

PUSH-BUTTON AS A HOUSE AND BUILDING SYSTEMS ENGINEERING CONTROL
ELEMENT

Description

5 The invention relates to a push-button as a house and building systems engineering control element, particularly for KNX applications (standard for house and building systems engineering administered by the Konnex-Association).

Document DE 10 2006 024 994 B3 discloses an electronic
10 switch with an actuation rocker fixed on a base and mobile with respect to said base, the actuation rocker stressing microswitches assembled in the base through actuation pins. A spring shaft support of the actuation rocker is provided, in which a shaft end of the actuation rocker engages a shaft
15 housing of a primary spring element fixed to the base, the corner areas of the actuation rocker pressing the secondary spring elements away from the base. Rocker retention elements form a stop with respect to the maximum mobility of the actuation rocker with respect to the base. The base can be
20 connected with a base of an apparatus containing a bus coupler, which supplies the signals generated by the microswitches to a bus system. The base can alternatively be connected with a base of an apparatus containing a relay which can be activated through the microswitches.

25 KNX control devices are usually designed such that they have a binary input as a UP insert (the part to be inserted in the wall) to which a control element is coupled. A control element of this type usually consists of a base on which a circuit board with microswitches is fixed, an elastically assembled rocker
30 being fixed, for example retained, in the base. In a concept of this type, one control element must be manufactured and provided for each conventional installation device program for sockets/switches/push-buttons/dimmers and for each color of this program.

35 The invention is based on the objective of providing an

optimized push-button as a house and building systems engineering control element.

This objective is solved according to the invention by means of a push-button as a house and building systems engineering control element,

- with a part to be inserted in the wall, in which a circuit board with microswitches assembled thereon is also housed in addition to the binary input,
- the part to be inserted in the wall having a rocker switch support to house a rocker switch,
- the rocker switch having switch arms actuating the microswitches through separate switch pushers,
- a rocker of a conventional installation device program for sockets/switches/push-buttons/dimmers being used as a control element.

A preferred embodiment is characterized in that the rocker switch support has a shaft housing provided with a straight support surface to house a shaft provided with a straight support surface, at least one compression spring elastically stressing the shaft, such that the straight support surfaces are pressed against one another. Therefore, after actuating the control element, it always returns to a neutral rest position (middle position, zero position parallel to the support ring).

Switch pushers conveniently have ribs forming a stop towards the circuit board. The microswitches are therefore prevented from becoming damaged/destroyed because of too high of a pressure.

Damping elements are optionally provided to demarcate the stop of the control element. This provides an improved "switch feeling". These damping elements are preferably fixed to a securing element engaging housings of a support ring of part to be inserted in the wall through retaining tabs and thereby blocking a cover frame of a conventional installation device program for sockets/switches/push-buttons/dimmers in the part to be inserted in the wall.

The advantages that can be achieved with the invention are particularly based on the fact that a conventional rocker of a conventional installation device program for sockets/switches/push-buttons/dimmers, as well as a conventional
5 cover frame of this conventional installation device program for sockets/switches/push-buttons/dimmers, can be used as a control element (single control element or double control element). Conventional installation device programs are understood in this respect as programs which, as they are marketed by a number of
10 manufacturers of installation devices, contain different rocker switch inserts, rocker push-button inserts, dimmer inserts, socket inserts as well as rockers and cover frames 1 time / 2 times / 3 times / 4 times in a determined design and determined colors.

15 Suitable configurations of the invention are characterized in the dependent claims.

The invention is explained below by means of the embodiments depicted in the drawings, in which:

Figure 1 shows a section through a part to be inserted in
20 the wall of a push-button,

Figure 2 shows a side view of a push-button,

Figure 3 shows a side view of a part to be inserted in the wall,

Figure 4 shows a perspective view of the back side of a
25 push-button,

Figure 5 shows an "exploded view" of a push-button,

Figure 6 shows a securing element of a push-button,

Figure 7 shows a view of the front side of a part to be inserted in the wall,

30 Figure 8 shows details of a securing element,

Figure 9 shows a perspective view of the front side of a part to be inserted in the wall,

Figure 10 shows an "exploded view" of a part to be inserted in the wall of a double push-button,

35 Figure 11 shows an "exploded view" of a part to be inserted

in the wall of a quadruple push-button.

Figure 1 depicts a section through a part to be inserted in the wall of a push-button. The part to be inserted in the wall forming a binary input consists of an upper casing part 9, a lower casing part 26 and a support ring 3. A rocker switch 12 (to form a double push-button) or a rocker switch 13 (to form a quadruple push-button) is fixed to the upper casing part 3 which, through its switch arms 16 or 17 and interconnected switch pushers 18 or 19, can act on microswitches 30 or 31 which are assembled on a circuit board 27 (in the case of a double push-button) or on a circuit board 28 (in the case of a quadruple push-button). At least one compression spring 23 contributes to returning the rocker switch, after having performed the actuation, again to a stable and neutral middle position. The switch pushers 18, 19 are provided with a rib 22 defining an end stop, i.e., the switch pushers 18, 19 press with the actuation of the rocker switch 12 or 13 against the circuit board 27 or 28, whereby safely avoiding stressing that is to intense and, accordingly, an overload of a microswitch. The switch pushers prevent transmitting the relative movement between rocker switch (which performs a circular movement) on one hand and microswitch on the other. The switch safety is thereby increased.

Figure 2 depicts a side view of a push-button, from which it is deduced that the part to be inserted in the wall 2 of the push-button 1 is completed by means of a cover frame 7 and a control element 6 or rocker, made as a single control element or a double control element. Both the control element 6 or rocker and the cover frame 7 can advantageously be taken from a conventional installation device program for sockets/switches/push-buttons/dimmers.

Figure 3 depicts a side view of a part to be inserted in the wall which, on one hand, shows retaining elements 5 between the support ring 3 and the upper casing part 9, as well as retaining elements 29 between the upper casing part 9 and the lower casing

part 26, and on the other hand it shows the support of the rocker switch 12 or 13 in a rocker switch support 10 of the upper casing part 9. For this rocker switch support, a shaft 14 of the rocker switch 12 or 13 engages a shaft housing 8 of the rocker switch support 10. A straight support surface 11 in the shaft housing 8 of the rocker switch support 10 or "shaft support" in the surface oriented towards the control element 6 of the shaft housing 8 is important. A straight support surface 15 of the shaft 14 is accordingly configured. Due to the spring back force of the at least one compression spring 23, the straight support surface 15 of the shaft 14 and the straight support surface 11 of the shaft housing 8 or shaft support are pressed against one another. A parallel orientation of the rocker switch 12 or 13 with respect to the support ring 3 of the part to be inserted in the wall 2 is thereby automatically obtained in the rest state.

Figure 4 depicts a perspective view of the back side of a push-button. In the bottom area of the part to be inserted in the wall 2 of the push-button 1, a terminal compartment 25 is provided for a KNX bushing. The figure further shows two separator housings 34 for the optional equipment with spring separators for fixing in a commercially available UP junction box, the support ring 3 and the cover frame 7.

Figure 5 depicts an "exploded view" of a push-button showing its essential constructive components, such as part to be inserted in the wall 2, cover frame 7, securing element 35 and control element 6 or rocker. The securing element 35 serves to lock the cover frame 7 in the part to be inserted in the wall 2. An optional function of the securing element 35 is based on demarcating the stop of the control element 6 with damping. To that end, the securing element 35 is provided with damping elements 38.

Figure 6 depicts in detail a securing element of a push-button. The securing element 35 having a square-base frame 36 has four symmetrically arranged elastic retaining tabs 40 for

inserting the support ring 3 in corresponding housings 4 (see Figure 7). On the main surface opposite the retaining tabs 40, the securing element 35 has damping elements 38 in the corner area of its base frame 36 which assure a damped stop for the control element 6 in the event that it is actuated (see Figure 5 also).

Figure 7 depicts a view of the front side of a part to be inserted in the wall. The part to be inserted in the wall 2 has an interface 42 for connecting a programming device, a programming push-button 43 to start the operation and an orientation light 44, preferably an LED. The housings 4 of the support ring 3 mentioned in Figure 6 are further shown.

Figure 8 depicts details of a securing element 35. A commercially available securing element used for electromechanical switches of a conventional installation device program for sockets/switches/push-buttons/dimmers is advantageously modified, retaining two damping element supports 37 on the base frame 36. Each damping element support 37 has on one of its main surfaces two damping elements 38 in each case and on its opposite main surface retaining means 39, preferably retaining projections, for being retained with the main surface of the base frame 36, which is not provided with the retaining tabs 40.

Figure 9 depicts a perspective view of the front side of a part to be inserted in the wall 2, in which the support of the rocker switch 12 or 13 with its shaft 14 engaging the shaft housings 8 of the rocker switch support 10 can particularly be seen. The switch arms 17 of the rocker switch are further shown.

Figure 10 depicts an "exploded view" of a part to be inserted in the wall of a double push-button. The following main components can be seen:

- a lower casing part 26 including a circuit board 27 with two microswitches 30, 33 fixed thereon,
- two switch pushers 18, 21,
- a support ring 3,

- an upper casing part 9 including a rocker switch support 10,
- two compression springs 23, 24,
- a rocker switch 12

5 Retaining element 29 between the upper casing part 9 and the lower casing part 26 can further be seen.

Figure 11 depicts an "exploded view" of a part to be inserted in the wall of a quadruple push-button. The following main components can be seen:

- 10 • a lower casing part 26 including a circuit board 28 with four microswitches 30, 31, 32, 33 fixed thereon,
- four switch pushers 18, 19, 20, 21,
- a support ring 3,
- an upper casing part 9 including a rocker switch support
- 15 10,
- two compression springs 23, 24,
- a rocker switch 13

Retaining element 29 between the upper casing part 9 and the lower casing part 26 can further be seen.

List of reference numbers

- | | |
|-------|--|
| 1 | push-button |
| 2 | part to be inserted in the wall, made up of upper casing part, lower casing part, support ring |
| 5 3 | support ring |
| 4 | housing for retaining tab of the securing element |
| 5 | retaining element with the upper casing part |
| 6 | control element (simple control element or double control element) or rocker of a conventional installation device |
| 10 | program |
| 7 | cover frame of a conventional installation device program |
| 8 | shaft housing in the rocker switch support |
| 9 | upper casing part, identical for the double and quadruple push-button |
| 15 10 | rocker switch support |
| 11 | straight support surface in the rocker switch support or shaft support |
| 12 | rocker switch for double push-button |
| 13 | rocker switch for quadruple push-button |
| 20 14 | shaft |
| 15 | straight support surface of the shaft |
| 16 | switch arm |
| 17 | switch arm |
| 18 | switch pusher |
| 25 19 | switch pusher |
| 20 | switch pusher |
| 21 | switch pusher |
| 22 | rib (stop with respect to the circuit board) |
| 23 | compression spring |
| 30 24 | compression spring |
| 25 | terminal compartment for a KNX bushing |
| 26 | lower casing part |
| 27 | circuit board for double push-button |
| 28 | circuit board for quadruple push-button |
| 35 29 | retaining element between the upper casing part and the |

lower casing part

30 microswitch

31 microswitch

32 microswitch

5 33 microswitch

34 separator housing

35 securing element

36 base frame

37 damping element support

10 38 damping elements

39 retaining projections

40 retaining tabs

41 -

42 interface for programming device

15 43 programming push-button to start the operation

44 orientation light

CLAIMS

1. A push-button (1) as a house and building systems engineering control element (6),
 - with a part to be inserted in the wall (2) in which a circuit board (27, 28) with microswitches (30, 31, 32, 33) assembled thereon is also housed in addition to a binary input, and the part to be inserted in the wall (2) has a terminal compartment (25) for a KNX bushing,
 - the part to be inserted in the wall (2) forming the binary input consists of an upper casing part (9), a lower casing part (26) and a support ring (3),
 - the part to be inserted in the wall (2) having a rocker switch (12, 13) and a rocker switch support (10) to house the rocker switch (12, 13),
 - the rocker switch (12, 13) having switch arms (16, 17) actuating the microswitches (30, 31, 32, 33) through separate switch pushers (18, 19, 20, 21),
 - switch pushers (18, 19, 20, 21) have ribs (22) forming a stop towards the circuit board (27, 28),
 - a rocker of a conventional installation device program for sockets/switches/dimmers being used as a control element (6) to switch of the rocker switch (12, 13).
2. The push-button (1) according to claim 1, characterized in that the rocker switch support (10) has a shaft housing (8) provided with a straight support surface (11) to house a shaft (14) provided with a straight support surface (15), at least one compression spring (23, 24) elastically stressing the shaft (14), such that the straight support surfaces (11, 15) are pressed against one another.
3. The push-button (1) according to claim 1, characterized in that to demarcate the stop of the control element (6) damping elements (38) are provided.
4. The push-button (1) according to claim 3, characterized in that the damping elements (38) are fixed to a securing element (35) engaging in housings (4) of a support ring (3) of the part to be inserted in the wall through retaining tabs (40) and thereby locking the cover frame (7) of a conventional installation device program for sockets/switches/dimmers in the part to be inserted in the wall (2).
5. The push-button (1) according to one of the preceding claims, characterized in that the part to be inserted in the wall (2) has an interface (42) for a programming device.
6. The push-button (1) according to one of the preceding claims, characterized in that the part to be inserted in the wall (2) has a programming push-button (43) to start the operation.
7. The push-button (1) according to one of the preceding claims, characterized in that the upper casing part (9) and the lower casing part (26) being attached to one another through a retaining element (29).