

MOBILIS ELITE

Electrical supply rail

GUARANTEE :

Our equipment is guaranteed one year against material or manufacturing defect recognised by ourselves. As we are not responsible for its installation and operation, our guarantee only recovers the replacement or repair (according to our choice) of the part recognised to be defective.

We decline all responsibility in the event of defects arising from faulty supervision or maintenance. We also disclaim liability for any production stoppages that may result. Any arbitration shall be in Strasbourg, even when several defendants are involved.



F E L S S . A .

2 RUE JOSEPH-MARIE JACQUARD

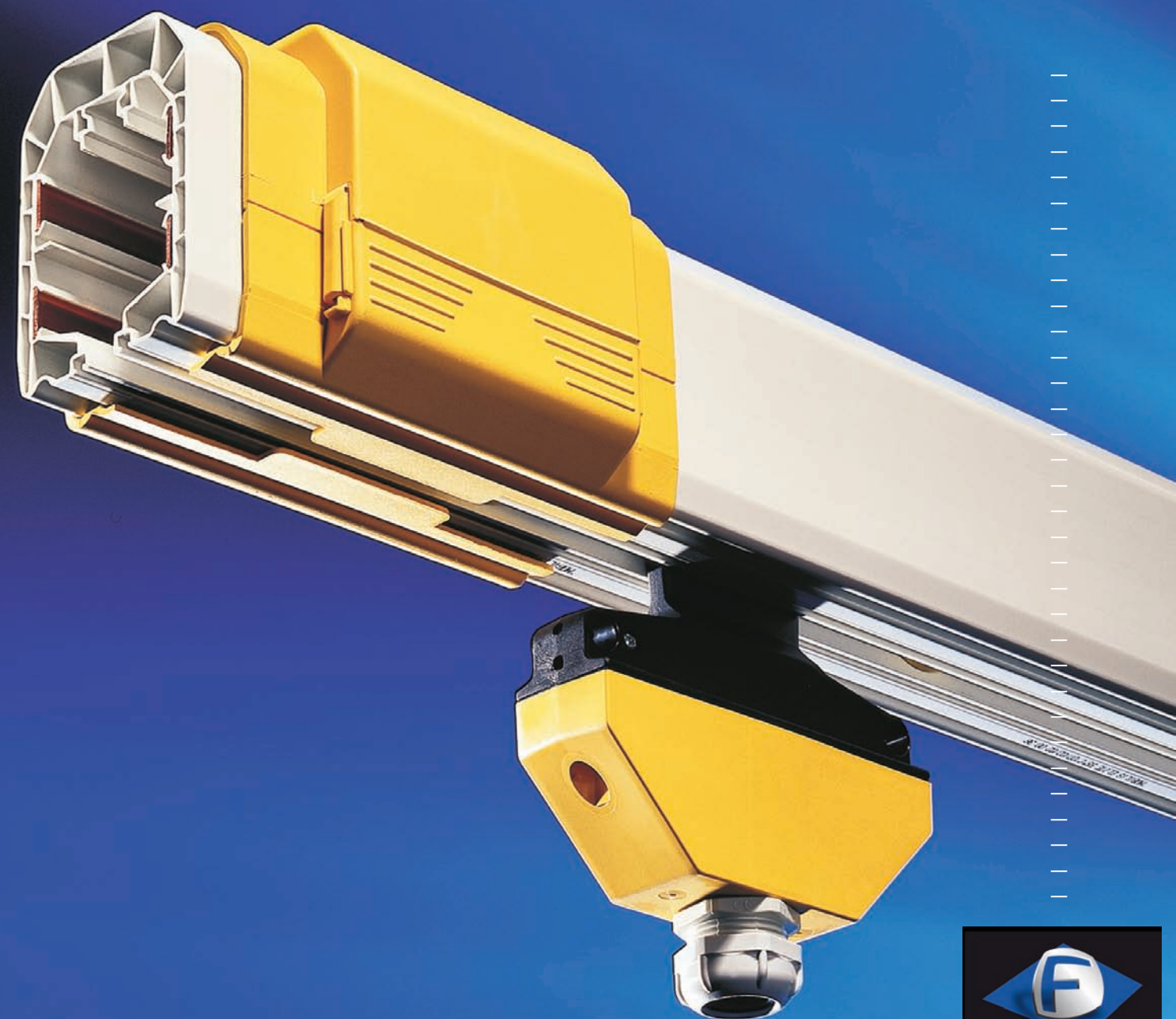
ZI SUD - BP 70069 - F-67402 ILLKIRCH CEDEX

TEL. +33 (0)3 88 67 10 60 - FAX +33 (0)3 88 67 33 10

w w w . f e l s . f r



Grandvaux - RCS Strasbourg 99 B 349 - As we are continually striving our products, we reserve the right to make any modifications without prior warning - 05/2010



FELS, THE COMPANY	3
THE MOBILIS ELITE RAIL	4
GENERAL TECHNICAL DATA	5
LINE CHOICE CRITERIA	9
CONSULTATION SHEET	13
STRAIGHT ELEMENTS	14
ACCESSORIES	15
FEED BOXES	16
INTRODUCTION GATES	17
VENTILATION ELEMENTS	17
EXPANSION JOINTS	18
CURVES	20
TRANSFER ELEMENTS	22
CIRCUIT INTERRUPTION ELEMENTS	26
TROLLEYS	28
CARRIER	32
AFTER-SALES REFERENCES	33
MAINTENANCE INSTRUCTIONS	33
ASSEMBLY INSTRUCTIONS	34

FELS, THE COMPANY

1. INNOVATION AT THE FOREFRONT

Located in Strasbourg at the heart of Europe, Fels has always specialised in high performance electrical contacts and electric rails for lifting equipment.

Over the decades, the company has built up a true corporate culture focused on the customer. This is why, more than ever before, Fels is developing high-tech products to supply the right solutions to a broad spectrum of demanding customers. Through working in close cooperation with manufacturers, installers and end-users, Fels has achieved state-of-the-art performance for its entire range of electric rails.

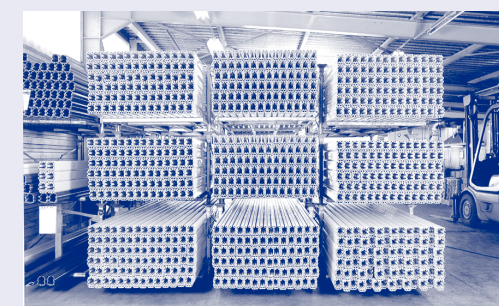


2. QUALITY AT THE HEART OF INNOVATION



If a company wants to ensure customer loyalty, it has to go beyond the concept of compliance. Fels set up an on-going development scheme for its technology and methods from a very early stage, bringing in tools and skills to pave the way for improving products and services. Quality certification was brought in at the beginning of 1990, demonstrating the company's capacity to anticipate. It is in keeping with this philosophy that the in-house R&D department is now working with top-level partners to develop equipment at the cutting-edge of innovation.

3. PRODUCTION AND SERVICES: INNOVATION IN PRACTICE



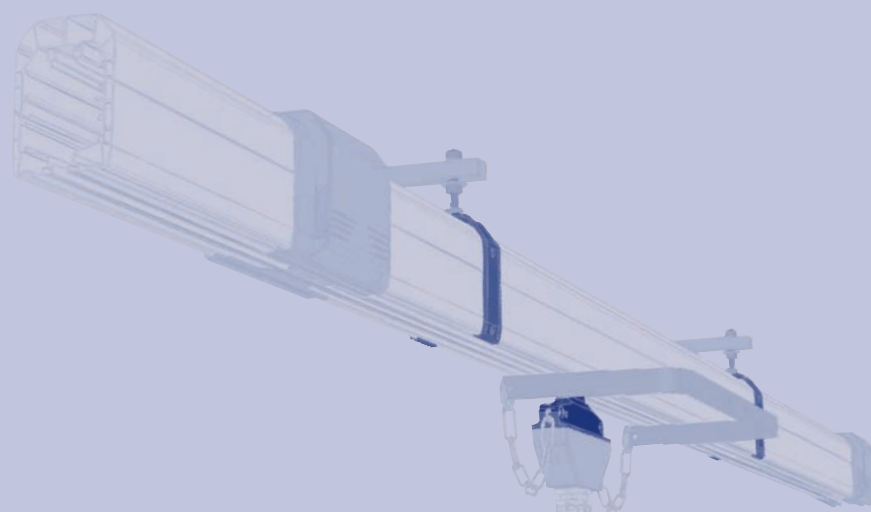
To meet the growing expectations of its customers in terms of services, Fels is cultivating a customer-focused philosophy. Each customer benefits from concerted, individual attention. Personalised contacts are encouraged to build up technical and commercial relations into a genuinely productive, quality-driven system of exchange.

Surveys are regularly conducted to measure the customer satisfaction ratio of each contact thereby providing on-going improvements to the services offered. These very services which are quoted by customers as one of the company's strongest points.

1. ENERGY RIGHT DOWN THE LINE

The Mobilis Elite electric rail was designed by Fels and developed jointly with the Plastics Technology Pole of the East (Pôle de Plasturgie de l'Est), the High Polymer Application College (Ecole d'Application des Hauts Polymères) and an industrial design consultancy. It meets the point-by-point requirements of the most demanding manufacturers, installers and end-users of travelling cranes :

- improved rigidity of the casing, due to its cellular structure, leading to higher safety;
- easy to assemble with its lightweight casing, suspensions and accessories to clip-on (no tools required), pre-mounted conductors and optional protection lips ;
- easy maintenance by simple and fast dismounting of connections and trolley brushes.



2. A BROAD RANGE OF REFERENCES

Since it was launched, the Mobilis Elite electric rail has proved its efficiency in all sectors where top-quality mobile electrification is required. Fels has supplied its equipment to customers in myriad plants throughout Europe and the world, proving that this leading-edge equipment can be adapted to many applications: the car industry, aeronautics industry, chemicals, railways and energy industries – everywhere where travelling cranes are essential.

With its network of partners, selected because they share the Fels philosophy in terms of quality and service, Fels has broken into the market on all five continents, providing an efficient, reliable service for companies in all sectors. When it comes to services, Fels also supplies the energy right down the line !



1. RATED OPERATIONAL INTENSITY

The MOBILIS ELITE lines are available in several intensities **20 A, 40 A, 60 A, 100 A, 130 A, 160 A and 200 A.**

2. NUMBER OF POLES

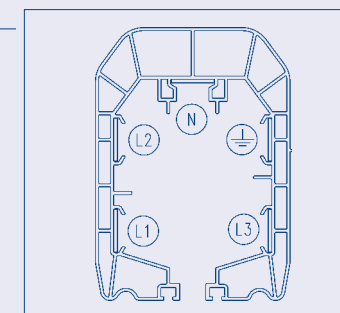
The MOBILIS ELITE lines are available in :

- **4-pole** version
- **5-pole** version

The earth conductor (PE) is marked on the line by a green-yellow band.

The neutral conductor (N), when present, is located in the top section of the casing.

The phases (L1, L2 and L3) are located as shown on the diagram opposite.



3. RATED OPERATIONAL AND INSULATION VOLTAGE

750 V alternative, 50 Hz for standard version

440 V alternative, 50 Hz for high-temperature version.

4. TEMPERATURE OF USE

The Mobilis Elite range is designed to work in ambient temperatures ranging from -20°C to +55°C in the standard version and from -20°C to +75°C in the high-temperature (H.T.) version. The accessories are the same for both ranges.



Caution : keep a safety distance from any sources of radiant heating.

5. RESISTANCE, REACTANCE AND IMPEDANCE ACCORDING TO THE TEMPERATURE

5.1 IMPULSE RUNNING

When the rush of current is of short duration followed by long rest periods, the figures in the table below can be used.

The value of the resistance R, reactance X and impedance Z at 50 Hz at ambient temperatures of 20°C and 35°C (*short period current*) :

THE FIGURES IN THE TABLE SHOULD BE MULTIPLIED BY 10^{-3} TO OBTAIN Ω/M .

Intensity (Amperes)	20	40	60	100	130	160	200
R at 20°C	7,4	1,6	1,1	0,72	0,52	0,36	0,26
R at 35°C	8,1	1,68	1,16	0,76	0,55	0,38	0,27
X	8,93	0,58	0,48	0,28	0,21	0,20	0,17
Z at 20°C	11,6	1,7	1,2	0,77	0,56	0,41	0,31
Z at 35°C	12,1	1,78	1,26	0,81	0,59	0,43	0,32

5.2 INTENSIVE RUNNING

The value of the resistance R, the reactance X and the impedance Z at 50 Hz according to the ambient temperature and taking into account the Joule effect for the different ratings carried by their nominal intensity and for a duty cycle as per paragraph 6.2 (* = $F_m < 100\%$).

THE FIGURES IN THE TABLE SHOULD BE MULTIPLIED BY 10^{-3} TO OBTAIN Ω/M .

Ambient temperature		25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°
20A	R	standard	8,8	9	9,3	9,6	9,9	10*	10*			
		H.T.						10,1	10,5	10,8	10,8*	10,8*
	X		8,93	8,93	8,93	8,93	8,93	8,93	8,93	8,93	8,93	8,93
40A	Z	standard	12,5	12,7	12,9	13,1	13,3	13,4*	13,4*			
		H.T.						13,5	13,8	14	14*	14*
	X		0,58	0,58	0,58	0,58	0,58	0,58	0,58	0,58	0,58	0,58
60A	R	standard	1,77	1,81	1,84	1,88	1,91	1,95	1,98	2,01	2,05	2,08
		H.T.								2,08	2,12	2,17*
	X		0,58	0,58	0,58	0,58	0,58	0,58	0,58	0,58	0,58	0,58
100A	Z	standard	1,86	1,9	1,93	1,96	1,99	2,03	2,06	2,09	2,13	2,16
		H.T.								2,16	2,20	2,25*
	X		0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48
130A	R	standard	1,22	1,24	1,26	1,28	1,31	1,33	1,35	1,39	1,4*	1,4*
		H.T.								1,4*	1,4*	1,4*
	X		0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48
160A	Z	standard	1,31	1,33	1,35	1,37	1,4	1,41	1,43	1,47	1,48*	1,48*
		H.T.								1,48*	1,48*	1,48*
	X		0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48	0,48
200A	R	standard	0,868	0,885	0,885*	0,885*	0,885*	0,885*	0,885*	0,902	0,919	0,931*
		H.T.								0,931*	0,931*	0,931*
	X		0,28	0,28	0,28	0,28	0,28	0,28	0,28	0,28	0,28	0,28
250A	Z	standard	0,910	0,926	0,926*	0,926*	0,926*	0,926*	0,926*	0,942	0,959	0,970*
		H.T.								0,970*	0,970*	0,970*
	X		0,21	0,21	0,21	0,21	0,21	0,21	0,21	0,21	0,21	0,21
300A	R	standard	0,599*	0,599*	0,599*	0,599*	0,599*	0,599*	0,599*	0,607	0,618	0,630*
		H.T.								0,630*	0,630*	0,630*
	X		0,21	0,21	0,21	0,21	0,21	0,21	0,21	0,21	0,21	0,21
350A	Z	standard	0,630	0,634*	0,634*	0,634*	0,634*	0,634*	0,634*	0,642	0,652	0,663*
		H.T.								0,663*	0,663*	0,663*
	X		0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20
400A	R	standard	0,430	0,435*	0,435*	0,435*	0,435*	0,435*	0,435*	0,438	0,446	0,457*
		H.T.								0,457*	0,457*	0,457*
	X		0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20
500A	Z	standard	0,474	0,479*	0,479*	0,479*	0,479*	0,479*	0,479*	0,482	0,489	0,499*
		H.T.								0,499*	0,499*	0,499*
	X		0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17
600A	R	standard	0,298	0,303*	0,303*	0,303*	0,303*	0,303*	0,303*	0,304	0,309	0,315
		H.T.								0,315	0,318*	0,318*
	X		0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17
700A	Z	standard	0,343	0,347*	0,347*	0,347*	0,347*	0,347*	0,347*	0,347*	0,347*	0,347*
		H.T.								0,347*	0,347*	0,347*
	X		0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17

6. RUNNING LIMITS

6.1 ENVIRONMENT

The Mobilis Elite feeding system is designed to run in a normal industrial atmosphere.

If used in a harsh environment, the risks are as follows :

Risk	Reduction of insulation distances	Corrosion of metal parts (incl. conductors)	Damage to thermoplastics	Installation instructions
Type				
High humidity rate	• • •	• •	–	Ventilation element
Outside use	–	•	–	Low risk of damage
Marine environment	• • •	• • •	–	Cleaning trolley
Dust	•	–	–	Cleaning trolley, protection lips
Chemical environment	•	• • •	• / • • • (*)	Check appropriate use of materials in conjunction with products
Maintenance instructions	Cleaning trolley	Cleaning trolley, Scraping trolley	/	<ul style="list-style-type: none"> • • • high risk • • average risk • low risk – zero risk

(*) according to product type

The Mobilis Elite feeding system is exclusively designed to run with opening of the casing facing downwards.

6.2 DUTY CYCLE FACTOR F_m

The duty cycle factor F_m , expressed in %, corresponds to the ratio running time T_1 over total time T ($running\ time + resting\ time$)

$$F_m = 100.(T_1/T) \text{ defined over 10 minute time periods}$$

It varies according to the ambient temperature.

The values below are given for operation under nominal current.

If, for a given intensity, F_m is higher than the value specified, it is necessary to select a higher intensity.

Temperature	20A		40A		60A		100A		130A		160A		200A	
	standard	H.T.	standard	H.T.	standard	H.T.	standard	H.T.	standard	H.T.	standard	H.T.	standard	H.T.
-20 à 25°C	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
30°C	100%	100%	100%	100%	100%	100%	100%	100%	88%	100%	97%	100%	100%	100%
35°C	100%	100%	100%	100%	100%	100%	80%	100%	74%	100%	78%	100%	80%	100%
40°C	100%	100%	100%	100%	100%	100%	62%	100%	60%	100%	63%	100%	65%	100%
45°C	100%	100%	100%	100%	100%	100%	46%	91%	48%	84%	49%	87%	51%	93%
50°C	67%	100%	100%	100%	100%	100%	32%	73%	37%	69%	37%	70%	38%	74%
55°C	40%	100%	100%	100%	62%	100%	22%	56%	26%	56%	26%	54%	27%	57%
60°C		100%		100%		100%		41%		43%		41%		43%
65°C		59%		100%		100%		28%		32%		28%		30%
70°C		33%		100%		51%		18%		23%		19%		20%
75°C		18%		37%		28%		12%		16%		13%		14%

6.3 CORRECTION FACTOR f

When the line carries a permanent current I_N (duty cycle factor 100%), it may be necessary to downgrade the intensities according to the temperature.

If I_G is the intensity of the rail and f is the correction factor defined in the table below, the new maximum permissible intensity I_{adm} will be :

$$I_{adm} = I_G \times f$$

Temperature	20A		40A		60A		100A		130A		160A		200A	
	standard	H.T.	standard	H.T.	standard	H.T.	standard	H.T.	standard	H.T.	standard	H.T.	standard	H.T.
-20 à 25°C	1	1	1	1	1	1	1	1	1	1	1	1	1	1
30°C	1	1	1	1	1	1	1	1	0,97	1	0,98	1	1	1
35°C	1	1	1	1	1	1	0,95	1	0,92	1	0,92	1	0,94	1
40°C	1	1	1	1	1	1	0,89	1	0,86	1	0,86	1	0,88	1
45°C	1	1	1	1	1	1	0,82	0,98	0,79	0,95	0,79	0,96	0,82	0,98
50°C	0,95	1	1	1	1	1	0,75	0,93	0,72	0,89	0,72	0,91	0,75	0,92
55°C	0,85	1	1	1	0,91	1	0,67	0,87	0,65	0,84	0,64	0,85	0,67	0,86
60°C	1			1		1		0,8		0,77		0,79		0,8
65°C	0,92			1		0,99		0,73		0,71		0,72		0,73
70°C	0,82			1		0,89		0,66		0,63		0,64		0,65
75°C	0,71			0,89		0,77		0,57		0,55		0,56		0,56

The intensity selected may be retained if the current in the line (I_N) is lower than or equal to the permissible intensity (I_{adm}) :

$$I_N \leq I_{adm}$$

7. STANDARDS APPLIED

The Mobilis Elite range has been designed to meet standards EN60439-2 and EN60204-32.

8. PROTECTION INDEX IP23

A mounted line with the full set of accessories has a protection level of IP23 according to EN60529.

Caution : *If one accessory is removed, the level of protection is eliminated.*

IP2X means that the equipment is protected so that people cannot access the dangerous sections, i.e. it is impossible to introduce a standard test finger of Ø12 mm with an effort of 10 N. The equipment is also protected against solid foreign bodies, i.e. it is not possible to introduce a metal sphere of Ø12,5 mm with an effort of 30 N.

IPX3 means that the equipment is protected against rainwater falling at a maximum angle of 60° in relation to the vertical plane.

The Mobilis Elite range is designed for both inside and external use.

If a Mobilis Elite line is used in an area open to the public, additional safety measures should be installed (*protection level IP4X required according to EN60204-32*).

9. INSULATION DISTANCES :

The insulation distance between conductors or between conductors and accessible parts :

- distance in the air : 10 mm min.
- creepage distance : 30 mm min. (*according to EN60204-32*).

10. FLAME RESISTANCE

All materials used to build Mobilis Elite lines are self-extinguishing.

11. SAFETY PIN

Line : to prevent mounting errors, 2 line elements with consecutive intensities cannot be assembled on the same line.

Trolley : with the safety pin system, it is not possible to insert a trolley into the line incorrectly, leading to a phase-earth connection. (*See also p. 37*).

12. OPERATING LIFE – ENDURANCE

The lines and accessories are built to withstand several years of use in a normal industrial environment.

The current collectors are designed to run for several thousand kilometres (*see also p. 33*).

13. VALUE OF THE RESISTANCE R AND THE REACTANCE X OF THE SYSTEM UNDER DEFAULT CONDITIONS

Data for the application of the impedance method.
The values in the table should be multiplied by 10⁻³ to obtain Ω/m.

Intensity	130 A	160 A	200 A TR
R _{ph} à 20°C ph-ph et ph-N	1,010	0,699	0,505
R _{ph} à 20°C ph-PE	1,010	1,048	0,757
R _{ph} à Ø1 version standard ph-ph et ph-N	1,231	0,854	0,617
R _{ph} à Ø1 version standard ph-PE	1,231	1,281	0,925
R _{ph} à Ø1 version H.T. ph-ph et ph-N	1,297	0,899	0,649
R _{ph} à Ø1 version H.T. ph-PE	1,297	1,348	0,974
X _p à 50Hz	0,271	0,271	0,271

Intensity 160A and 200A TR : I_{pk} = 11 kA

14. LINE CHOICE CRITERIA

To work out the intensity of a MOBILIS ELITE line, the following data must be known :

- Maximum intensity in continuous operation
- Type of receivers (*cage or slip-ring motors, electronic starters, resistors*)
- Receiver start-up intensity
- Maximum ambient temperature
- Maximum distance between a receiver and the nearest feeding point
- Permissible voltage and voltage drop in continuous operation and at start-up
- Type of current
- Running cycle of the receiver (*duty cycle*).

14.1 INTENSITY IN CONTINUOUS OPERATION

Take into account the number of receivers which run simultaneously and calculate the corresponding intensity :

$$I_N = I_1 + I_2 + \dots + I_n$$

The intensity may be worked out from the power of the receivers.

In a three-phase system, this gives :

$$I_n = \frac{P_u}{\eta \cdot U \cdot \sqrt{3} \cdot \cos \varphi}$$

W H E R E	I _n :	absorbed current (in Amperes)
	P _u :	Power output of the receiver (in Watts)
	η :	receiver efficiency (between 0,6 and 0,96 for a cage motor)
	U :	operating voltage (in Volts)
	cos φ :	power factor

In the absence of information about running simultaneity of consumers, please refer to the table hereunder:

Number of consumers on the line	For the whole hoisting devices			
	1 st motor	2 nd motor	3 rd motor	4 th motor
	Most powerful motor ⁽¹⁾	Motor, in power descending order ⁽¹⁾		
1	x	x		
2	x	x	x	
3	x	x	x	
4	x	x	x	x
5	x	x	x	x
2 hoisting devices working together	x	x	x	x

(1) for a drive through n motors of nominal intensity I_n, in parallel, please consider I_n = n x I_n

14.2 INTENSITY DURING THE START-UP PHASE

(2 seconds maximum)

Take into account the number of receivers starting up simultaneously and those already in operation, then calculate the corresponding intensity. When the start-up intensity is not known, find the approximate value as follows :

$$I_d = K \cdot I_n \quad \text{for a single receiver}$$

Where K = $\frac{\text{start-up current}}{\text{nominal current}}$

(in general,
K = 5 to 6 for cage motors
K = 2 for slipring motors
K = 2 with frequency converter)

In the absence of information about running simultaneity of consumers, please refer to the table hereunder:

Number of consumers on the line	For the whole hoisting devices (In)							
	1 st motor		2 nd motor		3 rd motor		4 th motor	
	I _d	I _n	I _d	I _n	I _d	I _n	I _d	I _n
1	x			x				
2	x			x		x		
3	x		x					
4	x		x			x		
5	x		x			x		x
2 hoisting devices working together	x		x			x		x

14.3 CALCULATING THE VOLTAGE DROP

Under normal running conditions, the voltage drop must not exceed 5% of the nominal voltage.

Taking into account the mains voltage, the length of the section considered, the nominal intensity, start-up intensity and the impedance of the conductor selected, voltage drops can be worked out for the start-up phase and normal running phase using the following formulas :

Three-phase alternative current : $\Delta U = \sqrt{3} \cdot Z \cdot L_t \cdot I$

Continuous current : $\Delta U = 2 \cdot R \cdot L_t \cdot I$

Voltage drop in % : $\Delta U_{\%} = (\Delta U / U) \times 100$

I : current in continuous operation or at start-up, as appropriate (in Amperes)

L_t : length of the section considered (in m), taking L_t as per paragraph 14,4

Z : line impedance (in Ω/m) (see paragraph 5 of general technical data)

R : line resistance (in Ω/m) (see paragraph 5 of general technical data)

U : mains voltage (in Volts)

In the case of impulse running, the voltage drop can be quickly checked using the "continuous operation" and "start-up" graphs (see on the following pages).

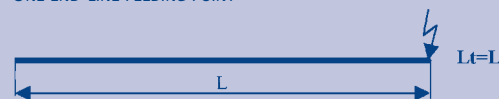
14.4 FEEDING: LENGTH OF LINE SECTIONS

It is possible to have several feeding points along a line

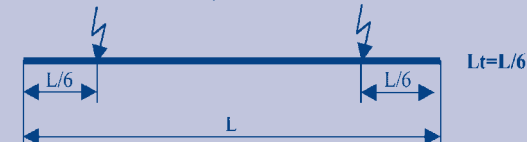
The judicious positioning of these points means voltage drop can be reduced.

If L is the line length, L_t is the maximum length of the section to be taken into account to work out the voltage drop.

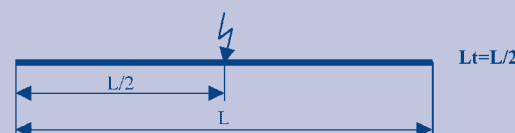
ONE END-LINE FEEDING POINT



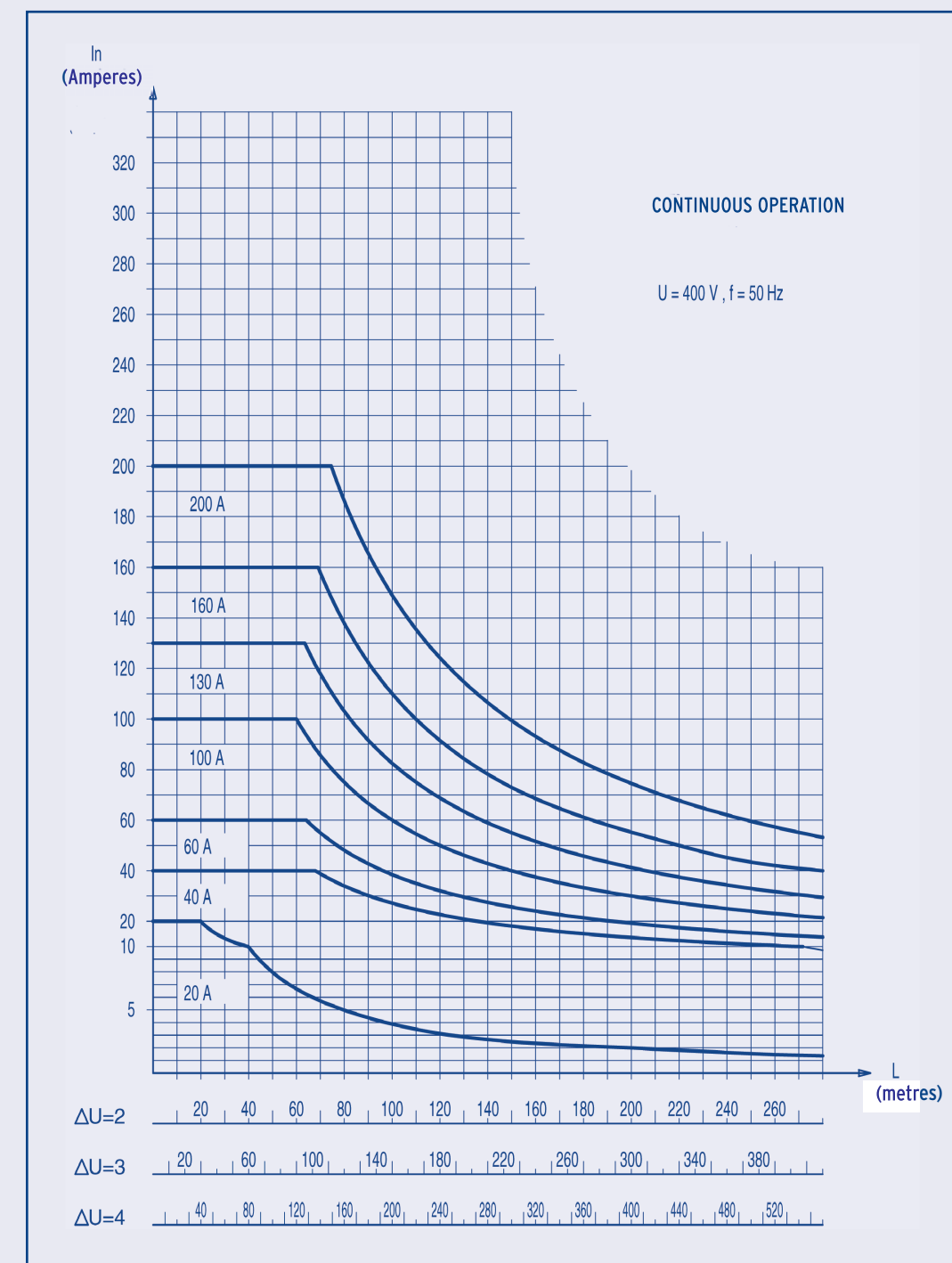
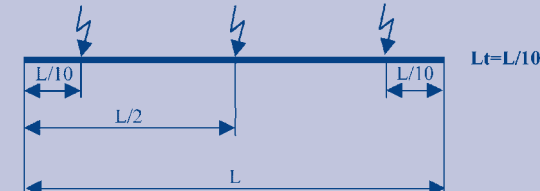
TWO FEEDING POINTS AT L/6 FROM EACH END

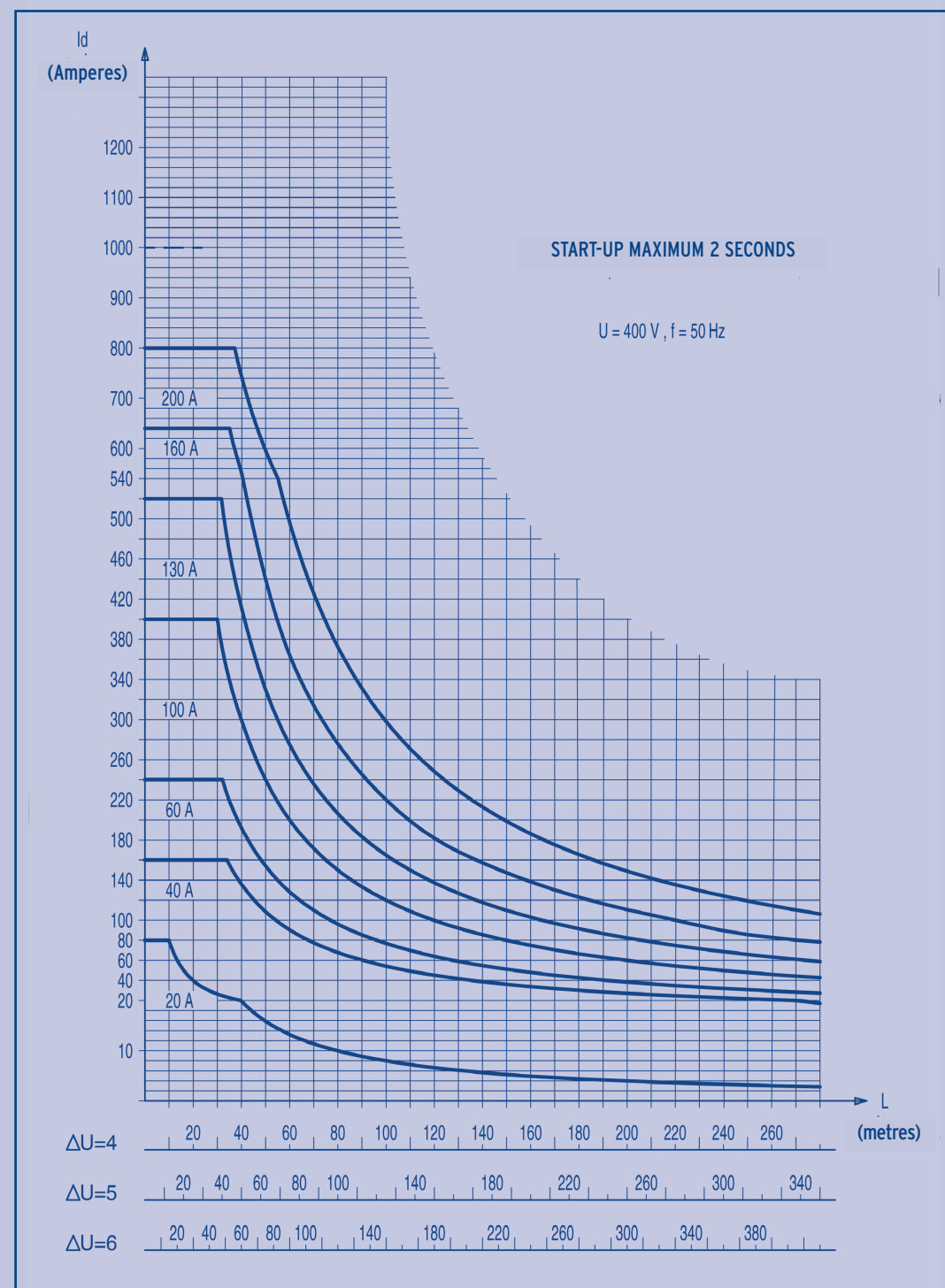


ONE MIDWAY FEEDING POINT



THREE FEEDING POINTS AT L/2 AND L/10 FROM EACH END





1-POWER CONSUMER TYPE :
(travelling crane, monorail, transtocker etc.)

2-LENGTH OF THE INSTALLATION : _____ m

3-TYPE OF CURRENT : ☐ AC ☐ DC _____ V _____ Hz

4-NUMBER OF POLES : _____ phases _____ earth _____ neutral

5-INTENSITY (if known) : _____ A

6-FEATURES OF CONSUMERS :

MOTOR (in KW)	CONSUMERS 1	CONSUMERS 2	CONSUMERS 3
LIFTING			
LONG TRAVEL			
CROSS TRAVEL			
OTHERS (please specify)			

7-TYPE OF MOTOR START-UP (direct, variator, additional resistors...)

8-STATIONARY USE : ☐ yes ☐ no

9-DUTY CYCLE FACTOR (maximum rate of use per 10 min. period) : _____ %

10-OPERATION : ☐ indoors ☐ outdoors

11-TEMPERATURE : min _____ °C max _____ °C

12-PERMISSIBLE VOLTAGE DROP : • in continuous : _____ (default value : 2%)

• at start-up : _____ (default value : 5%)

13-INSTALLATION ENVIRONMENT (dust, humidity, chemical agents) :

14-TRAVELLING SPEED OF MOBILE : _____ m/mn

15-NUMBER AND POSITION OF FEEDING POINTS ALONG THE LINE :

16-SUPPLY OF FIXING BRACKETS (see page 15) : ☐ yes ☐ no

17-OTHER INFORMATION ABOUT THE INSTALLATION :

18-FOR INSTALLATIONS WITH CURVES, TRANSFERS OR OTHER SPECIAL ELEMENTS,
PLEASE INCLUDE DRAWING OR A SKETCH

19-CONTACT DATA :

COMPANY : _____

FOR THE ATTENTION OF : _____

DEPARTMENT : _____

POSTAL ADDRESS : _____

TELEPHONE : _____

FAX : _____

E-MAIL : _____

Thank you for your enquiry

1. STANDARD STRAIGHT ELEMENTS

Material : light grey self-extinguishing PVC

Rated operational voltage : 750 V alternative

Temperature of use : -20°C to +55°C

For intensities of 20 A to 130 A, the connection system has built-in self-breaking screws, guaranteeing tightening at optimum torque.



Intensity	20A		40A		60A		100A		130A		160A		200A TR	
Conductor section L1, L2, L3, N	steel 16 mm ²		copper 10 mm ²		copper 16 mm ²		copper 24 mm ²		copper 35 mm ²		copper 48 mm ²		copper 70 mm ²	
Conductor section PE	steel 16 mm ²		copper 10 mm ²		copper 16 mm ²		copper 24 mm ²		copper 35 mm ²		copper 48 mm ²		copper 70 mm ²	
Number of poles	4	5	4	5	4	5	4	5	4	5	4	5	4	5
Weight (kg/m)	1,7	1,8	1,5	1,6	1,8	1,9	2,0	2,1	2,4	2,7	3,6	4,2	3,3	3,9
Length 4 m	ME4204	ME5204	ME4404	ME5404	ME4604	ME5604	ME4104	ME5104	ME4134	ME5134	ME4164	ME5164	ME8284-TR	ME8285-TR
Length 3 m	ME4203	ME5203	ME4403	ME5403	ME4603	ME5603	ME4103	ME5103	ME4133	ME5133	ME4163	ME5163	ME8283-TR	ME8289-TR
Length 2 m	ME4202	ME5202	ME4402	ME5402	ME4602	ME5602	ME4102	ME5102	ME4132	ME5132	ME4162	ME5162	ME8282-TR	ME8286-TR
Length 1 m	ME4201	ME5201	ME4401	ME5401	ME4601	ME5601	ME4101	ME5101	ME4131	ME5131	ME4161	ME5161	ME8281-TR	ME8287-TR
Special length	ME4200	ME5200	ME4400	ME5400	ME4600	ME5600	ME4100	ME5100	ME4130	ME5130	ME4160	ME5160	ME8280-TR	ME8288-TR

2. HIGH TEMPERATURE (H.T.) STRAIGHT ELEMENTS

Material : white self-extinguishing PVC

Rated operational voltage : 440 V alternative

Temperature of use : -20°C to +75°C



For intensities of 20 A to 130 A, the connection system has built-in self-breaking screws, guaranteeing tightening at optimum torque.



Caution : the H.T. line cannot be fitted with protection lips since the lip seal material is not appropriate for temperatures above 55°C.

The references are identical to the standard line elements, but with "-HT" quoted after the reference.

Example : ME4404 standard version
ME4404-HT high temperature version

3. STRAIGHT ELEMENTS WITH PROTECTION LIPS

Self-extinguishing elastomer lips.

Designed to limit the ingress of dust.

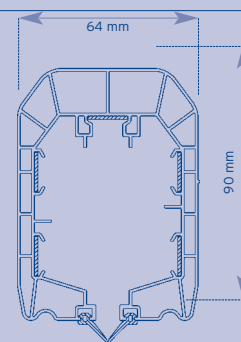
Caution : protection lips are not appropriate for temperatures above 55°C.



The references are identical to the standard line elements, but with "-LV" quoted after the reference.

Example : ME4404 standard version
ME4404-LV standard version with lips

Accessories and special elements are also available with a dust-protection fitting.



4. COVERING FLANGES

Material : self-extinguishing thermoplastic

Weight : 0,2 kg

Reference : ME1000

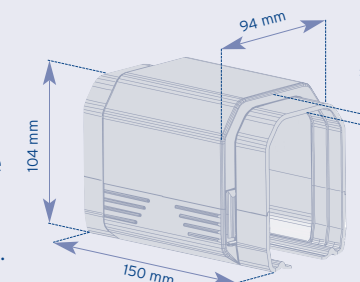
Clipped assembly – no tools required.
Assembling only possible when connections have been made.



For the dust-protection version, the covering flange is fitted with brushes.

To order, add "-LV" after the reference.

For special covering flanges for curves, see page 21.
To order, add "-CO" after the reference.



5. END-CAPS

Material : self-extinguishing thermoplastic

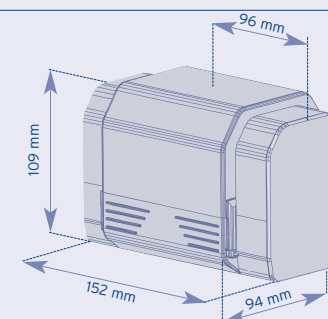
Weight : 0,3 kg

Area inaccessible by trolley : 35 mm

Reference : ME1400

Clipped assembly – no tools required.

Assembling only possible when connections have been made.



6. SLIDING HANGERS

The sliding hangers have a self-alignment system.

Material : galvanized steel

Weight : 0,1 kg

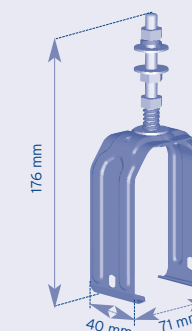
Reference : ME1510

The sliding hanger is fully pre-mounted.

Screw M8

Intensity 20 to 200 A : 2 hangers per 4 m element

The casing simply clips into the sliding hanger



7. FIXED HANGERS

The fixed hangers have a self-alignment system.

Material : galvanized steel

Weight : 0,1 kg

Reference : ME1500

The fixed hanger is fully pre-mounted.

Screw M8

Delivered with 2 anchoring screws.

The fixed hangers are always fitted in pairs on the same line element. Position the fixed hangers in the centre of the line or midway between 2 expansion joints

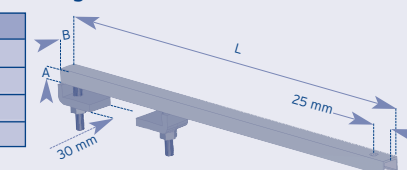
(except lines with transfer elements and/or curves) – (see p. 19)



8. BRACKETS

Material : galvanised steel. Max. thickness of girder wing : 20 mm

Reference	Length L	Section A x B	Weight
ME1700	380 mm	15 x 20 mm	0,5 kg
ME1750	500 mm	15 x 20 mm	0,6 kg
ME1760	600 mm	30 x 30 mm	1,0 kg
ME1780	850 mm	30 x 30 mm	1,2 kg



For Intensity 200 A, use references ME1760 and ME1780 only.

9. END-LINE FEED BOXES – PACKING BOX M25, M32, M40

Material : self-extinguishing thermoplastic

Intensity : 20 to 100 A

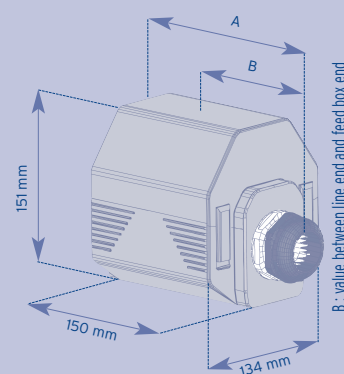
Weight : 0,4 kg

Area inaccessible by trolley : 35 mm

Possibility of packing box outlet from below.

Cable eye stiffeners Ø 5 mm required for connection.

Packing box	Value A	Value B	Reference	Cable Ø
P-E M25	181	126	ME1200	13 to 19 mm
P-E M32	182	127	ME1230	15 to 25 mm
P-E M40	186	131	ME1250	21 to 32 mm



10. IN-LINE FEED BOXES – PACKING BOX M25, M32

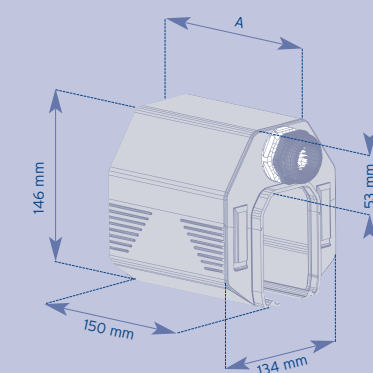
Material : self-extinguishing thermoplastic

Intensity : 20 to 100 A

Weight : 0,3 kg

Cable eye stiffeners Ø 5 mm required for connection.

Packing box	Value A	Reference	Cable Ø
P-E M25	169	ME1300	13 to 19 mm
P-E M32	170	ME1330	15 to 25 mm



In-line feed boxes are available with dust-protection brushes. To order, add "-LV" after the reference. For special feed boxes for curves, see p. 21. To order, add "-CO" after the reference.

11. IN-LINE FEED BOXES – PACKING BOX M40

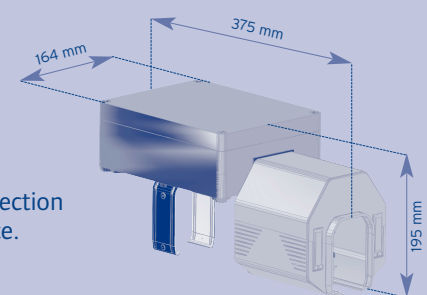
Material : self-extinguishing thermoplastic

Intensity : 20 to 100 A

Weight : 1,7 kg

Connection terminals : 35 mm²

Packing box	4 poles	5 poles	Cable Ø
P-E M40	ME1332	ME1329	21 to 32 mm



In-line feed boxes are available with dust-protection brushes. To order, add "-LV" after the reference.

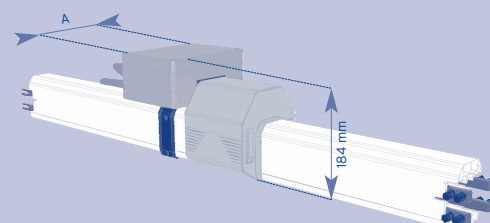
12. PRE-MOUNTED FEED BOXES

Pre-mounted on 1 or 4 m of line element.

2 sliding hangers required.

Connecting box aside required.

The feed boxes are delivered with 2 m of cable (standard version).



Intensity	Section	Cable Ø	Value A	Length	4 poles	Weight 4P	5 poles	Weight 5P
100A	35 mm²	16 mm	241	4 m	ME1310	13,5 kg	ME1311	15,4 kg
130A				1 m	ME1313	8,0 kg	ME1317	9,3kg
				4 m	ME1343	15 kg	ME1347	17,4 kg
160A	50 mm²	18 mm		1 m	ME1316	9,7 kg	ME1319	11,6 kg
				4 m	ME1346	17,5 kg	ME1349	20,6 kg
200A TR	70 mm²	20,5 mm		1 m	ME8299-TR	12,9 kg	ME8294-TR	15,6 kg
				4 m	ME8279-TR	22,8 kg	ME8295-TR	27,3 kg



Feed boxes are available with protection lips.

To order, add "-LV" after the reference.



Feed boxes are available in the high temperature version.

To order, add "-HT" after the reference.

13. INTRODUCTION GATES

Material : self-extinguishing PVC

Weight : add 0,6 kg to the weight of the equivalent standard line element over 2 m.

Introduction gates allow trolleys to be inserted or removed in-line.



Caution : the electrical supply to the line must be cut off before opening the introduction gate.

The introduction gate has a standard length of 2 m and is supported by 2 special sliding hangers for the lateral displacement of the two line sections.

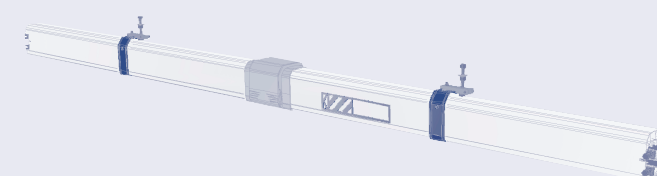


All articles are available with protection lips. To order, add "-LV" after the reference.



All articles are available in the high temperature version. To order, add "-HT" after the reference.

References :	20A	40A	60A	100A	130A	160A	200A TR
4 pôles	ME4702	ME4704	ME4706	ME4710	ME4713	ME4716	ME8296-TR
5 pôles	ME4752	ME4754	ME4756	ME4750	ME4753	ME4757	ME8297-TR



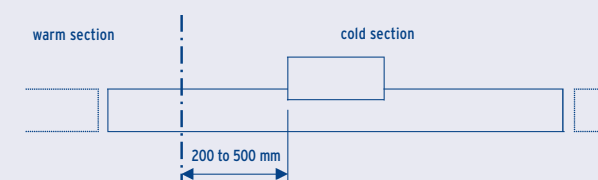
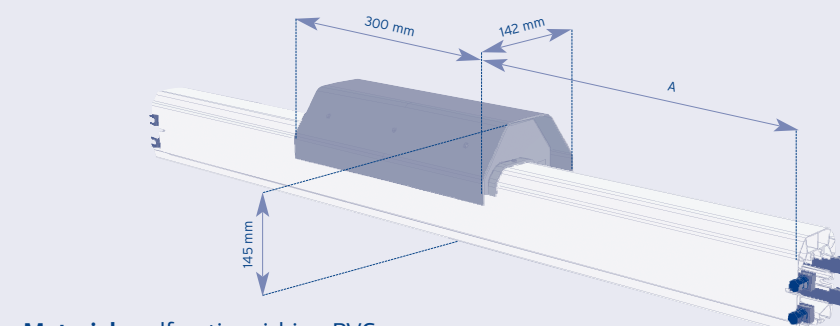
14. VENTILATION ELEMENTS

Material : self-extinguishing PVC

Weight : add 0,5 kg to the weight of the equivalent standard line element.

The purpose of the ventilation element is to limit condensation in a line with a warm section (inside the factory) and a cold section (outside the factory).

Assembly : The ventilation element is mounted like a standard element at the point where it exits the building (beginning of the cold section). The edge of the PVC cover must be installed in the cold section at between 200 and 500 mm from the warm section.



Use 2 hangers with a centre axis distance of 500 mm for a 1 m element and a centre axis distance of 2 m for a 4 m element.



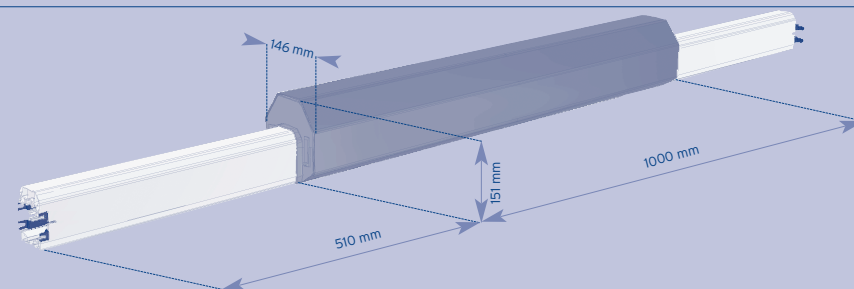
All articles are available with protection lips. To order, add "-LV" after the reference.



All articles are available in the high temperature version. To order, add "-HT" after the reference.

References :	20A	40A	60A	100A	130A	160A	200A TR	value A
1 metre	ME5310	ME5300	ME5301	ME5302	ME5303	ME5312	ME5304-TR	350
	ME5311	ME5305	ME5306	ME5307	ME5308	ME5313	ME5309-TR	
4 metres	ME5345	ME5340	ME5341	ME5342	ME5343	ME5347	ME5344-TR	1850
	-	ME5350	ME5346	-	-	ME5348	-	

15. EXPANSION JOINTS



Material : self-extinguishing PVC
Length : 2 m

The expansion joint is a line accessory which is designed to absorb the difference in expansion between the support structure and the Mobilis Elite line within the whole temperature range of the product, thereby ensuring the continuity of the electrical supply for the conductors and also the mechanical continuity for the sliding of the brushes and the trolley guides.

In all cases, an expansion joint requires the use of an extra single current collector to guarantee the current capacity and the quality of the electric contact at the cross-over point of the expansion joint.

Intensity	20A		40A		60A		100A		130A		160A		200A TR	
Maximum length of line without expansion joint	140 m		150 m		150 m		150 m		250 m		250 m		250 m	
Number of poles	4	5	4	5	4	5	4	5	4	5	4	5	4	5
Weight	6,4 kg	6,8 kg	6,0 kg	6,4 kg	6,5 kg	7,0 kg	7,6 kg	8,2 kg	8,7 kg	9,8 kg	8,9 kg	10,8 kg	11,4 kg	13,1 kg
References	ME8020	ME8520	ME8040	ME8540	ME8060	ME8560	ME8100	ME8510	ME8013	ME8513	ME8016	ME8516	ME8290-TR	ME8291-TR

To select the number of expansion joints for a standard line for all intensities and 20 A, 40 A or 60 A in the high temperature version :

Length Intensity	0 to 140 m	141 to 150 m	151 to 200 m	201 to 250 m	251 to 300 m	301 to 400 m	etc...
20 A	0 joint	1 joint		2 joints	3 joints	etc...	
40 to 100 A	0 joint	1 joint		2 joints	3 joints	etc...	
130 and 200 A	0 joint			2 joints	3 joints	etc...	

In the high temperature version, the maximum length of line branches at an intensity of 100 A, 130 A, 160 A or 200 A is 90 m instead of the standard 100 m. Hence :

To select the number of expansion joints for a 100 A, 130 A, 160 A or 200 A line in the high temperature version :

Length Intensity	0 to 150 m	151 to 180 m	181 to 250 m	251 to 270 m	271 to 360 m	etc...
100 A	0 joint	1 joint	2 joints	3 joints	etc...	
130 and 200 A	0 joint		2 joints	3 joints	etc...	

The length of the line section is, among other factors, dependent on the absorption capacity of the expansion joint. This is why line lengths without expansion joints cannot be reproduced between two fixed hangers on lines with expansion joints.



Caution : For the expansion joint to function correctly, adjustments must be made when installing. Adjust length L by sliding section n° 2 into section n° 1. This length L varies according to the ambient temperature when assembling, to provide the appropriate clearance in all circumstances.

Assembly temperature	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C	60°C
Length L	2005	2000	1995	1990	1985	1980	1975	1970	1965



All expansion joints are available with protection lips. To order, add "-LV" after the reference.



All expansion joints are available in the high temperature version. To order, add "-HT" after the reference.



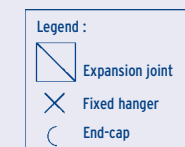
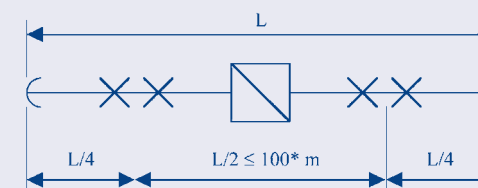
Caution : the conditions of use for expansion joints are different if the line includes one or more circuit interruption elements, transfer elements or curves (see corresponding paragraphs).

IN ALL CASES A LINE WITH AN EXPANSION JOINT MUST RESPECT 4 RULES :

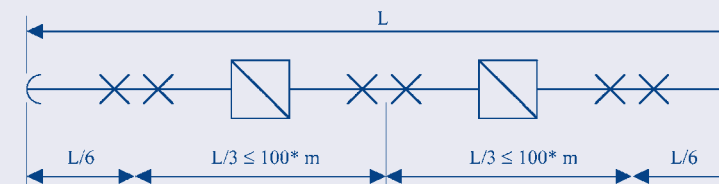
- the length beyond the fixed hangers = half the length between the fixed hangers (well-balanced line)
- the length between 2 fixed hangers ≤ 100 m (≤ 90 m for intensities of 100A, 130A, 160A and 200A in the high temperature version)
- the position of the expansion joint must be centred between 2 fixed hangers
- an extra single trolley must be used.

Installing expansion joints :

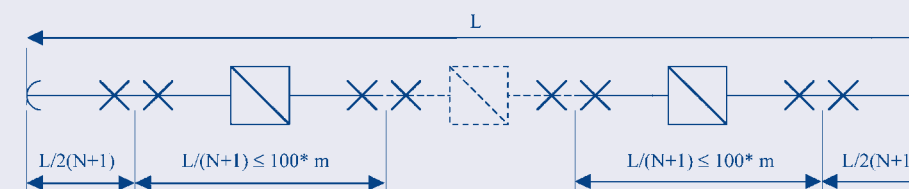
LINE WITH 1 EXPANSION JOINT :



LINE WITH 2 EXPANSION JOINTS :

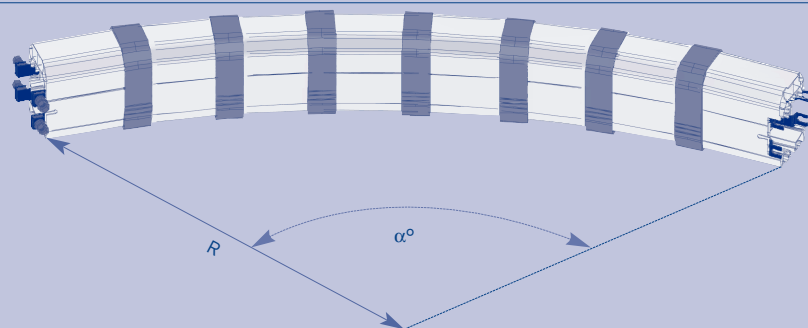


LINE WITH 2 EXPANSION JOINTS :



* 90 m for intensities of 100 A, 130 A, 160 A and 200 A in high temperatures

16. CURVES



Material : self-extinguishing PVC + thermoplastic

Radius : - maximum : no limit

- minimum : 800 mm (for lower radii, please enquire).

Angle : up to 120° max per element (above this, please enquire).

The feeding line must maintain a constant distance from the travel path of the mobile device requiring current and must therefore follow a parallel path. The special curved elements (in the horizontal plane) are designed for this type of installation.

REFERENCES :

Always indicate the direction of the curved element required (earth inside or outside). In principle, the line should be set to make the earth side visible so as to facilitate access to the trolley connection plate.

Intensity		20A	40A	60A	100A	130A	160A	200A TR
4 poles	Earth outside.	ME4020	ME4420	ME4620	ME4120	ME4140	ME4210	ME4220-TR
	Earth inside.	ME4022	ME4422	ME4622	ME4122	ME4142	ME4212	ME4222-TR
5 poles	Earth inside.	ME5020	ME5420	ME5620	ME5120	ME5140	ME5210	ME5220-TR
	Earth inside.	ME5022	ME5422	ME5622	ME5122	ME5142	ME5212	ME5222-TR

For curve 5 poles, please enquire before order.



All curved elements are available with protection lips.
To order, add "-LV" after the reference.



All curved elements are available in the high temperature version.
To order, add "-HT" after the reference.

Please provide the following data :

- reference of the curved element
- radius (R) example : ME4620 R=1500, $\alpha=90^\circ$
- angle (α)

HANGERS / FIXED HANGERS :

Always install fixed hangers on all curved elements.

Number of fixed hangers on a curved element :

- If the expanded length of the curved element is less than or equal to 2 m AND if the angle described by the curve is less than or equal to 90°, 2 fixed hangers per curved element are required.

Si $L_D \leq 2 \text{ m}$ AND $\alpha \leq 90^\circ$: 2 fixed hangers

- If the expanded length of the curve is greater than or equal to 2 m or if the angle described by the curve is greater than 90° C, then 3 fixed hangers are required per curved element.

Si $L_D > 2 \text{ m}$ or $\alpha > 90^\circ$: 3 fixed hangers

COVERING FLANGES AND FEED BOXES :

At each end of the curve, please use covering flanges especially for curve ME1000-CO and feed boxes especially for curve ME1300-CO, ME1330-CO, ME1332-CO or ME1329-CO.

EXPANSION JOINTS :

When a straight section of the line is located between 2 curved sections, install an expansion joint for lines longer than :

Max. length of section between curved elements without an expansion joint							
Intensity	20A	40A	60A	100A	130A	160A	200A
Standard	70 m	35 m	35 m	20 m	20 m	20 m	20 m
High temperature	70 m	30 m	30 m	20 m	20 m	20 m	20 m

Caution : this data is given for a duty cycle factor of 100% and a temperature range of -20°C to + 55°C. For other characteristics, please contact our sales department.

TROLLEYS :

Articulated trolleys must always be used in all curved installations, whatever the radius. Maximum speed limit in curves: 70 m/min.

Main references :

- Single articulated trolley 4 poles with cable : ME2042
- Single articulated trolley 4 poles with box : ME3042
- Double articulated trolley 4 poles with box : ME4041
- Single articulated trolley 5 poles with cable : ME2050
- Single articulated trolley 5 poles with box : ME3050

NOTA BENE:

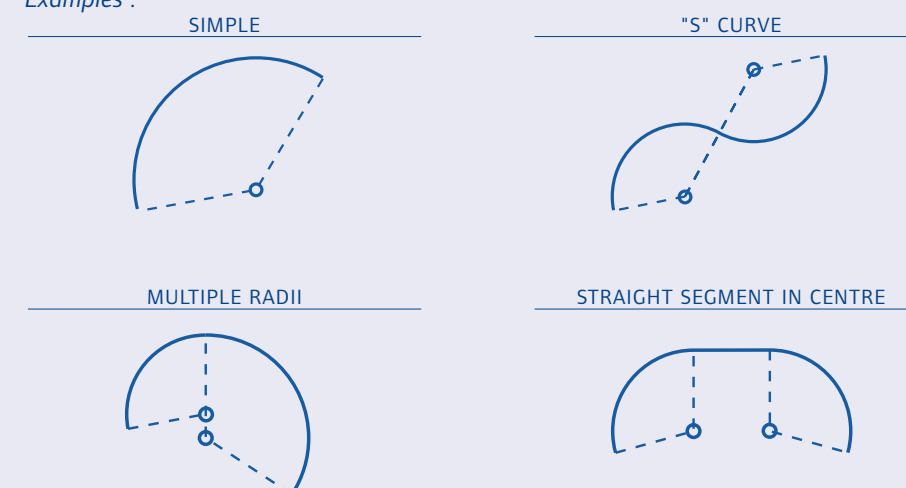
Maximum speed in curves : 70 m/min. (above this, please enquire)

When assembling, scrupulously follow the specifications in the assembly instructions for curved elements SPMO 064.

SPECIAL CURVED ELEMENTS :

Under certain conditions special curved elements can be made on request :

Examples :



17. TRANSFER ELEMENTS

Material : self-extinguishing PVC + thermoplastic.

Weight : comparable to a standard element of the same length.

Caution : Transfer elements are not available in the high temperature version.

The purpose of the transfer elements is to ensure the trolley crosses over mechanically discontinuous line sections, for instance as in the case of switches.

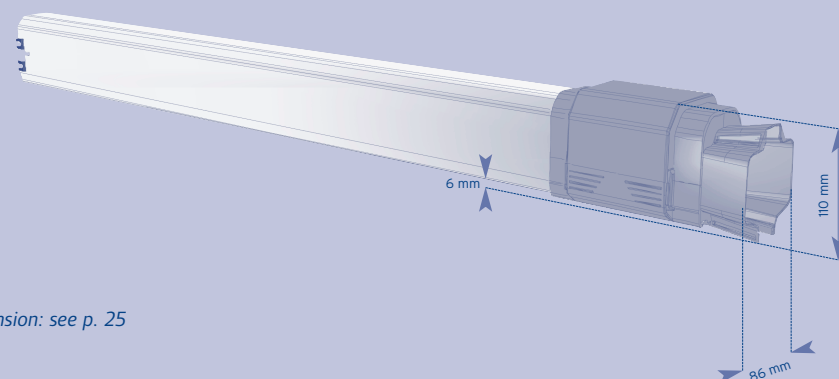
They can also be used for circuit interruptions (*the advantage being that they actually cut the electrical circuit*). However, transfer elements should in no case be used as electrical switches since they are not designed to resist electric arcing.

The Mobilis ELITE range proposes two families of transfer elements :

17.1 SHORT TRANSFER ELEMENTS

Transfer elements with short cones must be used when the facing cones are very close to each other with a minimum clearance of 10 mm and maximum clearance of 30 mm.

Permitted misalignment tolerance between short transfert elements : 3 mm max.



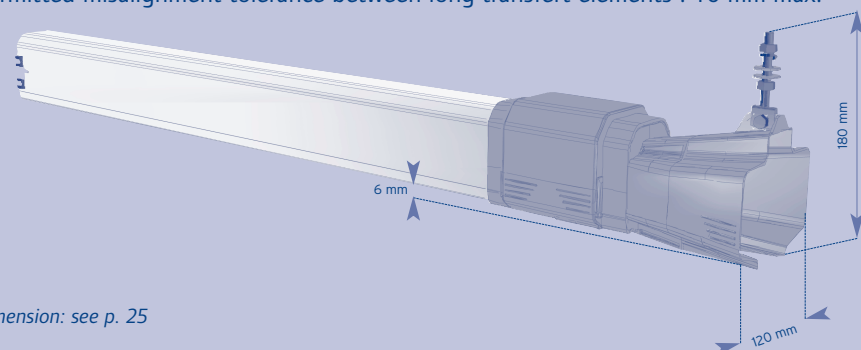
Dimension: see p. 25

17.2 LONG TRANSFER ELEMENTS

Transfer elements with long cones must be used when the facing cones are very far from each other, from 30 mm to infinity.

An extra rigid anchoring point is required in front of the cone to reinforce mechanical resistance. This part is included in the order reference for the long transfer element.

Permitted misalignment tolerance between long transfert elements : 10 mm max.



Dimension: see p. 25

The transfer elements are pre-mounted on line elements.

The total length is 1 metre in the standard version, but special lengths are available on request.

A transfer element with the earth on the right is identified by facing the transfer guide, with the opening at the bottom, when the green-yellow band is located on the right, and inversely for the transfer element with earth on the left.

A switch (*or circuit interruption element*) will always include a transfer element with the earth on the right and a transfer element with the earth on the left.

References :

Type of transfert element			Short		Long	
			Standard 1 m	Special length X m	Standard 1 m	Special length X m
20A	4 P	T à D	ME2501	ME2505	ME2551	ME2555
		T à G	ME2502	ME2506	ME2552	ME2556
	5 P	T à D	ME2503	ME2507	ME2553	ME2557
		T à G	ME2504	ME2508	ME2554	ME2558
40A	4 P	T à D	ME2509	ME2513	ME2559	ME2563
		T à G	ME2510	ME2514	ME2560	ME2564
	5 P	T à D	ME2511	ME2515	ME2561	ME2565
		T à G	ME2512	ME2516	ME2562	ME2566
60A	4 P	T à D	ME2517	ME2521	ME2567	ME2571
		T à G	ME2518	ME2522	ME2568	ME2572
	5 P	T à D	ME2519	ME2523	ME2569	ME2573
		T à G	ME2520	ME2524	ME2570	ME2574
100A	4 P	T à D	ME2525	ME2529	ME2575	ME2579
		T à G	ME2526	ME2530	ME2576	ME2580
	5 P	T à D	ME2527	ME2531	ME2577	ME2581
		T à G	ME2528	ME2532	ME2578	ME2582
130A	4 P	T à D	ME2533	ME2537	ME2583	ME2587
		T à G	ME2534	ME2538	ME2584	ME2588
	5 P	T à D	ME2535	ME2539	ME2585	ME2589
		T à G	ME2536	ME2540	ME2586	ME2590
160A	4 P	T à D	ME2601	ME2605	ME2609	ME2613
		T à G	ME2602	ME2606	ME2610	ME2614
	5 P	T à D	ME2603	ME2607	ME2611	ME2615
		T à G	ME2604	ME2608	ME2612	ME2616
200A TR	4 P	T à D	ME2541-TR	ME2545-TR	ME2591-TR	ME2595-TR
		T à G	ME2542-TR	ME2546-TR	ME2592-TR	ME2596-TR
	5 P	T à D	ME2543-TR	ME2547-TR	ME2593-TR	ME2597-TR
		T à G	ME2544-TR	ME2548-TR	ME2594-TR	ME2598-TR



All transfer elements are available with protection lips.

To order, add "-LV" after the reference.

SAFETY :

The contact with the protective earth conductor has priority over the other poles.

The transfer element design does not allow access to the live parts, even from the front of the cone, due to the built-in insulators and safety distances. The transfer elements have a protection index of IP23 taking access to the dangerous parts into consideration, but do not offer any protection against solid foreign bodies ($\varnothing 12,5$ ball test according to EN60529).



Operator protection against access to the live brushes on the trolley and against the risk of mechanical blockages when crossing the interval between transfer elements must be provided by the customer.

As the transfer elements are subjected to line expansion efforts, ME1500 fixed hangers must always be used together with rigid brackets such as ME1760 or ME1780, or welded brackets, for example. Furthermore, fixed hangers allow the transfer elements to withstand the stress caused by moving trolleys.

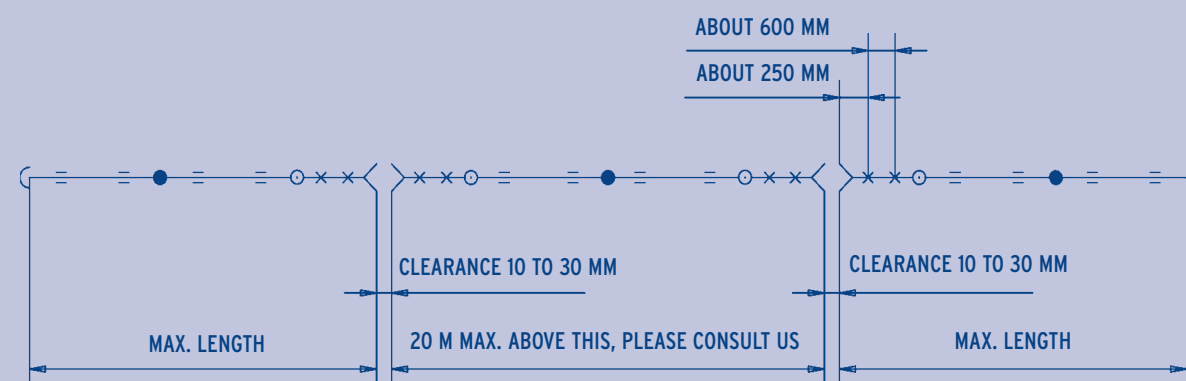
INSTALLATION, OPERATION AND MAINTENANCE INFORMATION :

The dead length made up of the transfer element cones and the insulators, and the design of the transfer elements require the use of specially adapted trolleys and carriers (see p. 25, p. 31 and p. 32).

Maximum speed during transfer : 70 m/min. max. (above this, please enquire)

Travel speed outside transfer : according to type of trolley.

COMPOSITION OF A LINE WITH SHORT TRANSFER ELEMENTS :

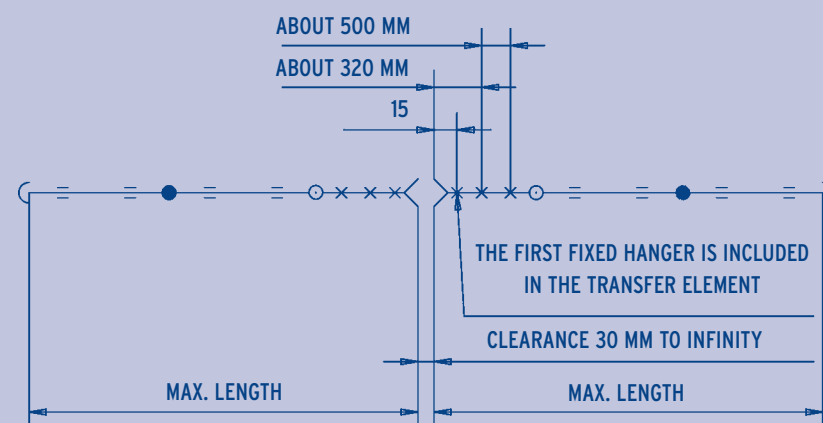


Max. length without expansion joint

Valid table for the configurations with short or long transfer elements.

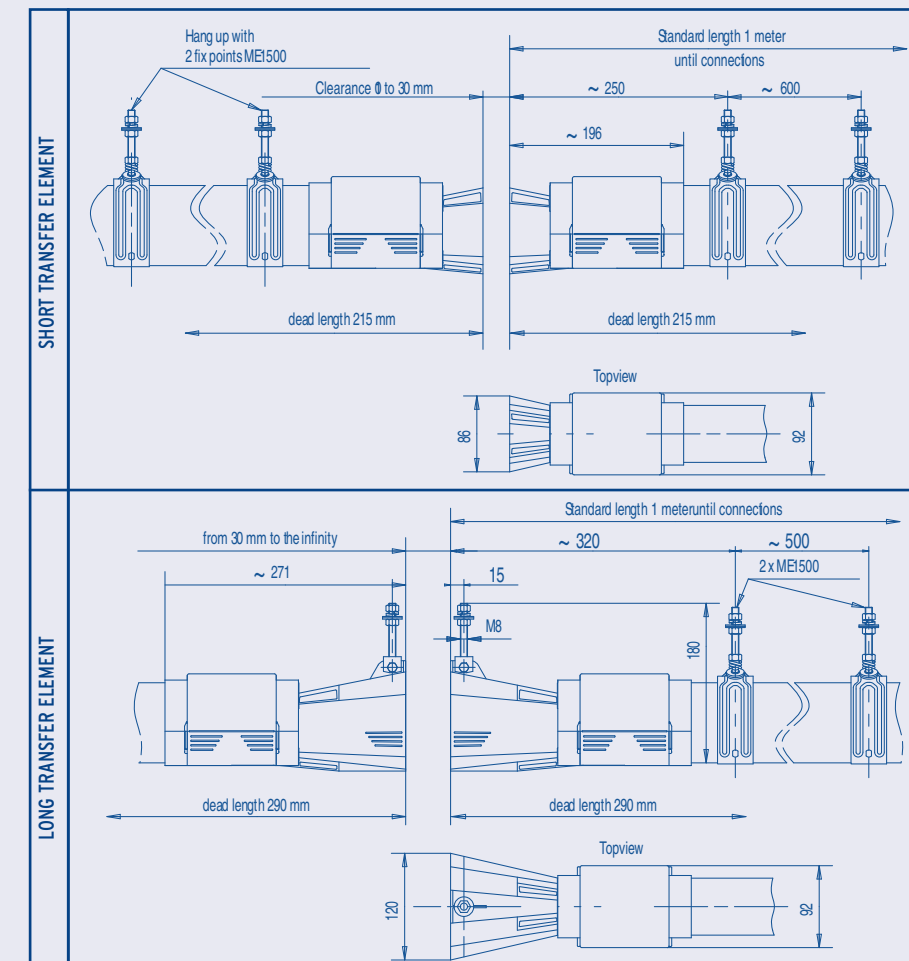
Intensity	20A	40A	60A	100A	130A	160A	200A
Max. length	62 m	76 m	62 m	52 m	40 m	35 m	30 m

COMPOSITION OF A LINE WITH LONG TRANSFER ELEMENTS :



⊔	End-cap
○	Covering flange
●	Feed box
—	Sliding hanger
×	Fixed hanger
⊕	Earth
⌢	Transfer element

DIMENSIONS OF TRANSFER ELEMENTS :



MAINTENANCE INSTRUCTIONS :

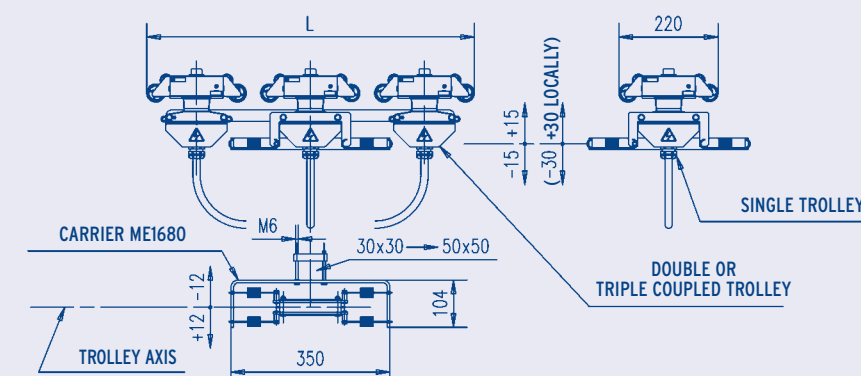
The operating life of the transfer elements and trolleys will be longer if the transfer elements are well aligned and if the trolleys are driven in the axis of the line.

For a pair of transfer elements, the trolley should be replaced every 25,000 cycles through and back.

After the same number of cycles, or at least once a year, you should check :

- the degree of electrical insulation. If necessary clean the cone, after first disconnecting the installation from the mains.
- the mechanical condition of the transfer elements and the trolleys (rollers, brushes, signs of wear in the cones etc.)

DIMENSION OF TROLLEYS FOR LONG TRANSFER ELEMENTS :

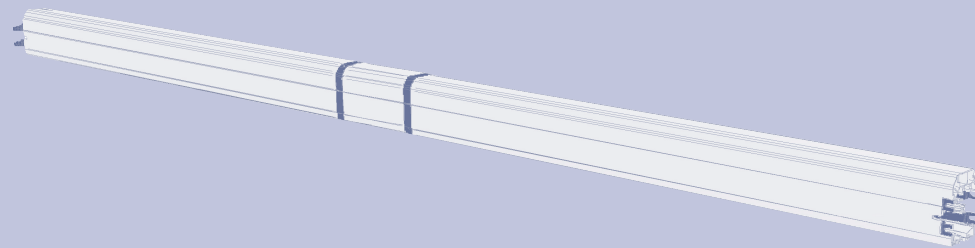


18. CIRCUIT INTERRUPTION ELEMENTS

Material : PVC

Weight : identical to equivalent standard element

Caution : no circuit interruption possible in the high temperature version



The purpose of the circuit interruption element is to insulate electrically one part of the line from another.

Example : on a line with several travelling cranes, the circuit interruption element allows maintenance to be carried out on a crane (in a well defined area) while the other cranes continue to run.

Selecting the type of circuit interruption element depends on how the line is used..

- "safety" interruption :

Prevents the insulation from being short-circuited via the trolley.

This configuration requires the trolley to be driven manually or mechanically from one sector to the other over the insulation.

The circuit interruption element must be adapted to the trolley type (e.g. double interruption for double collector trolley).

- "comfort" interruption :

In this case, it is possible to short-circuit the insulation via the trolley.

This configuration means the trolley can pass automatically from one sector to the other with current continuity if a double or triple collector trolley is used. A single interruption is always appropriate for this configuration (it must be shorter than the trolley).



Caution : The customer is responsible for taking the appropriate safety measures to prevent the trolley from short-circuiting the circuit interruption and supplying electricity to the maintenance area.

References :		20A	40A	60A	100A	130A	160A	200A TR
Single Interruption	4 poles	ME1960	ME1962	ME1964	ME1966	ME1968	ME1950	ME1970-TR
	5 poles	ME1961	ME1963	ME1965	ME1967	ME1969	ME1951	ME1971-TR
Double interruption	4 poles	ME1972	ME1974	ME1976	ME1978	ME1980	ME1952	ME1982-TR
	5 poles	ME1973	ME1975	ME1977	ME1979	ME1981	ME1953	ME1983-TR
Triple interruption	4 poles	ME1984	ME1986	ME1988	ME1990	ME1992	ME1954	ME1994-TR
	5 poles	ME1985	ME1987	ME1989	ME1991	ME1993	ME1955	ME1995-TR



All articles are available with protection lips.
To order, add "-LV" after the reference.

Maximum line length with circuit interruption element, without expansion joint :

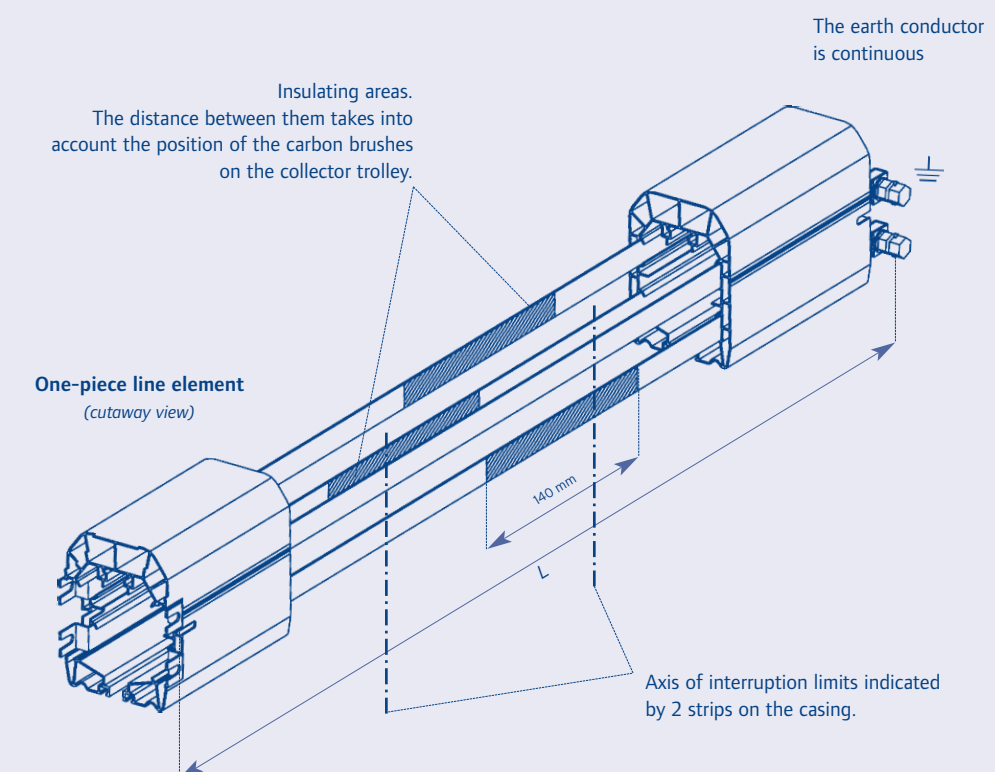
Intensity	20A	40A	60A	100A	130A	160A	200A
Max. length	140 m	150 m	150 m	150 m	150 m	150 m	150 m

Beyond these lengths an expansion joint is required per section of 100 m max.

Nota bene :

- The length "L" of the element should be stated when ordering.
- In the standard version, the interruption is located at the centre of the element, if you wish it to be placed elsewhere, please provide a drawing defining the position required. In this case, the element is given a special reference.
- For double or triple interruptions (no current continuity) the insulation area of 140 mm is extended. (412 mm for double interruptions and 684 mm for triple interruptions)
- The circuit interruption element must in no case be used as an electrical switch. The electrical arcs generated by driving the collector trolley across the interruption damages the conductors and insulators.
- Check possible reduction in the current capacity of the trolleys due to the insulators.
- Each section of the circuit must be provided with its own feed box.
- The earth conductor is continuous.
- The circuit interruption element is assembled like a standard element.
- When the maintenance area is cut off from the mains, make sure that no collector trolleys are travelling as they are likely to short-circuit the circuit interruption.
- The insulation between the conductors on the same pole on either side of the circuit interruption element must be checked regularly, at least once a year.

Construction principle for the circuit interruption element :



19. MOBILIS ELITE TROLLEYS – GENERAL FEATURES

The collector trolley is designed to shunt the electrical current in the Mobilis line to the mobile device requiring power.

The mechanical link between the trolley and the mobile device is ensured by the carrier (see p. 32).

The body of the trolley is made of self-extinguishing thermoplastic material.

The self-lubricating carbon brushes are mounted on springs, thereby guaranteeing permanent contact with the conductor.

The trolley is available with a box + packing box M25, allowing connection via flexible cables of 2,5 mm² to 6 mm², Ø13 to 19 mm.

It is also available with a cable H07-RNF (4 x 4 mm² or 5 x 4 mm²).

The trolley with cable can be delivered with a cable length of 1 m (standard) or more (on request).

The carbon brushes are the parts of the Mobilis Elite trolley most subject to wear.

They can be easily replaced without any intervention on the wiring. A simple screwdriver is all that is needed. The maximum wear tolerance is etched on the body of the trolley (see p. 33).

The single trolley can shunt up to 40 A when travelling. For higher intensities, building a set of 2 or 3 collector trolleys (double collector, triple collector) can respectively shunt up to 80 A and up to 120 A.

Operational life of stationary trolleys :

Single collector trolley	Double collector trolley	Triple collector trolley
40" to 40A	40" to 80A	40" to 120A
5' to 30A	5' to 60A	5' to 90A
30' to 20A	30' to 40A	30' to 60A
> 1 h à 16A	> 1 h à 32A	> 1 h to 48A

Contact quality according to speed :

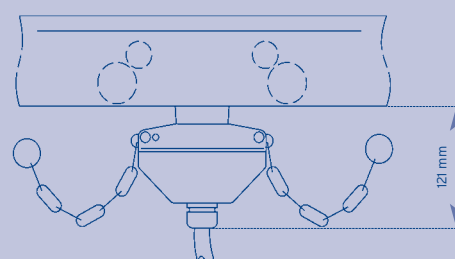
Speed of mobile	Single collector trolley		Double collector trolley
	≤ 50 m/min	≤ 250 m/min	≤ 250 m/min
Duration of micro-cutoff	< 1 ms	< 3 ms	< 1 ms
Comment	-	EN60204-32	-

So as to reduce the risk of micro-cutoffs, the collector trolleys should be doubled.

Various types of trolley are available (single, double or triple version) for specific uses :

- **rigid trolley :**
for standard installations, without curves, operating at speeds of ≤ 100 m/min.
- **high speed trolley (G.V.) :**
for straight-line installations operating at speeds of > 100 m/min.
- **articulated trolley :**
for installations with curves (whatever the radius).
- **special trolley for transfer element :**
for installations with transfer elements.
- **cleaning trolley :**
for cleaning the conductors.
Normally travels separately.

Overall dimensions of the trolleys in relation to the line



19.1 RIGID TROLLEYS

Use for standard installations (no curves) operating at normal speeds (≤ 100 m/min).

19.1.1 SINGLE TROLLEYS WITH BOX

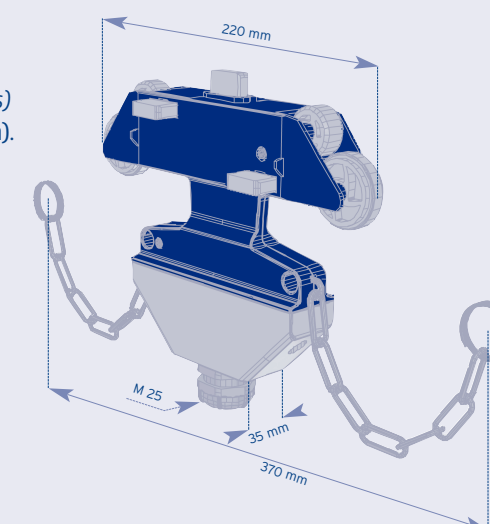
Nominal intensity : 40 A

Connection via flexible cable (not provided)

Terminals : 6 mm²

Weight : 0,6 kg

Reference	Box	with cable
4 poles	ME3043	ME2043
5 poles	ME3051	ME2051



19.1.2 SINGLE TROLLEYS WITH CABLE

Nominal intensity : 40 A

Flexible cable connection : 4 x 4 mm² or 5 x 4 mm²

Length : 1 m (for connection to carrier with box ME1660)

Weight : 0,9 kg

19.1.3 DOUBLE TROLLEYS WITH BOX

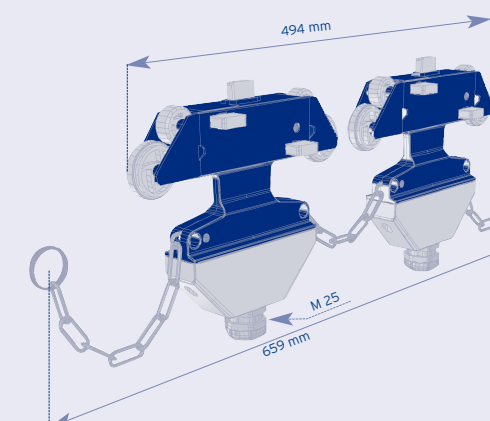
Nominal intensity : 80 A

Connection via 2 flexible cables : (not provided)

Terminals : 6 mm²

Weight : 1,1 kg

Reference	Box	with cable
4 poles	ME4042	ME4047-1M
5 poles	ME4050	ME4051



19.1.4 DOUBLE TROLLEYS WITH CABLE

Nominal intensity : 80 A

Flexible cables connected : 4 x 4 mm² or 5 x 4 mm²

Length : 2 x 1 m (for connection to carrier with box ME1640 or ME1645)

Weight : 1,8 kg

19.1.5 TRIPLE TROLLEYS WITH BOX

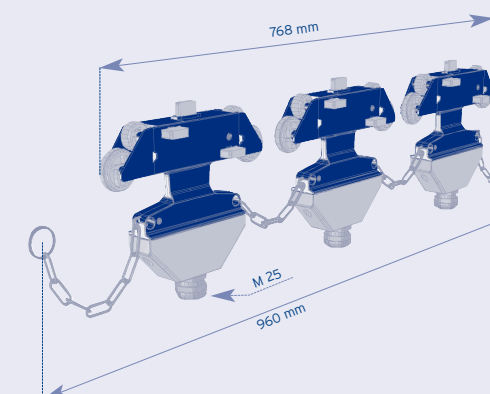
Nominal intensity : 120 A

Connection via 3 flexible cables (not provided)

Terminals : 6 mm²

Weight : 1,6 kg

Reference	Box	with cable
4 poles	ME5040	ME5049-1M
5 poles	ME5050	ME5059-1M



19.1.6 TRIPLE TROLLEYS WITH CABLE

Nominal intensity : 120 A

Flexible cables connected : 4 x 4 mm² or 5 x 4 mm²

Length : 3 x 1 m (for connection to carrier with box ME1650 or ME1655)

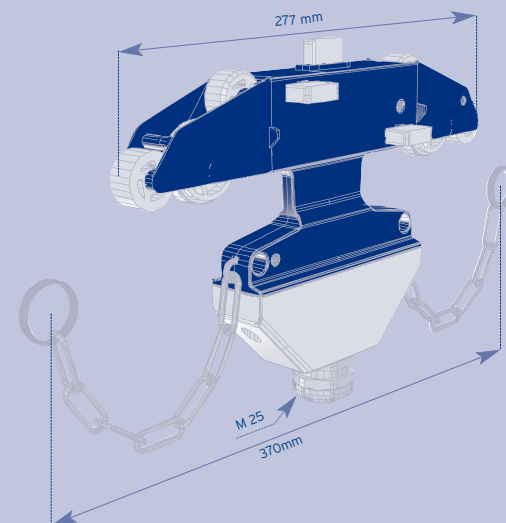
Weight : 2,6 kg

19.2 HIGH SPEED TROLLEYS

High speed trolleys have extra rollers to cross over junctions smoothly, even when travelling at high speeds.

High speed trolleys are required for speeds greater than 100 m/min.

All other features of high speed trolleys (*excepting running speed and dimensions*) are identical to those of the rigid trolleys.



Reference	4 poles	5 poles
Single with box	ME3041	ME3091
Double with box	ME4043	ME4053
Triple with box	ME5043	ME5053

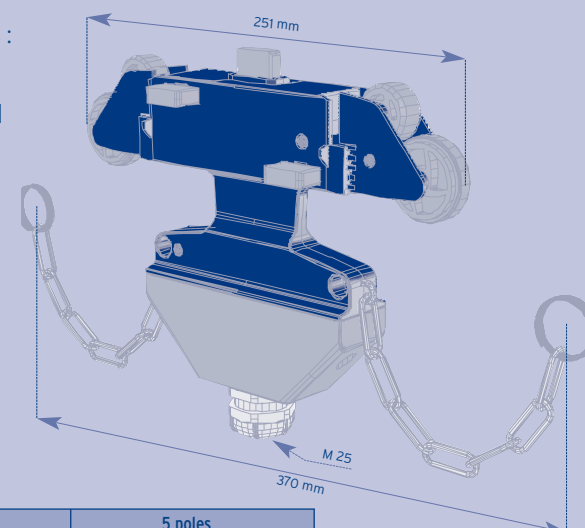
Notice : The triple high speed trolleys are not compatible with triple carriers.

19.3 ARTICULATED TROLLEYS

Articulated trolleys must be used with all installations including curves, whatever the radius of the curve.

Maximum speed limit in curves : 70 m/min.

All other features of articulated trolleys (*excepting dimensions*) are identical to those of the rigid trolleys.



Reference	4 poles		5 poles	
	Box	with cable	Box	with cable
Single	ME3042	ME2042	ME3050	ME2050
Double	ME4041	ME4040	ME4052	ME4055
Triple	ME5042	ME5041	ME5052	ME5055

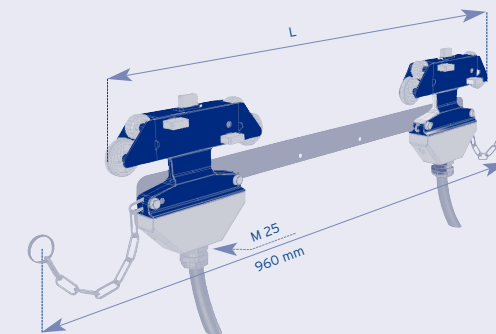
For satisfactory operation, check the positioning of the collector trolley drive in the curved sections, especially when the position of the collector is out of line with the mobile device, and limit the displacement of the axis to 50 mm maximum.

19.4 SPECIAL TROLLEYS FOR TRANSFER ELEMENTS



Caution : Operator protection against access to the live brushes on the trolley when crossing the interval between transfer elements must be provided by the customer.

The dead length, made up of the cones of the transfer elements and the insulators, requires the use of sets of specially designed trolleys and carriers.



19.4.1 TROLLEY FOR SHORT TRANSFER ELEMENT

With transfer elements with a short cone, double or triple trolleys with a coupling bar should be used together with a triple carrier with box type ME1650 (4 poles) or ME1655 (5 poles) to ensure current continuity.

19.4.2 TROLLEY FOR LONG TRANSFER ELEMENT

Use standard single trolleys (*rigid or articulated as appropriate*) and double and triple coupled trolleys. In the interval between the transfer elements, the trolleys must be maintained in the air. It is imperative to use a special carrier reference ME1680 (see p. 25 and 32).

In the standard version, **cabl e 1 metre long only.**

Reference	Double trolley for transfer element		Triple trolley for transfer element		Length L
	4 poles	5 poles	4 poles	5 poles	
Rigid	ME4060	ME4070	ME5060	ME5070	725 mm
Articulated	ME4062	ME4072	ME5062	ME5072	756 mm
High speed	ME4065	ME4075	ME5065	ME5075	783 mm
Weight	2,0 kg		2,8 kg		

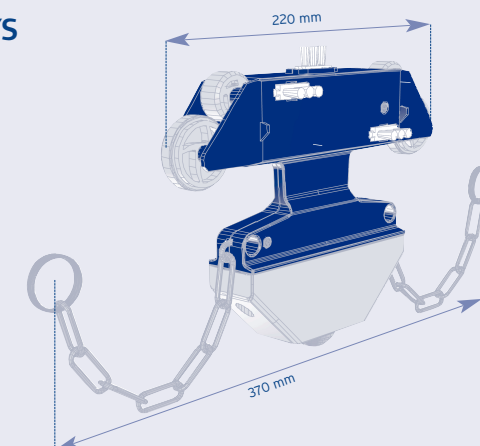
19.5 CLEANING TROLLEYS

The cleaning trolley is designed to clean the conductors, especially in the following cases :

- dusty environment
- very humid environment
- slight surface roughness on the conductors
- projection of particles towards the line
- ...

Weight : 0,4 kg

It is made up of a body which is identical to the collector trolleys. The brushes are replaced by brass fibre brushes. The cleaning trolley is not wired up and cannot therefore shunt electrical current.

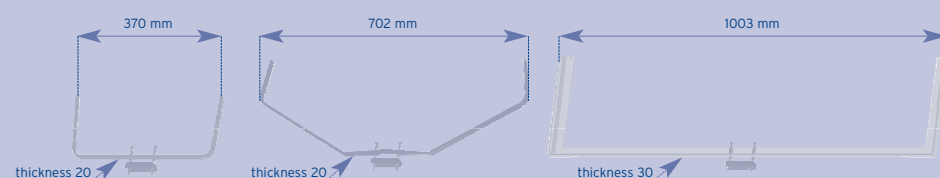


Reference	Rigid	Articulated
4 poles	ME4514	ME4522
5 poles	ME4525	ME4523

Caution : the cleaning trolley brushes wear more rapidly than the collector brushes. They should be checked and replaced regularly for efficient operation.

The frequency of use of the cleaning trolley depends on the line use. But it is not designed to be coupled to collector trolleys and must be handled separately.

20. STANDARD CARRIERS



Material : galvanised steel
Assembling on a square bar dimension E (mm).

Permissible clearance :

- horizontal : + 50 mm
- vertical : +0/-50 mm

The carriers ensure the mechanical link between the collector trolley which travels inside the Mobilis Elite line and the mobile device requiring current.

	Single carrier (for single trolley)	Double carrier (for double trolley)	Triple carrier (for triple trolley)
Order N° for E= 20 to 50	ME1600	ME1610	ME1630
Order N° for E= 20 to 30	ME1605	ME1615	-
Weight	0,6 kg	1,1 kg	2,6 kg

21. CARRIER WITH BOX

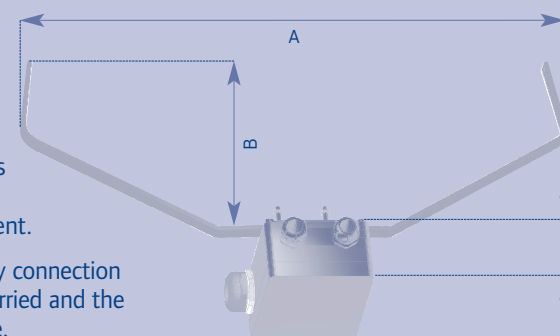
Material : galvanised steel. Mounted on a square bar from 20 to 50 mm

Permissible clearance :

- horizontal : ± 50 mm
- vertical : + 0/-50 mm

The carriers with box ensure the mechanical link between the collector trolley which travels inside the Mobilis Elite line and the mobile device requiring current.

They also provide an intermediary connection point between the collector(s) carried and the supply cable of the mobile device.



	Single carrier (for single trolley)	Double carrier (for double trolley)	Triple carrier (for triple trolley)
Reference 4 poles	ME1660	ME1640	ME1650
Reference 5 poles		ME1645	ME1655
Cable	Up to 5 x 16 mm ²	Up to 5 x 16 mm ²	Up to 4 x 25 mm ² or 5 x 16 mm ² (*)
Value A	370 mm	702 mm	1003 mm
Value B	154 mm	232 mm	260 mm
Weight	1,4 kg	1,9 kg	3,4 kg
Maximum duty cycle factor	to 35°C	to 55°C	to 35°C
	100 %	64 %	61 %
			27 %
			40 %
			13 %

The dimensions for the carriers with box are identical to those of the standard carriers.

(*) : The triple carrier with box is not appropriate for currents higher than 100 A.

22. SPECIAL CARRIER FOR LONG TRANSFER ELEMENT

Assembling on a square bar from 20 to 50 mm

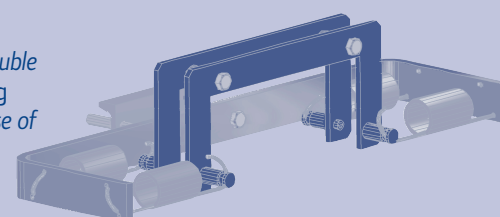
Permissible clearance :

- horizontal : ± 12 mm
- vertical : ± 15 mm

Maintains the trolley in the air (*single, double or triple*) during the interval between long transfer elements (*not necessary in the case of short transfer elements*).

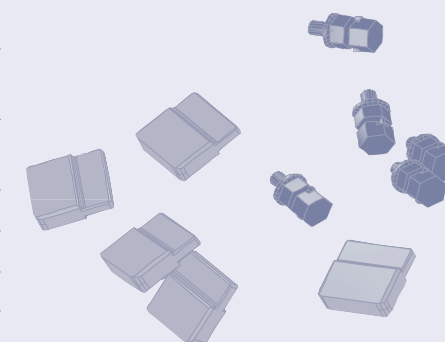
Reference : ME1680

Weight : 1,2 kg



23. REFERENCES OF ARTICLES AVAILABLE

Set of 5 screws + 5 nuts 20 A – 100 A	ME1345
Set of 10 screws + 5 nuts 130 A	ME1357
Set of 5 connections 160A	ME1353
Set of 5 connections 200 A 200A TR	ME1358 ME1358-TR
Set of 10 screws 200 A 200 A TR	ME1352 ME1352-TR
Set of 4 collector brushes	ME1354
Set of 5 collector brushes	ME1355
Set of 5 cleaning brushes (for cleaning trolley)	ME1356
Set of 2 screws for fixed hanger	ME1501
Set of 2 carrier rings	ME1359
Cone for short transfer elem.	ME0188
Cone for long transfer elem.	ME0189



MAINTENANCE INSTRUCTIONS FOR MOBILIS ELITE LINES

A) GENERAL POINTS

Any intervention must be carried out with the line switched off at the mains.

Maintenance primarily concerns the conductive tracks and the trolleys.

Any damage to the conductive tracks will reduce the operating life of the brushes.

This damage may take different forms:

- oxidation due to a chemical environment
- abrasive dust
- damage due to electrical arcs in the case of a faulty contact following oxidation, heavy soiling or use of worn brushes.

Regular inspection is required to check the wear of the brushes and the quality of the conductive tracks according to the rate of use, the distance covered and the chemical environment.

Inspection is required when the distance covered reaches 3 000 km or after one year of use at the most. During interventions, take the opportunity to remove the carbon dust from the collector trolleys so as to preserve the insulation performance.

B) MONITORING THE TRACKS

The tracks normally become covered with a protective black sheen with the repeated passage of the collector trolleys. Check the surface condition of the tracks at a junction point between the casings. The surface should be smooth. If the tracks are rough to the touch, run the cleaning trolley.

Caution : the cleaning trolley is not designed to run over long distances, its brushes wear down more rapidly than the conventional brushes.

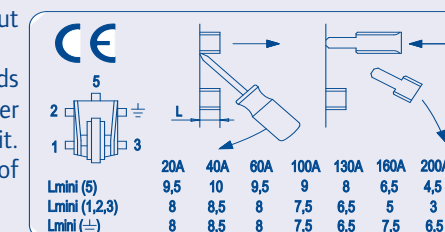
C) CHECKING THE BRUSHES

Switch the line off at the mains, take out the collector.

The replacement of the brushes depends on the line intensity, since the thicker the conductor, the higher the wear limit. These limits are etched on the body of the trolley.

D) MISCELLANEOUS

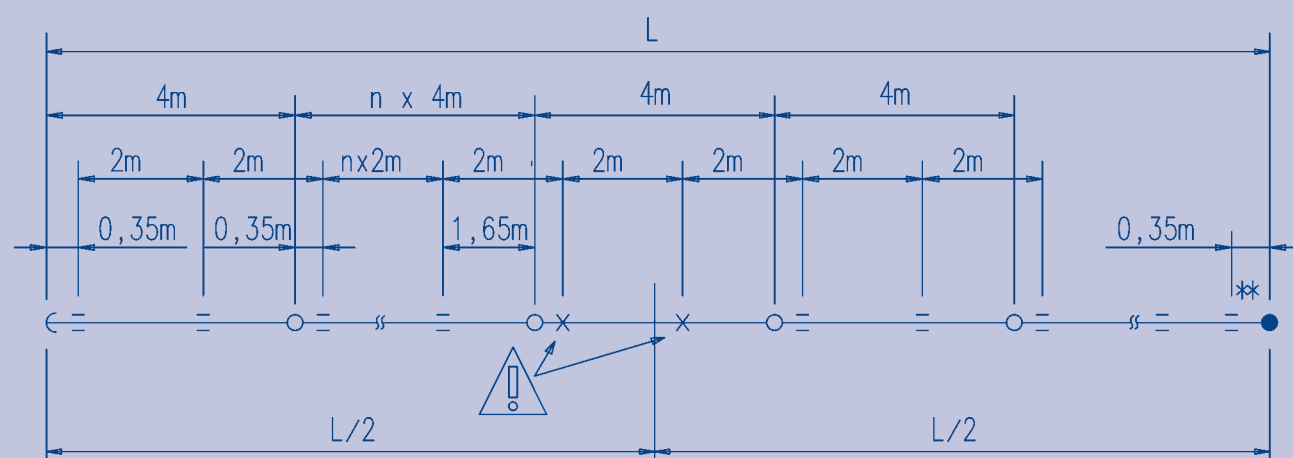
Check the trolleys (*rings and chains, rollers etc.*) and replace them every 10 000 km approximately.



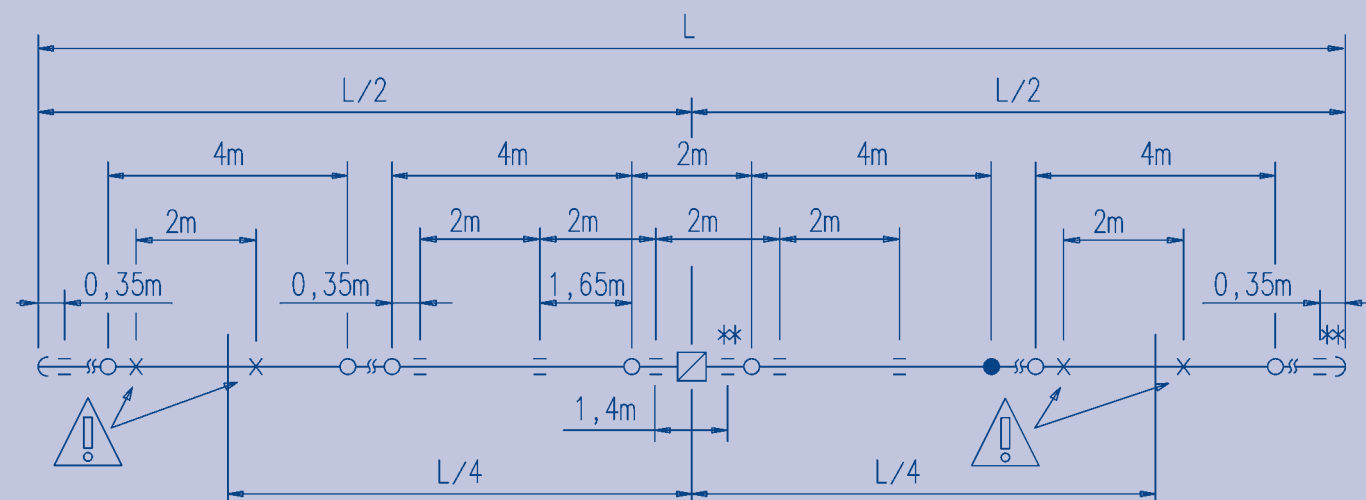
	20A	40A	60A	100A	130A	160A	200A
Lmini (5)	9,5	10	9,5	9	8	6,5	4,5
Lmini (1,2,3)	8	8,5	8	7,5	6,5	5	3
Lmini (±)	8	8,5	8	7,5	6,5	7,5	6,5

LAYOUT OF THE LINE ELEMENTS

Line without expansion joint



Line with expansion joint



Key

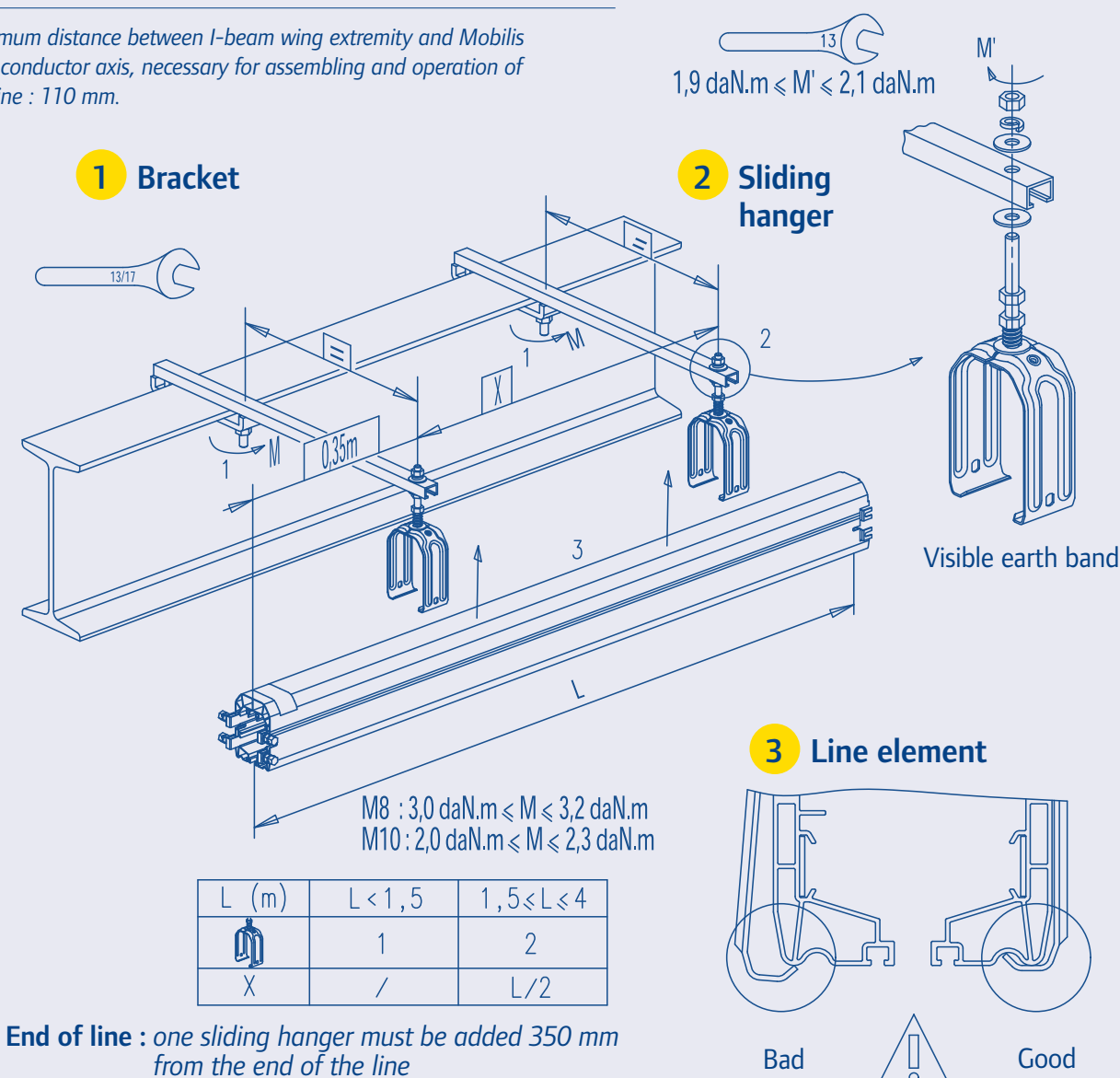
- × Fixed hanger
- Sliding hanger
- Covering flange
- Feed box
- Expansion joint
- ⌒ End-cap
- ** Additional sliding hanger

Remark

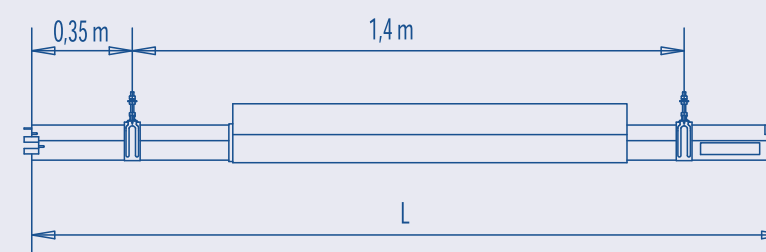
The position of the feed boxes is here only given for example. This position is defined by the calculation of the voltage drop and by the running conditions.

ASSEMBLY OF THE DIFFERENT ELEMENTS

Minimum distance between I-beam wing extremity and Mobilis Elite conductor axis, necessary for assembling and operation of the line : 110 mm.



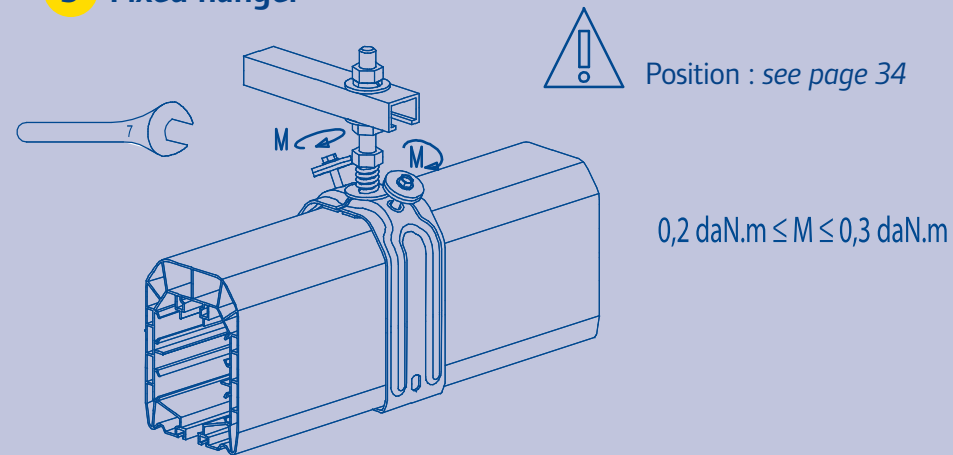
4 Expansion joint



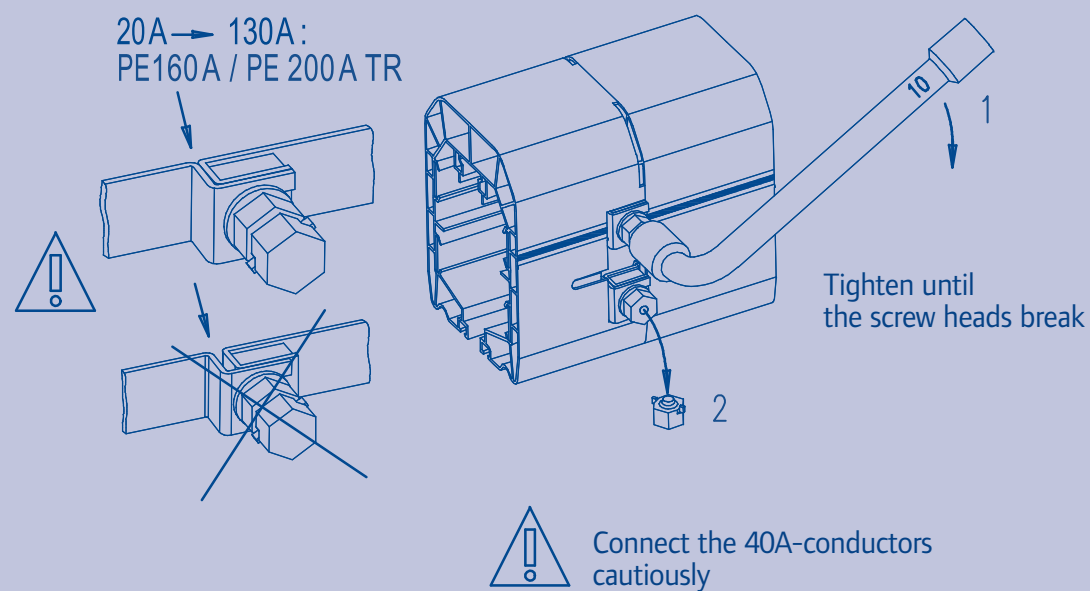
Draw out the element until the length L

Temperature at assembly	Length L (mm)
-20°C	2005
-10°C	2000
0°C	1995
10°C	1990
20°C	1985
30°C	1980
40°C	1975
50°C	1970
60°C	1965

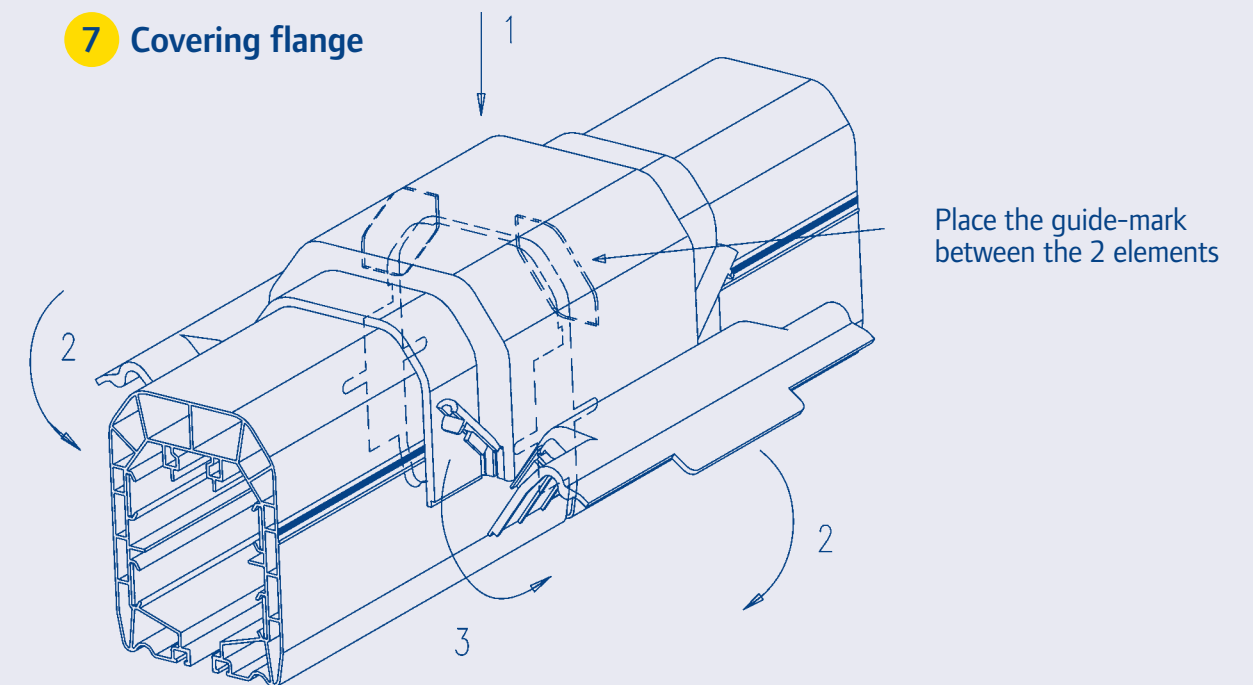
5 Fixed hanger



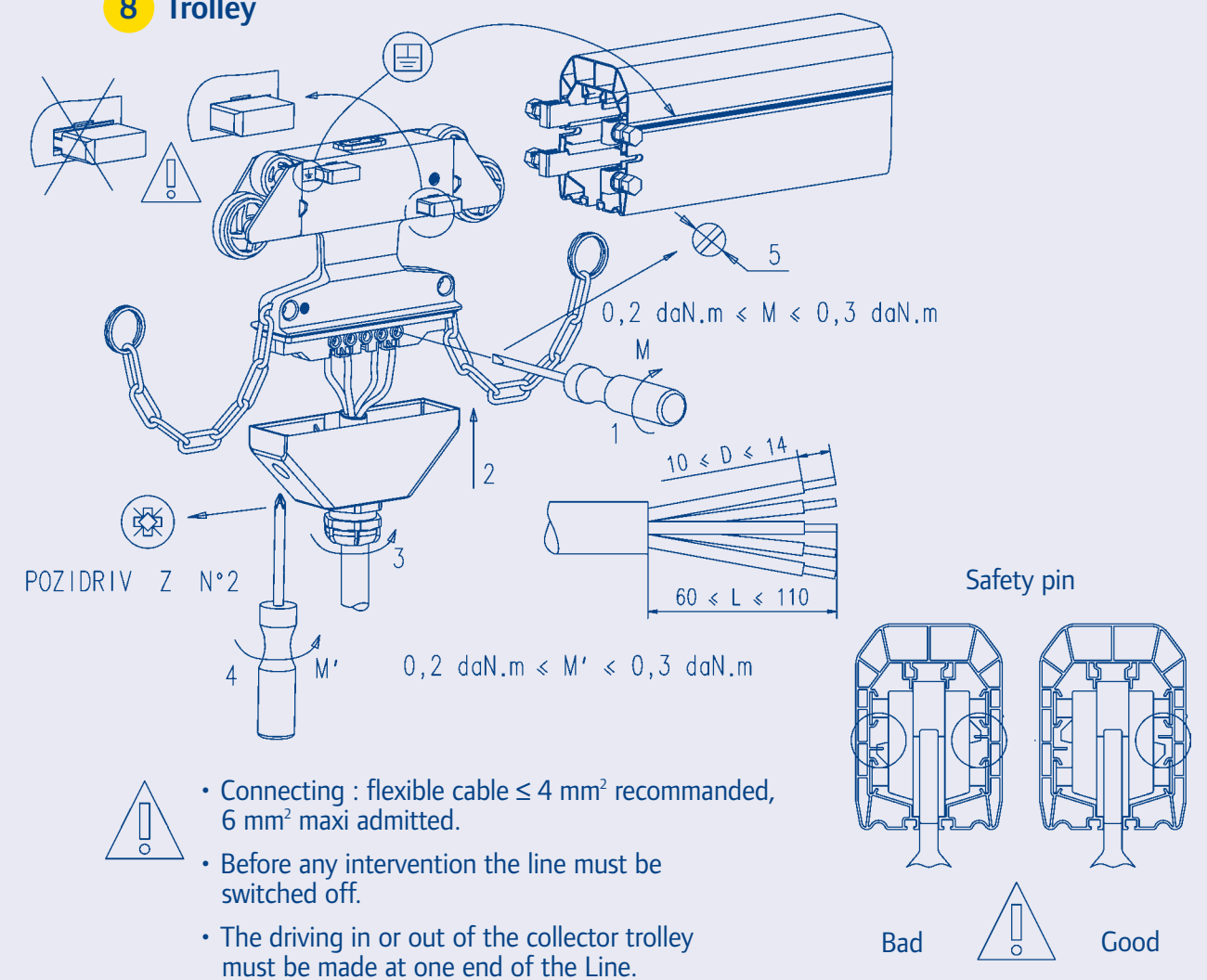
6 Connection of conductors



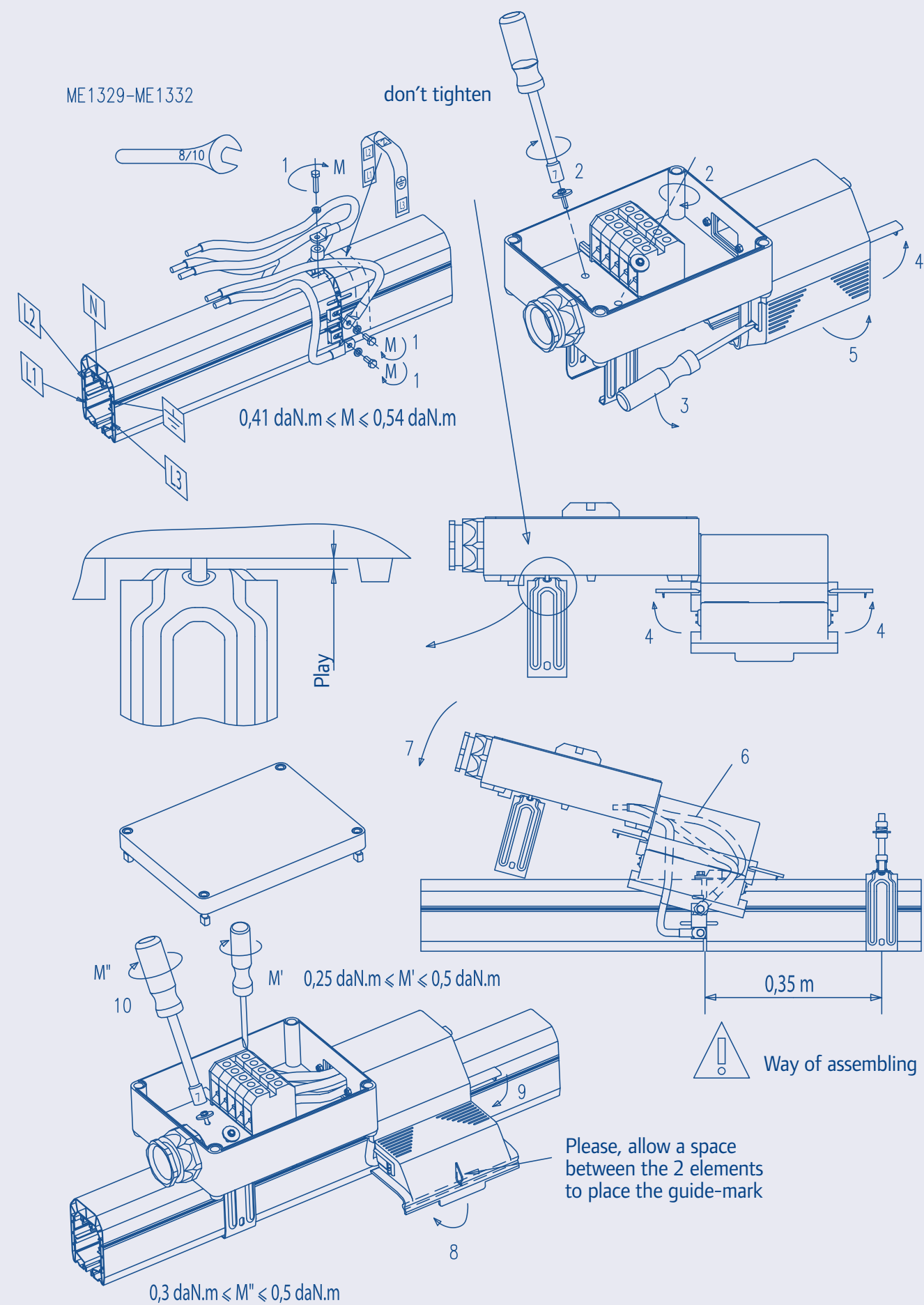
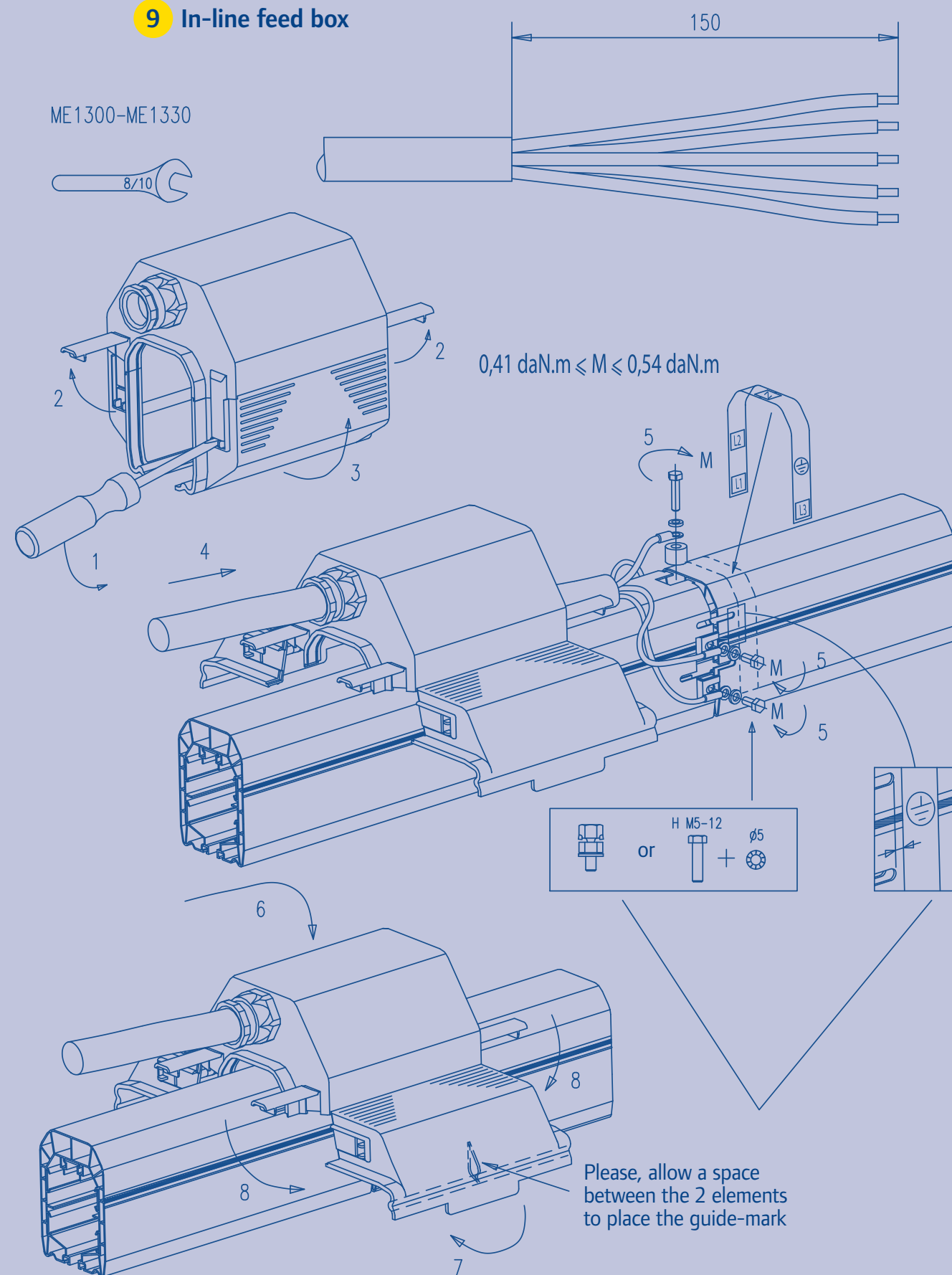
7 Covering flange

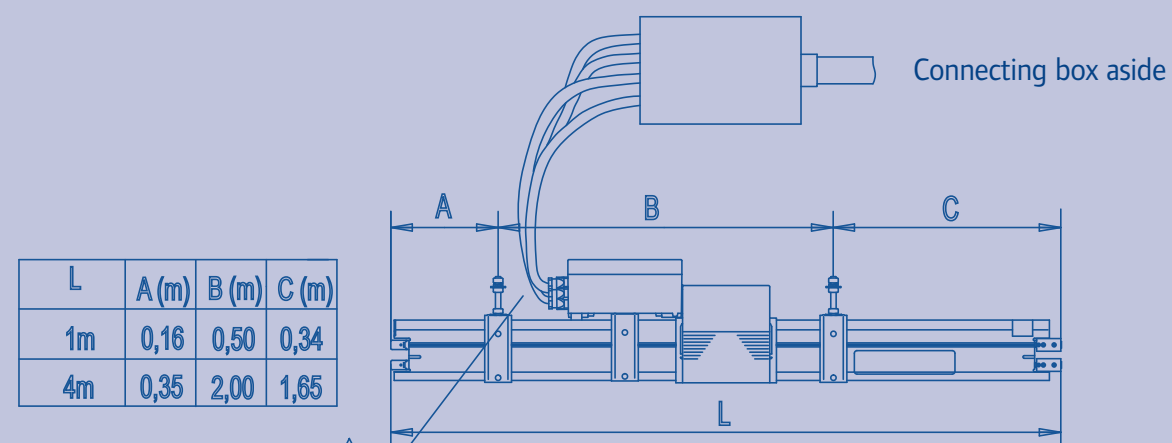


8 Trolley



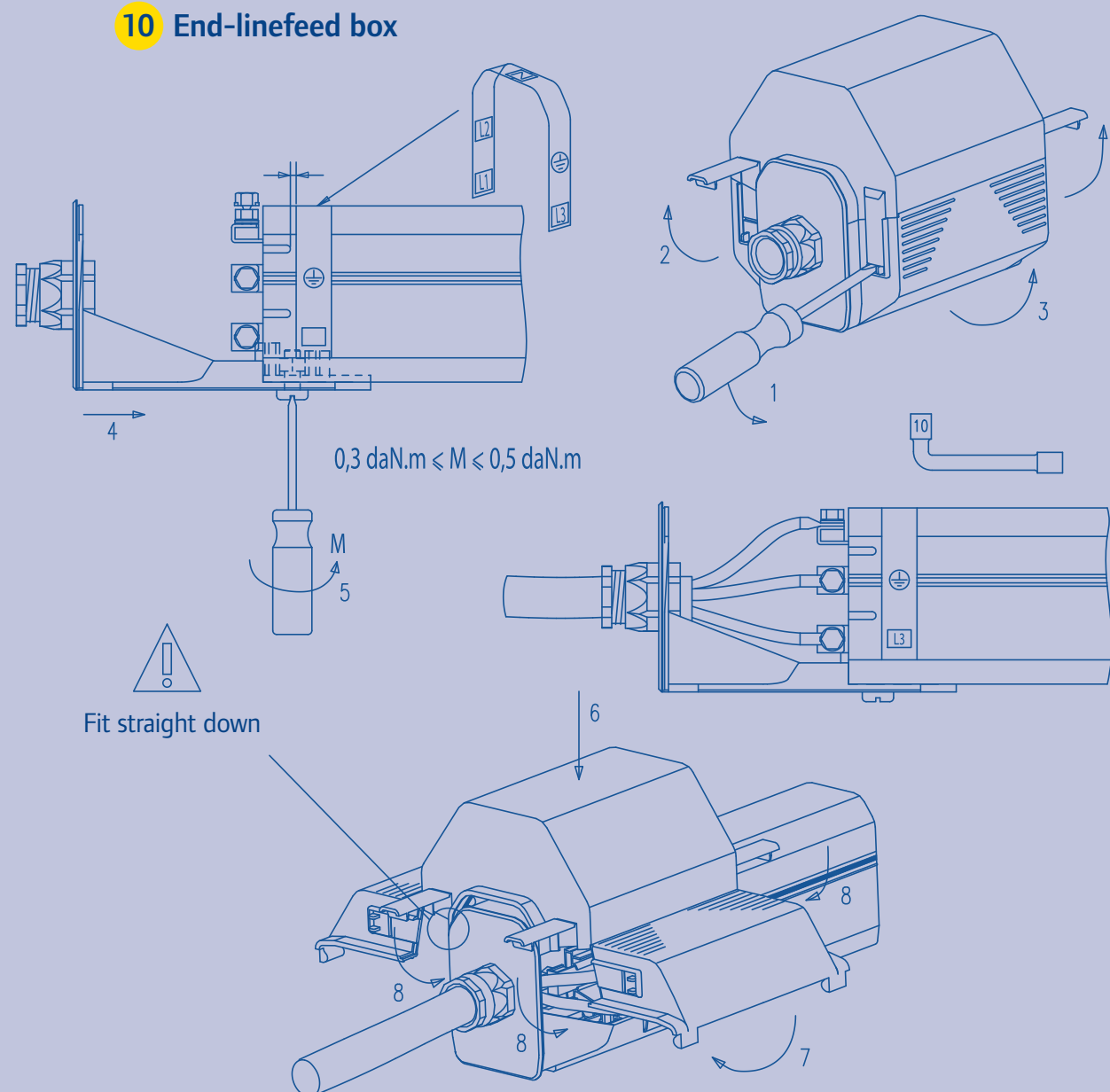
9 In-line feed box



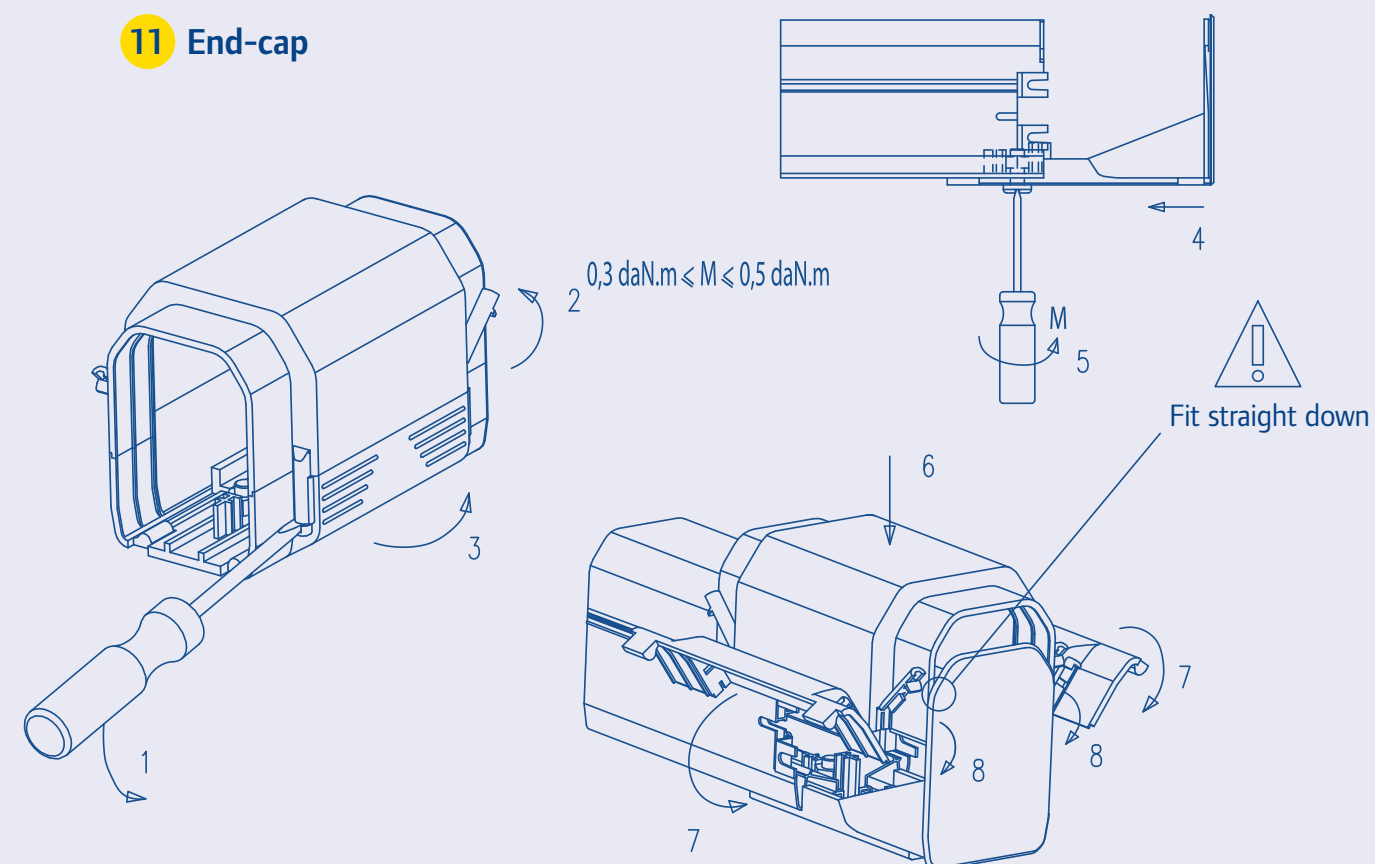


The layout of the cables and of the box must not impede the expansion. Keep a minimum play of 60 mm

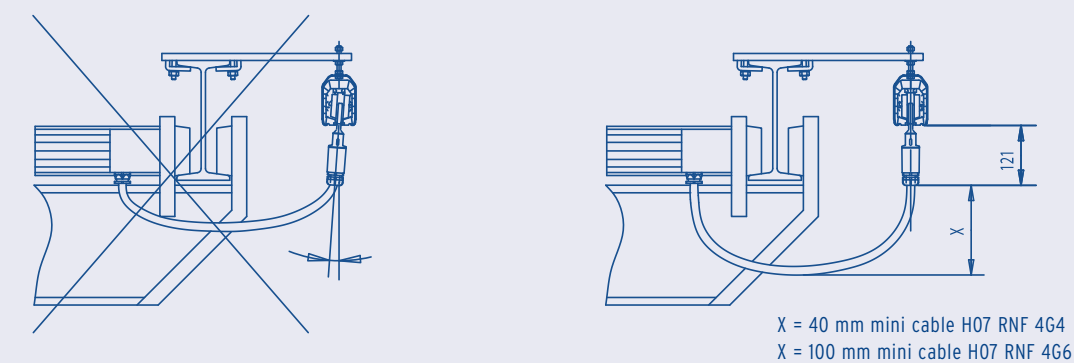
10 End-linefeed box



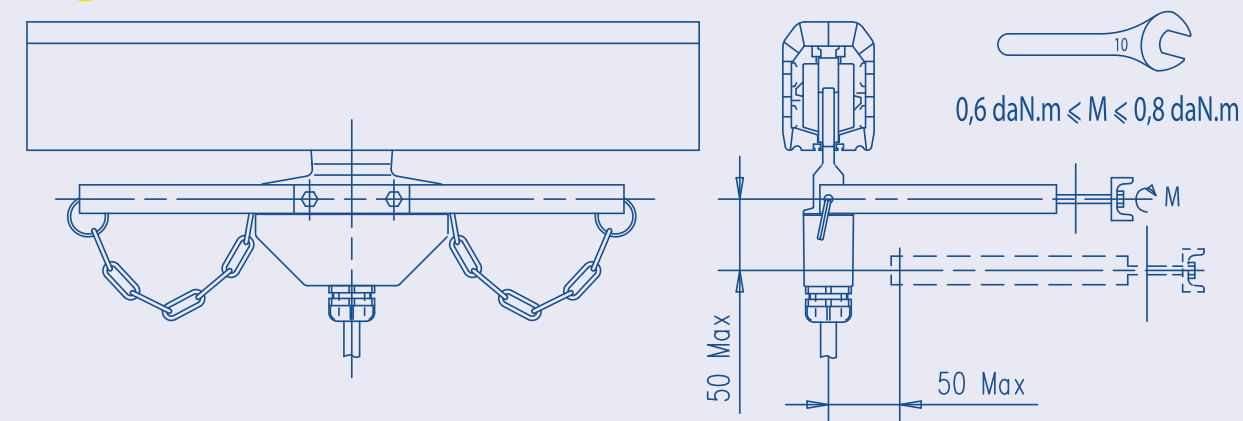
11 End-cap



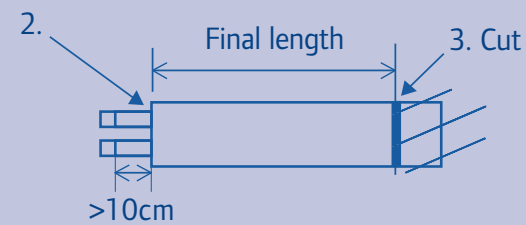
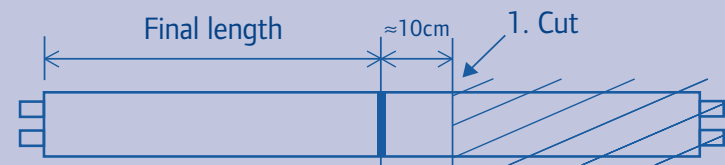
12 Connecting up the trolley



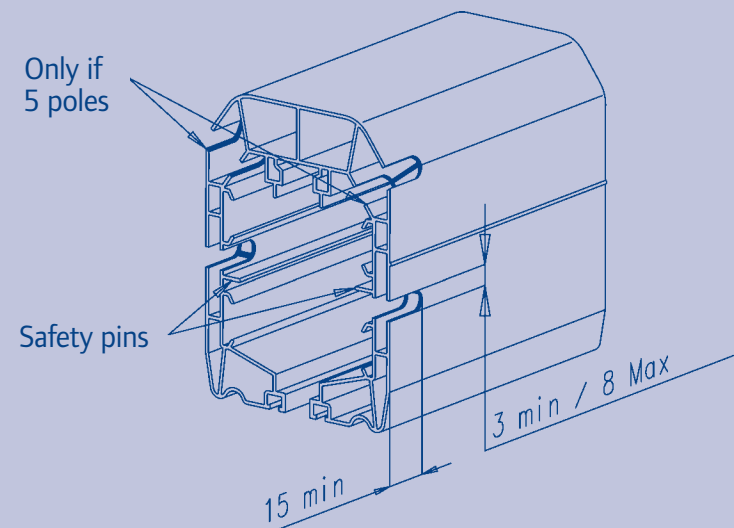
13 Carrier



14 Cutting the line on site



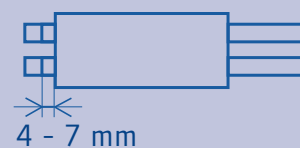
4. By the cut, notches have to be realized to reconstitute the insulation distances



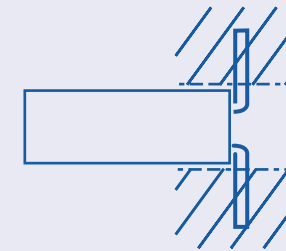
5. Burr the notches and remove the PVC dust from the conductors

6. Immobilizing the conductors in the PVC envelope

• Intensity 20A, 40A, 60A, 100A, 130A :

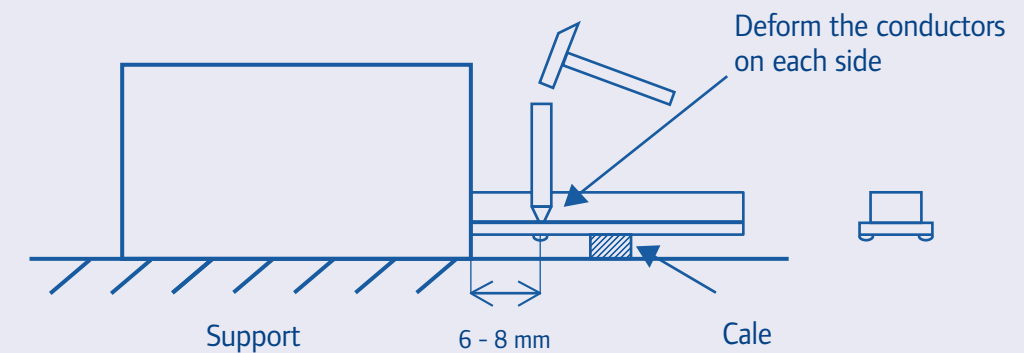
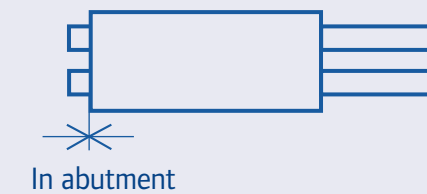


Draw-in the conductors again. Keep a play of 4 to 7 mm



Bend with the hand the ends of the conductors by the cut and cut again the excess length to enable the assembling of the end cap

• Intensity 160 A and 200 A :



Check the immobilization of the conductors and cut again the excess length to enable the assembling of the end cap

7. Mounting of the end cap



The element cut must be assembled at the end of the line.

The number of sliding hangers is given page 35.