

ABB i-bus® KNX
Electromotor Valve Drive
ST/K 1.1

Intelligent Installation Systems



Contents

	Page
1 Introduction	2
2 Device technology.....	3
3 Application and planning	6
3.1 Individual room temperature control	6
3.2 Commissioning	11
3.3 Valve design and seals.....	12
3.4 Limitation of the actuating value	13
3.5 Boiler control via the maximum actuating value	13
3.6 Monitoring of the actuating value.....	15
3.7 Binary inputs	15
4 Project design and programming	17
4.1 Communication objects	17
4.2 Parameters.....	19
4.2.1 Parameter window: "Characteristics of valve"	19
4.2.2 Parameter window: "Security and forced mode"	20
4.2.3 Parameter window: "External interface"	22
4.2.4 Parameter window: "User-defined characteristics of valve" ...	24
4.2.5 Parameter window: "Own characteristic curve"	26
4.2.6 Parameter window: "Linear characteristic curve"	28
5 Appendix	29
5.1 Read out error code	29
5.2 Check limit position.....	30
5.3 Check adapter ring.....	31
5.4 Ordering information	32

1 Introduction

The Electromotor Valve Drive ST/K 1.1 is a proportional valve drive for controlling heating valves via the KNX. The bus connection is carried out via bus connecting terminal.

The valve drive enables the user to have a room temperature control system which is efficient and simple to operate and thus contributes to convenience and energy savings.

The Electromotor Valve Drive ST/K 1.1 is controlled via a continuous KNX room thermostat. The continuous actuating value enables a valve position with an optimum control-action result. The actual valve position is indicated by 5 LEDs.

The valve drive has two external inputs for a presence and window contact. The status of these inputs can be sent on the KNX and used for toggling between frost protection, comfort and standby mode.

Using the valve adapter supplied, the valve drive can be used on many conventional thermostat valve bases.

There is the possibility of checking the function of the room thermostat through the Electromotor Valve Drive ST/K 1.1. To do so, the time interval between two actuating value telegrams is monitored and an alarm telegram is triggered on failure of the actuating value.

To adapt the inlet temperature, the Electromotor Valve Drive ST/K 1.1 can send a status signal about the current energy demand at the boiler. If there is only a low demand, this can reduce its temperature or increase the temperature when the demand is higher.

The valve drive can be switched to summer mode via the KNX using a time switch or a switch. The actuating value of the room thermostat is ignored in summer mode and the valve remains closed. It is possible to prevent the room being heated if the setpoint temperature has not yet been reached in the morning.

The valve protection function prevents the valve from being fixed in position when it is not operated over a long period. If valve protection is activated, it is also carried out during the summer.

2 Device technology



The Electromotor Valve Drive ST/K 1.1 is a proportional valve drive for controlling heating valves via the ABB i-bus® KNX. The valve drive is mounted on thermostat valve bases. The control is carried out via a continuous KNX room thermostat.

The Electromotor Valve Drive ST/K 1.1 also has two binary inputs which can be used e.g. for the connection of a presence contact and/or window contact. The status of these inputs can be sent on the bus.

Technical data

Power supply	– Operating voltage	21 ... 30 V DC, via the KNX
	– Power consumption	typ. 10 mA
Operating and display elements	– Power consumption via the KNX	typ. 240 mW / max. 350 mW
	– Programming LED and button	for entering the physical address
	– 5 LEDs	Display of the valve position: no LED: 0 % 1. LED: 1 % – 20 % 2. LED: 21 % – 40 % 3. LED: 41 % – 60 % 4. LED: 61 % – 80 % 5. LED: 81 % – 100 %
Drive	– Running time	< 20 s/mm
	– Max. lift	7.5 mm
	– Actuating force	max. 120 N
Connections	– 6-core connecting cable for:	
	– 2 binary inputs (per 2 cores)	Presence and/or window contact (yellow/green) and (white/brown)
	– KNX (2 cores)	Bus connecting terminal (black/red)
Type of protection	– IP 21 in accordance with EN 60 529	
Protection class	– III in accordance with DIN VDE 0106 part 1	
Ambient temperature range	– Operation	0 °C ... + 50 °C
	– Storage	– 20 °C ... + 60 °C
	– Transport	– 20 °C ... + 60 °C
	– Medium	max. + 100 °C
Design	– Compact device for placing on the valve base of thermostat	
Housing, colour	– Plastic housing, white	
Installation	– On valve base of thermostat	
	– Adapter rings supplied are suitable for:	Danfoss RA, Heimeier, MNG, Herb Schlösser 3/93, Honeywell, Onda Braukmann, Dumser, Reich (distributor), Landis+Gyr, Oventrop
	– Detection of the valve end stop	Fully automatic
Dimensions	– 82.5 x 50 x 65 mm (H x W x D)	
Weight	– 0.2 kg	

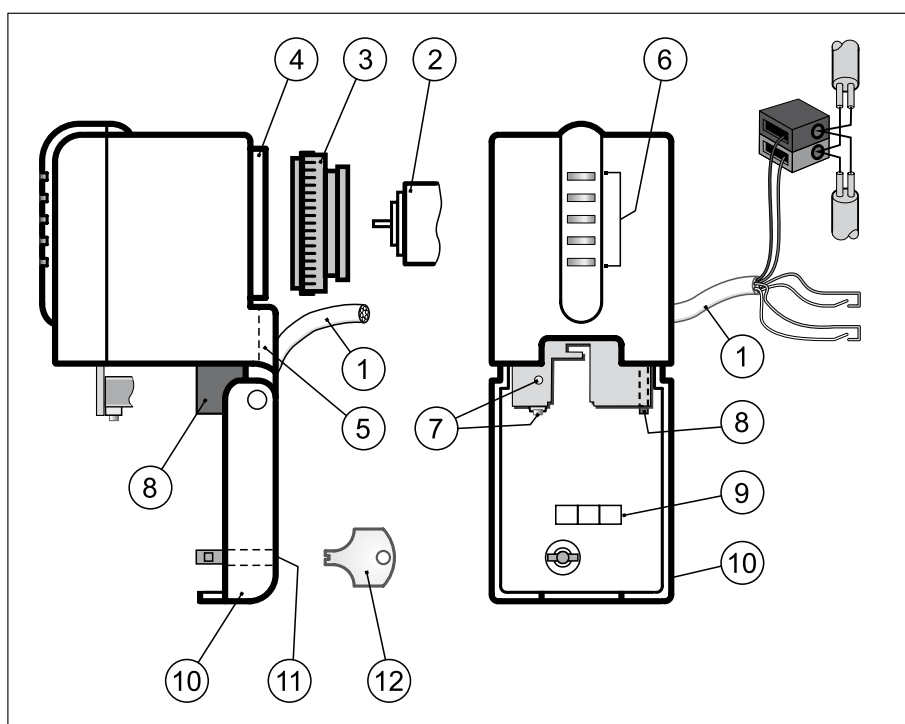
Technical data

Mounting position	– as required
Certification	– KNX-certified
CE norm	– in accordance with the EMC guideline and the low voltage guideline

Application programs

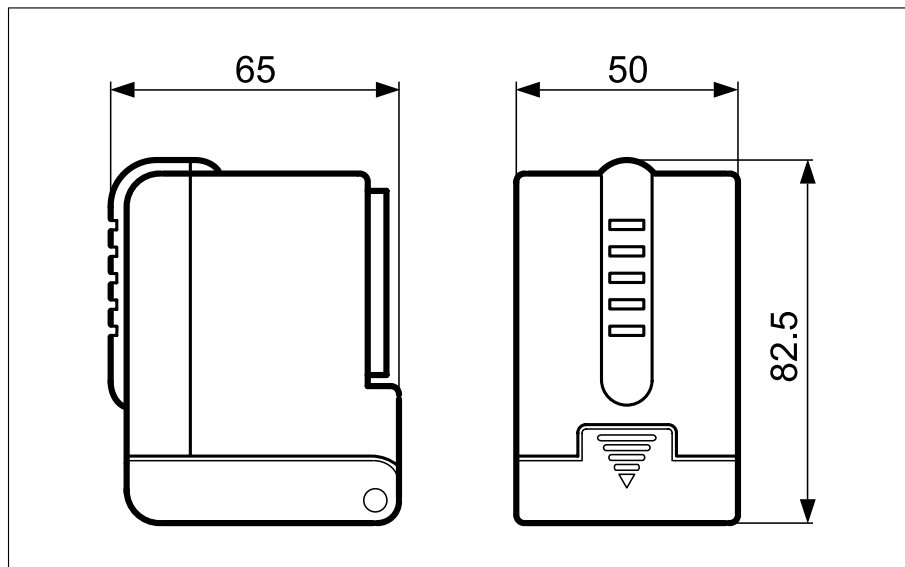
	Max. number of communication objects	Max. number of group addresses	Max. number of associations
Valve Drive Continuous /1	8	18	18

Circuit diagram



- | | |
|-------------------------|------------------------------|
| 1 Connection cable | 7 Programming button and LED |
| 2 Thermostat valve base | 8 Dismantling lever |
| 3 Adapter ring | 9 Labelling field |
| 4 Valve connection | 10 Hinged lid |
| 5 Cable entry | 11 Lock |
| 6 Valve opening display | 12 Key |

Dimension drawing



Note

The programming is carried out with ETS from version ETS2 V1.2a onwards.



During maintenance work on the heater, the valve drive should always be dismantled and the valve should be securely closed (e.g. original protective cap).

Otherwise, the valve could be opened unexpectedly by the thermostat or valve protection function and thereby cause water damage.

When downloading the application, the Electromotor Valve Drive ST/K 1.1 must already be mounted on the valve as otherwise no adaptation can take place.

If an already adapted device is placed on another valve, the adaptation must be carried out again by downloading the application.

3 Application and planning

3.1 Individual room temperature control

3.1.1 Simple individual room temperature control

To set up individual room temperature control, a continuous KNX room thermostat is required in addition to the Electromotor Valve Drive ST/K 1.1. The temperature in the room is recorded with the help of a sensor integrated in the room thermostat. The room thermostat enables the required setpoint temperature to be set and the actual temperature to be displayed (depending on the selected room thermostat).

The following KNX components are required to set up a simple individual room temperature control system:

- Electromotor Valve Drive ST/K 1.1
- KNX room thermostat + Bus coupler BA/U 3.2

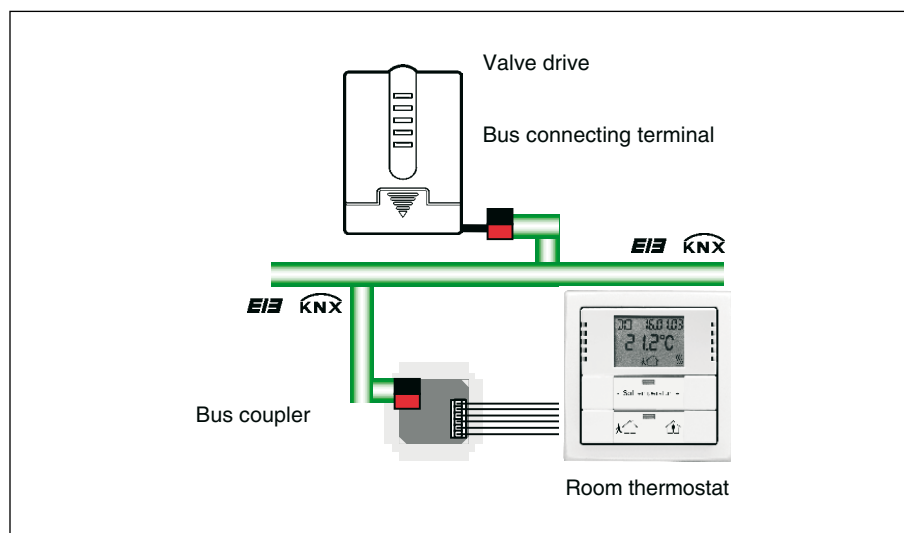


Fig. 1: Structure of a simple individual room temperature control system

ABB STOTZ-KONTAKT has the following KNX room thermostats in its range (see also Fig. 2):

- Room thermostat solo®
- Room thermostat alpha nea®
- Busch-Triton® switch sensors TRITON/3.D.RT.WA.1
- Busch-Triton® switch sensors TRITON/5.IR.D.RT.WA.2

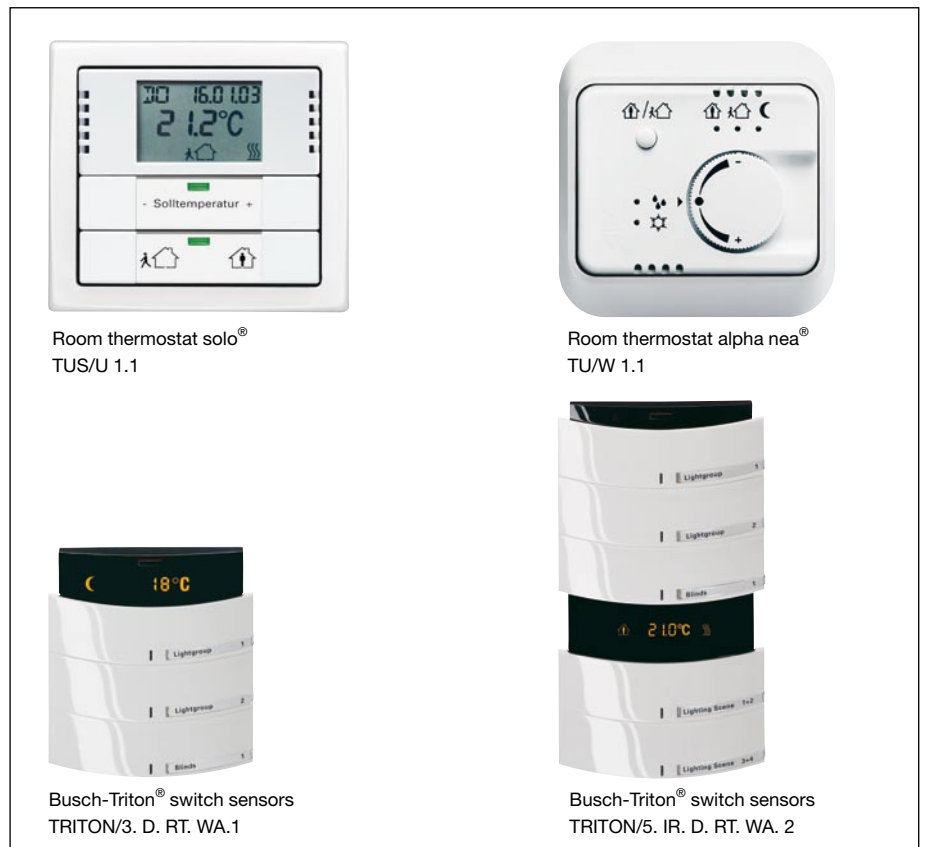


Fig. 2: Different room thermostats

If several heaters are installed in a room, the control can be extended to two or more valve drives without any problems (see Fig. 3a and 3b).

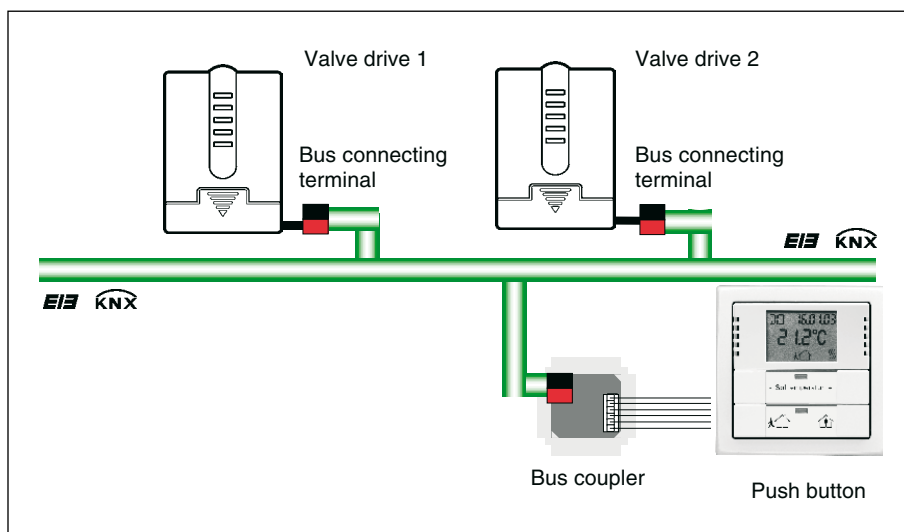


Fig. 3a: Extended individual room temperature control

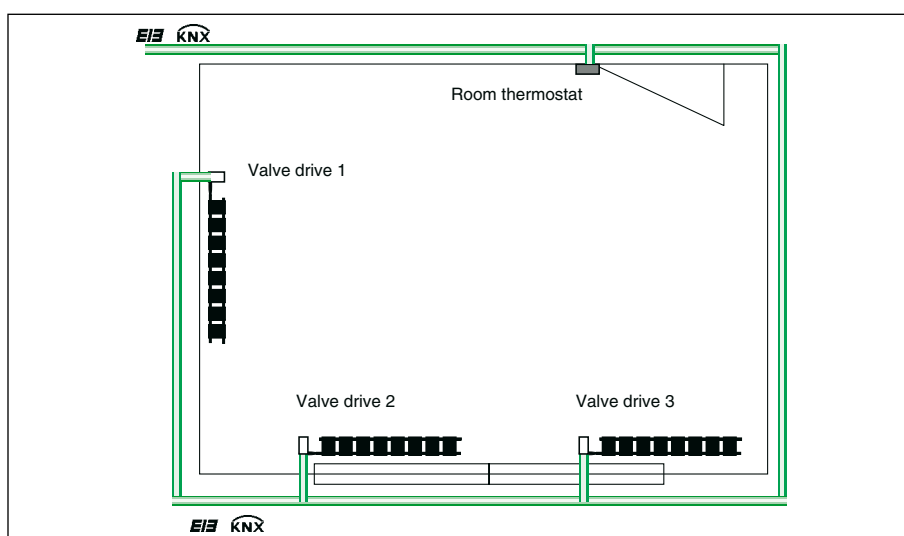


Fig. 3b: Extended individual room temperature control

3.1.2 Individual room temperature control with window contact and conventional presence detector

To set up an individual room temperature control system with window contact and conventional presence detector, a window contact and a presence detector are required in addition to the valve drive and the KNX room thermostat.

The temperature of the room thermostat is also detected in this configuration. The room thermostat enables the required setpoint temperature to be set and the actual temperature to be displayed (depending on the selected room thermostat). The window contact and the presence detector, both directly linked with the valve drive, enable further functions. The valve drive can set the heater to frost protection mode when the window is opened. By activating the presence detector, the room thermostat can automatically be switched to comfort mode.

The following components are required to set up an individual room temperature control system with window contact and conventional presence detector (see Fig. 4):

- Electromotor Valve Drive ST/K 1.1
- KNX room thermostat + Bus coupler BA/U 3.2
- Magnet reed contact set (MRS/W, MRS/B, VMRS/W, VMRS/B)
- Conventional presence detector

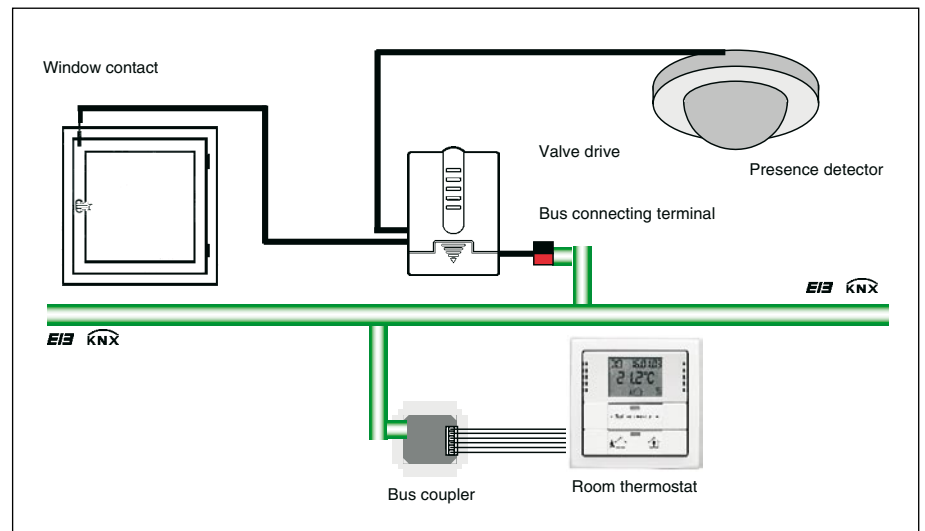


Fig. 4: Individual room temperature control with window contact and presence detector

3.1.3 Individual room temperature control with window contact and KNX presence detector

The following KNX components are required to set up an individual room temperature control system with window contact and KNX presence detector (see Fig. 5):

- Electromotor Valve Drive ST/K 1.1
- KNX room thermostat + Bus coupler BA/U 3.2
- Presence detector PM/A 1.2 and Surface-mounted housing AG/A 1.1 + Bus coupler BA/U 3.2

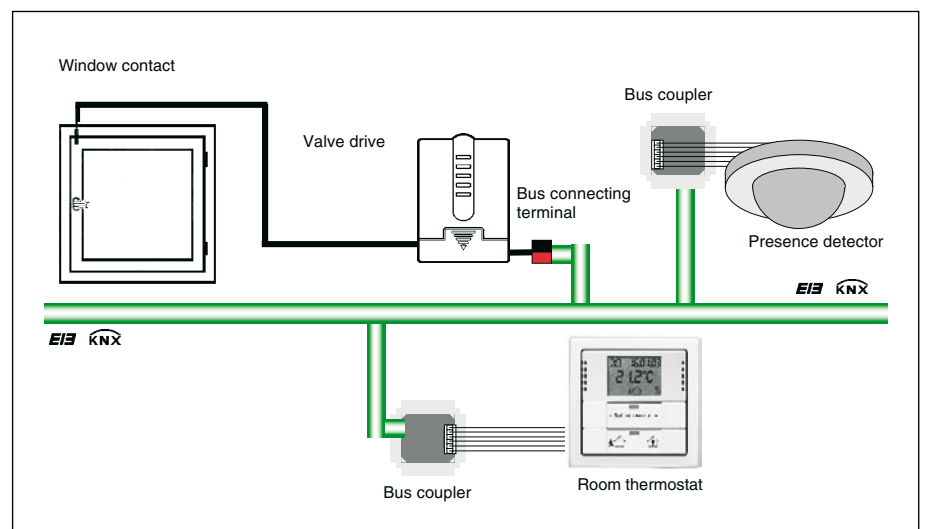


Fig. 5: Individual room temperature control with window contact and KNX presence detector

3.1.4 Individual room temperature control with window contact, presence detector and time switch

To set up an individual room temperature control system with window contact, presence detector and time switch, an KNX time switch with a year program is also required.

By adding an KNX time switch which is connected to the bus, it is possible to switch to summer mode centrally. This means that the actuating value of the room thermostat is ignored and it is possible to prevent the room being heated if the setpoint temperature has not yet been reached e.g. in the morning.

The following KNX components are required to set up an individual room temperature control system (see Fig. 6):

- Electromotor Valve Drive ST/K 1.1
- KNX room thermostat + Bus coupler BA/U 3.2
- Presence detector PM/A 1.2 and Surface-mounted housing AG/A 1.1
- Time switch SW/S 4.5 or Radio time switch FW/S 4.5 + Antenna FA/A 2.1

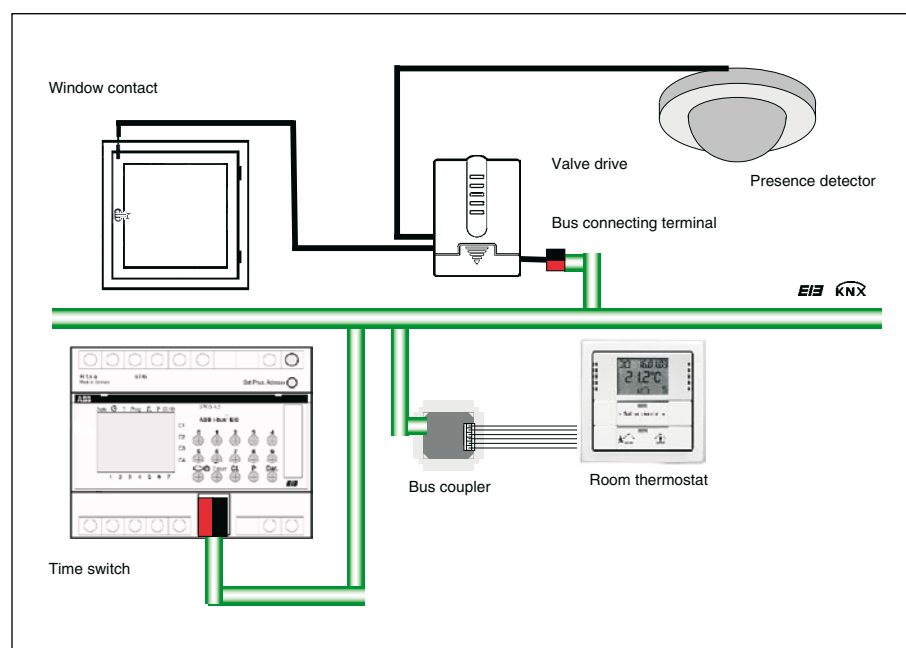


Fig. 6: Individual room temperature control with window contact, presence detector and radio time switch

3.2 Commissioning

3.2.1 Warning note



During maintenance work on the heater, the valve drive should always be dismantled and the valve should be securely closed (e.g. original protective cap). Otherwise, the valve could be opened unexpectedly by the thermostat or valve protection function and thereby cause water damage.

When downloading the application, the Electromotor Valve Drive ST/K 1.1 must already be mounted on the valve as otherwise no adaptation can take place.

3.2.2 Installation

The device is first clipped onto the valve with the appropriate adapter ring. The bus voltage is then applied, whereby the application is started automatically.

3.2.3 Automatic adaptation

As the travel (lift) of the valve tappet between 0 % (valve fully closed) and 100 % (valve fully open) can differ considerably from valve to valve, an automatic adaptation is carried out on the existing valve by the Electromotor Valve Drive ST/K 1.1.

1. The valve drive first retracts its spindle (0 % – valve closed). The 1st LED is blinking.
2. The spindle moves forwards until contact is made with the valve tappet (100 % – valve fully opened). The 2nd LED is blinking.
3. The spindle presses the tappet forwards until the seal is compressed into position (0 % – valve closed). The 3rd LED is blinking.

This process can take several minutes. The Electromotor Valve Drive ST/K 1.1 is then precisely adapted to the existing valve, travels to 25 % open and displays heating mode (2 LEDs light up).

Both limit positions (0 % and 100 %) are stored and are also retained after a voltage failure/reset. They are used as fixed reference points for the positioning.

The automatic adaptation is carried out for the first time in the site function once the bus voltage has been applied. Otherwise it is carried out after each download of the application.

To compensate for changes in the valve characteristics over a period of time (e.g. due to the ageing of the rubber seal), an automatic adaptation is carried out at regular intervals.



If an already adapted device is placed on another valve, the adaptation must be carried out again by downloading the application.

3.2.4 Site function

In the supplied state, the Electromotor Valve Drive ST/K 1.1 functions in site mode i.e. the valve is opened to 25 % when the KNX voltage is applied to prevent the heater from freezing. This function enables immediate limited use on the building site.

3.3 Valves and valve seals

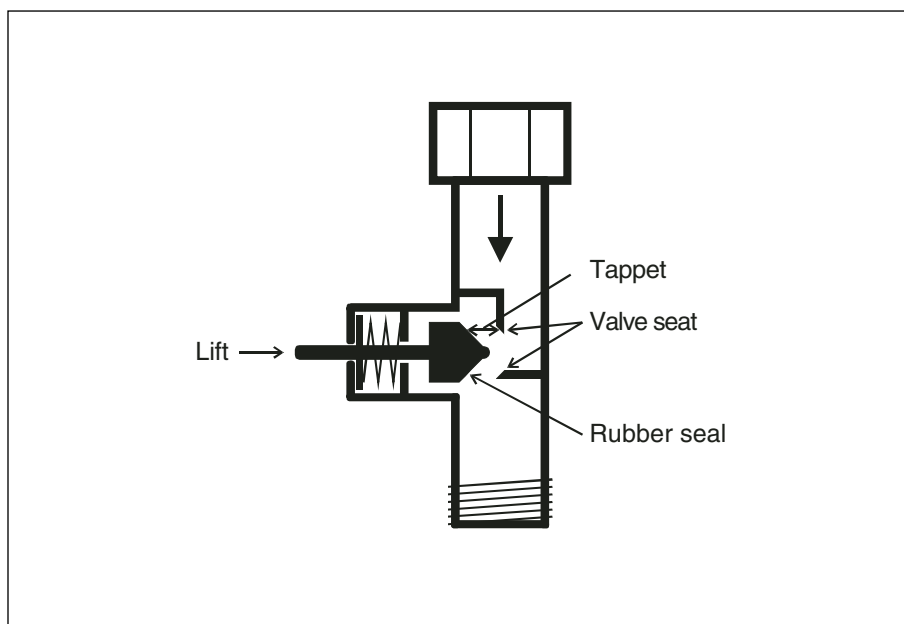


Fig. 7: Valve design

In the idle state i.e. if the tappet is not operated, it is pressed outwards by the spring and the valve is open (100 % position in normal operating mode). If the tappet is pressed, the rubber seal is pressed into the valve seat and the valve is closed (0 % position in normal operating mode).

If the valve does not close immediately when the rubber seal touches the valve seat, it may be necessary to move the tappet several millimetres, depending on the characteristics of the existing seal, until the valve is properly closed. This behaviour is determined by the hardness, the shape, the ageing or damage to the valve seal.

To correct the influence of this parameter, an additional compression of the valve seal can be achieved with the Electromotor Valve Drive ST/K 1.1 by a defined override of the valve lift (see parameter *Additional pressing of rubber seal*).

The valve lift is the mechanical travel between the two limit positions i.e. 0 % (valve closed) and 100 % (valve fully opened).



To avoid damage to the seal, the parameter value should be increased at the maximum in steps of 10, until the required seal properties are achieved.

3.4 Limitation of the actuating value

The Electromotor Valve Drive ST/K 1.1 receives its actuating value (0 % ... 100 %) from the room thermostat. In most cases, it is not necessary for practical reasons to use the complete bandwidth between 0 % and 100 %.

Maximum actuating value

In the upper range, the flow rate does not change for many valves between an actuating value of 60 % and 100 % i.e. the heater is already heating at its maximum capacity with an actuating value of 60 %.

The readjustment of the valve drive in the upper range can be suppressed without any disadvantage and can thus clearly reduce the frequency of the positioning.

Minimum actuating value

Many valves develop unpleasant whistling noises at a low actuating value. This effect can be prevented by defining a minimum actuating value. If e.g. a noise is established at an actuating value below 8 %, a minimum actuating value of 10 % can be defined. When an actuating value is received which is below the defined limit value, the valve drive can react in two different ways:

- either move immediately to 0 % (“0 %”)
- or remain in the position of the minimum actuating value and the valve is only fully closed on receipt of the actuating value 0 % (“0 % = 0 % otherwise min. actuating value”).

This reaction is set in the parameter *Behaviour at minimum actuating value underflow*.

3.5 Boiler control via the maximum actuating value

If all the valve drives in the installation are only opened slightly e.g. one at 5 %, one at 12 %, another at 7 %, the boiler can lower its capacity because only a low level of heating energy is required.

To guarantee this, the boiler requires the following information:
What is the actuating value in the room which currently has the greatest heat demand?

This task is adopted by the Electromotor Valve Drive ST/K 1.1 using the function ‘Determine maximum position’.

Each valve drive compares the received actuating values with its own actuating value. The valve drive with the largest actuating value sends its value via the KNX.

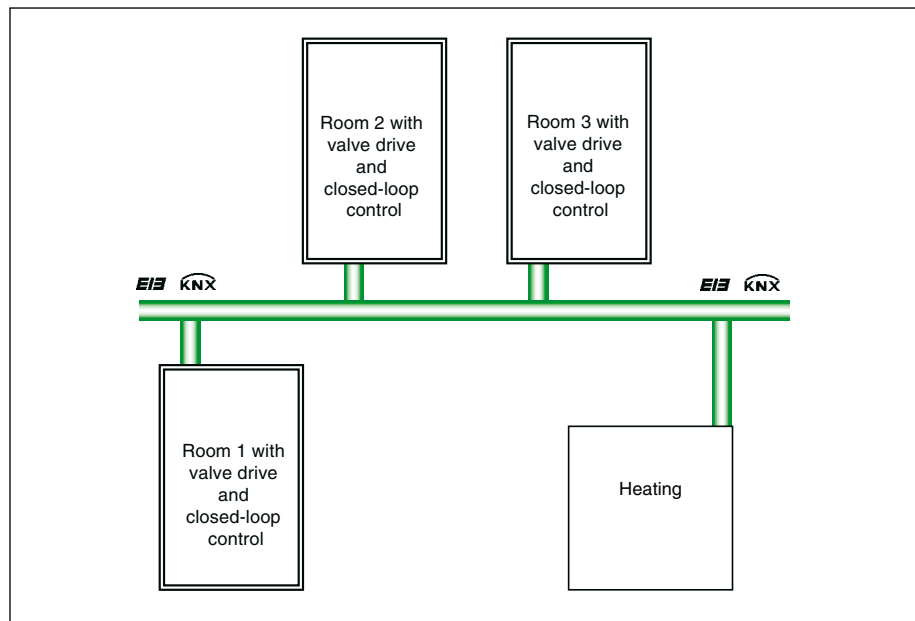


Fig. 8: Example of a boiler control system

The comparison of the actuating values takes place via the communication object “Maximum position”. To do so, a common group address for sending and receiving the maximum position is linked with the communication object.

To start the comparison of the actuating values among the bus devices, one device must send its value cyclically to this group address.

The task can be adopted either by the boiler or one of the valve drives. If the boiler carries this out, it must send the smallest possible value i.e. 0 %.

If one of the valve drives ST/K 1.1 carries this out, the parameter *Transmission of object “max. actuating value” for heating system* in the parameter window “Security and forced mode” must be set to a cyclic period. This valve drive then sends its own actuating value at regular intervals and the others can react to it.

Regardless of which bus device functions as a trigger, the parameter *Transmission of object “max. actuating value” for heating system* must be set to the default value “Only if own actuating value is higher” for all other valve drives.

3.6 Monitoring of the actuating value

If the room thermostat fails while the last sent actuating value is 0 % for example, all the valves remain closed regardless of further temperature progression in the room. This can lead to considerable damage if e.g. cold air penetrates the room at external temperatures below the zero reference point.

To prevent this, the Electromotor Valve Drive ST/K 1.1 can carry out the following functions:

- monitor the proper function of the room thermostat
- start an emergency program on failure of the actuating value
- send the status of the monitoring of the actuating values

The Electromotor Valve Drive ST/K 1.1 monitors whether at least one actuating value telegram is received within the parameterised time period and adopts a parameterised position when the actuating value fails (parameter “Valve position in case of failure of actuating value”).

The room thermostat is set for cyclical sending of the actuating value. The period for the monitoring of the actuating value in the valve drive ST/K 1.1 must be twice as long as the cyclical transmission period of the room thermostat so that the valve does not immediately move into the position on failure of the actuating value when a signal is omitted (e.g. due to a high bus load).

After a failure of the actuating value, normal operation is resumed as soon as a new actuating value is received.

3.7 Binary inputs

The Electromotor Valve Drive ST/K 1.1 has two binary inputs E1 and E2 available. Both inputs are led out via the 6-core connection cable of the Electromotor Valve Drive ST/K 1.1.

The parameterisation of the inputs is carried out on the parameter page “External interface”.

The current status of both inputs is sent on the KNX depending on the parameterisation and can thus be evaluated by other bus devices (room thermostats).

You can take the assignment of the 6-core connecting cable from the following table.

Name	Colour	Function
BUS	black (–) red (+)	KNX bus cable
E1	yellow green	Binary input for window contact(s)
E2	white brown	Binary input for presence detector or presence button

The input E1 is provided for connection of the window contacts. The window contacts can be connected directly and without an additional power supply.

A presence detector or button can be connected directly to input E2 without an additional power supply.

Example of a window contact:

The communication object “Window contact” can either be linked with the communication object “Forced position” of the valve drive ST/K 1.1 or with the communication object “Frost protection” of the room thermostat.

Advantage: If a window is opened for ventilation, the heaters can be restricted to save heating energy.



If the window input is linked with the “Forced position” and a “Forced position” of (or approximately) 0 % has been selected, opening the window for a long period at low external temperatures can lead to the heater being frozen.

Example of a presence contact:

The communication object “Presence contact” can be linked with the communication object “Comfort” of the room thermostat.

Advantage: If someone enters a room in which the heating is lowered, the room thermostat can be switched to comfort mode via a contact.

4 Project design and programming

The Electromotor Valve Drive ST/K 1.1 is loaded with the application program “Valve Drive Continuous/1” via the ETS program from version ETS2 V1.2a onwards.

4.1 Communication objects

no.	Object name	Function	C	R	W	U	T	Type
0	actuating value	Drive to position	✓	✓	✓			1 Byte
1	Forced position	Drive to forced position	✓	✓	✓			1 Bit
2	actual valve position	indicate actual valve position	✓	✓			✓	1 Byte
3	Maximum position	Determine maximum position	✓	✓	✓			1 Byte
4	Summer mode	Close valve in summer	✓	✓	✓			1 Bit
5	Window contact	indicate state of window conta	✓	✓			✓	1 Bit
6	Presence contact	indicate state of presence con	✓	✓			✓	1 Bit
7	Failure of actuating value	signal failure of actuating va	✓	✓			✓	1 Bit

Fig. 9: Communication objects

Actuating value – Drive to position (EIS6: 1 Byte)

Receives the actuating value (0...100 %) preset by the room thermostat. The valve is positioned accordingly.

Telegram value: „0“: Valve closed (0 %)
 „...“: Intermediate position
 „255“: Valve fully open (100 %)

Forced position – Drive to forced position (EIS1: 1 Bit)

If a telegram with the value “1” is received at this communication object, the valve is moved to the parameterised *Valve position at forced mode*. The valve remains in this position until the forced mode is deactivated again by a telegram with the value “0”. This operating mode has the highest priority.

Telegram value: „0“: Forced position deactivated
 „1“: Forced position activated

Actual valve position – Indicate actual valve position (EIS6: 1 Byte)

Sends the actual valve position (0...100 %) on the KNX. This function can be enabled if required (e.g. fault location) or disabled (see parameter window “Characteristics of valve”).

Telegram value: „0“: Valve closed (0 %)
 „...“: Intermediate position
 „255“: Valve fully open (100 %)

Maximum position – Determine maximum position (EIS6: 1 Byte)

This communication object has the following function depending on the parameterisation:

1. Receives the “actuating value” of the other valve drives (other rooms) so that they can be compared to its own value and sends its own “actuating value” to the boiler if it is higher than the received value.
2. Sends its own “actuating value” to the other valve drives to start a new comparison (see also the parameter *Transmission of object “Max. actuating value” for heating system* in the parameter window “Security and forced mode”).

Telegram value:	„0“:	Valve closed (0 %)
	„...“:	Intermediate position
	„255“:	Valve fully open (100 %)

Summer mode – Close valve in summer (EIS1: 1 Bit)

If a telegram with the value “1” is received at this communication object, summer mode starts i.e. the “actuating value” is no longer taken into account and the valve remains closed. If valve protection is activated (see parameter window “Security and forced mode”), it is also carried out during summer mode.

Telegram value:	„0“:	Normal operation
	„1“:	Summer mode

Window contact – Indicate state of window contact (EIS1: 1 Bit)

Sends the status of binary input E1. This communication object is only visible if the option “Input 1: window contact, Input 2: none” or “Input 1: window contact, Input 2: presence” is selected for the parameter *Function of external interface*.

Telegram value:	„0“:	Window open
	„1“:	Window closed

Presence contact – Indicate state of presence contact (EIS1: 1 Bit)

Sends the status of binary input E2. This communication object is only visible if the option “Input 1: window contact, Input 2: presence” is selected for the parameter *Function of external interface*.

Telegram value:	„0“:	Presence contact open
	„1“:	Presence contact closed

Failure of actuating value – Signal failure of actuating value (EIS: 1 Bit)

Sends an alarm telegram if no new actuating value has been received by the room thermostat within a parameterised period (see parameter *Monitoring of actuating value*).

Telegram value:	„0“:	No failure of the actuating value
	„1“:	Failure of the actuating value

4.2 Parameters

4.2.1 Parameter window: “Characteristics of valve”

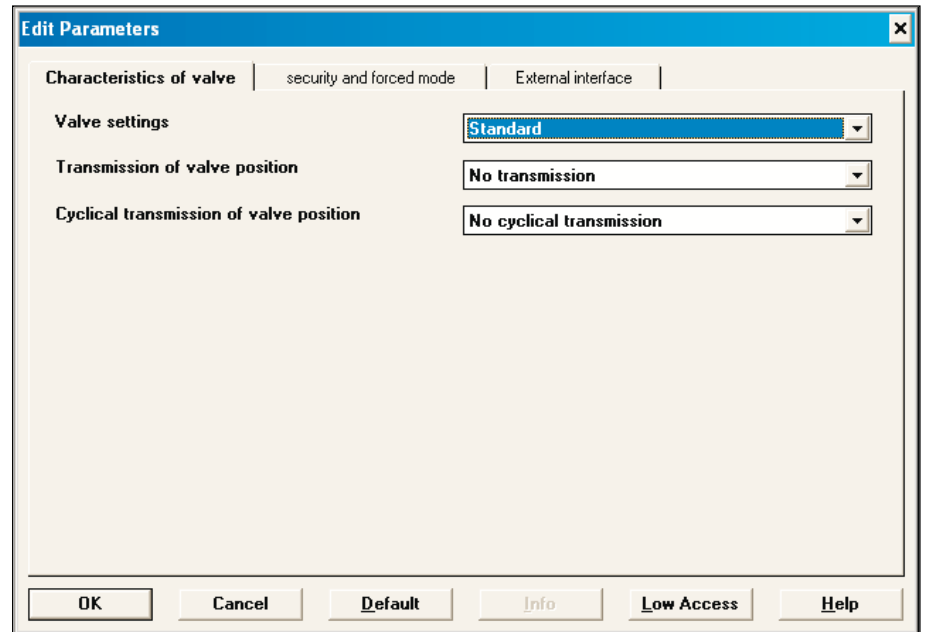


Fig. 10: Parameter window: “Characteristics of valve”

Valve settings

- Options:
- Standard
 - User-defined

Defining the valve settings. If the option “User-defined” is selected, the parameter window “User-defined characteristics of valve” is visible and additional parameters can be set.



Please only select the option “User-defined” if you have sufficient knowledge in the area of heating technology to be able to carry out the settings on the parameter page “User-defined characteristics of valve”. When using standard valves, it is possible to dispense with the additional settings and select the option “Standard”.

Transmission of valve position

- Options:
- No transmission
 - at change of 1 %
 - at change of 2 %
 - at change of 3 %
 - at change of 5 %
 - at change of 7 %
 - at change of 10 %
 - at change of 15 %

Setting the change compared to the last transmitted value at which the valve position is sent.

Cyclical transmission of valve position

- Options:
- No cyclical transmission
 - every 2 min.
 - every 3 min.
 - every 5 min.
 - every 10 min.
 - every 15 min.
 - every 20 min.
 - every 30 min.
 - every 45 min.
 - every 60 min.

Setting the cyclic transmission time for sending the valve position.

4.2.2 Parameter window: “Security and forced mode”

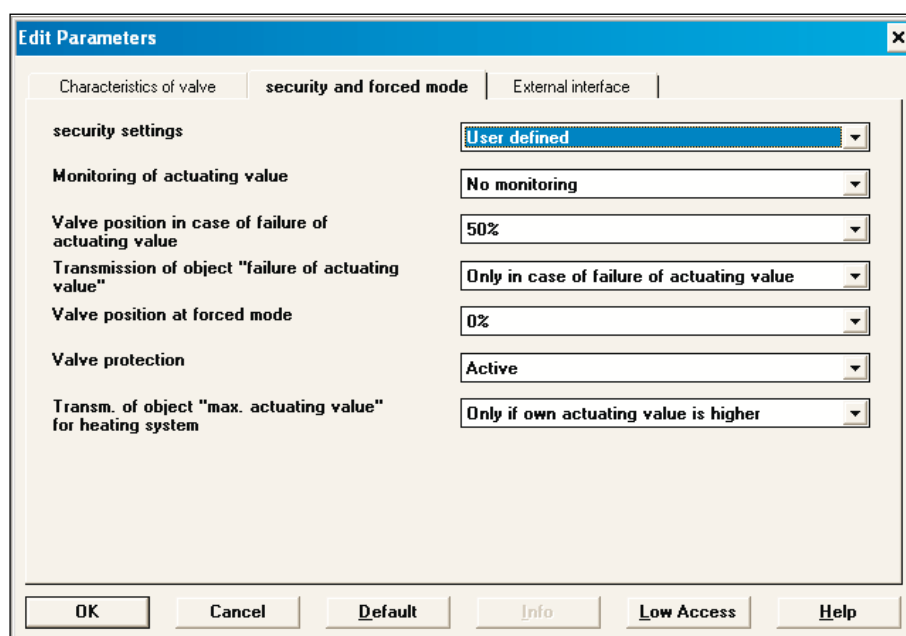


Fig. 11: Parameter window: “Security and forced mode”

Security settings

- Options:
- Standard
 - User-defined

Setting the safety function. By selecting the option “User-defined”, the parameter window “User-defined security and forced mode” becomes visible. Additional parameters can be set.

Monitoring of actuating value

- Options:
- No monitoring
 - 5 min.
 - 10 min.
 - 15 min.
 - 20 min.
 - 30 min.
 - 45 min.
 - 60 min.

The period for monitoring the actuating value in the Electromotor Valve Drive ST/K 1.1 should at least be twice as long as the cyclic transmission time of the room thermostat so that the valve does not immediately move to the *Valve position in case of failure of actuating value* when a signal is omitted (e.g. due to a high bus load).

Valve position in case of failure of actuating value

- Options:
- 0 %
 - 10 %
 - 20 %
 - 30 %
 - 40 %
 - 50 %
 - 60 %
 - 70 %
 - 80 %
 - 90 %
 - 100 %

Setting the valve position on failure of the actuating value.

Transmission of object “failure of actuating value”

- Options:
- Only in case of failure of actuating value
 - Always after a monitoring period has passed

If the option “Only in case of failure of actuating value” is selected, the status of the communication object is only sent on failure of the actuating value.

If the option “Always after a monitoring period has passed” is selected, the status is always sent cyclically once the parameterised monitoring period has elapsed (see parameter *Monitoring of actuating value*).

Valve position at forced mode

- Options:
- 0 %
 - 10 %
 - 20 %
 - 30 %
 - 40 %
 - 50 %
 - 60 %
 - 70 %
 - 80 %
 - 90 %
 - 100 %

Setting the valve position in forced mode.

Valve protection

- Options:
- Active
 - Inactive

This function prevents the valve from being fixed in position when it is not operated over a lengthy period. The valve protection program is always carried out if the actuating value has not changed during the last 24 hours. The valve is then fully opened once and closed again. This process is not displayed on the LEDs.

Transmission of object “max. actuating value” for heating system

- Options:
- Only if own actuating value is higher
 - every 2 min.
 - every 3 min.
 - every 5 min.
 - every 10 min.
 - every 15 min.
 - every 20 min.
 - every 30 min.
 - every 45 min.
 - every 60 min.

For selecting the cyclic transmission period of the maximum actuating value for the boiler control system.



A maximum of one cyclic transmission period may be set for a valve drive in each installation. The option “Only if own actuating value is higher” must be set for all other valve drives (see also chapter 3.5).

4.2.3 Parameter window: “External interface”

Edit Parameters	
<div> <div>Characteristics of valve</div> <div>security and forced mode</div> <div>External interface</div> </div>	
Function of external interface	Input 1: window contact, Input 2: presence
Type of connected window contact	Window open - contact closed
Transmission of window state	No cyclical transmission
Type of connected presence contact	Presence = contact closed
Transmission of presence state	No cyclical transmission
<div> <div>OK</div> <div>Cancel</div> <div>Default</div> <div>Info</div> <div>Low Access</div> <div>Help</div> </div>	

Fig. 12: Parameter window: “External interface”

Function of external interface

- Options:
- None
 - Input 1: window contact, Input 2: none
 - Input 1: window contact, Input 2: presence

If the option “Input 1: window contact, Input 2: none” is set, the parameters *Type of connected window contact* and *Transmission of window state* become visible.

If the option “Input 1: window contact, Input 2: presence” is set, the parameters *Type of connected window contact*, *Type of connected presence contact*, *Transmission of window state* and *Transmission of presence state* become visible.

Type of connected window contact

- Options:
- Window open – contact closed
 - Window open – contact open

Enables the use of both normally open and normally closed contacts.

Transmission of window state

- Options:
- No cyclical transmission
 - every 2 min.
 - every 3 min.
 - every 5 min.
 - every 10 min.
 - every 15 min.
 - every 20 min.
 - every 30 min.
 - every 45 min.
 - every 60 min.

For selecting the cyclic period for sending the window state.

Type of connected presence contact

- Options:
- Presence = contact closed
 - Presence = contact open

Enables the use of both normally open and normally closed contacts.

Transmission of presence state

- Options:
- No cyclical transmission
 - every 2 min.
 - every 3 min.
 - every 5 min.
 - every 10 min.
 - every 15 min.
 - every 20 min.
 - every 30 min.
 - every 45 min.
 - every 60 min.

For selecting the cyclic period for sending the presence state.

4.2.4 Parameter window: “User-defined characteristics of valve”

Fig. 13: Parameter window: “User-defined characteristics of valve”

Mode of operation of valve

- Options:
- Normal (closed with pushed tappet)
 - Inverted (open with pushed tappet)

The option “Normal (closed with pushed tappet)” is selected for all standard valves.

The option “Inverted (open with pushed tappet)” is selected for adaptation to inverted valves.

Additional pressing of rubber seal in 1/100 mm

- Options: – 0 100

It is possible to override the valve by the parameterised lift if it does not fully close due to the properties of the rubber seal.

Setting:

1 corresponds to 1/100 mm

10 corresponds to 1/10 mm

100 corresponds to 1 mm



To avoid damage to the seal, the value should be increased in steps of 10 at the maximum until the required seal properties are achieved.

Type of valve seal

- Options:
- Valve with standard seal
 - Valve with hard seal
 - Valve with soft seal
 - Valve with medium soft seal

For setting the type of valve seal.



This setting should only be changed if the valve does not open at low actuating values.

Characteristic curve of valve

- Options:
- Typical characteristic curve
 - Own characteristic curve
 - Linear characteristic curve

The option “Typical characteristic curve” is selected for all standard valves.

The option “Own characteristic curve” is selected for special valves with a known characteristic curve (see chapter 4.2.5).

The option “Linear characteristic curve” is selected for high-quality special valves with a linear characteristic curve (see chapter 4.2.6).



Please only select the option “Own characteristic curve” if you have sufficient knowledge in the area of heating technology to carry out the settings in the parameter window “Own characteristic curve of valve”.

Minimum actuating value

- Options:
- 0 %
 - 5 %
 - 10 %
 - 15 %
 - 20 %
 - 25 %
 - 30 %
 - 40 %

For setting the smallest possible valve position. This parameter prevents the valve whistling when the flow rate is too low.

Behaviour at minimum actuating value underflow

- Options:
- 0 %
 - 0 % = 0 % otherwise min. actuating value

If the option “0 %” is selected, the valve drive moves to 0 % for each actuating value that lies below the minimum value.

If the option “0 % = 0 % otherwise min. actuating value” is selected, the valve drive moves to the previously set minimum actuating value for each actuating value that lies below the minimum value. The valve is only fully closed at an actuating value of 0 %.

Maximum actuating value

- Options:
- 60 %
 - 70 %
 - 75 %
 - 80 %
 - 85 %
 - 90 %
 - 95 %
 - 100 %

For setting the maximum valve position.



As the majority of valves no longer change their flow rate between 60 % and 100 %, the positioning frequency can be reduced by indicating a maximum actuating value of 60 %.

Drive to new valve position

- Options:
- Position always accurate
 - At change of actuating value > 1 %
 - At change of actuating value > 2 %
 - At change of actuating value > 3 %
 - At change of actuating value > 5 %
 - At change of actuating value > 7 %
 - At change of actuating value > 10 %
 - At change of actuating value > 15 %

If the option “Position always accurate” is selected, the valve is repositioned after each change in the actuating value.

If one of the options “At change of actuating value > x%” is selected, the valve is always repositioned if the actuating value has changed by more than the set value when compared to the last position. Frequent small positioning movements can thus be suppressed.



If the value selected is too low, the positioning frequency of the valve increases. If the value is too high, the accuracy of the temperature regulation can be impaired. Changes in the setpoint temperature are only carried out in this case if the difference is sufficiently large.

4.2.5 Parameter window: “Own characteristic curve of valve”

Own characteristic curve of valve	
Valve position in % for 10 % volume flow (1..99)	10
Valve position in % for 20 % volume flow (1..99)	20
Valve position in % for 30 % volume flow (1..99)	30
Valve position in % for 40 % volume flow (1..99)	40
Valve position in % for 50 % volume flow (1..99)	50
Valve position in % for 60 % volume flow (1..99)	60
Valve position in % for 70 % volume flow (1..99)	70
Valve position in % for 80 % volume flow (1..99)	80
Valve position in % for 90 % volume flow (1..99)	90

Fig. 14: Parameter window: “Own characteristic curve of valve”

This parameter window only appears if the option “Own characteristic curve” has been selected for the parameter *Characteristic curve of valve* in the parameter window “User-defined characteristics of valve”. Using the characteristic curve of the valve (see manufacturer documentation), the behaviour of the valve drive can be adapted with precision. This parameter enables the adaptation of the valve drive to a valve over 9 points of the characteristic curve (10 % ... 90 %). The flow rate per valve position is set for each point.

Valve position in % for 10 % volume flow
Valve position in % for 20 % volume flow
Valve position in % for 30 % volume flow
Valve position in % for 40 % volume flow
etc.

Option: – 0 ... 100: 0 ... 100 % volumetric flow

Setting the valve characteristic curve over 9 points.

Fig. 15 illustrates a valve characteristic curve as it frequently occurs in practice. In this characteristic curve, a flow rate of 25 % is already present at a valve position of 10 %. At a valve position of 50 %, the flow rate is over 85 %.

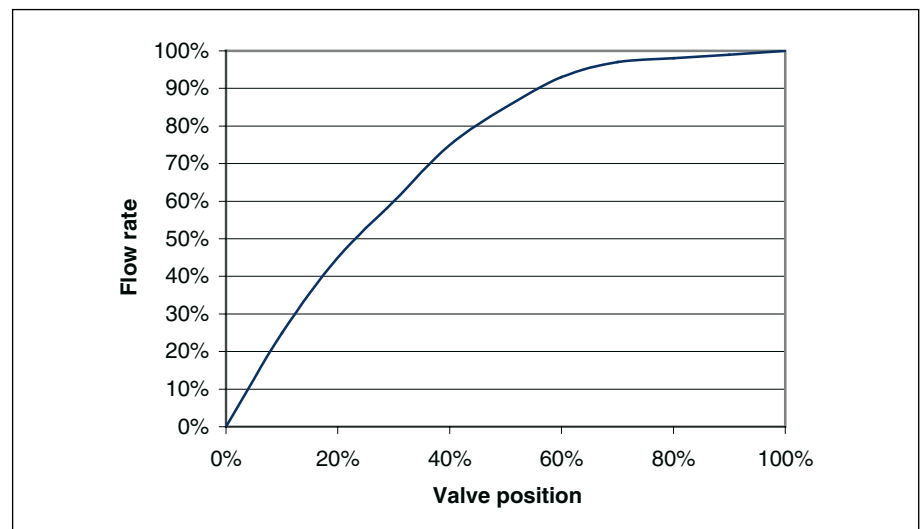


Fig. 15: Example of a characteristic curve

4.2.6 Parameter window:
“Linear characteristic
curve”

Edit Parameters

Characteristics of valve

security and forced mode

External interface

User defined characteristics of valve

Linear characteristic curve of valve

Valve position in % for 10 % volume flow (1..99)	10
Valve position in % for 20 % volume flow (1..99)	20
Valve position in % for 30 % volume flow (1..99)	30
Valve position in % for 40 % volume flow (1..99)	40
Valve position in % for 50 % volume flow (1..99)	50
Valve position in % for 60 % volume flow (1..99)	60
Valve position in % for 70 % volume flow (1..99)	70
Valve position in % for 80 % volume flow (1..99)	80
Valve position in % for 90 % volume flow (1..99)	90

OK

Cancel

Default

Info

Low Access

Help

Fig. 16: Parameter window: “Linear characteristic curve”



The following settings should only be used for valves which are expressly denoted as linear.

The following settings only indicate the values and cannot be modified.

This parameter window only appears if the option “Linear characteristic curve” has been selected for the parameter *Characteristic curve of valve* in the parameter window “User-defined characteristics of valve”.

Valve positioning % for 10 % volume flow

Value: 10

Valve positioning % for 20 % volume flow

Value: 20

Valve positioning % for 30 % volume flow

Value: 30

etc.

Options: No settings are possible

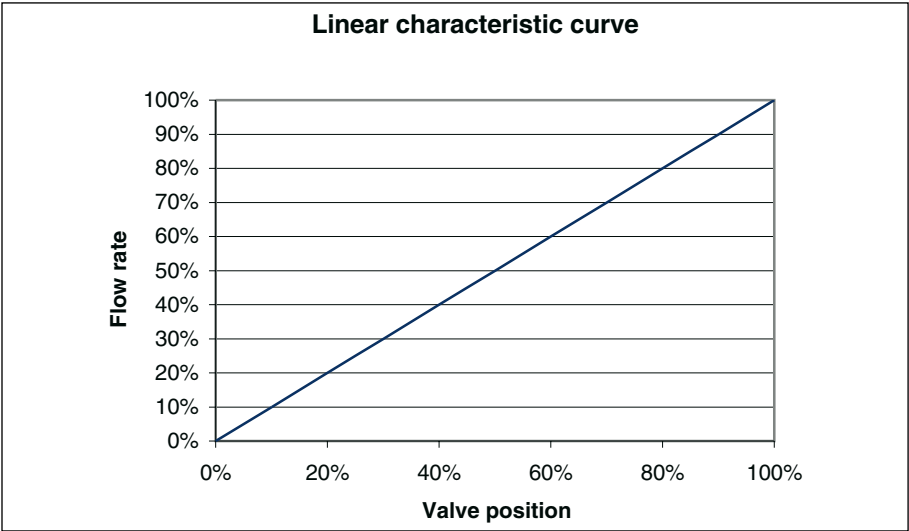


Fig. 17: Linear characteristic curve

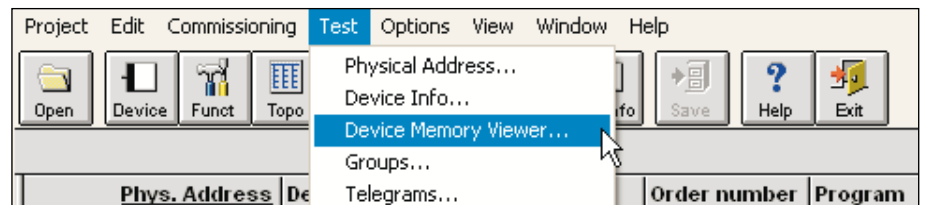
5 Appendix

5.1 Read out error code

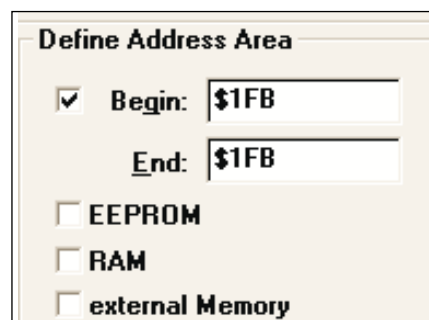
In the event of a malfunction of the Electromotor Valve Drive ST/K 1.1, all the LEDs flash as a continuous light.


The valve drive notes the malfunction in an error code in the BCU memory. This can be read out as follows with the help of the ETS program.

1. Select the device in the project and click on the menu item Test -> Device Memory Viewer.

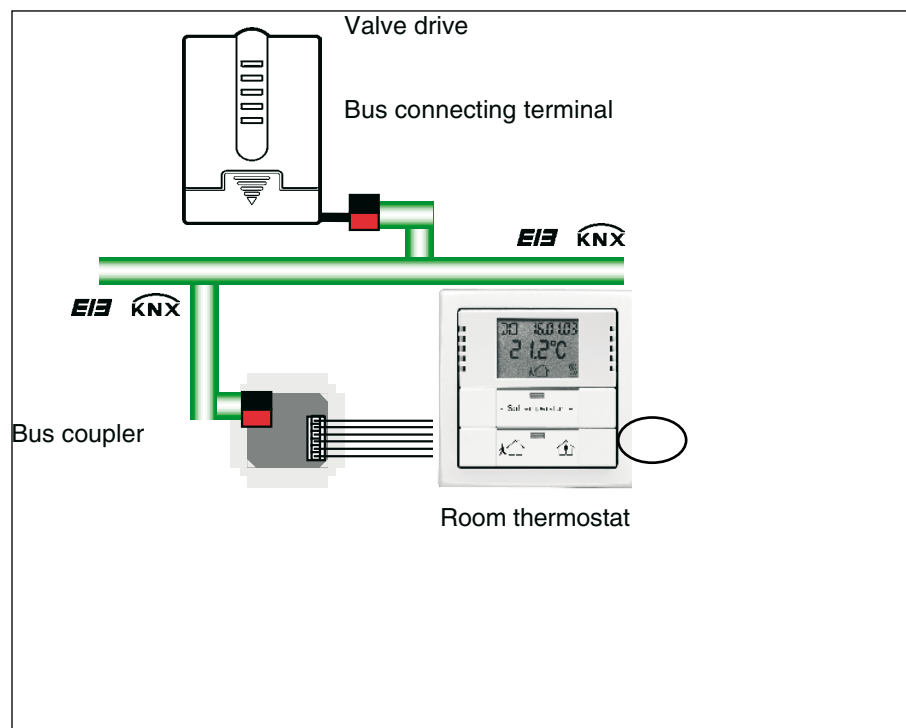


2. Enter 1FB in the address area and deselect RAM and EEPROM.



3. Click on the  button.

4. The error code appears in the results window.



5. The error code is decoded as follows:

Code	Name
00	No error
81	Overcurrent disconnection
82	Valve not found
83	Valve does not move
84	Lift is too short

Once the cause of the error has been rectified, the Electromotor Valve Drive ST/K 1.1 is isolated from the bus connecting terminal and reconnected again approx. 20 seconds.

5.2 Check limit positions

The limit positions stored during the adaptation process can be read out with the ETS program.

The internal end stop (spindle retracted, valve open) is stored under the address \$1FC while the outer end stop is stored under \$1FD in hex format.

The reading out of these memory positions is carried out as described in chapter 5.1.

After downloading the application, these values are reset (i.e. \$1FC = 00 and \$1FD = FF).

After a successful adaptation, the end stops that have been found are entered there.

If both addresses contain 00 after the adaptation, the adaptation was not successful.

To determine the end stops in millimetres, the values are converted into decimal values and divided by 20.

Calculation example:

Position	Valve	Adress	Hexadecimal value	Corre-sponds to decimal value	Result of decimal value/20 =
Inner end stop	open	\$1FC	24	36	1.8 mm
Outer end stop	closed	\$1FD	61	97	4.85 mm

The lift is calculated from the two values as follows:
Lift = outer end stop – inner end stop

In our example:
Lift = 4.85 mm – 1.8 mm = 3.05 mm

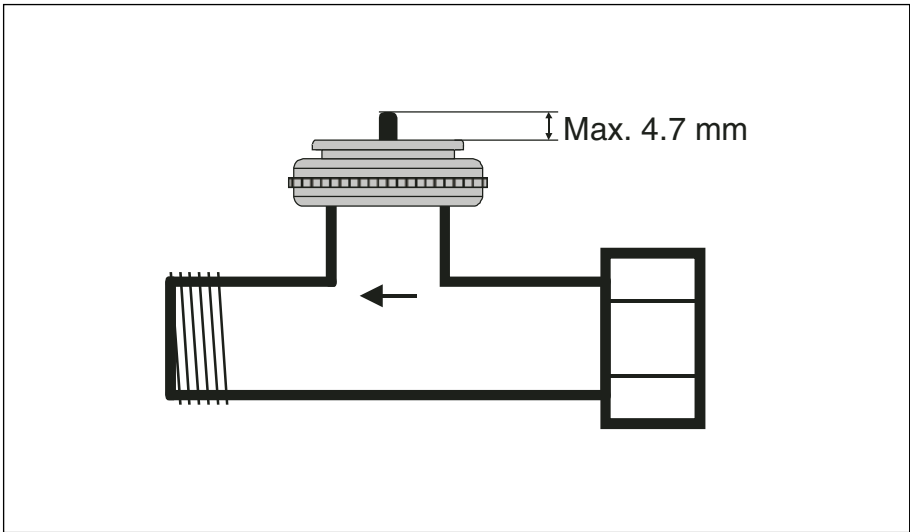
Limit values for a successful adaptation
The following values must be maintained:

Inner end stop		Outer end stop		Lift	
Dimension	Hex value	Dimension	Hex value	Dimension	Hex value
M 0.3 mm	M 6	m 7.5 mm	m 96	M 1.2 mm	M 18

5.3 Checking the adapter ring

The largest dimension between the upper edge of the adapter ring and the end of the tappet is 4.7 mm.

If this dimension is exceeded, another adapter ring must be used.



5.4 Ordering information

Description	Ordering information		bbn 40 16779 EAN	Price group	Unit weight [kg]	Pack unit [pc.]
	Short code	Order no.				
Electromotor valve drive	ST/K 1.1	2CDG 120 004 R0011	63022 1	20	0.2	1
Room thermostat, solo®, FM	TUS/U 1.1	GJ B000 6134 A0157	04202 1*	17	0.05	1
Room thermostat, alpha nea®, FM	TU/W 1.1	GJ B000 6134 A0137	00162 2*	17	0.1	1
Busch-triton® switch sensors, FM	TRITON/3. D. RT. WA. 1	GJ B000 6300 A1224	98573 1*	17	0.08	1
Busch-triton® switch sensors, FM	TRITON/5. IR. D. RT. WA. 2	GJ B000 6300 A1237	98942 5*	17	0.15	1
Bus coupler	BA/U 3.2	GJ B000 6120 A0065	03674 7*	17	0.06	1
Presence detector, FM	PM/A 1.2	GJ B000 6123 A0137	02352 5*	17	0.1	1
Surface-mounted housing for presence detector	AG/A 1.1	GJ B000 6899 A0282	00468 5*	17	0.04	1
Magnet reed contact set, white	MRS/W	GH Q320 1972 R0001	50660 1	50	0.06	1
Magnet reed contact set, brown	MRS/B	GH Q320 1972 R0002	50659 1	50	0.06	1
Magnet reed contact saver set, white	VMRS/W	GH Q320 1972 R0011	50658 1	50	1.05	1
Magnet reed contact saver set, brown	VMRS/B	GH Q320 1972 R0012	50657 1	50	1.05	1
Time switch	SW/S 4.5	GH Q605 0061 R0001	50096 8	20	0.34	1
Radio time switch	FW/S 4.5	GH Q605 0060 R0001	50093 7	20	0.45	1
Antenna for radio time switch	FA/A 2.1	GH Q605 0031 R0021	51237 4	20	0.1	1

* bbn no. 40 11395



The information in this leaflet is subject to change without further notice.

Pub. No. 2CDC 508 025 D0202
replace 2CDC 508 025 D0201

Your KNX-Partner