

1 Introduction

This manual is a shortened version for the exclusive use of the maintainers. Please refer to the full manual for a detailed description of the device. For wiring diagrams, refer to the wiring diagrams of the electrical cabinet

2 Operation for hydraulic lift

2.1 System with single additional valve

The NCBM01 allows to select the activation sequence valve by setting the parameter "valve sequence" in the configuration window. Using the parameter "down valve opening delay" the advance opening time of the additional valve is configured, while the parameter "down valve closing delay" determines the delayed valve closing time. The periodic test, in this configuration, is disabled. The periodic test, in this configuration, is disabled. To activate the valves the doors have to be closed (presence of voltage on P01,P02, LED4 off). Needed connections: down, up, speed, power supply, outputs (CO1, O1,O2)

2.2 System with double valves monitored

In the case of double valve system monitored and controlled in parallel, the manufacturers prescribe the obligation to perform a test for periodic monitoring through the concept of "built in redundancy" introduced by the regulations EN81-20

In this case, the device NCBM01 performs test at the hour set in the parameter "test time" written during the configuration of the device. The test is repeated daily or hourly according to the parameter "test frequency" set

The conditions that must occur to begin the test are:

- Scheduled time
- Contactors up, down, speed must be turned off, doors closed (voltage between P01-P02, LED4 off) for at least 30 seconds and lowest floor signal present (voltage present between PT1,PT2 LED 5 ON).

If the above conditions are met the test will start by opening the output O1 (valve V1 closed in testing) and maintaining the output O2 closed so that the valve V2 will remain open. The duration of the test valve is set via the parameter "test duration" in the configuration user interface, after the test of the first valve, after 5 seconds it will proceed to the tests of the second valve in a similar manner (activate O1, O2 deactivated). In case a leveling command is activated (up command active without speed signal within 5 second), the test is repeated. If during the second attempt a leveling command is activated again the test failed. The alarm is signaled by the fault relay and the lighting of the LED indicators. After a switch on/off of the NCBM01 the alarm remain activated until the reset button is pushed for at least 5 seconds.

If, during the test one of the following commands: door open or down or up followed by the speed within 5s, the test is suspended. If a frequency daily tests is set, the device has a time-out for the execution of the test of one hour. If the test is not performed within 1 hour an alarm is generated. If it is set the tests frequency of one hour, there is no time-out. The parameters for the handling of activation delay of the valves, during normal elevator operation, are configured using the masks "Valve sequence", "down valve closing delay", "down valve opening delay", as described in the previous paragraph.

Thirty seconds before the execution of the test and for the whole duration of the same, the output TW (test warning) will remain active to signal the imminent execution of the test. This function is useful to signal to the control cabinet the test coming and to perform the commands necessary for the preparation of the test : door closing, lowest floor...

2.3 Bucher I-VALVE signal control

The configuration Bucher I-VALVE allows to control the timing of the SMA signal when the travel signal is changing the state. As indicated in the valve manual, the system detects the error1 and error2:

Error 1 : when travel command goes from high level to low level, the SMA signal should change the state from 0.1s to 1s after the travel signal change, if the timing is not respected error1 has to be detected

Error 2 : when travel command goes from low to high level, the SMA signal should change the state within 0.1s after the travel signal change, if the timing is not respected error2 has to be detected

If the error is detected the Fault relay will change state according to the relay polarity selected in the SW configuration

FNO, in case of alarm FNO, CF is closed

FNC, in case of alarm FNC,CF is closed

Led 3, Led4 and led5 continues to signal the state of the SMA and TRAVEL commands even if NCBM is in alarm

The alarm will be maintained until a manual reset will be performed.

Correct I-Valve monitoring is guaranteed only if the TRAVEL signal status persists for more than 200ms.

2.4 Signaling Hydraulic mode

Using the function LED functionality of the user interface SW is possible select the led options.

NORMAL FUNCTIONALITY HYDRO			
LED	MONITOR / NOMONITOR		BUCHER I-VALVE
	(OPZ1)	(OPZ2)	
LED1(GREEN)	Up(On/Off)	Valve V1	OFF
LED2 (GREEN)	Down (On/Off)	Valve V2	OFF
LED3 ((GREEN)	High speed (On/Off)	POWER OK	Blink if travel low / On if travel high
LED4 (GREEN)	Doors (On/Off)	Doors (On/Off)	SMA signal, on if high
LED5 (GREEN)	Lower floor (On/Off)	Lower floor (On/Off)	Time verification pending, On until SMA signal change the state
ALL (RED)	Alarm (Off)	Alarm (Off)	Alarm (Off)

TAB. 1 Led Meaning in normal functionality

LED	TEST PENDING		TEST IN PROGRESS	
	(OPZ1)	(OPZ2)	(OPZ1)	(OPZ2)
LED1 (Green)	Up (On/Off)	Valve V1 (O1 out On/Off)	OFF	Valve V1 (O1 out On/Off)
LED2 (Green)	Down (On/Off)	Valve V2(O2 out On/Off)	OFF	Valve V2(O2 out On/Off)
LED3 (Green)	Test pending (Led blink)	Test pending (Led blink)	Test pending (Led blink)	Test pending (Led blink)
LED4 (Green)	Doors (On= open Off=closed)	Doors (On= open Off=closed)	Doors (On= open Off=closed)	Doors (On= open Off=closed)
LED5 (Green)	Lower floor (On=at floor /Off =not at floor)	Lower floor (On=at floor /Off =not at floor)	Test in progress (led blink)	Test in progress (led blink)
ALL (Red)	Alarm (Off)	Alarm (Off)	Alarm(Off)	Alarm (Off)

TAB. 2 Led Meaning during test monitoring pending or in execution

ALARM	Severity	Restore	LED1	LED2	LED3	LED4	LED5	ALL	Relay fault
Monitoring fault valve1	Unit blocked	RESET Button	ON	OFF	OFF	OFF	OFF	ON	ON
Monitoring fault valve12	Unit blocked	RESET Button	OFF	ON	OFF	OFF	OFF	ON	ON
Time out test, test not done in time	Unit blocked	RESET Button	ON	ON	OFF	OFF	OFF	ON	ON
Bucker-Ivalve (error 1)	Unit blocked	RESET Button	ON	OFF	Blink/ON	x	x	ON	ON
Bucker-Ivalve (error 2)	Unit blocked	RESET Button	OFF	ON	Blink/ON	x	x	ON	ON

TAB. 3 Led Meaning in case of alarm

2.5 Activation of the valves during an upward travel

Using the configuration window "Opening Up Valve Timing", you can configure the opening of a single or both valves during upward elevator travel. The maximum opening time is configurable to 4s. Checking the box "always on", you can configure the continuous opening of the valves during an upward travel. If in the configuration menu the box V1,V2 and "always on" are selected together, the opening and closing of the valves are handled according to the parameter set in the menus "Valve sequence", "down Opening Valve Delay" e "Down Closing Valve Delay".

3 Working principle for traction lift

3.1 Operation as a monitoring system for electric brakes

If the elevator is equipped with electric brakes certified it's possible monitoring them checking the safety microswitch on the brakes at each change of state (open / close). The NCBM controls at each lift travel the status of the microswitch and if an anomaly is detected triggers the alarm resettable via the manual button.

It's possible to monitor 2,3 or 4 safety switches, the configuration is selectable using the user interface SW.

The device receives the brake command and after a configurable time (default 5 seconds) checks the status of the microswitch. If the status is not correct the fault signal will be generated and the LED will indicate the possible fault on the brake.

The microswitch can be:

- Normally closed (NC) check the opening of the contact when the brake is activated (coil not energized)
- Normally open (NO) check the opening of the contact when the brake is activated. (coil not energized).

In this configuration (electric lift) it's possible to select the polarity of the fault output using configuration SW through the parameter "fault relay polarity":

- FNO, in case of alarm FNO, CF is closed
- FNC, in case of alarm FNC,CF is closed

3.2 Signaling traction lift

LED	Brakes deactivated No Alarm	Brakes activated	Brakes deactivated with alarm	Brakes activated with alarm
LED1(GREEN)	OFF (Contact1)	OFF (Contact 1)	ON if contact 1 faulty	ON if contact 1 faulty
LED2 (GREEN)	OFF (Contact 2)	OFF (Contact 2)	ON if contact 2 faulty	ON if contact 2 faulty
LED3 (GREEN)	ON (POWER OK)	ON blink (brake activated)	ON blink (brake activated)	ON blink (brake activated)
LED4 (GREEN)	OFF (Contact 3)	OFF (Contact 3)	ON if contact 3 faulty	ON if contact 3 faulty
LED5 (GREEN)	OFF (Contact 4)	OFF (Contact 4)	ON if contact 4 faulty	ON if contact 4 faulty
ALL (RED)	Alarm (Off)	Alarm (Off)	ON	ON
Unit blocked, relay fault ON, restore using the reset button				

TAB. 4 Signalling for traction lift

4 Monitoring system for OSG blocking coils

4.1 Working principle as OSG monitoring

Currently, there are two types of certified uncontrolled movement overspeed governor:

1. With coil released and activated and each arrival / departure from the floor
2. With coil always activated and released only in the event of uncontrolled movement

The type 1) can be monitored as an electric brake so please refer to section 3.1
The type 2) is described below.

4.2 Working principle in case of OSG actuated only in the event of uncontrolled movement

The NCBM01 unit allows to configure using the SW interface the time at which you want to run the test and its frequency (eg once a day), so if the following conditions are true:

- elevator stopped for at least 30s
- elevator to the lowest floor
- closed doors
- time test
- Led configuration to start the test: LED2,5 on, LED3 flashing

one of the following tests of the coil will start

Test option1:

1. the power supply contact electromagnet (O1) will be open
2. In a maximum time of 3 seconds the NCBM checks the microswitch status installed on the OSG (NC closed when OSG free to move, LED2 off)
3. if the contact remain closed the alarms will be activated.
4. If there were no alarms, the electromagnet is power supplied again (LED2 ON)
5. The contact will close again, if it remains open the alarm will be generated.

Test option2 (to be used for example in conjunction with the product Stem NCUMxx):

1. A test impulse of 300ms is sent.
2. After a set time (default 3s) the status of the microswitch installed on the OSG is checked (NC closed when OSG free to move, LED2 OFF then ON)
3. If the test fails, the alarms are activated

In both cases the signaling outputs activated are:

- TW (test warning), thirty seconds before the execution of the test and for the duration of the whole test, to signal to the control cabinet the test coming and to perform the commands necessary for the preparation of the test : door closing, lowest floor, stop of the elevator
- O2 about 10 seconds before the test is performed, to signal the imminent execution of the test to the control panel. This information is useful to prevent a up/down command given at the same time of the O1 opening, that may cause the operation of the safety gear.

During the waiting phase of the test (30s), the commands UP, down, door opening and lowest floor if activated will delay the test execution.

4.3 Signaling

LED	Normal working	Test pending	Alarme activated
LED1 (Green)	UP/down (On if active)	UP/down (On if active)	On
LED2 (Green)	OSG contact (On if closed)	OSG contact (On if closed)	On
LED3 (Green)	ON	Test pending (blink.)	Off
LED4 (Green)	Doors (On if open/Off closed)	Doors (On if open/Off closed)	Off
LED5 (Green)	Lowest floor (On/Off)	Lowest floor (On/Off)	Off
ALL (RED)	Alarm (Off)	Alarm (Off)	Alarm (On)
Unit blocked, relay fault ON, restore using the reset button			

TAB. 5 Signaling for OSG application

5 Generic alarm valid for all configurations

ALARM	Severity	Restore	LED1	LED2	LED3	LED4	LED5	ALL	Relay fault
Battery	No Block	Automatic	OFF	OFF	OFF	OFF	ON	ON	OFF
RTCC Alarme	No Block	Automatic	OFF	OFF	ON	OFF	OFF	ON	OFF
Alarme memory write	No Block	Automatic	OFF	OFF	OFF	ON	OFF	ON	OFF
Allrm time out HW	Block	RESET Button	OFF	OFF	ON	OFF	OFF	ON	ON

TAB. 6 Generic alarm valid for all configurations

6 HW redundancy circuitry

The NCBM is equipped with a redundancy HW circuit that in case the test is not performed within a 38-hour generates an alarm. The reset is possible only by pressing the reset button.

Each time the monitoring test is performed, the internal counter is reset by the change of status of the outputs O1-O2 and subsequent activation of the V1-V2 (to be connected in any application hydraulic, electrical and limiter)

7 Internal clock management

The device has an internal clock that thanks to the battery, continues to operate even in the absence of main power supply. Clock adjustment can be accomplished using the SW interface or by using the buttons on the NCBM unit.

Pressing the TIME button for 5 seconds, the current time is displayed by blinks of the led3: every flash corresponds to one hour.

Pressing the time and reset button for about 3 seconds allows to enter in configuration mode: the LED1 will light and every time you press the button "time" you will add 1 hour (example: if I need to set the 10 o'clock, we must press "TIME" 10 times). LED4 will flash each time you press the button.

8 Battery and operation in case of power failure

In case of power failure the NCBM01 keeps in operation only internal clock. After the return of the supply voltage, the control unit restores its normal operation within 1 minute.

The customer can select to use external 12V battery connected to the inputs A3-A4 or to use an internal battery inserted on the front side. The internal battery should be type CR2032 220mAh the "+" polarity toward the upper part of the device (tampo-print side).

9 START UP AND PERIODIC INSPECTION

9.1 HYDRAULIC LIFT

1. Set through the user interface SW related parameters
2. Do some test runs up and down checking through the LEDs 1 to Led5 (Option 1 and Option 2) that the received signals from the system are correct and the LED FAULT is not activated.
3. Simulate the operation of re-leveling and checks by means of the LEDs1 to Led5 (Option 1 and Option 2) that the received signals from the system are correct and the LED FAULT is not activated.
4. **TEST SIMULATION SUCCESSFULLY PERFORMED:** With the system stopped at the bottom floor and with closed doors, turn on the test input (T1 to GND, T2 to 24VAC/DC) by means of an external pushbuttons. The test monitoring will start opening one valve at a time. If the LED fault remain off, the test is considered passed
5. **TEST SIMULATION WITH NEGATIVE RESULT AT VALVE V1:** With the system stopped at the bottom floor and with closed doors, turn on the test input (T1 to GND, T2 to 24VAC/DC) by means of an external pushbuttons. During the valve V1 test (V2 open) simulate a re-leveling, once the car position is OK wait for the restart of the test (Led3/led5 flashing) and simulate again a re-leveling. The test is considered passed if the control unit will activate the alarm LED and the fault relay will change state.
6. **TEST SIMULATION WITH NEGATIVE RESULT AT THE POWER ON:** after the alarm generated at the step 5) remove and reconnect the power supply make sure that the alarm remains active, then press the reset button for approximately 5 seconds to reset the faulty condition.
7. **TEST SIMULATION WITH NEGATIVE RESULT AT VALVE V2:** with the system stopped at the bottom floor and with closed doors, turn on the test input (T1 to GND, T2 to 24VAC/DC) by means of an external pushbuttons. During the valve V2 test (V1 open) simulate a re-leveling. Once the car position is OK, wait for the restart of the test (Led3/led5 flashing) and simulate again a re-leveling. The test is considered passed if the control unit will activate the alarm LED and the fault relay will change state.
8. Do again the point 6
9. Checks the time and eventually set it to the correct value.

9.2 HYDRAULIC LIFT WITH BUCHER I-VALVE

10. Set through the user interface SW related parameters
11. Do some test runs up and down checking through the LEDs that received signals from the system are correct and the LED ALL and the relay FAULT are not activated.
12. **I-VALVE ERROR 1 DETECTED:** disconnect the SMA signal, travel command high (run elevator) than travel command low (stop the elevator), checks activation of the relay alarm and the correct led status
13. **I-VALVE ERROR 2 DETECTED:** connect the P01 to 24V, travel command high (run elevator), checks activation of the relay alarm and the correct led status

9.3 TRACTION LIFT USING BRAKES

1. Set through the user interface SW related parameters
2. Do some test runs up and down checking through the LEDs 1 to Led5 (Option 1 and Option 2) that the received signals from the system are correct and the LED FAULT is not activated.
3. **TEST SIMULATION WITH NEGATIVE RESULT:** simulate a non opening and a non-closing of the microswitch per each of them which is used.
4. **TEST SIMULATION WITH NEGATIVE RESULT AT THE POWER ON:** after the alarm generated at the step 3) switch on and off the power supply make sure that the alarm remains active, then press the reset button for approximately 5 seconds to reset the faulty condition.
5. Checks the time and eventually set it to the correct value.

9.4 TRACTION LIFT USING OSG

1. Set through the user interface SW related parameters
2. Do some test runs up and down checking through the LEDs 1 to Led5 (Option 1 and Option 2) that the received signals from the system are correct and the LED FAULT is not activated.

Type 1 OSG with electromagnet released each time the elevator stops at floor:
Perform the test 8.2 from points 3 to 5

Type 2 OSG with electromagnet released only in case of undetected movement

Option 1:

1. **TEST SIMULATION SUCCESSFULLY PERFORMED:** With the system stopped at the bottom floor and with closed doors, turn on the test input (T1 to GND, T2 to 24VAC/DC) by means of an external pushbuttons. After the pending time (30s), the test sequence will start, with the opening and subsequent closing output O1 in series with the electromagnet. If there is proper switching sequence on the OSG contact: opens when O1 opens, closes when O1 closes, the test ends successfully
2. **TEST SIMULATION WITH NEGATIVE RESULT (contact failure to open):**
 - a. Jumper output O1 so that the electromagnet remains always powered
 - b. With the system stopped at the bottom floor and with closed doors, turn on the test input (T1 to GND, T2 to 24VAC/DC) by means of an external pushbuttons. After the pending time (30s), the test sequence will start opening the output O1, but the microswitch will not change state because the electromagnet remain energized. The monitoring alarm will be activated
3. **TEST SIMULATION WITH NEGATIVE RESULT AT THE POWER ON:** after the alarm generated at the step 2) switch on and off the power supply make sure that the alarm remains active, then press the reset button for approximately 5 seconds to reset the faulty condition.
4. **TEST SIMULATION WITH NEGATIVE RESULT (contact failure to close):**
 - a. Disconnect the electromagnet from the output O1
 - b. With the system stopped at the bottom floor and with closed doors, turn on the test input (T1 to GND, T2 to 24VAC/DC) by means of an external pushbuttons. After the pending time (30s), the test sequence will start opening the output O1. The NCBM will check the opening of the contact, but since there will be no its closure an alarm will be generated.
5. Repeat test 3
6. Checks the time and eventually set it to the correct value.

Option 2:

1. **TEST SIMULATION SUCCESSFULLY PERFORMED:** With the system stopped at the bottom floor and with closed doors, turn on the test input (T1 to GND, T2 to 24VAC/DC) by means of an external pushbuttons. After the pending time (30s), an impulse will be sent to the output O1. If the contact of the microswitch connected to the OSG will perform the correct sequence: opens when O1 opens, closes when O1 recloses, the test will end with positive result.
2. **TEST SIMULATION WITH NEGATIVE RESULT (contact failure to open):**
 - a. Jumper output O1 so that the electromagnet remains always powered
 - b. With the system stopped at the bottom floor and with closed doors, turn on the test input (T1 to GND, T2 to 24VAC/DC) by means of an external pushbuttons. After the pending time (30s), the test sequence will start sensing an impulse to the output O1. The microswitch will not change the state and an alarm will be generated.
3. **TEST SIMULATION WITH NEGATIVE RESULT AT THE POWER ON** after the alarm generated at the step 2) switch on and off the power supply make sure that the alarm remains active, then press the reset button for approximately 5 seconds to reset the faulty condition.
4. **TEST SIMULATION WITH NEGATIVE RESULT (contact failure to close):**
 - a. Disconnect the electromagnet from the output O1
 - b.
 - c. With the system stopped at the bottom floor and with closed doors, turn on the test input (T1 to GND, T2 to 24VAC/DC) by means of an external pushbuttons. After the pending time (30s), the test sequence will start opening the output O1. The NCBM will check the opening of the contact, but since there will be no its closure an alarm will be generated.
5. Repeat test 3
6. Checks the time and eventually set it to the correct value.

9.5 PERIODICAL CHECKS

The tests described above are to be repeated during the maintenance visits and / or according to the indication provided by the manufacturers of the stopping elements (valves, brakes or limiter)

The frequency of the monitoring tests with regard to the valves and limiters type 2 are to be set in agreement with the indications prescribed by the valves or OSG manufacturer

10 Connectors

Name	Type	Functions Hydro Monitor/nomonitor	Functions Hydro I-VALVE	Functions Electric	Functions OSG	Range [V] AC/DC	Max I [A]	Max Power [W]
A1-A2	Power supply	Power supply	Power supply	Power supply	Power supply	15 ÷30	0.1	
T1-T2	Optoisolated input	Immediate test			Immediate test	15÷30	0.01	
D1-D2	Optoisolated input	Down contactor	TRAVEL	Brake coil	Down contactor	24÷220	0.01	
A3-A4	Battery supply	Battery supply	Battery supply	Battery supply	Battery supply	12V	0.1	
V1-V2	Optoisolated input	Speed contactor	Not used	Microswitch1	OSG microswitch contact	24 ÷220	0.01	
P01-P02	Optoisolated input	Door contactor	SMA	Microswitch2	Door contactor	24 ÷220	0.01	
S01-S02	Optoisolated input	Up contactor	Not used	Microswitch3	Up contactor	24÷220	0.01	
PT1-PT2	Optoisolated input	Lowest floor contactor	Not used	Microswitch4	Lowest floor contactor	24÷220	0.01	
TW	Transistor Output OC NPN	Test is coming	Not used	Not used	Test is coming	0-24VDC	0.1	0.24
O1	Relay out 1	V1 valve activation	Not used	Not used	Impulse test / Command power supply of the electromagnet	400VAC Switching	10	500
O2	Relay out 2	V2 valve activation	Not used	Not used	Not used	400VAC Switching	10	500
CO	Common relay output	Common relay output	Not used	Not used	Common relay output	400VAC Switching	10	500
CF	Common relay fault	Common relay fault	Common relay fault	Common relay fault	Common relay fault	220VDC Switching	2	60
FNC	Relay fault normal closed	Relay fault normal closed	Relay fault normal closed	Relay fault normal closed	Relay fault normal closed	220VDC Switching	2	60
FNO	Relay fault normal open	Relay fault normal closed	Relay fault normal closed	Relay fault normal closed	Relay fault normal closed	220VDC Switching	2	60

TAB. 7 Connectors

11 Push buttons

Buttons combination	Functions
Reset	Alarm reset if pushed for at least 5 seconds
Time	If pushed for at least 5 seconds, the current time is visualized
Reset +Time	If pushed for at least 3 seconds, the clock configuration will start
Time (in configuration)	Each press of the button one hour is incremented

TAB. 8 Push button

12 General technical data

General technical data	
Power supply	15-30V AC/DC 3W
Voltage inputs at the connectors: PO, PT,V,D,S	24 ÷220VAC/DC if the inputs are connected in parallel with coils (eg. contactor coils or solenoid valves), we recommend the use varistors or tranzorb diodes to protect the inputs
Maximum switching capability at alarm fault output	220VAC, 60W
Maximum switching capability outputs O1-O2	400 VAC, 500W
Working temperature	0 – 70 °C
USB port	MINI USB typeB 5 contacts.
Battery type	3V -220mAh 2032 type (diameter 20mm)
Battery life in stand-by	20 days
External Battery (Input A3-A4)	12V-7Ah Acid lead
Mechanical Dimension	Box ME MAX22, IP 20, thickness 22,5mm Height 125mm, width 105mm
Mechanical fixing system	DIN Type
Storage temperature	-40°C + 120°C
EMC compliance	EN12015:2005 – EN12016:2005
In accordance with	EN81-1:1998+A3:2009, EN81-2:1998+A3:2009, EN81-20:2014, EN81-50:2014
Approvals	IMQ certificate N°847

TAB. 9 General technical data