Danfoss OP-LPQM Plus Condensing Units Instructions

Contents

Danfoss OP-LPQM Plus Condensing

Product Information

Specifications

- Product Name: OPTYMATM Plus Condensing Units
- Models: OP-LPQM, OP-MPBM, OP-MPXM, OP-MPGM, OP-LPOM
- Manufacturer: Danfoss
- Website: www.danfoss.com

Product Usage Instructions

Installation and Servicing

Installation and servicing of the condensing units should be carried out by qualified personnel only. Follow the provided instructions and adhere to sound refrigeration engineering practices for installation, commissioning, maintenance, and service.

Usage Guidelines

- Use the condensing unit only for its designated purpose(s) and within its scope of application.
- Refrigerant must be used as per the specifications outlined for each model.
- Ensure compliance with safety regulations such as EN378 or other applicable local regulations at all times.
- For models falling under PED Cat I and II, mount a pressure relief valve in the refrigerant system during field installation. The PRV should be mounted on the receiver vessel.

Safety Precautions

- Avoid placing the unit in a flammable atmosphere and ensure it does not block walking areas, doors, or windows.
- Never pressurize the circuit with oxygen or dry air to prevent fire or explosion risks.
- Regularly check safety devices such as pressure switches and relief valves to ensure they are operational and

properly set.

Controller Instructions
For specific models, make necessary changes to the controller parameters as described in the manual to ensure proper operation and safety.

Frequently Asked Questions (FAQ)

- **Q: Can the condensing unit be operated in case of controller failure?**
  A: In case of controller failure, the condensing unit can still be operated by modifying the standard wiring as described in the manual. This modification should only be done by authorized electricians following country legislations.
- **Q: What is the maximum stacking for different housing types?**
  A: The maximum stacking for different housing types is as follows:
- **Housing 1:** 3 (Code no. 114X31– or 114X41–)
- **Housing 2:** 2 (Code no. 114X32– or 114X42–)
- **Housing 3:** 2 (Code no. 114X33– or 114X43–)
- **Housing 4:** 2 (Code no. 114X34– or 114X44–)

OPTYMA™ Plus Condensing Units
OP-LPQM, OP-MPBM, OP-MPXM,
OP-MPGM, OP-LPOM

- **Annex – A**
  Technical data
- **Annex – B**
  GA & PID Drawings
- **Annex – C**
  Wiring Diagram

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Optyma™ Plus
OP-LPQM, OP-MPBM, OP-MPXM, OP-MPGM, OP-LPOM

Installation and servicing of the condensing units by qualified personnel only. Follow these instructions and sound refrigeration engineering practice relating to installation, commissioning, maintenance and service.

This product is not subject to the UK PSTI regulation, as it is for supply to and use only by professionals with the necessary expertise and qualifications. Any misuse or improper handling may result in unintended consequences.

By purchasing or using this product, you acknowledge and accept the professional-use-only nature of its application. Danfoss does not assume any liability for damages, injuries, or adverse consequences (“damage”) resulting from the incorrect or improper use of the product and you agree to indemnify Danfoss for any such damage resulting from your incorrect or improper use of the product.The condensing unit must only be used for its

designed purpose(s) and within its scope of application. Refrigerant to be used as per specification with respect to model. Under all circumstances, the EN378 (or other applicable local safety regulations) requirements must be fulfilled.

The condensing unit is delivered under nitrogen gas pressure (1 bar) and hence it cannot be connected as it is; refer to the «installation» section for further details. The condensing unit must be handled with caution in the vertical position (maximum offset from the vertical : 15°) For PED Cat I and II models: Pressure relief valve shall be mounted in refrigerant system during field installation. PRV should be mounted on receiver vessel.

Relevant Standards and Directive

EN 378 -2:2016: Refrigerating Systems And Heat Pumps-Safety And Environmental Requirements. EN 60335-1: Household And Similar Electrical Appliances – Safety –Part 1:

- General Requirements Low Voltage Directive n° 2014 / 35 / UE
- Machinary Directive n° 2006 / 42 / CE
- Pressure Equipment Directive (PED) no. 2014/68/EU
- RoHS Directive 2011/65/EU
- WEEE Directive 2012/19/EU (Other local applicable standards)

Introduction

These instructions pertain to Optyma™ Plus condensing units OP-MPBM, OP-MPXM, OP-MPGM, OP-LPQM & OP-LPOM used for refrigeration systems. They provide necessary information regarding safety and proper usage of this product.
The condensing unit includes following:

- Microchannel heat exchanger
- Reciprocating or scroll compressor
- Receiver with stop valve
- Ball valves
- Sight glass
- High & low pressure switches
- Replaceable filter drier
- Electronic controller
- Main circuit breaker (Main switch with overload protection)
- Fan and compressor capacitors
- Compressor contactor
- Supply monitoring relay**
- Robust weather proof housing
- Liquid injection controller (Module B Plus)*
- Electronic expansion valve (ETS6)*
- Components connected are equipped with Schrader port

Only for P02 version,
only for P05 models

Handling and storage

- It is recommended not to open the packaging before the unit is at the final place for installation.
- Handle the unit with care. The packaging allows for the use of a forklift or pallet jack. Use appropriate and safe lifting equipment..
- Store and transport the unit in an upright position.
- Store the unit between -35°C and 50°C.
- Don’t expose the packaging to rain or corrosive atmosphere.
- After unpacking, check that the unit is complete and undamaged.

Installation precautions

	Never place the unit in a flammable atmosphere.
	Place the unit in such a way that it is not blocking or hindering walking areas, doors, windows or similar.
	PRV: For PED Cat I and II models, PRV shall be mounted at field during installation.

- Ensure adequate space around the unit for air circulation and to open doors. Refer to picture 1 for minimal values of distance to walls.
- Avoid installing the unit in locations which are daily exposed to direct sunshine for longer periods.
- Avoid installing the unit in aggressive and dusty environments.
- Ensure a foundation with horizontal surface (less than 3° slope), strong and stable enough to carry the entire unit weight and to eliminate vibrations and interference.
- The unit ambient temperature may not exceed 50°C during off cycle.
- Ensure that the power supply corresponds to the unit characteristics (see nameplate).
- When installing units for HFC refrigerants, use equipment specifically reserved for HFC refrigerants which was never used for CFC or HCFC refrigerants.
- Use clean and dehydrated refrigeration-grade Copper / Aluminium tubes with appropriate thickness and silver alloy brazing material.
- Use clean and dehydrated system components.
- The suction piping connected to the compressor must be flexible in 3 dimensions to dampen vibrations. Furthermore, piping has to be done in such a way that oil return for the compressor is ensured and the risk of liquid slug over in compressor is eliminated.
- In Optyma condensing unit has suction and liquid service valve with schrader port for field service operation

PRV Valve

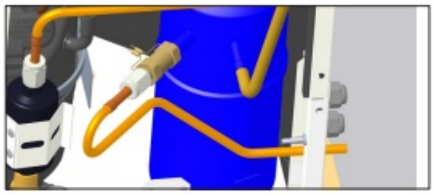
	For Optyma™ Plus, Condensing units which are fall in PED cat I and II, PRV shall be f itted (See Technical data for PED category in Annex **A**).
	PRV is provided as Spare part,. Refer Coolselector2

- PRV to be fitted on liquid receiver at 3/8″ NPT Connection. (Refer Coolselector2 for PRV spare part code). Use

Locatite 554 for PRV fitment.

- Torque: 40Nm (Don’t exceed given torque)

- I nstaller need to take care of where to blow the leaked refrigerant. Danfoss recommended to blow refrigerant away form condensing unit.
- Recommended to change PRV when after discharge, Changing refrigerant
- Valves must be installed vertically or Horizontally, but ensure PRV to be fitted above system’s liquid level.
- Ensure refrigerant is released safely to the atmosphere directly.
- Inncase of hazard, additional spare kit has been designed in order to collect the released refrigerant. Kit should be installation with proper piping routing for discharge of refrigerant safely. (See picture below)



- PRV should not be installed on service valve.
- Replace PRV after clean out of system or bared out.
- No Detachable joints and valves should not accessible to public. All brazing joints should comply with EN 14276-2 and other permanent joints should comply with EN-16084.

Installation

- The installation in which the condensing unit is installed must comply to pressure Equipment Directive (PED) 2014/68/EU. The condensing unit itself is not a ”unit” in the scope this directive.
- It is recommended to install the unit on rubber grommets or vibration dampers (not supplied).
- It is possible to stack units on top of each other.

Unit	Maximum stacking
Housing 1 (Code no. 114X31– or 114X41–)	3
Housing 2 (Code no. 114X32– or 114X42–)	2
Housing 3 (Code no. 114X33– or 114X43–)	2
Housing 4 (Code no. 114X34– or 114X44–)	2

- When stacking, the topmost unit must be secured to the wall, as shown in picture 2.
- Slowly release the nitrogen-holding charge through the Schrader port.

- Connect the unit to the system as soon as possible to avoid oil contamination from ambient moisture.
- Avoid material entering into the system while cutting tubes. Never drill holes where burrs cannot be removed.
- Braze with great care using state-of-the-art techniques and vent piping with nitrogen gas flow.
- Connect the required safety and control devices. When the Schrader port is used for this, remove the internal valve.
- It is recommended to insulate the suction pipe up to the compressor inlet with 19 mm thick insulation.
- Copper piping material should comply with EN12735-1. And all pipe joints should comply with EN14276-2
- At filed installation, support to added according to size and weight. Recommended maximum spacing for pipe support as per EN12735-1 & EN12735-2
- Connecting pipes shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts.

Leak detection

	Never pressurize the circuit with oxygen or dry air. This could cause fire or explosion.

- Do not use dye for leak detection.
- Perform a leak detection test on the complete system.
- The maximum test pressure is 31*) bar.
- When a leak is discovered, repair the leak and repeat the leak detection.

*) 25 bar for OP-…….AJ…. & OP-…….FH…. models

Vacuum dehydration

- Never use the compressor to evacuate the system.
- Connect a vacuum pump to both the LP & HP sides.
- Pull down the system under a vacuum of 500 µm Hg (0.67 mbar) absolute.
- Do not use a megohmmeter nor apply power to the compressor while it is under vacuum as this may cause internal damage.

Electrical connections

- Switch off and isolate the main power supply.
- Ensure that power supply can not be switched on during installation.
- All electrical components must be selected as per local standards and unit requirements.
- Refer to wiring diagram for electrical connection details.
- Ensure that the power supply corresponds to the unit characteristics and that the power supply is stable (nominal voltage ±10% and nominal frequency ±2,5 Hz).
- Dimension the power supply cables according to unit data for voltage and current.
- Protect the power supply and ensure correct earthing.
- Make the power supply according to local standards and legal requirements.

- The unit is equipped with an electronic controller. Refer to Manual 118U3808 for details.
- P02 version models (OP-xxxxxxxxxP02E) are equipped with Electronic circuit board (Module B Plus). Refer to section ” Module B Plus User Guide ” of this manual.
- The unit is equipped with a main switch with overload protection. The overload protection is factory preset but it is recommended to check the value before taking the unit in operation. The value for the overload protection can be found in the wiring diagram in the front door of the unit.
- The unit is equipped with high and low pressure switches, which directly cut the power supply to the compressor in case of activation. Parameters for high and low pressure cut outs are preset in the controller, adapted to the compressor installed in the unit.
- P05 models are also equipped with phase sequence relay to protect the unit against phase loss/sequence/ asymmetry and under-/over-voltage.

For units with a 3-phase scroll compressor (OP-MPXMxxxxxxxxE), correct phase sequence for compressor rotation direction shall be observed.

- Determine the phase sequence by using a phase meter in order to establish the phase orders of line phases L1, L2 and L3.
- Connect line phases L1, L2 and L3 to main switch terminals T1, T2 and T3 respectively.

Safety

	Electrical box door should be in closed condition before connecting to power supply.
	Discharge tube temperature will go upto 120°C during unit running condition.
	Recommended to install PRV inside unit and release of refrigerant should routed to a tmosphere directly.

Fusible Plug is not installed in unit, it is replaced with adapter blanking plug.
Unit has liquid receiver with an Adapter Plug with 3/8” NPT connection. installer/end user can select various options as mentioned in EN378-2 : 2016 Article § 6.2.2.3

- The unit/installation into which the condensing unit is mounted/integrated must be in accordance with the PED.
- Beware of extremely hot and cold components.
- Beware of moving components. Power supply should be disconnected while servicing.
- Compressor has Internal overload protector (OLP). Its will protect compressor pressure going beyond 32 bar pressure.
- No valves and detachable joints shall be located

in areas accessible to the general public except when they comply with EN 16084

- Refrigerant piping shall be protected or enclosed to avoid damage.
- Field piping should be installed such that it will be free from corrosive or salty environment to avoid corrosion in copper /Aluminum piping.
- In case of fire incidence, pressure increases due to increasing in temperature at receiver. Hence it is very important to install the PRV.

Filling the system

- Never start the compressor under vacuum. Keep the compressor switched off.
- Use only the refrigerant for which the unit is designed for.
- Fill the refrigerant in liquid phase into the condenser or liquid receiver. Ensure a slow charging of the system to 4 – 5 bar for R404A/R448A/R449A/R407A/R407F/R452A and approx. 2 bar for R134a and R513A.
- The remaining charge is done until the installation has reached a level of stable nominal condition during operation.
- Never leave the filling cylinder connected to the circuit.
- Suction, Liquid valves and Receiver Rotolock valves as Schrader port for service operation like Gas Charging, pressure measurement.

Setting the electronic controller

	For P02 version models (OP- xxxxxxxxxP02E), if o30 value is 19= R404A or 40=R448A or 41=R449A in controller. Change controller parameter o37 to 1 in case of SPPR retrofit. In case you add the SPPR (Supply monitoring relay) option to protect the compressor please change the setting o37 from 0 to 1

- The unit is equipped with an electronic controller which is factory programmed with parameters for use with the actual unit. Refer to Manual 118U3808 for details.
- By default, the electronic controller display shows the temperature value for the suction pressure in °C. To show the temperature value for the condensing pressure, push the lower button (picture 3).
- Push the middle button until the value for this parameter is shown.
- Push the upper or lower button to select the new value: 3 = R134a, 36 = R513A, 17 = R507, 19 = R404A, 20 = R407C , 21 = R407A, 37 = R407F, 40 = R448A, 41 = R449A, 42 = R452A.
- Push the middle button to confirm the selected value.
- Push the upper or lower button to find parameter code r84 (r84 = Maximum allowable discharge temperature).
- P ush the middle button, default maximum discharge temperature is 125°C
- If customer want to increase the valve, push the upper button to select the new value: 130 push middle button to confirm the selected value.
- Maximum allowable discharge temperature (r84) should not exceed 130 °C

Verification before commissioning

	Use safety devices such as safety pressure switch and mechanical relief valve in com pliance with both generally and locally applicable regulations and safety standards. E nsure that they are operational and properly set.
	Check that the settings of high- pressure switches and relief valves don’t exceed the maximum service pressure of any system component.

- Verify that all electrical connections inside the condensing unit are properly fastened as they could have worked loose during transportation.
- When a crankcase heater is required, the unit must be energized at least 12 hours before initial start-up and start-up after prolonged shutdown for belt type crankcase heaters.
- The unit is equipped with a main switch with overload protection. Overload protection is preset from factory, but it is recommended to check the value before taking the unit in operation. The overload protection value can be found in the wiring diagram in the unit front door.
- Check if discharge temperature sensor is firm and has proper contact with discharge pipe.
- Pressure drop in the suction and liquid line pipes must be evaluated as per evaporator location and distance (refer coolselector2).

Start-up

- Never start the unit when no refrigerant is charged.
- All service valves must be in the open position.
- Rotalock valve on the receiver must be turned 1 round to close direction to get the right condensing pressure for the pressure transmitter
- Check compliance between unit and power supply.
- Check that the crankcase heater is working.
- Check that the fan can rotate freely.
- Check that the protection sheet has been removed from the backside of condenser.
- Balance the HP/LP pressure.
- Energize the unit. It must start promptly. If the compressor does not start, check wiring conformity and voltage on terminals.
- Eventual reverse rotation of a 3-phase compressor can be detected by following phenomena; the compressor doesn’t build up pressure, it has abnormally high sound level and abnormally low power consumption. P05 models are equipped with a phase-reversal relay and compressor doesn’t start, the compressor doesn’t build up pressure, in case of wrong phase sequences. In such case, shut down the unit immediately and connect the phases to their proper terminals.
- If the rotation direction is correct the low pressure indication on the controller (or low-pressure gauge) shall show a declining pressure and the high pressure indication (or high pressure gauge) shall show an increasing pressure.

Check with running unit

- Check the fan rotation direction. Air must flow from the condenser towards the fan.

- Check current draw and voltage.
- Check suction superheat to reduce risk of slugging.
- When a sight glass is provided observe the oil level at start and during operation to confirm that the oil level remains visible.
- Respect the operating limits.
- Check all tubes for abnormal vibration. Movements in excess of 1.5 mm require corrective measures such as tube brackets.
- When needed, additional refrigerant in liquid phase may be added in the low-pressure side as far as possible from the compressor. The compressor must be operating during this process.
- For P02 version models (OP-xxxxxxxxxP02E) :
    - Check sight glass and make sure no bubbles in liquid line for proper liquid injection.
    - When o30 is set 19= R404A or 40=R448A or 41=R449A and readout U26 > 125 in controller, check and make sure liquid injection is ON. Economizer inlet pipe should be cold.
- Do not overcharge the system.
- Follow the local regulations for restoring the refrigerant from unit.
- Never release refrigerant to atmosphere.
- Before leaving the installation site, carry out a general installation inspection regarding cleanliness, noise and leak detection.
- Record type and amount of refrigerant charge as well as operating conditions as a reference for future inspections.

Emergency running without controller

In case of controller failure, the condensing unit can still be operated when the controller standard wiring (picture 4) is modified into a temporary wiring (picture 5) as described below.

	This modification may be done by authorized electricians only. Country legislations have to be followed.
	Disconnect the condensing unit from power supply (turn hardware main switch off)

- Contact of Room Thermostat must be possible to switch 250VAC.
- Remove wire 22 (safety input DI3) and wire 24 (room thermostat DI1) and put them together with an insulated 250 Vac 10mm² terminal bridge.
- Remove wire 25 (room thermostat DI1) and wire 11 (compressor supply) and put them together with an insulated 250VAC 10mm² terminal bridge.
- Remove wire 6 and connect it with a terminal bridge for wire 11 and 25. A fan pressure switch or fan speed controller can be connected in series to wire 6.
- Remove wire 14 (crankcase heater) and connect it to the compressor contactor terminal 22.
- Remove wire 12 (supply crankcase heater), extend this wire by using an 250 Vac 10mm² terminal bridge and 1,0mm² brown cable and connect it to compressor contactor terminal 21
- Remove the large terminal block from the controller terminals 10 to 19.
- Connect the condensing unit to power supply (turn the hardware main switch on).

Maintenance

	Always switch off the unit at main
	switch before opening the fan door (s).
	Internal pressure and surface
	temperature are dangerous and may
	cause permanent injury.Maintenance
	operators and installers require
	appropriate skills and tools. Tubing
	temperature may exceed 100°C and
	can cause severe burns.
	Ensure that periodic service
	inspections to ensure system
	reliability and as required by local
	regulations are performed.

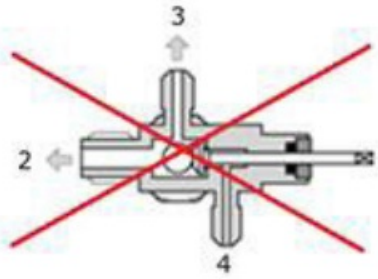
To prevent system related problems, following periodic maintenance is recommended:

- Verify that safety devices are operational and properly set.
- Ensure that the system is leak tight.
- Check the compressor current draw.
- Confirm that the system is operating in a way consistent with previous maintenance records and ambient conditions.
- Check that all electrical connections are still adequately fastened.
- Keep the unit clean and verify the absence of rust and oxidation on the unit components, tubes and electrical connections.

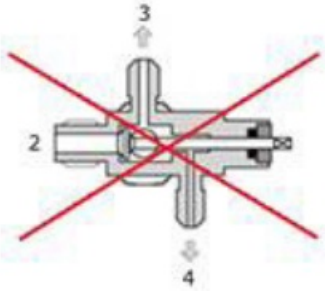
The condenser must be checked at least once a year for clogging and be cleaned if deemed necessary. Access to the internal side of the condenser takes place through the fan door. Microchannel coils tend to accumulate dirt on the surface rather than inside, which makes them easier to clean than fin-and-tube coils.

- Switch off the unit at main switch before opening the fan door.
- Remove surface dirt, leaves, fibres, etc. with a vacuum cleaner, equipped with a brush or other soft attachment. Alternatively, blow compressed air through the coil from the inside out, and brush with a soft bristle. Do not use a wire brush. Do not impact or scrape the coil with the vacuum tube or air nozzle.
- Before closing the fan door, turn the fan blade in a safe position, to avoid that the door hits the fan.

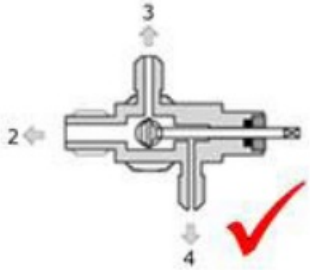
If the refrigerant system has been opened, the system has to be flushed with dry air or nitrogen to remove moisture and a new filter drier has to be installed. If evacuation of refrigerant has to be done, it shall be done in such a way that no refrigerant can escape to the environment.



- **Fig A:** Fully opened condition, Port 2 and 3 is fully opened and port 4 is fully closed



- **Fig B:** Fully closed condition, Port 3 and 4 is partially open and port 2 is fully closed



- **Fig C:** Partially Opened Condition (5.5 turns clock wise from fully opened condition. Port 2, 3, 4 is fully opened).

Declaration of incorporation

Pressure Equipment Directive 2014/68/EU EN 378-2:2016 – Refrigerating systems and Heat Pumps – Safety and environmental requirements-Parts 2: Design, construction, testing, marking and documentation.

Low Voltage Directive 2014/35/EU EN 60335-1:2012 + A11:2014- Household and similar electrical appliances-Safety-Part 1: General requirements-for all above mentioned condensing units Eco-design DIRECTIVE 2009/125/EC, establishing a framework for the setting of Eco-design requirements for energy-related products. REGULATION (EU) 2015/1095, implementing Eco-design Directive 2009/125/EC with regard to Eco-design requirements for professional refrigerated storage cabinets, blast cabinets, condensing units and process Chiller.

- Condensing unit measurements are made according to standard “EN 13771-2:2017” –Compressor and condensing units for refrigeration-performance testing and test methods- part 2: Condensing units.

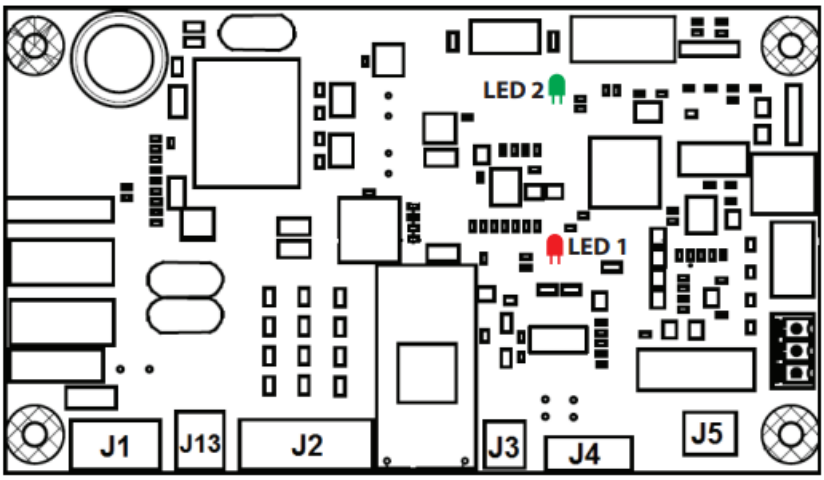
Warranty

Always transmit the model number and serial number with any claim filed regarding this product. The product warranty may be void in following cases:

- Absence of nameplate.
- External modifications, in particular, drilling, welding, broken feet and shock marks.
- Compressor opened or returned unsealed.
- Rust, water or leak detection dye inside the compressor.
- Use of a refrigerant or lubricant not approved by Danfoss.
- Any deviation from recommended instructions pertaining to installation, application or maintenance.
- Use in mobile applications.
- Use in explosive atmospheric environment.
- No model and serial number transmitted with the warranty claim.

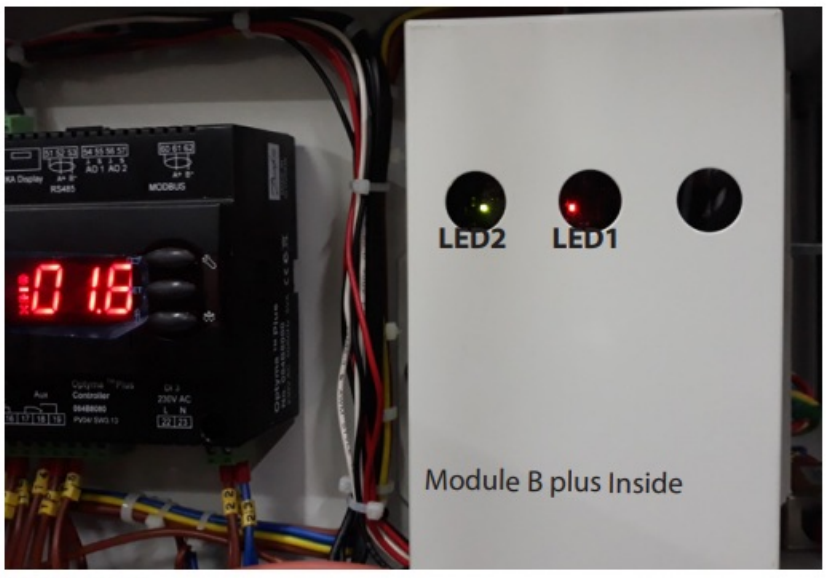
Disposal

Danfoss recommends that condensing units and oil should be recycled by a suitable company at its site.
Module B plus is an electronic circuit board used in P02 version models for automatic liquid injection into compressor scrolls set using an electronic expansion valve.



Module B Plus

Module B plus is covered by touch protection cover as Picture 6.
Do not remove touch protection cover unless required. Switch of the unit before removing this cover.



Picture 6

Application

Module B Plus controls liquid injection, and it also monitors the following parameters: Discharge gas temperature, phase sequence and phase failure.

Functional description

- Liquid injection
  - Module B Plus can control discharge gastemperature. The default set point is 125 °C, this is required to run the condensing unit within safe envelope.
- Do not change this set point.
  - When compressor stops the liquid injection

Module B Plus – User guide

valve will be closed within 6 seconds.

- Discharge gas temperature overheat protection
  - Discharge gas temperature sensor from Module B Plus can detect discharge gas temperature within the range -50 to 180°C, temperature measurement accuracy ±0.5°C. Discharge sensor is installed within 150mm from compressor discharge port.
  - If the discharge gas temperature is higher than Overheat Trigger Point (set point + 10 K)within 1 second, alarm relay (J5) will open. This status is named as DGT Overheat Static referring to Table 1. If the discharge gas temperature lower than Reset Point (Set Point -15 °C) continuously for 5 minutes, the alarm relay (J5) will close. This 5 minutes delay status is named as DGT Reset Delay.
  - If the discharge gas temperature overheat more than 5 times within 1 hour, alarm relay (J5) locks on open status and only can be reset by resetting Module B Plus power supply manually (switch-off the unit and switch-on again after some time). This status is named as DGT Overheat Lock, refer table 1 for error identification.
  - If discharge gas temperature sensor is malfunction, i.e. Sensor Open, Sensor Short circuit or Out of Range, alarm relay (J5) locks on open status too, refer table 1 for error identification.
  - Phase protection
  - Phase sequence and missing phase detection will only be performed every time the compressor was powered on. If a wrong phase status Phase Loss or Phase Reverse detected, within 4.5s to 5s, alarm relay (J5) will open and lock on open status. This lock on open status only can be reset by resetting Module B Plus power supply manually, refer table 1 for error identification.
- User interface
  - Module B Plus powers on, power LED 1 will be solid red all the time. When the Module is powered off, power LED 1 will be off. If Module B Plus powers on and has no error, status LED 2 will be solid green on. Refer picture 6 for LED 1 and LED 2 location on module B plus.
  - If Module B Plus powers on, and detects an error, status LED 2 will be yellow and red blinking one second alternately. Detail blink code see table 1.
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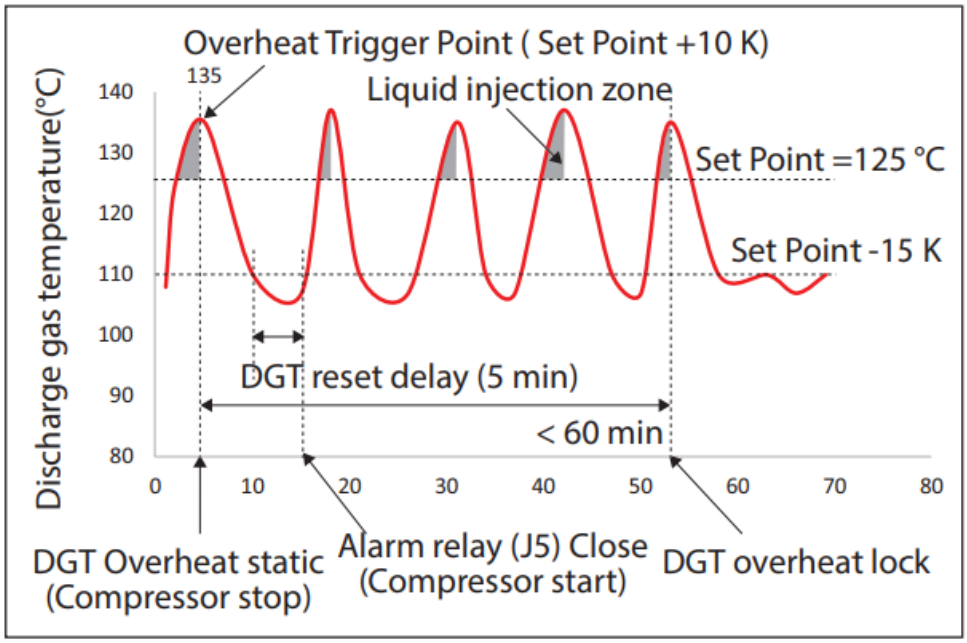
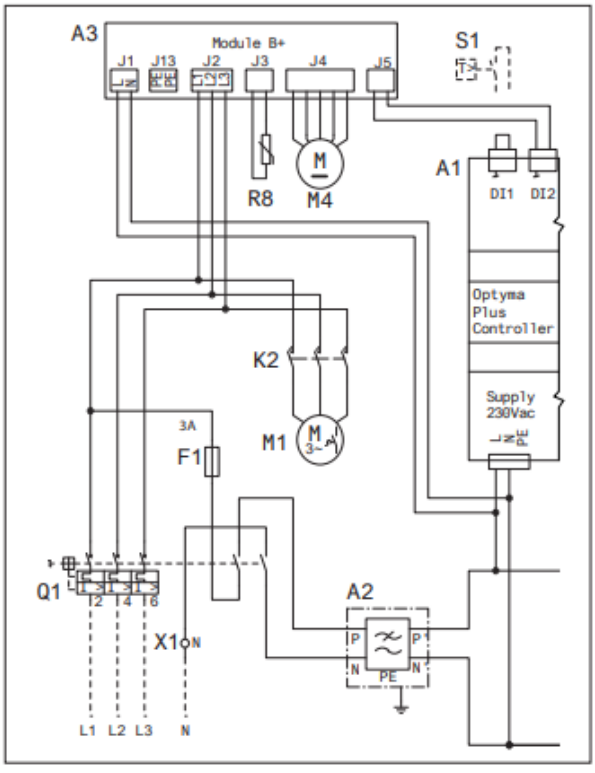


Picture 7.

Module B plus communication with Optyma Plus controller.

- When alarm relay (J5) is open, signal is communicated to Optyma controller digital input 2 (DI2), which enables safety alarm (A97) in Optyma plus controller and power supply to compressor will be stopped immediately.



Model B Plus wiring diagram

Category	Yellow Blink Times	Red Blink Times	Error	Description	Action
Discharge gas temperature	1	1	DGT Overheat static/ DGT Reset Delay	Discharge gas temperature is higher than compressor stop trip point	Check if Optyma Controller shows safety alarm (A97). If yes, wait till it gets resolved automatically. If this error is observed frequently, check if unit is running in recommended envelope.
		2	DGT Overheat Lock	DGT Overheat Static occurs 5 times within 1 hour	Reset Module B Plus supply manually (switch-off the unit and switch-on again after some time).
		3	DGT out of range	DGT is out of normal range (-50 … 180°C)	Check if discharge gas temperature sensor is mounted properly on discharge line. Check discharge gas temperature on Optyma Plus controller parameter U27 (should be within -50 … 180°C).
		4	DGT Sensor Open / DGT Sensor Short	Discharge gas temperature sensor open/short circuit	Check discharge temperature sensor and connection.
Triple Phase	2	1	Phase Loss	One phase signal loss	Check 3-Phase power supply (J2) to Module B Plus, if one of the 3 phases is missing. If yes, do correct power supply connection and reset Module B Plus manually (switch-off the unit and switch-on again after some time).
		2	PhaseReverse	Incorrect phase connection	Check 3-Phase power supply (J2) to Module B Plus, if 3 phases are in correct sequence. If not, do correct power supply connection in sequence and reset Module B Plus manually (switch-off the unit and switch-on again after some time).

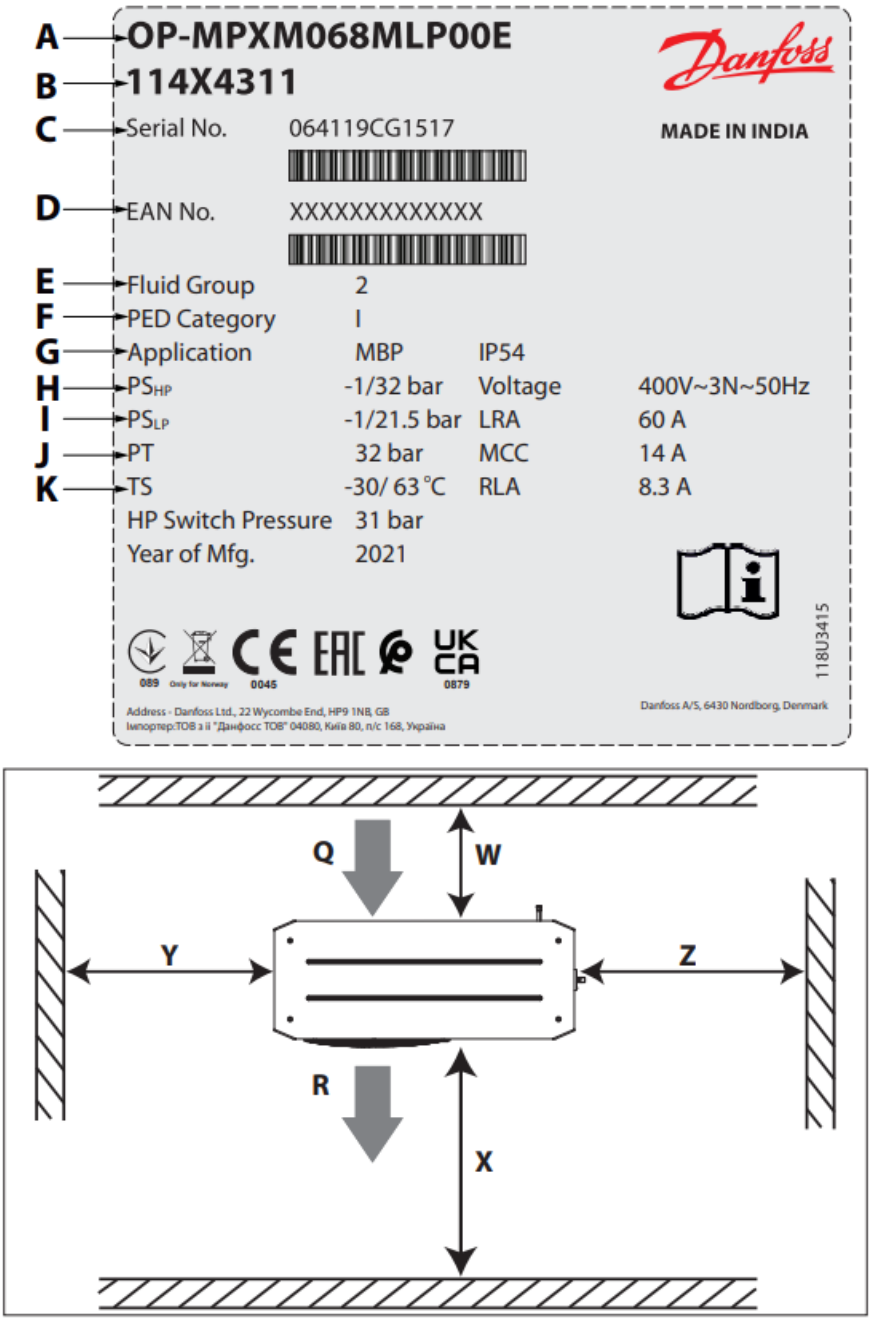
Annex -A
Technical data

Name plate

For exact values please refer name plate in unit

- A: Model
- B: Code number
- C: Serial Number and bar code
- D: EAN number
- E: Refrigerant
- F: PED Category
- G: Application, Ingress Protection
- H: Maximum Allowable Pressure (HP side)

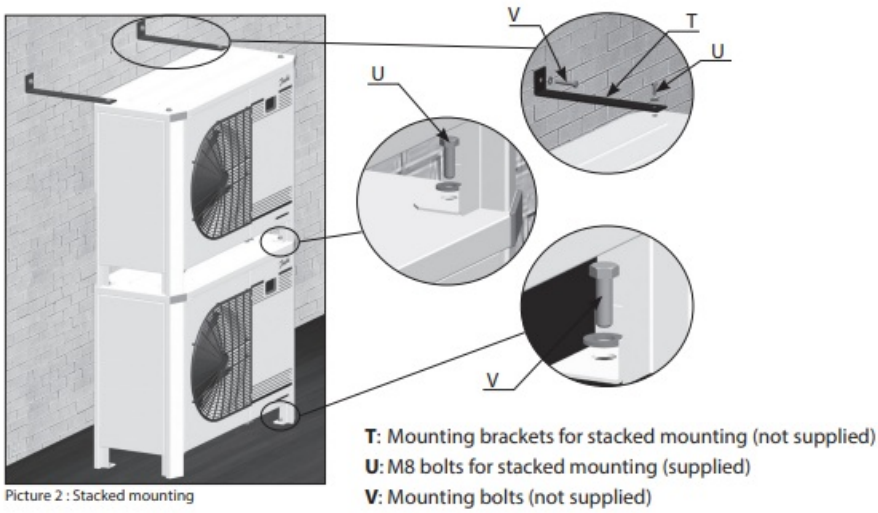
- I: Maximum Allowable Pressure (LP side)
- J: Test Pressure
- K: Maximum allowable Design Temperature



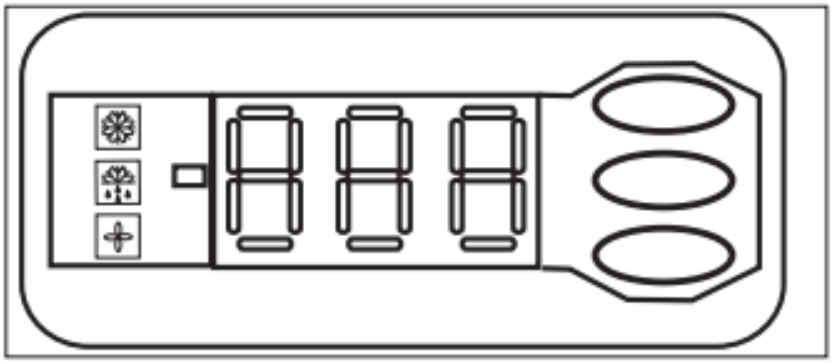
Picture 1 : Minimum mounting distances

- Q: Air in
- R: Air out

Unit	W [mm]	X [mm]	Y [mm]	Z [mm]
Housing 1 (Code n° 114X31– or 114X41–)	250	550	456	456
Housing 2 (Code n° 114X32– or 114X42–)	250	650	530	530
Housing 3 (Code n° 114X33– or 114X43–)	250	760	581	581
Housing 4 (Code n° 114X34– or 114X44–)	250	900	700	700



Picture 2 : Stacked mounting


Picture 3 : Electronic controller display

Compressor running

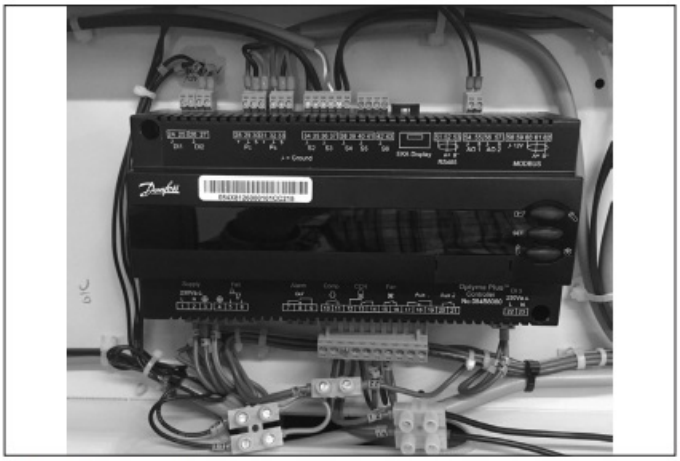
Crankcase heater on

Fan running

Temperature value for suction pressure.

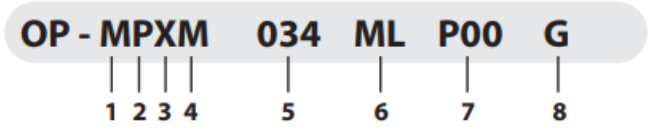
888 Push lower button to switch to temperature value for condensing pressure

Picture 4 : Normal wiring



Picture 5 : Temporary wiring

Designation system for the Optyma™ Plus range



1	**Application** M = MBP L = LBP
2	**Package** Condensing unit family: P = Optyma™ Plus
3	**Refrigerant** • H = R404A/R507 G = R134a, R513A • Q = R452A, R404A/R507 • X = R404A/R507, R134a, R407A, R407F, R448A, R513A R449A,R452A • Y = R404A/R507, R449A • B = R448A/R449A/R404A/R452A (MBP) P = R448A/R449A, R407A/F, R404A/R507 O = R448A/R449A/R404A/R452A (LBP)
4	**Condenser** M = Microchannel heat condenser
5	**Swept volume** Displacement in cm3: Example 034 = 34 cm3
6	**Compressor platform** ML= Fixed speed scroll MLZ
7	**Version** • P00: Optyma™ Plus • P02: Optyma™ Plus with Liquid Injection • P05: Optyma™ Plus with Supply monitoring relay
8	**Voltage code** • G = 230V/1-phase/50Hz compressor & fan • E = 400V/3-phase/50Hz compressor & 230V/1-phase fan

Varcion controll

Optyma™ **Plus**	**(P00)**	**(P02)**	**(P05)**
IP level	IP54	IP54	IP54
Compressor technology	Scroll/ Reciprocating	Scroll	Scroll (3phase)
Control box (pre-wired E-panel)	yes	yes	yes
Microchannel condenser	yes	yes	yes
Fan speed controller*	yes	yes	yes
Main switch (circuit breaker)	yes	yes	yes
Supply monitoring relay	–	–	yes
Filter drier (flare connections)	yes	yes	yes
Sight glass	yes	yes	yes
Crankcase heater	yes	yes	yes
HP/LP adjustable pressostat	Electronic	Electronic	Electronic
Fail safe mini-pressostat	Mechanical	Mechanical	Mechanical
Access door(s)	yes	yes	yes
Acoustic insulation	yes	yes	yes
Condensing unit electronic controller	yes	yes	yes
Network connectivity	yes	yes	yes
Stack mounting	yes	yes	yes
Discharge gas thermostat	yes	yes	yes
HP/LP Alarm	yes	yes	yes
Liquid injection kit, phase loss/sequence protectio n	–	yes	–
Pressure Relief Valve**	–	–	–

- Inbuilt function within Condensing unit electronic controller
- Accessory (Not factory mounted)

Technical data

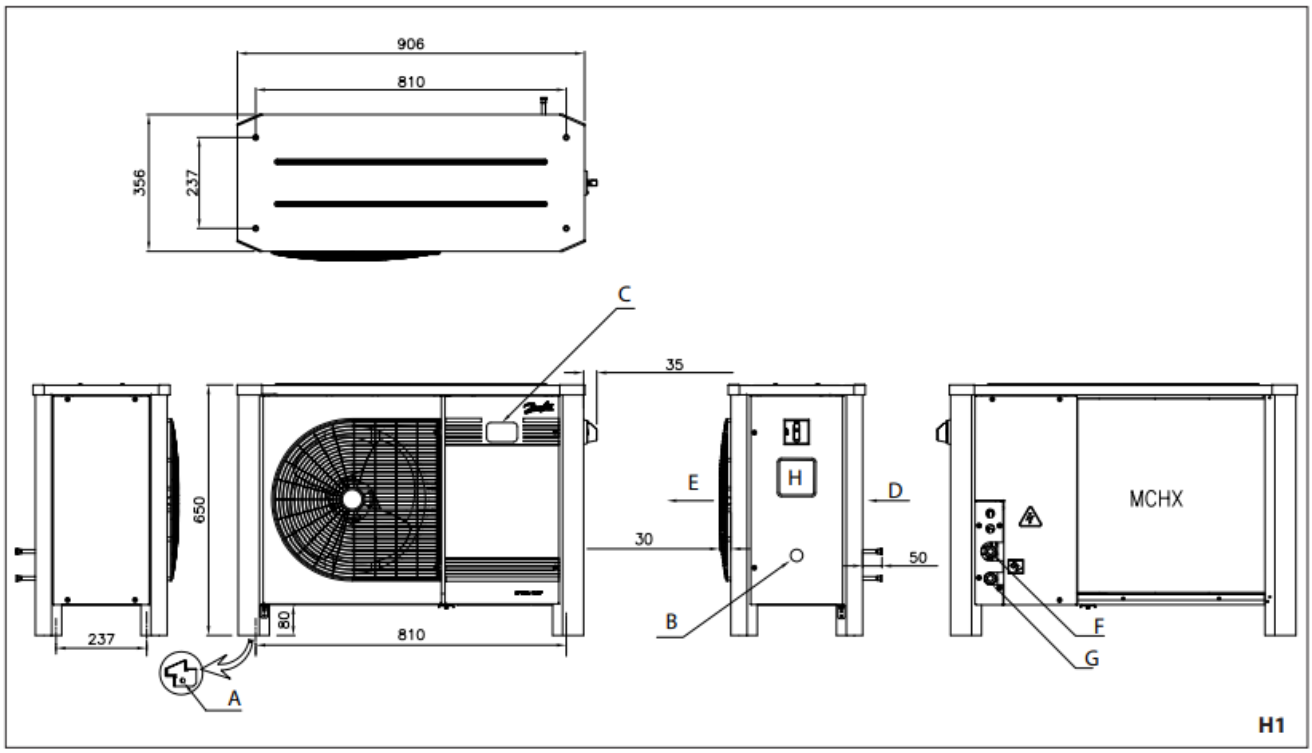
Application	Code	Model	Compressor Model	Electrical Code	Refrigerant	Receiver (L)	PED category*	PS	Suction Valve	Liquid Valve	Housing	Unit Dimensions (mm)		
								bar	Inch	Inch		L	W	H
LBP	114X3118	OP-LPQM017DPP00G	DPT16LA	G	Q	1.3	Artical 4 Para. 3	32	3/8″	3/8″	H1	650	941	406
LBP	114X3225	OP-LPQM048NTP00G	NTZ048-5	G	Q	3.4	I	32	5/8″	3/8″	H2	813	1090	480
LBP	114X3233	OP-LPQM048NTP00E	NTZ048-4	E	Q	3.4	I	32	5/8″	3/8″	H2	813	1090	480
LBP	114X3241	OP-LPQM068NTP00G	NTZ068-5	G	Q	3.4	I	32	5/8″	3/8″	H2	813	1090	480
LBP	114X3249	OP-LPQM068NTP00E	NTZ068-4	E	Q	3.4	I	32	5/8″	3/8″	H2	813	1090	480
LBP	114X3357	OP-LPQM096NTP00E	NTZ096-4	E	M	6.2	I	32	7/8″	1/2″	H3	965	1441	531
LBP	114X3371	OP-LPOM067LLP02E	LLZ013T4A	E	O	6.2	I	32	3/4″	1/2″	H3	965	1441	531
LBP	114X3372	OP-LPOM084LLP02E	LLZ015T4A	E	O	6.2	I	32	3/4″	1/2″	H3	965	1441	531
LBP	114X3373	OP-LPOM098LLP02E	LLZ018T4A	E	O	6.2	I	32	3/4″	1/2″	H3	965	1441	531
LBP	114X3485	OP-LPOM120LLP02E	LLZ024T4A	E	O	10	II	32	1 1/8″	3/4″	H4	966	1835	650
LBP	114X3486	OP-LPOM168LLP02E	LLZ034T4A	E	O	10	II	32	1 1/8″	3/4″	H4	966	1835	650
LBP	114X3301	OP-LPOM067LLP05E	LLZ013T4A	E	O	6.2	I	32	3/4″	1/2″	H3	965	1441	531
LBP	114X3302	OP-LPOM084LLP05E	LLZ015T4A	E	O	6.2	I	32	3/4″	1/2″	H3	965	1441	531
LBP	114X3303	OP-LPOM098LLP05E	LLZ018T4A	E	O	6.2	I	32	3/4″	1/2″	H3	965	1441	531

LBP	114X3401	OP-LPOM120LLP05E	LLZ024T4A	E	O	10	II	32	1 1/8″	3/4″	H4	966	1835	650
LBP	114X3402	OP-LPOM168LLP05E	LLZ034T4A	E	O	10	II	32	1 1/8″	3/4″	H4	966	1835	650
MBP	114X4119	OP-MPBM008DYP00G	DLY80RAb	G	Y	1.3	Artical 4 Para. 3	32	3/8″	1/4″	H1	650	941	406
MBP	114X4120	OP-MPBM009DYP00G	DLY90RAb	G	Y	1.3	Artical 4 Para. 3	32	3/8″	1/4″	H1	650	941	406
MBP	114X4121	OP-MPBM012DPP00G	DPT12RA	G	Y	1.3	Artical 4 Para. 3	32	3/8″	3/8″	H1	650	941	406
MBP	114X4122	OP-MPBM014DPP00G	DPT14RA	G	Y	1.3	Artical 4 Para. 3	32	3/8″	3/8″	H1	650	941	406
MBP	114X4261	OP-MPXM034MLP00G	MLZ015T5	G	X	3.4	I	32	3/4″	1/2″	H2	813	1090	480
MBP	114X4264	OP-MPXM034MLP00E	MLZ015T4	E	X	3.4	I	32	3/4″	1/2″	H2	813	1090	480
MBP	114X4281	OP-MPXM046MLP00G	MLZ021T5	G	X	3.4	I	32	3/4″	1/2″	H2	813	1090	480
MBP	114X4284	OP-MPXM046MLP00E	MLZ021T4	E	X	3.4	I	32	3/4″	1/2″	H2	813	1090	480
MBP	114X4290	OP-MPXM057MLP00G	MLZ026T5	G	X	3.4	I	32	3/4″	1/2″	H2	813	1090	480
MBP	114X4293	OP-MPXM057MLP00E	MLZ026T4	E	X	3.4	I	32	3/4″	1/2″	H2	813	1090	480
MBP	114X4308	OP-MPXM068MLP00G	MLZ030T5	G	X	6.2	I	32	7/8″	5/8″	H3	965	1441	531
MBP	114X4311	OP-MPXM068MLP00E	MLZ030T4	E	X	6.2	I	32	7/8″	5/8″	H3	965	1441	531

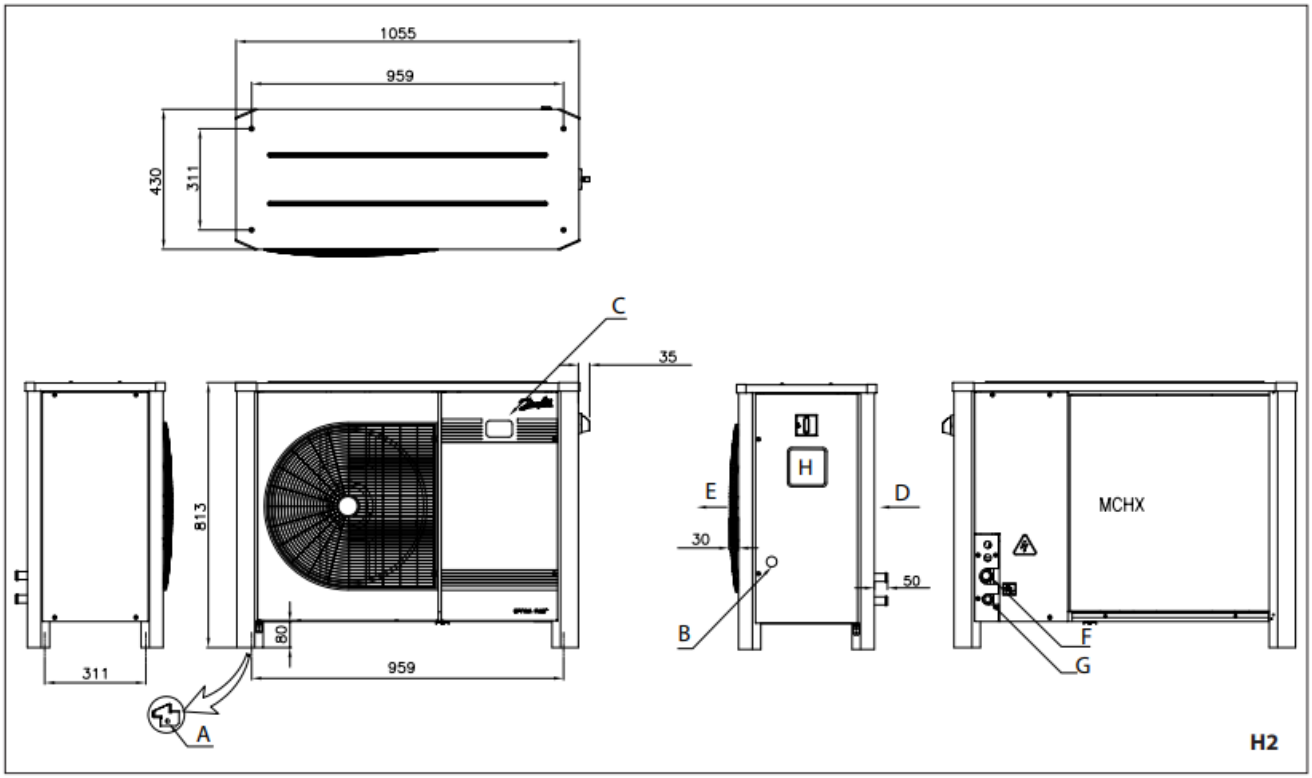
MBP	114X4321	OP-MPXM080MLP00G	MLZ038T5	G	X	6.2	I	32	7/8″	5/8″	H3	965	1441	531
MBP	114X4324	OP-MPXM080MLP00E	MLZ038T4	E	X	6.2	I	32	7/8″	5/8″	H3	965	1441	531
MBP	114X4344	OP-MPXM108MLP00E	MLZ048T4	E	X	6.2	I	32	7/8″	5/8″	H3	965	1441	531
MBP	114X4414	OP-MPXM125MLP00E	MLZ058T4	E	X	10	II	32	1 1/8″	3/4″	H4	966	1835	650
MBP	114X4434	OP-MPXM162MLP00E	MLZ076T4	E	X	10	II	32	1 1/8″	3/4″	H4	966	1835	650
MBP	114X4201	OP-MPXM034MLP05E	MLZ015T4	E	X	3.4	I	32	3/4″	1/2″	H2	813	1090	480
MBP	114X4202	OP-MPXM046MLP05E	MLZ021T4	E	X	3.4	I	32	3/4″	1/2″	H2	813	1090	480
MBP	114X4203	OP-MPXM057MLP05E	MLZ026T4	E	X	3.4	I	32	3/4″	1/2″	H2	813	1090	480
MBP	114X4303	OP-MPXM068MLP05E	MLZ030T4	E	X	6.2	I	32	7/8″	5/8″	H3	965	1441	531
MBP	114X4304	OP-MPXM080MLP05E	MLZ038T4	E	X	6.2	I	32	7/8″	5/8″	H3	965	1441	531
MBP	114X4305	OP-MPXM108MLP05E	MLZ048T4	E	X	6.2	I	32	7/8″	5/8″	H3	965	1441	531
MBP	114X4401	OP-MPXM125MLP05E	MLZ058T4	E	X	10	II	32	1 1/8″	3/4″	H4	966	1835	650
MBP	114X4402	OP-MPXM162MLP05E	MLZ076T4	E	X	10	II	32	1 1/8″	3/4″	H4	966	1835	650

PED Category for Group 2 fluid

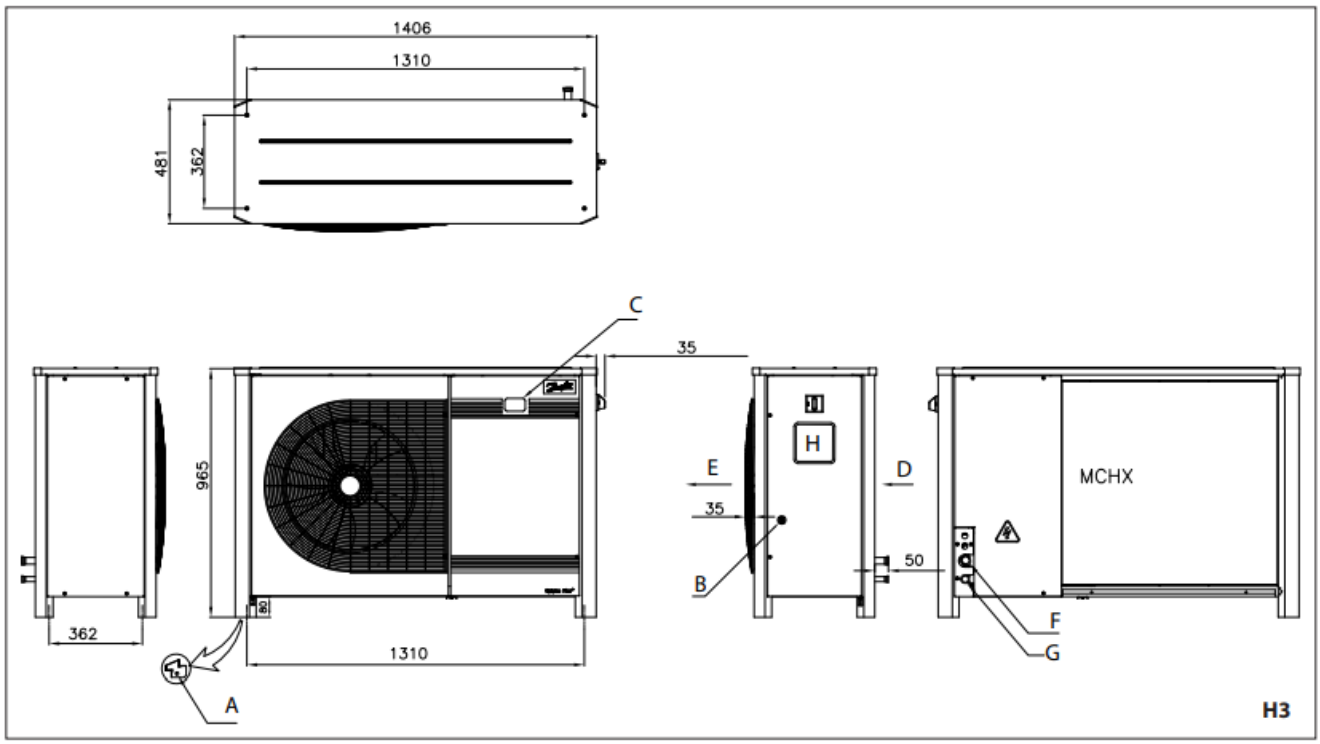
GA & PID Drawings



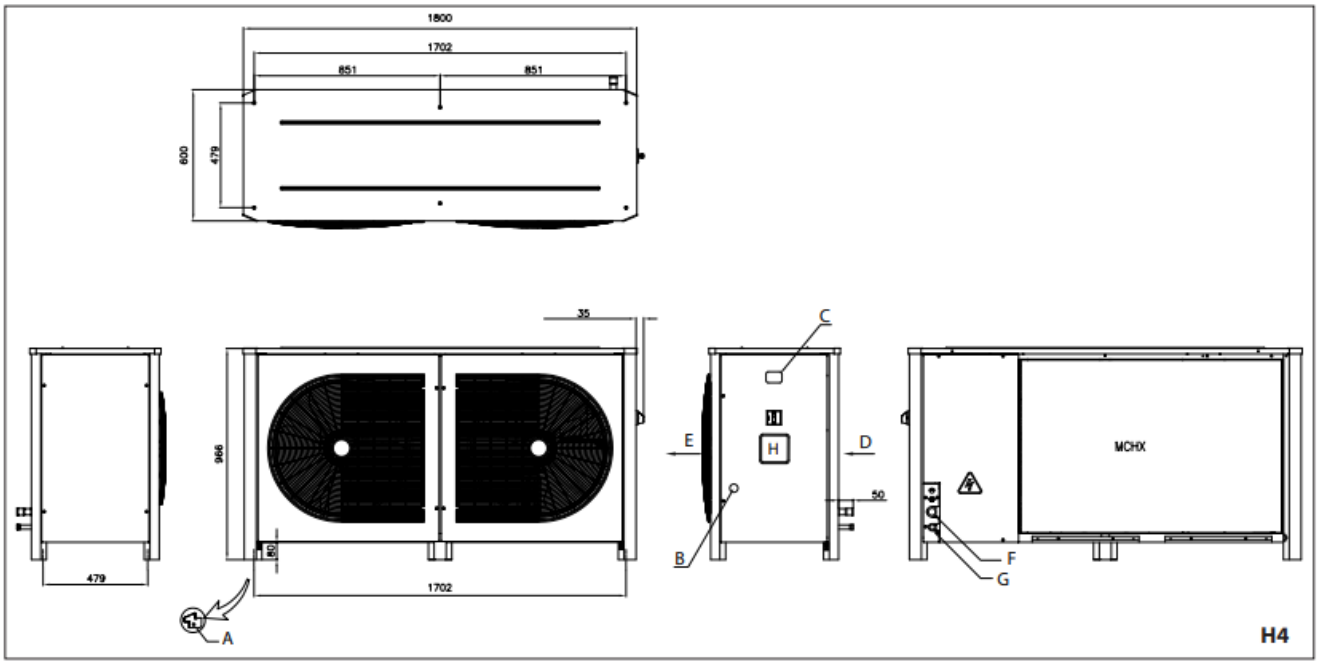
OP-LPQM026-048-068-074 & OP-MPBM018-024-026-034 & OP-MPXM034-046-057 & OP-MPGM033 -34 & OP-MPHM026-034 &
OP-LPHM026



OP-LPQM096-136 & OP-MPXM068-080-108



OP-LPQM215-271 & OP-MPXM125-162

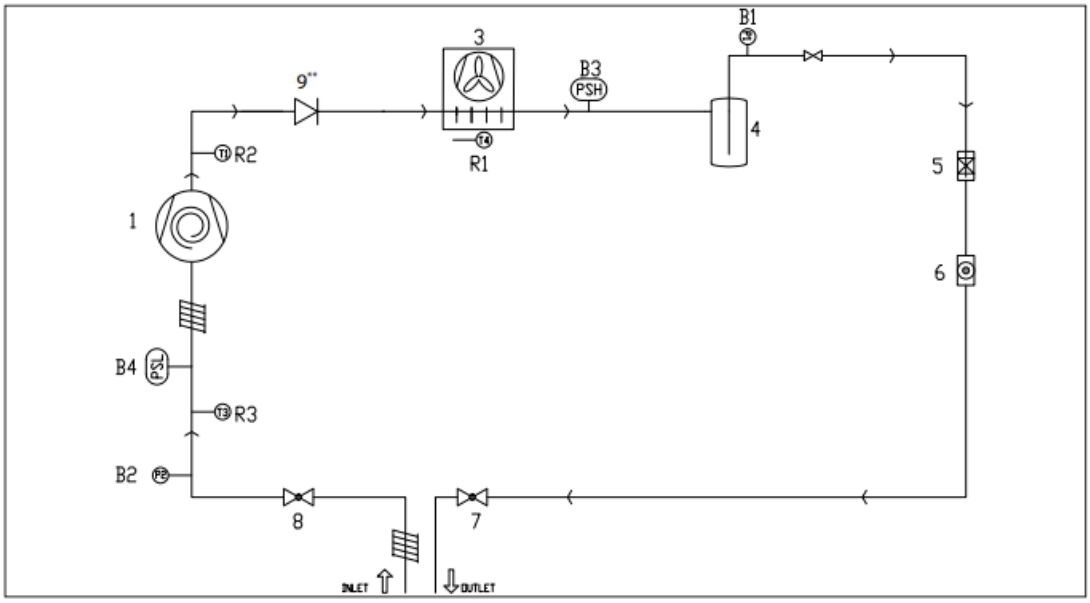


- A Ø12 Hole for Mounting
- B Sight Glass
- C Controller Display
- D Air in
- E Air out
- F Suction Port
- G Liquid Port
- H Nameplate

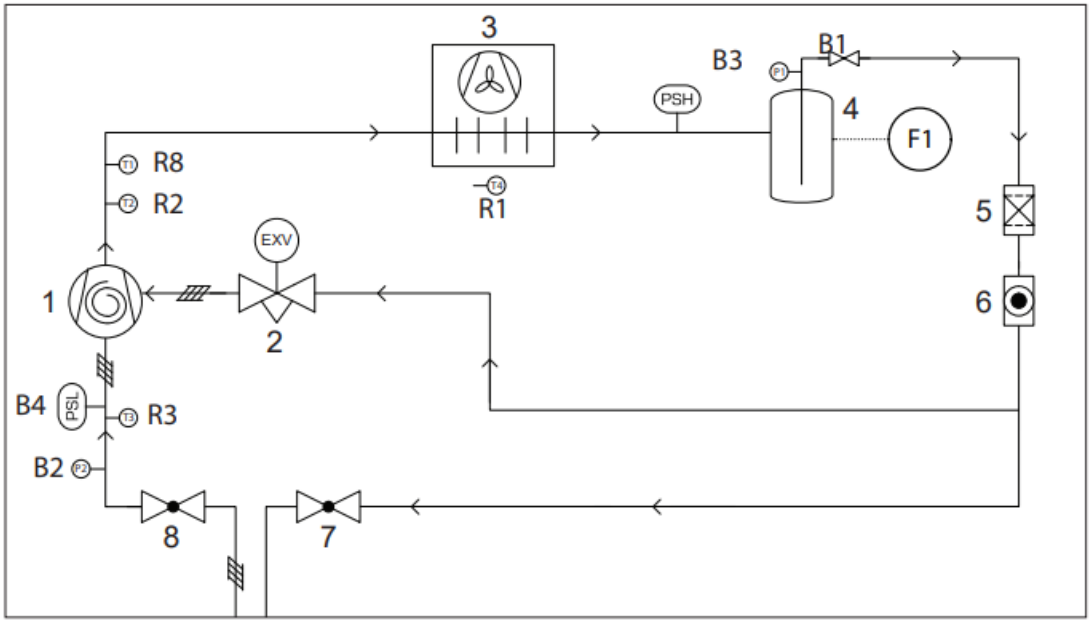
Electrical Cables

Note: all dimension are in mmTable 1: Error Blink Code (LED 2 Yellow -Red Blink code)

POO & P05 Models: OP-LPQM017-026-048-068-074-096-136-215-271, OP-MPBM008-009-012-014, OP-MPBM018-024-026-034, OP-MPXM034-046-057-68-080-108-125-162 & OP-MPGM033



P02 & P05 Models: OP-LPOM067-084-098-120-168



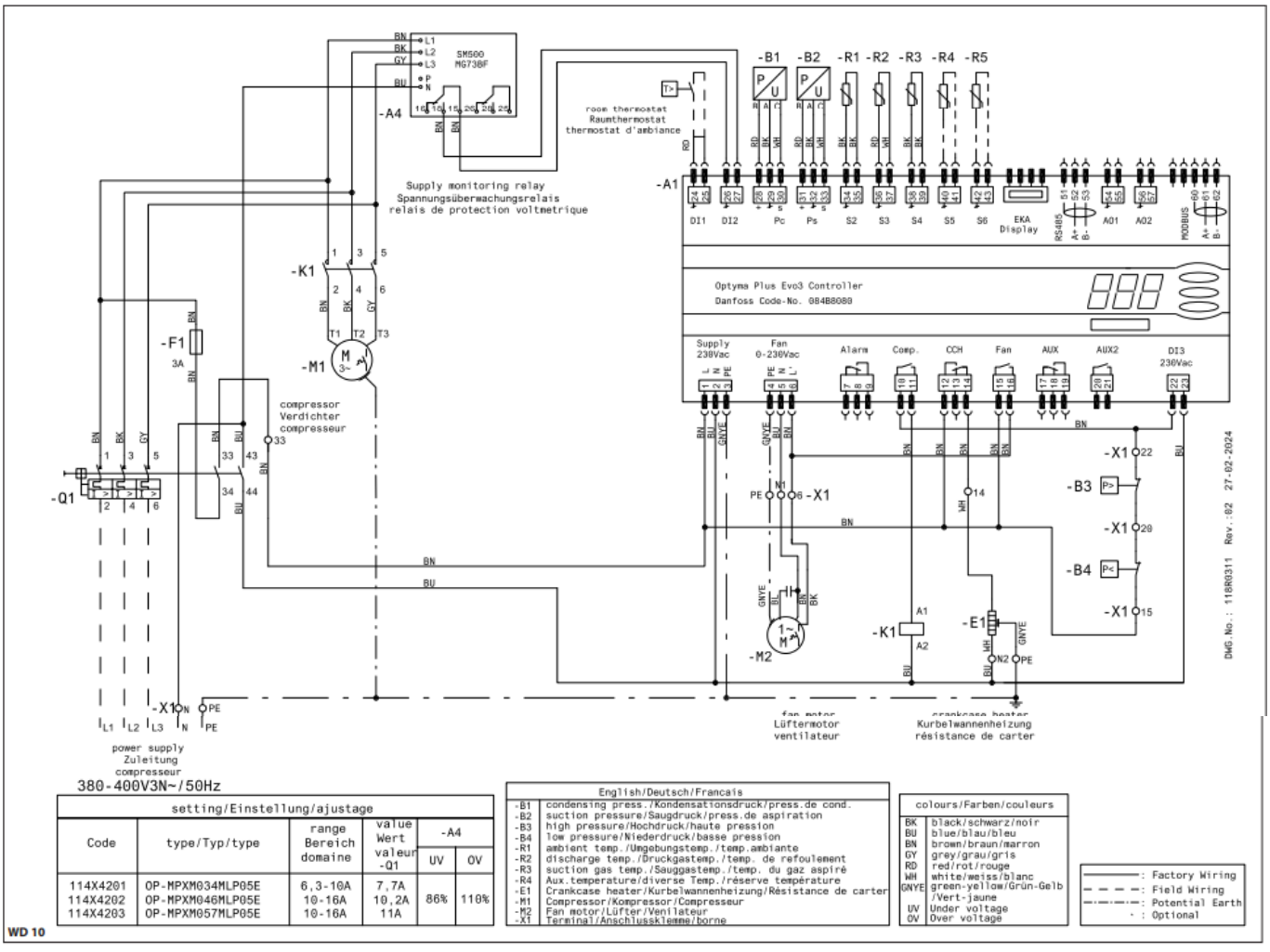
1. Compressor
2. Electric Expansion Valve
3. Micro Channel Heat Exchanger with

4. Refrigerant receiver with rotalock valve
5. Filter Drier
6. Sight Glass
7. Liquid Ball Valve
8. Suction Ball Valve
9. NRV (only for 114X44** models)
    - B1 Condensing Pressure Transducer (P1)

      B2 Suction Pressure Transducer (P2)
    - B3 High Pressure cartridge Switch (auto-reset) (PSH)
    - B4 Low Pressure cartridge Switch (auto-reset) (PSL)
    - F1 Pressure Relief Valve (PED category II models only)
    - R1 Ambient Temperature sensor (T4)
    - R2 Discharge Temperature Sensor (T2)
    - R3 Suction Temperature Sensor (T3)
    - R8 Discharge Temperature Sensor (T1)

Insulation

Code E (P05): OP-MPXM034-046-057



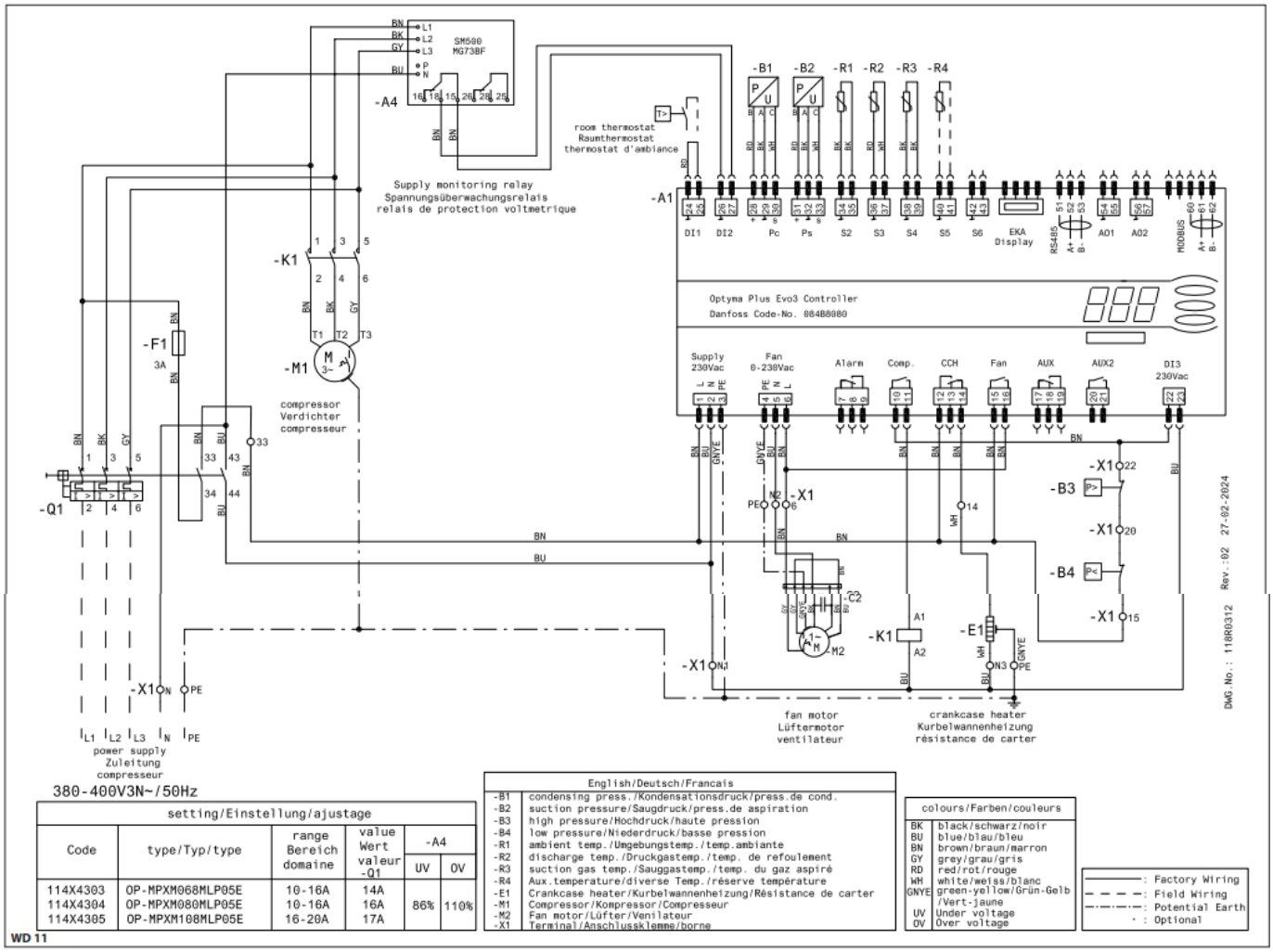
setting/Einstellung/ajustage					
Code	type/Typ/type	range Bereich domaine	value Wert valeur -Q1	-A4 UV	-A4 OV
114X4201	OP-MPXM034MLP05E	6,3-10A	7,7A	86%	110%
114X4202	OP-MPXM046MLP05E	10-16A	10,2A		
114X4203	OP-MPXM057MLP05E	10-16A	11A		

English/Deutsch/Francais	
-B1	condensing press./Kondensationsdruck/press.de cond.
-B2	suction pressure/Saugdruck/press.de aspiration
-B3	high pressure/Hochdruck/haute pression
-B4	low pressure/Niederdruck/basse pression
-R1	ambient temp./Umgebungstemp./temp.ambiante
-R2	discharge temp./Druckgastemp./temp. de refoulement
-R3	suction gas temp./Sauggastemp./temp. du gaz aspiré
-R4	Aux.temperature/diverse Temp./réserve température
-E1	Crankcase heater/Kurbelwannenheizung/Résistance de carter
-M1	Compressor/Kompressor/Compresseur
-M2	Fan motor/Lüfter/Venilateur
-X1	Terminal/Anschlussklemme/borne

colours/Farben/couleurs	
BK	black/schwarz/noir
BU	blue/blau/bleu
BN	brown/braun/marron
GY	grey/grau/gris
RD	red/rot/rouge
WH	white/weiss/blanc
GNYE	green-yellow/Grün-Gelb /Vert-jaune
UV	Under voltage
OV	Over voltage

: Factory Wiring
: Field Wiring
: Potential Earth
: Optional

Code E (P05): OP-MPXM068-080-108



setting/Einstellung/ajustage					
Code	type/Typ/type	range Bereich domaine	value Wert valeur -Q1	-A4	
				UV	OV
114X4303	OP-MPXM068MLP05E	10-16A	14A	86%	110%
114X4304	OP-MPXM080MLP05E	10-16A	16A		
114X4305	OP-MPXM108MLP05E	16-20A	17A		

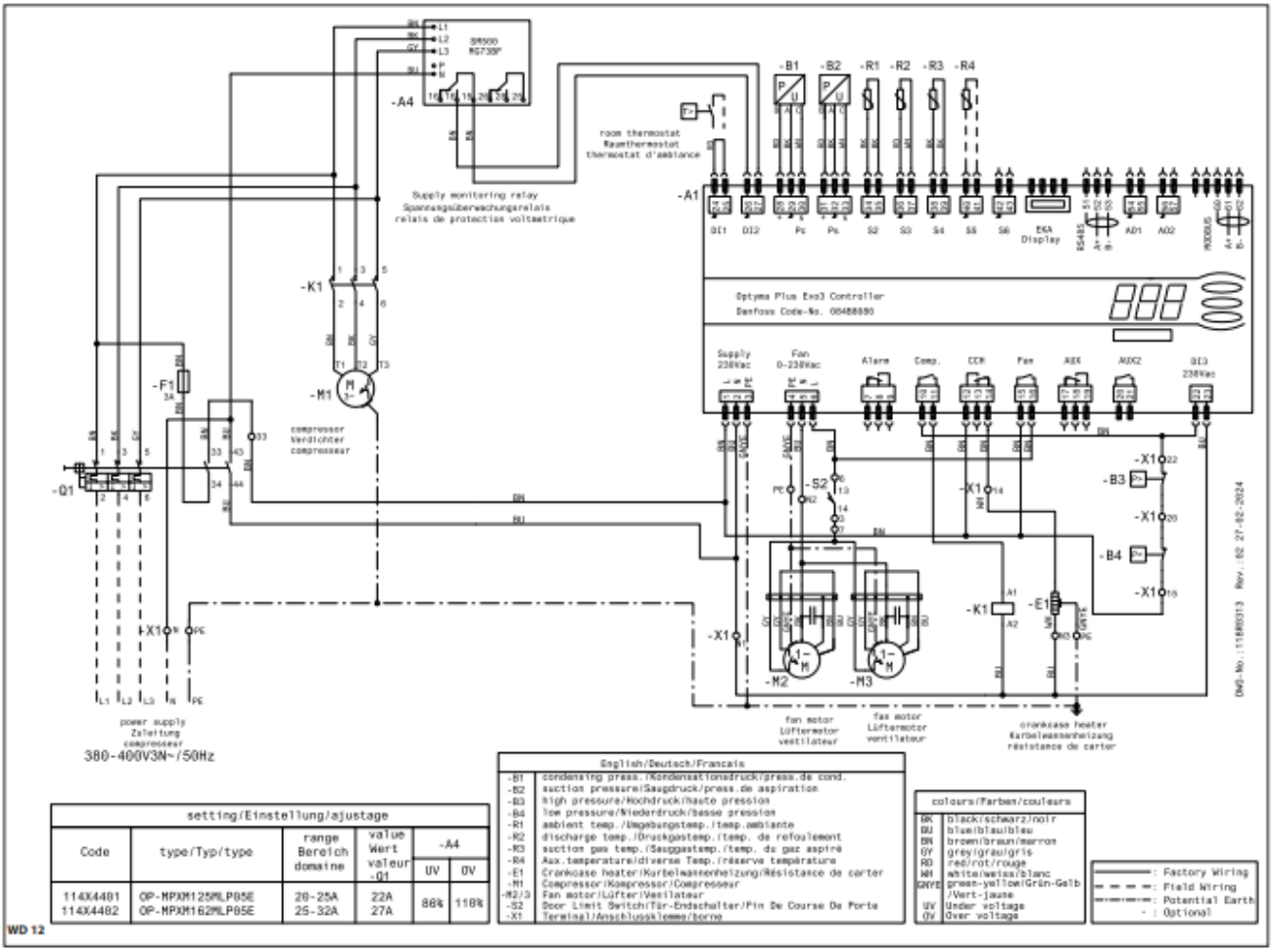
English/Deutsch/Francais	
-B1	condensing press./Kondensationsdruck/press.de cond.
-B2	suction pressure/Saugdruck/press.de aspiration
-B3	high pressure/Hochdruck/haute pression
-B4	low pressure/Niederdruck/basse pression
-R1	ambient temp./Umgebungstemp./temp.ambiante
-R2	discharge temp./Druckgastemp./temp. de refoulement
-R3	suction gas temp./Sauggastemp./temp. du gaz aspiré
-R4	Aux.temperature/diverse Temp./réserve température
-E1	Crankcase heater/Kurbelwannenheizung/Résistance de carter
-M1	Compressor/Kompressor/Compresseur
-M2	Fan motor/Lüfter/Ventilateur
-X1	Terminal/Anschlussklemme/borne

colours/Farben/couleurs	
BK	black/schwarz/noir
BU	blue/blau/bleu
BN	brown/braun/marron
GY	grey/grau/gris
RD	red/rot/rouge
WH	white/weiss/blanc
GNYE	green-yellow/Grün-Gelb /Vert-jaune
UV	Under voltage
OV	Over voltage

: Factory Wiring
: Field Wiring
: Potential Earth
: Optional

WD 11

Code E (P05): OP-MPXM068-080-108



Danfoss A/S

Climate Solutions

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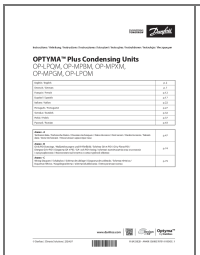
Documents / Resources



Danfoss OP-LPQM Plus Condensing Units [pdf] Instructions
OP-LPQM, OP-MPBM, OP-MPXM, OP-MPGM, OP-LPOM, OP-LPQM Plus Condensing Units, OP-LPQM, Plus Condensing Units, Condensing Units, Units

References

- Engineering Tomorrow | Danfoss
- User Manual