



DESCRIPTION

The unit NCUM01 is a safety device used to detect the uncontrolled movement of elevators in accordance with EN 81-20:2014. The operation of this module is based on the use of guided safety relay contacts.

SAFETY PRECAUTIONS

The inputs of the unit must be safety contacts comply with §5.11.2 of the standard EN81-20:2014 and perform a function of personal protection; they should not be bypassed (by shorting the contacts), moved, removed or rendered ineffective by other means. Incorrect installation or manipulation can cause serious personal injury. The manufacturer or installer of the machine is responsible for the proper and safe operation.

The auxiliary output 31-32-33 provides an indication on the status of the device, so it must not be used in any way as a safety output.
The NCUM01 is not suitable for operation in the presence of ionizing and non ionizing radiation (X-rays, microwaves, lasers, ultraviolet rays).

The NCUM01 control unit must be assembled in a suitable operating area (switch cabinet, protective housing).

In the following case you must use a IP54 cabinet:

- If the safety UCM outputs (13-14,23-24) have a voltage difference between them greater than 160V

OPERATION

The safety unit NCUM01 can work with input signal from the elevator safety circuit or with independent safety input signals.

Mode safety circuit with restart (Fig. 1): the system must be equipped with a leveling control unit (NC80, NC96 lift) whose output, in parallel with the safety door contact, is connected to C11 input of the NCUM01. The PS2 input connected before the door contact allows the restart of the NCUM01 after an open/close cycle of a safety contacts wired before the door contact

Mode independent inputs with automatic doors contact (Fig. 2): the system must be equipped with a safety leveling unit with 2 output contacts (NC80, NC96 lift) and an additional door contact. The contacts must be connected to the inputs S42 and S41 respectively.

Mode independent inputs with Safety doors Stem IP67 (Fig. 3): the system must be equipped with a safety leveling with 2 output contacts (NC80, NC96 lift) and the second safety contact is provided by the safety door system IP67. The contacts must be connected to the inputs S42 and S41, respectively.
 The unit monitors the door area leveling signals and the door opening.
 If a dangerous event occurs its safety outputs 13-14 and 23-24 will be opened.

Hazardous event - Amendment A3

It is consider an Hazardous event, a movement of the car with the doors open out of the door zone. Therefore the positioning of the magnet for the leveling must be due to guarantee that the car can stop the movement in one meter as indicated in the norme.

Start

As required by law, if a hazardous event occurs, the output will remain open until the safe operation by a competent person will bring the system in safety conditions and send a signal to start contacts (S31-S32). If a temporary lack of supply happen, the module will continue to work if it is connected to the battery. If the elevator car is at the floor, the safety output (13-14, 23-24) remain closed instead, if the cabin is out the floor, the level unit is open and in cosequence also the safety outputs (13-14, 23-24) will be open.
 The unit sense the presence of power supply, thanks the inputs PS1,PS2 and it will send an automatic start to close the outputs contact.

Stopping devices

The stopping elements usable with our device are: electrical brakes, solenoid lock to activate the overspeed governor, solenoid valves.

The stopping elements have to comply the EN81-20:2014. If the switching current to energize the braking element is greater than 3A (6A in case of outputs 13-14/23-24 connected in parallel) appropriate contactors in accordance to §5.11.2 of the EN81-20:2014, have to be installed between NCUM and the coil of the braking elements. The response time of the contactors have to be considered in the global system response time calculation.

STOPPING DEVICES MONITORING (Fig. 4-5-6)

The control unit manages the monitoring of two stopping devices: sending a test pulse to the inputs T1 and/or T2, the safety output contacts 13-14 and/or 23-24 will open activating the stopping devices (brakes, valves, solenoids lock on the overspeed governor). If they work properly, they will send a signal of successful implementation to R1 and R2 inputs and the NCUM01 will close again the safety outputs 13-14 and/or 23-24. The feedback signals on the OT outputs, allows to check the correct stopping device activation by the lift controller, while the impulse on the microswitch M1,M2 will check the correct functioning of them and they can be used to check the returning to the off position of the stopping devices. The periodical activation of the monitoring procedure using (T1 and/or T2 inputs) is in charge of the final user when required by EN81-20:2014.

Microswitches M1 and M2 have to be positive opening contacts

ASSEMBLY

Installation must be performed by authorized personnel only.
 The unit is installed by clipping it to a standard 35 mm top-hat rail.

ELECTRICAL CONNECTION

Electrical connection must be performed by authorized personnel only. All the electrical inputs must either be isolated from the mains supply by a movable safety transformer in accordance with EN IEC 61558-2-6 with limited output voltage in the event of a defect or by another equivalent movable mechanism.
 Each safety relay output (13-14 or 23-24) has a maximum current of 3 A; the power supply connected to the outputs must be protected from overcurrents by adequate devices to the loads that have to be protected.
All the output contacts must have an adequate protective circuit for capacitive and inductive loads. A fast-blow 500mA fuse must be connected to input A3 of the battery (+12 V).
 If a common power supply is used, all the inductive and capacitive loads (e.g. relay contactors) connected to the power supply must be connected to appropriate interference suppressors.

SERVICE AND INSPECTION

The correct functioning of the NCUM01 safety unit must be controlled by the operator and/or by the control circuit of the elevator periodically by checking:

- correct switching function
- secure mounting of components
- correct connection fixing.

The monitoring function of the unit is done at every switching.
 In the event of damage, the damaged system component must be replaced.

Liability coverage is void under the following circumstances:

- if instructions are not followed
- non-compliance with safety regulations
- installation and electrical connection not performed by authorized personnel
- non-implementation of functional checks.

SETUP

If the control unit does not appear to function when operating voltage is applied (green "Power" LED does not light up), the unit must be returned unopened to the manufacturer.
 Check whether the safety outputs are being switched (see LED display) by activating the two inputs and START.

LED Table

Function	LED	Color	State
Power supply	PWR	Green	on
Second door contact *: CLOSED	CP	Green	on
Output 13-14 / 23-24 : CLOSED **	OUT	Green	on
TEST: running	T	Green	on

* Second contact of a double door contacts or second output of the STEM IP67 safety door system. If the contacts S41 and S42 are both closed (+12 V), the CP LED remains off.

** LED OUT indicates the activation of the safety circuit; during the stopping devices 1 test, LED OUT remains ON even if output 13-14 and/or 23-24 opens.

CONNECTORS PINS FUNCTIONALITY

C11	Safety circuit input AC/DC (voltage according to ordering code)
C12	Safety circuit reference AC/DC
NC	Not connected
S41	Second door contact input
S42	Second levelling unit contact input
A1	Power supply module 24VDC positive / 24VAC
A2	Power supply module 24VDC negative / 24VAC
A4	Negative 12V DC battery power supply
A3	Positive 12V battery power supply (connect 500 mA fast blow fuse)
S31 - S32	Start / feedback input for the UCM unit
PS1	Sense power supply pin1 AC/DC(Vmax Voltage safety circuit)
PS2	Sense power supply pin2 AC/DC(Vmax Voltage safety circuit)
V+	Common for test inpulse (12VDC)
T1	Test input 1 (opening 13-14, VMAX 30VDC)
T2	Test input 2 (opening 23-24, VMAX 30VDC)
CT	Common for test inpulse (GND)
R1	Feedback from stopping device 1 (output 13-14, 0-10V)
R2	Feedback from the stopping device 2 (output 23-24, 0-10V)
31	Comon auxiliary contact
32	NC auxiliary contact
33	NO auxiliary contact
OT1	Feedback test stopping device 1 (0-12V)
OT2	Feedback test stopping device 2 (0-12V)
G	Internal voltage reference
13 - 14	UCM safety output1
23 - 24	UCM safety output2

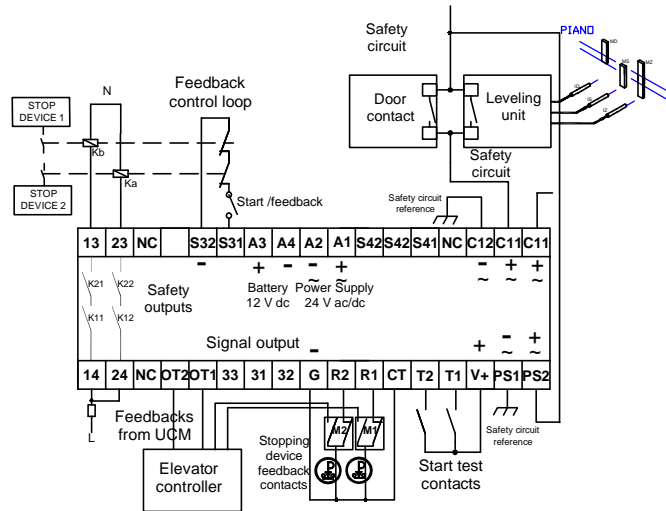


FIG. 1 Safety circuit with restart connection

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Subject to technical modifications without notice, no liability will be assumed for any detail.

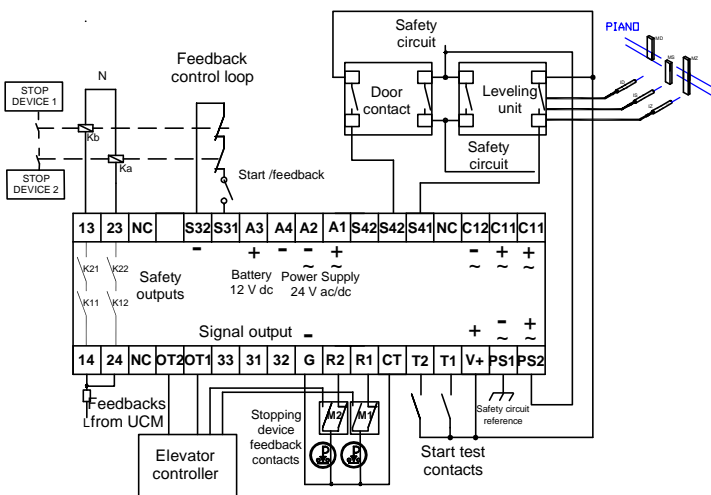


FIG. 2 Independent inputs mode with mechanical door contact

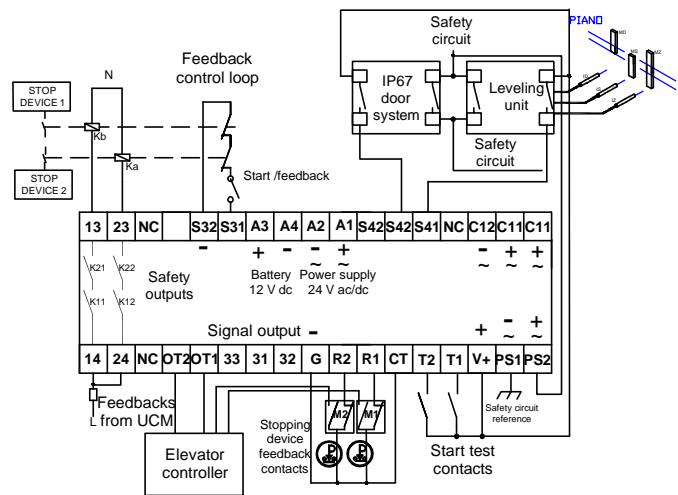


FIG. 3 Mode independent inputs with Safety doors Stem IP67

Leveling unit sensors positioning

Sensors and leveling unit have to comply §5.11.2 of EN81-20:2014. The sensor targets (typically a magnet) have to be positioned in the door zone and their length have to be appropriate in order to guarantee the car stopping within 1m from the landing sill as required by EN81-20:2014. The trimming of the target length (i.e. magnet) is in charge of the user in accordance to the response time of the stopping element and the elevator speed.

MONITORING TIMING DIAGRAM

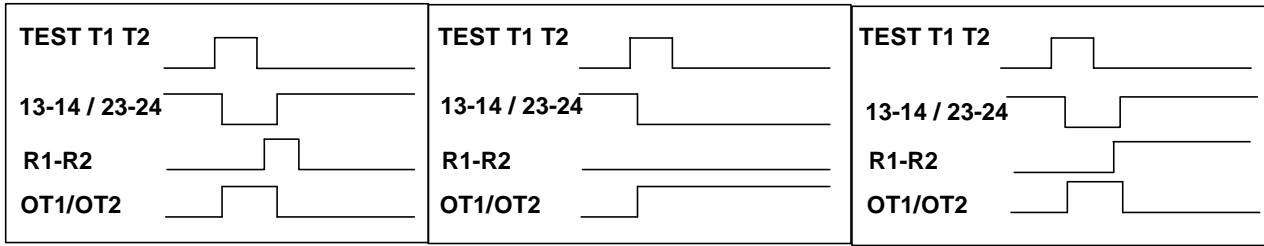


FIG. 4: TEST OK

FIG. 5: FAILED TEST
STOPPING DEVICE IS NOT WORKING SAFETY
OUTPUT REMAIN OPEN

FIG. 6: FAILED TEST
STOPPING DEVICE IS WORKING BUT MICROSWITCH IS BROKEN
OR STOPPING DEVICE DOESN'T COME BACK TO THE OFF POSITION

TECHNICAL DATA		
Parameter	Value	Unit
Housing material	PA	
Dimensions	106,6 x 96,8 x 62,5 (height)	mm
Weight	255	g
Operating conditions	Temperature: -5 ... +55	°C
	Relative humidity: 4% ... 100%	
	Pressure: 86 ... 106	kPa
Housing conditions	Temperature: -25 ... +70	°C
	Relative humidity: 5% ... 95%	
	Pressure: 86 ... 106	kPa
Degree of protection (IEC 60529)	IP20	
Degree of contamination (see note1)	3	
Overvoltage category	3	
Assembly	35 mm DIN standard rail	
Connection type	Screw terminals	
Supply voltage	24 -15% / +10% (AC 50 ÷ 60 Hz)	V ac/dc
Battery supply voltage	12 -15% / +10%	V dc
Internal fuse on the supply	750 mA PTC fuse	
External fuse on battery supply (A3, +12V)	500 mA fast blow fuse	
Current consumption	@24Vdc: 80 min, 150 max; @24Vac: 190 min, 380 max	mA
Safety Outputs switching voltage	240 (max) (Safety output)	V ac
Switching current AC-1 / Electrical life	3 A (Safety output) / >10 ⁵ cicli	A
Minimum switching current @ 10 V	10	mA
Safety output switching power	720 (max)	VA
External fuse at the output	8 A gG (according to IEC EN 60269-1)	
Safety outputs terminals	13 -14 / 23-24	
Auxiliary output terminals	31 - 32 NC 31 - 33 NO	
Usage category / Electrical Life (SAFETY outputs)	AC-15: 1,4 A / 240 V (inductive load, cosΦ=0,3) / 10 ⁵ c. DC-13: 1A / 24 V / 10 ⁵ cycles	
Auxiliary outputs parameters	max: 0,5A @ 24 Vdc	
OFF state response time	20	ms
Max input sensor resistance	200	ohm
Vibration resistance	IEC 60068-2-6:2007, IEC 60068-2-27:2008 EN 81-50:2014	
Mechanical life	10 ⁷	cycles
EMC compliance	EN 12015:2014, EN 12016:2013	
In accordance with	EN 81-20:2014, EN 81-50:2014	
Approval	TüV SUD EDCI 032	

NOTE 1

Condition met if:

-the UCM safety outputs (13-14,23-24) in the final application have a voltage difference between them of less than 160V

Safety circuit voltage	ORDERING CODE
24V	NCUM01000024
48V	NCUM01000048
60V	NCUM01000060
110V	NCUM01000110
220V	NCUM01000220



ELECTRICAL DRAWINGS FOR ELECTROMAGNET APPLICATION TO ACTIVATE THE OSG

To use of NCUM01 for OSG application, we suggest the connection diagrams in fig. 7,8. When the temporary voltage dip or the accidental opening of the safety circuits happens, the use of a second door contact allows to avoid the opening of the safety output 13-14/23-24 and then the activation of the safety gear.

The elevator system has to be equipped with an additional car door contact or it needs the door safety system STEM IP67.

Alternatively, to the second car door contact:

- the whole safety circuit could be placed under battery

- or a capacitor can be added at the beginning of the safety circuit, before each safety contacts, to have a delay in the OSG activation in case of main power supply failure

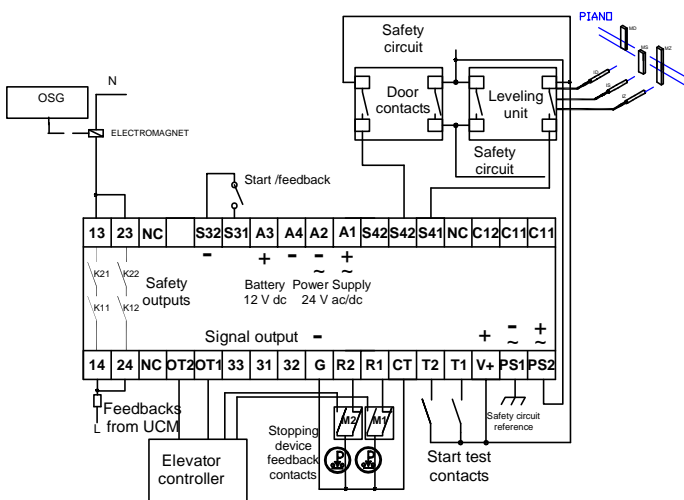


FIG. 7 Independent inputs mode with additional mechanical door contact for OSG application

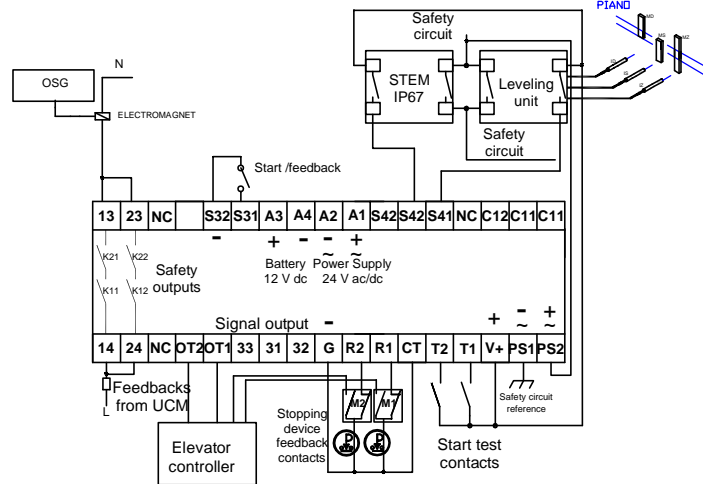


FIG. 8 Mode independent inputs with Safety doors Stem IP67 for OSG application

PROCEDURE FOR VALVES MONITORING IN THE HYDRAULIC LIFT

To use this procedure the levelling module should have an input for manual start and an a relay NC output

VALVE TEST V1

- 1) Stop the elevator at a designed floor
- 2) Checks that the door are closed
- 3) Send an impulse to the input T1
- 4) The safety output 13-14 will open and valve V1 will be closed
- 5) Open the valve V2
- 6) Wait a sufficient time to evaluate the possible oil leakage of the valve V1
- 7) Send a start signal to levelling unit
- 8) If the elevator doesn't move the NC contact of the levelling unit will open
- 9) If the NC contact of the levelling unit is open, the safety output 13-14 will be automatically closed, otherwise it will remain opened and the elevator will be out of service
- 10) The monitoring of the OT1 and R1 signals allow to check the test result (fig.4-5-6)

VALVE TEST V2

- 1) Stop the elevator at a designed floor
- 2) Checks that the door are closed
- 3) Send an impulse to the input T2
- 4) The safety output 23-24 will open and valve V2 will be closed
- 5) Open the valve V1
- 6) Wait a sufficient time to evaluate the possible oil leakage of the valve V2
- 7) Send a start signal to levelling unit
- 8) If the elevator doesn't move the NC contact of the levelling unit will open
- 9) If the NC contact of the levelling unit is open, the safety output 13-14 will be automatically closed, otherwise it will remain opened and the elevator will be out of service
- 10) The monitoring of the OT2 and R2 signals allow to check the test result (fig.4-5-6)

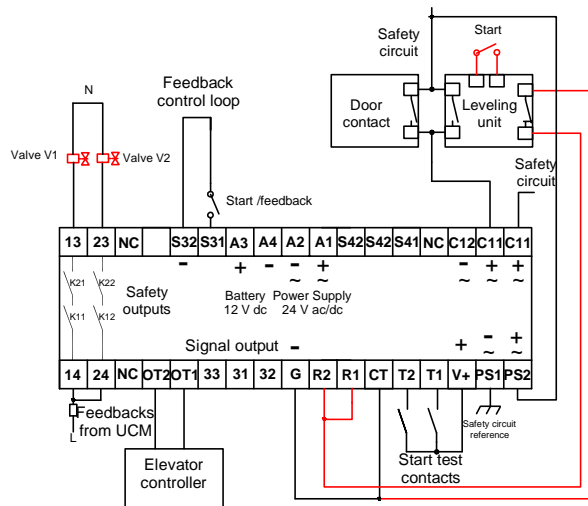


FIG. 9 Electrical scheme valves monitoring

ANNEX A

TESTING PROCEDURE ACCORDING TO EN 81-50:2014

Testing procedure according to §5.8.3.2.4

- 1) Install all the appropriate out of serving signalling at each floor
- 2) Check that nobody is in the car
- 3) Deactivate the landing call
- 4) Change the electrical connection as indicated in fig.1 (AnnexA)
- 5) Using the maintenance panel send a landing call
- 6) The NCUM will open the outputs 13-14, 23-24
- 7) The stopping element will be activated
- 8) Measure the braking trip distance

Testing procedure according §5.8.3.2.5

Monitoring test with a working stopping element

- 1) Install all the appropriate out of serving signalling at each floor
- 2) Check that nobody is in the car
- 3) Deactivate the landing call
- 4) Send an impulse to T1 and/or T2
- 5) The NCUM will pen the outputs 13-14 and/or 23-24
- 6) The signals R1 and/or R2 will change logical state and if everything works correctly the outputs 13-14 and/or 23-24 will be closed
- 7) Chek the system functionality monitoring the signals as indicated in the figures 4,5,6 (pag. 3 manual)

Monitoring with a simulation of faulty stopping element

- 1) Install all the appropriate out of serving signalling at each floor
- 2) Check that nobody is in the car
- 3) Deactivate the landing call
- 4) Shortcircuit the input R1,R2 as indicated fig.2 (AnnexA)
- 5) Send an impulse to T1 and/or T2
- 6) The NCUM will pen the outputs 13-14 and/or 23-24 that there will be not closed automatically
- 7) Check the system functionality monitoring the signals as indicated in the figures 4,5,6 (pag. 3 manual)

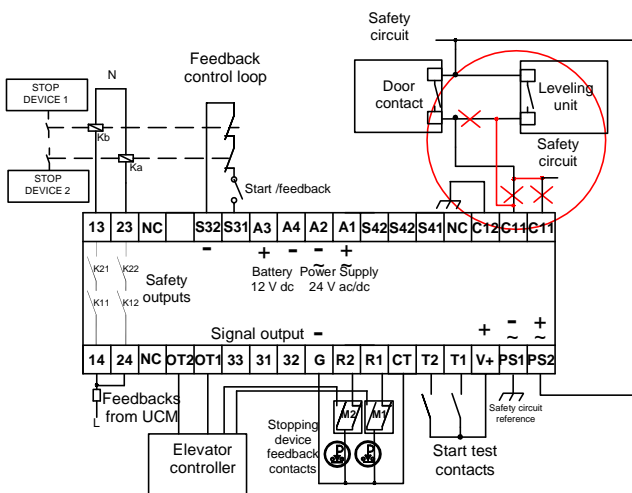


FIG. 1 Uncontrolled movement test

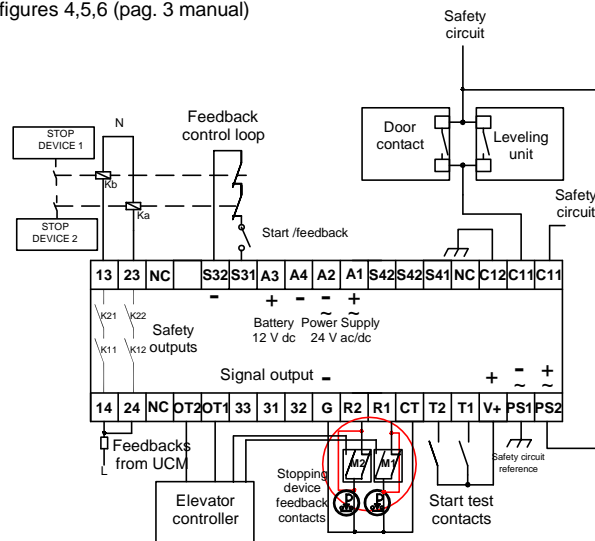


FIG. 2 Fault simulation of the stopping element