WL 5000

Specification and User Manual

Laird™
THERMAL SYSTEMS

www.lairdthermal.com

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Revision History

Date	Index	Reason for Change	Name	Page
13-Apr-20	1.0	First version		
22-May-20	2.0	New template. Page no. Updated.	A. Olsson	
10-MAR-2021	2.1	Corrected P/N	A. Kim	
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1. About this Manual

This Operational Manual addresses the needs of the user of the unit. Its intention is to allow the safe operation of the unit. Thus, it should be read carefully and be kept in a space accessible for the users of the unit at any time.

All chapters of this Operation Manual can be read independently and thus can be used for look-up purposes.

1.1 Terms of Guarantee

General sale and delivery terms of LAIRD apply. The buyer accepts these terms, at the latest when signing the contract of purchase.

The particular terms of guarantee and duration of guarantee of the unit in question can be taken from the contract documents as well as from the order confirmation.

Warranty claims and liability are excluded in case of one of the following situations:

- Use of the unit in an unintended way
- Inaccurate installation, putting into service, operation, repair or maintenance of the product by people that are not fully authorized
- Use of the product despite of defect, wrongly implemented or non-functional safety devices or protective gear
- Unauthorized or forbidden modifications by the user concerning the electrical equipment of the unit
- Unauthorized or forbidden modifications by the user concerning the mechanical structure of the unit
- Unauthorized or forbidden modifications by the user concerning the operating parameters
- Use of unauthorized tools
- Use of unauthorized operating supplies
- Exceedance of mandatory maintenance intervals
- Cases of disaster caused by foreign matter influence or act of nature beyond control

PLEASE NOTE

Any form of unintended use of the unit and any structural change caused by the user without prior authorization in written form by LAIRD will lead to the termination of warranty as well the termination of the declaration of conformation and will free LAIRD from product liability. This concern includes safety devices as well.

In case of authorized changes or when adding optional equipment, it is the sole responsibility of the customer to assure the accurate implementation of the safety devices required.

1.2 Contact Information

If you have questions with respect to this unit please use the contact information given below. Always communicate the following:

- Your name and address
- Name of contact at your address
- Product data as on identification plate: Type of unit, serial number and year of manufacture

Company contact:

See contact details at www.lairdthermal.com

2. Safety Regulations

2.1 Hazard Classes

In this document safety instructions are using standardized representation and symbols. Depending on the probability of their incidence and the severity of consequences three hazard classes are used.

DANGER

Reference to direct danger for humans.

Inobservance will lead to irreversible injuries or death.

CAUTION

Reference to noticeable danger for humans or possible damage to property.

Inobservance may lead to reversible injuries or to damage to property.

2.2 Safety Symbols

In this Operation Manual concrete safety instructions are given in order to point out unpreventable residual risks when operating the unit. These risks include danger for

- Human beings
- The unit and other equipment
- The environment

The safety symbols used in this manual are indicated below. The main reason for their use is to point the reader to the safety instruction given in the text field beside.

Symbol	Meaning
	Warning with respect to general danger or damage to property
	Warning with respect to electrical hazard

Symbol	Meaning
	This symbol indicates the requirement of wearing safety gloves
	This symbol indicates the requirement of disconnecting from mains.

2.3 Hints for Safe Operation

PLEASE NOTE

Conduct inspections on a regular time base
This will ensure that the appropriate measures will be carried out indeed.

The unit is operation save. It was built according to the state-of-the-art.

Despite this the unit could cause hazards if it

- is used in a way it was not intended for
- is used improperly
- is operated under unsuitable conditions

2.3.1 Prevent Hazards

Hazards can be prevented by safety-conscious and anticipatory behavior of staff.

Everybody working with the unit should keep the following in mind:

- Make this Operation Manual available for everybody at the operation site of the unit in a complete and perfectly readable state!
- Use the unit exclusively for what it was intended!
- The unit must be operational and error free. Check the condition of the unit before working with it and within a regular time frame.
- Make sure that nobody can injure himself by any part of the unit!
- Any disruption or recognizable change concerning the unit should be reported to the responsible person.
- Stick to accident prevention regulations as well as any regional regulations!

2.3.2 Hints Regarding the Electrical Equipment

DANGER

Danger to life through electrical shock when working on the electrical equipment of the unit!

- Switch off the unit before starting your work!
- Disconnect the unit from mains by pulling the mains plug!
- Verify that the installation is dead (volt-free)!
- Carry out earthing or short circuiting!

When working on electrical installations the following principles should be observed:

- Works on the electrical installations may only be accomplished by qualified electrical staff!
- When connecting electrical equipment to mains regional regulations must be observed.
- The unit is powered by electricity. Electrical shock hazard exists, if the electrical installations are defective or the insulation fails during operation.
- When switched-off the unit is not disconnected from mains. This is only the case when the mains plug is pulled.
- Any changes regarding the control elements of the unit can have an influence on the save operation. All intended changes must be authorized by the manufacturer.

- After the implementation of a change the operation of the safeguards must be verified.
- No unauthorized changes on the unit are allowed. All intended changes must be authorized by the manufacturer.

2.3.3 Environmental Issues

Environmentally conscious and anticipatory behavior of staff avoids environmentally hazardous impacts.

The following principles apply for environmentally conscious behavior:

- Environmentally hazardous substances must not get into the soil or into the drains. They should be kept in appropriate containers.
- Environmentally hazardous substances must be brought to utilization or disposal according to regional regulations.

When dealing with working fluids always keep aware of the safety data sheet of the corresponding manufacturer.

2.3.4 Protective Clothing

When doing a job that leads to contact of the skin with the coolant (e.g. filling-up of the coolant container):

	Wear safety gloves made of PVC, neoprene or nitrile rubber

2.4 Safety Equipment

PLEASE NOTE

The safety equipment listed below must be integrated in the local control environment by the customer, unless otherwise noted. These tasks must be carried out solely by trained experts.

Safety equipment must not be modified, removed or taken out of operation. All parts of the safety equipment must be accessible at all times.

2.4.1 Guards

Direct access to hazardous parts or areas of the unit is restricted by the unit cover. The cover may only be removed for maintenance or repair works and shall be replaced prior to taking the unit back to operation. The cover is fixed by screws which can be unscrewed using a metric wrench.

2.5 In Case of Accidents

Should you or another person be injured when working with the unit:

- Stay calm!
- Give first aid!
- Call the company's first-aider without exception!

3. Product Description

3.1 Description

The cooling unit WL 5000 S is intended for the cooling of a water circuit. The coolant can be water or a mixture of water and antifreeze (water-glycol). Water circulates between the cooling unit and the heat source. The water is re-cooled by an air-cooled heat exchanger. A bypass valve limits the pump pressure.

The capacity of the cooling unit depends on the temperature difference between the ambient temperature and the water outlet temperature. The cooling capacity has an amount of 5000 W related to a difference of 13,2 K between water outlet temperature and ambient temperature.

Cooling hoses are connected to the cooling unit via hose nipples.

Coolant inlet and outlet are marked with symbols: Inlet: $O^{\downarrow}$ and outlet: $O^{\uparrow}$

3.2 Non-Conformity with the Intended Use

Operation of the unit under improper operational conditions is not permitted, since otherwise the operation safety can not be granted

When using the unit in a way not compliant with the intended use, hazardous situations may occur.

Operation of the unit is not permitted under the following conditions:

- The unit is used for a purpose other than the one it is intended for.
- The unit or parts of it are damaged, the electrical installation is not correct or the insulation is broken.
- Protective or safety equipment is not functional or defect, improperly installed or missing.
- The unit is not working properly.
- The unit was modified without authorization or modified in a way that is not permitted.
- Controlling devices were modified in a way that is not permitted.
- Operational parameters were changed in a way that is not permitted.
- Operation in areas exposed to explosion hazards.
- Operation with cooling media not according to specification.
- Use of unauthorized tools.
- Exceedance of the compulsory maintenance intervals.

PLEASE NOTE

The manufacturer is not liable for damage occurring when using the unit in a way it was not intended. When using the unit in a way it was not intended for, the manufacturer’s warranty given by LAIRD will expire.

3.3 Technical data

Coolant: water or water-glycol

3.3.1 Physical dimensions

Length:	486 mm (w/o hose nipples)
Width:	406 mm
Height:	484 mm
Weight:	38.5 (empty)
Coolant capacity:	5.0 l

Table 1: *Dimensions and weight*

3.3.2 Performance data

Cooling capacity:	5000 W (ΔT ≤ 13.2 K)
Flow rate:	6.5 l/min at 3.0 bar
Main voltage:	230 V ± 10% / 50/60 Hz
Current consumption:	≤ 2.6 A
Noise level:	63 dB(A) (50 Hz) 67 dB(A) (60 Hz) at 1 m distance in any direction

Table 2: *Performance data*

3.3.3 Environmental specifications

Operating temperature:	-10°C...+ 40°C (with adequate amount of antifreeze)
Storage temperature:	-25°C...+ 70°C (storage without water)
Relative humidity:	20%...90%

Table 3: *Environmental conditions*

3.3.4 Settings

Maximum forward pressure:	6.0 bar ± 0.2 bar
Flow switch:	open at ≥ 4l/min Hysteresis < 0.8 l/min
Termal switch:	50°C ± 3°C Hysteresis ≤ 10°C

3.4 Setting-up Requirements

3.4.1 Installation Location

- The cooling unit must be positioned horizontally for sufficient air circulation without blocking the air openings.

3.4.2 Environmental Conditions

CAUTION

Risk of damage through unsuitable environmental conditions!

Damage to the unit and corrosion damage may result and are not covered by manufacturer's liability.

- The unit is only authorized for use in indoor environments.
- The unit must not be stored or operated in aggressive, humid environments.
- The unit must not be stored or operated outdoor.

Pay attention to the environmental conditions as given in the specifications in section 3.3.3

3.5 Infrastructure

The following infrastructure is required for connecting the unit:

Parameter	Rated value
Operating voltage	230 VAC 50/60 Hz

4. Initial Operation

4.1 Safety Indications Related to Initial Operation

CAUTION

Danger of malfunction caused by faulty connections during initial operation!

Before switching on the unit make sure that:
- All safety equipment of the unit is implemented and functional.
- All connections were properly made.
- Nobody is endangered by the start-up of the unit.
- Only cooling hoses with enough pressure resistance and with compatibility with used coolant is used!
- Run cooling unit always with correct coolant level above cooling fins inside the heat exchanger
- Read the manual before setting to work.

Moreover:
- Never operate cooling unit when ball cock is closed, otherwise damage of pump may occur!
- Never operate damaged or leaking equipment!

Please follow the rules in chapter Safety Regulations on page 9.

4.2 Setting to Work

4.2.1 Connecting the unit electrically

DANGER

Electrical danger!

Work on electrical installations may be carried out by trained and authorized electricians only.

→ Switch off the unit before starting your work.
→ Disconnect the unit from mains by pulling the mains plug.
→ Secure the unit against being switched on again.
→ Verify that the unit is disconnected.
→ Carry out earthing and short circuiting.
→ Keep unauthorized persons away from the working area.

NOTE

Risk of damage through improper connections!

Improper integration of the unit into the safety circuit of the device to be cooled will lead to the inoperativeness of the safety equipment included in the unit.

→ Ensure that all connected safety equipment is properly functioning.
→ All tasks should be carried out only by expert staff.

4.2.2 Carrying out Setting-to-Work

- The cooling unit must be positioned horizontally for sufficient air circulation without blocking the air openings

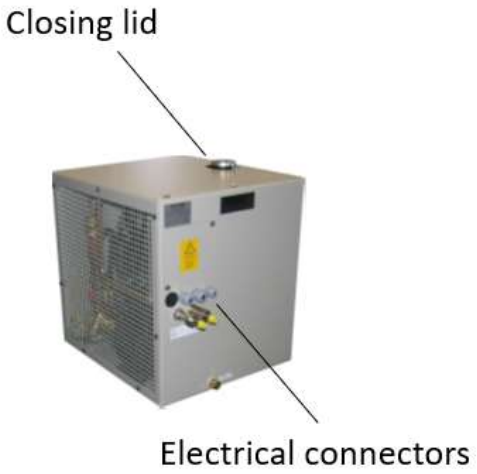
- Remove service cap

- Insert cable and connect cable to terminals according to terminal diagram
- Close service cap
- Connect the cooling unit with hoses
- Open lid
- Fill cooling unit with water (about 5.0 l)

CAUTION

The water level must be always above fins, otherwise reduced cooling capacity!

- Let the cooling unit run for about 10 minutes to deaerate the water circuit
- Check the water level, if necessary, refill water
- Close lid



Position of closing lid and electrical connectors

5. Maintenance and Cleaning

Diligent maintenance is the prime factor for assuring an error-free and efficient operation of the unit. Operating personnel can perform these tasks when properly trained.

Regularly check the water level and refill water and antifreeze, if necessary.

5.1 Heat exchanger

In order to achieve maximum cooling capacity keep the heat exchanger of the cooling unit clean. Regularly check it and if necessary clean it:

Proceed as following:

1. Disconnect cooling unit from the mains
2. Remove complete cover
3. Remove dust by forcing it out in the opposite direction from which it entered. If compressed air is available, direct the air against the inside of the heat exchanger
4. Mount cover

5.2 Pump

About every 3 months check the filter of the pump for clean condition, in case of polluted water, more often.

⚠ **CAUTION**

Clean filter regularly according to maintenance instructions, otherwise damage of pump may occur!

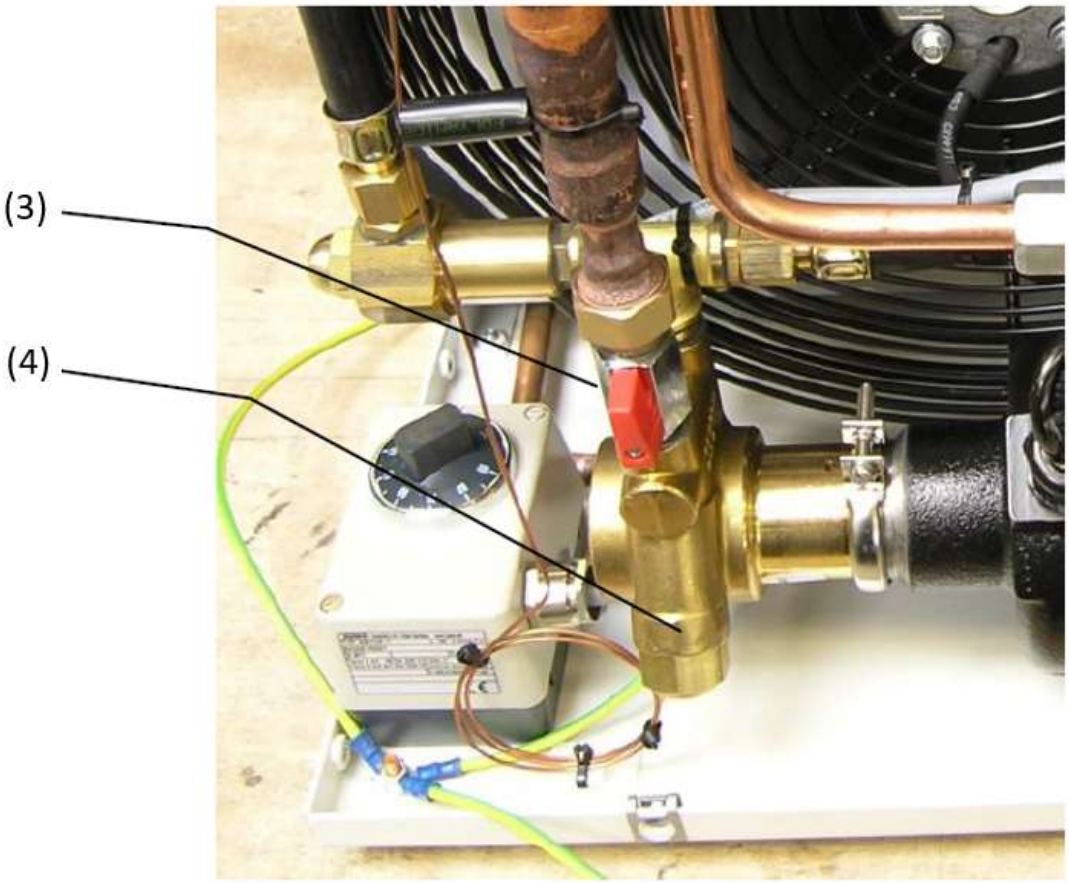
Proceed as following:

1. Disconnect cooling unit from the mains
2. Remove cover
3. Close ball cock
4. Unscrew filter cap (24 mm nut)
   Note: Some water will run out of pump. Collect the water with suitable vessel!
5. Remove and clean filter if necessary or replace filter
6. Insert filter and mount cap
7. Open ball cock

⚠ **CAUTION**

Never operate cooling unit when ball cock is closed, otherwise damage of pump may occur!

8. Mount cover
9. Run cooling unit to deaerate cooling circuit (Setting to work)
10. Check water level and refill if necessary



Position of close ball cock and filter cap

5.3 Cleaning of Unit Casing

CAUTION

Risk of damage due to the use of improper cleansing material!

When using aggressive or abrasive cleaning agents, corrosion may occur as result of a damaged paint film.

- For cleaning the device casing only use mild cleaning agents (e.g. dish washing detergents)!
- Use clean and lint free cloth for cleaning!

Regularly remove dirt from the casing of the unit to prevent corrosion damage. Pay attention that all the labels at the unit are always clean and legible.

6. Repair

PLEASE NOTE

Do not carry out any repair work on the unit. Send the unit back to the LAIRD service department (for contact see page 7).

7. Removal for Service

DANGER

Before starting any service work disconnect the cooling unit from the mains!

- Remove electrical connections
- Remove hoses
- Remove cap of the drain hole and purge coolant (*), collect with suitable vessel
- Mount it cap

Position of cap for drain hole

8. Wear Parts and Spare Parts

Spare parts must comply with the technical specifications defined by LAIRD. Original LAIRD parts are subject to strict obligations and fulfill these requirements.

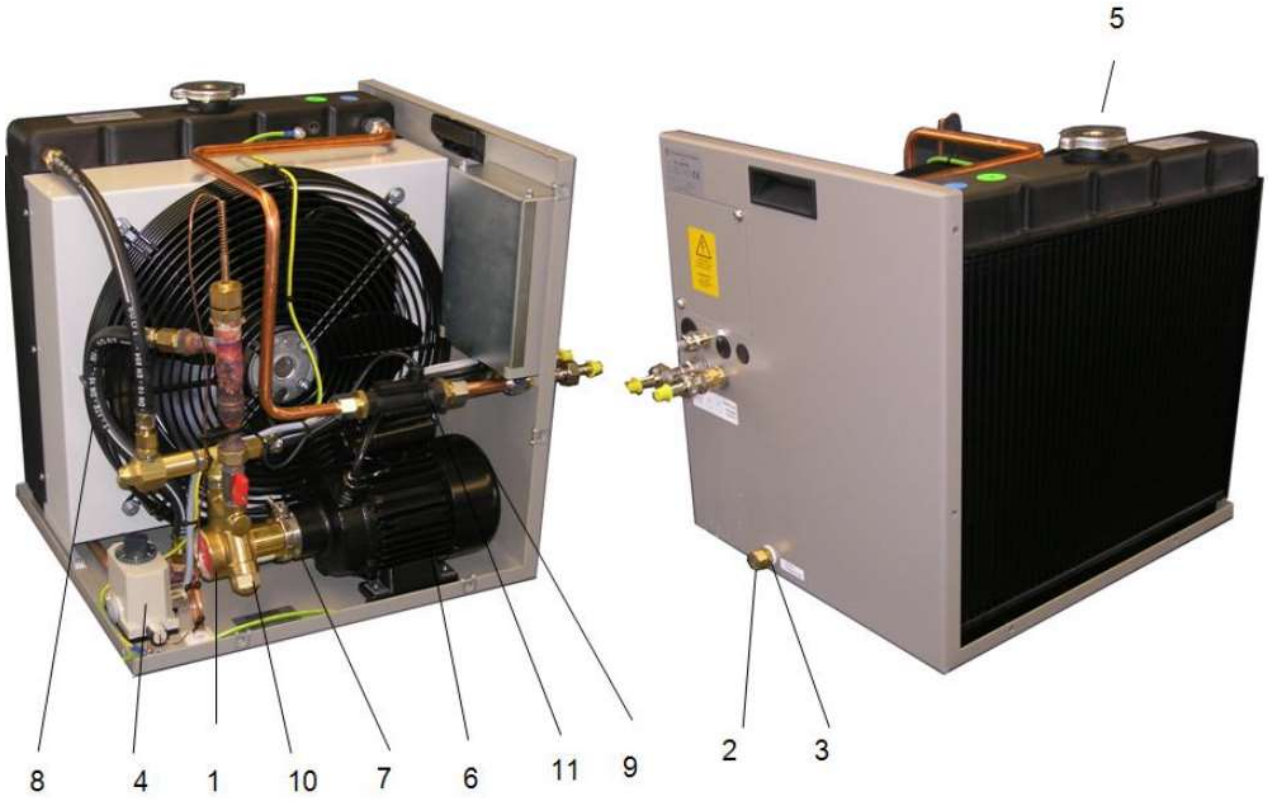
LAIRD does not provide warranty service in case of damages caused by the use of spare parts made by manufacturers other than LAIRD.

PLEASE NOTE

Identification data concerning the unit and spare parts
The type of unit and the article number can be found on the identification plate of the unit.

Please direct your inquiries and orders to LAIRD (contact see page 8) with the following detailed information:

- Type of unit
- Article number
- Serial number
- Part description
- Quantity
- Shipping details



Spare part overview

No.	Description	Code number
1	Pump with coupling and basic valve unit	2104.00
2	Cap	Not available
3	O-Ring for cap	Not available
4	Thermal switch	2032.00
5	Lid	2075.00
6	Motor with coupling	2001.00
7	Flexible coupling	2038.00
8	Fan	2029.00
9	Capacitor for fan	2088.00
10	Filter	2081.00
11	Flow switch with fittings	2031.00

Spare parts

Not available parts can be replaced only at manufacturer site by service technician.