

Filter-Dryer Installation

This file contains two bulletins. One was published in 1982 and one that was written to supersede it but never published.

I am including both so that the older bulletin can be used as a parts reference for existing installations.

There are some scribbles and cross-outs on the "new" bulletin. Ignore them. Unfortunately this is the only copy that I have.

TPL
November 2004

Filter Drier Installation

17, 19, and 23 Series

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Purpose:

To transmit instructions for use when installing filter drier systems on rotary machines.

Information:

This bulletin provides information to the field for installing filter driers to remove moisture, acids and rust in low and high pressure machines. Two kits are available from RCD.

Section 1 - Filter Drier Installation Instructions for Low Pressure Machines (R-11, R-113) and Rust Removal for High Pressure Machines (R-12, R-22, R-500, R-114, R-134a):

When installing a filter drier to remove moisture, acids, or rust particles from a low pressure machine, or for rust removal only on a high pressure machine, use the instructions and kit that follow.

Note: Because of manufacturing tolerances, machine dimensions may vary from those in this instruction.

Drier Location:

For 19GD's which have shipping rails, locate the drier assembly as shown in Figure 1. For machines without shipping rails, the drier can be placed on the floor in a wooden cradle which is made at the job site.

Cooler Connections:

The liquid pick-up and liquid and gas discharge can be located anywhere along the length of the shell, but they must be located vertically in relation to the top row of tubes. See Figure 1 and the tube location tables.

Weld a 3/4" Thread-o-let to the shell. Drill an 11/16" hole through the Thread-o-let. Be careful not to damage the threads or hit the cooler tubes. See Table 2.

Condenser Connection: 19C Condensers have an extra 3/8" NPT purge connection which can be used as the pick-up point for the eductor gas. Add a 3/8" connection if one is needed.

Piping Arrangement: See Figure 1.

Install the dry eyes, items 6 and 7, close to each other so they can be seen from the same angle. Leave the covers on when not viewing the dry eye.

Downstream from the ejector, restrictions in the line must be minimized. Be sure to use a long radius elbow, item 13, or if soft copper is used make a wide bend.

File:

Table 1: Location of Top Row of Cooler Tubes for 19D Series Machines

Shell Size	Centerline of Unishell * to Centerline of Top Cooler Tubes (Inches)					Centerline of Top Cooler Tubes to Bottom Edge of Tube Sheet Which Rests on Shipping Rails (Inches)				
	19D	19DA	19DG	19DH	19DK	19D	19DA	19DG	19DH	19DK
11	7.625	7.625	7.625	10.375	-	10.375	10.375	9.625	9.625	-
12	-	-	7.625	-	10.375	-	-	9.625	-	13.025
13	7.625	7.625	7.625	10.375	-	10.375	10.375	-	9.625	-
14	-	-	-	-	10.375	-	-	-	-	13.025
15	6.875	6.875	6.875	10.375	-	11.125	11.125	10.375	9.625	-
16	-	-	-	-	10.375	-	-	-	-	13.025
17	6.125	6.125	6.125	-	-	11.875	11.875	11.125	-	-
20	-	-	10.375	10.375	10.375	-	-	6.750	9.625	13.025
21	9.625	9.625	9.625	9.625	9.625	14.375	14.375	7.500	10.375	13.775
23	8.875	8.875	9.625	8.875	8.875	15.125	15.125	7.500	11.125	14.525
25	8.875	8.875	8.875	8.125	8.125	15.125	15.125	8.250	11.875	15.275
27	8.125	8.125	8.125	8.125	8.125	15.875	15.875	9.000	11.875	15.275
31	17.250	18.000	13.500	13.500	13.500	10.750	10.000	5.000	8.380	12.760
33	17.250	17.250	13.500	13.500	13.500	10.750	10.750	5.000	8.380	12.760
35	16.500	17.250	12.750	12.750	12.750	11.500	10.750	5.750	9.130	13.510
36	-	-	16.500	-	-	-	-	7.375	-	-
37	14.750	16.500	16.500	-	-	12.250	11.500	7.375	-	-
39	15.750	15.750	15.750	-	-	12.250	12.250	8.125	-	-
41	-	-	-	16.500	16.500	-	-	-	10.260	14.620
42	-	-	-	16.500	16.500	-	-	-	10.260	14.620
43	-	-	-	15.750	15.750	-	-	-	11.000	15.370
46	-	-	-	15.000	15.000	-	-	-	11.760	16.120
47	-	-	-	14.250	14.250	-	-	-	12.510	16.870
48	-	-	-	13.500	13.500	-	-	-	13.260	17.620

* Usually, there are two punch marks at the centerline of the unishell right next to the tubesheet

Table 2: 19D Series Shell Thickness

Unishell Size	Cooler (Inches)					Condenser (Inches)				
	19D	19DA	19DG	19DH	19DK	19D	19DA	19DG	19DH	19DK
11-16	-	-	-	.2500	.2500	-	-	-	.3750	.3750
11-17	.3125	.3125	.3125	-	-	.3125	.3125	.3125	-	-
20-27	.3750	.3750	.3750	.2500	.2500	.3750	.3750	.3750	.3750	.3750
31-35	.5000	.3125	.4375	.3125	.3125	.5000	.5000	.4375	.4375	.4375
36	-	-	.3125	-	-	-	-	.5000	-	-
37	.5000	.3125	.3125	-	-	.5000	.5000	.5000	-	-
39	.5000	.3125	.3125	-	-	.5000	.5000	.5000	-	-
41-43	-	-	-	.3125	.3125	-	-	-	.5000	.5000
46-48	-	-	-	.3125	.3125	-	-	-	.5000	.5000

Table 3 - Location of Top Row of 19C Cooler Tubes and Heat Exchanger Shell Thickness

Heat Exchanger Size	Location of Top Row of Cooler Tubes		Heat Exchanger Shell Thickness	
	Centerline of Cooler to Centerline of Top Row of Tubes (Inches)	Centerline of Top Row of Tubes to Bottom Edge of Tube Sheet (Inches)	Cooler (Inches)	Condenser (Inches)
1	5 - 5/16" Down	23 - 3/16"	3/16"	3/16"
2	4 - 9/16" Down	23 - 3/16"	3/16"	3/16"
3	4 - 9/16" Down	23 - 3/16"	3/16"	3/16"
4	4 - 9/16" Down	23 - 3/16"	3/16"	3/16"
5	4 - 9/16" Down	23 - 3/16"	3/16"	3/16"
6	3 - 13/16" Down	23 - 3/16"	3/16"	3/16"
7	3 - 13/16" Down	23 - 3/16"	3/16"	3/16"
8	3 - 1/16" Down	23 - 3/16"	3/16"	3/16"
9	3 - 1/4" Down	23 - 3/16"	1/4"	3/16"
10	-	-	-	3/16"
11	3 5/8" Down	30 - 9/16"	1/4"	1/4"
12	7" Down	32 - 3/16"	5/16"	1/4"
13	7" Down	32 - 3/16"	5/16"	1/4"
14	4" Down	29 - 7/8"	5/16"	1/4"
15	3 - 1/4" Down	29 - 7/8"	5/16"	1/4"
16	4" Down	28 - 3/16"	5/16"	5/16"
17	5/16"	28 - 3/16"	5/16"	5/16"
18	4 - 3/8" Down	38 - 3/8"	5/16"	5/16"
19	2 - 5/16" Down	35"	1/2"	5/16"
20	1 - 5/8" Up	30"	1/2"	5/16"
21	1 - 7/8" Up	31 - 1/2"	1/2"	5/16"
22	3 - 5/8" Up	31 - 1/2"	5/8"	5/16"
23	3 - 3/8" UP	31 - 1/2"	5/8"	5/16"
24	-	-	-	5/16"

19CB660-006 Filter Drier Kit

Item #	Qty.	Description	Item #	Qty.	Description
1	2	Street Elbow 5/8" ODS	14	1	Ball Valve 7/8" ODS
2	10	90° Elbow 5/8" ODS x 5/8" ODS	16	4	12-6 x 3/4" out Thread-o-let
3	25Ft	5/8" OD Copper Tube (Field Supplied)	17	1	Adaptor 3/4" MPT x 7/8" ODS
4	8Ft	7/8" OD Copper Tube (Field Supplied)	18	1	Filter Drier Shell 7/8" inlet x 5/8" outlet
5	1	Relief Valve 1/2" MPT x 5/8" Flare	19	4	Filter Drier Cores
6	1	Dry Eye 7/8" ODS	20	1	Adaptor 5/8" ODS x 3/8" FPT
7	1	Dry Eye 5/8" ODS	21	3	90° Elbow 7/8" ODS x 7/8" ODS
8	2	Adaptor 1/2" FPT x 5/8" ODS	22	1	Tee 7/8" ODS x 5/8" ODS x 5/8" ODS
9	3	Ball Valve 5/8" ODS	23	18Ft	Armaflex 1/2" ID x 1/2" wall
10	3	Adaptor 3/4" MPT x 5/8" ODS			(Field Supplied)
11	1	Ejector	24	1	Armaflex Sheet 36" x 48" x 1/2" thick
12	2	Tee 5/8" ODS			(Field Supplied)
13	6	Elbow 5/8" Wide Angle	25	1	5/8" Flare Nut (Field Supplied)
			26	1	Adaptor 5/8" ODF x 1/2" FPT

Section 2 - Filter Drier Installation Instructions for high pressure Machines (R-12, R-22, R-500, R-114, R-134a):

These are instructions for installing a filter-drier to remove moisture and acids from high pressure machines.

NOTES: 1) For removal of rust from high pressure machines, refer to Section 1.

2) Because of engineering tolerances, machine dimensions may vary from those in this bulletin.

Materials Required

Drier installation package 19EA660-020

Drier Location

Locate the drier in a wooden cradle on the floor near the utility vessel (19EA, 19EB) or the cooler (17/19FA).

Connections

19EA, 19EB Many machines have a liquid drain valve on the bottom of the utility vessel which can be used for a liquid pick-up. On machines which were shipped before the liquid drain valve was added, a tee can be installed in the bypass line between the float ball chamber and the economizer. Machines shipped after August, 1975 have neither the bypass line nor the liquid valve in the economizer. Therefore, take the liquid from the 1/2" coupling at the bottom of the low-side float chamber nearest to the cover. Do not pipe from the new liquid valve near the bottom isolation valve, since the liquid valve is downstream of the low side valve.

17/19FA Take the liquid supply from the 1/2" coupling at the bottom of the low side float chamber near the cover. Return the liquid to the cooler through any convenient location. There are one inch couplings on the bottom of the cooler at each end. Some vessels have extra coupling near the relief valves. If a new connection is made, enter the shell at the same elevation as the motor cooling refrigerant return to the cooler

Piping Arrangement

Use Figure 2 as a guide to arrange the components of the 19EA, 19EB, and 17/19FA machines. The connections apply only to the 19EA and 19EB machines.

Install the dry eyes (5) close to each other so they can be seen from the same angle. Leave the covers on when not viewing the dry eye.

The relief valve (8) is installed to prevent the dangerously high pressures that can occur if the drier shut-off valves are closed, and the liquid in the drier is not vented.

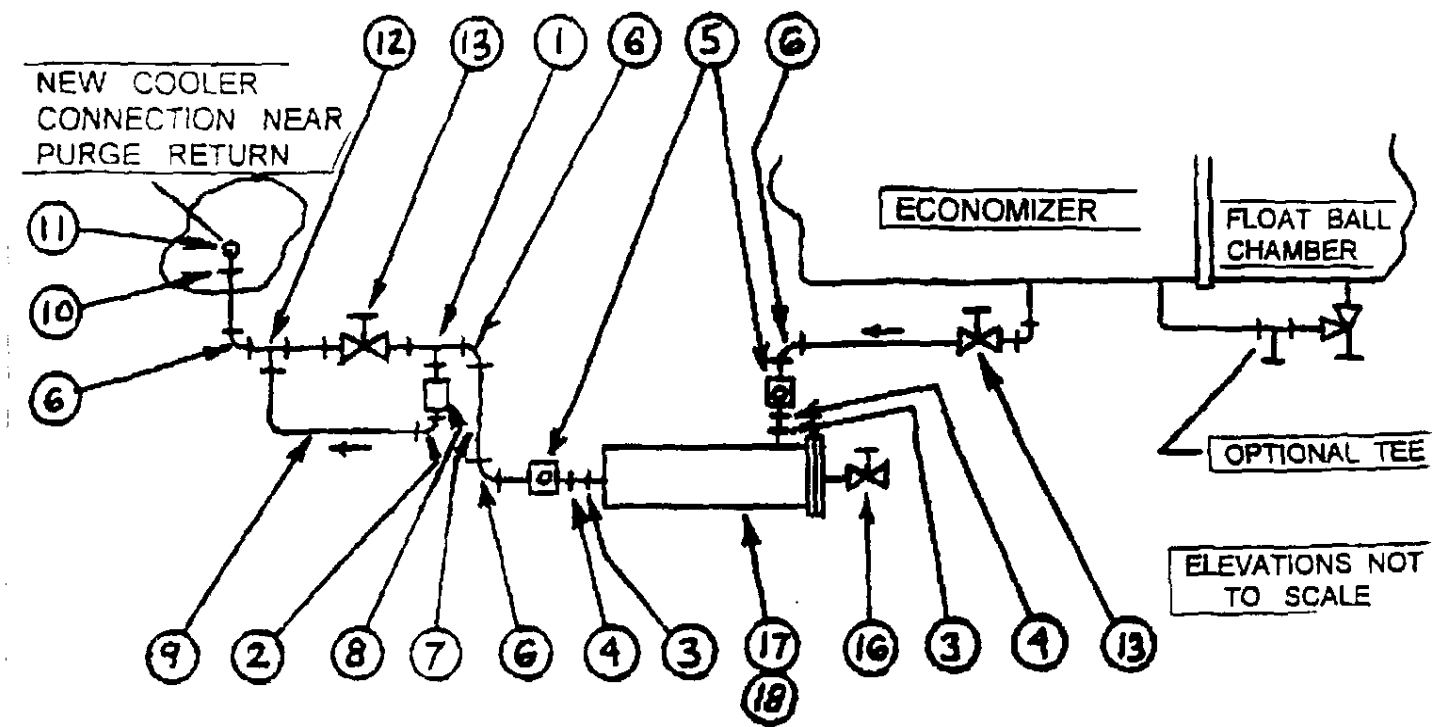


FIGURE 2 - 19EA, 19EB, and 17/19FA, 17/19EX Moisture and Acid Removal

Table 4 Location of Top Row of 19EA and 19EB Cooler tubes			
Unishell Size	Centerline of *Unishell to Centerline of Top Cooler Tubes	Centerline of Top Cooler Tubes to Bottom Edge of Tube Sheet which rests in the shipping rail	
		19EA	19EB
41. 71	10.5"	11"	18.26"
42. 72	10.5"	11"	18.26"
43. 73	11"	12.75"	20.198"
45. 75	11"	12.75"	20.198"
46. 76	12.125"	11.625"	18.995"
47. 77	11.375"	12.375"	19.745"
51. 81	14"	11.5"	18.983"
52. 82	13.25"	12.25"	19.688"
53. 83	13.25"	12.25"	19.688"
55. 85	14.75"	13"	20.373"
57. 87	14"	13.75"	21.123"
59. 89	14.375"	14.375"	21.865"

* Usually, there are two prick punch marks at the centerline of the unishell, right next to the tube sheet.

Table 5 19EA and 19EB Shell Thicknesses

Unisell Size	Cooler	Condenser
41-47 and 71-77	.5"	.5"
51-57 and 81-87	.626"	.625"
59 and 89	.75"	.75"

Table 6 - 17/19FA Vessel Information

Heat Exchanger Size	Cooler		Condenser
	Centerline of Cooler to Centerline of Top Row of Tubes, in. (mm)	Shell Thickness, in. (mm)	Shell Thickness, in. (mm)
22	6.5 (165.1)Down	0.5 (12.7)	-
24	5.0 (127.0)Down	0.5 (12.7)	0.38 (9.7)
25	4.25 (108.0)Down	0.5 (12.7)	0.38 (9.7)
26	3.5 (88.9)Down	0.5 (12.7)	0.38 (9.7)
27	8.06 (204.7)Down	0.5 (12.7)	0.438 (11.1)
28	7.32 (185.9)Down	0.5 (12.7)	0.438 (11.1)
29	6.56 (166.6)Down	0.5 (12.7)	0.438 (11.1)
30	-	-	0.5 (12.7)
31	-	-	0.5 (12.7)
32	-	-	0.5 (12.7)
52	6.5 (165.1)Down	0.5 (12.7)	-
54	5.0 (127.0)Down	0.5 (12.7)	-
55	4.25 (108.0)Down	0.5 (12.7)	0.38 (9.7)
56	3.5 (88.9)Down	0.5 (12.7)	0.38 (9.7)
57	8.06 (204.7)Down	0.5 (12.7)	0.38 (9.7)
58	7.32 (185.9)Down	0.5 (12.7)	0.438 (11.1)
59	6.56 (166.6)Down	0.5 (12.7)	0.438 (11.1)
60	5.06 (128.6)Down	0.5 (12.7)	0.5 (12.7)
61	-	-	0.5 (12.7)
62	-	-	0.5 (12.7)

Table 7 - 17/19EX Vessel Information

Heat Exchanger Size	Cooler		Condenser
	Centerline of Cooler to Centerline of Top Row of Tubes, in. (mm)	Shell Thickness, in. (mm)	Shell Thickness, in. (mm)
31	1.00 (25.4)Down	0.375 (9.5)	0.375 (9.5)
32	1.00 (25.4)Down	0.375 (9.5)	0.375 (9.5)
33	1.00 (25.4)Down	0.375 (9.5)	0.375 (9.5)
41	2.38 (60.4)Down	0.5 (12.7)	0.375 (9.5)
42	2.38 (60.4)Down	0.5 (12.7)	0.375 (9.5)
43	2.38 (60.4)Down	0.5 (12.7)	0.375 (9.5)
45	2.38 (60.4)Down	0.5 (12.7)	0.375 (9.5)
46	2.38 (60.4)Down	0.5 (12.7)	0.375 (9.5)
47	2.38 (60.4)Down	0.5 (12.7)	0.375 (9.5)
48	3.75 (95.2)Up	0.5 (12.7)	-
51	-	-	0.375 (9.5)
52	-	-	0.375 (9.5)
53	-	-	0.375 (9.5)
55	-	-	0.375 (9.5)
56	-	-	0.375 (9.5)
57	-	-	0.375 (9.5)

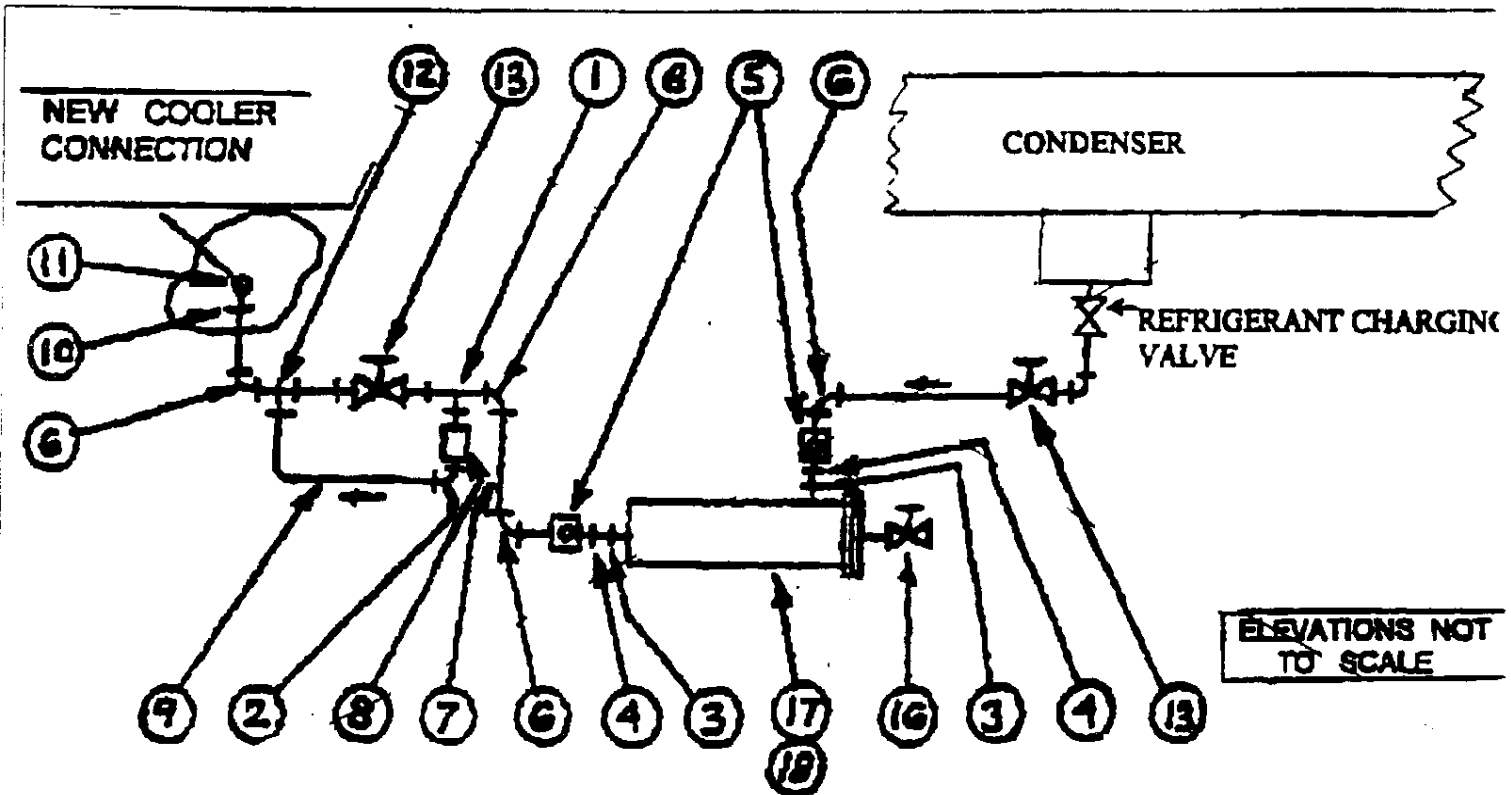


FIGURE 3 - 23XL, 19XL, 19XR, 19XT, 19XRT Moisture and Acid Removal

Table 8 – 23XL Vessel Information

Heat Exchanger Size	Cooler		Condenser
	Centerline of Cooler to Centerline of Top Row of Tubes, in. (mm)	Shell Thickness, In. (mm)	Shell Thickness, in. (mm)
10	1.63 (41.3) Up	0.38 (9.65)	0.38 (9.65)
11	2.50 (63.5) Up	0.38 (9.65)	0.38 (9.65)
20	1.94 (49.2) Up	0.38 (9.65)	0.38 (9.65)
21	2.81 (71.4) Up	0.38 (9.65)	0.38 (9.65)
40	3.00 (76.2) Down	0.38 (9.65)	0.38 (9.65)
41	2.12 (54.0) Down	0.38 (9.65)	0.38 (9.65)
42	1.25 (31.8) Down	0.38 (9.65)	0.38 (9.65)
43	0.38 (9.5) Down	0.38 (9.65)	0.38 (9.65)

Table 9 – 19XR Vessel Information

Heat Exchanger Size	Cooler		Condenser
	Centerline of Cooler to Centerline of Top Row of Tubes, in. (mm)	Shell Thickness, In. (mm)	Shell Thickness, in. (mm)
10	1.62 (41.2) Down	0.25 (6.35)	0.25 (6.35)
11	0.75 (19.0) Down	0.25 (6.35)	0.25 (6.35)
12	0.12 (3.1) Up	0.25 (6.35)	0.25 (6.35)
15	1.62 (41.2) Down	0.25 (6.35)	0.25 (6.35)
16	0.75 (19.0) Down	0.25 (6.35)	0.25 (6.35)
17	0.12 (3.1) Up	0.25 (6.35)	0.25 (6.35)
20	1.93 (49.1) Down	0.25 (6.35)	0.25 (6.35)
21	1.06 (27.0) Down	0.25 (6.35)	0.25 (6.35)
22	0.69 (17.6) Up	0.25 (6.35)	0.25 (6.35)
30	1.93 (49.1) Down	0.25 (6.35)	0.25 (6.35)
31	1.06 (27.0) Down	0.25 (6.35)	0.25 (6.35)
32	0.69 (17.6) Up	0.25 (6.35)	0.25 (6.35)
35	1.93 (49.1) Down	0.25 (6.35)	0.25 (6.35)
36	1.06 (27.0) Down	0.25 (6.35)	0.25 (6.35)
37	0.69 (17.6) Up	0.25 (6.35)	0.25 (6.35)
40	1.06 (27.0) Down	0.38 (9.65)	0.38 (9.65)
41	0.26 (6.5) Up	0.38 (9.65)	0.38 (9.65)
42	1.13 (28.6) Up	0.38 (9.65)	0.38 (9.65)
45	1.06 (27.0) Down	0.38 (9.65)	0.38 (9.65)
46	0.26 (6.5) Up	0.38 (9.65)	0.38 (9.65)
47	1.13 (28.6) Up	0.38 (9.65)	0.38 (9.65)
50	0.44 (11.2) Up	0.38 (9.65)	0.38 (9.65)
51	1.75 (44.4) Up	0.38 (9.65)	0.38 (9.65)
52	2.63 (66.7) Up	0.38 (9.65)	0.38 (9.65)
55	0.44 (11.2) Up	0.38 (9.65)	0.38 (9.65)
56	1.75 (44.4) Up	0.38 (9.65)	0.38 (9.65)
57	2.63 (66.7) Up	0.38 (9.65)	0.38 (9.65)
60	2.0 (50.7) Up	0.38 (9.65)	0.38 (9.65)
61	2.87 (73.0) Up	0.38 (9.65)	0.38 (9.65)

Table 9 Continued – 19XR Vessel Information

Heat Exchanger Size	Cooler		Condenser
	Centerline of Cooler to Centerline of Top Row of Tubes. in. (mm)	Shell Thickness, in. (mm)	Shell Thickness, in. (mm)
62	3.76 (95.4) Up	0.38 (9.65)	0.38 (9.65)
65	2.0 (50.7) Up	0.38 (9.65)	0.38 (9.65)
66	2.87 (73.0) Up	0.38 (9.65)	0.38 (9.65)
67	3.76 (95.4) Up	0.38 (9.65)	0.38 (9.65)
70	0.59 (14.9) Down	0.38 (9.65)	0.38 (9.65)
71	0.73 (18.5) Up	0.38 (9.65)	0.38 (9.65)
72	2.04 (51.8) Up	0.38 (9.65)	0.38 (9.65)
75	0.59 (14.9) Down	0.38 (9.65)	0.38 (9.65)
76	0.73 (18.5) Up	0.38 (9.65)	0.38 (9.65)
77	2.04 (51.8) Up	0.38 (9.65)	0.38 (9.65)
80	1.87 (47.6) Down	0.38 (9.65)	0.38 (9.65)
81	0.56 (14.2) Down	0.38 (9.65)	0.38 (9.65)
82	0.75 (19.0) Up	0.38 (9.65)	0.38 (9.65)
85	1.87 (47.6) Down	0.38 (9.65)	0.38 (9.65)
86	0.56 (14.2) Down	0.38 (9.65)	0.38 (9.65)
87	0.75 (19.0) Up	0.38 (9.65)	0.38 (9.65)

Table 10 – 19XL Vessel Information

Heat Exchanger Size	Cooler		Condenser
	Centerline of Cooler to Centerline of Top Row of Tubes. in. (mm)	Shell Thickness, in. (mm)	Shell Thickness, in. (mm)
40	3.0 (76.2) Down	0.38 (9.65)	0.38 (9.65)
41	2.12 (54.0) Down	0.38 (9.65)	0.38 (9.65)
42	1.25 (31.8) Down	0.38 (9.65)	0.38 (9.65)
43	0.375 (9.5) Down	0.38 (9.65)	0.38 (9.65)
50	3.44 (87.3) Down	0.38 (9.65)	0.38 (9.65)
51	2.56 (65.1) Down	0.38 (9.65)	0.38 (9.65)
52	1.25 (31.8) Down	0.38 (9.65)	0.38 (9.65)
53	0.376 (9.54) Down	0.38 (9.65)	0.38 (9.65)
55	3.44 (87.3) Down	0.38 (9.65)	0.38 (9.65)
56	2.56 (65.1) Down	0.38 (9.65)	0.38 (9.65)
57	1.25 (31.8) Down	0.38 (9.65)	0.38 (9.65)
58	0.376 (9.54) Down	0.38 (9.65)	0.38 (9.65)

Table 11 - 19XRT, 19XT Vessel Information

Heat Exchanger Size	Cooler		Condenser
	Centerline of Cooler to Centerline of Top Row of Tubes. in. (mm)	Shell Thickness. In. (mm)	Shell Thickness. in. (mm)
60	2.56 (65.1) Down	0.38 (9.65)	0.38 (9.65)
61	0.82 (20.6) Down	0.38 (9.65)	0.38 (9.65)
62	0.5 (12.7) Up	0.38 (9.65)	0.38 (9.65)
63	2.25 (57.2) Up	0.38 (9.65)	0.38 (9.65)

19EA660-020 Filter Drier Kit (High Pressure)

ITEM	QTY	DESCRIPTION
1	1	Tee 1/2" ODS x 1/4" FPT Tee
2	1	90° 1/4" MPT x 1/4" ODS
3	2	Bushing - Male to Female 2-1/8" x 7/8"
4	2	Bushing - Male to Female 7/8" x 1/2"
5	2	Dry Eye 1/2" ODS
6	4	90° 1/2" ODS x 1/2" ODS
7	25'	Copper Tubing - 1/2" O.D.
8	1	Relief Valve 1/4" MPT in x 1/4" FPT out
9	3'	Copper Tubing 1/4" O.D.
10	1	90° El. 1/8" RPT x 1/2" ODS
11	1	Black Pipe Nipple 3/8" MPT x 3" lg
12	1	Tee 1/2" ODS x 1/4" ODS
13	3	Hand Valve 1/2" ODS
14	1	3/16" Tap Drill
15	1	3/8" -18 NPT Tap
16	1	Angle Valve 1/4" MPT
17	1	Drier Housing - KH49EA-110
18	4	Drier Cartridges - P506-8H100



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SERVICE BULLETIN

SUBJECT:

FILTER DRIER INSTALLATION

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Installation, repair and service and equipment referenced in this Service Bulletin should be undertaken only by qualified persons. Carrier Corporation (1) makes no representations or warranties, expressed or implied, concerning the accuracy, completeness or right to use the information contained herein, and (2) disclaims all liability for injuries, damages, infringements and other losses which may arise on account of, or which may result from, the use or application of any information, method or apparatus disclosed herein.

Filter Drier Installation Instructions for 19 Series Machines

When installing a filter drier to remove moisture and acids from a 19C or D machine, use the instructions starting on page 2; for a 19E or FA Series machine, see page 6. If a filter drier is installed to remove rust particles, see page 10.

NOTE: Because of manufacturing tolerances, machine dimensions may vary from those in this bulletin.

*Eductor CNØ1CB155
Superseded by
17EAØ131572*



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19C and D Series Machines

Materials Required

Drier Installation Package #1*	19CB111-141
Drier Housing	KH49EA-110
Drier Cartridges (4 Req'd. per Change)	KH29EZ-070

* Parenthesized numbers in text refer to the components included in this package and itemized on page 6 of these instructions.

Drier Location

For 19DGs which have shipping rails, locate the drier assembly as shown in Fig. 1. For machines without shipping rails, the drier can be placed on the floor in a wooden cradle.

Cooler Connections

The liquid pick-up and liquid and gas discharges can be located anywhere along the length of the shell, but they must be located vertically in relation to the top row of tubes. See Fig. 1 and the tube location tables.

Drill through the shell with the 37/64" tap drill (24), taking care not to hit the cooler tubes. Tap the hole with the 3/8" NPT tap (25). Install 3" nipples with Loctite thread sealant.

Condenser Connection

19C condensers have an extra 3/8" NPT purge connection which can be used as the pick-up point for the eductor gas. Add a 3/8" connection if one is not available.

Piping Arrangement

Install the dry eyes (8) close to each other so they can be seen from the same angle. Leave the covers on when not viewing the dry eye.

Downstream from the ejector, restrictions in the line must be minimized.

The relief valve (5) is installed to prevent the dangerously high pressures that can occur if the drier shut-off valves are closed and the liquid in the drier is not vented.

The hand valve (13) located between the tee (20) and the dry eye (8) permits charging refrigerant into the cooler through the drier.



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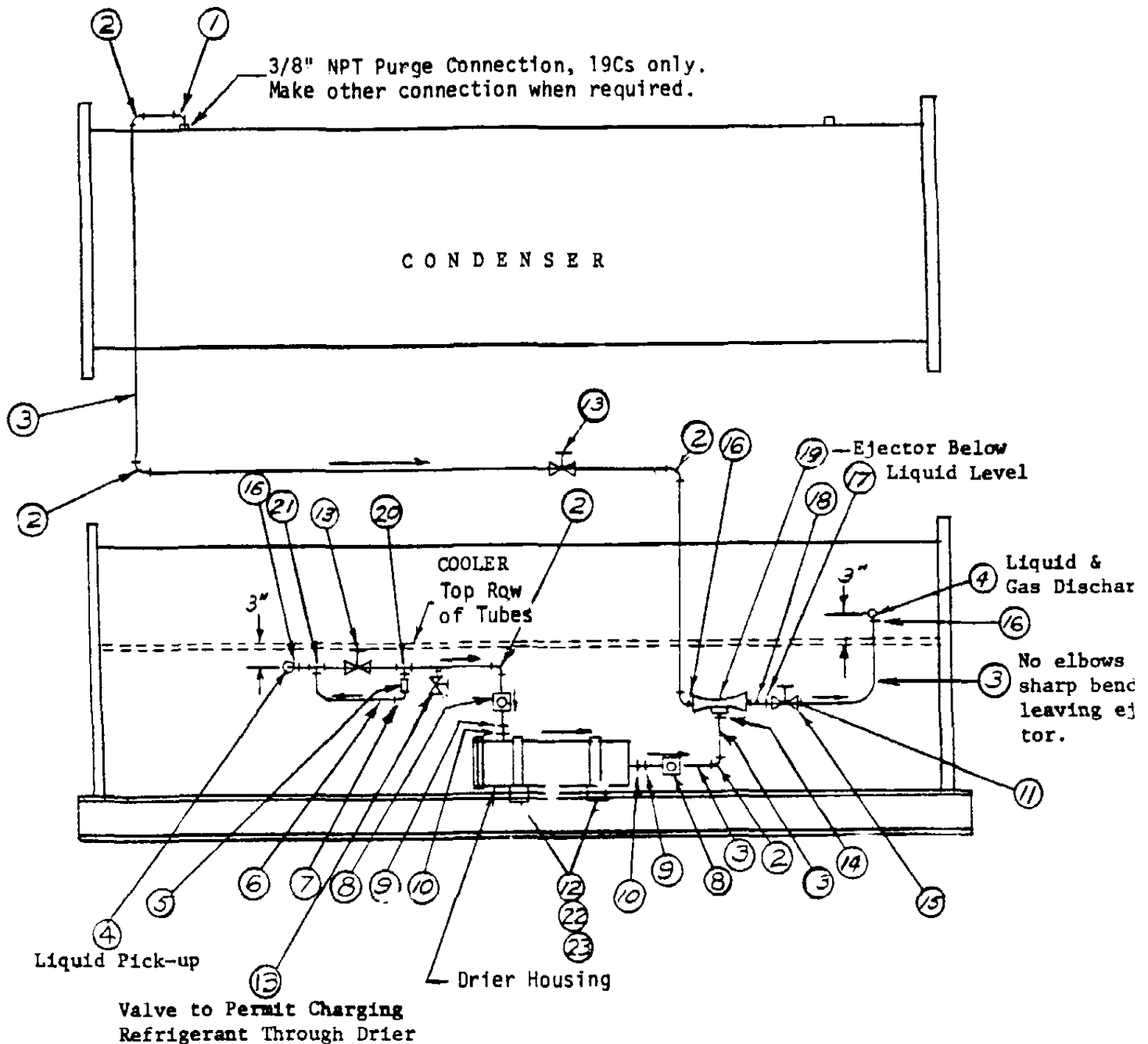


Fig. 1. 19C and 19D Series Filter Drier Arrangement



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Table 1. Location of Top Row of Cooler Tubes for 19D Series Machines

Unishell Size	Centerline of Unishell* to Centerline of Top Cooler Tubes (inches)					Centerline of Top Cooler Tubes to Bottom Edge of Tube Sheet Which Rests on the Shipping Rail (inches)				
	19D	19DA	19DG	19DH	19DK	19D	19DA	19DG	19DH	19DK
11	7.625	7.625	7.625	10.375	-	10.375	10.375	9.625	9.625	-
12	-	-	7.625	-	10.375	-	-	9.625	-	13.025
13	7.625	7.625	7.625	10.375	-	10.375	10.375	-	9.625	-
14	-	-	-	-	10.375	-	-	-	-	13.025
15	6.875	6.875	6.875	10.375	-	11.125	11.125	10.375	9.625	-
16	-	-	-	-	10.375	-	-	-	-	13.025
17	6.125	6.125	6.125	-	-	11.875	11.875	11.125	-	-
20	-	-	10.375	10.375	10.375	-	-	6.750	9.625	13.025
21	9.625	9.625	9.625	9.625	9.625	14.375	14.375	7.500	10.375	13.775
23	8.875	8.875	9.625	8.875	8.875	15.125	15.125	7.500	11.125	14.525
25	8.875	8.875	8.875	8.125	8.125	15.125	15.125	8.250	11.875	15.275
27	8.125	8.125	8.125	8.125	8.125	15.875	15.875	9	11.875	15.275
31	17.250	18	13.500	13.500	13.500	10.750	10	5	8.38	12.76
33	17.250	17.250	13.500	13.500	13.500	10.750	10.750	5	8.38	12.76
35	16.500	17.250	12.750	12.750	12.750	11.500	10.750	5.750	9.13	13.51
36	-	-	16.500	-	-	-	-	7.375	-	-
37	14.750	16.500	16.500	-	-	12.250	11.500	7.375	-	-
39	15.750	15.750	15.750	-	-	12.250	12.250	8.125	-	-
41	-	-	-	16.500	16.500	-	-	-	10.26	14.62
42	-	-	-	16.500	16.500	-	-	-	10.26	14.62
43	-	-	-	17.750	15.750	-	-	-	11.00	15.37
46	-	-	-	15.000	15.000	-	-	-	11.76	16.12
47	-	-	-	14.250	14.250	-	-	-	12.51	16.87
48	-	-	-	13.500	13.500	-	-	-	13.26	17.62

*Usually, there are two punch marks at the centerline of the unishell right next to the tube sheet.

Table 2. 19D Series Shell Thicknesses

Unishell Size	Cooler (inches)					Condenser (inches)				
	19D	19DA	19DG	19DH	19DK	19D	19DA	19DG	19DH	19DK
11-16	-	-	-	.2500	.2500	-	-	-	.3750	.3750
11-17	.3125	.3125	.3125	-	-	.3125	.3125	.3125	-	-
20-27	.3750	.3750	.3750	.2500	.2500	.3750	.3750	.3750	.3750	.3750
31-35	.5000	.3125	.4375	.3125	.3125	.5000	.5000	.4375	.4375	.4375
36	-	-	.3125	-	-	-	-	.5000	-	-
37	.5000	.3125	.3125	-	-	.5000	.5000	.5000	-	-
39	.5000	.3125	.3125	-	-	.5000	.5000	.5000	-	-
41-43	-	-	-	.3125	.3125	-	-	-	.5000	.5000
46-48	-	-	-	.3125	.3125	-	-	-	.5000	.5000



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Table 3. Location of Top Row of 19C Series Cooler Tubes and Heat Exchanger Shell Thickness

Heat Exchanger Size	Location of Top Row of Cooler Tubes		Heat Exchanger Shell Thickness	
	Centerline of Cooler to Centerline of Top Row of Tubes (in.)	Centerline of Top Row of Tubes to Bottom Edge of Tube Sheet (in.)	Cooler	Condenser
			(in.)	(in.)
1	5-5/16 Down	23-3/16	3/16	3/16
2	4-9/16 Down	↓	↓	↓
3	↓	↓	↓	↓
4	↓	↓	↓	↓
5	↓	↓	↓	↓
6	3-13/16 Down	↓	↓	↓
7	↓	↓	↓	↓
8	3-1/16 Down	↓	↓	↓
9	3-1/4 Down	↓	1/4	↓
10	-	-	-	↓
11	3-5/8 Down	30-9/16	1/4	1/4
12	7 Down	32-3/16	5/16	↓
13	↓	↓	↓	↓
14	4 Down	29-7/8	↓	↓
15	3-1/4 Down	↓	↓	↓
16	4 Down	28-3/16	↓	5/16
17	3-1/4 Down	↓	↓	↓
18	4-3/8 Down	38-3/8	↓	↓
19	2-5/16 Down	35	1/2	↓
20	1-5/8 Up	30	↓	↓
21	1-7/8 Up	31-1/2	↓	↓
22	3-5/8 Up	↓	5/8	↓
23	3-3/8 Up	↓	↓	↓
24	-	-	-	↓



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Drier Installation Package #1, Part No. 19CB111-141*
(For 19C and 19D Series Machines)

<u>Item</u>	<u>Quantity</u>	<u>Part No.</u>	<u>Description</u>
1	1	DE16CA-203	90° Elbow, 3/8" MPT x 1/2" ODS
2	8	DE13BA-201	90° Elbow, 1/2" ODS x 1/2" ODS
3	25 ft	-	Copper Tubing, 1/2" OD
4	2	CE01CA-118	Black Pipe Nipple, 3/8" MPT x 3" Long
5	1	Circle Seal #559B-2MP-100	Relief Valve, 1/4 MPT In x 1/4" FPT Out
6	3 ft	-	Copper Tubing 1/4" OD
7	1	DE16CA-051	90° Elbow, 1/4" MPT x 1/4" ODS
8	2	KM43AG-201	Dry Eye, 1/2" ODS Connections
9	2	DE35BA-504	Bushing 7/8" x 1/2" Male to Female
10	2	DE35BB-709	Bushing, 2-1/8" x 7/8" Male to Female
11	1	-	Adapter, 3/4" MPT x 1/2" ODS
12	1	19CB111-121	Drier Mounting Assembly (includes 2 Support Assy.)
13	3	EP10BA-181	Hand Valve, 1/2" ODS
14	1	DE04DA-201	Adapter, 1/2" MPT x 1/2" ODS
15	1	EP71CQ-241	Ball Valve, 3/4" FPT, 1/2" Port
16	3	DE17CB-203	90° Elbow, 3/8" FPT x 1/2" ODS
17	1	CA53RA-202	Reducer, 3/4" MPT x 1/2" FPT
18	1	CE01CA-160	Black Pipe Nipple, 1/2" MPT x 2" Long
19	1	CN01CB-155	Ejector, 3/8" MPT In; 1/2" FPT Out; 1/2" FPT Suction
20	1	-	Tee, 1/2" ODS x 1/4" FPT
21	2	DE40BA208	Tee, 1/2" ODS x 1/4" ODS
22	6	-	Hex Bolt, 1/2-13 x 2-1/2"
23	6	-	Hex Nut, 1/2-13
24	1	-	37/64" Tap Drill
25	1	-	3/8" NPT Tap
26	1	PH23GH-017	Touch-up Paint

* Order Drier Housing, KH49EA-110, and 4 Drier Cartridges, KH29EZ-070, separately.



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19E Series and 19FA Machines

Materials Required

Drier Installation Package #2*	19EA660020
Drier Housing	KH49EA-110
Drier Cartridge (4 Req'd. per Change)	KH29EZ-070

* Parenthesized numbers in text refer to the components included in this package and itemized on page 9 of these instructions.

Drier Location

Locate the drier in a wooden cradle on the floor near the utility vessel (19E Series) or the cooler (19FA).

Connections

19E Series. Many machines have a liquid drain valve on the bottom of the utility vessel which can be used for a liquid pick-up. On machines shipped before the liquid drain valve was added, a tee can be installed in the bypass line between the float ball chamber and the economizer. Machines shipped after August 1975 have neither the bypass line or the liquid valve in the economizer, so take liquid from the 1/2" coupling at the bottom of the low side float chamber nearest to the cover. Do not pipe from the new liquid valve near the bottom isolation valve, since the liquid valve is downstream of the low side float valve.

19FA: Take the liquid supply from the 1/2" coupling at the bottom of the low side float chamber near the cover. Return the liquid to the cooler through any convenient location. There are one-inch couplings on the bottom of the cooler at each end. Some vessels have extra couplings near the relief valves. If a new connection is made, enter the shell at the same elevation as the motor cooling refrigerant return to the cooler.

Piping Arrangement

Use Fig. 2 as a guide to arrange components on both 19E Series and 19FA machines. The connections apply only to the 19E Series.

Install the dry eyes (5) close to each other so they can be seen from the same angle. Leave the covers on when not viewing the dry eye.

The relief valve (8) is installed to prevent the dangerously high pressures that can occur if the drier shut-off valves are closed, and the liquid in the drier is not vented.



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Unishell Size	Centerline of Unishell* to Centerline of Top Cooler Tubes (inches)	Centerline of Top Cooler Tubes to Bottom Edge of Tube Sheet Which Rests on the Shipping Rail	
		19EA (in.)	19EB (in.)
41	10.500	11	18.26
42	10.500	11	18.26
43	11	12.750	20.198
45	11	12.750	20.198
46	12.125	11.625	18.995
47	11.375	12.375	19.745
51	14	11.500	18.983
52	13.250	12.250	19.688
53	13.250	12.250	19.688
55	14.750	13	20.373
57	14	13.750	21.123
59	14.375	14.375	21.865

* Usually, there are two prick punch marks at the centerline of the unishell, right next to the tube sheet.

Table 5. 19E Series Shell Thicknesses

<u>Unishell Size</u>	<u>Cooler (in.)</u>	<u>Condenser (in.)</u>
41-47	.500	.500
51-57	.625	.625
59	.750	.750



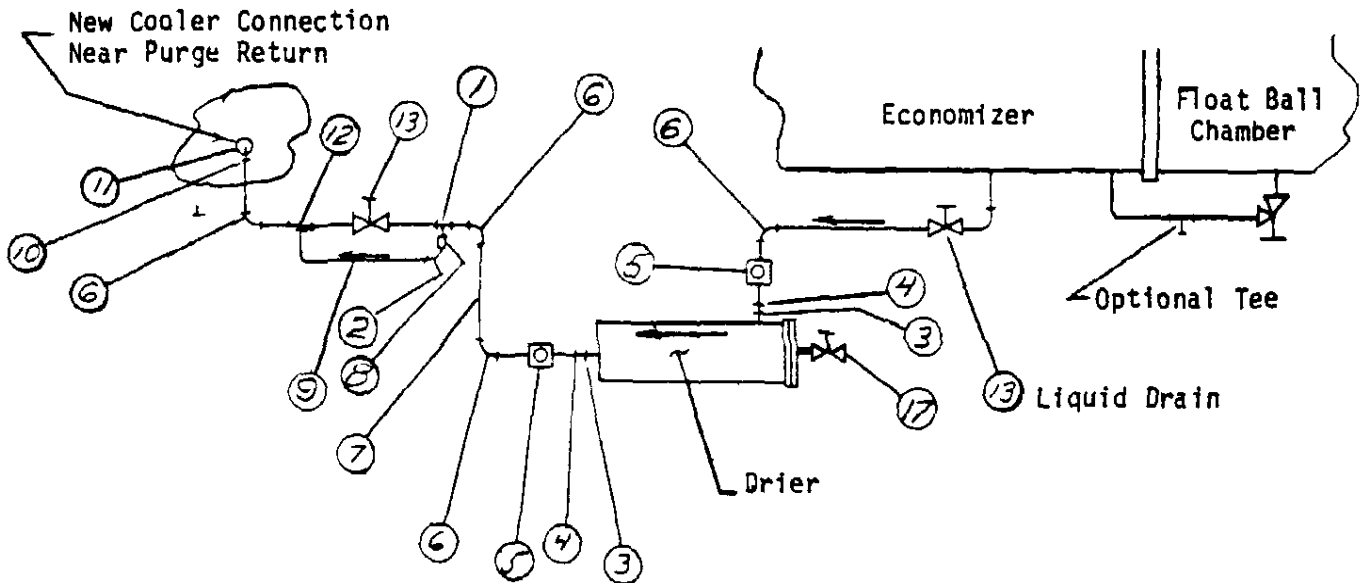
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Elevations Not to Scale

Fig. 2. 19E Series and 19FA Filter Drier System

Drier Installation Package #2, Part No. 19EA660020*
(For 19E Series and 19FA Machines)

Item	Quantity	Part No.	Description
1	1	-	Tee, 1/2" ODS x 1/4" FPT
2	1	DE16CA-051	90° Elbow, 1/4" MPT x 1/4" ODS
3	2	DE35BB-709	Bushing, 2-1/2" x 7/8" Male to Female
4	2	DE35BA-504	Bushing, 7/8" x 1/2" Male to Female
5	2	KM43AG-201	Dry Eye, 1/2" ODS Connections
6	4	DE138A-201	90° Elbow, 1/2" ODS x 1/2" ODS
7	25 ft	-	Copper Tubing, 1/2" OD
8	1	Circle Seal 559B-2MP-100	Relief Valve, 1/4" MPT In x 1/4" FPT Out
9	3 ft	-	Copper Tubing, 1/4" OD
10	1	DE17CB-203	90° Elbow, 3/8" FPT x 1/2" ODS
11	1	CE01CA-118	Black Pipe Nipple, 3/8" MPT x 3" Long
12	1	DE40BA-208	Tee, 1/2" ODS x 1/4" ODS
13	3	EP10BA-181	Hand Valve, 1/2" ODS
14	1	-	37/64" Tap Drill
15	1	-	3/8" NPT Tap
16	1	PH23GH-017	Touch-up Paint
17	1	Superior 600-A-4C	1/4" MPT Angle Valve

*Order Drier Housing, KH49EA-110, and 4 Drier Cartridges, KH29EZ-070, separately.



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Removing Rust Particles from 19 Series Machines

When corrosion in a centrifugal chiller causes a rust particle problem, a second liquid pick-up can be added to the filter drier arrangement shown in Fig. 1. The high-to-low side filter drier system shown in Fig. 2 is not adaptable for removing rust particles. The rust removal pick-up (Fig. 3, Valve 2) is located about 1/3 up from bottom of operating level. The top cooler connection (Valve 1) is used only to remove moisture or acid from the refrigerant (see Fig. 1).

The recommended filter drier normally uses four cartridges. When cleaning a system containing large amounts of rust particles, install one cartridge and hold it in place with a stick, leaving a large cavity on the entering side of the drier housing for accumulating large amounts of corrosion products.

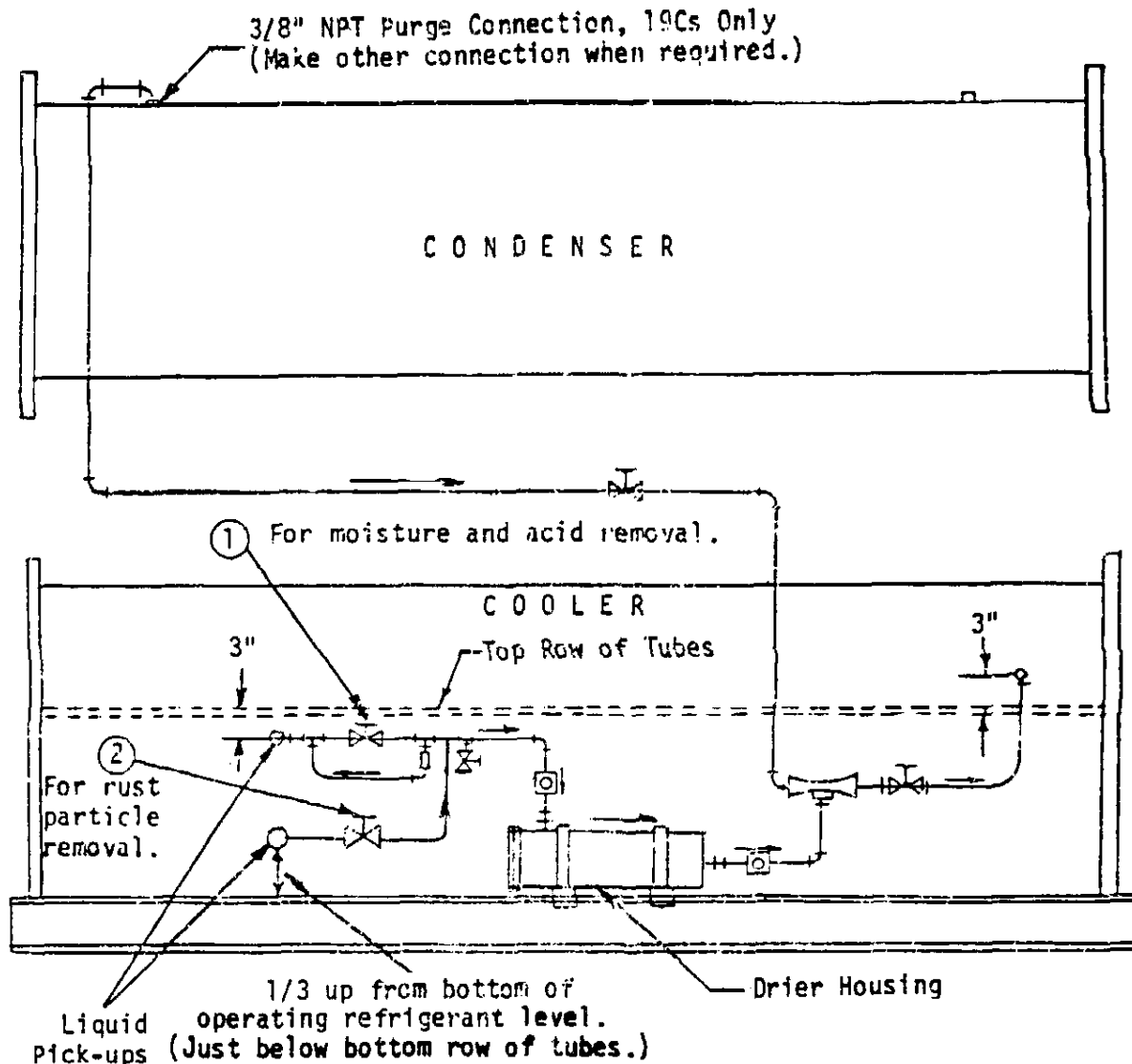


Fig. 3. 19 Series Filter Drier Arrangement for Rust Removal