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# Table of Contents

Warranty and Liability ........................................................................................................... 2

1 Introduction .......................................................................................................................... 4
   1.1 Definition "gate control / gate circuit" ........................................................................... 5
   1.2 Task Description ......................................................................................................... 6

2 Setup and description .......................................................................................................... 7
   2.1 Components used ........................................................................................................ 7
   2.2 Hardware setup ........................................................................................................... 8
   2.3 LOGO! program .......................................................................................................... 9
   2.3.1 Digital gate circuit ................................................................................................. 10
   2.3.2 Analog gate circuit ............................................................................................... 10
   2.3.3 Message texts ....................................................................................................... 10
   2.4 Mounting the LOGO! into KNX ............................................................................... 11
   2.4.1 Configuration of LOGO! CMK2000 .................................................................... 12

3 Commissioning .................................................................................................................... 13

4 Adjustments and expansions ............................................................................................... 14
   4.1 Functional expansions in the application example ......................................................... 14
   4.2 Adapting the message texts ....................................................................................... 16

5 Appendix ............................................................................................................................. 17
   5.1 Service and support .................................................................................................... 17
   5.2 Links and Literature .................................................................................................. 18
   5.3 Change documentation .............................................................................................. 18
1 Introduction

This application example offers you the “Gate circuit” logic function for LOGO! 8 according to the definition in chapter 1.1.

An expanded application of the application example (see chapter 4) contains suggestions for using the function for the gate circuit for a wind sensor (or a weather station). Use these applications as a basis for your own implementation of a gate circuit by modifying, replacing or adding functions in LOGO! Soft Comfort.

The integrated functions of a LOGO! 8 offer many options for quick and easy solutions for automation tasks. Pre-programmed function blocks support you when creating a project, e.g. week timer, pulse generator, astro timer, yearly timer, stopwatch and simple logic gates.

The LOGO! text display unit (TDE) and the integrated LOGO! 8 web server offer additional options for control and monitoring with function keys and message texts.

The communication module CMK2000 from Siemens provides a solution for communication in building automation with LOGO! 8. The communication module enables communication between a LOGO! 8 and any KNX device via the KNX building system bus.

Figure 1-1: Hardware setup for the application example

Advantages

The combination of the logic function in LOGO! 8 and the CMK2000 module offers you the following advantages:

- Task can easily be expanded with additional functions
- The task can be combined with other independent tasks
- Integration of LOGO! inputs and output into a KNX system
- Prevents wind damage of your blinds (monitoring of wind speed)

Target group

This application example is aimed at experienced KNX users who seek to expand their KNX system with the functionalities of a LOGO! 8.
1.1 Definition "gate control / gate circuit"

This application example shows the software function "Gate circuit". This is not a material gate (garage gate) as it would be found with the search term "Gate control".

Figure 1-2 shows the simplest form of a gate circuit where a control value is switched or locked depending on a release signal.

The release can be a general event and the gate can stand as a symbol for a time window. The control value can be an analog value, e.g. filling level, or a specific pressure at the gate.

Figure 1-2: Simple representation of a gate circuit (software function)

![Gate Circuit Diagram]

The following table shows a few examples of gate circuits that can be realized with a LOGO! and that can be applied to this application example.

<table>
<thead>
<tr>
<th>Application (→ release)</th>
<th>Control value</th>
<th>Gate circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pull in blinds</td>
<td>Voltage at the blinds motor</td>
<td>Blinds are pulled in</td>
</tr>
<tr>
<td>Weather station</td>
<td></td>
<td>Blinds are pulled in up to the setpoint value of the analog value</td>
</tr>
<tr>
<td>⇒ Release via sensor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(wind speed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expansion (heater)</td>
<td>Digital switching signal to cooling system</td>
<td>Cooling system is locked</td>
</tr>
<tr>
<td>⇒ Release button</td>
<td></td>
<td></td>
</tr>
<tr>
<td>⇒ Temperature value</td>
<td>Analog heating value is switched.</td>
<td>Heating value is switched on</td>
</tr>
<tr>
<td>Night lighting</td>
<td>Astro timer</td>
<td>Twilight (lighting on)</td>
</tr>
<tr>
<td>⇒ Set time</td>
<td>Voltage on</td>
<td></td>
</tr>
<tr>
<td>Pump control</td>
<td>Analog value for pump performance</td>
<td>Filling level exceeds the set maximum range (limit value)</td>
</tr>
<tr>
<td>⇒ Filling level exceeded</td>
<td></td>
<td>⇒ The higher the value is exceeded, the higher the speed of the pump</td>
</tr>
<tr>
<td>Sauna; whirlpool</td>
<td>Timer is activated and pump motor is started.</td>
<td>Whirlpool active</td>
</tr>
<tr>
<td>⇒ Person present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquarium; terrarium</td>
<td>Quantity of food</td>
<td>Feeding machine...</td>
</tr>
<tr>
<td>⇒ Week timer</td>
<td></td>
<td>⇒ ...puts a specific quantity into the aquarium</td>
</tr>
<tr>
<td>Garbage press, quantity of</td>
<td>Analog value for pressure</td>
<td>Hydraulic press switched on...</td>
</tr>
<tr>
<td>garbage</td>
<td></td>
<td>⇒ ...until the set pressure force is reached</td>
</tr>
<tr>
<td>⇒ Button</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1.2 Task Description

This application example is divided into a simple and an expanded LOGO! 8 switching program.

The simple switching program shows how to connect a simple gate circuit to the inputs and outputs of the KNX bus. To do this, refer to chapter 2.3.

The expanded switching program with a wind sensor is an example for the gate circuit. To do this, refer to chapter 4.

You can individually expand both switching programs, e.g. with additional monitoring or alarm functions for the current switching states.

Note

A functional description of the logic function can be found as a comment of the switching program under LOGO! Soft Comfort:
> "Tools" > "Select Hardware" > "Offline settings" > "Comment".

Tip: Activate the "Comment" option box under "Tools" > "Options" > "Print" for the function description to be printed together with the program.
2 Setup and description

2.1 Components used

This application example was created with the following components:

Table 2-1: Hardware and software components for the application example

<table>
<thead>
<tr>
<th>Component</th>
<th>Number</th>
<th>Article number</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOGO! Soft Comfort V8.1</td>
<td>1</td>
<td>6ED1058-0BA08-0YA1</td>
<td>Upgrade to V8.1 can be found at <a href="http://www.siemens.com/logo">http://www.siemens.com/logo</a></td>
</tr>
<tr>
<td>LOGO! Power</td>
<td>1</td>
<td>6EP3332-6SB00-0AY0</td>
<td>-</td>
</tr>
<tr>
<td>LOGO! 8 12/24 RCE</td>
<td>1</td>
<td>6ED1052-1MD00-0BA8</td>
<td>-</td>
</tr>
<tr>
<td>LOGO! CMK2000</td>
<td>1</td>
<td>6BK1700-0BA20-0AA0</td>
<td>Product data base ETSS: <a href="http://www.siemens.com/gamma-td">http://www.siemens.com/gamma-td</a></td>
</tr>
<tr>
<td>LOGO! TDE</td>
<td>1</td>
<td>6ED1055-4MH00-0BA1</td>
<td>Optional components</td>
</tr>
<tr>
<td>Siemens GAMMA KNX Power Supply</td>
<td>1</td>
<td>5WG1 125-1AB12</td>
<td>320 mA</td>
</tr>
<tr>
<td>Siemens GAMMA KNX bus coupler</td>
<td>1</td>
<td>5WG1 117-2AB12</td>
<td>-</td>
</tr>
<tr>
<td>Siemens GAMMA KNX room control unit</td>
<td>1</td>
<td>5WG1 2272AB11</td>
<td>Product data base ETSS: <a href="http://www.siemens.com/gamma-td">http://www.siemens.com/gamma-td</a></td>
</tr>
<tr>
<td>Siemens GAMMA KNX 3-Gang Button</td>
<td>1</td>
<td>5WG1 223-2DB13</td>
<td>Product data base ETSS: <a href="http://www.siemens.com/gamma-td">http://www.siemens.com/gamma-td</a></td>
</tr>
<tr>
<td>Siemens GAMMA KNX/IP interface</td>
<td>1</td>
<td>5WG1 148-1AB12</td>
<td>Required for programming the KNX devices. Alternatively: USB interface</td>
</tr>
<tr>
<td>Wind sensor (impulse signal)</td>
<td>1</td>
<td>Specialist retailers</td>
<td>e.g.: Ventus mini wind gage: Art. 200 430</td>
</tr>
<tr>
<td>Measuring range: 0.8 to 40 m/s 100Hz =&gt; 40m/s</td>
<td>1</td>
<td>5WG1 257-3AB32</td>
<td>Product data base ETSS: <a href="http://www.siemens.com/gamma-td">http://www.siemens.com/gamma-td</a></td>
</tr>
<tr>
<td>Alternatively: KINX weather station AP 257/32 weather station WS1 (GPS) or similar</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2 Setup and description

This application example consists of the LOGO! and ETS programs.

Table 2-2: Components and programs for the application example

<table>
<thead>
<tr>
<th>Component</th>
<th>File name</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation</td>
<td>109748589_LOGO8_GateCircuit_DOC_en.pdf</td>
<td>-</td>
</tr>
<tr>
<td>LOGO! 8 programs</td>
<td>109748589_LOGO8_GateCircuit_basic.lsc</td>
<td>Requirement: LOGO! Soft Comfort V8.1</td>
</tr>
<tr>
<td></td>
<td>109748589_LOGO8_GateCircuit_extended.lsc</td>
<td></td>
</tr>
<tr>
<td>ETS5 projects</td>
<td>109748589_LOGO8_GateCircuit_en.knxproj</td>
<td>Project for “basic” and “extended”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Requirement ETS5 software</td>
</tr>
</tbody>
</table>

2.2 Hardware setup

Figure 2-1 shows the hardware setup for this application example.

The assignment of the digital input and output signals of LOGO! 8 for the basic sample project can be found in Table 2-3 and for the expansion in Table 4-1. The assignment of the KNX communication objects and the group addresses can be found in Table 2-4.

Figure 2-1: Hardware configuration for the application example

Note

LOGO! TDE is an optional component. You can also use its functions (message texts and function buttons) via the integrated LOGO! web server.
2.3 LOGO! program

The LOGO! switching program in Figure 2-2 consists of a digital and an analog gate circuit described in chapters 2.3.1 and 2.3.2. Table 2-3 shows the input and output signals of this figure.

Both gate circuits consist of the gate release, the gate control value and the gate itself. Use the LOGO! Soft Comfort simulation function for a direct graphic display of the dependencies in the switching program. Active connections (signals) are displayed in red, passive connections in blue.

Figure 2-2: LOGO! switching program for the application example (basic switching program)

Table 2-3: Input and output signals in the LOGO! (Basic switching program)

<table>
<thead>
<tr>
<th>Signals</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input [I1], [I2] and [M41], [M51]</td>
<td>Release of the gate by the digital inputs of the LOGO! Release signals from KNX to LOGO! (Table 2-4)</td>
</tr>
<tr>
<td>Input [I3] and [M42]</td>
<td>Digital control value (Hi/Lo signal) (KNX button A2) at KNX group address 1/1/2 via channel 2 Figure 4-1</td>
</tr>
<tr>
<td>Input [I4]</td>
<td>Selection of the analog control value via KNX or the analog input of the LOGO!</td>
</tr>
<tr>
<td>Output [Q1]</td>
<td>Output signal as result of the operation of the digital gate circuit.</td>
</tr>
</tbody>
</table>
2.3.1 **Digital gate circuit**

The AND block [B006] corresponds to the gate. The gate is released via the button at [I1] or the KNX button A1 at [M41].

The digital control value at the gate is represented by the signal at button [I3] or the KNX button A2 at [M43].

With a high signal at [I1] or [M41], gate [B006] is opened and the digital control value at the output [Q1] is switched.

2.3.2 **Analog gate circuit**

The analog multiplexer (analog MUX) [B003] corresponds to the gate. The gate is released via [I2] or the KNX button B1 at [M42].

You can select [NAI1] (KNX room control unit) as analog control value for the gate via a high signal at [I4]. If [I4] has a low signal, then [AI1] is selected as analog control value.

With a high signal at [I2] or [M42], gate [B003] is opened and the analog control value at the analog flag [AM13] is switched.

In the basic example, the analog control value is created by the LOGO! at the analog input (input terminal I7=[AI1]=0V..10V).

The analog KNX control value is configured at the room control unit. The respective LOGO! input is the analog network input [NA1].

The communication path of the control value can be described as follows. The KNX room control unit (1st function) sends a "2 byte value" to the KNX module (CMK2000) via the KNX group address 1/1/12. Via channel 12 of the module, the value is sent to LOGO! 8 and written in its virtual address range (VM address 120).

The network input [NAI1] has the virtual address VW120 assigned.

The control value is output at the LOGO! display and at the KNX room control unit (2nd function reading) as "Analog value (gate-passed)".

How to connect the LOGO! to KNX is explained in chapter 2.4.

2.3.3 **Message texts**

The display of the message texts Figure 2-3 consists of two windows that you can view at the LOGO! display, the LOGO! TDE or the web server (LOGO! TD).

- Digital gate (center representation from simulation function)
- Analog gate (right representation from web server)

**Figure 2-3:** Message texts (switching states of the window contacts)
2.4 Mounting the LOGO! into KNX

LOGO! 8 is integrated into a KNX system via the LOGO! communication module CMK2000.

The bi-directional data exchange between LOGO! and the KNX devices is made via configurable communication channels of the LOGO! CMK2000. For the channels, you parameterize inputs and outputs, flags or variable memories as signals in the LOGO!.

The following Table 2-4 shows the signals of the LOGO! for this application example and the communication direction between LOGO! and KNX for the two switching programs in this application example. The ETS5 projects included in the delivery contain the LOGO! CMK2000 configured for use with the specific hardware from Table 2-1.

Table 2-4: KNX group addresses and LOGO! channels for communication

<table>
<thead>
<tr>
<th>Signals in the LOGO!</th>
<th>KNX Group address</th>
<th>Channel Communication between LOGO! and KNX</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Digital gate circuit</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flags [M41]</td>
<td>1/1/1</td>
<td>KNX to LOGO! (Channel 1)</td>
<td>Release of the gate circuit KNX button A1 (upper left)</td>
</tr>
<tr>
<td>Flags [M42]</td>
<td>1/1/2</td>
<td>KNX to LOGO! (Channel 2)</td>
<td>Control value (active) KNX button A2 (upper right)</td>
</tr>
<tr>
<td>Output [Q1]</td>
<td>1/1/3</td>
<td>LOGO! to KNX (channel 3)</td>
<td>Gate has switched!</td>
</tr>
<tr>
<td><strong>Analog gate circuit</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flags [M51]</td>
<td>1/1/10</td>
<td>LOGO! to KNX (channel 10)</td>
<td>Release of the gate circuit KNX button B1 (center left)</td>
</tr>
<tr>
<td>Network input [NAI1] VM address 120</td>
<td>1/1/12</td>
<td>KNX to LOGO! (Channel 12)</td>
<td>In the simple example: KNX room control unit (Sends analog 2 byte value via first function.) In the expanded example: Wind sensor</td>
</tr>
<tr>
<td>Analog flag [AM13]</td>
<td>1/1/13</td>
<td>LOGO! to KNX (channel 13)</td>
<td>KNX room control unit (Receives analog 2 byte value via second function.)</td>
</tr>
</tbody>
</table>

Note

In this application example, a 3-gang button with status LEDs and a room control unit with configurable functions are used for switching and displaying KNX signals.

In the expanded example, the analog KNX value is not sent by the KNX room control unit, but from a wind sensor or a weather station.
2.4.1 Configuration of LOGO! CMK2000

Note

In this application example, the KNX devices and the LOGO! communication module CMK2000 have been integrated into the ETS software as "devices".

The basic prerequisites for the signal exchange between LOGO! 8 and the KNX system bus are shown below.

The LOGO! CMK2000 communication module is configured via the ETS software.

Configuration of LOGO! CMK2000:

- General settings for LOGO! CMK2000 and the settings for the channels for the communication between LOGO! 8 and KNX are made in the "Parameters" window.
- Select the LOGO! basic module with which the signal and data exchange is to be performed in the general parameters.
- You have to assign valid IP addresses for the LOGO! base module and the LOGO! CMK2000.
- Enter a password for the web interface.
- One channel of the CMK2000 is configured in the ETS software for the direction "from LOGO! to KNX" and one for the direction "from KNX to LOGO!".
- The LOGO! CMK2000 communication channels must be connected with the group addresses of the KNX devices in the "Communication objects" window.
3 Commissioning

Proceed as follows to commission the application example:

LOGO!

1. Start LOGO! Soft Comfort V8.1
2. Open the LOGO! example program included in the delivery: "109748589_LOGO8-KNX_GateCircuit_basic_en.lsc"
3. Load the program to the LOGO!

Note

In this application example, the LOGO! IP address has been preconfigured as 192.168.0.1.

How to set the IP address of a LOGO! 8 can be found in the manual in chapter: 3.8.1 "Configuring network settings"

KNX

The following requirements apply to the KNX application:

- The physical addresses "1.1.1", "1.1.2" and "1.1.3" are freely available in your KNX system.
- The communication interface has been defined in the ETS software.
  (Menu bar: "ETS > Bus")
- The bus connection with KNX participants has been established.
  (e.g.: via the USB interface or the IP interface).

1. Start the ETS software.
2. Click "ETS" in the ETS menu bar.
3. Select the "Overview" tab.
4. Click on the "Import project" symbol.
5. Navigate to the path of the KNX project: "109748589_LOGO8-KNX_GateCircuit_basic_en.knxproj"
6. In the "Devices" window, select the button and the LOGO! CMK2000.
7. Click the "Download" button and select "Download all".
8. Follow the instructions in the container "Pending Operations" and press the programming button of the respective device.

Note

Further information on the programming button can be found in the "LOGO! CMK2000" manual:

Technical product information GAMMA KNX 3-Gang Button:
(in the manual called Commissioning key "F9")

You can check the actual switching states of the gate circuit using the message texts from the switching program Figure 2-3.
4 Adjustments and expansions

The following application case of a wind sensor or weather station is based on the basic gate circuit. 

Figure 4-1 shows the functional expansion of the application example. 

The signal assignment can be found in Table 4-1.

4.1 Functional expansions in the application example

Figure 4-1 shows the release of the gate circuit at position (1) which is set depending on the wind speed (2).

As there are different versions of wind sensors, the examples include the KNX connection as well as two more examples for signal implementation in LOGO! Soft Comfort (3). You only have to adapt the respective VM address for the network input [NA1] (position 2) before you load the program to the LOGO!.

- KNX wind sensor is preset: VM address = 120
- Position (3.1) Analog sensor: VM address = 1
- Position (3.2) Sensor with impulse output: VM address = 2

The gate release (strong wind) switches an analog and a digital control value (4). The digital control value in the example triggers that the blinds are pulled in at [Q2] (5). The message texts show the thresholds for "light wind (from 30km/h)" and "strong wind (from 50km/h)".

A switching hysteresis has been added for the dynamic changes of wind speeds at a sensor. This means, for example, that the threshold "strong wind" is set if 50km/h are exceeded, but is only set back at 47km/h (6). The analog control value is not used in this example.

Table 4-1 shows the input and output signals of the expanded switching program.
Table 4-1: Input and output signals in the LOGO! (expanded LOGO! switching program)

<table>
<thead>
<tr>
<th>Input signals</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs [I3] and [M42]</td>
<td>Digital control value (Hi/Lo signal) (KNX button A2) at KNX group address 1/1/2 via channel 2</td>
</tr>
<tr>
<td>[AI1] Analog control value</td>
<td>Analog control value at the input terminal [I7]</td>
</tr>
<tr>
<td>[NAI1] KNX connection to wind sensor</td>
<td>Release signal at VM address 120 via analog network input for [Q1]  KNX wind sensor (2byte value) at KNX group address 1/1/12 via channel 12</td>
</tr>
<tr>
<td>[AI2] Wind sensor (analog)</td>
<td>Simulation of the wind speed via potentiometer at [I8] = (0 .. 10V) Connection through [NAQ3] (wind sensor output) at [NAI1] via the VM address 1</td>
</tr>
<tr>
<td>[I5] Wind sensor with (Impulse signal)</td>
<td>Impulse signal at [I5] is converted to [km/h] Connection through [NAQ2] (wind sensor output) at [NAI1] via the VM address 2</td>
</tr>
<tr>
<td>[I6] (Impulse signal via block B002 for simulation, alternatively to [I5])</td>
<td>Signal starts block [B002] which sends continuous impulses. The impulses or impulse-pause ratios can be varied online in simulation mode to achieve different values for the speed in [km/h].</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output signals</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output [Q2]</td>
<td>Signal for pulling in the blinds</td>
</tr>
<tr>
<td>[AM13]</td>
<td>Analog output signal when the gate is open and an analog control value is active.</td>
</tr>
<tr>
<td>[NAQ3]</td>
<td>See input signal at [AI2]</td>
</tr>
<tr>
<td>[NAQ2]</td>
<td>See input signal at [I5] or [I6]</td>
</tr>
</tbody>
</table>

The connection of the wind sensors from Figure 4-1 at pos. (3.1) and (3.2) is realized via an analog input [AI1] and via an impulse signal at [I5].

Both circuits use a network output [NAQ2] and [NAQ3] of the LOGO! 8 as output signal.

Network inputs and outputs offer you the option of installing a LOGO! directly on site, at the wind sensor, to send the data to a central station.

If you only use analog sensors, change the switching program and replace [NQI1] with the respective input.

A useful expansion of the wind sensor with a weather station is shown in the following entry:

The measured values of the wind sensor in this LOGO! program "68585346_LOGO!_Set11_LOGO!_8.lsc" are processed in the program part "Blinds".

Use the functions from this application example to individually modify and expand a KNX weather station (Table 2-1) with the switching program from the LOGO! Set 11.
4.2 Adapting the message texts

In the message texts Figure 4-2 you can place individual parameters of the function blocks from your switching program that you want to view via the display of the LOGO! base module, the LOGO! TDE or optionally via the web server. The wind speed is shown as a bar chart, in this case, with wind speeds represented from 0 to a maximum of 50km/h. The second bar chart (red message text) symbolizes the closing gate from the gate circuit.

- In the first message text of the application example, the wind speed is between 0 and 30km/h.
- In the second message text (yellow), the wind speed is between 30 and 50km/h. The hysteresis for decreasing wind is at 27km/h.
- In the third message text (red), the wind speed exceeds 50km/h. The hysteresis for decreasing wind is at 47km/h.

A configuration mode for individual block parameters is offered for specific function blocks.

A detailed description can be found in the LOGO! 8 manual in chapter: 8.1 "Switching to parameterization mode".

5 Appendix

5.1 Service and support

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https://support.industry.siemens.com/cs/ww/en/sc/2067
5.2 Links and Literature

Table 5-1: Links and literature

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<th>No.</th>
<th>Topic</th>
<th>Link</th>
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<td>Siemens Industry Online Support</td>
<td><a href="https://support.industry.siemens.com">https://support.industry.siemens.com</a></td>
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<tr>
<td>2</td>
<td>This entry</td>
<td><a href="https://support.industry.siemens.com/cs/ww/en/view/109748589">https://support.industry.siemens.com/cs/ww/en/view/109748589</a></td>
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5.3 Change documentation

Table 5-2: Document version and change history

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Modifications</th>
</tr>
</thead>
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<tr>
<td>V1.0</td>
<td>07/2017</td>
<td>First version</td>
</tr>
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