

# Switching Actuators – Flexible, Sensitive and Powerful

## GAMMA Building Management Systems



The modular design of the GAMMA switching actuators ensures the flexibility to handle any application and power requirements. The integrated load current detection enables a wide range of new application options.

### ■ Flexibility that meets all demands

If required a switching actuator main module can be expanded from a 3-channel into a 6-channel, 9-channel, 12-channel or 15-channel switching actuator and adapted in number and size to the loads to be switched. Up to four switching actuator submodules can be connected to the 6-pole interface of a main module using the jumper plug.

### ■ Comprehensive functionality

The functionality of the application software covers a broad spectrum: this ranges from multi-step fan control, operating hours and switching operation counters, over scene control and thermal drive control, through to load detection and monitoring of load current per channel.

## Highlights

- Individual power combinations – modular and extendable up to 20 AX
- Sensitive recording and monitoring of the load current per output for load failure and overload
- 1- to 3-step fan speed control possible
- Simplified maintenance through integrated switching operation and operating hours counter

# Output Devices

## Binary output devices

### Overview

#### Modular switching actuators

The extensive application program controls not only the outputs of the main module but also the outputs of all the connected sub-modules. It includes for example

- Recording and monitoring of the load current per output for load failure and overload
- Simultaneous switching of all three outputs
- Implementation of a speed specified as a percentage into 1- to 3-step switching commands (fan speed control)
- Implementation of a valve setting specified as a percentage into a pulse-width modulated switching command (thermal drive control)
- Switching operation and operating hours counter with limit value monitoring per output
- Integrated 8-bit scene control with integration of each output in up to eight scenes

#### Applications

Switching actuators for standard rail mounting are more widely used in non-residential and residential buildings than any other KNX device

- Switching of loads up to 20 AX per channel
- 3-phase switching of drive/loads
- Control of 1- to 3-step supply air/exhaust air systems
- Load current detection
- Detection of a significant equipment failures
- Preventive detection of failures through continuous current monitoring
- Recording of operating hours and switching operations
- Indication of maintenance or servicing work
- Detection of electric circuit interruptions

Block diagram: switching actuator 15-channel, main module with four submodules<sup>1)2)</sup>



<sup>1)</sup> The block diagram shown here is just an example of how modules can be interconnected and interfaced.

For more detailed information, please refer to the technical documentation available at: [www.siemens.com/gamma-td](http://www.siemens.com/gamma-td).

<sup>2)</sup> All modules with the imprint 10 AX, 16 AX and 20 AX are fully interoperable and therefore can be used together.

#### The specifications AC1, AX, AC3 and C-load

The industrial sector and building management systems have seen the establishment of a range of different switching capacities and outputs. These tend to be specific to the respective applications and are specified in the corresponding national and international standards. Tests are defined so that they simulate typical applications such as motor loads (industry) or fluorescent lamps (buildings).

The specifications AC1 and AC3 are switching capacity specifications which have become established in the industrial sector.

- AC1: refers to the switching of mainly resistive loads (p.f. = 0.8)
- AC3: refers to an (inductive) motor load (p.f. = 0.45)

These switching capacities are defined in the standard EN 60947-4-1 "Contactors and Motor Starters – Electromechanical Contactors and Motor Starters". The standard describes starters and/or contactors which were originally used in industrial applications.

AX has become established in building management systems.

- AX: refers to a (capacitive) fluorescent lamp load

In connection with fluorescent lamp loads one speaks of switchable capacitive loads (200  $\mu$ F, 140  $\mu$ F, 70  $\mu$ F or 35  $\mu$ F). This switching capacity refers to the standard EN 60669 "Switches for Household and Similar Fixed Installations – Principles", which is primarily implemented for applications in building management systems. A test with 70  $\mu$ F is required for 6 A devices and with 140  $\mu$ F for devices of more than 6 A. The switching capacity specifications AC and AX cannot be directly compared with each other.

In short, it is generally true that

- users who are primarily involved with industrial applications tend to refer to an AC3 switching capacity, whereas
- users who come from the building management systems and lighting sector generally refer to an AX switching capacity or C-load (200  $\mu$ F loads)

Switching capacity differences must be taken into account when selecting a switching actuator.

## Technical specifications

| Type  | Description  |
|---|--|
|  | <p><b>N 562/11, N 512/11 and N 513/11 switching actuators, main modules, N 562/21, N 512/21 and N 513/21 switching actuators, submodules</b></p> <ul style="list-style-type: none"> <li>• 3 x 230/400 V AC, 10 AX, 16 AX or 20 AX, C-load, load check</li> <li>• 1 relay contact per output as switching element</li> <li>• Rated contact operating voltage: 230 V AC</li> <li>• Rated contact frequency: 50/60 Hz</li> <li>• Rated contact current to EN 60669-1: 10 A, 16 A or 20 A</li> <li>• Fluorescent lamp load to EN 60669-1: 10 AX, 16 AX or 20 AX at 230 V AC (200 µF)</li> <li>• Switching current in AC1 mode (p.f. = 0.8) to EN 60947-4-1: 16 A or 20 A at 230 V AC</li> <li>• Switching current in AC3 mode (p.f. = 0.45) to EN 60947-4-1: 10 A, 16 A or 20 A at 230 V AC</li> <li>• Number of switching cycles in AC1: &gt; 10<sup>5</sup></li> <li>• Number of switching cycles in AC3: &gt; 3 x 10<sup>4</sup></li> <li>• Selection of whether all outputs of the switching actuators are to be set identically or individually</li> <li>• Selectable operating mode for each output (normal mode, time switch mode)</li> <li>• Selectable relay mode (NC contact / NO contact) for each output</li> <li>• Status object as an optional addition for each output</li> <li>• Sending of status objects on request and/or automatically after a change</li> <li>• Variable ON and OFF delay times for each output</li> <li>• Selectable logic operation (AND/OR) of two communication objects and variable start value of the logic operation per output in the event of bus voltage recovery</li> <li>• Selectable switching state for each output in the event of bus voltage failure and recovery</li> <li>• Optional addition of a night mode object per output for time-limited ON switching of the output (and thus, the lighting) at night</li> </ul> <ul style="list-style-type: none"> <li>• Variable ON period at night or time switch mode</li> <li>• Selectable function <ul style="list-style-type: none"> <li>- Post-triggering of the ON period (ON period extension) in time switch mode</li> <li>- Warning signal prior to imminent switching-off by means of three-times short off and on switching (flashing) at night or in time switch mode</li> <li>- Including additional communication object for manual override of an output</li> <li>- Forced control, including additional communication object for switching an output on or off in forced mode</li> <li>- Three-phase switching function (simultaneous switching of 3 outputs)</li> <li>- 1- to 3-step fan speed control function</li> <li>- Control of thermo-electrical drives by pulse width modulation (PWM), including a function for avoiding calcification of a valve</li> <li>- Counting of operating hours and with threshold monitoring of the operating hours</li> <li>- Counting of load cycles and with threshold monitoring of the load cycles</li> <li>- Load current recording in the range of 0.1 ... 16 A with 10 AX or 0.1 ... 20 A with 16 AX and 20 AX and with load current monitoring of an adjustable upper and lower threshold</li> </ul> </li> <li>• Integrated 8-bit scene control and linking of each output into up to 8 scenes</li> <li>• Modular installation device for mounting on TH35 EN 60715 mounting rail</li> <li>• Max. module width 3 MW (1 MW = 18 mm)</li> </ul> <p>Versions</p> |
| <p><b>N 562/11</b><br/><b>N 512/11</b><br/><b>N 513/11</b></p>                    | <ul style="list-style-type: none"> <li>• Interface for connecting a switching actuator submodule and software for controlling up to 4 switching actuator submodules 3 x 10 AX, 3 x 16 AX or 3 x 20 AX in any combination</li> <li>• Bus-powered device electronics and electronics of the connected switching actuator submodules via the bus voltage</li> <li>• Button for toggling between bus mode and direct mode and for selecting the device to be switched (main module or submodule 1...4)</li> <li>• Status object for reporting direct mode</li> </ul> <ul style="list-style-type: none"> <li>• Yellow LED to indicate direct mode activated</li> <li>• 1 green LED each to indicate the selected device</li> <li>• 1 pushbutton each per output of the selected device for switching via a UM function in direct mode, functional on application of the bus voltage, even if the bus communication has failed or is not yet in operation</li> <li>• 1 red LED to indicate the switching state per output of the selected device</li> <li>• Integrated bus coupling unit</li> <li>• Bus connection via bus terminal</li> </ul>   |
| <p><b>N 562/21</b><br/><b>N 512/21</b><br/><b>N 513/21</b></p>                    | <ul style="list-style-type: none"> <li>• Interface and corresponding bridging plug for connecting a switching actuator main module or a switching actuator submodule</li> <li>• Interface for connecting a further switching actuator submodule</li> <li>• Electronics powered via the bus connection of the switching actuator main module</li> </ul>   |

## Selection and ordering data (Dated 03/2010)

| Type  | Version         | DT   | Order No. | PU                    | PS*/<br>P. unit | PG | Weight<br>per PU<br>approx. |
|---|-----------------|--|-----------|-----------------------|-----------------|----|-----------------------------|
|   |                 |  |           | Unit(s)               | Unit(s)         |    | kg                          |
| <br>5WG1 562-1AB11<br>5WG1 512-1AB11<br>5WG1 513-1AB11 | <b>N 562/11</b> | <b>N 562/11 switching actuators, main modules</b><br>3 x 230/400 V AC, 10 AX, C-load, load check | B         | <b>5WG1 562-1AB11</b> | 1               | 1  | 030 0.240                   |
|   | <b>N 512/11</b> | <b>N 512/11 switching actuators, main modules</b><br>3 x 230/400 V AC, 16 AX, C-load, load check | B         | <b>5WG1 512-1AB11</b> | 1               | 1  | 030 0.240                   |
|   | <b>N 513/11</b> | <b>N 513/11 switching actuators, main modules</b><br>3 x 230/400 V AC, 20 AX, C-load, load check | B         | <b>5WG1 513-1AB11</b> | 1               | 1  | 030 0.240                   |
|   | Accessories     |  |           |                       |                 |    |                             |
| <br>5WG1 562-1AB21<br>5WG1 512-1AB21<br>5WG1 513-1AB21 | <b>N 562/21</b> | <b>N 562/21 switching actuators, submodules</b><br>3 x 230/400 V AC, 10 AX, C-load, load check   | B         | <b>5WG1 562-1AB21</b> | 1               | 1  | 030 0.225                   |
|   | <b>N 512/21</b> | <b>N 512/21 switching actuators, submodules</b><br>3 x 230/400 V AC, 16 AX, C-load, load check   | B         | <b>5WG1 512-1AB21</b> | 1               | 1  | 030 0.225                   |
|   | <b>N 513/21</b> | <b>N 513/21 switching actuators, submodules</b><br>3 x 230/400 V AC, 20 AX, C-load, load check   | B         | <b>5WG1 513-1AB21</b> | 1               | 1  | 030 0.225                   |

\* You can order this quantity or a multiple thereof.

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