

# Assembly and operating instructions

**REMKO KWP Eco series**

**Chillers with heat pump function**

KWP 460 Eco - 2460 Eco





**Read these operating instructions carefully before commissioning / using this device!**

**These instructions are an integral part of the system and must always be kept near or on the device.**

Subject to modifications; No liability accepted for errors or misprints!

**Installation and operating instructions (translation of the original)**

## Table of contents

<b>1</b>	<b>Safety and usage instructions</b>	<b>4</b>
1.1	General safety notes	4
1.2	Identification of notes	4
1.3	Personnel qualifications	4
1.4	Dangers of failure to observe the safety notes	4
1.5	Safety-conscious working	4
1.6	Safety notes for the operator	5
1.7	Safety notes for installation, maintenance and inspection	5
1.8	Unauthorised modification and changes	5
1.9	Intended use	5
1.10	Warranty	5
1.11	Transport and packaging	6
1.12	Environmental protection and recycling	6
<b>2</b>	<b>Technical data</b>	<b>7</b>
2.1	Unit data	7
2.2	Usable limits	22
2.3	Unit dimensions	23
<b>3</b>	<b>Design and function</b>	<b>27</b>
3.1	Unit description	27
3.2	Necessary system components	28
3.3	Hydraulic unit construction	29
<b>4</b>	<b>Operation of the controller</b>	<b>30</b>
<b>5</b>	<b>Installation instructions for qualified personnel</b>	<b>34</b>
<b>6</b>	<b>Installation</b>	<b>36</b>
<b>7</b>	<b>Condensate drainage connection and safe drainage</b>	<b>41</b>
<b>8</b>	<b>Electrical wiring</b>	<b>42</b>
8.1	General connection and safety instructions	42
8.2	Unit connection	44
8.3	Electrical components	45
<b>9</b>	<b>Leak testing</b>	<b>45</b>
<b>10</b>	<b>Before commissioning</b>	<b>46</b>
<b>11</b>	<b>Commissioning</b>	<b>48</b>
<b>12</b>	<b>Shutdown</b>	<b>49</b>
<b>13</b>	<b>Troubleshooting and customer service</b>	<b>50</b>
<b>14</b>	<b>Care and maintenance</b>	<b>52</b>
<b>15</b>	<b>Index</b>	<b>53</b>

# REMKO KWP Eco series

## 1 Safety and usage instructions

### 1.1 General safety notes

Carefully read the operating manual before commissioning the units for the first time. It contains useful tips and notes such as hazard warnings to prevent personal injury and material damage. Failure to follow the directions in this manual not only presents a danger to people, the environment and the system itself, but will void any claims for liability.

Keep this operating manual and the refrigerant data sheet near to the units.

### 1.2 Identification of notes

This section provides an overview of all important safety aspects for proper protection of people and safe and fault-free operation. The instructions and safety notes contained within this manual must be observed in order to prevent accidents, personal injury and material damage.

Notes attached directly to the units must be observed in their entirety and be kept in a fully legible condition.

Safety notes in this manual are indicated by symbols. Safety notes are introduced with signal words which help to highlight the magnitude of the danger in question.



#### **DANGER!**

Contact with live parts poses an immediate danger of death due to electric shock. Damage to the insulation or individual components may pose a danger of death.



#### **DANGER!**

This combination of symbol and signal word warns of a situation in which there is immediate danger, which if not avoided may be fatal or cause serious injury.



#### **WARNING!**

This combination of symbol and signal word warns of a potentially hazardous situation, which if not avoided may be fatal or cause serious injury.



#### **CAUTION!**

This combination of symbol and signal word warns of a potentially hazardous situation, which if not avoided may cause injury or material and environmental damage.



#### **NOTICE!**

This combination of symbol and signal word warns of a potentially hazardous situation, which if not avoided may cause material and environmental damage.



*This symbol highlights useful tips and recommendations as well as information for efficient and fault-free operation.*

### 1.3 Personnel qualifications

Personnel responsible for commissioning, operation, maintenance, inspection and installation must be able to demonstrate that they hold a qualification which proves their ability to undertake the work.

### 1.4 Dangers of failure to observe the safety notes

Failure to observe the safety notes may pose a risk to people, the environment and the units. Failure to observe the safety notes may void any claims for damages.

In particular, failure to observe the safety notes may pose the following risks:

- The failure of important unit functions.
- The failure of prescribed methods of maintenance and repair.
- Danger to people on account of electrical and mechanical effects.

### 1.5 Safety-conscious working

The safety notes contained in this manual, the existing national regulations concerning accident prevention as well as any internal company working, operating and safety regulations must be observed.

## 1.6 Safety notes for the operator

The operational safety of the units and components is only assured providing they are used as intended and in a fully assembled state.

- The units and components may only be set up, installed and maintained by qualified personnel.
- Protective covers (grille) over moving parts must not be removed from units that are in operation.
- Do not operate units or components with obvious defects or signs of damage.
- Contact with certain unit parts or components may lead to burns or injury.
- The units and components must not be exposed to any mechanical load, extreme levels of humidity or extreme temperature.
- Spaces in which refrigerant can leak sufficient to load and vent. Otherwise there is danger of suffocation.
- All housing parts and device openings, e.g. air inlets and outlets, must be free from foreign objects, fluids or gases.
- The units must be inspected by a service technician at least once annually. Visual inspections and cleaning may be performed by the operator when the units are disconnected from the mains.

## 1.7 Safety notes for installation, maintenance and inspection

- Appropriate hazard prevention measures must be taken to prevent risks to people when performing installation, repair, maintenance or cleaning work on the units.
- The setup, connection and operation of the units and its components must be undertaken in accordance with the usage and operating conditions stipulated in this manual and comply with all applicable regional regulations.
- Local regulations and laws such as Water Ecology Act must be observed.
- The power supply should be adapted to the requirements of the units.
- Units may only be mounted at the points provided for this purpose at the factory. The units may only be secured or mounted on stable structures, walls or floors.
- Mobile units must be set up securely on suitable surfaces and in an upright position. Stationary units must be permanently installed for operation.
- The units and components should not be operated in areas where there is a heightened risk of damage. Observe the minimum clearances.

- The units and components must be kept at an adequate distance from flammable, explosive, combustible, abrasive and dirty areas or atmospheres.
- Safety devices must not be altered or bypassed.

## 1.8 Unauthorised modification and changes

Modifications or changes to units and components are not permitted and may cause malfunctions. Safety devices may not be modified or bypassed. Original replacement parts and accessories authorised by the manufacturer ensure safety. The use of other parts may invalidate liability for resulting consequences.

## 1.9 Intended use

Depending on the model and the unit, the units are only intended to be used as a chiller for the cooling or warming of the operating medium water or a water-glycol mixture within a closed medium cycle.

Any different or additional use is a non-intended use. The manufacturer / supplier assumes no liability for damages arising from non-intended use. The user bears the sole risk in such cases. Intended use also includes working in accordance with the operating and installation instructions and complying with the maintenance requirements.

The threshold values specified in the technical data must not be exceeded.

## 1.10 Warranty

For warranty claims to be considered, it is essential that the ordering party or its representative complete and return the "certificate of warranty" to REMKO GmbH & Co. KG at the time when the units are purchased and commissioned.

The warranty conditions are detailed in the "General business and delivery conditions". Furthermore, only the parties to a contract can conclude special agreements beyond these conditions. In this case, contact your contractual partner in the first instance.

# REMKO KWP Eco series

## 1.11 Transport and packaging

The devices are supplied in a sturdy shipping container. Please check the equipment immediately upon delivery and note any damage or missing parts on the delivery and inform the shipper and your contractual partner. For later complaints can not be guaranteed.



### **WARNING!**

**Plastic films and bags etc. are dangerous toys for children!**

Why:

- Leave packaging material are not around.
- Packaging material may not be accessible to children!

## 1.12 Environmental protection and recycling

### **Disposal of packaging**

All products are packed for transport in environmentally friendly materials. Make a valuable contribution to reducing waste and sustaining raw materials. Only dispose of packaging at approved collection points.



### **Disposal of equipment and components**

Only recyclable materials are used in the manufacture of the devices and components. Help protect the environment by ensuring that the devices or components (for example batteries) are not disposed in household waste, but only in accordance with local regulations and in an environmentally safe manner, e.g. using certified firms and recycling specialists or at collection points.



## 2 Technical data

### 2.1 Unit data

#### Unit data KWP 460-600 Eco

Series		KWP 460 Eco	KWP 520 Eco	KWP 600 Eco
Operating mode		Air-cooled chiller for external installation in high-efficiency design for cooling and heating		
Cooling capacity <sup>1)</sup>	kW	46.4	51.7	60.3
SEER		5.8	5.7	4.9
Annual room cooling efficiency $\eta_{s,c}$	%	225	221	189
Heating capacity <sup>2)</sup>	kW	50.5	56.6	70.4
Adjustment range - return temperature cooling	°C	+5 to +18		
Adjustment range - return temperature heating	°C	+25 to +50		
Operating range, cooling	°C	+5 to +48		
Operating range, heating	°C	-10 to +30		
Cooling circuits, number		1		
Refrigerant		R452B		
GWP value		676		
Refrigerant filling quantity	kg	16.0	17.0	18.0
CO <sub>2</sub> equivalent	t	10.8	11.5	12.2
Compressor. number		2		
Nominal flow rate	m <sup>3</sup> /h	22 000		
Number of fans		1		
Sound pressure level <sup>3)</sup>	dB (A)	53.3	53.6	54.7
Sound power level	dB (A)	85.3	85.6	86.7
Power supply	V/Ph/Hz	400/3~N/50		
Enclosure class	IP	X4		
Electrical current consumption, max.	A	53.2	53.3	55.0
Rated power consumption, cooling	kW	11.7	13.6	18.0
Rated current consumption, cooling	A	21.1	24.5	32.0
Operating medium		Water; max. 35% ethylene glycol, max. 35% propylene glycol		
Operating pressure, medium. max.	kPa	800		
Nominal flow rate, cooling	m <sup>3</sup> /h	8.0	8.9	10.4
Minimum flow volume, medium	m <sup>3</sup> /h	4.8	5.3	6.2
Maximum flow volume, medium	m <sup>3</sup> /h	12.8	14.2	16.6

# REMKO KWP Eco series

Series		KWP 460 Eco	KWP 520 Eco	KWP 600 Eco
Pressure loss, indoor	kPa	58.7	57.1	58.0
Medium connection, inlet	Inches	1 1/2	2	
Medium connection, outlet	Inches	1 1/2	2	
Dimensions				
Height	mm	See drawings		
Width	mm	See drawings		
Depth	mm	See drawings		
Weight	kg	517	544	570
Standard colour		similar to RAL 9018		

<sup>1)</sup> Air intake temperature TK 35 °C. medium inlet 12 °C. medium outlet 7 °C. 0% glycol concentration

<sup>2)</sup> Air intake temperature TK 7 °C. medium inlet 40 °C. medium outlet 45 °C. 0% glycol concentration

<sup>3)</sup> Distance 10 m free field



## Unit data KWP 790-1120 Eco

Series		KWP 790 Eco	KWP 900 Eco	KWP 1030 Eco	KWP 1120 Eco
Operating mode		Air-cooled chiller for external installation in high-efficiency design for cooling and heating			
Cooling capacity <sup>1)</sup>	kW	78.5	90.1	102.7	112.1
SEER		5.9	6.0	5.8	5.9
Annual room cooling efficiency $\eta_{S,C}$	%	227	230	225	227
Heating capacity <sup>2)</sup>	kW	89.4	101.6	110.9	126.4
Adjustment range - return temperature cooling	°C	+5 to +18			
Adjustment range - return temperature heating	°C	+25 to +50			
Operating range, cooling	°C	+5 to +48			
Operating range, heating	°C	-10 to +30			
Cooling circuits, number		1		2	
Refrigerant		R452B			
GWP value		676			
Refrigerant filling quantity	kg	18.0	20.0	12.5	
CO <sub>2</sub> equivalent	t	12.2	13.5	8.5	
Compressor, number		3		4	
Nominal flow rate	m³/h	44 000			
Number of fans		2			
Sound pressure level <sup>3)</sup>	dB (A)	57.4	57.7	58.0	58.4
Sound power level	dB (A)	89.4	89.7	90.0	90.4
Power supply	V/Ph/Hz	400/3~N/50			
Enclosure class	IP	X4			
Electrical current consumption, max.	A	84.3	81.1	110.3	106.3
Rated power consumption, cooling	kW	21.3	24.4	28.3	32.8
Rated current consumption, cooling	A	38.5	44.0	51.0	59.3
Operating medium		Water; max. 35% ethylene glycol, max. 35% propylene glycol			
Operating pressure, medium, max.	kPa	800			
Nominal flow rate, cooling	m³/h	13.5	15.5	17.7	19.3
Minimum flow volume, medium	m³/h	8.1	9.3	10.6	11.6
Maximum flow volume, medium	m³/h	21.6	24.8	28.3	30.9
Pressure loss, indoor	kPa	61.3	56.5	41.8	50.2
Medium connection, inlet	Inches	2	2 1/2		

# REMKO KWP Eco series

Series		KWP 790 Eco	KWP 900 Eco	KWP 1030 Eco	KWP 1120 Eco
Medium connection, outlet	Inches	2	2 1/2		
Dimensions	mm	See drawings			
Height					
Width	mm	See drawings			
Depth	mm	See drawings			
Weight	kg	1090	1091	1199	
Standard colour		similar to RAL 9018			

<sup>1)</sup> Air intake temperature TK 35 °C, medium inlet 12 °C, medium outlet 7 °C, 0% glycol concentration

<sup>2)</sup> Air intake temperature TK 7 °C, medium inlet 40 °C, medium outlet 45 °C, 0% glycol concentration

<sup>3)</sup> Distance 10 m free field

## Unit data KWP 1220-1480 Eco

Series		KWP 1220 Eco	KWP 1310 Eco	KWP 1400 Eco	KWP 1480 Eco
Operating mode		Air-cooled chiller for external installation in high-efficiency design for cooling and heating			
Cooling capacity <sup>1)</sup>	kW	122.1	130.5	139.7	148.3
SEER		5.7	5.5	5.7	5.8
Annual room cooling efficiency $\eta_{S,C}$	%	218	214	220	225
Heating capacity <sup>2)</sup>	kW	135.0	145.8	154.8	163.9
Adjustment range - return temperature cooling	°C	+5 to +18			
Adjustment range - return temperature heating	°C	+25 to +50			
Operating range, cooling	°C	+5 to +48			
Operating range, heating	°C	-10 to +30			
Cooling circuits, number		2			
Refrigerant		R452B			
GWP value		676			
Refrigerant filling quantity	kg	13.0	13.5		14.0
CO <sub>2</sub> equivalent	t	8.8	9.1		9.5
Compressor, number		4			
Nominal flow rate	m³/h	44 000			
Number of fans		2			
Sound pressure level <sup>3)</sup>	dB (A)	59.4	59.6	59.7	59.8
Sound power level	dB (A)	91.4	91.6	91.7	91.8
Power supply	V/Ph/Hz	400/3~N / 50			
Enclosure class	IP	X4			
Electrical current consumption, max.	A	116.3	126.3	136.3	146.3
Rated power consumption, cooling	kW	37.2	41.5	42.5	43.4
Rated current consumption, cooling	A	67.1	75.0	76.7	78.5
Operating medium		Water; max. 35% ethylene glycol, max. 35% propylene glycol			
Operating pressure, medium, max.	kPa	800			
Nominal flow rate, cooling	m³/h	21.0	22.5	24.1	25.5
Minimum flow volume, medium	m³/h	12.6	13.5	14.5	15.3
Maximum flow volume, medium	m³/h	33.6	36.0	38.6	40.8
Pressure loss, indoor	kPa	51.6	58.0	54.8	47.1
Medium connection, inlet	Inches	DN 80			

# REMKO KWP Eco series

Series		KWP 1220 Eco		KWP 1310 Eco	KWP 1400 Eco	KWP 1480 Eco
Medium connection, outlet	Inches	DN 80				
Dimensions	mm	See drawings				
Height						
Width	mm	See drawings				
Depth	mm	See drawings				
Weight	kg	1369	1383			
Standard colour		similar to RAL 9018				

<sup>1)</sup> Air intake temperature TK 35 °C, medium inlet 12 °C, medium outlet 7 °C, 0% glycol concentration

<sup>2)</sup> Air intake temperature TK 7 °C, medium inlet 40 °C, medium outlet 45 °C, 0% glycol concentration

<sup>3)</sup> Distance 10 m free field

## Unit data KWP 1700-2460 Eco

Series		KWP 1700 Eco	KWP 1960 Eco	KWP 2220 Eco	KWP 2460 Eco
Operating mode		Air-cooled chiller for external installation in high-efficiency design for cooling and heating			
Cooling capacity <sup>1)</sup>	kW	169.9	196.2	222.7	246.1
SEER		5.5	6.0		
Annual room cooling efficiency $\eta_{S,C}$	%	214	231	232	230
Heating capacity <sup>2)</sup>	kW	181.7	211.7	238.4	270.1
Adjustment range - return temperature cooling	°C	+5 to +18			
Adjustment range - return temperature heating	°C	+25 to +50			
Operating range, cooling	°C	+5 to +48			
Operating range, heating	°C	-10 to +30			
Cooling circuits, number		2			
Refrigerant		R452B			
GWP value		676			
Refrigerant filling quantity	kg	18.0		18.5	19.0
CO <sub>2</sub> equivalent	t	12.2		12.5	12.8
Compressor, number		4			
Nominal flow rate	m <sup>3</sup> /h	66 000			
Number of fans		3			
Sound pressure level <sup>3)</sup>	dB (A)	62.2	62.6	62.9	63.3
Sound power level	dB (A)	94.2	94.6	94.9	95.3
Power supply	V/Ph/Hz	400/3~N / 50			
Enclosure class	IP	X4			
Electrical current consumption, max.	A	163.9	188.7	213.5	235.5
Rated power consumption, cooling	kW	51.0	55.3	63.0	70.8
Rated current consumption, cooling	A	92.1	99.8	113.7	127.9
Operating medium		Water; max. 35% ethylene glycol, max. 35% propylene glycol			
Operating pressure, medium, max.	kPa	800			
Nominal flow rate, cooling	m <sup>3</sup> /h	29.3	33.8	38.4	42.4
Minimum flow volume, medium	m <sup>3</sup> /h	17.6	20.3	23.0	25.4
Maximum flow volume, medium	m <sup>3</sup> /h	46.9	54.1	61.4	67.8
Pressure loss, indoor	kPa	41.7	53.1	49.4	58.7
Medium connection, inlet	Inches	DN 80			

# REMKO KWP Eco series

Series		KWP 1700 Eco	KWP 1960 Eco	KWP 2220 Eco	KWP 2460 Eco
Medium connection, outlet	Inches	DN 80			
Dimensions					
Height	mm	See drawings			
Width	mm	See drawings			
Depth	mm	See drawings			
Weight	kg	1650	1772	1889	1910
Standard colour		similar to RAL 9018			

<sup>1)</sup> Air intake temperature TK 35 °C, medium inlet 12 °C, medium outlet 7 °C, 0% glycol concentration

<sup>2)</sup> Air intake temperature TK 7 °C, medium inlet 40 °C, medium outlet 45 °C, 0% glycol concentration

<sup>3)</sup> Distance 10 m free field

## Chiller with standard pump

Series		KWP 460 Eco	KWP 520 Eco	KWP 600 Eco
Nominal pump pressure, max.	kPa	153.1	145.0	168.5
Equipment pressure, available	kPa	94.4	86.3	112.6
Power consumption, pump	kW	1.0		1.3
Current consumption, pump	A	1.9		2.5
Weight, pump	kg	9.5		12.2

Series		KWP 790 Eco	KWP 900 Eco	KWP 1030 Eco	KWP 1120 Eco
Nominal pump pressure, max.	kPa	160.9	134.8	164.8	174.1
Equipment pressure, available	kPa	102.2	76.1	106.1	115.4
Power consumption, pump	kW	1.3		1.8	
Current consumption, pump	A	2.5		3.7	
Weight, pump	kg	12.2		16.5	

Series		KWP 1220 Eco	KWP 1310 Eco	KWP 1400 Eco	KWP 1480 Eco
Nominal pump pressure, max.	kPa	161.5	155.3	144.8	143.3
Equipment pressure, available	kPa	102.8	96.6	86.1	84.6
Power consumption, pump	kW	1.8			
Current consumption, pump	A	3.7			
Weight, pump	kg	16.5			

Series		KWP 1700 Eco	KWP 1960 Eco	KWP 2220 Eco	KWP 2460 Eco
Nominal pump pressure, max.	kPa	146.4	187.3	168.1	162.5
Equipment pressure, available	kPa	87.7	128.6	108.4	103.8
Power consumption, pump	kW	1.8	2.6		
Current consumption, pump	A	3.7	4.5		
Weight, pump	kg	16.5	37.0		

# REMKO KWP Eco series

## Chiller with high pressure pump

Series		KWP 460 Eco	KWP 520 Eco	KWP 600 Eco
Nominal pump pressure, max.	kPa	222.1	207.7	267.8
Equipment pressure, available	kPa	163.4	149.0	211.9
Power consumption, pump	kW	1.3		2.0
Current consumption, pump	A	2.5		4.1
Weight, pump	kg	12.4		17.0

Series		KWP 790 Eco	KWP 900 Eco	KWP 1030 Eco	KWP 1120 Eco
Nominal pump pressure, max.	kPa	266.0	240.4	244.9	254.4
Equipment pressure, available	kPa	207.3	181.7	186.2	195.7
Power consumption, pump	kW	2.0		3.5	
Current consumption, pump	A	4.1		6.1	
Weight, pump	kg	17.0		22.3	

Series		KWP 1220 Eco	KWP 1310 Eco	KWP 1400 Eco	KWP 1480 Eco
Nominal pump pressure, max.	kPa	241.8	235.7	225.1	223.6
Equipment pressure, available	kPa	183.1	177.0	166.4	164.9
Power consumption, pump	kW	3.5			
Current consumption, pump	A	6.1			
Weight, pump	kg	22.3			

Series		KWP 1700 Eco	KWP 1960 Eco	KWP 2220 Eco	KWP 2460 Eco
Nominal pump pressure, max.	kPa	226.5	224.2	253.4	250.1
Equipment pressure, available	kPa	167.8	165.5	194.7	191.4
Power consumption, pump	kW	3.5		4.6	
Current consumption, pump	A	6.1		8.7	
Weight, pump	kg	22.3	39.5	48.0	



## Chiller with high-performance pump

Series		KWP 460 Eco	KWP 520 Eco	KWP 600 Eco
Nominal pump pressure, max.	kPa	311.0	298.6	325.4
Equipment pressure, available	kPa	252.3	239.9	269.5
Power consumption, pump	kW	2.0		2.6
Current consumption, pump	A	4.1		4.7
Weight, pump	kg	18.1		16.8

Series		KWP 790 Eco	KWP 900 Eco	KWP 1030 Eco	KWP 1120 Eco
Nominal pump pressure, max.	kPa	322.9	293.8	266.7	280.4
Equipment pressure, available	kPa	264.2	235.1	208.0	221.7
Power consumption, pump	kW	2.6		4.6	
Current consumption, pump	A	4.7		8.7	
Weight, pump	kg	16.8		48.0	

Series		KWP 1220 Eco	KWP 1310 Eco	KWP 1400 Eco	KWP 1480 Eco
Nominal pump pressure, max.	kPa	271.1	268.5	261.0	263.0
Equipment pressure, available	kPa	212.4	209.8	202.3	204.3
Power consumption, pump	kW	4.6			
Current consumption, pump	A	8.7			
Weight, pump	kg	48.0			

Series		KWP 1700 Eco	KWP 1960 Eco	KWP 2220 Eco	KWP 2460 Eco
Nominal pump pressure, max.	kPa	269.2	270.7	314.5	310.2
Equipment pressure, available	kPa	210.5	212.0	255.8	251.5
Power consumption, pump	kW	4.6		6.3	
Current consumption, pump	A	8.7		10.4	
Weight, pump	kg	48.0		60.0	

# REMKO KWP Eco series

## Sound data

Series		KWP 460 Eco	KWP 520 Eco	KWP 600 Eco
Sound pressure level <sup>2)</sup> in standard version	dB(A)	53.3	53.6	54.7
Sound pressure level <sup>2)</sup> with low-noise kit	dB(A)	49.5	49.8	50.9
Sound pressure level <sup>2)</sup> with super-low-noise kit	dB(A)	46.9	47.2	48.3
Sound power level in standard version	dB(A)	85.3	85.6	86.7
Sound power level with low-noise kit	dB(A)	81.5	81.8	82.9
Sound power level with super-low-noise kit	dB(A)	78.9	79.2	80.3

Series		KWP 790 Eco	KWP 900 Eco	KWP 1030 Eco	KWP 1120 Eco
Sound pressure level <sup>2)</sup> in standard version	dB(A)	57.2	57.4	57.7	58.0
Sound pressure level <sup>2)</sup> with low-noise kit	dB(A)	53.4	53.6	53.9	54.2
Sound pressure level <sup>2)</sup> with super-low-noise kit	dB(A)	50.8	51.0	51.4	51.7
Sound power level in standard version	dB(A)	89.2	89.4	89.7	90.0
Sound power level with low-noise kit	dB(A)	85.4	85.6	85.9	86.2
Sound power level with super-low-noise kit	dB(A)	82.8	83.0	83.4	83.7

<sup>2)</sup> Distance 10 m free field

## Sound data (continued)

Series		KWP 1220 Eco	KWP 1310 Eco	KWP 1400 Eco	KWP 1480 Eco
Sound pressure level <sup>2)</sup> in standard version	dB(A)	58.4	59.4	59.6	59.7
Sound pressure level <sup>2)</sup> with low-noise kit	dB(A)	54.6	55.6	55.8	55.9
Sound pressure level <sup>2)</sup> with super-low-noise kit	dB(A)	52.0	53.0	53.2	53.4
Sound power level in standard version	dB(A)	90.4	91.4	91.6	91.7
Sound power level with low-noise kit	dB(A)	86.6	87.6	87.8	87.9
Sound power level with super-low-noise kit	dB(A)	84.0	85.0	85.2	85.4

Series		KWP 1700 Eco	KWP 1960 Eco	KWP 2220 Eco	KWP 2460 Eco
Sound pressure level <sup>2)</sup> in standard version	dB(A)	59.8	62.2	62.6	62.9
Sound pressure level <sup>2)</sup> with low-noise kit	dB(A)	56.0	58.4	58.8	59.1
Sound pressure level <sup>2)</sup> with super-low-noise kit	dB(A)	53.5	55.9	56.2	56.5
Sound power level in standard version	dB(A)	91.8	94.2	94.6	94.9
Sound power level with low-noise kit	dB(A)	88.0	90.4	90.8	91.1
Sound power level with super-low-noise kit	dB(A)	85.5	87.9	88.2	88.5

<sup>2)</sup> Distance 10 m free field

# REMKO KWP Eco series

## Chiller with soft start

Series		KWP 460 Eco	KWP 520 Eco	KWP 600 Eco
El. starting current, max.	A	200.2	152.3	168.5
El. starting current, max. with soft start	A	111.5	96.0	109.5

Series		KWP 790 Eco	KWP 900 Eco	KWP 1030 Eco	KWP 1120 Eco
El. starting current, max.	A	181.3	183.3	181.1	206.3
El. starting current, max. with soft start	A	125.1	127.1	124.9	150.1

Series		KWP 1220 Eco	KWP 1310 Eco	KWP 1400 Eco	KWP 1480 Eco
El. starting current, max.	A	209.3	233.3	243.3	259.3
El. starting current, max. with soft start	A	153.1	167.2	177.2	188.2

Series		KWP 1700 Eco	KWP 1960 Eco	KWP 2220 Eco	KWP 2460 Eco
El. starting current, max.	A	269.3	322.3	352.7	377.5
El. starting current, max. with soft start	A	198.2	233.6	255.9	280.7

## Chiller with storage tank

Series		KWP 460 Eco	KWP 520 Eco	KWP 600 Eco
Reservoir volume	Litres	200.0		
Weight (additional)	kg	123.0		

Series		KWP 790 Eco	KWP 900 Eco	KWP 1030 Eco	KWP 1120 Eco
Reservoir volume	Litres	200			
Weight (additional)	kg	208.0			213.0

Series		KWP 1220 Eco	KWP 1310 Eco	KWP 1400 Eco	KWP 1480 Eco
Reservoir volume	Litres	200.0	375.0		
Weight (additional)	kg	213.0	360.0		

Series		KWP 1700 Eco	KWP 1960 Eco	KWP 2220 Eco	KWP 2460 Eco
Reservoir volume	Litres	375.0			
Weight (additional)	kg	360.0	262.0		253.0

# REMKO KWP Eco series

## 2.2 Usable limits

For trouble-free unit operation and compliance with the legal warranty conditions, it is essential that the unit is be used within its respective usage limits. These are shown in the following diagram. Further information on this can likewise be found in the technical data.

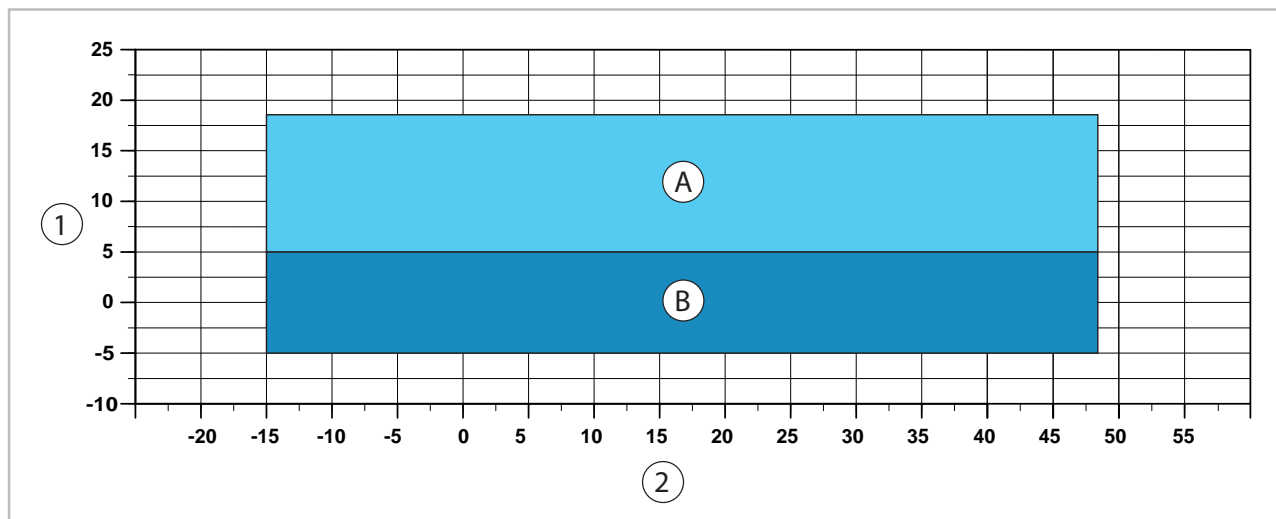


Fig. 1: Usable limits, cooling

A: Standard design

B: Unit with low temperature accessories

1: Return temperature

2: Ambient temperature

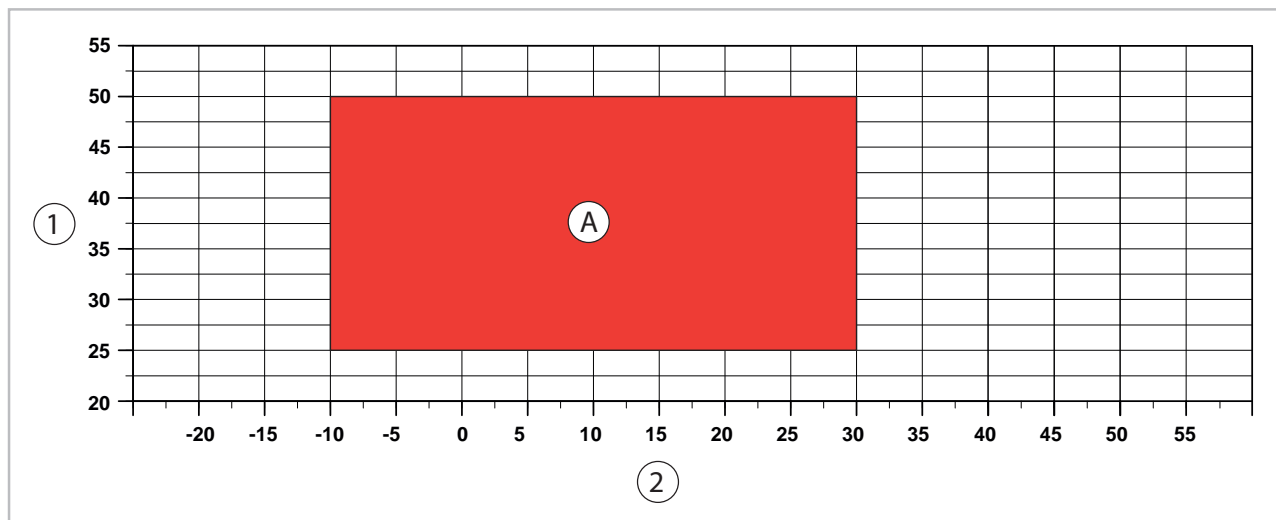


Fig. 2: Usable limits, heating

A: Standard design

1: Return temperature

2: Ambient temperature

## 2.3 Unit dimensions

### KWP 460-600 Eco without storage tank

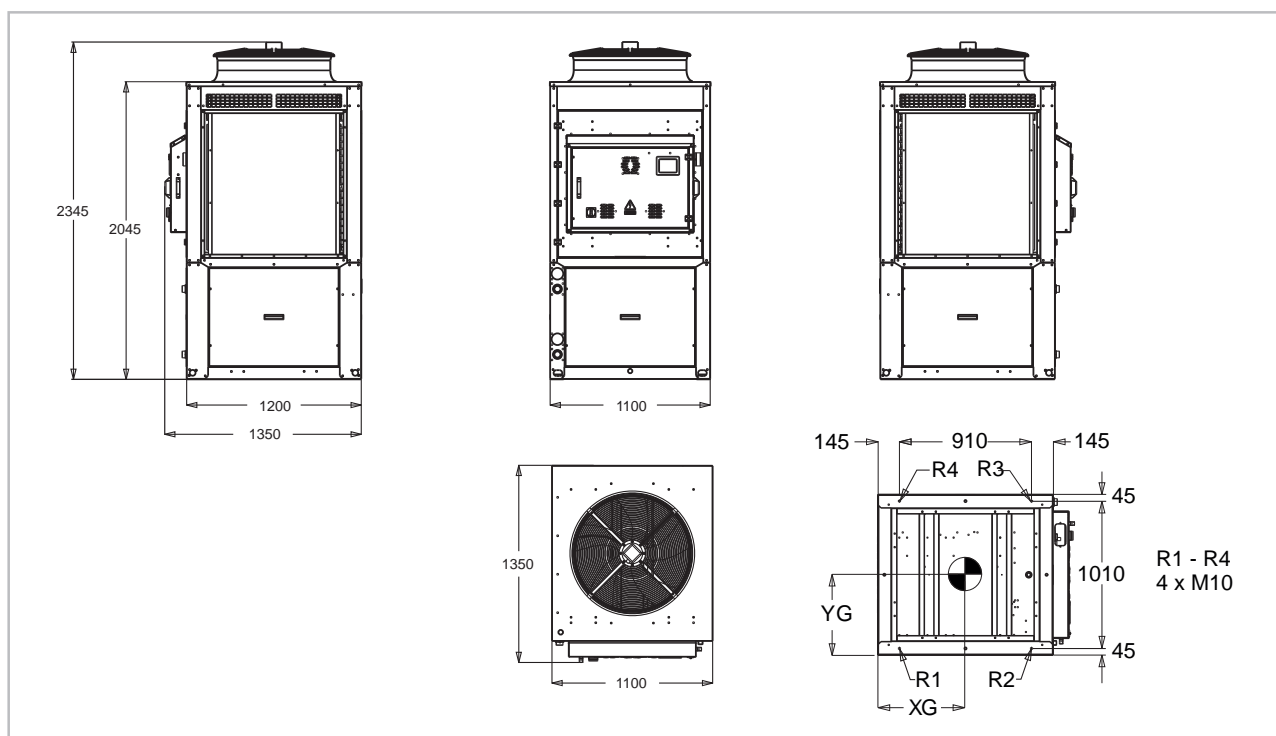


Fig. 3: Dimensions of KWP 460-600 Eco without storage tank (all measurements in mm)

### KWP 460-600 Eco with storage tank

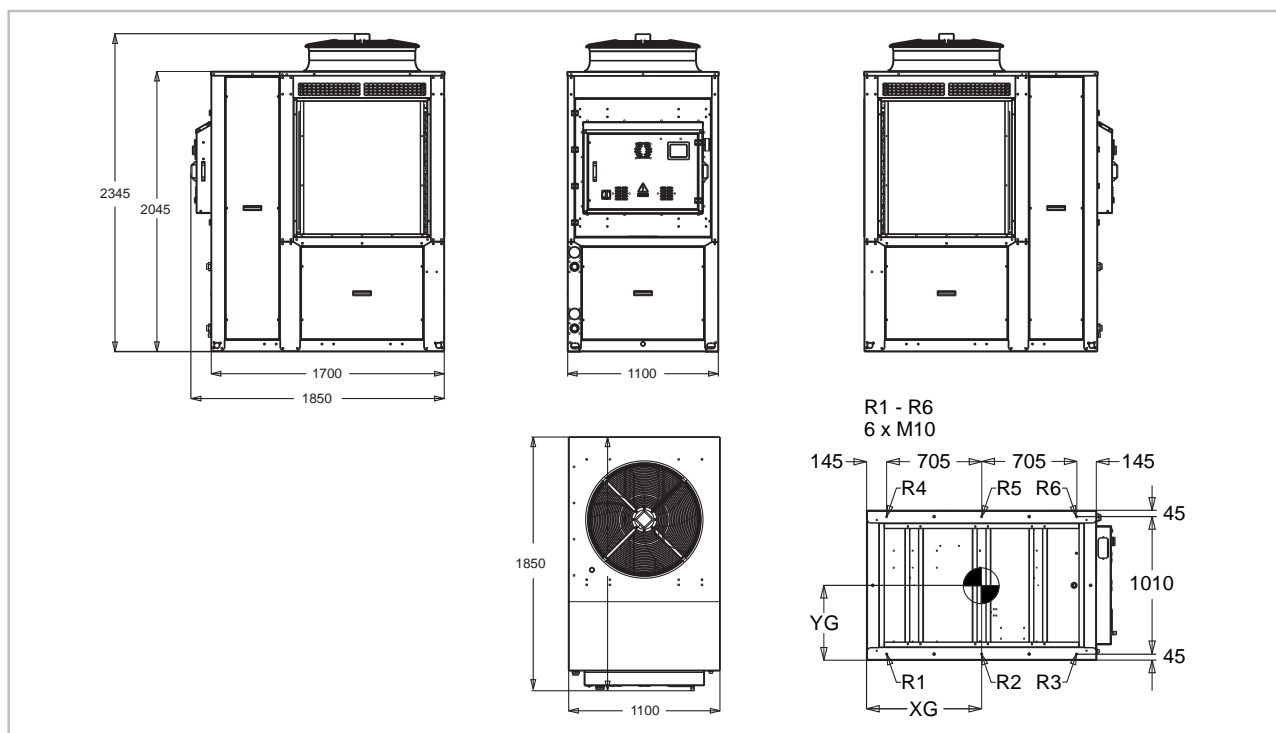


Fig. 4: Dimensions of KWP 460-600 Eco with storage tank (all measurements in mm)

We reserve the right to modify the dimensions and design as part of the ongoing technical development process.

# REMKO KWP Eco series

## KWP 790-1120 Eco without storage tank

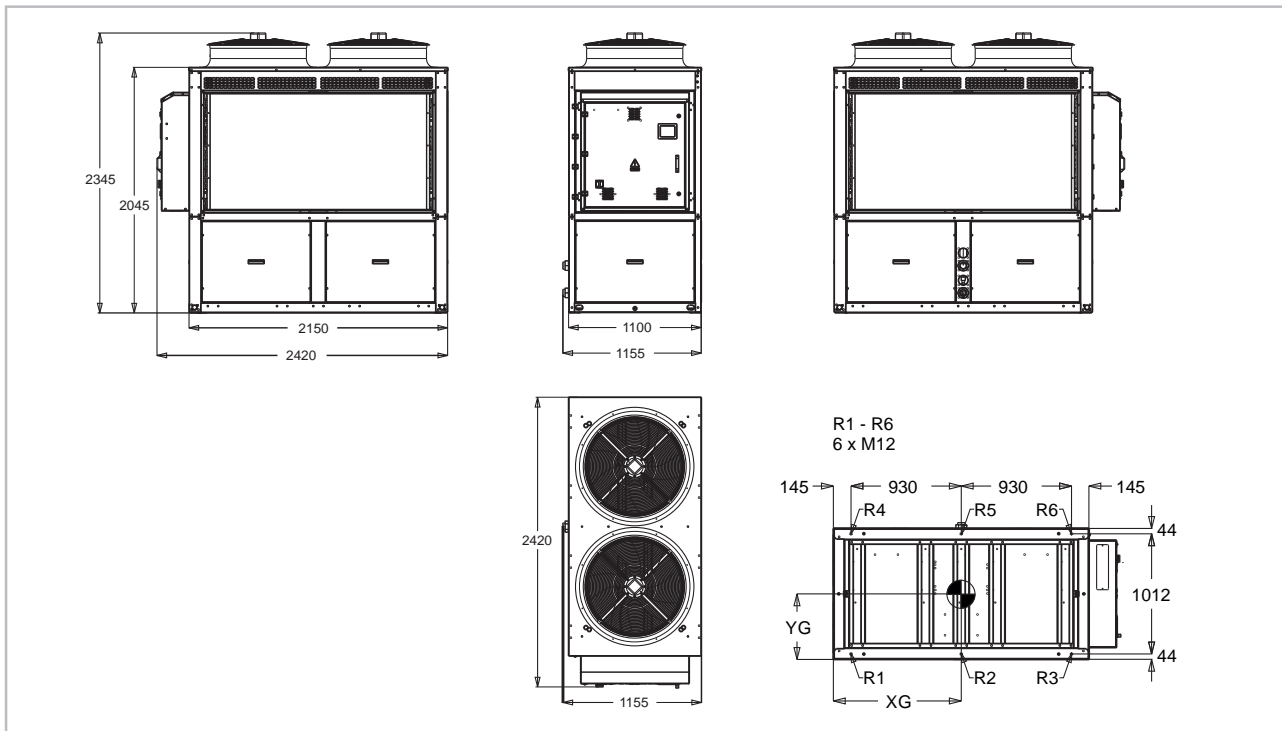


Fig. 5: Dimensions of KWP 790-1120 Eco without storage tank (all measurements in mm)

## KWP 790-1120 Eco with storage tank

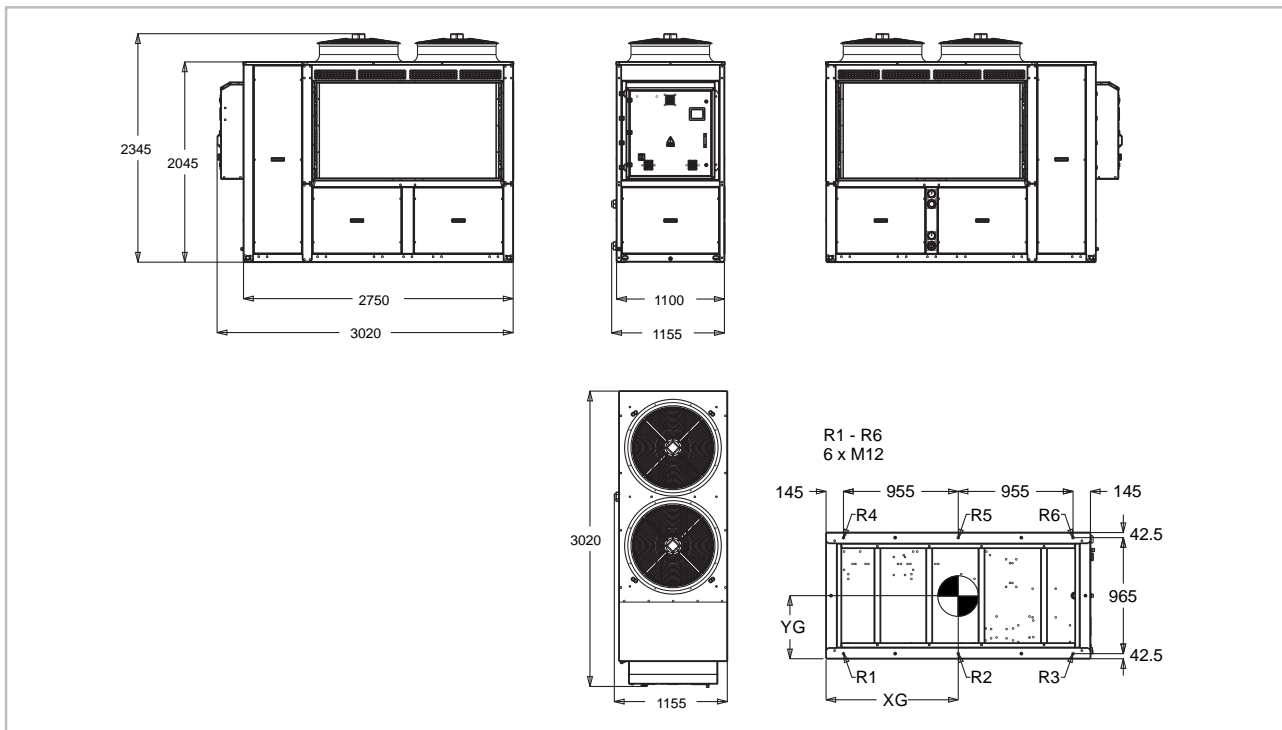


Fig. 6: Dimensions of KWP 790-1120 Eco with storage tank (all measurements in mm)

We reserve the right to modify the dimensions and design as part of the ongoing technical development process.





# REMKO KWP Eco series

## KWP 1700-2460 Eco without storage tank

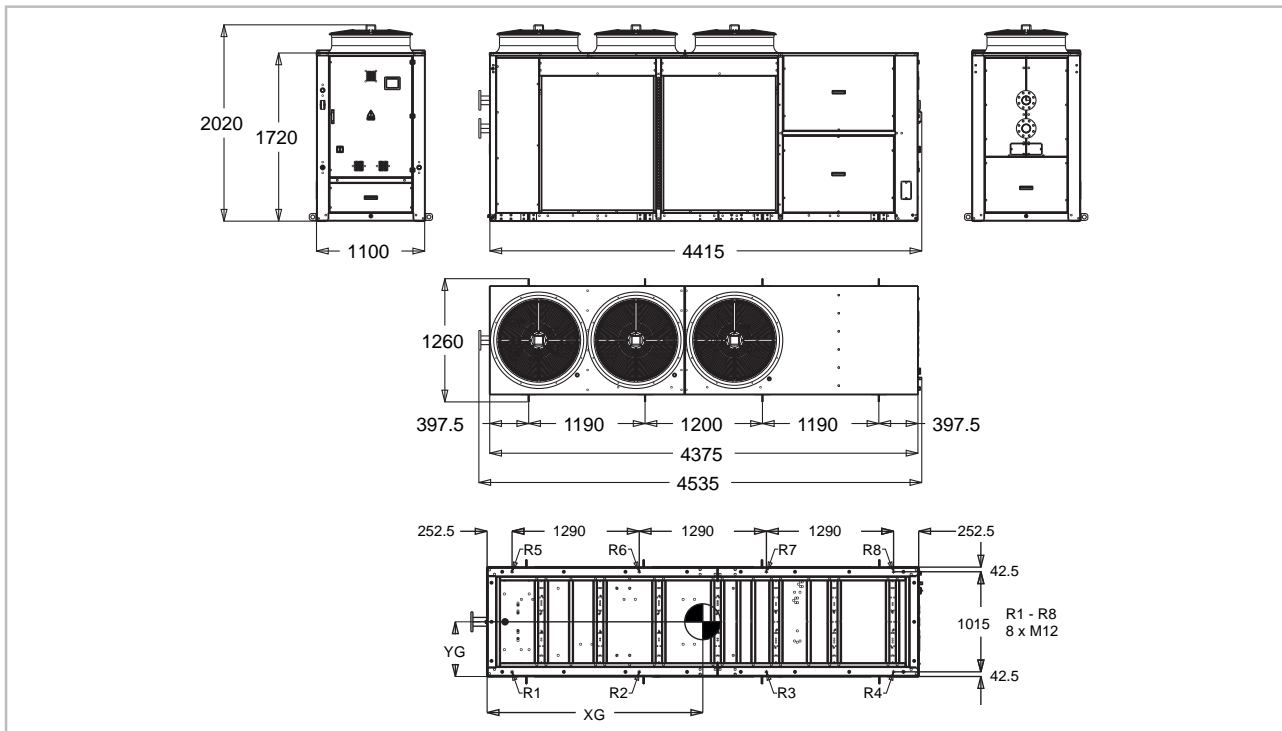


Fig. 9: Dimensions of KWP 1700-2460 Eco without storage tank (all measurements in mm)

## KWP 1700-2460 Eco with storage tank

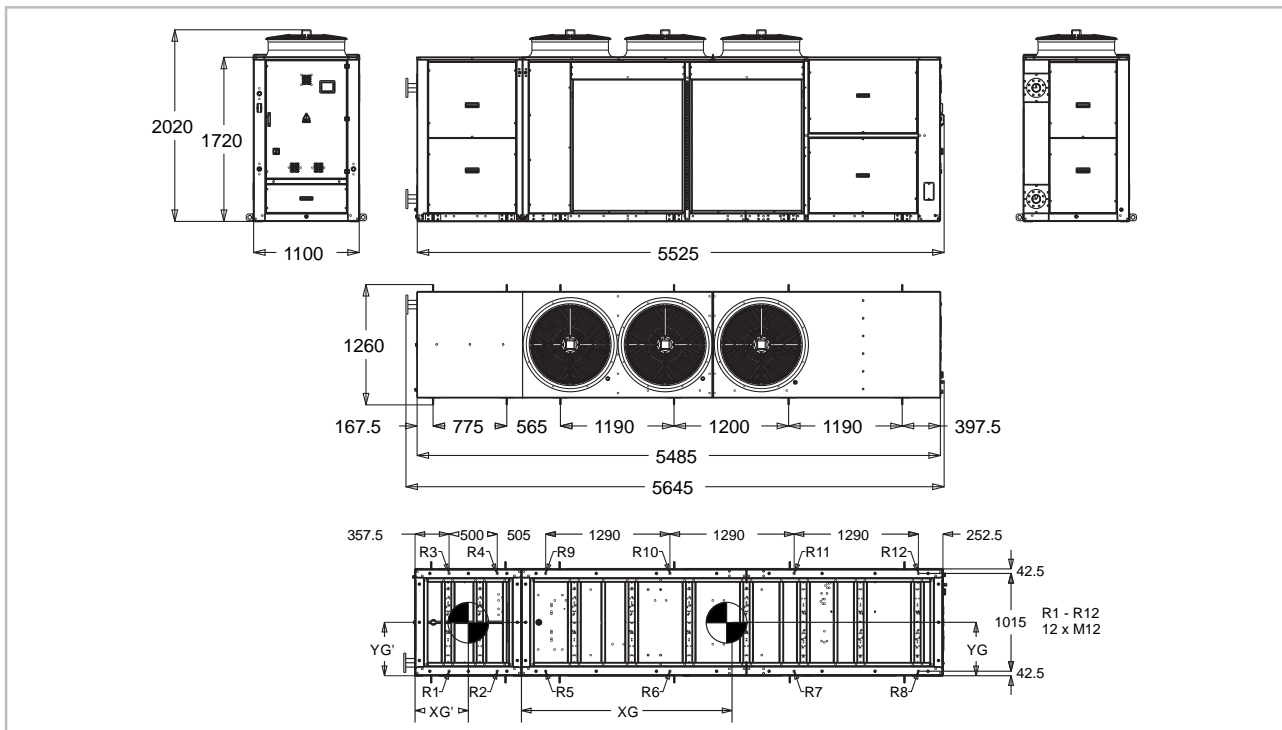


Fig. 10: Dimensions of KWP 1700-2460 Eco with storage tank (all measurements in mm)

We reserve the right to modify the dimensions and design as part of the ongoing technical development process.

## 3 Design and function

### 3.1 Unit description

The KWP Eco series units are air-cooled chillers for outdoor installation. The cooling circuit built into the unit extracts heat from the circulating water (or water-glycol mixture) and then releases it into the ambient air outdoors.

The hermetically sealed refrigeration circuit consists primarily of the main components compressor, condenser, expansion valve and evaporator. The evaporator is designed as a plate heat exchanger and contains the refrigerant, which absorbs heat from the water (or water-glycol mixture) at this point through evaporation. This operates in a counterflow process. The compressor compresses the cool, gaseous refrigerant and thus brings it to a high temperature and pressure level. The condenser is designed as a finned heat exchanger and releases the heat previously absorbed in the evaporator to the ambient air. This is achieved by liquefying the refrigerant and removing the heat by means of fans installed in the unit. The refrigerant is then expanded again in the electronic expansion valve so that it is available again at low pressure and low temperature for the evaporation process.

The hydraulic circuit can be configured as required for each application. In the case of units without hydraulic components, neither a medium storage tank nor a circulation pump are installed in the unit and must be provided by the customer. On units with storage tank and pump, these are already built into the unit. Depending on the application, the circulation pump can also be selected in different pressure levels, so that almost every possible pipe network can be supplied accordingly.

The integrated 4-way changeover valve allows the refrigerant circuit to be reversed, which means that the unit can also be operated in heating mode.

# REMKO KWP Eco series

## 3.2 Necessary system components



Fig. 11: Necessary system components

- |                                 |                               |
|---------------------------------|-------------------------------|
| 1: Expansion pipe coupling      | 6: Pressure gauge             |
| 2: Safety valve                 | 7: Bleeder                    |
| 3: Shut-off valve               | 8: Diaphragm expansion vessel |
| 4: Valve for hydronic balancing | 9: Dirt trap                  |
| 5: Fill and drain device        |                               |



*The system layout shown above shows the recommended pipework components to be provided by the customer. The detailed planning, layout and design of all components as well as the complete hydraulic system is the responsibility of the specialist company carrying out the work.*

The value of 4 litres per kW of cooling capacity can be used as a guide value for approximate storage tank dimensioning. However, this value should only be seen as a guide value for a classic comfort air-conditioning system.



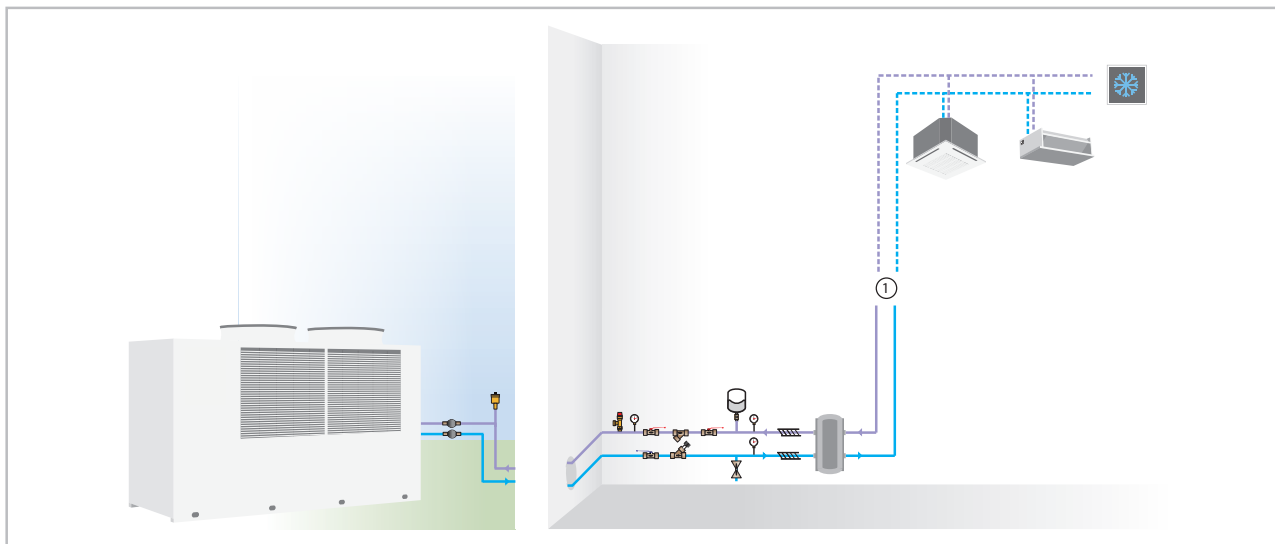
*Malfunctions can result if the flow rate drops below the minimum medium volume.*

### Minimum medium volume, per unit

In order to avoid the cyclic operation of the chiller as well as unnecessary system temperature fluctuations, a certain medium volume is required on the primary side. The cooling capacity of the unit, the amount of the permissible system temperature fluctuation, the number of compressors and the type of medium used are the decisive factors for the dimensioning of the storage volume.

### 3.3 Hydraulic unit construction

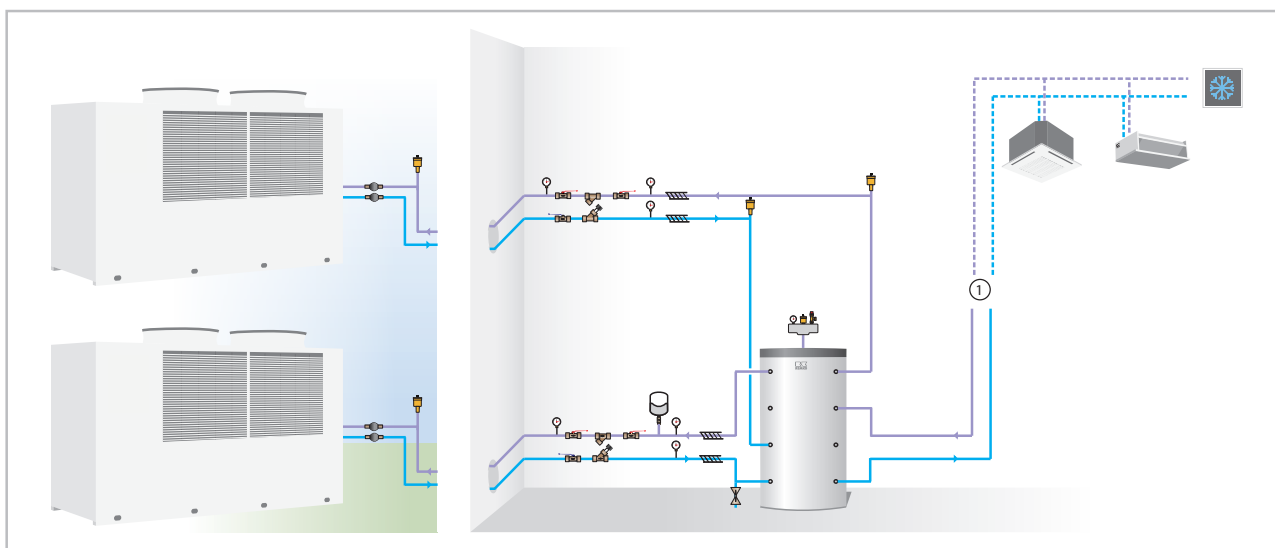
The hydraulic diagrams sketched below serve as a planning aid and to illustrate a possible system layout. All the components shown outside the chiller and the hydraulics to be provided by the customer must be planned and designed by the planner or the specialist company carrying out the work.



1: Hydraulics provided by the customer

#### Configuration:

Chiller with plate heat exchanger for hydraulic separation of primary and secondary circuits. Use of glycol-water mixture on primary side and water on secondary side possible. Secondary circuit pump required. Note the minimum medium volume on the primary side.



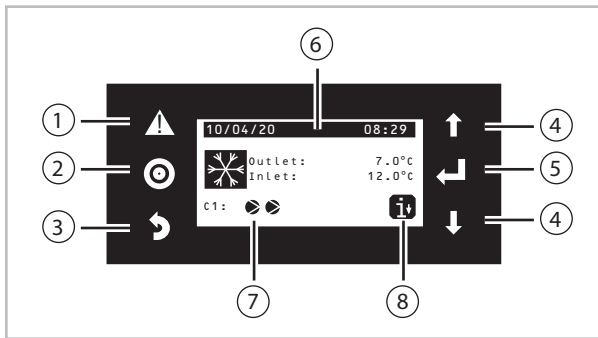
1: Hydraulics provided by the customer

#### Configuration:

2 chillers in redundant unit operation with a common storage tank as hydraulic compensator. Use of glycol-water mix in complete system. Storage tank dimensioning based on the cooling capacity of the units.

# REMKO KWP Eco series

## 4 Operation of the controller



### Explanation of the keys

#### ① “Alarm” key

By pressing this key, a current malfunction can be selected. Pressing the key again acknowledges that a malfunction has been rectified. The error memory can be called up by subsequently pressing the “Enter” key.

#### ② “Main menu” key

This key takes you to the main menu in which the 8 submenus are located. To navigate, press the arrow keys and the “Enter” key to select a submenu.

#### ③ “Back” key

Press this key to cancel an entry or to return to the previous menu.

#### ④ “Arrow up / down” key

Use the arrow keys to navigate within the menus and set the parameter values

#### ⑤ “Enter” key

The “Enter” key can be used to select a parameter or setpoint or to confirm the setting of a setpoint.

### Meanings of the displays

#### ⑥ Time and date display

The current time and date are displayed here. Under the “C. Clock / Scheduler” submenu, the time and date can be adjusted manually.

#### ⑦ “Compressor” display

When this symbol appears, the compressor is activated and in operation.

#### ⑧ “Information” display

Enables access to information level in order to call up further sensor values and operating conditions.

#### “Outlet” display

Displays the medium temperature measured at the return flow.

#### “Inlet” display

Displays the medium temperature measured at the inlet.

### Main menu

Access to the main menu is possible by pressing the “Main menu” key. The main menu provides access to the 8 submenus. To navigate, press the arrow keys and then the “Enter” key to select a submenu.

#### A. On / Off Unit

The operating status can be selected here. OFF, Auto, Energy Save and ON are available.

#### B. Setpoint

In the “Setpoint” submenu, the return flow temperature can be set in nominal mode and in Energy save mode.

#### C. Clock / Scheduler

In this menu it is possible to set the time and date. In addition, a time program can be stored in which it can be determined when the system is to be On, Off or operated in Energy Save mode.

#### D. Input / Output

Under “Input / Output” current probe values and information about the current operating status of various components can be read.

#### E. Data Logger

This is the error memory of the system, in which up to 50 malfunctions can be stored. If all 50 spaces are occupied, the oldest malfunction alarm is deleted and overwritten.

#### F. Board switch

This menu allows the addressing of the system for a building management system.

#### G. Service

In this menu you can configure the settings on the system. Access is password protected. If you have any questions, please contact our service department.

#### H. Manufacturer

This menu level is only accessible to the manufacturer. If you have any questions, please contact our service department.

## Operating states

The unit has four adjustable operating states:

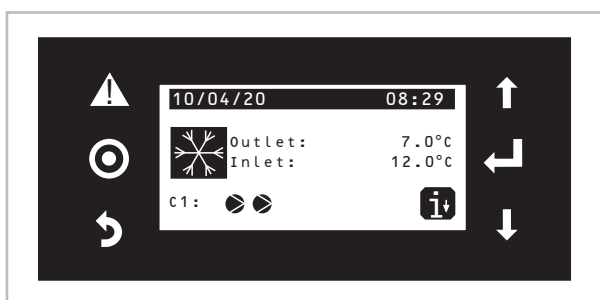
**Off:** The unit is in standby mode. The safety equipment is still active.

**Auto:** Automatic switching between heating and cooling. This operating state is intended for units with heat pump function.

**Energy Save:** In the Energy Save operating state, the system runs the stored Energy Save setpoints and time program.

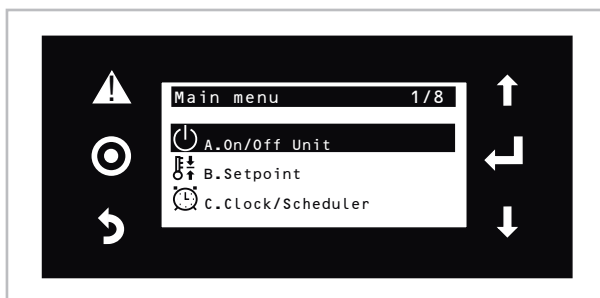
**On:** The unit is activated and complies with the normal setpoints.

The desired operating status can be set as follows:



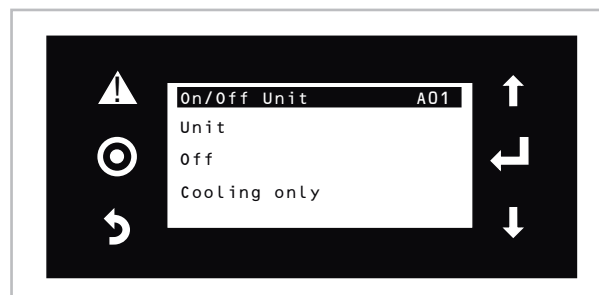
To enter the main menu, press the “Menu” key on the start screen.

1 x 



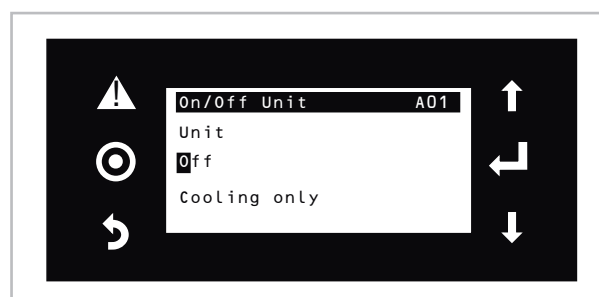
In the main menu, use the arrow keys to select the “A. On / Off Unit” submenu and confirm with the “Enter” key

1 x 



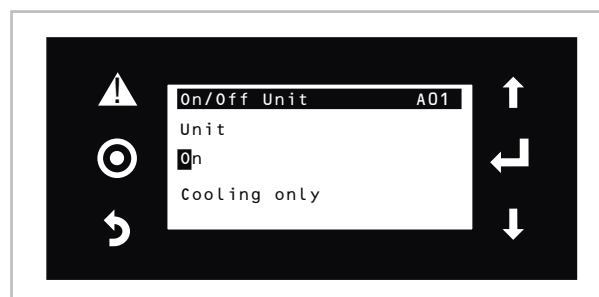
In the “On / Off Unit” window, press the “Enter” key.

1 x 



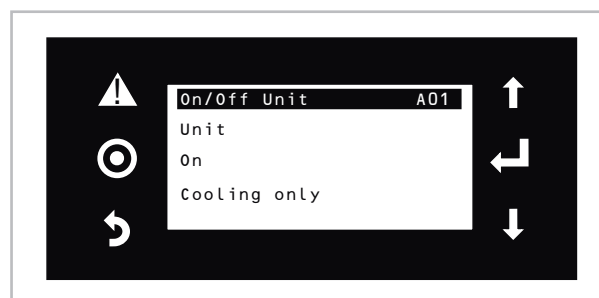
The value can now be changed using the two arrow keys.

 / 



Press the “Enter” key to confirm your selection.

1 x 



The setting is now made and saved.

# REMKO KWP Eco series

## Setpoint return temperature sensor

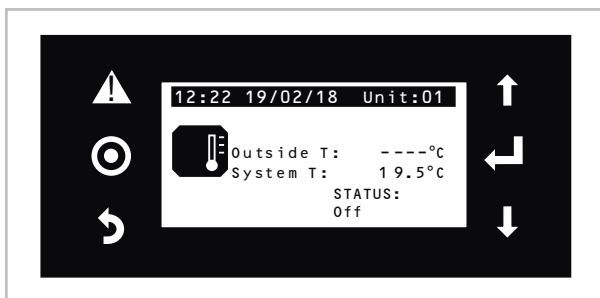
Two different values can be set for the return flow temperature:

**Nominal setpoint:** The setpoint for normal operation

**Energy Save setpoint:** The setpoint for the energy-saving mode

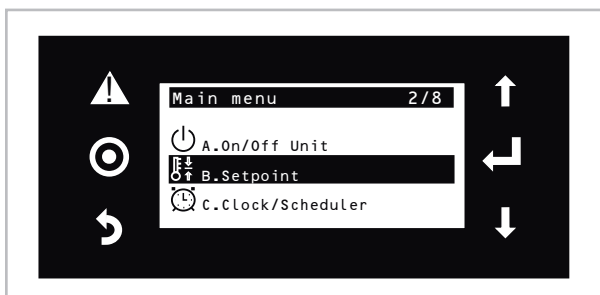
The respective “heating” setting is intended for units with heat pump function.

The setpoints can be set as follows:



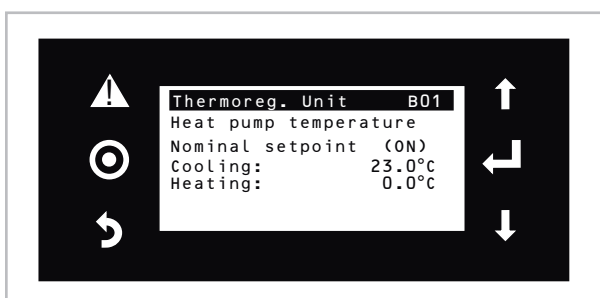
To enter the main menu, press the “Menu” key on the start screen.

1 x



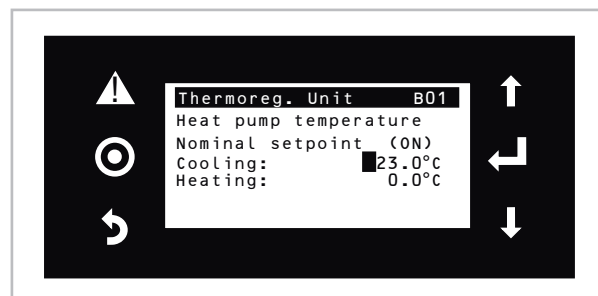
In the main menu, use the arrow keys to select the “B. Setpoint” submenu and confirm with the “Enter” key

1 x



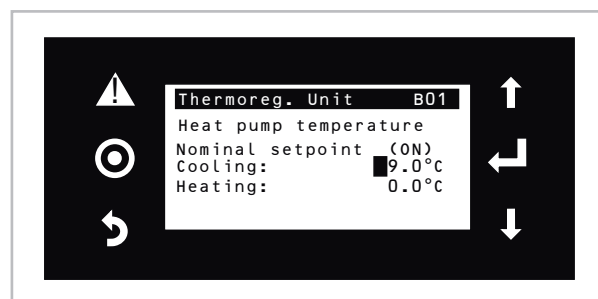
In the “Thermoreg. Unit” field, use the arrow keys to select the window for the setpoint in nominal or energy-saving mode and press the “Enter” key.

1 x



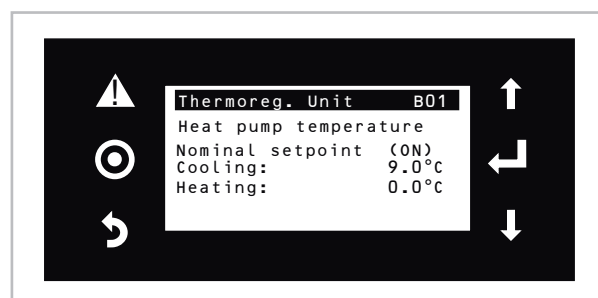
The value can now be changed using the two arrow keys.

/



Press the “Enter” key to confirm your selection.

1 x



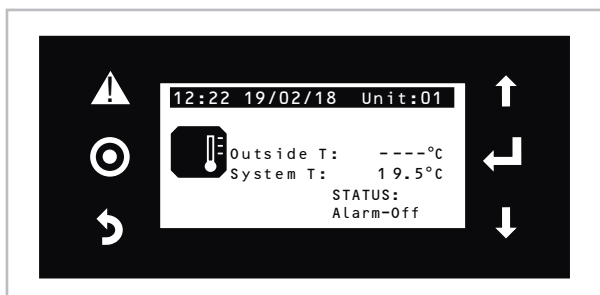
The setting is now made and saved.

## Display and acknowledge malfunctions

In order to protect the unit from damage, the controller checks the components that are relevant for the safety of the unit by means of sensors for temperature, pressure, configuration, etc.

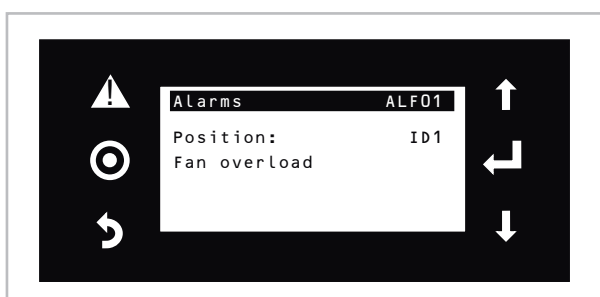
An error code and a brief description of the malfunction are displayed in the error view of the controller. A rectified error can be acknowledged in the error view:





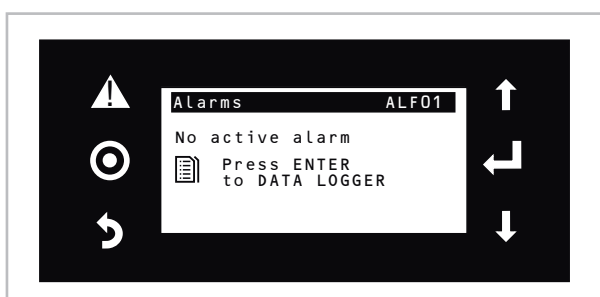
To enter the error view, press the “Alarm” key on the start screen.

1 x 



An active malfunction is now displayed in the alarm menu. After eliminating the cause of the error, acknowledge the malfunction by pressing the “Alarm” key twice.

2 x 



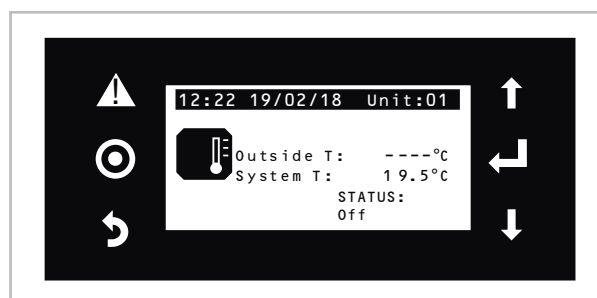
The malfunction is now acknowledged. The last 50 malfunctions can be found in the error memory for subsequent review.

### Error memory

In the event of a malfunction, the error memory of the controller collects and stores the most important data such as time of the malfunction, designation and error code of the malfunction, and measured values of the sensors. This means that information on past malfunctions can also be retrieved at a later point in time.

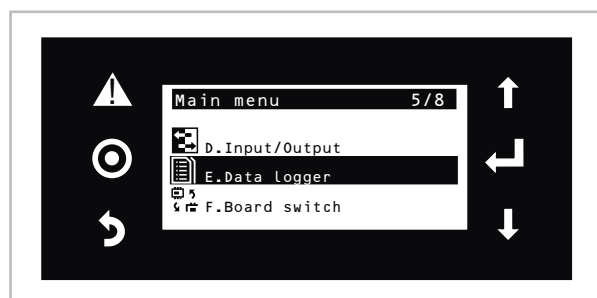
The controller stores up to 50 malfunctions. If all 50 spaces are occupied, the oldest malfunction alarm is deleted and overwritten.

The error memory can be called up as follows:



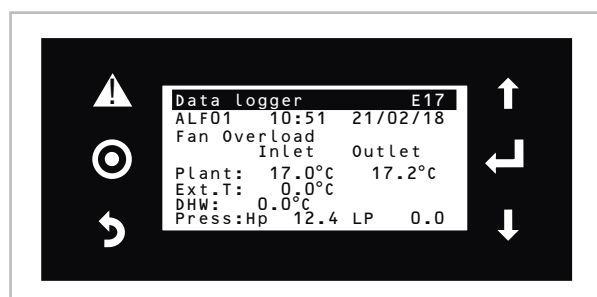
To enter the main menu, press the “Menu” key on the start screen.

1 x 



In the main menu, use the arrow keys to select the “E. Data Logger” submenu and confirm with the “Enter” key

1 x 



Use the arrow keys to navigate in the error memory.

# REMKO KWP Eco series

## 5 Installation instructions for qualified personnel

### Important notes prior to installation

- Observe the operating manuals for the indoor unit and the chiller or heating system when installing the entire system.
- The indoor units and chillers work independently. A connecting line between the two is not necessary.
- Transport the unit in its original packaging as close as possible to the installation location. You avoid transport damage by doing so.
- The units may only be moved as installed (upright) using appropriate transport gear. Secure against tipping!
- The unit must be kept upright when transporting to a higher elevation.

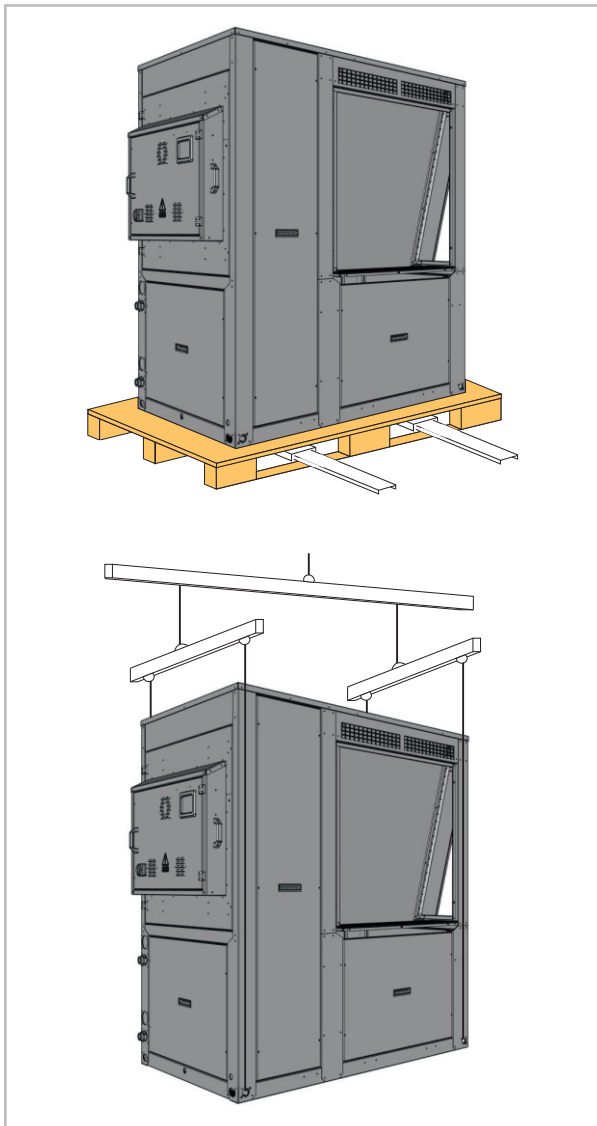


Fig. 12: Unit transport

- Check the contents of the packaging for completeness and check the unit for visible transport damage. Report any damage immediately to your contractual partner and the shipping company.
- Select an installation location which allows air to freely flow through the air inlet and outlet (see section "Minimum clearances").
- Do not install the unit in the immediate vicinity of devices which generate intensive thermal radiation. Installation in the vicinity of thermal radiation reduces the unit output.
- Lift the unit only at intended lifting points. Never place the medium or refrigerant piping under load.
- The medium connection lines, valves and connections must have vapour density insulation. If necessary, also insulate the condensate drainage line. In dual systems with cooling and heating modes, the requirements of the current energy savings ordinance (EnEV) are to be complied with.
- Seal off open lines to prevent dirt getting in and never kink or crimp the lines.
- Install all electrical wiring in accordance with applicable DIN and VDE standards.
- Ensure the electrical cables are properly connected to the terminals. Otherwise there is a risk of fire.
- Comply with all regulations governing structural and building requirements and conditions with regard to the installation site.
- In the selection of the installation site, pay attention to the site itself and to any possible acoustic reflection from surrounding units.
- To avoid the transmission of vibrations to the installation site, the units must be installed on vibration absorbing material or on vibration decoupled foundations. In doing so, make sure that the lines are also vibration decoupled.
- If the installation site must fulfil special sound emission requirements, these must be realised on-site when appropriate adjustments can be made. In these cases, please consult an appropriate acoustics expert.

### Wall openings

- We recommend that the inside of the opening be padded or lined for example with a PVC pipe to prevent damage to the lines.
- After installation, the wall opening should be closed off by the customer with a suitable sealant. Do not use substances containing lime or cement!

## Selecting the installation location

The unit is designed for horizontal installation on a base in outdoor areas. The installation site must be level, flat and firm. The unit should also be secured to prevent it from tipping over. The unit can be installed outside as well as inside a building. For external installation, please observe the following instructions to protect the unit from the influence of the weather.

### Rain

The unit should be at least 10 cm off the ground when mounted on the roof or ground. A floor bracket is available as an accessory.

Increasing the installation height will also increase the heating capacity generated by the heating / cooling unit (only HP function).

### Sun

The finned condenser gives off heat in cooling mode.

Exposure to sunlight further increases the temperature of the fins and reduces the heat released by the finned heat exchanger.

The unit should, whenever possible, be installed on the north side of the building.

If necessary, take measures to provide sufficient shade (responsibility of customer).

This could take the form of a small roof.

However, the discharging warm air flow must not be affected by the measures

### Wind

If the unit is being installed in windy areas, ensure that the warm outlet air is discharged in the prevailing wind direction. If this is not possible, it may be necessary to install a windbreak (to be provided by the customer).

Ensure that the windbreak does not adversely affect the air intake to the unit.

### Snow

The unit should be wall-mounted in areas of heavy snowfall. Installation should be at least 20 cm above the expected level of snow to prevent snow from entering the outdoor unit.

## Minimum clearances

The following illustrations indicate the minimum clearances for trouble-free operation of the equipment.

The protective zones serve to provide unhindered air intake and outlet, as well as providing sufficient room for performing maintenance and repairs and preventing the unit from being damaged.

An infringement of the minimum clearances can result in unit operation being impaired.

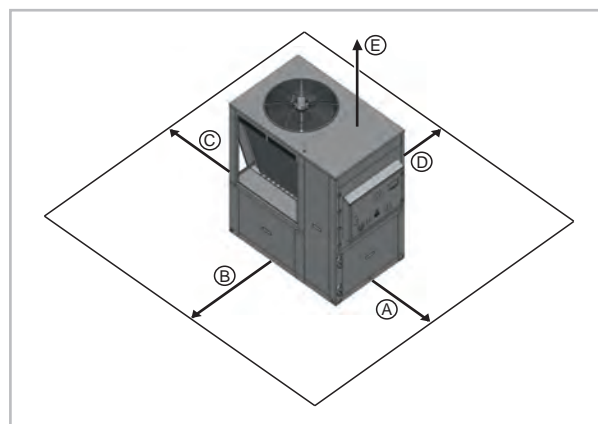


Fig. 13: Minimum clearances

### Minimum clearances (all measurements in mm)

	KWP 460-2460 Eco
A	1500
B	1500
C	1500
D	1500
E	2500

# REMKO KWP Eco series

## Set-up

The hermetically closed system of the refrigeration circuit contains a flammable refrigerant of safety class A2L.



### Warning of inflammable substances!

When installing the unit, the local safety regulations must be checked and observed by the specialist company carrying out the work. If necessary, additional safety precautions must be taken in accordance with the applicable regulations (e.g. DIN EN 378).

## 6 Installation

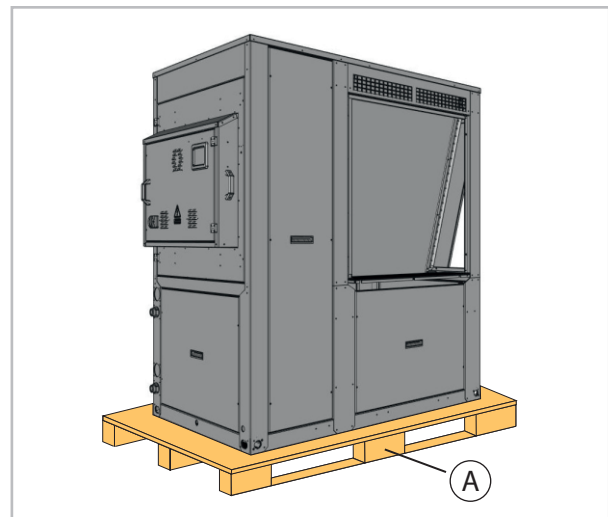
### Unit installation

Perform the unit installation as follows:

1. ➤ Install the vibration dampers (accessories) under the unit / medium storage tank (accessories).
2. ➤ Attach the unit to the building where structurally permitted.
3. ➤ Ensure that structure-borne sound is not transferred to parts of the building.
4. ➤ Connect the medium piping.

### Disassembly of the transport pallets

The units are supplied with transport pallets for the purpose of transportation. Remove these before installation.



A: Transport pallet

### Mounting the vibration dampers

The chillers are equipped with threaded inserts on the underside of the unit to enable vibration dampers to be screwed in. The exact positions (R1-R12) of the mounting points can be found in the drawings in the "Dimensions" chapter. Further information on the installation can be found in the installation instructions for the vibration dampers.

## Connection of the medium piping

- For servicing purposes, connections must be equipped with shut-off valves.
- Additional automatic bleed valves are to be provided in the supply and return flow at the installation's highest point.
- The medium piping may not exert any structural load on the unit.
- The line connections may not generate any thermal or mechanical stresses on the unit.
- If the unit is at first to be operated with only a part of the entire system, the medium flow rate for the missing system components is to be simulated using a hydronic balancing valve.
- The pipe sizing is to be designed so that the required minimum flow volume is not undercut.
- A valve for hydronic balancing must be provided by the customer to adjust the medium flow rate to the nominal flow rate.



*A permanently large medium flow rate must be ensured to realise the minimum flow volume.*

## Minimum / maximum flow volume

The circulation pump of the chiller generates a constant medium flow rate; the result is a loss of pressure in the system and in the chiller.

The flow switch in the chiller monitors the medium flow rate and switches the unit off if the flow rate drops below the minimum medium flow rate.

The medium flow rate limit may likewise not be exceeded (maximum flow volume).

A 3-way valve with bypass and a hydraulic compensator to establish a primary and secondary circuit or a volume-dependent bypass are necessary to ensure a constant medium flow rate.

### ! NOTICE!

The product and safety data sheets of the glycol type used must be observed during use and disposal.

### ! NOTICE!

Use the required type and mix ratio appropriate for the application area to ensure the freezing point.

## Medium piping

Medium piping can be made of copper, steel or plastic. To minimise pressure losses, only streamlined fittings should be used.

When designing the layout, the large medium flow rates in cold water systems, high pressure losses in connection with water-glycol mixtures and the chiller's minimum flow volume must be taken into account.

The lines are to be insulated against vapour diffusion and, if necessary, the current German energy-saving ordinance (EnEV) must be observed. UV resistance must be realised outdoors.

To avoid flow noise during operation of the unit, the medium piping must be dimensioned such that a flow velocity of 2 m/s is not exceeded.

## Pressure and temperature displays

The pressure and temperature displays to be installed on-site at the intake and outlet serve to set the medium flow rate. The display should be able to be shut off.

Temperature probes are located in the chiller's medium inlet and outlet. Probe values can be queried via the controller.

## Valves for hydronic balancing

The calculated individual pressure losses in the pipeline network layout for each individual unit are adjusted to the entire system with hydronic balancing valves to be provided by the customer.

This is necessary for setting the medium flow rate to its nominal value and thus ensures both the operation of the circulation pump on its characteristic curve and the transfer of the corresponding cooling capacity with a spread of 5 Kelvin.

## Anti-freeze protection (accessories)

A water glycol mix is generally used as the medium for a cold water system. Depending on the use to which the glycol type and quantity is put, the viscosity changes, the loss in pressure increases and the unit's cooling or heating capacity reduces. All system components must be approved for use with glycol.

As a rule, the addition to the water of ethylene glycol, in a proportion of 34%, with inhibitors for corrosion protection is recommended. This concentration ensures anti-freeze protection to -20 °C; at lower temperatures, an ice porridge forms which has no explosive effect.

# REMKO KWP Eco series

The toxicologically harmless propylene glycol should be used if there is a risk that the medium can come into contact with drinking water or food stuffs. To inhibit the explosive effects, a proportion of 38% is necessary as a rule.

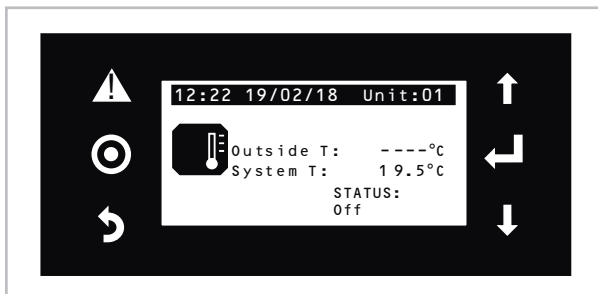
Glycol content	Frost protection +2 °C	Correction factors when using a mixture of glycol *) and water				
		Cooling capacity	Compressor capacity		Volume flow	Pressure loss
			Cooling	Heating		
Vol. %	° C	K <sub>L</sub>	K <sub>P</sub> cooling	K <sub>P</sub> heating	K <sub>V</sub>	K <sub>D</sub>
0	0	1	1	1.012	1	1
20	-9	0.981	0.988	1.012	1.040	1.19
35	-21	0.971	0.982	1.018	1.090	1.35
40	-26	0.968	0.981	1.019	1.105	1.51

\*) We recommend using an ethylene glycol mixture. Observe the safety and product data sheets for the type of glycol used.

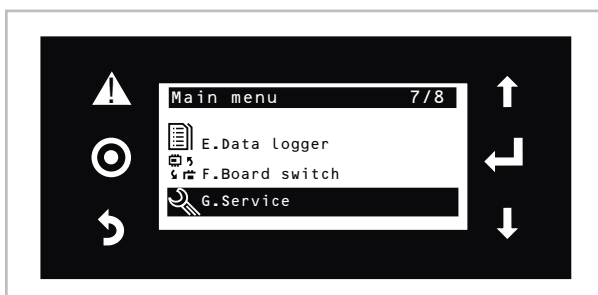
## Configuration anti-freeze protection parameters

It can be necessary to reconfigure the anti-freeze protection parameters when using a water-glycol mixture. Adjustment is only possible after password input. For this purpose, please contact REMKO.

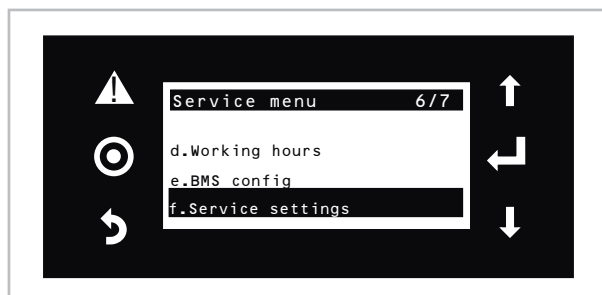
Perform the configuration as follows:



Call up the main menu.



Select the "Service" menu.

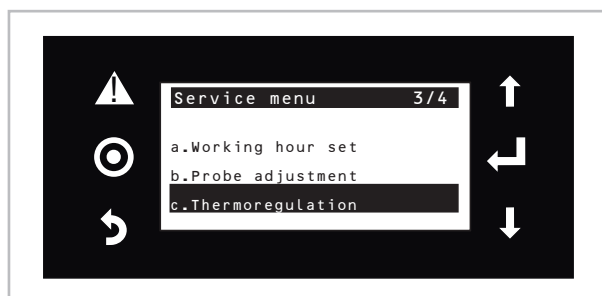


Select the submenu "f. Service setting".

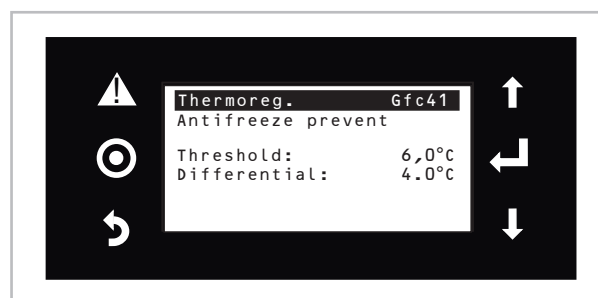


## Password entry

Enter the 4-digit password.



Open the window "c. Thermal regulation".



Set the frost protection alarm value.



Set the value for the alarm difference. If the difference is exceeded, the alarm is reset.



This completes the configuration.

### Diaphragm expansion vessel (MAG)

To avoid pressure fluctuations during standstill because of temperature changes, diaphragm expansion vessels filled with nitrogen (moisture neutral) must be integrated in the system.

The preliminary pressure must be set on the system; an increase in volume or, in the event of the realisation of a cooling-heating system, the installation of another diaphragm expansion vessel may be necessary.

If there is already a diaphragm expansion vessel in the unit, this is only designed for the medium volume of the unit itself. An additional diaphragm expansion vessel is always required for the hydraulic system provided by the customer.

### Fill and drain connection

A connection should be provided in an area safe from frost for the draining of pipe lines (especially if water is used as a medium). Applicable local disposal ordinances must be observed if glycol is used.

# REMKO KWP Eco series

## Dirt trap

A rinsable dirt trap must be installed upstream from the unit intake. Shut-off valves should be installed upstream and downstream of the dirt trap in order to be able to isolate this during maintenance and cleaning work. The mesh width of the sieve insert shall not exceed 0.6 mm.

### ! NOTICE!

Improperly installed or missing dirt traps can cause fouling of the plate heat exchanger.

### ! NOTICE!

The installation of a dirt trap in the unit's return is necessary for the safety of the unit. If the technical assistance commissioning of the chiller is to be carried out by REMKO GmbH & Co. KG or their partner company, the prior installation of a dirt trap is essential.

## Shut-off valves

As a rule, in cold water systems, shut-off valves with full admission should be used. For the purpose of servicing, medium inlet and medium outlet must be equipped with shut-off valves (if necessary safety valves).

## Air bleeding valves

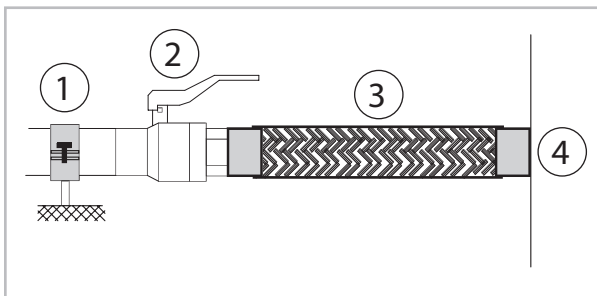
The unit has manual air bleeding valves. The unit can be bled separately after the system has been filled. Automatic bleeding valves must also be installed at the highest point in the collector line.

### ! NOTICE!

Glycol tolerant air bleeding valves are necessary when using media that contain glycol.

## Compensators

Compensators are used to connect lines to the unit to prevent vibration in the chiller from transmitting to other system components.



- 1: Static fastening
- 2: Shut-off valve
- 3: Compensator
- 4: Connection KWP

## Safety valves

Safety valves limit excess operating pressure due to excess warming or overfilling of the operating medium. The valve outlet requires unobstructed draining into a drain line. Applicable local disposal ordinances must be observed if glycol is used. The unit's standard equipment includes one safety valve (for unit configuration with pump).



## 7 Condensate drainage connection and safe drainage

### Condensate drainage connection

If the temperature falls below the dew point, condensation may form on individual components and can be collected and drained off.

Taking the water resources act into account, it is necessary to check locally whether a condensate tray with oil separator is to be installed under the unit. This may need to be provided by the customer.

- The condensate drainage line should have an incline of min. 2% and is the responsibility of the customer. If necessary, fit vapour-diffusion-proof insulation.
- When operating the unit at outside temperatures below 4 °C, ensure the condensate drainage line is laid to protect it against frost. The lower part of the housing and condensate tray is also to be kept frost free in order to ensure permanent draining of the condensate. If necessary, fit a pipe heater.
- Following installation, check that the condensate run off is unobstructed and ensure that the line is durably leak tight.

### Safe drainage in the event of leakages

Local regulations or environmental laws, for example the German Water Resource Act (WHG), can require suitable precautions to protect against uncontrolled drainage in case of leakage to provide for safe disposal of escaping air conditioning fluid or hazardous media.

### Unit connections

The unit has 2 brass connections where the condensate can be collected and drained off.

The connection installed in the right-hand corner is used both to drain off rainwater collected in the unit and to provide a means of draining the operating medium, which can also be drained centrally via this connection if the unit is drained using shut-off valves.

The condensate water arising on the components can be drained off via the central connection.

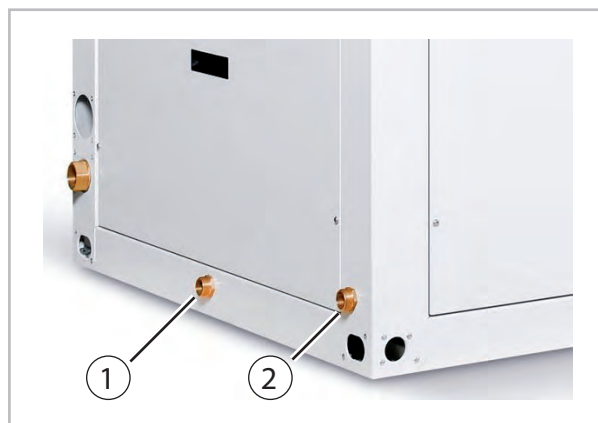


Fig. 14: Unit connections

- 1: Connection for draining off component condensate water
- 2: Connection for draining off rainwater and for draining the unit (storage tank)

# REMKO KWP Eco series

## 8 Electrical wiring

### 8.1 General connection and safety instructions



#### **DANGER!**

All electrical installation work is to be performed by specialist companies. Disconnect the power supply when connecting the electrical terminals.

- The power supply is made at the chiller; a control line to the indoor unit is not necessary.
- An all-pole separating switch, which disconnects individual phase conductors in the event of a malfunction, must be installed in the supply line upstream from the unit.
- Electrical wiring must be carried out as fixed connections in accordance with the applicable regulations!
- Check all terminal points for stability.
- The supply line must be adequately insulated on-site and the voltage drop may not exceed permissible values.
- Make sure that the electrical system is adequate for the operation of the unit and can supply the operating current necessary for other units already installed.
- Determine before installation, when connecting to existing system components, whether the unit's service connection is adequately sized for the unit's rated power consumption.
- The connection of the units must always be carried out with adequately sized, low-resistance earth conductors, and, if necessary, carried out several times (especially with plastic pipes).
- When installing the units on flat roofs, lightning protection measures may be necessary.
- All electrical connections such as network supply, cabled remote control etc. must be carried out in the unit's switch cabinet.
- The lines to be installed are to be fed into the switch cabinet through the cable glands provided.
- An electrician must determine the sizing and selection of the fuses and the cross section of the lines to be installed. Note that starting current max. may be up to 10 times nominal current

Carry out the following electrical connections:

- Connection to the power supply.
- Possible enabling contact for the set mode or standby.
- Possible operating mode contact for cooling or heating mode (units with HP function).
- Possible connection of a winter pressure controller (accessory).
- Possible connection of crankcase heating (accessory).
- Possible connection of cabled remote control (accessory).
- Possible connection of a heater for anti-freeze protection medium (accessory, factory installation only).



*Check all plugged and clamped terminals to verify that they are seated correctly and make permanent contact. Tighten as required.*

## Electrical wiring - cable reel

If the chiller is operated autonomously and without the use of external control components or connection to a building management system, only a power supply for the unit must be provided.

The planning, design and execution of the type of cable/wiring and its cross-section depends on local factors such as the type of installation, ambient temperature, installation arrangement and others. This must be carried out in accordance with the applicable standards and regulations and the locally applicable technical connection conditions ("TAB").

All unit-specific characteristics (power supply, maximum current consumption of the unit) can be found in the "Technical Data" chapter of these operating instructions.

Use	Number of cores	Description	Selection/requirement
Supply	5	L1, L2, L3, N, PE	Customer's layout
External enabling (if required)	2	Closed = enabled	Potential-free
General alarm signal (if required)	2	Closes in the event of an alarm	Potential-free
Modbus	3	+, -, GND	Screened, screen connected at one end

# REMKO KWP Eco series

## 8.2 Unit connection

Proceed as follows to establish the connection:

1. ➤ Open the control box covers by removing the fixing screws and lifting off the covers.
2. ➤ Feed the voltage-free cable through the glands into the switch cabinet. Depending on the selection of the cable cross section, a suitable cable gland must be provided by the customer.
3. ➤ Then connect the cable in accordance with the connection diagram.
4. ➤ Ensure a correct rotating field.
5. ➤ Mount all removed parts.

### External enabling contact Operation/Standby

In addition to being operated with the controller or the cabled remote control, the unit can be switched on and switched off (standby) via an external potential-free contact.

This contact is closed when delivered.

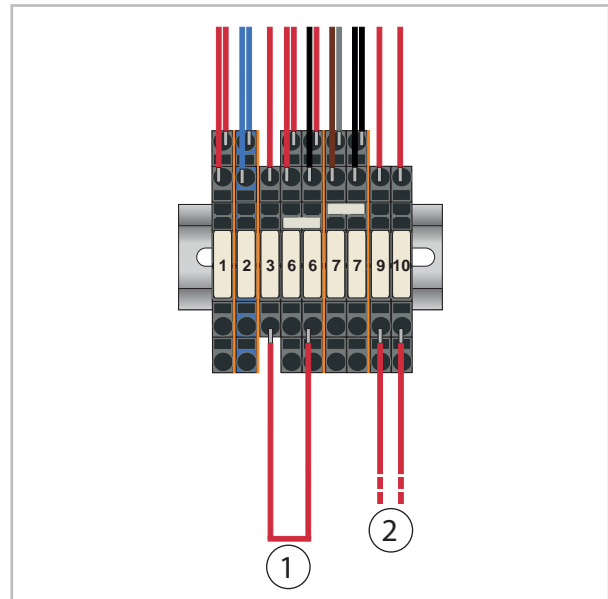
This enable is used for example to realise standstill times at night or for the activation / deactivation of a building control system.

### General alarm signal (standard equipment)

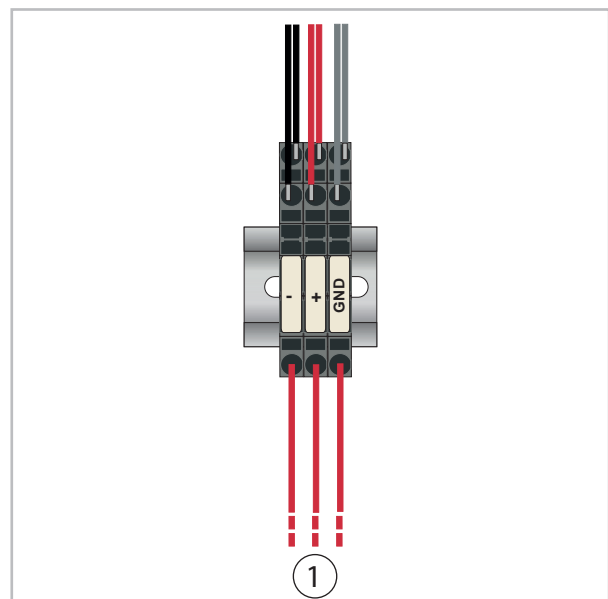
The connection of a potential-free general alarm signal, for example, for signalling or for further processing to a building control system is possible as standard equipment. Use the respective connection diagram for this purpose and pay attention to the maximum contact loads.

### Cabled remote control (accessory)

The cabled remote control is used, for example, for the querying, programming or operation of the unit from a remote location. Use respective installation instructions for this purpose.



- 1: External enabling  
2: General alarm signal



- 1: Modbus connection

## 8.3 Electrical components

### Electrical components and safety equipment

#### Pressure switch cooling cycle HP and LP

There is a high pressure switch (HP) in the hot gas line within the cooling circuit to for switching off the chiller in the event of insufficient heat dissipation. A low pressure switch (LP) in the suction pipe or in the compressor switches off the chiller if the fill level for the refrigerant is too low.

#### Flow switch

The flow switch monitors the medium flow rate and switches the unit off if the flow rate drops below the minimum medium flow rate. This component is therefore largely responsible for the protection of the unit and so its function must not be changed in any way.

#### Condenser fan thermal contacts

The condenser fan's thermal contacts prevent overheating of the motors.

#### Compressor thermal contact

The thermal contact is located within the compressor and limits its hot gas end temperature.

#### Phase sequence relay

The phase sequence relay controls the direction of rotation for the power supply. The controller will not be enabled if the direction of rotation is wrong.

#### Probe medium inlet

The probe is located at the unit's medium inlet (system return flow). It serves to detect the current temperature to regulate the setpoint.

#### Probe medium outlet

The probe is located at the unit's medium outlet (system inlet). It serves to detect the current temperature and check the anti-freeze protection temperature.

## 9 Leak testing

The leak test is carried out after the connection has been made.

1. ➤ Flush the system twice with tap water.
2. ➤ Clean the sieve insert on the dirt trap.
3. ➤ Fill the system with water again and bleed the unit at the manual bleed valves.
4. ➤ Adjust the test pressure to at least 200 kPa (2.0 bar).
5. ➤ Check the connections after a period of at least 24 hours for leaking water. If water is visible, the connection has not been established properly. Tighten the connection or establish a new connection.
6. ➤ After a successful leak test, remove the excess pressure from the medium piping if a water-glycol mixture is used or adjust the non-circulating pressure to the required system pressure.

# REMKO KWP Eco series

## 10 Before commissioning

### Rinsing the system

Due to the factory test run of the chiller, there may still be some residual water in the unit. It is therefore recommended to flush the chiller and the entire system before filling. During this flushing process, a dirt trap must already be present in the system to separate out any contaminants.

### Filling the system

The system is filled at the customer-provided filling and draining connections.

### Anti-freeze protection for the medium

If a water-glycol mixture is used, it is to be pre-mixed before being put in the system. The desired concentration is then to be checked.

### Unit preliminary pressure for the medium

The preliminary pressure of the medium (without operation of the circulation pump) varies within the system. From the highest point, the pressure increases by approx. 10 kPa (0.1 bar) per metre difference in altitude (geodetic altitude). The value measured at the highest point is identified as the non-circulating pressure.

The position of the unit in the system is decisive in the calculation of the unit's preliminary pressure (pressure of the manometer on the unit installed by the customer). The pressure must be set to at least 70 kPa (0.7 bar).

- If the unit is positioned at the **lowest** point in the system, the unit preliminary pressure (=non-circulating pressure+geodetic system altitude) must be set to **at least 70 kPa (0.7 bar) + 10 kPa (0.1 bar) x geodetic system altitude**.
- If the unit is positioned at the **highest** point in the system, the unit preliminary pressure (=non-circulating pressure) must be set to **at least 70 kPa (0.7 bar)**. Please note that the system pressure at the lowest point is **increased** by the geodetic system altitude! (See Fig. 15)

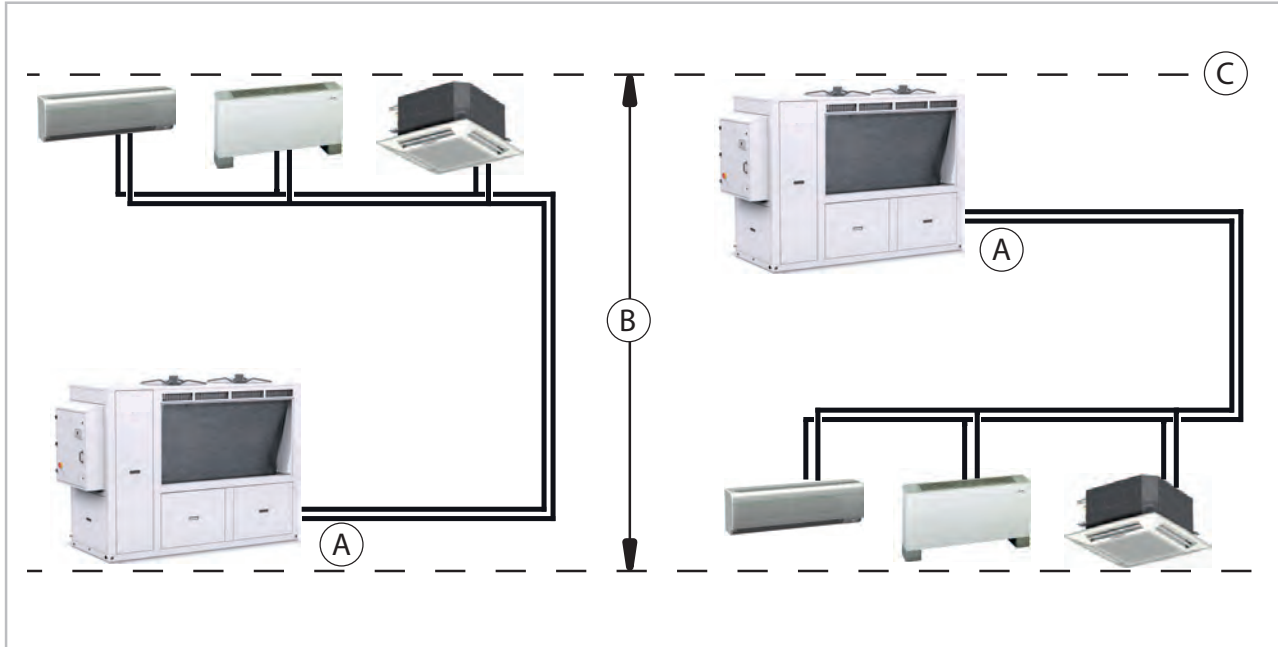


Fig. 15: Unit preliminary pressure

A: Unit preliminary pressure  
B: Geodetic system altitude

C: Non-circulating pressure

### Bleeding the system

- Air may still be in the pipe lines after the leak testing. This is carried during operation of the circulation pump to the automatic bleeding valves or to the cold water drain. In this case it is necessary to bleed the system again.
- Also bleed the pump if necessary.
- The non-circulating pressure must then be adjusted to the required system pressure.

#### **! NOTICE!**

During manual bleeding, any glycol mixtures which escape must be disposed of separately. Do not feed them into the condensate tray!

### Diaphragm expansion vessel

- The preliminary pressure for the diaphragm expansion vessel must be adjusted individually to the system layout, the volume of the medium and the installation site.
- If necessary, change the installation site. For this, the manufacturer's authorisation is required.

### Valves for hydronic balancing

- The calculated excess pressure in the pipe network layout at the individual cold water outlets must be adjusted with the hydronic balancing valves.

### Safety valve

- The safety valves and their correct function must be checked.
- The drain line for the valves is to be checked for function and leak tightness.
- If necessary, change the installation site. For this, the manufacturer's authorisation is required.

### Additional checks

#### General checks

- Checking that minimum clearances are correct.
- Checking the possibility of transferring cooling and heating capacity via the cold or hot water consumer (indoor unit).

### Electrical checks

- Checking electrical connections for correct phase sequencing.
- Function check of the cooling mode / heating mode enable (option).
- Function check of the enable Operation / Standby (option).

### Checking the medium cycle

- Checking the circulation pump for freedom of movement.
- Checking whether all valves are open.
- Checking the medium cycle.
- Setting the circulation pump's nominal flow rate.

### Checking the cooling circuit

- Checking the cooling circuit for adequate oil / refrigerant.
- Checking the cooling circuit for leak tightness.
- Checking the medium cycle.
- Setting the circulation pump's nominal flow rate.



*The units are equipped with a phase sequence relay which prevents the operation of the controller if the direction of rotation of the electric power supply is wrong. The rotary field must be replaced if the controller is not activated during commissioning of the unit.*

# REMKO KWP Eco series

## 11 Commissioning

### ! NOTICE!

Commissioning should only be performed by specially trained personnel and documented after the certificate has been issued.

### ! NOTICE!

Observe the manuals for the unit and all other components when commissioning the entire system.



*The delivery of the unit from the factory takes place with standard parameterisation of the output control. If necessary during commissioning a system-specific parameterisation must be carried out by authorised personnel.*

### Function test for cooling operating mode

1. ➤ Switch the power supply on.
2. ➤ Open all shut-off valves if necessary.
3. ➤ Switch on the chiller and the corresponding circulation pump. The outlet temperature must be between 0 °C and +18 °C.
4. ➤ Switch the unit on and select the cooling operating mode. If the return temperature is warmer than the setting, the compressor display will flash and the compressor will begin to work after a short time.
5. ➤ Please note that the inlet temperature at the nominal flow rate of the medium lies approx. 5 K below the return temperature.  
  
If the spread between medium inlet and medium outlet is too large or too small, the medium flow rate must be checked and adjusted by means of settings on the hydronic balancing valve(s).  
  
- The circulation pump starts and the controller checks the medium flow rate via the flow switch. If the volume is insufficient, a fault shut-off will be carried out and the cooling cycle will not be enabled.
6. ➤ Measure and record all the required values in the commissioning report and check the safety functions.
7. ➤ Check the unit control system using the functions described in the "Operation" chapter.

### Final tasks

- Mount all removed parts.
- Familiarise the operator with the system.



## 12 Shutdown

### Temporary shutdown

1. ➤ Shut down the indoor units using the remote control.
2. ➤ Switch the unit off via the internal controller in the chiller (or using the remote control).
3. ➤ Check the percentage concentration of glycol.
4. ➤ Check the unit for visible signs of damage and clean it as described in the “Care and maintenance” chapter.
5. ➤ As much as possible, cover the unit with a plastic foil to protect it against the weather.

### ! NOTICE!

If only water and not a mixture of water and glycol is used, in regions subject to freezing, water must be drained from components when these are at standstill. The drained water volume must be replaced when components are put back into operation!

### Permanent shutdown

Ensure that units and components are disposed of in accordance with local regulations, e.g. through authorised disposal and recycling specialists or at collection points.

REMKO GmbH & Co. KG or your contractual partner will be pleased to provide a list of certified firms in your area.

# REMKO KWP Eco series

## 13 Troubleshooting and customer service

The unit and components are manufactured using state-of-the-art production methods and tested several times to verify that they function correctly. However, if malfunctions should occur, please check the functions as detailed in the list below. For systems with an indoor unit and outdoor unit, refer to the chapter "Troubleshooting and customer service" in both operating manuals. Please inform your dealer if the unit is still not working correctly after all function checks have been performed!

### Operational malfunctions

Malfunction	Possible causes	Checks	Remedial measures
The unit does not start	Display is not illuminated.	No power supply, power failure, device fuse / main switch switched off / defective	Check the power connections on the general supply terminals and the voltage values. Check the unit fuse, the main switch and the fuses on the secondary side of the additional transformer.
	The display lights up and shows "Phase sequence error".	Incorrect phase sequence. The phase sequence relay did not issue an enable signal.	Swap the phase conductors of the power supply on the terminal block on the control panel.
	Display shows status: "Off".	The unit is deactivated. Change the operating status in the "A. On / Off Unit" submenu	
	The controller emits an acoustic signal.	One or more protective devices have tripped. A malfunction is present.	Check error messages, rectify the malfunction, acknowledge the malfunction (see chapter "Error indication").
	The compressor icon is displayed, but the unit does not start.	Compressor or compressor contactor defective.	Have specialist replace contactor or compressor.
The unit works at reduced cooling capacity	Thermal load too high.	Thermal load was increased.	If possible, reduce the thermal load.
	Inlet temperature too high.	Return flow temperature set too high.	Reduce return temperature.
	Air in the medium cycle.	Medium cycle not bled, no automatic bleeding valves installed.	Manually bleed or install automatic bleeding valves at the highest point.
	Condenser temperature too high.	Slats dirty, exposed to strong sunlight.	Clean fins, provide shade for the unit, adhere to operating limits.
	Pulse mode because of too little demand.	System may be overdimensioned	Increase medium flow rate with the installation of a storage tank.

Malfunction	Possible causes	Checks	Remedial measures
Medium outlet	Drop formation at connection points of the pipeline.	Leakage of the joint	Seal the joint.
	Condensate formation	Uninsulated cables or components, defective insulation.	Attach or repair the insulation.

# REMKO KWP Eco series

## 14 Care and maintenance

Regular care and observation of some basic points will ensure trouble-free operation and a long service life.



### DANGER!

Prior to performing any work, ensure the equipment is disconnected from the voltage supply and secured to prevent accidental switch-on!

### Care

- Ensure the unit is protected against dirt, mould and other deposits.
- Only clean the unit using a damp cloth. Do not use any caustic, abrasive or solvent-based cleaning products. Do not use a jet of water.

- Clean the fins on the unit prior to long shut-down periods.

### Maintenance

- It is recommended that you take out a maintenance contract with a yearly service from an appropriate specialist firm.



*This enables you to ensure the operational reliability of the plant at all times!*



### NOTICE!

Statutory regulations require a leak test for the cooling cycle dependent on the refrigerant capacity or its CO<sub>2</sub> equivalent. Inspection and documentation of the work performed is to be carried out by specialist technicians.

Type of task	Commis- sioning	Monthly	Half-yearly	Yearly
Checks/maintenance/inspection				
General	●			●
Check voltage and current	●			●
Check function of compressor / fans	●			●
Dirt on condenser / evaporator	●	●		
Check the refrigerant volume	●		●	
Check condensate drainage	●		●	
Check insulation	●			●
Check moving parts	●			●
Sealing test for cooling cycle	●			● <sup>1)</sup>

<sup>1)</sup> see note

## 15 Index

### A

Air bleeding valves	40
Anti-freeze protection	37

### C

Cabled remote control	44
Care and maintenance	52
Commissioning	48
Compensators	40
Compressor thermal contact	45
Condensate drainage connection	41
Condenser fan thermal contacts	45
Configuration anti-freeze protection parameters	38
Connection of the medium piping	37
Customer service	50

### D

Description of the unit	27
Diaphragm expansion vessel	47
Diaphragm expansion vessel (MAG)	39
Dirt trap	40
Disassembly of the transport pallet	36
Disposal of equipment	6
Drain connection	39

### E

Electrical components	45
Electrical components and safety equipment	45
Electrical unit connection	44
Electrical wiring	42
Environmental protection	6
External enabling contact Operation/Standby	44

### F

Fill and drain connection	39
Fill the system	46
Filling the system	46
Flow switch	45
Frost protection parameters, configuration	38
Function test for cooling operating mode	48

### G

General alarm signal	44
----------------------	----

### H

Hydraulic unit construction	29
-----------------------------	----

### I

Installation	36
Installation location, selection	35
Intended use	5

### L

Leak testing	45
--------------	----

### M

MAG - Diaphragm expansion vessel	39
Maintenance	52

### Malfunctions

Checks	50
Possible causes	50
Remedial measures	50
Medium piping	37
Medium piping, connection	37
Minimum / maximum flow volume	37
Minimum clearances	35

### N

Necessary system components	28
-----------------------------	----

### O

Operational malfunctions	50
--------------------------	----

### P

Phase sequence relay	45
Pressure and temperature displays	37
Pressure switch cooling cycle HP and LP	45
Probe medium inlet	45
Probe medium outlet	45

### R

Rinsing the system	46
--------------------	----

### S

Safe drainage in the event of leakages	41
Safety	
Dangers of failure to observe the safety	
notes	4
General	4
Identification of notes	4
Notes for inspection	5
Notes for installation	5
Notes for maintenance	5
Personnel qualifications	4
Safety notes for the operator	5
Safety-conscious working	4
Unauthorised modification	5
Unauthorised replacement part manufacture	5
Safety valve	47
Safety valves	40
Selecting the installation location	35
Shut-off valves	40
Shutdown	
Permanent	49
Temporary	49
System components	28

### T

Transport pallets	36
Troubleshooting and customer service	50

### U

Unit description	27
Unit installation	36
Usable limits	22

# REMKO KWP Eco series

**V**

Valves for hydronic balancing . . . . . 37, 47

**W**

Warranty . . . . . 5



# REMKO QUALITY WITH SYSTEMS

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