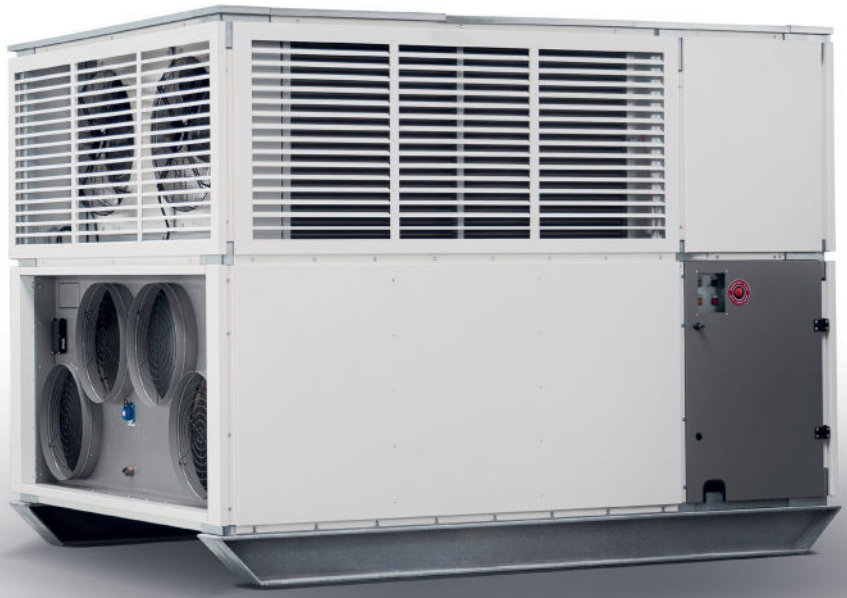
Operating manual

MW80

Mobile air-to-air heat pumps for heating



Similar to illustration

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2 General Information

The operating manual must be read carefully before installation and commissioning!

Transport damage must be noted on the shipping receipt and acknowledged by the driver! Technical faults must be reported to Kroll Energy immediately!

2.1 Signal Signs

The signal signs used in the operating manual have the following meaning:

WARNING; Sign warns of personal injury
These instructions must be followed

ATTENTION; Sign warns of damage to property and the environment
These instructions must be followed

HINT; These hints provide tips for work and offer additional information for the user

Reference to other sections in this operating manual

2.2 Intended Use

MW80 is a mobile heat pump, that is not suitable for simple domestic use.

It was designed for commercial use on construction sites, in workshops, storage rooms, etc. and must not be used for space heating with high and highest requirements for indoor air!

The MW80 may only be operated by instructed persons!

2.3 Disclaimer of Liability

Kroll Energy GmbH accepts no liability for possible damage resulting from improper use.

The manufacturer's liability also expires if work and repairs to the system are carried out improperly.

2.4 EC Conformity

The unit was built in accordance with the applicable European directives and regulations and bears the CE mark.

EC Declaration of Conformity in ***12 EC Declaration of Conformity***.

2.5 Warranty

Any use, installation, maintanance that is not effected according to the rules as asserted in the technical manual or unauthorized modifications on the original version as delivered from manufacturer, leads to expiration of any right to warranty. Further on our „Conditions of Sales and Delivery“ are valid.

The unit must be installed and commissioned by a specialist in order to obtain warranty claim.

Further prerequisites for the guarantee are regular maintenance according to these instructions, which must be carried out at least once a year. The general warranty period for the MW80 is 24 months after delivery. The date of the invoice is crucial.

3 Safety Regulations

The system is operationally safe when used as intended. Construction and design comply with the current state of the art and all relevant rules of technology as well as the applicable European directives and regulations.

EC Declaration of Conformity in ***12 EC Declaration of Conformity***.

Every person who carries out work on the system must have read and understood the operating instructions before starting work and must comply with the local accident prevention and safety regulations.

A risk assessment must be carried out by the operator at the site!

Danger to life due to electric current!

Electrical work must only be carried out by qualified personnel. Before opening the unit, the system must be disconnected from the power supply and secured against being switched on again.

Refrigerant

The installation contains fluorinated greenhouse gases covered by the Kyoto Protocol.

The type, quantity and GWP of the refrigerant used can be found in ***Table 4-1***.

Local risk of frostbite on contact with the refrigerant!

If refrigerant escapes at a leak, it is about -40 °C cold. Direct contact with body parts can lead to frostbite.

System contains flammable refrigerant!

The appliance must be installed and operated on a fireproof base!

If refrigerant leaks out, do the following: Disconnect the system from the mains, inform the customer service and keep ignition sources away!

In the event of refrigerant leakage, the water-polluting oils contained therein must be properly absorbed and disposed of!

The safety distance of the unit to walls and objects must be ensured according to the *installation plan on page 17*.

Never switch on the unit if housing parts are removed from the unit!

Only set up the MW outdoors and only operate it with outside air as the heat source. The air-guiding sides must not be narrowed or blocked.

The ambient air at the installation site and the air that is drawn in as a heat source must not contain any corrosive/chemical components! Otherwise, damage or even total loss may occur.

Locations with heavy dust loads are to be avoided! Otherwise, ensure regular cleaning of both airways!

4 Machine Overview

4.1 Technical Specifications MW80

Table 4-1: Technical specifications

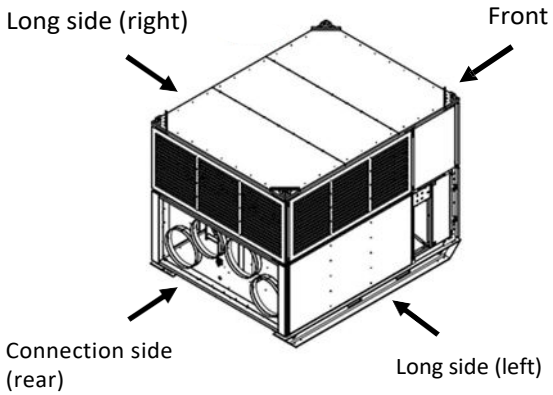
Characteristics	Value
Nominal heat output	96,7 kW
Unit COP[1] (outside 5 °C/inside 35 °C)	2.7

[1] integrated heating system inclusive

Characteristics	Value
Annual performance factor[2]	2.45
Operating temperature min. - max.	-20 °C - +25 °C
Refrigerant (security class A2L, low flammability!)	R454C
Amount of refrigerant	26 kg
Global warming potential	148 CO_2 equivalent
CO_2 equivalent	4,004 t
Usable volume flow free blowing	16000 m3/h
Max. pressure loss in the useful air	250 Pa
Total mass filled	2750 kg
Dimension h x b x l ca.	2350 mm x 2300 mm x 3000 mm
Connection size air hoses (Ø)	4x525 mm
Emission sound pressure level	***Table 4-2***
Electrical connection	3/N/PE~400V 50 Hz
Protection class	I – protective conductor
IP protection class with hose connection	IP44
Network monitoring ($U_{min} \geq U \leq U_{max}$)	375 V ≤ U ≤ 433 V
Max. rated current	62 A

Sound

The following sound pressure levels were determined in free-standing installation without sound reflection. The measurements were taken at a height of 1.8m on each side of the system (see ***Figure 4-1***). A different installation (with adjacent sound-reflecting surfaces) can lead to an increase in level. An exact indication of the respective sound pressure levels is only possible by measuring at the installation site.



[2] static calculation method VDI 4650 Blatt 1: 2019-03 (https://www.waermepumpe.de/jazrechner/)

Figure 4-1: Sides oft the system

The regional regulations on sound insulation must be complied with!

The following A-rated sound pressure levels are resulted depending on distance:

Table 4-2: Sound pressure level

Distance [m]	1	2	3	4	5	6
connection side	79,8	77,5	75,6	74,1	73,4	72,2
front	76,5	73,3	70,5	69,2	68,0	66,8
long sides	72,2	69,3	67,4	66,8	66,0	65,3

4.2 Different Views of the Unit

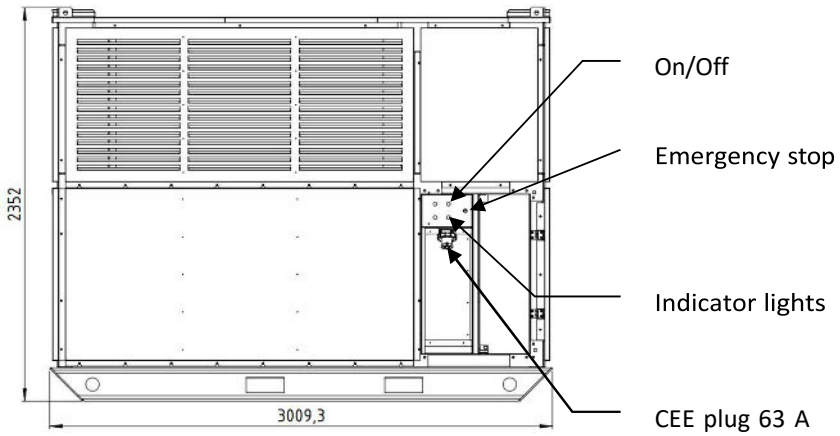


Figure 4-2: Long side left of the MW80

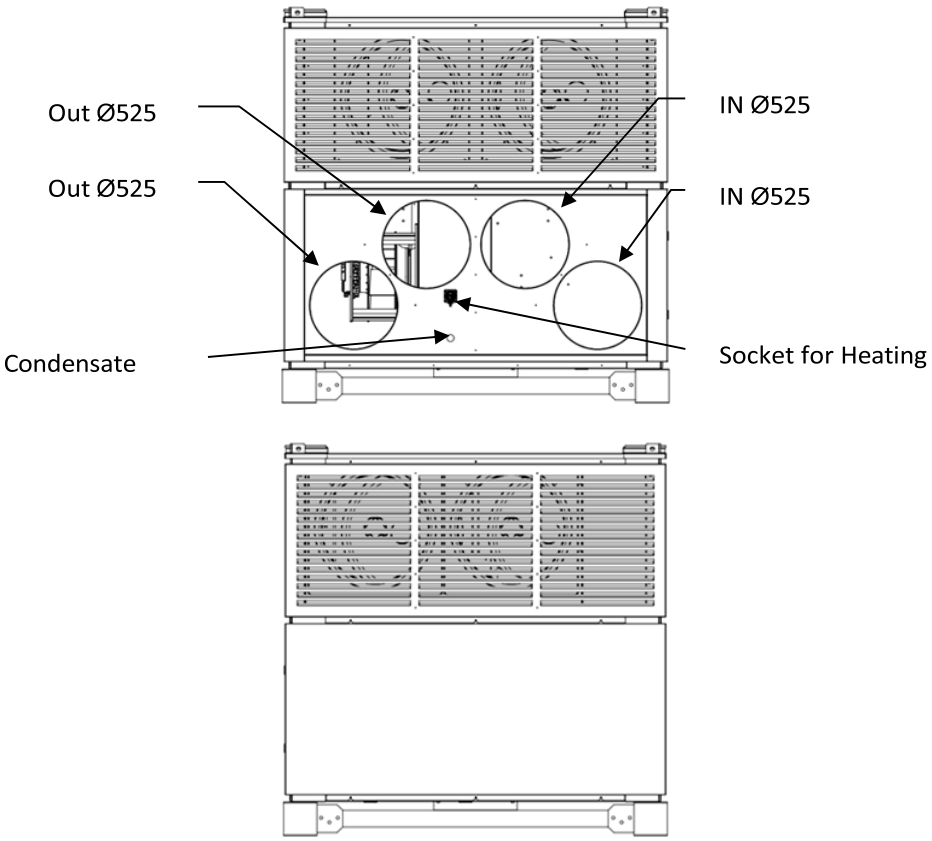


Figure 4-3: Illustration of the front of the MW80 (figure below) and the rear connection side (figure above)

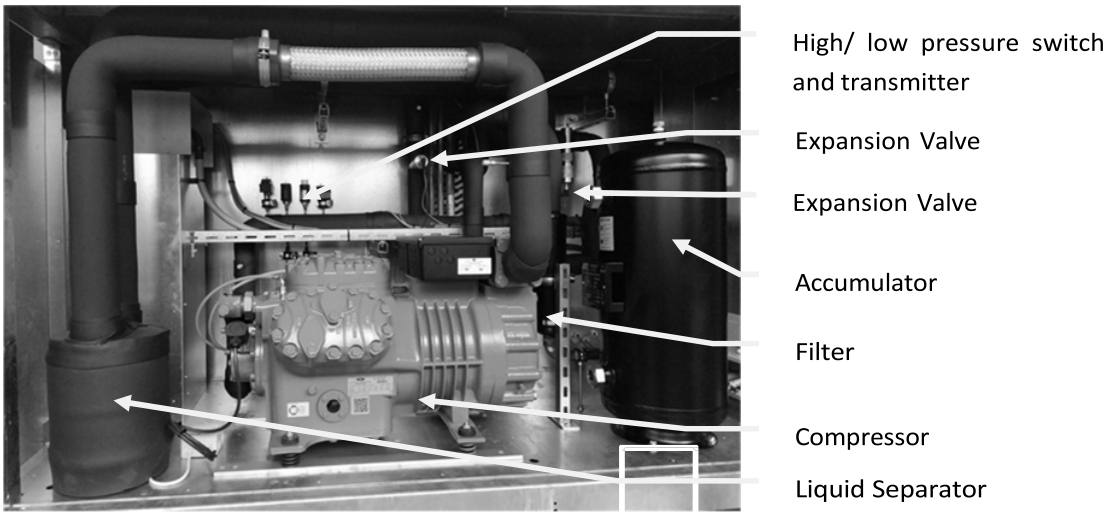


Figure 4-4: Interior view of the MW80 with labelling of the most important components

4.3 Functions of the Unit

The MW80 is a fully automatic air/air heat pump that ensures independent operation after presetting and activation. The operating parameters can be set via browser-based visualisation (see

***Figure* 4-5**)

General view of the WEB-visu in ***Figure 4-8***.

Figure 4-5: Partial view WEB-visu (right side), settings and parameter

The following parameters can be entered or readout:

Table 4-3: Parameters and description

Settings	Unit	Description
Target room temperature	°C	Desired room temperature (20 to 28 °C)
Temperature hysteresis	K	Working range around the control temperature (0,5 to 3 K)
Fan speed	%	Maximum speed of the indoor fans (50 to 100%)
Air temperature sampling time	min	Time interval of the air temperature check. The indoor fan is switched on every x-minutes to check the room temperature (1 to 10 min)
Switch on the fan during the hysteresis pause	-	Fans also run when target temperature is reached in order to achieve mixing
Reset electrical consumption	-	Reset the counter

Parameter	Unit	Description
Heating capacity	kW	Performance for heat exchange in the room air
Electrical power	kW	Driving energy of the machine
Efficiency	-	Quotient of generated heat output and expended electrical energy
Electrical consumption	kWh	Summation of the electrical energy used

Defrost

The defrost function is used to free the evaporator from adhering ice so that it can work energy-efficiently again. The need for defrosting is detected and carried out automatically by the system. During defrosting, the fans are switched off and the hot gas generated by the compressor (superheated refrigerant) is fed directly into the evaporator. After 15 minutes at the latest, the compressor switches off and defrosting is finished. During this time, no useful heat is generated and no air is circulated. 3 min after the end of defrosting, the process starts automatically in normal operation.

System regulation

The system has a speed-controllable compressor to vary the heating output. In principle, the system always tries to provide the maximum output at the set target temperature. This is also possible when the ambient temperature drops (down to -25 °C) by converting the maximum reference flow.

If the system reaches its operating range limits, it automatically reduces the compressor and fan output.

Compressor run time

The compressor would be exposed to increased wear during uncontrolled starting and stopping processes. To avoid this and to ensure a long service life, the following runtime limits are stored in the machine control:

1. Regardless of the temperature setting, there is a minimum of 8 minutes between two compressor starts.
2. Regardless of the control limit, the compressor runs for at least 2 minutes (except for safety shutdown).

Emergency stop

Pressing the emergency stop button shuts down the system immediately. A restart is only possible after the power has been disconnected.

Working area

The MW80 is functional within the limits shown in ***Figure***

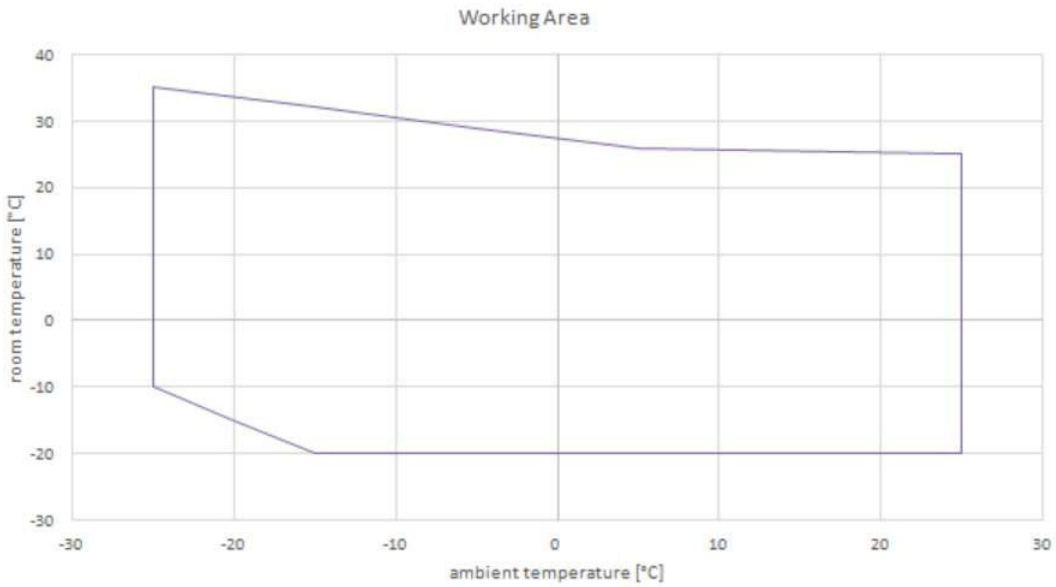
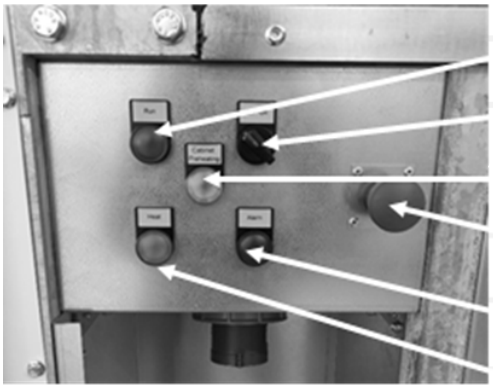


Figure 4-6: Working area diagram from the MW80

4.4 Description of Control and Display

Indicator lights

The system operator can switch the system on and off using the rotary switch in the connection box. The three indicator lights show the operating status (see ***Figure 4-7***).



On/Off

Operation

Control cabinet heating

Emergency stop

Alarm

Heat

Figure 4-7: indicator lights and switch in the terminal box

The colour assignment is explained in the following table:

Table 4-4: Indicator lights and their meaning

Green light (operation)	flashes	preheating	The unit is in startup mode
	shines	running	The unit is running
	off	error	The unit is in error mode
Orange light (heat)	shines	heating	The unit is in heating mode
Red light (alarm)	flashes	error	The unit is in error mode The system restarts up to 3 times automatically (see ***10 Error Messages***)
	shines	error	The unit is in error mode The system does not restart automatically (see ***10 Error Messages***)
lamp white (Preheat control cabinet)	shines	hesting	The Unit is in preheating mode of the control cabinet for 12 minutes (at ambient temperature <5°C)

User interface (WEB-visu)

The MW80 can be monitored in its operating modes and set within specified limits by trained operators. For this purpose, a connection to a PC must be established via Ethernet cable or LTE radio connection.

The main components of the system, the process parameters and necessary setting parameters can be found on the user interface shown below. This provides a good overview of the processes in the system as well as input and output values.

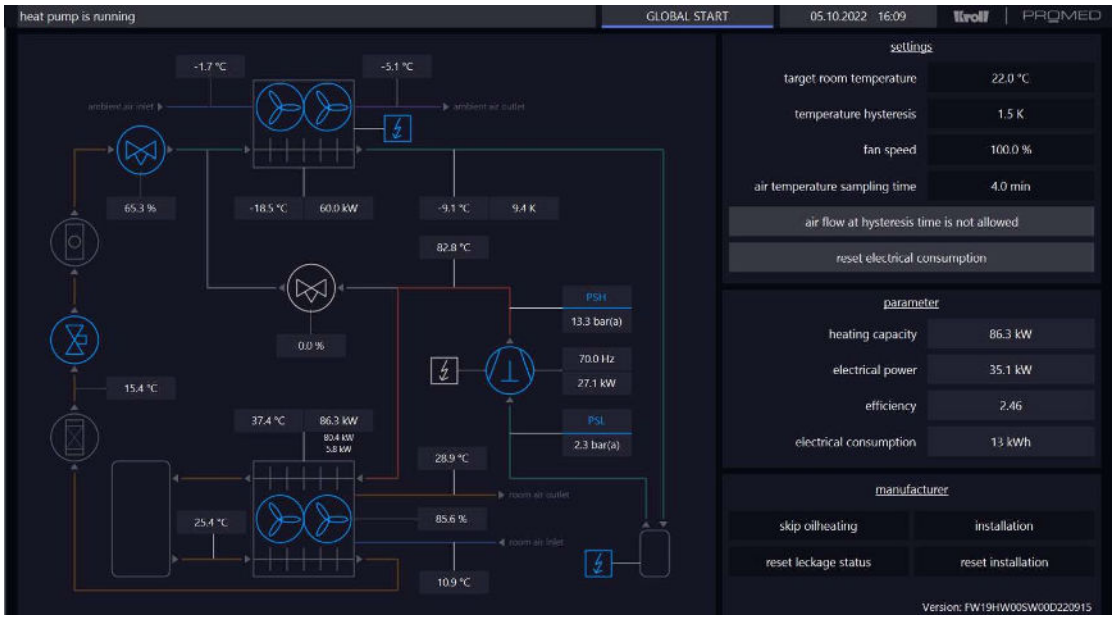


Figure 4-8: Overall view WEB-visu

5 Transport, Handling and Storage

To avoid transport damage, the unit should be transported to the installation site in packed condition using suitable industrial trucks.

The unit must be transported in accordance with the applicable safety regulations.

During transport, it is forbidden to stand under or close to the unit! Falling down or tilting of the unit during transport may cause personal injury and damage to property!

During transport, the maximum impact load of 15g must not be exceeded. A corresponding impact indicator is attached to the machine.
The indicator must be checked before starting operation. If it is activated, the machine is not allowed not be started up and has to be checked for full functionality and damage by service personnel! (Figure 5.1)

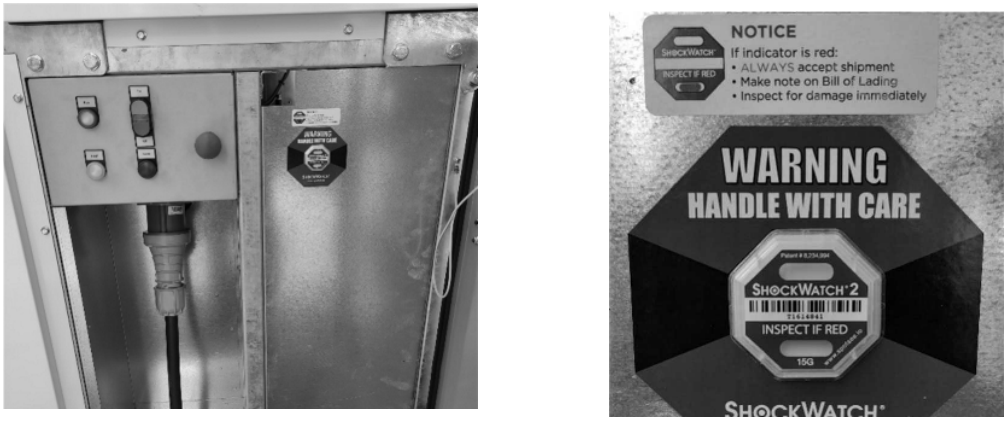


Figure 5-1: impact indicator

Lifting with industrial trucks

For the selection of the industrial truck, the total weight of the unit in *Table 4-1* and the position of the centre of gravity in *Figure 5-1*! The industrial truck used must have a load capacity suitable for the weight of the system!

To lift the system with industrial trucks, only use the forklift mounts on the long sides (see *Figure 5-1*)! Make sure that the forks are correctly positioned and locked and that the unit is correctly seated on the forks (see *Figure 5-2*) in order not to damage them!

Lifting via the front or rear can cause damage to the unit and is expressly not recommended!

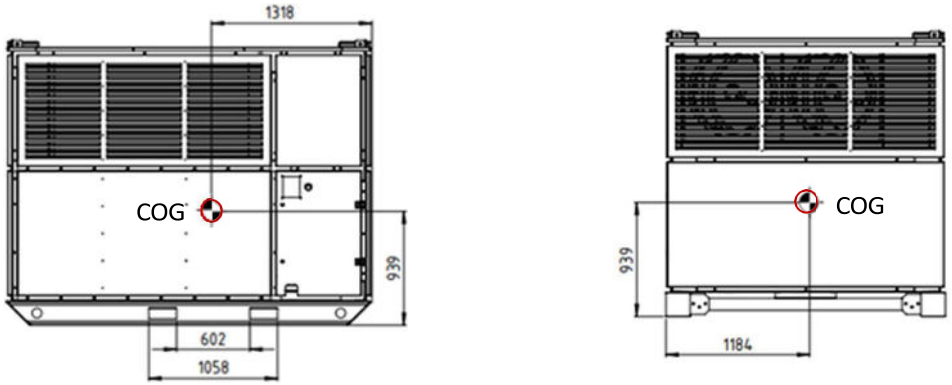


Figure 5-1: Position of the centre of gravity

Centre of gravity marking

These symbol marks the position of the centre of gravity on the long sides of the MW.

The centre of gravity is not in the middle, but in the front area of the unit!

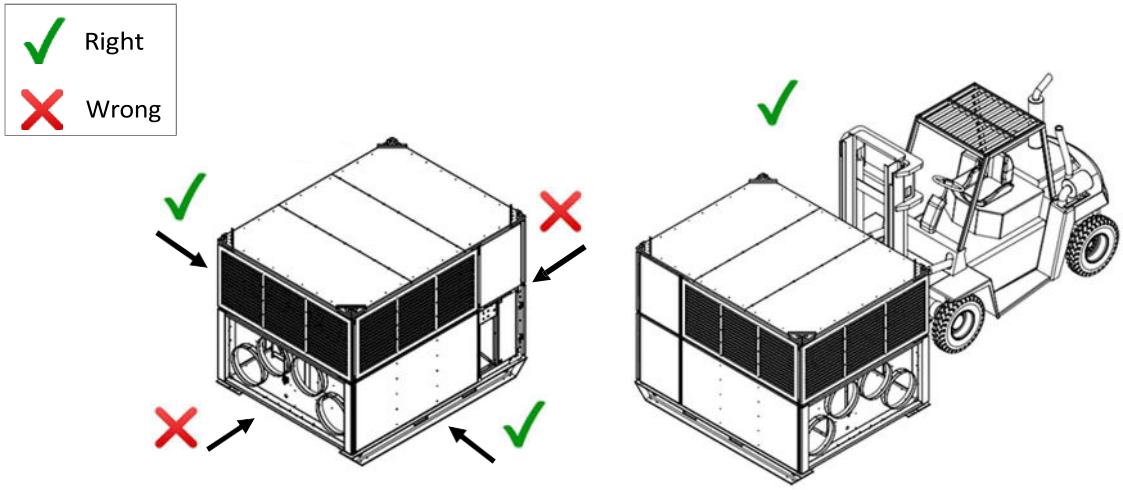


Figure 5-2: Transport sides and correct pick-up with the forklift truck

Lifting with the crane

Lifting with the crane is prohibited during strong wind events!

Crane transport is only possible with the loops above the unit. The manufacturer accepts no liability for improper crane transport in the event of damage!

For crane suspension a minimum rope length must be observed in order to enable stable transport and not to damage the unit (see ***Figure 5-3***).

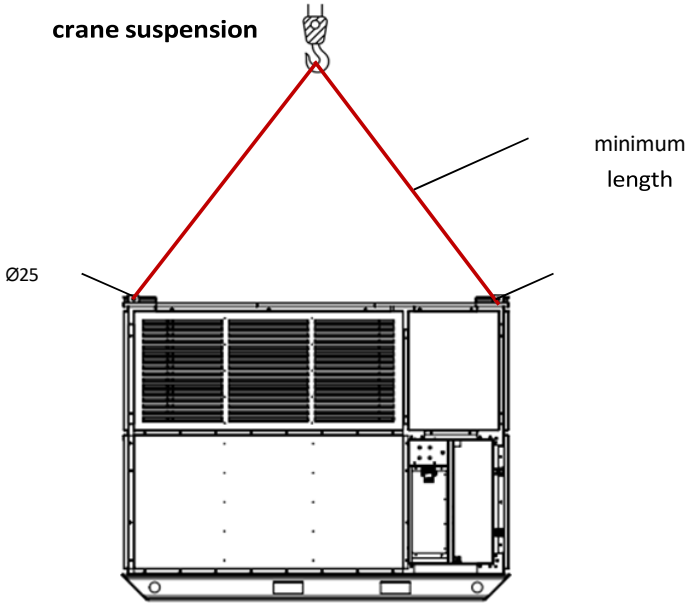


Figure 5-3: Minimum rope length for crane transport

6 Set-up and Installation

Set-up

For the installation and operation of the system, the general rules of technology, the building inspection regulations, the fire protection regulations and the legal regulations for the operation of electrical systems must be observed as well as DGUV regulation 38.

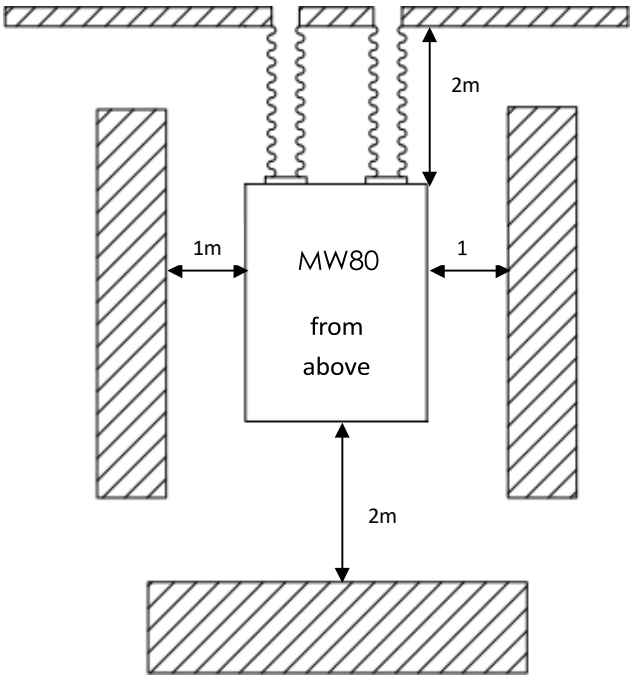


Figure 6-1: Installation plan

Incorrect and improper installation can cause dangerous personal injury, damage to property and a reduction in the service life of the system. For this reason, such work should only be carried out by competent personnel!

Due to the flammable refrigerant, the unit must be installed and operated on a fireproof base and outdoors! Sources of ignition in the vicinity of the MW are also not permitted!

The unit must be set up on a firm surface. A soft floor can cause the unit to tip over, resulting in personal injury.

When installing on sealed surfaces, make sure that the condensate is drained off! Otherwise there is a risk of slipping due to frozen condensate at cold temperatures!

The unit must be positioned free-standing in the room with the minimum distances indicated in ***Figure 6-1***.

When selecting the installation site, please observe the **maximum inclination of 2 °** so that excess condensation water can drain off and the service life of the compressor bearings is not reduced.

Hose connections

For the hose connections (IN/OUT), temperature-resistant air hoses with a diameter of 525 mm should be selected and to be connected to the provided spigots with tensioning straps.

Spiral-reinforced hoses must be used against the negative suction pressure. Alternatively, fixed sheet metal ducts or corrugated pipes can be installed.

A maximum line resistance of 300 Pa must not be exceeded in order to maintain the functionality of the system!

Splitting the heating hoses is not recommended due to the pressure loss as well as targeted air routing.

7 Electrical Connection

Danger to life due to electric current!

Electrical work must only be carried out by qualified personnel. Before opening the unit, the system must be disconnected from the power supply and secured against being switched on again.

When installing and carrying out electrical work, observe the relevant EN, VDE and/or locally applicable safety regulations!

The electrical connection on the customer side must be protected with a 3-phase circuit breaker 64 A type C per heat pump MW80. Fuse protection via a low-voltage slow-blow fuse (DT or D0 fuse) is also permissible.

The electrical connection also has to be monitored via a residual current circuit breaker (FI/RCD), the manufacturer recommends a type B circuit breaker with a differential tripping current of 30 mA.

Due to the use of a frequency converter in the machine, the RCD con triggered by leckage currents from the EMC filter when the heat pump is switch on or off.

The power connection of the MW is located in the junction box on the left-hand side (next to the indicatos). It is a CEE plug 63 A (3 ~ 400 V AC, N, PE).

The junction box is lockable and must therefore be protected against access by unauthorised persons!

Other connections:

Another socket is available for charging purposes, e.g. a laptop or tablet.

An additional socket serves as an Ethernet interface for carrying out service work and for attaching a laptop to the machine for connection to the machine control.

.

Figure 7-1: Machine connections

The interface connection via an Ethernet cable or Wifi can be made using the following instructions (located in the machine cabinet).

Interface Connection

1. **Via Ethernet cable**
   - **Connect your device with an ethernet cable to the machine**
   - **Open your browser and type 192.168.135.2 in the address bar**
2. **Via Wifi**
   - **Search for Wifi named after the machine ID**
   - **Connect with the Wifi network**
   - **Type in the Wifi-PW**
   - **Open your browser and type 192.168.135.2 in the address bar**

8 Commissioning

The unit may only be put into operation with a closed facade!

1. Installation Control:

   ✓ Installation and assembly have been carried out in accordance with these operating manual
   ✓ The electrical installation was carried out properly and professionally
   ✓ All pipe systems and components of the unit are tight

2. Commissioning:

   - Establish power connection (CEE plug 64 A, 5-pin in the junction box)
   - Turn switch to position ON
   - Wait until preheating is complete (green light shines, time: 5 to 30 minutes) or if the outside temperature is <-5°C, wait until the control cabinet preheater is connected (duration 12 minutes)
   - Connect via PC, tablet or smartphone:

LOGIN	
WAN Router: *via VPN*	Please finde the IP-adress on the additional sign see last page[3].
WLAN SSID:	Please see the additional sign[3].
WLAN PW:	Please see the additional sign[3].

In the vicinity of about 5 metres, direct dialling into the router of the system is possible. At greater distances, a SIM card is required.

Via WLAN to WEB-visu:

First, the WLAN must be activated on the end device (e.g. laptop). When the system is switched on, it sets up a WLAN network that can be selected on the end device (name, see additional sign[3]). Access is gained by entering the ***WLAN PW*** (see additional sign[3]). After the connection has been established, open the browser window and enter the following in the browser line: ***192.168.135.2/webvisu***. The WEB-Visu window then opens.

Via Ethernet to WEB-visu:

For an Ethernet connection, first open the upper door of the machine room to access the PLC controller). Use the LAN cable to connect the PLC controller and the terminal device. If DHCP[4] is active at the end device, then the following entry can be made in the browser as with the WLAN connection: ***192.168.135.2/webvisu***. If DHCP[4] is not active, the IP of the end device must be

[3] The additional sign is located in the junction box of the unit under the type plate.

[4] dynamic host configuration protocol transferred to the IP range of the system: ***192.168.135.xxx***. Addresses 1, 2 and 3 must not be used for the ***xxx*** at the end!

The MW is designed for stand-alone operation. The system operation can be monitored by the customer via the user interface (see ***Figure 4-8***) by remote access and the operating parameters can be controlled individually. If malfunctions occur during operation, the machine switches itself OFF.

The outside of the unit can be cleaned with a damp cloth and commercially available cleaning agents. Do not use any cleaning or care products that are abrasive or contain acid and/or chlorine.

The intake and exhaust openings must be checked for dirt at regular intervals (depending on the installation site) and cleaned if necessary.

Other components that require regular cleaning are listed in ***9.2 Maintenance***.

The manufacturer strongly recommends carrying out annual maintenance to prevent damage to property and the environment!

Maintenance of refrigeration systems must be carried out by a specialist company with a certificate of competence!

The following work must be carried out during maintenance:

1. Safety inspection of the electrical installation.

The parts of the buildings are screwed together with M6 (SW10) hexagon head screws and M6 (SW5) hexagon socked screws. The tool and ladder are required to open the housing for service purposes.

Before removing the housing parts, the earth connections or screw M6) must be loosened. When attaching the parts of the building, these earth connections must be re-established properly in order to ensure personal protection in the event of a fault.

The air filter in the control cabinet fan must be checked annually. If the filter is dirty, it must be replaced. A replacement filter can be purchased from Rittal under item number 3173.100.

Oil change:

An oil change and cleaning of the filters are recommended after 10000 operating hours. The oil change may only be carried out by a specialist company and must be carried out in accordance with the specifications of the compressor manufacturer.

10 Error Messages

If a fault cannot be rectified independently or with the help of a specialist, please contact the manufacturer!

Contact: service@kroll.de/ +49 (0)7191-9070-222

Please have the type plate[5] ready when exchanging with the service!

Table 10-1: Description of the error messages

Code	Description	Cause
10	signal: EC-Fan Error	Occurs when a fan actually switches ist error relay or the fan is not sufficiently supplied with high voltage
15	signal: Emergency stop	Direct evaluation oft he emergency stop button → pressed → signal = 1, not pressed → signal = 0
20	signal: Motor protection	Occurs when the compressor is too hot or the protective device is not supplied with sufficient high voltage
25	signal: High pressure	Occurs when the HP switch is triggered→ Heat dissipation impossible/difficult→ Too warm or insufficient air flow
30	Signal: Low pressure	Occurs when the LP switch triggers → too cold or insufficient refrigerant flow (valve, driver, lack of refrigerant)
35	Signal: Pressure switch	LP and/or HP switch triggered→ Reasons see 25 or 30

[5] The type plate is located in the junction box of the unit.

40	Signal: FC error	Occurs when: FC does not receive enough high voltage, compressor draws too much current, a phase breaks, etc. → exact error table in manual of FC
45	Signal: Undervoltage	Occurs when the power supply falls below 380V. With the XHP40, this reduces the engine power across the board.
50	Signal: Oil differential pressure switch	Occurs when the monitoring unit trips or the phase is switched on.
55	Signal: RCD	Occurs when the fuse of the additional socket trips ◊ prevents further operation of the condensate heater
600	High-pressure switch triggers	from insufficient heat output; inlet temp. too high; EC fan defective
100	AC contactor start	Either the contactor is stuck or there are problems evaluating the return signal
120	AC contactor operation	High voltage lost or problem evaluating the return signal
300	FI error	Why the signal can come up, see 40. With 40a machines, only switching off the power helps. On the 40b and 80 we have our own reset command on the electrics
310	Motor protection	Why signal comes up, see 20 Protection device resets itself automatically
320	FC start	If there is no error message and no run signal after 30s, and other actuators such as the protective device, LP and HP switches do not show any problems, then something is probably wrong with the return signal electrically
330	FC Stop	Relay to start command is stuck
340	FC operation	Can happen if there is a sudden power failure (also switching off) or if one/several phase(s) fail(s).
350	Oil differential pressure	Actual problem with the oil level or problem with the protection device itself Reset only possible by removing the current → Main contactor is discarded by the controller
500	Refrigerant sensor position	Sensors probably mixed up. The machine switches off permanently because it cannot be operated in this way
510	Refrigerant sensor failure	This leads to a permanent shutdown as the machine cannot be operated in this way
600	High pressure	Causes of HP switch see 25
610	Low pressure	Causes of LP switch see 30
620	High condensing temperature	This is a software protection for the compressor. HD switch serves as an emergency shutdown, but software takes temperature-dependent operating range into account
630	Low condensing temperature	This is a software protection for the compressor. Reason may be too cold room temperatures
640	High evaporating temperature	This is a software protection for the compressor. The reason could be that the control valve is stuck
650	Low evaporating temperature	This is a software protection for the compressor. Reason may be too cold room temperatures

660	Low superheat	Protects compressor from liquid. Reasons: Spontaneous changes in the external conditions or problems with the control of the expansion valve
670	Low evaporating temperature	This is a software protection for the compressor. Reason may be too cold room temperatures
680	Discharge temperature	Protection of compressor and oil stability. Should only occur in connection with 620. Unless the compressor is seizing up
700	Emergency stop	Because simply "pulling" the button does not restart the system, the entire system must be switched off once
710	Stepper motor card	An attempt is made to restart the card
720	Stepper motor card	An attempt is made to restart the card
730	Stepper motor card	An attempt is made to restart the card
740	Temperature map	Incorrect signal evaluation. The machine must switch off because safe operation is not possible in this way. Check card contact.
750	Current measurement	Switching off necessary, because without any current information, the risk of overload is too great
800	Refrigerant flow / lack of refrigerant	The 1st criterion describes an insufficient refrigerant flow. This can be due to a leak or a stuck valve, clogged filter, etc. The 2nd criterion clearly indicates a lack of refrigerant. Unless the machine is activated at an ambient temperature of < -30°C
900	Airflow	Pure information that there could be problems here and so the efficiency and/or the working area suffers
910	Motor Current Monitoring	Not a situation to worry about. Since each FC has some variance in current return. However, if a FI has never sent this information (after many hours of operation), other parameters (such as hot gas temperature) should be looked at. The compressor may start to seize up.
920	Total current signal	As long as the compressor current is still being measured, the machine continues to run. The total current is calculated with a high degree of certainty ◊ as long as this information is available, there may be a reduction in performance
930	Motor current signal	As long as the total current is still being measured, the machine continues to run. Compressor current is calculated with a high degree of certainty ◊ as long as this information is available, there may be a reduction in performance
940	Ambient air relay	Since 2 sensors are connected to 1 input, the 2 values are measured via signal switching. If this no longer works, the machine can continue to run, but undesirable effects may be possible (with regard to defrosting).
950	Room air relay	Since 2 sensors are connected to 1 input, the 2 values are measured via signal switching. If this no longer works, the machine can continue to run, although undesirable

		effects may be possible (room target temperature control through to constant clocking of the machine)
960	High voltage	From this it can be concluded that there is no 230V in the machine.

11 Dismantling, Decommissioning and Disposal

The decommissioning of the system must be carried out in accordance with the locally applicable laws, guidelines and standards for the recovery, reuse and disposal of operating materials and components of heat pumps.

Dismantling must be carried out by qualified heating or cooling system personnel!

Danger to life due to electric current!

Electrical work must only be carried out by qualified personnel. Before opening the unit, the system must be disconnected from the power supply and secured against being switched on again.

System is under pressure and contains flammable refrigerant!

The refrigerant must be disposed of in accordance with the applicable national regulations!

For this purpose, the refrigerant must be properly and professionally transferred to a designated and appropriately labelled recycling bottle and handed over to a specialist reprocessing company.

It is mandatory to wear cold-insulated protective clothing (protective gloves, face shield) for this work, as the refrigerant used is about -40 °C cold when it escapes!

Components must be disposed of separately according to material and returned to the material cycle!

12 EC Declaration of Conformity

-Translation of original-

Kroll Energy GmbH
Eduard-Breuninger-Straße 67, 71522 Backnang, Germany

We, Kroll Energy GmbH, declare that the machine described in the following

MW80, complies with all relevant requirements of the EC Machinery Directive 2006/42/EC. The machine also complies with the following EC/EU directives and regulations:

Directive	2006/42/EC	... on machinery
Directive	2014/68/EU	... to the making available on the market of pressure equipment
Directive	2014/30/EU	... relating to electromagnetic compatibility
Directive	2014/35/EU	... relating to the making available on the market of electrical equipment
Regulation	EU 517/2014	... on fluorinated greenhouse gases
Regulation	EC 1516/2007	... standard leakage checking requirements for ...
Regulation	EU 1494/2007	... the form of labels and additional labelling requirements ...

The following harmonized standards were applied:

DIN EN 378-2 (2018-04): Refrigerating systems and heat pumps - Safety and environmental requirements - Part 2: Design, construction, testing, marking and documentation.

Dr. Alexander Ramm

Technical Manager Kroll Energy GmbH

Backnang, 01.08.2023

13 Service Documentation

Date	Disturbance	Root Cause	Measure/ Use of Materials	Assembler

Date	Disturbance	Root Cause	Measure/ Use of Materials	Assembler

Bei nicht bestimmungsgemäßer Verwendung, Aufstellung, Wartung, wie in der Betriebsanleitung vorgegeben oder eigenmächtigen Änderungen an der werkseitig gelieferten Geräteausführung erlischt jeglicher Gewährleistungsanspruch.
Im Übrigen gelten unsere „Verkaufs- und Lieferbedingungen“.
Technische Änderungen im Sinne der Produktverbesserung vorbehalten.

Any use, installation, maintenance that is not effected according to the rules as asserted in the technical manual, or unauthorized modifications on the original version as delivered from manufacturer leads to expiration of any right to warranty.
Furtheron our „Conditions of Sales and Delivery“ are valid.
Technical modification for product improvement are subject to change without notice.

Toute utilisation, installation et maintenance qui ne soit pas effectué onformément aux directives fixés dans le manuel technique, ainsi que toute modification à l’appareil livré du fabricant dans sa version originale, entraîne l’expiration du droit de garantie.
En plus, nos „Conditions de vente et de livraison“ sont en vigueur.
Sous réserve de modification technique dans le sens d’amélioration du produit.

Любое использование, установка, обслуживание, выполненные не в соответствии с правилами, указанными в Техническом руководстве, либо несанкционированная модификация оригинальной версии, поставленной изготовителем, приводит к тому, что любые гарантии теряют силу.
Кроме того, действуют наши „Условия продаж и поставки“.
В изделие могут без уведомления вноситься технические модификации, направленные на усовершенствование изделия.

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