
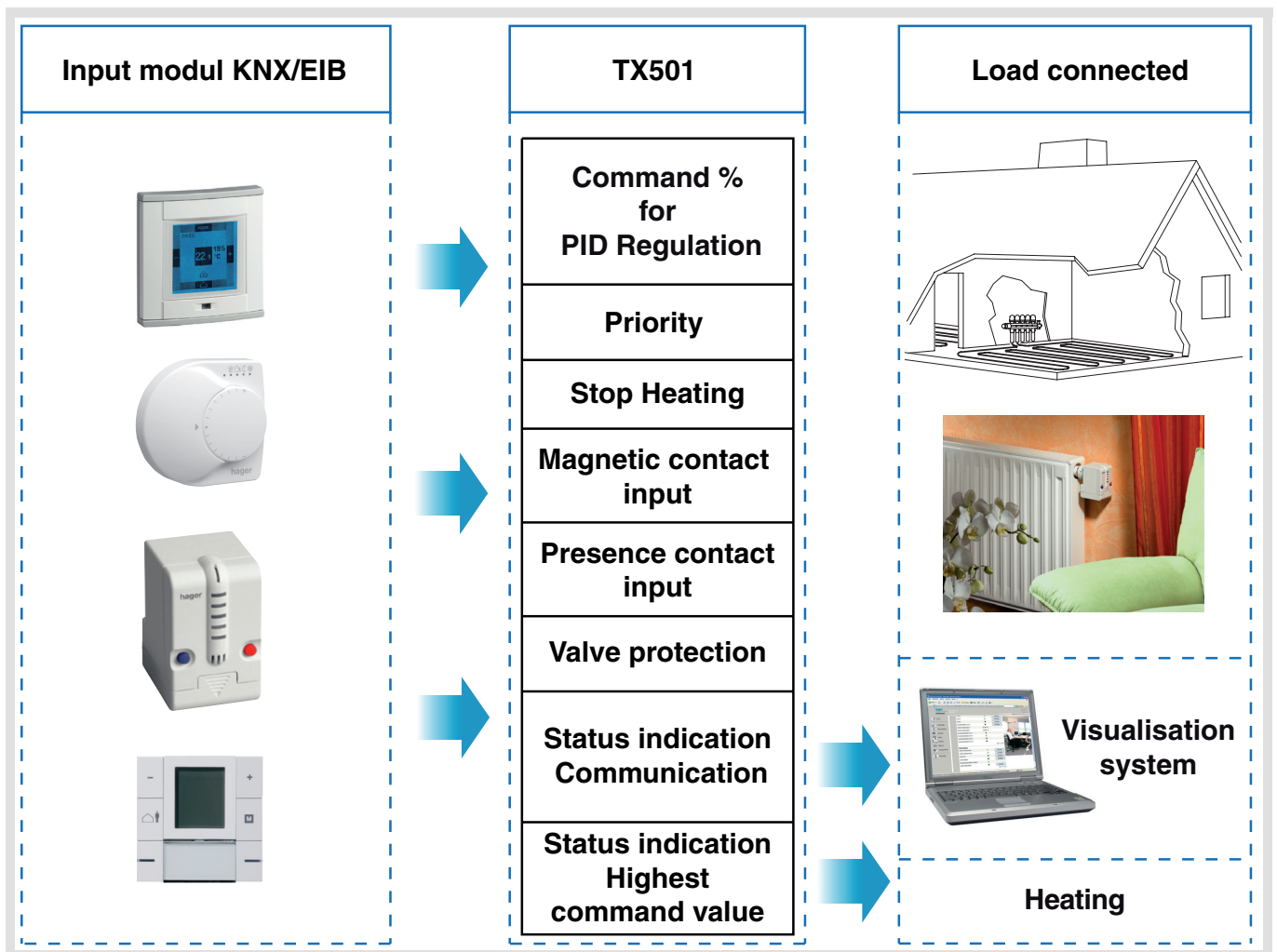


Tebis Application software

TL501A V1 X Heating
Valve actuator KNX

Electrical / Mechanical characteristics : see product user's instructions

	Product reference	Product designation
	TX501	Valve actuator KNX



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1. Presentation of the functions

The TL501A application software allows configuring the TX501 valve actuator. The main functions are the following :

■ Valves control

The function of the KNX valve actuator TX501 is to actuate the valve of a hot water radiator or a hot water manifold. It receives from a room thermostat the "valve position in %" command and actuates the valve in order to position it at this value. The TX501 adapts itself automatically to the curve of the valve.

■ Valve protection

A valve that remains inoperated for a long time may jam. To prevent this, the TX501 integrates a valve protection function. In case of absence of any movement for more than 24 hours, the Valve protection function is activated and actuates the valve temporarily. The Valve protection function may be activated or deactivated.

■ Stop (Summer mode)

When a Stop command is received, the valve is closed immediately. As long as the Stop command is present, the valve position commands will not be applied. The valve protection function remains active.

■ Priority %

The Priority % function allows positioning and locking the valve at a value defined in the parameters. As long as the Priority command is present, the valve position commands will not be applied. The valve protection function remains active.

■ Command failure mode

The reception of command values can be monitored. If a command is missing, a backup program defined in the parameters of the TX501 (e.g.: 50 %) can be activated. Furthermore, the Command failure information can be issued on the bus.

■ Magnetic contact input

The TX501 valve actuator has an input to connect a magnetic contact. The Magnetic contact open or closed information can be issued on the bus to control the Frost protection mode of the thermostat.

■ Presence contact input

The TX501 valve actuator has an input to connect a presence contact. The Presence contact open or closed information can be issued on the bus to control the delayed Comfort mode of the thermostat.

■ Status indication valve position % (%)









The current position of the TX501 can be issued on the bus either cyclically or upon a variation.

■ Customizable valve characteristics

The characteristics of the valve controlled by the TX501 can be parameterised. The adjustable characteristics are e.g. : tappet pushed = valve closed or open, valve seal type, characteristic curve of the valve.

2. Configuration and parameterising

2.1 Objects list

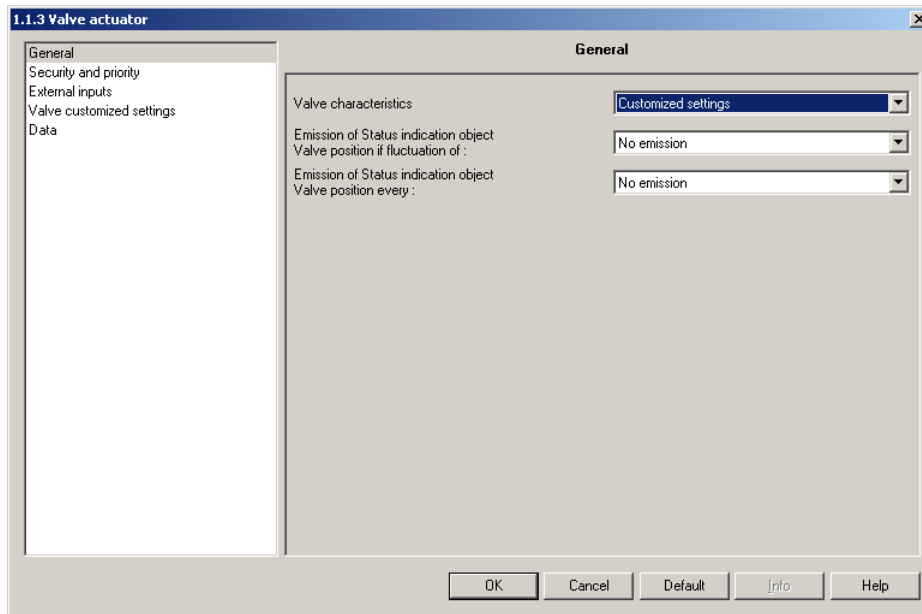
	Object			Value
	N°.	Name	Operation	
	0	Valve	Command %	0 - 100 %
	1	Valve	Priority %	0 : Priority not active 1 : Priority active
	2	Valve	Stop	0 : Not active 1 : Stop (Summer mode)*
	3	Status indication	Valve position %	0 - 100 %
	6	Status indication	Highest command value	0 - 100 %
	4	Status indication	Magnetic contact	0/1 Status of the contact according to the parameterising
	5	Status indication	Presence contact	0/1 Status of the contact according to the parameterising
	7	Status indication	Presence/Absence command	0 : Command received 1 : Command not received

* In Stop (summer) mode, the commands received on the 0 object will not be applied. The valve positions itself at 0 %. At the end of the Stop (summer) mode, the valve positions itself at the value active before the beginning of the Stop mode or at the last command value received.

2.2 Functions description and parameters setting

2.2.1 General parameters

The general parameterising allows defining the features of the valve controlled (standard or customized) and the conditions for the emission of the "Status indication Valve position %" object.



Screen 1

Designation	Description	Values
Valve characteristics	This parameter defines whether the standard settings of the valve can be used or if the installation must be customized*.	Standard, Customized settings. Default value : Standard.
Emission of status indication object valve position if fluctuation of :	This parameter defines the minimum position variation for the emission of the Status indication Valve position % object.	No emission, 1 %, 2 %, 3 %, 5 %, 7 %, 10 %, 15 %. Default value : No emission.
Emission of status indication object valve position every :	This parameter defines the frequency of the emission of the Status indication Valve position % object (independently of the value variations).	No emission, 2 min, 3 min, 5 min, 10 min, 15 min, 20 min, 30 min, 45 min, 60 min. Default value : No emission.

* When this parameter has the value Customized parameters, an additional parameterising screen is displayed and allows defining the various features of the valve (see "2.2.4 Customized valve characteristics function" Page : 8).

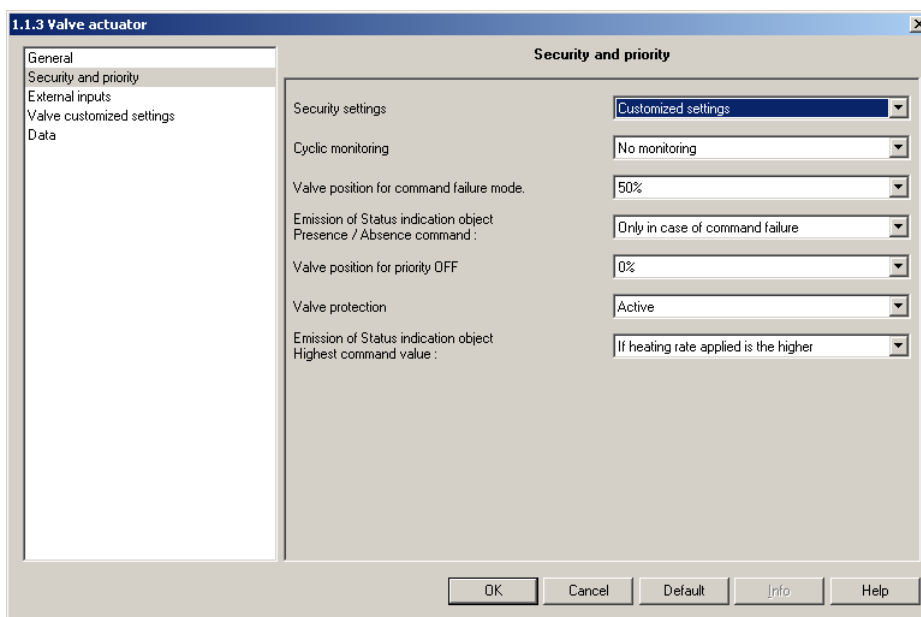
2.2.2 Security and Priority

The Security and Priority parameterising screen displays the parameters linked with security (e.g. command failure mode, valve protection, cyclic monitoring) and the parameters linked with the priority mode (e.g. position for priority mode). This screen also allows defining the parameters linked with the emission of the Status indication object Highest command value.

■ Security

The reception of command values on the Valve - Command % object can be monitored. If no command is received within the time interval defined in the Cyclic monitoring parameter, the TX501 valve applies the value defined in the parameter value to apply in command failure mode).

The Emission parameter of the object Presence/Absence of command Status indication allows defining whether the information must be issued at the end of each monitoring cycle or only in case of absence of the command..



Screen 2

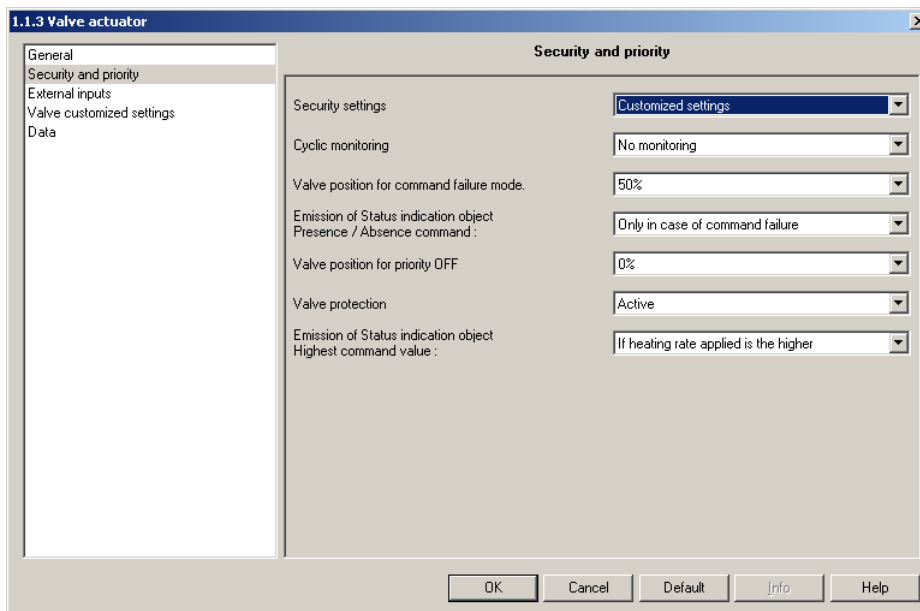
Designation	Description	Values
Security settings.	This parameter defines whether the standard settings of the valve can be used or if the installation must be customized.	Standard, Customized settings. Default value : Standard.
Cyclic monitoring*.	This parameter allows defining the time interval within which a command must be received on the Valve - Command % object before activating the Command failure.	No monitoring, 5 min, 10 min, 15 min, 20 min, 30 min, 45 min, 60 min. Default value : No monitoring.
Valve position for command failure mode*.	When a command failure is detected, the command value defined in this parameter is applied.	0 %, 10 %, 20 %, 30 %, 40 %, 50 %, 60 %, 70 %, 80 %, 90 %, 100 %. Default value : 50 %.
Emission of status indication object Presence / Absence of command*.	This parameter allows defining whether the Status indication object Presence/Absence of command must be issued systematically at the end of the monitoring cycle or only in case of Command failure.	At the end of each cyclic monitoring, Only in case of command failure. Default value : Only in case of command failure.

* This parameter is only visible if the Security settings parameter has the value Customized settings.

Priority and valve protection

The Valve - Priority % object allows switching the valve in the Priority mode. A 1 on this communication object activates the priority, a 0 deactivates the priority. Priority allows having the TX501 apply the command value % defined in the parameter Valve position in Priority mode.

A valve that remains inoperated for a long time may jam. To prevent this, the TX501 integrates a valve protection function. In case of absence of any movement for more than 24 hours, the Valve protection function is activated and actuates the valve temporarily. The Valve protection function may be activated or deactivated.



Screen 3

Designation	Description	Values
Valve position for priority mode.	This parameter allows defining the position (%) of the valve in case of reception of a Priority instruction.	0 %, 10 %, 20 %, 30 %, 40 %, 50 %, 60 %, 70 %, 80 %, 90 %, 100 %. Default value : 0 %.
Valve protection*	This parameter allows defining whether the Valve protection function is active or not.	Inhibited, Authorized. Default value : Authorized.

* This parameter is only visible if the Security settings parameter has the value Customized settings.

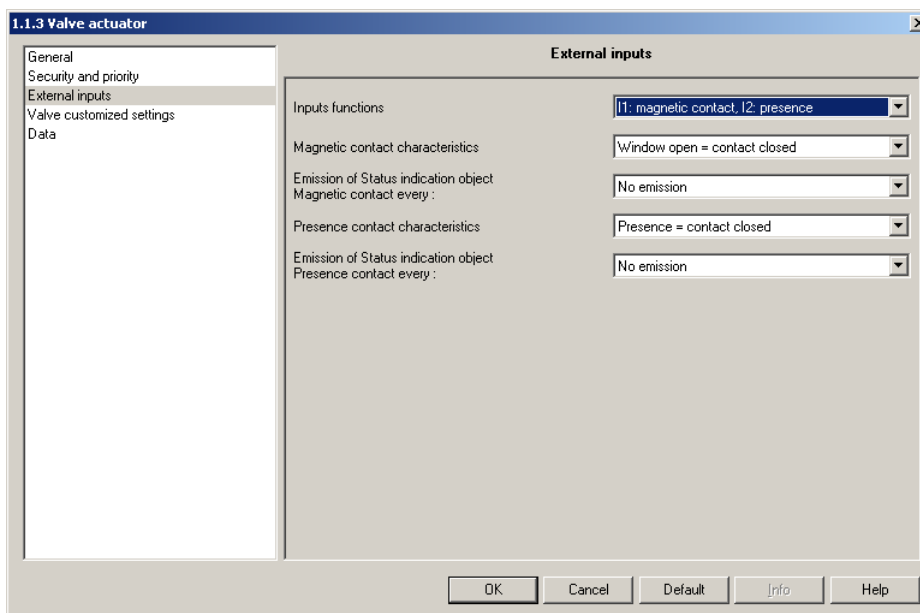
Highest command value

The most important hot water need in the installation must be communicated to the boiler to allow it to optimize its hot water production. Use the following operation to that purpose : One of the valves issues cyclically its command value and thus initialises the comparison. When they receive a value on Status indication object - Highest value command, the other valves compare their values with the received value. If their own command value is higher than the received one, it will be issued on the Status indication object - Highest command value. The higher the difference between the received value and the applied value, the faster the emission will be. This way of operating allows limiting the amount of information on the bus.

Designation	Description	Values
Emission of status indication object - Highest command value.	This parameter allows defining whether the valve shall issue this comparison cyclically (see above) or only when its own value is higher.	If heating rate applied is the higher, 2 min, 3 min, 5 min, 10 min, 15 min, 20 min, 30 min, 45 min, 60 min. Default value : If heating rate applied is the higher.

2.2.3 External inputs

The TX501 valve allows connecting two potential-free inputs. The status of the input is issued on the bus. One of the inputs is intended to connect a magnetic contact, the second one for a presence contact. The magnetic contact can e.g. be used to switch the thermostat to Frost protection mode. The presence contact can e.g. be used to switch the thermostat to delayed Comfort mode.



Screen 4

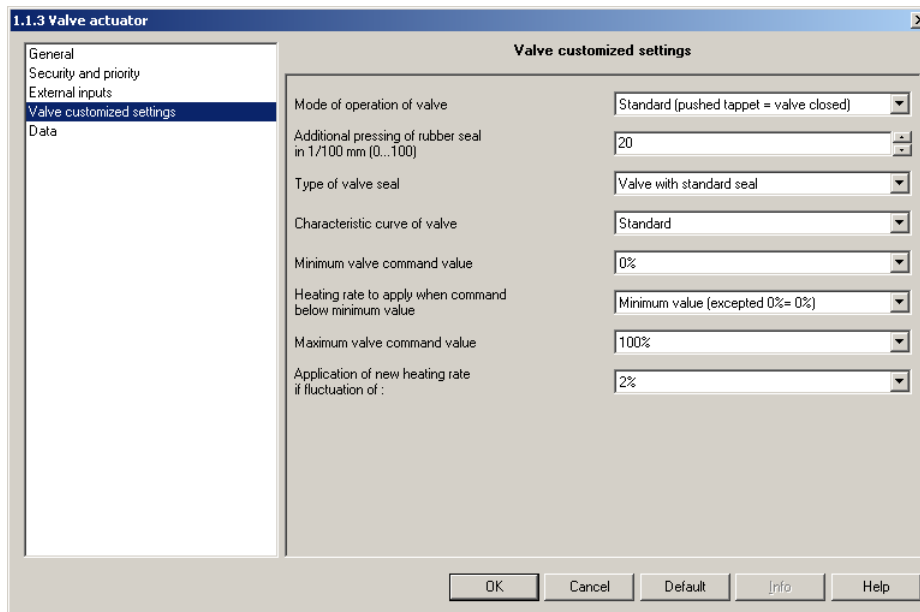
Designation	Description	Values
Inputs functions.	This parameter allows defining the external inputs used.	Not used, I1 : magnetic contact, I2 : none, I1 : magnetic contact, I2 : Presence contact. Default value : Not used.
Magnetic contact characteristics*.	This parameter defines the characteristics of the connected contact.	Window opened = contact closed, Window opened = contact opened. Default value : Window opened = contact closed.
Emission of status indication object Magnetic contact every :*.	This parameter defines the frequency of the emission of the Status indication object - Magnetic contact.	No emission, 2 min, 3 min, 5 min, 10 min, 15 min, 20 min, 30 min, 45 min, 60 min. Default value : No emission.
Presence contact characteristics**.	This parameter defines the characteristics of the connected contact.	Presence = contact closed, Presence = contact opened. Default value : Presence = contact closed.
Emission of status indication object Presence contact every :**.	This parameter defines the frequency of the emission of the Status indication object - Presence contact.	No emission, 2 min, 3 min, 5 min, 10 min, 15 min, 20 min, 30 min, 45 min, 60 min. Default value : No emission.

* This parameter is only visible if the Magnetic contact function was defined in the Inputs function parameter.

** This parameter is only visible if the Presence contact function was defined in the Inputs function parameter.

2.2.4 Customized valve characteristics function

The "Customized valve characteristics" parameterising screen is only visible if the "Valve characteristics" parameter in the "General parameters" screen has the value "Customized settings". (see "2.2.1 General parameters" Page : 4)
 These parameters allow modifying the standard settings defined for the valve.



Screen 5

Designation	Description	Values
Mode of operation of valve.	This parameter defines the characteristics of the connected valve.	Standard, pushed tappet = valve closed; Not standard, pushed tappet = valve opened. Default value : Standard, pushed tappet = valve closed.
Additional pressing of rubber seal.	The curve of the valve is automatically recognised by the TX501 at the start-up. If the valve is not completely closed for a 0 command, this parameter allows bringing the valve to the 0 point. Caution : In order not to damage the valve, we recommend to modify this value using steps of 10 at the maximum.	0 to 100 (in 1/100 mm) by steps of 1. Default value : 20.
Type of valve seal.	This parameter defines the type of seal mounted on the valve. Setting advices : If the command required to open the valve is : 5 % → Valve with standard seal 10 % → Valve with medium soft seal 20 % → soft seal	Valve with standard seal. Valve with hard seal. Valve with soft seal. Valve with medium soft seal. Default value : Valve with standard seal.
Characteristic curve of valve.	This parameter allows selecting the type of curve of the valve.	Linear*, Customized**, Standard. Default value : Standard.
Minimum valve command value.	This parameter allows defining the minimum value of the command. Defining a minimum command different from 0 % may for example prevent the valve from whistling.	0 %, 5 %, 10 %, 15 %, 20 %, 25 %, 30 %, 40 %. Default value : 0 %.

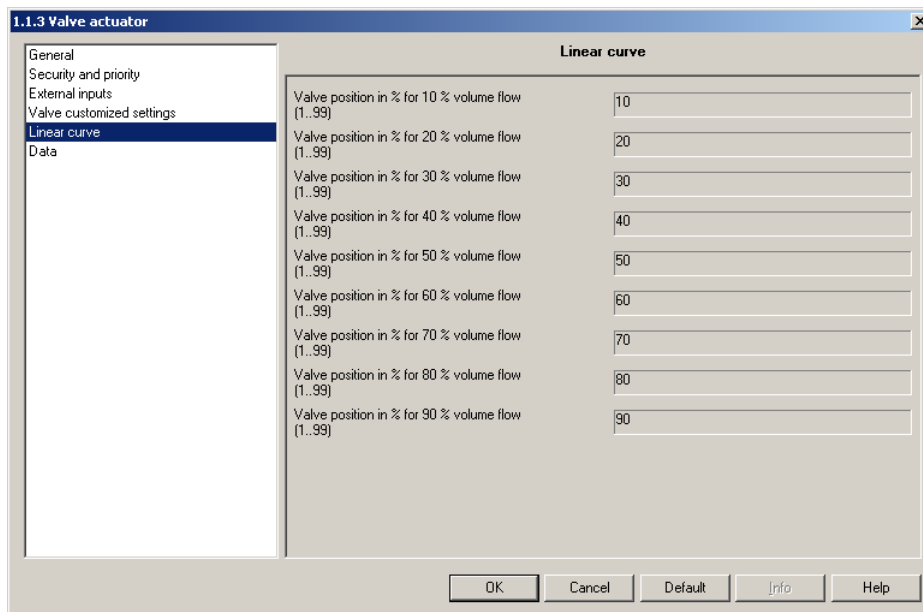
Designation	Description	Values
Heating rate to apply when command below minimum value.	<p>This parameter allows defining the command to be carried out on the valve when the command received (%) is lower than the value defined in the Minimum command value parameter.</p> <p>0 % This setting means that, if the command received is lower than the minimum value, the valve will be positioned on 0 %.</p> <p>Minimum value (excepted 0% = 0%) This setting means that, if the command received is lower than the minimum value, the output will be positioned on the value defined in the Minimum command value parameter. If the command issued is 0 %, the output will be positioned on 0 %.</p>	0 %, Minimum value (excepted 0%=0%) Default value : Minimum value (excepted 0%=0%).
Maximum valve command value.	This parameter allows defining the maximum value of the command.	60 %, 70 %, 75 %, 80 %, 85 %, 90 %, 95 %, 100 %. Default value : 80 %.
Application of new heating rate if fluctuation of :	<p>This parameter defines the maximum difference between the command received in % and the real valve position, if this value exceeds the setting, the valve is re-positioned.</p> <p>Caution : A too high value might impair the quality of the regulation</p>	Position always accurate, 1 %, 2 %, 3 %, 5 %, 7 %, 10 %, 15 %, Default value : 2 %.

*A "linear" setting means that the relationship between the valve position and the flow is linear (e.g.: a 10 % flow corresponds to a valve position of 10 %). These values appear in a specific parameterising screen, but they cannot be modified (see "2.2.4.1 Linear curve" Page : 9).

** A "customized" setting means that the link between the flow and the valve position can be defined freely. A specific parameterising screen allows modifying these values (see "2.2.4.2 Customized curve" Page : 10).

2.2.4.1 Linear curve

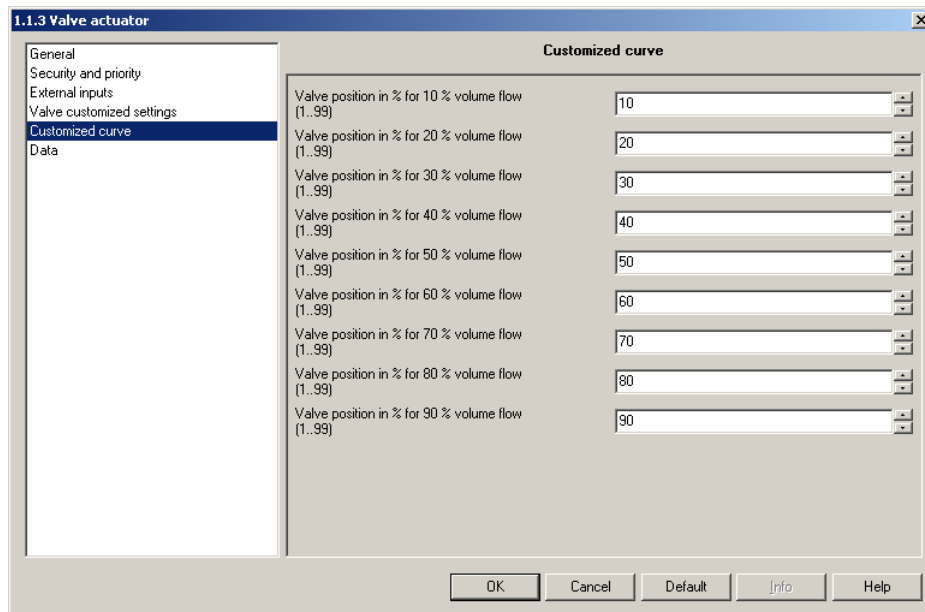
The "Linear curve" parameterising screen is only visible if the parameter "Characteristic curve of valve" has the value Linear (see "2.2.4 Customized valve characteristics function" Page : 8). In this case, the curve of the valve is pre-defined. The flow evolves on a linear way with the position of the valve.



Screen 6

2.2.4.2 Customized curve

The "Customized curve" parameterising screen is only visible if the parameter "Characteristic curve of valve" has the value Customized (see "2.2.4 Customized valve characteristics function" Page : 8). In this case, the user defines the flow corresponding to each position of the valve.



Screen 7

Designation	Description	Values
Valve position in % for x % volume flow.	This parameter allows defining that the position of the valve x % corresponds to a volume flow of y %. The curve is defined with the help of 9 points.	1 to 100 by steps of one. Default value : Linear curve (see " Screen 7").

3. Configuration and parameters of the Dimming functions

Max. number of group addresses	252
Max. number of links	254
Objects	9

4. Physical addressing

To perform physical addressing or check for the presence of the bus, press the physical address pushbutton located on the product.

"Physical programming" indicator lighted = bus present and device in programming mode.
The product remains in physical addressing until the physical address is transmitted by ETS.
Pressing a second time allows leaving the physical addressing mode.

5. Operating advices

5.1 Valve adaptation

When the valve is in the factory configuration, when it is connected to the bus for the first time, the valve will adapt itself automatically to the installation. This operation may require several minutes. In the absence of an application software, the TX501 will position itself on 25 % (factory setting). The valve end point recognised by the valve when it is connected to the bus for the first time will remain stored, even in case of a bus breakdown. It is thus indispensable to mount the valve before connecting it to the bus. At every change of the ETS application, the TX501 will re-adapt itself to the installation. To ensure a good operation of the valve, the size of the tappet after a possible mounting of the adapter ring must not exceed 4.7 mm.

5.1.1 Error code search

The TX501 generates a certain number of information in case of breakdown, this data can be consulted in the ETS (Test → Device memory viewer). The error codes are stored in the memory address \$1FB.

Behaviour	Error code (Hex)	Product designation	Potential cause	Remedy
All LEDs flash as continuous light from bottom to top → valve adaption was unsuccessful	00	No error	--	--
	82	Valve not found	No valve	Plug TX501 onto valve and reload application.
	84	Stroke too short	Valve tappet is already touched, although the spindle of the valve actuator is fully returned.	Check the adapter mounted on the valve (if necessary replace it). When the spindle is returned, the valve tappet must be at least 3/10 mm away from the spindle.
	81	Overload switch-off (overcurrent)	Valve tappet cannot be moved, even with maximum force (120N..	Check if the valve tappet is blocked, if yes replace the valve.
			Following start-up, valve actuator with valve was mounted onto a different valve..	Re-download the application.
			Valve seal too heavily pressed.	Remove the additional pressure
83	Valve does not move	Valve jams	Check valve	
Valve does not close when actuating value is 0 %	--	--	Valve seal is insufficient for pressing onto the valve seat.	Increase the value in the parameter "Additional pressing of rubber seal". This value must be increased very progressively in order not to damage the valve (see : Page 8).
	--	--	Valve seal is damaged.	Replace valve
Valve opens only with an unexpectedly large actuating value.	--	--	Existing valve seal is too soft	Adjust the "Type of valve seal" parameter. (see : Page 8). If the valve only opens for setting values exceeding 5% → Standard seal 10% → Medium soft seal 20% → Soft seal.

Behaviour	Error code (Hex)	Product designation	Potential cause	Remedy
Valve doesn't move to positions below or above a certain value.	--	--	Modify the Minimum valve value and/or Maximal valve value parameters.	Modify the parameters and, if necessary, adapt them (see : Page 8).

5.1.2 Positioning of the valve

To apply the set point, the TX501 presses on the valve tappet. During the adaptation of the TX501, the internal (tappet pushed in) and external (tapped out) stop positions are stored. If the value of the "Mode of operation of valve" parameter has the value Standard, the internal stop corresponds to an entirely open valve and the external stop to an entirely closed valve. The end positions stored can be read out using the ETS software (Test → Device memory viewer. To determine the stop positions in millimetres, the values are converted into decimal and divided by 20. The internal stop position is stored under the address \$1FD. The external stop position is stored under the address \$1FC.

Example :

Position	Valve (Operating direction : Standard)	Address	Hexadecimal Value	Decimal value	Values / 20	Stroke = External stop - Internal stop
Internal stop	Open	\$1FC	24	36	1.8 mm	Stroke = 4.85 mm - 1.8 mm = 3.05 mm
External stop	Closed	\$1FD	61	97	4.85 mm	

For correct valve operating, the following limit values must be respected

	Hexadecimal Value	Decimal value / 20
Internal stop	≥ 6	≥ 0.3 mm
External stop	≤ 96	≤ 7.5 mm
Stroke	≥ 18	≥ 1.2 mm

