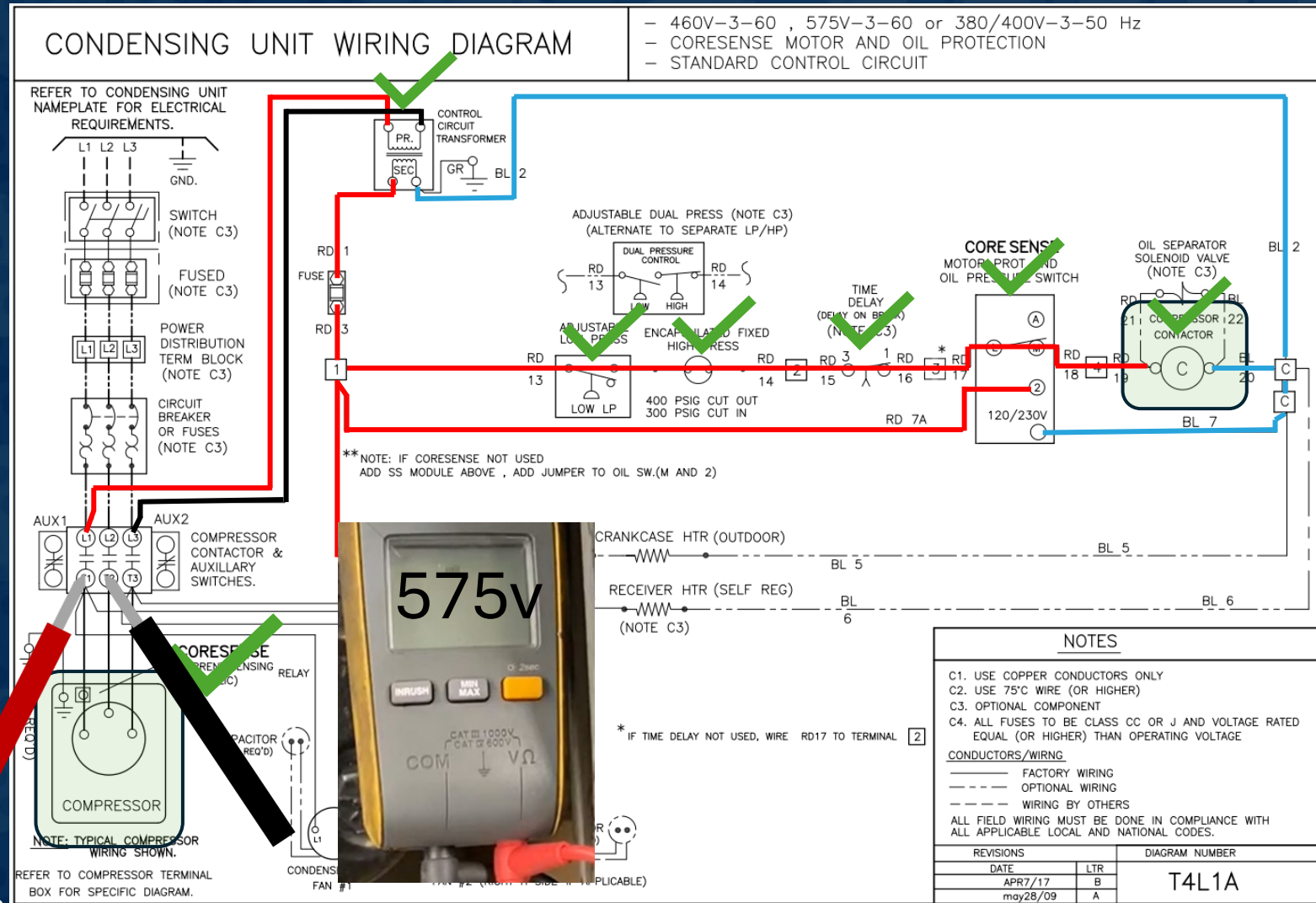




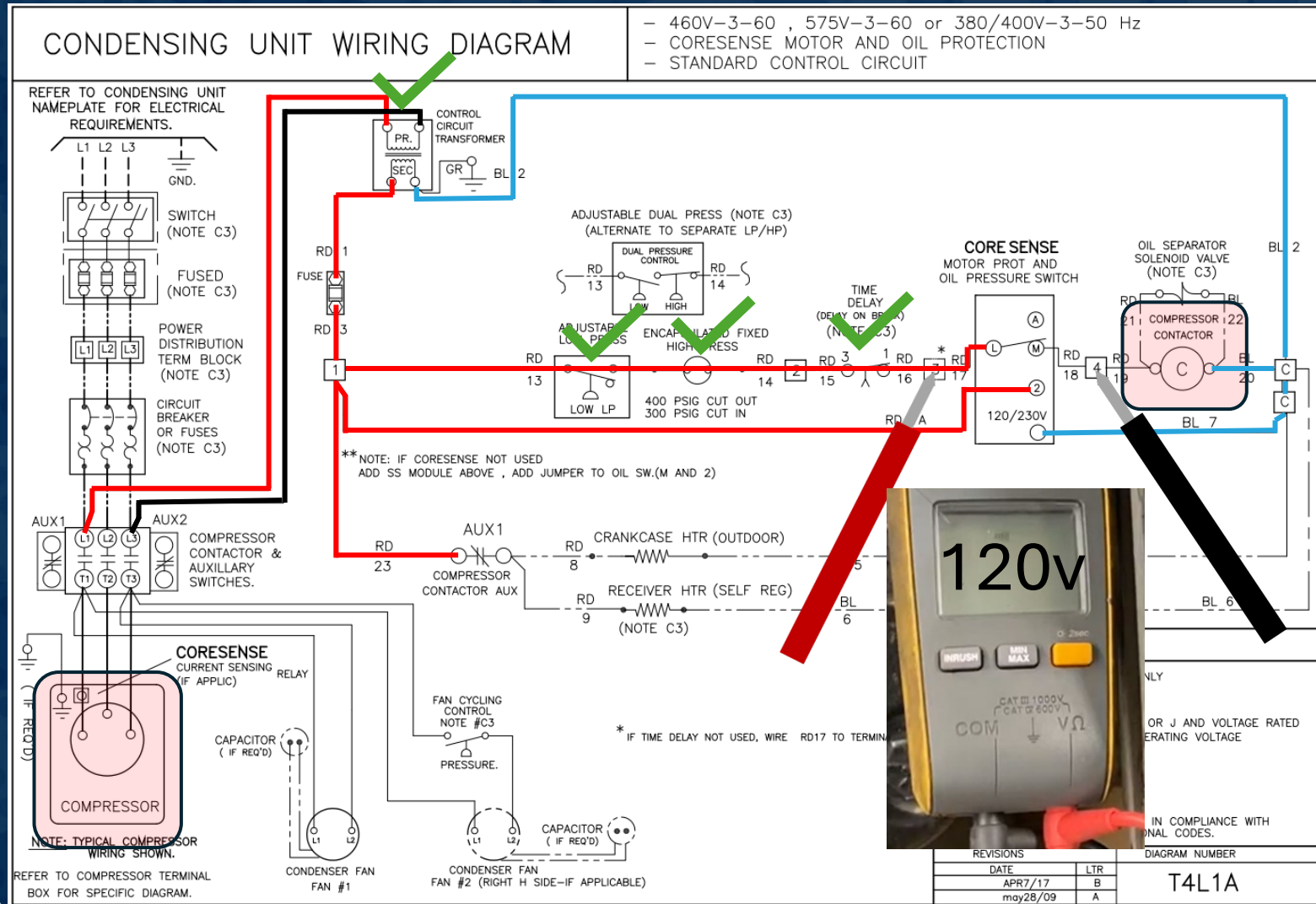
Visualize your measurement



Everything looks normal

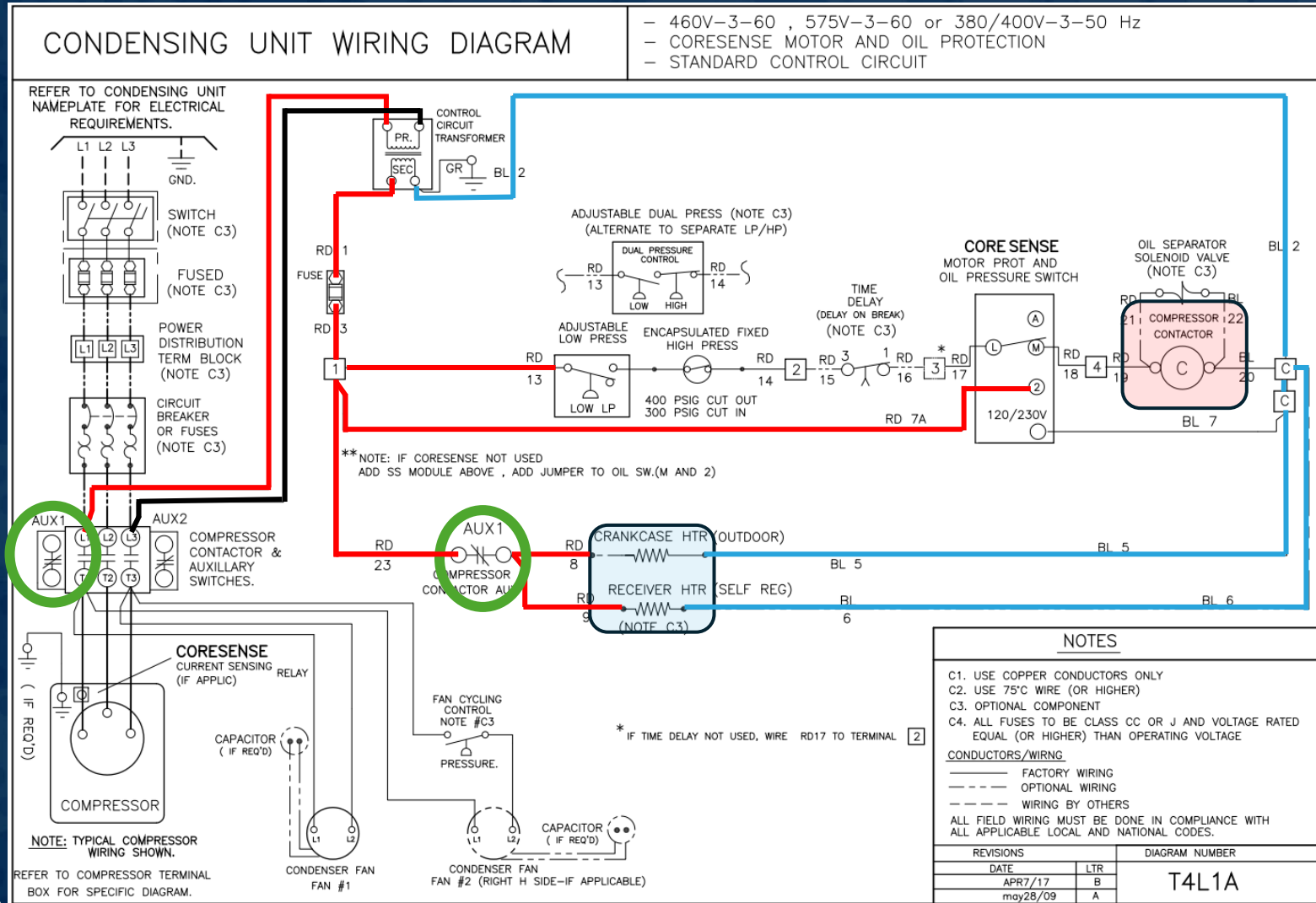


120 seconds later the circuit tells the truth

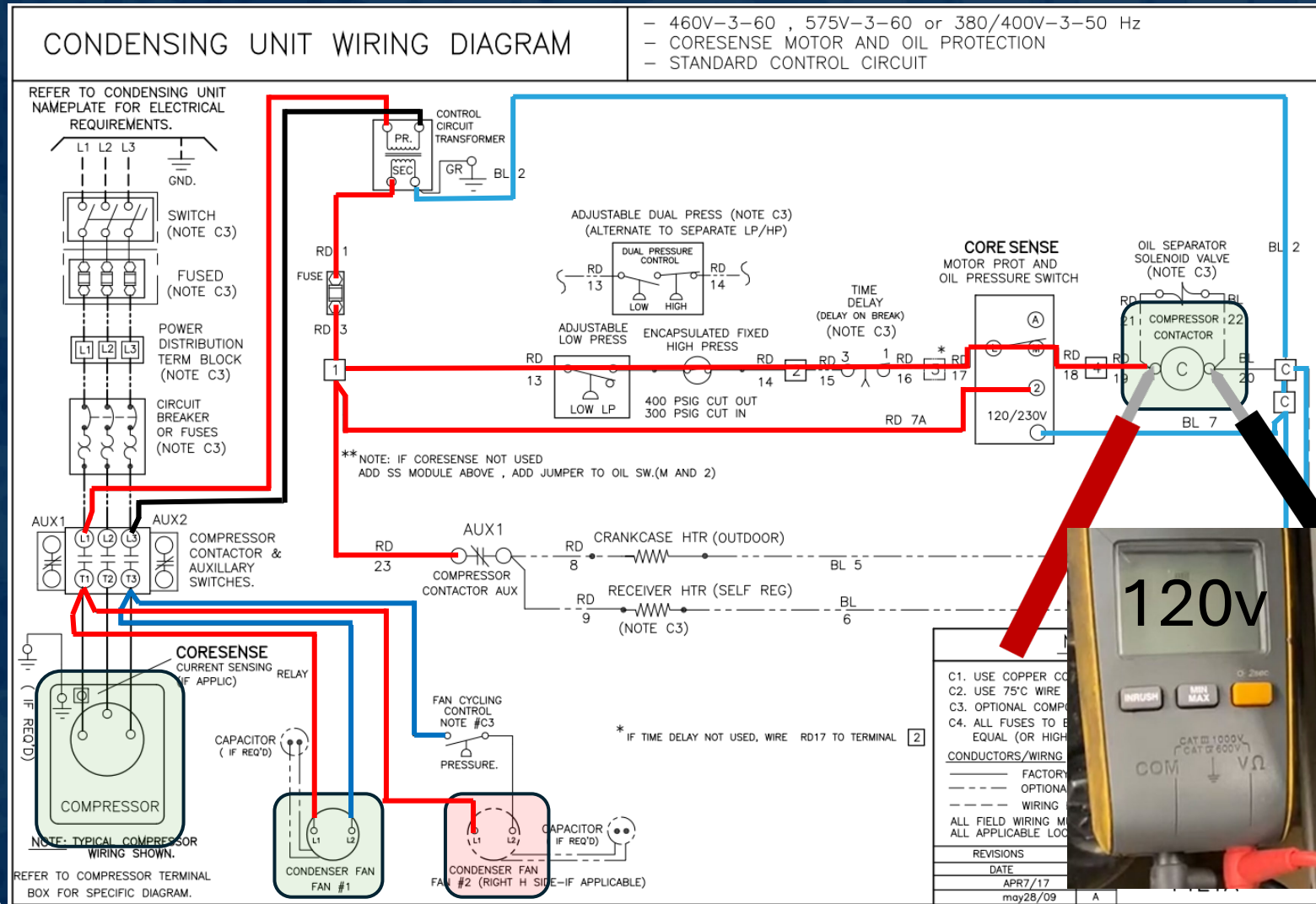




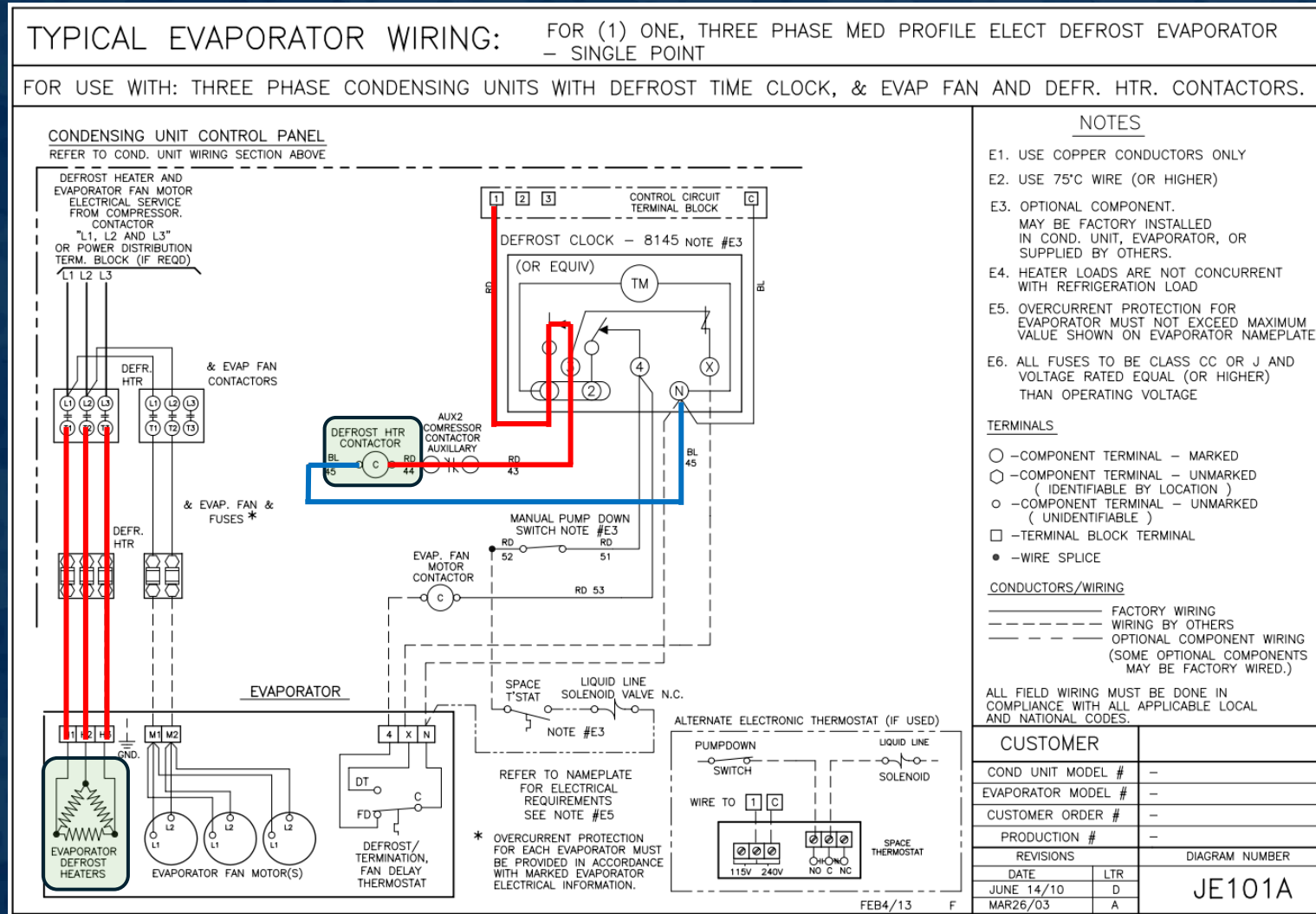
Commonly misunderstood



Pressure logic



Multiple paths, same rules



NOTES

- E1. USE COPPER CONDUCTORS ONLY
- E2. USE 75°C WIRE (OR HIGHER)
- E3. OPTIONAL COMPONENT. MAY BE FACTORY INSTALLED IN COND. UNIT, EVAPORATOR, OR SUPPLIED BY OTHERS.
- E4. HEATER LOADS ARE NOT CONCURRENT WITH REFRIGERATION LOAD
- E5. OVERCURRENT PROTECTION FOR EVAPORATOR MUST NOT EXCEED MAXIMUM VALUE SHOWN ON EVAPORATOR NAMEPLATE.
- E6. ALL FUSES TO BE CLASS CC OR J AND VOLTAGE RATED EQUAL (OR HIGHER) THAN OPERATING VOLTAGE

TERMINALS

- - COMPONENT TERMINAL - MARKED
- - COMPONENT TERMINAL - UNMARKED (IDENTIFIABLE BY LOCATION)
- - COMPONENT TERMINAL - UNMARKED (UNIDENTIFIABLE)
- - TERMINAL BLOCK TERMINAL
- - WIRE SPLICE

CONDUCTORS/WIRING

- FACTORY WIRING
- - - WIRING BY OTHERS
- · - · - OPTIONAL COMPONENT WIRING (SOME OPTIONAL COMPONENTS MAY BE FACTORY WIRED.)

ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.

CUSTOMER	
COND UNIT MODEL #	-
EVAPORATOR MODEL #	-
CUSTOMER ORDER #	-
PRODUCTION #	-
REVISIONS	DIAGRAM NUMBER
DATE	LTR
JUNE 14/10	D
MAR26/03	A
JE101A	

Read the notes

* IF OIL SWITCH NOT REQD, WIRE RD19 TO TERMINAL 3

* * IF TIMER NOT USED, WIRE RD17 TO TERMINAL 2

IF OIL SWITCH AND TIME DELAY NOT REQUIRED, WIRE RD19 TO TERMINAL 2

NOTES

- C1. USE COPPER CONDUCTORS ONLY
- C2. USE 75°C WIRE (OR HIGHER)
- C3. OPTIONAL COMPONENT
- C4. ALL FUSES TO BE CLASS CC OR J AND VOLTAGE RATED EQUAL (OR HIGHER) THAN OPERATING VOLTAGE

CONDUCTORS/WIRING

- FACTORY WIRING
- - - - - OPTIONAL WIRING
- - - - - WIRING BY OTHERS

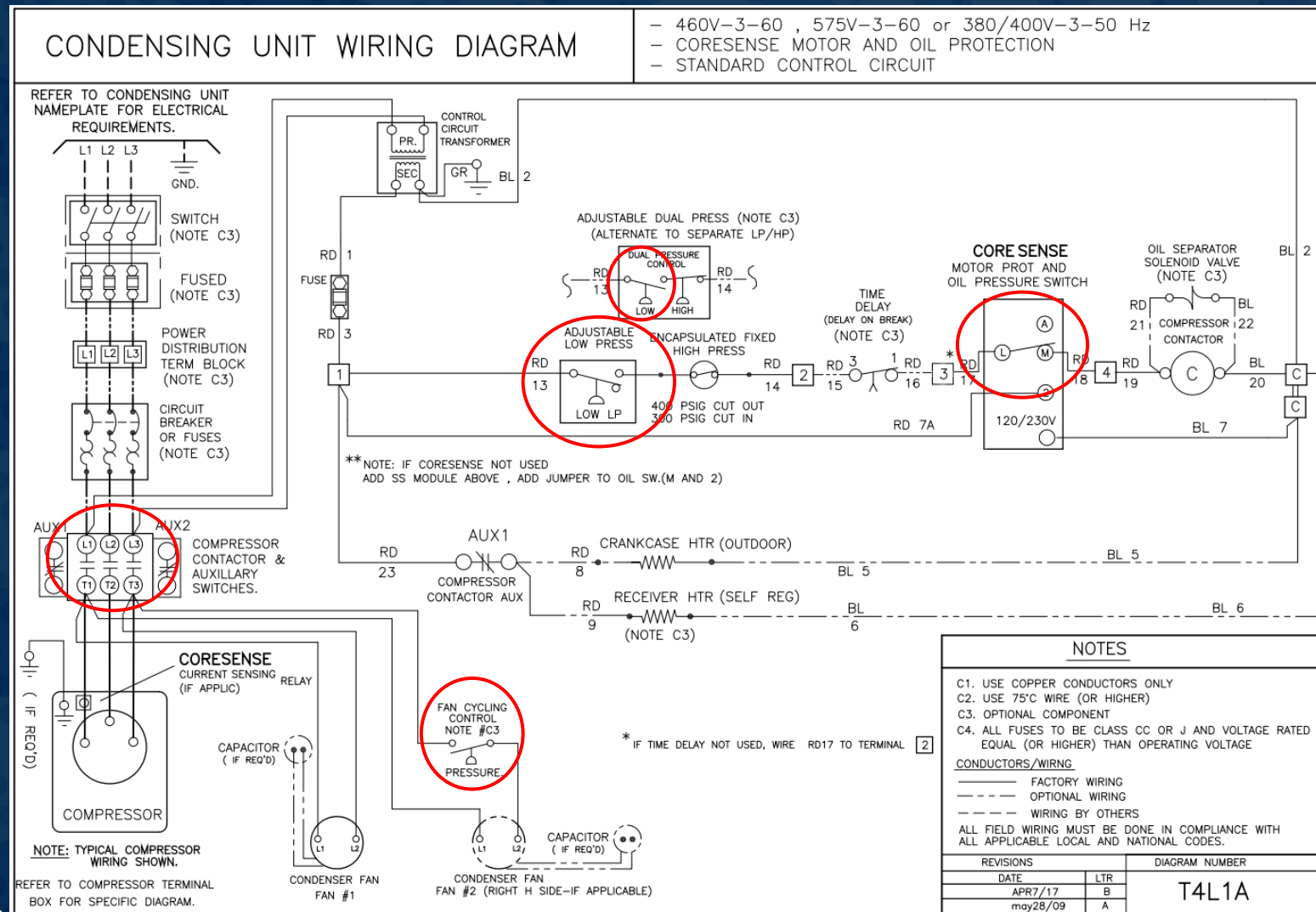
ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.

Jumping safeties

Dangerous Shortcut

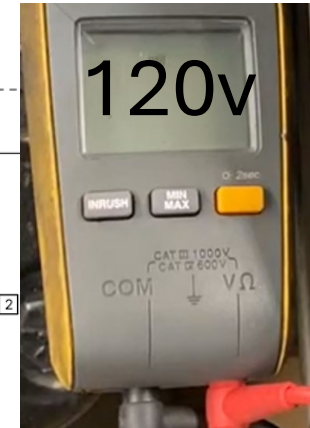
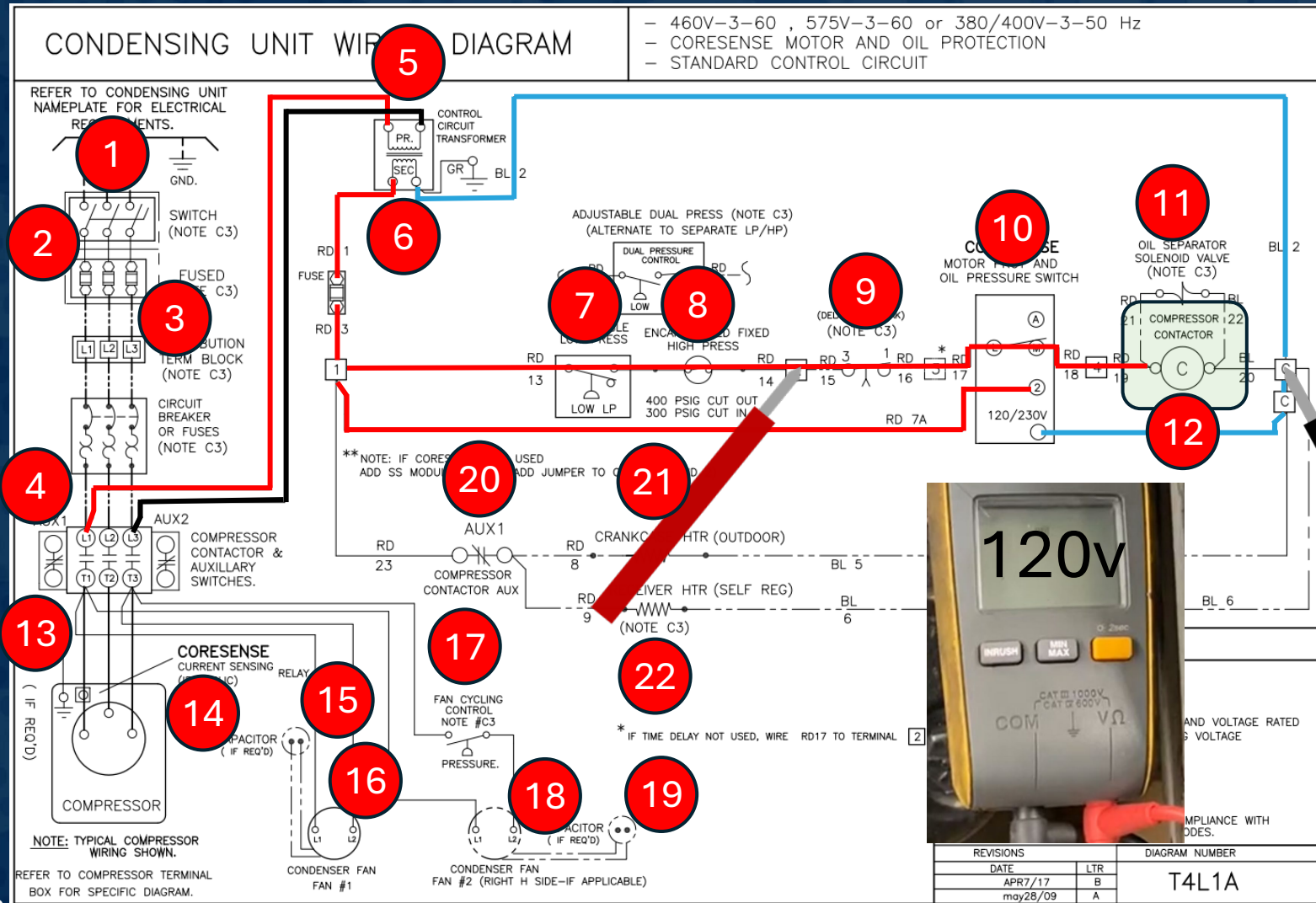


Normal means unpowered



Smart Readings Beat More Readings

Think before measuring



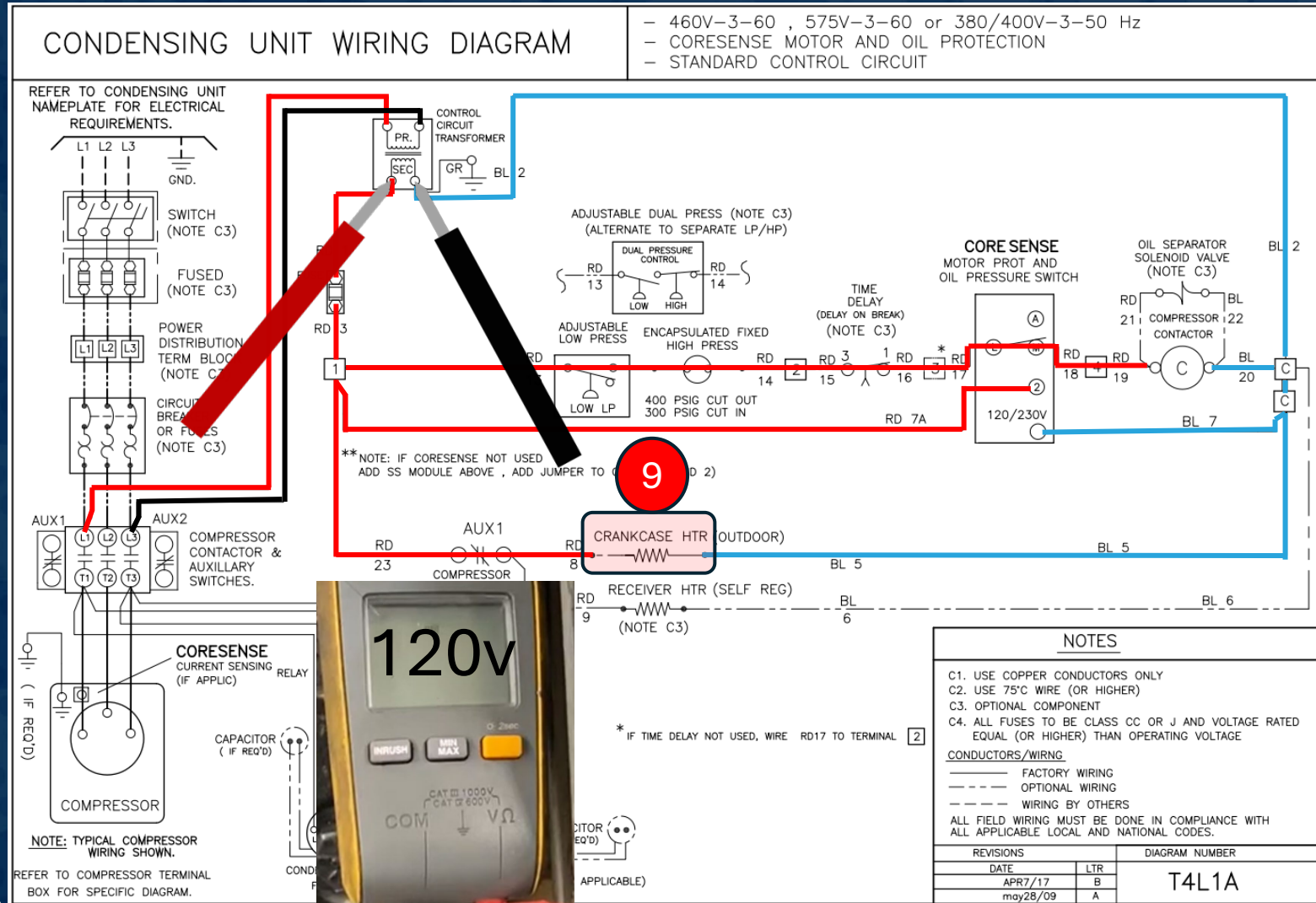
REVISIONS	DATE	LTR	DIAGRAM NUMBER
	APR7/17	B	T4L1A
	may28/09	A	

A repeatable method



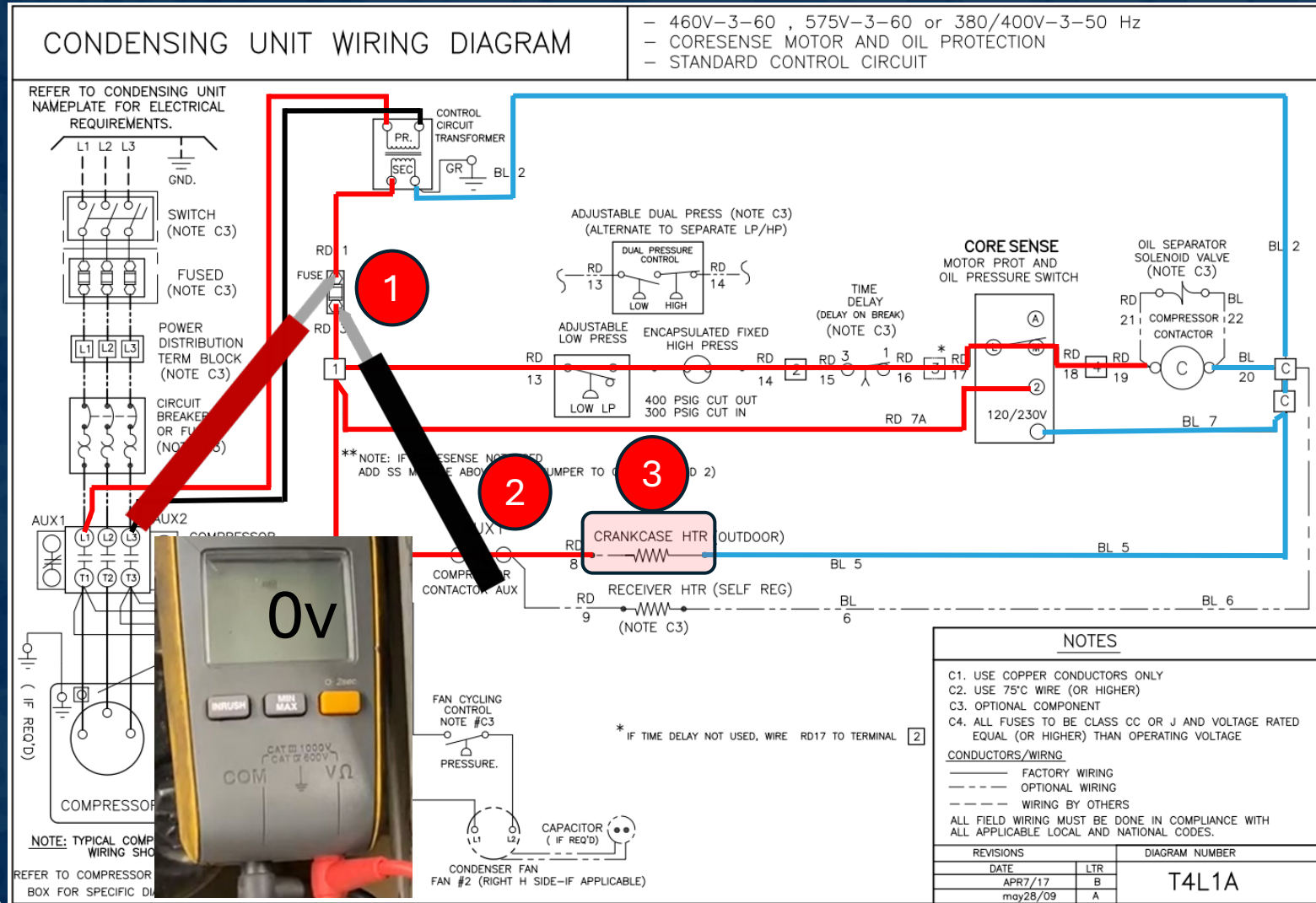


Find its power source



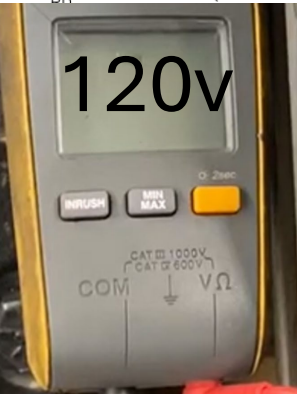
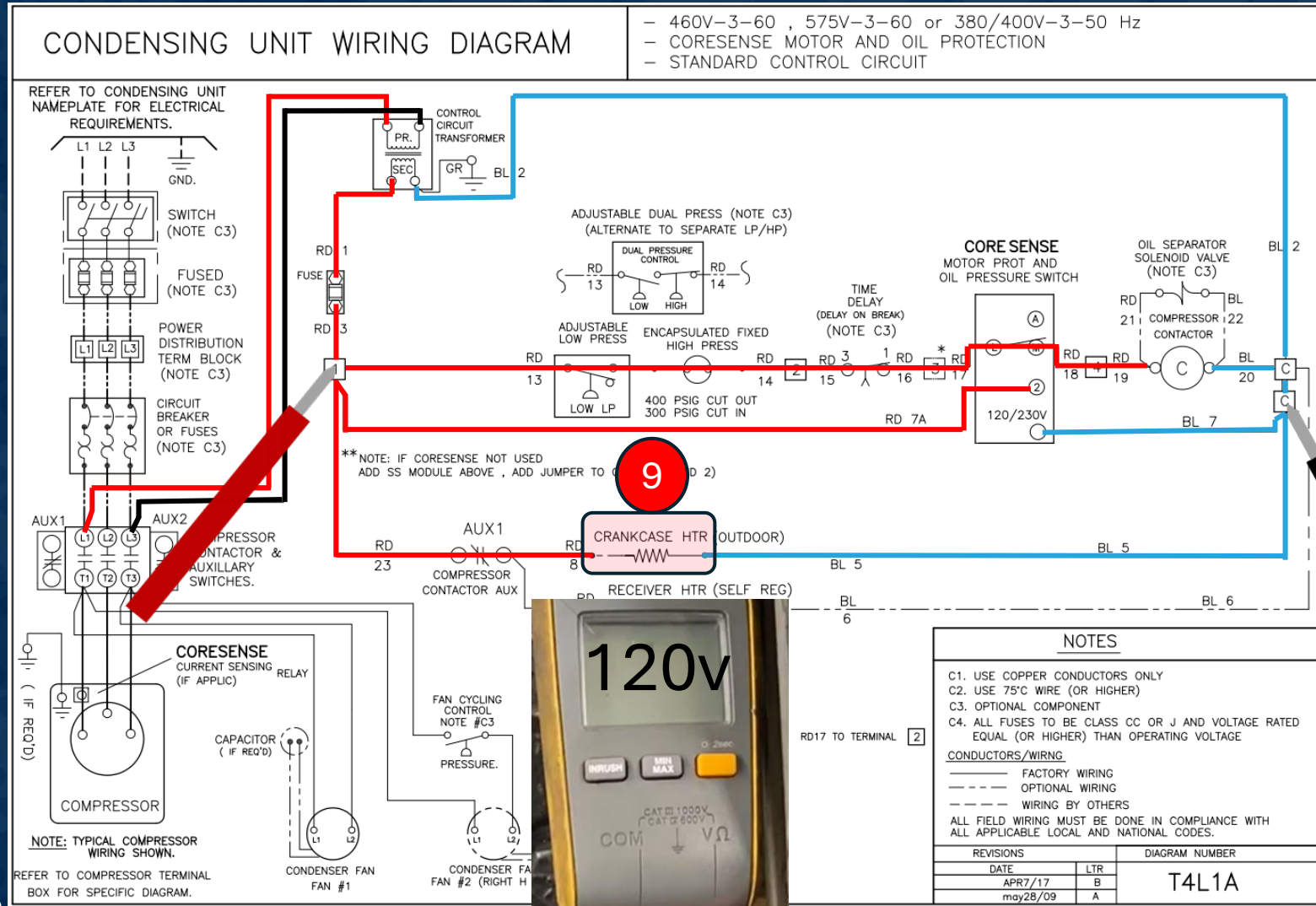


Measure across components



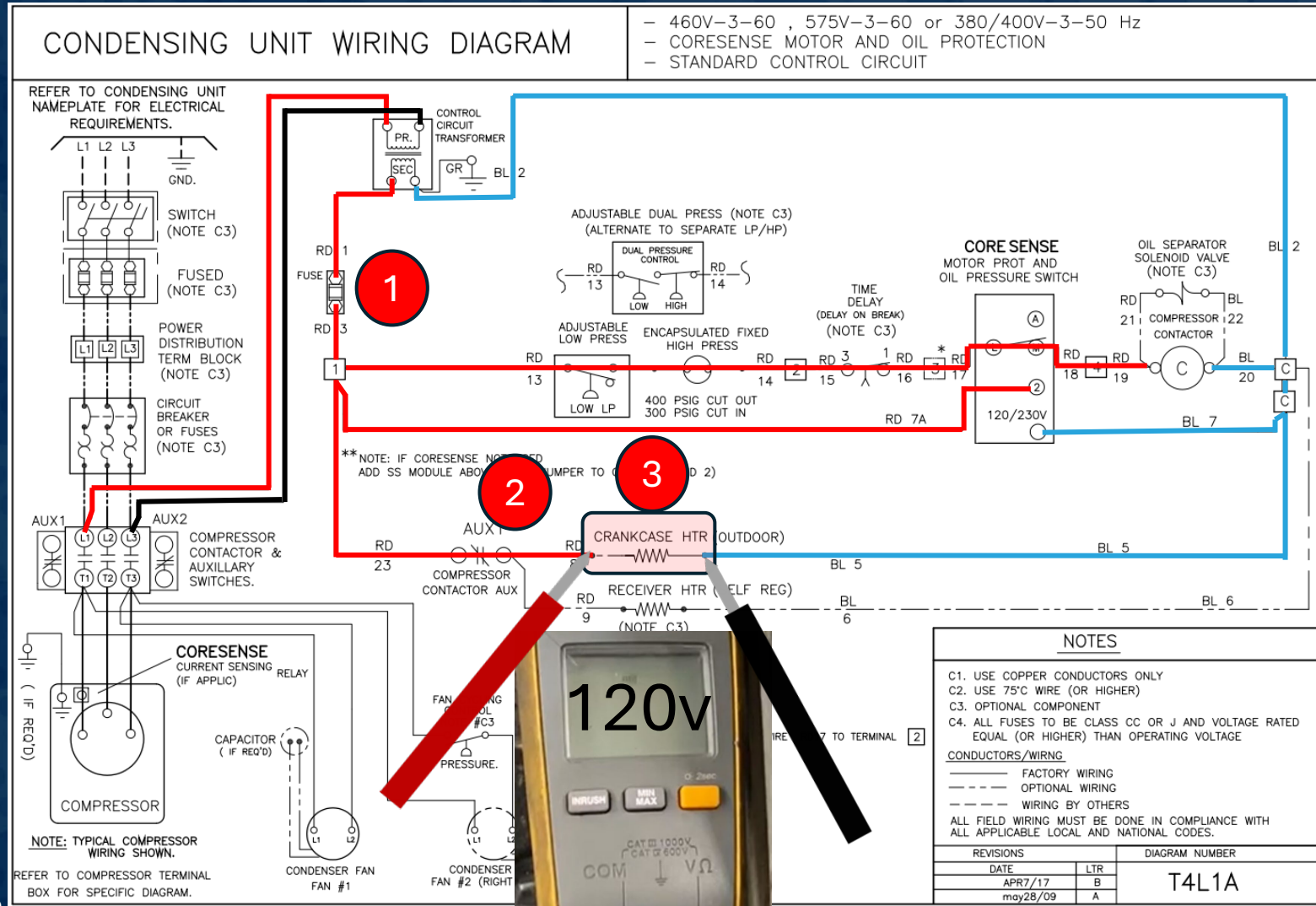


Follow the series path



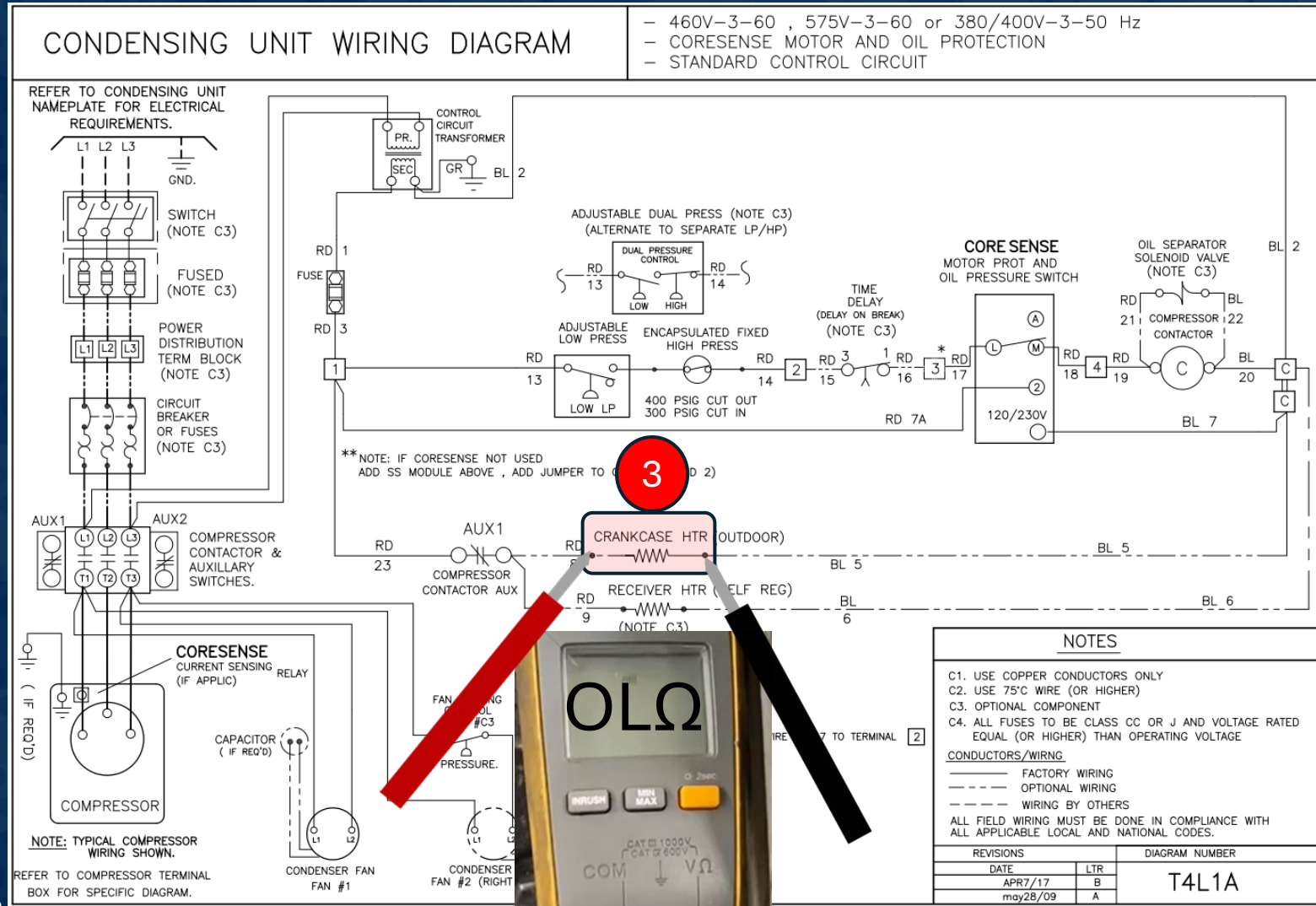


Find voltage drop, short or open circuit

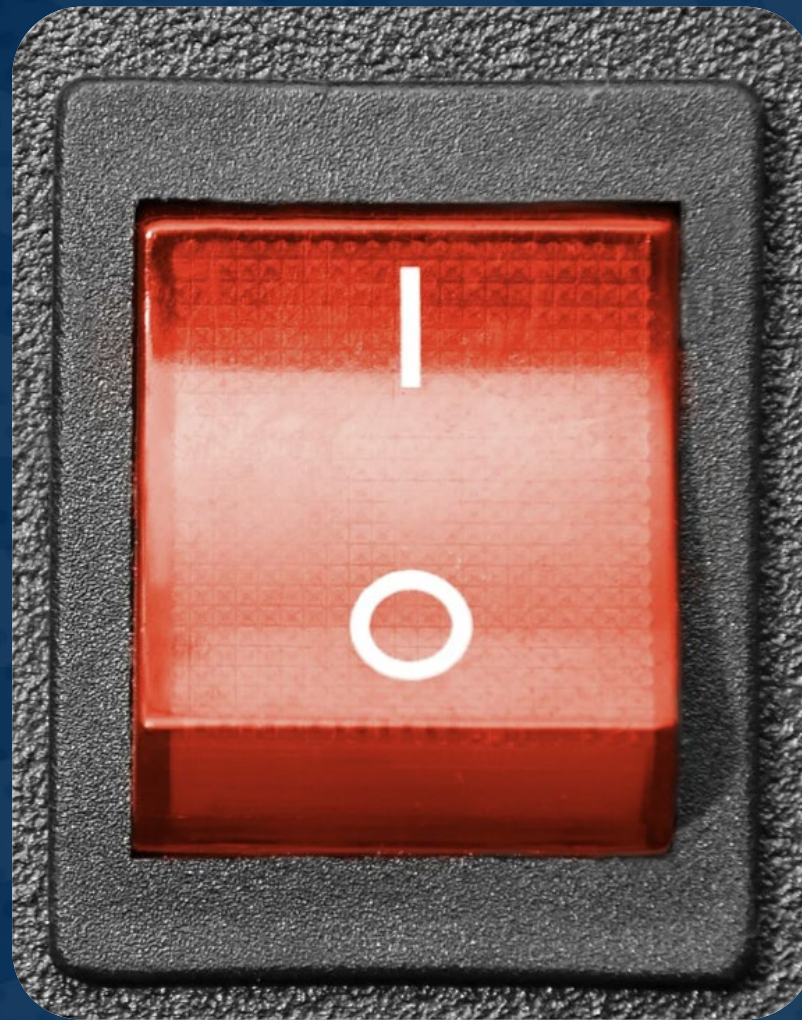




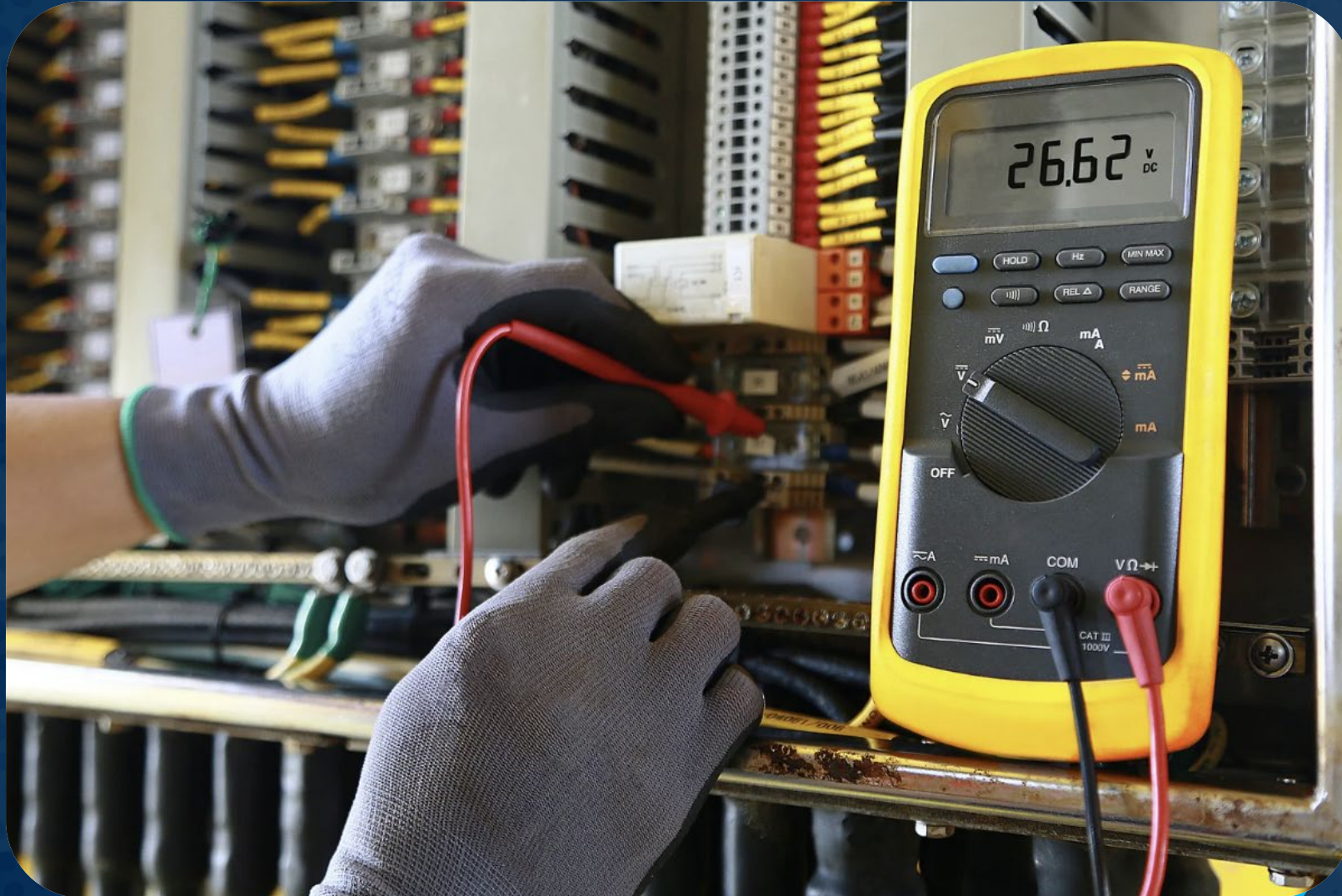
Prove the failure



Electricity only does what the circuit allows



Slow down, prove it, stop guessing



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Understanding Electrical Troubleshooting on Refrigeration Systems

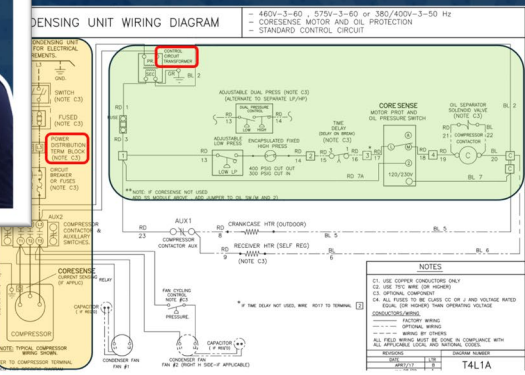
LET'S GET A CONVERSATION GOING.

▶▶▶



Two Circuits Always Exist

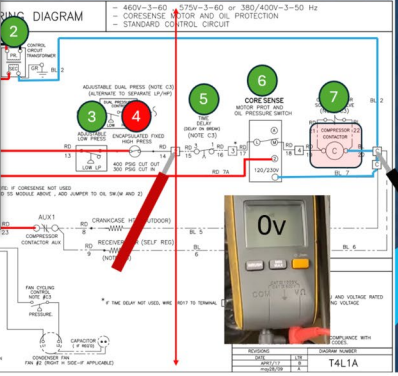
Power and control circuits



CONDENSING UNIT WIRING DIAGRAM - 460V-3-60, 575V-3-60 or 380/400V-3-50 Hz
- CORESENSE MOTOR AND OIL PROTECTION
- STANDARD CONTROL CIRCUIT

NOTES:
1. USE COPPER CONDUCTORS ONLY.
2. USE THE WIRE SIZE SHOWN.
3. ALL WIRES TO BE CLASS C0 OR J AND VOLTAGE RATED.
4. ALL WIRES TO BE IDENTIFIED BY NUMBER OR LETTER.
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7. ALL WIRES TO BE IDENTIFIED BY NUMBER OR LETTER.
8. ALL WIRES TO BE IDENTIFIED BY NUMBER OR LETTER.
9. ALL WIRES TO BE IDENTIFIED BY NUMBER OR LETTER.
10. ALL WIRES TO BE IDENTIFIED BY NUMBER OR LETTER.

Divide and Conquer



CONDENSING UNIT WIRING DIAGRAM - 460V-3-60, 575V-3-60 or 380/400V-3-50 Hz
- CORESENSE MOTOR AND OIL PROTECTION
- STANDARD CONTROL CIRCUIT

2. FAN MOTOR
3. FAN MOTOR
4. FAN MOTOR
5. FAN MOTOR
6. CORESENSE MOTOR
7. CORESENSE MOTOR

0v



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Learn how to quickly diagnose and fix common electrical issues in refrigeration systems.

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SCAN HERE



Master the Electrical Side of Refrigeration

THANK YOU!