

iFerm Nano Top



Operating instructions

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Contents

1	Introduction	5
1.1	Proper use	5
1.2	Prior knowledge	6
1.3	Notes about the operating instructions	6
2	Safety notices	7
3	Product overview	8
3.1	Scope of delivery	9
3.1.1	Opening iFerm Nano Top	10
3.2	Standard components	10
3.3	Connections and control elements	12
3.4	Display	13
3.4.1	Display buttons	14
3.4.2	Status messages	15
3.5	Optional accessories	16
4	Assembly and installation	17
4.1	Preparing the housing	18
4.1.1	Opening the cable lead-throughs	18
4.1.2	Installing the cable screw connection	18
4.1.3	Repositioning the terminal holder	19
4.1.4	Inserting the screw terminal	20
4.1.5	Securing the housing cover on the housing	20
4.2	Installing the housing	21
4.2.1	Wall mounting	22
4.2.2	Using the mounting plate	23
4.2.3	Using the installation set	23
4.3	Cable connection	24
4.3.1	Cable specification and connection instructions	24
4.3.2	Routing the cable into the housing	26
4.3.3	Connecting the strands	27
4.3.4	Installing special equipment	28

4.3.5	Positioning and installing the temperature controller	28
4.3.6	Connecting the power supply and laying the cables	29
4.3.7	Positioning the valves	30
5	Applications	30
5.1	Termination – power connection	32
5.2	Passage – power connection	34
5.3	Termination – power connection and data bus	36
5.4	Termination – power connection and data bus	38
5.5	Temperature probe	40
5.6	iFerm Nano Top with cooling valve	42
5.7	iFerm Nano Top with heating valve	44
5.8	Cooling and heating	46
6	Operation	48
6.1	Commissioning	48
6.2	Setting the target temperature	49
7	Extended configuration	51
7.1	Activating and deactivating the button lock	51
7.2	Changing settings	52
7.2.1	Changing the appliance address	52
7.2.2	Activating and deactivating communication	53
8	Maintenance and care	54
9	Appendix	55
9.1	Technical data	55
9.2	Troubleshooting	56
9.3	Disposal	57
9.4	Declaration of conformity	58
9.5	Customer service	59

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 Top*.

- ➔ 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 Top is designed for stationary use for measuring and controlling process temperatures in beverage processing. 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.

Operation and configuration of *iFerm Nano Top* are performed via the integrated display that always shows the process temperature and current messages. Using a temperature probe (not included in the scope of delivery), *iFerm Nano Top* measures the actual temperature in the tank and adjusts it to the set target temperature via a microprocessor. Every deviation results in an adjustment of the valve that controls the flow to the heat exchanger in the tank or in the room cooling.

In conjunction with the optionally available control unit *iFerm Nano Terminal* you can operate *iFerm Nano Top* centrally. *iFerm Nano Terminal* can access up to 30 controllers of the *iFerm Nano* series and can also use them for special functions such as monitoring heating processes or controlling Collective switches or Chiller.



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 Top*. 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.

**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 Top* from the front.

2 Safety notices

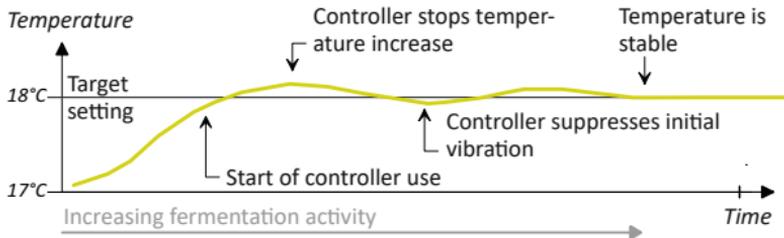
- Read the operating instructions carefully and obey all safety notices. Material damage resulting from ignoring the safety notices is not covered by any warranty.
- Whenever you use *iFerm Nano Top*, follow the laws that apply at the place of use, particularly the general safety and accident prevention regulations. If in doubt, these take precedence over the directions in the operating instructions.
- *iFerm Nano Top* is operated with 24 V AC, 50/60 Hz safety low voltage.
- Extreme temperatures caused by heat build-ups, frost, UV light, direct sunlight etc. can cause irreparable damage. Always maintain the specified ambient temperatures, see “9.1 Technical data” on page 55.

- *iFerm Nano Top* is protected against water jets (IP65). However, avoid intensive contact with liquids (e.g. immersion, high-pressure cleaners). Keep the power connection dry.
- Always lay cables and hoses 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 Top* 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 Top*. Follow the instructions in the chapter “8 Maintenance and care” on page 54.

3 Product overview

iFerm Nano Top 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 Top* 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 [“6 Operation” on page 48](#). Other changes are not possible until after enabling, see [“7 Extended configuration” on page 51](#).

3.1 Scope of delivery

The scope of delivery contains some components that have already been installed. The package contains the following articles:

Quantity	Description
1	Temperature controller <i>iFerm Nano Top</i> with display; standard version with supplied loose cable screw connections and other components, see “3.2 Standard components” on page 10 .
1	Operating instructions

- ➔ Check the package contents against the list provided.



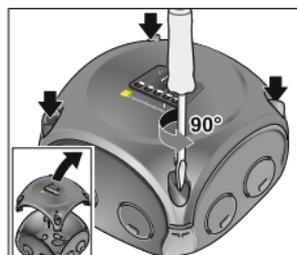
Attention!

Contact our customer service immediately if parts are missing or if you find any damage, see “9.5 Customer service” on page 59.

- ➔ Dispose of all packaging materials in accordance with the disposal regulations that apply in your region.

3.1.1 Opening iFerm Nano Top

You must open the *iFerm Nano Top* in order to check that the scope of delivery is complete. To do this, use a medium-sized slotted screwdriver (not supplied):



- ➔ Open the quick-release fasteners in the housing cover with a quarter turn to the left.
- ➔ Lift off the housing cover and place all components on a clear, flat surface.

3.2 Standard components



The following components are included as standard in the *iFerm Nano Top* scope of delivery:

Item	Brief description
	1 x Terminal holder for screw terminal, can be locked onto the housing wall

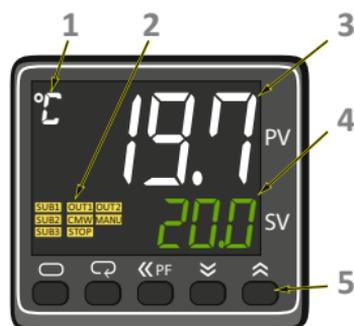
Item	Brief description
	<p>1 x Screw terminal, 5-pole each with 2 contact points. Depending on the cable cross section, up to 8 cable strands can be connected per pole:</p> <ul style="list-style-type: none"> • 0.75 mm²: max. 8 strands • 1.5 mm²: max. 6 strands • 2.5 mm²: max. 4 strands • 4.0 mm²: max. 2 strands
	<p>2 x U-clamp terminal, 1-pole with 2 contact points</p>
	<p>4 x Cable screw connection M20 for cable diameter 5 – 13 mm</p>
	<p>2 x Cable screw connection M20 with reduction to M12 for cable diameter 2 – 5 mm</p>
	<p>6 x Locknut M20; for securing the cable screw connections from the inside</p>
	<p>3 x Plug for operation without cable</p>
	<p>1 x 2 brackets with holes for wall mounting; can be plugged onto the rear of the housing</p>
	<p>1 x Cover holder as a strain relief for securing the open housing cover (attachment in one corner of the housing)</p>

3.3 Connections and control elements



Pos.	Brief description
1	Cable screw connections (each 2, bottom and left)
2	Display with display buttons, see <i>"3.4 Display"</i> on page 13.
3	Robust housing, dustproof and protected against water jets (IP65)
4	4 quick-release fasteners of the housing
5	Type plate with article number and serial number
6	2 brackets with holes for wall mounting (left and right)
7	2 cable screw connections on the right

3.4 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 <i>"3.4.2 Status messages" on page 15.</i>	
3	PV area (<i>process value</i> , white characters): Shows the measured actual temperature.	Shows the name of the current menu.
4	SV area (<i>set value</i> , green characters): Shows the set target temperature. 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 <i>"3.4.1 Display buttons" on page 14.</i>	

3.4.1 Display buttons

The display buttons have the following functions:

But-ton	Im normal operation	In the menu
	Blocked, no function.	Call up menu and navigate in the menu, see <i>"7 Extended configuration" on page 51.</i>
	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.

3.4.2 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 <i>Cooling</i> mode.)
SUB3	Alarm: The difference between the actual and target temperature is greater than 1.5 K (the value preset at the factory).
OUT2	<i>Cooling</i> mode is activated.
CMW	The interface is activated. Communication via the data bus is possible.
S.ERR	Error message in the PV display area (<i>sensor error</i>): The sensor shows incorrect behaviour, see " 9.2 Troubleshooting " on page 56.

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 <i>Cooling outlet</i> : 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.

Symbol	Meaning
SUB1	The valve is open. (Only displayed in <i>Heating</i> mode.)
OUT1	<i>Heating</i> mode is activated.

3.5 Optional accessories

The accessories listed here enable you to extend *iFerm Nano Top* 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
Temperature probe	With 5 m or 15 m cable length
Valves	Solenoid valves or motorised ball valves as well as ball valves and strainers from size ½" connection
Simplex cooling tube	Portable solution for heat transfer.
Heat exchanger plate	Guarantees efficient temperature control of the tank contents.
Thermowell	Permanently installed in the tank so that the temperature probe does not have to be hung loose into the container.
<i>iFerm Nano Terminal</i> control unit	Used for centrally controlling up to 30 temperature controllers via touch display and data bus.
Mounting plate	Secures <i>iFerm Nano Top</i> safely in a mesh tray.

Item	Brief description
<i>iFerm Nano</i> installation set	Back plate and installation parts for securing onto walls, wood and metal plates; can be extended
<i>iFerm Nano Switch</i> extension module	Serves in conjunction with <i>iFerm Nano Terminal</i> for delivery of sampling information for Cooling / Heating/Alarm: <ul style="list-style-type: none"> • Visual information through LED indicator lamps blue/orange/red • Potential-free contacts, e.g. to request cooling or heating medium
VariAll cable routing	Stainless steel mounting system for hygienic laying of cables in the wine cellar

4 Assembly and installation

The amount of assembly work depends on the particular application. The following provides information on the basic steps, required for preparing *iFerm Nano Top* and about the respective available installation variants.

Following the sequence below has proved to be a successful method when assembling and installing *iFerm Nano Top*:

- Preparing the housing (lead-throughs, terminal holders etc.).
- Installing the housing (wall mounting, installation set etc.).
- Laying, routing through and connecting the cables.

4.1 Preparing the housing

4.1.1 Opening the cable lead-throughs



Attention!

Only open the cable lead-throughs that you need for the task, see *“5 Applications” on page 30*.

Pay attention to the installation locations recommended in the examples.

Always pierce only the inner M20 ring of a cap.

- ➔ Place the housing upright on a stable and level surface so that the required cable lead-through faces upwards.
- ➔ Place a slotted screwdriver onto the oval marking of the cable lead-through.
- ➔ Use a hammer to pierce the cap inwards with a powerful tap.
- ➔ Repeat this procedure for all the required cable lead-throughs.
- ➔ Remove the pierced debris, check the openings and deburr the edges as necessary.



4.1.2 Installing the cable screw connection



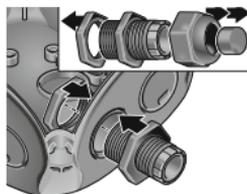
Attention!

Always select the cable screw connection that is approved for the respective cable diameter. Otherwise leaks are inevitable.

Keep the supplied plugs in a safe place. You can use them to close off installed cable screw connections when you no longer need them.

The M20 cable screw connection consists of the following parts:

- Locknut for securing on the inside
- Double nipple with thin-plate terminal and sealing ring
- Union nut for locking the cable
- Plug for operation without cable



EN



Information

On the smaller cable screw connection, the M20 double nipple is reduced outwards to M12. Installation is done in the same way.

- ➔ Select the suitable cable screw connection:
 - M20 for cable diameter 5 – 13 mm
 - M12 for cable diameter 2 – 5 mm
- ➔ Insert the double nipple into the cable lead-through from the outside and screw it into place from the inside using a locknut.
- ➔ Tighten the connection securely.

4.1.3 Repositioning the terminal holder

The terminal holder is preinstalled in the right housing wall, but it can be repositioned to the left side if necessary.

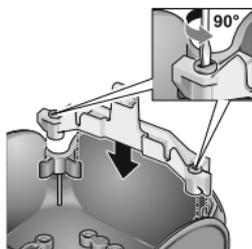


Information

Please note that the terminal holder cannot be positioned in the top and bottom housing walls due to the space requirements.

The fixing points for the terminal holder sit in the housing corners. You can easily route the cables through under the terminal holder.

- ➔ Undo the blue quick-release fasteners of the terminal holder with a quarter turn to the left.
- ➔ Insert the terminal holder into both holders from above at a suitable location.
- ➔ Lock the blue quick-release fasteners of the terminal holder with a quarter turn to the right.



4.1.4 Inserting the screw terminal

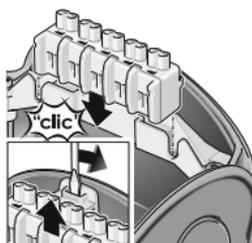
At the factory, the screw terminal is clipped into the terminal holder. It can simply be removed to connect the cable strands.



Information

To easily remove the screw terminal, simply bend the locking lug of the screw terminal slightly towards the rear.

- ➔ Insert the screw terminal into the terminal holder from above.
- ➔ Lock the screw terminal by clipping it into the locking lug towards the back.



4.1.5 Securing the housing cover on the housing

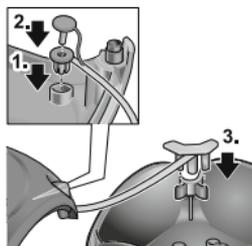
The blue retaining strap serves as strain relief for the cables which are connected to the controller in the housing cover of *iFerm Nano Top*. It is secured on the inside in a corner where the housing and housing cover meet. Installation is optional.



Information

When positioning the retaining strap, bear in mind that the cover is turned when the housing is closed.

- ➔ Insert the round end of the retaining strap into one of the 4 housing cover supports.
- ➔ Secure this attachment point by pressing the locking pin all the way down.
- ➔ Insert the other end of the retaining strap into one corner of the housing. This attachment can be easily undone if necessary.



4.2 Installing the housing

The *iFerm Nano Top* scope of delivery includes simple brackets for wall mounting. Other installation material is optionally available, see “3.5 Optional accessories” on page 16.



Attention!

At every installation location, make sure that it is suitable for installing *iFerm Nano Top* and that installation can be done properly.

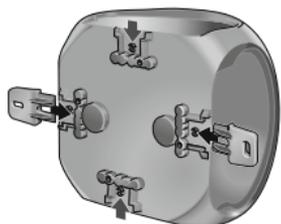
Pay attention to hidden pipes and cables and avoid areas exposed to splashing water.

Select the installation location so that no cables represent a trip hazard and can be laid with sufficient strain relief.

4.2.1 Wall mounting

The two supplied brackets allow safe mounting of the *iFerm Nano Top* on walls or pillars. As delivered, both brackets are connected at a predetermined breaking point. Installation is optional.

- ➔ Break the connected brackets into 2 parts at the predetermined breaking point.
- ➔ Push the brackets into two holders opposite each other on the rear of the housing. They engage noticeably when slight pressure is applied to them.



Information

You need to pull very firmly on a bracket in order to unlock it.

- ➔ Prepare the installation location for wall mounting. For this you can use the housing with the fitted brackets as a drilling template.



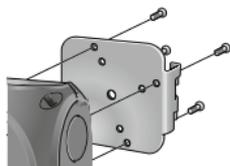
- ➔ Use suitable fastening material (screws, plugs etc.) in order to install *iFerm Nano Top* securely.

4.2.2 Using the mounting plate

(The supplied wall-mounting brackets are not required.)

The optionally available mounting plate is used to securely hook the *iFerm Nano Top* into a mesh tray.

- ➔ Secure the mounting plate on the back of the housing. To do this, use the 4 round-head screws supplied with the mounting plate.



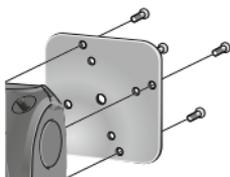
- ➔ When hanging the *iFerm Nano Top*, make sure that all 4 hooks of the mounting plate sit securely on the braces of the mesh tray.

4.2.3 Using the installation set

(The supplied wall-mounting brackets are not required.)

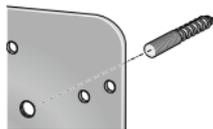
The installation set consists of a flat mounting plate and a set of screws that allows a few common attachment variations.

- ➔ First secure the mounting plate on the back of the housing. To do this, use the 4 round-head screws supplied with the mounting plate.



- ➔ Select one of the following mounting variations:

- **Hanger bolt**
(for walls, wood, etc.):
Anchor it properly at the intended installation location.
- **Threaded bolt**; for pipe clamp, metal plate, etc.:
Screw it securely into place at the intended installation location.



- ➔ Position the *iFerm Nano Top* with the middle threaded hole of the mounting plate onto the hanger bolt (or onto the threaded bolt) and screw the housing securely into place.



Information

Additional bolts, nuts and washers are included in the installation set for individual attachment configurations and for fastening the hanger bolts and the threaded bolts to the mounting plate.

4.3 Cable connection



DANGER! – Electric shock

Carry out work on the terminals only when they have been isolated from the mains power.

Before you open the housing, always disconnect from the mains any terminal boxes that have been connected.



Attention!

A short circuit can destroy the connected appliances. Whenever you work on the electrical connection, make sure it has been isolated from the mains power.

4.3.1 Cable specification and connection instructions



Attention!

Read and follow the instructions below before you select and connect the required cables.

4.3.1.1 24 V AC power connection

Fuse

The supply cable for the 24 V AC mains must be protected against short-circuiting. When selecting the fuse, pay attention to the maximum permitted current on the transformer.

A glass tube fuse should normally have the triggering characteristic *slow blow*. For example, a safety fuse or an automatic circuit breaker can be looped into the connecting cable.

Configuration and cable cross sections

For each transformer, connect only the number of appliances and valves which is permitted as a maximum.

Ensure that the cable cross sections are sufficient and pay attention to the maximum permitted cable lengths. Power loss caused by too-small cable cross sections and too-long cables can cause malfunctioning of the valves.

The table below shows a few configuration examples. However, the details must only be seen as guideline values and are no substitute for the calculation required for a proper configuration:

Number of connected solenoid valves	Connected cable length	
	10 m	20 m
8	2 x 1.5 mm ²	2 x 2.5 mm ²
4	2 x 0.5 mm ²	2 x 1.5 mm ²
2	2 x 0.5 mm ²	2 x 0.5 mm ²

4.3.1.2 Data bus

When selecting the bus cable, make sure that it is both suitable and approved for the Modbus communication protocol.

4.3.1.3 Insulation

Stripped strand ends must not be longer than approximately 10 mm. They must always be protected with wire end ferrules. Exposed strand ends must be shortened and properly insulated.

The stripped shield of the bus cable must not be laid bare, it must be properly insulated with a shrink-on sleeve.

4.3.2 Routing the cable into the housing

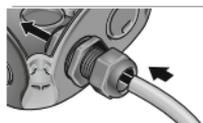


Attention!

Keep the plug in a safe place so that the cable screw connection can be sealed tight when not in use.

Only use cables with a diameter permissible for the cable screw connection, see *“4.1.2 Installing the cable screw connection” on page 18*:

- ➔ Loosen the union nut of the cable screw connection sufficiently to allow the cable to be pushed through easily.
- ➔ Remove the plug if necessary.
- ➔ Strip the required length of the cable:
 - After connection, the cable sheath should project about 5 mm into the inside of the housing.
 - The free strands should be long enough to connect them without tension and to close the housing cover with controller without pressure.
- ➔ Route the cable through the loosened cable screw connection and into the housing.
- ➔ Secure the cable against pulling when the cable sheath projects about 5 mm into the housing:



- Use an open-end spanner to tighten the union nut hand-tight.
- Remember that the cable should remain easy to rotate until the strands are connected.

4.3.3 Connecting the strands



Attention!

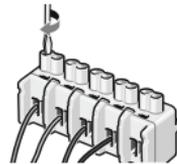
Follow the recommendations in the chapter *“5 Applications” on page 30*.

Make sure that the stripped strand ends are not longer than approximately 10 mm.

Always protect the strand ends with wire end ferrules before you connect them.

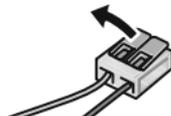
Screw terminal

- ➔ Use a slotted screwdriver to undo the screw and to open the terminal sufficiently.
- ➔ Push the strand end all the way into the contact point.
- ➔ Tighten the contact point screw securely.
- ➔ Check that the strand is secure in the terminal.
- ➔ Repeat this procedure for all the required strands.



U-clamp terminal

- ➔ Open the terminal by flipping the tab upwards.
- ➔ Push the strand end all the way into the contact point.
- ➔ Flip the tab down to close the terminal.
- ➔ Check that the strand is secure in the terminal.

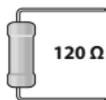


4.3.4 Installing special equipment

Bus terminating resistor

Each end of a data bus line must be terminated by a 120 Ω bus terminating resistor.

For this, both connections of the resistor are, like the strand ends of a cable, connected in a screw terminal. See *“5.3 Termination – power connection and data bus” on page 36.*



4.3.5 Positioning and installing the temperature controller



Attention!

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

- ➔ Follow the instructions in the chapter *“5.5 Temperature probe” on page 40.*
- ➔ Use the smaller version of the cable screw connection (M12) to install the temperature probe.
- ➔ Push the stripped temperature probe sufficiently far into the cable screw connection so that the cable sheath projects about 5 mm into the inside of the housing.
- ➔ Make the connections to the probe cable.
- ➔ Lock the temperature probe by tightening the cable screw connection.

4.3.6 Connecting the power supply and laying the cables

The power supply cable 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 Top switches itself on automatically when connected to a power supply, see “6.1 Commissioning” on page 48. 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 sufficient strain relief and kink protection.
- ➔ Lay the cables so that no liquids can run along the cable and get into the controller housing.
- ➔ Connect the connecting cable to your system properly.

The strands of the *iFerm Nano Top* 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 *“9.5 Customer service” on page 59.*

- ➔ Secure the laid cables properly.

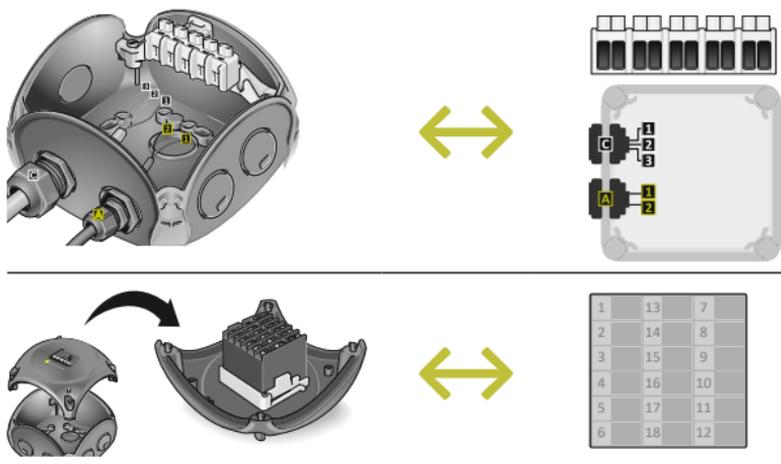
4.3.7 Positioning the valves

- ➔ For optimum positioning of the valves please follow the corresponding information in the respective operating instructions.

5 Applications

Use *iFerm Nano Top* to make all connections that you require. For the most common applications, you will find below a few recommendations for cable routing and for the respective required terminal assignment.

In the example graphics, the installation locations for the cable screw connection and for the cable routing are shown schematically as plan views. The following comparisons are intended to show how the schematic representations should be interpreted:



Follow the instructions below when making the cable connections described in the examples:

- ➔ Only open the cable lead-throughs that you actually need.
- ➔ Pay attention to the installation locations recommended in the examples.
- ➔ Check that the connected strands are secure before you complete the installation work and close the *iFerm Nano Top*.
- ➔ Securely tighten all cable screw connections on the inside and outside in order to ensure strain relief and no leaks.

Detailed instructions about the respective required work can be found in the chapter *“6.1 Commissioning” on page 48*.



Attention!

Strand colours shown in the examples apply only to LiquoSystems products from 2017 onwards. Pay special attention to the details relating to the respective signal being carried and the terminal assignment.

5.1 Termination – power connection

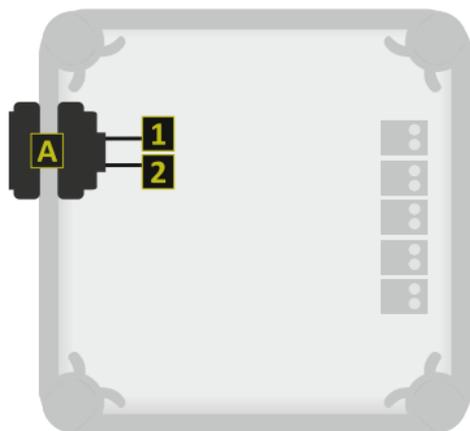
iFerm Nano Top functions as a safe termination for the mains. It can be extended at any time from here.

The following cables are connected:

A Power cable (input)

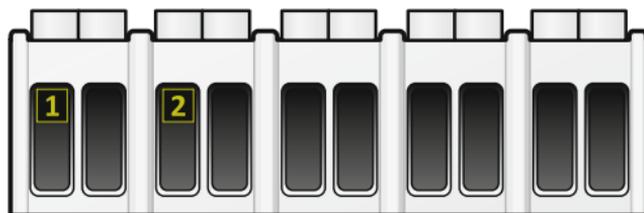
- 1** 24 V AC power supply (blue)
- 2** 0 V AC power supply (brown)

Cable connections



EN

Terminal assignment



5.2 Passage – power connection

iFerm Nano Top functions as a junction box for the power supply to which you can connect appliances or other cables.

The following cables are connected:

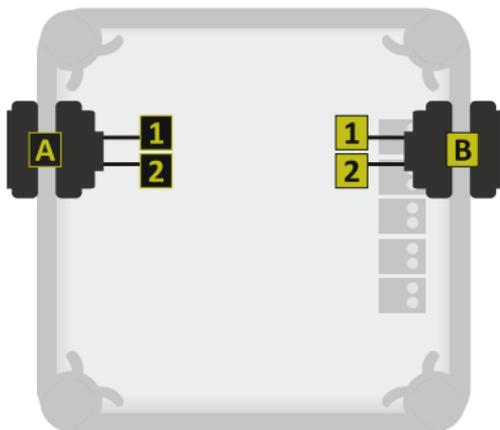
A Power cable (input)

- 1** 24 V AC power supply (blue)
- 2** 0 V AC power supply (brown)

B Power cable (output)

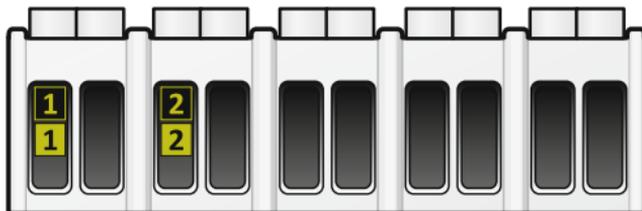
- 1** 24 V AC power supply (blue)
- 2** 0 V AC power supply (brown)

Cable connections



EN

Terminal assignment



5.3 Termination – power connection and data bus

Precondition: Preinstalled *iFerm Nano Top* in accordance with “5.1 Termination – power connection” on page 32.

iFerm Nano Top functions as a safe termination for the supply. The mains and data bus can be extended at any time from here.

The following cables and a bus terminating resistor that terminates the data bus are connected:

C Data bus (input)

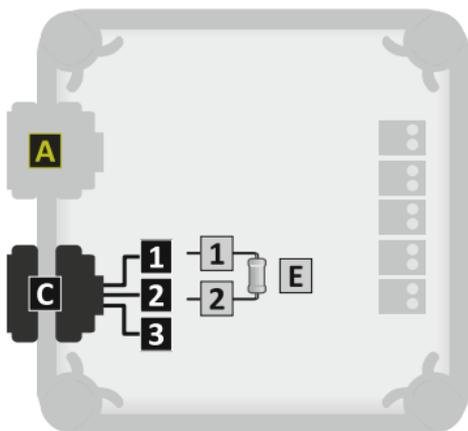
- 1** Modbus RS485 A
- 2** Modbus RS485 B
- 3** Modbus shield

E Bus terminating resistor (120 Ω)

(Any connection direction can be selected.)

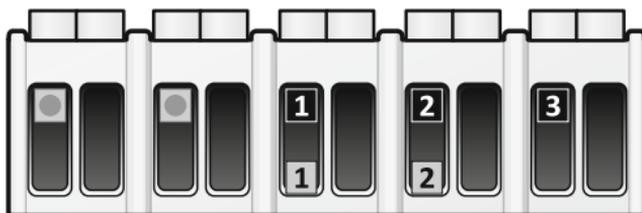
- 1** Connection 1
- 2** Connection 2

Cable connections



EN

Terminal assignment



5.4 Termination – power connection and data bus

Precondition: Preinstalled *iFerm Nano Top* in accordance with “5.2 Passage – power connection” on page 34.

iFerm Nano Top functions as a junction box for the power supply and data bus to which you can connect appliances or other cables.

The following cables are connected:

C Data bus (input)

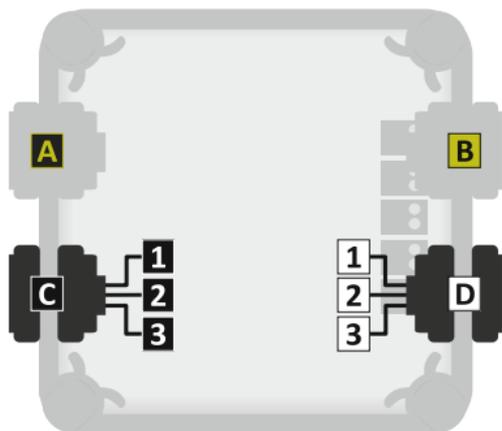
- 1** Modbus RS485 A
- 2** Modbus RS485 B
- 3** Modbus shield

D Data bus (input)

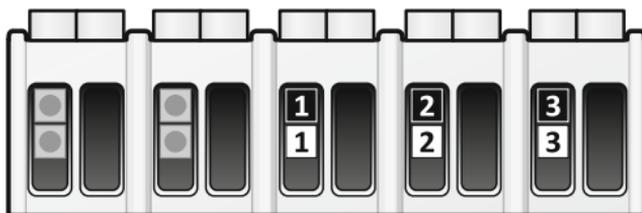
- 1** Modbus RS485 A
- 2** Modbus RS485 B
- 3** Modbus shield

Cable connections

EN



Terminal assignment



5.5 Temperature probe

(Example applies to temperature probes in a 3-wire circuit that minimises measured value deviations even with long control cables.)

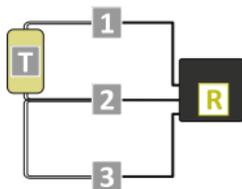
Precondition: Preinstalled *iFerm Nano Top* in accordance with “5.4 Termination – power connection and data bus” on page 38.

For monitoring the process temperatures, first a temperature probe is connected to *iFerm Nano Top*.



Information – 3-wire circuit

Two measuring circuits are formed using an additional cable to the measuring resistor, allowing the line resistance to be calculated.

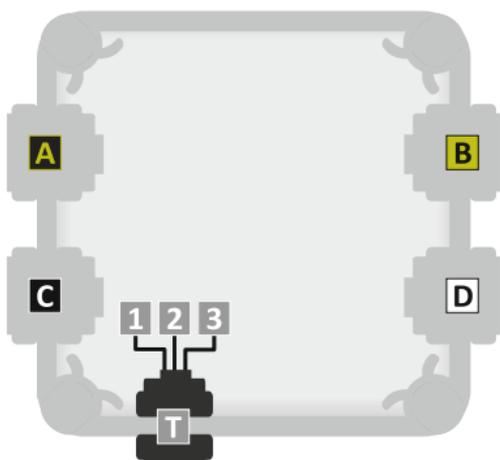
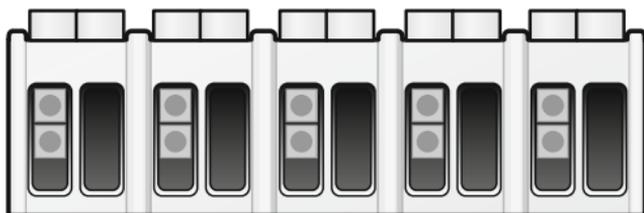


This enables precise measurements even when at a greater distance from the controller.

The following cables are connected:

T Connecting cable, temperature probe

- 1 Strand 1 (white)
- 2 Strand 2 (brown)
- 3 Strand 3 (yellow, compensating cable)

Cable connections**Terminal assignment**

1	13	7
2	14	8
3	15	9
4	16	10
5	17	11
6	18	12

5.6 iFerm Nano Top with cooling valve

Precondition: Preinstalled *iFerm Nano Top* in accordance with “5.5 Temperature probe” on page 40.

iFerm Nano Tank controls a valve in the cooling circuit in order to regulate the process-dependent cooling of a container (*Cooling mode*).

The following cables are connected:

F Cooling valve connecting cable

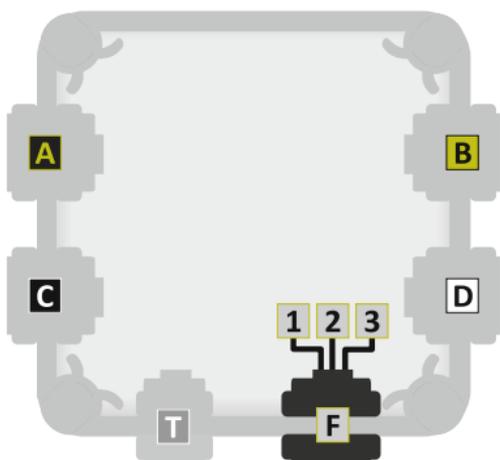
- 1** 24 V AC power supply (only present on certain motorised ball valve types)
- 2** 0 V AC power supply
- 3** 24 V AC switching contact

R Control unit connecting cable

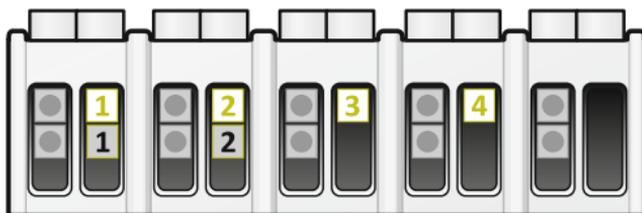
- 1** 24 V AC power supply (white)
[Control unit with jumper from terminal 11 to 10.]
- 2** 0 V AC power supply (brown)
- 3** Modbus RS485 A (yellow)
- 4** Modbus RS485 B (grey)
- 5** 24 V AC switching contact, cooling valve (green)

Cable connections

EN



Terminal assignment



1	13	4	7
2	14	3	8
3	15		9
4	16		10
5	17		11
6	18		12

5.7 iFerm Nano Top with heating valve

(Heating mode only in conjunction with *iFerm Nano Terminal*.)

Precondition: Preinstalled *iFerm Nano Top* in accordance with “5.5 Temperature probe” on page 40.

iFerm Nano Tank controls a valve in the heating circuit in order to regulate the process-dependent heating of a container (Heating mode).

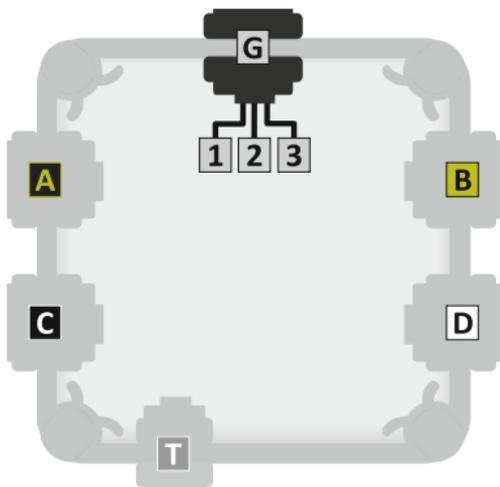
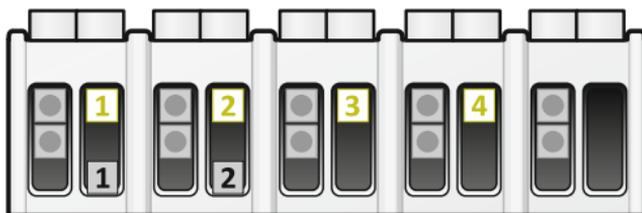
The following cables are connected:

G Heating valve connecting cable

- 1** 24 V AC power supply (only present on certain motorised ball valve types)
- 2** 0 V AC power supply
- 3** 24 V AC switching contact

R Control unit connecting cable

- 1** 24 V AC power supply (white)
[Control unit with jumper from terminal 11 to 10.]
- 2** 0 V AC power supply (brown)
- 3** Modbus RS485 A (yellow)
- 4** Modbus RS485 B (grey)
- 6** 24 V AC switching contact, heating valve (pink)

Cable connections**Terminal assignment**

1	13	4	7
2	14	3	8
3	15		9
4	16		10
5	17		11
6	18		12

5.8 Cooling and heating

(Heating mode only in conjunction with *iFerm Nano Terminal*.)

Precondition: Preinstalled *iFerm Nano Top* in accordance with “5.5 Temperature probe” on page 40.

iFerm Nano Top controls a valve in the cooling circuit and a valve in the heating circuit.

The following cables are connected:

F Cooling valve connecting cable

- 1** 24 V AC power supply (only present on certain motorised ball valve types)
- 2** 0 V AC power supply
- 3** 24 V AC switching contact

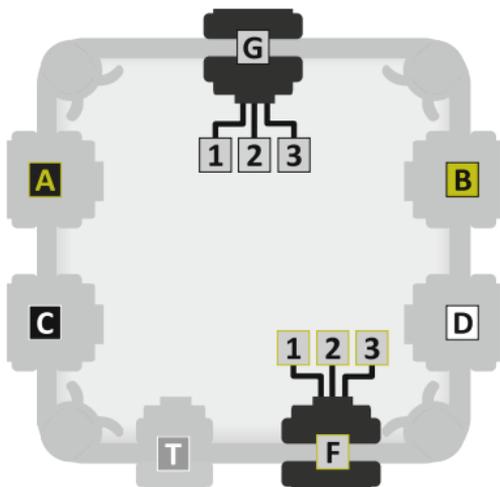
G Heating valve connecting cable

- 1** 24 V AC power supply (only present on certain motorised ball valve types)
- 2** 0 V AC power supply
- 3** 24 V AC switching contact

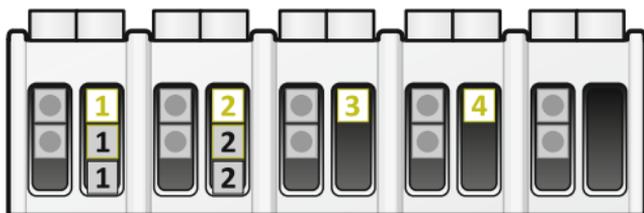
R Control unit connecting cable

- 1** 24 V AC power supply (white)
[Control unit with jumper from terminal 11 to 10.]
- 2** 0 V AC power supply (brown)
- 3** Modbus RS485 A (yellow)
- 4** Modbus RS485 B (grey)
- 5** 24 V AC switching contact, cooling valve (green)
- 6** 24 V AC switching contact, heating valve (pink)

Cable connections



Terminal assignment



1	13	4	7	
2	14	3	8	5
3	15		9	6
4	16		10	1
5	17		11	1
6	18		12	2

6 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 “7 *Extended configuration*” on page 51.

6.1 Commissioning

You can start commissioning as soon as *iFerm Nano Top* is properly installed and connected to all the necessary cables.

- ➔ Test once again whether all strands are securely connected to the screw terminal.
- ➔ Check that all screw connections are secure.
- ➔ Put the housing cover properly into place and close the 4 quick-release fasteners with a quarter turn to the right.

iFerm Nano Top is now ready for operation. As soon as all cables have been laid and connected properly, you can start operation.

- ➔ Check the *iFerm Nano Top* at regular intervals to ensure that it is in the correct state.



Attention! - First commissioning

When *iFerm Nano Top* is commissioned for the first time, the factory preset values apply, see “9.1 *Technical data*” on page 55. Change these as required before you start a process.

- ➔ Connect *iFerm Nano Top* to the mains, see “4.3 *Cable connection*” on page 24. The display switches itself on and shows the actual and target temperatures.

The 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 “6.2 Setting the target temperature” on page 49.
 - Start up the production process in the usual way.
- ➔ Check *iFerm Nano Top* at regular intervals to ensure correct operation.

6.2 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 Top*.

- ➔ 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:



➔ 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.



Information

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



Information

To use *iFerm Nano Top* 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.

7 Extended configuration

This chapter gives instructions on how to change appliance settings with which you can adapt *iFerm Nano Top* 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 “9.5 Customer service” on page 59.

7.1 Activating and deactivating the button lock



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



➔ Call up the protected menu area:
OP display (operation / adjustment protect)



➔ Select the parameter *OP* (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.
- *1*: 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 Top saves the respective last setting of the button lock. For safety reasons, you should reactivate the button lock (value 1) as soon as you have made the desired changes.

7.2 Changing settings

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

- First deactivate the button lock, see [“7.1 Activating and deactivating the button lock” on page 51](#).
- Make the desired changes and then reactivate the button lock.

7.2.1 Changing the appliance address

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



iFerm Nano Top 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:
CN-E display (*input type*)
-  , 1x → Select the *PSEL* (*parameter selection*) menu.
-  , 1x → Select the *U-N \bar{o}* (*unit number*) parameter.
The SV area shows the current appliance address.
-  /  → Set the desired appliance address; the values *1-30* are valid.
-  → End the process. The display switches over to showing the temperature.

7.2.2 Activating and deactivating communication

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



You can disconnect *iFerm Nano Top* from the data bus communication; for this, simply deactivate the communication connection to the central control unit.

-  , 1x → Call up the parameter level:
L.RdJ display (*adjustment level*)
 -  , 2x → Select the *CMW \bar{E}* (*communications writing*) parameter. The SV area shows the current setting.
 -  /  → Select one of the following values:
 - *ON* (*on*): Communication is activated.
 - *OFF* (*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*.

8 Maintenance and care

iFerm Nano Top is designed for continuous and largely maintenance-free operation. The following instructions will help you to always keep *iFerm Nano Top* 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 Top*.
- ➔ If in doubt, contact customer service, see “9.5 Customer service” on page 59.

iFerm Nano Top 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 Top* 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 immersion, high-pressure cleaners).

9 Appendix

9.1 Technical data

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Parameter	Value
Default settings	Target temperature 30 °C, Mode <i>Cooling</i> , 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
Size (H x W x D)	approx. 170 x 170 x 80 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

9.2 Troubleshooting

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

Fault	Cause	Remedy
Short circuit or no function	Interruption / loose contact.	Check all contact points, see <i>"5 Applications" on page 30.</i>
No power.	Fuse faulty.	Replace fuse, see <i>"4.3.1.1 24 V AC power connection" on page 25.</i>
	Transformer switched off or faulty.	Switch on transformer, repair / replace if necessary.
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 <i>"3.4.1 Display buttons" on page 14.</i>
	Button stuck.	Clean button carefully, see <i>"8 Maintenance and care" on page 54.</i>
	Button faulty, no contact.	Contact customer service.
The displayed actual temperature is imprecise or there is an error <i>S.ERR</i> (sensor error).	Probe cable not watertight, moisture causes the measured value to increase slowly.	Check the temperature probe and probe cable for damage and replace if necessary.
No sensors / actuators.	Sensor / actuator faulty.	Repair sensor / actuator, or replace if necessary.

Fault	Cause	Remedy
Solenoid valve indicator lamp faulty.	Lights up even though there is no flow.	Check the pressure difference between the inlet and outlet. Flow is possible only if there is admission pressure at the inlet.
		Valve or inlet filter dirty, see <i>"8 Maintenance and care"</i> on page 54.
	Valve stuck (limescale); contact customer service.	
	Does not light up despite flow.	Valve stuck (limescale); contact customer service.
No reaction on central controller.	Communication via data bus deactivated.	Activate communication, see <i>"7.2.2 Activating and deactivating communication"</i> on page 53.

Contact us directly if the fault persists or if you need spare parts, see *"9.5 Customer service"* on page 59.

9.3 Disposal

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

- ➔ 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.



9.4 Declaration of conformity



iFerm Nano Top

Manufacturer: LiquoSystems GmbH
Wilhelmstraße 45
74366 Kirchheim / Neckar
Germany

Declaration: We hereby declare that the product
iFerm Nano Top 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: 15/01/2018

Signature:

Stephan Wieland,
Managing director

9.5 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

Wilhelmstraße 45 | 74366 Kirchheim / Neckar, Germany

Tel.: +49 7143 891050 | Fax: +49 7143 92868

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 – 04:30 pm

Friday: 09:00 am – 01:00 pm

E-mail: e-kundendienst@liquosystems.de

Phone: +49 7143 891050

Hotline

10th September to 10th November

Mon. – Fri.: 08:00 am – 08:00 pm

Sat. + Sun.: 09:00 am – 06:00 pm

iFerm Nano



Top



Terminal



Tank



Box



Solo



Switch