ABB i-bus® EIB

Electronic Switch Actuator, 4-fold, MDRC
ES/S 4.1.1, GH Q631 0061 R0111

SK 0035 B02

The 4-fold electronic switch actuator is a DIN rail mounted device for the static switching of resistive loads. The device is suitable for installation onto a mounting rail in electrical distribution boards or panelboards for heating systems. The connection to the EIB is established via a bus connection terminal.

It is primarily suitable for controlling heating systems and cooling ceilings via electrothermal valve drives normally closed in de-energised state.

It switches four non-isolated outputs both noise-free and without wear and tear.

The outputs are monitored for overload/short circuits. In the event of a fault, the relevant output is switched off and the fault LED switches on.

The electronic switch actuator is operated either with direct or alternating voltage (24 V … 230 V AC/DC).

Technical Data

Power supply	– EIB	24 V DC, via the bus line
	– Power input	24 V … 230 V AC/DC
Outputs	– 4 non-isolated	
	– Continuous current	0.7 A resistive load at T_u up to 45 °C 0.4 A resistive load at T_u up to 60 °C
	– Starting current	max. 1 A, 10 s at T_u up to 60 °C
Operating and display elements	– Red LED and push button	for assigning the physical address
	– 4 yellow LEDs	Status display for outputs
	– Green LED "ON"	Supply voltage OK
	– Red LED	Fault indication (short circuit/overload)
Connections	– Supply to switching circuit	2 x 2 screw terminals for L (L+) and N (L–)
	– Output	2 screw terminals per output
	– Wire range	0.5 … 2.5 mm² multi-core 0.5 … 4.0 mm² single-core
	– EIB	Bus connection terminal (included)
Type of protection	– IP 20, EN 60 529	
Ambient temperature range	– Operation	– 5 °C … 45 °C
Design	– Modular installation device, pro*M*	
Housing, colour	– Plastic housing, grey	
Mounting	– onto 35 mm mounting rail, DIN EN 50 022	
Dimensions	– 90 x 72 x 64 mm (H x W x D)	
Mounting depth/width	– 68 mm/4 modules at 18 mm	
Weight	– 0.21 kg	
Certification	– EIB-certified	
CE norm	– in accordance with the EMC guideline and the low voltage guideline	

Application programs	Number of communication objects	Max. number of group addresses	Max. number of associations
Heat Switch Flush Forced Position/1.4	18	32	32
Heat Switch Flush Forced Position/1.2	18	32	32

Wiring diagram

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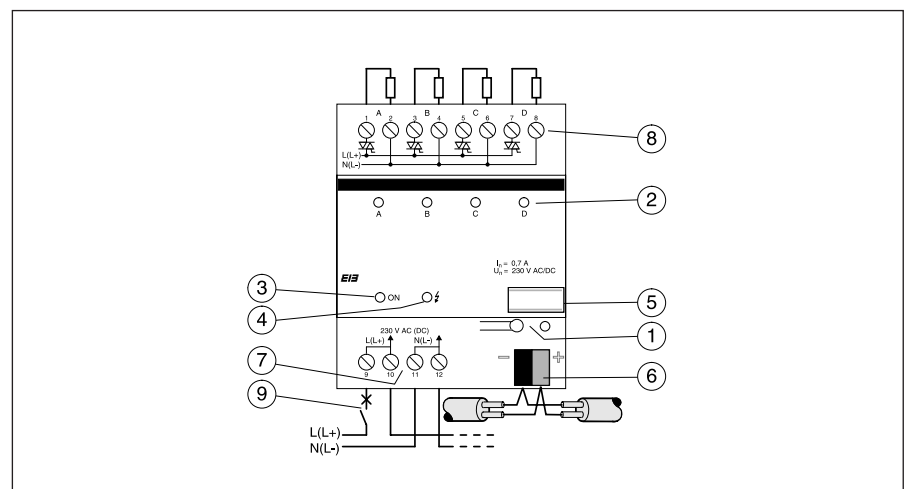
1 Programming button and LED
2 Status LED (yellow) for outputs
3 Display LED (green)
  Supply voltage OK
4 Fault LED (red)
  (short circuit/overload)

5 Label
6 Bus connection terminal
7 Screw terminals for supply
  to switching circuit
**8** Screw terminals for outputs
9 Back-up fuse

Note

Caution: Prior to programming, it is necessary to install Service Release B of ETS2 V1.1 or higher on the commissioning PC. If this is not carried out, the device cannot function and can no longer be programmed.

The ambient operating temperature at the installation site must be considered during the project design to ensure that the dissipation of waste heat is sufficient.

When looping through the L and N conductors, care should be taken not to exceed the maximum terminal current of 10 A.

The phase must likewise be fused e.g. using a 10 A miniature circuit-breaker. The device must be disconnected to prevent it from being damaged during insulation tests in which the cores are compared, contrary to the Standard DIN VDE 0100, part 610.

Heat Switch Flush Forced Position/1.4

Selection in ETS2

– ABB
 └Output
  └Binary output, 4-fold

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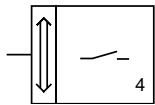
The application program enables the four non-isolated outputs of the electronic switch actuator to be used to control heating systems and/or cooling ceilings via electrothermal valve drives (normally closed).

Heat

In the basic configuration, the application has four 1 bit communication objects for switching the outputs. The electronic switch actuator can be controlled with 1 bit control values via two-step or PWM control (PWM=Pulse Width Modulation). To do so, the switch objects of the outputs must be linked with the control value outputs of room thermostats. The parameters of the room thermostat must be set to "continuous 2-step control" or "switching 2-step control".

If a room thermostat can only transmit 1 byte control values, it is possible to assign 1 byte objects to the outputs of the switch actuator. In this case, the outputs of the switch actuator can be controlled via these objects with a 1 byte control value.

Depending on the type of thermostat control used, the parameter "Control signal is received as" must be set to "1 bit signal" or "1 byte signal".

The additional parameter "PWM cycle time" appears if 1 byte control has been selected. The cyclic period for the closing and opening operations of the output is set with this parameter. The reason for cyclical switching lies in the fact that the electronic switch actuator converts the 1 byte control value into an equivalent pulse width modulation. This means for example that at a control value of 66% and a cyclic interval of 15 minutes, the output opens for 10 minutes and closes for 5 minutes.

When parameterising the cyclic intervals, it should be noted that it is only advisable to set shorter periods for test purposes. Even a thermoelectric valve drive that opens relatively quickly needs approx. 2 min to carry out a full opening and closing operation.

The function of 1 byte control is required if the room temperature controller is only able to send continuous control values or if a continuous control value is required for other functions (such as central inlet temperature control). Otherwise, the control should be carried out with a 1 bit value.

Electrothermal valve drives (normally closed) can be controlled with the electronic switch actuator. Electrothermal valve drives normally open in de-energised state can not use directly.

In the event of an overload/short circuit of one or more outputs, the relevant output is switched off and the "Fault" LED is switched on.

The restart of the output(s) or the extinguishing of the "Fault" LED is only carried out once the fault has been rectified and further ON telegrams have been received at all the previously overloaded outputs.

Flush

If an output should not be modified e.g. for a week, it can be opened for a set time and then closed again. This function prevents the heating valves from calcifying during the summer. This period is set with the parameter "Timer controlled flushing of the valve". This can be carried out once per week or once per month.

Alternatively, it is possible to flush the valves e.g. using a time switch. To do so, the 1 bit object "Valve flushing" must be activated for the respective inputs via the parameter "Enable valve flushing by telegram".

The status objects of the outputs are not updated during flushing.

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Forced position

The electronic switch actuator can activate a forced position if the parameter "Enable forced position of the valve drive by EIS1 telegram (1 bit)" is set to "yes". The forced position serves to move the electronic switch actuator to a specific position in response to certain events e.g. the opening of a window (frost protection) or if condensation occurs on the cooling ceiling (dewpoint alarm).

If the forced position is activated, the object "Output ... - Forced position" is available for each output. As soon as the value "1" is received at this object, the actuator is moved to the preset position.

The parameter "Position of the valve drive in case of forced position" indicates the opening of the valve when the forced position is active. The value "0%" means that the valve is fully closed while the value "100%" means that the valve is fully opened. If an intermediate value is set, it is implemented with pulse width modulation, in the same way as for continuous (1 byte) control.

If the control of the output is set to 1 byte signals, the period set for pulse width modulation as defined in the parameter "PWM cycle time" is used when the forced position is active. For 1 bit control, the period for pulse width modulation is defined with the parameter "PWM cycle time for forced position and failure of room thermostat". This period is likewise used when a fault is established with the room thermostat.

Fault signal

If the parameter "Cyclical monitoring of the connection to the room thermostat" has been set to "yes", a further communication object "Output - Telegr. Fault" is available. The electronic switch actuator detects a fault if it has not received any telegrams at its switch object within a certain period. Possible reasons are that the associated room thermostat has failed or telegrams are no longer able to pass through the coupler due to a line-crossing function.

If a fault is detected, the actuator sends a telegram with the value "1" to its communication object "Output - Telegr. Fault".

The monitoring period in which a telegram must be received is defined with a "Time base for monitoring time" and a factor. As the switch actuator expects a telegram within this period, the corresponding room thermostat must be configured for cyclical sending. It should be ensured that the cyclic time of the room thermostat is shorter than the monitoring period of the electronic switch actuator.

In addition, the valve moves to a predefined position in the event of a fault. This position is selected with the parameter "Position of the valve drive in case of room thermostat failure". The value "0%" means that the valve is fully closed while the value "100%" means that the valve is fully opened. If an intermediate value is set, it is implemented with pulse width modulation, in the same way as for continuous (1 byte) control or forced position.

If the control of the output is set to 1 byte signals, the period set for pulse width modulation as defined in the parameter "PWM cycle time" is used in the event of a fault. For 1 bit control, the period for pulse width modulation is again defined with the parameter "PWM cycle time for forced position and failure of room thermostat".

Status

The current status of each output is sent via the respective communication object "Output ... - Telegr. Status". This function can be used e.g. for visualisation. It indicates whether the heating or cooling function is currently active. The status is only sent if the parameter "Send status of the output" is set to "yes". In this case, the status object is made visible and sends a "1" if the valve is opened and a "0" if the valve is closed. Please note that the status in question is the valve state and not the object status of the output. The valve is considered open with an opening of only 1%.

Bus voltage recovery

The output of the actuator is an electronic output. The output is therefore open, provided that the bus voltage has not been applied. It is not possible to set a "Default position on bus voltage failure" in the same way as a relay contact.

It is possible to set the behaviour on bus voltage recovery. The "Position of the valve drive in case of bus voltage recovery" can be set in 10% intervals between 0% = fully closed/open and 100% = fully opened/closed.

Communication objects
for 1 bit switch inputs

No.	Type	Object name	Function
0	1 bit	Output A	Switch
1	1 bit	Output B	Switch
2	1 bit	Output C	Switch
3	1 bit	Output D	Switch

Communication objects
for continuous control with value inputs (1 byte)

No.	Type	Object name	Function
0	1 byte	Output A	Switch-PWM
1	1 byte	Output B	Switch-PWM
2	1 byte	Output C	Switch-PWM
3	1 byte	Output D	Switch-PWM

Communication objects
for activated forced position

No.	Type	Object name	Function
…			
4	1 bit	Output A	Forced position
5	1 bit	Output B	Forced position
6	1 bit	Output C	Forced position
7	1 bit	Output D	Forced position

Communication objects
with isolated flushing objects

No.	Type	Object name	Function
…			
8	1 bit	Output A	Valve flushing
9	1 bit	Output B	Valve flushing
10	1 bit	Output C	Valve flushing
11	1 bit	Output D	Valve flushing

Communication objects
for activated fault signal

No.	Type	Object name	Function
…			
12	1 bit	Output A	Telegr. Fault
13	1 bit	Output B	Telegr. Fault
14	1 bit	Output C	Telegr. Fault
15	1 bit	Output D	Telegr. Fault

Communication objects
with status objects

No.	Type	Object name	Function
…			
16	1 bit	Output A	Telegr. Status
17	1 bit	Output B	Telegr. Status
18	1 bit	Output C	Telegr. Status
19	1 bit	Output D	Telegr. Status

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ABB i-bus® EIB

Parameters
The default setting for the values is **printed in bold type.**

Separate for each output:	
– Control signal is received as	**1 bit signal** 1 byte signal (converted into PWM)
Only for 1 byte control:	
– PWM cycle time	16.5 s / 33 s / 66 s / 2.1 min / **4.4 min** / 8.9 min / 17.8 min / 36 min / 1.2 h / 2.3 h / 4.6 h / 9.5 h / 19 h / 1.6 d / 3.1 d / 6.3 d
– Send status of the output	yes / **no**
– Enable valve flushing by telegram	yes / **no**
– Timer controlled flushing of the valve	one time per week one time per month **no automatic flushing**
Only for timer-controlled flushing:	
– Duration of flushing	4 min **6 min** 10 min
– Position of the valve drive in case of bus voltage recovery	**0 %** 10 % 20 % … 90 % 100 %
Only for 1 bit control:	
– PWM cycle time for forced position and failure of room thermostat	16.5 s / 33 s / 66 s / 2.1 min / **4.4 min** / 8.9 min / 17.8 min / 36 min / 1.2 h / 2.3 h / 4.6 h / 9.5 h / 19 h / 1.6 d / 3.1 d / 6.3 d
– Enable forced position of the valve drive by EIS1 telegram (1 bit)	yes / **no**
Only if "yes" is selected:	
– Position of the valve drive in case of forced position	**0 %** 10 % 20 % … 90 % 100 %
– Cyclical monitoring of the connection to the room thermostat	yes / **no**
Only if "yes" is selected:	
– Time base for monitoring time	130 ms / 260 ms / 520 ms / 1.0 s / 2.1 s / 4.2 s / **8.4 s** / 17 s / 34 s / 1.1 min / 2.2 min / 4.5 min / 9 min / 18 min / 35 min / 1.2 h
– Factor for monitoring time (5…127)	**107**
– Position of the valve drive in case of room thermostat failure	**0 %** 10 % 20 % … 90 % 100 %

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Heat Switch Flush Forced Position/1.2
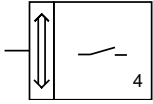
Selection in ETS2

– ABB
  └Output
    └Binary output, 4-fold

The application program "Heat Switch Flush Forced Position/1.2" corresponds to the application program "Heat Switch Flush Forced Position/1.4". With the application program 1.2 there is the additional possibility to select by parameter a electrothermal valve normally close or open.

The type of the vavle drive is written in the technical data sheet of the respective valve manufacturer.

Communication objects

Objects see application program "Heat Switch Flush Forced Position/1.4"

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Parameters
The default setting for the values is **printed in bold type.**

Paramenter see application program "Heat Switch Flush Forced Position/1.4" with the following addition for each output:

state for each output:

| – Connected vavle drive | **de-energised closed** |
| | de-energised open |

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⚠ With the use of the application program "Heat Switch Flush Forced Position/1.2" please consider:
If EIB voltage and main voltage are lost for more then two minutes, the channels announce themselves by bus return with a short circuit error and send in short distances the "0" signal on its status objects.
This error is to be stopped only by a Reset.

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