Manual for Installation, Operation and Maintenance

Air-Water Heat Pump

WSLHP7 & WSLHP12

The manual has to be handed over to the end user after installation.

1. Important information

The manual describes the process of installation and maintenance of the device. The installation and maintenance can only be performed by qualified personnel. Read the manual carefully before the installation, this way you will be informed about the intended use, functionality and process of handling the device.

- The manual has to be handed over to the end user after installation.
- In case the product shall be given to a third person for use, the manual has to be handed over to them as well.

Definitions

- An informed person is a person who reads this manual.
- A qualified person has a certificate of expert qualifications.
- An authorised commission contractor is trained by the manufacturer and authorised to perform commission.
- The authorised technician is trained and authorised by the manufacturer to perform maintenance and servicing of the device.
- The user uses the device according to its use.
- The installer is a person professionally trained for performing hardware and/or electro-installation work and mounting of the device.

Incorrect use of the device can lead to damage of the device, property or injury to the user. To reduce risk the manual points out important information with the use of symbols.

1.1 Symbols

These symbols mark various risks for the user or the device.

DANGER: Risk of situations which can lead to serious physical injuries.
WARNING: Risk of situations which can lead to minor physical injuries.
CAUTION: Risk of situations which can lead to damage or malfunction of the device.

This symbol marks information for the user.

NOTE: A notice which holds important information regarding requirements of the manufacturer and the device.

1.2 General

NOTE
Read the instructions for use and installation before installation.

NOTE
Any remaking or replacement of original components of the device eliminates the manufacturerôs guarantee for safe and functional operation. In the case of undesignated and incorrect use of the device the manufacturer is not responsible for the consequences and will not acknowledge claims for damages in these cases. The user is solely responsible for injuries and damages on the device itself or on other objects resulting from undesignated and incorrect use of the device.

NOTE
The installation of the device has to be performed in accordance with the manual; otherwise the manufacturer does not acknowledge the warranty.

DANGER
Failure to comply with the manual and good practise while connecting the device to the power supply can lead to serious injury or death.

WARNING
Connecting the device to the power source can only be performed by a qualified installer.

1.3 Safety warnings and instructions

DANGER
It is prohibited to move, shift, clean or service the device while in operation.

WARNING
It is prohibited to play with the device. Children are not allowed to clean the device without supervision.

WARNING
The device can be operated independently only by informed persons who are familiar with the safe operation of the device and understand possible hazards of its operation. Children older than 8 and people with reduced physical and mental capacities and with lack of experience and knowledge can only operate the device under the supervision of an informed person.

WARNING
Before installation and any further adjustments to the device, it is necessary to consider the manual for safe use and maintenance.

WARNING
Installation has to be performed in accordance with national regulations on electrical installations and with the instructions of the manufacturer. It has to be performed by a professionally trained person.

WARNING
It has to be made sure that the device does not endanger anybody. Access to the device has to be denied to children and persons who are not informed about the operation of the device.

WARNING
The device must never be cleaned with cleaning agents containing sand, soda, acid or chlorides because these might damage the surface of the device.

WARNING
The device contains fluorinated greenhouse gas. This is why tampering with the device is only allowed to persons authorised for working with the coolant as defined by the national legislation in force. While performing works on the device, it is necessary to prevent the coolant to leak into the atmosphere.

WARNING
It is necessary to consider all technical data and instructions in this manual as well as all warnings and notes during planning, design, installation and use of the device.

WARNING
Electrical installations have to be inspected in accordance with regulations on the requirements for low voltage electrical installations in buildings by the installer of electrical installations.

DANGER
Connecting the devices power cable must be performed by a qualified electrician. During the procedure the device must not be live.

WARNING
In case the power cable of the device is damaged it has to be immediately replaced. The replacement can only be performed by the manufacturer and authorised maintenance worker.

WARNING
Before opening the device disconnect all electrical circuits and make sure the device is not live.

CAUTION
Putting any kinds of items on or next to the device is prohibited.

CAUTION
The device must not be placed in a room where it cannot be removed. Later walling or setting up of other obstacles next to the device is forbidden.

CAUTION
In three-phase versions of the device it is necessary to ensure the correct arrangement of phases when connecting it to the power supply.

CAUTION
For the correct operation of the device, the electrical distributor has to provide electricity of adequate quality (SIST EN 50160). In normal conditions this is within ± 10 % of the rated voltage. The data about the state of the electrical grid have to be acquired from the electrical distributor.

CAUTION
Connecting the device to the electrical network has to be performed in accordance with the standards for connecting devices to the electrical network. Connect the device to the electrical network via the power supply cut-off which is installed into the electrical installation under the regulations in force.

1.4 Obligations of the manufacturer

The manufacturer guarantees that the device is in accordance with current European directives and standards. The device is marked with the mark CE and it has all the necessary documentation.

We reserve the right to make changes to the manual without prior notice.

As manufacturer we do not take responsibility for the consequences arising from:

- Non-compliance with the manual for the device.
- Incorrect and/or inadequate maintenance of the device.
- Non-compliance with the manual for the installation of the device.

1.5 Obligations of the installer during installation

The installer is responsible for installing the device in accordance with the following requirements:

- To thoroughly study the instructions for use and installation accompanying the device before installation.
- To install the device in accordance with the instructions and national legislation, policies and standards in force.

1.6 Obligations for commissioning .

CAUTION
The first commissioning can only be performed a commissioning agent appointed by the Waterford Stanley in accordance.

The commissioning agent is responsible for commissioning the device in accordance with the following requirements:

- Performs the first commission and with the installer of others section of heating system eliminates all eventual irregularities found at the commission.
- To train the user for operating the device and settings.
- Alerts the user to regularly maintain the device for keeping the device functioning properly throughout its entire lifespan.
- Gives the user all the documentation accompanying the device.

1.7 Obligations of the user

For ensuring unobstructed and effective operation of the device, the user has to follow the following instructions:

- To thoroughly study the instructions for use and installation accompanying the device before use.
- To have a qualified and authorised installer perform the installation of the device.
- To have a contractor for commissions perform the commission.
- Allow the authorised contractor for commissioning or ask him to thoroughly explain the functioning and how to operate the device.
- Ensure regular yearly inspections and maintenance of the device by the authorised maintenance worker.
- Store this manual in an appropriate dry place close to the device.

1.8 Factory testing

For ensuring the high quality standard every device is tested in production for the following:

- Tightness of the cooling cycle,
- Electrical safety and
- Functionality.

2. Transport and installation of the device

2.1 Transport

CAUTION

- The device must be transported with transport devices.
- Secure the device during transport to prevent damage.
- Transport the device in vertical position.
- It is prohibited to tilt the device above 45°. Otherwise, damage to the cooling system may occur.

2.2 Installation of the device

CAUTION

Appropriate transport equipment must be used for installing the device. Safety regulations and good practise have to be used.

2.3 Storing and warehousing of the device

The device has to be stored in a dry and clean place. The allowed storing temperature is between 10 °C and 45 °C.

3. Delivery package

3.1 The delivery package includes

- The heat pump external unit , the external unit is designed specifically for use with separate condenser (Internal unit) for internal installation.

WSLHP7

WSLHP12

- Manual for Installation, Use and Maintenance
- Instructions for use (accompanying the internal unit).
- Plugs for plugging the holes of the condensation vessel.
- Fitting for attaching the condenserôs drainage pipes.
- Rubber support legs (4x).

3.2 Internal device

The internal device is installed depending on the design of the heating system:

- Internal unit - WSL141 & WSL142 Installation and operation manual

3.3 Package and worn-out device management

- Sort the package according to cardboard, wood and foil and dispose of it in appropriate containers.
- After the lifespan of the device ends it has to be disposed of in accordance with the legislation on waste electrical and electronic devices in force.

Refrigerant

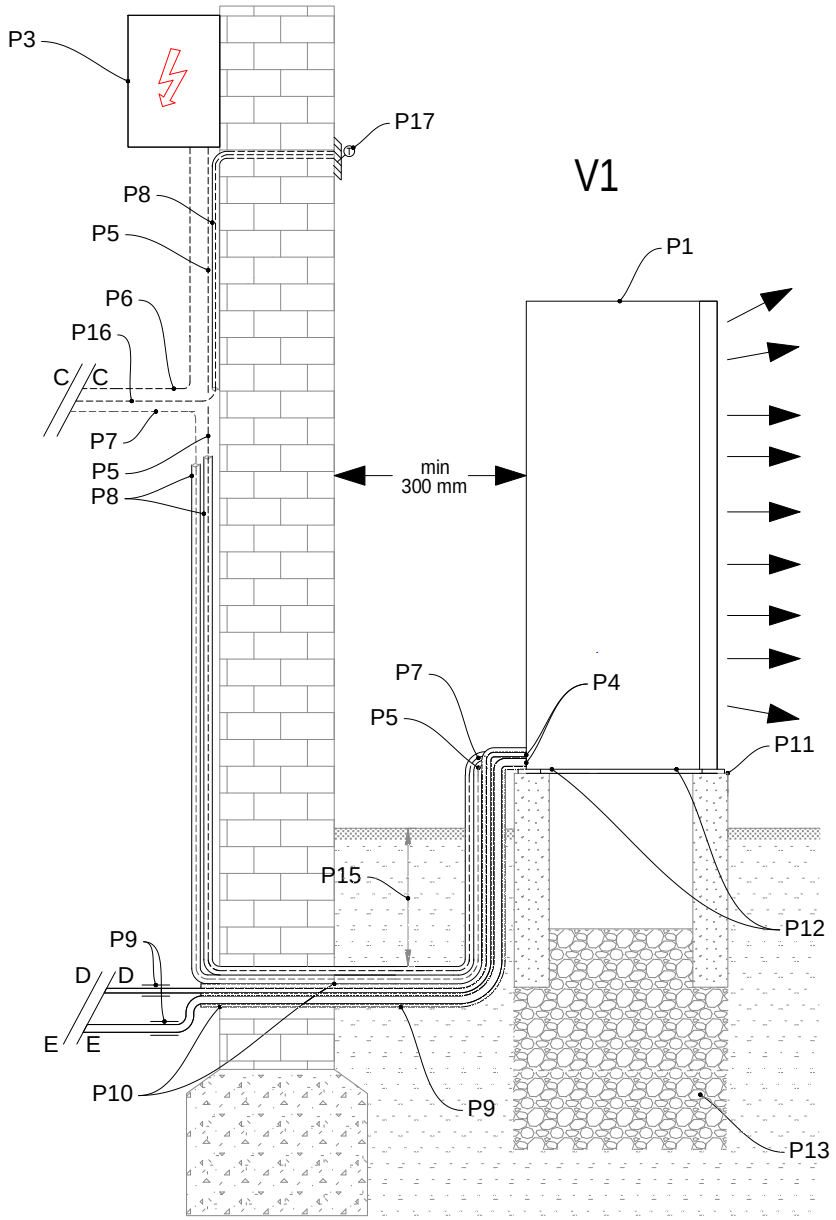
The device holds the fluorinated greenhouse gas. You have to prevent leakage of the gas into the atmosphere. During a maintenance procedure or removal of the device it has to be made sure that the gas is removed in accordance with the current regulations on the use of substances harmful to the ozone and fluorinated greenhouse gasses.

4. Installation of the device

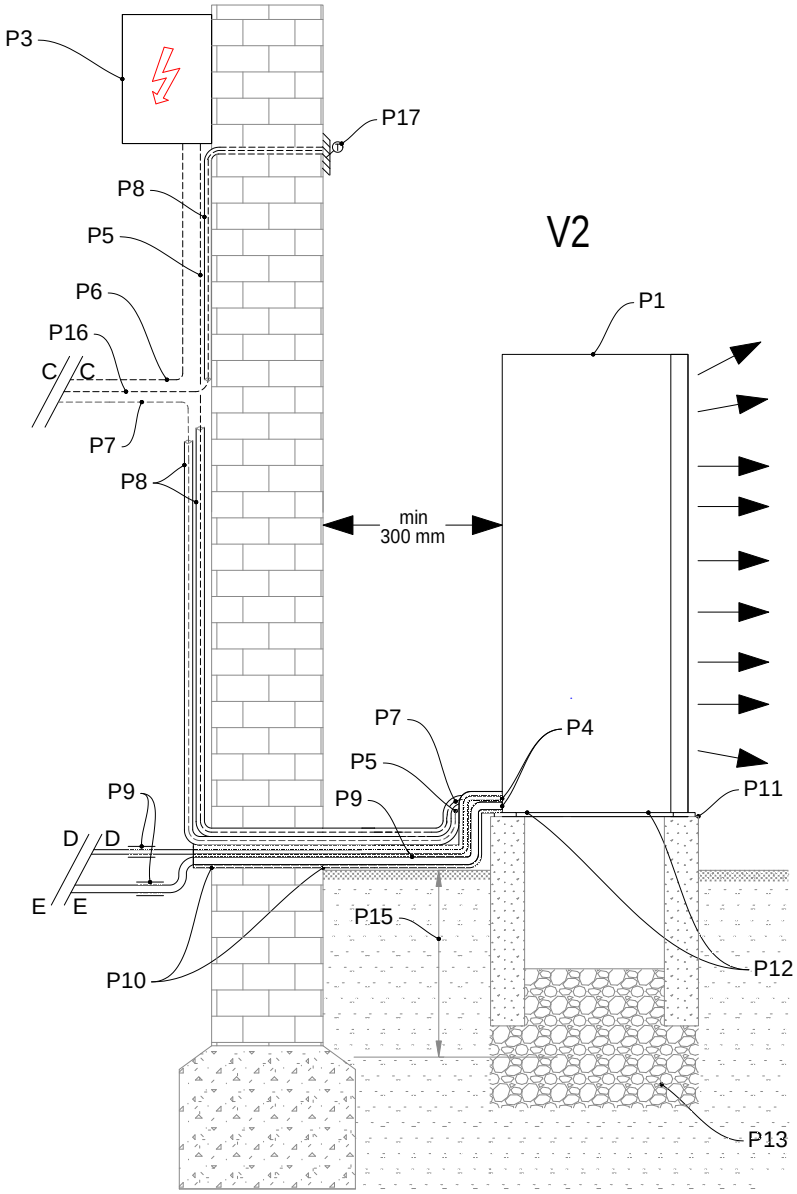
4.1 General

The device provides a hardware connection with the utility room from three different sides. From the side, the back and the front. With the installation of V1 and V2 two most common installations are shown.

INSTALLATION-V1



INSTALLATION-V2



C	Electrical and communication connection	P7	Communication cable - connection between external and internal control unit
D	Refrigerant (freon) line - for liquids	P8	An adequate protection hose separate for power / communication
E	Refrigerant (freon) line - for gas	P9	Heat insulation with appropriate screen (for example ALU harness)
P1	Heat pump - external device	P10	Wall penetrations must be water-proofed and adequately insulated
P3	Electrical cabinet	P11	Concrete pedestal for the device
P4	Cooling (freon) line	P12	Condensate drainage (drained through the holes on the bottom of the condensation vessel)
P5	Power cable - external control unit	P13	Sink
P6	Power cable - internal control unit	P15	Frost limit (depending on the geographical location)
		P17	Temperature sensor for external temperature

Devices for external installation must be placed on a level concrete foundation (chapter 4.2.5). For exact position and dimensions of pipe connections, see technical data (chapter 7). Along with pipes for the hydraulic connection, install also pipes with wire rope (it is advisable to separate the power / sensors). Use this wire rope to lay the two external devices power cables and the jacketed communication cable from the utility room. The recommended diameter of this pipe is given in the table below and depends on the dimension of the power cable.

Dimension of the power cable (mm^2)	**The recommended diameter of the ribbed protective pipe (mm^2)**
5 x 2.5	35
5 x 4	35
5 x 6	40

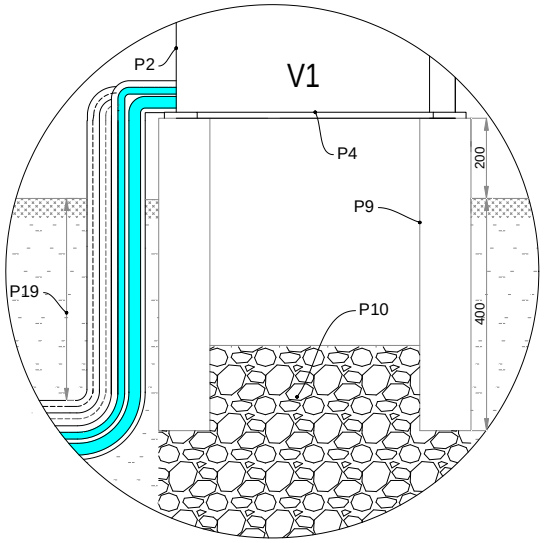
For the appropriate diameter of the power cable, see technical data (chapter 7.2).

Make a sink for the condensate forming in the evaporator of the device underneath the concrete foundation. The sink must be under the frost limit to ensure unobstructed drainage.

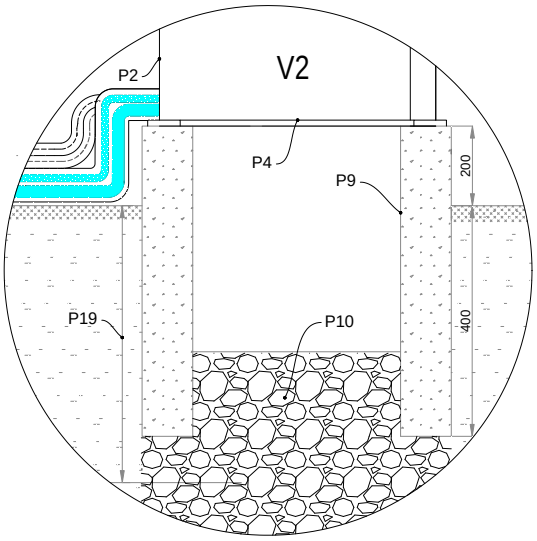
Sink in installations V1 or V2

When installing the pedestal, the installations V1 and V2 can be chosen according to the connection with the utility room.

Sink in installation V1



Sink in installation V2



Legend:

P2	External device	P9	Concrete pedestal serving as shaft - recommended dimensions: 1100 x 500
P4	Condensate drainage (drained through the holes on the bottom of the device)	P10	Stones
		P19	Frost limit (depending on the geographical location)

4.2 Location of the device

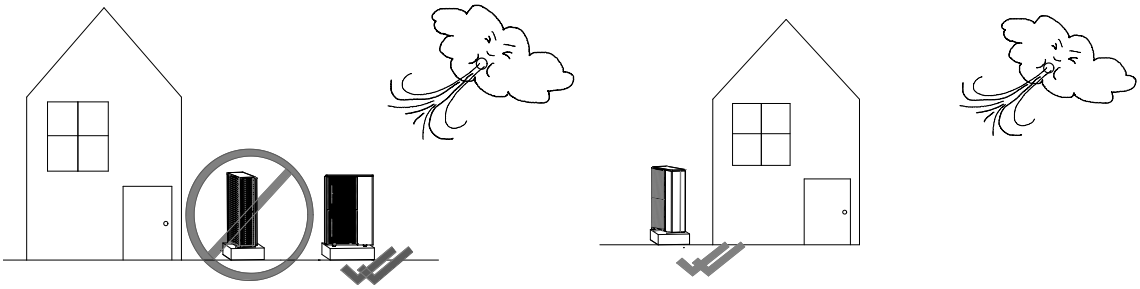
CAUTION

- The concrete pedestal must carry the weight of the device. See technical information.
- The device must be levelled

NOTE
It is obligatory to consider the minimal clearance from obstacles for ensuring unobstructed access for maintenance and service of the device.

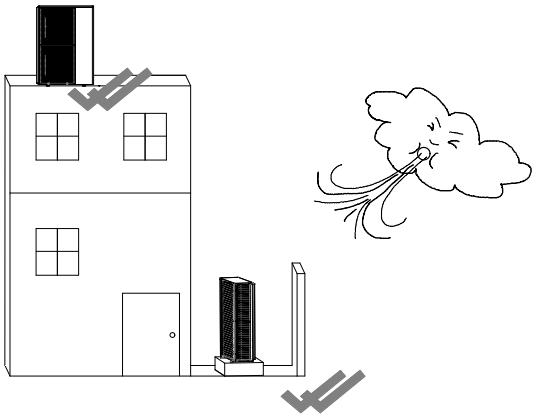
NOTE
The location of the device has to be accessible with manual transport devices to ensure undisturbed delivery of replacement parts and equipment for maintenance and servicing. Costs connected with hiring special equipment for installing the device, servicing and maintenance are charged the operator separately and are not subject of the warranty.

The device must not be set up at a location, which is subject to stronger and lengthy gusts of wind they could obstruct the normal air circulation through the evaporator which could result in disruptions in operation.



In case the device is installed in the wind direction, it is necessary to install adequate wind protection.

- Wind protection must be robust enough to prevent the influence of the wind. The best option is a concrete or brick version.
- The height and width of the wind protection must be at least 150 % of the basic dimensions of the device. Only these dimensions enable adequate wind protection of the device.
- The wind protection must be located at least 3000 mm away from the external device to ensure sufficient air flow.



NOTE
The device must be set up in a leeward location.

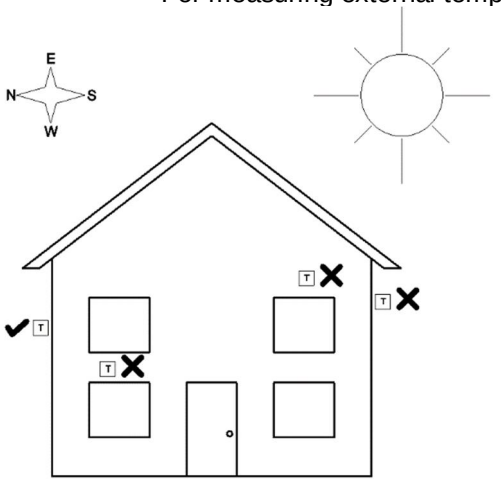
NOTE
Salt or dust gathering on the outer heat conductor must be regularly cleaned (dust once yearly and salt in coastal regions at least three times yearly) or rinsed with water.

4.2.1 Set up and connection of the external sensor.

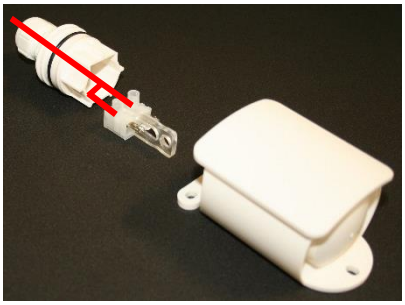
For controlling the heating according to the external temperature, it is necessary to install the external temperature sensor.

CAUTION

- The sensor must be set up in a shady spot.
- **The sensor must not be set up above a window or door.** It must be located away from heat sources.
- For measuring external temperature, the sensor type **PT 1000** is used.



Temperature sensor for external temperature.



The direction of connecting cables.

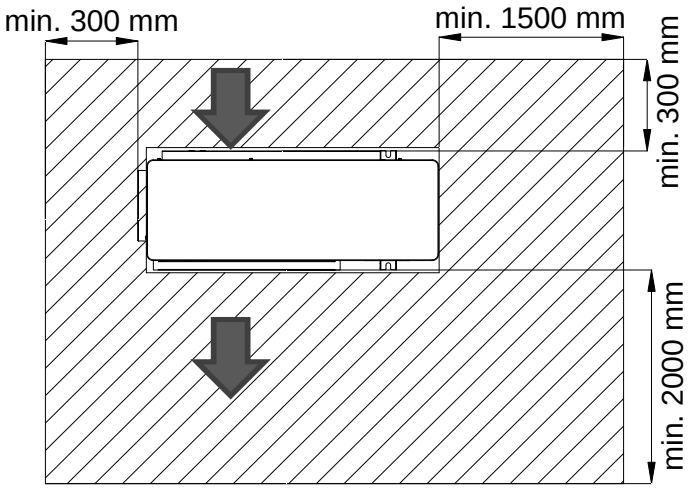
T Temperature sensor for external temperature.

CAUTION

The external sensor must be connected and watertight to prevent water penetration.

4.2.2 Minimal clearance from the device

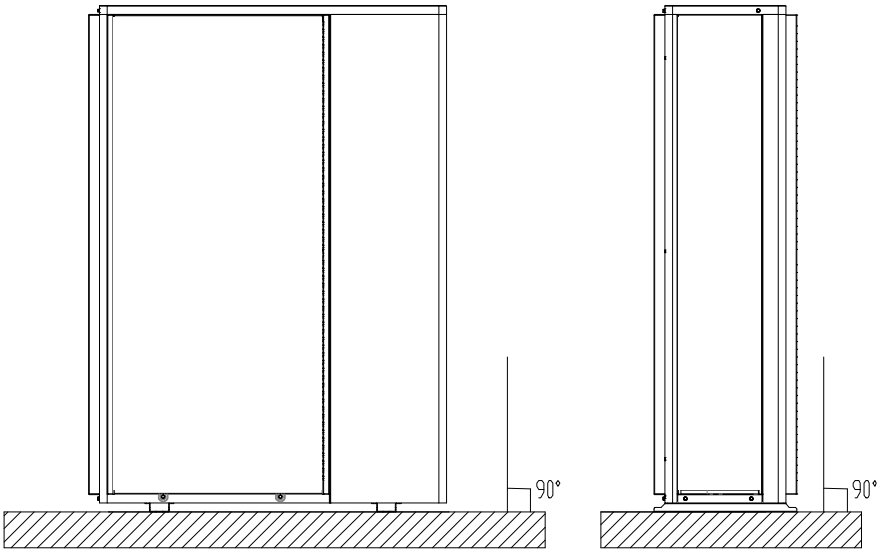
The air direction and minimal clearances of the external device from walls for seamless operation, maintenance and servicing.



- The clearances for the internal device are provided in the document **Manual for Installation, Use and Maintenance – Hydro Module.**

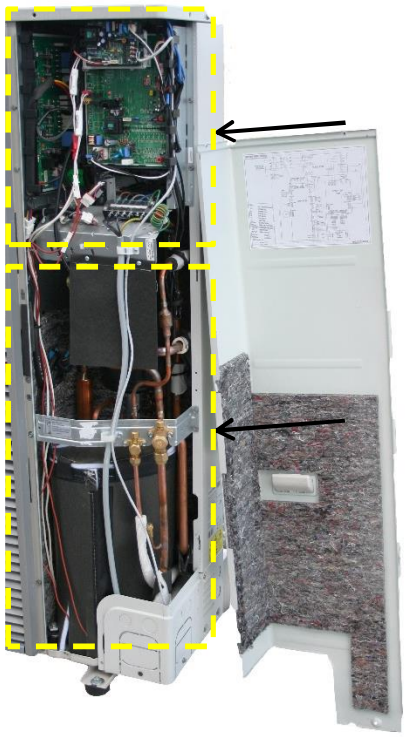
4.2.3 Levelling of the device

The external device must be levelled in the horizontal position as shown on the diagrams below:



4.2.4 Removal of side

Unscrew 3 screws of the side



Electrical and machine connections

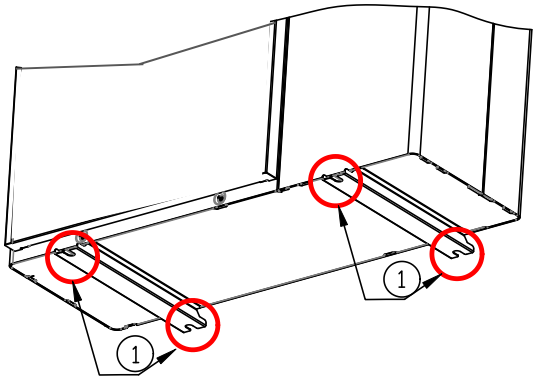
- Unscrew the screws marked with 1 on the front and right side of the device.
- Pull down the lower part of the side (2) and open it towards you.

4.2.5 Concrete pedestal

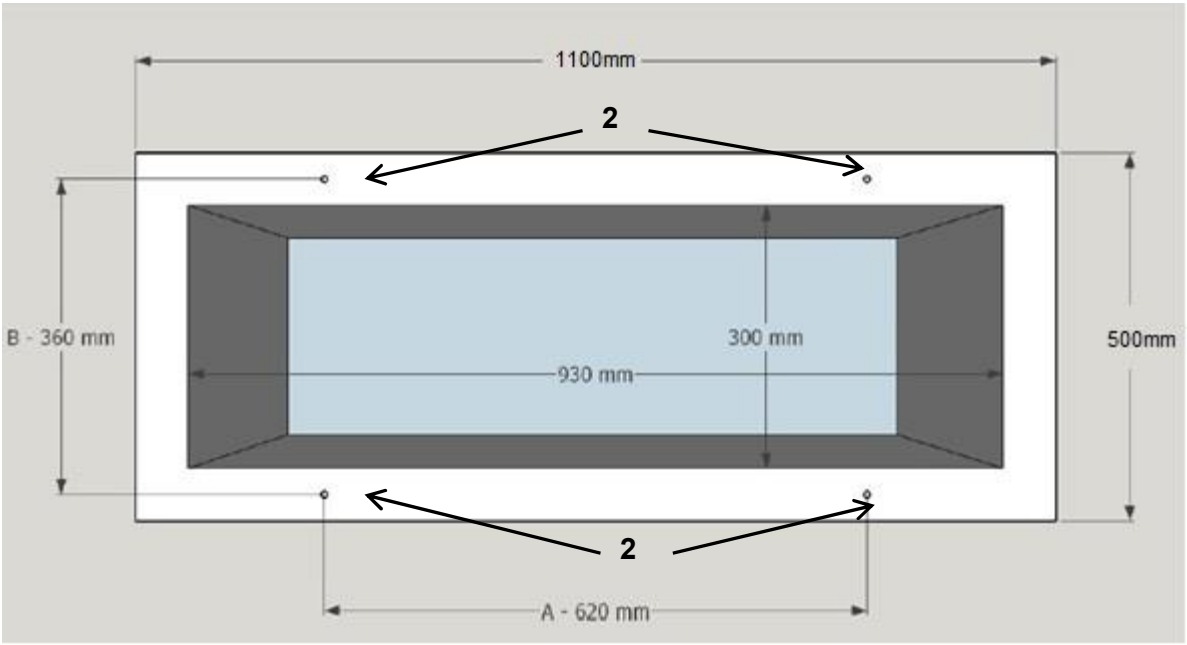
The installation (connections above or below ground) routed from the utility room to the device does not influence the make of the concrete pedestal.

Because of greater safety, installation using an underground cable duct is recommended (installation V1).

Installation of the concrete pedestal The recommended minimal edge thickness of the pedestal is 60 mm. Width 1050 mm, depth 420 mm and height 600 mm.



CAUTION
The device must be screwed on the designated places (1) to the concrete pedestal because of the possibility of stronger gusts of wind.



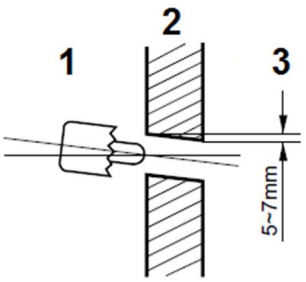
Legend:

1	Attachment points at the concrete pedestal	2	Attachment points of the device

4.2.6 Wall penetration for the refrigerant and electro-communication connection

When installing a refrigerant and electro-communication connection between the internal and external device, please note:

- The passage through the wall must be drilled with a crown drill with the diameter of 70 mm for laying pipe connections.
- The hole for the pipe connection must be slightly sloped in the direction towards the external device to prevent water penetrating into the building. See the diagram below.



1 Internal device
2 Wall
3 External device

4.3 Refrigerant pipe connection of the exterior and interior device

Connect the exterior and interior device with refrigerant pipes.

NOTE
Use insulated pipes for the installation of the connection between external and internal device.

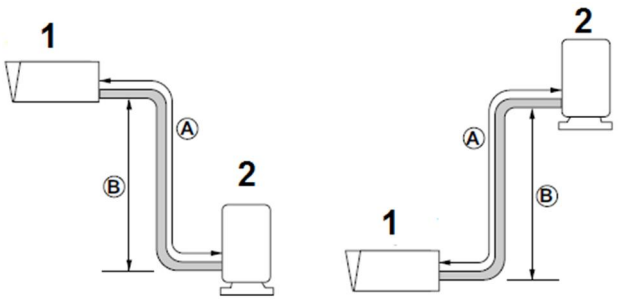
CAUTION
The refrigerant pipes filled with nitrogen are always laid closely sealed to prevent impurities, air, moisture and contaminants penetrating the interior.

4.3.1 Determining the length of the connection pipes

- When determining the length of connection pipes, follow the instructions for the maximal allowed pipe length and the height difference between the devices.

CAUTION
The refrigerant pipes must not be installed alongside the heating in the screed or alongside any kind of source of heat or cold.

The data on permitted lengths and height differences between devices



1 Internal device
2 External device

The average length of the refrigerant connection between the devices is 7.5 m. **The external device is factory filled for connections of up to 15 m.** For longer connections, it is necessary to supplement the refrigerant according to the table below.

Model	Pipe diameter [mm]		Length A [m]		Length B [m]		Supplement of refrigerant [g/m]
	Gas	Liquid	Min.	Max.	Normal	Max.	
WSLHP7	15.88 (5/8")	9.52 (3/8")	3	30	0	12	40
WSLHP12	15.88 (5/8")	9.52 (3/8")	3	30	0	12	40

WSLHP7 and WSLHP12

Example 1: When installing the external device and accompanying internal device with the distance of 30 m, it is necessary to supplement the system with additional refrigerant. The quantity of the refrigerant is calculate with the following equation:

(30 m ï 15 m) x 40 g/m = **600 g**

In the given example, it is necessary to supplement the system with **600 g** of refrigerant **R410 A.**

NOTE
In case of installing an internal device which is higher than the external device and when the height difference is 4 m or more, a qualified person has to manufacture oil siphons for every 4 m of height difference to enable adequate oil transport.

In case the external device is higher than the internal device, oil filters are not necessary.

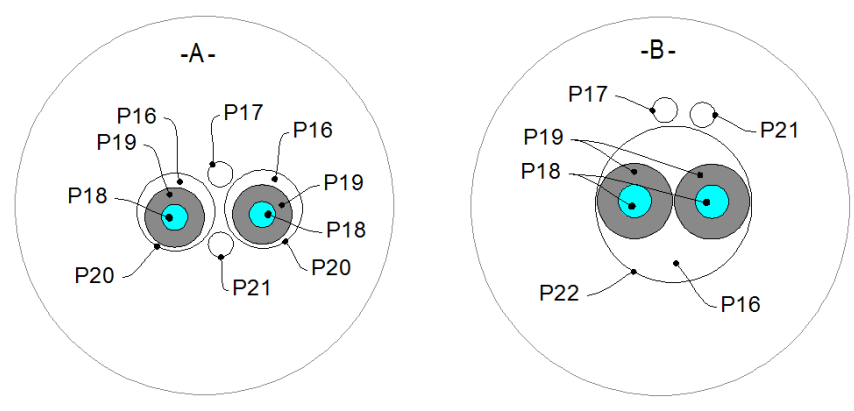
WARNING
The device contains the refrigerant HFC which is classified as a greenhouse gas. Only persons authorised for working with the refrigerant as defined by the national legislation in force are permitted to work on the appliance. While performing works on the device it is necessary to prevent the refrigerant to leak into the atmosphere. Contact Waterford Stanley for a local engineer who is f gas registered and trained on Waterford Stanley heat pumps.

4.3.2 Pipe connection protection

CAUTION
The pipeline and electrical cables have to be protected with heat and waterproof insulation in a protective pipe. This prevents soaking of the pipe connections in cases of high groundwater or rainwater and with it intensive draining of heat into the surroundings.

The pipe connection between the external and internal device can be made by laying the pipes in two ways:

- A inside two separate ribbed protective pipes,
- B in one joint ribbed protective pipe.



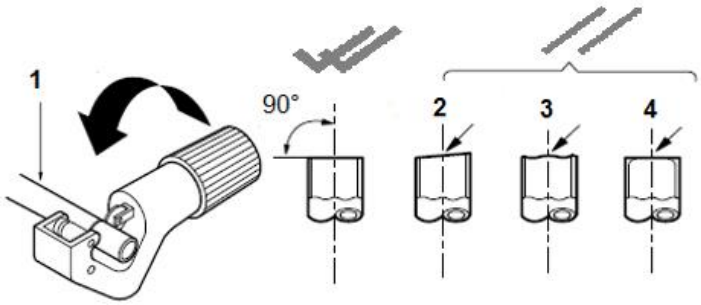
A		B	
P16	Fill with waterproof polyurethane foam, i.e.: purpen	P20	Ribbed protective pipe min. ὲ 75
P17	Protective pipe for external sensors or communication cables	P21	The ribbed protective pipe for the power cable depends on the dimension of the supply cable
P18	Copper pipe Cu	P22	Ribbed protective pipe min. ὲ 150
P19	Insulation min. 13 mm.		

4.3.3 Preparation of the refrigerant pipe

Prepare the pipe in steps. Unsuitably made joints are one of the main reasons for leakage, the joints must thus be made thoroughly and in accordance with the listed steps.

STEP 1: Cutting the pipe

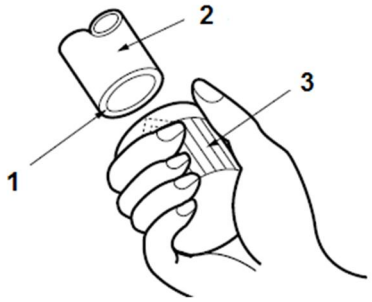
- Use a pipe cutter which does not leave chips to cut the pipe.
- Determine the distance between the exterior and interior device.
- Cut the pipes longer in order to make it possible to connect the internal and external device normally.



1 Copper pipe
2 Inclined
3 Uneven
4 Rough

STEP 2: Removal of chips

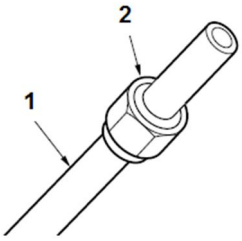
- Remove all chips from the part where the pipe was cut.
- Hold the pipe downwards during cleaning so that the chips do not fall into the pipe.



1	Copper pipe	**3**	Beveler
2	Copper pipe held downwards		

STEP 3: Inserting the screw nut

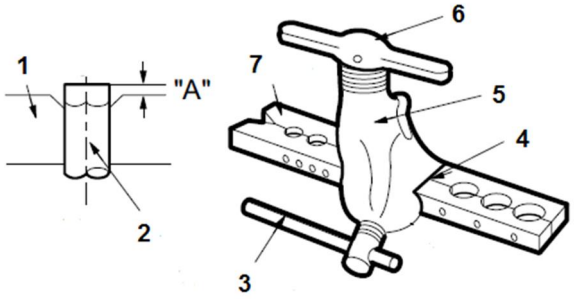
- Removing the screw nut from the exterior unit.
- Inserting the screw nut into the pipe which has been cleaned.



1	Copper pipe	**2**	Screw nut

STEP 4: Edging

- The edging has to be performed with tools for edging as shown:



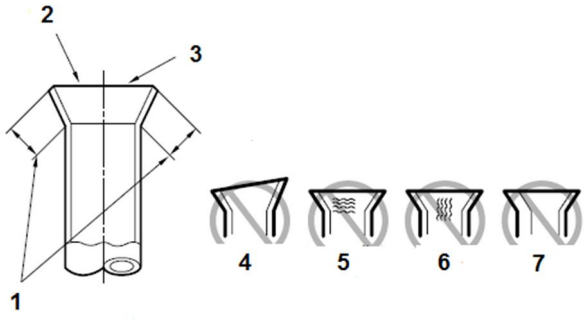
1	Holder	**4**	Cone
2	Copper pipe	**5**	Bracket
3	Fitting	**6**	Handle
		7	Holder

- Mount the copper pipe firmly into the tool for edging. Consider the dimensions listed in the table below.

External diameter		"A"
[mm]	**[inch]**	**[mm]**
9.52	3/8	1.5 ~ 1.7
15.88	5/8	1.6 ~ 1.8

STEP 5: Testing

- Compare the edging of the pipe with the drawing below.
- In the case of damaged edging, cut the part off and repeat the edging procedure.



1	Circular edging of the pipe of the same length.	**4**	Inclined edge
2	Circularly smooth edge	**5**	Uneven surface
3	Interior edge and surface without scratches	**6**	Cracked / rough
		7	Unequal thickness

4.3.4 Connecting the pipe-refrigerant connection on the exterior device

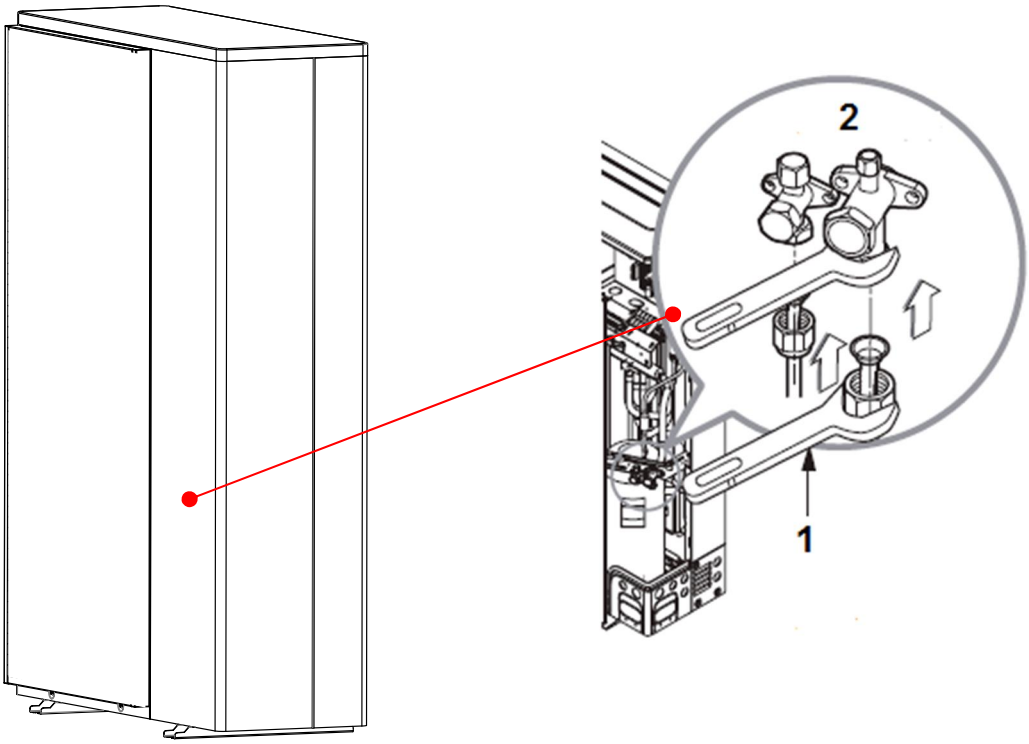
STEP 1: Determine the direction of the pipe connection

- The pipe can be connected to the external device in various directions (cee chapter 4).

STEP 2: Mounting

- Remove the side (see chapter 4.2.4).
- Align with the middle of the pipe and then tighten the screw nut by hand.
- Tighten the screw nut with a torque wrench until it clicks.
  Prescribed torques for tightening:

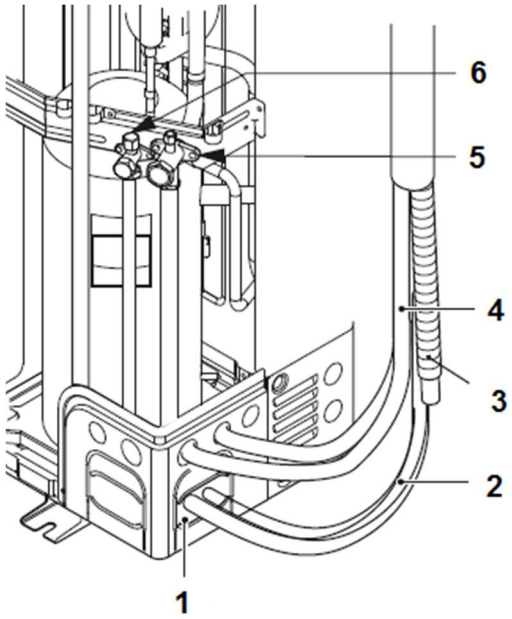
External diameter		Torque
[mm]	[inch]	[Nm]
9.52	3/8	34 ï 42
15.88	5/8	65 ï 81



1 Torque key
2 Counter key

STEP 3: Preventing foreign bodies entering the unit

- Tightly seal all openings which occurred on the housing of the external device during installation with sealant or any sealing insulation sold separately.



1	Putty or sealant for closing the openings	**4**	Connecting cables
2	Pipe connections	**5**	Gas pipe
3	Condensation tube (if needed)	**6**	Liquid pipe

4.3.5 Leak test

After screwing the pipe check the tightness of the pipe connection between internal and external device. Remove all non-condensing gasses and moisture from the device (the system needs to be vacuumed).

STEP 1: Preparation

Make sure both pipes (gas and liquid pipe) between the devices are connected correctly.

STEP 2: Leak test

Connect the service manometer (with pressure gauge) to the nitrogen gas bottle and filling pipes and filling pipes on the service valves.

WARNING
Do not open the valves of the external device until all installation works are completed. The device is filled with HFC refrigerant which expands at standard atmospheric pressure.

STEP 3:

- Fill the system with nitrogen up to **1.1 x Max. operating pressure** Close the closing valve on the nitrogen gas bottle at **1.1 x Max. operating pressure**. For *Max. operating pressure* of the device, see chapter 7.2.

DANGER
When filling the system with nitrogen, follow proper safety distance and safety at work.

- Close the valve on the nitrogen gas bottle.

NOTE
Prevent the penetration of nitrogen into the refrigerant system by always placing the upper part of the nitrogen gas bottle with the valve higher than the lower part during filling of the system. The gas bottle is used in vertical position.

STEP 4:

- Use a soap solution to perform the leak test on all coupling areas of the pipes (on the external as well as internal device) and both service/connection valves, the gas and liquid pipe. The presence of bubbles indicates leakage. After the test, remove the soap solution with a clean rag.

STEP 5:

- If there was no leakage found on the device, vent the nitrogen out of the system.

4.3.6 Vacuuming of the system

CAUTION
The pipe connections must be prepared according to instructions (chapter 4.2.6) to avoid the presence of moisture/water and impurities in the system.

Vacuuming is performed in the following steps:

STEP 1:

Connect the end of the filling pipe which was used for filling nitrogen to the vacuum pump. Begin vacuuming on the service connection pipes (gas and liquid) and pipe connections to the internal device **until the end absolute pressure of 0,03kPa (0.3 mbar)**. Vacuum the gas and liquid side at the same time. The time needed for vacuuming the system depends on the length of the device and power of the vacuum pump.

STEP 2:

When the required vacuum in the system is reached, close the connections to the service manometer and turn off the vacuum pump and check:

a) If the absolute pressure after 10 min is raised and stays at 230 microns (0,03 kPa [0,3 mbar]).

b) If the absolute pressure after 10 min is raised and stays at 1000 microns (0,13 kPa [1,3 mbar]) and 5000 microns (0,67 kPa [6,7 mbar]), the system contains moisture and the vacuuming of the system needs to be repeated.

c) If the absolute pressure is (quickly) raised above 5000 microns (0,67 kPa [6,7 mbar]), the system is leaking.

4.3.7 The release of the refrigerant from the external device into the finished system

STEP 1:

Use hex key No. 4 to completely open the valve on the liquid side and hex key No. 5 on the gas side of the external device (counter-clockwise).

STEP 2:

If needed, add refrigerant to the device in accordance with the table in chapter 4.3.1.

STEP 3:

Carefully remove the filling pipe with service manometer to prevent refrigerant leakage.

STEP 4:

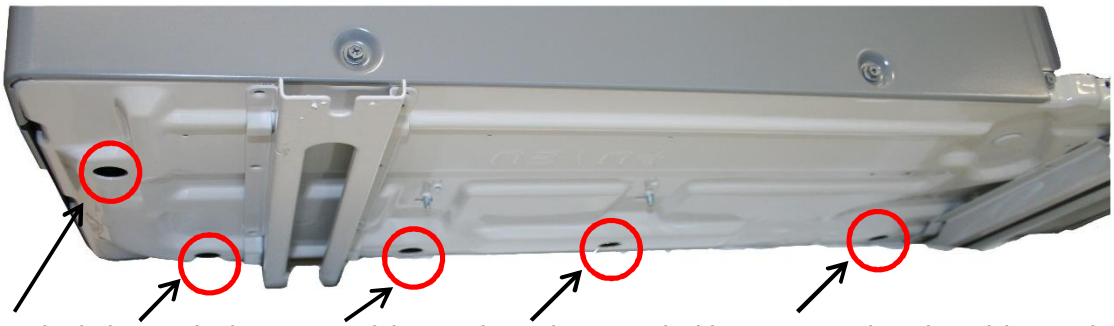
Attach the screw nut and cover on the suction side back to the service valve/connection. This part of the process must be performed carefully and exactly to prevent potential leakage of the system. Make sure the cover has the gasket.

STEP 5:

Set the covers on the service valves/connections on the gas and liquid side and attach them.

4.3.8 Condensate drainage

The device has multiple openings for condensate drainage on the bottom side of the condensation vessel. It accumulates on the evaporator from the air or is a consequence of evaporator defrosting. In case a sink will be installed without a drainage pipe, leave all openings for condensate drainage open. In case a PVC drainage pipe is installed on the sink, use plugs (1) and plug 4 holes; attach the fitting for the drainage pipe for condensate on the remaining one (2). The pipe for condensate drainage must be installed lower than the hardware connections of the utility room and device. It can also be routed to the rain water sink; in this case freezing of the pipe must be prevented.



Plug the holes on the lower part of the condensation vessel with accompanying plugs (1). Attach the fitting for attaching the condenserôs drainage pipes (2) to one of them.

1	2
	

You can also install a pipe for condensate drainage which has to be lower than the hardware connection of the utility room and device. It can also be routed to the rain water sink; in this case freezing of the pipe must be prevented. In case a condensate pipe is not installed, leave open the openings on the bottom of the device (chapter 4.3.8).

WARNING
If the condensate drainage is fed to faecal sewage, a suitable syphon must be installed on the drainage pipe. Otherwise, the presence of ammonia can lead to corrosion of vital parts of the device and malfunction of the device.

4.4 Electrical connection

Connect the external device to the mains according to the instructions described in this chapter.

CAUTION
Connecting the device to the electrical network has to be performed in accordance with the standards for connecting devices to the electrical network. The device has to be connected to the electrical network via the power supply cut-off which is installed into the electrical installation under the regulations in force.

DANGER
The final electrical connection can only be performed by the person authorised by the manufacturer to ensure the correct and efficient operation of the device.
IT IS STRICTLY PROHIBITED FOR UNAUTHORISED PERSONS TO TAMPER WITH THE ELECTRICAL CONNECTION OF THE DEVICE.

DANGER
The device must be connected to the mains, which has a built-in RCD residual-current device, switch type A.

CAUTION
The device must be connected to the mains with a cable with an appropriate **diameter**. The electrician defines the diameter of the cable according to the **installation method, distance** of the device from the main electrical cabinet and the **power** of the device.

WARNING
Pay attention to the characteristics of the inputs and outputs. Incorrect connection can lead to damage to the device.

4.5 Removal of the external device cover

See chapter 4.2.4.

4.6 Connecting the external unit

In the scope of the external unit it is necessary to connect the following two cables (see technical data 7.2):

- External unit power cable.
- Plated communication cable between external and internal control unit.

4.6.1 Power cable connection of the external unit

DANGER
Connecting the device to the power source can only be performed by a qualified installer in a voltage-free state.

CAUTION
The cable must be routed through the cord anchorage installed before the connecting terminals in the indoor unit. Make sure the cable connected in the indoor unit is relieved from strain.

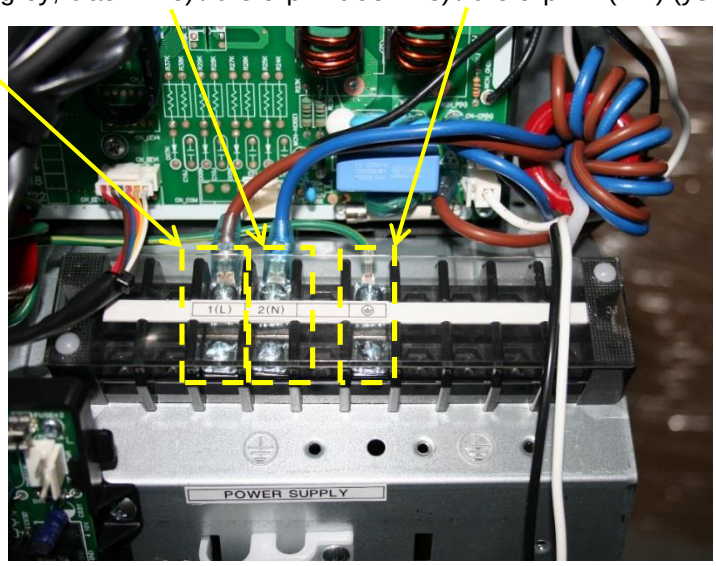
CAUTION
Wrong dimensioning of the power cable or too weak terminal fuses of the device could lead to an overload of the safety elements on the power grid of the building which could lead to overheating of the electrical installation. Follow the requirements listed in this manual.

CAUTION
The communication cable must not be laid together with energy cables (in accordance with good engineering practise and regulations).

Connecting clips of the supply cable WSLHP7 1F and WSLHP12 1F

The device is powered by the supply cable ~230 V / 50 Hz and is connected to connecting clips L / N / PE (⏚). The dimensions of the power cables are listed in the technical information (chapter 7.2).

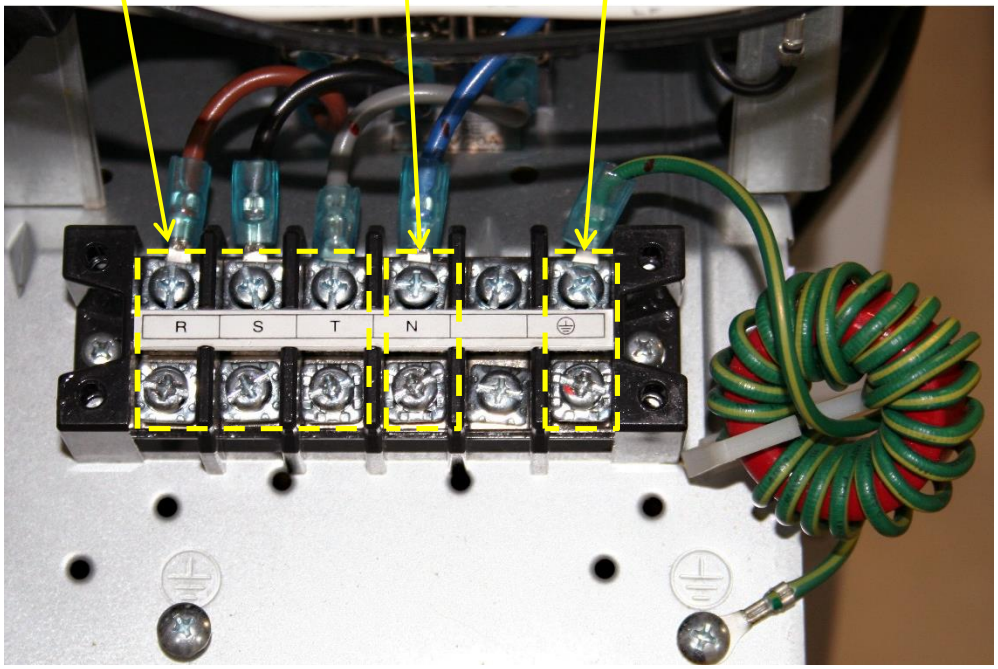
The clip L1 (brown, grey, black wire) / the clip N blue wire) / the clip PE (⏚) (yellow-green wire)



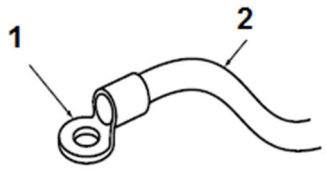
Connecting clips of the supply cable WSLHP12 3F

The device is powered by the supply cable 3N ~400 V / 50 Hz and is connected to connecting clips R, S, T (3 x black or black, grey, brown wire) / N / PE (⏚). The dimensions of the power cables are listed in the technical information (chapter 7.2).

The clips R, S, T (brown, black, grey) / clip N (blue) / clip PE (⏚) (yellow-green)



For connecting the connecting clips of the device, use cable eyelets or cable lugs.



1 Round connecting fitting **2** Power strip

In case of using a stiff cable or cable eyelets, follow the following instructions:

- The use of cables of different sizes is not allowed in making connections (slackness can occur which can lead to extreme overheating).
- More cables of the same thickness must be connected as shown on the picture below.

4.6.2 The connection of the plated communication cable to the external unit

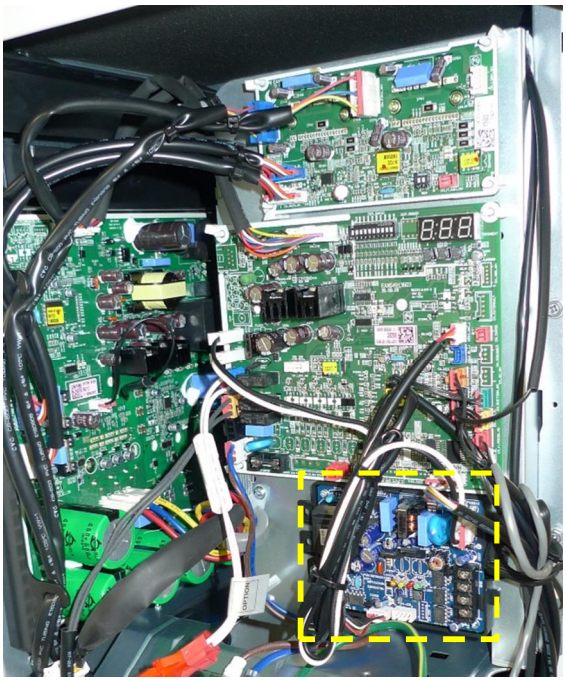
The communication cable is intended for communication between the external Gateway PI485 and the internal input/output module.

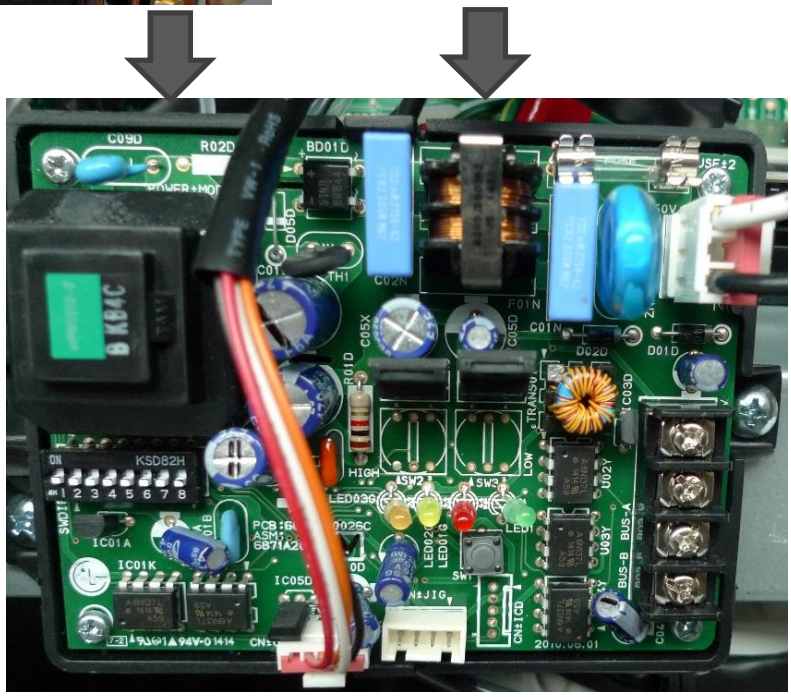
Connecting of the communication connection on the exterior device

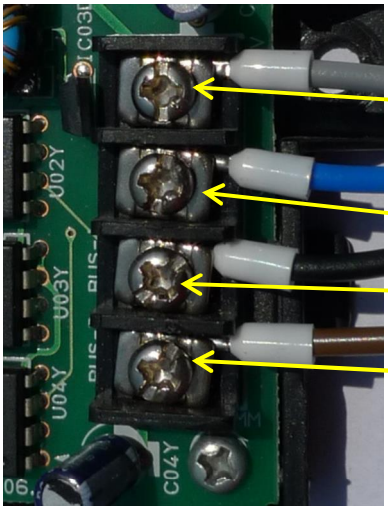
- After laying the plated cable between the external and internal device, use four cables you connect to the connection clips **Bus_A [+]** / **Bus_B [-]** / **GND** / **10 V** on the **Gateway PI485** module. Gateway PI485 is located on the external device as shown on the picture below.

WSLHP7

WSLHP12







Connect the communication cable on terminals:

10 V

GND

BUS ï A

BUS ï B

DANGER
The communication connection is considered as a low-voltage connection. The type of the communication cable must be H05VV-F 4 x 0.75mm2 (IEC 60227-53) or similar.

For connecting the plated communication cable of the internal unit, see:

- **WSL141 & WSL142 Installation and Operation manual**

4.7 Connecting the internal device

See:

WSL141 & WSL142 Installation and Operation manual.

4.8 Spatial corrector

See:

- **Instructions for installing and using KT-1** or
- **Instructions for installing and using KT-2**

5. Commissioning of the device

CAUTION
Before the commission it is necessary all the required tasks and inspections from the tasks for commission.

After professional installation, the authorised contractor has to perform the commissioning of the device.

CAUTION
The commission can only be performed by a person authorised by Waterford Stanley If the commission is performed by an unauthorised person, the warranty is not recognised.

Management of the device must be performed in accordance with current instructions for use.

6. Maintenance

The device must be visually inspected once a year. The electrical and hardware installation of the device as well as the state of the evaporator have to be inspected. In case irregularities and impurities are detected on the evaporator or clotting of the channels between the lamellas, contact the authorised service engineer to perform cleaning.

CAUTION
The servicing and maintenance of the device can only be performed by a person authorised by the Waterford Stanley.

6.1 Cleaning of the heat exchanger

6.1.1 Cleaning the heat source (air side)

The air lamella heat exchanger must be checked at least 1 x yearly. In case of impurities in the air dust can accumulate on the surface of the heat exchanger which worsens heat exchange in the air. In this case the evaporator has to be cleaned. The cleaning has to be performed by a qualified person.

DANGER
Before cleaning, make sure the device is turned off and in a voltage free state.

WARNING
Do not touch the evaporator with your hands so as not to cut yourself on the lamellas.

Cleaning the lamella conductor should be done with an air jet which blows away dust particles on the lamella heat conductor. The evaporator can also be cleaned using a soft water spray or purpose cleaning agents intended for cleaning the lamellas of the conductor. Be careful not to deform the lamellas and cause uneven air flow and degraded performance of the device.

WARNING
Heating the air heat conductor (evaporator) can only be performed by an authorised person. The manufacturer is not liable for damage to the user or device. All damage to the device caused by inappropriate cleaning are not covered by the warranty.

6.2 Disturbances in the operation

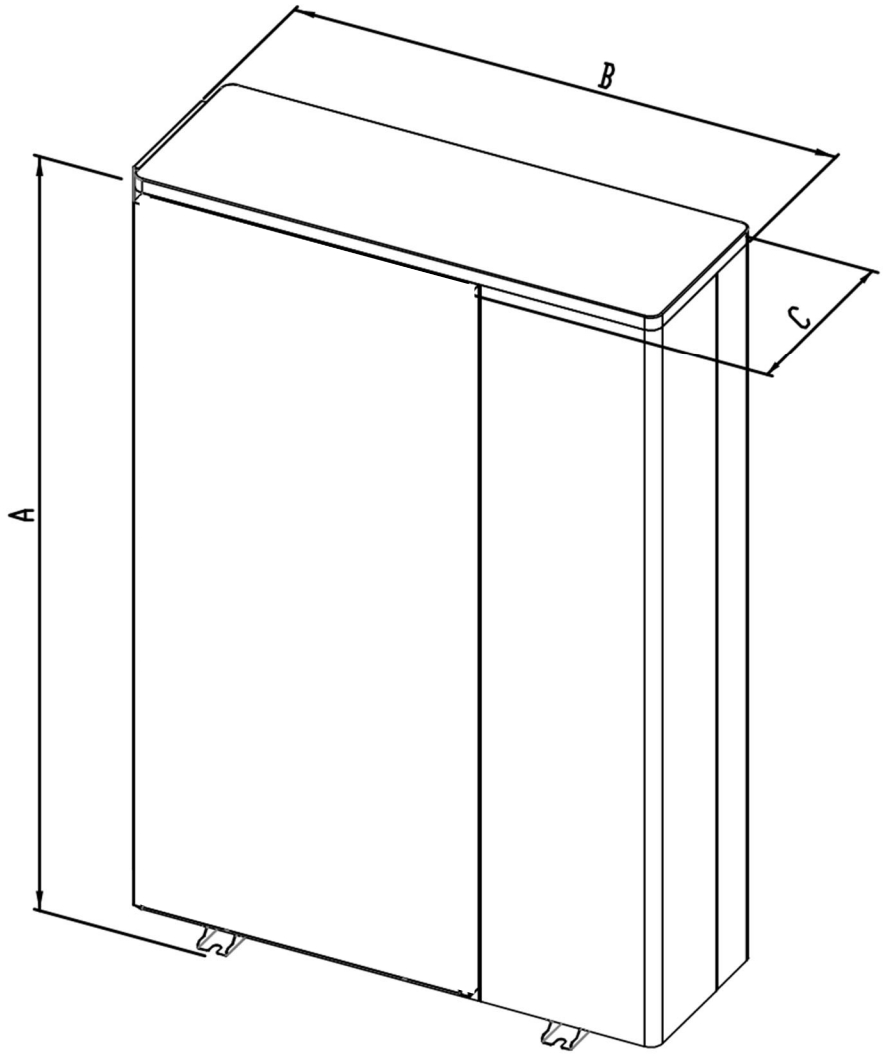
In case of a malfunction during the operation of the device the display of the TERMOTRNIC controller displays the warning ñCaution, malfunctionò

Find the malfunction description in the manual. For error correction call the installer who installed the device.

CAUTION
In case of heavy snowfall, it has to me made sure the snow does not obstruct the airflow through the evaporator.

7. Technical data

7.1 Dimensions of the device



Device	WSLHP7	WSLHP12
Dimensions A [mm]	834	1380
Dimensions B [mm]	990	990
Dimensions C [mm]	400	400

7.2 Technical data

7.2.1 External device

Device		WSLHP7	WSLHP12
Corresponding Internal Unit			
Mark		WSL141, WSL142	
Version			
Heat source		External air	
Heat sink		Water	
Controller		TERMOTRONIC 3000 WEB	
Device placement		External	
Placement of the controller un.		Internal	
Compressor		1 x twin Rotary	
Defrosting		Active (change of the cooling circuit direction)	
Circulation pump, secondary		/	
Capacity			
Heating		**Heating power / electrical power / COP[2)]**	
A2/W30-35	kW / kW / -	5,3 / 1,4 / 3,7	9,6 / 2,5 / 3,9
A7/W30-35	kW / kW / -	5,4 / 1,2 / 4,4	10,6 / 2,1 / 5,1
A-7/W35	kW / kW / -	5,6 / 2,0 / 2,8	10,9 / 3,7 / 3,0
Cooling		**Cooling power / electrical power / EER[3)]**	
A35/W12-7	kW / kW / -	6,1 / 2,3/ 2,6	12,1 /4,8 / 2,5
Electrical data (single phase)			
External and internal unit			
Max. electrical power[9)]	kW	9,1	10,8
External unit			
Rated voltage		~ 230 V; 50 Hz	~ 230 V; 50 Hz
Max. operational current	A	19	25
Max. electrical power	kW	4,5	6,2
Fuses[12)]	A	1 x C 20	3 x C 32
Electrical power cable[4)]	mm2	3 x 2,5 (H07RN-F)	3 x 6,0 (H07RN-F)
Electrical data (three phase)			
External and internal unit			
Max. electrical power[9)]	kW	/	12,8
External unit			
Rated voltage		/	3N~ 400 V; 50 Hz
Max. operational current	A	/	16,1
Max. electrical power	kW	/	6,2
Fuses[12)]	A	/	3 x C 16
Electrical power cable[4)]	mm2	/	5 x 2,5 (H07RN-F)
Refrigerant system			
Refrigerant - type		R410A	
Refrigerant - quantity	kg	2,60	3,50
Max. operational pressure	MPa	4,2	
Cooling (freon) line			
Gas	mm	15,88 (5/8")	
Liquid	mm	9,52 (3/8")	9,52 (3/8")
Primary side (heat source) - air			
Nominal flow	m^3/h	3,600	7,200
Heating			
Range of operation - min. / max. air temperature	°C	-20 / 40	
Cooling			
Range of operation - min. / max. air temperature	°C	15 / 45	

Device		WSLHP7	WSLHP12
Dimensions and mass – transpot			
Dimensions (W x H x D)	mm	1150 x 956 x 470	1150 x 1502 x 470
Mass	kg	89	142
Dimensions and mass – net			
Dimensions (W x H x D)	mm	990 x 834 x 400	990 x 1380 x 400
Mass	kg	77	126
Noise			
Level of sound power	dB (A)	63	67
Level of sound pressure at a distance of 1 m	dB (A)	55	59
Level of sound pressure at a distance of 5 m	dB (A)	41	45
Level of sound pressure at a distance of 10 m	dB (A)	35	39
Communication			
Connection between ext. and inter. unit		Cable H05VV-F 4 x 0,75 mm^2 (IEC 60227-53) or similar	
Connection to BMS		MODBUS protocol (UTP cable ï connection RJ45) ï RS 485	
Connection to the internet[8)]		UTP 5e cable - connection RJ45 - Ethernet	
Miscellaneous			
Protection class			
External unit		IPX4	

1) /

2) COP (Coefficient of Performance) is an indicator for performance efficiency of the device, the heating number which is a quantity without unit. COP is the ratio between the energy gained - heat energy gained and electrical energy needed for the functioning of the device.

3) EER (Energy Efficiency Ratio) is an abbreviation for the coefficient of the cooling energy efficiency. Mathematically EER is the ratio between the effective cooling power and effective electrical power in [kW].

4) With the cable we have taken into account laying B2 from the table A.52.4 ï IEC 60364-5-52. The cable in the installation pipe is fixed to the wall. The dimensions of the electrical cables must always be checked or determined by the designing engineer of electrical installations.

4*) /

5) /

6) /

7) /

8) Connection to the internet is not necessary for the operation of the device but it is necessary for remote control through the Home Cloud service. It is also advisable for faster troubleshooting of the deviceõs operation.

9) For internal HM devices, see technical data for HM.

10) /

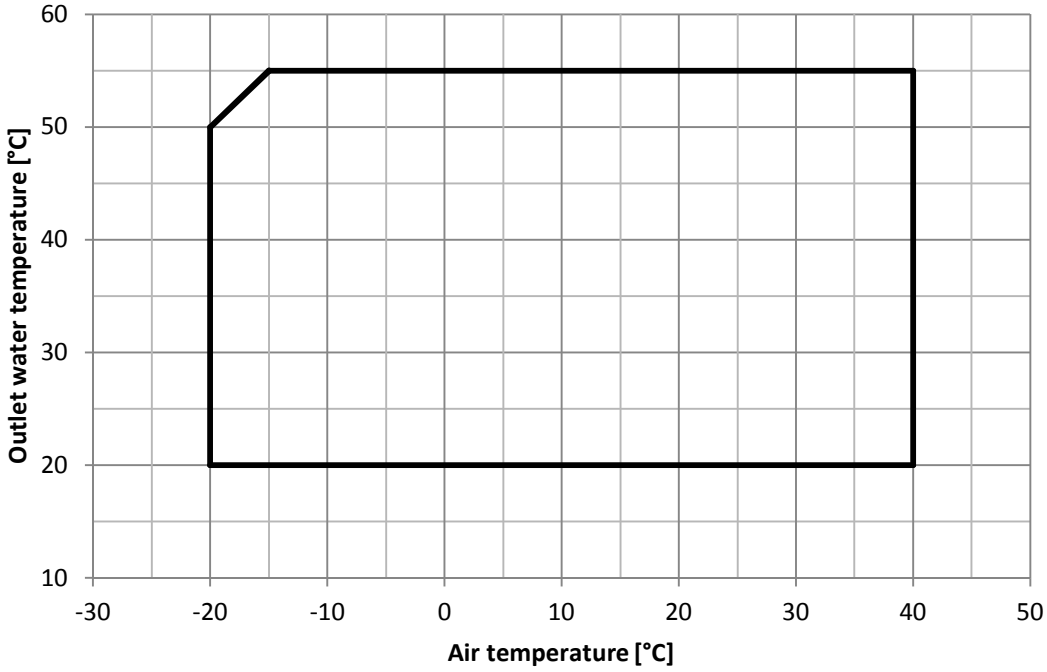
11) /

12) Circuit breaker with ñslowò characteristics for devices with very high inrush current.

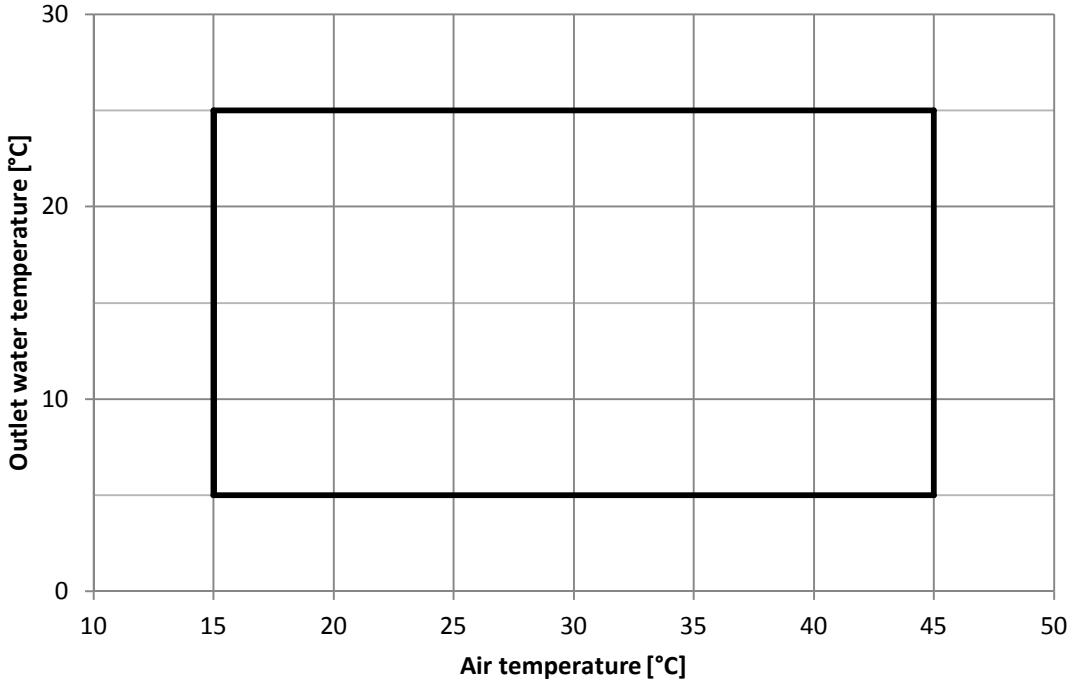
7.3 Range of operation

Heat pumps can operate inside the operation ranges shown below.

7.3.1 Heating mode



7.3.2 Cooling mode



7.4 Noise

Noise is any kind of sound which causes a disturbance, interferes with a personôs work and causes harm to health and well-being. Individuals can have different reactions to the same noise at different occasions. Perception of sound also depends on the current mood of an individual.

Every device which operates with fluctuation is a source of sound. The spread of sound or noise is also affected by walls and other obstacles in the in the vicinity of the device. This is why the correct choice of location of the device is very important.

Sound emissions of the device into the surroundings are described by physical quantities such as sound power and sound pressure. Both physical quantities are given in the dimensionless unit decibel (dB).

Level of sound power *(L)*

The power level of sound is the energy of sound which the device emits into the environment per second. It is a quantity which is used for the basic comparison of various sound sources and for determining whether the machine or device complies with the regulations and standards for noise radiation. The power of sound is independent on the environment in which the source is located.

The reference sound power is 10^{-12} W.

Example: The sound power of the human breathing is 10^{-11} W or 10 dB.
The sound power of whispering is 10^{-10} W or 20 dB.

The level of sound pressure *(p)*

The level of sound pressure is the changing pressure of sound waves which a sound produces. Sound pressure is detected or heard as volume. It depends on the environment where the source is located and the distance of the listener to the source of the sound.

The standard reference sound pressure in the air is 20 μPa (10^{-6} Pa). This is the sound auditory threshold at the sound frequency of 1 kHz.

Example: The sound pressure of normal human speech at a distance of 1 m ranges from 2 to 20 mPa (10^{-3} Pa) or from 40 to 60 dB.

Decibel (dB, dB(A))

A decibel is the unit without dimension with which we express the ratio between the changing quantity and the fixed reference. Among others it is also used for measuring the intensity of sound or sound energy. It is calculated on a logarithmic scale which means that if the ratio increases by 3 dB, the sound energy doubles, if it increases by 10 dB, the sound energy increases by a factor of 10 and if it increases by 20 dB, the sound energy increases by a factor of 100, etc.

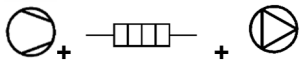
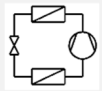
Example:

The level of sound pressure of the device is measured in a free sound field at three different distances. For precise data on the sound pressure of your device see technical data 7.2.

Noise	
Level of sound power of the device	dB (A)
Level of sound pressure at a distance of 1 m	dB (A)
Level of sound pressure at a distance of 5 m	dB (A)
Level of sound pressure at a distance of 10 m	dB (A)

The source of sound of the device	Level of sound power [dB]	Noise
A pocket watch in the bedroom	20	Very quiet
Air conditioning in an office	40	quiet
Heating heat pump	57	Loud
Normal speech	60	Loud
Gas burner	75	Very loud
Traffic, loud radio	80	Very loud
Plane motor	140	Painful

7.5 Legend of data label

Mark	Characteristics
	Maximal compressor electrical power.
	Maximal electrical heater power.
	Maximal additional load electrical power (circulation pump, etc.).
	Maximal electrical power of the device (compressor + electric heater + additional load).
	Cooling circuit.
	DHW.
	Heat exchanger in the DHW.
	Heating system.
	Internal device (Hydraulic module or Termotronic).
	External device (WSLHP).
	Device mass.
	Note about handling waste electronic equipment.
	CE sign for the compliance of the device with CE directives.

Product supplied by:

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Unit 401-403
IDA Industrial Estate,
Cork Road,
Waterford.

Tel : 00353 51 302300
E mail : service@waterfordstanley.com
Website : www.waterfordstanley.com