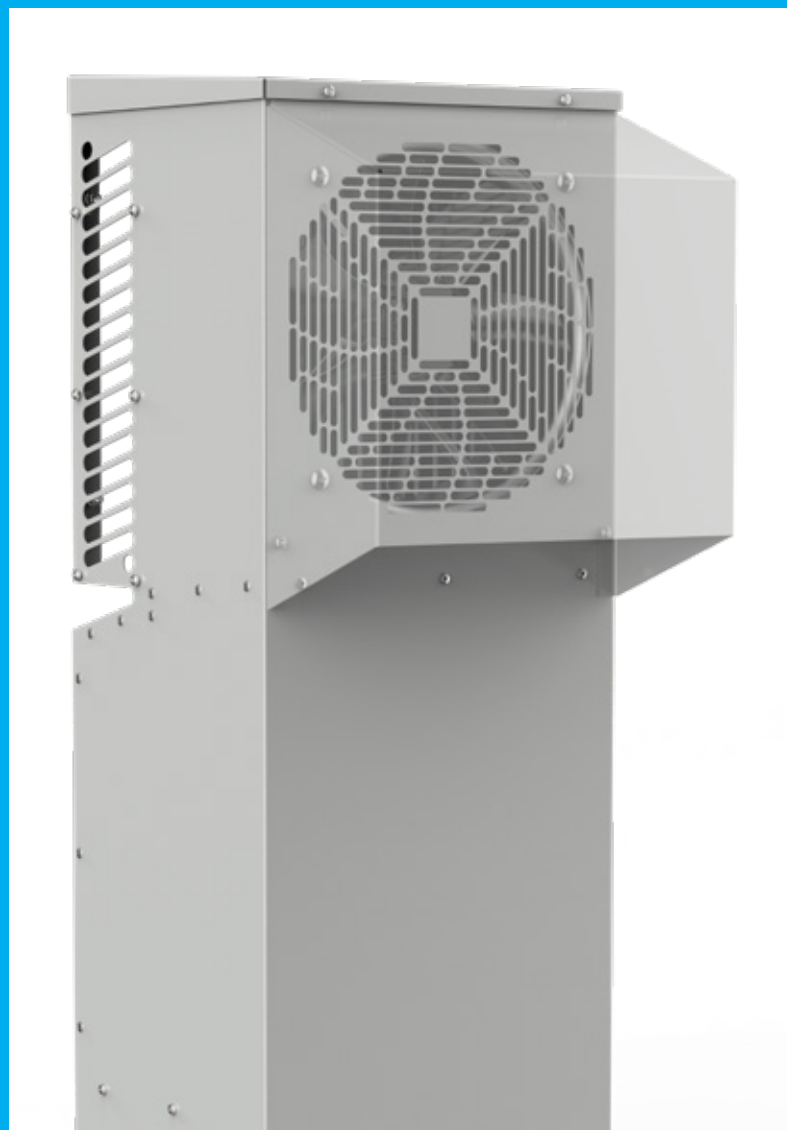


Technical Manual

Operation and installation cooling units PKS 3000 SERIES 115V / 230V / 460V

Version 1.0, March 2018



Preface

The skills and information provided in the ORIGINAL OPERATING MANUAL are required for assembly and safe operation of Pfannenberg cooling units.

The information is presented in a brief, clearly arranged format. The chapters are numbered throughout. If you have the operating manual in digital format, the links are interactive.

Various unit types are documented in this operating manual.

Pfannenberg cooling units are subject to continuous improvement. Please understand that we reserve the right to make changes to the design, equipment and technology. For this reason, no claims to specific features of the unit can be derived from the content of this operating manual.

Safety Instructions and Symbols



DANGER

Identifies an exceptionally hazardous situation. Severe, irreversible injuries or death will occur if this notice is not observed.



DANGER

Identifies an exceptionally hazardous situation in connection with electrical voltage. Severe, irreversible injuries or death will occur if this notice is not observed.



WARNING

Identifies an exceptionally hazardous situation. Severe, irreversible or deadly injuries could occur if this notice is not observed.



CAUTION

Identifies a hazardous situation. Minor or moderate injuries could occur if this notice is not observed.





NOTICE

Notice is used to address practices not related to physical injury.

Digital operating manual:

If you have the operating manual in digital format, the links are interactive.

Clicking   on links takes you to the target text position.

- The table of contents is also interactive.
- The key combination ALT ← brings you back to the starting point.



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1 : INTENDED USE

1.1 General overview

The Pfannenberg attachment and installation cooling units of the PKS series are stationary cooling units for the dissipation of heat from switch cabinets.

The cooling units have different cooling outputs. For exact specifications power consumption, see [Technical data](#). Use of aluminum filters, fleece filters and fluted filters is possible with an additional adapter.

The cooling units are available with thermostat controllers. These controllers are regulating units for the adjustment of refrigeration functions and operating data.

- For detailed specifications for the controller, see [Technical data](#) and [Operation](#).

All Pfannenberg cooling units are ROHS-compliant and free from:

- Silicone connections
- PCT, asbestos, formaldehyde, cadmium
- Moisture-impairing substances

1.2 Duty of the operator

The operator must ensure that the cooling units are used exclusively as intended and dangers of all types to the life and limb of users or third parties are avoided. In addition, accident prevention regulations and recognized safety rules are to be observed.

The operator must ensure that all users have read and understood this operating manual. Non-observance of this operating manual will void the warranty. The same applies if improper work has been carried out on the unit by the customer and/or third parties without the approval of the manufacturer.

2 : UNIT DESCRIPTION

2.1 Description of use

Pfannenbergl PKS series cooling units are designed to dissipate heat from switch cabinets. Sensitive components in the switch cabinet are protected.

2.2 Scope of delivery

The shipment consists of the following contents:

- PKS cooling unit
- Cooling unit quick guide
- Accessory kit: Appropriate seal, fastening material, electrical plug connector, etc. for the specific unit type
- Special accessories, if applicable

2.3 Order options



NOTICE

Spare parts from third-party manufacturers can damage the unit

- Only original parts are subject to the manufacturer's quality control.
- Only use originally manufacturer parts for safe and reliable operation.
- For Pfannenbergl spare part numbers, see [Spare part orders](#).
- For Pfannenbergl part numbers for accessory orders, see Ordering of [accessory parts](#).



WARNING

Hazardous due to impermissible use of units

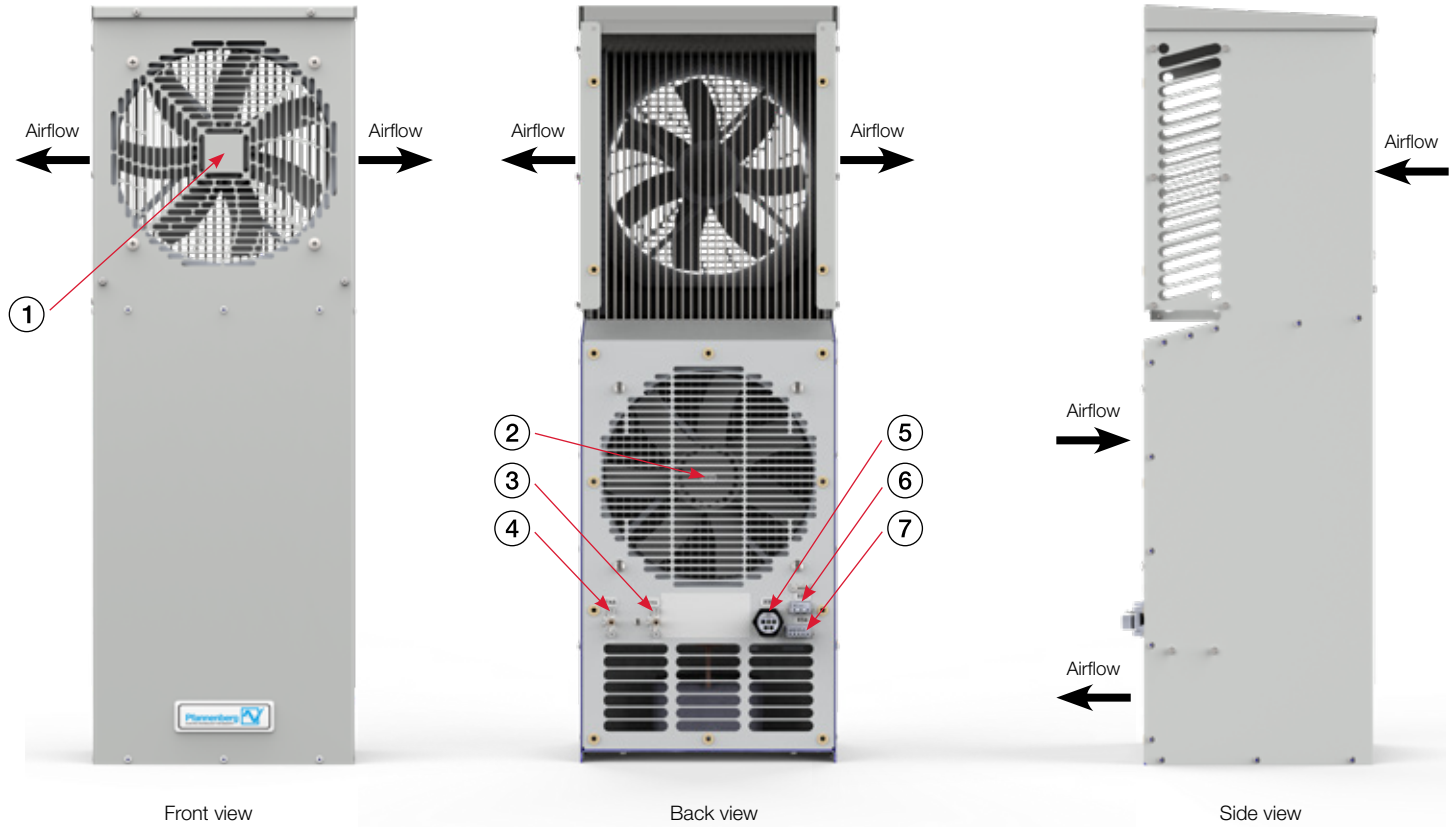
Inappropriate use of the units can cause severe accidents.

- Cooling units must only be used in stationary operation.

Pfannenbergl cooling units are only approved for stationary operation. As cooling units with protection rating IP 54, the cooling units are essentially dust-protected. Limitation: Dust can still penetrate after continuous exposure. The cooling units are resistant to spray water, but not a constant water jet.

2.4 Functional description

2.4.1 Air flow functional principle



Item Number	Description	Item Number	Description
1	Condenser Fan	5	Power Supply Connector
2	Evaporator Fan	6	Voltage Selector
3	Alarm set point control (2TAS)	7	Alarm / Door Contact
4	Unit set point control (1TAS)		



CAUTION

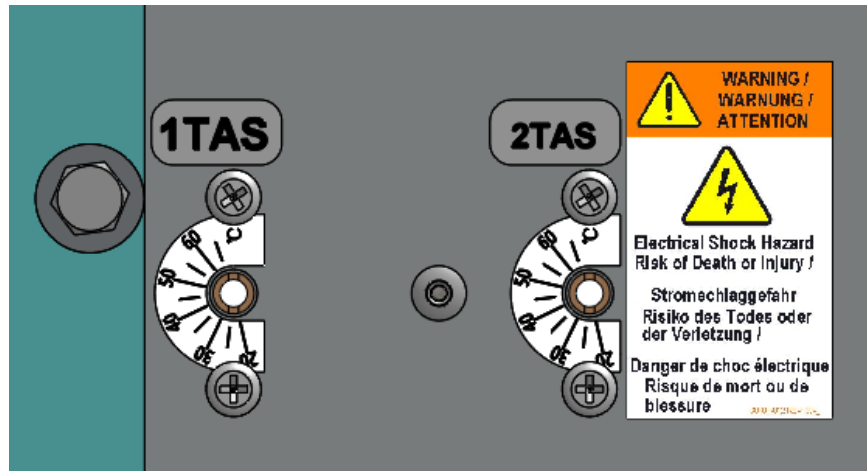
Danger due to the release of very warm air

The air outlet can become very warm depending on the ambient temperature.

- Keep body parts away from the air outlet.
- For the ambient temperature and air outlet ratio, see [Technical data](#).

2.4.2 Temperature Regulation

The thermostats are for the adjustment of refrigeration functions and operating data.



Standard controller (SC) operating display

2.4.3 Safety concept



WARNING

Hazards due to modified safety equipment

Non-functioning or defective safety equipment can cause severe accidents.

- Any changes to the unit, particularly the safety equipment, are prohibited.
- In case of defective safety equipment, shut down the unit and decommission it immediately.
- Fans and compressors are protected from overloading and overheating.

2.5 Type plate

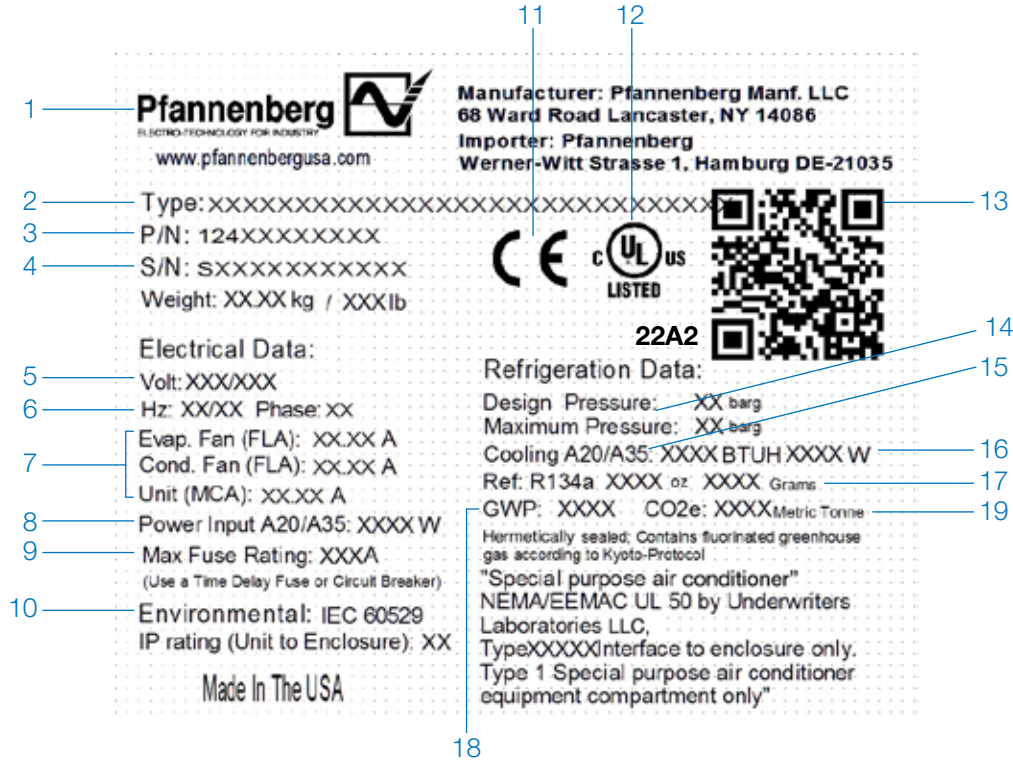


WARNING

Hazards due to noncompliance with manual

Disregarding type plate specifications can result in severe accidents.

- Always observe the specifications on the type plate when installing and maintaining the units.
- The figure shows the standard version of type plate.



Item Number	Designation	Item Number	Designation
1	Manufacturer logo	11	CE mark
2	Unit type	12	UL mark
3	Part number	13	QR code
4	Serial number	14	Coolant pressure
5	Rated operating voltage	15	Exterior / interior ambient conditions
6	Frequency	16	Cooling capacity
7	Nominal current	17	Coolant
8	Power rating	18	Global Warming Potential
9	Fuse	19	CO2 equivalent value
10	Protection type		

2.6 Technical data and spare parts

PKS 336X

Model		PKS 336X (115V, 230V, 400V, 460V)								
Cooling Data		PKS 3361			PKS 3363			PKS 3364		
Specific Cooling Capacity @ 20°C ΔT Q 0 A20(+68°F) / A40(+104°F)		180 w/c			180 w/c			180 w/c		
		3500 W / 11942 BTU/h			3020 W / 10305 BTU/h			3020 W / 10305 BTU/h		
Refrigerant Type		R 134a								
Refrigerant Amount		360 g / 12.7 oz per heat pipe assembly, Unit contains two heat pipe assemblies								
Adjustable Thermostat Setting 1TAS (factory set)		+35°C / +95°F								
Failure Indication: Enclosure Internal Temp.		Set to 15°C above control set point								
Ambient Air Temp.		-25°C / -13°F . . . +55°C / +131°F								
Enclosure Internal Temp.		+35°C / +95°F . . . +70°C / +158°F*								
Air Volume, External Circulation		1247 m³/h / 734 CFM								
Air Volume, Internal Circulation		957 m³/h / 563 CFM								
Electrical Data										
Rated Voltage		115V	230V, 1~	400V/460V, 1~	115V	230V, 1~	400V/460V, 1~	115V	230V, 1~	400V/460V, 1~
Main Frequency		60Hz	50/60Hz	50/60Hz	60Hz	50/60Hz	50/60Hz	60Hz	50/60Hz	50/60Hz
Operating Range		103V-127V	198V-253V	360-440V/416-506	103V-127V	198V-253V	360-440V/416-506	103V-127V	198V-253V	360-440V/416-506
Power Consumption (A20/A40)		353W	245W	245W	353W	245W	245W	353W	245W	245W
Current Capacity (nom max)		<3	<2	<1	<3	<2	<1	<3	<2	<1
Line Cord		Connector								
EMI/RFI Suppression		CE EN61000-6-2 / EN 6100-6-3								

*115V units, 55°C max internal temp.

PKS 336X - ADDITIONAL DATA

Mounting Dimensions*	PKS 3361	PKS 3363	PKS 3364
Height	889 mm / 35 inch	889 mm / 35 inch	889 mm / 35 inch
Width*	305 mm / 12 inch	305 mm / 12 inch	305 mm / 12 inch
Depth*	279 mm / 11 inch	279 mm / 11 inch	279 mm / 11 inch
Weight (lb)	54 lb (25 kg) - 115 & 230V 64 lb (29 kg) - 400/460V	60 lb (27 kg) - 115 & 230V 70 lb (32 kg) - 400/460V	60 lb (27 kg) - 115 & 230V 70 lb (32 kg) - 400/460V
Installation Attitude	vertical or horizontal		
Unit Construction	Sheet steel		304 stainless steel
Corrosion Protection	galvanized, electrostatically powder coated: RAL 7035, or ANSI61, Baked (200°C / 392°F)		304 stainless steel
Protection Classification (Against the enclosure, under correct operating conditions)	NEMA Type 12, IP 54 (EN 60529)	NEMA Type 3R/4, IP 56 (EN 60529)	NEMA Type 4/4x IP 56 (EN 60529)

Spare Parts	PKS 336X		
Voltage	115 V	230 V	400 / 460 V
Internal Fan	18511000002	18511000003	18511000003
External Fan	18511000002	18511000003	18511000003
Thermostat	18500000001		
Transformer	N/A	N/A	18883000005

* Note: The 3R/4/4x units have required louvers on the sides which add an additional 3" to the width and a rainhood on the front which adds an additional 4" to the depth.

PKS 330X

Model		PKS 330X (115V, 230V, 400V, 460V)							
Cooling Data		PKS 3301		PKS 3303			PKS 3304		
Specific Cooling Capacity @ 20°C ΔT Q 0 A20(+68°F) / A40(+104°F)		150 w/c		150 w/c			150 w/c		
		3240 W / 11055 BTU/h		2786 W / 9506 BTU/h			2786 W / 9506 BTU/h		
Refrigerant Type		R 134a							
Refrigerant Amount		360 g / 12.7 oz per heat pipe assembly, Unit contains one heat pipe assemblies							
Adjustable Thermostat Setting 1TAS (factory set)		+35°C / +95°F							
Failure Indication: Enclosure Internal Temp.		Set to 15°C above control set point							
Ambient Air Temp.		-25°C / -13°F . . . +55°C / +131°F							
Enclosure Internal Temp.		+35°C / +95°F . . . +70°C / +158°F*							
Air Volume, External Circulation		1247 m³/h / 734 CFM							
Air Volume, Internal Circulation		957 m³/h / 563 CFM							
Electrical Data									
Rated Voltage	115V	230V, 1~	400V/460V, 1~	115V	230V, 1~	400V/460V, 1~	115V	230V, 1~	400V/460V, 1~
Main Frequency	60Hz	50/60Hz	50/60Hz	60Hz	50/60Hz	50/60Hz	60Hz	50/60Hz	50/60Hz
Operating Range	103V-127V	198V-253V	360-440V/416-506	103V-127V	198V-253V	360-440V/416-506	103V-127V	198V-253V	360-440V/416-506
Power Consumption (A20/A40)	353W	245W	245W	353W	245W	245W	353W	245W	245W
Current Capacity (nom max)	<3	<2	<1	<3	<2	<1	<3	<2	<1
Line Cord	Connector								
EMI/RFI Suppression	CE EN61000-6-2 / EN 6100-6-3								

*115V units, 55°C max internal temp.

PKS 330X - ADDITIONAL DATA

Mounting Dimensions*	PKS 3301	PKS 3303	PKS 3304
Height	889 mm / 35 inch	889 mm / 35 inch	889 mm / 35 inch
Width*	305 mm / 12 inch	305 mm / 12 inch	305 mm / 12 inch
Depth*	279 mm / 11 inch	279 mm / 11 inch	279 mm / 11 inch
Weight (lb)	54 lb (25 kg) - 115 & 230V 64 lb (29 kg) - 400/460V	60 lb (27 kg) - 115 & 230V 70 lb (32 kg) - 400/460V	60 lb (27 kg) - 115 & 230V 70 lb (32 kg) - 400/460V
Installation Attitude	vertical or horizontal		
Unit Construction	Sheet steel		304 stainless steel
Corrosion Protection	galvanized, electrostatically powder coated: RAL 7035, or ANSI61, Baked (200°C / 392°F)		304 stainless steel
Protection Classification (Against the enclosure, under correct operating conditions)	NEMA Type 12, IP 54 (EN 60529)	NEMA Type 3R/4, IP 56 (EN 60529)	NEMA Type 4/4x IP 56 (EN 60529)

Spare Parts	PKS 330X		
Voltage	115 V	230 V	400 / 460 V
Internal Fan	18511000002	18511000003	18511000003
External Fan	18511000002	18511000003	18511000003
Thermostat	18500000001		
Transformer	N/A	N/A	18883000005

* Note: The 3R/4/4x units have required louvers on the sides which add an additional 3" to the width and a rainhood on the front which adds an additional 4" to the depth.

PKS 320X

Model		PKS 320X (115V, 230V, 400V, 460V)							
Cooling Data		PKS 3201			PKS 3203			PKS 3204	
Specific Cooling Capacity @ 20°C ΔT Q 0 A20(+68°F) / A40(+104°F)		100 w/c			100 w/c			100 w/c	
		2120 W / 7234 BTU/h			1972 W / 6729 BTU/h			1972 W / 6729 BTU/h	
Refrigerant Type	R 134a								
Refrigerant Amount	360 g / 12.7 oz per heat pipe assembly, Unit contains one heat pipe assemblies								
Adjustable Thermostat Setting 1TAS (factory set)	+35°C / +95°F								
Failure Indication: Enclosure Internal Temp.	Set to 15°C above control set point								
Ambient Air Temp.	-25°C / -13°F . . . +55°C / +131°F								
Enclosure Internal Temp.	+35°C / +95°F . . . +70°C / +158°F*								
Air Volume, External Circulation	342 m³/h / 201 CFM								
Air Volume, Internal Circulation	308 m³/h / 181 CFM								
Electrical Data									
Rated Voltage	115V	230V, 1~	400V/460V, 1~	115V	230V, 1~	400V/460V, 1~	115V	230V, 1~	400V/460V, 1~
Main Frequency	60Hz	50/60Hz	50/60Hz	60Hz	50/60Hz	50/60Hz	60Hz	50/60Hz	50/60Hz
Operating Range	103V-127V	198V-253V	360-440V/416-506	103V-127V	198V-253V	360-440V/416-506	103V-127V	198V-253V	360-440V/416-506
Power Consumption (A20/A40)	75W	75W	75W	75W	75W	75W	75W	75W	75W
Current Capacity (nom max)	<1A	<1A	<1A	<1A	<1A	<1A	<1A	<1A	<1A
Line Cord	Connector								
EMI/RFI Suppression	CE EN61000-6-2 / EN 6100-6-3								

*115V units, 65°C max internal temp.

PKS 320X - ADDITIONAL DATA

Mounting Dimensions*	PKS 3201	PKS 3203	PKS 3204
Height	889 mm / 35 inch	889 mm / 35 inch	889 mm / 35 inch
Width*	305 mm / 12 inch	305 mm / 12 inch	305 mm / 12 inch
Depth*	279 mm / 11 inch	279 mm / 11 inch	279 mm / 11 inch
Weight (lb)	44 lb (20 kg) - 115 & 230V 47 lb (22 kg) - 400/460V	50 lb (23 kg) - 115 & 230V 53 lb (24 kg) - 400/460V	50 lb (23 kg) - 115 & 230V 53 lb (24 kg) - 400/460V
Installation Attitude	vertical or horizontal		
Unit Construction	Sheet steel		304 stainless steel
Corrosion Protection	galvanized, electrostatically powder coated: RAL 7035, or ANSI61, Baked (200°C / 392°F)		304 stainless steel
Protection Classification <i>(Against the enclosure, under correct operating conditions)</i>	NEMA Type 12, IP 54 (EN 60529)	NEMA Type 3R/4, IP 56 (EN 60529)	NEMA Type 4/4x IP 56 (EN 60529)

Spare Parts	PKS 320X		
Voltage	115 V	230 V	400 / 460 V
Internal Fan	18511000004	18511000006	
External Fan	18511000005	18511000007	
Thermostat	18500000001		
Transformer	N/A	N/A	18883000018

* Note: The 3R/4/4x units have required louvers on the sides which add an additional 3" to the width and a rainhood on the front which adds an additional 4" to the depth.

PKS 313X

Model		PKS 313X (115V, 230V, 400V, 460V)							
Cooling Data		PKS 3131		PKS 3133			PKS 3134		
Specific Cooling Capacity @ 20°C ΔT Q 0 A20(+68°F) / A40(+104°F)		65 w/c		65 w/c			65 w/c		
		1500 W / 5118 BTU/h		1410 W / 4811 BTU/h			1410 W / 4811 BTU/h		
Refrigerant Type		R 134a							
Refrigerant Amount		360 g / 12.7 oz per heat pipe assembly, Unit contains one heat pipe assemblies							
Adjustable Thermostat Setting 1TAS (factory set)		+35°C / +95°F							
Failure Indication: Enclosure Internal Temp.		Set to 15°C above control set point							
Ambient Air Temp.		-25°C / -13°F . . . +55°C / +131°F							
Enclosure Internal Temp.		+35°C / +95°F . . . +70°C / +158°F*							
Air Volume, External Circulation		342 m³/h / 201 CFM							
Air Volume, Internal Circulation		308 m³/h / 181 CFM							
Electrical Data									
Rated Voltage	115V	230V, 1~	400V/460V, 1~	115V	230V, 1~	400V/460V, 1~	115V	230V, 1~	400V/460V, 1~
Main Frequency	60Hz	50/60Hz	50/60Hz	60Hz	50/60Hz	50/60Hz	60Hz	50/60Hz	50/60Hz
Operating Range	103V-127V	198V-253V	360-440V/416-506	103V-127V	198V-253V	360-440V/416-506	103V-127V	198V-253V	360-440V/416-506
Power Consumption (A20/A40)	75W	75W	75W	75W	75W	75W	75W	75W	75W
Current Capacity (nom max)	<1A	<1A	<1A	<1A	<1A	<1A	<1A	<1A	<1A
Line Cord	Connector								
EMI/RFI Suppression	CE EN61000-6-2 / EN 6100-6-3								

*115V units, 65°C max internal temp.

PKS 313X - ADDITIONAL DATA

Mounting Dimensions*	PKS 3131	PKS 3133	PKS 3134
Height	889 mm / 35 inch	889 mm / 35 inch	889 mm / 35 inch
Width*	305 mm / 12 inch	305 mm / 12 inch	305 mm / 12 inch
Depth*	279 mm / 11 inch	279 mm / 11 inch	279 mm / 11 inch
Weight (lb)	44 lb (20 kg) - 115 & 230V 47 lb (22 kg) - 400/460V	50 lb (23 kg) - 115 & 230V 53 lb (24 kg) - 400/460V	50 lb (23 kg) - 115 & 230V 53 lb (24 kg) - 400/460V
Installation Attitude	vertical or horizontal		
Unit Construction	Sheet steel		304 stainless steel
Corrosion Protection	galvanized, electrostatically powder coated: RAL 7035, or ANSI61, Baked (200°C / 392°F)		304 stainless steel
Protection Classification <i>(Against the enclosure, under correct operating conditions)</i>	NEMA Type 12, IP 54 (EN 60529)	NEMA Type 3R/4, IP 56 (EN 60529)	NEMA Type 4/4x IP 56 (EN 60529)

Spare Parts	PKS 313X		
Voltage	115 V	230 V	400 / 460 V
Internal Fan	18511000004	18511000006	18511000006
External Fan	18511000005	18511000007	18511000007
Thermostat	18500000001		
Transformer	N/A	N/A	18883000018

* Note: The 3R/4/4x units have required louvers on the sides which add an additional 3" to the width and a rainhood on the front which adds an additional 4" to the depth.

3 : ASSEMBLY AND INITIAL COMMISSIONING

3.1 Transport



WARNING

Hazards due to uncontrolled movements

Improper securing of the unit can result in severe accidents.

- Loading must only be carried out by trained, qualified personnel.
- Lash the unit correctly for transport on a truck or trailer.
- Only use lashing straps with an adequate rated strength.
- Use slip-resistant materials for securing, e.g. anti-slip mats.
- When loading by crane, do not walk or stand under the raised units.



NOTICE

Danger of material damage during transport and setting down of the units.

- Improper device securing or uncontrolled movements can cause damage.
- Exercise maximum caution during movement and transport of the units.

Always transport the cooling units using the packaging provided by the factory.

Transporting cooling units

REQUIREMENTS:

- Cooling units must be in the packaging provided by the factory.

REQUIRED TOOLS AND MATERIAL:

- Lashing straps, loading crane, if applicable

PROCEDURE:

- Always raise cooling units by the housing.
- Always raise cooling units slowly and evenly and set down safely.
- Secure correctly for transport with lashing straps.
- The cooling unit was transported and loaded correctly.

3.2 Storage

- Do not expose the cooling unit to temperatures above +70 °C during storage*.

* The warranty will no longer apply if these instructions are not observed.

3.3 Unpacking



WARNING

Hazard of accidents due to the heavy weight of the units

Uncontrolled movements of the units during assembly can cause accidents.

- Use suitable lifting equipment and secure units to prevent accidents.
- Also secure assembled components.



CAUTION

Hazard of injury due to sharp edges

- For manufacturing reasons, the metal edges of the unit may have burrs.
- Wear gloves during service and assembly work.



NOTICE

- Perform a visual inspection for transport damage when unpacking the cooling units.
Take note of any loose parts, dents, scratches, visible loss of oil etc.
- Inspect and secure the packaging material for any loose functional parts before disposal.
- Report any damages to the freight carrier immediately. Observe the “Terms for Cases of Damage”.
- Precise information about defects, including possible photos must be provided for the handling of warranty claims.
Always specify the type designation and serial number.

3.4 Assembly



DANGER

Life-threatening hazard due to electric shock

Live units and exposed connection cables can generate an electric shock and cause severe accidents.

- Work on electrical connections must be carried out exclusively by trained, qualified electricians.
- Before assembly, de-energize all supply lines to the separate fuse or a main switch, disconnect the system and secure to prevent re-connection.
- Test to ensure the absence of voltage on the unit.



CAUTION

Hazard of crushing during assembly of the unit

There is a hazard of crushing between the switch cabinet and frame of the unit during assembly.

- Keep body parts out of the space between the frame and unit cut-out.
- Work carefully and wear gloves.



NOTICE

Switch cabinet installation hazard due to assembly chips

When making the cooling unit cut-outs, assembly chips can fall into the switch cabinet.

- When assembling the switch cabinet, protect against contaminants and use protective covers.

3.4.1 General assembly requirements

- Select an assembly location for the switch cabinet which will guarantee adequate ventilation of the cooling unit.
A minimum clearance of 200 mm between units and the nearest wall must be observed.
- Installed components in the switch cabinet must not impede air circulation.
- Protect the installation location from heavy contamination with covers.

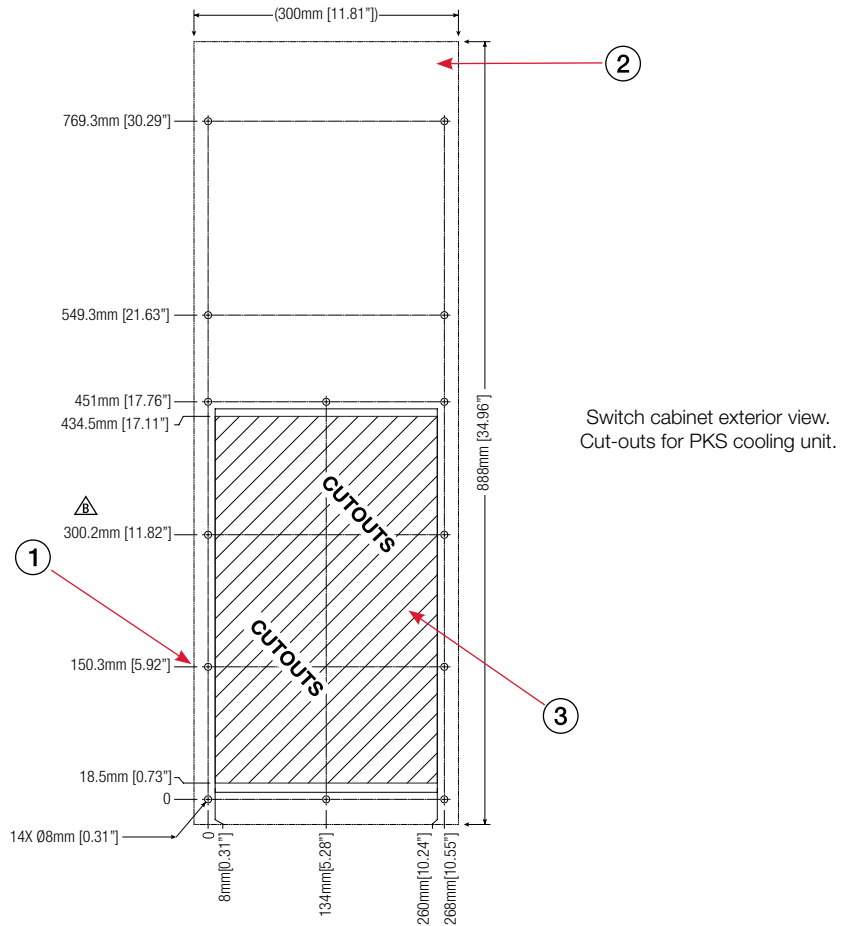


CAUTION

The following general requirements must be followed for safe and reliable operation of the cooling units:

- Secure the switch cabinet against tipping.
- Ensure that provided hinges can support the additional weight of the cooling unit.

3.4.2 PKS cooling unit assembly (side attachment)



Item Number	Designation	Item Number	Designation
1	Holes	2	Device size
3	Cut-outs		

Make cut-outs for the PKS cooling unit

REQUIREMENTS:

- All general requirements have been fulfilled; see [General assembly requirements](#)
- The unit is de-energized

REQUIRED TOOLS AND MATERIAL

- Saw
- Use a switch cabinet cutter, if applicable
- Protective covers

PROCEDURE

- Use a protective cover to protect the switch cabinet from chips.
- Provide the switch cabinet with cut-outs (3) and holes (1). For the prescribed dimensions, refer to the figure exterior view of the switch cabinet.
- Deburr the cut edges.
- Remove chips and assembly waste from the switch cabinet.
- Cut-outs and holes have been made.

Install seal on the PKS cooling unit (side attachment)

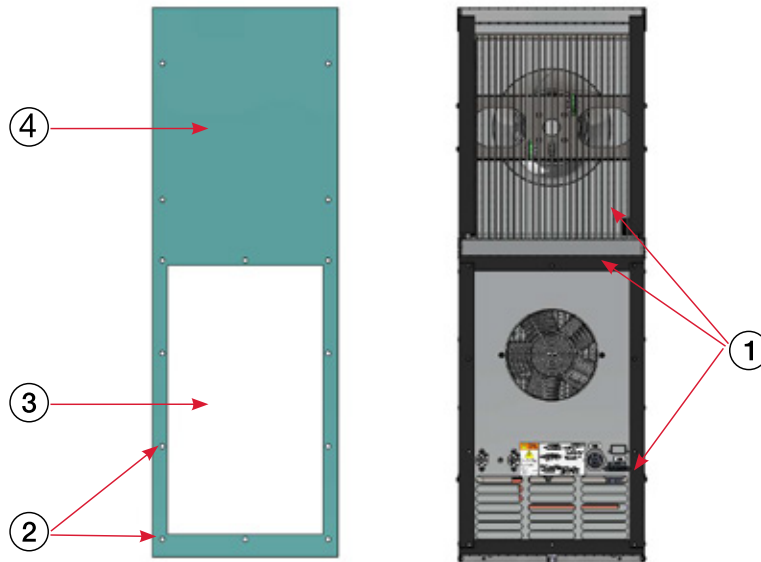


DANGER

Hazard of accidents due to incorrectly installed seals

Leaky seals can allow moisture to penetrate and cause short-circuits.

- Install the seal so that it provides a tight seal to the switch cabinet.
- Always inspect seals during cleaning and maintenance.



Item Number	Designation	Item Number	Designation
1	Unit seals	2	Cabinet mounting holes
3	Cabinet cut-out	4	Enclosure

Install seals and assembly

REQUIREMENTS:

- Cut-outs for the PKS cooling unit have been made; see figure PKS cooling unit assembly.
- The cooling unit is de-energized.

REQUIRED TOOLS AND MATERIAL

- Installation tool
- Accessory kit: Threaded bolts, screws, nuts, washers

PROCEDURE

- Attach seals (1) on the PKS unit (2). Fit the seals with the slotted holes over unit mounting holes.
- Screw in the two supplied threaded bolts (accessory kit) in the upper fastening points of the PKS cooling unit. Suspend the cooling unit on the switch cabinet with the threaded bolts installed from outside. Tighten the screws on the PKS cooling unit on the switch cabinet interior. Use the supplied screws, nuts and washers (accessory kit) to fasten the unit. Firmly tighten the screw fasteners so that the seal is pressed together.
- The PKS cooling unit is attached to the switch cabinet and ready for electrical connection; see [Electrical connection](#).

3.5 Electrical connection

3.5.1 Standard controller (SC) electrical circuit diagram

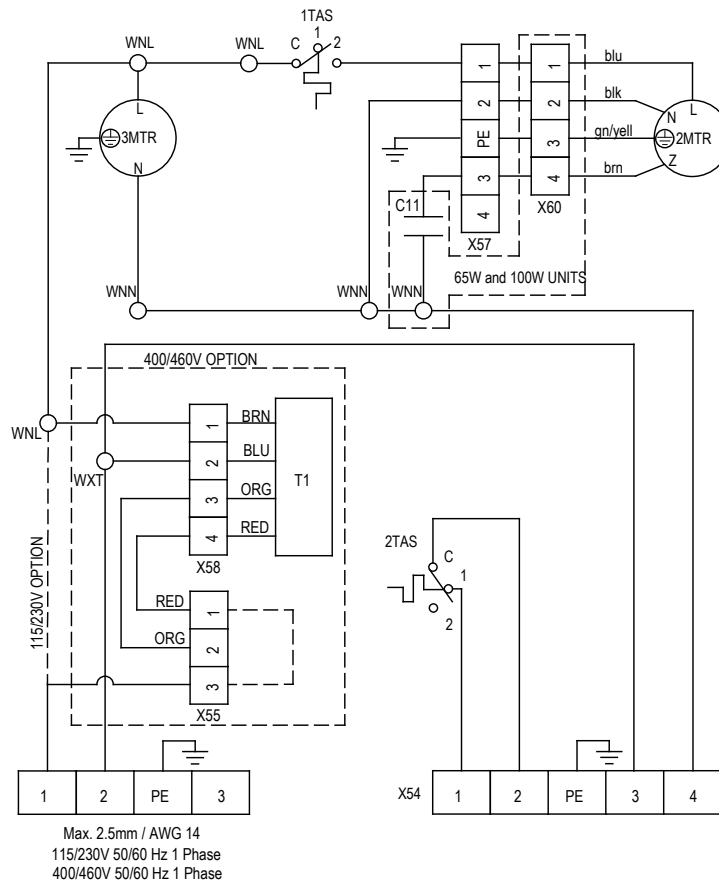


DANGER

Life-threatening hazard due to electric shock

Live units and exposed connection cables can generate an electric shock hazard and cause severe accidents.

- Work on electrical connections must be carried out exclusively by trained, qualified electricians.
- Ensure that the unit is voltage-free before routing all electrical connections.



Item Number	Designation	Item Number	Designation	Item Number	Designation
2MTR	Condenser fan	3MTR	Evaporator fan	1TAS	Thermostat
2TAS	High Temperature Alarm	T1	Transformer	X50	Connection mains
X54	Connection door contact + failure indication 3-4 Door Contact : If door contact is used, remove bridge between wire 3 + 4	X55	Transformer Switch		

3.5.2 Door contact switch



WARNING

Hazard due to connection of external voltage at the input of the door contact

External voltage can cause severe accidents.

- Connection of external voltage to the input for the door cabinet is prohibited.

Installation of a door contact switch increases safety and prevents increased accumulation of condensate.

- If a door contact switch has not been connected, the connection contact (S1) must be jumped.

Door contact switch installation

REQUIREMENTS:

- The cooling unit is de-energized.

PROCEDURE:

- The door contact switch is connected to the S1 connection; see [Electrical connection](#) or the electrical circuit diagram in the housing cover.
- The door contact is supplied with high voltage, from the cooling unit.
- The door contact switch is connected. The motors switch off when the switch cabinet is opened.

3.5.3 Main supply connection



WARNING

Potential hazard due to incorrect cables

An incorrect cable cross-section will cause the cable to overheat. Scorched insulation can cause fires.

- The cable cross-section (4) matches the output required for the power consumption and is 1 – 2.5mm² or AWG 18 to AWG 14.



DANGER

Electric arcing can cause electric shock and burns.

When disconnecting and connecting the plug connector for mains connection under load or voltage, electric arcing, dangerous voltage and electric shock can occur.

- The plug connector for mains connection must never be plugged in or disconnected under load/voltage.
- Work on plug connectors must only be carried out with adequate lighting.
- Always disconnect power to unit.

The following general requirements must be ensured for safe and reliable operation of the cooling units:

- Upstream installation of a supply-side temperature regulator is prohibited.
- Connect the upstream fuse specified on the type plate as wiring protection; see [Type plate](#).
- Ensure that the type plate specifications for rated values match the present values for mains voltage and mains frequency; see [Type plate](#).
- Always connect the cooling unit to the mains by means of a separating device (switch/contactors).

Cooling unit electrical connection



DANGER

Life-threatening hazard due to electric shock

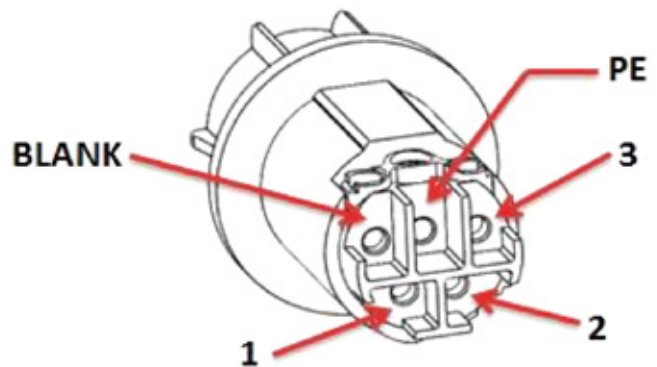
Circuit breaker systems that are not connected or attached incorrectly can generate hazardous voltages and electric shock and cause severe accidents.

- Work on electrical connections must be carried out exclusively by trained, qualified electricians.
- Circuit breakers systems must be provided in accordance with DIN EN 60204-1, chapter 8.2.
- Each element of electrical equipment must be connected to the circuit breaker system.
- Never interrupt the circuit breaker system if electrical equipment is attached to covers, doors or cover panels.
- If parts are removed, e.g. for maintenance work, ensure that the circuit breaker system is not interrupted for the remaining parts.

Part Description: Connection Instruction

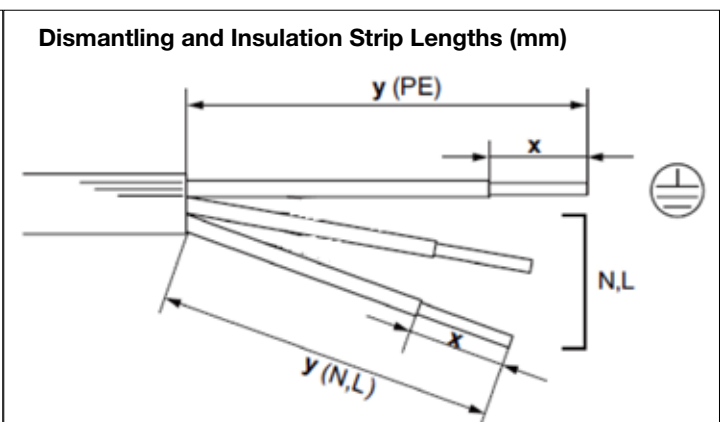
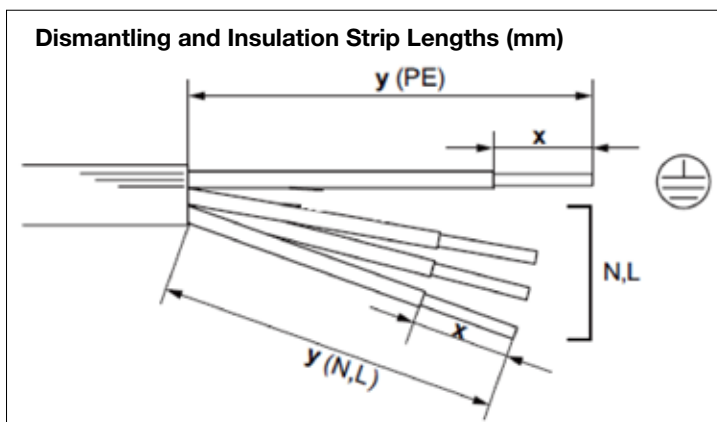
Refer to Connection Diagram:

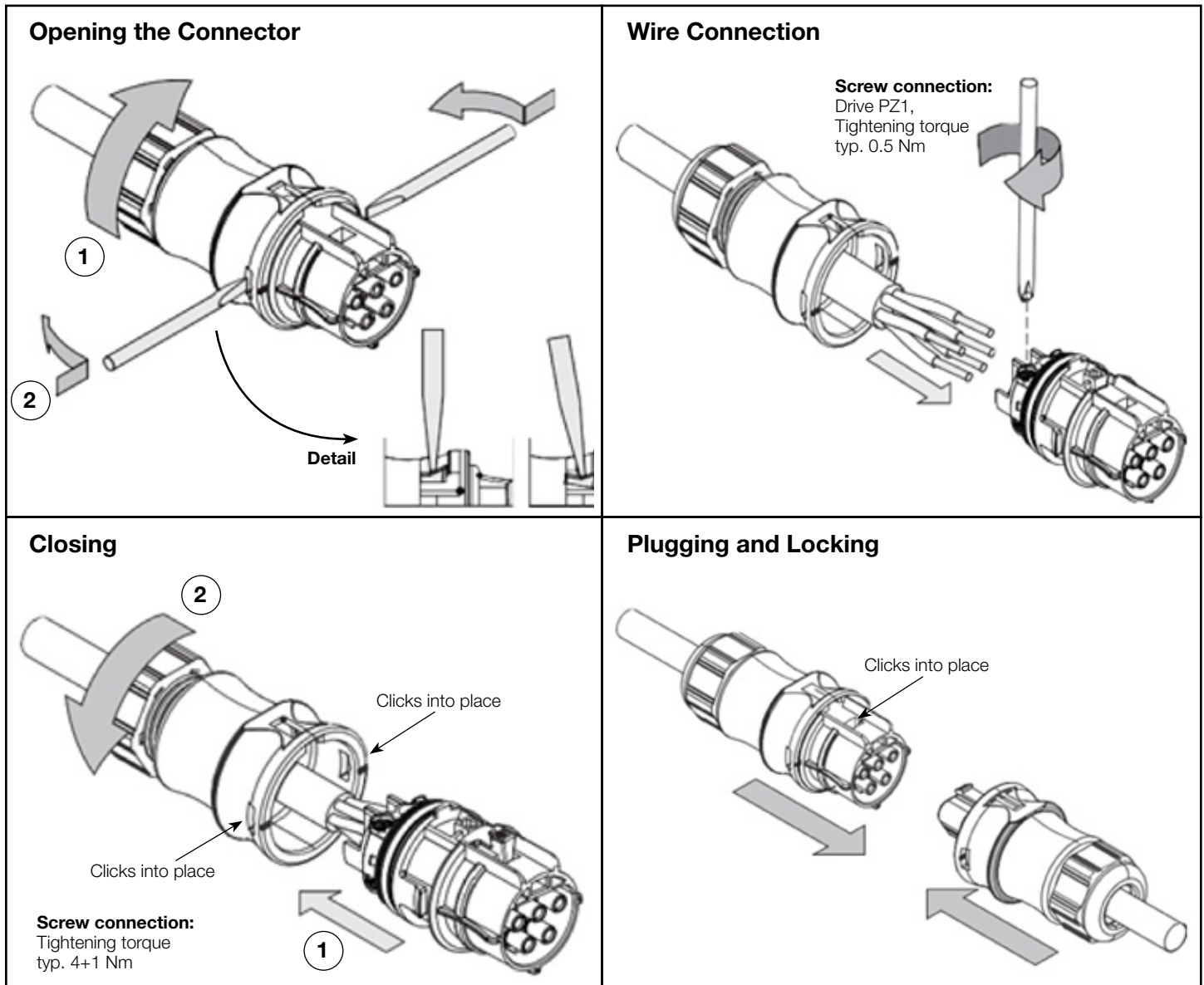
	115V	230V	230V	460V	460V
1	L	L	L	L1	L1
2	N	N	L	L2	L2
3	----	----	----	----	L3
PE					



Screw Connections

	Connector			
	Ø6...10 / Ø10...14		Ø13...18	
Strain Relief				
Conductor	PE	N,L	PE	N,L
Dismantling Length y (mm)	30	25	55	50
Dismantling Length y (splitter connector)	45	40		
Insulation Strip Length x (mm)	8 (conductor cross section 1,5 ... 4 mm ²)			





CAUTION

To maintain the IP-rating type of enclosure, protective caps (accessory) must be mounted on all unoccupied connectors! Further the connectors must not be exposed to bending forces (e.g. do not attach loads to the cable, no free-dangling cable windings etc.). The connectors are not suitable for current interrupting. Never connect or disconnect under load!

Requirement

- All general requirements for safe and reliable operation are assured; see [Main supply connection](#).
- The cooling unit is de-energized.

Procedure

- Connect the cable (4) with the connecting plug (1)/(accessory kit) as specified in the electrical circuit diagram; see [Electrical connection](#).
- For electrical connection, insert the screwdriver (3) into the cage terminal (2) and connect the cables (4) to the cooling unit with the connecting plug (1).
- Insert the screwdriver firmly into the cage terminal (2). Never twist the screwdriver; otherwise the cage terminal (2) will be damaged.
- Before switching on, ensure that the mains voltage matches the upstream fuse; see [Electrical connection](#).
- The cooling unit is connected electrically.

4 : OPERATION

4.1 General functions



NOTICE

Danger of damage to the cooling unit

Operation without the unit cover prevents the adequate supply of air to the condenser and limits the intended heating function.

- Only operate the cooling unit with the unit cover installed.
- Once assembly and installation work is completed, switch on the power supply to the cooling unit.
- After the supply voltage has been connected and the door is closed, the units run continuously.
- The cooling unit (2) is equipped with an electronic control unit. A temperature sensor (4) detects the temperature of the air sucked in from the interior of the switch cabinet (3).
- If the upper or lower limit temperature is exceeded or undercut, a fault indication is triggered (6).
- The ambient conditions and switch cabinet interior temperatures must correspond to the prescribed technical data; see [Technical data](#).
- The ambient temperature must be less than 55°C.

4.2 Operation of the cooling unit

- After connection of the mains voltage, the device switches to operating mode.
- If cooling mode as needed; this will take place depending on whether a temperature switching threshold (TSet) is reached or undercut.
- Cooling mode switches off when the temperature switching threshold (TSet) is undercut.
- The evaporator fan (internal) and condenser fan (external) switch off when the door is opened.

Operating conditions

- The mains voltage must lie within the specified range; see [Electrical data](#).
- A deviation of $\pm 10\%$ is permissible.
- The ambient temperature must be below 55 °C. For further options, see [Technical data](#).
- The cooling unit must only be used in such a manner as to ensure that the specified cooling capacity is able to meet actual demands.
- Only the specified coolant may be used.

5 : SERVICE AND MAINTENANCE

5.1 General Cleaning



DANGER

Life-threatening hazard due to electric shock

Live units and exposed connection cables can generate an electric shock and cause severe accidents.

- Work on electrical connections must be carried out exclusively by trained, qualified electricians.
- Before working on the unit, de-energize all supply lines to the separate fuse or a main switch, disconnect the system and secure to prevent re-connection.
- Test to ensure the absence of voltage on the unit.



WARNING

Hazards of accidents due to component damage during cleaning

Cleaning of cooling units with water jet, steam jet, high-pressure washer or sharp objects can damage the electrical and electronic assemblies. Malfunctions can cause accidents.

- Do not clean with a water jet, pressure washer or flammable cleaning agents.
- Protect electrical components from the penetration of moisture.
- Do not use pointed or sharp-edged objects to clean the fins. They must not be pinched or damaged.



CAUTION

Hazards of crushing during removal of the unit cover

Hands and other body parts can be crushed during removal and re-installation of the unit cover.

- Keep body parts out of the space between the frame, springs and unit cut-out.
- Work carefully and wear gloves.

The frequency of cleaning intervals depends on the operating conditions in the individual case. The following cleaning work must take place regularly for safe and reliable operation of the cooling units:

- Remove dust or environmental residue from the heat exchangers.
- Check the condensate drain regularly.

5.2 Maintenance



DANGER

Life-threatening hazard due to electric shock

Live units and exposed connection cables can generate an electric shock and cause severe accidents.

- Opening, troubleshooting and replacement of components on the unit must only be carried out by qualified personnel.
- Always ensure that the unit is de-energized before working on the unit.



WARNING

Hazard due to improper maintenance work

Damage of components and faulty replacement of components can cause accidents.

- Always switch off the disconnecter/contactor before beginning maintenance work.
- Wait For unloading phase of 5 minutes for the electric components. Open only afterwards device.
- Ensure that the fans are in idle position and are no longer rotating.
- After replacement of defective parts or components, inspect the unit for correct and safe operation.
- After all maintenance or replacement of spare parts, check to ensure the full capability of the condensate drain.



WARNING

Spare parts from third-party manufacturers can damage the unit and cause accidents.

- Only original parts are subject to the manufacturer's quality control.
- Only use specially agreed manufacturer parts for safe and reliable operation.



NOTICE

Danger of unit damage due to incorrectly performed maintenance

Disregard of the recommended maintenance work reduces the cooling capacity of the cooling unit and could result in reduced machine availability.

- Maintenance work must be carried out regularly, as specified in the maintenance checklist.
- Warranty claims are only valid for units that have been maintained according to specifications.

Pfannenberg recommendation to the operator for maintenance work:

- Carry out maintenance work regularly, every 12 months, according to the maintenance checklist; see Maintenance checklist template.
- Shorter maintenance intervals are required for cooling units that cool in oil- and dust-laden ambient air. A reduced guideline value of two to six months between maintenance intervals applies.

5.3 Maintenance checklist template

Cooling Unit Maintenance Checklist

Maintenance Interval:

- Conduct maintenance every twelve months.
- Conduct maintenance every two to six months in oil and dust-laden environmental air.

Type: _____

Serial number: _____

Date of maintenance: _____

Technician: _____

	Unit range designation/ Required maintenance tasks	Visual inspection	To Do	Result
1	Aggregate before maintenance			
1.1	General visual inspection of the aggregate			
1.2	Inspection for corrosion damage			
2	Condenser / heat exchanger			
2.1	Inspection for general corrosion damage			
3	Condenser fan (external)			
3.1	Inspect mount for loose parts			
3.2	Inspect the electrical connection for damage			
3.3	Check motor bearings for noises			
3.4	Check the drive for signs of overheating			
4	Condenser fan (internal)			
4.1	Inspect mount for loose parts			
4.2	Inspect the electrical connection for damage			
4.3	Check motor bearings for noises			
4.4	Check the drive for signs of overheating			

* Maintenance intervals are more frequent, depending on the degree of contamination.

5.4 Decommissioning



WARNING

Hazard of injury due to materials and substances

Improper work on the unit can be damaging to health.

- Always ensure that the unit is de-energized before working on the unit.
- The unit must only be disposed of by qualified personnel and in accordance with applicable environmental regulations.

If the cooling unit is no longer needed for a longer period, it must be disconnected from the voltage supply.

- Ensure that improper start-up by third parties is not possible.

Final Decommissioning



CAUTION

Hazard of crushing during the decommissioning of units

Hands and other body parts can be crushed during removal of units.

- Keep body parts out of the space between the frame, springs and unit cut-out.

If cooling units are to be definitively decommissioned or disposed of, the following must be observed:

- Applicable statutory regulations of the user country and environmental protection regulations must be observed.
 - Refrigerant must be professionally extracted from the refrigerant system. Avoid refrigerant emissions.
 - The cooling unit must only be disposed of by authorized, qualified personnel.
-
- Waste equipment must also be disposed of correctly by Pfannenberg. Freight charges for delivery to one of our manufacturing facilities must be pre-paid.

6 : TROUBLESHOOTING

Fault	Possible causes	Corrective measures
Unit does not cool; evaporator fan (internal) running	Temperature setting too high	Check the temperature setting
Unit does not cool sufficiently	Operating limits exceeded	Check the ambient temperature and internal load
	Too little coolant	Call in authorized qualified personnel; check the unit for leakage
	Heat exchanger dirty	Clean the heat exchanger
	Evaporator fan (internal) defective Condenser fan (external) defective	Call in authorized, qualified personnel; replace fan
	Disruption in the air circulation inside the cabinet	Check the installation and the path of air circulating in the switch cabinet Check the supply and outlet flow of air of the cooling unit to the inlet and outlet opening of the switch cabinet

7 : ACCESSORIES

Item Number	Designation	Item Number	Designation
18082000001	Kit louveres - light grey		
18082000002	Kit louveres - stainless steel		
18082000003	Kit filter		
18082000004	Kit accessory pack		

Note: Always specify the Pfannenber part numbers when ordering spare parts and accessory parts.

8 : TERMS OF WARRANTY

The warranty does not apply or is voided in the following cases:

- Improper use of the unit.
- Failure to observe operating conditions or disregard of the operating manual.
- Lack of regular maintenance on the cooling units.
- Damage due to disregard of maintenance recommendations.
- Damage to cooling units due to soiled or clogged filters.
- Damage due to unauthorized opening of the refrigerant circuit.
- Modifications carried out on the unit or a change to the serial number.
- In the event of damage during transport or other accidents.
- Replacement of parts by unauthorized personnel.
- Only original Pfannenber parts are permitted for use. Violations void the warranty.

For recognition of warranty claims and return of the unit, observe the following:

- Provide an exact description of the defect and the SRO (RMA) numbers specified by Pfannenber with the cooling unit.
- Include a reference document (delivery note or invoice copy).
- Forward the cooling unit to us, complete with all accessories, in the original box or in comparable packaging with freight and transport insurance pre-paid.
- Observe transport instructions; see [Transport](#).

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All information contained was thoroughly checked in 2018.
However, we make no guarantee as to the completeness and correctness of the specifications.

Org 07/17/18
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