20 A4 Binary 906401

Use of the application program

Product family: Output
Product type: Binary output, 4-fold
Manufacturer: Siemens

Name: Load switch N 510/03
Order no.:   5WG1 510-1AB03

Name: Load switch N 510/04
Order no.:   5WG1 510-1AB04

Functional description

The application software supports four independent switching channels. There are four receiving objects per channel (On/Off, OR function, AND function, positive drive) and one status object. The status object contains the current status of the output. The object can send automatically after a change or only react on request. The On/Off, OR, AND and status objects are 1 bit objects i.e. On/Off (see EIS 1). The positive drive object is a 2 bit object (see EIS 8). Two operating modes can be set per channel: normal mode or time switch.
If the switching object receives an On/Off signal, it passes through the time function first. This signal is then linked with the OR object. The resulting signal is linked with the AND object and finally with the positive drive object. The output of the positive drive directly triggers the switching relay. It can be set whether the status is automatically sent after a change in the relay. The individual logic operations can be disabled.

Switching with On/Off delay (normal mode)

If an On delay has been assigned, the On signal is routed with a delay (to the OR function). If a further On signal is received during the On delay, the period is restarted. In the same way, a specified Off delay causes the Off signal to be routed with a delay. The Off delay is restarted if a further Off signal is received during this period. No changes occur however if an Off signal is received during the On delay or an On signal is received during the Off delay as the delay that is currently active is interrupted.
If no time delays have been assigned, then the On/Off signal is routed immediately.

Switching with On delay/overshoot time (time switch)

If an On delay has been assigned, the On signal is routed with a delay. If a further On signal is received during the On delay, the period is restarted. Once the On delay has elapsed, the On signal is routed and the overshoot time is started simultaneously. The Off signal is routed once the overshoot time has elapsed. If a premature Off signal is received during the overshoot time, the period is interrupted and the signal is routed immediately (=switching off prematurely).

OR function

The OR object input and the output of the time function form the two inputs of the OR function. If the OR function is enabled, both the inputs are linked with an OR logic operation and are available at the internal output of the OR function. If the OR function is disabled, the output of the time function is available directly at the internal output of the OR function.

AND function

The AND object input and the output of the OR function form the two inputs of the AND function. If the AND function is enabled, the two inputs are linked with an AND logic operation and are available at the internal output of the AND function. If the AND function is disabled, the output of the OR function is available directly at the internal output of the AND function.

Positive drive

The input of the positive drive object and the output of the AND function form the two inputs of the positive drive. If the positive drive is enabled, the two inputs are linked as follows and are available at the internal output of the positive drive. The positive drive object is a 2 bit object. If bit 1 has the value 0, then the positive drive is regarded as "passive" and the output of the AND function is available directly at the output of the positive drive. This value is simultaneously loaded into the bit 0 of the positive drive object so that the status is <u>always</u> contained in bit 0 of this object. If bit 1 of the positive drive object has the value 1, the positive drive is regarded as "active" and the output of the AND logic operation has no function. In this case, bit 0 of the positive drive object determines the value of the internal output of the positive drive. If the positive drive is disabled, the output of the AND function is available directly at the internal output of the positive drive.

Bit 1	Bit 0	Function
0	0	Disabled positive drive
0	1	Disabled positive drive
1	0	Switch off with positive drive
1	1	Switch on with positive drive

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Status object

After each switching operation, the status object is updated accordingly and automatically sent. It is possible to disable the automatic sending of the object via parameters so that the relay state is only achieved by querying this object specifically.

Bus voltage failure / bus voltage recovery

The program always stores all the object values on bus voltage failure. It is also possible to assign a switching operation to the relay. On bus voltage recovery, these object values are read back first of all. They are then modified according to the parameters selected. The relay state is then produced from the object values and the corresponding "system configuration" (logic operations....).

Block diagram of a channel
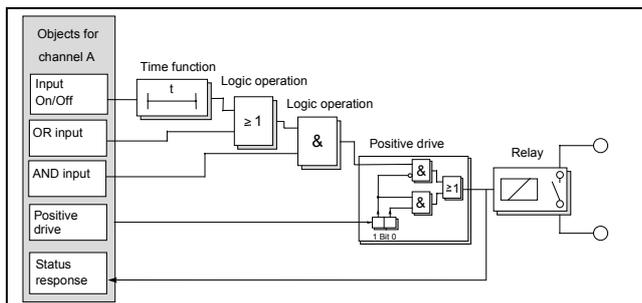
Maximum number of group addresses: 55
Maximum number of associations: 56

Note

The view of the objects can be arranged individually i.e. this view can vary.

Communication objects

Obj	Object name	Function	Type	Flag
0	Switch, Channel A	On / Off	1 Bit	CW
1	Switch, Channel B	On / Off	1 Bit	CW
2	Switch, Channel C	On / Off	1 Bit	CW
3	Switch, Channel D	On / Off	1 Bit	CW
The switching telegrams that are relayed via the time function to relay channels A, B, C or D are received via the group addresses in these objects.				
4	Status, Channel A	On / Off	1 Bit	CRT
5	Status, Channel B	On / Off	1 Bit	CRT
6	Status, Channel C	On / Off	1 Bit	CRT
7	Status, Channel D	On / Off	1 Bit	CRT
The current switching states of the channels are stored in this object. The object value is dependent on the switching telegrams to the switching object as well as the status of the objects for logic operation and positive drive. Via the parameter "status transmitting" the behaviour of this status object can be set so that each change triggers off a transmission of the value. The switching state can be read out via the ETS program or a visualisation terminal.				

Generally, parameters

Parameters	Settings
Device, Ordernumber	**510/03 (5WG1 510-1AB03)**
	510/04 (5WG1 510-1AB04)
Via this parameter the selection of the product intended for configuration can be set. The two specified products differ from each other by the relay control. Note: If the wrong device is selected the behaviour of the relays is just the other way round, the operation mode of the relay for example is configured for closing and the device responds like a normally closed contact.	

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Normal mode: Parameters

Relay A_1

Relay C_2	Relay D_1	Relay D_2
Load Switch N510/03	**Relay A_1**	Relay A_2	Relay B_1	Relay B_2	Relay C_1

Channel A	enabled	▼
Operating mode	Normal mode	▼
Positive drive (priority 1)	no positive drive	▼
Logic operation AND (priority 2)	no logic operation	▼
OR function (Prio. 3)	no logic operation	▼
Relay mode	normally open contact	▼
On / Off delay	disabled	▼
Initialization of object values	adjustable	▼
Init value of switch object	logic 0 (Off)	▼
Init value of positive drive object	Positive drive Off	▼

Note:

The function and parameters of channels A to D are identical.

Parameters	Settings
Channel A	**enabled** disabled
The corresponding channel can be disabled (not used) or enabled via this parameter. If "disabled" is selected, the following parameters are no longer displayed.	
Operating mode	**Normal mode** Time switch
The function of the channel is set via this parameter. The parameter window "Relay" changes depending on the function that is selected here and the relevant parameters are displayed with default settings.	
Positive drive (priority 1)	**no positive drive** Positive drive
Using this parameter, the relay can be controlled via a positive drive object. The positive drive input and the output of the AND function form the two inputs of the positive drive. If the positive drive is enabled, the two inputs are linked and are available at the internal output of the positive drive.	
Logic operation AND (priority 2)	**no logic operation** AND function
This parameter defines whether a logic operation should be carried out with the AND function object at the output of the OR function.	
OR function (Prio. 3)	**no logic operation** OR function
This parameter defines whether a logic operation should be carried out with the OR function object at the output of the time function.	

Parameters	Settings
Relay mode	**normally open contact** normally closed contact

This parameter defines the behaviour of the relay contact.
"normally open contact":
       Off telegram = contact open,
       On telegram = contact closed.
"normally closed contact":
       Off telegram = contact closed,
       On telegram = contact open.	

On / Off delay	**enabled** disabled
The On/Off delay can be disabled (not used) or enabled via this parameter. If "disabled" is selected, the parameters that are used for setting the time delays are no longer displayed. If however time switch mode is selected, there is always a time delay.	
Factor for On delay (0-127)	**0**
Base for On delay	**Time base 130 ms** Time base 260 ms Time base 520 ms Time base 1 sec Time base 2.1 sec Time base 4.2 sec Time base 8.4 sec Time base 17 sec Time base 34 sec Time base 1.1 min Time base 2.2 min Time base 4.5 min Time base 9 min Time base 18 min Time base 35 min Time base 1.2 hr
The time for the "On delay" is set here. This is calculated from the selected base multiplied by the factor that is entered here. Note: An attempt should always be made to set the required time with the smallest possible base as the base that is selected here also simultaneously specifies the maximum timing error.	

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Parameters	Settings
Factor for overshoot time (5-127)	**5**
Base for overshoot time	**Time base 130 ms** Time base 260 ms Time base 520 ms Time base 1 sec Time base 2.1 sec Time base 4.2 sec Time base 8.4 sec Time base 17 sec Time base 34 sec Time base 1.1 min Time base 2.2 min Time base 4.5 min Time base 9 min Time base 18 min Time base 35 min Time base 1.2 hr
The time for the "Overshoot time" is set here. This is calculated from the selected base multiplied by the factor that is entered here. Note: An attempt should always be made to set the required time with the smallest possible base as the base that is selected here also simultaneously specifies the maximum timing error.	
Initialisation of object values	**adjustable** as before bus voltage failure
This parameter defines whether the object values can be preselected on bus voltage recovery (adjustable) or assume the state prior to bus voltage failure.	
Init. value of switch object	**logic 0 (Off)** logic 1 (On)
This parameter defines the initialisation value of the switching object, if the object value is adjustable.	
Init. value of positive drive object	**Positive drive Off** logic 0 (Off), positive drive On logic 1 (On), positive drive On
This parameter defines the initialisation value of the positive drive object, if the object value is adjustable.	

Relay A_2

Parameters	Settings
Init. value of AND object	**logic 0 (Off)** logic 1 (On)
This parameter defines the initialisation value of the AND object, if the object value is adjustable.	

Parameters	Settings
Init. value of OR object	**logic 0 (Off)** logic 1 (On)
This parameter defines the initialisation value of the OR object, if the object value is adjustable.	
Behaviour on bus voltage failure	no action relay picks up **relay drops down**
The behaviour of the relay contact on bus voltage failure can be set here. The status of the relay contact is inverted if the parameter setting "normally closed contact" is selected for the relay mode. "no action": The relay contact maintains its current switching state on bus voltage failure. "relay picks up ": In the setting "normally open contact", the relay contact is closed on bus voltage failure. If "normally closed contact" is selected, the relay contact is opened. "relay drops off ": In the setting "normally open contact", the relay contact is opened on bus voltage failure. If "normally closed contact" is selected, the relay contact is closed.	
Status transmitting	**if object value changes / at bus recovery** using read request
This parameter defines the behaviour of the status object. (It controls the "transmit flag" of the object parameter settings). "if object value changes / at bus recovery": If the object value has changed, a corresponding telegram is sent. "using read request": The status object only sends the status in response to a read request.	

Time switch: Parameters

Relay A_1

Note:

The function and parameters of channels A to D are identical.

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Parameters	Settings
Channel A	**enabled** disabled
The corresponding channel can be disabled (not used) or enabled via this parameter. If "disabled" is selected, the following parameters are no longer displayed.	
Operating mode	Normal mode **Time switch**
The function of the channel is set via this parameter. The parameter window "Relay" changes depending on the function that is selected here and the relevant parameters are displayed with default settings.	
Positive drive (priority 1)	**no positive drive** Positive drive
Using this parameter, the relay can be controlled via a positive drive object. The positive drive input and the output of the AND function form the two inputs of the positive drive. If the positive drive is enabled, the two inputs are linked and are available at the internal output of the positive drive.	
Logic AND operation (priority 2)	**no logic operation** AND function
This parameter defines whether a logic operation should be carried out with the AND function object at the output of the OR function.	
OR function (Prio. 3)	**no logic operation** OR function
This parameter defines whether a logic operation should be carried out with the OR function object at the output of the time function.	
Relay mode	**normally open contact** normally closed contact

This parameter defines the behaviour of the relay contact.
"normally open contact":
      Off telegram = contact open,
      On telegram = contact closed.
"normally closed contact":
      Off telegram = contact closed,
      On telegram = contact open.	

Factor for On delay (0-127)	**0**
Base for On delay	**Time base 130 ms** Time base 260 ms Time base 520 ms Time base 1 sec Time base 2.1 sec Time base 4.2 sec Time base 8.4 sec Time base 17 sec Time base 34 sec Time base 1.1 min Time base 2.2 min Time base 4.5 min Time base 9 min Time base 18 min Time base 35 min Time base 1.2 hr

Parameters	Settings
The time for the "On delay" is set here. This is calculated from the selected base multiplied by the factor that is entered here. Note: An attempt should always be made to set the required time with the smallest possible base as the base that is selected here also simultaneously specifies the maximum timing error.	
Factor for overshoot time (5-127)	**5**
Base for overshoot time	**Time base 130 ms** Time base 260 ms Time base 520 ms Time base 1 sec Time base 2.1 sec Time base 4.2 sec Time base 8.4 sec Time base 17 sec Time base 34 sec Time base 1.1 min Time base 2.2 min Time base 4.5 min Time base 9 min Time base 18 min Time base 35 min Time base 1.2 hr
The time for the "Overshoot time" is set here. This is calculated from the selected base multiplied by the factor that is entered here. Note: An attempt should always be made to set the required time with the smallest possible base as the base that is selected here also simultaneously specifies the maximum timing error.	

Relay A 2

Parameters	Settings
Initialisation of object values	**adjustable** as before bus voltage failure
This parameter defines whether the object values can be preselected on bus voltage recovery (adjustable) or assume the state prior to bus voltage failure.	
Init. value of switch object	**logic 0 (Off)** logic 1 (On)
This parameter defines the initialisation value of the switching object, if the object value is adjustable.	

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Parameters	Settings
Init. value of positive drive object	**Positive drive Off** logic 0 (Off), positive drive On logic 1 (On), positive drive On
This parameter defines the initialisation value of the positive drive object, if the object value is adjustable.	
Init. value of AND object	**logic 0 (Off)** logic 1 (On)
This parameter defines the initialisation value of the AND object, if the object value is adjustable.	
Init. value of OR object	**logic 0 (Off)** logic 1 (On)
This parameter defines the initialisation value of the OR object, if the object value is adjustable.	
Behaviour on bus voltage failure	no action relay picks up **relay drops down**
The behaviour of the relay contact on bus voltage failure can be set here. The status of the relay contact is inverted if the parameter setting "normally closed contact" is selected for the relay mode. "no action": The relay contact maintains its current switching state on bus voltage failure. "relay picks up": In the setting "normally open contact", the relay contact is closed on bus voltage failure. If "normally closed contact" is selected, the relay contact is opened. "relay drops down": In the setting "normally open contact", the relay contact is opened on bus voltage failure. If "normally closed contact" is selected, the relay contact is closed.	
Status transmitting	**if object value changes / at bus recovery** using read request
This parameter defines the behaviour of the status object. (It controls the "transmit flag" of the object parameter settings). "if object value changes / at bus recovery": If the object value has changed, a corresponding telegram is sent. "using read request": The status object only sends the status in response to a read request.	