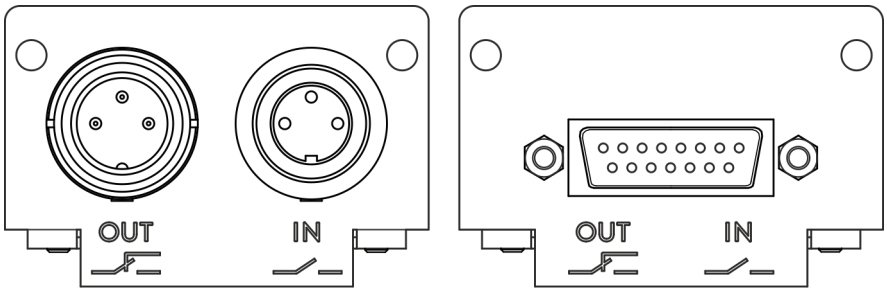
Operation manual

Interface module LRZ 927 / 928

LRZ 927 – Advanced contact module with single input and output (NAMUR)

LRZ 928 – Advanced contact module with 3 inputs and outputs



LRZ 927 LRZ 928

V2R5

Read this manual prior to performing any task!

Manufacturer:
LAUDA DR. R. WOBSER GMBH & CO. KG
Laudaplatz 1
97922 Lauda-Königshofen
Germany
Telephone: +49 (0)9343 503-0
E-mail: info@lauda.de
Internet: https://www.lauda.de

Translation of the original operation manual

Q4DA-E_13-022, 2, en_US 10/24/2022

replaces issue V2R4, V1R5

Table of contents

1 General

Many types of LAUDA constant temperature equipment have vacant module slots for installing additional interfaces. The number, size and arrangement of the module slots vary depending on the device and are described in the operating manual accompanying the constant temperature equipment. Two additional module slots available as accessories can be fitted to a LiBus module box, which is then connected as an external casing to the LiBus interface on the constant temperature equipment.

This operating manual describes how to install and configure the following interface modules:

- Contact module with single input and output (NAMUR), catalog no. LRZ 927
- Contact module with 3 inputs and outputs, catalog no. LRZ 928

The contact interface is used to set or query binary states of the constant temperature equipment by opening and closing circuits. The module activates when states are output (read). When the states change (write), the user opens or closes the circuit outside the module. The interface functions provided for this purpose are described in chapters ↳ Chapter 7.2.1 “Read commands” on page 20 and ↳ Chapter 7.2.2 “Write commands” on page 21.

1.1 Intended use

The interface module can only be operated as intended and under the conditions specified in this operating manual.

The interface module may only be used in the following areas:

- Production, quality assurance, research and development in an industrial environment

The interface module is an accessory item that is used to control and monitor the LAUDA constant temperature equipment. The interface module is built into the device and connected to the 24 volt supply. It may only be installed in constant temperature equipment that supports the interface provided. Refer to the chapter "Compatibility” in this operating manual for a list of compatible product lines.

Operation of the interface module is also permitted in combination with the LiBus module box (LAUDA catalog no. LCZ 9727). This operating manual also contains a description of how to install and connect up the module box.

Reasonably foreseeable improper use

- Operation on a non-compatible device
- Outdoor operation
- Operation in a potentially explosive area
- Operation after incomplete assembly
- Operation using defective cables or connections or those that do not confirm to standards
- Operation under medical conditions in accordance with DIN EN 60601-1 or IEC 601-1

1.2 Compatibility

The interface modules are available as accessories for the following LAUDA product lines:

- Integral IN
- PRO
- Variocool
- Variocool NRTL

> *No operation of interfaces of the same type*
> *Depending on the constant temperature equipment, only one Kontakt interface can be used. This applies irrespective of the interface type.*

1.3 Technical changes

All technical modifications are prohibited without the written consent of the manufacturer. Damage resulting from a failure to observe this condition will void all warranty claims.

However, LAUDA reserves the right to make general technical modifications.

1.4 Warranty conditions

LAUDA grants a standard warranty of one year.

1.5 Copyright

This operating manual was written in German, checked and approved. If the content of other language editions deviates from the German edition, the information in the German edition shall take precedence. If you notice any discrepancies in the content, please contact LAUDA Service, see ↳ Chapter 1.6 “Contact LAUDA” on page 7.

Company and product names mentioned in the operating manual are usually registered trademarks of the respective companies and are therefore subject to brand and patent protection. Some of the images used may also show accessories that are not included in the delivery.

1.6 Contact LAUDA

Contact the LAUDA Service department in the following cases:

- Troubleshooting
- Technical questions
- Ordering accessories and spare parts

Please contact our sales department for questions relating to your specific application.

Contact information

LAUDA Service

Phone: +49 (0)9343 503-350

Email: service@lauda.de

2 Safety

2.1 General safety information and warnings

- Read this operating manual carefully before use.
- Keep the operating manual in a place within easy reach of the interface module.
- This operating manual is part of the interface module. If the interface module is passed on, the operating manual must be kept with it.
- This operating manual is applicable in combination with the operating manual of the constant temperature equipment in which the interface module is installed.
- Manuals for LAUDA products are available for download on the LAUDA website: https://www.lauda.de
- The warnings and safety instructions in this operating manual must be observed without fail.
- There are also certain requirements for personnel, see Chapter 2.3 “Personnel qualification” on page 9.

Structure of warnings

Warning signs	Type of danger
	Warning – danger zone.

Signal word	Meaning
WARNING!	This combination of symbol and signal word indicates a potentially dangerous situation that can result in death or serious injury if it is not avoided.
NOTICE!	This combination of symbol and signal word indicates a potentially dangerous situation that can result in material and environmental damage if it is not avoided.

2.2 Information about the interface module

- Always disconnect the constant temperature equipment from the power supply before installing the interface module or connecting interfaces.
- Always take the recommended safety measures against electrostatic discharge before handling interface modules.
- Avoid touching the circuit board with metallic tools.
- Do not start up the constant temperature equipment before installation of the interface module is complete.
- Store any unused interface modules in their packaging in accordance with the specified ambient conditions.
- Use only suitable cables of sufficient length for cable connections.
- Make sure that the protective screen on the cables and connectors complies with EMC regulations. LAUDA recommends using preassembled cables.
- Always lay cables correctly so that they do not pose a tripping hazard. Secure the laid cables and make sure that they cannot be damaged during operation.
- Check the condition of the cables and interfaces prior to each operation.
- Immediately clean any soiled parts, in particular unused interfaces.
- Make sure that the signals transmitted via the interface correspond to the permitted operating parameters of the interface module.

2.3 Personnel qualification

Specialized personnel

Only specialized personnel are permitted to install interfaces modules. Specialized personnel are personnel whose education, knowledge, and experience qualify them to assess the function and risks associated with the device and its use.

3 Unpacking

NOTICE!
Transport damage

Device damage

- Closely inspect the device for transport damage prior to starting up.
- Never operate a device that has sustained transport damage!

NOTICE!
Electrostatic discharge

Material damage

- Always observe safety measures against electrostatic discharge.

Please observe the following installation sequence:

1. Remove the interface module from its packaging.
2. If you want to store the interface module at the installation location, use the outer packaging. This packaging is protected against static charging.
3. After installing the equipment, dispose of the packaging materials in line with environmental regulations, see ↳ “Packaging” on page 26.

If you discover any damage on the interface module, contact LAUDA Service immediately, see ↳ Chapter 1.6 “Contact LAUDA” on page 7.

4 Device description

4.1 Purpose

The contact module is used to set or query binary states of the constant temperature equipment by opening and closing circuits:

- Output state (read): The module activates the circuit of the defined interface function, see Chapter 7.2.1 “Read commands” on page 20.
- Set state (write): The user activates the circuit of the defined interface function from outside the module, see Chapter 7.2.2 “Write commands” on page 21.

4.2 Versions

Choosing the most suitable version depends entirely on the scope of control required:

- Contact module with single input and output (NAMUR): One switching function and one query can be configured for one input and one output, which is enough to switch the constant temperature equipment between operating and standby mode as well as monitor the temperature, for example.
- Contact module with 3 inputs and outputs: There are three inputs and three outputs to which you can assign various switching functions and queries.

Only one of the two versions can be operated for each item of constant temperature equipment. This is particularly important to note when integrating additional modules via the module box.

4.3 Structure

Contact output (*OUT*) and contact input (*IN*) on interface module LRZ 927 are implemented using two 3-pin connections.

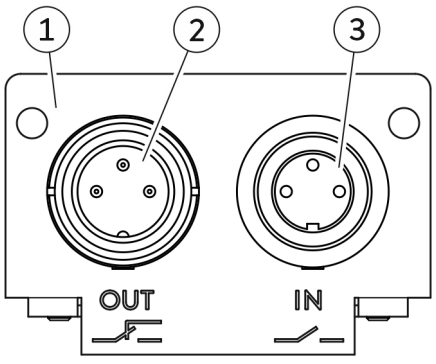


Fig. 1: Contact module LRZ 927

1 Cover with holes for M3x10 fastening screws
2 Contact output, connector, 3-pin
3 Contact input, socket, 3-pin

Refer to Chapter 6.1.1 “Contact module with single input and output (NAMUR)” on page 16 for more information on contact assignment.

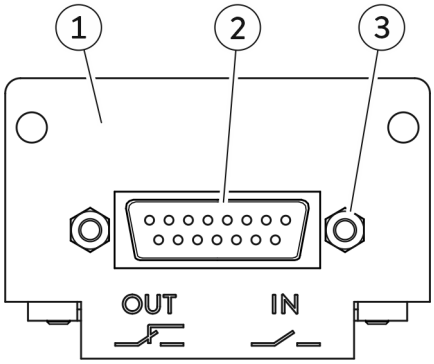


Fig. 2: Contact module LRZ 928

Contact outputs (*OUT*) and contact inputs (*IN*) on interface module LRZ 928 have a 15-pin D-Sub socket design.

1 Cover with holes for M3x10 fastening screws
2 D-Sub socket, 15-pin (3 outputs, 3 inputs)
3 2x D-Sub threaded bolts for securing the connector

Refer to ↳ Chapter 6.1.2 “Contact module with 3 inputs and outputs” on page 16 for more information on contact assignment.

5 Before starting up

5.1 Installing the interface module

The interface module is connected to an internal LiBus ribbon cable and inserted into a vacant module slot. The number and arrangement of the module slots vary depending on the device. The module slots are protected by a cover that is screwed onto the casing or attached to the slot opening.

WARNING!
Touching live parts

Electric shock

- Disconnect the device from the power supply before starting any installation work.
- Always observe safety measures against electrostatic discharge.

The module installation description essentially applies to all LAUDA constant temperature equipment; the example diagrams here show the installation of an analog module in constant temperature equipment from the Variocool product line.

Please note that an interface module with a small cover can only be installed in a low module slot. The fitted cover must cover the opening on the module slot completely.

You will require two M3 x 10 screws and a suitable screwdriver to secure the interface module.

Please observe the following installation sequence:

1. Turn off the constant temperature equipment and pull out the mains plug.
2. If necessary, remove the screws from the cover on the relevant module slot. If necessary, use a slotted screwdriver to prise off the cover.

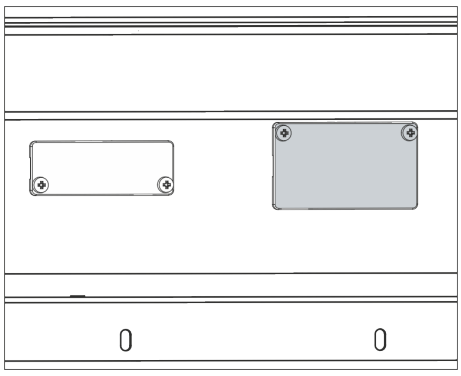


Fig. 3: Removing the cover (schematic diagram)

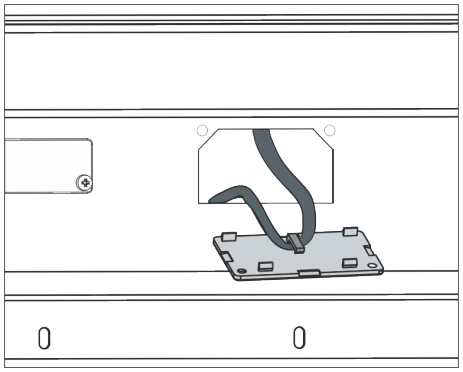


Fig. 4: Detaching the LiBus ribbon cable (schematic diagram)

3. Remove the cover from the module slot.
   - ▶ The module slot is open. The LiBus ribbon cable is attached to the inside of the cover and is easily accessible.
4. Disconnect the LiBus ribbon cable from the cover.

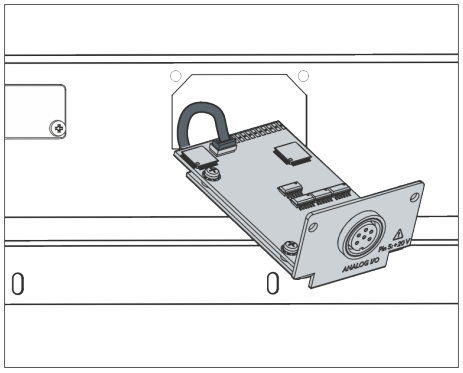


Fig. 5: Connecting the interface module (schematic diagram)

5. Connect the red plug on the LiBus ribbon cable to the red socket on the circuit board of the interface module. Plug and socket are reverse polarity protected: Make sure that the lug on the plug is aligned with the recess in the socket.
   - ▶ The interface module is correctly connected to the constant temperature equipment.
6. Slide the LiBus ribbon cable and the interface module into the module slot.

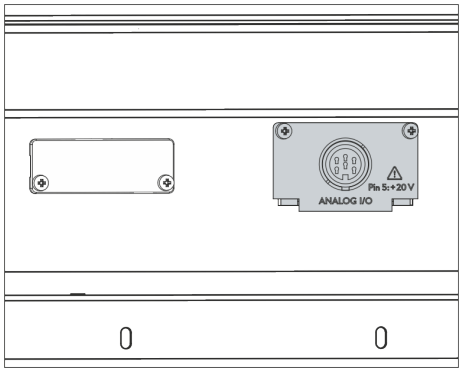


Fig. 6: Securing the cover (schematic diagram)

7. Secure the cover to the casing using two M3 x 10 screws.
   - ▶ The new interface on the constant temperature equipment is ready for operation.

5.2 Using the module box

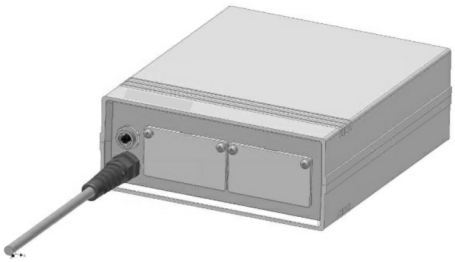


Fig. 7: LiBus module box, catalog no. LCZ 9727

You can extend LAUDA constant temperature equipment by two additional module slots using the LiBus module box. The module box is designed for interface modules with a large cover and is connected to constant temperature equipment via a vacant LiBus socket.
The socket on the constant temperature equipment bears the label **LiBus**.

Please observe the following installation sequence:

1. Switch off the constant temperature equipment.
2. Disconnect the cable on the module box from the constant temperature equipment.
   - ▶ The module box is disconnected from the power supply.
3. Check which interfaces are already present on the constant temperature equipment and module box.

   Observe the information on interface module compatibility. Only install an interface module with the same type of interface if operation with several of these interfaces is permitted.
4. Install the required interface module in the module box. Please read the information on installing the module box in the constant temperature equipment, see chapter "Installing the interface module".
5. Position the module box close to the constant temperature equipment.
6. Connect the cable on the module box to the LiBus socket on the constant temperature equipment.
   - ▶ The interfaces on the module box are ready for operation.

6 Commissioning

6.1 Contact assignment

If you have assembled the cables yourself, please note the following:

- *Statutory EMC requirements also apply to the cable connections. Use only shielded connection lines with shielded plugs/sockets.*
- *Reliably isolate all equipment connected to the extra-low voltage inputs and outputs according to DIN EN 61140 to safeguard against dangerous contact voltages. For example, use double or reinforced insulation according to DIN EN 60730-1 or DIN 60950-1.*

The two variants of contact module differ in the number of inputs and outputs. Two 3-pin circular connectors and a 15-pin D-Sub socket are used as connections. The connector can be configured for an external system according to the contact assignments listed below.

Refer to Chapter 12 “Accessories” on page 27 for accessory information on assembling connection cables.

6.1.1 Contact module with single input and output (NAMUR)

Contact output (connector) and contact input (socket) on the interface module have a 3-pin connection design.

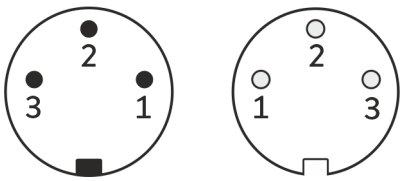


Fig. 8: Output / input contacts

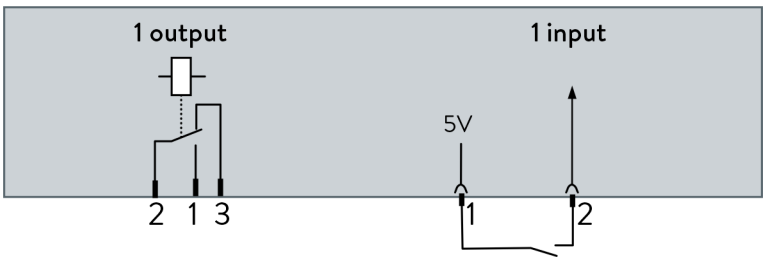


Fig. 9: Circuit diagram

6.1.2 Contact module with 3 inputs and outputs

The connection on this interface module is designed as a 15-pin D-Sub socket.

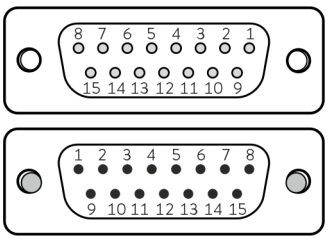


Fig. 10: Socket / plug contacts

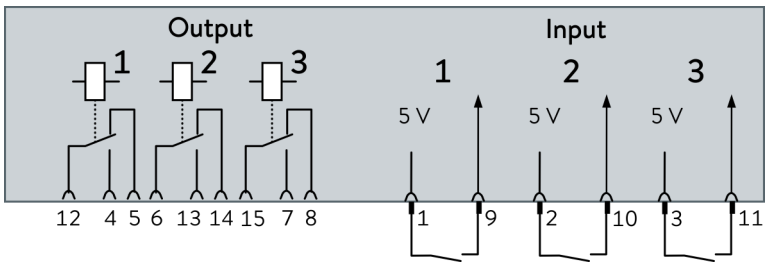


Fig. 11: Circuit diagram

6.2 Software update

Older software installed on constant temperature equipment may have to be updated for the new interface to work.

1. Switch on the constant temperature equipment after installing the new interface.
2. Check whether a software warning appears on the display.
   - Warning 510 - 532 *SW update required* or *SW too old* : Please contact LAUDA Service, see ↳ Chapter 1.6 “Contact LAUDA” on page 7.
   - No software warning: Operate the constant temperature equipment as normal.

6.3 Module generation

To see which generation of an interface module is involved, proceed as follows:

1. Switch on the constant temperature equipment after installing the interface module.
2. Press the [Enter key] on the constant temperature equipment to open the menu.
3. On the Integral IN constant temperature equipment, for example, select the → *Device status* → *Hardware version* menu items.
   On the Variocool constant temperature equipment, for example, select the → *Setup* → *Device status* → *Hardware version* menu items.
   ▶ A list of hardware versions opens.

   If the revision number *(1)* appears in brackets in front of the printed circuit board index, a second generation interface module (with the suffix "Advanced") is installed in the constant temperature equipment.

7 Operation

After the equipment is switched on, the new interface can be addressed and configured from the constant temperature equipment menu. Different functions can be selected for the inputs and outputs: Depending on the interpretation of the input signal, different information is transmitted to the signal output.

7.1 Menu structure

The menu only ever shows functions that are available for the current constant temperature equipment.

The menu for configuring the interface is integrated in the main menu of the relevant constant temperature equipment:

All operating units except for the master — *Menu* → *Modules* → *Switching contacts*

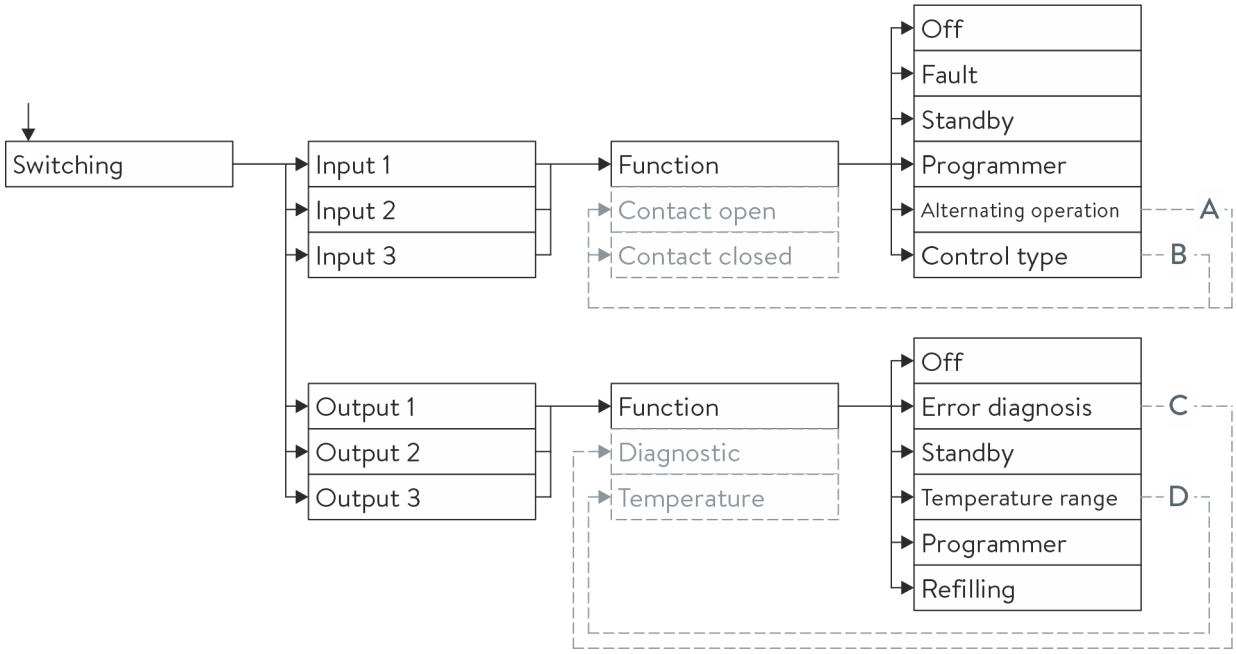


Fig. 12: Contact module menu

The alternating operation (= specifying two temperature set points alternately), control type, error diagnosis and temperature range functions require additional settings and the menu is therefore extended accordingly:

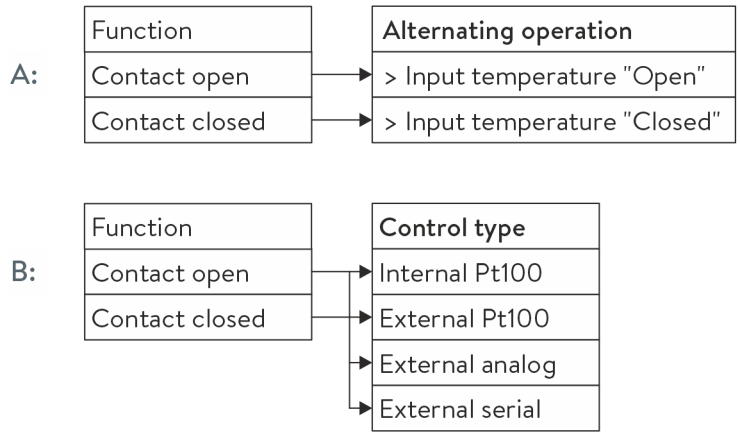


Fig. 13: Contact input, alternating operation and control type menus

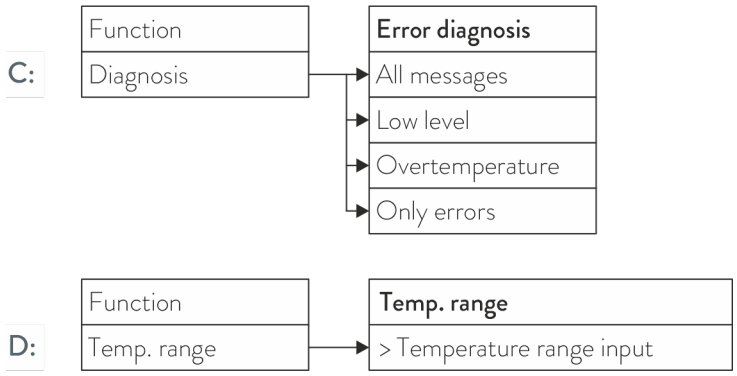


Fig. 14: Contact output, error diagnosis and temperature range menus

7.2 Interface functions

Interface functions such as read and write commands make it possible to read out the current operating parameters of constant temperature equipment and predefine specific settings and process values.

The interface functions supported by this interface are presented briefly below. They are sorted by topic according to the component affected and assigned a unique ID. Depending on the technical configuration of your constant temperature equipment, the number and scope of the interface functions actually available may vary from the list shown here, see chapter "Availability of the interface functions".

7.2.1 Read commands

The contact module recognizes the following read commands, which you can use to query the operating data of the constant temperature equipment:

Table 1: Fill level

ID	Function	Unit
10	Signal refilling	[–]

Table 2: Status

ID	Function	Unit
75	Status of standby: 0 = Device is switched on / 1 = Device is switched off	[–]
130	Device status	[–]
137	Error status	[–]
140	Low-level alarm	[–]
141	Overtemperature alarm	[–]
153	Report compliance with the defined temperature range (inside / outside)	[–]

Table 3: Programmer

ID	Function	Unit
82	Programmer status	[–]

7.2.2 Write commands

The contact module recognizes the following write commands, which you can use to transfer values to the constant temperature equipment:

Table 4: Control

ID	Function	Unit
66	Control in control variable X: 0 = internal / 1 = external Pt / 2 = external analog / 3 = external serial / 5 = external Ethernet / 6 = external EtherCAT / 7 = external Pt 2	[–]

Table 5: Status

ID	Function	Unit
74	Switch equipment on / off (standby)	[–]

Table 6: Programmer

ID	Function	Unit
78	Start programmer	[–]
79	Pause programmer	[–]
80	Continue programmer (after pause)	[–]

Table 7: Safety

ID	Function	Unit
151	Specify external fault	[–]

Table 8: Temperature

ID	Function	Unit
152	Specify two temperature set values alternately	[–]

7.2.3 Availability of the interface functions

The following table shows the read and write commands that the interface module provides for all compatible product lines of constant temperature equipment.

Special functions (for example, "[ID 6] outflow pressure / pump pressure") are only available if the constant temperature equipment is equipped accordingly. Optional accessories may have to be connected correctly and ready for operation.

	Integral IN		Variocool		
ID	IN...XT *	IN...T *	VC NRTL	VC	PRO
10	✓	✓	✓	✓	✓
66	✓	✓	✓	✓	✓
74	✓	✓	✓	✓	✓
75	✓	✓	✓	✓	✓
78	✓	✓	✓	✓	✓
79	✓	✓	✓	✓	✓
80	✓	✓	✓	✓	✓
82	✓	✓	✓	✓	✓
130	✓	✓	✓	✓	✓
137	✓	✓	✓	✓	✓
140	✓	✓	✓	✓	✓
141	✓	✓	✓	✓	✓
151	✓	✓	✓	✓	✓
152	✓	✓	✓	✓	✓
153	✓	✓	✓	✓	✓

* Equipment type as per rating label

8 Maintenance

The interface module is maintenance-free.

Any dust and dirt deposits should be cleaned from the connections on the interface module on a regular basis, especially if the interfaces are not being used.

WARNING!
Live parts in contact with cleaning agent

Electric shock, material damage

- Disconnect the device from the mains supply before starting any cleaning work.
- Water and other fluids should not be allowed to enter the device.

NOTICE!
Repairs performed by unauthorized persons

Material damage

- Only specialized personnel are permitted to carry out repairs.

1. Use a damp cloth or brush to remove any dust and dirt deposits.
2. When using compressed air: Always set a low working pressure to prevent mechanical damage to the connections.

If you have any questions about technical modifications, please contact LAUDA Service, see ↳ Chapter 1.6 “Contact LAUDA” on page 7.

9 Faults

If a fault occurs, the interface distinguishes between different message types, e.g. alarms, errors and warnings. The procedure for rectifying a fault depends on the device. Follow the corresponding instructions in the operating manual accompanying the constant temperature equipment.

If you are unable to rectify a fault, please contact LAUDA Service, *see* Chapter 1.6 “Contact LAUDA” on page 7.

10 Decommissioning

WARNING!
Touching live parts

Electric shock

- Disconnect the device from the power supply before starting any installation work.
- Always observe safety measures against electrostatic discharge.

Decommission the interface module by removing it from the constant temperature equipment:

1. Observe the information in ↳ Chapter 5.1 “Installing the interface module” on page 13. Proceed in reverse order to remove.
2. Always attach the LiBus connecting cable to the inside of the module slot cover.
3. Fit the cover to the vacant module slot to protect the constant temperature equipment against the ingress of dirt.
4. Protect the interface module against static charging before placing it in storage. The storage location must meet the ambient conditions specified in the technical data.
5. If you intend to dispose of the module, please read the information in ↳ “Old device” on page 26 first.

11 Disposal

Packaging

The packaging normally consists of environmentally friendly materials that can be easily recycled when properly disposed of.

1. Dispose of packaging materials in accordance with the applicable disposal guidelines in your region.
2. Comply with the requirements of Directive 94/62/EC (packaging and packaging waste) if disposing of the product in a member state of the EU.

Old device

The device must be properly decommissioned and disposed of at the end of its life cycle.

1. Dispose of the device in accordance with the applicable disposal guidelines in your region.
2. Comply with Directive 2012/19/EU (WEEE Waste of Electrical and Electronic Equipment) if disposing of the product takes place in a member state of the EU.

12 Accessories

The following LAUDA accessories are available for assembling the required connection cables:

Table 9: Accessories

Item	Catalog number
LiBus module box; extension of constant temperature equipment by up to two interface modules with large cover	LCZ 9727
Contact module with single input and output (NAMUR)	
Coupling connector, 3-pin	EQS 048
Coupling socket, 3-pin	EQD 047
Contact module with 3 inputs and outputs	
15-PIN D-SUB connection, complete	EKS 211

13 Technical data

Characteristic	Unit	Value/version	
Interface module			
Catalog number	[–]	LRZ 927	LRZ 928
Size of module slot, W x H	[mm]	51 x 27	
External dimensions (excluding connectors), W x H x D	[mm]	56 x 37 x 82	
Weight	[kg]	0.1	
Operating voltage	[V DC]	24	
Maximum current consumption	[A]	0.1	
Number of inputs / outputs	[–]	1 / 1	3 / 3
Connection type	[–]	Output: 1x circular connector, 3-pin Input: 1x circular socket, 3-pin	D-SUB socket, 15-pin
Service life	[–]	The interface module is designed for 20,000 operating hours.	
Contact output			
Version	[–]	Relay contact (changeover contact)	
Maximum voltage	[V]	30	
Maximum current	[A]	0.2	
Contact input			
Version	[–]	Binary; controlled via external potential-free contacts	
Voltage	[V]	5 ±10 %	
Maximum current	[A]	0.01	
Ambient conditions			
Relative humidity	[%]	Maximum relative humidity 80% at an ambient temperature of 31°C, relative humidity linearly decreasing to 50% at 40°C.	
Height up to	[m]	2000	
Ambient temperature range	[°C]	5 – 40	
Temperature range during storage and transport	[°C]	-20 – 60	
Degree of pollution according to EN 60664-1 / VDE 0110-1	[–]	2	
IP protection level	[IP]	21	

14 Declaration of Conformity

EU DECLARATION OF CONFORMITY

Manufacturer: LAUDA DR. R. WOBSER GMBH & CO. KG
Laudaplatz 1, 97922 Lauda-Königshofen, Germany

We hereby declare under our sole responsibility that the products described below

Product line: Accessories **Serial number:** from S220000001

Device type: Interface modules
LRZ 926, LRZ 927, LRZ 928, LRZ 929, LRZ 930, LRZ 931, LRZ 932, LRZ 933

comply with all the relevant provisions of the Directives listed below, based on the design and type of the version we have placed on the market:

- EMC Directive 2014/35/EU
- RoHS Directive 2011/65/EU in conjunction with (EU) 2015/863

The products may only be operated when incorporated or connected in accordance with the operating instructions.

Applicable standards:

- DIN EN IEC 61326-1:2013-07

Authorized representative for the composition of the technical documentation:

Dr. Jürgen Dirscherl, Head of Research & Development

Signed for and on behalf of

LAUDA DR. R. WOBSER GMBH & CO. KG

Lauda-Königshofen, Germany, 06.27.2022

A. Dinger

Dr. Alexander Dinger, Head of Quality Management

°FAHRENHEIT. °CELSIUS. °LAUDA.

Document number: Q5WA-QA13-026-DE Version 01

15 Index

Manufacturer:
LAUDA DR. R. WOBSER GMBH & CO. KG ◦ Laudaplatz 1 ◦ 97922 Lauda-Königshofen
Telephone: +49 (0)9343 503-0
E-mail: info@lauda.de ◦ Internet: https://www.lauda.de