

SOLUTIONS FOR TUNNELS

BOXES AND CONNECTORS

JUNCTION BOXES

MODEL	APPLICATION	CONDUCTOR SECTION
 EXPRESS® XL	STANDARD LIGHTING	From 2.5 mm ² to 35 mm ²
 EXPRESS®	STANDARD LIGHTING	From 2.5 mm ² to 35 mm ²
 B2 FIRE-RESISTANT	EMERGENCY LIGHTING	From 1.5 mm ² to 6 mm ²
 EXPRESS® XL FIRE-RESISTANT	EMERGENCY LIGHTING	From 4 mm ² to 35 mm ²
 EXPRESS® FIRE-RESISTANT	EMERGENCY LIGHTING	From 4 mm ² to 35 mm ²
 EQINOX FIRE-RESISTANT	EMERGENCY SIGNALLING, SIGNPOSTING	From 25 mm ² to 120 mm ²

BOXES AND CONNECTORS

MODEL	APPLICATION
 FIRE DEPARTMENT BOX	SAFETY REFUGE
 SAFETY BOXES	SAFETY REFUGE
 DS F400	FANS AND SMOKE VENTILATORS

CABLE	STANDARDS	PAGE
Through boxes with or without cable termination Multi conductors (Ø 13 to 29 mm)	/	p. 214
Through boxes with or without cable termination Single or multi conductors (Ø 9 to 28 mm)	/	p. 216
Through boxes with cable termination Single or multi conductors (Ø 2.5 à 25 mm)	NF C 32-070 (DIN 4102-12 to come)	p. 218
Through boxes with or without cable termination Multi-conductors (Ø 13 to 29 mm)	NF C 32-070 DIN 4102-12/E30	p. 220
Through boxes with or without cable termination Single or multi conductors (Ø 9 to 28 mm)	NF C 32-070 EN 50362	p. 222
Through boxes with cable termination Single or multi conductors	NF C 32-070 DIN 4102-12/E60	p. 224

FUNCTION	STANDARDS	PAGE
Connection of electrical equipment for rescue teams inside tunnels.	/	p. 226
Communication between different rescue teams inside tunnels.	NF C 32-070	p. 228
Local isolation for fans and smoke ventilators (400 °C/2h)	IEC/EN 60947-3 EN 12101-3	p. 230

SOLUTIONS FOR TUNNELS

MARECHAL ELECTRIC proposes a wide range of products dedicated to the electric connections for tunnels. Based on technology specially designed for such difficult environments and the quick disconnections of lights, MARECHAL ELECTRIC has already equipped more than 2 000 km of underground roads, railroads and inland waterways...

our objectives remain the same: to provide user safety, optimise maintenance and make the work of the emergency services easier.

PRODUCTS SUITED FOR SPECIAL TUNNEL ENVIRONMENTS

Very often in a tunnel, there is dust, stone projections, smoke, gas, moisture, water streaming and, of course, pollution. Electric connections in tunnels are subjected to extremely corrosive conditions. Designed to withstand such conditions, MARECHAL® boxes equipped with connectors or deconnectors provide safe solutions for tunnel maintenance.

WATERTIGHTNESS

All boxes are watertight and withstand the use of high-pressure washing during tunnel maintenance.

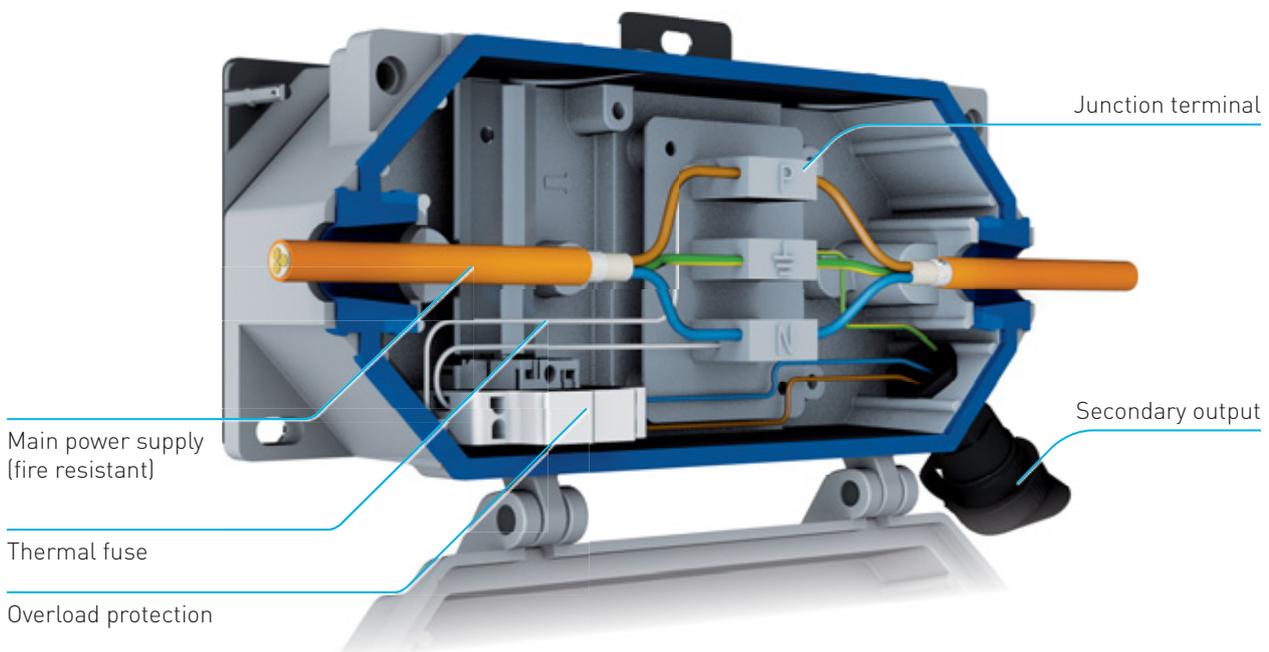
CORROSION AND IMPACT RESISTANCE HALOGEN AND SMOKE FREE

For optimum safety, the materials used for making Marechal® boxes and connectors are resistant to corrosion and impact (resistance IK09). In case of fire, these materials emit a limited amount of non dangerous smoke.

QUALITY CONNECTION AND EASY DISCONNECTION: USE OF BUTT-CONTACTS

Easy disconnection = easy maintenance: thanks to the MARECHAL® silver-nickel butt-contact technology, the contacts never weld. Therefore, the connection quality remains absolutely stable, and the disconnection can be done any time, even after several years.

TYPICAL WIRING DIAGRAM OF OUR JUNCTION BOXES.





STANDARDS AND CERTIFICATIONS

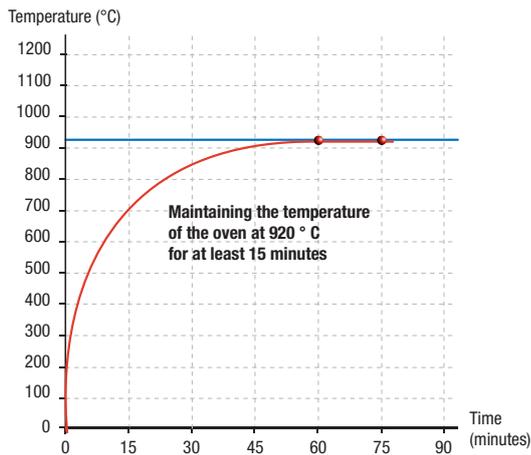
The use of Marechal solutions for tunnels facilitates the compliance of your infrastructure to:

- European Directive 2004/54/EC relating to tunnels in the road networks across Europe in terms of safety measures,
- for the transposition of the European Directive,
- in France:
 - to the application of text in the Highway Code relating to the safety of people in tunnels, as well as to inter-ministerial circulars No 2006-20 and 2000-63 (Annexe 2) on safety in tunnels and road networks.

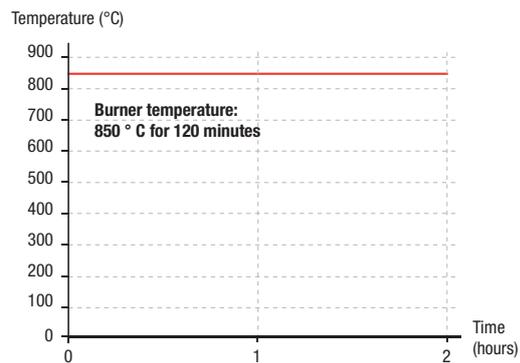
- the requirements of the CETU guide defining the behaviour of fire in road tunnels,
- according to the text relating to the Transport Code in terms of safety equipment.

MARECHAL® solutions for tunnels are compliant with the following fire resistance standards:

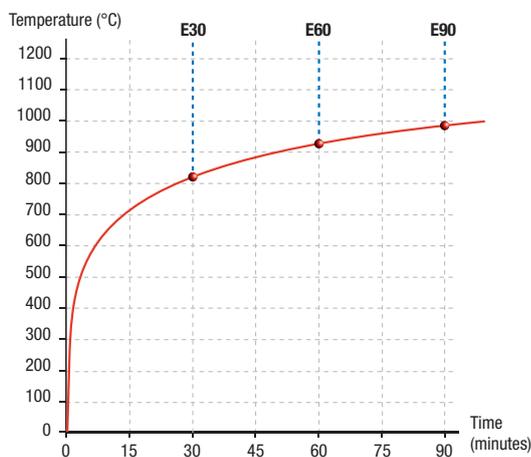
- EN 50362 (Europe) tested by the IMQ Italy laboratory,
- NF C 32-070 (France) tested by the laboratory C.S.T.B France,
- DIN 4102-12 (Germany) tested by the laboratory MPA Dresden GmbH,
- EN 12101-03 (Europe) tested by the laboratory EFECTIS France.



**Oven temperature curve - Standardized time
NF C 32-070 standard**



**Flame temperature curve - Time
NF EN 50362 standard**



**Over temperature curve - Time
DIN 4102 standard**

STANDARD LIGHTING

BOX EXPRESS® XL



IP66



GRP



IK09

OTHER FEATURES

Service terminals	2 to 5 insulation-piercing.
Service protection	By circuit breaker fitted to DIN rail.
Cables accepted	Armoured and unarmoured cables, stranded or flexible, from 2,5 mm ² to 35 mm ² , with an external diameter 13 to 29mm. Configuration with cable cut is also possible.
Earthing point	Inside and outside the enclosure.
Fire smoke class	M1F0
Self extinguishing material	UL94 V-0
Modularity box Options Other equipment	<ul style="list-style-type: none"> • Secondary line wiring with MARECHAL® socket-outlet. • Accessories for fixing box to cable tray or ladder (option). • "Power On" signal light (option).

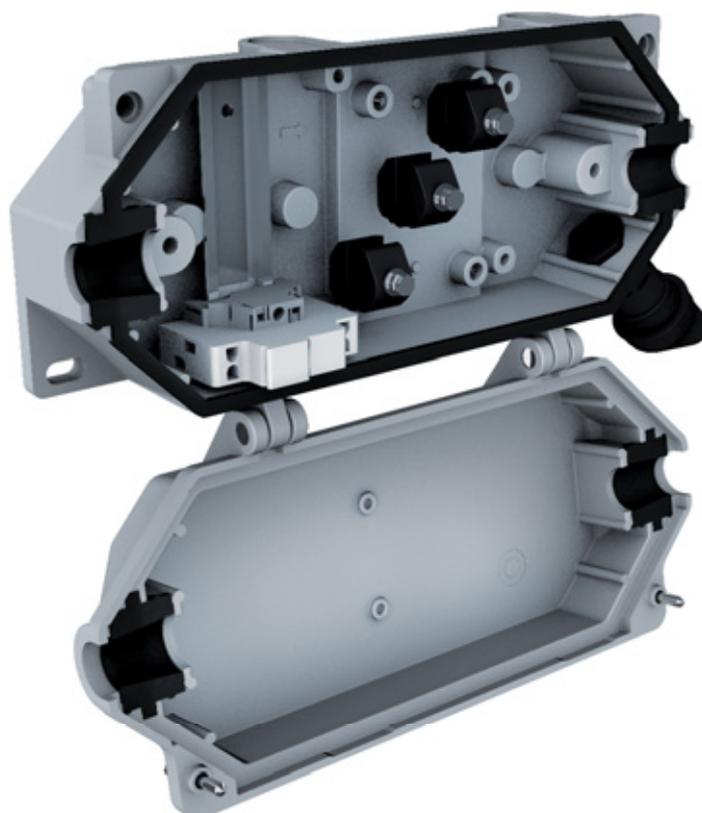
REFERENCES AND DIMENSIONS

JUNCTION BOX WITH OR WITHOUT THE NEED TO CUT THE CABLE

Made from halogen-free glass fibre reinforced polyester compound, these boxes allow a service tap-off from the main through cable with or without the need to strip or cut the main cable. Gaskets allow the immediate positioning of cables with a maximum diameter of 29 mm whilst creating an IP66 seal. The box lid mounted on a stainless steel axis is fixed to the box by means of captive stainless steel screws.

BOX EXPRESS® XL

Type	H x W x D in mm	Distribution
91250	175 x 362 x 99	- Maximum 2 tap-offs using 2 sockets - Maximum 4 tap-offs using glands



STANDARD LIGHTING

BOX EXPRESS®



IP66



GRP



IK09

OTHER FEATURES

Service terminals	2 to 5 insulation-piercing.
Service protection	By circuit breaker fitted to DIN rail
Cables accepted	Armoured and unarmoured cables, stranded or flexible, from 2,5 mm ² to 35 mm ² , with an external diameter 9 to 28 mm. Configuration with cable cut is also possible.
Earthing point	Inside and outside the enclosure
Fire smoke class	M1F0
Self extinguishing material	UL94 V-0

Modularity box
Options
Other equipment

- Secondary line wiring with MARECHAL® socket-outlet.
- Accessories for fixing box to cable tray or ladder (option).
- "Power On" signal light (option).
- Plate for external fixing.
- Gasket for two cables*.

*Contact us for more details.

REFERENCES AND DIMENSIONS

JUNCTION BOX WITH OR WITHOUT THE NEED TO CUT THE CABLE

Made from halogen free glass fibre reinforced polyester compound, these boxes allow a service tap-off from the main through cable with or without the need to strip or cut the main cable. "Snail" type gaskets allow the immediate positioning of cables with a maximum diameter of 28 mm whilst creating an IP66 seal. The box lid, fitted with a retaining cord, is fixed to the box by means of captive stainless steel screws.

BOX EXPRESS®

Type	H x W x D in mm	Distribution
91150	191 x 254 x 111	<ul style="list-style-type: none"> - Maximum 2 tap-offs using 2 sockets - Maximum 4 tap-offs using glands

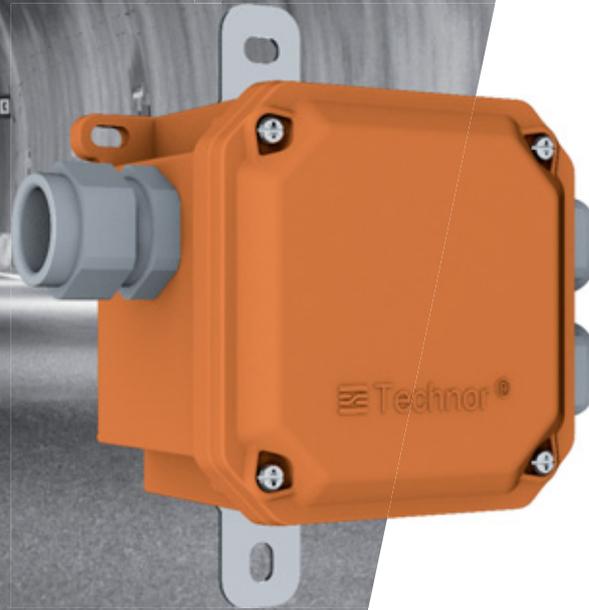


EMERGENCY LIGHTING

BOX B2 FIRE-RESISTANT

NF C 32-070 (DIN 4102-12 TO COME)

NEW



IP66
IP67



2 x 1,5 mm²
to 5 x 6 mm²



GRP



IK08



E90

OTHER FEATURES

Electrical continuity of the main power supply is guaranteed according to NF C 32-070 (DIN 4102-12 to come).

Service terminals	2 to 5 ceramic-isolated steel junction terminals mounted on a specific stainless steel rail fixed to the wall through a stainless steel base plate.
Cables accepted	Armoured and unarmoured cables, stranded or flexible, from 1.5 mm ² to 6 mm ² .
Earthing point	Inside and outside the enclosure.
Modularity box Options Other equipment	<ul style="list-style-type: none">• Secondary line wiring with MARECHAL[®] socket-outlet*.• Accessories for fixing box to cable tray or ladder.

*Contact us for more details.

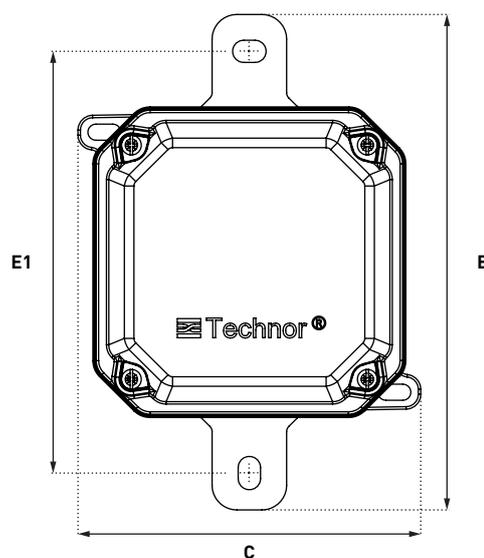
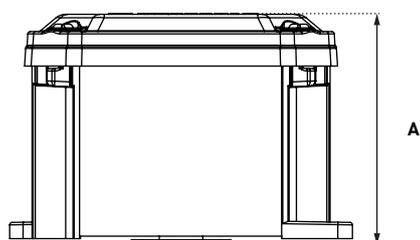
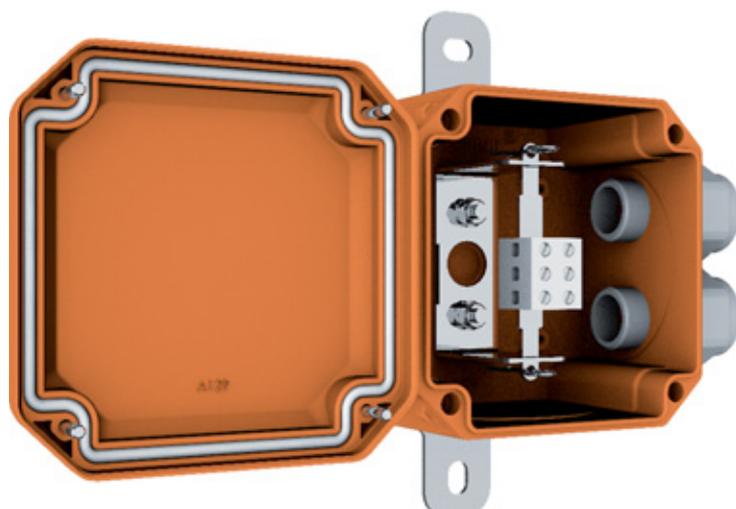
REFERENCES AND DIMENSIONS

FIRE-RESISTANT JUNCTION BOX

Made from polyamide, these boxes ensure the junction between one or more main through fire-resistant cables. The interconnection of crossing cables is performed thanks to ceramic-isolated steel junction terminals mounted on a specific steel rail. The box lid, which can be mounted on hinges as an option, is fixed by means of captive stainless steel screws.

BOX B2 FIRE-RESISTANT

Reference	W x H x D in mm	Distribution
91321	120 x 120 x 91	Maximum 4 tap-offs using glands
91361	160 x 160 x 91	Maximum 4 tap-offs using glands



	A	E1	B	C
120x120	94	171	201	138
160x160	94	215	245	178

EMERGENCY LIGHTING

BOX EXPRESS® XL
FIRE-RESISTANT

NF C 32-070
DIN 4102-12



IP66



GRP



IK09



NF C 32-070
DIN 4102-12

OTHER FEATURES

Electrical continuity of the main line is guaranteed according to NF C 32-070/DIN 4102-12 - E30 classification.

Tapping terminals	Quantities : up to 5 stainless steel terminals Technology: Insulation piercing terminal, fixed on a ceramic base (NF C 32-070/DIN 4102-12), or aerial (DIN 4102-12). Fixing: Wall mounted stainless steel plate by means of the box's plate.
Tapping protection	By circuit breaker fitted to DIN rail
Cables accepted	Armoured and unarmoured cables, stranded or flexible, from 4 mm ² to 35 mm ² , with an external diameter 13 to 29 mm. Configuration with cable cut is also possible.:
Earthing terminal	Inside and outside the enclosure
Fire smoke class	M1F0
Self extinguishing material	UL94 V-0
Modularity box Options Other equipment	<ul style="list-style-type: none"> • Secondary line wiring with MARECHAL® socket-outlet. • Accessories for fixing box to cable tray or ladder (option). • "Power On" signal light (option). • Possibility to use non-perforating terminals.

REFERENCES AND DIMENSIONS

JUNCTION BOX WITH OR WITHOUT THE NEED TO CUT THE CABLE

Made from halogen-free glass fibre reinforced polyester compound, these boxes allow a service tap-off from the main through cable with or without the need to strip or cut the main cable. Gaskets allow the immediate positioning of fire resistant cables with a maximum diameter of 29 mm whilst creating an IP66 seal. The box lid mounted on a stainless steel axis is fixed to the box by means of captive stainless steel screws.

BOX EXPRESS® XL FIRE-RESISTANT

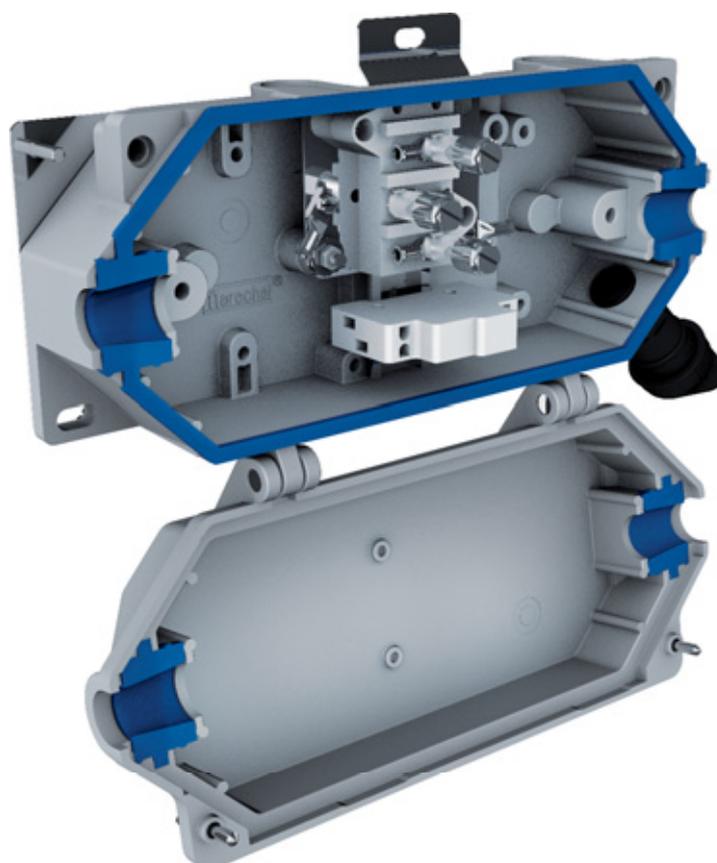
NF C 32-070

Type	Terminals	H x W x D in mm	Distribution
91251	Ceramic	175 x 362 x 99	- Maximum 2 tap-offs using 2 sockets - Maximum 4 tap-offs using glands

BOX EXPRESS® XL FIRE-RESISTANT

DIN 4102-12

Type	Terminals	W x H x D in mm	Distribution
91252 91253	Ceramic Loose	175 x 361 x 99	- Maximum 2 tap-offs using 2 sockets - Maximum 4 tap-offs using glands



EMERGENCY LIGHTING

BOX EXPRESS®
FIRE-RESISTANT

NF C 32-070
EN 50362
DIN 4102



IP66



GRP



IK09



NF C 32-070
EN 50362/E30 DIN 4102

OTHER FEATURES

Electrical continuity of the main power supply is guaranteed according to NF C 32-070/EN 50362 - 850°C/120min classification and DIN 4102 classification E30.

Service terminals

Quantités : Jusqu'à 5 bornes inox.
Technologie : Borne à perforation d'isolant, montée sur une embase céramique (NF C 32-070/EN 50362), ou volante (EN 50362).
Fixation : Platine inox, solidaire du mur par l'intermédiaire de la platine de fixation du coffret.

Service protection

By circuit breaker fitted to DIN rail

Cables accepted

Armoured and unarmoured cables, stranded or flexible, from 4 mm² to 35 mm² with an external diameter 9 to 28 mm.

Earthing point

Inside and outside the enclosure

Fire smoke class

M1F0

Self extinguishing material

UL94 V-0

Modularity box
Options
Other equipment

- Secondary line wiring with MARECHAL® socket-outlet.
- Accessories for fixing box to cable tray or ladder (option).
- "Power On" signal light (option).
- Possibility to use non-perforating terminals.
- Gasket for two cables*.

*Contact us for more details.

REFERENCES AND DIMENSIONS

FIRE-RESISTANT JUNCTION BOX

Made from halogen free glass fibre reinforced polyester compound or thermoplastic, these boxes allow a service tap-off from the main through cable without the need to strip or cut the main cable. "Snail" type gaskets allow the immediate positioning of fire resistant cables with a maximum diameter of 28 mm whilst creating an IP66 seal. The box lid, fitted with a retaining cord, is fixed to the box by means of captive stainless steel screws.

BOX EXPRESS® FIRE-RESISTANT

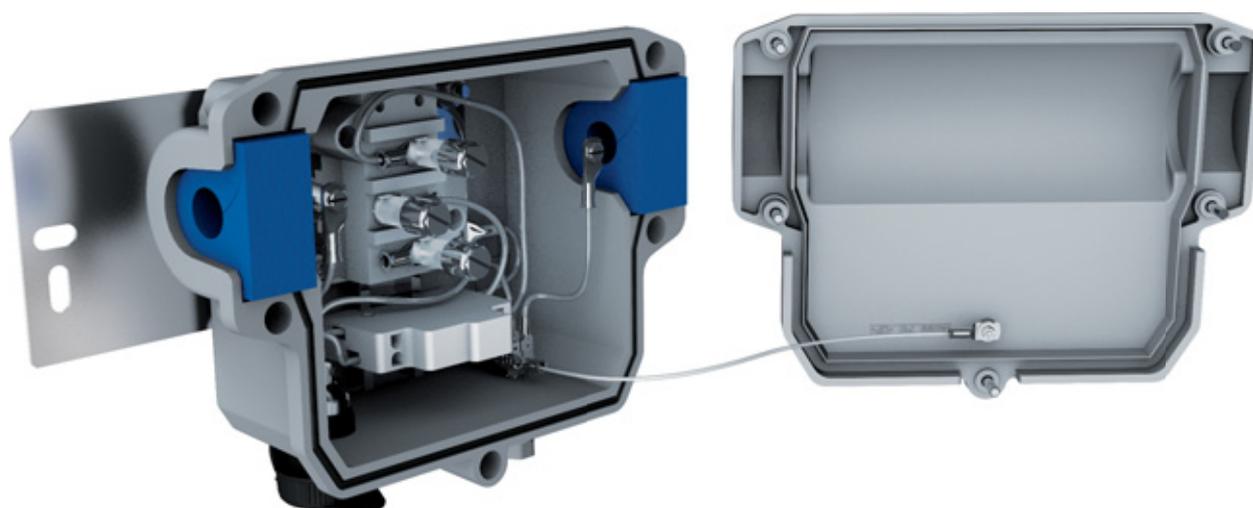
NF C 32-070

Type	Terminals	H x W x D in mm	Distribution
91151	Ceramic	191 x 254 x 111	- Maximum 2 tap-offs using 2 sockets - Maximum 4 tap-offs using glands

BOX EXPRESS® FIRE-RESISTANT

EN 50362

Type	Terminals	H x W x D in mm	Distribution
91154	Loose	191 x 254 x 111	- Maximum 2 tap-offs using 2 sockets - Maximum 4 tap-offs using glands



EMERGENCY SIGNALLING, SIGNPOSTING

BOX EQINOX FIRE-RESISTANT

NF C 32-070 + DIN 4102-12/E60

NEW



IP66/IP67



AISI 316L
STAINLESS STEEL



IK10



NF C 32-070
DIN 4102-12/E60

OTHER FEATURES

Electrical continuity of the main power supply is guaranteed according to NF C 32-070 (91141 type) and DIN 4102-12 (91142 type)

Service terminals	2 to 7 insulation-piercing, stainless steel terminals, fitted into a ceramic base.
Service protection	By circuit breaker fitted to DIN rail
Cables accepted	Armoured and unarmoured cables, stranded or flexible, from 25 mm ² to 120 mm ²
Earthing point	Inside and outside the enclosure
Fire smoke class	M0

Modularity box
Options
Other equipment

- Secondary line wiring with MARECHAL® socket-outlet.
- “Power On” signal light (option).

REFERENCES AND DIMENSIONS

FIRE-RESISTANT JUNCTION BOX

Made from AISI 316L stainless steel, these boxes ensure the junction between one or more main through fire-resistant cables (in compliance with NF C 32-070 or DIN 4102 or E30/E60/E90 type). Cable glands are fire-resistant and the inter-connection of crossing cables is performed thanks to stainless steel terminals mounted on ceramic plates. The box lid mounted on hinges is fixed by means of captive stainless steel screws.

BOX EQINOX FIRE-RESISTANT

Type	Norm	W x H x D in mm	Distribution
91141	NF C 32-070	140x200x130	Cable glands or MARECHAL® socket-outlets. Number of inputs/outputs depending on configuration.
91142	DIN 4102-12	200x270x130	
		270x350x130	
		350x350x160	
		350x500x160	
		500x500x160	



TUNNEL REFUGE POINT

FIRE BOXES



IP65
IP66/IP69



ALUMINIUM
GRP



IK09
IK09

OTHER FEATURES

Cables accepted

Armoured and unarmoured cables, stranded or flexible,
from 2.5 mm² to 25 mm²

Service protection

30 mA differential breaker

Earthing point

Inside and outside the enclosure

REFERENCES AND DIMENSIONS

ALUMINIUM BOX

Especially developed in collaboration with emergency services who specialise in tunnel rescue, this box is installed in a refuge point. Made from aluminium, this box is composed of a back plate, an inclined cover with mounted socket-outlets and an inspection window.

Power supply of this box is performed using 5G16 cables (max. conductor section). The box lid is fixed by means of captive stainless steel screws.

ALUMINIUM box

Type	H x W x D in mm	Distribution
91277	345 x 280 x 125	One or two MARECHAL® socket-outlet can be mounted on the inclined cover.



THERMOPLASTIC BOX

Natural evolution of the aluminum version, this enclosure has equivalent functions and increased environmental resistance with its IP66/IP69 level (high cleaning pressure) and the increased resistance to corrosion to protect from road-salting. This box is composed of two parts fixed on hinges:

- a protection part, with a transparent window (locking key in option),
- an inclined cover with mounted socket-outlets.

Power supply of this box is performed using 5G25 cables (max. conductor section).

THERMOPLASTIC BOX

Type	H x W x D in mm	Distribution
3134017CDxx	342 x 225 x 156	One or two MARECHAL® socket-outlet can be mounted on the inclined cover.



TUNNEL REFUGE POINT

EMERGENCY SERVICE BOXES

NEW



IP66



AISI 316L
STAINLESS STEEL



IK10



NF C 32-070

OTHER FEATURES

Electrical continuity of the main power supply is guaranteed according to NF C 32-070.

Service terminals	2 to 5 stainless steel terminals mounted on ceramic plates.
Cables accepted	Armoured and unarmoured cables, stranded or flexible, from 1.5 mm ² to 6 mm ²
Earthing point	Inside and outside the enclosure
Fire smoke class	M0

REFERENCES AND DIMENSIONS

FIRE-RESISTANT SELF-POWERED PHONE BOX

Made from AISI 316L stainless steel, these boxes ensure the junction between the main through fire-resistant cable (CR1-C1 type in compliance with NF C 32-070)

Cable glands are fire-resistant and the inter-connection of crossing cables is performed thanks to stainless steel terminals mounted on ceramic plates.

The box lid mounted on hinges is fixed by means of captive stainless steel screws.

SELF-POWERED PHONE BOX

Type	H x W x D in mm	Distribution
91141	270 x 200 x 130	2 outputs with MARECHAL® metal PN socket-outlet.



125 A

690 V

U MAXI

DECONTACTOR™ DS F400



400 °C/2H

FIRE-RATED FOR TUNNEL JET FANS



IP66
IP67



10 - 35 mm² (1)
10 - 50 mm² (2)



METAL



IK09



400 °C/2h



AC-22
AC-23



60947-3
12101-3



2 AUX.



-40 °C
+60 °C

(1) Flexible wiring (min.-max.).
(2) Stranded wiring (min.-max.).
Earthing cable section 35 mm² max.



Other configurations
on request

LOAD-BREAK CAPABILITY OF THE DECONTACTOR™

Load-break capability according to IEC/EN 60947-3/AC-22	125 A - 690 V
Load-break capability according to IEC/EN 60947-3/AC-23	125 A-400 V - 63 A 690 V
Power kW AC-22/AC-23	110 kW/55 kW

OTHER FEATURES

Electrical continuity of the main power supply is guaranteed according to EN 12101-3 - 400°C/120min classification.

Compliant with European Low Voltage Directive 2014/35/EU



SOCKET-OUTLET
DS F400



INLET
DS F400

380-440 V AC	3P+E	3964F13	3968F13
660-690 V AC	3P+E	3964F93	3968F93
Auxiliaries 5 A/500 V AC	+ 2 contacts	Ref. + 972	Ref. + 972*

* Auxiliaries on connector side are shunted.

► Contact us for other configurations and references.

DS F400 PLUGS AND SOCKET-OUTLETS FACILITATE THE COMPLIANCE OF:

- electrical machinery
 - ▶ to the "Machinery" European Directive on isolating device,
 - ▶ to the standard EN 60204-1 : Safety of machinery-electrical equipment of machines,
 - ▶ to the standard EN ISO 14118 : Safety of machinery - Prevention of unexpected start-up.
- smoke ventilators to the standard EN 12101-3 (fire resistance classification F400: 400°C/2h)

DS F400 plugs and socket-outlets comply with:

- European Directives Low Voltage and RoHS (affixing of CE marking).
- REACH European Regulation,
- standard IEC/EN 60947-3 (dealing with the load breaking capacities of AC-22 and AC-23 utilization categories).

OPTION	Reference
LOCKING PIN FOR 2 PADLOCKS Ø 4 TO 8 mm (PADLOCKS NOT SUPPLIED)	
	Réf + 843

WALL BOXES	Input	Reference
METAL BOX WITHOUT CABLE GLAND (+ EARTHING WIRE + METAL SLEEVE) UP TO 50 mm² - Contact us for special cables		
	30° M25	574C3M25185
	30° M32	574C3M32185
	30° M40	574C3M40185
	30° M50	574C3M50185

METAL BOX WITH STRANDED CONDUCTOR WITH SECTION >50 mm²	Reference
	Contact us.

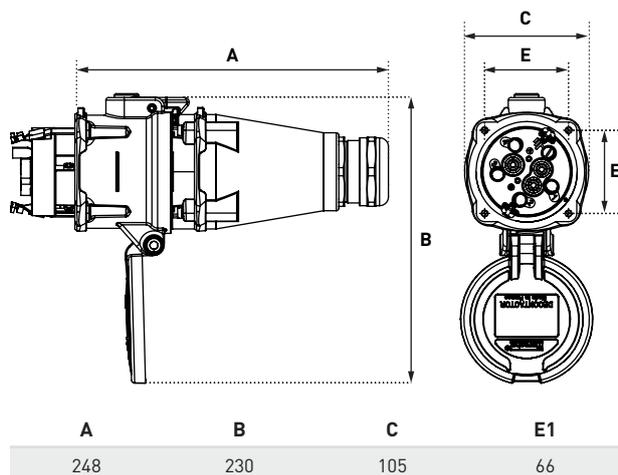
HANDLES	Input	Reference
METAL HANDLE WITHOUT CABLE GLAND (+ EARTHING WIRE) - Contact us for special cables		
	M25	574P0M25185
	M32	574P0M32185
	M40	574P0M40185
	M50	574P0M50185

CABLE GLAND	Cable outer Ø	Input	Reference
	8 - 16 mm	M25	9PEM25METAL+J
	16 - 24 mm	M32	9PEM32METAL+J
	22 - 32 mm	M40	9PEM40METAL+J
	34 - 44 mm	M50	9PEM50METAL+J

OUR CERTIFICATIONS



PLUG ON SOCKET OUTLET



PLUG ON SOCKET MOUNTED ON WALL BOX

