

Topvex SoftCooler TR09-15



Installation instructions



-EN_GB 17-05-12V.A001

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1 Declaration of Conformity

Manufacturer



hereby confirms that the following products:

Cooling unit

Topvex SoftCooler TR09	
Topvex SoftCooler TR12	
Topvex SoftCooler TR15	

(The declaration applies only to product in the condition it was delivered in and installed in the facility in accordance with the included installation instructions. The insurance does not cover components that are added or actions carried out subsequently on the product)

Comply with all applicable requirements in the following directives

- Machinery Directive 2006/42/EC
- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC

The following harmonized standards are applied in applicable parts:

EN ISO 12100-2010	General principles for design Risk assessment and risk reduction
EN 13857	Safety of machinery – Safety distances to prevent hazard zones being reached by upper or lower limbs
EN ISO 60 204-1	Safety of machinery – Electrical equipment of machines – Part 1: General requirements
EN 60 529	Degrees of protection provided by enclosures (IP Code)
EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61000-6-3	Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standards for residential, commercial and light-industrial environments

The complete technical documentation is available.

Skinnskatteberg, 17-05-2012

Ingemar Wallström Site Manager

2 Warnings

The following admonitions will be presented in the different sections of the document.

\land Danger

- Make sure that the Mains supply to the unit is disconnected before performing any maintenance or electrical work!
- All electrical connections must be carried out by an authorized installer and in accordance with local rules and regulations.
- Operation in the refrigerant circuit and handling refrigerants must be performed by certified personnel.

🔨 Warning

- The door handles are only intended to be used during the installation. These must be removed before the unit is put into operation to ensure the required level of safety for the unit.
- The unit is heavy. Be careful during transport and mounting. Risk of injury through pinching. Use protective clothing.
- Beware of sharp edges during mounting and maintenance. Make sure that a proper lifting device is used. Use protective clothing.
- Skin contact with the refrigerant must be avoided. Use protective equipment such as protective goggles, gloves and suitable clothing's. God ventilation must be arranged.
- If freezing injury a doctor must be seen.
- If skin contact the exposed part of the body must be carefully washed.
- If eye contact use eye wash or lukewarm water and wash for 20 minutes, visit a doctor.
- The units electrical connection to the mains supply must be preceded by an all pole circuit breaker with a minimum 3 mm gap.

▲ Caution

- If the unit is installed in a cold place make sure that all joints are covered with insulation, and tape well
- · Duct connections/duct ends should be covered during storage and installation
- · Do not connect tumble dryers to the ventilation system

3 Refrigerant Control/Reporting

Topvex SoftCooler TR comes pre-filled with refrigerants and belongs to the group "Piece units containing more than 3kg refrigerants per circuit". Before commissioning shall always a control report in respect of the installation be established by a cooling certified person. Leakage control with record keeping shall be done once per year. The installation of the Topvex SoftCooler TR is only duty to report if the property/enterprise where the installation occurs, all together after installation, has a total amount of refrigerants of 10 kg or more ("small Piece units" with refrigerants less than 3 kg, e.g. normal refrigerators/freezers does not includes). Reporting shall in occurring cases be done to major inspection authority (normally the municipal environmental office).

Different regulations can be valid in different countries. Check with your local government.

4 Product information

4.1 General

This installation manual concerns Topvex SoftCooler TR09-15 manufactured by Systemair AB. Topvex SoftCooler TR09-15 include the following model options:

- Model: TR09, TR12, TR15.
- Right or left models: R (Right) L (Left). The side of the supply air outlet when viewed from the access side.

This manual consists of basic information and recommendations concerning the design, installation, start-up and operation, to ensure a proper fail-free operation of the unit.

The key to proper and safe operating of the unit is to read this manual thoroughly, use the unit according to given guidelines and follow all safety requirements.

This instruction is a complement to "Topvex TR09, TR12, TR15 Airhandling units Installation instruction" (separate document) and should also be read prior to installation.

4.2 Technical data

4.2.1 Dimensions and weights Topvex SoftCooler TR09-TR12





Fig. 1 Dimensions (mm) TR09-TR12 (Drawn as left hand unit)

Model	AA	В	С	D	Е	F	G	Ι	J	к	L
TR09	2630	1630	1120	810	895	104	129	129	105	5 210	700
TR12	2770	1740	1230	930	965	76	104	104	105	5 215	800
TR15	2820	1980	1470	1180	965	76	104	104	105	5 236	1000
Model	М	N	0	Р	Q	R	S	Weigl kg	nt,	Total Weig	ght, kg¹
Model TR09	M 300	N 190	O 1030	P 870	Q 840	R 550	S 120	Weigl kg 260	nt,	Total Weig	ght, kg ¹
Model TR09 TR12	M 300 350	N 190 185	0 1030 1140	P 870 940	Q 840 840	R 550 500	S 120 135	Weigl kg 260 290	nt,	Total Weig 765 870	ght, kg ¹

1. Incl. air handling parts

4.2.2 Electrical data

Model	Voltage	Current (A)	Power (W)	Fuse, slow
Topvex SoftCooler TR09	400V 3N~, 50Hz	12	6090	16
Topvex SoftCooler TR12	400V 3N~, 50Hz	15	9230	20
Topvex SoftCooler TR15	400V 3N~, 50Hz	15	9230	20

5 Transport and storage

The Topvex SoftCooler should be stored and transported in such a way that it is protected against physical damage that can harm panels, handles etc. It should be covered so that dust, rain and snow cannot enter and damage the unit and its components. The appliance is delivered in one piece containing all necessary components, wrapped in plastic on a pallet for easy transportation.

When transporting the Topvex SoftCooler use a forklift, but once installed on the floor avoid transfer, the feet can damaged due to lateral loading.

Marning

- The unit is heavy. Be careful during transport and mounting. Risk of injury through pinching. Use protective clothing.
- Be careful so the unit don't tip over.

6 Installation

6.1 Unpacking

Verify that all ordered equipment are delivered before starting the installation. Any discrepancies from the ordered equipment must be reported to the supplier of Systemair products.

6.2 Where/how to install

Topvex SoftCooler are meant for indoor installation. Place the unit on a **horizontal flat surface**. It's important that the unit is completely levelled before it is put into operation.

The electronic components should not be exposed to lower temperature than 0° C and higher than +50° C.

The following max. temperatures applies for an interference-free operation of the Topvex SoftCooler:

- Outside air max. +33 °C
- Extract air max. +28 °C.
- Ambient temperature max. +28 °C.

When choosing the location it should be kept in mind that the unit requires maintenance regularly and that the inspection doors should be easily accessible. Leave free space for opening the doors and for taking out the main components (figure 1). General maintenance includes among other things inspection and cleaning of the drip tray and flange coils.

A floor drain must be available in the room so that the condensation water can be drained off (chapter 6.4.1.3)

Avoid placing the appliance against a wall, as low frequency noise can cause vibrations in the wall even if the fan noise-level is acceptable. If this is not possible it is recommended to carefully insulate the wall.

6.3 Installing the unit

6.3.1 Installation



Fig. 2 Installation without by-pass, left hand unit

Position	Description
	Supply air
	Exhaust air
	Outdoor air
	Extract air
1	VAV Pressure transmitters (accessory)
2	Damper and motor outdoor air (accessory)
3	Damper and motor exahust air (accessory)
4	Locked connection





Fig. 3 Installation with by-pass, left hand unit

Position	Description
	Supply air
	Exhaust air
	Outdoor air
	Extract air
1	Exhaust air, By-pass
2	VAV Pressure transmitters (accessory)
3	Damper and motor, outdoor air (accessory)
4	Damper and motor, exhaust air (accessory)
5	Damper and motor, exhaust air by-pass (accessory)

6.3.2 Installation procedure

1

Prepare the surface where the unit is to be mounted. Make sure that the surface is flat, levelled and that it supports the weight of the unit. Perform the installation in accordance with local rules and regulations.

2

Lift the unit in place.

\land Warning

Beware of sharp edges during mounting and maintenance. Make sure that a proper lifting device is used. Use protective clothing.

3

Level the unit with help of the enclosed mounting feet



Connect the unit electrically to the mains through the all pole circuit breaker (safety switch), which is enclosed inside the unit on delivery. The wiring between the safety switch and the unit is led through the top of the unit casing directly to the electrical connection box.

See enclosed wiring diagram, and chapter 6.5.2.2, table 2 for more information.

▲ Warning

The units electrical connection to the mains supply must be preceded by an all pole circuit breaker with a minimum 3 mm gap.

\land Danger

- Make sure that the Mains supply to the unit is disconnected before performing any maintenance or electrical work!
- All electrical connections must be carried out by an authorized installer and in accordance with local rules and regulations.



6.4 Deviding the Topvex TR air handling unit.

Before the installation of Topvex SoftCooler the Topvex TR has to be divided (figure 4).

How to split the unit:

Reove the heat exchanger, extract fan and the extract air filter

- A. Remove the plate
- B. Loose the cable connectors
- C. Remove the 7 M10 screws that join the two halves of the appliance



Fig. 4 Illustration shows the left handed version of the unit



6.4.1 Assembly the Topvex SoftCooler

Fig. 5 Left hand unit

Make sure that the sealing stripes and faces of sealing in-between the unit half are undamaged.

1. To get access to the upper mounting screws (M8) remove the rectangular covering plate on top of the Topvex SoftCooler.

Place the Topvex SoftCooler in-between the two air handling unit parts and carefully push them together.

- 2. When the three parts are completely joined together: Screw the upper and lower mounting screws that joining the parts.
- 3. Connect the electrical wiring in the Topvex TR electrical box. Assemble the electrical fast couplings and the transparent air tubes on each side of the Topvex SoftCooler make sure that they are on the right place by reading the labelling.

Assemble the plate "A" figure figure 4, heat exchanger, extract- fan and filter.

6.4.1.1 Duct connections

When Topvex SoftCooler have been joined together with the two air handling unit parts it is in total 5 duct connections on top of the unit: Outdoor air, Supply air, Extract air and 2 Exhaust air. Duct connections can be done on two different ways, with or without a by-pass-function for the exhaust air.

For duct connection without by-pass function on the exhaust air only 4 duct connections are used. The exhaust air duct are then to be connected to the exhaust air duct connection on the Topvex SoftCooler module. The exhaust air duct connection on the air handling unit must be locked with the Topvex SoftCooler included locking plate.

For duct connection with "By-pass" function on the exhaust air all 5 duct connections are used. The exhaust air duct are then to be connected both to the Exhaust air duct connection on the Topvex SoftCooler module and to the one on the air handling unit.

N.B. Motorized spring return dampers must be mounted on each exhaust air duct connection.



6.4.1.2 Condensation and Heat Insulation

Outdoor air duct and discharge ducts must always be well insulated against condensation. Correct insulation installation on ducts connected to the unit is especially important. All ducts installed in cold rooms/areas must be well insulated. Use insulating covering (minimum 100 mm mineral wool) with plastic diffusion barrier. In areas with extremely low outdoor temperatures during the winter, additional insulation must be installed. Total insulation thickness must be at least 150 mm.

1 Caution

- If the unit is installed in a cold place make sure that all joints are covered with insulation, and tape well
- Duct connections/duct ends should be covered during storage and installation
- · Do not connect tumble dryers to the ventilation system

6.4.1.3 Condensation drain

Warning

The unit is not to be taken into operation before the included condensation drain and water seal are connected from the SoftCooler to the floor drain.

The drain is to be connected to the drain connection under the drip-tray. The drip-tray is located in the bottom of the Topvex SoftCooler.

Use the included plastic connection pipe which is to be cut to the correct height "H" according to the below figure. See the below table for the relation of hight "H" and maximum under pressure in the unit.



Fig. 6 Dimension and assemby

H (mm)	Max. Negative pressure (Pa)
85	500
110 ¹	750
135	1000

1. Normal conditions

To led the water from the water seal outlet to the floor drain an extra pipe, not included with the Topvex SoftCooler, is needed. Connect this pipe and make sure that the slope is at a minimum 1:200 to the floor drain and also that the complete drain installation are in a frost free space.



Fig. 7 Pipe to floor drain

6.5 Connections

6.5.1 Ducting

6.5.1.1 Air connection principles



Fig. 8 Connections and basic components in left hand connected units

Position	Description
1.	Compressor
2.	Condenser coil
3.	Evaporator coil
4.	Filter drier with sight glass
5.	Expansion valve
6.	Drip-tray with drain
7.	Water seal
8.	Cable grommet for external cabling
9.	El. cabinet with frequency converter
10.	Exhaust air duct connection
11.	Exhaust air sensor, EHS
12.	Pressure/hot gas switches
13.	Measuring points refrigerant system high/low



6.5.2 Electrical connection

\land Danger

- Make sure that the Mains supply to the unit is disconnected before performing any maintenance or electrical work!
- All electrical connections must be carried out by an authorized installer and in accordance with local rules and regulations.
- Operation in the refrigerant cycle and handling refrigerants must be performed by certified personnel.
- 1. Make sure that all of the cable joints and the two transparent pressure measuring tubes to the extract air fan are correct assembled between the unit parts.
- 2.. Wire the prepared control cable to the Topvex TR electrical cabinet (in the supply air part), use the prepared grommets. Connect the wires to the terminal blocks in the electrical cabinet according to labelling on the wires and the electrical wiring diagram. See also the chapter Internal electrical connections.
- 3. Move the Exhaust air temp. sensor "EHS", located at the extract air filter, from its place to the new place by the label "EHS" in the SoftCooler.



Fig. 9 EHS shown at a left hand unit

4. Connect the unit electrically to the mains (400V 3N~, 50Hz) through the all pole circuit breaker (safety switch), which is enclosed inside the unit on delivery. The wiring is

led through the top of the unit casing directly to the Topvex SoftCooler electrical connection box. Dimension the wires and fuses according to the chapter Electrical data.

5.5. Do the electrical connections for the Topvex TR air handling unit according to the installation instructions that follows that unit.

6.5.2.1 Electrical cabinet



Fig. 10

Position	Description
1.	Terminal block, mains supply
2.	Circuit breaker (MCB) oil heaters
3.	Relays
4.	Terminal block, internal/external connections
5.	Frequency converter with display
6.	EMC filter

6.5.2.2 External/Internal connections

See also the enclosed wiring diagram.

Mains supply (and in some cases By-pass damper) is the only external connection that should be connected to the Topvex SoftCooler.

Table 1: External connections

Ter- minal block		Description	Remark
	PE	Ground	
Ν	Ν	Earthed neutral (supply voltage)	400V 3N~, 50Hz,
L1	L1	Phase (supply voltage)	supplied via safety switch
L2	L2	Phase (supply voltage)	
L3	L3	Phase (supply voltage)	
28	G	By-pass damper"DBEH" exhaust air (option)	24V AC
29	GO	By-pass damper "DBEH" exhaust air (option)	Neutral (24 VAC)

The already prepared operating cable in Topvex SoftCooler is to be drawn to the electrical cabinet in the supply part of the Topvex air handling unit and connected to the terminal blocks with the same numbers as the cable markings.

Table 2: Internal connections

Ter- minal block		Description	Remark
G	G		24V AC
4	DI ref		Referens
10	DO ref		Referens
12	DO	Exhaust air damper. A signal from control unit E28 is lead via the relay R2 to terminal 28 for controlling of the by-pass damper (accessory).	24V AC, 0.5A
14	DO	A signal from control unit E28 for starting "P1-cooling" indicates a cooling demand. The signal controls relay R2 that is then closing the by-pass damper (accessory).	24V AC, 0.5A
15	DO	A signal from control unit E28 for starting "DX cooling step1" indicates a cooling demand. The signal controls relay R1 that is then starting the compressor.	24V AC, 0.5A
74	DI	Alarm indication cooling (Run Error P1-Cooler).	NO
90	AO ref		Reference
94	AO	Control signal from control unit E28 for cooling. Controls the frequency converter "FC".	0-10V DC

7 Function Description



Fig. 11 Without by-pass, left hand unit



Fig. 12 With by-pass, left hand unit

Position	Description
EF	Extract air fan
SF	Supply air fan
SS	Temp. sensor supply air
OS	Temp. sensor outdoor air
ETS	Temp. sensor extract air
EHS	Temp. sensor exhaust air
UC	Controller E28
RC	Rotor control
RM	Rotor motor
HE	Exchanger

Position	Description
DO	Damper outdoor air (accessory)
DEH	Damper exhaust air (accessory)
DBEH	Damper by-pass exhaust air (accessory)
FC	Frequency converter
CPR	Compressor
EV	Evaporator
СО	Condenser
HPS	Condenser pressure sensor

7.1 General

Control unit E28 (UC) senses the temperature via the extract temperature sensor (ETS) and then keep the set extract temperature by sequence controlling the compressor (CPR), heat exchanger (HE) and hot water- /electrical heater (HWL/H, ELH). The temperature sensor in the supply air (SS) is min. and max. limiting the supply air temperature.

7.2 Cool recovering

Exchanger (HE) will automatically start to recover the cold in the extract air when the extract air is colder then the outdoor air.

7.3 Power control

The compressor (CPR) are step-less controlled between, in the frequency converter (FC), set minimum and maximum frequency.

7.4 Power limitation

The frequency converter (FC) is continuously sensing the condensing pressure via the high pressure sensor (HPS) and gradually slows down the speed of the compressor (CPR), if the pressure exceeds the set limitation value. This is done to avoid a high pressure alarm.

7.5 By-pass function (option)

To reduce the energy use for the extract fan when there is no cooling demand the exhaust by-pass damper (accessory) is opened and thereby the exhaust air does not pass the condenser (CO). At stopped unit all dampers are closed.

Note:

This instruction contains functions for the Topvex SoftCooler TR, for a complete description of functions see "Topvex TR09, 12, 15 Compact Air Handling Unit Installation instructions"

8 Commissioning protocol

Company:	
Responsible:	

8.1 General

Customer:	Date:	Installation:
Object/unit:	Item no:	Installation address:
Model/size	Serial no:	Designation:

8.2 Installation control

Moment	Done	Note
Control report cooling concerning installation established. (Application shall in some cases be done, see chapter 3, Refrigerant Control/Reporting).		
All unit parts undamaged.		
Installation carried out according to instructions (see chapter 6.4.1, Assembly the Topvex SoftCooler and chapter 6.4.1.1, Duct connections).		
Exhaust sensor "EHS" moved (see chapter 6.5.2, Electrical connection).		
Condensation drain connected (see chapter 6.4.1.3, Condensation drain).		
Mains supply connected via the Safety switch (see chapter 6.5.2, Electrical connection).		
By-pass damper connected when such is to be used, accessory (see chapter 6.5.2.2, External/Internal connections).		
Internal operating cable connected (see xchapter 6.5.2.2, External/Internal connections).		
The two transparent pressure measuring tubes to the extract fan connected thru the Topvex SoftCooler		
Supply and extract airflow adjusted		

8.3 Preparing control unit E28

To receive correct functions the following settings must be done in the control unit E28. Log in into the control unit E28 (3333) before taking action. As an alternative can the settings be done with the PC-software tool "Corrigo E-tool Ventilation" then download the configuration file (.vtc) from the Systemair online catalogue.



Moment	Done	Note
Select the menu Configuration-Input/Output:		Noto:
• Select Digital Inputs		
• Browse to DI4, select.		Note: DI4 cannot be used for extended run when Topvex SoftCooler is used.
Change the setting to Cooling Pump Indication		
Select the menu Configuration-Control functions:		
• Check that the setting is Extract air control or Cascade room temp control		
Select the menu Configuration-Cooler type/coil:		
• Set DX		
Set Supply min setpoint reduction to $0.0^\circ C.$		
Select Configuration-Step switch-Step switch cooling:		
• Set Sequential		
• Select Number of elements: 1		
Set Min in/out connecting time: 1 sec		
Select the menu Configuration-Cooler type/coil:		
Set Cool Recycling to position On		

8.4 Before first compressor start

To avoid damage on the compressor the oil in the compressor crankcase must be heated before the first start.

Moment	Done	Note
Stop the Supply- and extract fan (via the Topvex air handling units safety switch)		
Turn on the mains supply for the Topvex SoftCooler via the working switch, make sure that the voltage is on (the display in the frequency converter lights up) Wait for minimum 2 hours so that the oil will reach about +30° C!		

8.5 Control cooling operation

Moment	Done	Note	
Start the Supply- and extract fan (via the Topvex		Supply airm ³ /h	
air nandling units safety switch). Run the unit on dimensioning airflows.		Extract airm³/h	
Start the compressor by establishing a 100% cooling demand:			
Log in to the control unit E28 (2222)			
• Select menu Hand/Auto			
• Select Cooler type/coil			
Set Cooler to Manual output 100.0			

- 🖑 system**air**

Moment	Done	Note
Run the compressor for at least 10 minutes.		Outdoor air temperature°C
Then read the Extract-, Outdoor-, Supply and		Supply air temperature°C
Exhaust air temperature via the display of the control unit E28 (in the menu Temperature).		Extract air temperature°C
		Exhaust air temperature°C
Let the compressor run.		Hotgas temperature°C
Measure the hotgas- and liquid line temperature with a strap-on temperature detector.		Liquid line temperature°C
Keep the compressor running.		
Read the below values via the display of the frequency converter, see section "Frequency converter, quick guide", in Operating and Maintenance Instructions. First set the parameter for reading, then let the door of the Topvex SoftCooler be closed for at least 5 minutes before reading:		
Output frequency (Param d001)		Output frequencyHz
Output current (Param d002)		Output currentHz
Condenser pressure (Param d004)		Condenser pressurebar
Note:		
Important! Restore the cooling operation to "Auto":		
Log in to the control unit E28 (2222)		
• Select menu Hand/Auto		
• Select Cooler type/coil		
• Set Cooler to Auto		

Notes:

system**air** :

Topvex SoftCooler TR09-15

Systemair AB reserves the right to make changes and improvements to the contents of this manual without prior notice.



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