



# Danfoss B3-030-30-3.0 Dual Circuit Condenser Installation Guide

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## Danfoss B3-030-30-3.0 Dual Circuit Condenser



## Product Information

### Specifications

- Product: Danfoss BPHEs/MPHEs
- Fluids Compatibility: Oils (synthetic or mineral), organic solvents, water (not seawater), brines (ethanol, ethylene glycol, propylene glycol or similar), refrigerants
- Installation: Vertical mounting
- Operating Pressure: Refer to product label
- Test Pressure: Refer to product label
- Volume: Refer to product label

### Product Usage Instructions

#### Installation

1. Store the BPHEs/MPHEs dry at ambient temperature.
2. Mount the BPHEs/MPHEs vertically as shown in the provided figures.
3. Connectors on the front side are named with Q, and on the rear side are named with H. Install connections according to the product drawing for diagonal flow products.

#### Safety Warnings

- Hot/Cold Surfaces: The BPHE/MPHE may have hot or cold surfaces that can cause skin burns. Provide facilities for dealing with accidental burns.
- Hot Water: Drain water from district heating or air conditioning systems before demounting due to high pressure and temperature.
- Transportation Damage: Inspect for damage before use to prevent operational issues.
- Water Quality: Follow Danfoss' water quality recommendations to prevent corrosion and leakage.

#### Mechanical Mounting

- Follow the provided guidelines for connecting pipes.
- Ensure proper backflow cleaning.
- Use the appropriate stud bolt size and tightening torque as per the table provided

#### FAQ

• **Q: What fluids are compatible with Danfoss BPHEs/MPHEs?**

A: Compatible fluids include oils (synthetic or mineral), organic solvents, water (not seawater), brines (ethanol, ethylene glycol, propylene glycol or similar), and refrigerants.

• **Q: How should I mount the BPHEs/MPHEs?**

A: Mount the BPHEs/MPHEs vertically as indicated in the provided figures. Connectors on the front side are named with Q, and on the rear side are named with H.

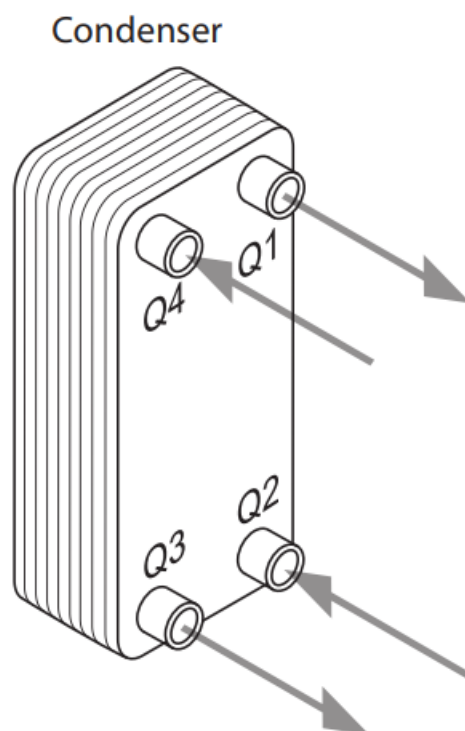
• **Q: What safety precautions should I take?**

A: Ensure facilities are in place to handle hot/cold surfaces to prevent skin burns. Drain water from systems before demounting and inspect for transportation damage before use.

## Installation guide

### Instructions

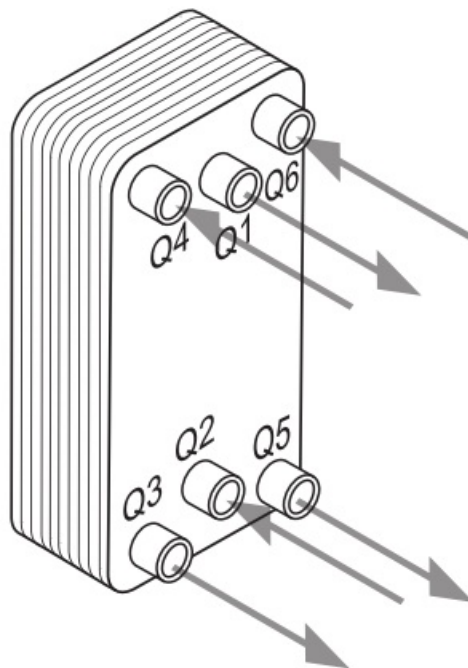
- General information – Brazed Plate Heat Exchangers (BPHEs) and Micro Plate Heat Exchangers (MPHEs) are available with different functions, pressure ratings and combinations of materials. The standard materials are stainless steel vacuum-brazed with pure copper or a nickel-based filler etc.
- The fluids that can be used with Danfoss BPHEs/MPHEs depend on the materials used in the heat exchangers. Typical fluids include oils (synthetic or mineral), organic solvents, water (not seawater), brines (ethanol, ethylene glycol, propylene glycol or similar) and refrigerants. Note that if ammonia is used the BPHE/MPHE must be brazed with a nickel-based filler.
- Store dry at ambient temperature. The performance of Danfoss BPHEs/MPHEs is affected by their installation, maintenance and operating conditions being in accordance with the manual. Danfoss cannot assume any liability for
- BPHEs/MPHEs that do not meet these criteria. Mount BPHEs/MPHEs vertically (see figs. left).
- Condensers – Suggest to Connect the refrigerant (gas) to the upper left connection, Q4 (Dual circuit: upper left, Q4, and upper right, Q6), and the condensate to the lower left connection, Q3 (Dual circuit: lower left, Q3, and lower right, Q5).



- Connect the water/brine circuit inlet to the lower right connection, Q2, and the outlet to the upper right connection, Q1 (Dual circuit: inlet lower middle, Q2, and outlet upper middle, Q1).
- Evaporators – Suggest to Connect the refrigerant (liquid) to the lower left connection Q3 (Dual circuit: lower left Q3 and lower right Q5) and the refrigerant (gas) outlet to the upper left connection Q4 (Dual circuit: upper left Q4 and upper right Q6). Connect the water/brine circuit inlet to the upper right connection, Q1, and the outlet to the lower right connection, Q2 (Dual circuit: inlet upper middle, Q1, and outlet lower middle, Q2).

- Note: Connectors on front side are named with Q, on the rear side are named with H. For diagonal flow product, please install the connection according to product drawing.
- Strainer – We recommend that a strainer (30 and above mesh is suggested) be installed before BPHE/MPHE water inlet connection.
- SAFETY NOTES – To avoid injury to persons and damage to the device, it is mandatory to read and observe these instructions carefully. Necessary assembly, start-up and maintenance work must be performed only by qualified and authorized personnel.
- The working temperature range:
- Ts min. -196 °C. Ts max. 200 °C
- The continuous operational temperature range in primary or secondary side should no greater than 80 °C.
- The maximum operating pressure of the BPHE/MPHE PS: See information on product label.
- The test pressure of the BPHE/MPHE TP: See information on product label.
- Volume V: See information on product label.
- This equipment must not be used outside these limits. Protection against exceeding the allowable limits, safety accessories, pressure limiting devices and temperature monitoring devices are not provided by Danfoss. The provision and calculation of this equipment is the responsibility of the user.

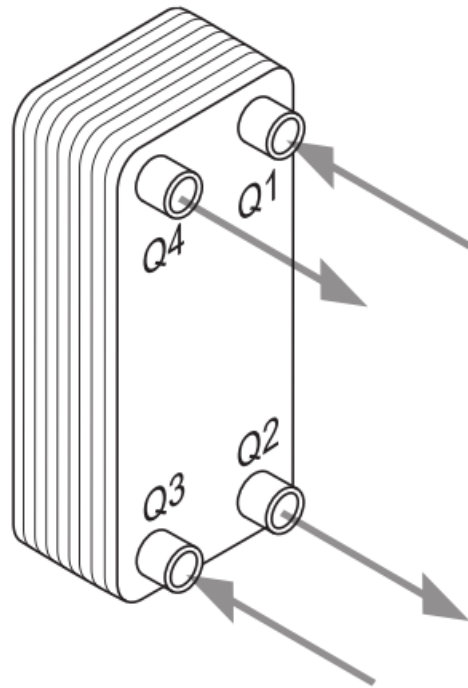
### Dual Circuit Condenser



- Warning: hot/cold surfaces
- The BPHE/MPHE may have hot or cold surfaces depending on the application where it is used. This may cause skin burns. The customer must provide and maintain facilities for dealing with accidental skin burns at the installation before it becomes operative.
- Warning: hot water
- The water in district heating or air conditioning systems may be very hot and under high pressure. Water must therefore be drained from the station before demounting.
- Warning: damage during transportation
- Before the BPHE/MPHE is taken into use, ensure that it has not been damaged (including deformation, surface contamination etc.) during transportation.
- Warning: Open water loop is forbidden.
- Water quality To avoid corrosion and leakage in copper-brazed units, observe Danfoss' recommendations for

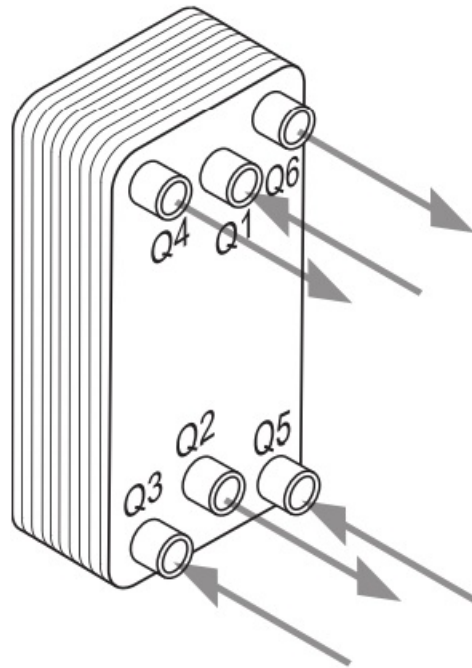
water quality in the “BPHE-MPHE Corrosion guidelines” at below.

### Evaporator



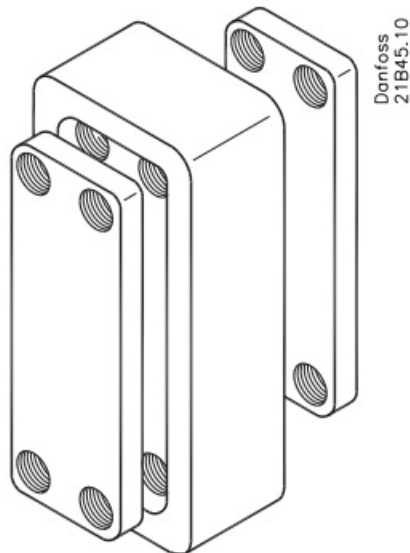
- Delivery – BPHEs/MPHEs may be delivered in any orientation. However, the recommended orientation is lying on the end plate. If delivered in bulk, they must be protected by inserting suitable material between them. BPHEs/MPHEs must not be transported or stored resting on their pipe connections.
- Warning: Sharp edges – BPHEs/MPHEs may have sharp edges.
- Handling and lifting – Don't use the connectors for the handling/lifting the exchanger. Larger BPHE/MPHE can be equipped with lifting rings. Eye bolts applied to the studs must be fully tightened to avoid bending the stud bolts. Warning:
- Keep safety distance when lifting.
- Mounting – Never expose the unit to pulsations or excessive cyclic pressure or temperature changes. It is also important that limit vibrations as much as possible by installing vibration absorbers. For large connection diameters, it is advisable to use an expanding device in the pipeline. A buffer between the BPHE/MPHE and the mounting clamp (e.g. a rubber mounting strip) is also recommended to prevent the water hammer.
- Start-up and shut-off – When the BPHE/MPHE is started up/shut off, the pressure must be increased/decreased slowly to avoid stress damage to the unit. Recommended to add pressure-relief valve.
- Additional load: This equipment has not been designed to withstand earthquakes, wind or force from mounting accessories. It is the responsibility of the user to protect the unit and reduce the risk of damage. Neither is the equipment designed to withstand, or protected against, fire. It is the responsibility of the user to protect the equipment.

## Dual Circuit Evaporator



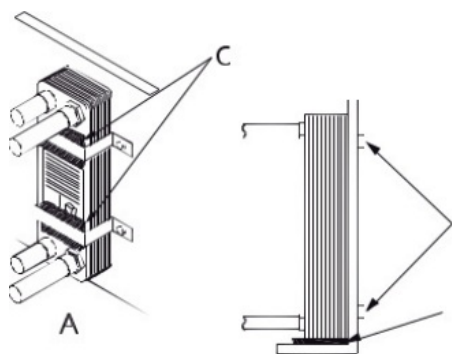
- Design conditions and approvals – The maximum working pressure (PS) and maximum/minimum working temperatures (TS) for BPHEs/MPHEs are specified on the product label. BPHEs/MPHEs have approvals in accordance with:
  - Europe: Pressure Equipment Directive (PED)
  - USA: Underwriters Laboratories (UL)

## Insulation

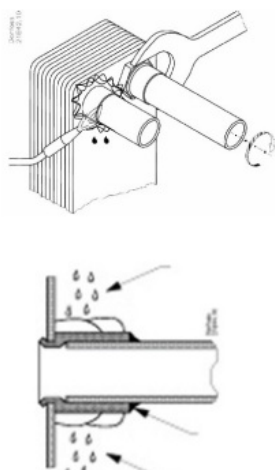


- Danfoss heat exchangers are designed for use with fluids in accordance with PED. If you have any questions about design conditions and approvals, please contact Danfoss.
- Insulation – It is recommended that the product be insulated during operation. Use insulation to create a vapor barrier and prevent heat losses.

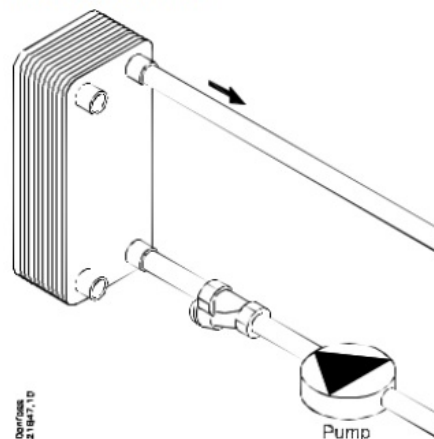
### Mechanical mounting



### Connecting pipes



### Back flow cleaning



Stud Bolt	M3	M4	M6	1/4"	M8	M10	M12
Tightening Mx Torque (Nm)	0.9	2.2	6	8	15	25	35

Size	1/2	3/4	1	1-1/4	1-1/2	2	2.5	3	4
Tightening Size Torque, (Nm)	35	115	155	265	350	600	1450	2460	4050

Suggested connection brazing procedure – Keep the surface dry and clean and apply flux evenly. Insert the copper pipe into the connection and braze using 45% or above silver brazing. Brazing temperature should be lower than 800°C. Take care to avoid directing the flame at the heat exchanger. Use a wet cloth or cooling water to protect the connection against overheating. Use nitrogen gas to protect the inside of the heat exchanger from oxidation. For bi-metal connector brazing, 5% silver content is recommended.

**Warning!** Danfoss does not take responsibility for mistakes or accidents that may occur as a result of incorrect soldering. Please note, overheating can cause the copper to fuse and thereby destroy the heat exchanger. Freezing protection – it is recommended to apply the following rules in order to avoid the risk of freezing:

- Use a strainer 30 mesh or above before the BPHE/MPHE water inlet pipe;
- Ensure constant water flow before/during/after compressor operation – Flow switch and freeze protection thermostat are recommended;
- Avoid water pump shut down during operation;
- Use brine (antifreeze) when the evaporation temperature is close to the freezing point of the secondary fluid;
- When in standstill and ambient temperature  $\leq 0^{\circ}\text{C}$  ( $32^{\circ}\text{F}$ ), the BPHE/MPHE must be protected by antifreeze and/or electric heater; or empty water completely in BPHE.



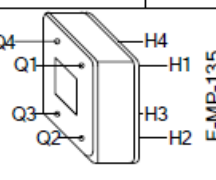
Expansion valves – The expansion device should be installed at a distance to the evaporator in a range of 10 to 30 times the inner diameter of the pipe; piping should be horizontal, without bends, expansion or reductions. Pipe diameter should have the same diameter as the connector; connector larger than pipe diameter must be avoided because risking of refrigerant mal-distribution.


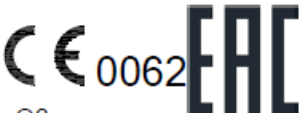
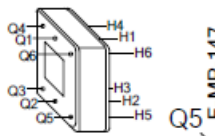
Maintenance – Back flow cleaning Use a strainer or filter. Use a 5% solution of a weak acid such as phosphoric or citric acid. Reverse the normal flow direction and increase the flow rate to 1.5 times normal. After cleaning it is recommended to rinse carefully the BPHE/MPHE with clean water; a solution of 1-2% sodium hydroxide (NaOH) or sodium bicarbonate ( $\text{NaHCO}_3$ ) before the last rinse ensures that all acid is neutralized. Hydraulic circuits are recommended to be equipped with connectors and valves dedicate to an easy maintenance.

Guarantee the strainer will be installed after maintenance!

All BPHEs/MPHEs carry a product label with all vital product information such as model, code number, technical data and date of manufacture. The label also contains relevant approval information such as the CE marking for PED-approved units. Arrows in the corners of the label point towards the locations of the connections, which are identified as Q1, Q2, Q3 or Q4.

For further technical information, please refer to your local Danfoss representative or [danfoss.com](http://danfoss.com)

<div style="text-align: center;">  <p>MADE IN CHINA</p> <p><b>Product name</b></p> <p><b>Model:</b></p> <p><b>Spec:</b></p> <p><b>Code No:</b></p> <p><b>Manufacturing Date:</b></p> <p>TS (°C): -196/+200</p> <p><b>Weight (kg):</b></p> <p>Plate,connector:Stainless Steel</p> <p>Solder:Copper/Nickel</p> </div>			
	PS(MPa) (bar)	TP(MPa) (bar)	V(L)
Q1H1-Q2H2	-0.1/x -1/y	a b	
Q3H3-Q4H4	-0.1/x -1/y	a b	
<div style="text-align: center;">   <p>Danfoss Ltd., 22 Wycombe End, HP9 1NB, GB</p> <p>Danfoss A/S 6430 Nordborg Denmark</p> </div>			

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	PS(MPa) (bar)	TP(MPa) (bar)	V(L)
Q1H1-Q2H2	-0.1/x -1/y	a b	
Q3H3-Q4H4	-0.1/x -1/y	a b	
Q5H5-Q6H6	-0.1/x -1/y	a b	
<div style="text-align: center;">   <p>Danfoss A/S 6430 Nordborg Denmark</p> </div>			

Content		Concentration mg/l or ppm	Material	
			AISI 316L	Copper
pH		<6	o	o
		6 – 7,5	o	o
		7,5 – 9	+	+
		>9	+	o
Alcalinity	HCO <sup>-</sup>	<70	+	o
		70 – 300	+	+
		>300	+	o
Sulphate	SO <sup>2-</sup>	<70	+	+
		70 – 300	+	–
		>300	+	–
		>1	+	+



Alcalinity/Sulphate	HCO <sup>-</sup> /SO <sup>2-</sup>	<1	+	–
Electrical conductivity	S/cm	<10	+	o
		10 – 500	+	+
		>500	+	o
Ammonium	NH	<2	+	+
		2 – 20	+	o
		>20	+	–
Free chlorine	Cl	<1	+	+
		1-5	–	o
		>5	–	–
Hydrogen sulfide	H S	<0,05	+	+
		>0,05	+	–
Free carbon dioxide (aggressive)	CO	<5	+	+
		5 – 20	+	o
		>20	+	–
Nitrate	NO <sup>-</sup>	<100	+	+
		>100	+	o
Iron	Fe	<0,2	+	+
		>0,2	+	o
Aluminium	Al	<0,2	+	+
		>0,2	+	o
Manganese	Mn	<0,1	+	+
		>0,1	+	o

Chloride content (Cl <sup>-</sup> )	Maximum temperature			
	60°C	80°C	120°C	130°C
≤ 10 ppm	AISI 304L	AISI 304L	AISI 304L	AISI 316L
≤ 25 ppm	AISI 304L	AISI 304L	AISI 316L	AISI 316L
≤ 50 ppm	AISI 304L	AISI 316L	AISI 316L	
≤ 80 ppm	AISI 316L	AISI 316L	AISI 316L	
≤ 150 ppm	AISI 316L	AISI 316L		
≤ 300 ppm	AISI 316L			

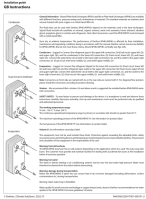
**Good resistance**

Corrosion may occur when more factors are “o”. Not recommended to use BPHE/MPHE

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Note: It is important to point out that this water speciŷcation is not a guarantee against corrosion, but must be considered as a tool to avoid the most critical water applications.

Documents / Resources



[Danfoss B3-030-30-3.0 Dual Circuit Condenser](#) [pdf] Installation Guide  
B3-030-30-3.0, D62-E-60, B3-030-70 3.0, D62-E-80, D118E-80, D118E-50, B3-030-30-3.0 Dual Circuit Condenser, B3-030-30-3.0, Dual Circuit Condenser, Circuit Condenser, Condenser

References

-  [Engineering Tomorrow | Danfoss](#)
-  [Engineering Tomorrow | Danfoss](#)
- [User Manual](#)

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