ABB STOTZ-KONTAKT GmbH
ABB i-bus® KNX
Webinar “Shutter Control with KNX”
Webinar “Shutter Control with KNX”

Agenda

- Introduction and Applications for Shutter Control
- ABB i-bus KNX Shutter Actuators
- ETS parameter
- Automatic control
  - Sun protection (standard)
  - Sun protection with tracking of the sun’s position
  - Heating/cooling automatic
  - Redirection of daylight
- SMI technology and actuators
- Shutter actuators in function with ABB i-bus® Tool
Webinar “Shutter Control with KNX”

Introduction

- The Blind/Roller Shutter Actuators JRA/S facilitate complex demands on modern sun protection and ventilation control systems, without sacrificing comfort, cost-effectiveness and safety.
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Current situation

Shutter Actuator SMI LoVo / 230V

Shutter Actuator 24V DC

Shutter Actuator 230V

Room Controller 8.2

Room Controller 4.2

Shutter Actuator Module 230V

Shutter Actuator Module 24V DC

Room Master 2.1

Room Master 3.1

FM Blind Actuator

Weather Sensor

Outside Lightsensor

Radio Time Switch

Presence Detector

Switch Sensor

Shutter Control Unit
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General

- Modern building installation enables a high degree of functionality and simultaneously complies with increased security requirements
- Due to the structured installation of the electrical components, it is possible to carry out rapid planning, installation and commissioning as well as achieve cost benefits during operation
- Modern sun protection devices have a significant role, as they must fulfill many demands:
  - Anti-glare protection (e.g. PC workstations)
  - Utilization of daylight by tracking the sun’s position and directing available daylight
  - Protecting furniture and carpets from fading,
  - Regulating the room temperature (overheating protection in summer; harvesting the available energy on cold days)
  - Providing protection from people looking in from the outside
  - Protection against intruders
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General

- The role of protection against the sun in buildings is increasing in significance due to increasing energy costs and statutory regulations.
- With intelligent and automated control via ABB i-bus® KNX, the Blind/Roller Shutter Actuators JRA/S play a significant role in the energy efficiency of all kinds of buildings.
- The potential savings for cooling using automatic blind control were presented in a study by the Biberach University of Applied Sciences.

![Diagram showing automatic blind control dependent on factors such as automatic twilight control, timer program, external brightness, slat tracking adjustment dependent on position of sun, and slat tracking adjustment dependent on position of sun and presence controlled constant lighting control. The diagram includes a bar chart illustrating potential savings compared to manual operation.]
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Shutters (roller shutter): Up/down – stop

Picture source: Internet
Webinar “Shutter Control with KNX”
Shutters: Open/close – stop

Picture source: Internet
Webinar “Shutter Control with KNX”
Blinds up/down – step(open and close)/stop

Curtain with horizontal lamellas (external venetian blinds)

Curtain with vertical lamellas (vertical louvre blinds)

Picture source: Internet
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Applications residential Buildings

- Shutter / curtain control for privacy and sun protection
- Closing of roof windows after showering via time function (Dehumidification)
- Closing of roof windows in case of rain
- Opening of roof windows (outlet) and shutters (escape) in the event of fire alarm
- Go down of shutters during the night: Mechanical protection against intrusion, energy saving in winter
- Move down shutter at the terrace if alarm system is set, mechanical protection against intrusion
- Move up the shutters via time function in the morning (except sleeping room)
- Time- or temperature controlled opening of the windows in the winter garden (natural ventilation)
- Drive out of awning or shading of winter garden in case of sun
- Fresh air supply in combination with air quality sensor
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Applications commercial Buildings

- Shading system in general for an efficient and comfortable building
- Sun position depending control of blinds with lamellas for an efficient building regarding lighting and heating/cooling demand
- Redirection of the sun light into the building for less artificial light
- Heating automatic: Energy harvesting of solar energy for less heating
- Cooling automatic: Prevention of solar energy in the building for less cooling
- Night Cool down: Opening of windows in summer during the night to cool down the building
- Fresh air supply in combination with air quality sensor for a meeting room
### Webinar “Shutter Control with KNX”

**Blinds up/down – step(open and close)/stop**

<table>
<thead>
<tr>
<th>Component</th>
<th>Function</th>
<th>Output</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.1.24</strong></td>
<td>Shutter sensor x-fold</td>
<td></td>
<td></td>
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<tr>
<td>Rocker 2</td>
<td>move / travel</td>
<td></td>
<td>3/2/41</td>
</tr>
<tr>
<td>Rocker 2</td>
<td>adjust lamella</td>
<td></td>
<td>3/2/42</td>
</tr>
</tbody>
</table>

1-bit

- **Operation long** (> 400msec.)
- **Operation short**

<table>
<thead>
<tr>
<th>Component</th>
<th>Function</th>
<th>Output</th>
<th>Code</th>
</tr>
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<tr>
<td><strong>1.1.29</strong></td>
<td>Shutter actuator x-fold</td>
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<td></td>
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<tr>
<td>Output A</td>
<td>Move blinds Up-Down</td>
<td></td>
<td>3/2/41</td>
</tr>
<tr>
<td>Lamella/Slats:</td>
<td>„0“ – OPEN</td>
<td>3/2/42</td>
<td></td>
</tr>
<tr>
<td></td>
<td>„1“ - CLOSE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output A</td>
<td>Louvre adj./Stop Up-Down</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Move: „0“ – UP
- „1“ - DOWN
Webinar “Shutter Control with KNX”
Product and functional overview

- The ABB i-bus® Blind/Roller Shutter Actuators are modular installation devices in Pro M design for installation in a distribution board.

- The devices are used for control of motors (230 V AC / 24 V DC) with sun protection products, such as blinds, roller shutters, Venetian blinds, awnings, roller blinds, curtains, vertical blinds, etc.

- The control of blinds/shutters via electrical drives saves the user not just manual raising and lowering of the blinds/shutters, but also enables fully automatic control. This type of control takes into consideration the time of day, the strength of the sunlight, the temperature conditions, the wind force etc. The shutter/blind is positioned in accordance with these factors. The user can also adjust this position manually to match individual requirements more precisely.

- The devices are also ideal for the control of ventilation flaps, skylights, doors, gates and other products that can be controlled via a drive.
Webinar “Shutter Control with KNX”
Product and functional overview

- The Blind/Roller Shutter Actuators are powered via the ABB i-bus® KNX and do not require an additional power supply.
- The connection to the KNX is implemented using the bus connection terminal.
- The device variants with manual operation JRA/S X.230.2.1 also feature push buttons on the device front.
- The connected drive manually adjusts the blinds/shutters connected to the drive, e.g. move UP/DOWN, STOP and slat adjustment UP/DOWN in steps.
- The front mounted LEDs indicate the current direction of movement or the current end position and status.
- The device variants JRA/S X.230.5.1 and JRA/S 4.24.5.1 also feature manual operation via automatic travel detection via current detection.
Webinar “Shutter Control with KNX”
Product and functional overview

- The output contacts for the UP and DOWN directions of motion are electro-mechanically mutually interlocked on all 230 V AC Blind/Roller Shutter Actuators.
- Simultaneous application of voltage would lead to destruction of the drives.
- The electro-mechanical interlocking feature ensures that both contacts can never have an applied voltage at the same time.
- The reversing delay when the direction changes can be set using parameters.
- The reaction on bus voltage failure and recovery as well as programming can be set individually.
Webinar “Shutter Control with KNX”
Product range overview

<table>
<thead>
<tr>
<th>JRA/S X.230.5.1</th>
<th>JRA/S X.230.2.1</th>
<th>JRA/S X.230.1.1</th>
<th>„SMI“ SJR/S 4.24.4.1</th>
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<tbody>
<tr>
<td>2-fold</td>
<td>2-fold</td>
<td>2-fold</td>
<td>4x4f-fold LoVo</td>
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<tr>
<td>4-fold</td>
<td>4-fold</td>
<td>4-fold</td>
<td>JA/S 4.SMI.1M</td>
</tr>
<tr>
<td>8-fold</td>
<td>8-fold</td>
<td>8-fold</td>
<td>4x4-fold</td>
</tr>
</tbody>
</table>

The right device for every application.
Universal range for many sun protection technology applications.
2, 4, 8-fold Blind/Roller Shutter Actuators (230 V AC) with and without manual operation.
Device for 24 V DC now also with manual operation and automatic travel detection.
Webinar “Shutter Control with KNX”
Device Overview JRA/S X.230.5.1, 4.24.5.1

**JRA/S 2-, 4-, 8-fold 230 V and 4-fold 24 V DC**

- With Travel Detection
- With Manual Operation and status LEDs
- The devices do not require an auxiliary voltage (only KNX)
- Universal head screw terminals
Webinar “Shutter Control with KNX”
Device Overview JRA/S X.230.2.1

JRA/S 2-, 4-, 8-fold 230 V
- With Manual Operation and status LEDs
- Same application programm like JRA/S X.230.5.1-devices but without the functions of „Travel Detection“
- The devices do not require an auxiliary voltage (only KNX)
- Universal head screw terminals

2-fold 4-fold 8-fold
Webinar “Shutter Control with KNX”
Device Overview JRA/S X.230.1.1

JRA/S 2-, 4-, 8-fold 230 V

- Without manual Operation and status LEDs
- Same application programm like JRA/S X.230.5.1-devices but without the functions of „Travel Detection“
- The devices do not require an auxiliary voltage (only KNX)
- Universal head screw terminals
### Webinar “Shutter Control with KNX”

#### Type designation

<table>
<thead>
<tr>
<th>JRA/S</th>
<th>w</th>
<th>x</th>
<th>y</th>
<th>z</th>
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</thead>
<tbody>
<tr>
<td>Number of outputs</td>
<td>4</td>
<td>x</td>
<td>y</td>
<td>z</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>230</td>
<td>x</td>
<td>y</td>
<td>z</td>
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<td>Hardware - properties</td>
<td>5</td>
<td>x</td>
<td>y</td>
<td>z</td>
</tr>
<tr>
<td>Version</td>
<td>1</td>
<td>x</td>
<td>y</td>
<td>z</td>
</tr>
</tbody>
</table>

- **w**: Number of outputs (2, 4, or 8)
- **x**: Rated voltage (24 V or 230 V)
- **y**: Hardware properties
  - 1 = standard
  - 2 = with manual operation
  - 5 = with automatic travel detection and manual operation
- **z**: Hardware version
Webinar “Shutter Control with KNX”
Connection to the blind and roller shutter drives

1. Label carrier
2. LED
3. Button
4. Bus connection terminal
   ABB i-bus® KNX
5. Button and LED
6. Button (2 per output)
7. LEDs (2 per output)
8. Screw terminals
   (UP/DOWN, Phase L)
Webinar “Shutter Control with KNX”
Connection to the blind and roller shutter drives

Important:

- Only one drive can be connected per channel!
- Parallel connection of several drives is not allowed → reverse voltages may occur
Webinar “Shutter Control with KNX”
Connection to the blind and roller shutter drives

- Blind/Roller Shutter Actuator 2-fold JRA/S 2.230.x.1
- To control up to 2 independent blind and roller shutter drives (output A and B)
- 2 x 2 parallel relay outputs
Webinar “Shutter Control with KNX”
Connection to ventilation flaps/dampers or switch mode

1 Label carrier
2 LED
3 Button
4 Bus connection terminal
   ABB i-bus® KNX
5 Button and LED
6 Button (2 per output)
7 LEDs (2 per output)
8 Screw terminals
   (UP/DOWN, Phase L)
Webinar “Shutter Control with KNX”
Connection to 24V-DC drives

1 Label carrier
2 LED
3 Button
4 Bus connection terminal
   ABB i-bus® KNX
5 Button and LED
6 Button (2 per output)
7 LEDs (2 per output)
8 Screw terminals
   (UP/DOWN, Phase L)
Webinar “Shutter Control with KNX”

Safety

- Electro-mechanically interlocked outputs prevent possible destruction of the drives
- On a bus voltage failure, the default position of the bistable relay will be set even without an additional supply voltage
The commissioning power supply generates a DC voltage (no KNX!) and is used for on-site commissioning of KNX devices should KNX system voltage be unavailable.

Hence, the most important functions of a KNX device (e.g. Fan Coil Actuator or Shutter Actuator) can be tested with manual operation.

The output is permanently short-circuit proof and overload protected.

- Supply voltage $U_s \ 85\ldots265\ V\ AC$
- Output voltage $U_N \ 21\ldots28\ V\ DC\ SELV$
- Rated current $I_N \ 30\ mA$
Webinar “Shutter Control with KNX”

Manual operation

- The outputs can be directly controlled using the push buttons in manual operation.
- Accordingly, the wiring of the drives connected to the outputs can be verified during commissioning.
- You can, for example, ensure that the connected blind drives move up and down correctly.
- If bus voltage is not yet available at the time of commissioning, the device can be supplied with power for manual operation using the Power Supply NTI/Z.
- Safety telegrams such as weather alarms, blocking and forced operation have the highest priority and block manual operation.
- This is carried out if manual operation is activated and a safety telegram is received.
Webinar “Shutter Control with KNX”

Manual operation

Push buttons are located on the front of the device for manual operation

- Button 🌧️ „Manual operation“
  - Switch to „Manual operation“ and „KNX mode“
- Button 🔡 ‖ † „Output A…X UP/DOWN“
  - KNX mode: No reaction
  - Manual operation:
    - Long operation: UP/DOWN or opening/closing of the contact
    - Short operation: Slat adjustment /STOP
Webinar “Shutter Control with KNX”

Manual operation

Function

- As standard button “manual operation” is enabled and switch on and off is possible using it

- Switch on of manual operation:
  - Press button until the yellow LED lights continuously

- Switch off of manual operation:
  - Press button until the yellow LED switches off
  - The yellow LED flashes during the switchover process

- After connection to the KNX, an ETS download or ETS reset the device is in KNX operation
  - The LED is off
  - All LEDs indicate their current state
Indicators LEDs are located on the front of the device

- **LED ** „Manual operation“
  - Off: The device is in KNX mode
  - On: The device is in manual mode

- **LED ** „Output A…X UP/DOW“
  - On : Upper limit position
  - On : Lower limit position
  - Both LED On: Safety function active, e.g. wind alarm
  - Flashes : Blind/shutter moving upwards
  - Flashes : Blind/shutter moving downwards
  - Both LEDs flash alternately (only JRA/S x.y.5.1): Malfunction drive fault (no current flow or invalid travel times)
  - Off: Intermediate position
Webinar “Shutter Control with KNX”
Simplified commissioning: Copy and exchange

- Copy one channel to one or more channels → transferring the parameter settings
- Exchange two channels
- Copy / exchange with or without group addresses
Webinar “Shutter Control with KNX”
Simplified commissioning: Convert

Convert of devices

- Conversion of application versions
- Assume the parameter settings and group addresses from earlier application program versions
- Furthermore, conversion can be applied to transfer the existing parameterization of a device to another device
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Control with slat adjustment (blinds, vertical blinds, ..)

- After the UP movement of the blind, the slats are generally open (horizontal slat position)
- If the blind is moved downwards, the slats are initially closed (slat position vertical), and the blind moves downwards
- If the blind is now once again moved upwards, the slats will once again be opened (slat position horizontal) and will then be moved upwards
Webinar “Shutter Control with KNX”
Control with slat adjustment (blinds, vertical blinds, ..)

- Short movements can be undertaken in order to purposely adjust the slat angle
- Thus, the blind is moved for a brief programmed time – the so-called duration of slat adjustment – in steps in the required direction and in this way it undertakes a slat adjustment
- The smaller the duration of slat adjustment selected, the more accurate the adjustment of the slat angle
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Reaction on bus voltage failure

- The reaction of each individual output at bus voltage failure can be parameterized.
- This parameterization acts directly on the output contacts and has the highest priority.
- If a bus voltage failure occurs during the movement, the blind/shutter can also move in the opposite direction of motion.
- After the contact positions are set with bus voltage recovery, the JRA/S remains non-functional, until the bus voltage recovers.
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Reaction on bus voltage failure

- **no reaction**
  The output contacts remain in their current state

- **up/down**
  The blind/shutter(s) move up or down

- **Stop**
  If the blind/shutter is performing a movement, this movement stops immediately. If the blind/shutter is at rest, it will remain unchanged in its position
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Reaction after bus voltage recovery /programming or ETS reset

- no reaction: The output contacts remain in their current state
- up/down: The blind/shutter(s) move up or down
- stop: If the blind/shutter is performing a movement, this movement stops immediately
- position 1…4: If one of these positions is selected, the blind/shutter(s) move to a preset position
- individual position: Movement to one of the individual positions occurs (position height in % [0...100] and position slat in % [0...100])
- enable automatic sun protection: The automatic is switched on
**Enhanced status messages**

- Height and slat (0...255, two separate com. objects)
- Upper and lower end position (two separate com. objects)
- Operability (to indicate to the user via an LED that the blinds/shutters can not be moved at the current time e.g. weather alarm)
- Automatic Sun Protection
- Information (16 bit)
  - Drive fault (no current flow with controlled drive, only available on devices of type JRA/S x.y.5.1)
  - Wind alarm
  - Drive in motion …

![Device configuration screenshot](image-url)
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Travel times (blinds, roller shutters, etc.)

- The travel time is the time that the blind/shutter requires for a movement from fully upwards to fully downwards and vice versa.
- The movement times UP or DOWN can be separately determined and entered.
- If the JRA/S receives a movement telegram for upwards or downwards movement, the corresponding output is switched, and the blind/shutter is moved in the required direction.
Automatic travel detection (only x.y.5.1)

- The movement times of the drives are determined via the automatic travel detection.
- The duration of the current flow that the drive uses for the movement from the lower to the upper end position and vice versa is measured via current detection.
- This has the advantage that the ageing process and temperature related influences on the blind/shutter, e.g. expansion of the belts and cords on the blinds, are compensated.
- It facilitates exact positioning of the blind/shutter.
- Furthermore, the travel detection simplifies and accelerates commissioning and sends an error message, if the current flow is interrupted on the connected drive.
- Travel detection occurs automatically in ongoing operation or optionally via a communication object.
- The determined travel times serve as the basis for the calculation and control of positions or for the position feedbacks.
Webinar “Shutter Control with KNX”
Automatic travel detection (only x.y.5.1)

- Determine the travel times via current detection
- The travel times are automatically and permanently determined during ongoing operation and/or via object "Trigger travel detection"
- Advantage
  - Compensation for changes in the length of the blind/shutter due to external influences (frost, UV rays or the use of heavier blind/shutter types)
  - Malfunction drive fault (no current flow or invalid travel times)
Webinar “Shutter Control with KNX”

Set travel times

- This method must be used on devices without travel detection (JRA/S x.230.2.1 and JRA/S x.230.1.1)
- In this way, the travel times for the lower to the upper end position and vice versa are measured, e.g. via a stop watch
- Using travel times, the current position of the blind/shutter is determined during ongoing operation
Webinar “Shutter Control with KNX”
Set travel times

- As an alternative to automatic travel detection, the devices of type JRA/S x.y.5.1 can use the manual method of travel detection via the application program.
  
- In this way, the travel times for the lower to the upper end position and vice versa are measured, e.g. via a stop watch.
  
- The measured values are then entered into the ETS parameter.
  
- This method must be used on devices without travel detection (JRA/S x.230.2.1 and JRA/S x.230.1.1).
  
- Using travel times, the current position of the blind/shutter is determined during ongoing operation.
  
- For this reason, the travel times should be measured as precisely as possible and parameterized.
  
- Precise travel times are the basis for an exact calculation or positioning of the blind/shutter, in particular during positioning movements, automatic control or status messages.
Webinar “Shutter Control with KNX”
Travel times (blinds, roller shutters, etc.)

- The blind/shutter is moved in this direction until the output receives a STOP telegram or the upper or lower limit positions are reached and the drive is switched off by the end limit switch.

- If the drive is switched off via the limit switch, the corresponding output contact remains closed, until the set total travel time has elapsed.

- Furthermore, the travel time can be extended by a parameterized overflow time.

- Only then there is no longer voltage on the output.
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Control with slat adjustment

Two methods are available for control of the slats and calculation of the slat turning times

1. Slat turning time via duration of slat adjustment (step)
   - With this method, the number and duration of slat adjustments that are required to turn the slats from fully closed to fully opened are set
   - Using the maximum number of slat adjustments, the current position of the slats is determined during ongoing operation
   - The max. number of slat adjustments must be counted by the operator and entered as a parameter
Two methods are available for control of the slats and calculation of the slat turning times

2. Slat turning time via total duration for slat turning
   - With this method, the time required by the slat to toggle from fully closed to fully opened is initially determined
   - Thereafter, the required number of slat adjustments (steps) that the slats will require from fully closed to fully opened is entered
   - The JRA/S then calculates the time required for a slat adjustment
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Time-delayed switching of drives

- In large KNX systems, a large starting current peak is generated if all drives start simultaneously due to central telegrams.
- The current peak can be limited by time delayed switching of the outputs.
- The time delay applies for all outputs or connected drives of the actuator.
- The central travel telegrams are executed with a delay:
  - Move to height for sun 0..255, Adjust slat for sun 0..255
  - Block, Forced operation
  - Wind alarm, Rain alarm, Frost alarm …
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Starting delay, coasting delay and minimum run time

- Some drives do not deliver full power immediately
- It is delivered after a starting delay of a few milliseconds
- Other drives continue to run for a few milliseconds after switch off (stopping delay) or have a minimum run time
- These parameters must only be entered should you require even more exact positioning of the blinds/shutters

Important

- Generally, the standard settings for these parameters are adequate to ensure correct operation
- If changes are to be made in the user-defined settings on these parameters, the technical data of the respective drive manufacturer should be observed!
Limitation of the travel range

- For certain applications, the travelling range can be limited for the user

- Example
  Opening and closing of the windows, doors or skylights can be limited to a certain group of users to a range of 0 to 20% opening, whereas the building caretaker may operate the complete range of movement

- In addition to limitation of the travelling range, you can determine whether the upper and lower limit should be used for direct telegrams and/or for automatic telegrams
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Limitation of the travel range

- For certain applications, the travelling range of the blinds/shutters can be limited for the user
  - via object "Blinds/shutters up-down limited" or
  - via object "Enable limitation"

- The limitation only acts with a telegram to the communication object Blinds/shutters up-down limited and a scene telegram
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Dead times

- In a few rare cases, compensation for the mechanically present dead times of the blinds/shutters or slats is required
- Parameters are available to compensate for the dead times and enable exact positioning

**Important**

- Generally, the standard settings for these parameters are adequate to ensure correct operation
- If changes are to be made in the user-defined settings on these parameters, the technical data of the respective blind/shutter manufacturer should be observed!
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Dead times

- The sun protection system dead times of the blind/shutter mechanisms can occur individually. They can be caused by ageing of the blind/shutter, e.g. mechanical loading. It may occur that precision positioning of the blind/shutter may no longer be possible.
  - Dead time blinds/shutters from bottom until moving up
  - Dead time of slat from 100% closed until slat turn
  - Slippage of blinds/shutters on change of direction
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Tensioning of the awning/slot positioning

- This function is used for
  - Tensioning or tightening textile blinds/shutters or
  - Setting so-called slot positioning on roller shutters
- In this way, the blind/shutter is stopped at the end of a DOWN motion and moved in the opposite direction for a parameterizable time
- In this way, for example, the awning cloth is tightened or light or ventilation slots are set on roller shutter
Webinar “Shutter Control with KNX”
Tensioning of the awning/slot positioning

- These parameters for slat adjustment are available exclusively in operation mode control without slat adjustment.
- This function is used for tensioning or tightening textile blinds/shutters (e.g. the cloth of an awning with articulated arms) or for setting slot positioning (e.g. light or ventilation slots) on roller shutters.
- In this way, the blind/shutter is stopped at the end of a DOWN motion and moved in the opposite direction for a parameterizable time:
  - After each down command
  - Only after reaching lower end position
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Priority for safety functions

- The safety functions Wind alarm, Rain alarm, Frost alarm, Block and Forced operation have priority over all other functions
- If one of these functions has been activated for an output, the operation of the output is disabled for other movements
- A priority can also be defined for the safety functions among one another in order to precisely control the blinds/shutters, if more than one safety function is activated simultaneously

Example

- A parameter is used to determine that the forced operation has priority when cleaning a window over a wind alarm, so that the cleaning personnel are not hindered by an upward movement due to a wind alarm when cleaning the slats
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Forced operation

- Each blind/shutter can also be moved individually into a forced position via a telegram (1 bit or 2 bit), and operation is disabled
- On activation of the function forced operation function, the output is simultaneously informed about the position to which the blind/shutter should be moved
- Operation of the blind/shutter is disabled
- After a reset of forced operation, the blind/shutter is moved to the parameterized Position on reset of weather alarm, blocking and forced operation and operation is enabled
- The function Forced operation is ideal, for example, to move shutters and blinds up and down, when windows have to be cleaned
- At the same time, the operation of the blind/shutter is blocked to ensure that the cleaning personnel are not endangered by an unexpected movement
Webinar “Shutter Control with KNX”

Forced operation

- With the function Forced operation, the blind/shutter can move via a 1 bit telegram to a determined position or it can move up or down via 2 bit telegrams and operation can be blocked
  - activated (1 bit)
    - Position height in % [0...100]
    - Position slat in % [0...100]
  - activated (2 bit)
    - The communication object Forced operation 2 bit is enabled
With the help of the function Block, an output of the JRA/S can be moved into a parameterized position via a 1 bit telegram, and the operation is disabled.

When the function Block is recalled, the blind/shutter is moved to the set Position during blocking, and operation is blocked.

After a reset, the blind/shutter is moved to the parameterized Position on reset of weather alarm, blocking and forced operation, and operation is enabled.
Webinar “Shutter Control with KNX”
Weather-dependent sensors

Outside Light Sensor LFO/A 1.1
Interface for Outside Light Sensor HS/S 4.2.1

Weather Unit WZ/S 1.1 and Weather Sensor, WES/A 2.1

Weather Station WS/S 4.1
All common weather sensors can be connected to the device (0-10V, 4-20mA, etc.)
Webinar “Shutter Control with KNX”
Rain alarm and frost alarm

- For protection against rain and freezing from frost, e.g. for awnings, the JRA/S can receive 1 bit rain alarm and frost alarm telegrams
- In the event of an alarm, the blind/shutter is moved into the parameterized position and cannot be moved again, until the alarm is reset
- The Position on rain alarm and Position for frost alarm can be set separately for each output
Webinar “Shutter Control with KNX”

Wind alarm

- The JRA/S can receive wind alarm telegrams (1 bit) to protect the blind/shutter in the event of wind and storms
- If a wind alarm occurs, the blind/shutter is moved to the set Position on wind alarm and can no longer be moved, until the wind alarm has been deactivated again
- The JRA/S can be controlled by up to 3 anemometers
- It can be freely selected for each output, which of the three anemometers it should react to and whether the function Wind alarm should or should not be activated for this output
- The Position on wind alarm can also be set separately for each output
- The anemometers, which are assigned to an output, are linked by an OR function, i.e. if an alarm has been triggered by at least one of the associated anemometers, the blind/shutter is moved to the alarm position
Webinar “Shutter Control with KNX”
Position on wind-, rain- and frost alarm

- No reaction: It will remain unchanged in its position
- Up: The blind/shutter moves UP after a weather alarm is received
- Down: The blind/shutter moves DOWN after a weather alarm is received
- Stop: If the blind/shutter is performing a movement, this movement stops immediately. If the blind/shutter is at rest, it will remain unchanged
- Position 1…4: If one of these positions is selected, the blind/shutter (s) move to a preset position
- Individual position: Movement to one of the individual positions is possible (position height in % [0...100] and position slat in % [0...100])
- Deactivated: No reaction occurs in the event of a weather alarm
Webinar “Shutter Control with KNX”
Note for wind, rain alarm and frost alarm

- The anemometer as well as rain sensor and the frost sensor are monitored cyclically by the JRA/S, i.e. the sensors send the alarm status cyclically and the JRA/S expects this signal
- If the signal is not received, the JRA/S assumes that the sensor is defective or the bus line has been interrupted
- All blinds/shutters that are influenced by the sensor are moved to the set alarm position, and operation is blocked
- The monitoring period of the JRA/S should be twice as long as the cyclical sending time of the anemometer or rain/frost sensor, so that the blind/shutter does not move immediately to the rain or frost alarm position when a signal is not received, e.g. due to a high bus load
- When the wind, rain or frost alarm is reset, the blind/shutter is moved to the set Position on reset of weather alarm, blocking and forced operation, and operation is enabled
Webinar “Shutter Control with KNX”

Positions – Reference movement

- Every output permanently determines the current position of the blind/shutter as well as the position of the slat angle based on the duration of the individual movement actions.
- Slight inaccuracies can occur over extended periods in the determination of the position due to temperature fluctuations and ageing.
- For this reason, the JRA/S uses the upper and lower end positions for unique determination of the current position of the blinds/shutters.
- Every time when the blind/shutter is in the upper end position, the position is updated in the memory of the device.
- If the end positions are not reached in normal operation, a reference movement, which is fully upwards or fully downwards, can be performed via a telegram.
- After a reference movement, the blind/shutter remains in the reference position or moves back to the stored position as specified in the programming.
Webinar “Shutter Control with KNX”
Positions – Move to position 0 % ... 100 %

- The blinds/shutters can be moved into any position via an 8 bit value
- In the control with slat adjustment operation mode, the slats can also be positioned into any angle via an 8 bit value
- In this way, it can be decided for each movement telegram which position the blind/shutter should move to, and it is possible to set the position from a display or a visualisation terminal
Webinar “Shutter Control with KNX”
Positions – Move to preset position

- For each output, it is possible to parameterize up to 4 preset positions individually, which are then recalled via a 1 bit telegram.

- When moving into one of these preset positions, the target position must first be set, either via the parameters during programming or via the function “Set preset position”.

- This preset target position can then, for example, be recalled as often as required by pressing a push button.
Webinar “Shutter Control with KNX”
Positions – Set preset position

- The preset position can be changed very easily via a 1 bit telegram.
- To do so, the blinds are moved into the required new preset position via UP/DOWN telegrams as well as STOP/slat adjustment UP/DOWN telegrams.
- The new position is adopted via a 1 bit telegram as a new preset position into the memory of the device.
- The saved preset values are retained with a bus voltage failure.
- With the programming it is possible to set via a parameter if the saved values should be overwritten by the parameterized values.

Example

- The shutters are moved into a preset position after a short push button action, and the current position is adopted as the new preset position after a long push button action.
Webinar “Shutter Control with KNX”

Positions – 8 bit scene

- With the 8 bit scene, up to 64 scenes are managed via a single group address
- An 8 bit scene telegram contains the following information:
  - Number of the scene (1…64) as well as
  - Store/recall scene
- The JRS/A receives the telegram
  - All the outputs, which are assigned to the received scene number via a parameter, move to the recalled scene position or store their current position as a new default value for this scene number
- Each individual output of the device can be integrated into up to eighteen 8 bit scenes
Webinar “Shutter Control with KNX”

Positions – 8 bit scene

Example

- The first three outputs of the device are assigned to the following scenes:

<table>
<thead>
<tr>
<th>Output</th>
<th>Scene No.</th>
<th>Specified position</th>
<th>Specified slat</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5</td>
<td>20 %</td>
<td>50 %</td>
</tr>
<tr>
<td>A</td>
<td>9</td>
<td>47 %</td>
<td>30 %</td>
</tr>
<tr>
<td>A</td>
<td>45</td>
<td>70 %</td>
<td>80 %</td>
</tr>
<tr>
<td>B</td>
<td>5</td>
<td>20 %</td>
<td>50 %</td>
</tr>
<tr>
<td>B</td>
<td>37</td>
<td>82 %</td>
<td>65 %</td>
</tr>
<tr>
<td>B</td>
<td>45</td>
<td>75 %</td>
<td>31 %</td>
</tr>
<tr>
<td>C</td>
<td>58</td>
<td>65 %</td>
<td>77 %</td>
</tr>
</tbody>
</table>

- If scene no. 5 is now recalled, the blinds/shutters on outputs A and B will move to the saved preset positions and align the slats in accordance with the saved preset value.

- The blind/shutter on output C is not assigned to scene No. 5 and will therefore not move.
Webinar “Shutter Control with KNX”

Positions – 8 bit scene

- Each blind/shutter output can be integrated in up to 18 scenes
- If a telegram is received on the communication object “Scene”, all outputs assigned to the sent scene number will then move to the saved scene position (call a scene), or the current position will be saved as a new scene position (store a scene)
  - Position height in % [0...100]
  - Position slat in % [0...100]
Webinar “Shutter Control with KNX”
Automatic control

- Sun protection (standard)
- Sun protection with tracking of the sun’s position
- Heating/cooling automatic
- Redirection of daylight
- Night cool down
Webinar “Shutter Control with KNX”
Automatic control – sun protection

- It is possible to set up a very convenient automatic sun protection system by combining Blind/Roller Shutter Actuator JRA/S with other KNX components

- The automatic sun protection controls the shutter/blind according to the level of sunlight

- Depending on the strength and direction of the sun, the shutter/blind is moved into a set position via an 8 bit value or into a variable position depending on the situation

- For example, the blind can be raised if the sun is only weak or is not shining on the window at all

- As much light as possible is thereby let into the room without any disruptive direct sunlight being taken into account
Webinar “Shutter Control with KNX”
Automatic control – sun protection (standard)

- If there is blazing sun on the window however, the blind is lowered and the louvres are closed to the extent that direct sunlight cannot penetrate the room.
- The residual opening in the blinds lets in a sufficient level of diffuse light into the room.

No sun → Blind raised

Sun → Blind lowered and louvres closed
Webinar “Shutter Control with KNX”
Automatic control – sun protection (standard)

- Two further components are required:
  - An activation option for the user (e.g. a further switch sensor or the second rocker of the UP/DOWN switch sensor) and
  - A brightness sensor

- With the help of the second switch sensor, the user of the room can specify whether he wishes to use the automatic sun protection or whether he would rather control the shutters/blinds manually

- If the automatic sun protection is activated via a switch sensor, the shutter/blind moves automatically until either the automatic sun protection is deactivated via the same switch sensor or the user issues a direct movement command (e.g. UP/DOWN or move into position) and the automatic function is thus also deactivated
Webinar “Shutter Control with KNX”
Automatic control – sun protection (standard)

- The Blind/Roller Shutter Actuator receives the information via the brightness sensor as to whether there is direct sunlight on the window or the facade.
- Once the adjustable delay period has elapsed, the Blind/Roller Shutter Actuator positions the shutter/blind according to the set Position for sun = “1” (sun) or Position for sun = “0” (no sun).
Webinar “Shutter Control with KNX”
Automatic control – sun protection (standard)

- Automatic control activated
- Direct UP/DOWN
- Automatic control deactivated

Brightness sensor

"1" = sun
"0" = no sun

Position for sun = "1"
Position for sun = "0"

Direct positioning via UP/DOWN or movement to position

Shutter Actuator

"1" = sun
"0" = no sun
Webinar “Shutter Control with KNX”
Automatic control – sun protection (standard)

Direct UP/DOWN

Automatic control activated

Brightness sensor

"1" = sun
"0" = no sun

Position for sun = "1"
Position for sun = "0"

Automatic control deactivated

Shutter Actuator

Device: 11.1 JRA/58.230.51 Blind/RollerShutterAct LT/2/M/B230V

Deactivation of automatic control via object "Act. of automatic control"
Toggling to automatic control enabled
Toggling to direct control enabled

Position for sun = 1 (sun) down
Position for sun = 0 (no sun) up

Delay for sun = 1 in s [0..6000] 1
Delay for sun = 0 in s [0..6000] 1
Read activated automatic objects after bus voltage recovery no
Enable heating/cooling automatic no
Webinar “Shutter Control with KNX”
Automatic control – sun protection with tracking of the sun’s position

- To set up an automatic sun protection system with tracking of the sun’s position, an additional control unit is required (e.g. the Shutter Control Unit JSB/S 1.1)
- The current position of the sun is continually calculated in the shutter control unit
- The shutter/blind is moved via an 8 bit value into the optimum position to deflect direct sunshine but to let through as much diffuse light as possible
- The influence of shadows e.g. the buildings opposite can also be taken into account in the shutter control unit
Webinar “Shutter Control with KNX”
Automatic control – sun protection with tracking of the sun’s position

Time Master: Date and Time
Brightness sensor
Shutter Control Unit JSB/S 1.1
Shutter Actuator JRA/S
Webinar “Shutter Control with KNX”
Automatic control – sun protection with tracking of the sun’s position

- Brightness sensor
- Direct UP/DOWN
- Automatic control activated
  - "1" = sun and 8-bit value position and slat
  - "0" = no sun
- Automatic control deactivated
- Move to 8-bit position and slat
- Position for sun = "0"
- Direct positioning via UP/DOWN or movement to position
- Shutter Actuator
Webinar “Shutter Control with KNX”
Automatic control – sun protection with tracking of the sun’s position

Shutter control unit JSB/S

Move to 8-bit position and slat
Position for sun = “0”

Direct UP/DOWN

Automatic control activated

Automatic control deactivated

Device: 1.1.1 JRA/BE.230.5.1 Blind/Blinds/ShutterAct.TO, M, 84.230V

Deactivation of automatic control via object “Act of automatic control”
Toggling to automatic control enabled
Toggling to direct control enabled
Position for sun = 1 (sun) receive position and slat via object
Position for sun = 0 (no sun) up
Delay for sun = 1 in s [0..6,000] 0
Delay for sun = 0 in s [0..6,000] 0
Read activated automatic objects after bus voltage recovery no
Enable heating/cooling automatic no

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The automatic heating/cooling is an enhancement of the automatic sun protection.

During absences the automatic heating/cooling function controls the shutter/blind according to the sunlight and the required energy input in the room.

The shutter/blind is moved into a set position depending on whether the room should be heated or cooled and how strong the sun is and in which direction it is shining.

The following parameters are linked for the function Heating/cooling automatic:

- Absence of persons
- Sun
- Heating or cooling period
Webinar “Shutter Control with KNX”
Automatic control – Automatic heating/cooling

- The shutter can for example be raised during the heating phase when the sun is shining to achieve a maximum energy input into the room.

Heating period

<table>
<thead>
<tr>
<th>Sun</th>
<th>No sun</th>
</tr>
</thead>
<tbody>
<tr>
<td>→ outside up</td>
<td>→ outside down</td>
</tr>
</tbody>
</table>
Webinar “Shutter Control with KNX”
Automatic control – Automatic heating/cooling

During the cooling phase, the blind can be lowered during full sunshine in order to keep the energy input at a minimum.

Sun → outside down
No sun → outside up
Webinar “Shutter Control with KNX”
Automatic control – Automatic heating/cooling

- Two further components are required in addition to the automatic sun protection
  - A toggling option between automatic sun protection and automatic heating/cooling (e.g. a presence detector) as well as
  - A toggling option between heating and cooling (e.g. a year time switch or a temperature sensor)
- With the help of the switch sensor, the user of the room can specify whether he wishes to use the automatic control or whether he would rather control the shutters/blinds manually
- If the automatic sun protection is activated via a switch sensor, the shutter/blind moves automatically until either the automatic function is deactivated via the same switch sensor or the user issues a direct movement command (e.g. UP/DOWN or move into position)
Webinar “Shutter Control with KNX”
Automatic control – Automatic heating/cooling

- The Blind/Roller Shutter Actuator receives the information via the presence detector as to whether there are people in the room
  - If the room is occupied, the blind is controlled according to the automatic sun protection function
  - If nobody is in the room, the blind is controlled according to the automatic heating/cooling function
- For example, the Shutter Actuator receives the information via a year time switch or a thermostat as to whether the room should be heated or cooled
- The blind moves into the set heating or cooling position, depending on the position and intensity of the sun
Webinar “Shutter Control with KNX”
Automatic control – Automatic heating/cooling

- **Presence detector**
- **Automatic control activated**
- **Automatic control deactivated**

- **Heating/cooling automatic**
- **Automatic sun protection**

- **Direct positioning via UP/DOWN or movement to position**
- **Shutter Actuator**

- **Brightness sensor**

- **Position for heating = “1” and sun = “0”**
- **Position for cooling = “1” and sun = “0”**
- **Position for sun = “1”**

Heating or Cooling
Webinar “Shutter Control with KNX”

Automatic control – Automatic heating/cooling

- Presence detector
- Heating/cooling automatic
- Automatic sun protection
- Direct UP/DOWN

- Automatic control activated
- Position for heating = “1” and sun = “0”/sun = “1”
- Position for cooling = “1” and sun = “0”/sun = “1”
- Position for sun = “1” sun = “0”

- Automatic control deactivated
- Direct positioning via UP/DOWN or movement to position

- Shutter Actuator

- Device 1.1.1 JRA/SK210.3.1 Blind/RollerShutterActuator

- Deactivation of automatic control via object “Act of automatic control”
- Position for sun = “1” (sun) remove position and slide via object
- Position for sun = “0” (no sun) up
- Delay for sun = “1” in s (0, 6,000) 0
- Delay for sun = “0” in s (0, 6,000) 0
- Read activated automatic objects after bus voltage recovery no
- Enable heating/cooling automatic yes
- Delay for presence = “1” in s (0, 4,000) 0
- Delay for presence = “0” 0
- Position for heating = “1” and sun = “1” up
- Use overheat control yes
- Upper threshold value room temperature in °C (21..50) 24
- Position at upper threshold value and sun = “1” down
- Position for cooling = “1” and sun = “0” no reaction
- Position for cooling = “1” and sun = “0” no reaction
- On heating = “1” and cooling = “1” or the output is controlled only by automatic sun protection

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Webinar “Shutter Control with KNX”
Automatic control – Automatic heating/cooling

Overheat control (during automatic heating/cooling is active)

- Heat up of the unoccupied room is avoided using overheat control
- During the heating period, rooms with large glass fronts can heat up very quickly in strong sunshine, even if the external temperature is low
- Overheat control is used in order to avoid the need for any cooling energy
- If the temperature threshold here is reached or exceeded, the blinds/shutters will move to a parameterizable position, e.g. DOWN
- If the temperature value drops by more than 3 degrees Kelvin, overheat control is ended
- The blinds/shutters are then moved to the parameterized position
Webinar “Shutter Control with KNX”
Automatic control – Automatic heating/cooling

Overheat control (during automatic heating/cooling is active)

- Heat up of the unoccupied room is avoided using overheat control
- If the temperature threshold here is reached or exceeded, the blinds/shutters will move to a parameterizable position, e.g. DOWN

![Overheat control diagram]
Webinar “Shutter Control with KNX”
Automatic control – redirection of daylight

- When using special directional louvres, the direct light into the room is guided so that the no disruptive direct light penetrates the room but at the same time optimum use is made of the existing natural daylight.
Webinar “Shutter Control with KNX”
Automatic control – Night cool down

- Using the Night cool down automatic function it is possible to implement cooling of rooms by temperature dependent ventilation
- It is not useful to always open the window at fixed times
- Example: The window of a production hall should be opened for cooling early in the morning before work starts in summer
- The internal and external temperature must be measured
- Two conditions must also be fulfilled:
  - Internal temperature is higher than the external temperature
  - External temperature is lower than a defined fixed value, e.g. 18°C
SMI = Standard Motor Interface

- First standard for the connection of intelligent drives for shutters, windows and sun protection systems
- SMI enables telegram transmission from the control unit to the drive and vice versa
- www.smi-group.com
SMI is the abbreviation for STANDARD MOTOR INTERFACE and is the standardised electrical connection for shutter, windows and sun protection system drives.

Renowned European manufacturers have joined the SMI Consortium to develop the digital interface.

Using this standard interface drives are controlled via data packages.

Thanks to this technology, SMI drives provide precise feedback.

A parallel connection of up to 16 drives is possible which can each be individually addressed.

SMI drives are available for mains voltage (230V) and low voltage (LoVo).
Webinar “Shutter Control with KNX”
SMI Group

- Member

- Partner, e.g.
Webinar “Shutter Control with KNX”
www.smi-group.com
Webinar “Shutter Control with KNX”

SMI

- Master-Slave System
- Connection of up to 16 drives (slaves) at 1 SMI output (master)
- Broadcast, group and individual addressing
- Motor response
  - motor is rotating
  - direction of rotation
  - motor defect
- Precise positioning (2° / Step)
- Push button operation possible

Names and colour codes of the wires for connecting SMI systems
Webinar “Shutter Control with KNX”
SMI

- Connection via 5-core wire
  - I+, I-: SMI telegram transfer
  - L, N, PE: Power supply
- Free topology
- SMI cable length max. 350 m
- SMI control voltage 18V DC
- Data transfer 2400 bit/s
- SMI signal lines are protected against polarity reversal so that an incorrect connection cannot damage the actuator or drives
- The I+ and I- SMI wires can be laid in the motor connection line of the SMI drive or in their own cable

Names and colour codes of the wires for connecting SMI systems
Webinar “Shutter Control with KNX”
Conductor assignment for SMI drives for mains voltage

I+: Control wire +
I-: Control wire -
PE: Protective earth conductor
L: Live
N: Neutral wire

Names
Push Button operation
Telegram operation
Webinar “Shutter Control with KNX”

SMI

SMI-Planning manual

- SMI and building management (technology, …)

- Development (positioning, advantages, fields of application, …)

- Planning (principles of sun protection automation, SMI-drive systems, standards, …)

- Installation (connection scheme, SMI-easy monitor, manual control cable …)
Webinar “Shutter Control with KNX”

SMI

4 independent groups with up to 4 SMI drives per output

Communication with feedback

JA/S 4.SMI.1M

SJR/S 4.24.2.1 LoVo
Webinar “Shutter Control with KNX”
SMI – JA/S 4.SMI.1M

- The Shutter Actuator JA/S 4.SMI.1M controls
  - four independent groups (Broadcast Mode)
  - each with up to 4 SMI shutter or roller blind drives (230 V Motors)
- Status signals (motor fault, direction of movement) can also be sent from the SMI drive on KNX
- No SMI commissioning necessary
- Manual operation
- Status LEDs
Webinar “Shutter Control with KNX”
SMI – SJR/S4.24.2.1 LoVo

- The Shutter Actuator SJR/S4.24.2.1 LoVo controls
  - four independent groups (Broadcast Mode)
  - each with up to 4 SMI shutter or roller blind drives (24 V Motors - SMI LoVo) via the KNX
- No SMI commissioning necessary
- Status signals (motor fault, direction of movement) can also be sent from the SMI drive on KNX
- Manual operation
- Status LEDs
Webinar “Shutter Control with KNX”

SMI

JA/S 4.SMI.1M

SJR/S 4.24.2.1
The following functions are available with the application program:

- Move UP/DOWN, Stop/Louvre adjustment
- Move into position (up to 4 preset positions)
- Set position (modification of the preset position via KNX)
- Move to position 0…100 %
- Scenes
- Sun automatic control
- Heating/cooling automatic control
- Monitoring of wind, rain and frost alarms (cyclical)
- Block and forced operation
- Status messages
- …
Webinar “Shutter Control with KNX”

SMI

Status

- Position 0...255
- Louvre
- Position top
- Position bottom
- Operation
- Automatic control
- Status byte
- SMI failure
- Number of drives
- Diagnostic byte
Webinar “Shutter Control with KNX”
SMI – Status messages (each output)

- One object “SMI failure“(1 bit)
  - “0“: SMI ok
  - “1“: SMI or 230V/24V (motor) has failed
- One object “number of drives“(1 bit)
  - “0“: = number of drives o.k.
  - “1” = number of drives too high/ too low
- One object ”diagnostic byte“(1 Byte):
  - 7: No communication
  - 6: Motor moves up
  - 5: Motor moves down
  - 4: Motor fault
  - 3: Short-circuit on SMI (hardware fault)
  - 2: More drives detected than configured
  - 1: Less drives detected than configured
  - 0: More than 4 drives detected on SMI
Webinar “Shutter Control with KNX”
i-bus® Tool
### Blind/Roller Shutter Actuator JRA/S

#### i-bus® Tool

#### Menu:
- Back
- Home
- Help
- Select Display mode
- Refresh

#### Device data:
- Device type: JRA/S 4.2305.1
- Physical address: 1.1.35
- Application: Blind/Roller Shutter 4 II 230V TravelDetection M/3.3
- Device: AD01

#### Status of output:
- Operating mode: Control with slat adjustment (Blinds)
- Weather/safety alarm
- Status manual operation
- Automatic sun protection
- Heating/cooling automatic
- Motor in motion
- Motor error

#### Weather / safety alarms:
- Wind alarm No.1
- Wind alarm No.2
- Wind alarm No.3
- Rain alarm
- Frost alarm
- Forced operation
- Block

#### Positions 1-4 / Scene:
- Position 1
- Position 2
- Position 3
- Position 4
- Scene no: 24

#### Position / Control blinds / roller shutter:
- Current position: 100 % (255)
- Position valid

#### Automatic Control:
- Activate automatic control
- Direct control blocked
- Automatic control disabled
- Sun
- Object value height for sun: 32 % (133)
- Change position height for sun: 52 %
- Object value slat for sun: 25 % (64)

#### Heating / Cooling:
- Presence
- Heating
- Cooling
- Object value room temperature: 25°C
- Simulate room temperature: 25°C

#### General weather alarms for all channels:
- Wind alarm No.1
- Wind alarm No.2
- Wind alarm No.3
- Rain alarm
- Frost alarm
Webinar “Shutter Control with KNX”
www.abb.com/knx → product tree → shutters
Webinar “Shutter Control with KNX” Documentation

- Product Manual
- Product Information
- Application Manual “Shutter Control”
- Technical datasheet
Webinar “Shutter Control with KNX”
Power and productivity for a better world™