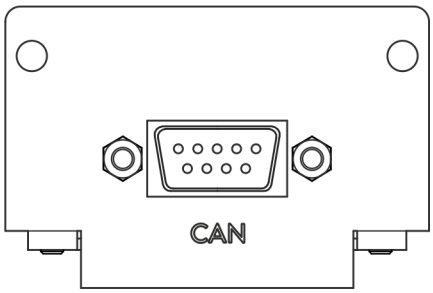
Operation manual

Interface module LRZ 933

CAN module Advanced



V3R4

Read this manual prior to performing any task!

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Translation of the original operation manual

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replaces issue V2R6

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 CAN interface module (catalog no. LRZ 933).

The CAN interface is designed for activating constant temperature equipment via the LAUDA command set. The interface functions provided for this purpose are described in chapters Chapter 7.5.1 “Read commands (CAN master input data)” on page 24 and Chapter 7.5.2 “Write commands (CAN master output data)” on page 30.

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 module is available as an accessory for the following LAUDA product lines:

- Universa
- Integral IN
- PRO
- Variocool
- Variocool NRTL

No operation of interfaces of the same type

Only one CAN type interface can be used for each item of constant temperature equipment. This applies irrespective of the interface operating mode.

No operation of different interfaces

Combining the CAN interface with a Profibus, RS 232/485 or Profinet interface is not permitted. These interfaces cannot be combined with one another.

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

Fax: +49 (0)9343 503-283

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 44.

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 CAN module is designed for installation in constant temperature equipment that supports the CAN interface. The CAN interface allows the user to activate constant temperature equipment via the LAUDA command set and integrate it into a CAN network.

4.2 Structure

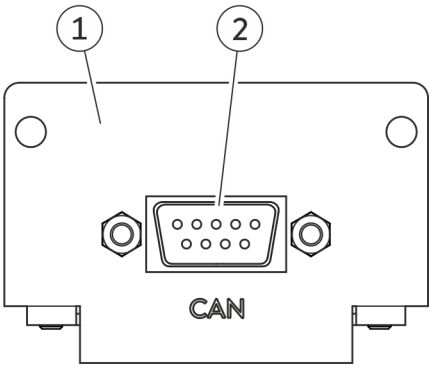

Fig. 1: CAN module

1 Cover with holes for fastening screws
2 D-Sub socket, 9-pin

The CAN module is equipped with a serial interface with 9-pin D-Sub socket that incorporates a galvanically isolated optocoupler to ensure electrical isolation and greater immunity to interference. For information on integration into a CAN network, see ↳ Chapter 6.1 “Contact assignment” on page 16.

5 Before starting up

5.1 Defining the network termination

Termination

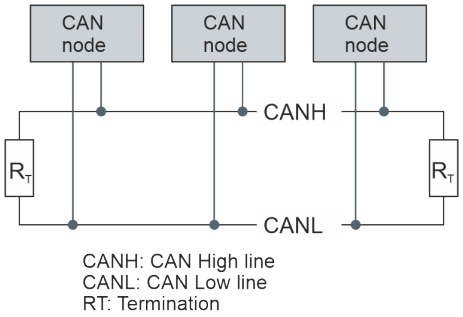

Fig. 2: CAN termination

A CAN bus always requires a bus termination in the form of a termination network (Fig. 2) that guarantees a defined standby state in the high-ohm phases of bus operation.

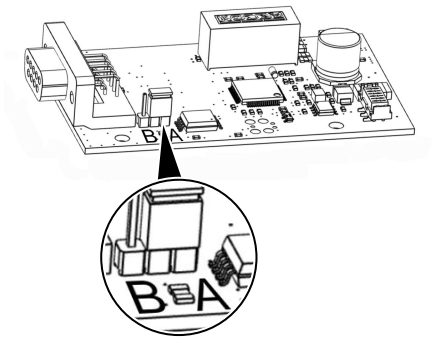

Fig. 3: CAN module printed circuit board

A jumper can be found on the printed circuit board of the slot-in module. If the jumper is inserted in position A, the network is terminated with a resistance of 120 ohm (Fig. 3).

If the jumper is inserted in position B, the network is not terminated (factory setting).

5.2 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.

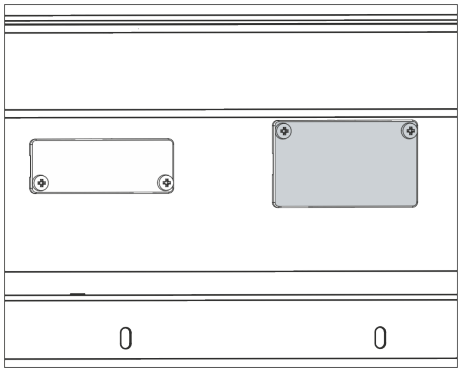

Fig. 4: Removing the cover (schematic diagram)

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.

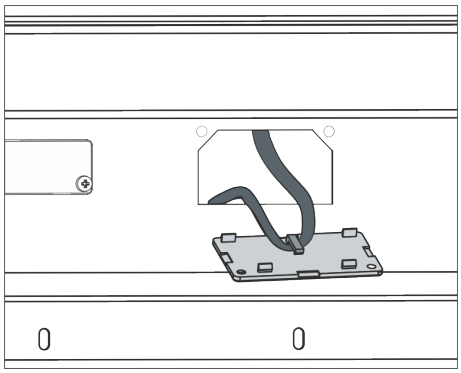

Fig. 5: Detaching the LiBus ribbon cable (schematic diagram)

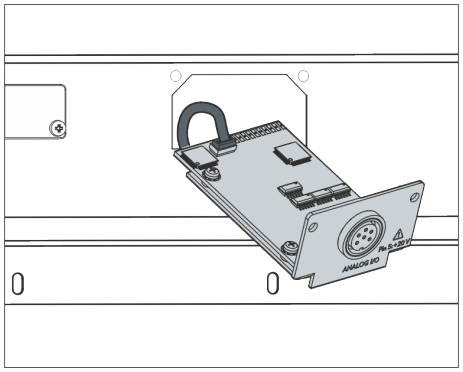

Fig. 6: Connecting the interface module (schematic diagram)

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.

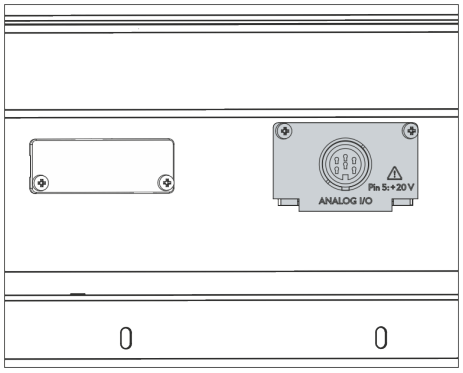

Fig. 7: Securing the cover (schematic diagram)

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.

5.3 Using the module box

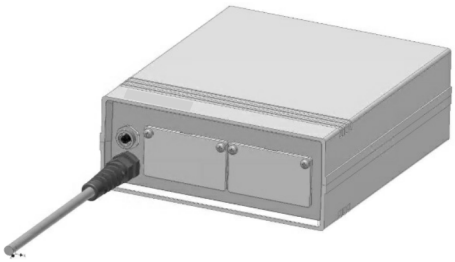

Fig. 8: LiBus module box, catalog no. LCZ 9727

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 CAN interface is designed as a 9-pin D-Sub socket. The plugs must always be secured with the integral screw connection. Refer to Chapter 12 “Accessories” on page 45 for accessory information on assembling connection cables.

A CAN connection is established using a 2-wire or 3-wire cable; contacts that are not required should not be connected. The following contact assignment applies, depending on the version of the D-Sub socket on the connected system:

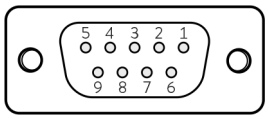

Fig. 9: Contacts of D-Sub socket, 9-pin

Table 1: D-Sub socket for CAN, 9-pin

Signal	Contact
CAN_L	2
GND (optional)	3
CAN_H	7

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

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.

Menu → *Modules* → *CAN interface*

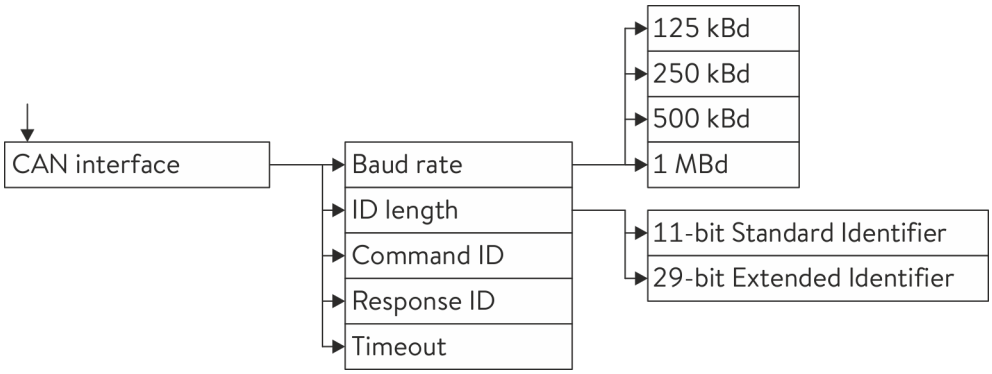

Fig. 10: CAN interface menu

7.2 Configuring the interface

The interface can be configured via the software menu of the constant temperature equipment.

Baud rate

The baud rate can be set to one of 4 different transmission speeds. Select the baud rate used in your CAN network.

ID length

You can choose between Standard Identifier and Extended Identifier.

Identifier of messages

Only two identifiers are required for communication with the constant temperature equipment.

The control system sends the message containing the command ID to the constant temperature equipment. It can contain either a write command, a read command, an activation command, or a deactivation command.

The constant temperature equipment sends the message containing a response ID to the control system. It is either a direct response to a message containing a command ID or it is sent cyclically every second if sending was configured for a parameter using an activation command.

Structure of the messages ↳ Table 2 “Structure of a command-message” on page 20 and ↳ Table 3 “Structure of a response-message” on page 22.

Command ID

The message containing the command ID is used to send commands to the constant temperature equipment.
The command ID on the control element of the constant temperature equipment is changed byte by byte. Please note that the value must be entered as a decimal number.

Example

Proceed as shown in the following example:
`0x14FD35C7` should be used as a command ID.

First determine the decimal number for the 4 bytes:

- 0x14 = 20
- 0xFD = 253
- 0x35 = 53
- 0xC7 = 199

1. Select the menu items *Modules* → *CAN interface* → *Command ID* in the software menu on the constant temperature equipment.
   - ▶ You will be prompted to enter byte 1.
2. Enter the lowest byte as a decimal number (in the example: 199).
3. Then enter the second lowest byte as a decimal number (in the example: 53).
4. Proceed in the same way for the third and fourth byte (253 and 20 in the example).
5. Press the left arrow button to exit the menu.
   - ▶ The → *CAN interface* opens again.
6. Check that the identifier displayed there as a hexadecimal value is now configured correctly.

After being entered successfully, the entire identifier is displayed in hexadecimal format.
The values preset in the factory are: Command ID = 0x554

Response ID

The message containing the response ID is sent by the constant temperature equipment.

The response ID on the control element of the constant temperature equipment is also changed byte by byte. Please note that the value must be entered as a decimal number.

Proceed in the same way described for the command ID.

After being entered successfully, the entire identifier is displayed in hexadecimal format.
The values preset in the factory are: Response ID = 0x555

Operating multiple items of constant temperature equipment

If multiple items of LAUDA constant temperature equipment are used in a CAN network, different command identifiers and response identifiers must be set for each device in order to distinguish between the devices. Otherwise, different participants would send the same message and cause a collision during arbitration as a result.

7.3 Interface protocol

Syntax

The protocol for the LAUDA CAN interface provides the structure of the command messages and response messages shown in ↳ Table 2 “Structure of a command-message” on page 20 and ↳ Table 3 “Structure of a response-message” on page 22.

Table 2: Structure of a command-message

Type	CAN ID	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 – 7
Read command	*CMD [1]*	*READ*	*Param. no. [3]*			
Example:	Read out bath / outflow temperature.					
	0x554	0x04	0x32	0x00	0x00	0x00000000
Write command	*CMD [1]*	*WRITE*	*Param. no. [3]*			*Parameter value [4]*
Example:	Adjust the set temperature to -30 °C.					
	0x554	0x05	0x01	0x00	0x00	0xD08AFFFF (-30 °C)
Activation command	*CMD [1]*	*ACTIVATE*	*Param. no. [3]*			
Example:	Activate periodic transmission of the bath / outflow temperature.					
	0x554	0x06	0x32	0x00	0x00	0x00000000
Deactivation command	*CMD [1]*	*DEACTI-VATE*	*Param. no. [3]*			
Example:	Deactivate periodic transmission of the bath / outflow temperature.					
	0x554	0x07	0x32	0x00	0x00	0x00000000

[1] CMD = Command ID set in the CAN menu; Factory setting: 0x554
[3] Parameter number
[4] Little endian byte sequence (Intel format)

CMD

The identifier of each command message corresponds to the configured command ID, ↳ Chapter 7.2 “Configuring the interface” on page 18↳ “Command ID” on page 19.

8 data bytes must be sent for a write command, i.e. the DLC of the CAN message is 8.

The message of a read, activation and deactivation command can contain 4 data bytes (DLC = 4) or 8 data bytes (DLC = 8), whereby the constant temperature equipment ignores the content of byte 4-7.

Byte 0	Byte 0 defines the command type: READ = 0x04 The value 0x04 indicates that the command is a read command and is used to read out any parameter, in particular measured values. WRITE = 0x05 The value 0x05 indicates that the command is a write command and is used to configure parameters, in particular set points, settings and modes. ACTIVATE = 0x06 The value 0x06 indicates that the command is an activation command that allows the periodic transmission of a response message by the constant temperature equipment to be activated. This is only possible for measured values, set points and status signals. DEACTIVATE = 0x07 The value 0x07 indicates that the command is an deactivation command that allows the periodic transmission of a response message by the constant temperature equipment to be deactivated.
Byte 1	In each message, byte 1 contains the parameter number and specifies which system parameter must be changed or read. A system parameter can be a set point, measured value, setting, mode, or status. See also ↳ Chapter 7.5.1 “Read commands (CAN master input data)” on page 24 and ↳ Chapter 7.5.2 “Write commands (CAN master output data)” on page 30.
Byte 2 and byte 3	These bytes are either unused or reserved for future extensions. They should always be transmitted with 0x00.
Bytes 4 to 7	The parameter value is transferred in these bytes if the command is a write command such as the temperature set point, for example. In the case of read, activation and deactivation commands, this value is ignored.

Table 3: Structure of a response-message

Type	CAN ID	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 – 7
Value response	*RES* [2]	*VAL*	*Param. no.* [3]			*Parameter value* [4]
Example:	Bath / outflow temperature is transmitted					
	0x555	0x02	0x32	0x00	0x00	0x39300000 (12.345 °C)
OK response	*RES* [2]	*OK*	*Param. no.* [3]			
Example:	Response to a successful write command.					
	0x555	0x01	0x01 (example)	0x00	0x00	0x00000000
ERROR response	*RES* [2]	*ERR*	*Param. no.* [3]	*Err code*		
Example:	Response to failure of the write command "Activate periodic transmission of the bath / outflow temperature".					
	0x555	0x00	0x01	0x01	0x00	0x00000000

[2] RES = Response ID set in the CAN menu; Factory setting: 0x555
[3] Parameter number
[4] Little endian byte sequence (Intel format)

RES

The identifier of each response message corresponds to the configured response ID, ↳ “Command ID” on page 19↳ “Response ID” on page 19

If write or read access is successful, the value response is transmitted by the constant temperature equipment.

If access was not possible, the constant temperature equipment sends an ERROR response, whereby the data length is reduced to 3 bytes (DLC = 3).

Byte 0

VAL = 0x02
If byte 0 of the response message contains the value 0x02, the read, write, activation or deactivation command was successful and bytes 4-7 contain the current parameter value.

ERR = 0x00
If byte 0 of the response message contains the value 0x00, the read, write, activation or deactivation command was not successful. In this case, byte 2 contains an error code ↳ Chapter 7.4 “Overview of error coding” on page 23.

Byte 1

In each message, byte 1 contains the parameter number and specifies which system parameter it relates to. A system parameter can be a set point, measured value, setting, mode, or status. See also ↳ Chapter 7.5.1 “Read commands (CAN master input data)” on page 24 and ↳ Chapter 7.5.2 “Write commands (CAN master output data)” on page 30.

Byte 2

If byte 0 of the response message contains the value 0x00, this indicates an error code as specified in ↳ Chapter 7.4 “Overview of error coding” on page 23. Otherwise this value is 0x00.

Byte 3

This byte is unused or reserved for future extensions. It is currently always transmitted with 0x00.

Bytes 4 to 7

The parameter value is transferred in these bytes if the command is a write command such as the temperature set point, for example, and, in the case of a read command, the actual temperature value, for example.

7.4 Overview of error coding

The following contains a description of the error messages of the CAN modules.

Table 4: Error messages

ERROR code	Description
2	Incorrect entry (for example, buffer overflow)
3	Wrong command
5	Syntax error in value
6	Impermissible value
8	Module or value not available
30	Programmer, all segments occupied
31	Not possible to specify set point (analog set point value input is ON)
32	TiH ≤ TiL
33	External sensor missing
34	Analog value not present
35	Automatically configured
36	Not possible to specify set point, programmer is running or has been paused
37	Not possible to start programmer (analog set point value input is ON)
38	No operating rights. Another control section has exclusive operating rights, which means that writing via this interface is not permitted.

7.5 Interface functions

Interface functions such as read, write and activation commands make it possible to read out the current operating parameters of the constant temperature equipment to specify certain settings and process values and activate the periodic transmission of 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 features of your constant temperature equipment, the number and scope of the interface functions actually available may vary from the list shown here.

7.5.1 Read commands (CAN master input data)

The CAN module recognizes the following read commands, which can be used to query the operating data of the constant temperature equipment.

Table 5: Temperature

ID	Function	Unit, resolution	Parameter number	Parameter name, *.dbc file
2	Temperature set point	0.001 °C	0x01	T_SET
4	Bath temperature (outflow temperature)	0.001 °C	0x32	T_INT
5	Controlled temperature (internal / external Pt / external analog / external serial)	0.001 °C	0x33	T_CTRL
8	External temperature TE (analog input)	0.001 °C	0x36	T_EXT_ANA
14	External temperature TE (Pt100)	0.001 °C	0x35	T_EXT_PT
25	Overtemperature turn off point T_Max	0.1 °C	0x50	T_MAX
27	Limitation of outflow temperature TiH (upper limit)	0.001 °C	0x05	T_IH
29	Limitation of outflow temperature TiH (lower limit)	0.001 °C	0x04	T_IL
33	Temperature set point Tset in safe mode	0.001 °C	0x07	T_SET_SAFE
158	Actuating signal of master controller in case of external control	0.001 °C	0x3C	T_FOLLOW
162	Overtemperature turn off point, tank	°C	0x5C	T_MAX_TANK
163	Overtemperature turn off point, outlet	°C	0x5D	T_MAX_RET

Table 6: Pump

ID	Function	Unit, resolution	Parameter number	Parameter name, *.dbc file
6	Outflow pressure / pump pressure, relative to the atmosphere	0.001 bar	0x34	PUMP_PRESSURE
12	Flow rate	0.001 l/min	0x39	FLOW
18	Pump power stage	---	0x02	PUMP_STEP
31	Outflow pressure set point / pump pressure (for pressure control settings)	0.001 bar	0x06	PUMP_PRESS_SPT
37	Through-flow control set point (liters per minute)	0.001 l/min	0x09	FLOW_SPT
71	Status of through-flow control: 0 = off / 1 = on	---	0x2D	FLOW_CTRL_STATE
154	Outflow pressure of through-flow control, relative to the atmosphere	0.001 bar	0x3B	PRESS_OUT_FC
156	Pressure limit set point with active through-flow control (MID through-flow controller must be connected)	0.001 bar	0x0A	PRESS_LIM_SPT
157	Overpressure turn off point with active through-flow control (MID through-flow controller must be connected)	0.001 bar	0x0B	MAX_PRESS
160	Valve position of the flow controller	%	0X3D	FC_VALVE_POS

Table 7: Fill level

ID	Function	Unit, resolution	Parameter number	Parameter name, *.dbc file
9	Bath level (fill level)	---	0x37	LEVEL

Table 8: Actuating signal

ID	Function	Unit, resolution	Parameter number	Parameter name, *.dbc file
11	Resolution of controller actuating signal in per mill	0.1 %	0x38	ACT_VAR_P
13	Controller actuating signal	W	0x3A	ACT_VAR_W
	– negative value → device is cooling – positive value → device is heating			

Table 9: Cooling *

ID	Function	Unit, resolution	Parameter number	Parameter name, *.dbc file
24	Cooling mode: 0 = off / 1 = on / 2 = automatic	---	0x03	COOL_MODE
	* only available on constant temperature equipment with cooling unit			

Table 10: Safety

ID	Function	Unit, resolution	Parameter number	Parameter name, *.dbc file
35	Timeout communication via interface (1 – 60 [s]; 0 = Off)	s	0x08	TIMEOUT
73	Status of Safe Mode: 0 = off / 1 = on	---	0x2E	SAFE_MODE_STATE

Table 11: Control parameters

ID	Function	Unit, resolution	Parameter number	Parameter name, *.dbc file
39	Control parameter Xp	0.001 ---	0x14	XP_INT
41	Control parameter Tn	s	0x15	TN_INT
43	Control parameter Tv	0.001 s	0x16	TV_INT
45	Control parameter Td	0.001 s	0x17	TD_INT
47	Control parameter KpE	0.001 ---	0x18	KP_EXT
49	Control parameter TnE	s	0x19	TN_EXT
51	Control parameter TvE	s	0x1A	TV_EXT
53	Control parameter TdE	0.001 s	0x1B	TD_EXT
55	Correction limitation	0.001 K	0x1C	DYNAMIC_LIMIT

ID	Function	Unit, resolution	Parameter number	Parameter name, *.dbc file
57	Control parameter XpF	0.001 ---	0x1D	XP_F
61	Control parameter Prop_E	K	0x1F	PROP_EXT

Table 12: Control

ID	Function	Unit, resolution	Parameter number	Parameter name, *.dbc file
59	Set point offset	0.001 K	0x1E	T_OFFSET
67	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	---	0x29	CTRL_VAL
69	Offset source X for set point: 0 = normal / 1 = external Pt / 2 = external analog / 3 = external serial / 5 = external Ethernet / 6 = external EtherCAT / 7 = external Pt 2	---	0x2C	OFFS_SRC

Table 13: Rights

ID	Function	Unit, resolution	Parameter number	Parameter name, *.dbc file
63	Status of Master keyboard: 0 = free / 1 = blocked	---	0x28	KEYLOCK_R
65	Status of remote control keyboard: 0 = free / 1 = blocked	---	0x2B	KEYLOCK_B

Table 14: Status

ID	Function	Unit, resolution	Parameter number	Parameter name, *.dbc file
75	Status of standby: 0 = Device is switched on / 1 = Device is switched off	---	0x2A	STANDBY
107	Device type (e.g.: "ECO", "INT" or "VC")	---	0x5B	DEV_TYPE
130	Device status: 0 = OK / 1 = fault (error, alarm or warning)	---	0x46	DEV_STATE
137	Error status: 0 = OK, 1 = error	---	0x47	ERR_STATE
138	Alarm status: 0 = OK, 1 = alarm	---	0x48	AL_STATE
139	Warning status: 0 = OK, 1 = warning	---	0x49	WARN_STATE

Table 15: Software version

ID	Function	Unit, resolution	Parameter number	Parameter name, *.dbc file
108	Control system	---	0xC8	SWV_R
109	Protection system	---	0xC9	SWV_S

ID	Function	Unit, resolu-tion	Parameter number	Parameter name, *.dbc file
110	Command remote control unit	---	0xCA	SWV_B
111	Cooling system	---	0xCB	SWV_T
112	Analog interface module	---	0xCC	SWV_A
113	Through-flow control	---	0xDE	SWV_A1
114	RS 232/485 interface module or Profibus / Profinet	---	0xCD	SWV_V
115	Ethernet interface module	---	0xDA	SWV_Y
116	EtherCAT interface module	---	0xDB	SWV_Z
117	Contact interface module	---	0xCE	SWV_D
118	Solenoid valve for cooling water	---	0xCF	SWV_M
119	Solenoid valve for automatic filling device	---	0xD0	SWV_M1
120	Solenoid valve for constant level device	---	0xD1	SWV_M2
121	Solenoid valve, shut off valve 1	---	0xD2	SWV_M3
122	Solenoid valve, shut off valve 2	---	0xD3	SWV_M4
123	High-temperature cooler	---	0xD8	SWV_M5
124	Pump 0	---	0xD4	SWV_P
125	Pump 1	---	0xD5	SWV_P1
126	Heating system 0	---	0xD6	SWV_H
127	Heating system 1	---	0xD7	SWV_H1
128	External Pt interface 0	---	0xD9	SWV_E
129	External Pt interface 1	---	0xDC	SWV_E1
142	Base remote control unit	---	0xDD	SWV_B1

Table 16: Contact input / output *

ID	Function	Unit, resolu-tion	Parameter number	Parameter name, *.dbc file
96	Contact input 1: = open / 1 = closed	---	0x50	DI_1
98	Contact input 2: = open / 1 = closed	---	0x51	DI_2
100	Contact input 3: = open / 1 = closed	---	0x52	DI_3
102	Contact output 1: = open / 1 = closed	---	0x53	DO_1
104	Contact output 2: = open / 1 = closed	---	0x54	DO_2
106	Contact output 3: = open / 1 = closed	---	0x55	DO_3
	* only available on constant temperature equipment with contact interface			

Table 17: Pressure overlay

ID	Function	Unit, resolution	Parameter number	Parameter name, *.dbc file
165	Set pressure for pressure overlay	bar	0x0C	TANK_PRESS_SPT
166	Tank pressure of pressure overlay	bar	0x3E	TANK_PRESS
168	Pressure overlay hysteresis	bar	0x0D	TANK_PRESS_HYST

Table 18: Filling system

ID	Function	Unit	Parameter number	Parameter name, *.dbc file
169	Status of the filling and draining unit (0 = Init., 1 = Standby, 2 = Pre-temp. ctrl., 3 = Drain, 4 = Change application, 5 = Leak test, 6 = Fill, 7 = Pause, 8 = Refill, 9 = Decommission) Caution! Filling and draining unit must be connected.	–	0x2F	FDS_STATE
172	Draining temperature	°C	0x10	T_DRAIN_SPT
174	Pressure specification for leak test	bar	0x11	P_LEAK_SPT
176	Leak test duration	s	0x20	LEAKT_TIME
178	Maximum permissible pressure difference during leak test	bar	0x21	LEAKT_DIFF
180	Venting time at the end of the filling process	s	0x22	DEAIR_TIME
182	Target filling level of the expansion tank of the constant temperature equipment during the filling process	–	0x12	TARGET_LVL
184	Status of automatic filling device for the filling and draining unit tank (0 = off, 1 = on)	–	0x31	FDS_RF_EN
186	Start of automatic filling device (lower fill limit -> refilling on)	%	0x23	REFILL_START
188	Stop of automatic filling device (upper fill limit -> refilling off)	%	0x24	REFILL_END
189	Filling/draining system outflow pressure	bar	0x3F	FDS_PRESS
190	Filling/draining system tank level	%	0x40	FDS_LEVEL
Not with Integral IN T				

7.5.2 Write commands (CAN master output data)

The CAN module recognizes the following write commands, which can be used to transfer values to the constant temperature equipment:

Table 19: Temperature

ID	Function	Unit	Parameter number	Parameter name, *.dbc file
1	Temperature set point	0.001 °C	0x01	T_SET
15	Actual value of external temperature (via interface)	0.001 °C	0x00	T_EXT_CAN
26	Limitation of outflow temperature TiH (upper limit)	0.001 °C	0x05	T_IH
28	Limitation of outflow temperature TiH (lower limit)	0.001 °C	0x04	T_IL
32	Temperature set point T_{set} in Safe Mode	0.001 °C	0x07	T_SET_SAFE

Table 20: Pump

ID	Function	Unit	Parameter number	Parameter name, *.dbc file
17	Pump power stage (device-specific, e.g. 1 – 6, 1 – 8)	---	0x02	PUMP_STEP
30	Set pressure (for pressure control settings)	0.001 bar	0x06	PUMP_PRESS_SPT
36	Through-flow control set point	0.001 l/min	0x09	FLOW_SPT
70	Activate through-flow control: 0=Switch = switch off / 1 = switch on	---	0x2D	FLOW_CTRL_STATE
155	Pressure limitation set point with active through-flow control	0.001 bar	0x0A	PRESS_LIM_SPT

Table 21: Cooling

ID	Function	Unit	Parameter number	Parameter name, *.dbc file
23	Cooling mode: 0 = off / 1 = on / 2 = automatic	---	0x03	COOL_MODE

Table 22: Safety

ID	Function	Unit	Parameter number	Parameter name, *.dbc file
34	Timeout communication via interface (1 – 60 seconds; 0 = Off)	s	0x08	TIMEOUT
72	Activation of Safe Mode	---	0x2E	SAFE_MODE_STATE

Table 23: Control parameters

ID	Function	Unit	Parameter number	Parameter name, *.dbc file
38	Control parameter Xp	0.001 ---	0x14	XP_INT
40	Control parameter Tn (5 – 180 s; 181 = Off)	s	0x15	TN_INT
42	Control parameter Tv	0.001 s	0x16	TV_INT
44	Control parameter Td	0.001 s	0x17	TD_INT
46	Control parameter KpE	0.001 ---	0x18	KP_EXT
48	Control parameter TnE (0 – 9000 s; 9001 = Off)	s	0x19	TN_EXT
50	Control parameter TvE (5 = Off)	s	0x1A	TV_EXT
52	Control parameter TdE	0.001 s	0x1B	TD_EXT
54	Correction limitation	0.001 K	0x1C	DYNAMIC_LIMIT
56	Control parameter XpF	0.001 ---	0x1D	XP_F
60	Control parameter Prop_E	K	0x1F	PROP_EXT

Table 24: Control

ID	Function	Unit	Parameter number	Parameter name, *.dbc file
58	Set point offset	0.001 K	0x1E	T_OFFSET
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	---	0x29	CTRL_VAL
68	Offset source X for set point: 0 = normal / 1 = external Pt / 2 = external analog / 3 = external serial / 5 = external Ethernet / 6 = external EtherCAT / 7 = external Pt 2	---	0x2C	OFFS_SRC

Table 25: Rights

ID	Function	Unit	Parameter number	Parameter name, *.dbc file
62	Master keyboard (equivalent to "KEY"): 0 = unlock / 1 = lock	---	0x28	KEYLOCK_R
64	Keyboard remote control unit (command): 0 = unlock / 1 = lock	---	0x2B	KEYLOCK_B

Table 26: Status

ID	Function	Unit	Parameter number	Parameter name, *.dbc file
74	Switch the device on / off (standby)	---	0x2A	STANDBY

Table 27: Pressure overlay

ID	Function	Unit	Parameter number	Parameter name, *.dbc file
164	Set pressure for pressure overlay	bar	0x0C	TANK_PRESS_SPT
167	Pressure overlay hysteresis	bar	0x0D	TANK_PRESS_HYST

Table 28: Filling system

ID	Function	Unit	Parameter number	Parameter name, *.dbc file
170	Action at the filling and draining unit (0 = No action, 1 = Start draining, 2 = Start filling) Caution! Filling and draining unit must be connected.	–	0x30	FDS_CMD
171	Draining temperature	°C	0x10	T_DRAIN_SPT
173	Pressure specification for leak test	bar	0x11	P_LEAK_SPT
175	Leak test duration	s	0x20	LEAKT_TIME
177	Maximum permissible pressure difference during leak test	bar	0x21	LEAKT_DIFF
179	Venting time at the end of the filling process	s	0x22	DEAIR_TIME
181	Target filling level of the expansion tank of the constant temperature equipment during the filling process	–	0x12	TARGET_LVL
183	Status of automatic filling device for the filling and draining unit tank (0 = off, 1 = on)	–	0x31	FDS_RF_EN
185	Start of automatic filling device (lower fill limit -> refilling on)	%	0x23	REFILL_START
187	Stop of automatic filling device (upper fill limit -> refilling off)	%	0x24	REFILL_END
Not with Integral IN T				

7.5.3 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	Universa	IN...XT *	IN...P *	IN...T *	VC NRTL *	VC *	PRO
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓
6	–	✓	✓	✓	✓	–	–
8	✓	✓	✓	✓	✓	✓	✓
9	✓ **	✓	✓	✓	✓	✓	✓
11	✓	✓	✓	✓	✓	✓	✓
12	–	✓	✓	–	–	–	–
13	✓	✓	✓	✓	✓	✓	✓
14	✓	✓	✓	✓	✓	✓	✓
15	✓	✓	✓	✓	✓	✓	✓
17	✓	✓	✓	–	–	–	✓
18	✓	✓	✓	–	–	–	✓
23	✓	✓	✓	✓	✓	✓	✓
24	✓	✓	✓	✓	✓	✓	✓
25	✓	✓	✓	✓	–	–	✓
26	✓	✓	✓	✓	✓	✓	✓
27	✓	✓	✓	✓	✓	✓	✓
28	✓	✓	✓	✓	✓	✓	✓
29	✓	✓	✓	✓	✓	✓	✓
30	–	✓	✓	–	–	–	–
31	–	✓	✓	–	–	–	–

* Equipment type as per rating label

** Only at Universa MAX

ID		Integral IN			Variocool		
	Universa	IN...XT *	IN...P *	IN...T *	VC NRTL *	VC *	PRO
32	✓	✓	✓	✓	✓	✓	✓
33	✓	✓	✓	✓	✓	✓	✓
34	✓	✓	✓	✓	✓	✓	✓
35	✓	✓	✓	✓	✓	✓	✓
36	–	✓	✓	–	–	–	–
37	–	✓	✓	–	–	–	–
38	✓	✓	✓	✓	✓	✓	✓
39	✓	✓	✓	✓	✓	✓	✓
40	✓	✓	✓	✓	✓	✓	✓
41	✓	✓	✓	✓	✓	✓	✓
42	✓	✓	✓	✓	✓	✓	✓
43	✓	✓	✓	✓	✓	✓	✓
44	✓	✓	✓	✓	✓	✓	✓
45	✓	✓	✓	✓	✓	✓	✓
46	✓	✓	✓	✓	✓	✓	✓
47	✓	✓	✓	✓	✓	✓	✓
48	✓	✓	✓	✓	✓	✓	✓
49	✓	✓	✓	✓	✓	✓	✓
50	✓	✓	✓	✓	✓	✓	✓
51	✓	✓	✓	✓	✓	✓	✓
52	✓	✓	✓	✓	✓	✓	✓
53	✓	✓	✓	✓	✓	✓	✓
54	✓	✓	✓	✓	✓	✓	✓
55	✓	✓	✓	✓	✓	✓	✓
56	✓	✓	✓	✓	✓	✓	✓
57	✓	✓	✓	✓	✓	✓	✓
58	✓	✓	✓	✓	✓	✓	✓
59	✓	✓	✓	✓	✓	✓	✓
60	✓	✓	✓	✓	✓	✓	✓
61	✓	✓	✓	✓	✓	✓	✓
62	✓	✓	✓	✓	✓	✓	✓

* Equipment type as per rating label

** Only at Universa MAX

ID		Integral IN			Variocool		
	Universa	IN...XT *	IN...P *	IN...T *	VC NRTL *	VC *	PRO
63	✓	✓	✓	✓	✓	✓	✓
64	–	–	–	–	–	✓	–
65	–	–	–	–	–	✓	–
66	✓	✓	✓	✓	✓	✓	✓
67	✓	✓	✓	✓	✓	✓	✓
68	✓	✓	✓	✓	✓	✓	✓
69	✓	✓	✓	✓	✓	✓	✓
70	–	✓	✓	–	–	–	–
71	–	✓	✓	–	–	–	–
72	✓	✓	✓	✓	✓	–	–
73	✓	✓	✓	✓	✓	–	–
74	✓	✓	✓	✓	✓	✓	✓
75	✓	✓	✓	✓	✓	✓	✓
96	✓	✓	✓	✓	✓	✓	✓
98	✓	✓	✓	✓	✓	✓	✓
100	✓	✓	✓	✓	✓	✓	✓
102	✓	✓	✓	✓	✓	✓	✓
104	✓	✓	✓	✓	✓	✓	✓
106	✓	✓	✓	✓	✓	✓	✓
107	✓	✓	✓	✓	✓	✓	✓
108	✓	✓	✓	✓	✓	✓	✓
109	✓	✓	✓	✓	✓	✓	✓
110	✓	✓	✓	✓	✓	✓	✓
111	✓	✓	✓	✓	✓	✓	✓
112	✓	✓	✓	✓	✓	✓	✓
113	–	✓	✓	–	–	–	–
114	✓	✓	✓	✓	✓	✓	✓
115	–	✓	✓	✓	✓	✓	✓
116	✓	✓	✓	✓	✓	✓	✓
117	✓	✓	✓	✓	✓	✓	✓
118	✓	✓	✓	✓	✓	✓	✓

* Equipment type as per rating label

** Only at Universa MAX

ID		Integral IN			Variocool		
	Universa	IN...XT *	IN...P *	IN...T *	VC NRTL *	VC *	PRO
119	✓	–	–	–	–	✓	✓
120	✓	–	–	–	–	✓	✓
121	✓	✓	✓	✓	✓	✓	✓
122	✓	✓	✓	✓	✓	✓	✓
123	–	–	–	–	–	–	–
124	–	✓	✓	✓	✓	✓	✓
125	–	✓	✓	✓	✓	✓	✓
126	–	✓	✓	✓	✓	✓	✓
127	–	✓	✓	✓	✓	✓	✓
128	✓	✓	✓	✓	✓	✓	✓
129	✓	✓	✓	✓	✓	✓	✓
130	✓	✓	✓	✓	✓	✓	✓
137	✓	✓	✓	✓	✓	✓	✓
138	✓	✓	✓	✓	✓	✓	✓
139	✓	✓	✓	✓	✓	✓	✓
142	–	–	–	–	–	–	✓
154	–	✓	✓	–	–	–	–
155	–	✓	✓	–	–	–	–
156	–	✓	✓	–	–	–	–
157	–	✓	✓	–	–	–	–
158	✓	✓	✓	✓	✓	–	–
160	–	✓	✓	–	–	–	–
162	–	✓	✓	–	–	–	–
163	–	–	✓	–	–	–	–
164	–	–	✓	–	–	–	–
165	–	–	✓	–	–	–	–
166	–	–	✓	–	–	–	–
167	–	–	✓	–	–	–	–
168	–	–	✓	–	–	–	–
169	–	✓	✓	–	–	–	–
170	–	✓	✓	–	–	–	–

* Equipment type as per rating label

** Only at Universa MAX

ID		Integral IN			Variocool		
	Universa	IN...XT *	IN...P *	IN...T *	VC NRTL *	VC *	PRO
171	–	✓	✓	–	–	–	–
172	–	✓	✓	–	–	–	–
173	–	✓	✓	–	–	–	–
174	–	✓	✓	–	–	–	–
175		✓	✓	–	–	–	–
176	–	✓	✓	–	–	–	–
177	–	✓	✓	–	–	–	–
178	–	✓	✓	–	–	–	–
179	–	✓	✓	–	–	–	–
180	–	✓	✓	–	–	–	–
181	–	✓	✓	–	–	–	–
182	–	✓	✓	–	–	–	–
183	–	✓	✓	–	–	–	–
184	–	✓	✓	–	–	–	–
185	–	✓	✓	–	–	–	–
186	–	✓	✓	–	–	–	–
187	–	✓	✓	–	–	–	–
188	–	✓	✓	–	–	–	–
189	–	✓	✓	–	–	–	–
190	–	✓	✓	–	–	–	–
* Equipment type as per rating label ** Only at Universa MAX							

7.5.4 Operating rights

Valid for Universa, Integral IN and Variocool NRTL constant temperature equipment

As soon as a write command is sent to the device via the interface, the interface automatically obtains the operating rights.

> *If another control section already has exclusive operating rights, writing is not possible and the interface responds with error message 38.*

If you subsequently want to operate the device from a different control section, you must first explicitly obtain the relevant operating rights.

Example

If you wish to take over operation and operate the device using its keyboard, you must press the softkey with the lock symbol on the device display and confirm your entry.

Exclusive operating rights

If you wish to prevent any other control section from obtaining operating rights, you have the option of using the command with the ID 34 – setting the timeout value for communication – to secure exclusive operating rights for the interface. The timeout setting must be greater than 0 seconds.

When the timeout is set to a value greater than 0 ↳ Chapter 7.5.5 “Communication monitoring” on page 38, communication monitoring is activated.

If the status of exclusive operating rights changes again, the timeout value for communication monitoring must be reset to 0. Monitoring is deactivated as a result.
Subsequently, the operating rights are no longer exclusive and another control section can obtain the operating rights, if required.

See also the chapter "Operator and viewer" in the operating manual accompanying your constant temperature equipment.

7.5.5 Communication monitoring

The write command with the *ID 34* allows you to set the timeout value for communication monitoring. If the selected value is greater than 0 seconds, communication monitoring is activated for the interface. The timeout value can also be set from the device menu of the interface module.
If a command is not sent via the interface for the duration of the preset timeout, the timeout has expired and a disconnection is detected.

Valid for Integral IN, Variocool NRTL and PRO constant temperature equipment

In this case, *Alarm 22* is triggered and the device:

a) - Stops the pump, the heater and the refrigerating machine if the Safe Mode function is deactivated.

b) - Starts Safe Mode if the Safe Mode function is activated.

Valid for Variocool constant temperature equipment

In this case, *Warning 503* is triggered and the device sets the stored safety set point once (write command *ID 32*, factory setting 20 °C) and continues to control the temperature with this operating status.

It is therefore necessary to send any messages periodically so that the monitoring feature recognizes that communication is still active.

If the status of communication monitoring changes again, the timeout value for communication monitoring must be reset to 0. Monitoring is deactivated as a result.
The timeout value can also be adjusted from the device menu.

7.6 Control and automation software

VECTOR CANalyzer

A configuration file `LAUDA_CAN-Modul_250kBd_Std-IDs_0x554_0x555_vxxx.cfg` (xxx = versioning) is available for the VECTOR CANalyzer. This file matches the factory settings of the CAN module that can be used to test communication.
The associated database `LAUDA_CAN-Modul_Std-IDs_0x554_0x555_vxxx.dbc` (xxx = versioning) is also provided.

Both files can be found in the download area of the LAUDA website: https://www.lauda.de/de/services/download-center/filter/Software

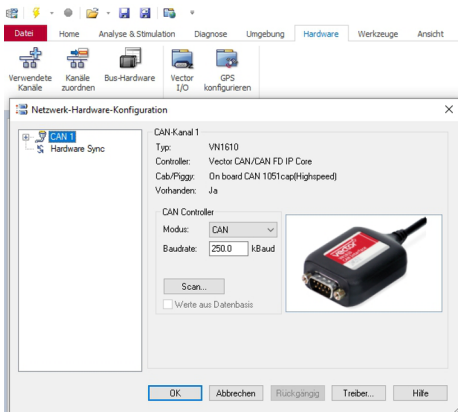

Fig. 11: Changing the baud rate

If the baud rate of the CAN interface is changed on the device, it must also be adapted in the CANalyzer (Fig. 11).

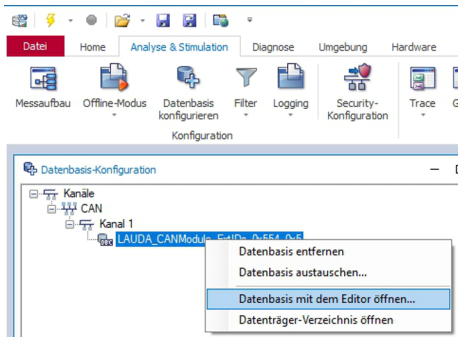

Fig. 12: Opening the database

If the identifiers for the command and response messages of the CAN interface are changed on the device, the two messages must be adapted accordingly in the database. The database can be opened from the CANalyzer (Fig. 12).

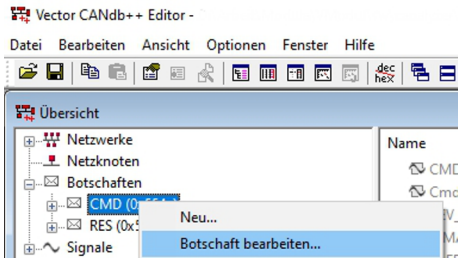

Fig. 13: Editing the message

The database `xxx.dbc` file contains the two *CMD* and *RES* messages as well as all signals. The CMD and RES messages can then be edited (Fig. 13).

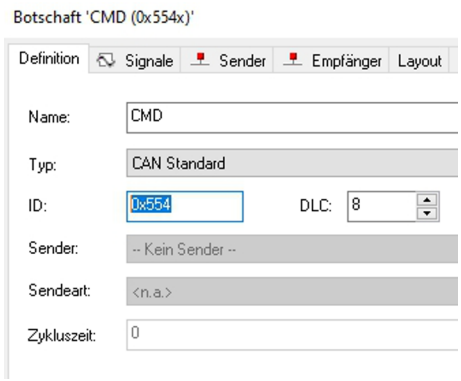

Fig. 14: Adapting the identifier (ID)

The *ID* can be adapted and the type (CAN Standard or CAN Extended) can be selected (Fig. 14) here.

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.

9.1 Alarm

The CAN interface recognizes the following alarm messages.

Table 29: CAN alarm messages

Code	Meaning
11	Triggers when the command with ID 15 (actual value external temperature) has not been received for several seconds while the system is regulating to the "external serial" control variable.
22	Disconnection detected. There was no communication for a period longer than the preset timeout.

9.2 Error

The CAN interface recognizes the following error messages.

Table 30: CAN error messages

Code *	Meaning
501 – 504, 507, 508	Interface module hardware faulty. Contact the LAUDA department.
505	Internal 24 V voltage of the interface module is too low.
506	Internal 24 V voltage of the interface module is too high.

9.3 Warning

The CAN interface recognizes the following warning messages.

Table 31: CAN warning messages

Code	Meaning
501	Internal communication overloaded.
502	Unexpected reset. Contact LAUDA Service if the warning occurs multiple times.
503	Disconnection detected. There was no communication for a period longer than the preset timeout. Valid for the Variocool and PRO product lines.
508	Bus system faulty. Contact LAUDA Service if the warning occurs multiple times.
509	Unknown module connected.
510 – 532	Software for specified component outdated. Contact the LAUDA department.

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 5.2 “Installing the interface module” on page 12. 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 44 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

Complete connection cables and plugs are available for assembling cables.

Table 32: Accessories

Item	Catalog number
LiBus module box; extension of constant temperature equipment by up to two interface modules with large cover	LCZ 9727
D-Sub 9 socket, complete	EKS 210
RS 232 cable, shielded, 2 m in length	EKS 037
RS 232 cable, shielded, 5 m in length	EKS 057

13 Technical data

Characteristic	Unit	Value/version
Interface module		
Catalog number	[–]	LRZ 933
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
Connection type	[–]	D-SUB socket, 9-pin
Service life	[–]	The interface module is designed for 20,000 operating hours.
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 S250000001

Device type: Interface modules
LRZ 912, LRZ 914, LRZ 915, LRZ 918, LRZ 926, LRZ 927, LRZ 928, LRZ 929, LRZ 930, LRZ 931, LRZ 932, LRZ 933, LRZ 934, LRZ 935, LCZ 9727

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:

- EN IEC 61326-1:2021

Authorized representative for the composition of the technical documentation:

Dr. Jürgen Dirscherl, Head of Research & Development

Lauda-Königshofen, Germany, 27.02.2025

A. Dinger

Dr. Alexander Dinger,
Head of Quality and Environmental Management

Q5WA-QA13-026-EN-04

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