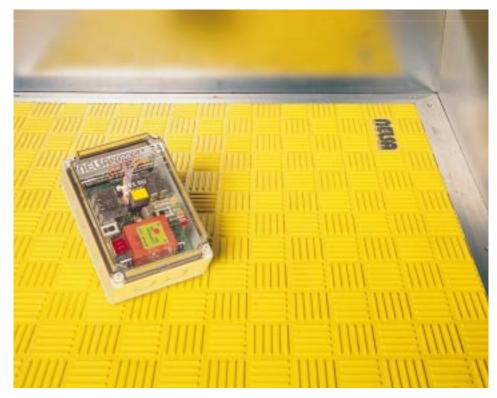


Pressure Sensitive Safety Mats

model: Eurozone



nelsa Eurozone pressure sensitive safety mats

((

EC Type certification

Third party certification to EN 1760-1, EN 954-1 category 3 & EN 60204-1

The ultimate presence sensing system for area detection

Overall sensitivity including uniting trim

Completely failsafe system with cross monitored control unit

Rugged construction - will take the weight of a 3 ton forklift truck

Sealed to IP67 - washdowns are no problem

Vinyl construction - resistant to most oils

The Nelsa Eurozone system has been developed to meet the stringent specifications laid down by both legal requirements and industrial necessity.

The Eurozone system combines sound engineering practice with a unique innovative construction process to give maximum reliability and safety. The mat has been designed from the "ground up" to meet the arduous conditions found on the factory floor, and uses tried and trusted components and techniques throughout. The mats are available in a wide range of standard sizes to meet most

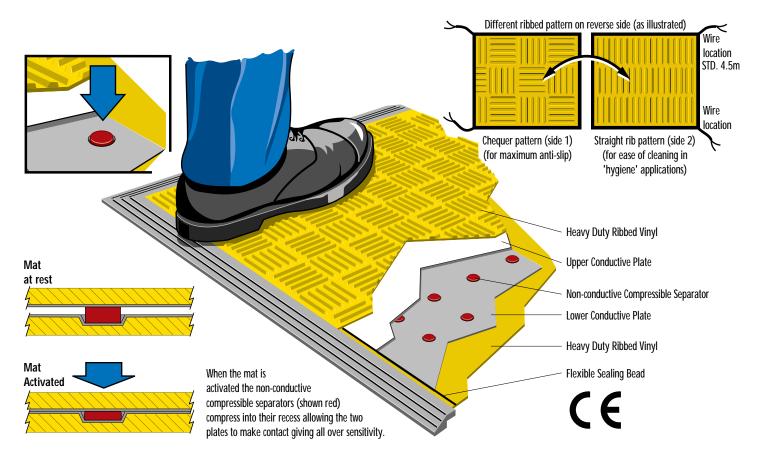
requirements quickly and economically. Special sizes and shapes can be supplied to meet the requirements of any application.

The mat has two conductive treated plates that are held apart by non conductive compressible separators. Each 4 wire mat, operating on only 24V DC is pre-wired, and connected in series with any other mats forming a complete floor level guarding system for the hazardous areas. The circuit through the mat is monitored by the Eurozone Control Unit which, when the area is clear, provides a signal to the machine control circuit.

application examples







When a mat is stepped on, the conductive plates touch and the resistance in the circuit falls to zero. This is monitored by the Control Unit, which shuts the machine down. The unique molding process ensures the long life and reliability of the mat.

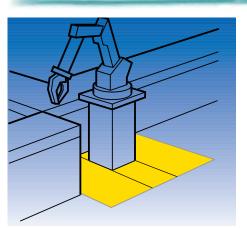
Being completely sealed (IP67), water, liquids and coolants present no problem. In addition the tough vinyl will resist bleaches, acids, salts and all but the most aggressive of industrial chemicals. Whether it is a machine tool, packaging machine, mechanical handling or food machine, the Eurozone system copes easily.

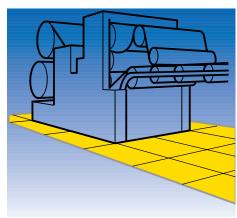
Easy To Install

Provided the floor is reasonably flat, clean and free from debris, installation is simple and economical. Lay the mats on the floor, with the uniting trim between the mats. Ensure lead wires from the mat are located conveniently to enable interconnection. Connect all mats together using the connectors supplied and lay wires around the perimeter of the mat area. Place the surface trim around the perimeter of the area, ensuring that none of the wires are trapped, and that the trim is notched to allow

the final wires to exit. Drill the floor and insert suitable fixings to secure the trim.

Interconnection of the mats to the control box is equally simple as only four wires exit the whole system and a minimum amount of technical expertise is required. Simple, no nonsense, installation. Fully illustrated installation instructions are provided.





takes a 3 ton forklift truck



page 2

Fax: (414) 423-8115

european standards

The Nelsa Eurozone mat system has been designed to conform with the European Standard EN 1760-1 "Safety of machinery - Pressure sensitive devices; mats and floors"

This standard contains requirements for all aspects of design. Some of the most important points are as follows:-

(From 4.2.2) Where an effective sensing area is built up from more than one sensor (mat) it shall have no dead zone.

The standard gives details of the size, force and positioning of test pieces for testing the mat sensitivity. (From 4.5.1) A single sensor (mat) shall still perform its function after one million actuations by a mass of 75kg.

(From 4.7) When the actuating force is applied the output signal switching device(s) shall change from an ON state to an OFF state. It shall remain in the OFF state for at least as

long as the actuating force is applied.

(From 4.7.1) Device with reset – b)After the actuating force has been removed, the output of the output signal switching device(s) shall only change to the ON state after the application of a reset signal.

(From 4.7.2) Device without reset – For a pressure sensitive mat without reset the output of the output signal switching device(s) shall change to an ON state at power ON and after the actuating force has been removed.

(From 4.15) The pressure sensitive mats shall meet the requirements of the category for which they are specified.....

NOTE: The Nelsa Eurozone mat system features an "active" mat and a dual channel monitoring fail-safe control unit. This means that any single electrical fault in the mat, wiring or control unit will be detected and the control unit will go to a safe (OFF) condition.

(From informative annex B.1.1)

The top (mat) surface should be of a material which will withstand the operating duty.....
The top surface should not present a risk through becoming slippery due to wear or the effects of liquids....

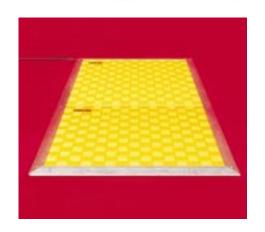
(From informative annex B.1.7)

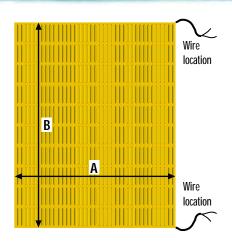
In some situations, heavy loads (such as fork lift trucks) can be applied to the sensor (mat)..... If this is required the user should identify the need to the mat manufacturer.

NOTE: The standard Nelsa Eurozone mat can be successfully used with fork lift trucks, as illustrated.

The Nelsa Eurozone mat system should be installed in accordance with the requirements of pr EN 999 - 'The positioning of protective equipment in respect of approach speeds of parts of the human body'.

mat sizes

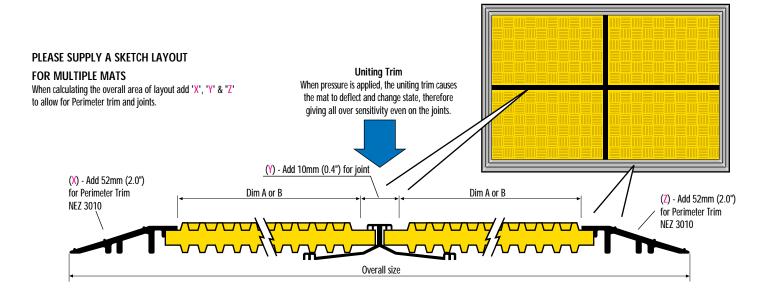


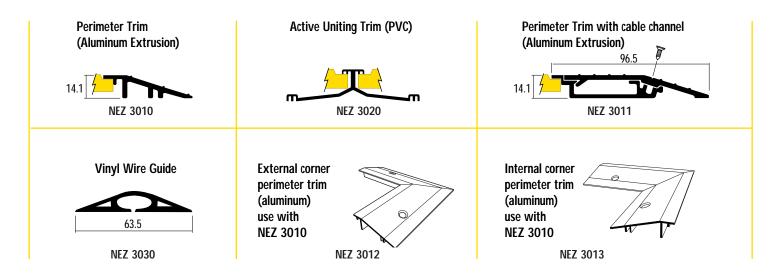


Nominal standard sizes

Model No.	Α	В
NEZ 1010	500mm (19.7")	500mm (19.7")
NEZ 1030	500mm (19.7")	1500mm (59.1")
NEZ 1510	750mm (29.5")	500mm (19.7")
NEZ 1515	750mm (29.5")	750mm (29.5")
NEZ 1530	750mm (29.5")	1500mm (59.1")
NEZ 2010	1000mm (39.4")	500mm (19.7")
NEZ 2015	1000mm (39.4")	750mm (29.5")
NEZ 2020	1000mm (39.4")	1000mm (39.4")
NEZ 2025	1000mm (39.4")	1250mm (49.2")
NEZ 2030	1000mm (39.4")	1500mm (59.1")

measuring for installation





nelsa Eurozone control unit



The Eurozone Control Unit monitors all of the mats which are connected together to form the safeguarded zone which may be a total of 100m² and made from any number of mats. It interfaces with the control circuit of the machine and includes two safety relays to ensure control redundancy.

Detects - Presence on the mat

- Short circuit
- Open circuit

Cross monitored output with redundancy Auto/Manual reset Selectable input voltage

DIN rail mounting model Model No: NEZ 4000

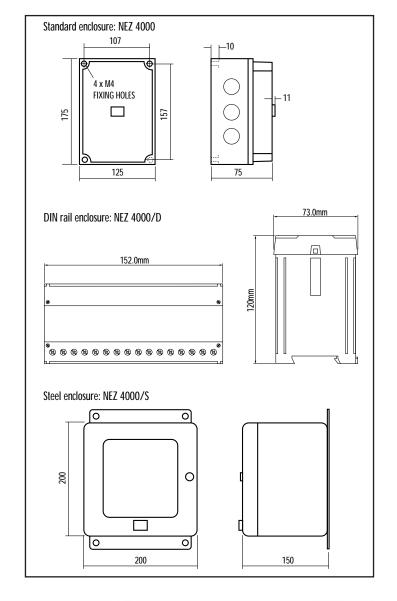
IP65 Polycarbonate enclosure

Model No: NEZ 4000

IP 65 steel enclosure

NMEA 12

Model No: NEZ 4000



chemical resistance

CHEMICAL RESISTANCE OF SENSOR MAT VINYL COVERING						
Substance	_	Resistance of mat covering				
WATER	-	EXCELLENT				
ETHYL ALCOHOL	_	EXCELLENT				
SODIUM CHLORIDE	-	EXCELLENT				
BLEACH	_	EXCELLENT				
HYDROCHLORIC ACID	-	FAIR to EXCELLENT				
SULPHURIC ACID	_	FAIR to EXCELLENT				
NITRIC ACID	_	FAIR to EXCELLENT				
ACETIC ACID	-	FAIR				
PETROL (GASOLINE)	_	FAIR				
TRICHLORETHYLENE	_	FAIR to POOR				
BENZENE	_	POOR				
ACETONE	_	POOR				

In general the covering has excellent resistance to acids, alkalis and salts.

Hot acids and alkalis, as well as concentrated and organic acids, have a deleterious effect on prolonged exposure. The covering has fair resistance to aliphatic solvents, fair to poor resistance to aromatic and chlorinated solvents and poor resistance to ketones and most esters.

NOTE: Combinations of chemicals can have unpredictable effects. Testing is recommended in such cases. Small pieces of the vinyl material are available from Nelsa inc. if testing is required.

safety distance calculations

The minimum distance calculated is the minimum horizontal distance from the outer edge of the Eurozone sensor mat detection zone to the nearest part of the hazard.

The prEN 999 formula for floor mounted safety mats is

 $S = (1600 \times T) + 1200 mm$

S is the minimum safety distance in millimetres

The factor of 1600 is based on the standard assumption

of 1600mm/s as the approach speed.

T is the overall stopping time in seconds

The added 1200mm takes into account stride length and arm reach

SPECIFICATIONS

CONTROL UNIT

Conformity: EN 1760-1, EN 60204-1: EN954 -1: CATEGORY 3 Response time (mat pressed to safety output contacts open): 35mS.

Environmental protection: IP65 Impulse withstand voltage: 2500V.

Contamination level: III.

Min. switched current/voltage: 10mA/10V.

Power supply - user select: 110V/230V AC or 24V AC/DC. +10% -15%.

110V setting also enables use at 100V ±15%

Power consumption: <9 VA 6W.

Relay outputs: 2 x independent voltage free N/O safety contacts - Fuse externally.

Max. external output fuse - : 5A (quick acting) 1 x voltage free N/C auxiliary contact

Utilisation category (AC): 4A/250VAC/500VA at COSØ=1.

Max. switched DC current: 2A/30VDC/60W
Outputs: Remote reset/indicator: 24V DC / 0.24W

Inputs: External contactor monitoring & Remote reset switch (2 x N/O)

Indication LEDs: Auto Reset Mode - Green / Power - Green

Manual Reset Mode - Green / Machine Enabled - Green

External controls: Reset (optional)

Internal controls: Voltage selector & Manual reset mode/Auto reset mode selector.

Internal supply fuses: 500mA (2off).

Ambient temperature range: -10°C to +45°C

Humidity: 0-90% RH at +50°C.

Vibration: Tested in accordance with IEC 68-2-6, frequency range 10 - 55Hz, displacement 0.15mm, 10 cycles per axis, sweep rate, 1 octave per minute.

Control unit case material: Polycarbonate

Weight: 870g.

SENSOR MAT

Sensor mat conformity: EN 1760-1, EN954 -1: CATEGORY 1 Minimum weight of person with assured detection: 35Kg

Maximum detection zone: 100m²

Maximum number of individual mats: No limit (up to max 100m²)

Maximum total length of connection wires: 200m

Mass / m² (sensor mats): 24Kg

Environmental protection mats: IP66/IP67 - dust sealed, jet sealed,

temporary immersion proof. Mechanical life: 10⁵ operations. Humidity: 0 - 100% RH

Sensor mat outer covering material: Vinyl.

The system comprising interconnected sensor mats and control unit meets the requirements of EN 954-1 Category 3 when installed according to the information for use.

The overall stopping time T is made up of two parts: T = t1 + t2

t1 is the maximum time between actuation of the sensing function and the output signal switching devices being in the OFF state.

For the Eurozone, t1 = 35mS

t2 is the response time of the machine i.e. the time required to stop the machine or remove the risks after receiving the output from the Eurozone.

The response time of the machine used in the calculation needs to be the worst case time. Some machines have inconsistent response times which are dependent upon mode of operation, nature of the workpiece and point in the operating cycle at which stopping is initiated. An allowance should be made for wear in brakes etc, if this can affect the response time. An allowance for further delays in the machine control system may be required in some circumstances.

CALCULATION EXAMPLE

In this example the Eurozone is being used with a machine whose worst case response time has been measured as 0.485 seconds.

Using the formulae above,

T = t1 + t2 $S = (1600 \times 0.520) + 1200 \text{mm}$ = 35mS + 485mS = 832 + 1200 mm = 2032 mm

= 520mS = 0.520S

Sensor mats will be required from 2032mm right up to the edge of the machine baseplate.

Telephone: (414) 423-8121

Sensitive Edge System



EC Type certification

Conforms to Pr EN 1760-2 & EN 954-1 Category 3

UL & CSA approved

Failsafe system

Up to 50 metres on one control unit

90° corner units fully sensitive as standard, other angles available

Can be radiused to 200mm

Fully redundant & cross monitored control unit

High resistance to abrasion

Suitable for outdoor use, specify when ordering

"C" rails "C" rail C112/A can be supplied curved to meet most applications



safedge

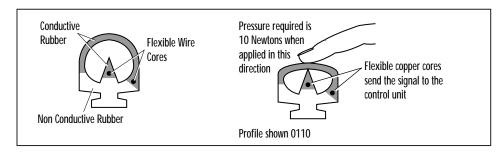
This new type of sensitive edging system is ideal as a safety sensor in applications such as power operated doors, guided vehicles and moving machinery beds etc. It can provide a continuous line of high sensitivity touch sensing along or around practically anything. Light pressure from any direction through 90° on the profile will cause the control unit to stop or reverse motor driven movement or sound an alarm. It is easy to fit and totally flexible so it keeps bouncing back into shape even after repeated heavy crushing forces.

The secret of the Safedge's ability to out perform competition lies in its innovative design. It uses a combination of non conductive rubber and flexible wire cored conductive rubber bonded together to form a variety of perfectly flexible and energy absorbing profiles.

The Safedge has no rigid internal parts which can "break through" or cause fatigue failures after prolonged use. The copper wire core throughout the length of the strip (up to 50m) ensures that there are no problems of resistance build up on long lengths.

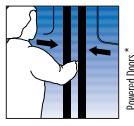
A Control Unit is available with two channel failsafe electronics with 100% redundancy and will give guaranteed isolation of machine power if anything presses on the profile. It will also initiate power isolation in the event of component or power supply failure, or if the profile or connecting wire is severed.

The Safedge profile slides into a "C" rail which is fixed to equipment to be guarded. A range of accessories is available for end termination and corner joints with a choice of eight different sensing profiles.



Fax: (414) 423-8115

application examples



owered Doors



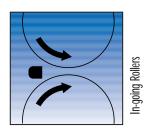
Roller Doors



Crushing Hazards



Consider sealing lip (below) or profile covered system (page 10).

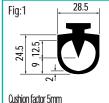


Anti-climb Sensing

Jehicle Sensing

safedge strip profiles

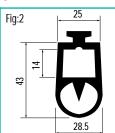
The Safedge is available in 9 different profiles. Straight sections are fixed using the "C" section mounting rail. The profile can also be bent to a minimum radius of 200mm. Various cushion factors are offered for applications where "over travel" may be experienced. NOTE: All profiles below with the exception of N24 0110N are manufactured from EPDM - Ethylene Propylene Diene Modified Rubber. The profile in Fig:2 is manufactured from NBR/CR - Acrylonitrile (nitrile) Butadiene Rubber/Chloropriene Rubber, petrol and wear and has a high resistance to abrasion.



N24 0110 N24 01101: Increased resistance

to conductive fluids

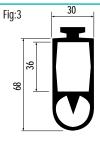
N24 0110N: Increased resistance to oil



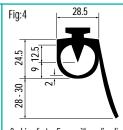
Cushion factor 19mm

N24 1610

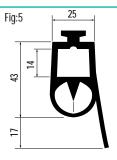
N24 1610N: Increased resistance to oil



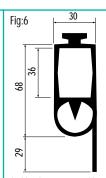
Cushion factor 41mm N24 0310



Cushion factor 5mm with sealing lip N24 0510

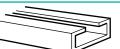


Cushion factor 19mm with sealing lip N24 0804



Cushion factor 41mm with sealing lip - N24 0210

"C" rails available



"C" rail- aluminum C112/A

N24 1212 Suitable for the fixing of all the Safedge Profiles.



"C" rail- zinc coated steel C112/S N24 1112

Suitable for the fixing of all the Safedge Profiles.



"C" rail- PVC - C112/PB = Black, C112/PR = Red or C112/PY = Yellow N24 1212PB, N24 1212PR or N24 1212PY Suitable for the fixing of all the Safedge Profiles. 3 colours available



"C" rail- aluminum C112/A3 N24 1215

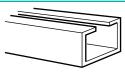
Ideal when external fixing of "C" rail is required. Accepts all profiles



N24 1214 Ideal when external fixing of "C" rail is

required. Accepts all profiles

20





"C" rail- aluminum C112/A4 N24 1216

Deeper rail allows cables to be run through channel under safedge profiles. Accepts all profiles

ALL "C" RAILS ARE SUPPLIED WITHOUT FIXING HOLES.

safedge control unit



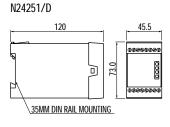
The failsafe Control Unit monitors the status of the Safedge profile and provides an output of two fully cross monitored relays with complete redundancy.

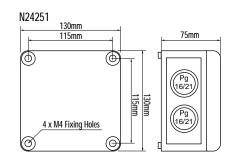
- Monitors up to 50m of Safedge profile
- Two safety relay outputs
- A changeover auxiliary relay
- Auto/Manual reset
- Indicators for RUN, STOP and FAULT CONDITIONS
- Provides contactor monitoring
- Supply Voltages- 240Vac, 110Vac, 24Vac, and 24Vdc as standard on one control unit. Other voltages available
- Control Circuit Voltageall relay outputs are volt free
- IP 65 enclosure N24251
 IP 40 DIN rail N24251/D

ordering details

Control Unit	Supply Voltage					
N24-251	230Vac	110Vac	24Vac	24Vdc		
N24251/D	230Vac	110Vac	24Vac	24Vdc DIN Rail		

chemical resistance





SPECIFICATIONS

Power Supply: 110/230V AC and 24V AC/DC.

Power Consumption: <6VA.

MC-MC Contactor monitoring Loop: Normally closed contactor loop.

Safety inputs: Safedge Profile (open res. 6K8).

Safedge Profile voltage: Maximum operating voltage profile 12V DC (open circuit)

Nominal operating voltage: 4V (run condition).

Internal fuses: 2 x 2A Safety fuses, 500mA supply Fuse.

Internal switches: Mains selector switch.

Relay outputs: 2 N/O safety and 1 N/C aux.

Aux must not be used for safety circuit.

Utilisation Cat.(AC): 2 A / 250V AC / 500V A at COSØ = 1 Max. switched DC current/voltage: 1 A / 30V DC / 30 W.

Min. switched current/voltage: 10 mA / 10V.

Max. output fuse: 2 A Quick acting Indication LED 1: Green: Run.

LED 2: Yellow: Open.

LED 3: Red: Stop.

System response time: 13ms Impulse withstand voltage: 2500V.

Over voltage: Category 2.
Operating temperature

Safedge control unit: -10°C to + 55°C.

Safedge Profile: -5°C to +55°C except profile 01610N (0°C to 55°C)

Contamination level: III. Humidity: 90% RH at + 55 °C.

Enclosure protection: IP 65 (std enclosure), IP 40 (DIN rail enclosure)

Max. conductor size: 1 x 1 $\,\mathrm{mm^2}$ stranded with sleeves stripped

5mm, 1 x 1.5mm² solid conductor.

Terminals: Minus terminal screws M2 spring action.
Weight: (IP 65 controller) 534g - (IP 40 controller) 450g
Material and colour: Clear lid, beige base polycarbonate.
Installation group: C in accordance with VDE 0110.

Fixing details: 4 Screws 95mm centres.

Miscellaneous: The Safedge Profile must be terminated with a 68K resistor.

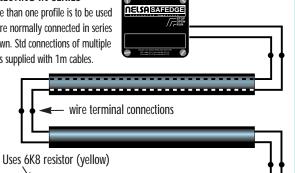
CHEMICAL RESISTANCE OF SAFEDGE PROFILE							
Substance	- Resistance -	Resistance -	Substance	Resistance -	Resistance -		
	Std. Profile EPDM	"N" Profile NBR/CR		Std. Profile EPDM	"N" Profile NBR/CR		
ACETIC ACID (10%)	- GOOD	GOOD	NITRIC ACID (10%)	- GOOD	FAIR		
ACETONE	- GOOD	FAIR	PETROL	- POOR	FAIR		
AMMONIUM HYDROXIDE (35%)- GOOD	GOOD	SILICONE FLUIDS	- GOOD	GOOD		
BENZENE	- POOR	POOR	SODIUM CHLORIDE (25%)	- GOOD	GOOD		
DIESEL OIL	- POOR	GOOD	TRICHLORETHYLENE	- GOOD	POOR		
ETHYL ALCOHOL (ETHANOL)	- GOOD	GOOD	VEGETABLE OILS (GENERAL)	- GOOD	GOOD		
HYDROCHLORIC ACID (10%)	- GOOD	GOOD	WATER (DISTILLED)	- GOOD	GOOD		
LUBRICATING OIL	- POOR	GOOD	WATER (SEA)	- GOOD	GOOD		

connection in parallel & series

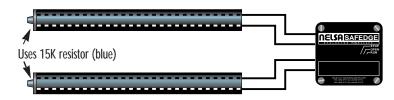
STANDARD CONNECTION METHOD

CONNECTING IN SERIES

If more than one profile is to be used they are normally connected in series as shown. Std connections of multiple lengths supplied with 1m cables.



ALTERNATIVE CONNECTION METHOD



CONNECTING IN PARALLEL

A maximum of two profiles can be connected in parallel to assist in ease of wiring in certain applications.

IF MULTIPLE PROFILES ARE TO BE USED A SKETCH WOULD OFTEN HELP. CONNECTION DETAILS MUST BE STATED AT TIME OF ORDERING

alternative cable termination



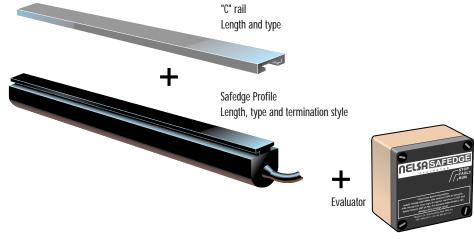


N.B. - Standard End Terminations will be supplied unless otherwise specified

RHT - Right Hand Termination

Note: When cables are fitted in the side of the profile a Grommet is used.

how to order factory assembled systems



Our Profile is supplied with 1 metre of cable connected from one end as standard. Longer lengths are available. Alternative cable terminations are shown on page 10.

Example shown Profile 0110 x 2.0 metres 'SET' termination "C" Rail 112/A x 2.0 metres N24251 Evaluator

IF MULTIPLE PROFILES ARE TO BE USED A SKETCH WOULD OFTEN HELP.

accessories



AXIAL CONNECTOR 006/1 N24 006/1 With this connector you can connect directly two profiles. Suitable for 0110, 0110N and 0110I profiles.

COILED CONNECTION CABLE

N24 2450 - 2.5m (extended) of flexible coiled cable.

N24 2700 - 3.5m (extended)

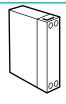
of flexible coiled cable. Typical use - when Safedge is mounted on

moving machine guard or door.



CONNECTION BOX - N24 0116 Polycarbonate housing 53 x 35 complete with two pole terminal and trumpet type screw on connector with strain relief clamp.

For use with coiled cable.



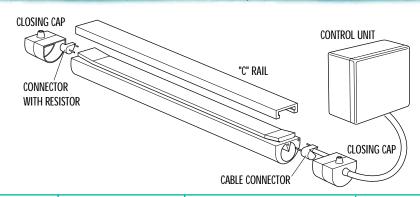
DELAY TIMER N24 2001 Provides a 0.8 sec. delay at evaluator resetting. IP20 Terminals, IP40 Mounting. Din rail mounting EN50022 (for supplied adaptor plate).

24V to 240V. 1 x 2 way output. Dimensions 22.5 x 70 x 110.

Typical use - for reversing roller shutter doors.

safedge in component form & alternative components

Some OEM's may prefer to assemble the Safedge themselves. The Safedge can be supplied in rolls which the customer can cut to size and terminate. The components below are already included in the assembled profile as ordered on opposite page.





CABLE CONNECTOR 130
With connecting cable as shown.
Cables available in 1, 2 and 10 metres
N24 1301 = 1metre

N24 1301 = 1metres

N24 1305 = 5metres

N24 1306 = 10metres

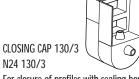
N24 1307 = 15metres



CONNECTOR with resistor
Single length or series connection:
N24 1308 = 6K8 colour yellow
Parallel connection:
N24 1309 = 15K colour blue



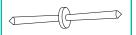
CLOSING CAP 130/2 N24 130/2 CLOSING CAP 130/2N material: NBR/CR



For closure of profiles with sealing border for closing the coasting chambers of profiles 003.10 and 016.10. CLOSING CAP 130/3N Material NBR/CR



AXIAL CONNECTOR 006/1 N24 006/1 With this connector you can connect directly two profiles. Suitable for 0110 and 0110I profiles.



STRAIGHT PIN CONNECTORS N24 0004 For profiles 0310 and 1610. Kit contains 1 pair of pins suitable for 1 joint. 90° CORNER CONNECTOR (horizontal)

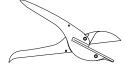
007/1 for use with profile 0110 007/1N for use with profile 0110N 007/1I for use with profile 0110I 007/3 for use with profile 0310 007/4 for use with profile 1610 007/4N for use with profile 1610N



007/2 for use with profile 0110 007/2N for use with profile 0110N 007/2I for use with profile 0110I 007/6 for use with profile 0310 007/5 for use with profile 1610 007/5N for use with profile 1610N



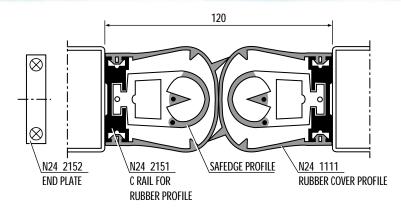
CYANOACRYLATE ADHESIVE N24 0020 Contents: 2g. Sufficient for approx. 15 terminations.



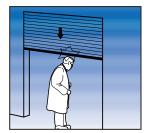
SHEARS - N24 3084 Suitable for cutting profiles 0110, 0110N, 0110I

rubber covered profile system - for door applications









The Rubber Covered Profile System is ideal for use on door applications. The cover allows movement to form a seal without tripping the device and is suitable for outdoor applications. Suitable for 0110 or 1610 Profiles. Specify the Safedge system in the normal way replacing the standard C Rail with C Rail N24 2151 by length, + Rubber cover profile N24 1111 by length, + End plate N24 2152 per end.

Your local distributor is



6179 Industrial Court
P.O. Box 18 , Greendale, WI 53129-0018
E-mail: general@nelsa.com
Web site: www.nelsa.com

Pub. No: 1282C Telephone: (414) 423-8121 Fax: (414) 423-8115