

ENGINEERING
TOMORROW

Danfoss

Milk Cooling Tanks

Reduce everything but reliability

The dairy industry world has been through many changes with historically increasing operating costs and lower milk prices.

Danfoss is committed to its customers and their end-users with an optimal selection of scrolls or reciprocating compressors, Optyma™ standard or packaged condensing units for 800 to 10 000 liters-milk cooling tanks.

Up to

24%

energy savings with
Optyma™ Slim Pack



milkcooling.danfoss.com

OPTYMA™
DANFOSS CONDENSING UNITS

Milk Cooling Tanks

Reduce everything but reliability

The quality of milk for safe consumption requires limiting the growth of bacteria, cooling the raw milk immediately after milking and maintaining it at a temperature between 4 and 6°C throughout its production, storage and retail process.

The most common method used to cool milk is the use of direct expansion (DX) type bulk cooling tanks placed in milk

production centers. Other methods like immersion cooling and ice bank tanks are also used¹.

Whatever the desired level of and technology solutions used by manufacturers of milk tanks ranging from direct expansion type, instant cooling to two-stage cooling process, Danfoss offers an optimal selection of scrolls or reciprocating compressors,

standard condensing units or packaged condensing units for 800 to 10 000 liters-milk cooling tanks with either reduced application, operating or servicing costs.

¹ For more information, sign up for a free e-lesson on learning.danfoss.com

Compressors

A wide range of efficient technologies for the dairy industry guarantees long lifetime and low installation and running costs

Danfoss Scroll compressors MLZ

MLZ scroll compressors are dedicated to commercial and light commercial refrigeration applications with refrigerants R134a, R404A / R507A, R407A/F. Both brazed and rotolock connections are available for most of the compressors.

- Compact design especially for large capacities frees up space in the systems
- Energy efficient by design with optimized motor and scroll wrap for refrigeration applications increases

overall efficiency of the milk tanks by cutting down electricity consumption

- Reliable track records guarantee milk preservation and reduce your maintenance and warranty costs
- Low decibels improve the working environment with the lowest sound level in the industry
- Compact footprint, up to 30% smaller than alternative, reduces the logistic costs and frees up space in the system





Danfoss Maneurop® Reciprocating Compressors MTZ

Maneurop® MT and MTZ series compressors are of the hermetic reciprocating type and are designed for medium and high evaporating temperature applications.

Available in a large variety of single and tandem models for refrigerants R404A, R134a, R407A / F, the compressors operate under extreme conditions with reliability and a long lifetime expectancy.

Danfoss Inverter Maneurop® - VTZ

VTZ are reciprocating inverter compressors with cooling capacity from 3 to 48 kW and with multi-refrigerant capability for R404A, R407C and R134a. They prevent you from designing oversized and short cycling systems by automatically adapting to the current

load in your commercial cooling systems. Using an innovative and intelligent compressor package that utilizes variable speed technology ensures superior efficiency across the entire operating range.



Ready for F-Gas and Ecodesign

Danfoss compressors and condensing units already operate with R134a, R407A/F refrigerants. Further qualifications with new alternative refrigerants are in progress. For more information contact Danfoss.

The Ecodesign certification is applicable to condensing units. The expected energy efficiency level depends on the cooling capacity of the unit.

Both Optyma™ and Optyma™ **Slim Pack** ranges already fulfil the requirements of the ErP related to fan motors and will comply with the Ecodesign target by July 1st, 2016.

¹ For VTZ and R407A/F, contact Danfoss



For more information about compressors and other components, use Coolselector coolselector.danfoss.com

Condensing units

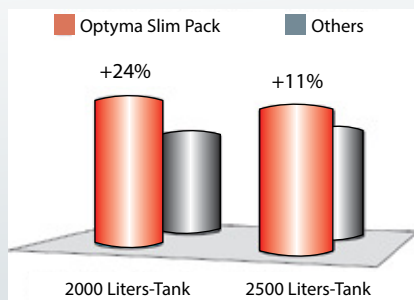
Reliability, efficiency and compactness will make the Danfoss Optyma™ **Slim Pack** condensing unit a perfect cooling solution in milk tanks.



Energy efficient and cost effective solution

Up to 24% energy savings:

- Thanks to smart Danfoss design and components, the Optyma™ **Slim Pack** condensing units are highly energy efficient.
- COP is up to 24% higher than standard offerings available on the market.

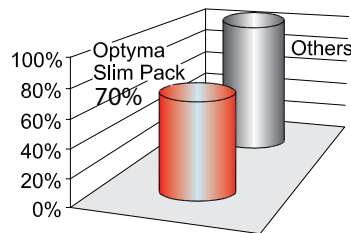


COP comparison between Optyma™ **Slim Pack** and equivalent model

Up to 35% cost savings on refrigerant

- Optyma™ **Slim Pack** units utilize highly efficient micro channel heat exchangers to help to reduce refrigerant charge by up to 35% compared to standard condensers.

- Micro channel saves on installation cost, is environmentally friendly and resists corrosion far better than conventional condensers ensuring long lasting reliability.
- Danfoss scroll technology guarantees vibration free, quiet operation.

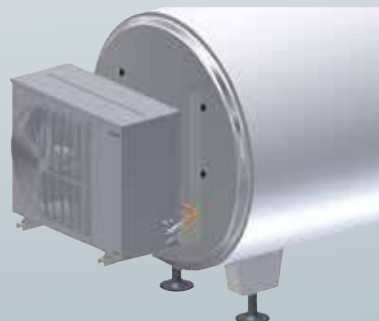


Refrigerant charge comparison between Optyma™ **Slim Pack** and equivalent model



Dimensions the perfect match

- Optyma™ **Slim Pack** has been designed to perfectly match a milk tanks' size, enabling transportation of the entire system from the factory to the end user without additional cost.



High reliability and customers satisfaction

The challenge with milk is to lower its temperature from 35°C to 4°C in just a few hours. Quick pull down is essential to ensure 100% quality without product loss.

Whether working indoors or outdoors, Danfoss Optyma™ **Slim Pack** condensing units fulfill the requirements of milk production and collection frequency in several ways:

- The Optyma™ **Slim Pack** condensing unit has been developed to meet the European Norm for Food Processing Machinery EN13732 (Bulk Milk Coolers).
- Long term reliability and efficient operation are supported by the inclusion of the tried and tested Danfoss scroll compressor technology.
- All units are 100% factory tested to ensure safe factory assembly on to milk tanks, reduced leak risks and down time on site.
- Danfoss Micro channel heat exchangers and housing are corrosion resistant.
- The galvanized and painted housing has passed a 400 hour salt spray test to ensure a long lifetime in harsh environments.

A Danfoss optimized solution

The Optyma™ **Slim Pack** condensing unit is equipped with Danfoss components optimized to work together: compressor, controls, heat exchanger. A smart way to secure best performance and highest reliability.

The design makes the difference

A wide range of cooling capacities featured for milk cooling tanks from 800 to 10 000 liters, 2 and 4 milking coolers.

1. Heat exchanger and housing resistance to corrosion prolongs the lifetime of the unit

2. Micro channel heat exchanger enhances unit performance and saves on energy

3. Accessible fan and condenser for easy maintenance

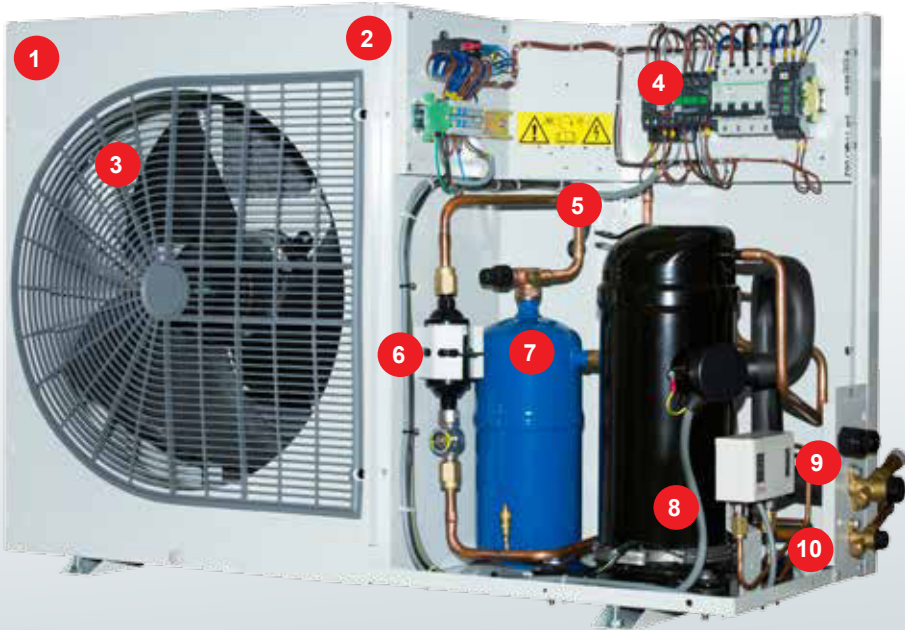
4. Accessible pre-wired electrical junction panel enables easy servicing
5. PED approved KP17WB dual pressure switch for protection against excessive high and low pressures

6. Filter drier and sight glass protect from moisture, acids and solid particles

7. Receiver with shut off valve makes servicing easier

8. Crankcase heater protects compressor when operating during cold weather conditions
9. Quick connections accelerate installation: just mount, braze and plug.

10. Accessible service ports on service valves (suction and liquid)



Models available with scroll and reciprocating compressors

Chemicals commonly found in farms and interaction with components of Micro Channel Heat Exchanger

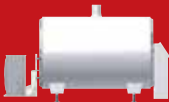
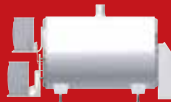
Chemicals	Behaviour with copper	Behaviour with aluminium
Sulfuric acid (H2SO4)	C	C
Sodium hypochlorite (NaClO)	C	B
Sodium hydroxide (NaOH)	B	C
Hydrogen sulfide (H2S)	D	B
Ammonium hydroxide (NH4OH)	D	B
Nitric acid (HNO3)	D	B

A	No reaction
B	Good resistance to corrosion
C	Slow corrosion
D	High corrosion

Make your choice!

Select the Optyma™ **Slim Pack** model which best fits your needs

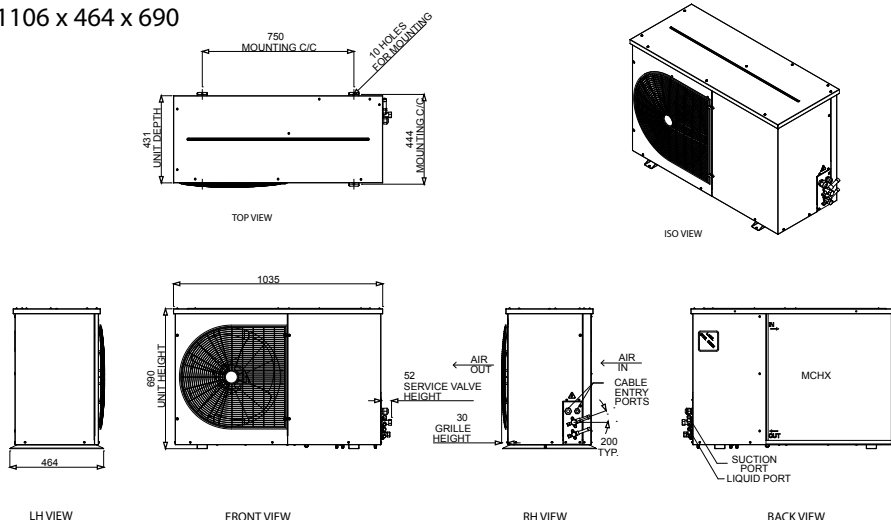
Unit	Code	Phases	HP	R404A Cooling capacity [W] at ambient 32 °C			Power consumption [W] at -5 °C evap. temp	COP at -5 °C evap. temp	Dimensions H x W x D [mm]	Net Weight [kg]
				-5 °C	0 °C	+5 °C				
OP-MSHM024	114X7097	1	1	2 550	3 100	3 700	1 150	2.22	695 x 1106 x 464	63
OP-MSHM026	114X7083	1	1	2 800	3 400	4 000	1 400	2.00		
	114X7093	3								
OP-MSHM034	114X7084	1	1.5	3 400	4 100	4 800	1 730	1.97		
	114X7094	3								
OP-MSUM034	114X7061	1	2	4 050	4 800	5 650	1 700	2.38		
	114X7062	3								
OP-MSUM046	114X7063	1	3	5 350	6 250	7 250	2 400	2.23		
	114X7064	3								
OP-MSUM057	114X7065	1	3.5	6 250	7 300	8 400	3 250	1.92		
	114X7066	3								
OP-MSUM068	114X7067	1	4	8 750	10 350	12 150	3 280	2.67		
	114X7068	3								
OP-MSUM080	114X7069	1	5	10 150	11 950	13 950	3 950	2.57		
	114X7070	3								
OP-MSUM093	114X7098	1	6	11 150	13 200	15 550	4 780	2.33	830 x 1106 x 464	87
OP-MSUM099	114X7071	3	6	11 750	13 800	16 050	5 000	2.35		
OP-MSUM108	114X7072	3	7	12 550	14 700	17 050	5 440	2.31		

Tank design in terms of milkings/day			Condensing unit model		
2	3	4	Configuration		Cooling capacity [W] Evaporating temperature -5°C at ambient 32°C R404A
			with 1 unit 	with 2 units 	
400 L	600 L	800 L	OP-MSHM024		2 550
450 L	700 L	900 L	OP-MSHM026		2 800
500 L - 600 L	750 L - 900 L	1000 L - 1100 L	OP-MSHM034		3 400
600 L - 700 L	900 L - 1000 L	1100 L - 1300 L	OP-MSUM034		4 050
				OP-MSHM024	5 100
800 L - 900 L	1200 L - 1400 L	1400 L - 1700 L	OP-MSUM046		5 350
				OP-MSHM026	5 600
900 L - 1100 L	1400 L - 1600 L	1800 L - 2000 L	OP-MSUM057		6 250
				OP-MSHM034	6 800
1200 L - 1500 L	1700 L - 2200 L	2400 L - 2800 L	OP-MSUM068		8 750
1600 L - 1800 L	2200 L - 2500 L	3000 L - 3400 L	OP-MSUM080		10 150
				OP-MSUM046	10 700
1800 L - 2100 L	2500 L - 2800 L	3400 L - 3800 L	OP-MSUM093		11 150
				OP-MSUM057	12 500
1900 L - 2200 L	2500 L - 2800 L	3400 L - 3800 L	OP-MSUM099		11 750
				OP-MSUM057	12 500
2300 L - 2600 L	2800 L - 3200 L	3800 L - 4000 L	OP-MSUM108		12 550

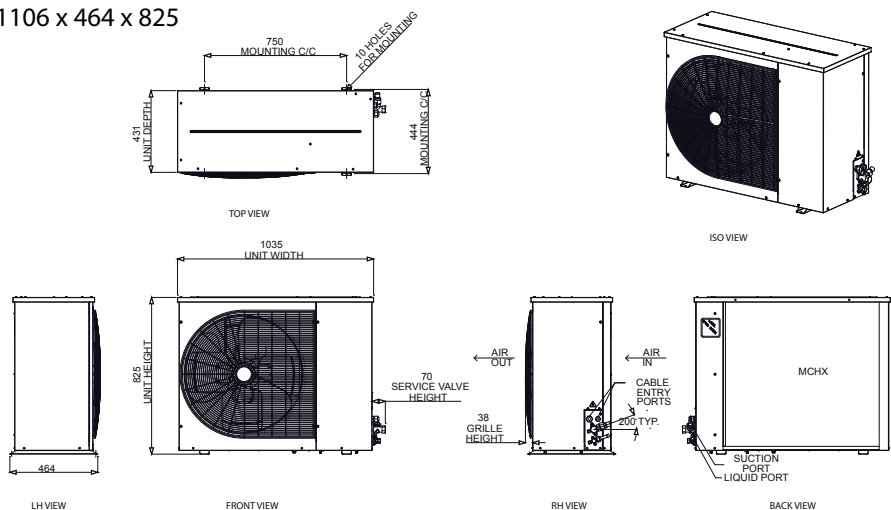
Make your choice!

Select the Optyma™ **Slim Pack** model which best fits your needs

Housing B2 - 1106 x 464 x 690



Housing B3 - 1106 x 464 x 825



Designation system for the Optyma™ Slim Pack range

(For additional program frequency etc., please contact your local wholesaler)

OP- MSUM034 ML W05 E

1 2 3 4 5 6 7 8

1	Application: M = MBP L = LBP	5	Displacement in cm ³
2	Condensing unit family: S = Optyma™ Slim Pack	6	Compressor platform
3	Refrigerant U = R134a/R404A/R507/R22/R407A/R407F H = R404A/R507 G = R134a	7	Version W05
4	Condenser type M = Standard with micro channel heat exchanger	8	Voltage code: G = 230 V / 1 ph compressor & fan E = 400 V / 3 ph compressor & 230 V / 1 ph fan



For more information about compressors and other components,
use Coolselector coolselector.danfoss.com

More questions?

Online Self-Service 24/7

- Solutions for milk cooling tanks: milkcooling.danfoss.com
- Product selection: coolselector.danfoss.com
- Literature about commercial compressors: cc.danfoss.com
- Learning platform: learning.danfoss.com
- About inverter technology: invertercompressor.danfoss.com



Commercial Compressors &
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