blumotix
TOUCH YOUR WORLD

Technical Manual
24-channel Multifunction Actuator
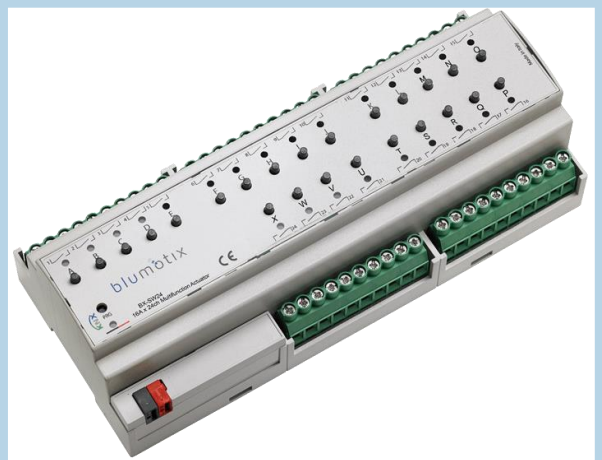
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1. General

BX-SW24 is a 24-channel multifunctional relay actuator.

Each channel can deliver a maximum current of 16A at 230VAC.
The device can be programmed with ETS to perform various functions:
- o control lights and utilities in general
- o raise and lower roller shutters and blinds

The device can be used in both residential and industrial environments.

2. Product features

2.1 Technical data

The actuator is powered by Konnex bus, through a state-of-the-art TPUART, whose excellent performance in terms of current output allows high switching speeds to be achieved.
The IP20 enclosure is designed for installation on a 35mm DIN rail according to DIN EN 60715, installation width 12 x 18mm modules, equal to 213 mm.
It is equipped with 16A bistable relays with contacts connected directly to the terminals, without phase sharing.
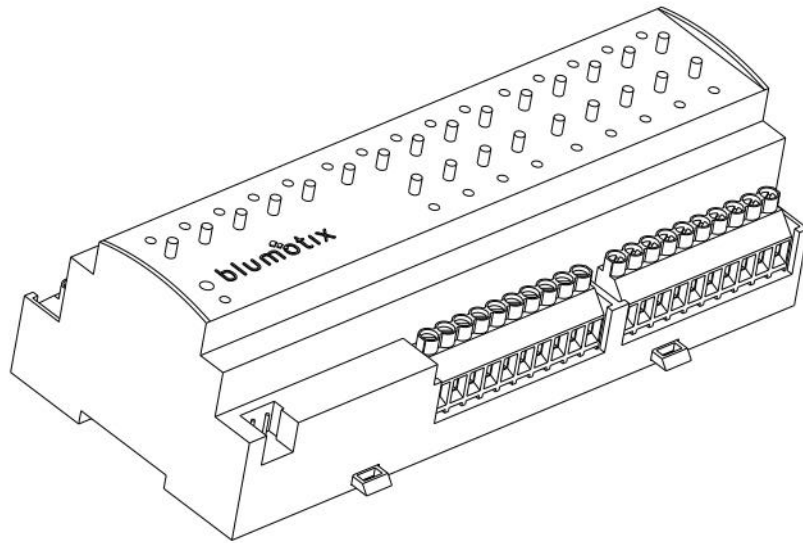The screw terminals can accommodate cable cross-sections up to 5 mm2.

The relays used can withstand an inrush current of up to 320A in the first 2ms, making them particularly suitable for driving inductive loads such as fluorescent or neon lamps.

Under certain extreme conditions of use, e.g. when the module is connected to highly inductive loads (remote control switches, solenoid valves), malfunctions may occur. In such cases, it is advisable to connect snubbers in parallel with the load, which have the ability to block electromagnetic interference emitted when the power supply to these loads is disconnected.
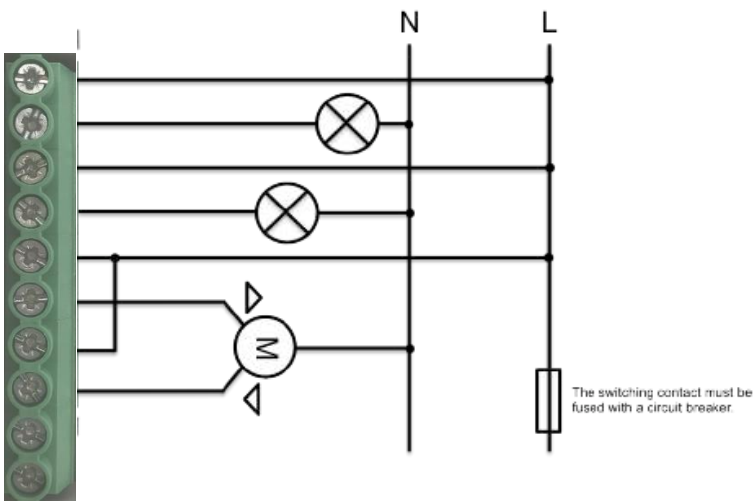
The relays can be controlled manually using the keypad on the front panel, complete with LEDs indicating contact status. When the ETS application is loaded, the buttons have activation modes that depend on the preset function of the relays and on an enabling parameter on the setup pages. Their operation will be detailed depending on the function chosen.
If, however, the ETS application has not been loaded or if the relay or pair function is disabled when the application is loaded, the corresponding relay is activated when a key is pressed and returns to its resting state when released. Only one key can be pressed at a time per pair; if one is already pressed, the other will have no effect. This behaviour is to safeguard the shutter motors, avoiding the possibility of both motors running simultaneously.

Number of outputs	24
Maximum switchable load	16A
Max. inrush current	170A/2ms
Mechanical life expectancy	3,000,000 switches
Power supply	Voltage via KNX Bus 21-32VDC (consumption < 10 mA)
Operating conditions	[0-45]°C
Degree of protection	IP20 Ref EN60529
Container	12 modules 35mm DIN rail IP20 protection
Maximum number of pairings	xxx
Maximum limit of group addresses	xxxx

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2.2 Connection diagram

The switching contact must be fused with a circuit breaker.

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3. ETS library

The ETS Library has a series of parameters that allow the operation of each output of our actuator to be characterised.
Parameters are conveniently divided into dedicated pages to set up each channel, according to the function chosen for each of them.

3.1 Channels AB CD EF GH IJ KL MN OP QR ST UV WX

This window allows you to configure the actuator outputs to perform the desired functions in your project, setting up channels to perform functions such as opening and closing windows and blinds and switching loads on or off. Enabling a complex function results in two neighbouring relays being reserved for it.
The relays are listed in pairs (AB, CD, EF, GH, IJ, KL, MN, OP, QR, ST, UV, WX) to highlight the possibility of making them work in a coordinated and interlocked mode, if they are intended to control the movement of a shutter or blind.

1.1.1 BX-SW24 > Output setup		
General	A-B Outputs	Not active
Output setup	C-D Outputs	Not active
	E-F Outputs	Not active
	G-H Outputs	Not active
	I-J Outputs	Not active
	K-L Outputs	Not active
	M-N Outputs	Not active
	O-P Outputs	Not active
	Q-R Outputs	Not active
	S-T Outputs	Not active
	U-V Outputs	Not active
	W-X Outputs	Not active

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Each pair of relays can be assigned one of the following functions

- Disabled
- Switching, staircase light
- Roller shutters, blinds

"Disabled" excludes the relay pair from any interaction with the outside.
"Switching, staircase light" sets up each relay of the pair for NON-interlocked operation, and allows each of the two relays of the pair to be used for separate INDEPENDENT functions, with further specialisation of the choice made in a subsequent menu. In this case, two further items appear on the left, each dedicated to a relay, as shown in the figure.


"Roller shutters, blinds" configures the operation of the pair of relays in interlocked and coordinated mode, highlighted by the appearance on the left of a single item dedicated to the pair, as shown in the following figure.

3.2 Independent outputs

When selecting a single output on the left, the single relay output setup page will appear, as shown in the following figure.
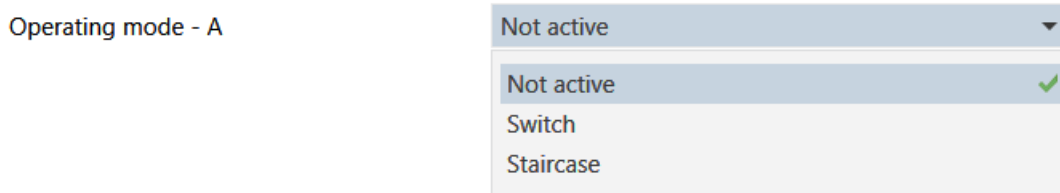
Operating mode - A

Not active	▼
Not active	✔
Switch	
Staircase	

Each pair of relays can be assigned one of the following functions:

- Disabled
- Switching
- Staircase Lighting

"Disabled" excludes the single relay from any interaction with the outside.
"Switching" sets the relay to control general loads.
"Stair lighting" prepares the relay to manage the timing of staircase lighting in blocks of flats.
If **"Switching"** or **"Staircase lighting"** is selected, the setup parameters for the relevant function are shown below.

3.2.1 Output set up for switching

General	Operating mode - A	Switch ▼
Output setup	Enable front button	○ Disable ◉ Enable
Output - A	Contact mode	◉ Normally open ○ Normally close
Output - B	Behavior after bus power up	Off ▼
	Enable lock	◉ NO ○ YES
	Enable ON delay	○ NO ◉ YES
	ON delay (s)	30
	Enable OFF delay	○ NO ◉ YES
	OFF delay (s)	30
	Enable scenes	◉ NO ○ YES
	Central function	◉ NO ○ YES

As shown in the figure above, the parameters on the switching output setup page are as follows:

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"Enable front button" – if "Enabled" is selected (default when the library is not yet configured), it allows you to use the front button to switch the corresponding relay. When the button is pressed and released, the relay switches state and remains in that state until the next time the button is pressed and released, after which it switches state again.

"Contact mode" – it allows you to choose which state the relay should have in the resting position, i.e. when it is not enabled in the device logic.

"Behaviour when switched on" – see figure below. When the device is switched on, if the parameter is 'Off', the relay is in the resting position. If the parameter is 'On', the relay is active.

"Previous state" – It recalls the last state of the relay before switching off the device.

Behavior after bus power up	Off ▼
Enable lock	Off ✓
	On
Enable ON delay	No change

"Blocking enabled" – if enabled ("YES"), it activates the communication object that enables the relay to be locked, i.e. to freeze its state.
Normal relay operation can be restored via the same communication object. If the parameter is disabled ("NO"), this communication object is deactivated.

"Actuation delay ON" – see figure below. If enabled, it activates the delay selection menu, "Delay ON(s)", with which it is possible to set an actuation delay from 1 to 255 seconds, following a command that activates the relay.

Enable ON delay	○ NO ◉ YES
ON delay (s)	30

"Actuation delay OFF" – see figure below. If enabled, it activates the delay selection menu, "Delay OFF(s)", with which it is possible to set a disabling delay from 1 to 255 seconds, following a command that puts the relay in the resting state.

Enable OFF delay	○ NO ◉ YES
OFF delay (s)	30

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"Scenes enabled" – if enabled, it activates the specific sub-menu on the left, which calls up the scene setup page. It also activates the specific communication object as shown in Tab. **3.6.1**.
A scene consists of one or more actions that are implemented on receipt of the associated identification number **"Scene ID"**, via the corresponding communication object specific to each output. The value imposed by these actions is taken from the **"Behaviour"** on the ETS page of scenes, configured or possibly stored by a current value of the device.

General	Set OFF before scene	◉ NO ○ YES
Output setup	SCENE - 1	
− Output - A	ID scene	1 ▼
	Behavior	◉ Off ○ On
Scenes	Learning scene	◉ NO ○ YES

8 different actions are available, which can be called up from the scene number set in "**Scene ID**" from 1 to 64.

"OFF before scene", – unique for all scenes, if enabled, it disables the output before enabling a scene to avoid that two relays with opposite functions would be simultaneously enabled.

"Manual configuration" – It enables the function of storing the relay's own current value in **"Behaviour"**. Storage takes place after receiving a scene value with high bit = 1 on the scene communication object.

"General functions" – It enables action on the single relay following a command sent to the communication object always present and dedicated to act on all relays set up for simultaneous switching. See paragraph **3.5**.

3.2.2 Output set up for staircase lighting

As shown in the figure above, the parameters on the switching output setup page are as follows:

"Enable front button" – if "Enabled" is selected (default when the library is not yet configured), it allows you to use the front button to switch the corresponding relay. When the button is pressed and released, the relay switches state and remains in that state until the next time the button is pressed and released, after which it switches state again.

"Contact mode" – it allows you to choose which state the relay should have in the resting position, i.e. when it is not enabled in the device logic.

"Scenes enabled" – See the analogous function in **"3.3.1 Output set up for switching"**.

"General functions" – It enables action on the single relay following a command sent to the communication object always present and dedicated to act on all relays set up for simultaneous staircase lighting. See paragraph **3.5**.

"Staircase lighting time (sec)" – It contains the relay activation time, following the staircase light command telegram, with a value between 1 and 30000 seconds.

"Reset staircase lights" – If enabled (YES), when the relay is active with the seconds counting, following an activation telegram, it restarts the count from the "Staircase lighting time" value.

"Staircase lighting start command" – It contains the value of the relay staircase lighting command telegram.

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3.3 Interdependent outputs. Roller shutters/blinds

In this case, the first relay of the pair intended for this function is to connect the phase to the motor winding to raise the shutter, while the second is to lower it.

Selecting a pair of outputs on the left, the shutters/blinds setup page will appear, as shown in the following figure.

The parameters on the "output for switching" setup page are as follows:

"Enable front button" – if **"Enabled"** is selected (default when the library is not yet configured), it allows you to use the front button to switch the corresponding relay. When the button is pressed, the relay is activated; when released, it returns to its resting state. Only one key can be pressed at a time per pair; if one is already pressed, the other will have no effect. This behaviour is to safeguard the shutter motors, avoiding the possibility of both running simultaneously.

"Single or double travel time" – It provides the possibility of differentiating the up and down travel time (measured during installation) of the roller shutter to the end of its travel. **"Single"** – it is used to set a single up and down time from 1 to 2000 seconds. **"Double"** – two fields appear, as shown in the figure below, to set different up and down times.

This parameter enables the calculation of the position in percentage and the positioning of the shutter by means of a special communication object as per Table 3.6.2.

When the shutter/blind is raised, the value will be 0%, and when it is lowered, the value will be 100%.

Single or double up/down time	○ Single ◉ Double
Pull up time	30
Pulll down time	30

"Extra time" – Additional time to the one normally used to move the roller shutter/blind to compensate for any delays due to sliding problems. It should be noted that this time is not used in the calculation of the roller shutter/blind position from the travel time. Its value can be from 0 to 300 seconds.

"Reverse travel time" – It is the pause time set between two consecutive movements in opposite directions, to safeguard the motors. It can have a value between 100ms and 5 seconds.

"Behaviour when switched on" – It determines the position of the shutter when the device is switched on, offering the possibility of moving it all the way up (open), or all the way down (closed, also with anti-intrusion functions), or of not performing any action on it.

"Movement indication" – if enabled with **"YES"**, it provides two communication objects that signal when the shutter/blind is going up or down.

"End-of-stroke indication" – if enabled with **"YES"**, it provides two communication objects that signal when the roller shutter reaches the end of its down or up travel.

"Blinds management" – if "**Blinds**" is selected, the function of the Stop/Step communication object changes, which can be identified as in Tab. 3.6.2. Other times to be set are also displayed, as shown in the figure below.

Blinds control	○ Shutter ◉ Blinds
Open/close time (x 100ms)	50
Step time	300 ms

Blinds rolling time (x 100 ms) – Total time for blinds rolling with the shutter stopped, expressed in multiples of 100ms (measured during installation).

"Single step time" – Blinds rolling time (with the shutter at standstill) after receiving a command on the communication object as per **Tab. 3.6.2.**
When the shutter is in motion, the Stop/Step command always blocks the movement, regardless of the value (1 or 0). With the shutter at standstill, if **"Blinds management"** is enabled, the command opens the blind (bit at 0) or closes the blind (bit at 1) over the **"Single step time"**

"Enable scenes" – Enables the scene function.
If enabled, it activates the specific sub-menu on the left, which calls up the scene setup page. It also activates the specific communication object as shown in **Tab. 3.6.1.**
A scene consists of one or more actions that are implemented on receipt of the associated identification number **"Scene ID"**, via the corresponding communication object specific to each output. The values set with these actions are taken from the **"Roller shutter position"** parameter and the **"Blinds position"** value from the scenes ETS page, as set up or possibly stored from the current values of the device.

General	SCENE - 1	
	ID scene	1 ▾
Output setup	Shutter position	0 ▾
— Blinds, shutter C-D	Learning scene	◉ NO ◯ YES
Scenes	Slat position	0 ▾

8 different actions are available, which can be called up from the scene number set in **"Scene ID"** from 1 to 64.

"OFF before scene", – unique for all scenes, if enabled, it disables the output before enabling a scene to avoid that two relays with opposite functions would be simultaneously enabled.

"Manual configuration" – It enables the function of storing the relay's own current value in **"Behaviour"**. Storage takes place after receiving a scene value with high bit = 1 on the scene communication object.

"General functions" – It enables action on a single pair following a command sent to the communication objects always present and dedicated to acting on all pairs of relays configured for the shutter/blind function simultaneously. See paragraph **3.5.**

3.4 Communication objects of General Functions

The following communication objects are always present in the ETS configuration, and a command to them acts simultaneously on all enabled outputs.

General function	Number	Data point	Type
On/Off command	121	1,001	1–bit, switch
Staircase Lighting command	122	1,010	1–bit, start/stop
Roller shutter – Movement (up=0 down =1)	123	1,008	1–bit, up/down
Roller shutter – Move into position (%)	124	5,001	8–bits, percentage (0..100%)
Roller shutter – Stop/Step (up=0 down=1)	125	1,010	1–bit, start/stop
Blind – Move into position (%)	126	5,001	8–bits, percentage (0..100%)

3.5 Communication objects of single outputs

3.5.1 Outputs A to X for Switching/Staircase lighting

Data point	1,001	1,001	1,010	18,001	1,003
Type	1–bit, switch	1–bit, switch	1–bit, start/stop	1 byte, scene control	1 bit, enable
Output	Switching	Output state	Staircase Lighting	Implement Scene switching	Block
A	1	25	49	73	97
B	2	26	50	74	98
C	3	27	51	75	99
D	4	28	52	76	100
E	5	29	53	77	101
F	6	30	54	78	102
G	7	31	44	79	103
H	8	32	56	80	104
I	9	33	57	81	105
J	10	34	58	82	106
K	11	35	59	83	107
L	12	36	60	84	108
M	13	37	61	85	109
N	14	38	62	86	110
O	15	39	63	87	111
P	16	40	64	88	112
Q	17	41	65	89	113
R	18	42	66	90	114
S	19	43	67	91	115
T	20	44	68	92	116
U	21	45	68	93	117
V	22	46	70	94	118
W	23	47	71	95	119
X	24	48	72	96	120

3.5.2 Relay pair outputs AB to WX for shutters/blinds

Data point	1,008	1,002	5,001	5,001	1,010	5,001	5,001	1,002	1,002	1,002	1,002	18,001
Type	1-bit, up/down	1 bit, boolean	8-bits, percentage (0..100%)	8-bits, percentage (0..100%)	1-bit, start/stop	8-bits, percentage (0..100%)	8-bits, percentage (0..100%)	1 bit, boolean	1 bit, boolean	1 bit, boolean	1 bit, boolean	1 byte, scene control
Output	Move up/down	State – Movement in progress	Move Roller shutter %	State Roller shutter position %	Stop/Step	Move blinds %	State Blinds position %	State Movement up	State Movement down	State End limit up	State End limit down	Enable Scene Roller shutters
AB	127	128	129	130	131	132	133	134	135	135	137	138
CD	140	141	142	143	144	145	146	147	148	149	150	151
EF	153	154	155	156	157	158	159	160	161	162	163	164
GH	166	167	168	169	170	171	172	173	174	175	176	177
IJ	179	189	181	182	183	184	185	186	187	188	189	190
KL	192	193	194	195	196	197	198	199	200	201	202	203
MN	205	206	207	208	209	210	211	212	213	214	215	216
OP	218	219	220	221	222	223	224	225	226	227	228	229
QR	231	232	233	234	235	236	237	238	239	240	241	242
ST	244	245	246	247	248	249	250	251	252	253	254	255
UV	257	258	259	260	261	262	263	264	265	266	267	268
WX	270	271	272	273	274	275	276	277	278	279	280	281