FLOWSERVE GESTRA

GESTRA Steam Systems

EF 1-40

EN
English

Installation Instructions 818959-00

Actuator
EF 1-40

spectorbus CANopen

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Important Notes

Usage for the intended purpose

The actuator type EF 1-40 is designed for use with suitable controllers to operate control and shut-off equipment (valves, cocks, gate valves etc.).

The actuator EF 1-40 is approved for operation with GESTRA continuous blowdown valves BAE 46 and BAE 47.

Safety note

The equipment must only be installed and commissioned by qualified and competent staff.

Retrofitting and maintenance work must only be performed by qualified staff who – through adequate training – have achieved a recognized level of competence.

Danger

Please observe the safety notes in the installation manuals of the control and shut-off equipment to be operated by the actuator EF 1-40.

For operation of the GESTRA continuous blowdown valves, observe the installation instructions BA 46, BA 47, BAE 46, BAE 47.

Note that powering up the actuator will move the valves / levers / rods that are connected to it.

Danger of crushing: During operation, moving parts can cause serious injury to hands and arms. Keep clear of moving parts!

The continuous blowdown valves BAE 46 and BAE 47 are remote-controlled and can open and close abruptly.

The terminal strips of the actuator EF 1-40 are live when the unit is in operation!

There is a possibility of serious injury by electrical current.

Before starting work on the terminal strips (installation, dismantling, connecting the cables), the unit **must always be isolated** from the electrical supply!

ATEX (Atmosphère Explosible)

According to the European Directive 94/9/EC, the equipment must **not** be used in potentially explosive areas.

Explanatory Notes

Scope of supply

Actuator EF 1-40

1 actuator EF 1-40
1 cable tie
1 installation manual

Description

The CAN bus control element URZ 40 is integrated in the actuator EF 1-40. This allows control systems that make use of the CANopen protocol for data exchange via CAN bus to directly control the actuator EF 1-40 via the integrated control element URZ 40.

The direct control is made possible by

- the controller LRR 1-40 (continuous boiler blowdown control)
- the control, operating & display panel SPECTOR*control*,
- adjustable CANopen control equipment produced by other manufacturers.

Function

The valve position requested by the control system is made available in the form of a data message in the CAN bus system. The control element URZ 40 converts the valve position data into a control command and the actuator will be operated until the feedback potentiometer signals that the required valve position has been reached.

For further feedback information, the control element URZ 40 normalizes the value that depends on the valve position and is indicated by the feedback potentiometer (0 – 100 %) and sends it to the CAN bus in the form of a data message.

In addition, the data message (which is sent out cyclically) may contain the following error messages:

- Power failure in actuator
- Excessively high temperatures in control element URZ 40
- Fault in feedback potentiometer (parting of a cable, short circuit)
- Both limit switches have been activated
- Wrong sense of rotation
- Feedback potentiometer immobilized

The actuator motors into the preset safety position if

- the data sending cycle is interrupted or
- there is a malfunction in the feedback potentiometer.

The activation control of the actuator is switched off if

- both limit switches have been activated,
- the sense of rotation is wrong, or
- the feedback potentiometer is immobilized.

If the sense of rotation is wrong or the feedback potentiometer is immobilized, the control element URZ 40 tries to restart after approx. 5 sec.

Technical Data

Actuator

Protection
IP 54 to EN 60529
IP 67 to EN 60529 (option)

Motor
230 V ± 10 %, 50/60 Hz ± 5 %, cyclic duration factor 100 %, insulation class B to VDE 0530, with starting capacitor 0.18 µF, 1500 V and RC interference suppression filter

Power consumption
max. 50 W at max. 230 V AC

Angle of rotation
max. 270°

Actuating time
120 s / 90°

Torque
30 Nm

Limit switches
2 change-over switches (break / make contact), max. switching capacity 10 (3) A, 50 V AC

Feedback potentiometer
1 kΩ potentiometer, 320°, ± 3 %, type RP 19

Cable entry / electrical connection
1 cable gland with integral cable strain relief, M20 x 1.5
1 three-pole terminal strip for connecting the potentiometer, conductor size 1.5 mm²
1 nine-pole screw-type terminal strip, conductor size 2.5 mm²
1 two-pole screw-type terminal strip, conductor size 2.5 mm²

For connecting the CAN bus
M12 sensor connector (male), 5 poles, A coded
M12 sensor connector (female), 5 poles, A coded

Admissible ambient temperature
0 °C to +70 °C
–20 °C to +70 °C (with IP 67 protection)

Technical Data – continued –

Control element

Interface
Interface for CAN bus according to ISO 11898, CANopen protocol

Supply voltages
18 – 36 V DC, 0.1 A, protected against polarity reversal
115 – 230 V AC, 4 A, for the motor in the actuator

Inputs
2 inputs for monitoring the limit switches, opto-isolated, 115 – 230 V AC
1 input for detecting zero crossing, opto-isolated, 115 – 230 V AC
1 input for signalling the valve position via feedback potentiometer, 1 kΩ

Outputs
2 volt-free relay contacts for actuating the motor
Contact material AgNi 0.15

Measuring range
0 – 100 % of the manipulating range, ±1 %

Indicators and adjustors
2 pushbuttons for manual positioning and calibration
5 LEDs for internal status messages
1 ten-pole code switch for setting the node ID and the baud rate
1 four-pole code switch for system configuration

Fault response time
5 sec.

Power consumption
max. 3 W at max. 24 V DC

Fuse
Electronic thermal fuse T_{max} 85 °C, hysteresis -5 K

Technical Data – continued –

Name plate / identification marks

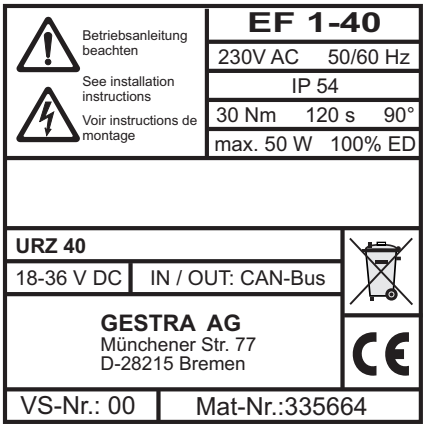


Fig. 1

Technical Data – continued –

Dimensions

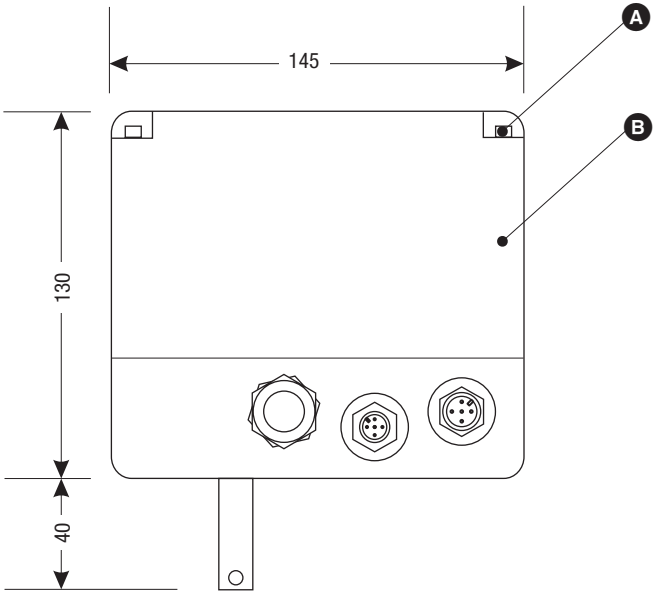


Fig. 2

Functional Elements

EF 1-40

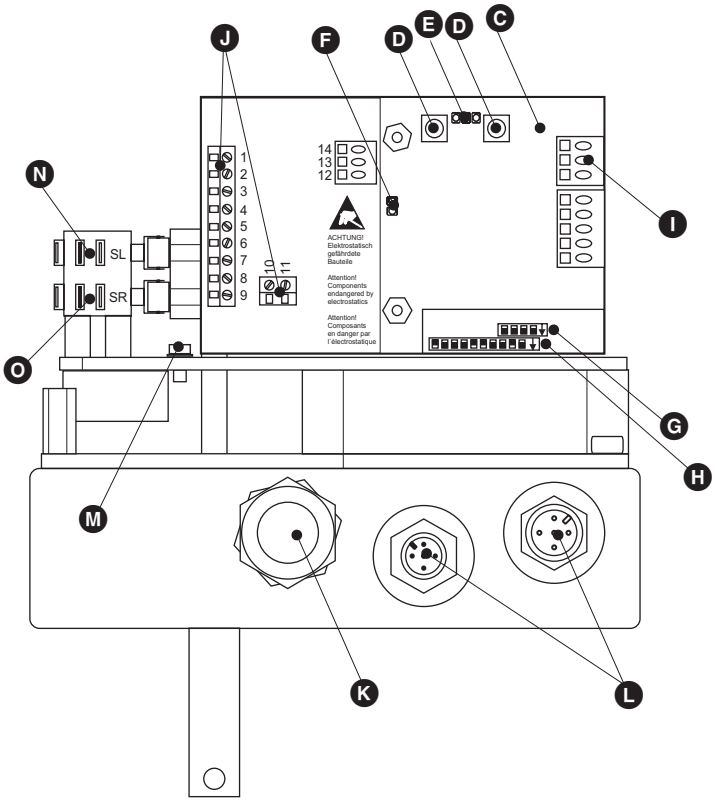


Fig. 3

Technical Data / Functional Elements – continued –

Key

- **A** Cross-recess cover screws **Fig. 2**
- **B** Cover **Fig. 2**
- **C** Terminal block
- **D** Pushbutton for manual operation
- **E** Light-emitting diodes 1 – 3 (LED 1 green “Power”, LED 2 yellow “Status”, LED 3 red “Malfunction”)
- **F** Light-emitting diodes 4 – 5
- **G** Code switch “System configuration”
- **H** Code switch “Node ID / baud rate”
- **I** Terminal strip for feedback potentiometer
- **J** Terminal strip for connecting the mains power and the motor
- **K** Cable gland for mains connection
- **L** M12 sensor connectors (1 male, 1 female), 5 poles, A coded
- **M** Grounding screw
- **N** Limit switch SL
- **O** Limit switch SR

Installation

Actuator EF 1-40

The actuator type EF 1-40 is designed for use with suitable controllers to operate control and shut-off equipment (valves, cocks, gate valves etc.).

The actuator can be installed in any position. Installation on the control unit takes place via a mounting support attached to the actuator. The actuator is provided with permanent grease lubrication and is maintenance-free.

The GESTRA continuous blowdown valves BA 46 and BA 47 can be retrofitted with the actuator EF 1-40 (BAE 46, BAE 47).

For this retrofit, please observe the installation instructions BA 46, BA 47, BAE 46, BAE 47.

Notes

Cable entry
For storage, installation and commissioning, ensure that the cable entries are closed off properly. Use only cables that are suitable for the diameter of the the cable entry.

Installing the cover
When installing the cover, ensure that the O-ring and the 3 Pertinax washers are properly seated.
Check that there is no damage to the mating surfaces of the cover.
Tighten the cover screws evenly.

Enclosure / cover
Do not drill any additional holes in the actuator housing or in the cover.

After installation, the steps

- connecting the supply voltage
- changing the baud rate
- configuring the control element (see “Commissioning”), and
- changing the node ID (see under “Appendix”)

can be performed in one working step with the cover still open.

Electrical Connection

Connecting the actuator

Flexible three-core cable (e.g. Ölflex Classic 110, manufactured by LAPP, 3 x 0.75 mm²) is required for connecting the actuator.

1. Undo the cross-recess cover screws Ⓐ and remove the cover Ⓑ.
2. Undo the fastening screws and remove the terminal block Ⓒ.
3. Undo the cable gland Ⓚ and pull the cable through the gland.
4. Strip off approx. 50 mm of cable insulation coating and remove approx. 5 mm of conductor end insulation.
5. Connect the cable to terminal strip Ⓙ in accordance with the wiring diagram. Connect PE to the grounding screw inside the enclosure.
6. Seal off the cable entry by tightening the cable gland Ⓚ.
7. Replace the terminal block Ⓒ and tighten the fastening screws.

CAN bus cable, cable length and conductor size

Screened multi-core twisted-pair control cable (e.g. UNITRONIC® BUS CAN 2 x 2 x .. mm²; Li 2YCY 2 x 2 x .. mm²) **must** be used for the bus line.

Preassembled control cables (equipped with connectors) are available in various lengths as optional extras.

The cable length dictates the baud rate (data transfer rate) between the bus nodes, and the total power consumption of the sensors dictates the conductor size.

S 8	S 9	S 10	Baud rate	Cable length	Number of pairs and conductor size [mm²]
OFF	**ON**	**OFF**	**250 kBit/s**	**125 m**	2 x 2 x 0.34
Factory setting					
ON	ON	OFF	125 kBit/s	250 m	2 x 2 x 0.5
OFF	OFF	ON	100 kBit/s	335 m	2 x 2 x 0.75
ON	OFF	ON	50 kBit/s	500 m	Available on request (depends on the configuration)
OFF	ON	ON	20 kBit/s	1000 m	
ON	ON	ON	10 kBit/s	1000 m	

The baud rate is set at the code switch Ⓗ **Fig. 3** (S 8-10). The factory setting for the baud rate of control element URZ 40 is 250 kBit/s (cable length up to 125 m). For longer cable lengths, reduce the baud rate setting accordingly. Make sure that all bus nodes exhibit the same setting.

Changing the baud rate

With the cover taken off:
Set the baud rate at code switch Ⓗ (switches S8 to S10) in accordance with the baud rate table, using e.g. a screwdriver with a small tip.

Note

The maximum baud rates and cable lengths are based on empirical values obtained by GESTRA. In practice, it may become necessary to reduce the baud rate to ensure trouble-free operation.

Voltage supply of CAN bus

An adequately dimensioned power supply is a prerequisite for trouble-free operation of a CAN bus system.

Please check the power supply of your bus system with the aid of the following table.

Controllers with power supply	Qty	x	Power output per item of equipment	=	**Sum 1**
		x	**6 W**	=	**W**
Sensor, transmitter, control elements, control terminal & display unit URB 1	Qty	x	Power output per item of equipment	=	**Sum**
		x	**3 W**	=	**W**
Control terminal & display unit URB 2		x	**5 W**	=	**W**
			Sum 2	=	**W**

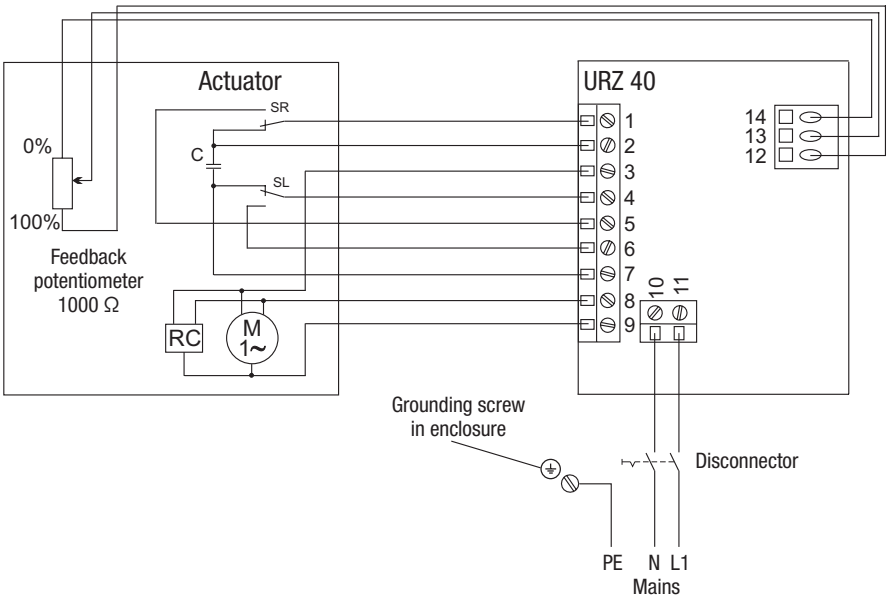
If sum **2** exceeds sum **1**, provide the CAN bus with 24 V DC from a separate, stabilized safety power supply unit (e.g. SITOP Smart 24 V 2.5 A).

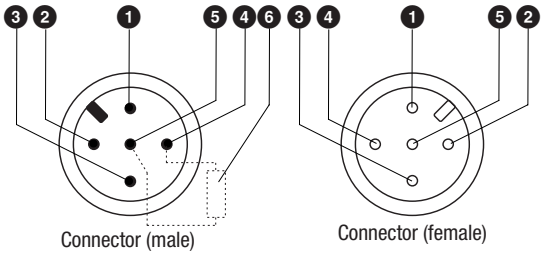
The power supply unit must meet the requirements of DIN VDE 0106 (safe isolation) and be provided with an overcurrent protective device according to EN 61010-1/VDE 0411.

In this case, the CAN bus power supply must not be connected to the control units (terminals 1 and 5).

Electrical Connection – continued –

Wiring diagram for actuator EF 1-40 / control element URZ 40





❶ Screen
❷ Supply voltage 24 V DC+
❸ Supply voltage 24 V DC–
❹ CAN data line C_H
❺ CAN data line C_L
❻ Terminating resistor 120 Ω

Pin assignment of male and female connectors for CAN bus lines

Fig. 4

Electrical Connection – continued –

Attention

- To protect the switching contacts, provide the circuits with a slow-blow fuse 2.5 A.
- Provide all connected contactors and actuators with RC combinations (according to the manufacturer's instructions) in order to suppress interference.
- Install the disconnector for the measuring transducer so that it is easily accessible and in close proximity to the equipment (as per EN 61010-1).
- Mark this switch as being a disconnecting device for the measuring transducer.
- Wire the CAN bus in series. Star-type wiring is not permitted!
- Connect the screens of bus lines **once** to the central earthing point (CEP).
- If two or more system components are connected in a CAN bus system, provide the first and the last device with a terminating resistor of 120 Ω (terminal C_L / C_H).
- The CAN bus network must not be interrupted during operation!
  An interruption will trigger an alarm.

Tools

- Screwdriver for slotted screws, size 2.5, completely insulated according to VDE 0680-1
- Screwdriver for cross-recess screws, size 2
- Screwdriver (5.5/100)

Basic Settings

Factory setting for GESTRA continuous blowdown valve BAE 46, BAE 47

The limit switches in the actuator EF 1-40 are set in the factory to "CLOSED" (scale position "0") and "OPEN" (scale position "4").

Factory setting for control element URZ 40

The control element URZ 40a has the following factory-set default values:

- Node ID: 048
- Baud rate: 250 kBit/s (125 m cable length)
- Code switch Ⓖ: All switches in the position OFF

Commissioning

Danger

Please observe the safety notes in the installation manuals of the control and shut-off equipment to be operated by the actuator EF 1-40.

For operation of the GESTRA continuous blowdown valves, observe the installation instructions BA 46, BA 47, BAE 46, BAE 47.

Note that powering up the actuator will move the valves / levers / rods that are connected to it.

Danger of crushing: During operation, moving parts can cause serious injury to hands and arms. Keep clear of moving parts!

The continuous blowdown valves BAE 46 and BAE 47 are remote-controlled and can open and close abruptly.

The terminal strips of the control element URZ 40 are live when the unit is in operation!

There is a possibility of serious injury by electrical current.

Before starting work on the terminal strips (installation, dismantling, connecting the cables), the unit **must always be isolate**d from the electrical supply!

Safety note

For commissioning, however, the supply voltage must be switched on again. The equipment must therefore only be installed and commissioned by qualified and competent staff.

Attention

Before starting with commissioning, switch the code switch Ⓖ S2 to ON (manual operation)! **Fig. 3**

Checking the electrical connection

Before commissioning, please check the following:

Is the wiring of all the CAN bus devices in accordance with the wiring diagrams?
Is the polarity correct throughout the whole bus line?
Is the bus line of each of the end nodes provided with a 120 Ω terminating resistor?

Switching on the supply voltage

Switch on the supply voltage for the CAN bus system and for the motor.

The green bus LED 4 then flashes or is illuminated. **Fig. 6**

Check the supply voltage of the CAN bus system. The two end-of-line devices must be supplied with a voltage of > 24 V DC. If this is not the case, check the supply voltage of the CAN bus; see section “Electrical Connection”.

Setting the limit switches

Do not change the settings of the limit switches in the actuator EF 1-40 for the GESTRA continuous blowdown valve BAE 46, BAE 47!

For other applications, however, the limit switches SR and SL can be adjusted as follows:

The adjustable control cam actuates the limit switches SL and SR. The adjusting screws NL and NR are of different lengths and are used for setting the corresponding control cams L and R.

Limit switch SL

- Using a screwdriver, press the red button on the control element until the desired limit position is reached.
- Using the adjusting screw NL, turn the control cam L in the direction of rotation of the camshaft Ⓔ until the limit switch SL clicks.

Limit switch SR

- Using a screwdriver, press the blue button on the control element until the desired limit position is reached.
- Using the adjusting screw NR, turn the control cam R in the direction of rotation of the camshaft Ⓔ until the limit switch SR clicks.

To check the adjustment, motor to the two end limits again and readjust if necessary.

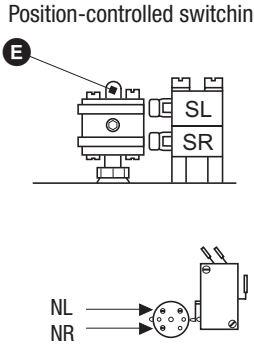
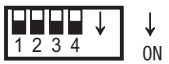


Fig. 5

Commissioning – continued –

Configuring the control element URZ 40

The configuration is set at the code switch Ⓖ, **Fig. 3.** Set the switches S1 to S4 in accordance with the table by means of a small-tipped screwdriver.

Ⓖ 

Toggle switch = white

Code switch Ⓖ		Function
S1	OFF	Actuator safety position, right
	ON	Actuator safety position, left
S2	OFF	Automatic operation
	ON	Manual operation
S3	OFF	Calibration of feedback potentiometer not active
	ON	Calibration of feedback potentiometer active by pressing button
S4	OFF	Monitoring of limit switch; switch functions as a make contact
	ON	Monitoring of limit switch; switch functions as a break contact

Actuator safety position

Switch Ⓖ S1 is used to define the safety position of the actuator. The actuator motors into the preset safety position if

- the data sending cycle is interrupted or
- there is a malfunction in the feedback potentiometer.

Calibrating the feedback potentiometer

The actuator is equipped with a feedback potentiometer for indicating the valve position.
Please calibrate the feedback potentiometer as follows:

- Using a screwdriver, press the blue button on the control element until the limit switch SR switches off the actuator.
- Set the code switch Ⓖ S3 to the position ON and press the blue button again with a screwdriver. This calibrates the 0 % valve position.
- Set the code switch Ⓖ S3 to the position OFF again.
- Using a screwdriver, press the red button on the control element until the limit switch SL switches off the actuator.
- Set the code switch Ⓖ S3 back to the position ON and press the red button again. This calibrates the 100 % valve position.
- After completing the calibration procedure, set the code switch Ⓖ S3 back to the position OFF.

The green LED 1 flashes during the calibration procedure. **Fig. 5**

Configuring the control element URZ 40 – continued –

Monitoring of the limit switches

If the contacts of the limit switches are directly accessible, the control element URZ 40 can also be used to monitor the function of the switches. In this case, the indicating signal must be configured according to the operational mode of the limit switches.

- If the limit switches function as break contacts for the indicating signal, set the code switch Ⓖ S4 to the position ON.
- If the limit switches function as make contacts for the indicating signal, then set the code switch Ⓖ S4 to the position OFF.

On completion of commissioning:

- Set the code switch Ⓖ S2 back to OFF (automatic operation).
- Replace the cover Ⓑ and tighten the cross-recess cover screws Ⓐ.

Installing the cover

When installing the cover, ensure that the O-ring and the 3 Pertinax washers are properly seated.
Check that there is no damage to the mating surfaces of the cover.
Tighten the cover screws evenly. Make sure that the cables are not pinched.

Operation

Automatic operation

The yellow LED 2 flashes while the actuator is energized and the valve is moving. **Fig. 5**
LED 2 remains illuminated when the actuator has reached its limit position.

Manual operation

Remove the cover and set the code switch ⓖ S2 to the position ON (manual operation). The green LED 1 flashes rapidly. Depending on the desired direction, press the blue button (actuator closes, i.e. turns clockwise) or the red button (actuator opens, i.e. turns counter-clockwise). The yellow LED 2 flashes while the button is pressed and remains illuminated when the limit position has been reached.
Fig. 5

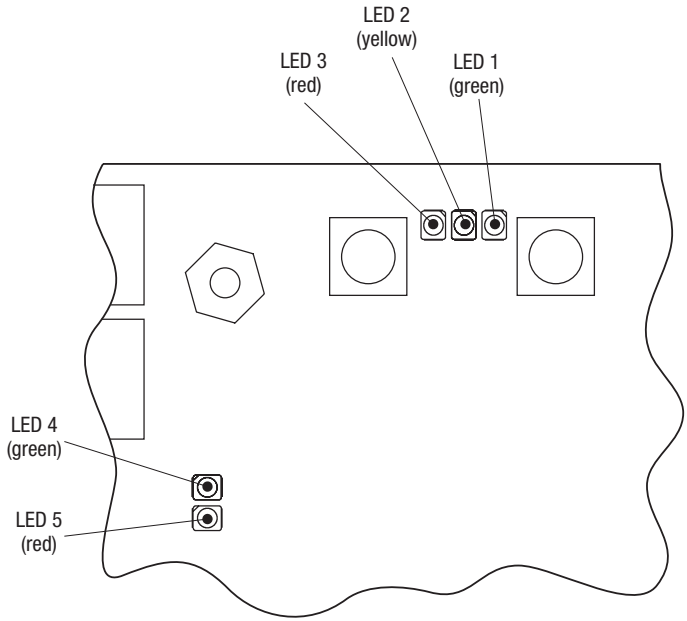


Fig. 5

LED 1 – 4, meaning of the displays

Display	Status
LED 1 is illuminated	Control element is in operation
LED 1 is flashing	Feedback potentiometer is being calibrated
LED 1 is flashing rapidly	Control element is in manual mode
LED 2 is flashing	Actuator is energized and moving the valve
LED 2 is illuminated	Actuator has reached its limit position
LED 4 is illuminated	CAN node has been started

System Malfunctions

LED 2 – 5, error indicators and remedial action

Display	Possible cause	Remedy
LED 3 is flashing	No communication possible between **control element URZ 40** and the **control unit**	Check the 24 V bus supply, wiring, configuration of the LW electrodes (jumpers), node ID, baud rate and terminating resistors. After making any changes, switch off the mains voltage, wait approx. 5 sec. and then switch on again.
	No communication possible between **control element URZ 40** and the **control unit**. Malfunction occurs after lengthy intervals.	There is a source of interference near the equipment. Suppress interference from contactors and actuators by installing RC combinations as per manufacturer's instructions. Take measures against high-frequency interference.
LED 3 is flashing slowly	Temperature within the enclosure of the control element has exceeded or fallen below the admissible value.	Check installation of the control element. If the ambient temperature is below zero, do not switch off the supply voltage. LED 3 stops flashing after approx. 5 minutes of operation.
LED 3 is flashing rapidly	Malfunction in the feedback potentiometer, or limit switch defective, or supply voltage for the motor is missing.	Check the supply voltage and actuator.
LED 5 is flashing	Faulty communication in the CAN bus system.	Check the 24 V bus supply, wiring, configuration of the level limiters, node ID, baud rate and terminating resistors. After making any changes, switch off the mains voltage, wait approx. 5 sec. and then switch on again.

Measures against high-frequency interference

Provide all connected contactors and actuators with RC combinations (according to the manufacturer's instructions) in order to suppress interference.

Should sporadic failures occur in installations susceptible to faults (e.g. malfunctions due to out-of-phase switching operations), we recommend the following measures for suppressing interference:

HF interference suppression of the power supply by means of ferrite rings, and
HF interference suppression of the CAN bus line by means of hinged-shell ferrite rings.

Causes

Malfunctions occur if CAN bus components have been mounted or configured incorrectly or if electronic component parts are defective, or in the event of excessive heat in the equipment or electrical interference in the supply system. Further malfunctions include:

- Faulty communication in the CAN bus system
- 24 V PSU in the control unit is overloaded.

Note

Before carrying out the systematic fault finding procedure, please check:

Wiring:
Is the wiring in accordance with the wiring diagrams?
Is the polarity correct throughout the whole bus line?
Is the bus line of each of the end nodes provided with a 120 Ω terminating resistor?

Node ID:
Are all the node IDs set correctly?
Do not use a node ID twice!

Baud rate:
Is the length of the cable in accordance with the adjusted baud rate?
Is the baud rate the same for all devices?

Systematic malfunction analysis

The sources of malfunctions occurring in CAN bus systems operating with several bus-based stations must be analysed systematically, since faulty components or incorrect settings can give rise to negative interactions with intact bus devices in the CAN bus system. These unwanted interactions can cause error messages in fully functional bus devices, which will make fault detection even more difficult.

Systematic malfunction analysis – continued –

We recommend the following faultfinding procedure:

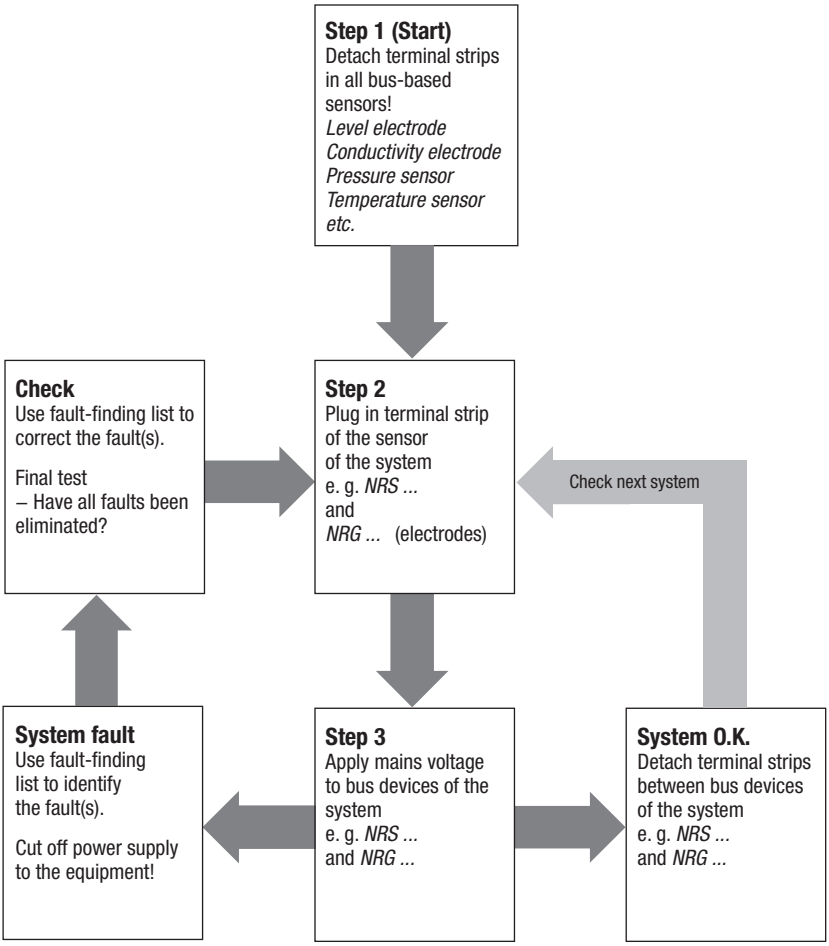


Fig. 6

If faults occur that are not listed above or cannot be corrected, please contact our service centre or authorized agency in your country.

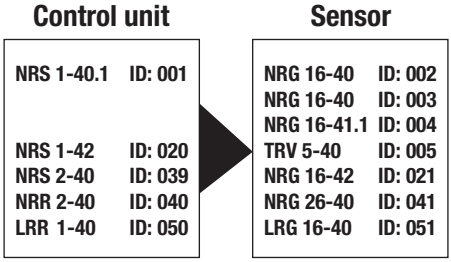
CAN Bus Settings

CAN bus

All level, conductivity and temperature controllers and the associated electrodes are interconnected by means of a CAN bus using the CANopen protocol. All devices have an electronic address – the node ID. The four-core bus cable serves as power supply and data highway for high-speed data exchange.

The CAN address (node ID) can be set between 2 and 122.

Factory setting of the node IDs



Individual node IDs must be set manually at the device itself. Please observe the corresponding installation manuals of the equipment!

Node ID

If the devices are to be assigned different node IDs, the node IDs for the individual nodes must be defined as follows, because of their mutual dependency:

Example of continuous blowdown control

Control element URZ 40a for electrical actuators with AC motor	Controller LRR 1-40	Conductivity electrode LRG 1.-40	Spare	
X – 1	X	X + 1	X + 2	
49	50	51	52	**Factory setting**

Reserved range

Changing the node ID

With the cover taken off:
Set the node ID at switches S1 to S7 of code switch Ⓗ **(Fig. 3)** in accordance with the table of node IDs **(Fig. 7)**, using e.g. a screwdriver with a small tip.

CAN Bus Settings – continued –

Danger

The terminal strips of the control element URZ 40 are live when the unit is in operation!

There is a possibility of serious injury by electrical current.

Before starting work on the terminal strips (installation, dismantling, connecting the cables), the unit must always be **isolated** from the electrical supply!

Attention

A node ID must never be used twice in a CAN bus system.
The node ID 0 is not permissible.

Table of node IDs

A maximum of 123 subscribers (devices) can be managed on a CAN bus. Each subscriber is given a separate address (node ID), which can be set at the 10-pole code switch Ⓗ. **Fig. 3**

Ⓗ 

Toggle switch = white

Ⓗ 

Toggle switch = white

		Node ID	48
S1	OFF	1	
S2	OFF	2	
S3	OFF	4	
S4	OFF	8	
S5	**ON**	16	
S6	**ON**	32	
S7	OFF	64	

(Factory setting)

		Node ID	89
S1	**ON**	1	
S2	OFF	2	
S3	OFF	4	
S4	**ON**	8	
S5	**ON**	16	
S6	OFF	32	
S7	**ON**	64	

(Example)

Fig. 7

S 8	S 9	S 10	Baud rate	Cable length
OFF	**ON**	**OFF**	**250 kBit/s**	**125 m**
Factory setting				
ON	ON	OFF	125 kBit/s	250 m
OFF	OFF	ON	100 kBit/s	335 m
ON	OFF	ON	50 kBit/s	500 m
OFF	ON	ON	20 kBit/s	1000 m
ON	ON	ON	10 kBit/s	1000 m

CAN Bus Message

Object dictionary

Index (hex)	Subindex (hex)	Access	Data type	Designation	Description
Tx PDO 1					
2001	1	RO	Uint8	VIst	Valve actual pos. in %
2001	2	RO	Uint8	VSol	Valve required pos. in %
2001	3	RO	Uint8	VHys	Hysteresis in %
2001	4	RO	Uint8	VSts	Status
2001	5	RO	Uint8	VErr	Fault messages
2001	6	RO	Uint8	VTmp	Temperature in the enclosure in °C
2001	7	RO	Uint16	VRoh	Filtered raw value from potentiometer
Tx PDO 2					
2005	1	RO	Uint16	Kal0	Calibration value 0 %
2005	2	RO	Uint16	Kal1	Calibration value 100 %
2005	3	RO	Uint16	VRoh	Filtered raw value from potentiometer
2005	4	RO	Uint8	TmpSW	Temperature switching threshold
2005	5	RO	Uint8	TiOut	TimeOut in 100 ms
Calibration parameters					
2003	1	RW	Uint16	Kal0	Calibration value 0 %
2003	2	RW	Uint16	Kal1	Calibration value 100 %
2003	3	RW	Uint16	Kalm	Minimum digit spacing
Other settings					
2004	1	RW	Uint8	TmpSW	Temperature switching threshold
2004	2	RW	Uint8	TiOut	TimeOut in 100 ms
2004	3	RW	Uint8	VHys	Hysteresis in %
2004	4	RW	Uint8	VBlock	Blocking detection in 100 ms

PDO

Ident	Statically mapped objects
T x PDO 1 self	2001 01, 2001 02, 2001 03, 2001 04, 2001 05, 2001 06, 2001 07
T x PDO 2 self	2005 01, 2005 02, 2005 03, 2005 04, 2005 05

CAN Bus Message – continued –

Information contained in the CAN bus transmit message (PDO 1)

Identifier EF 1-40	**180 (hex) + node ID**
Byte 0	Valve actual pos. in %
Byte 1	Valve required pos. in %
Byte 2	Hysteresis in %
Byte 3 Status	Bit 0 (0 x 01) Valve closing actuated Bit 1 (0 x 02) Valve opening actuated Bit 2 (0 x 04) Limit position closed Bit 3 (0 x 08) Limit position open Bit 4 (0 x 10) Remote operation Bit 5 (0 x 20) Automatic operation (direct with probe) Bit 6 (0 x 40) Manual operation Bit 7 (0 x 80) Calibration (0 x 0 x) Safety position actuated
Byte 4 Fault	Bit 0 (0 x 01) TimeOut / BusOff Bit 1 (0 x 02) Limit switch plausibility Bit 2 (0 x 04) Actuator blocked Bit 3 (0 x 08) Potentiometer fault (cable break, short circuit) Bit 4 (0 x 10) Temperature threshold exceeded Bit 5 (0 x 20) Both buttons pressed Bit 6 (0 x 40) Calibration error Bit 7 (0 x 80) 230 V not available
Byte 5	Temperature in the enclosure in °C
Byte 6: H Byte 7: L	Filtered raw value from potentiometer

Information contained in the CAN bus transmit message (PDO 2)

Identifier EF 1-40	**280 (hex) + node ID**
Byte 0: H Byte 1: L	Calibration value 0 %
Byte 2: H Byte 3: L	Calibration value 100 %
Byte 4: H Byte 5: L	Filtered raw value from potentiometer
Byte 6	Temperature switching threshold
Byte 7	TimeOut in 100 ms

CAN Bus Message – continued –

Valve control

	Data type	Designation	Description
R x PDO 1 Automatic identifier URZ 40: 200 (hex) + node ID			
Byte 0: H Byte 1: L	Uint16	Signature	Fixed at 5A3A hex
Byte 2	Uint8	AMode	Automatic only 20 hex
Byte 3	Uint8	Set point	Set point in %
R x PDO 2 Remote identifier URZ 40: 300 (hex) + node ID			
Byte 0: H Byte 1: L	Uint16	Signature	Fixed at 5A3A hex
Byte 2	Uint8	RMode	Auto 20 hex, manual 40 hex
Byte 3	Uint8	Set point / cmd	Set point in % or command

RMode = manual (command)	
55 hex	Open the valve
AA hex	Closed the valve
00 hex	Stop the valve
3A hex	Use current position as 0 % calibration value
A3 hex	Use current position as 100 % calibration value
nn hex	Stop the valve

Priorities	
Manual / calibration	Highest priority
Remote	
Automatic	Lowest priority

Note

The PDO must be transmitted cyclically at certain intervals, otherwise the device will respond with TimeOut. The factory setting for the transmit cycle is 5 seconds.

The switching threshold for TimeOut can be adjusted under: Object Dictionary, Other Settings, 2004 hex, Subindex 2 (units in 100 ms).

Decommissioning, Disposal

Danger

Please observe the safety notes in the installation manuals of the control and shut-off equipment to be operated by the actuator EF 1-40.

For operation of the GESTRA continuous blowdown valves, observe the installation instructions BA 46, BA 47, BAE 46, BAE 47.

Note that powering up the actuator will move the valves / levers / rods that are connected to it.

Danger of crushing: During operation, moving parts can cause serious injury to hands and arms. Keep clear of moving parts!

The continuous blowdown valves BAE 46 and BAE 47 are remote-controlled and can open and close abruptly.

The terminal strips of the control element URZ 40 are live when the unit is in operation!

There is a possibility of serious injury by electrical current.

Before starting work on the terminal strips (installation, dismantling, connecting the cables), the unit **must always be isolated** from the electrical supply!

Decommissioning

First disconnect the mains supply, and then pull the cable out of the cable gland.
Pull off the male and female connectors of the CAN bus lines, and then connect them to each other.

Attention: An interruption of the CAN bus line will trigger an alarm.

Dismantle the actuator EF 1-40.

Disposal

Dismantle the actuator EF 1-40 and separate the waste materials according to the list of materials.
Electronic components (e.g. circuit boards) must be disposed of separately!
For the disposal, observe the statutory regulations on waste disposal.

Appendix

Declaration of Conformity CE

We hereby declare that the control element **URZ 40** conforms to the following European Directives:

- Low Voltage Directive (LVD) 73/23/EEC, as amended by 93/68/EEC
- EMC Directive 89/336/EEC, as amended by 93/68/EEC

This declaration is no longer valid if modifications are made to the equipment without prior consultation with us.

Bremen, 20 June 2006
GESTRA AG

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