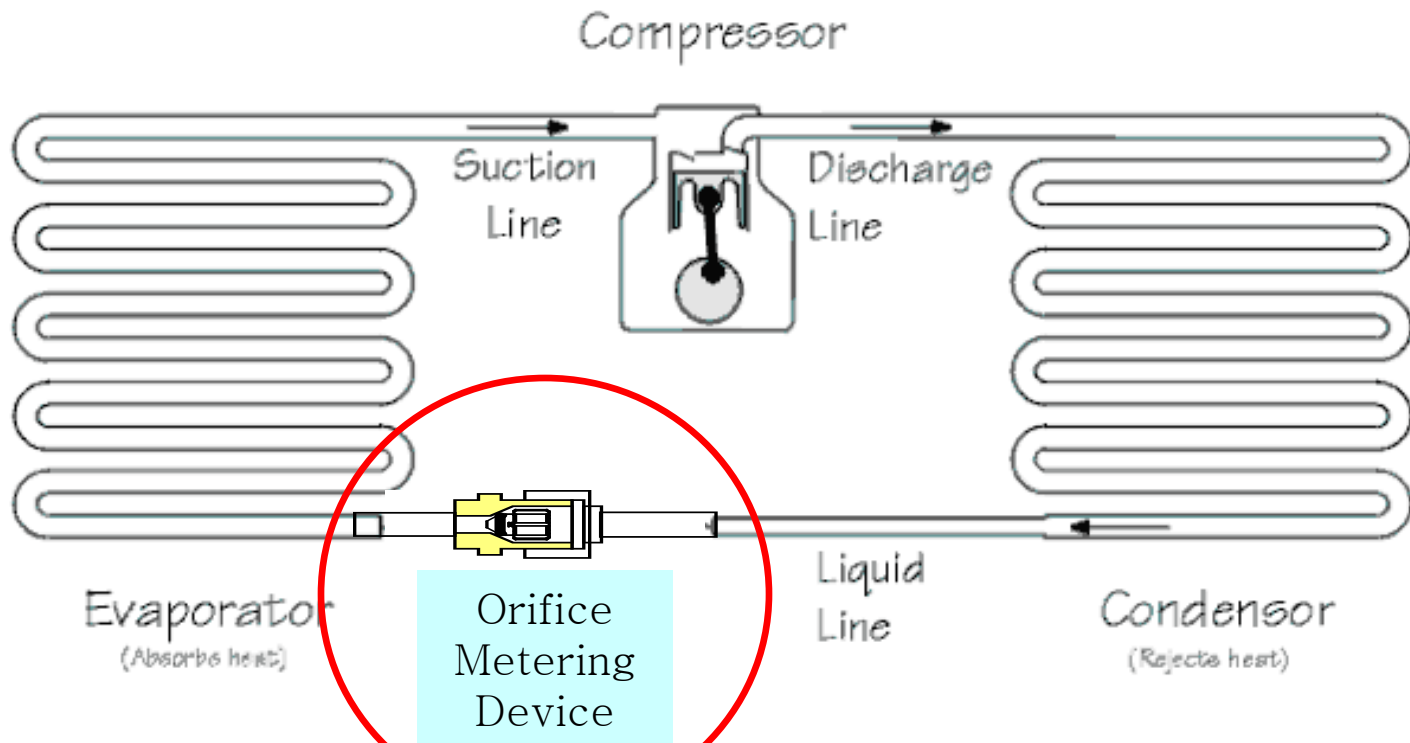


Superheat Charging Method

Superheat Method

THE SUPERHEAT METHOD IS USED FOR SYSTEMS



Superheat Method

THERE ARE TWO WAYS TO CHARGE A SYSTEM USING THE SUPERHEAT METHOD:

- 1. USING DRY BULB RETURN AIR TEMPERATURE**
- 2. USING WET BULB RETURN AIR TEMPERATURE**

THE WET BULB RETURN AIR TEMPERATURE METHOD IS THE MOST ACCURATE

USING DRY BULB RETURN AIR TEMPERATURE

(Not Used)

NOTE:

**Indoor airflow should be within
+/- 20 % of rated cfm.**

Fixed Orifice

1. Purge gauge lines. Connect service gauge manifold to base-valve service ports. Run system at least 10 minutes to allow pressure to stabilize.
2. For best results, temporarily install a thermometer on the suction line near the compressor. The thermometer should be located within 4" to 6" of the compressor. Ensure the thermometer makes adequate contact and is insulated.

NOTE: An optional, less accurate, method is to locate the thermometer at the suction line service valve. Ensure the thermometer makes adequate contact and is insulated.

3. Refer to the superheat table provided for proper system superheat. Add charge to lower superheat or recover charge to raise superheat. Disconnect manifold set, installation is complete.

**SUPERHEAT FORMULA =
SUCTION LINE TEMP. - SAT. SUCTION TEMP.**

Saturated Suction Temperature

Pressure

Sat. Evap. Temp.



INSTALL Thermometer/Thermocouple

- **INSTALLED ON THE SUCTION LINE
(LARGER OF TWO COPPER LINES)**

Using Superheat Table

- Get the outside ambient temperature in the shade of the condensing unit
- Get the return air dry bulb temperature at the return air grill
- Intersect the 2 numbers on the chart shown on the next slide
- That will give you the amount of superheat you need

SYSTEM SUPERHEAT

**Ambient Condenser
Inlet Temp.
(°F Drybulb)**

**Return Air Temperature
(°F Drybulb)**

65

70

75

80

85

115

3

100

5

95

5

5

90

7

12

18

85

5

10

17

20

80

5

12

21

26

75

5

10

17

25

29

70

5

14

20

28

32

65

13

19

26

32

35

60

17

25

30

33

37

Superheat Formula

Suction Line Temperature minus the Saturated Evaporating Temp = Superheat

Example

- YOUR LOW SIDE PRESSURE IS 75 PSI
- DIRECTLY BELOW THAT NUMBER IS THE SATURATION TEMPERATURE, WHICH IS 44°F
- TAKE YOUR SUCTION LINE TEMPERATURE, WHICH IS 65°F

Example

- Subtract the 2 numbers and that's how much superheat you have
- $65^{\circ}\text{f} - 44^{\circ}\text{f} = 21^{\circ}\text{f}$ superheat
- We only needed 5°f
 - *Add charge to lower super heat*
 - *Remove charge to raise superheat*

Superheat Method

**Using Wet Bulb Return Air
Temperature**

Charging Fixed Restrictor Systems

- Determine the Required Superheat
- Measure the Operating Superheat
- If the operating superheat is low...remove refrigerant
 - Assuming that no other problems exist
- If the operating superheat is high...add refrigerant



R-410A Superheat (Wet Bulb)

TABLE 1 SUPERHEAT CHARGING

OUTDOOR TEMP (°F)	EVAPORATOR ENTERING AIR TEMP (°F WB) Superheat ° F is at low-side service port													
	50	52	54	56	58	60	62	64	66	68	70	72	74	76
55	9	12	14	17	20	23	26	29	32	35	37	40	42	45
60	7	10	12	15	18	21	24	27	30	33	35	38	40	43
65	-	6	10	13	16	19	21	24	27	30	33	36	38	41
70	-		7	10	13	16	19	21	24	27	30	33	36	39
75	-		-	7	9	12	15	18	21	24	28	31	34	37
80	-		-	-	5	8	12	15	18	21	25	28	31	35
85	-		-	-	-	-	8	11	15	19	22	26	30	33
90	-		-	-	-	-	5	9	13	16	20	24	27	31
95	-		-	-	-	-	-	6	10	14	18	22	25	29
100	-	-	-	-	-	-	-		8	12	15	20	23	27
105	-	-	-	-	-	-	-	-	5	9	13	17	22	26
110	-	-	-	-	-	-	-	-	-	6	11	15	20	25
115	-	-	-	-	-	-	-	-	-	-	8	14	18	23

TABLE 2-REQUIRED SUCTION TUBE TEMPERATURE ° F

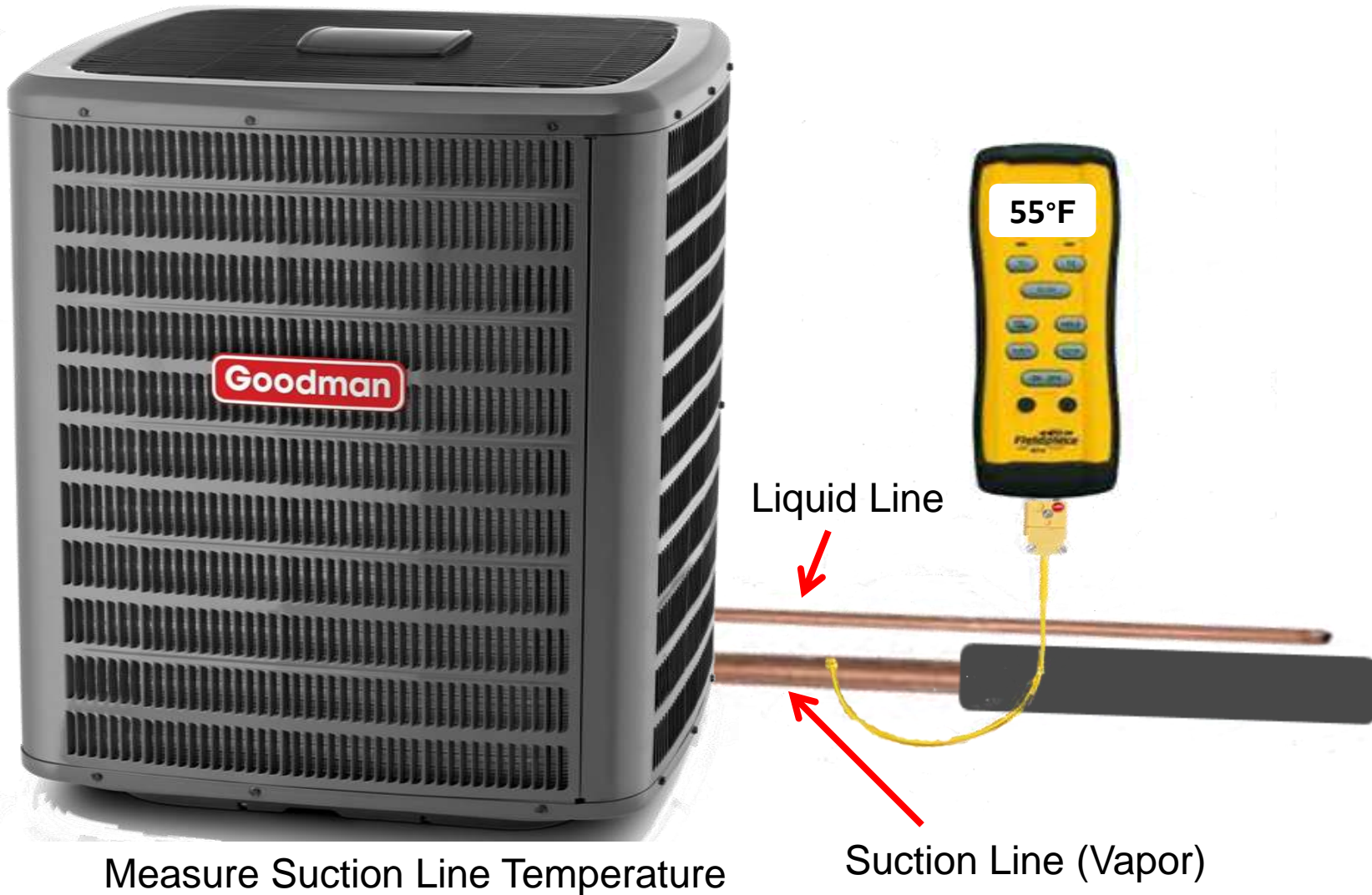
Measure suction pressure at the low side service port

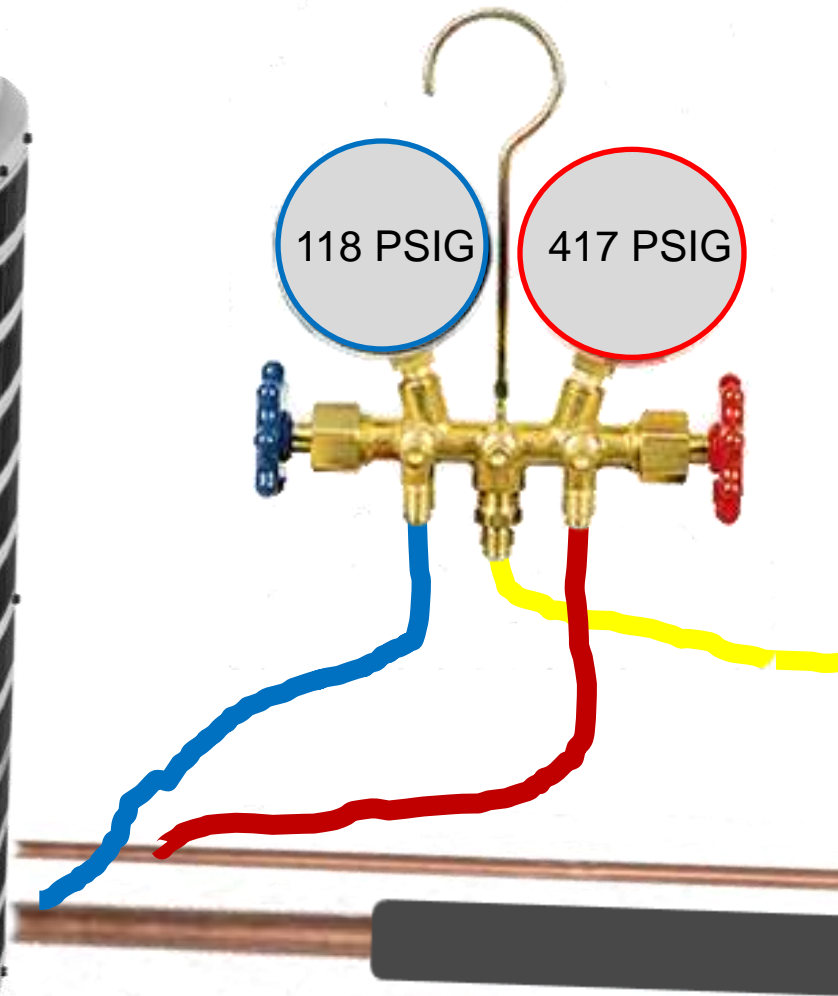
Superheat Temp. ° F	Suction pressure at service port psig								
	108	112	117	121	126	131	139	141	146
0	35	37	39	41	43	45	47	49	51
2	37	39	41	43	45	47	49	51	53
4	39	41	43	45	47	49	51	53	55
6	41	43	45	47	49	51	53	55	57
8	43	45	47	49	51	53	55	57	59
10	45	47	49	51	53	55	57	59	61
12	47	49	51	53	55	57	59	61	63
14	49	51	53	55	57	59	61	63	65
16	51	53	55	57	59	61	63	65	67
18	53	55	57	59	61	63	65	67	69
20	55	57	59	61	63	65	67	69	71
22	57	59	61	63	65	67	69	71	73
24	59	61	63	65	67	69	71	73	75
26	61	63	65	67	69	71	73	75	77
28	63	65	67	69	71	73	75	77	79
30	65	67	69	71	73	75	77	79	81
32	67	69	71	73	75	77	79	81	83
34	69	71	73	75	77	79	81	83	85
36	71	73	75	77	79	81	83	85	87
38	73	75	77	79	81	83	85	87	89
40	75	77	79	81	83	85	87	89	91

ADD CHARGE TO LOWER SUPER HEAT

REMOVE CHARGE TO RAISE SUPERHEAT

Determine Operating Superheat





- Measure Suction Line Pressure
- Convert Pressure to Saturation Temperature
- Subtract SATURATION Temperature from ACTUAL Temperature
- The Difference is OPERATING SUPERHEAT

$$118 \text{ PSIG} = 41^{\circ}\text{F}$$

$$55^{\circ}\text{F} - 41^{\circ}\text{F} = 14^{\circ}\text{F}$$