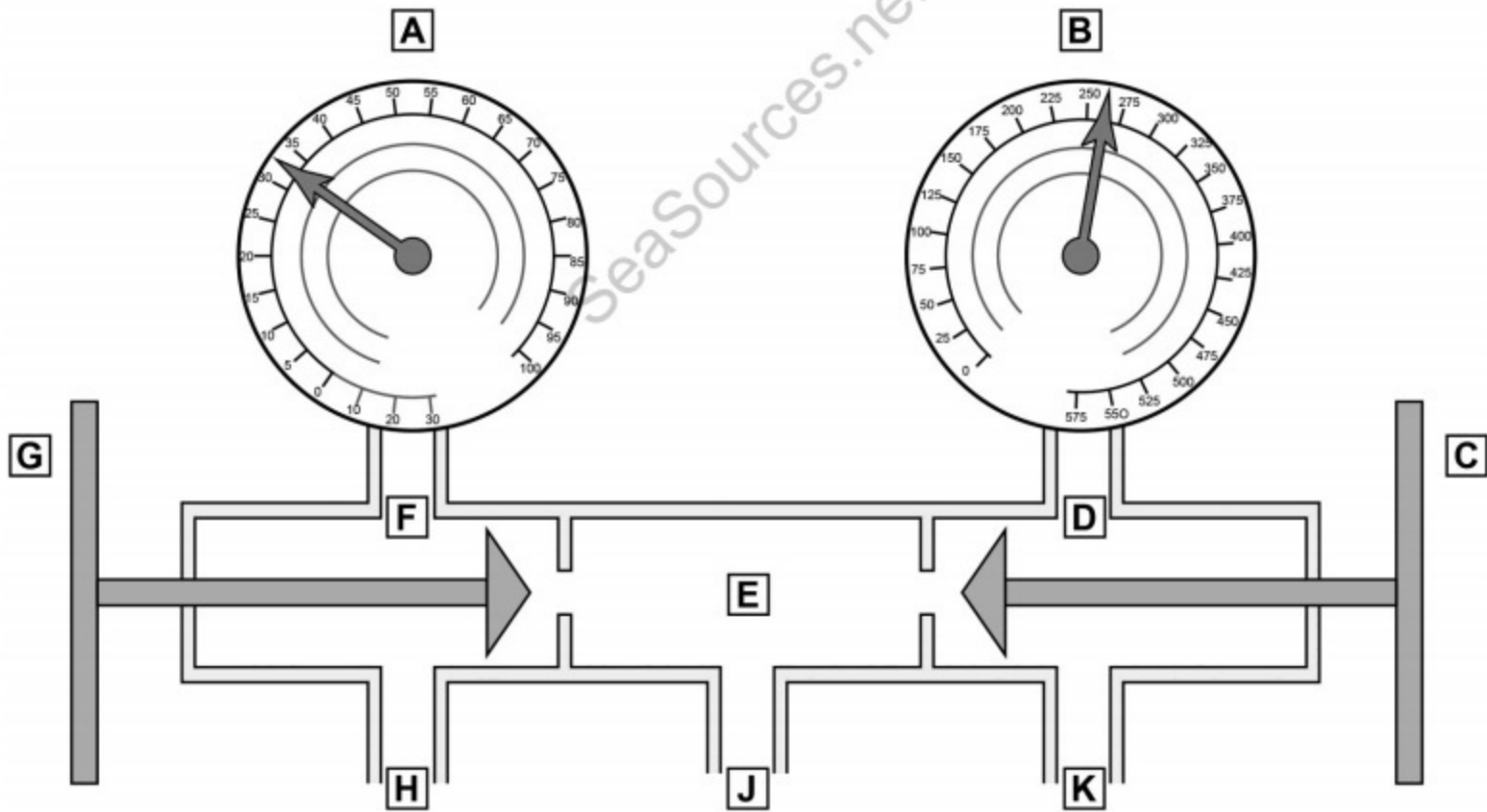
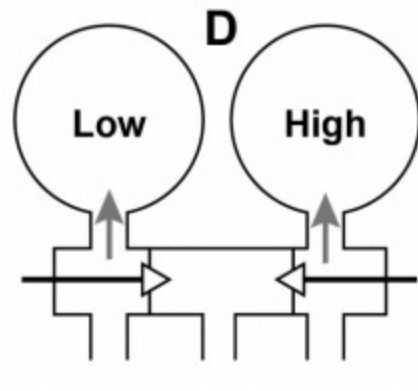
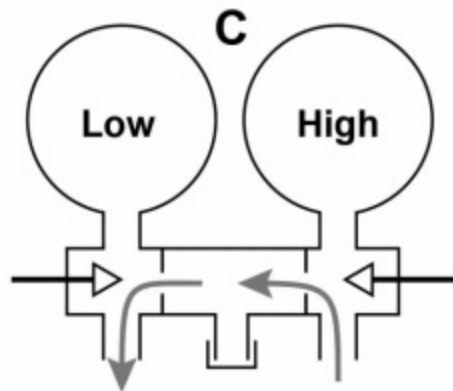
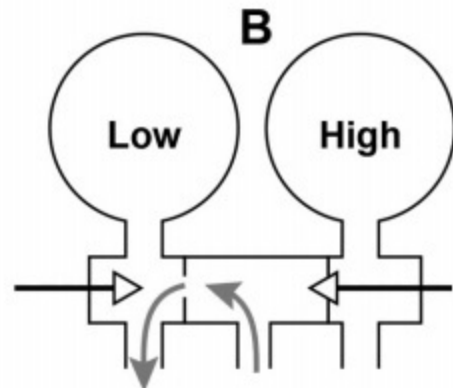
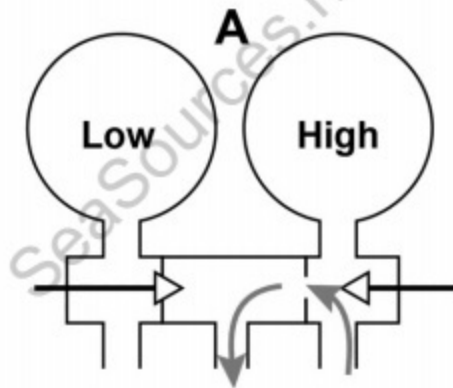
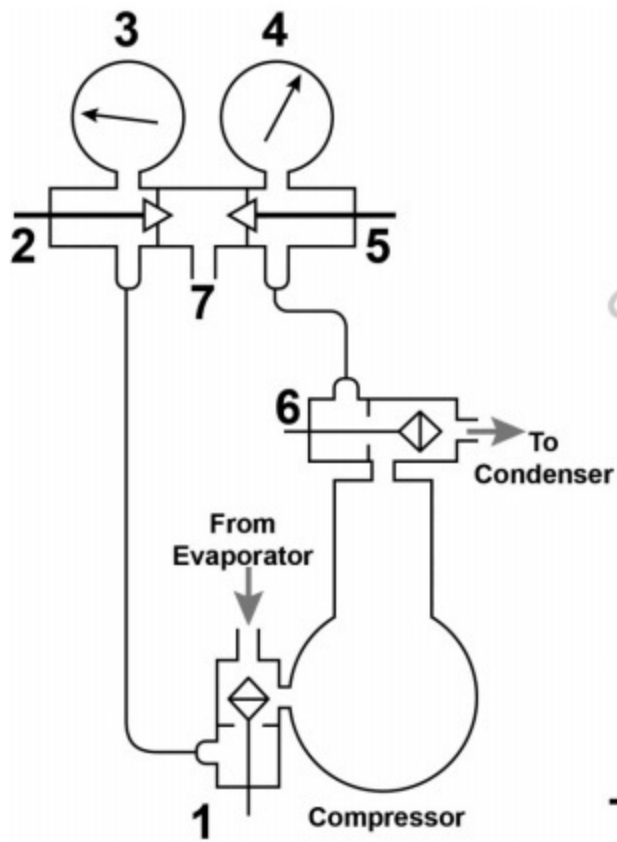


GS-RA-01

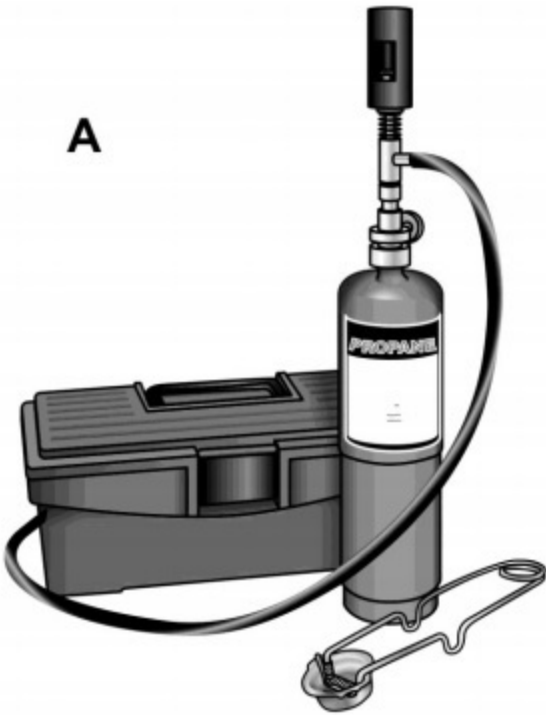


GS-RA-03

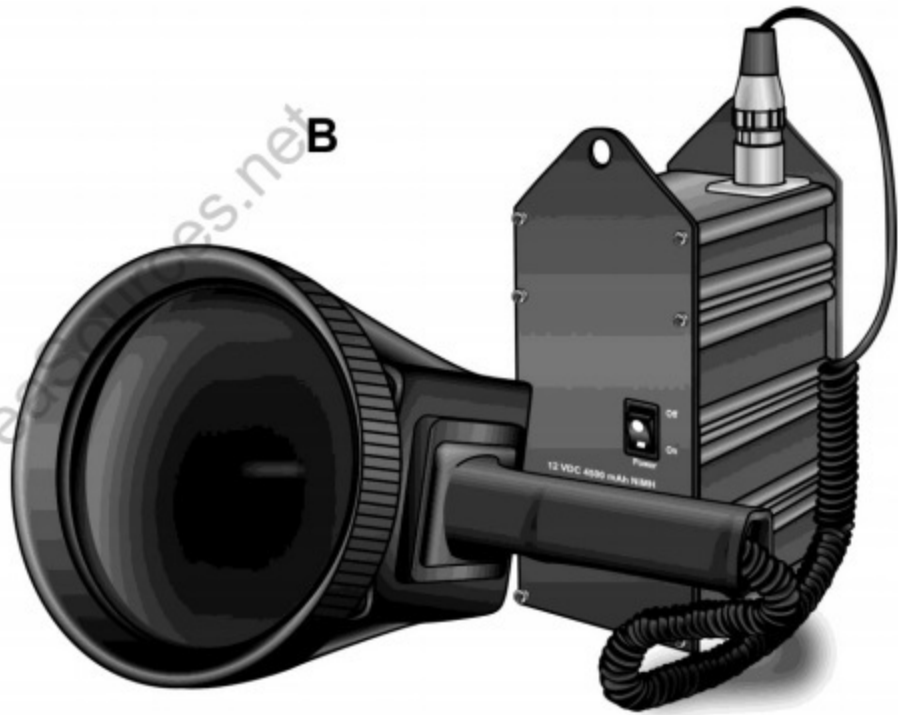


GS-RA-04

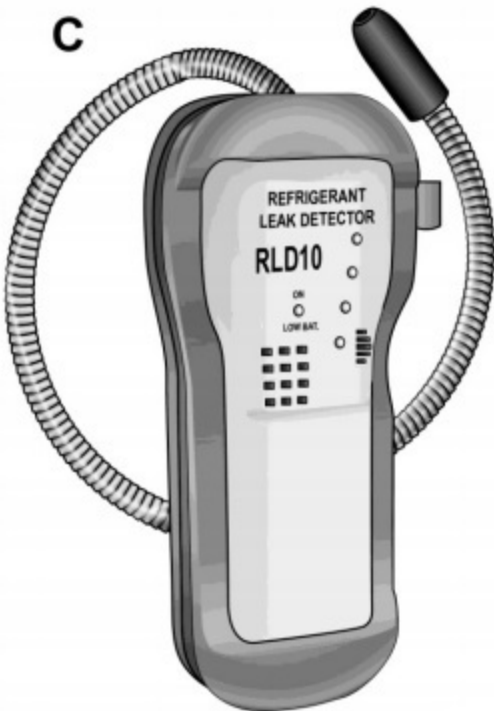
A



B



C



D



GS-RA-06



A



B

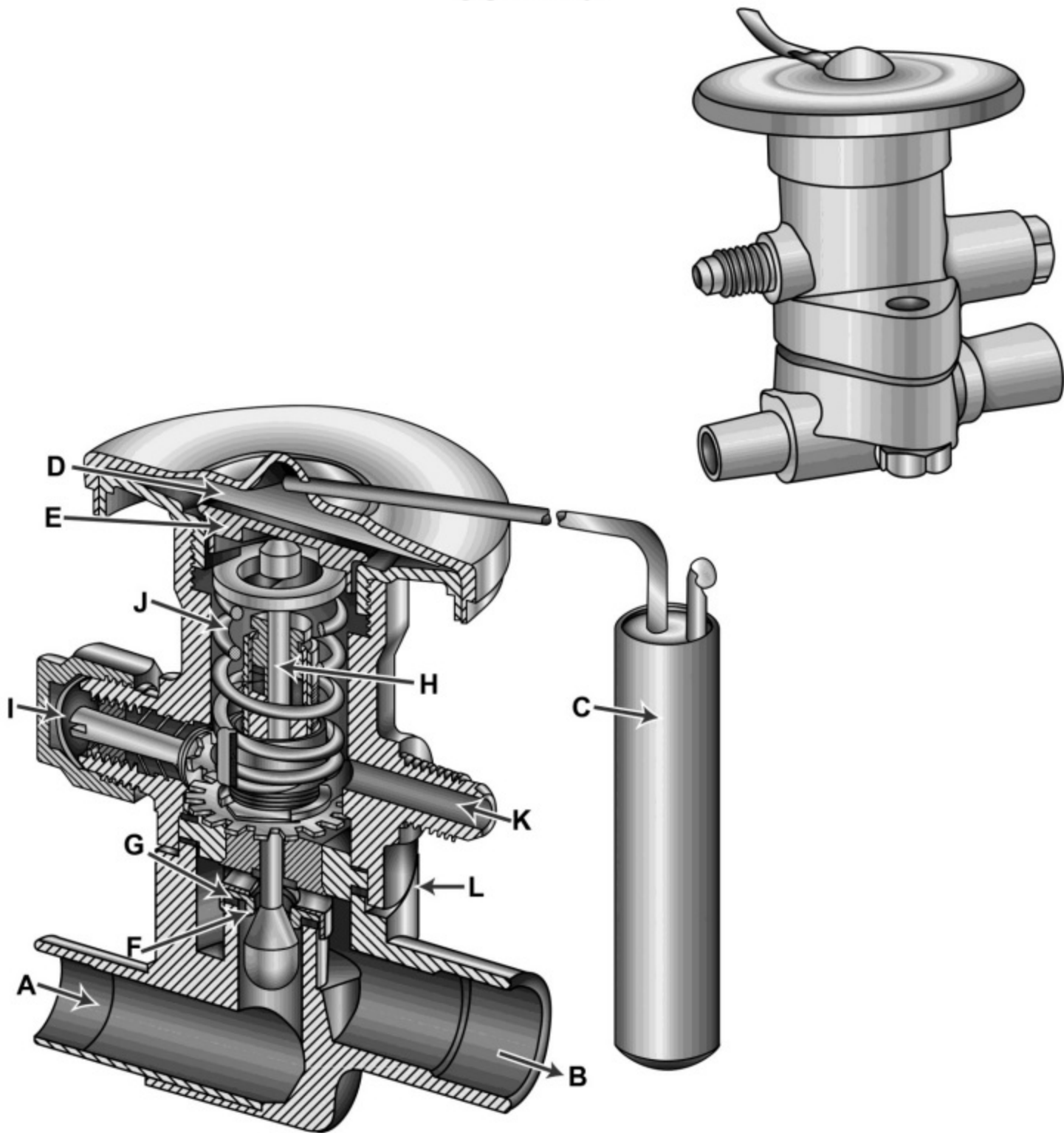


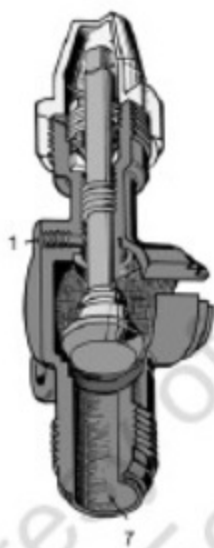
C



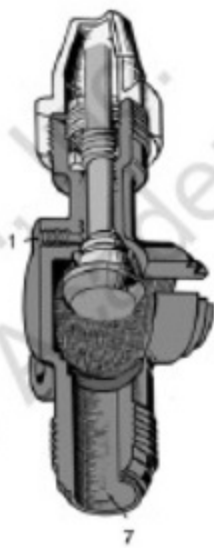
D

GS-RA-07

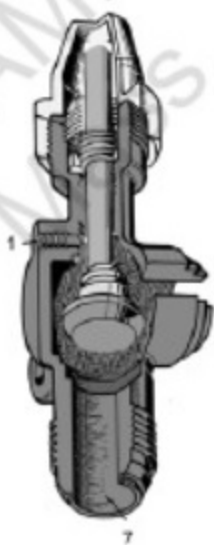




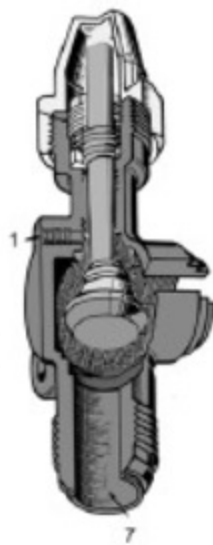
A



B



C

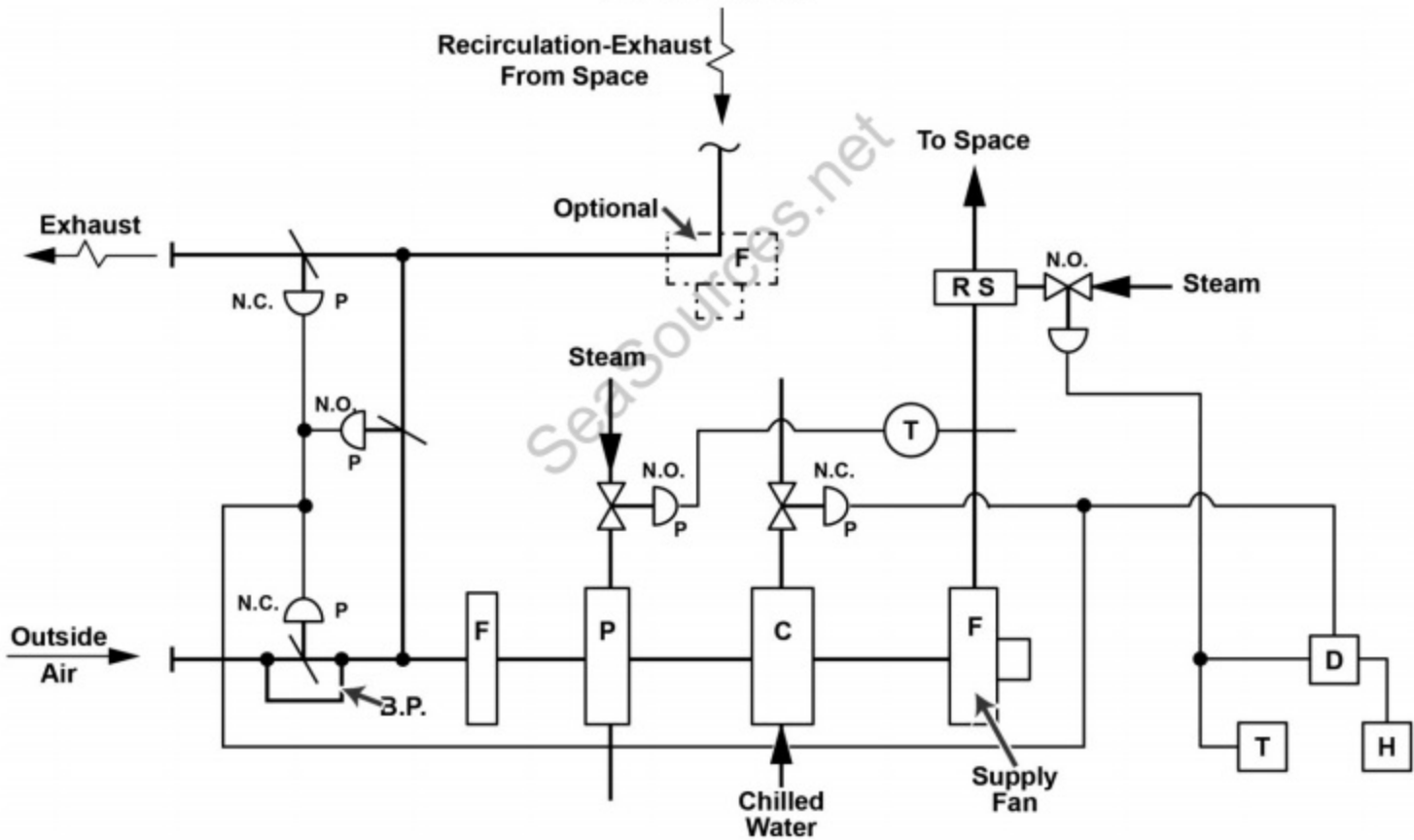


D

SeaSources.net

GS-RA-08x

GS-RA-09



- | | | | |
|--|-------------------|------|-----------------------------------|
| | Humidistat | | Room Thermostat |
| | Fan | | Diverting Relay |
| | Filter | | Pneumatic Damper and Motor |
| | Cooling Coil | | Pneumatic Relay |
| | Preheater (Steam) | N.C. | Normally Closed (Valve or Damper) |
| | Reheater (Steam) | N.O. | Normally Open (Valve or Damper) |
| | Duct Thermostat | B.P. | Minimum Outside Air Bypass |
| | | P | Positive Positioning Relay |

GS-RA-10



A



B



C



D

GS-RA-11

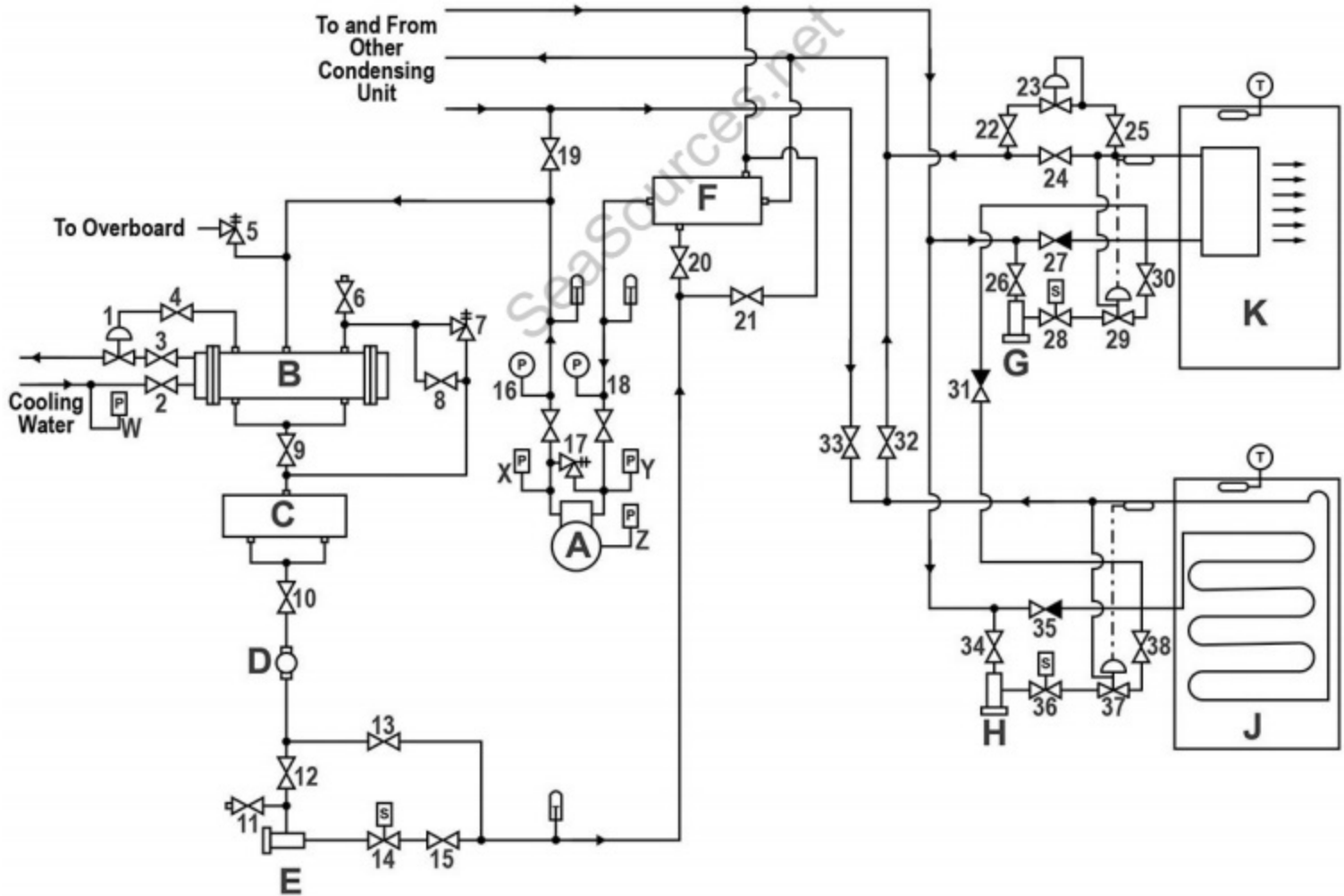
R-134a Pressure-Temperature Chart

Temperature °F	Vacuum “Hg
-40	14.6
-35	12.3
-30	9.7
-25	6.7
-20	3.5
-18	2.1
-16	0.6

Temperature °F	Pressure psig
-14	0.4
-12	1.2
-10	2.0
-8	2.9
-6	3.7
-4	4.6
-2	5.6
0	6.5
2	7.6
4	8.6
6	9.7
8	10.8
10	12.0
12	13.2
14	14.5
16	15.8
18	17.1
20	18.5
22	19.9
24	21.4
26	22.9

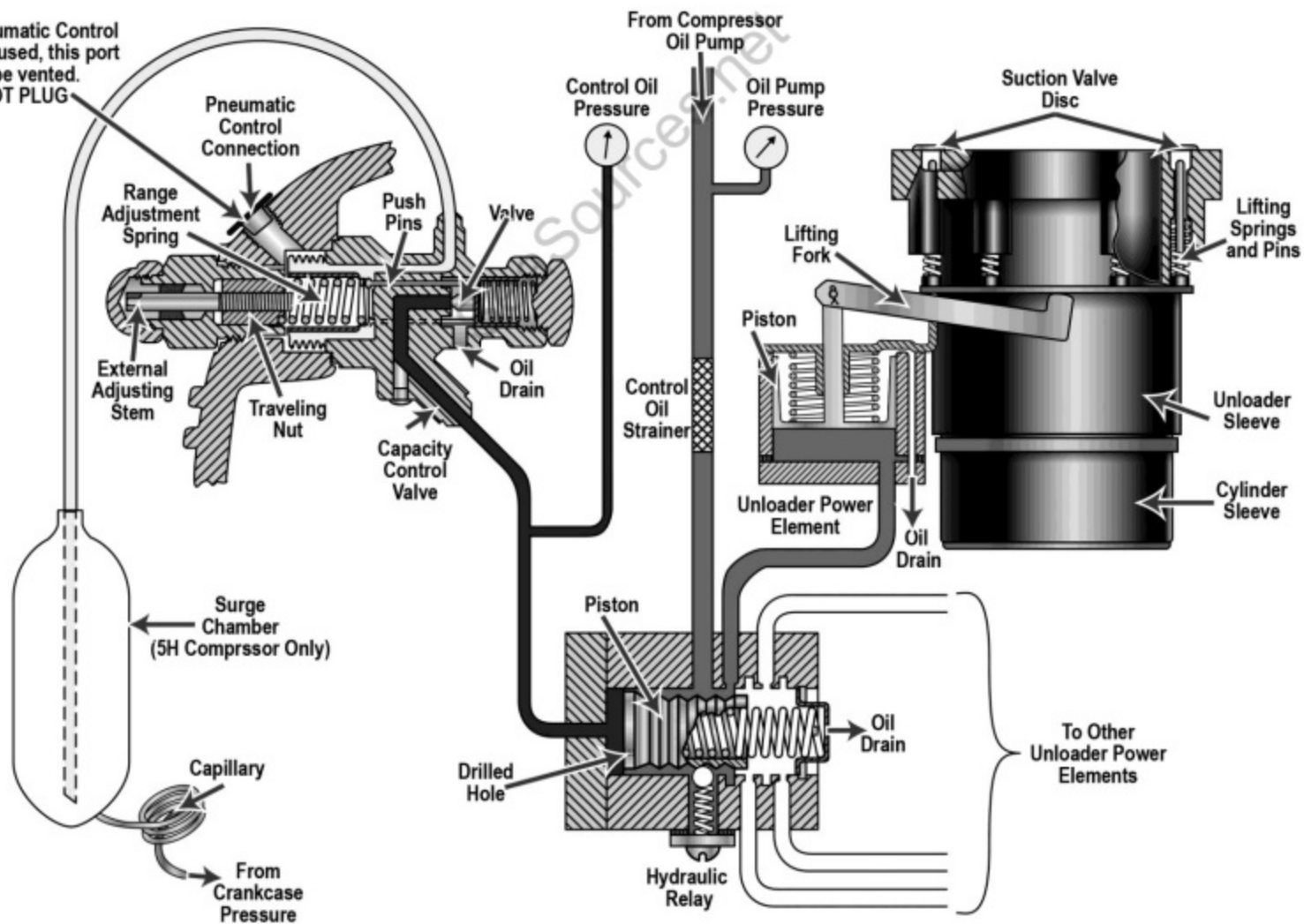
Temperature °F	Pressure psig
28	24.5
30	26.1
32	27.8
34	29.6
36	31.3
38	33.2
40	35.1
45	40.1
50	45.5
55	51.2
60	57.4
65	64.1
70	71.1
75	78.7
80	86.7
85	95.3
90	104.3
95	114.0
100	124.2
105	135.0
110	146.4
115	158.4
120	171.2
125	184.6
130	198.7
135	213.6
140	229.2
145	245.6
150	262.9
155	281.1

GS-RA-12



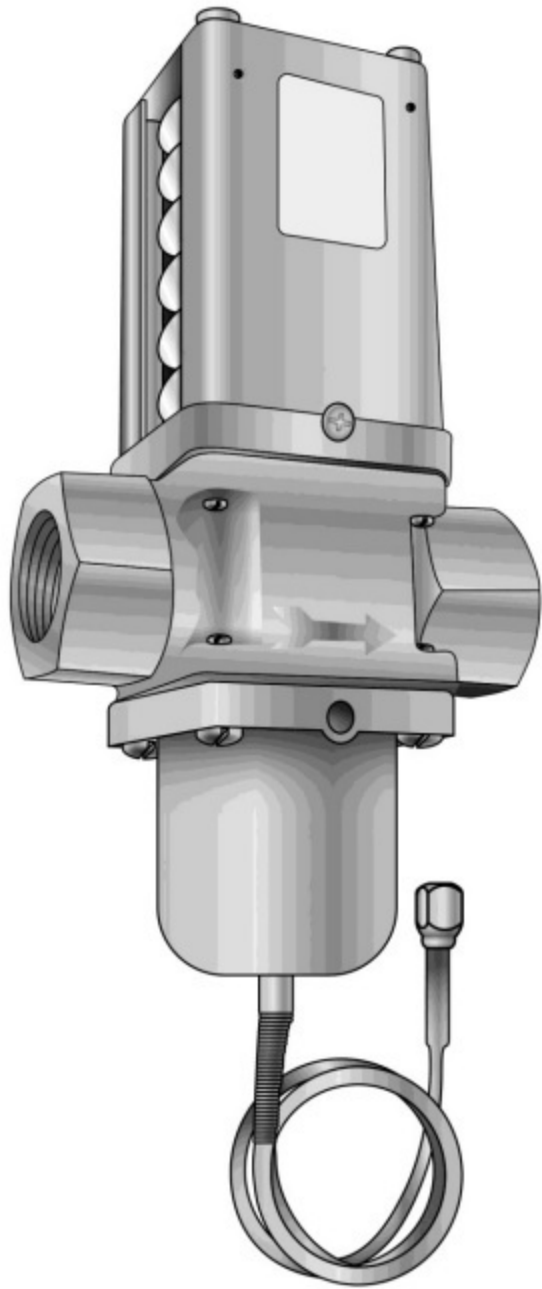
GS-RA-13

If Pneumatic Control is not used, this port must be vented. DO NOT PLUG

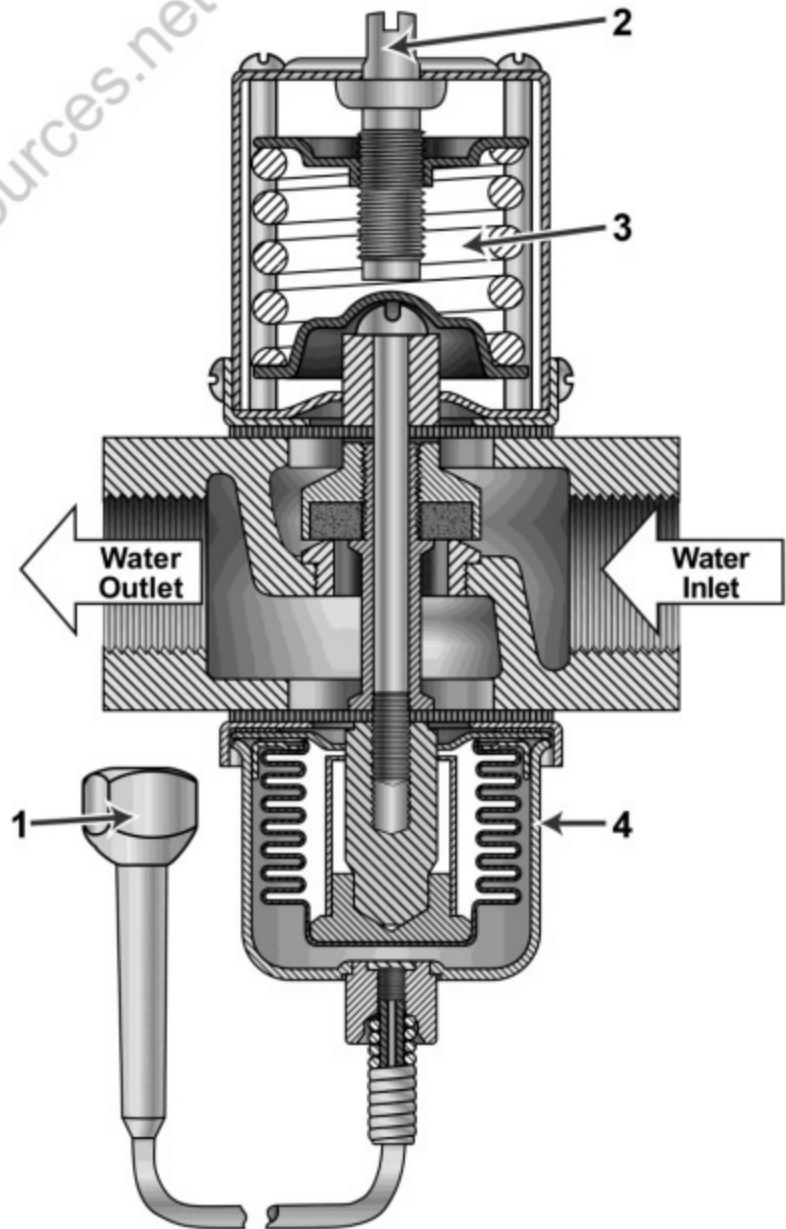


- Control Oil Pressure
- Oil Pump Pressure
- Crankcase Pressure

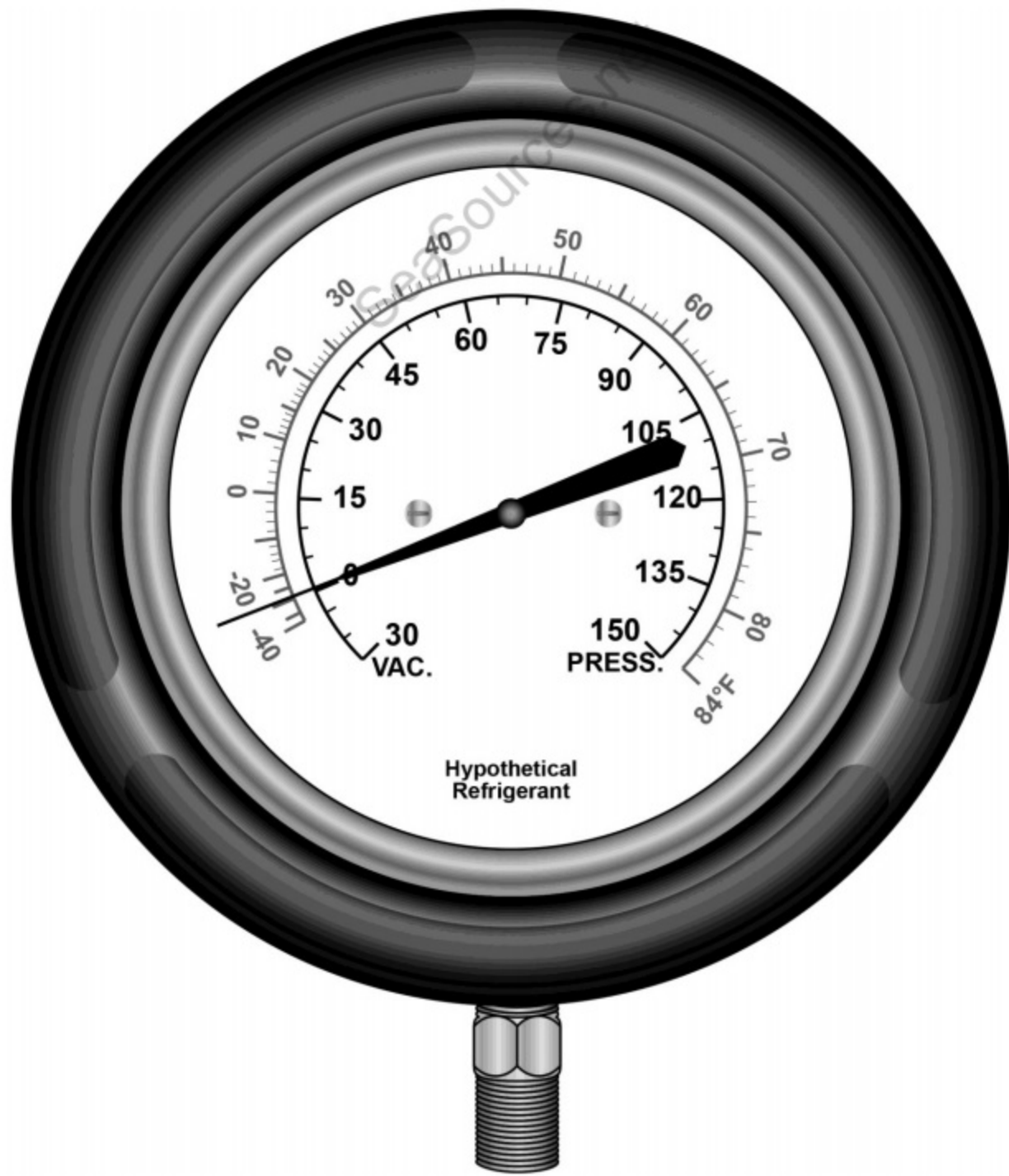
GS-RA-14



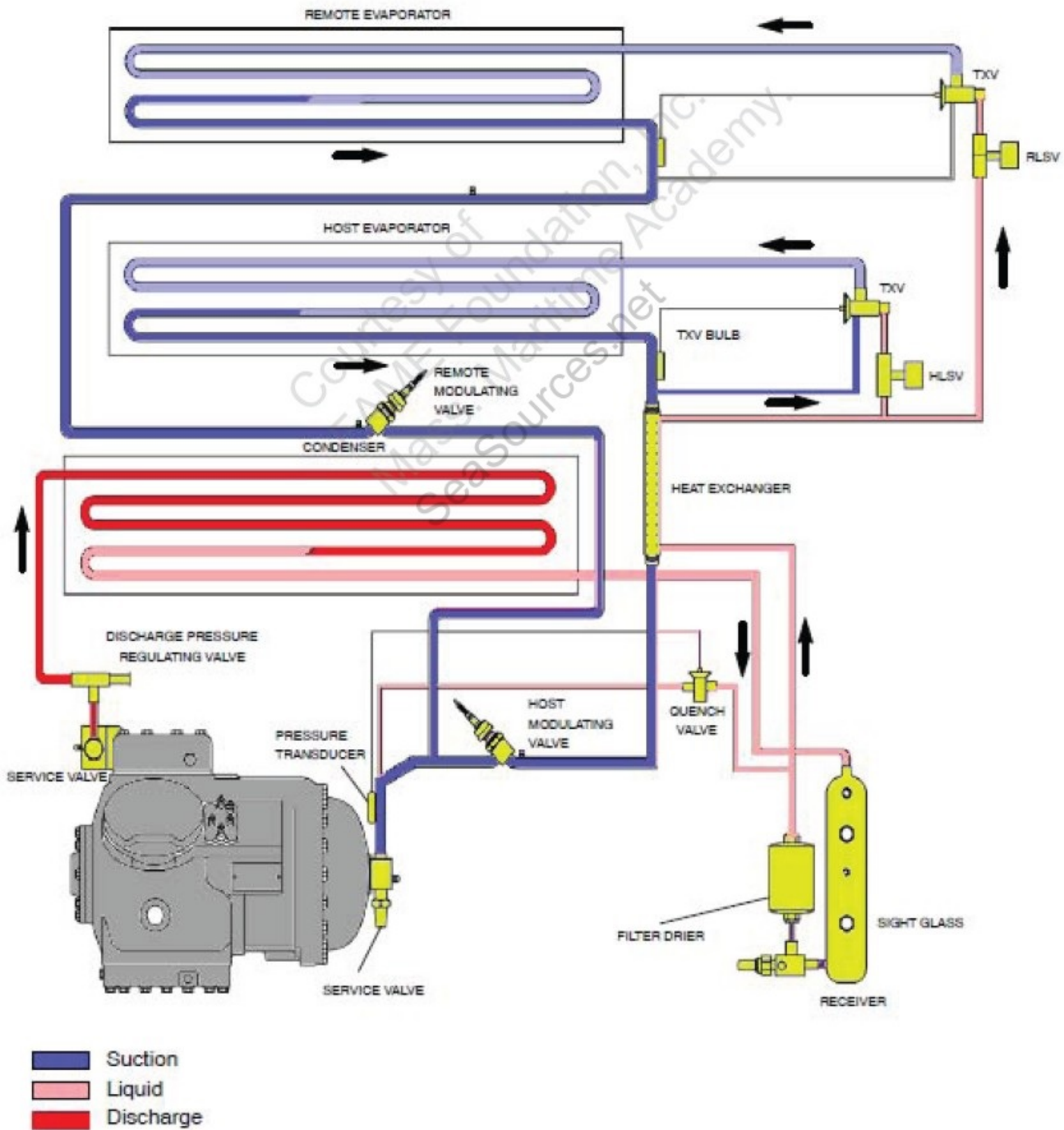
SeaSources.net



GS-RA-16



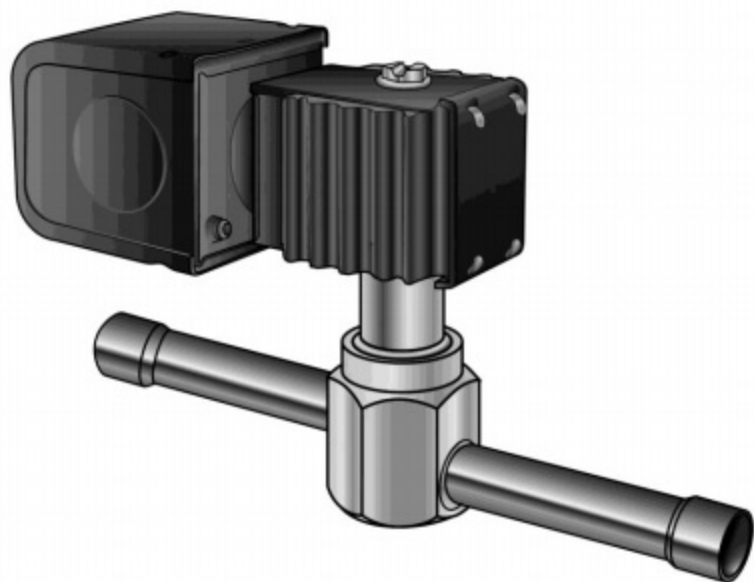
Hypothetical
Refrigerant



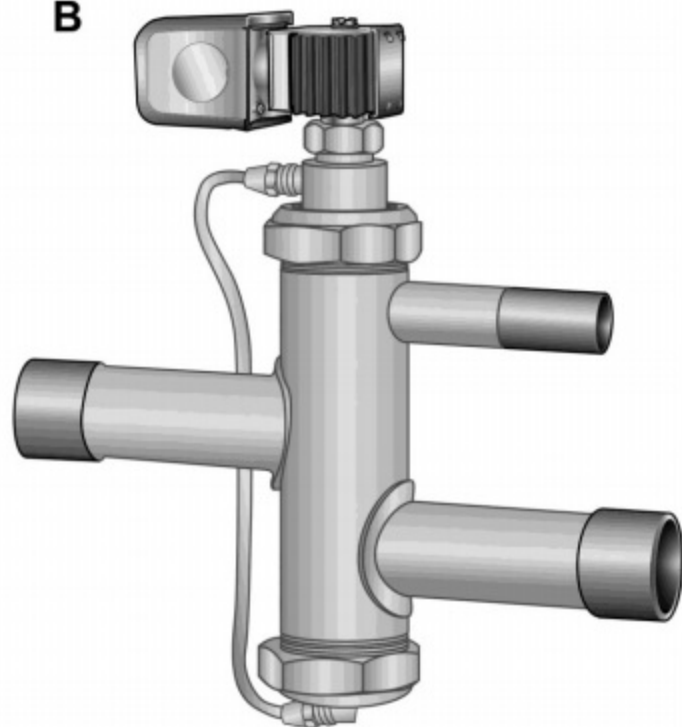
GS-RA-17x

GS-RA-19

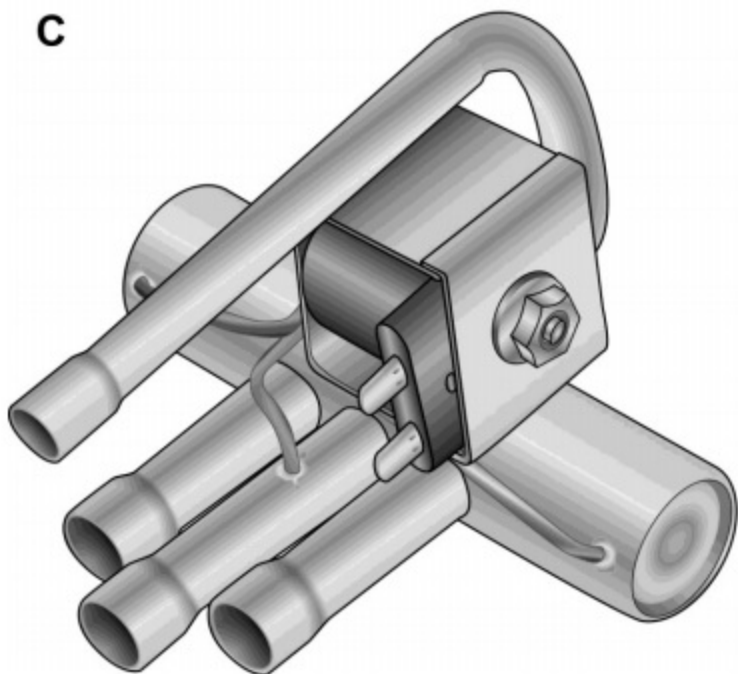
A



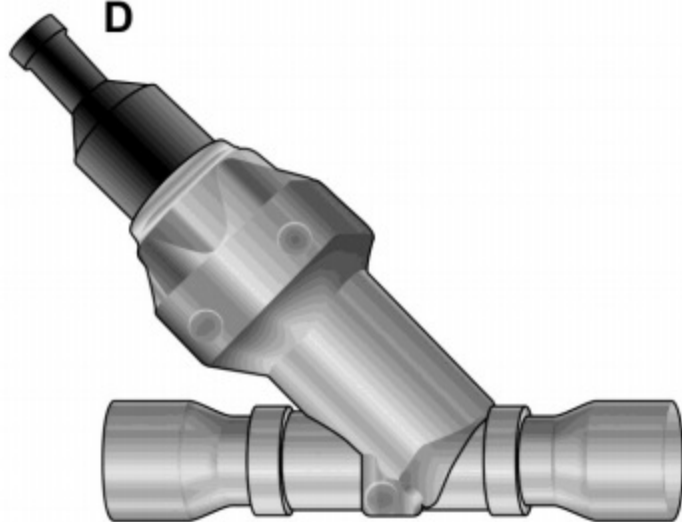
B



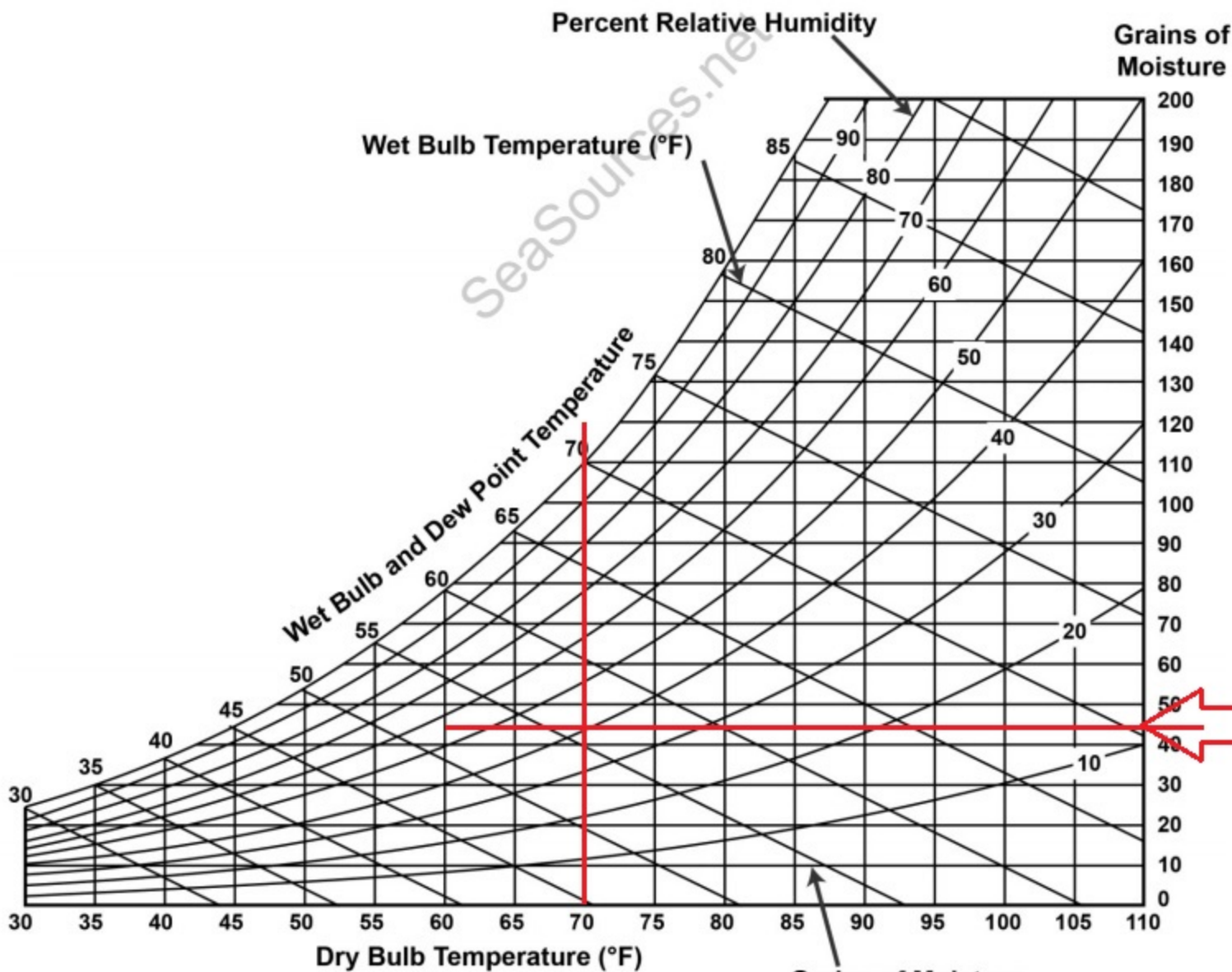
C



D



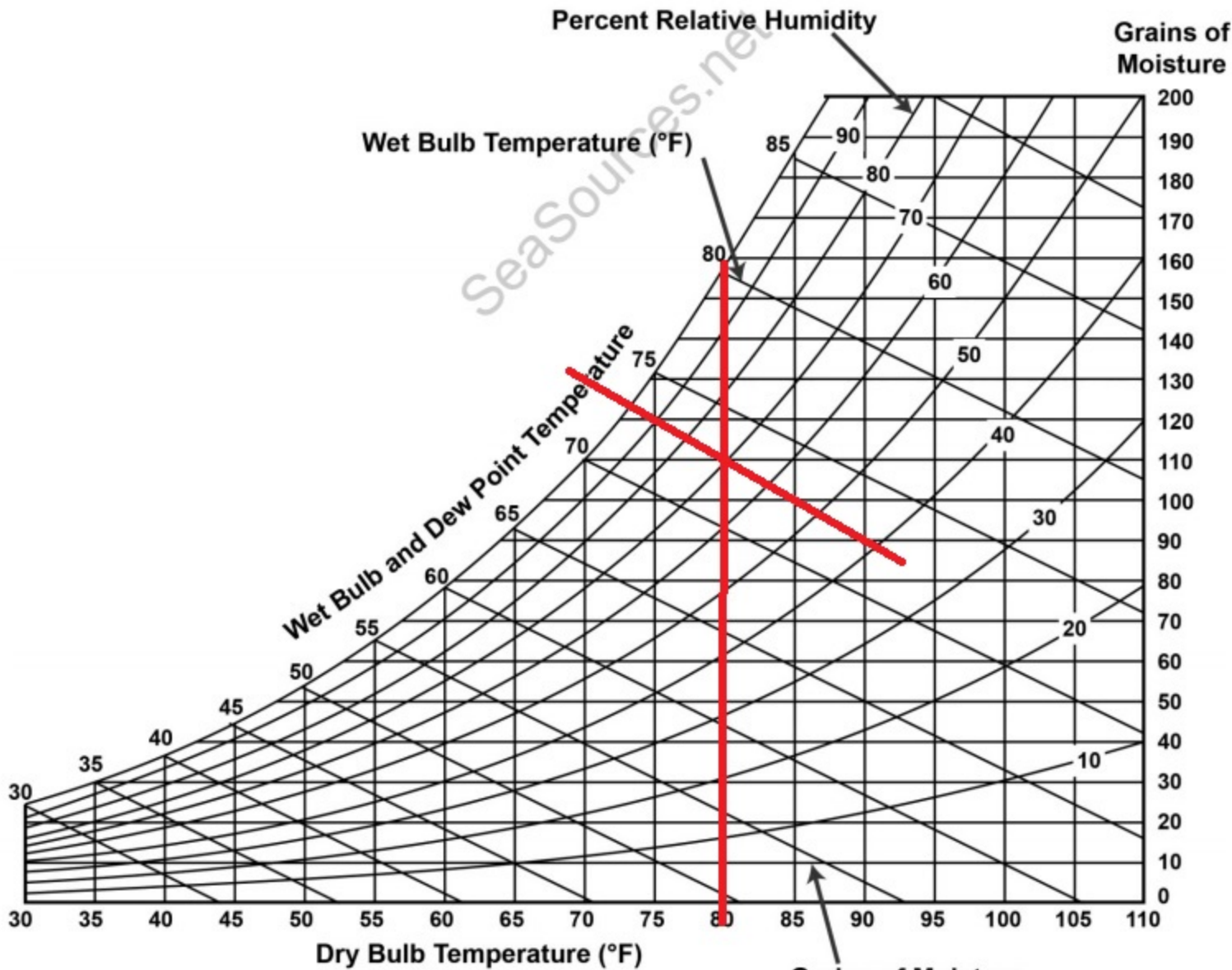
GS-RA-22



Simplified Psychrometric Chart

Grains of Moisture
Per Pound of Dry Air
and Dew Point
Temperature (°F)

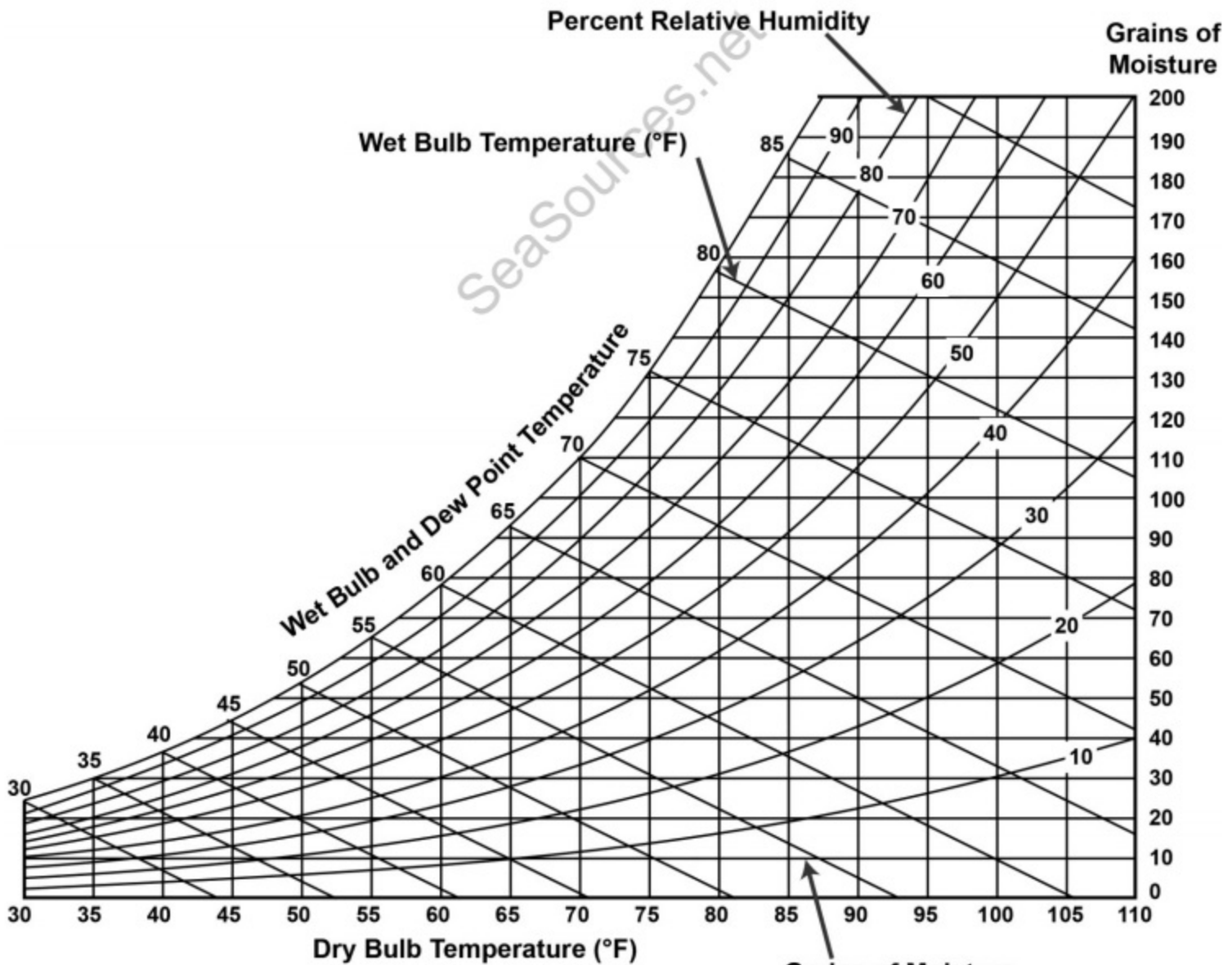
GS-RA-22



Simplified Psychrometric Chart

Grains of Moisture
Per Pound of Dry Air
and Dew Point
Temperature (°F)

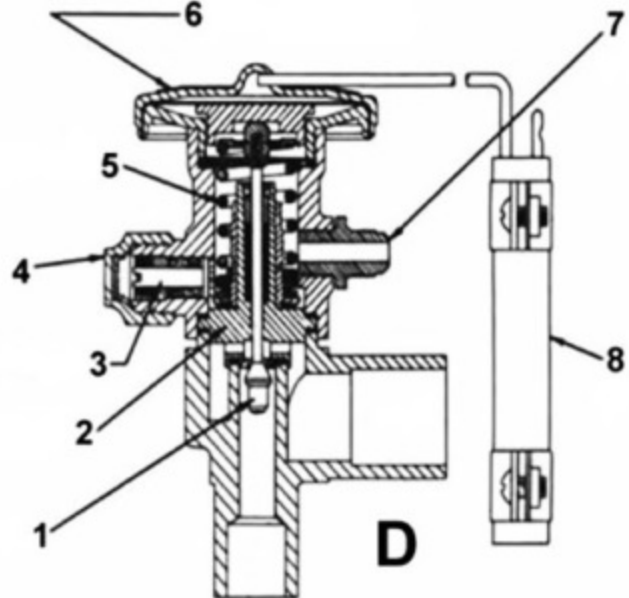
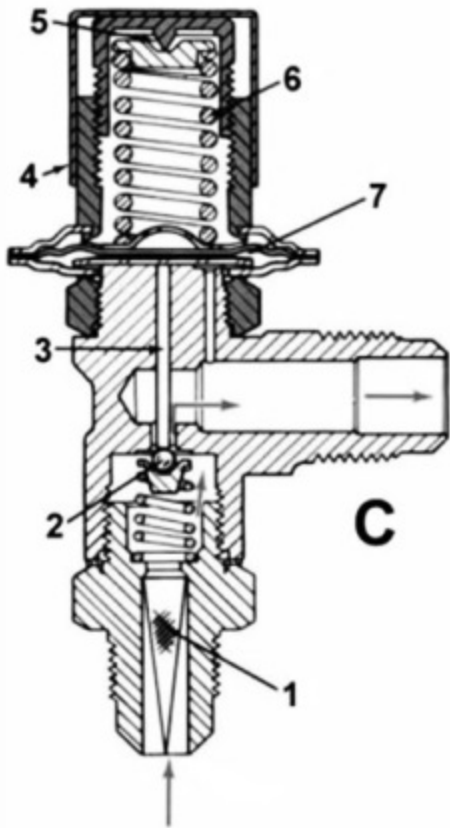
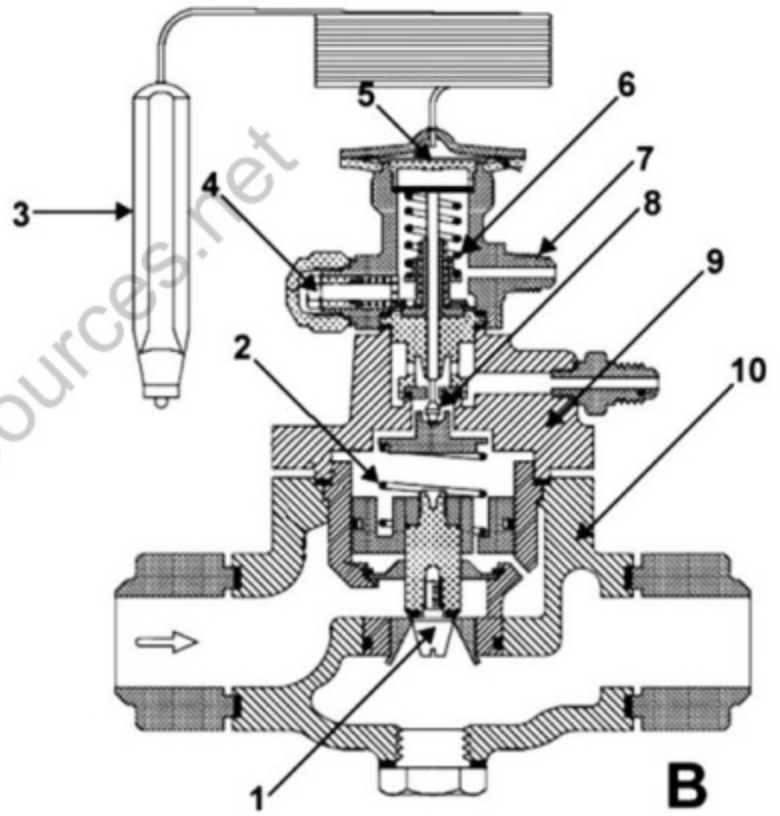
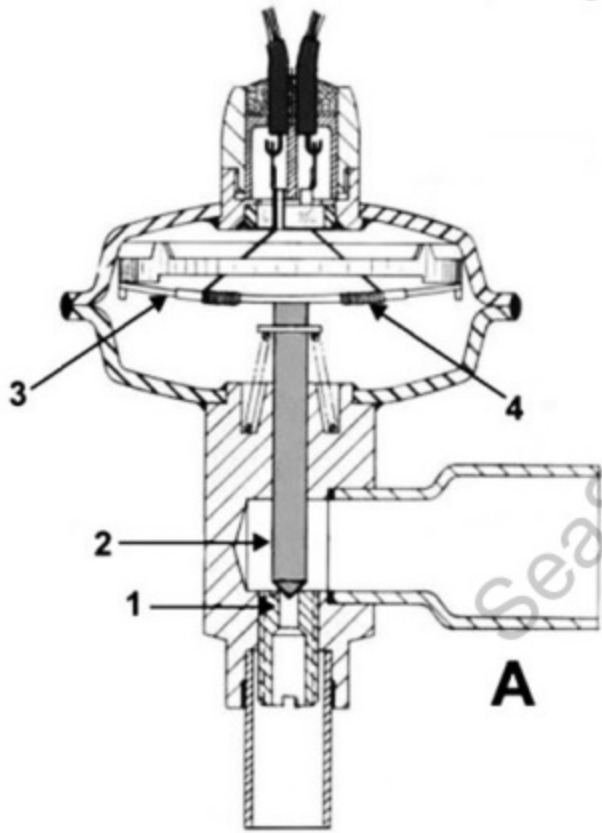
GS-RA-22



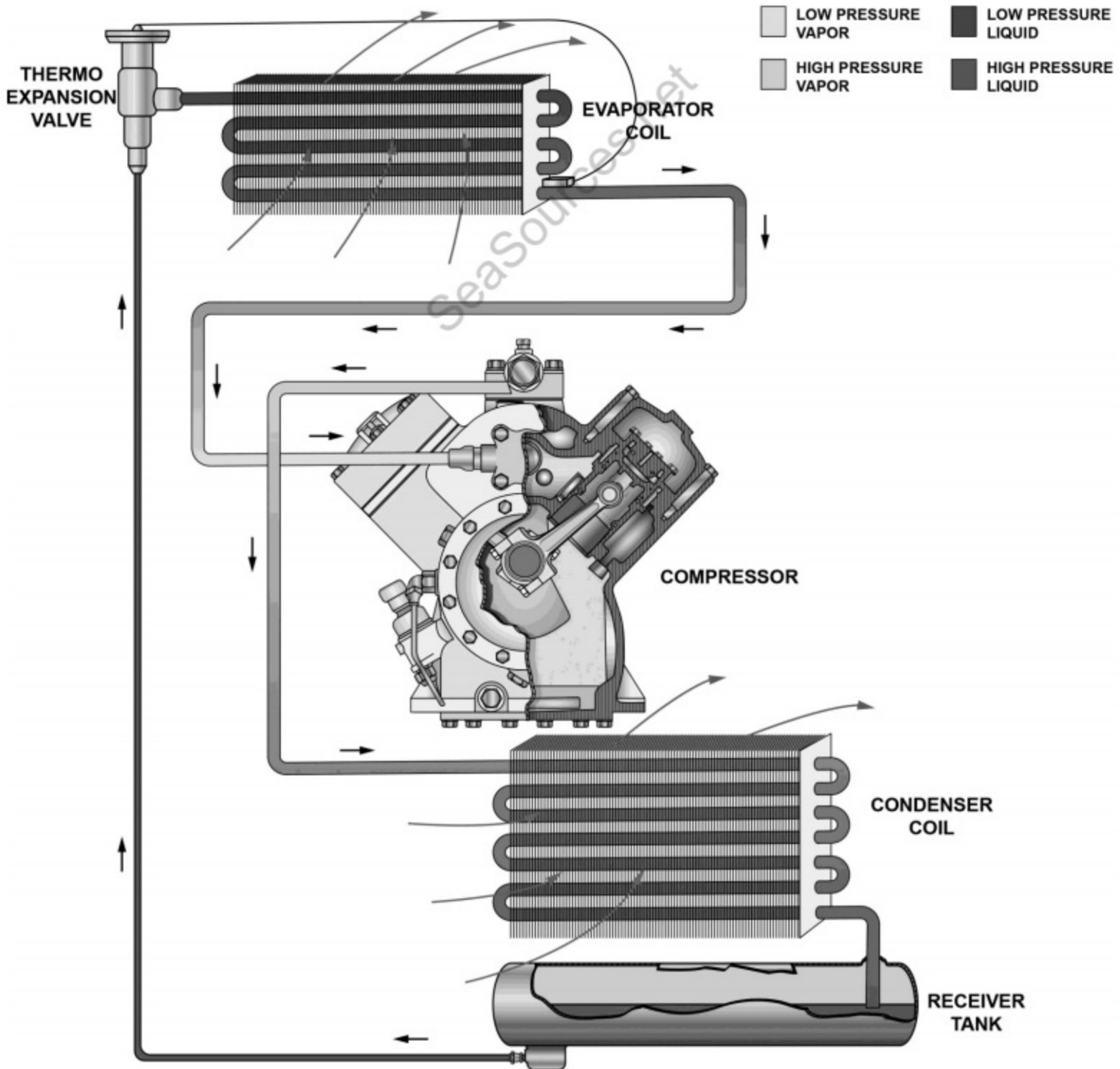
Simplified Psychrometric Chart

Grains of Moisture
Per Pound of Dry Air
and Dew Point
Temperature (°F)

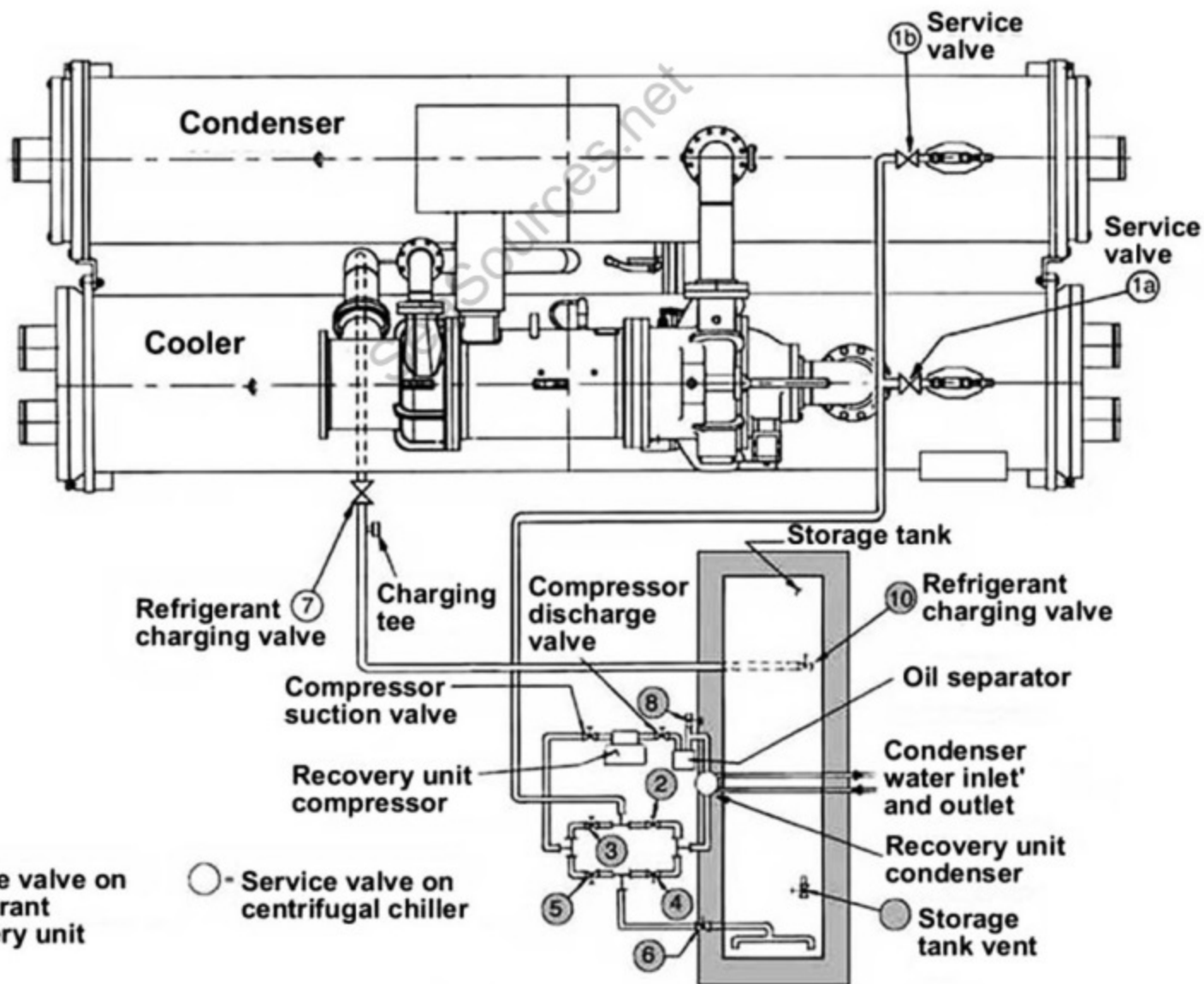
GS-RA-24



GS-RA-25



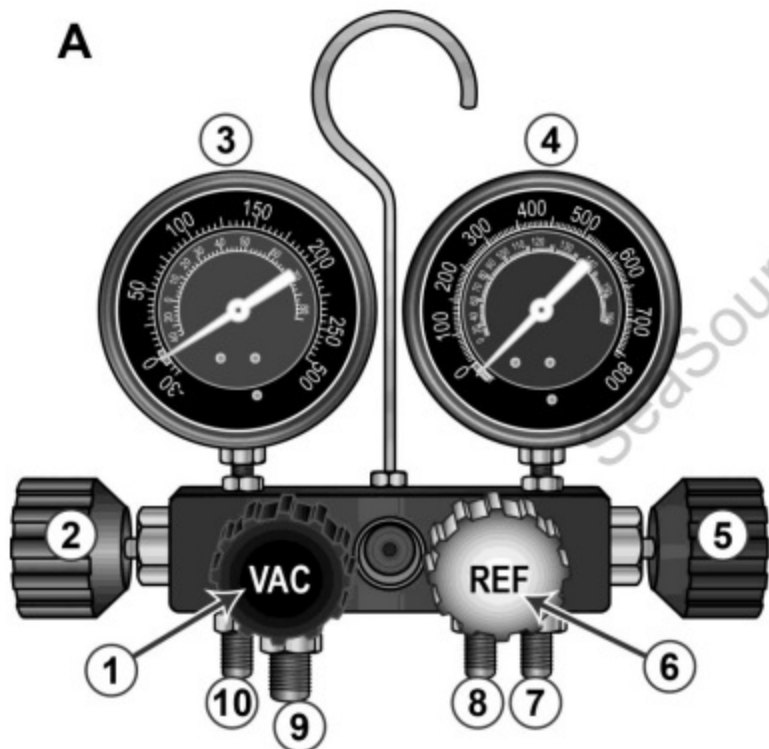
GS-RA-28



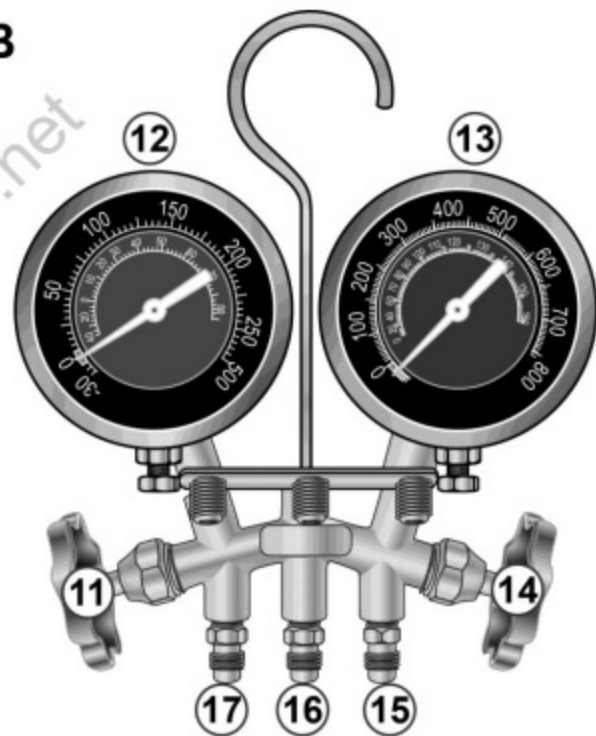
Centrifugal Chiller Refrigerant Recovery Circuit

GS-RA-30

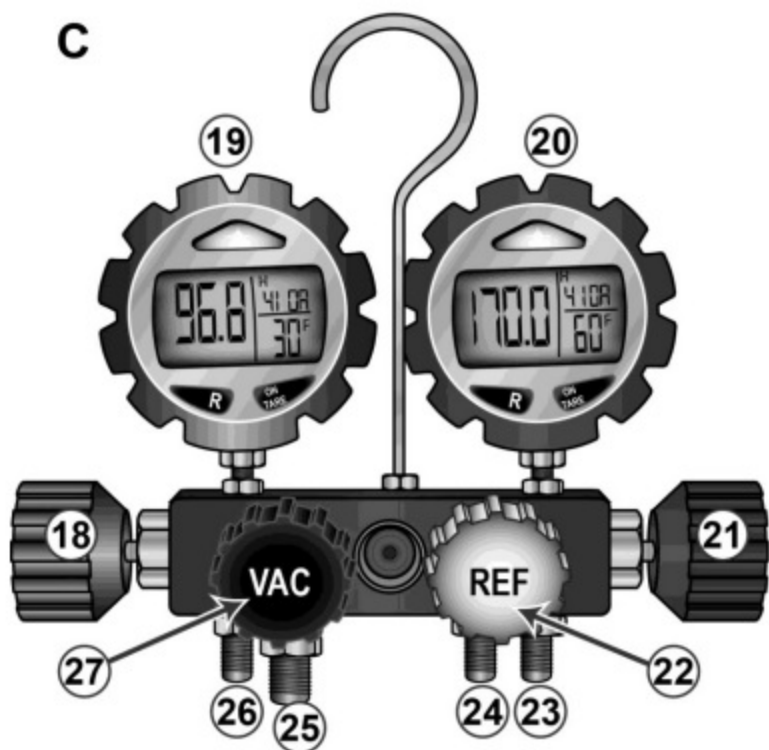
A



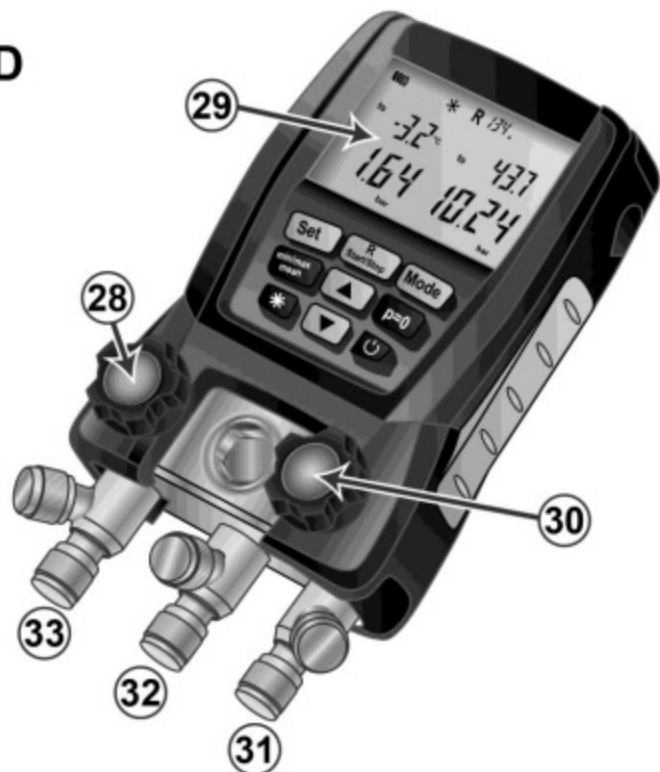
B



C

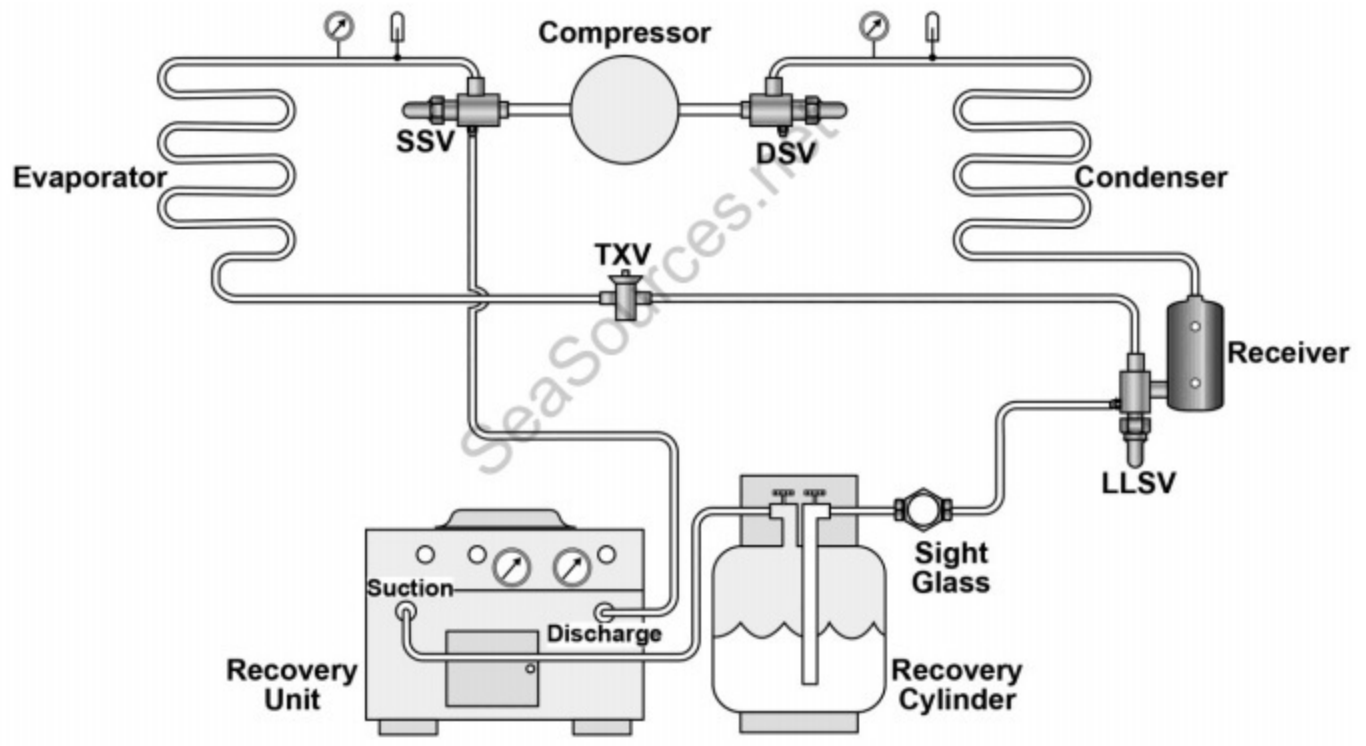


D

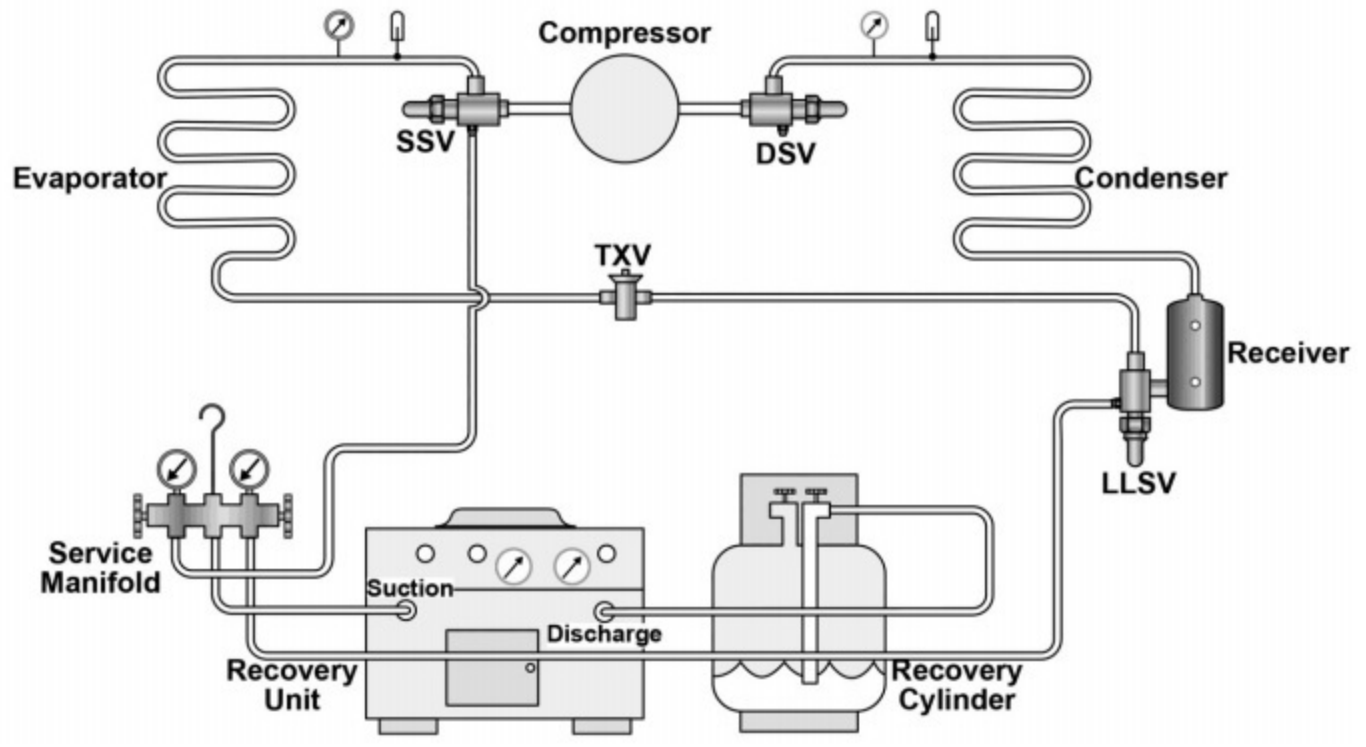


GS-RA-33

A

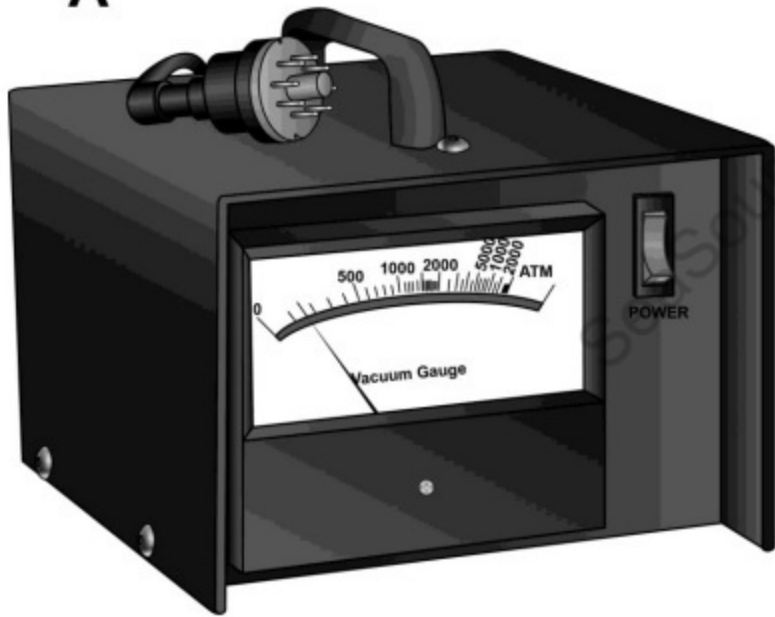


B

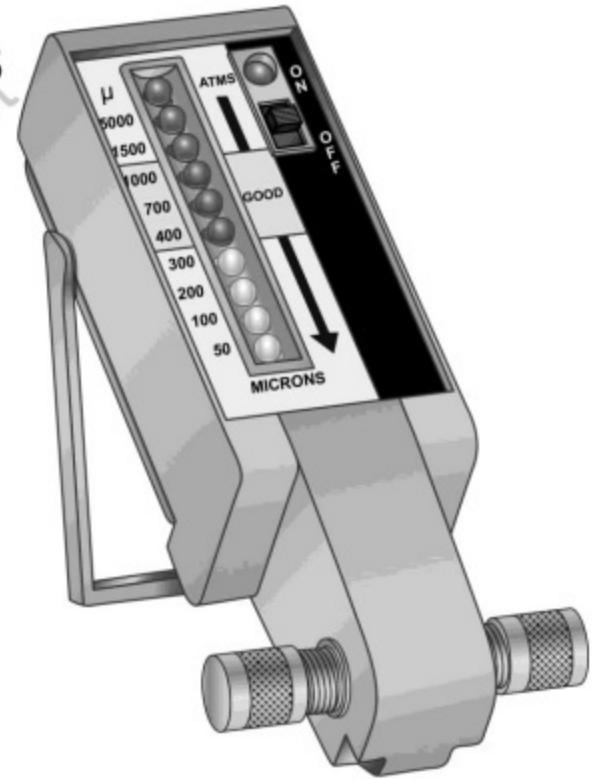


GS-RA-37

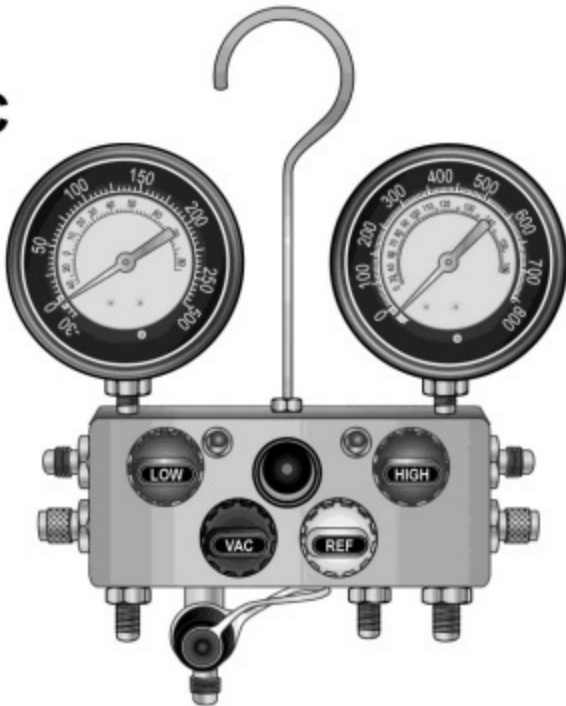
A



B



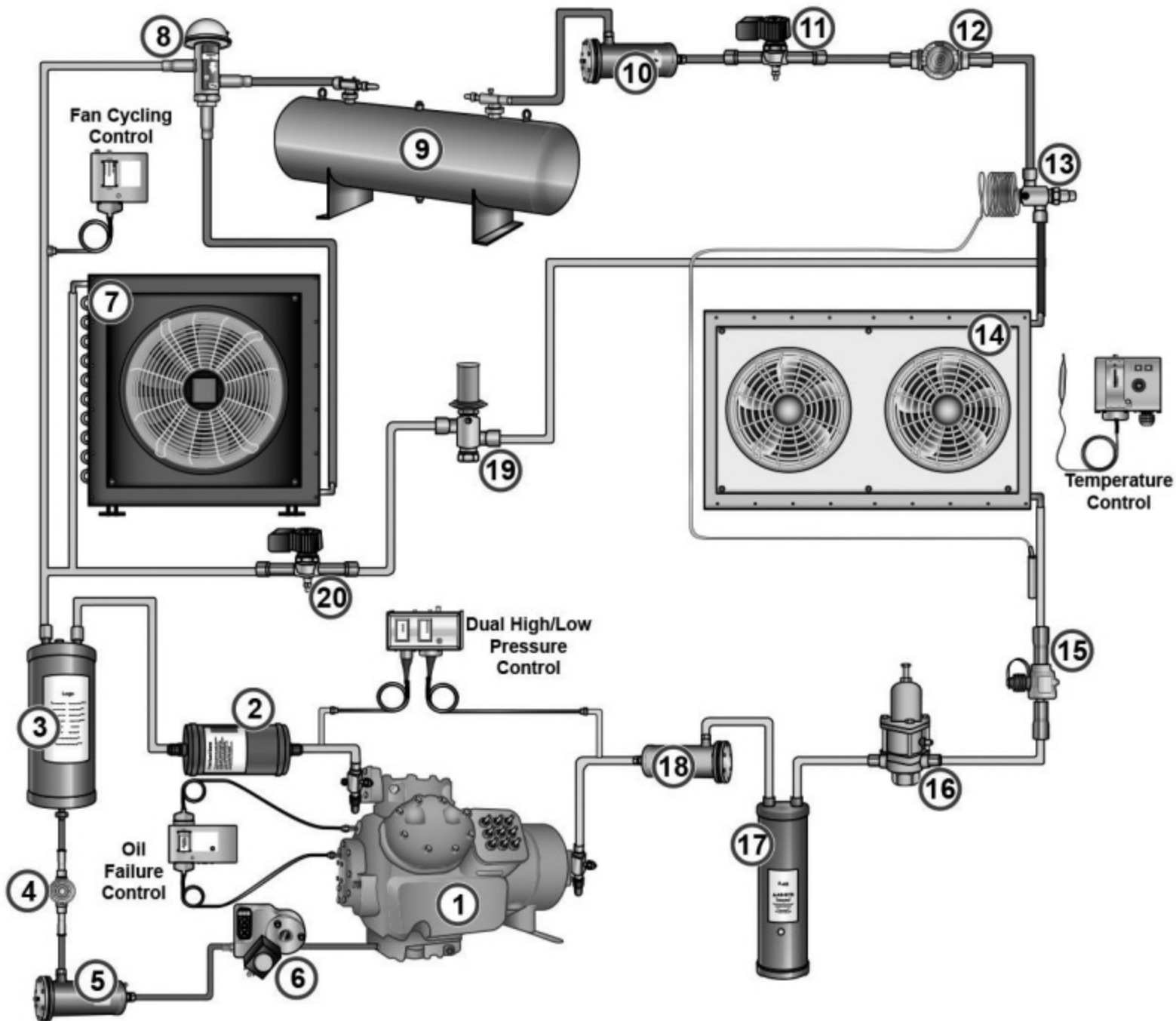
C



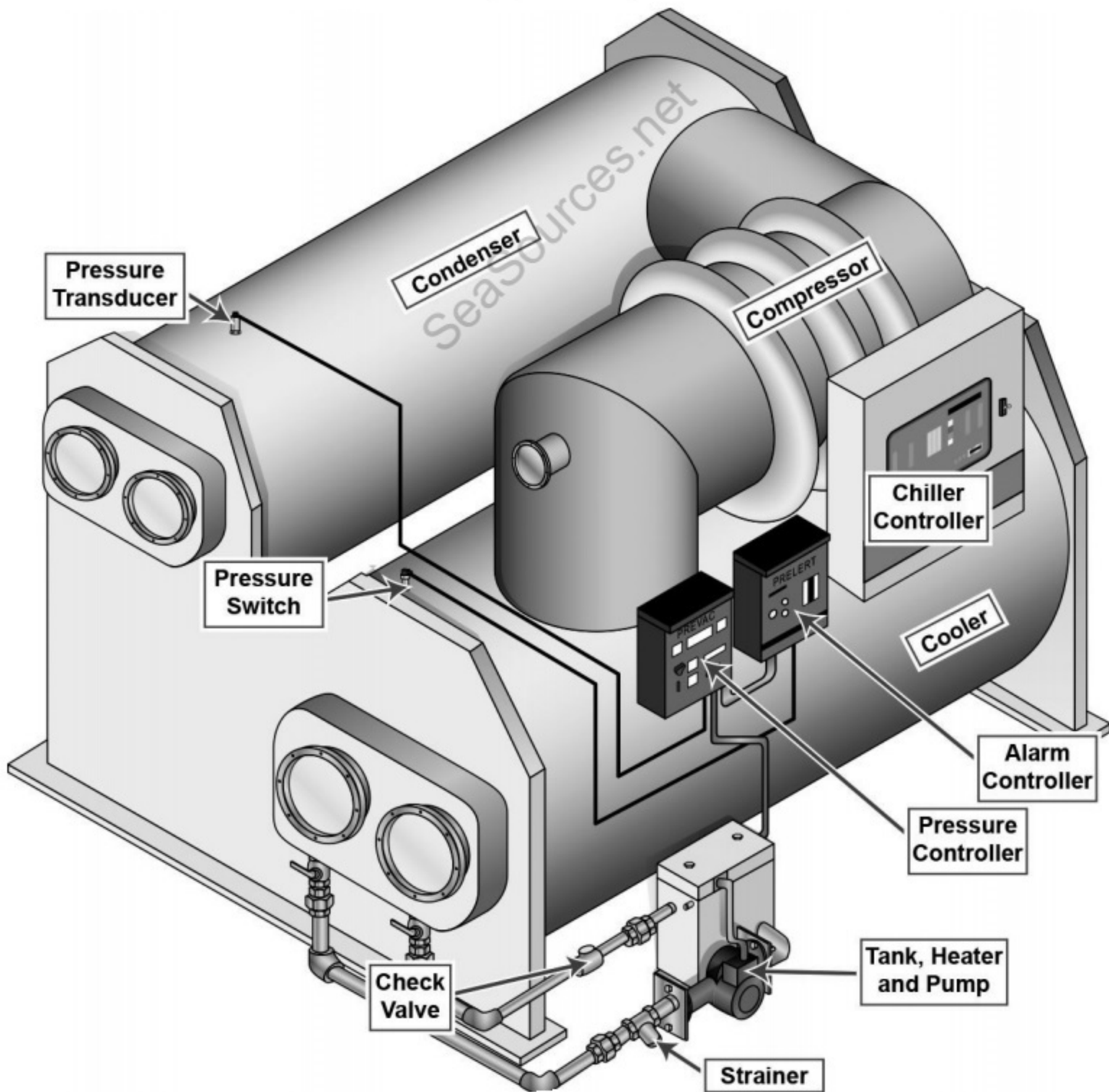
D



GS-RA-39

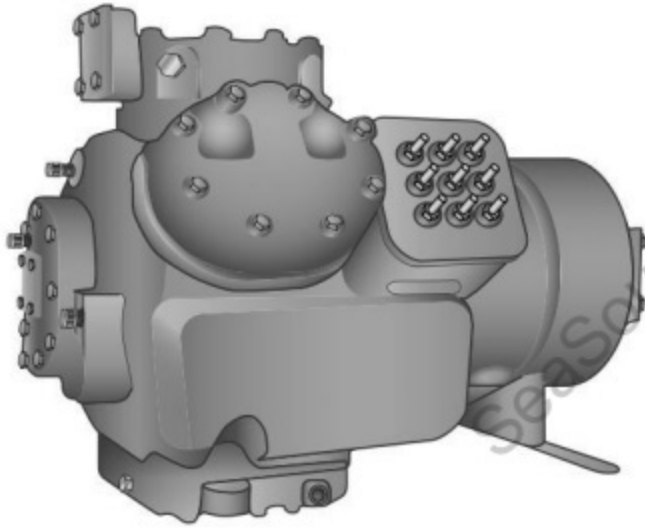


GS-RA-40



GS-RA-41

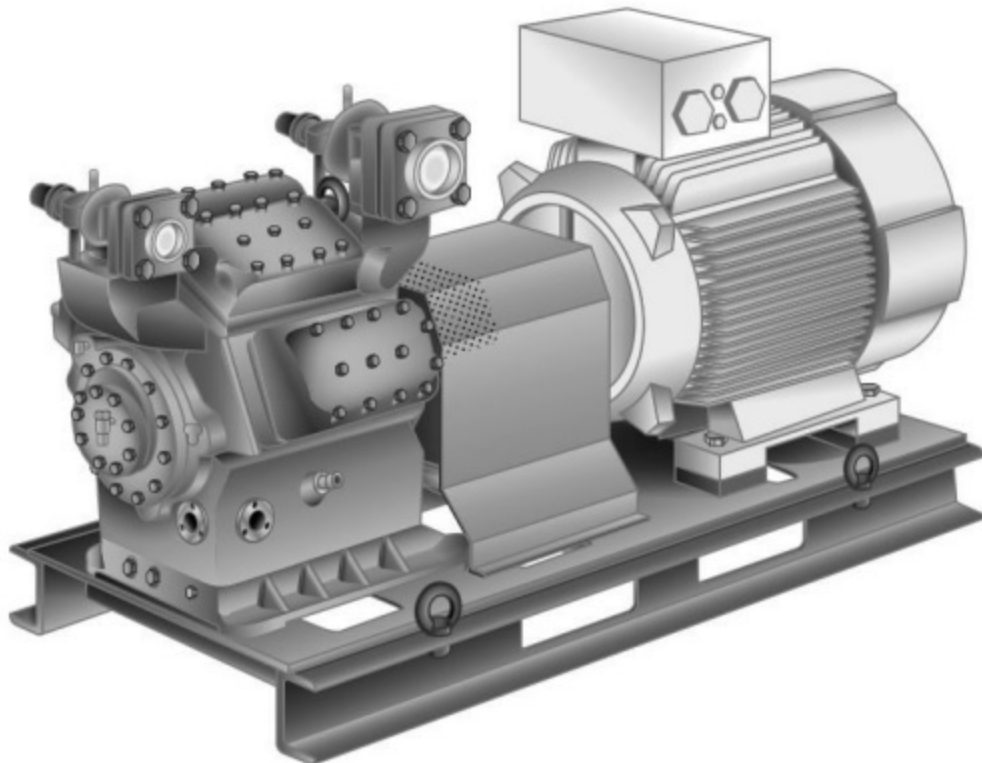
A



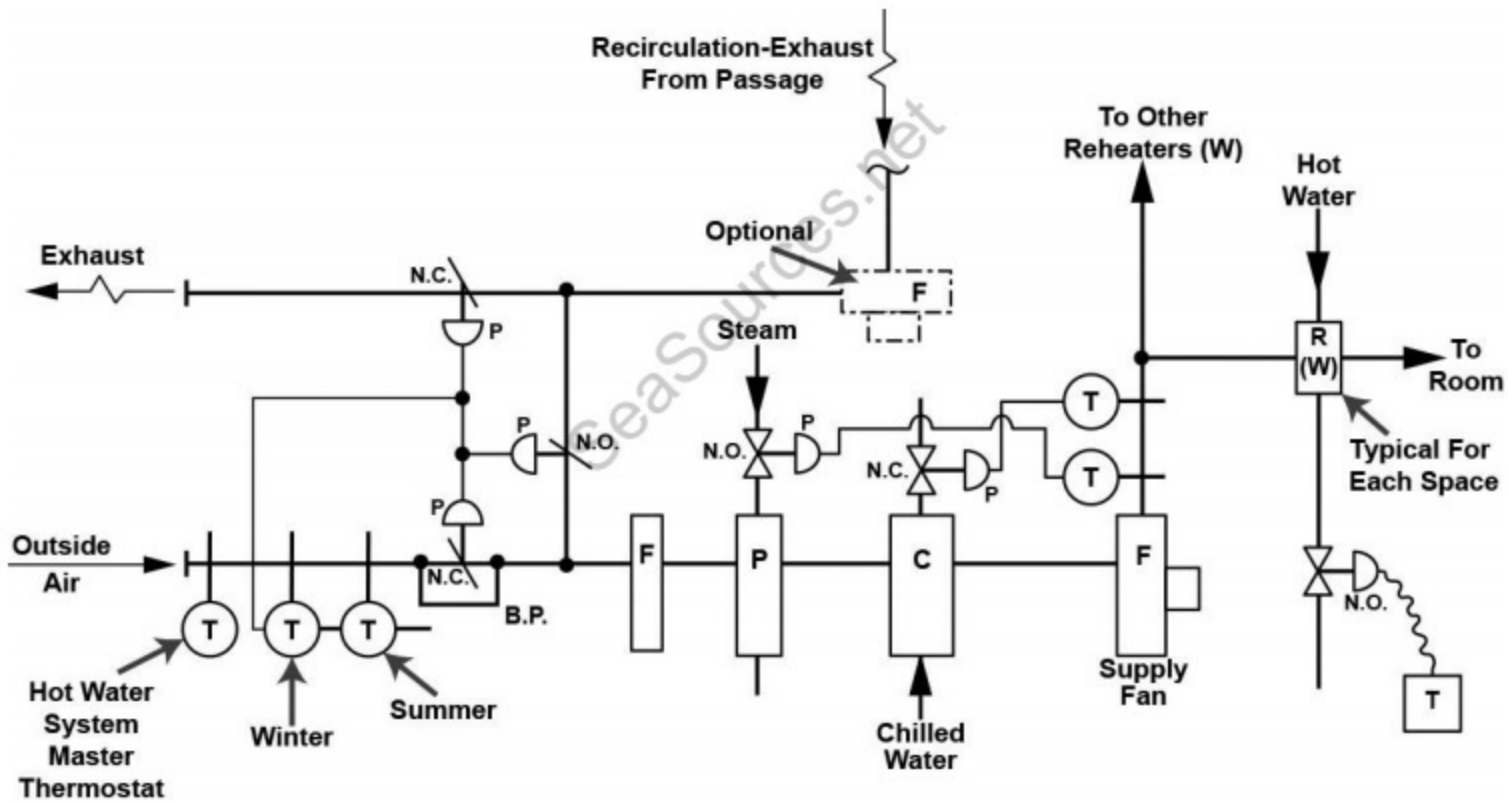
B



C



GS-RA-42



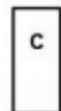
LEGEND



Fan



Filter



Cooling Coil



Preheater (Steam)



Reheater (Water)



Room Thermostat



Duct Thermostat



Pneumatic Damper and Motor



Pneumatic Relay

N.C.

Normally Closed (Valve or Damper)

N.O.

Normally Open (Valve or Damper)

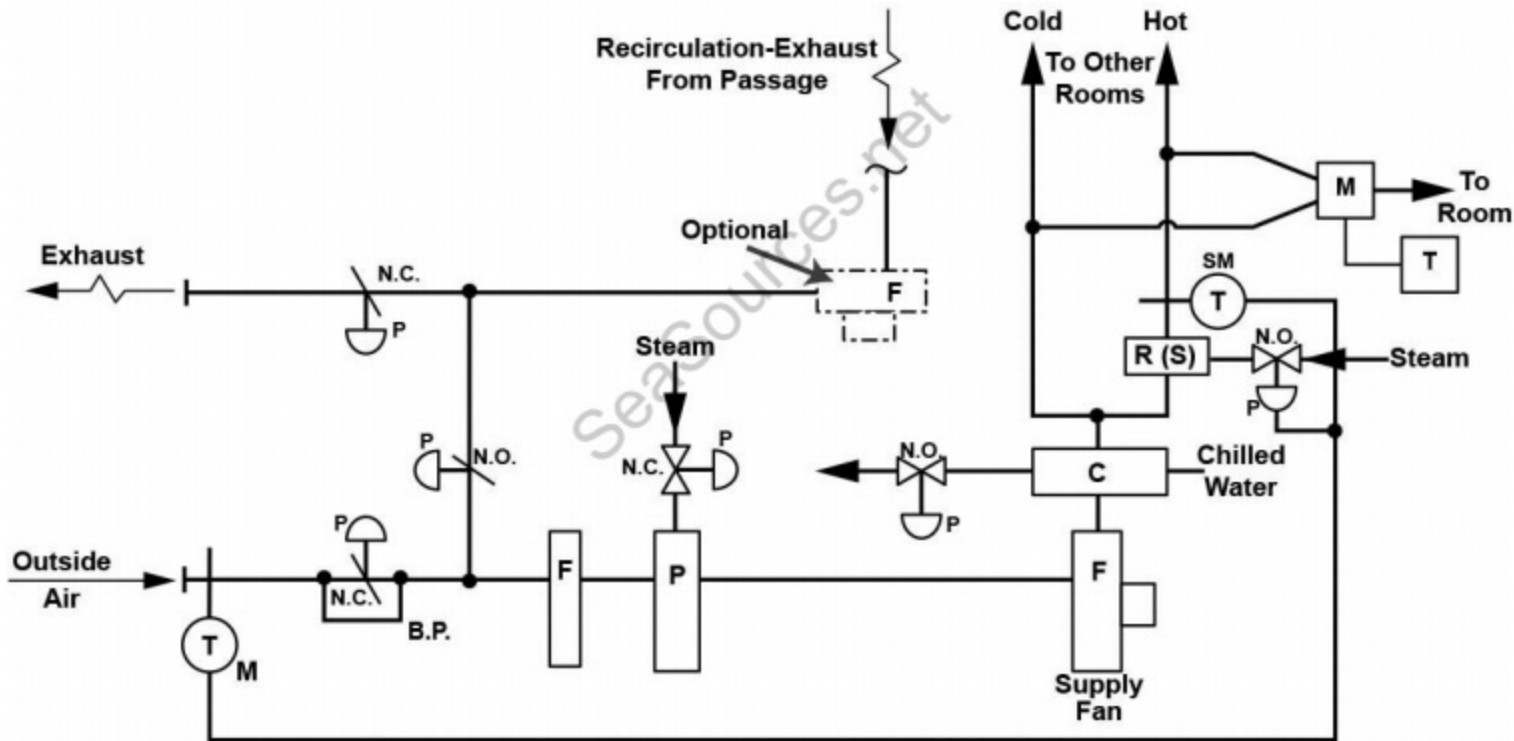
B.P.

Minimum Outside Air Bypass

P

Positive Positioning Relay

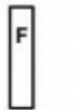
GS-RA-43



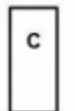
LEGEND



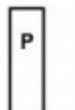
Fan



Filter



Cooling Coil



Preheater (Steam)



Reheater (Steam)



Dual Duct Air Mixing Unit



Room Thermostat



Duct Thermostat



Pneumatic Damper and Motor



Pneumatic Relay

N.C.

Normally Closed (Valve or Damper)

N.O.

Normally Open (Valve or Damper)

B.P.

Minimum Outside Air Bypass

P

Positive Positioning Relay

M

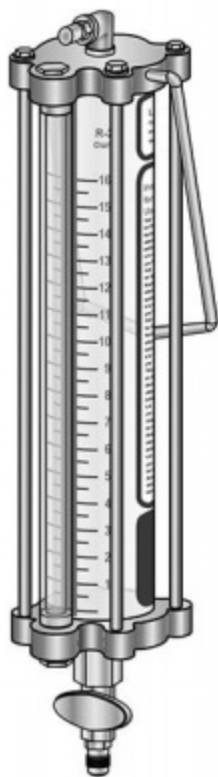
Sub-Master

SM

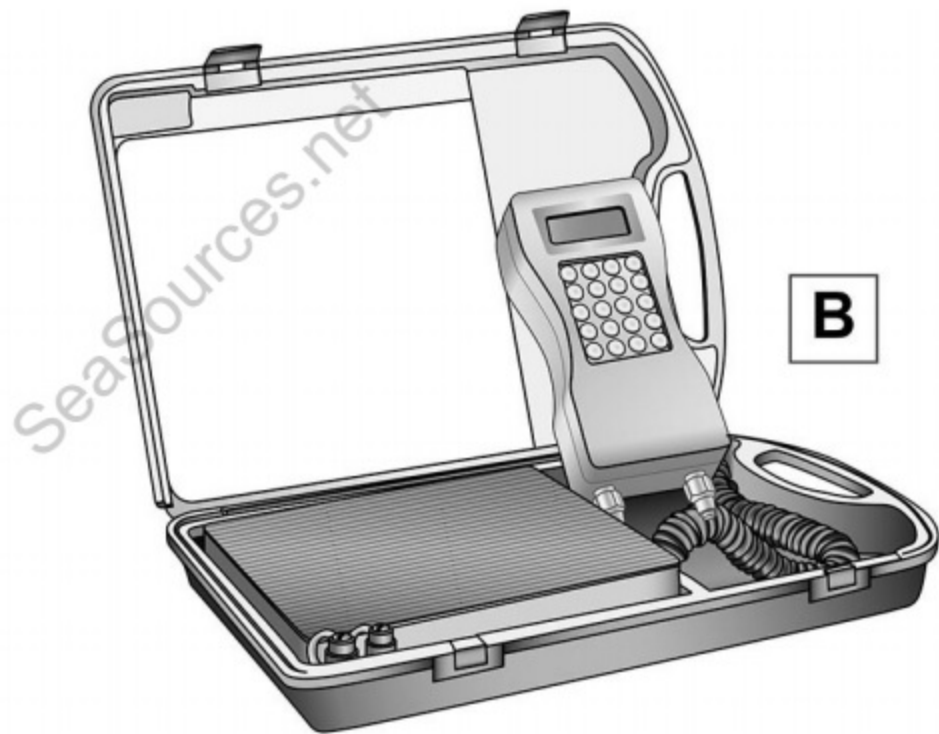
Master

GS-RA-45

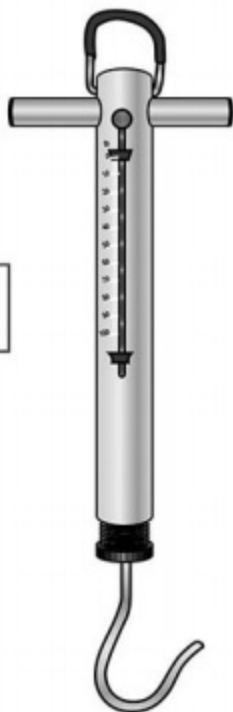
A



B



C

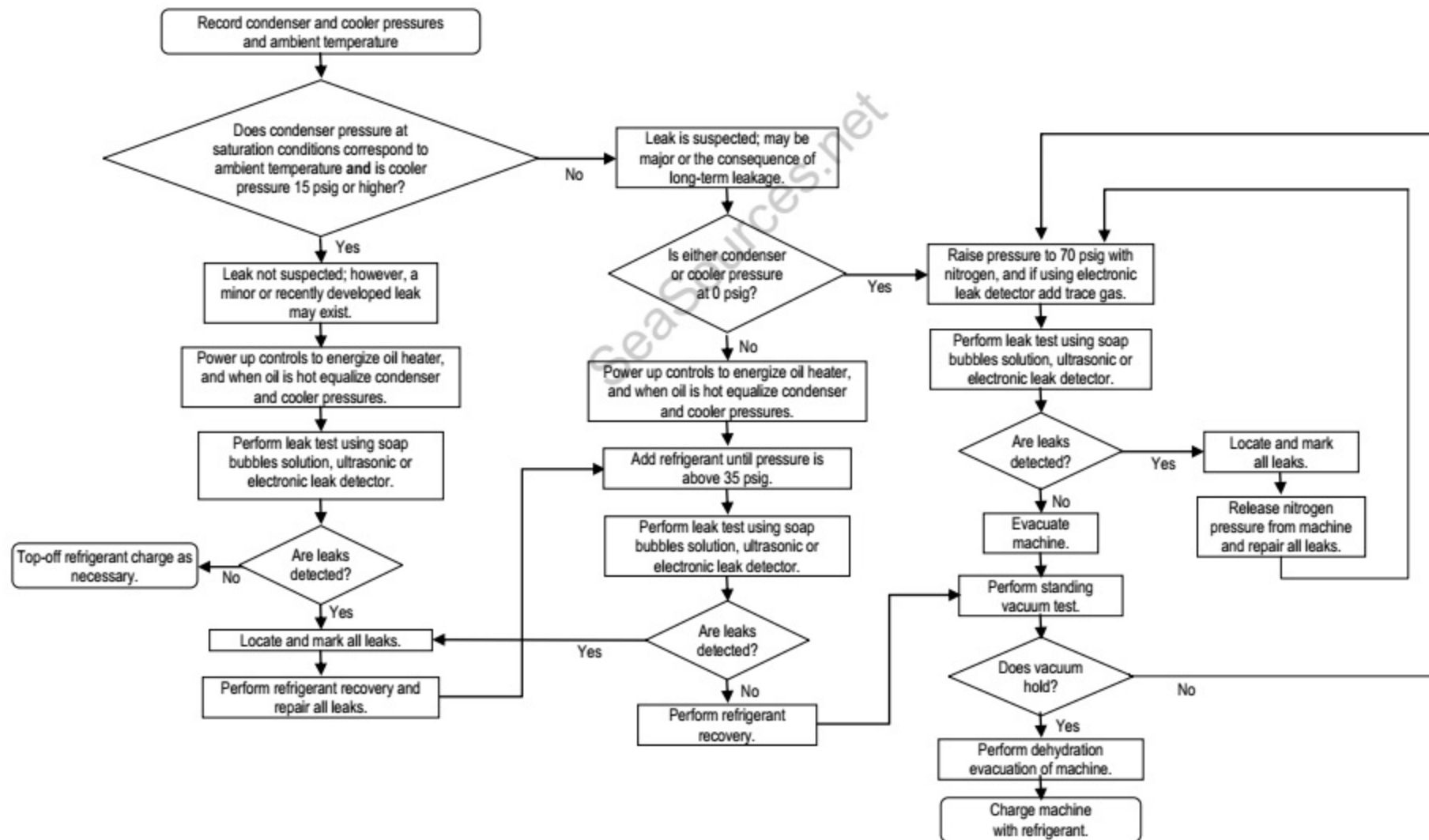


D



GS-RA-47

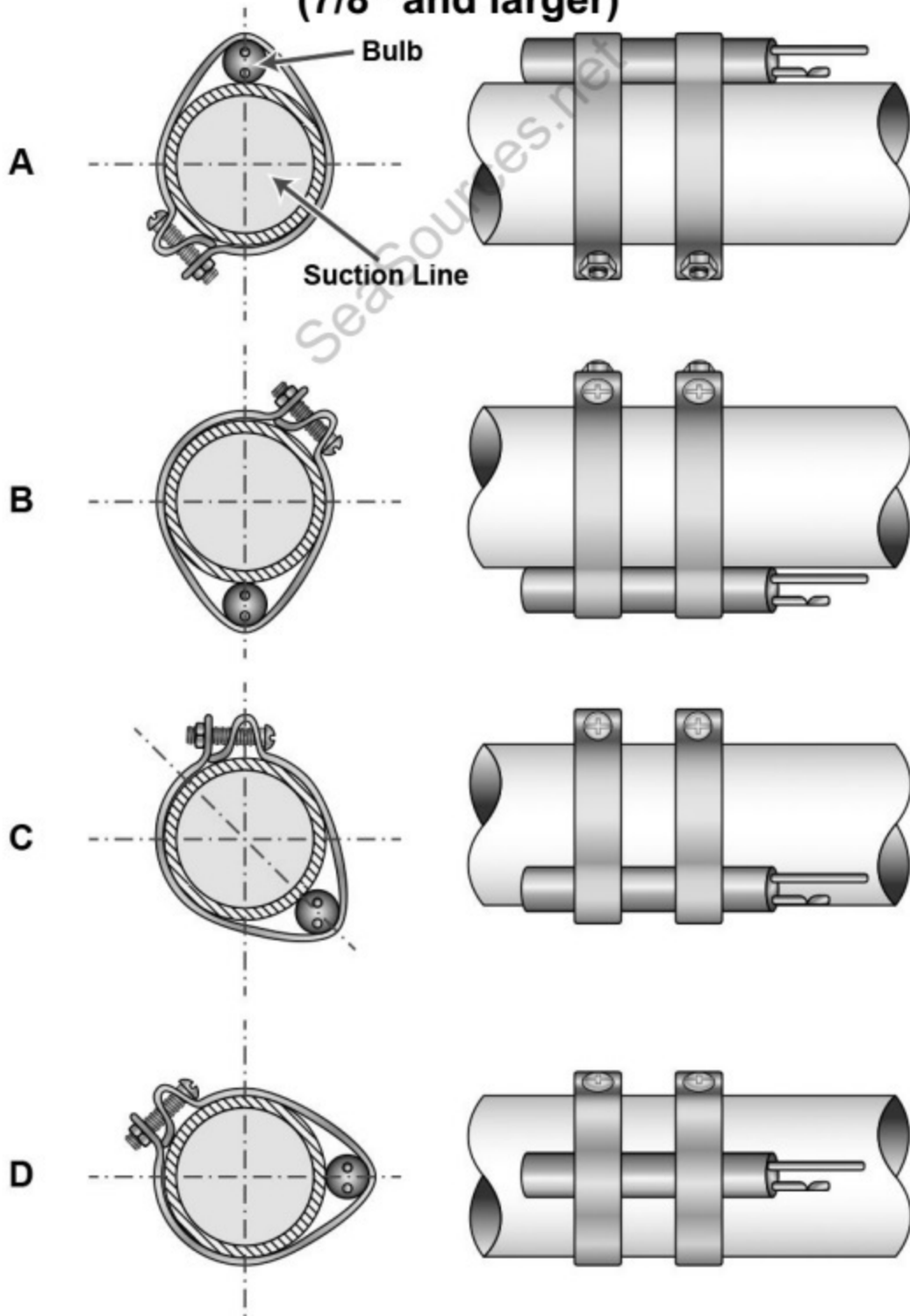
Leak Test Procedure for Idle Centrifugal Chiller Charged with R-134a Refrigerant



Thermistor Temperature (F) vs Resistance/Voltage Drop

TEMPERATURE (F)	VOLTAGE DROP (V)	RESISTANCE (Ohms)	TEMPERATURE (F)	VOLTAGE DROP (V)	RESISTANCE (Ohms)	TEMPERATURE (F)	VOLTAGE DROP (V)	RESISTANCE (Ohms)
-25	4.821	98,010	60	3.409	7,665	145	1.211	1,141
-24	4.818	94,707	61	3.382	7,468	146	1.192	1,118
-23	4.814	91,522	62	3.353	7,277	147	1.173	1,095
-22	4.806	88,449	63	3.323	7,091	148	1.155	1,072
-21	4.800	85,486	64	3.295	6,911	149	1.136	1,050
-20	4.793	82,627	65	3.267	6,735	150	1.118	1,029
-19	4.786	79,871	66	3.238	6,564	151	1.100	1,007
-18	4.779	77,212	67	3.210	6,399	152	1.082	986
-17	4.772	74,648	68	3.181	6,238	153	1.064	965
-16	4.764	72,175	69	3.152	6,081	154	1.047	945
-15	4.757	69,790	70	3.123	5,929	155	1.029	925
-14	4.749	67,490	71	3.093	5,781	156	1.012	906
-13	4.740	65,272	72	3.064	5,637	157	0.995	887
-12	4.734	63,133	73	3.034	5,497	158	0.978	868
-11	4.724	61,070	74	3.005	5,361	159	0.962	850
-10	4.715	59,081	75	2.977	5,229	160	0.945	832
-9	4.705	57,162	76	2.947	5,101	161	0.929	815
-8	4.696	55,311	77	2.917	4,976	162	0.914	798
-7	4.688	53,526	78	2.884	4,855	163	0.898	782
-6	4.676	51,804	79	2.857	4,737	164	0.883	765
-5	4.666	50,143	80	2.827	4,622	165	0.868	750
-4	4.657	48,541	81	2.797	4,511	166	0.853	734
-3	4.648	46,996	82	2.766	4,403	167	0.838	719
-2	4.636	45,505	83	2.738	4,298	168	0.824	705
-1	4.624	44,066	84	2.708	4,196	169	0.810	690
0	4.613	42,679	85	2.679	4,096	170	0.797	677
1	4.602	41,339	86	2.650	4,000	171	0.783	663
2	4.592	40,047	87	2.622	3,906	172	0.770	650
3	4.579	38,800	88	2.593	3,814	173	0.758	638
4	4.567	37,596	89	2.563	3,726	174	0.745	626
5	4.554	36,435	90	2.533	3,640	175	0.734	614
6	4.540	35,313	91	2.505	3,556	176	0.722	602
7	4.527	34,231	92	2.476	3,474	177	0.710	591
8	4.514	33,185	93	2.447	3,395	178	0.700	581
9	4.501	32,176	94	2.417	3,318	179	0.689	570
10	4.487	31,202	95	2.388	3,243	180	0.678	561
11	4.472	30,260	96	2.360	3,170	181	0.668	551
12	4.457	29,351	97	2.332	3,099	182	0.659	542
13	4.442	28,473	98	2.305	3,031	183	0.649	533
14	4.427	27,624	99	2.277	2,964	184	0.640	524
15	4.413	26,804	100	2.251	2,898	185	0.632	516
16	4.397	26,011	101	2.217	2,835	186	0.623	508
17	4.381	25,245	102	2.189	2,773	187	0.615	501
18	4.366	24,505	103	2.162	2,713	188	0.607	494
19	4.348	23,789	104	2.136	2,655	189	0.600	487
20	4.330	23,096	105	2.107	2,597	190	0.592	480
21	4.313	22,427	106	2.080	2,542	191	0.585	473
22	4.295	21,779	107	2.053	2,488	192	0.579	467
23	4.278	21,153	108	2.028	2,436	193	0.572	461
24	4.258	20,547	109	2.001	2,385	194	0.566	456
25	4.241	19,960	110	1.973	2,335	195	0.560	450
26	4.223	19,393	111	1.946	2,286	196	0.554	445
27	4.202	18,843	112	1.919	2,239	197	0.548	439
28	4.184	18,311	113	1.897	2,192	198	0.542	434
29	4.165	17,796	114	1.870	2,147	199	0.537	429
30	4.145	17,297	115	1.846	2,103	200	0.531	424
31	4.125	16,814	116	1.822	2,060	201	0.526	419
32	4.103	16,346	117	1.792	2,018	202	0.520	415
33	4.082	15,892	118	1.771	1,977	203	0.515	410
34	4.059	15,453	119	1.748	1,937	204	0.510	405
35	4.037	15,027	120	1.724	1,898	205	0.505	401
36	4.017	14,614	121	1.702	1,860	206	0.499	396
37	3.994	14,214	122	1.676	1,822	207	0.494	391
38	3.968	13,826	123	1.653	1,786	208	0.488	386
39	3.948	13,449	124	1.630	1,750	209	0.483	382
40	3.927	13,084	125	1.607	1,715	210	0.477	377
41	3.902	12,730	126	1.585	1,680	211	0.471	372
42	3.878	12,387	127	1.562	1,647	212	0.465	367
43	3.854	12,053	128	1.538	1,614	213	0.459	361
44	3.828	11,730	129	1.517	1,582	214	0.453	356
45	3.805	11,416	130	1.496	1,550	215	0.446	350
46	3.781	11,112	131	1.474	1,519	216	0.439	344
47	3.757	10,816	132	1.453	1,489	217	0.432	338
48	3.729	10,529	133	1.431	1,459	218	0.425	332
49	3.705	10,250	134	1.408	1,430	219	0.417	325
50	3.679	9,979	135	1.389	1,401	220	0.409	318
51	3.653	9,717	136	1.369	1,373	221	0.401	311
52	3.627	9,461	137	1.348	1,345	222	0.393	304
53	3.600	9,213	138	1.327	1,318	223	0.384	297
54	3.575	8,973	139	1.308	1,291	224	0.375	289
55	3.547	8,739	140	1.291	1,265	225	0.366	282
56	3.520	8,511	141	1.289	1,240			
57	3.493	8,291	142	1.269	1,214			
58	3.464	8,076	143	1.250	1,190			
59	3.437	7,868	144	1.230	1,165			

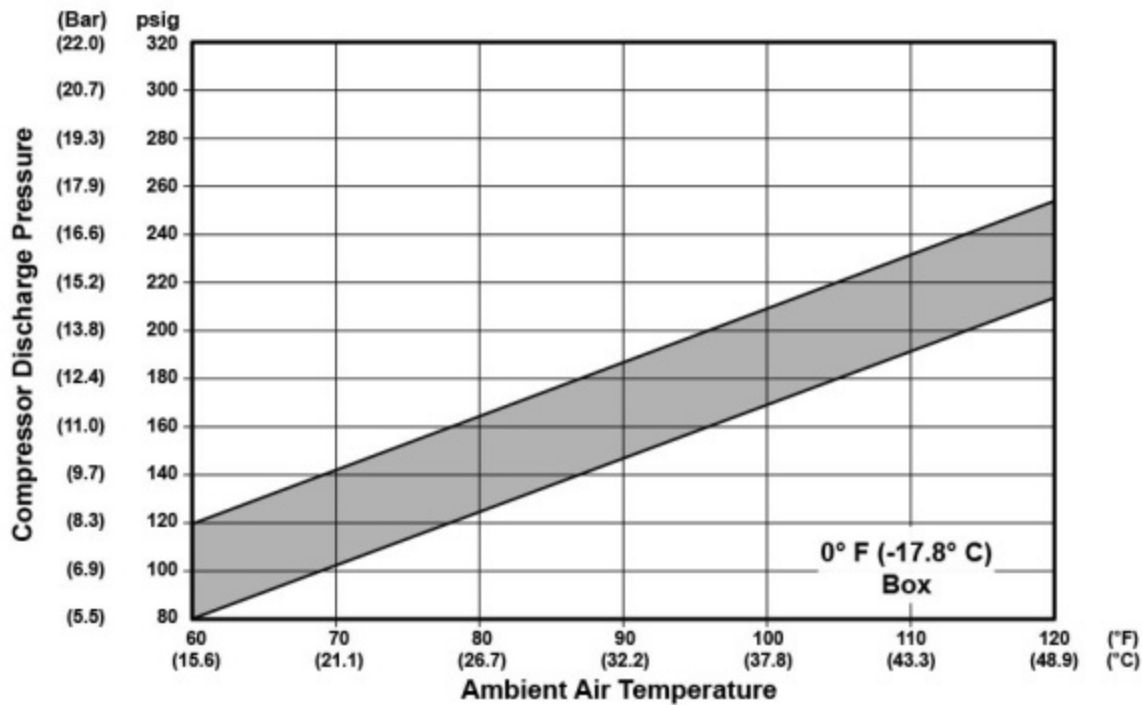
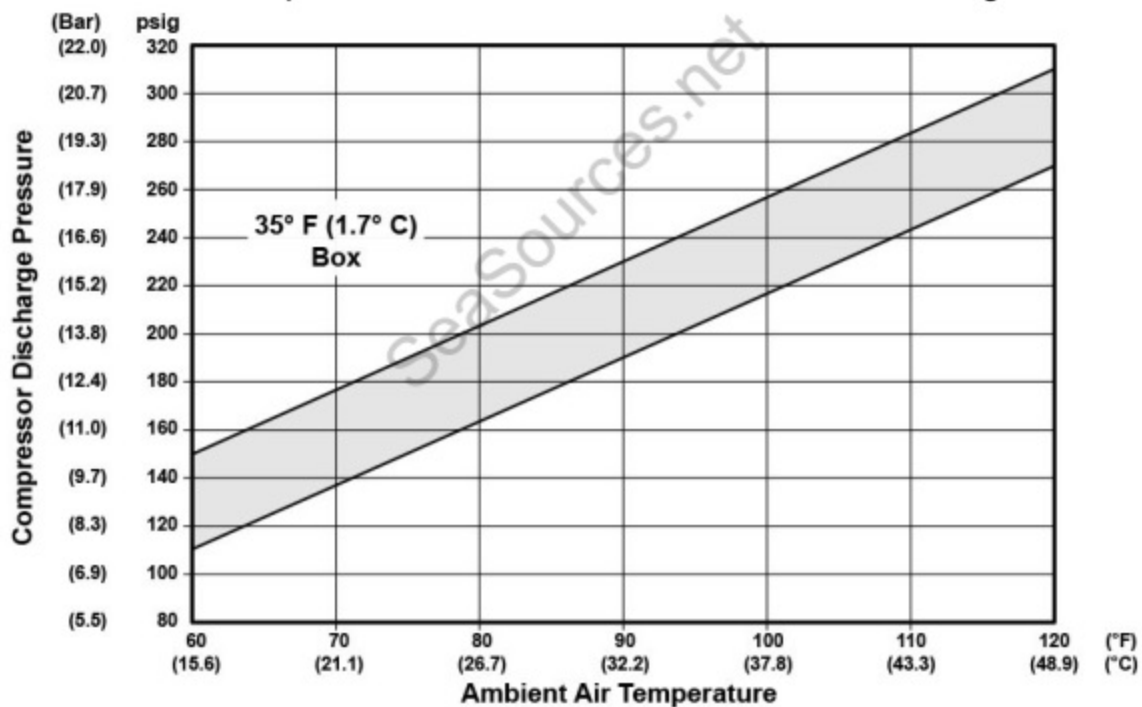
GS-RA-50 TXV Feeler Bulb on Small Suction Line (7/8" and larger)



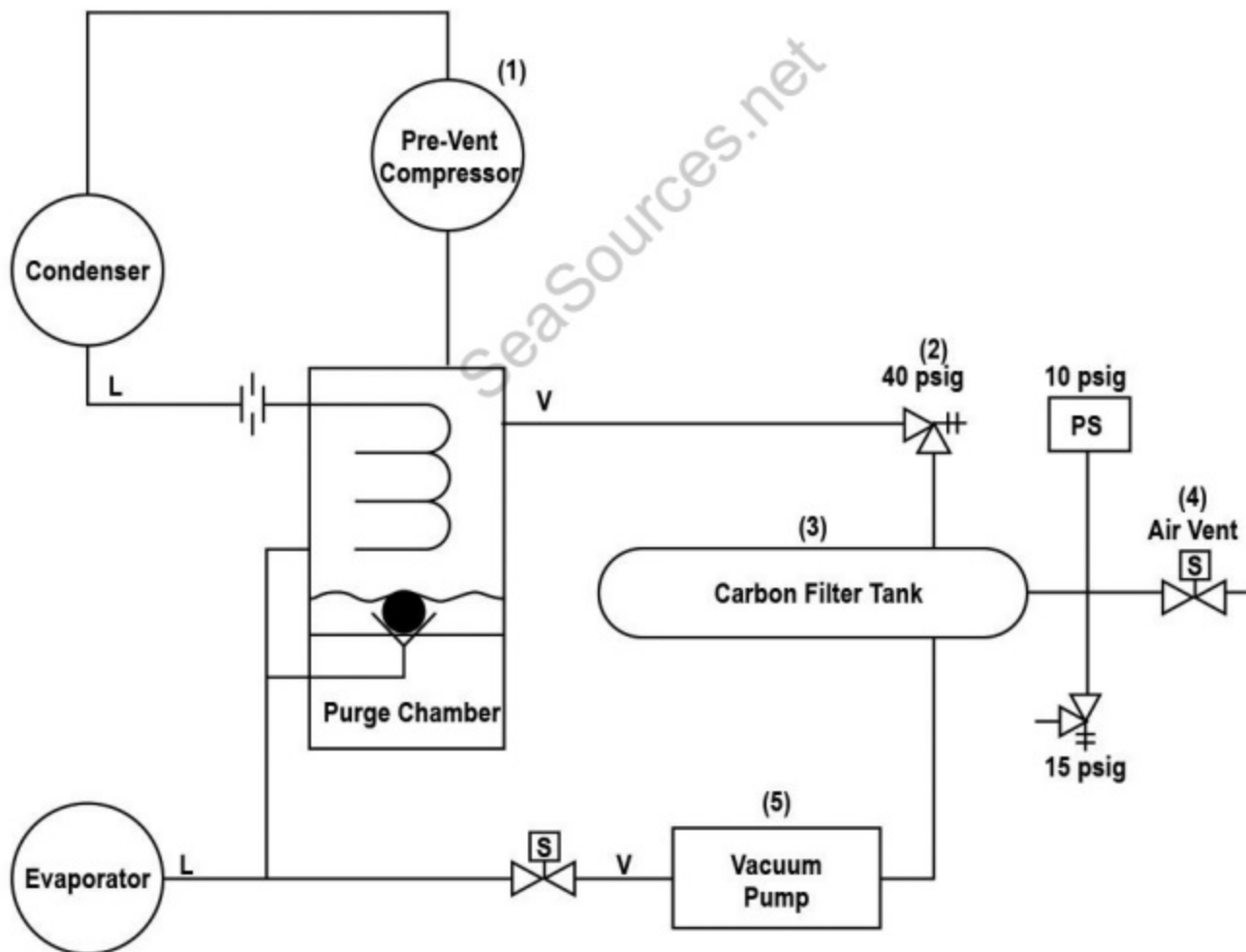
GS-RA-51: The new Illustration associated with this question has not yet been made available to the public from the National Maritime Center even though they are already using them in the exam room. We hope to have them posted soon.

GS-RA-52

Note: Curves to be used as a troubleshooting guide only for model series 69NT40 with fresh air makeup vent closed with unit powered on 460 VAC/60Hz and the suction modulating valve 100% open.



GS-RA-55



LEGEND



Solenoid Valve



Orifice



Relief Valve



V Vapor Line



PS Pressure Switch



L Liquid Line

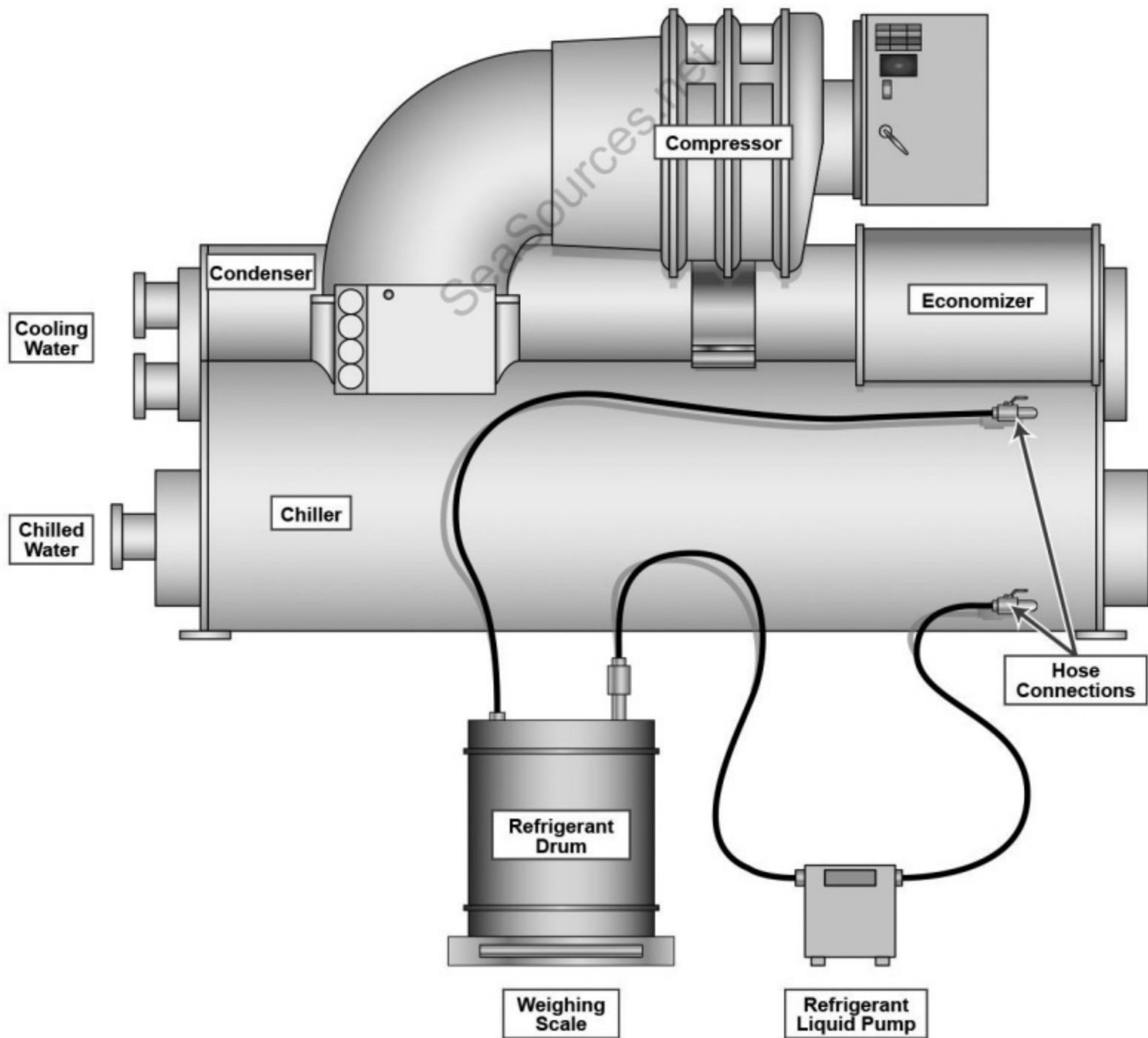
- (1) Pre-Vent compressor increases pressure in existing purge chamber to 40+ psig.
- (2) 40 psig Relief valve vents purge mixture into carbon filter tank
- (3) Carbon in tank absorbs refrigerant. Pressure increases.
- (4) At 10 psig in carbon filter tank, vent Opens. Air and noncondensibles are purged.
- (5) Vent closes. Vacuum pump cycles on for ten minutes returning vapor to chiller.

GS-RA-56

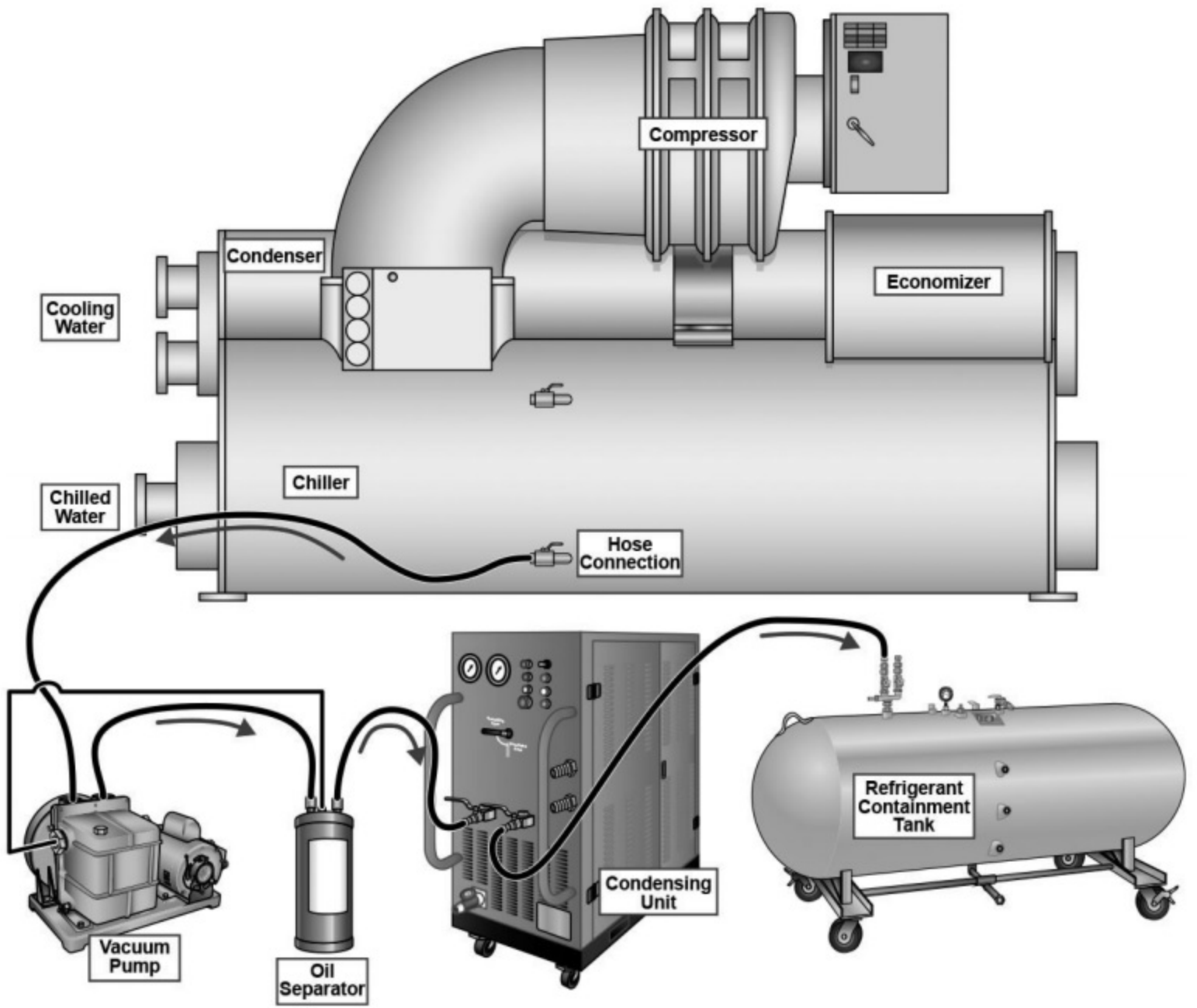
Pressure Vacuum Equivalents

Absolute Pressure above zero base (microns)	Vacuum below one atmosphere (inches Hg)	Vaporization temperature of water at each pressure (Fahrenheit)
0	29.921	-
50	29.92	-50
100	29.92	-40
150	29.92	-33
200	29.91	-28
300	29.91	-21
500	29.90	-12
1,000	29.88	1
2,000	29.84	15
4,000	29.76	29
6,000	29.69	39
10,000	29.53	52
15,000	29.33	63
20,000	29.13	72
30,000	28.74	84
50,000	27.95	101
100,000	25.98	125
200,000	22.05	152
500,000	10.24	192
760,000	0	212

GS-RA-58



GS-RA-59



GS-RA-67



A



B



C



D



A



B



C



D

GS-RA-69x