Installation and Operating Manual

HC_-Air Cooler

HENNLICH Cooling Technologies GmbH

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Datum: Sept 2016

Issue: Rev 03

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Date and Signature		22.09.2016

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HCA with AC Motor

(230V / 400V / special voltage)

HCD with DC Motor

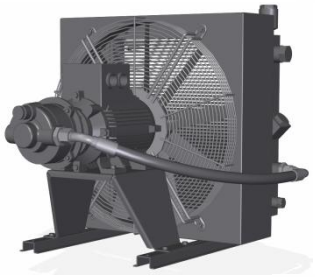
(12/24V)

HCH with Hydraulic Drive

(2ccm to 45ccm)

HCP with Electric Motor and Pump

(from 8 to 60L/min)



HCC Combined Cooler

For diesel or gas engines

2. General Information

Introduction:

Please read these instructions thoroughly before using our HC cooler models. All instructions should be followed and warnings observed. Upon receipt, the contents should be checked for any damage and to confirm the delivery is complete. These Installation and Operating Instructions are a part of the product and should be carefully stored near the air cooler. If lost, immediately request a new copy or replacement from your HCT supplier. HCT reserves the right to perform any technical changes in these Installation and Operating Instructions at any time without prior notice.

Abbreviations:

HC……...HENNLICH Cooling
HCT…….HENNLICH Cooling Technologies GmbH
Manual…Installation and Operating Instructions

Intended use:

The HCT air cooler is primarily designed to be used in a stationary position for the efficient cooling of oils (hydraulic, lubricating…) and mixtures of glycol and water (at least 20% glycol). The cooler may only be used when:

- The air cooler has been checked under the terms and conditions specified in this manual and is used for the designated purpose
- The electric, control and safety equipment has been connected correctly by qualified staff
- Only original HCT parts are used
- The relevant marking plates on the equipment are observed

Warranty and Complaints:

In the event of any equipment failure, please contact HCT immediately or your local supplier. Under no circumstances will HCT be held responsible or liable for any damages caused by, or subsequent faults arising from, any repairs, adaptations or alterations to our products carried out by the Customer or their own subcontractors.

Liability and Warranty:

Unless specified to the contrary in our manual, no changes to the HCT air cooler are permitted and it is the Customer’s responsibility to ensure this. Warranty cover will be avoid in such cases.

Ammendments:

Additionally to this manual other manuals (for operating and maintenance) have to be noted, if applicable. Particularely:

- Manuals for motors/engines
- Manuals for pumps
- Manuals in case of ATEX requirements
- Manuals for other components (if available)

3. Safety Instructions

Safety Instruction Description:

The following symbols are the prohibition, warning, information and advice notices used in the Instructions:

Danger

This symbol advises of the potential for accidents if the safety regulations are not observed. The accident could cause a serious injury, leading to death in the worst case scenario.

Warning

This symbol advises of the potential for accidents if the safety regulations are not observed. The accident could cause serious injury, or, in the worst case scenario, even death.

Attention

This symbol advises of the risk of an accident, leading to injury, material damage etc., if regulations are not observed.

General Warning

Disconnect the plug

Warning - hot surfaces

Warning - ecological damage

Warning - electric voltage

Warning - airborne objects

General Instructions:

Danger

Risk of electric shock!
Electric motors of the HC cooler model series should only be installed by a qualified electrician. Incorrect handling represents a RISK OF ACCIDENTAL DEATH. All warnings on the cooler must be observed.

Warning

Always check that the device/system is disconnected from the power supply before any maintenance work is carried out on the air cooler. Before opening any hydraulic connections, (hoses, measuring devices etc.), always check there is no pressure in the equipment. Air coolers with a thermal switch, relay or Fan Soft Control (FSC) are activated automatically when the set switching temperature is reached. Therefore extra care should be taken when working with this equipment, as the motor or the fan wheel will start turning automatically when the set switching temperature is reached. Depending on the function in use, the air cooler may reach a high temperature, thus presenting a burns risk. Observe the safety instructions!

4. Product Description

Design:

HCA Air Cooler with AC Motor
HCD Air Cooler with DC Motor
HCH Air Cooler with Hydraulic Motor
HCP Air Cooler with Alternating Motor and Pump
HCC Air Cooler “Combi” with Alternating or direct or hydraulic drive motor

Air coolers in the HC series, (HCA, HCD and HCH), consist of an active cooling element connected by bolts to the cooler cover. Motor cages and brackets are used according to the model and size. Holders and brackets are attached to the cover of the cooler or onto the feet of the cooler to the rest of the cooling unit. The cooler feet are attached by bolts to the bottom part of the cooler cover. The drive motor is mounted on the holders or attached with flanges. The connection is also secured with bolts, washers and nuts. In smaller models, the motor is directly mounted on the cover of the cooler because it is possible to ensure safe operation without the holder. However, HCT may change or modify the design at any time and its current version is based on the relevant HCT drawings, which are available on request.

The **HCA** model series is supplied with single-phase or multi-phase electric motors. The motor data is stated on the relevant marking plates of the electric motors or in these instructions.

The **HCD** model series is delivered with 12 VDC or 24 VDC fan motors. The motor data is stated on the relevant marking plates of the electric motors or coolers or in these instructions.

The **HCH** model series is supplied with various types of hydraulic motors (2ccm – 45ccm). Hydraulic motors in larger models have offset bearings. The motor data is stated on the relevant marking plates of the motors or coolers or in these instructions.

HCP Air Cooler with Motor Pump Unit
The HCP air cooler model series consists of an active cooling element, connected to the cover of the cooler with bolts. Motor brackets are used according to the model and size. The cooler motor is connected to the rest of the cooling unit by brackets attached to the cover or the feet of the cooler. The cooler feet are attached to the bottom part of the cooler cover with bolts. The drive motor with the pump is mounted or attached by flanges to the bracket. The connection is also secured with bolts, washers and nuts. During assembly in HTC‘s production process, the pump is connected to the cooling unit with a hose. HCT may change or modify the design at any time and its current model is based on the relevant HCT drawings, which are available on request.

The **HCP** model series is supplied with single-phase or multi-phase motors. The size of the circulating pumps is determined by the requisite cooling capacity. Standard maximum rates of oil flow are from 8 to 60L/min. The motor data is stated on the relevant marking plates of the electric motors or in these Instructions. HCT may change or modify the design at any time and its current version is based on the relevant HCT drawings, which are available on request.

HCC “Combined” Air Cooler

The HCC coolers consist of several cooling sections linked to the body of the main cooler. Motor holders, brackets and attaching metal plates are used according to the model and size. Holders, brackets and metal plates are screwed on the feet/cover/body of the cooler, connecting them to the rest of the cooling unit. The cooler feet are attached by bolts to the bottom part of the cooler covers. The fan’s drive motor is mounted on the holders or brackets or directly on the diesel engine. The connection must be secured with bolts, washers and nuts. HCT may change or modify the design at any time and its current model is based on the relevant HCT drawings, which are available on request.

The acoustic noise level (acoustic pressure at the distance of 1m and 1 level) of the HCT air cooler is approximately 60 up to 98 dB(A) under normal operating conditions. However, such data or values stated in material data sheets may be affected by an unsuitable installation site or specific conditions of use. Detailed values are available upon request.

Designation:

The designation of the HC air cooler is stated on the marking plate, attached to the cover of the equipment containing the following information:

- Air cooler as a name
- Fan direction
- Air flow direction
- Cooler designation
- Production number
- Max permissible operating pressure
- Max permissible operating temperature
- Motor data
- Serial number
- Company name

  ……

In combined coolers, the individual data for several coolants is provided separately on the marking plate!

Technical Data:

The technical data (dimensions, noise level, capacity…) is provided in the relevant data sheets of the HC cooler model series.

5. Installation

Handling

 **Attention, Risk of Crushing!**

When moving the cooler, care should be taken to secure the cooler and its parts, employing appropriate lifting equipment. Lifting gear must be safety checked and in perfect working order, having a lift capacity commensurate with the weight of the air cooler.

Method of Installation:

The method of installation of the HC air cooler must be such that it does not restrict the function of the cooler. The principle rule for installation is to ensure that the cooler is positioned at a distance from the wall, both in front and behind, which should be no less than the height of the cooling element. However, this gap can be reduced by up to 50% of the height of the cooler if there is a circulating and unrestricted air inflow and outlet. This is necessary to prevent intake of hot air (=thermal circulation). Unsuitable installation may increase the acoustic pressure level and decrease the cooling effect. **During installation the site should be designated a No Entry zone for staff, at risk of auditory harm.** When using the HC air cooler in a contaminated environment, it should be protected according to the level of contamination (protection against dust and rocks /hard objects). However, due to risk of damage, cleaning the cooling elements is not recommended, unless absolutely necessary; if cleaning is unavoidable, it should be conducted in such a way as to preserve full functionality of the cooler. Deposited impurities on or in the cooling element or cooler may decrease the cooling capacity and could result in a system malfunction.

Outdoor Installation:

When using the HC air cooler outdoors, it should be remembered that oil viscosity increases with decreasing temperature. This may lead to a system overload during any cold start of the equipment, resulting in damage to the cooling element. A bypass valve must be installed to prevent such damage to the cooler. The maximum pressure specified in the data sheet and on the relevant marking plate must be observed.

In some cases, the fluid may require preheating, due to the possible risk of cavitation (as well as to high pressure) which can damage the pump, for instance with the HCP. The maximum and minimum pressure rates according to the pump and HC data sheets must be observed.

The risk of freezing can cause damage to the coolers and must be noted!

Indoor Installation:

When installed in an enclosed environment, there should be a sufficient supply and outlet of fresh air. In order to prevent restrictions of the cooling capacity, attention must be paid to any potential pressure loss when fresh air is supplied through air ducts, unless they are regulated by their own fans.

Power Line:

 **Danger**

Risk of electric shock! 
Electric installations and connections should only be carried out by qualified staff. Prior to connection to the power supply, the motor data on the marking plate should be checked and power to the feeding cables should be switched off. The cables and motor should always be checked for damage. Electric motors must be protected with overload protection, in compliance with national regulations and standard technical rules.

The electric motors are wired according to relevant wiring diagrams or according to the relevant motor operating instructions. The usual limit ambient temperatures for the motor are from -15 to +40°C, unless the marking plate on the motor states otherwise.

Hydraulic Line:

 **Attention**

To prevent damage to the cooling element (pmax 26 bar static… for standard sizes of **C**XX.XX), care should be taken to ensure that the system is not subject to any pressure impact or stress. If that is not possible, a separate circuit should be installed for the cooler. HCT recommends using suitable hydraulic hoses or compensators. The maximum pressure specified in the relevant data sheet must not be exceeded. **The Customer should therefore provide a safety valve for each hydraulic circuit.**

The input of the cooling element should be selected on the bottom connection of the cooling element but it may also be executed on the top. To prevent a decrease in the cooling capacity, input and output connections should be installed with a diagonal orientation.

The size of the ports depends on the type of HC and its dimensions. (See technical sheets of the relevant model series). Normally, an additional port is needed (usually 1/2") for the installation of any potential measuring, testing and switching devices. This ½” port is factory-sealed/plugged, unless ordered otherwise.

  The adapters/plugs must be checked and carefully sealed to prevent loosening or spalling from the connections and fluid leakage, which could be hot.

6. Activation

 **Attention, Risk of Injury!**

Prior to activation, check that the HC air cooler is properly installed and connected and that it does not show any signs of damage.

Checklist for Initial Activation:

- The HC cooler is not damaged.
- The HC cooler has been connected in a proper way.
- The fan wheel can be manually turned without restrictions; it does not snag on the cover of the cooler or any other part.
- All bolt joints and adapters are sufficiently tightened and protected.
- There are no objects inside the cooler that could cause injury or other damage.
- Fill the air cooler with the propriate liquid and activate the system.
- When using the HCP model series (i.e. with the pump), ensure that the system is filled and that there is no dry-run.
- When using the HCP series (with the pump), the integrated bypass valve must be set correctly and the value of 5 bar not exceeded. The valve is used for **short-term emergency** protection of the system and does not replace the hydraulic circuit protection by using appropriate devices such as pressure relieve valves,….
- The system must be sufficiently vented.
- The tightness must be checked and any leakage in all hydraulic adapters and all connections must be ruled out.
- If there is leakage, tighten all adapters and replace loose connections to prevent injury and rule out any leakage.
- Start the relevant drive.
- If the direction of the motor does not match the direction specified on the marking plate, check that the connection is correct or provide a correct connection.
- There should not be any unusual sounds or vibrations. Otherwise, the fan wheel or the drive motor (or other parts) may be damaged. Any damaged parts must be replaced immediately.
- The drive parameters are specified on the marking plate of the motor and they must be observed.
- The pump parameters are specified either on the marking plate or/and in the pump-manual, which has to be noted, too!

During Operation

Attention, Danger!

The HC air coolers may become extremely hot during operation. Let the device cool down before touching. The maximum permissible temperature (of the oil) must not exceed 120°C. For the HCP-model series the max. oil temperature is 75°C. The ambient temperature must not exceed 40°C unless specified otherwise. The warning labels on the cooler must be observed.

Risk of Injury!

Relating to the rotating parts of the cooler (fan, motor); detaching of parts, leakages or rupture of hoses!

7. Maintenance and Cleaning

Maintenance Checklist:

- Noise and vibrations
  No unusual sounds or vibrations should occur
- Connections and mounting
  The air cooler is correctly connected. Any missing or loose parts must be replaced and/or tightened.
- Tightness of the cooling element and the cooling system
  Any loose bolt connections must be immediately replaced. Leaking fluids present a danger to the environment and human health. In case of leaking, refill and de-aerate the system.
- Contamination of the cooling element
  The cooling components must be clean and protected against contamination. Polluted coolers reduce the cooling capacity and can cause damage.
- The warning labels must not be damaged or removed.
  Otherwise they must be replaced
- Prior to maintenance or contact with the system, it should be allowed to cool down, the pressure should be released and care taken to ensure that any rotating parts cannot cause injury.
- When working with electric appliances, first disconnect the power to the device.

Regular Inspections:

Electric devices must be checked at least once a year by trained qualified staff.
HCT recommends daily checks for any signs of damage to the equipment within the remit of inspections.

Cleaning:

Risk of Electric Shock!

 During cleaning, particularly when using water, the cooler must be disconnected from the mains and protected against accidental activation. Care should be taken to avoid any damage to the cables and the motor.

Risk of Injury!

 Before cleaning, disconnect the drive motor and check that no rotating parts could start or move.

Risk of Burns!

 The HCT air coolers may become extremely hot during operation.
The cooler must be allowed to cool down before cleaning.

Cleaning of cooling elements:

Cleaning the cooling elements is not recommended due to the risk of possible damage. If cleaning is unavoidable, it should be carried out carefully with compressed air, although water may also be used. Make sure that the cleaning flow is directed in parallel with the segments, otherwise the cooler screen may be damaged.

If cleaning with water, and cleaning agents are required (such as degreasing agents), ensure they are safe for use on aluminium and will not damage the surface, coating, parts or any other material used.

Cleaning the Cooler Cover:

To clean the inside of the cover, the cooling element needs dissembling: Blow the cover with compressed air or use a cleaning aggregate to remove impurities. Cover the motor first to prevent contamination. Perform cleaning in the direction from the drive (motor). If needed, cleaning or degreasing agents may be used, but should be safe for use on the cooler components.

Assembly and Disassembly of Parts:

 **Risk of Injury!**

Prior to disassembling the cooler, disconnect the drive motor to prevent accidental activation.

 We recommended disconnecting the motor from the mains. When using hydraulic motors, they should be disconnected from the hydraulic circuit.

 **Risk of Burns**!
The air cooler may become extremely hot during operation and should therefore be allowed to cool down sufficiently prior to handling.

 **Risk of Bruising!**

To prevent injuries caused by falling parts, or indeed the cooler itself, they should be secured before loosening the bolts. It is particularly important to adequately secure heavy parts, such as the motor or the cooling accumulator.

Procedure for Disassembling the Cooling Element:

Disconnect the equipment.
Turn off the fan motor and secure it against accidental activation.
Check that the equipment is not under pressure and that it has cooled down.
Disconnect the inlet and outlet of the cooler.
Completely empty the cooler.
Loosen the bolts connecting the cooling element to the cover.
Remove the cooling element.

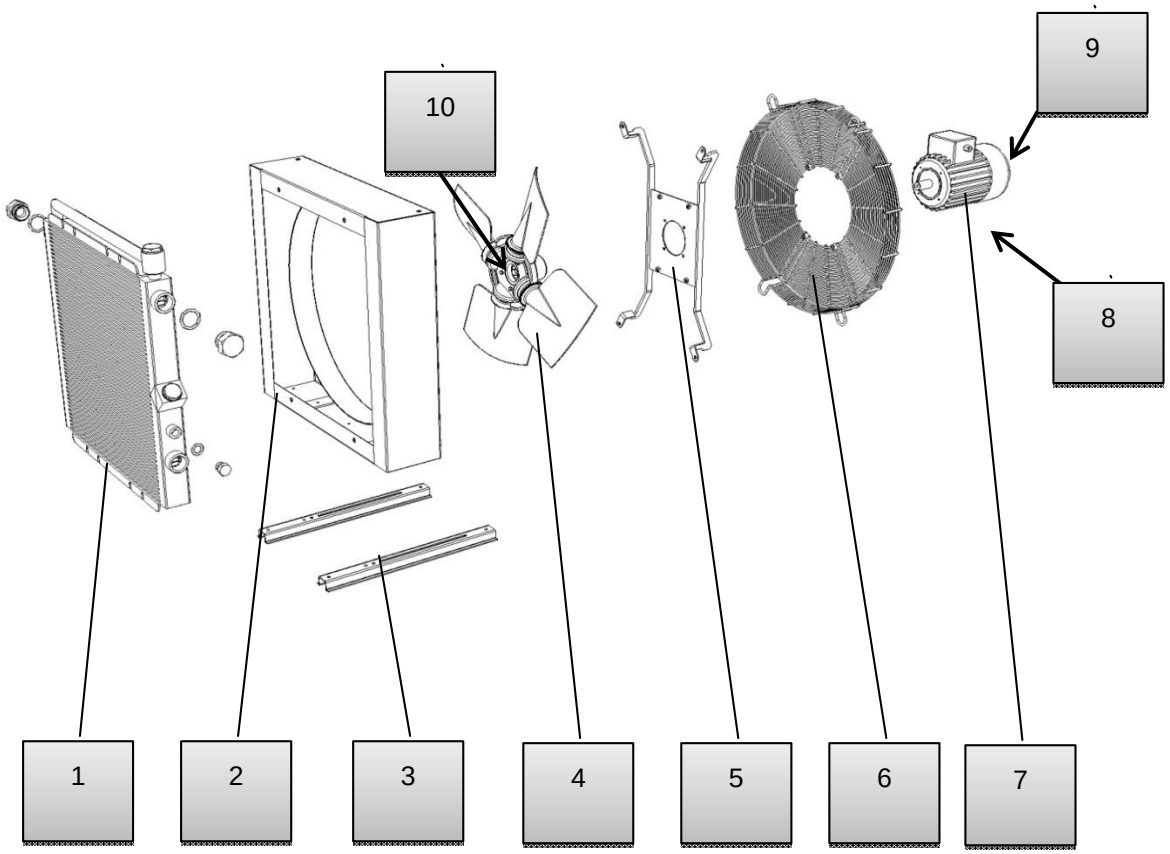
Procedure for Disassembling Motor/Drive and fan:

Disconnect the cooler equipment.
Disconnect the fan and secure it against accidental activation.
Check that the equipment is not under pressure and that it has cooled down.
Detach the group of “motor / fan / protection grid” from the cover.
If a motor bracket is used, the bracket bolts will also need loosening.
Loosen the fan bolts (with difficulty as adhesive is used!!!)
Remove the fan from the motor shaft (avoid knocking the motor shaft) and disconnect the motor from the protection grid and the motor holder by loosening the bolts.

 When assembling the fan with the motor shaft later on, secure the self-locking bolts prior to loosening (by fluid or mechanically)!

Procedure for Assembling the Cooling Segment:

Mount the cooling element.
Attach the cooling segment to the cover using bolts.
Secure the bolts against loosening with suitable adhesives or mechanical protection.
Mount the inlet and outlet of the cooler accumulator.
Close any open connections and assembly devices if present.
Connect the motor to the power supply, following the procedure described in the section on "Activation" prior to the automatic start-up.



Main Components:

1… Cooler segment
2… Cooler body / cover
3… Feet
4… Fan
5… Motor bracket/holder
6… Protection grid
7… Drive

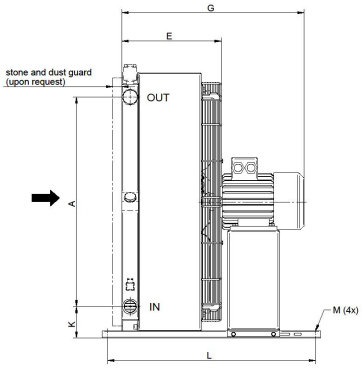
Not shown:

8… Motor console (only if needed)
9… Circulating Pump in the HCP Series (Mounted on the Motor)

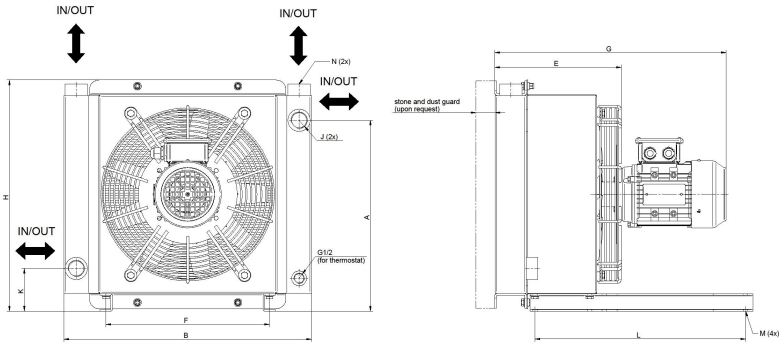
10… Self-locking bolt for air fan

8. Drawings

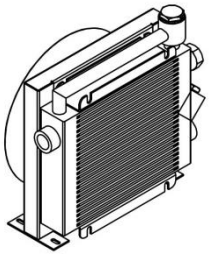
HCA Standard Series:



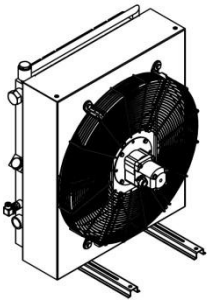
HCAF Flex Type Series:
=>Ports (possible rotation in all directions!



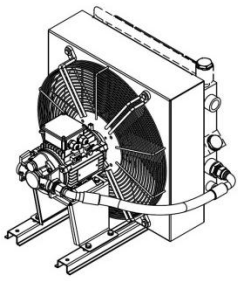
HCD Standard



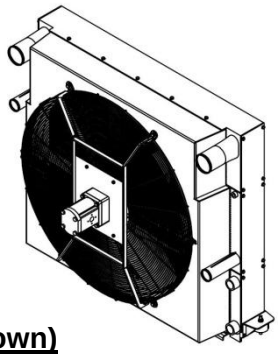
HCH Standard



HCP-Standard

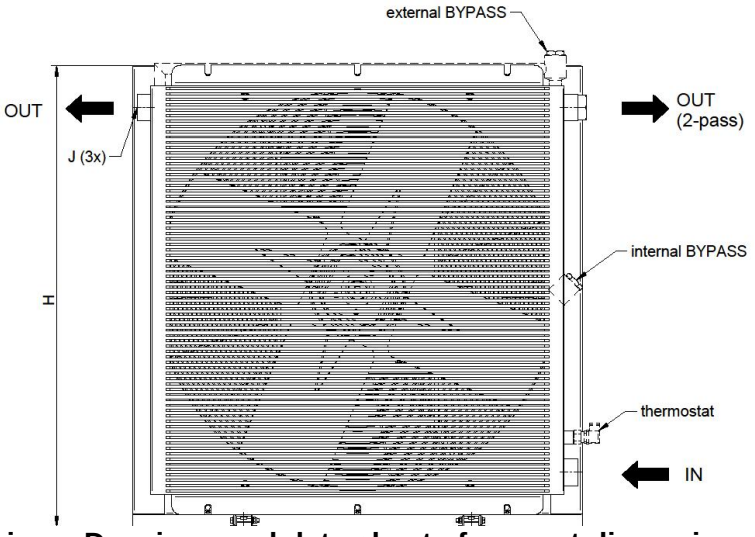


HCC



<u>Other Type Series (e.g. HCD Flex, HCH Flex and HCP Flex are not shown)</u>

Connection:
(for standard series)



Advice:

These are simplified drawings. Drawings and data sheets for exact dimensions, connections etc. are available on request!

9. Declaration of Assembly under the terms of Directive 2006/42/EC on Machinery

Manufacturer:	HENNLICH Cooling-Technologies GmbH Schnelldorf 51 A-4975 Suben, Austria
Designated QM Employee	Gerhard Schwarz
Product:	HC Air Cooler
Models:	HCA, HCD, HCH, HCP, HCC

The manufacturer hereby declares that the above mentioned product is an incomplete appliance under the terms of the Machine Directive 2006/42/EC and that it meets the basic requirements of the Directive (Article 13, Annex II, Volume 1, Section B, Annex VI, Annex VII, Part B).

The product is exclusively designed to be installed into equipment or incomplete equipment and thus it does not meet all the requirements of the Directive on Machinery.

Special technical documents have been issued according to Annex VII, Part B. The person authorized to prepare the technical documents undertakes to submit such documents at the request of state authorities.

The product must not be activated unless the machine in which it is to be installed meets all the basic requirements of the Directive on Machinery and an EC Declaration of Conformity has been issued.

Applicable Directives / Ordinances / Standards:
Directive 2006/42/EC on Machinery
Low Voltage Equipment Directive 2014/35/EU (replacement for 2006/95/EC)
Electromagnetic Compatibility Directive 2014/30/EU (replacement for 2004/108/EC)

Suben, Austria

Gerhard Schwarz