Operation and Maintenance

ThermoCooler HP 100-1280

Order number:

Project:

PRODUKT

Translation of the original instructions

Table of Contents

1 Safety precautions

Follow all safety precautions in this document and pay attention to all warning signs on the air handling unit.

Failure to comply with the safety precautions may result in injury to persons or damage to air handling units.

1.1 Personal protective equipment

Personal protective equipment must always be used based on the risks present at the workplace. Comply with national and local laws and regulations.

The following personal protective equipment is recommended where the work requires:

- Protective shoes with steel cap
- Hearing protectors
- Safety helmet
- Gloves
- Goggles
- Covering clothing
- Protective overalls
- Mouthguard/protective mask
- Fall protection

1.2 Prevent injury to personal and damage to air handling units

To avoid injury to persons or damage to air handling units, pay attention to the following:

- Read the entire document before working on the unit.
- Comply with national and local laws and regulations for work safety.
- Do not wear loose clothing or jewellery that may get fasten.
- Do not step or climb on the heater.
- Use recommended tools and equipment intended for the job.
- Use recommended personal protective equipment when the work requires it.
- Observe the unit's product signs, information and warning stickers.
- Keep the unit clean and follow operating and care instructions.
- Make sure that all hatches are in place, that inspection hatches are closed and that lockable inspection hatches are locked before starting the unit and after repairs/service.
- Use appropriate fall protection when working at heights - normally over 2 meters. Even work at lower heights may require protective measures.

Continuous product development may give rise to specification changes without notice.

1.3 Product signs, information and warning stickers

Keep signs and stickers free from soiling and replace them if they are lost, damaged or illegible. Contact IV Produkt for replacement stickers; specify the item number.

1.4 Safety message

The following warning symbols and signal words are used in this document to inform of risks.

DANGER!	**Danger - indicates an imminent dangerous situation which, if not avoided, can result in death or serious injury.**
WARNING!	**Warning - indicates a potentially dangerous situation which, if not avoided, can lead to serious injury.**
CAUTION!!	**Caution - indicates a less potentially dangerous situation which, if not avoided, can lead to less serious or minor injuries.**
NB!	**NB! - indicates a potentially hazardous situation which, if not avoided, may result in damage or impaired operation of the air handling unit.**

1.5 General safety messages

Comply with the following general safety messages.

Lockable safety switch

⚠	**DANGER!** **Risk of serious injury.** **Electrical power can cause electric shock, burns and death.** **Working on/servicing the unit – Shut down the unit via the service switch in the control equipment, then turn the safety switch to the 0 position and lock it.** **There may be several safety switches serving the different parts of the unit. All safety switches must be switched off before repairs/service.**

!	**NB!** **The safety switch is not designed for starting/stopping the unit. Always use the service switch in the control equipment to start and shut down the unit.**

Electrical connection

⚠	**DANGER!** **Risk of serious injury.** **Electrical power can cause electric shock, burns and death.** **Working on/servicing the unit – Shut down the unit via the service switch in the control equipment, then turn the safety switch to the 0 position and lock it.** **There may be several safety switches serving the different parts of the unit. All safety switches must be switched off before repairs/service.**

⚠	**WARNING!** **Risk of personal injury.** **Rotating fan impellers can cause crushing injuries or lacerations.** **The unit must not be energised until all ducts have been connected.**

!	**NB:** **Wiring of connections and other electrical work may only be carried out by a qualified electrician or by service personnel recommended by IV Produkt.**

Inspection doors

	**WARNING!** **Risk of personal injury.** **Overpressure in unit.** **Allow the pressure to drop before you open the inspection doors.**

	**WARNING!** **Risk of personal injury.** **The doors in front of moving parts shall normally be locked; there are no safety guards.** **During repairs/service, the inspection doors are locked with the supplied keys.** **Make sure that all doors are in place, that inspection doors are closed and that lockable inspection doors are locked before starting the unit and after repairs/service.**

Cooling/heating pump

	**WARNING!** **Risk of personal injury.** **Hot surfaces can cause burns.** **Working on/servicing the unit – Shut down the unit via the service switch in the control equipment, then turn the safety switch to the 0 position and lock it.** **There may be several safety switches serving the different parts of the unit. All safety switches must be switched off before repairs/service.** **Wait at least 30 minutes before opening the compressor inspection doors.**

Heating coil

	**WARNING!** **Risk of personal injury.** **Hot surfaces can cause burns.** **Working on/servicing the unit – Shut down the unit via the service switch in the control equipment, then turn the safety switch to the 0 position and lock it.** **There may be several safety switches serving the different parts of the unit. All safety switches must be switched off before repairs/service.** **Wait at least 5 minutes before opening the battery inspection doors.**

2 General

2.1 Intended use

The ThermoCooler HP cooling/heating pump is intended to be used to cool and heat supply air in properties. The reversible heat pump is designed to be installed together with IV Produkt AB air handling units.

The cooling/heating pump should not be used as a standalone unit.

When installed indoors, the unit must be installed in an area that maintains a temperature between +7 and +30°C, and with a moisture content of <3.5 g/kg in dry air in the winter. The unit can also be equipped for outdoor installation.

Any other use and installation in other environments are prohibited unless specifically permitted by IV Produkt AB.

It is not permitted to use the unit in potentially explosive environments, Eex.

2.2 Manufacturer

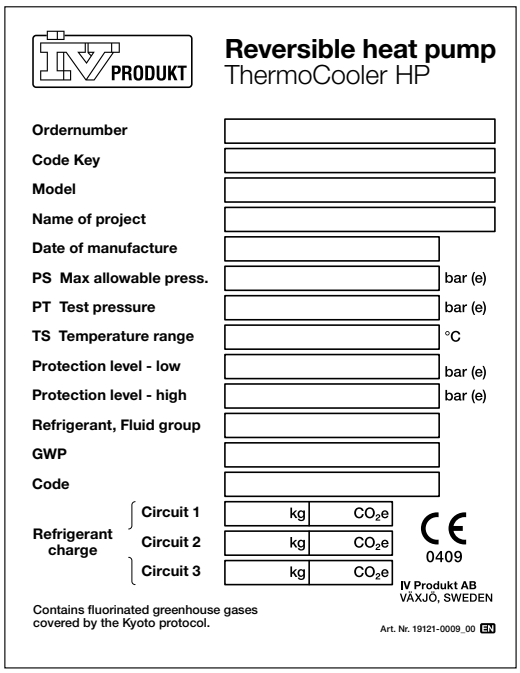
The ThermoCooler HP cooling/heating pump is manufactured by:

IV Produkt AB
Sjöuddevägen 7
S-350 43 VÄXJÖ

2.3 Designations

The reversible heat pump comes with a model rating plate placed on the front.

The model type plate shows the series number and the requisite designations to identify the unit.

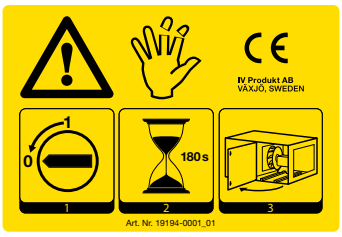


Typical model identification label

2.4 CE marking and EU Declaration of Conformity

The reversible heat pump is CE-marked, which means that upon delivery, it conforms to applicable provisions in EU Machinery Directive 2006/42/EC as well as to the EU Directives applicable to the type of unit, e.g. Pressure Equipment Directive.

As certification confirming that the requirements have been met, we provide an EU Declaration of Conformity, which is available under Documentation at ivprodukt.docfactory.com, or under Order Unique Documentation at docs.ivprodukt.com.



Typical CE label for air handling units

2.5 Maintenance

Regular maintenance of the reversible heat pump should be performed by a certified refrigeration technician.

2.6 Handling of refrigerant

The following information summarises the requirements and guidelines for handling the refrigerant used in cooling units. For further information, see the F-gas Regulations.

The unit is marked with the amount of refrigerant and carbon dioxide equivalent, alternatively refer to docs.ivprodukt.com (Technical data). The unit must be installed in accordance with applicable standards and standards.

Operator responsibilities

By operator, we refer to the European Parliament's definition: "...the natural or legal person exercising actual power over the technical functioning of the equipment and systems...".

Generally speaking, the unit operator must:

- Minimise and prevent leakage
- Take corrective action to remedy any leakage that arises
- Ensure that the service and repair of the refrigerant circuit is carried out by a certified refrigeration technician
- Ensure that refrigerant is handled in an environmentally secure manner and in accordance with national regulations.

Leakage inspection and registration

For sizes 190-1280

- **Leakage control** must be carried out by a certified refrigeration technician:
  – during installation/commissioning
  – periodically at least once per 12 months between inspections
  – within one month after any work is performed (for example tightening a leak or replacing components)
- The operator must **record** events, such as the volume and type of refrigerant topped up, refrigerant taken into possession, results of inspections and work done, person and company who carried out service and maintenance.

If a unit has been constructed on site, the rules for record-keeping,installation and periodic leakage control are applicable to sizes 100-150 as well.

2.7 Extended warranty

In cases in which the equipment delivered is covered by a 5-year warranty, in accordance with ABM 07 with appendix ABM-V 07 or in accordance with NL 17 with appendix VU20, the IV Produkt Service and Warranty Manual is supplied with the product.

In order to claim an extended warranty, a complete, documented and signed IV Produkt Service and Warranty Manual must be presented.

2.8 Spare parts

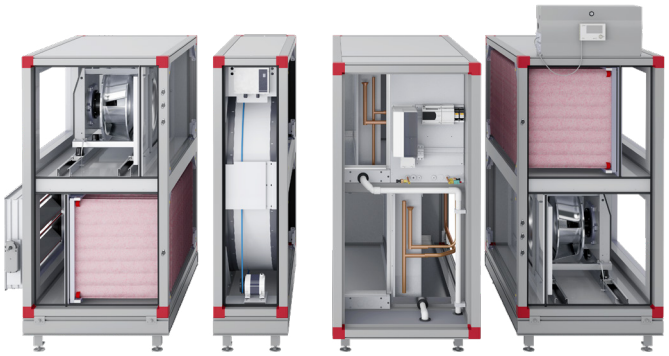
Spare parts and accessories for this unit can be ordered from IV Produkt's nearest sales office. When ordering, the order number and designation must be given. These are stated on a model type plate, affixed to each component. There is a separate spare parts list for the unit, refer to Order Unique Documentation at docs.ivprodukt.com.

2.9 Dismantling and decommissioning

When an air handling unit is to be dismantled, separate instructions must be followed, see Dismantling and decommissioning the AHU under Documentation at ivprodukt.docfactory.com.

3 Technical description

3.1 Cooling/heating pump ThermoCooler HP



Fan and filter section (extract air fan) *Rotor* *ThermoCooler HP cooling/heating pump* *Fan and filter section (supply air fan)*

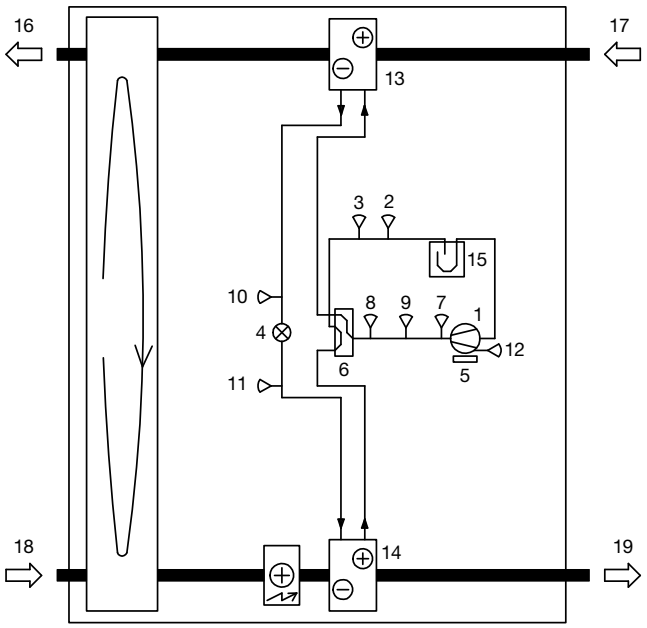
ThermoCooler HP is a series of integrated, speed controlled reversible heat pumps with stepless cooling and heating power.

Cooling circuit function

The reversible heat pump has four basic components. Supply air and exhaust air coil, expansion valve and compressor.

A 4-way valve is used to shift between cooling and heating.

For cooling, the 4-way valve is in cooling mode. The supply air coil will then serve as the evaporator (cooling coil) and the extract air coil will serve as the condenser (heating coil). When the 4-way valve is in heating mode, the extract air coil serves as the evaporator and the supply air coil serves as the condenser.



Flowchart for cooling mode, reversible heat pump (size 100-240)

1	Compressor
2	Suction gas sensor (temp after evaporator)
3	Pressure sensor, low pressure
4	Expansion valve
5	Frequency inverter
6	4-way valve
7	High pressure switch
8	Pressure sensor, high pressure
9	Temperature sensor, hot gas
10	Temperature sensor liquid line cooling
11	Temperature sensor liquid line heating
12	Temperature sensor sump
13	Extract air coil (condenser/evaporator)
14	Supply air coil (condenser/evaporator)
15	Suction gas separator
16	Exhaust air
17	Extract air
18	Outdoor air
19	Supply air

Cooling mode

The compressor carries out the work required to run the cooling process. The evaporator is located in the supply air for the unit. The heat from the outdoor air is taken up in this coil, thereby cooling the supply air.

The energy supplied to the cooling system from the evaporator and the compressor leaves the unit via the condenser in the extract air.

It is important to ensure that the air volumes are above the specified minimum flow on both the outdoor air and extract air side. The process cannot work if these air volumes are not available.

Heating mode

The heating pump function takes the heat content of the extract air and reuses it, supplying the same heat to the air handling unit's supply air.

The extract air is the heat pump's energy source. When the extract air meets the extract air coil, it is cooled since the coil functions as an evaporator. From the evaporator, the refrigerant moves to the compressor, where it is compressed. The refrigerant then moves to the supply air coil, where the energy from the extract air and the compressor is released. The energy remaining in the extract air downstream of the heat pump is then recovered in the rotor.

These two recovery systems give a very high degree of efficiency.
Since the rotor requires less energy to run than the compressor system, this will be in the first instance. The compressor will only start when the rotor's energy recovery is insufficient to heat the supply air.

Compressor

The reversible heat pump is equipped with a speed-controlled PM scroll compressor.
Depending on its size, the reversible heat pump may be equipped with one or two additional fixed compressors which are step-connected to the speed-controlled compressor. In the event of an increased power requirement, the frequency inverter will increase the speed of the compressor.

If the reversible heat pump is equipped with two or more compressors, the fixed compressors will engage when the speed-controlled compressor has reached its maximum speed. The speed-controlled compressor returns to its minimum speed and can then adjust back up to maximum speed. This achieves infinitely adjustable cooling power.

The function is reversed where less cooling is needed.

Continuous product development may give rise to specification changes without notice.

Compressor protection

In the event of an alarm initiated by the control equipment or the safety circuit, the compressor stops and an alarm indication is given. The alarm can be read on the Climatix display or the Carel unit on the unit's circuit board.

In the event of an alarm, correct the fault and then reset the alarm. If alarm trips repeatedly, an authorised refrigeration service company must be called in.

The cooling/heating pump will primarily trip alarms for the following errors:

- High pressure in the system, manual reset on pressure control HP1
- Low pressure in the system
- Alarm from frequency inverter
- Incorrect phase sequence (sizes 600-1280).

Function

The reversible heat pump is interlocked across the air handling unit. If any of the fans stop, the cooling/heating pump will also stop. The reversible heat pump is not permitted to start unless the minimum air flow has been achieved. The same applies if a heater is fitted.

The interlock and demand signal is sent via Modbus.

Circuit board

The circuit board for the unit contains:

- Main switch
- Fuses
- Control unit
- Any control unit for expansion valve next to fixed compressor.

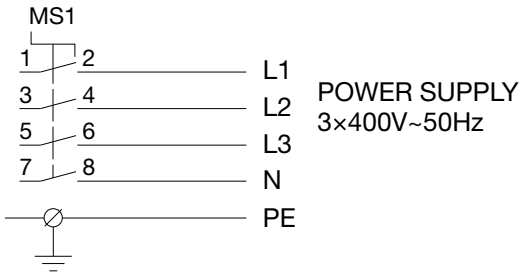
The circuit board is installed inside the unit and is internally prewired and tested at the factory.

Continuous product development may give rise to specification changes without notice.

4 Wiring instructions

4.1 Power supply

The reversible heat pump is powered separately as shown in the diagram below. For the recommended fuse protection, refer to "8 Technical data" page 22.



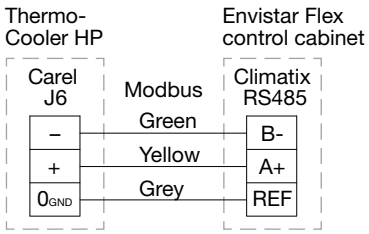
!	**NB!** **A residual current circuit breaker should not be used since the unit has a built-in frequency inverter.**

If a residual current circuit breaker is used, we recommend a 300 mA, type B residual current circuit breaker specially adapted for the frequency inverter.

A 300 mA, type B residual current circuit breaker offers fire protection – not personal protection.

4.2 Communication with Climatix

Communication with the air handling unit's (Envistar Flex) Climatix control system takes place via Modbus. The connection between Carel and Climatix is made using a pre-installed quick connector.

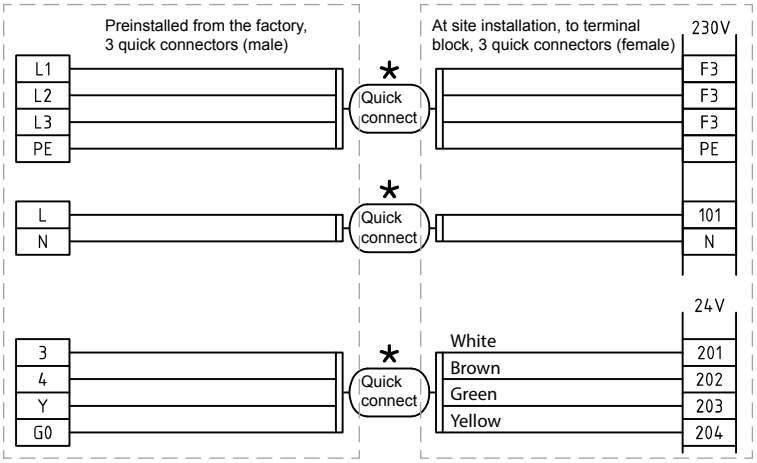


Basic diagram showing communication between Carel and Climatix via Modbus

4.3 Heater (optional)

A heater is optional and supplied integrated and fully connected with quick connectors if they have been selected when ordering the reversible heat pump.

The following wiring instructions apply if the heater is retrofitted.
All connections are made internally in the reversible heat pump.



For maintenance instructions, refer to the section entitled “Air heater electric” in Operation and Maintenance for Envistar Flex, under Order-specific Documentation at docs.ivprodukt.com.

4.4 Envistar Flex unit parts

Quick connectors

Connection between unit parts in the air handling unit is carried out by connecting the pre-installed quick connectors using the markings on the cables for guidance.

Setting Climatix

The following settings for Climatix are made at the factory.

System settings / Configuration / Configuration 1

Heat recovery	Rotor
Heating	TCHP
Electric heater	TCHP
Cooling	TCHP

System settings / Configuration / Configuration 2

Cooling recovery	No
Support operation	No
Support operation/Osstp block	No
Freezing monitor	No
Pump heating	No
Pump alarm heating	No

System settings / Configuration / Integration

Type of cooling, Modbus	Carel
No. of compressors	1, 2 or 3
High pressure sensors	Yes
Increased MB communication	Yes

System settings / Configuration / Basic data

Electric heater electrical power	value dependent on output variant

5 Operation

5.1 Commissioning

Commissioning of the unit must be carried out by qualified personnel in accordance with the Commissioning Record, which can be downloaded at docs.ivprodukt.com or ivprodukt.docfactory.com.

The validity of the product warranty is conditional on the system having been commissioned correctly. Working on the reversible heat pump during the warranty period without the approval of IV Produkt shall render the warranty void.

The unit was designed and manufactured based on given operation cases that must comply with the unit's use for optimal function and a good operating economy. External circumstances should not be changed without checking that such changes are within the unit's intended area of operation.

Prior to commissioning, the contractor must:

⚠	**DANGER!** **Risk of serious personal injury and/or damage to air handling unit.** **Read and understand the entire chapter "1.5 General safety messages" page 3 before working on, servicing, or inspecting the air handling unit.**

!	**NB!** **Risk of compressor damage.** **The oil in the speed-controlled compressor must be warm before commissioning. The reversible heat pump must be powered up for at least 8 hours before commissioning.**

!	**NB!** **Risk of compressor damage.** **For units in sizes 600-980 (2-circuit) and 1080-1280 (3-circuit), the compressors in the second and third circuits are dependent on the correct phase sequence. Compressor 2 starts briefly 30 seconds after powering up the unit in order to check the phase sequence. Check whether the alarm is displayed. If necessary, switch two of the incoming phases.**

1. Connect the unit to the power supply via a lockable safety switch.
2. Connect all ducts.

Follow the troubleshooting instructions in the troubleshooting chart before contacting a service representative for servicing a unit under warranty. This will prevent any unnecessary service calls.

5.2 Cooling status

Status information is read on the Climatix display.

Information	Value	Explanation
Regulator	x%	Cooling regulator output signal
Cooling output signal	x%	Cooling load from Climatix to Carel
Heating output signal	x%	Heating load from Climatix to Carel
Cooling unit status		Status of cooling unit
Status HP		Heat pump operation status
Settings	>	Blocking operation settings
DX cooling	Off/step 1	
Alarms	>	The alarm is displayed if there is a fault with the inverter or compressor. In the event of an alarm, see "7.2 Alarm information for inverter and compressor" page 20.
**********		
Compressor C1	On/Off	Compressor operating mode
Suction gas temp C1	x.x°C	Measured suction gas temp
Evaporation temp C1	x.x°C	Calculated evaporating temp based on low pressure
Low pressure C1	x.x bar	Relative pressure from low pressure sensor
Overheating C1	x.x K	Measured superheating
High pressure C1	x.x bar	Relative pressure from high pressure sensor
Expansion valve 1	x%	Expansion valve position
Condensation temp C	x.x°C	
Hot gas temperature	x.x°C	Temperature of output from compressor
Liquid line temperature	x.x°C	Temperature downstream of condenser
Supercooling	x.x°C	Measured supercooling

6 Maintenance instructions

6.1 Service schedule

For a service schedule, see Operation and Maintenance for Envistar Flex, under Order-specific Documentation at docs.ivprodukt.com.

6.2 Periodic inspection

The operation parameters for the reversible heat pump must not be changed unless a check is first made to ascertain that the changes will be within the unit's operating range.

Leakage inspection and registration

For information on the operator's responsibility with regards to leakage inspection and registration, see "2.6 Handling of refrigerant" page 7.

Visual check

DANGER!
Risk of serious personal injury and/or damage to air handling unit.
Read and understand the entire chapter "1.5 General safety messages" page 3 before working on, servicing, or inspecting the air handling unit.

Check:

1. The fins on the condenser/evaporator to detect mechanical deformations
2. The drip tray and drain with water trap (clean if necessary)
3. That the water trap (without non-return valve) is filled with water.

Cleaning

DANGER!
Risk of serious personal injury and/or damage to air handling unit.
Read and understand the entire chapter "1.5 General safety messages" page 3 before working on, servicing, or inspecting the air handling unit.

If the fins on the condenser and evaporator are fouled, they should be vacuumed from the inlet side. Alternatively, you can blow them clean with compressed air from the outlet side. In the event of heavier fouling, you can clean them with warm water mixed with dishwashing detergent that does not corrode aluminium.

For more information, refer to Cooling coil, cleaning under Documentation at ivprodukt.docfactory.com.

Check function

Check that the cooling/heating pump in the air handing unit is operating as it should by temporarily lowering/increasing the temperature setting (setpoint).

7 Alarm management and troubleshooting

Alarm information is read out on the Carel display. Press the alarm symbol to view alarms.

7.1 Troubleshooting in the event of an alarm

Inspection		Possible cause	Corrective action
Has the high pressure switch tripped?	YES ⇒	No or too low air flow across the condenser	Check the air flow across the condenser. Rest the pressure switch manually.
		Defective high pressure switch	Check/replace
NO ⇓			
Is alarm “118 Compr 1, Low evaporation pressure” or ”176 Compr 2, LowEvapPressure” or “177 Compr 3, LowEvapPressure” displayed?	YES ⇒	Insufficient refrigerant volume	Look for leakage, seal the leak and top up with refrigerant
		No or too low air flow across evaporator	Check/adjust the flow
		Defective expansion valve	Check/replace
NO ⇓			
Is the LED flashing red on the frequency inverter?	YES ⇒	Phase failure/voltage failure	Check the 3-phase supply, measure the incoming voltage. Reset the frequency inverter by switching off the voltage for 1 minute or more. Check that the compressor is running without dissonance.
		Overload/defective stepless compressor	Reset the frequency inverter by switching off the voltage for 1 minute or more. Check that the compressor is running without dissonance.
NO ⇓			
Is the alarm “189 Phase Rotation order”displayed?	YES ⇒	Incorrect phase sequence for supply voltage on compressor 2	Shut off voltage and switch two of the incoming phases
NO ⇓			
Is the alarm “94 Drive offline”displayed?	YES ⇒	ThermoCooler HP does not have supply voltage 3×400V	Connect supply voltage

Inspection		Possible cause	Corrective action
NO ⇓			
Displayed alarm “AL 120 Compr 1, Low pressure diff.”	YES ⇒	No pressure difference between the high-pressure and low-pressure side	Contact service
NO ⇓			
Displayed alarm “AL 183 AL_ C1_4wayRevValve”	YES ⇒	Four-way valve in wrong position	Contact service
NO ⇓			
Displayed alarm “AL 190 Al LowEvapFrost-Protec	YES ⇒	Too low temperature for too long in the evaporator, which is at risk of freezing	Too low return air temperature or too low return air flow or skewed flows
NO ⇓			
Displayed alarm “AL 59 Compr 1, Low Cond Temp”	YES ⇒	Condensation temperature too low	Too low return air temperature or too low return air flow or skewed flows

Continuous product development may give rise to specification changes without notice.

7.2 Alarm information for inverter and compressor

Alarm Climatix	Explanation and corrective action
Cooling unit	
Sum alarm	Sum alarm, check alarm in Carel, see table below.
Alarm C1 R. pressure switch	High pressure switch tripped or alarm for frequency inverter.
Alarm C1 EEV motor fault	Fault on electrical connection to expansion valve.
Alarm C1 low pressure sensor	Power cut or short circuit to low pressure sensor. Check EVD, cabling and sensor.
Alarm C1 suction gas sensor	Power cut or short circuit to suction gas sensor. Check EVD, cabling and sensor.
Alarm C1 high pressure sensor	Power cut or short circuit to high pressure sensor. Check EVD, cabling and sensor.
Alarm C1 low overheating	Compressor stoppage caused by low overheating.
Alarm C1 LOP	Compressor stoppage caused by low evaporation temperature.
Alarm C1 MOP	Compressor stoppage caused by high evaporation temperature.
Alarm C2 communication EVD	Communication error to EVD 2 (expansion valve control).
Alarm C3 communication EVD	Communication error to EVD 3 (expansion valve control).
Alarm C1 low suction gas temp	Low suction gas temperature.

Alarm Carel	Explanation and corrective action
76 Drive MainsPhaseLoss	Check that all three phases are connected to the frequency inverter.
81 Drive U_phaseLoss	
82 Drive V_phaseLoss	
83 Drive W_phaseLoss	
94 Drive offline	No communication with the frequency inverter. Check that the frequency inverter is energised with 3-phase 400V.
118 Compr 1, Low evaporation pressure	Circuit 1, low evaporation temp/pressure. Check leakage in cooling circuit.
121 Compr 1, High pressure switch	Circuit 1, high pressure switch tripped. Check air flow and fire damper.
172 Compr 2, Motor protector	Circuit 2, motor protection alarm
173 Compr 3, Motor protector	Circuit 3, motor protector alarm
174 Compr 2, High pressure switch	Circuit 2, high pressure switch tripped. Check air flow and fire damper.
175 Compr 3, High pressure switch	Circuit 3, high pressure switch tripped. Check air flow and fire damper.
176 Compr 2, LowEvapPressure	Circuit 2, low evaporation temp/pressure. Check leakage in cooling circuit.
177 Compr 3, LowEvapPressure	Circuit 3, low evaporation temp/pressure. Check leakage in cooling circuit.
180 Compr 1, High pressure switch	Circuit 1, high pressure switch tripped. Check air flow and fire damper.
189 Phase rotation order	Incorrect phase sequence gives incorrect rotation direction. Switch two of the incoming phases.

Continuous product development may give rise to specification changes without notice.

7.3 Troubleshooting via symptoms

Symptom	Possible cause	Corrective action
Low cooling power - too high temperature in the cooled object	The power supply has been interrupted	Check the control/safety switches and fuses.
	Separate supply not connected	Connect supply
	None or too low air flow across evaporator	Check that nothing inhibits the air flow
	The control equipment is incorrectly preset/defective	Adjust the settings or replace the equipment
Compressor is not operating	The power supply has been interrupted.	Check the control/safety switches and fuses
	Incorrect phase sequence (compressor 2)	Switch two of the incoming phases
	Compressor has opened a safety circuit	Check and reset, if needed
	Defective compressor	Check/replace
Frost on the evaporator (heating application)	Expansion valve is defective	Check/replace
	Insufficient refrigerant volume	Look for leakage, seal the leak and top up with refrigerant
	Low return air flow	Adjust the flow

7.4 Alarm reset

In the event of an alarm initiated by the frequency inverter or the safety circuit, the compressor stops. The alarm is displayed on both Climatix and the Carel display.

In the event of an alarm, take corrective action to correct the fault, and then press the “Alarm reset” button on the Carel display for 3 seconds. If the safety circuit alarm trips repeatedly, an authorised refrigeration service company must be called in.

Continuous product development may give rise to specification changes without notice.

8 Technical data

Size		100	150	190	240	300	360		400		480	
Output variant		2V	2V	2V	2V	2V	1V	2V	1V	2V	1V	2V
Air flow min [a]	m^3/s	0,25	0,38	0,50	0,58	0,68	0,85	0,85	0,92	0,92	1,07	1,07
Air flow max [a]	m^3/s	0,95	1,61	2,12	2,48	2,91	3,64	3,64	3,93	3,93	4,61	4,61
Max cooling power [b]	kW	13,9	22,4	28,8	30,6	43,9	47,3	50,9	48,2	53,7	59,1	68,3
No. of compressors	units	1	1	1	1	1	1	1	1	1	1	1
Max. operating current	A	7,6	11	15	15	23	24	24	23	26	23	33
External fuse protection [c]	A	10	16	20	20	25	23	32	25	32	25	40
Refrigerant R410A	kg	2,8	4,6	5,8	7,0	8,2	10,1	10,1	10,7	10,7	13,2	13,2

Size		600	740	850	980	1080	1280
Output variant		2V	2V	2V	2V	2V	2V
Air flow min [a]	m^3/s	1.34	1.71	1.98	2.38	2.38	2.70
Air flow max [a]	m^3/s	5.75	7.34	8.47	9.95	10.14	11.46
Max cooling power [b]	kW	85.8	104.8	119.7	134.9	152.2	175.6
No. of compressors	units	2	2	2	2	3	3
Max operating current	A	44	52	63	65	77.8	98.2
External fuse protection [c]	A	50	63	80	80	80	100
Refrigerant R410A	kg	10.4+5.8	14.0+6.0	14.0+9.0	17.4+12.6	11.8+9.7+9.7	14.6+10.6+10.6

a) For units with dampers, ePM1-50% (F7) filter supply air, ePM10-60% (*M5) filter extract air, SFPv values with NP rotor, supply air temp 20°C and duct pressure 200 Pa (170+30 Pa). Max. air flow calculated with a minimum 10% spare capacity for fans.*

b) At outdoor temp 28 °C, 50% RH and extract air temp 22 °C.

c) Regarding cooling/heating pump at 3×400V+N 50 Hz. Fuses with type C characteristics. The air handling unit is fused separately and the fuse protection size varies depending on selection of fan variants.

© IV Produkt AB DSTCH.191101.02.EN

Air handling with focus on LCC

You are welcome to contact us

Switchboard:	+46 (0)47 075 88 00	
Control support:	+46 (0)47 075 89 00	styr@ivprodukt.se
Service:	+46 (0)47 075 89 99	service@ivprodukt.se
Spare parts:	+46 (0)47 075 88 00	spareparts@ivprodukt.com

Visit us at: www.ivprodukt.com
Documentation for your unit: docs.ivprodukt.com
Technical documentation: docs@ivprodukt.se