

KV series – Deep-freezing evaporating units



Vertical-mounted evaporating units designed for freezing tunnels, built in galvanised steel structure and bodywork with thermosetting polyester coating.

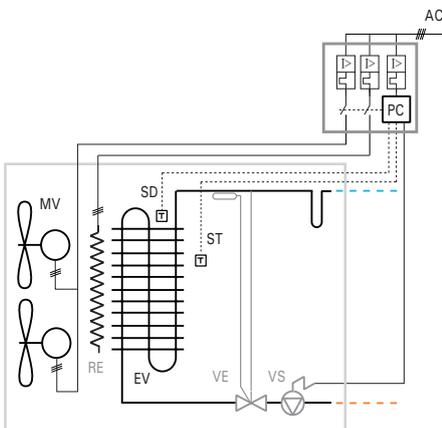
Features

- ▶ 400V 3N 50Hz power supply. Available in 60Hz. Other voltages on request.
- ▶ Air-cooled high efficiency coils, in copper pipes and aluminium fins, with 10 mm fin spacing.
- ▶ Double stainless steel draining pan with easy access.
- ▶ Solenoid valve in liquid line and thermostatic expansion valve as standard.
- ▶ Flexible draining pan heater cable.
- ▶ High-flow axial motor fans operating at 1300 rpm and available static pressure up to 100 Pa.
- ▶ Ready-to-solder refrigeration connections, with suction trap air oil trap as standard.
- ▶ Adjustable height in 3 different positions to adapt to several models of carts.

Options

- ▶ Electrical defrost heater inside the coil and over the drain pan.
- ▶ Electronic expansion valve.
- ▶ Control and power board with electronic microcontroller and digital display, with differential protection MCB switch for heaters and fans, relays for control, cold room and defrost temperature probes, and operation LEDs.
- ▶ Anti-corrosion coil coating.

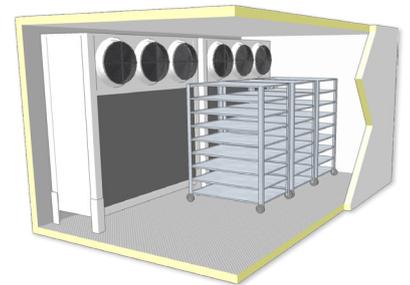
Refrigeration and electrical scheme



- MV: MOTOR FAN
- EV: EVAPORATOR
- AC: ELECTRICITY SUPPLY
- ST: THERMOSTAT PROBE
- SD: DEFROST PROBE
- PC: CONTROL PANEL (OPTIONAL)
- VS: SOLENOID VALVE (OPTIONAL)
- VE: EXPANSION VALVE (OPTIONAL)
- RE: DEFROST HEATER (OPTIONAL)

- ❄ High efficiency coils.
- ❄ Expansion and solenoid valves as standard.
- ❄ 100 % factory tested and adjusted units for the highest performance.
- ❄ Easy maintenance access and cleaning.
- ❄ Static available pressure: between 100 Pa.

Tunnel freezer



Electronic control panel

All equipment can be controlled by means of an advanced multi-function controller, consisting of an electronic board integrated in the electrical panel and digital control unit.



Electronic expansion valve

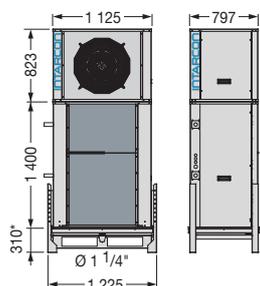
The evaporator units are optionally equipped with an electronic pulse expansion valve.

400V 3N 50Hz | Deep-freezing | R-449A

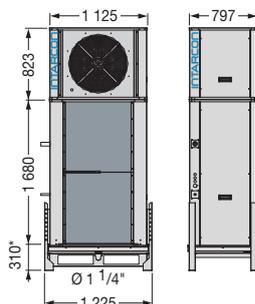
Refrigerant	Application	Cooling capacity (W) according to cold room temperature ⁽¹⁾			Coil			Fans				Electrical defrost		Liq-Gas Cooling Connection	Weight (kg)		
		Series / Model	SC3	SC4	SC5	Fin spacing (mm)	Area (m ²)	Vol. (litres)	Air flow (m ³ /h)	Nx Ø (mm)	Power (W)	I max. (A)	ASP (Pa) ⁽²⁾			Power (W)	Intensity (A)
			-18 °C 95 % RH DT1 = 7 K	-25 °C 95 % RH DT1 = 6 K	-34 °C 95 % RH DT1 = 6 K												
R-449A	Deep-freezing	UKV-NG-3 156	9 710	7 930	7 530	10	62	26	8 200	1x Ø 560	1.1	2.3	100	12x 700	12	1/2"-1 3/8"	193
		UKV-NG-4 163	12 790	10 440	9 920	10	75	31	12 400	1x Ø 630	2.0	3.4	100	15x 700	15	1/2"-1 5/8"	226
		UKV-NG-3 256	21 190	17 300	16 440	10	125	51	16 400	2x Ø 560	2.2	4.6	100	18x 800	21	5/8"-2 1/8"	293
		UKV-NG-4 263	28 300	23 100	21 950	10	150	61	24 800	2x Ø 630	4.1	6.8	100	24x 800	28	5/8"-2 1/8"	349
		UKV-NG-3 263	32 310	26 370	25 050	10	187	74	25 600	2x Ø 630	4.1	6.8	100	24x 1 000	35	7/8"-2 5/8"	435
		UKV-NG-4 363	42 140	34 400	32 680	10	223	88	37 200	3x Ø 630	6.1	10.2	100	30x 1 000	43	7/8"-2 5/8"	450
		UKV-NG-3 363	38 040	31 060	29 500	10	248	98	32 800	3x Ø 630	6.1	10.2	100	24x 1 250	43	7/8"-2 5/8"	571
		UKV-NG-4 463	50 010	40 820	38 780	10	298	117	49 600	4x Ø 630	8.2	13.6	100	30x 1 250	54	7/8"-2 5/8"	537

Dimensions

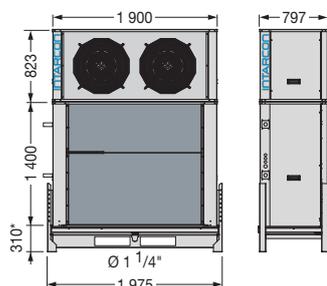
3 156 model



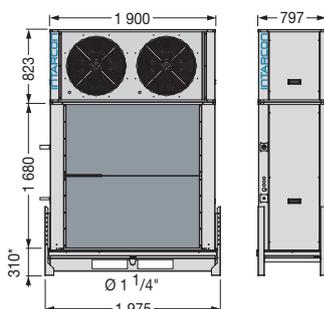
4 163 model



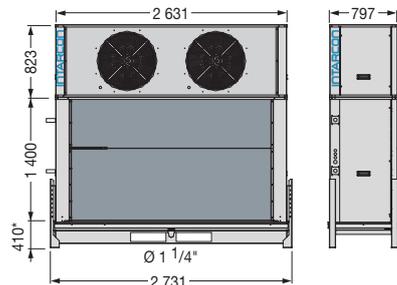
3 256 model



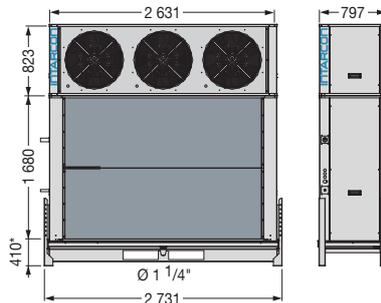
4 263 model



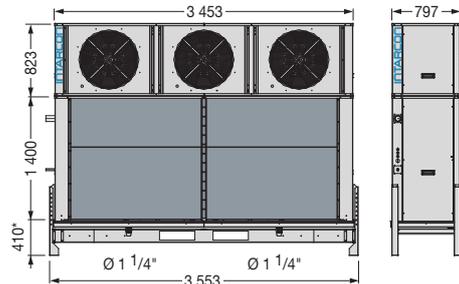
3 263 model



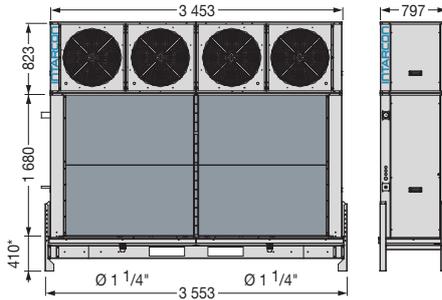
4 363 model



3 363 model



4 463 model



Dimensions in mm.

* Height adjustable with 3 support positions to adjust the height to the pallet or trolley.

The UKV series supports are configurable in 3 possible heights: 50, 100, 150 mm, in order to adapt to the different types of trolleys.

⁽¹⁾ Cooling capacity at room temperature and relative humidity, calculated from dry cooling capacity according to EN 328 standard, applying the following empirical factors:

Conditions	Reference	Rate
0 °C 85 % RH	EN 328 SC2	1.15
-18 °C 95 % RH	EN 328 SC3	1.05
-25 °C 95 % RH	EN 328 SC4	1.00
-34 °C 95 % RH	EN 328 SC5	0.95

To take into account the slip in R-449A, the average evaporating temperature has been considered.

⁽²⁾ Available static pressure.

Note for transport: The evaporator units of the UKV series are supplied in 2 packages, the fan train on one side and the coil on the other side.

Control and power panel

Microcontroller

Compact control board to control evaporating units up to 3600 W defrost power. Optional for JB, JD and JC series.

- ▶ Electronic microprocessor control unit with digital display, with three control relays for solenoid valve, defrost and fans.
- ▶ Configurable digital input.
- ▶ Compact surface mounting.
- ▶ Supplied with 5 m electrical interconnections and 3 m power supply cable.

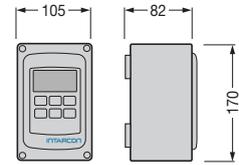
Features of the control panel

Control and power panel for evaporators in high, medium and low temperature applications, with electronic controller and digital display. Optional for JD (3 to 5), KD, KC, KH and KV series.

- ▶ White painted galvanised sheet steel cabinet with key.
- ▶ Electronic control microprocessor with digital display, with six control relays for solenoid, defrost, fans, light, alarm, and configurable auxiliary relay; temperature and defrost probes,
- ▶ General cut-off switch, differential switch, three-pole contactors and magnetothermic switches for heating elements and fans.
- ▶ Operation indicator lights.
- ▶ Connection terminal block.
- ▶ Independent control for 1 or 2 evaporator units.
- ▶ Electronics with LAN BUS communication for synchronisation of up to 8 devices (except ATM-N-01031 and MTM-N-01161).

Microcontroller dimensions

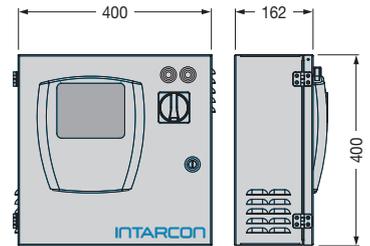
0 series



Dimensions in mm.

Control panel dimensions

1 series



Dimensions (mm)	A	B	C
size 1	400	162	400
size 2	600	162	400
size 3	650	162	550
size 4	650	162	750

Dimensions in mm.

Table of features for temperature control panel

	Model	Power supply	Max. defrost power (kW)	Max. defrost intensity (A)	Max. fans intensity (A)	VEE ⁽¹⁾	Application to evaporators	Control panel size ⁽²⁾
For temperature control 1 evaporating unit	ATM-N-01031	230V	ventilated	--	3	-	JB, JD, JC	0
	ATM-N-11031	230V	ventilated	--	3	•	KC, JD 3-5	1
	ATM-N-13101	400V 3N	ventilated	--	10	•	KD, KH, KV 31,41,32,42	1
	ATM-N-13161	400V 3N	ventilated	--	16	•	KV 43,33,44	1
	MTM-N-01161	230V	3,6	16	3	-	JB, JD 1-2, JC	0
	MTM-N-11161	230V	3,6	16	3	•	JB, JD 1-2, JC	1
	MTM-N-13161	400V 3N	10	16	10	•	JD 3-5, KD 12, KC, KH 11-21-12, KV 31	1
	MTM-N-13201	400V 3N	12	20	10	•	KH 22, KV 41	1
	MTM-N-13321	400V 3N	20	32	10	•	KD 22-33, KH 13-23-14, KV 3256	1
	MTM-N-13401	400V 3N	25	40	10	•	KV 3263-4263, KH 24	1
For temperature control 2 evaporating units	MTM-N-13641	400V 3N	2x 20	64	16	•	KV 43,33,44	2
	ATM-N-11122	230V	ventilated	--	2x 6	•	JB, JD, JC, KC, KD 12	1
	ATM-N-13202	400V 3N	ventilated	--	2x 10	•	KH, KV 31-41-32	2
	ATM-N-13322	400V 3N	ventilated	--	2x 16	•	KV 43-33-44	2
	MTM-N-11322	230V	2x 3,6	2x 16	2x 6	•	JB, JD 1-2, JC	2
	MTM-N-13322	400V 3N	2x 10	2x 16	2x 10	•	KC, JD 3-5, KD 12, KH 11-21-12, KV 31	3
	MTM-N-13402	400V 3N	2x 12	2x 20	2x 10	•	KH 22, KV 41	3
	MTM-N-13642	400V 3N	2x 20	2x 32	2x 10	•	KD 22-33, KH 13-23-14-24, KV 3256-4263	3
	MTM-N-13802	400V 3N	2x 25	2x 40	2x 16	•	KV 3263	3

Options

- ▶ Control panel available in 60Hz.

⁽¹⁾ Optional electronic expansion valve.

⁽²⁾ Optionals, such as electronic expansion valve, may modify the control panel size.

Temperature and humidity control panel (AHM models)

Cuadro de control y potencia para controlar temperatura y humedad, con controlador electrónico y display digital.

- ▶ White painted galvanised sheet steel cabinet with key.
- ▶ Electronic control microprocessor with digital display, with six control relays for solenoid, defrost, fans, light, alarm, and configurable auxiliary relay; temperature and defrost and humidity probes.
- ▶ General cut-off switch.
- ▶ Operation indicator lights.
- ▶ Connection terminal block.
- ▶ Configurable digital input.

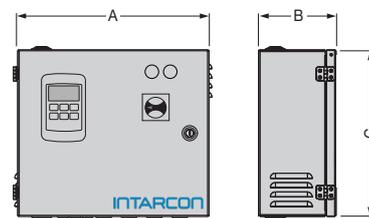
Features of humidity control panel (MHM models)

Control and power panel for evaporators in high, medium and low temperature applications, with electronic controller and digital display.

- ▶ White painted galvanised sheet steel cabinet with key.
- ▶ Electronic control microprocessor with digital display, with six control relays for solenoid, defrost, fans, light, alarm, and configurable auxiliary relay; temperature and defrost probes, and humidity
- ▶ General cut-off switch, differential switch, three-pole contactors and magnetothermic switches for heating elements and fans.
- ▶ Operation indicator lights.
- ▶ Connection terminal block.
- ▶ Configurable digital input and digital input for door microswitch.

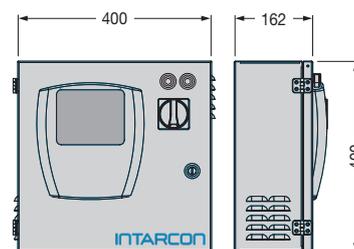
Control panel dimensions for AHM models

1 series



Control panel dimensions for MHM models

1 series



Dimensions (mm)	A	B	C
size 1	400	162	400
size 2	600	162	400
size 3	650	162	550
size 4	650	162	750

Dimensions in mm.

Table of features for para de humidity control panel

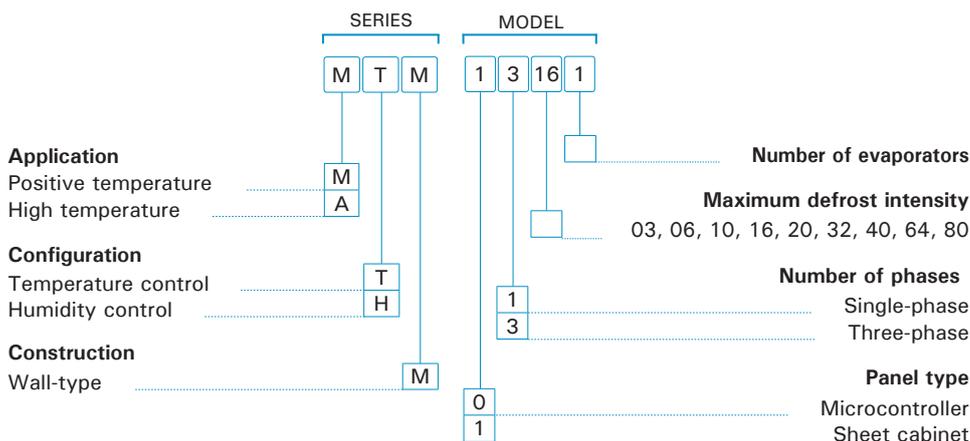
	Model	Power supply	Max. defrost power (kW)	Max. defrost intensity (A)	Max. fans intensity (A)	VEE ⁽¹⁾	Application to evaporators	Control panel size ⁽²⁾
For humidity control 1 evaporating unit	AHM-E-11031	230V	ventilated	--	3	•	JB, JD, JC, KC	1
	AHM-E-13101	400V 3N	ventilated	--	10	•	KD, KH, KV 31,41,32,42	1
	MHM-N-11161	230V	3,6	16	3	•	JB, JD 1-2, JC	1
	MHM-N-13161	400V 3N	10	16	10	•	JD 3-5, KD 12, KC, KH 11-21-12, KV 31	1
	MHM-N-13201	400V 3N	12	20	10	•	KH 22, KV 41	1
	MHM-N-13321	400V 3N	20	32	10	•	KD 22-33, KH 13-23-14, KV 3256	1
	MHM-N-13401	400V 3N	25	40	10	•	KV 3263-4263, KH 24	1

Options

- ▶ Control panel available in 60Hz.
- ▶ Control for heating resistances, or dehumidification and heating, only HM models (3 kW, 9 kW, 12 kW, 18 kW, 24 kW and 30 kW).

⁽¹⁾ Optional electronic expansion valve.
⁽²⁾ Optionals, such as electronic expansion valve, may modify the control panel size.

Nomenclature of temperature and humidity control panels



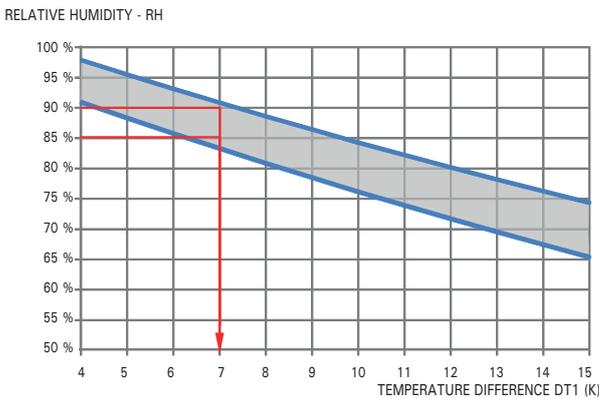
Method of calculation of evaporating units

Condiciones estándares de cálculo

Condition	Cool room temperature	Relative humidity	DT1	Superheating	Liquid temperature
SC1	10 °C	85 %	10 K	6,5 K	30 °C
SC2	0 °C	85 %	8 K	5,2 K	30 °C
SC3	-18 °C	95 %	7 K	4,5 K	20 °C
SC4	-25 °C	95 %	6 K	3,9 K	20 °C
SC5	-34 °C	95 %	6 K	3,9 K	20 °C

The cooling capacities have been calculated using standard conditions according to standard EN 328.

Choice of Temperature Difference (DT1)



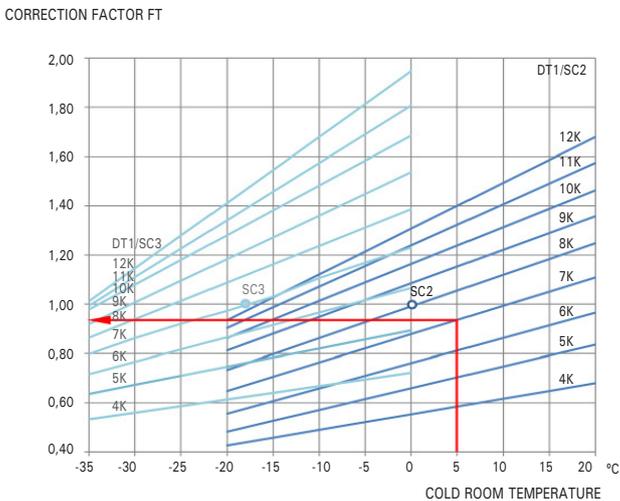
The Temperature Difference DT1 is defined as the difference between the temperature of the air entering the evaporator and the evaporating temperature of the refrigerant.

In positive temperature conservation cold rooms, the Temperature Difference in the evaporator has a great influence on the degree of humidity in the environment, in addition to other factors such as the design of the cold room, the rate of ventilation and the transpiration of the stored product.

In negative temperature cold rooms, the DT1 has little influence on the relative humidity, while an excessive DT1 will imply a lower evaporation temperature and lower performance of the compressors.

The attached graphic will allow you to choose the most suitable DT1 for sizing of the evaporator. Depending on the desired relative humidity, we look for the intersection point with the curve, obtaining the value of the new thermal jump:

Correction factor for calculation condition (FT)



To obtain the cooling capacity at another cold rooms temperatures and thermal jump, you must use the correction factor FT.

The attached graph will allow you to obtain, based on the ambient temperature and the Temperature Difference DT1, said factor, taking as reference the standard power level SC2 or SC3:

Calculation example: it is desirable to store vegetables at temperature of 5 °C and relative humidity between 85 and 90 %, with estimated refrigeration needs of 38 kW and using refrigerant R-449A in direct expansion.

To obtain the degree of relative humidity, we choose a Temperature Difference 7 K the cold room, and we can see that this calculation condition corresponds to a correction factor FT = 0.94.

We can calculate the corrected cooling capacity:

We choose the evaporating unit MKH-NG-2350 with a cooling capacity SC2 = 45.2 kW

$$Q_c = \frac{38 \text{ kW}}{0,94} = 40,42 \text{ kW}$$

Evaporator selection

To select an evaporator, you must calculate the corrected refrigeration capacity using the following formula:

$$Q_c = \frac{Q_o}{FT}$$

Online selection and calculation of evaporators with the Calcooling software

The cooling calculator includes an advanced calculation method for refrigeration systems, based on calculation rules suggested by ASHRAE, refrigerant properties by REFPROP from the NIST and updated thermodynamic correlations for the calculation of heat transfer coefficient.



<https://intarcon.calcooling.com/>