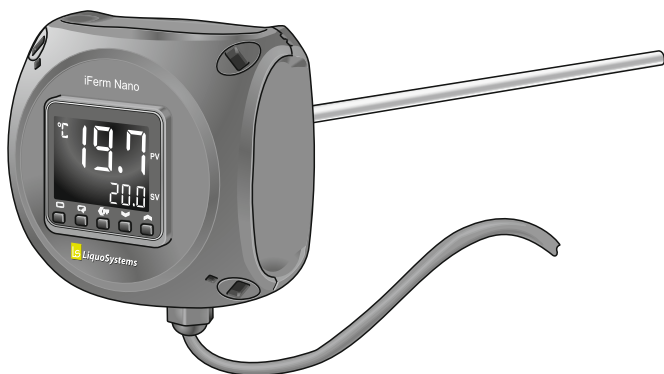**LS** *LiquoSystems*®
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iFerm Nano Tank

Operating instructions

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iFerm Nano Tank. They were written, checked and approved
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takes precedence. If you come across any discrepancies,
please contact our customer service, see *"8.5 Customer
service" on page 30*.

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Contents

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1   Introduction

These operating instructions provide you with information about all technical and safety-relevant aspects that you must be familiar with for using *iFerm Nano Tank*.

EN

➡ Read the operating instructions in full before operating the unit, and also use them for the purpose of instructing all users.

1.1   Proper use

iFerm Nano Tank is designed for measuring and controlling process temperatures in beverage production. Normal operation involves regulating the supply of refrigerant as required, which in turn guarantees maintenance of the setpoint temperatures in fermentation processes.

Temperature control applications for processes such as filtration, bottling, tartrate stabilisation, room temperature control and stock cooling are still deemed to be proper. Use for other purposes is only permissible if the manufacturer's written approval has been obtained for the actual situation.

For installation, *iFerm Nano Tank* is placed into a thermowell on the tank with the preinstalled temperature probe. Operation and configuration are performed via the integrated display that always shows the process temperature and current messages. The actual temperature in the tank is measured and adjusted to the set target temperature by a microprocessor. Every deviation results in an adjustment of the connected valve that controls the flow to the heat exchanger in the tank.

In conjunction with the optionally available control unit *iFerm Nano Terminal* you can operate *iFerm Nano Tank* centrally (only the *24 V AC, 50/60 Hz + data bus* version). *iFerm Nano Terminal* can access up to 30 controllers of the *iFerm Nano* series and can also use them for special functions such as the monitoring of heating processes.

1.2 Prior knowledge

In the operating instructions, users are defined as all persons who are involved in the installation and operation of the *iFerm Nano Tank*. Users must be at least 16 years of age. They must have read and understood the operating instructions and must be able to follow all notices and instructions.

The operating instructions are intended for persons with experience in handling comparable measuring instruments and systems. In particular, basic knowledge of beverage production is required.

1.3 Notes about the operating instructions

The following typographical elements are used in the operating instructions in order to notify you of possible hazards or particular information:

⚠️ *DANGER!*

Identifies notices of the Danger hazard level.
Indicates possible hazards that can result in injury or death if ignored.

EN

⚠ **Attention!**
Identifies notices of the Attention hazard level.
Indicates possible hazards that can result in material damage if ignored.

ⓘ Information
Indicates more detailed information.
Points out alternative actions, further information sources or helpful tips.

All stated positions (left, right, front, back, top, bottom etc.) relate to an observer looking at the display of *iFerm Nano Tank* from the front. The connecting cable is therefore at the bottom, the display in front.

2 Safety notices

- Read the operating instructions carefully and obey all safety notices. Material damage resulting from ignoring the safety notices is not covered by any warranty.

- Whenever you use *iFerm Nano Tank*, follow the laws that apply at the place of use, particularly the general safety and accident prevention regulations. If in doubt, these take precedence over the directions in the operating instructions.

- *iFerm Nano Tank* is operated with 24 V AC, 50/60 Hz safety low voltage, see *"4.2 Attaching the connecting cable" on page 18*. The power supply must be properly connected and then checked and approved by a qualified electrician. There is a risk of electric shock if the connection is faulty!

- Extreme temperatures caused by heat build-ups, frost, UV light, direct sunlight etc. can cause irreparable damage. Always maintain the specified ambient temperatures, see *"8.1 Technical data" on page 27*.
- *iFerm Nano Tank* is protected against water jets (IP65). However, avoid intensive contact with liquids (e.g. high-pressure cleaners).
- Lay cables so that they do not present a trip hazard and away from sharp-edged objects. Ensure sufficient strain relief and kink protection.
- Clean the *iFerm Nano Tank* with a soft damp cloth. Do not use any aggressive, scouring cleaning agents or cleaning agents containing solvents.
- Do not perform any repairs on *iFerm Nano Tank*. Follow the instructions in the chapter *"7 Maintenance and care" on page 26*.

3   Product overview

iFerm Nano Tank keeps the process temperature in the tank constant to the value of the specified target temperature, as long as the cooling or heating medium required for this is constantly available in a sufficient quantity. To achieve this, the temperature probe sends the measured actual temperature to the microprocessor that adjusts it to the target temperature. Every deviation results in an adjustment of the valve setting so that the tank's heat exchanger can be filled as required and the target temperature is maintained in every process phase.

Since fermentation yeasts react sensitively to frequent temperature changes, *iFerm Nano Tank* intervenes in fermentation processes even before the target temperature is reached and starts the cooling. Brief cooling pulses gently slow down the temperature rise, and exceeding of the target temperature is prevented by more intensive cooling.
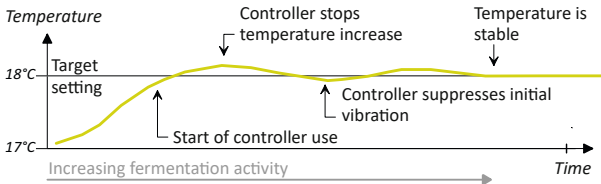
The frequency of the cooling pulses varies depending on the difference between the actual value and the target value. In the event of major deviations, the pulse/pause ratio can be regulated in such a way that the valve is permanently open. The controller detects temperature deviations that occur mainly in the initial vibrations range, and counteracts them automatically by continually restricting the controller tolerance. After a short time, a stable target temperature is arrived, at which the tank contents can be reliably kept.

The actual and target temperature can always be read off on the display. The target value can simply be adjusted via the display buttons, see . Other changes are not possible until after enabling, see .

3.1 Scope of delivery

The package contains the following articles:

Quantity	Description
1	Temperature controller *iFerm Nano Tank* with display; the following components are preinstalled at the factory: • Temperature probe on the rear of the housing with which *iFerm Nano Tank* is placed in a thermowell on the tank for installation. • Connecting cable with loose strands for connecting to the power supply, data bus and valve by means of an optionally available *iFerm Nano Box* terminal box.
1	Operating instructions

➡ Check the package contents against the list provided.

⚠ **Attention!**

Contact our customer service immediately if parts are missing or if you find any damage, see *"8.5 Customer service" on page 30*.

➡ Dispose of all packaging materials in accordance with the disposal regulations that apply in your region.
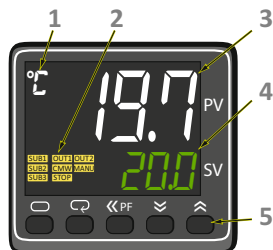
3.2 Connections and control elements
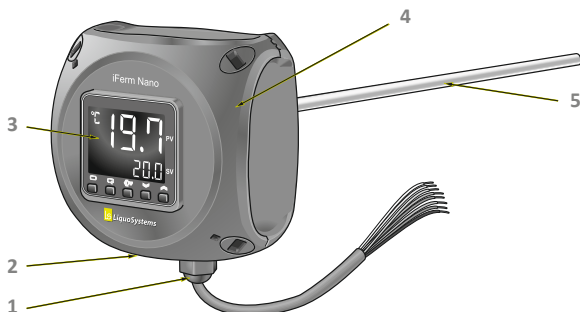
Pos.	Brief description
1	Cable screw connection with connecting cable; the strands of the connecting cable are routed to the iFerm Nano Box terminal box and connected as required, see *"4.2 Attaching the connecting cable" on page 18*.
2	Type plate (underside of controller housing)
3	Display with display buttons, see *"3.3 Display" on page 12*.
4	Robust controller housing
5	Preinstalled temperature probe; measures the actual temperature of the tank content and at the same time secures *iFerm Nano Tank* (by way of a thermowell on the tank).

3.3 Display

Pos.	In normal operation	In the menu
1	Shows the unit of the temperature display.	Extends the PV range, see Pos. 3.
2	**Message area** (texts on yellow background): Shows messages relating to the current operating state, see *"3.3.2 Status messages" on page 14*.	
3	**PV area** (*process value*, white characters):	
	Shows the measured actual temperature.	Shows the name of the current menu.
4	**SV area** (*set value*, green characters):	
	Shows the set target temperature.	Shows the currently set value.
	The displayed value can be changed via the display buttons. After a change, the display flashes briefly and the new value is then accepted.	
5	**Display buttons** for entering values and for configuration; for assignment, see *"3.3.1 Display buttons" on page 13*.	

3.3.1 Display buttons

The display buttons have the following functions:

Button	Im normal operation	In the menu
⬭ ⬭	Blocked, no function.	Call up menu and navigate in the menu, see *"6 Extended configuration" on page 22*.
⏴PF	Enter a value directly in the SV area: Each press of the button moves the flashing cursor one space to the left. Changes are all made using the buttons on the right.	
⌄	Reduce the target temperature by 0.1 K in each case; keep the button pressed for fast forward.	Reduce the value in the SV area or scroll back by one adjustment option.
⌃	Increase the target temperature by 0.1 K in each case; keep the button pressed for fast forward.	Increase the value in the SV area or scroll forward by one adjustment option.

These operating instructions use the following symbols to represent operation of the display buttons:

Symbol	Meaning
⬭	Press this button briefly.
⬭, 2x	Press this button briefly twice.
⬭ / ⬭	Press one of these two buttons.
⬓	Keep this button pressed for up to 3 seconds.
⬓ + ⬓	Keep these two buttons pressed together for up to 3 seconds.

3.3.2 Status messages

In the display's message area, symbols with a yellow background describe the current operating state as long as certain criteria are met. These status messages mean the following:

Symbol	Meaning
SUB2	The valve is open. (Only displayed in *Cooling* mode.)
SUB3	Alarm: The difference between the actual and target temperature is greater than 1.5 K (the value preset at the factory).
OUT2	*Cooling* mode is activated.
CMW	The interface is activated. Communication via the data bus is possible.
5.ERR	Error message in the PV display area (*sensor error*): The sensor shows incorrect behaviour, see *"8.2 Troubleshooting" on page 28*.

When there is central control via the *iFerm Nano Terminal* control unit, additional displays are possible such as the following messages:

Symbol	Meaning
MANU	Manual mode; control mode is interrupted, i.e. a certain valve setting was specified, e.g. a value for the parameter *Cooling outlet*: SV area = 100: Valve is open (*100%*). SV area = 0: Valve is closed (*0%*).
STOP	Measurement and display operation; the actual temperature continues to be measured and displayed. Control and display in the SV area are deactivated.

EN

Symbol	Meaning
SUB1	The valve is open. (Only displayed in *Heating* mode.)
OUT1	*Heating* mode is activated.

3.4   Optional accessories

The accessories listed here enable you to extend
iFerm Nano Tank and to optimally adapt to your system
technology. Details of the available versions can be found in
our current catalogue at:
https://liquosystems.de/downloads

Item	Brief description
iFerm Nano Box	Allows connection to the power supply, the data bus and the valves being controlled. In conjunction with *iFerm Nano Terminal*, you can also control the valve of a heating system in addition to the cooling valve.
iFerm Nano Terminal control unit	Used for centrally controlling up to 30 temperature controllers via touch display and data bus.
Thermowell	Permanently installed on the tank to accommodate the temperature probe; versions available for screw fitting or welding in.
Valve (incl. connecting cable)	Motorised ball valve (or alternatively solenoid valve) for installing in the inlet of the cooling or heating circuit. Allows controlled infeed of the respective medium to the heat exchanger.

4   Installation

Before each commissioning, all connections must be made and safe mounting at the place of use must be ensured.

4.1   Positioning the temperature controller

iFerm Nano Tank is intended for direct installation on a tank that has a suitable thermowell. In this, the temperature probe preinstalled on the back of *iFerm Nano Tank* is placed:
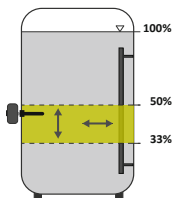
4.1.1   Installing the thermowell

You can retrofit the thermowell if one is not already installed on the tank. The optionally available versions can be screwed or welded onto the tank wall.
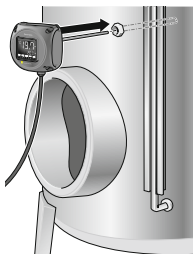
⚠️ **Attention!**

To obtain reliable measured values, the thermowell must be fitted so that it is completely surrounded by tank content for the entire duration of the process. Positions just under half the fill level and a sufficient distance from the heat exchanger are the most suitable.

➡ It is essential to ensure that you install the thermowell horizontally.

4.1.2   Installing the temperature controller

➡ Push *iFerm Nano Tank* with the temperature probe as far as possible into the thermowell in the tank.

➡ Rotate *iFerm Nano Tank* so that you can read off the display and perform operations easily.

⚠ **Attention!**

The probe rod of *iFerm Nano Tank* is 230 mm long and 7 mm in diameter. The thermowell used must fulfil the following criteria for a secure fit on the tank and to obtain the correct measurement results:

• The probe rod of *iFerm Nano Tank* can be fully immersed in the thermowell.

• The inside diameter of the thermowell is only slightly larger than the diameter of the probe rod.

• *iFerm Nano Tank* can be securely locked with a clamping fixture.

If there is no suitable thermowell on the tank, you should fit one, see *"3.4 Optional accessories" on page 15*.

4.2 Attaching the connecting cable

The connecting cable carries all signals that *iFerm Nano Tank* requires for the power supply, data bus and control of the valves. It must be properly laid and connected.

⚠️ *DANGER! – Electric shock*

Always disconnect the system from the power supply before working on the electrical connection.

iFerm Nano Tank switches itself on automatically when connected to a power supply, see *"5.1 Commissioning" on page 20*. Therefore, do not switch on the power supply until connection and installation have been completed.

➡ First plan the laying route for the connecting cable before you make the electrical connection.
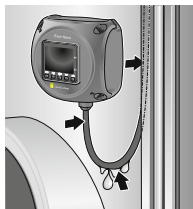
➡ Ensure that there is no trip hazard, and also that there is sufficient strain relief and kink protection.

➡ Keep liquid running along the cable away from the controller housing by forming a drip loop under the cable screw connection.

⚠️ **Attention!**

To protect against damage, you should lay the connecting cable along the level indicator or in a separate conduit.

➡ Connect the connecting cable to your system properly. For this, use for example the optionally available *iFerm Nano Box* terminal box and always follow the directions in the installation instructions.

The strands of the *iFerm Nano Tank* connecting cable are coloured differently and are assigned as follows:

Wire colour	Assignment
White	24 V AC, 50/60 Hz power supply
Brown	0 V AC, 50/60 Hz power supply
Green	Switching contact, cooling valve, 24 V AC, 50/60 Hz
Yellow	Modbus RS485 A
Grey	Modbus RS485 B
Pink	Switching contact, heating valve, 24 V AC, 50/60 Hz
Blue	Reserve
Red	Reserve (optional)

⚠ **Attention!**

When connecting, ensure that you follow the assignment stated here. Ignoring this can result in functional faults. If in doubt, contact our customer service, see *"8.5 Customer service" on page 30*.

➡ Secure the laid cables properly.

5 Operation

This chapter contains instructions on operating steps that are usually required during normal operation. Instructions on further settings can be found in the chapter *"6 Extended configuration" on page 22*.

5.1 Commissioning

You can start commissioning as soon as *iFerm Nano Tank* is properly connected to the tank and the cooling system.

⚠ **Attention! - First commissioning**

When *iFerm Nano Tank* is commissioned for the first time, the factory preset values apply, see *"8.1 Technical data" on page 27*. Change these as required before you start a process.

➡ Switch on the power supply for the system in which *iFerm Nano Tank* is installed. The display switches itself on and shows the actual and target temperatures.

The connected valve moves into the position obtained from the current difference between the actual and target temperatures.
In *Cooling* mode this means, for example:
– Actual temperature > target temperature: Valve opens.
– Actual temperature < target temperature: Valve closes.

➡ Test the function of the valve by setting another target temperature. The following example applies to *Cooling* mode (message *OUT2*):
– Increase the target temperature to the extent that the valve must close. There should then no longer be any detectable flow at the tube.
– Reduce the target temperature again to open the valve.

➡ Start operation:
  – Set the desired target temperature, see *"5.2 Setting the target temperature" on page 21*.
  – Start up the production process in the usual way.
➡ Check *iFerm Nano Tank* at regular intervals to ensure correct operation.

5.2 Setting the target temperature

The correct setting of the desired target temperature is the only action that you must perform during operation of *iFerm Nano Tank*.

➡ Check the setting at regular intervals.

 / ➡ Lower or increase the target temperature (SV area) by 0.1 degrees with each press of the button.

Or

 / ➡ Activate fast forward to make greater value changes.

 | **Information**

Alarm threshold SUB3
In the case of a greater value change, this message indicates that the actual temperature deviates from the target value by more than 1.5 K. The message disappears as soon as the difference between the actual and target values is once again less than 1.3 K (set hysteresis 0.2 K).

For a targeted value change, it is also possible to directly select individual digits of the target temperature:

《PF ➡ Select the digit to be changed in the displayed value. The flashing cursor moves one digit to the left each time the button is pressed.

∨ / ∧ ➡ Change the selected digit as required.

i **Information**

You can change the target temperature centrally if there is a connection via data bus to the *iFerm Nano Terminal* control unit.

i **Information**

To use *iFerm Nano Tank* in display mode only, you can deactivate *Cooling* mode: Set a high value for the target temperature that the actual temperature of the process cannot attain (e.g. 50 °C). This means that the valve constantly remains closed.

6 Extended configuration

This chapter gives instructions on how to change appliance settings with which you can adapt *iFerm Nano Tank* to certain operational situations. These settings are not required in normal operation.

⚠ **Attention!**

Do not make any configuration changes that exceed the framework described here. Ignoring this can result in irreparable damage and can also render any warranty void. If in doubt, contact our customer service, see *"8.5 Customer service" on page 30*.

6.1 Activating and deactivating the button lock

The button lock is used to prevent un-intentional changes to the configuration. You must deactivate the button lock in order to be able to change settings.

⬛ + ⬛ ➡ Call up the protected menu area: *ōRPt* display (*operation / adjustment protect*)

⬛, 1x ➡ Select the parameter *ĊĊPt* (initial setting / *communications protect*). The SV area shows the current setting.

The following values are defined for the button lock:

– *0*: The button lock is not activated.

– *2*: The button lock is activated and prevents unintentional operation of the two buttons on the left (standard).

⚠️ **Attention!**

The values *1* and *3* must not be adjusted because this can cause functional limitations.

⬇️ / ⬆️ ➡ Select the value *0* to enable access to the extended configuration.

⬛ + ⬛ ➡ End the process. The display switches over to showing the temperature.

⚠️ **Attention!**

iFerm Nano Tank saves the respective last setting of the button lock. For safety reasons, you should reactivate the button lock (value $\exists$) as soon as you have made the desired changes.

6.2 Changing settings

Always observe the following sequence to change one of the settings described below:

➡ First deactivate the button lock, see .

➡ Make the desired changes and then reactivate the button lock.

6.2.1 Changing the appliance address

(Only necessary when controlling several appliances via data bus.)

iFerm Nano Tank has as standard the appliance address **1**. In most cases, this address must be changed for central control via a data bus in order to allow clear identification.

➡ Call up the configuration level: $\bar{\iota}N$-$\bar{\iota}$ display (*input type*)

, 1x ➡ Select the $P5EL$ (*parameter selection*) menu.

, 1x ➡ Select the ⊔-Nō (*unit number*) parameter. The SV area shows the current appliance address.

/ ➡ Set the desired appliance address; the values ⊦ – ∃0 are valid.

➡ End the process. The display switches over to showing the temperature.

6.2.2 Activating and deactivating communication

(Only required in conjunction with *iFerm Nano Terminal* control unit.)

iFerm Nano Tank can also be used in portable single operation if the power is supplied via the connecting cable with bus cable. For this, simply deactivate the communication connection to the central control unit.

, 1x ➡ Call up the parameter level: ⌐.Adj display (*adjustment level*)

, 2x ➡ Select the CMWE (*communications writing*) parameter. The SV area shows the current setting.

/ ➡ Select one of the following values:
 – ōN (*on*): Communication is activated.
 – ōFF (*off*): Communication is deactivated.

, 1x ➡ End the process. The display switches over to showing the temperature.

CMW With communication activated, the display constantly shows the message *CMW*.

7 Maintenance and care

iFerm Nano Tank is designed for continuous and largely maintenance-free operation. The following instructions will help you to always keep *iFerm Nano Tank* in an operational state and to immediately remedy any faults that occur.

⚠️ **Attention!**

Regular factory inspections help ensure permanently safe operation and that all parameters are reliably adhered to. You should therefore have the inspections carried out regularly every 2 years.

➡ Do not perform any repairs on *iFerm Nano Tank*.

➡ If in doubt, contact customer service, see *"8.5 Customer service" on page 30*.

iFerm Nano Tank is protected against the ingress of dust and water jets (IP65). Normally, simple cleaning measures are sufficient. Follow the instructions below:

➡ Remove accumulated dust and dirt from *iFerm Nano Tank* and the connecting cables at regular intervals:
  – Use a soft, damp cloth to do this.
  – Do not use any aggressive, scouring cleaning agents or cleaning agents containing solvents.
➡ Avoid intensive contact with liquids (e.g. by high-pressure cleaners).

8 Appendix

8.1 Technical data

Parameter	Value
Default settings	Target temperature *20 °C*, Mode *Cooling*, Appliance address *1* (data bus)
Modes	Cooling, heating
Data bus type	Modbus protocol (optional)
Controller type	PID
Measuring range	-20 to +120 °C
Accuracy	Max. deviation ±0.5 K
Alarm threshold	1.5 K
Valve opening time	Min. 180 seconds
Power supply	24 V AC, 50/60 Hz
Power consumption	Max. 5 W
Protection class	IP65
Length connecting cable	approx. 5 m
Size (H x W x D)	approx. 120 x 100 x 330 mm
Weight	approx. 0.5 kg
Operating conditions	Temperature range -10 to +50 °C Icing or condensation not allowed Relative humidity 25 to 85 % No direct sunlight
Storage conditions	Temperature range -25 to +65 °C Icing or condensation not allowed Relative humidity 25 to 85 % No direct sunlight

8.2   Troubleshooting

If the *iFerm Nano Tank* is not working properly, the following can help to remedy the fault:

Fault	Cause	Remedy
Display shows nothing.	No power.	Check power supply (supply cables, fuses etc.).
	Display faulty.	Contact customer service.
Display button shows no effect.	Button blocked / not working.	Check button assignment, see *"3.3.1 Display buttons" on page 13*.
	Button stuck.	Clean button carefully, see *"7 Maintenance and care" on page 26*.
	Button faulty, no contact.	Contact customer service.
The displayed actual temperature is imprecise or there is an error *S.ERR* (sensor error).	Temperature probe faulty or not watertight, moisture causes the measured value to increase slowly.	Check the temperature probe and have it replaced if necessary.
No reaction on central controller.	Communication via data bus deactivated.	Activate communication, see *"6.2.2 Activating and deactivating communication" on page 25*.

Contact us directly if the fault persists or if you need spare parts, see *"8.5 Customer service" on page 30*.

8.3 Disposal

iFerm Nano Tank must be properly disposed of at the end of its useful life:

EN

➡ Secure the old appliance against unauthorised access.

➡ Never put the old appliance in with domestic waste. Use a collection point for returning and recycling old appliances.

➡ Follow the disposal regulations that apply in your region.

8.4 Declaration of conformity

$C\epsilon$ *iFerm Nano Tank*

Manufacturer: LiquoSystems GmbH
Wilhelmstraße 45
74366 Kirchheim / Neckar
Germany

Declaration: We hereby declare that the product
iFerm Nano Tank meets the requirements of the
following EU directives:
2011/65/EU: RoHS
2014/30/EU: Electromagnetic compatibility
2014/35/EU: Electrical equipment (low voltage)

Product type: Temperature controller

Date: 12/06/2017

Signature:

Stephan Wieland,
Managing director

8.5   Customer service

LiquoSystems is one of the few brand suppliers in the field of cellar technology for professional tank cooling and temperature control. We supply refrigerators, heat exchangers, temperature controllers and accessories, through to turnkey installation on your premises.

If you have any questions about our products or about how to extend and optimise your system, please contact us directly:

LiquoSystems GmbH

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info@liquosystems.de | www.liquosystems.de

You'll always be on the safe side with our factory customer service and repair service:

Technical assistance

Hours of business:	Mon. – Thu.:	09:00 am – 16:30 pm
	Friday:	09:00 am – 13:00 pm

E-mail:	e-kundendienst@liquosystems.de
Phone:	**+49 7143 891050**

Hotline	10th September to 10th November
	Mon. – Fri.: 08:00 am – 20:00 pm
	Sat. + Sun.: 09:00 am – 18:00 pm

iFerm Nano

Top

Terminal

Tank

Box

Solo

Switch

2017-07 | iFerm Nano Tank