Installation Guide

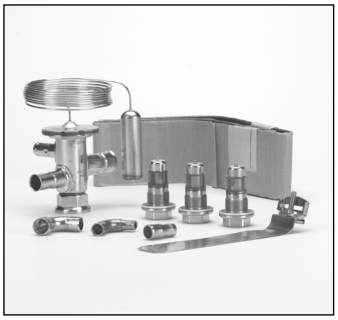
Service on ice machines with R404A
Type TU service kit

068R9559

068R9559

Danfoss TU thermostatic expansion valves are the market leading solution for ice machines based on:

- **Bimetal connections that enable faster installation with no wet wrap.**
- **Precision port design that affords a quick pull down after harvest cycle.**
- **Optimized bulb charges that ensure stable performance throughout the cycle.**
- **Stainless steel design and laser welding for the longest lasting valve in the industry.**



Service kit

These kits are designed with the contractor in mind, to help save time and money by providing a universal valve that can easily be adapted to replace any OEM specific thermostatic expansion valve. This kit includes an exchangeable orifice valve and a selection of orifice sizes covering ice machines ranging from 75-2300 pounds of output.

Selection:

- Determine the type of machine (cube, flake, or nugget), output of the machine in pounds of ice per 24 hours, and the number of expansion devices installed.
- Divide the output in pounds of ice by the number of expansion valves (e.g. A 500 pound machine with one expansion valve would be 500 pounds of ice per valve. A 1600 pound machine with two valves would be 800 pounds per valve).
- Use the appropriate selection table below to determine the correct orifice size for the ice output per expansion valve.

Straightway to angleway

Small kit (code no. 068U4900)

Cuber	Flaker/Nugget	
Nameplate lbs./24 hrs per valve	Nameplate lbs./24 hrs per valve	Estimated Orifice Size
75 to 150lbs.	75 to 200 lbs.	1
151 to 350lbs.	201 to 500 lbs.	3
351 to 600 lbs.	501 to 950 lbs.	5

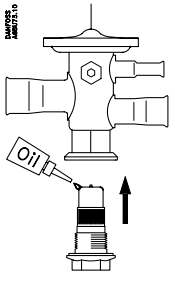
Large kit (code no. 068U4901)

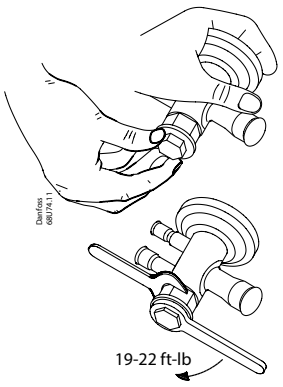
Cuber	Flaker/Nugget	
Nameplate lbs./24 hrs per valve	Nameplate lbs./24 hrs per valve	Estimated Orifice Size
351 to 600 lbs.	501 to 950 lbs.	5
601 to 1200lbs.	951 to 1650 lbs.	7
1201 to 1800lbs.	1651 to 2300 lbs.	8

Note: Only OEM specific parts will achieve exact performance promised by the OEM. This kit and selection guide enable a faster solution to replacing an ice machine TXV with nearly the same ice capacity.

Assemble Valve with Orifice

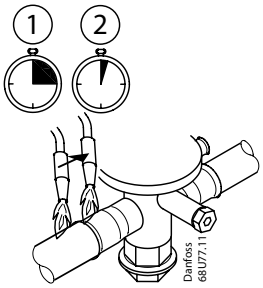
- Place one drop of refrigerant oil on the top part of the orifice . (see drawing).
- Verify that the metal gasket is seated on the base of the orifice.
- Torque the assembly to 19-22 ft-lb.
- Anytime an orifice is removed, the metal gasket should be replaced to ensure a tight seal.

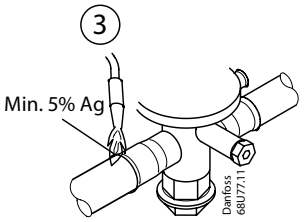




Sweat Connections

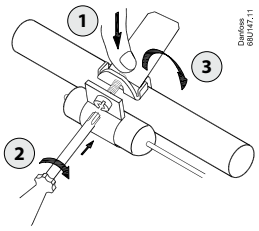
- Cut back Cu tubes as needed to fit the new valve.
- Add elbow and/or reducer as needed.
- Clean and insert copper tubing into appropriate connection on valve.
- Direct torch at copper tubing until it turns red. (1)
- Briefly direct torch on valve connection. (2)
- Apply brazing alloy until it flows. Do not try to fill the ridge - attempts to do so may clog the connector. (3)
- Sweat connections using any common brazing alloy (min. 5 silver).
- As internal connector surface is copper, connections are copper to copper, end there is no need for use of high silver content solder.

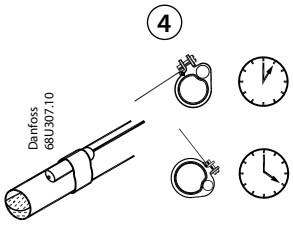




Installation of bulb:

- Secure sensing bulb with enclosed bulb strap to suction line in the same location as the prior bulb. Bulb should be located between 1:00 and 4:00 on the tube, and the strap should be tight enough that no bulb movement is possible. (4)
- Wrap insulation tape beginning one inch before the bulb and overlapping each wrap, finishing one inch beyond the bulb on the other end.
- Use remaining insulation tape (~6") on the outlet connection of the expansion valve and valve body.





Start up and performance measurements:

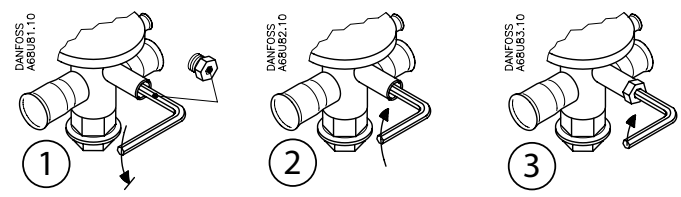
After the new valve is installed and the machine is back in operation, it is important to verify appropriate superheat performance. Cube ice machines typically start cycles with high superheat, which decreases as a harvest cycle approaches.

A properly sized and adjusted valve will assure adequate capacity during all phases of the freeze cycle and positive superheat through the cycle. As the valve nears the end of the freeze cycle it is imperative that you accurately measure the evaporator superheat.

1) Inspect the ice for sufficient production.
2) Inspect the suction line just before the compressor for any frost that could indicate liquid flooding.
3) Measure superheat at the end of the freeze cycle.
4) If superheat is between 10 °F - 18 °F, ice is forming appropriately, and there is no sign of liquid flooding, the installation is complete.
5) If superheat is below 10 °F - increase SH.
6) If superheat is above 18 °F - decrease SH.
7) If after adjusting superheat you still see too low superheat or liquid flooding, please install the next smaller orifice and repeat this process.
8) If after adjusting superheat you still see too high superheat or insufficient ice formation, please install the next larger orifice and repeat this process.

If superheat adjustment is necessary

- Remove the cap with a 5/32 in. Allen wrench.
- Make superheat adjustments 1/4 turn at a time (1/4 turn≈1°F).
- Turning clockwise increases superheat.
- Turning counter-clockwise decreases superheat.
- Reinstall the cap.



Scan code for more information

ENGINEERING
TOMORROW

Installation guide

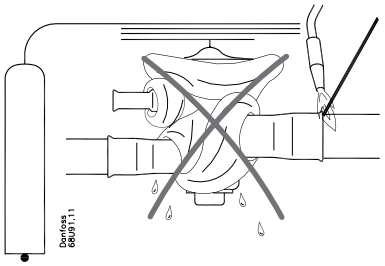
Thermostatic expansion valve

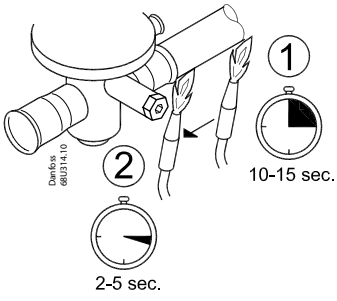
Type TCBE / TCCE /TCAE

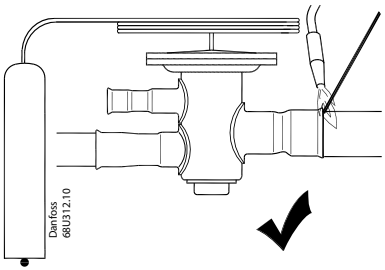
068R9552

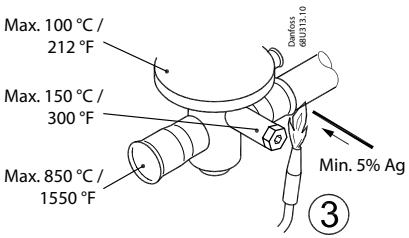
Standard refrigerants: See product label	**Max. working pressure:** PS / MWP: 45.5 bar / 660 psig	**Max. test pressure** P_{test} = 45.5 bar / 660 psig

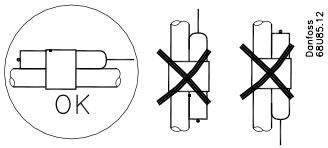
068R9552

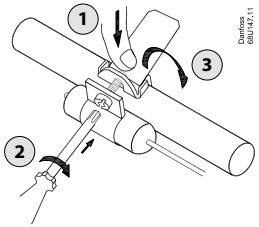


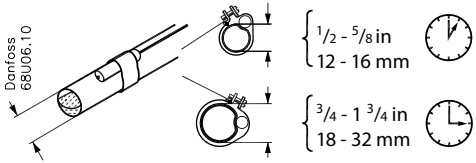


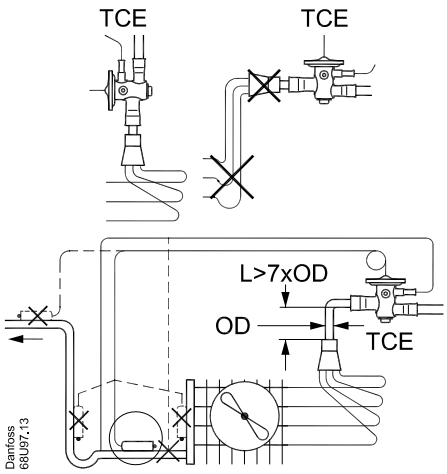


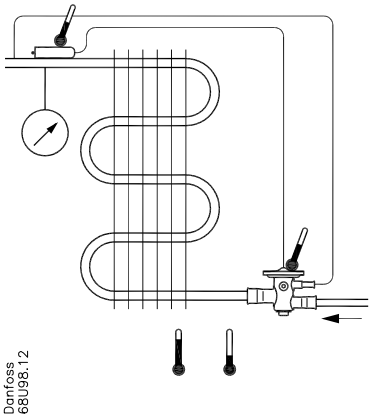






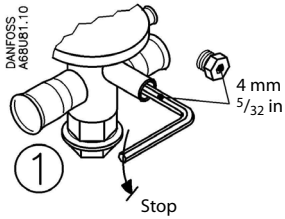


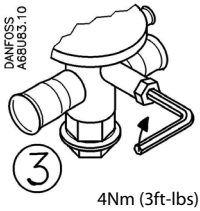




SS = Static Superheat

N, B: 4 °C / 7 °F
N_{MOP}, NM: 4 °C / 7 °F
B_{MOP}: 4 °C / 7 °F





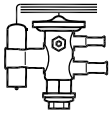
R22/R407C	R134a	R404A/R507	R410A	ΔSS 1 × + −	
-	N	-	-	1 °C	(1.8°F)
N	NM	N,B	N,B	1.5 °C	(2.7°F)
NM,B	-	NM	NM	2 °C	(3.6°F)

Temperature ranges:

N = -40 – 10 °C / -40 – 60 °F
NM = -40 – -5 °C / -40 – 25 °F
B = -60 – -25 °C / -75 – -15 °F

Installation Guide

Thermostatic expansion valves
Type TUA, TUAE and TCAE orifice



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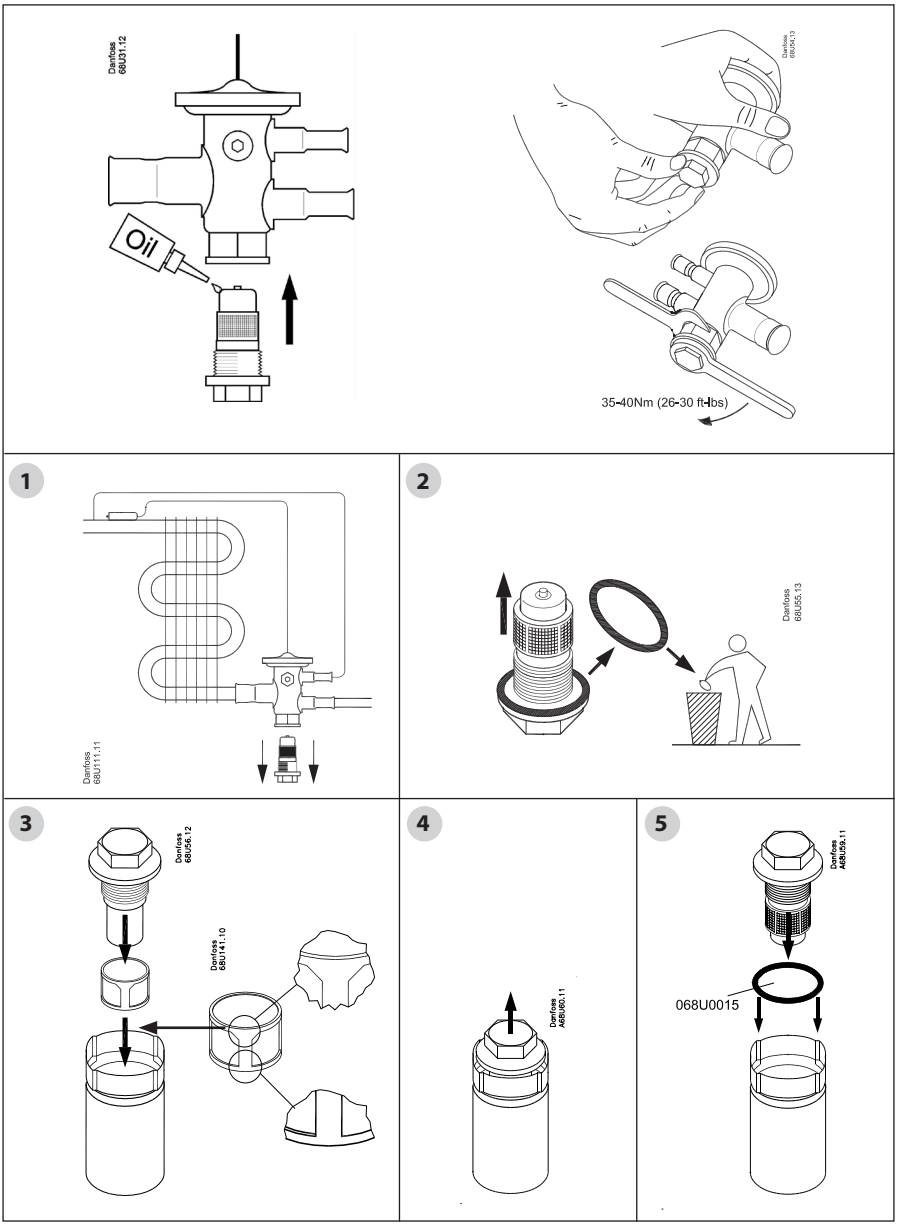

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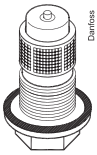
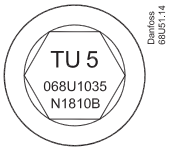
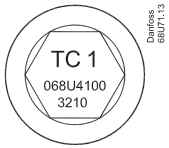


Example: TUA/TUAE



Example: TCAE



Range N: *-40 – +10 °C (-40 – +50 °F)*

Orifice no.	Rated capacity [kW]					Rated capacity [TR]					Code no.
	R22	R134a	R404A/ R507	R407C	R410A	R22	R134a	R404A/ R507	R407C	R410A	
TUA and TUAE											
0	0.60	0.47	0.47	0.63	-	0.17	0.13	0.13	0.18	-	**068U1030**
1	0.90	0.70	0.70	0.92	1.3	0.25	0.19	0.19	0.26	0.40	**068U1031**
2	1.3	1.0	1.0	1.4	2.1	0.36	0.28	0.28	0.38	0.60	**068U1032**
3	1.8	1.4	1.4	1.9	2.9	0.50	0.39	0.39	0.53	0.80	**068U1033**
4	2.6	2.1	2.1	2.8	4.5	0.75	0.59	0.60	0.80	1.3	**068U1034**
5	3.5	2.7	2.8	3.8	5.9	1.00	0.78	0.79	1.1	1.7	**068U1035**
6	5.3	4.1	4.2	5.7	9.0	1.5	1.2	1.2	1.6	2.5	**068U1036**
7	7.0	5.5	5.6	7.5	12.0	2.0	1.6	1.6	2.1	3.4	**068U1037**
8	11.0	8.2	8.4	11.0	18.0	3.0	2.3	2.4	3.2	5.0	**068U1038**
9	16.0	12.0	12.0	17.0	26.0	4.5	3.5	3.5	4.8	7.5	**068U1039**
TCAE											
1	17.5	12.0	13.5	19.0	23.0	5.0	3.5	3.8	5.4	6.5	**068U4100**
2	21.0	14.5	16.0	23.0	27.5	6.0	4.1	4.5	6.5	7.8	**068U4101**
3	26.5	18.0	20.0	28.5	34.0	7.5	5.2	5.7	8.1	9.8	**068U4102**

Range B: *-60 – -25 °C (-75 – -15 °F)*

Orifice no.	Rated capacity [kW]			Rated capacity [TR]			Code no.
	R22	R404A/ R507	R407C	R22	R404A/ R507	R407C	
TUA and TUAE							
0	0.52	0.36	0.46	0.15	0.10	0.13	**068U1030**
1	0.68	0.50	0.58	0.19	0.14	0.16	**068U1031**
2	0.85	0.64	0.70	0.24	0.18	0.20	**068U1032**
3	1.2	0.89	1.0	0.34	0.25	0.28	**068U1033**
4	1.8	1.3	1.4	0.50	0.37	0.41	**068U1034**
5	2.3	1.8	1.9	0.66	0.50	0.55	**068U1035**
6	3.5	2.7	2.9	1.0	0.75	0.82	**068U1036**
7	4.7	3.5	3.9	1.3	1.0	1.1	**068U1037**
8	7.1	5.3	5.8	2.0	1.5	1.6	**068U1038**
9	10.4	7.8	8.5	2.9	2.2	2.4	**068U1039**
TCAE							
1	12.5	10.9	10.3	3.6	2.7	3.1	**068U4100**
2	16.4	14.1	13.5	4.7	3.5	4.0	**068U4101**
3	21.6	19.4	18.0	6.1	4.6	5.5	**068U4102**

