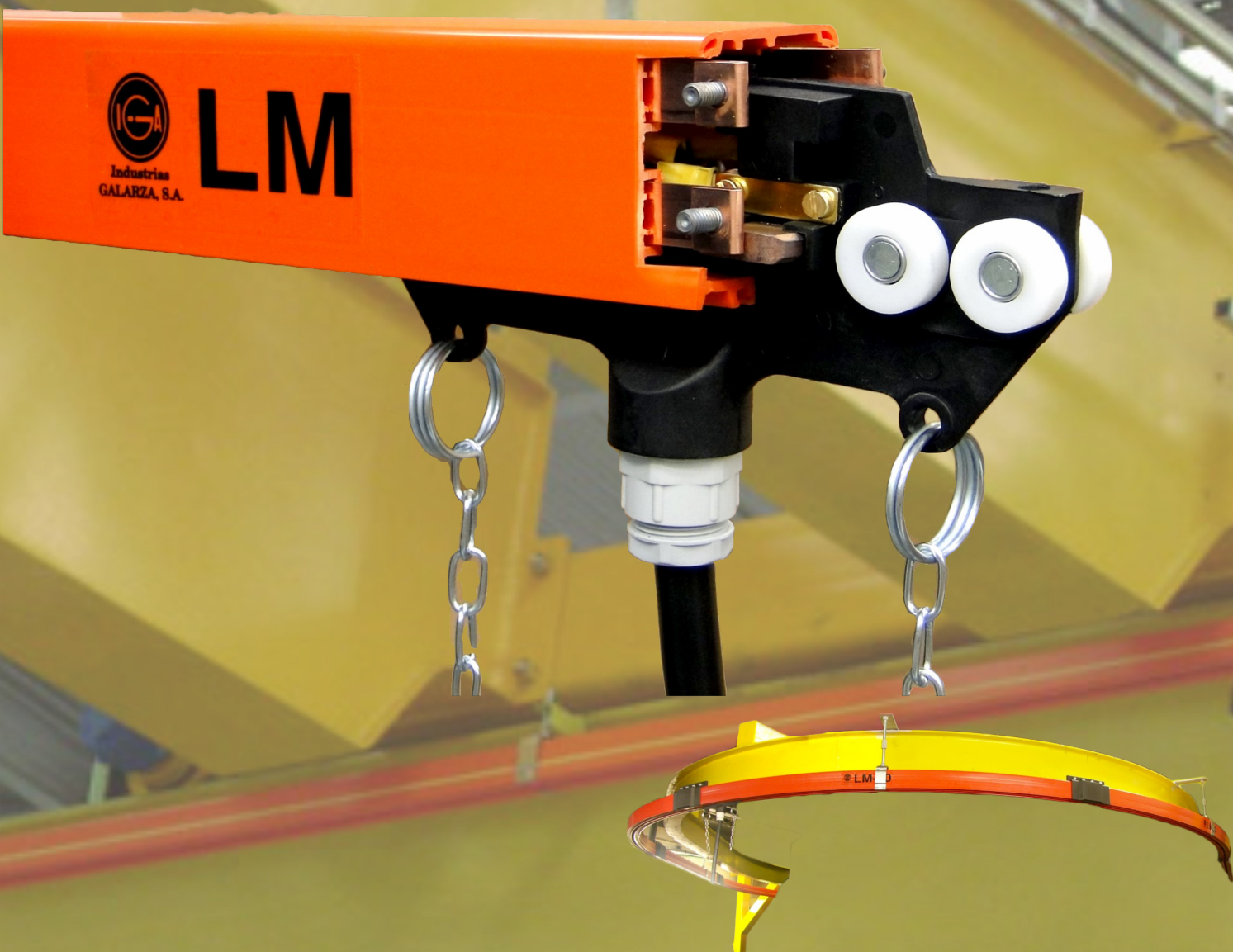




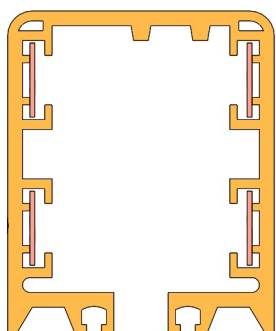
**Industrias
GALARZA, S.A.®**

Leaders in electrical conductivity since 1958

CATALOGUE 2020



PVC HOUSING



DESCRIPTION

PVC INSULATED 4 POLE
CONDUCTOR SYSTEM FOR
MOBILE POWER FEEDING

SERIES

LM-4



Generalities

The supply of the products contained in this catalogue is subject to the conformity of the tariff in force at the moment and the terms contained in these General Conditions of Sale and Guarantees.

Orders and prices

All orders received by IGA will be confirmed via fax or email. If in the following 24 hours IGA does not receive any claim, they will be considered definitive. IGA reserves the right to accept or reject any order.

Codes

The codes indicated in this catalogue are the standard products of IGA.

Delivery time

If for reasons beyond our control we can not fulfill this service commitment, IGA will inform the customer of the new term within a maximum of 48 hours after the reception of the order.

The rest of references will be served in the shortest period of time possible and may make partial deliveries.

Orders received that have a delivery time less than 72 hours, will follow the procedure described above.

The breach of the previous commitment or a fractioned issue will not be grounds for compensation.

Transport

Our products are considered expired in our warehouse and the date of issue is shown on the delivery note.

The goods travels at the addressee expense and risk, even if they are sent prepaid.

In the case of lack of packages or visible damages due to transportation, the addressee must write it down on the delivery note, claim the carrier and inform the commercial department of IGA within 48 hours. Otherwise, it will be considered the conformity of the goods in quantity and condition. Claims for delays in transportation will not be accepted.

After 8 days from receipt of the goods, no claims will be accepted about the contents of the boxes.

Refunds

The products invoiced by IGA are considered a firm sale and has no right to refund.

In case of an error in the execution of the order, the following shall be taken into account:

-The change must be authorized by the commercial direction of IGA. The warehouse of IGA will not accept any product without authorization.

-The accepted material will have a 20% reduction of its value for verification expenses.

-The goods returned to IGA travel at the client's risk.

Installations

IGA is exempted from any responsibility in the installations that do not comply with the advice or with the specifications and features of each range of product.

Warranty

IGA range of products has a 2 year warranty. The acknowledgment of the responsibility in warranty corresponds only to IGA and / or to its insurance company. Any other defect caused by aging, corrosion, improper installation or improper application, will not be subject to possible claims.

Jurisdiction

IGA will try to resolve any divergence with his clients through friendly channels. Having said that, in case of litigation, the parties agree and are obliged to submit to the arbitration appointed by the Court of the Arbitration Association of Bilbao, which will be responsible for the administration of the aforementioned arbitration in accordance with its Statute and Regulations. Likewise, they are obliged from now on to comply with the arbitral report that is issued.

IGA reserves the modification of the articles without previous notice.

OPTIONS



FAST PLUG: LM-60Q

The connections between conductors with spring connections speeds up the assembly operations, reducing cost.

Note: The quick connetions CO-4-Q are not compatible with the LM-4 unit.



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MODULAR CONDUCTOR SYSTEM LM-4

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CERTIFICATIONS

Certificate of Protection IP 237



CENTRO DE INVESTIGACIÓN TECNOLÓGICA

DPTO. DE ELECTROTECNIA

EXPEDIENTE N° 99.300-1-E

Protocolo de ensayos

OBJETO DE ENSAYO: Línea modular
DESIGNACION: LM-4
SOLICITANTE: ELEMA Y COSA
Irufia nº 1-5ª planta.
48.014 BILBAO (VIZCAYA)
FABRICANTE: ELEMA Y COSA
NORMATIVA: UNE 20-324-89
Clasificación de los grados de protección proporcionados por las envolventes.
UNE 20.672.83 parte 2-1
Ensayos relativos a los riesgos de incendio.

FECHA ENSAYOS: 20 a 29 de setiembre de 1.993
El objeto de ensayo ha sido sometido a las pruebas requeridas por el solicitante, aplicando los procedimientos de ensayo especificados en la Normas antes indicada.
Los procedimientos y resultados de ensayo se recogen en el informe adjunto.

El presente documento, Protocolo de Ensayos, concierne Únicamente a las muestras sometidas a ensayo.
Queda terminantemente prohibida la reproducción parcial del presente documento, salvo autorización expresa por escrito, de este laboratorio.
La presencia de erratas o modificaciones queda automáticamente anulada por este documento.

EL PRESENTE PROTOCOLO CONSTA DE:
Páginas: cuatro.

Burtzeña a 19 de octubre de 1993

Fco. Javier Soto
Jefe de Laboratorio

P. Zarrabeitia
Jefe de Programa

SEDE CENTRAL:
Centro de Investigación Tecnológica, 16
Tfn. 34 • 497 24 00
Fax. 34 • 497 24 01
48011 BILBAO • VIZC.
Apdo. 1234 • 48080 BILBAO
C.F. Q 9835001 E

DERIVAMIENTO DE ELECTROTÉCNIA:
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Tfn. 34 • 497 24 00
Fax. 34 • 497 24 01
Burtzeña-Bonavilla
Apdo. 1234 • 48080 BILBAO

DIVISION TEC. INFORMACIÓN Y CALIDAD:
CENTRO DE SUPERVISIÓN
Parque Tecnológico Edificio 101
Tfn. 34 • 497 23 00
Fax. 34 • 497 23 40
48016 Gernika
Apdo. 1234 • 48080 BILBAO

artamento de Electrotecnia, remitidos por el solicitante, tación prefabricada, de referencia

a equipos móviles.

is se trataba de verificar:

ccionado por la envolvente IP 237
gos de incendio.

ísticas dieléctricas
alización, exteriormente, en toda su longitud, con papel

res activos unidos entre sí y a la envolvente metálica.
los demás unidos entre sí y a la envolvente metálica.
pidad de frecuencia 50 Hz. y valor eficaz 2.500 V,
ante 1 minuto.

o perforación, contorno o deterioro de los aislamientos.
le protección proporcionados por las envolventes.

cción de cuerpos sólidos superiores a 12 mm.
i descrito en la figura 1 de la norma 20-324-89, con un
as ranuras de la canalización.

En ningún caso se produjo penetración del dedo en el interior de la canalización.
Primera cifra característica 2

Expediente n° 99.300-1-E
Hoja n° 2 de 4

Expediente n° 99.300-1-E
Hoja n° 3 de 4

Expediente n° 99.300-1-E
Hoja n° 4 de 4

ica.
ituado en el interior de la envolvente contra la penetración
la, en ángulo inferior a 60° con respecto a la vertical.
en toda su longitud, a la lluvia artificial proporcionada por el
en la Fig 5 de la norma UNE 20-324-89, con un ángulo de
a la vertical de 60°.
3 minutos.
to se observa penetración de agua en el interior de la
lctrica, repetido después de esta prueba, en forma idéntica
.2.1, dió resultado satisfactorio.
ica 3

ica.
a por las envolventes de los materiales contra los daños
ón, al efecto de impactos mecánicos de energía 6 julios,
sde una altura de 0,40 m, de una pieza de golpeo de masa
conforma un casquete esférico de radio 50 mm.
i puntos de la envolvente, en todas y cada una de las caras
lme, aplicando en cada uno de ellos tres impactos.
se observaron fisuras ni marcas que perjudiquen el normal
o ni de la envolvente.

a canalización IP 237

esgos de incendio.
ente.
i de la canalización, se tomaron muestras de 30x30 mm.
is, se fijaron verticalmente al equipo de ensayo, se aplicó la
ente durante 30 segundos.

El hilo incandescente había sido previamente calentado y estabilizado en temperatura
y corriente de calentamiento, durante 60 segundos.

ncandescente en la muestra se reguló a un valor

en el mismo instante de aplicación del hilo

la muestra.
i inflamables, sobre la placa de papel de seda
200 mm.
te, al cabo de los 30 segundos de aplicación, la
menta inmediata.
stras, con resultados prácticamente idénticos.
duce que las muestras ensayadas, cumple las
UNE 20.672.83 parte 2-1, sobre riesgos de
60 °C, pudiendo ser considerado autoextinguible.

sobre muestras de 30x30 mm., tomadas de la
ular, se realizó la prueba de termoplaticidad.
e como base las especificaciones que se
en su apartado 9.5.2.

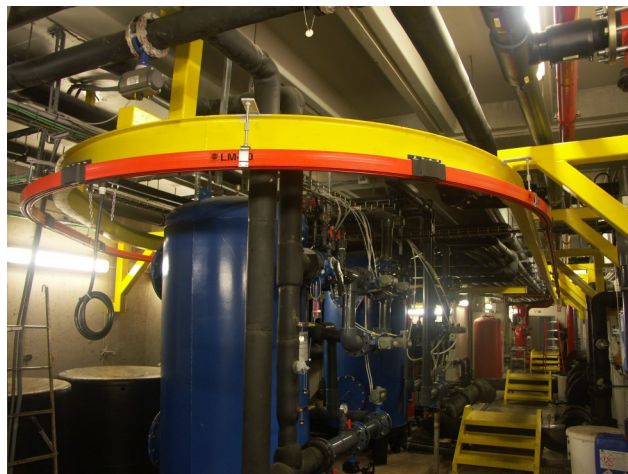
ujeron en estufa de aire a temperatura de 70 °C,
so de ensayo, bola de acero de 2,5 mm diámetro.
ó la bola sobre la muestra en ensayo, con una
estas condiciones durante una hora.
uestra de ensayo en forma rápida, por inmersión
procedió a la observación de la huella dejada por
a 0,5 mm, no observándose deformaciones en la
ones especificadas para severidad 70 °C



MODULAR CONDUCTOR SYSTEM LM-4

APPLICATIONS AND FEATURES

Protected electrical conduit, with movable current collector. Applied, for safety, as a mobile power supply with fixed travel (straight and curved) in: cranes, hoists, moving electric machines, moving equipment and, in general, where a mobile power outlet is needed.



Classification of the degree of protection Modular Line LM-4 (UNE 20-324-89, CEI 144, DIN 40050):

IP 237

Presented on dielectric profile in PVC with four poles, "earth" line marked in yellow, in different versions according to intensities. With parallel assembly of several lines, more poles and higher intensities are obtained. Conductors freely housed in the profile, allow different expansions of copper and PVC, as well as the dissipation of heat caused by the Joule effect.

Possibility of mounting indoors and outdoors with service temperatures between -10°C and + 50°C for indoor and between -30°C and 60°C for outdoor.

For outdoor installation, the assembly scheme is different and the line components, with specific treatment and stainless screws, vary their references.

Special installations: lengths greater than 280m., mixed indoor-outdoor installations, etc. consult our Technical Service providing sketches and service conditions.

For installations with curved sections, dimensions drawing is required. Including the travel of the hoist running on the beam.

The smallest radius we can manufacture is 1m.



MODULAR CONDUCTOR SYSTEM LM-4

BASE COMPONENTS

PVC HOUSING

Composition: Rigid auto-extinguishable PVC (UNE 20.672.83) complies with the specific conditions of the standard UNE 21-0995 part. 9.8.1. on thermoplasticity to 70°C severity.

DIELECTRIC CHARACTERISTICS

Dielectric Strength.....25 Kv/mm.
Transverse Resistivity..... $1 \times 10^{10} \Omega/\text{cm}$.

MECHANICAL CHARACTERISTICS

Bending Strength.....780 Kgs/cm².
Tensile Strength..... ≥ 540 Kgs/cm².
Impact Resistance (DIN 53453).....No Failure.

SERVICE TEMPERATURES

Continuous Operation.....between -30°C y +60°C.
Softening Point (VICAT).....80°C.

DENSITY..... $1,49 \pm 0,02 \text{ gr/cm}^3$.

EXPANSION COEFFICIENT.....0,05mm/m/°C.

RESISTANCE TO CHEMICAL AGENTS

Oils and Greasy Minerals.....YES.
Solvents: all except aromatical cetanic and chlorinated solvents.
Hydrochloric acid.....NO.
Sulphuric acid diluted to 50%.....YES.
Concentrated Sulphuric Acid.....NO.
Caustic soda at 50%.....Yes to $\leq 40^\circ\text{C}$.

INFLAMMABILITY

Self extinguishing, fire resistant material.

WATER ABSORPTION

Undetectable.....<0,07%.

CONDUCTORS

Fabricated in electrolytic copper straps, conforming to the standard DIN 1787 / 17670 / 40500 and quality CU-ETP certification.

Density: 8,9 gr/cm³.

Expansion coefficient: 0,0165mm/m/°C.

Conductivity IACS:100.

REF.	INTENSITY Amp.	VOLTAGE V	IMPEDANCE (Z) Ω/m	SECTION mm^2	Distance between conductors mm	Voltage Drop V/m/Amp
LM-40	40	500	$2,00 \times 10^{-3}$	9,0	15	0,00346
LM-60	60	500	$1,75 \times 10^{-3}$	12,0	15	0,00303
LM-80	80	500	$1,18 \times 10^{-3}$	16,5	15	0,00204
LM-100	100	500	$1,00 \times 10^{-3}$	21,0	15	0,00173
LM-140	140	500	$0,75 \times 10^{-3}$	30,0	15	0,00123
LM-160	160	500	$0,65 \times 10^{-3}$	37,5	15	0,00105
LM-200	200	500	$0,55 \times 10^{-3}$	52,5	15	0,00090

Values of voltage drop are considered at 20°C y $\cos \phi:1$, E.D. 80% in altern three-phase current.

- With temperatures of 30°C (86°F), apply correction factor 1,04.
- With temperatures of 40°C (104°F), apply correction factor 1,08.
- With temperaturas of 50°C (122°F), apply correction factor 1,12.

Consumption values at 60% E.D., apply correction factor 0,77.



SYSTEM CALCULATIONS

To determinate the system type and the location of the feeding points, the intensities of the main and auxiliary motors are considered along with the admisible voltage drop.

For these calculations, take into account the simultaneity of the consumption of the motors at startup and during continuous work, accepting that starting intensities will be higher than the usual system allows (for a max. of 2 seconds); but only if voltage drop is admisible.

STARTING INTENSITIES AND NOMINAL INTENSITIES

The starting intensity is the same as the one that the motor consumes when the rotor is standing.
Nominal intensity = Motor absorbing intensity when working at nominal power, connected to a nominal voltage.
The following equation gives its value:

$$I_N = \frac{P}{\sqrt{3} \times V \times \cos \varphi}$$

I_N : Nominal intensity (Amps.).

P: Power (Watts).

V: Voltage over phases (Volts).

$\cos \varphi$: Power factor

$\cos \varphi$: Power factor

POWER FACTOR

The power factor or $\cos \varphi$ is a quality electric factor of the motor. The higher it is, the less intensity will be absorbed to give the same power. Its value indicates the "quality" of the motor related to its consumption. Its maximum value will be 1.

ORIENTATING VALUES FOR THE 4 POLES THREE-PHASE MOTOR NOMINAL CURRENTS ACCORDING TO NF C63-110.1970.

POWER		NOM.INTENSITY (Amp.)			RELATION
C.V.	K.W.	220 V.	380 V.	500 V.	IA / IN
3	2,2	8,7	5	3,8	5
4	3	11,5	6,6	5	5
5,5	4	14,5	8,5	6,5	5,2
7,5	5,5	20	11,5	9	5,4
10	7,5	27	15,5	12	5,4
13,3	10	35	20	15	5,6
15	11	39	22	17	5,8
20	15	52	30	23	5,8
25	18,5	64	37	28,5	6
30	22	75	44	33	6
40	30	103	60	45	6,2
50	37	126	72,5	55	6,8
60	45	147	85	65	6,8
75	55	182	105	80	6,8



MODULAR CONDUCTION SYSTEM LM-4

VOLTAGE DROP

For three-phase alternating current:

$$\Delta U: 3 \times I \times L \times Z$$

ΔU : Voltage drop (Volts).

I: Amperage (Amps.).

L: Length (Meters).

Z: Impedance of the conductors (Ohm/m.).

Length to be considered for the voltage drop calculation (System length = L):

- Power supply in one extreme = L / 1.
- Power supply in the centre = L / 2.
- Power supply in both extremes = L / 4.
- Power supply at 1/6 from each extreme = L / 6.

The value "L" is reduced when the width of the mobile machine is considered.

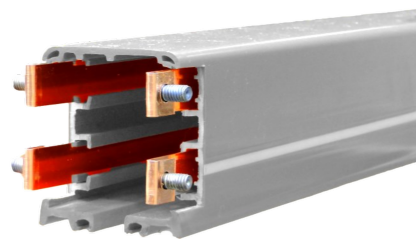
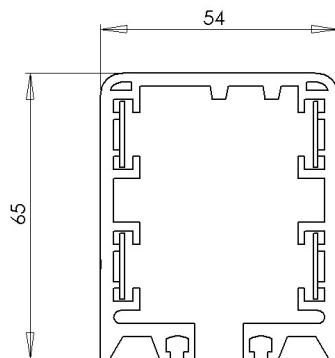
The system length includes the feeding track length + feeding cable length.

INDOOR / OUTDOOR / AGGRESSIVE ENVIROMENTS

For indoor installations the identifying color of the PVC Housing is orange RAL 2004; while the color of the PVC Housing for outdoor and aggressive enviroments is light grey RAL 7035. The line signalling "earth" in yellow.



Indoor



Outdoor or aggressive
enviroments

TEMPERATURE RANGE: -10°C / +50°C.

TEMPERATURE RANGE: -30°C / +60°C.

Treatment of the components for aggressive enviroments or outdoor installations:

- Connections: copper and brass screws.
- Fixed points and Sliding hangers: zinc plated steel coated with EPOXY-POLYESTER paint.
- Screws: stainless steel A2.
- PVC with special formulation, based on anti UV additives. Designed to prevent it from deteriorating outdoors.

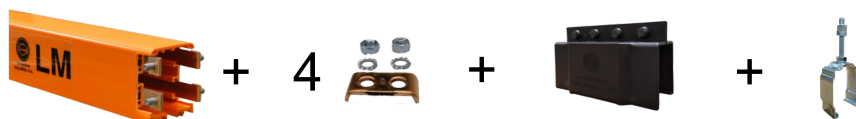


MODULAR CONDUCTOR SYSTEM LM-4

SYSTEM COMPONENTS

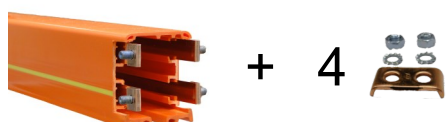
LM SET

Composed by modular housing (ref. PEM) with connections, joints (ref. EMP-4) and sliding hangers (ref. SO-4).



ENVIRONMENT		REFERENCE	CODE	MAX. INTENSITY	SET
ENVIRONMENT	INDOOR	LM-40	213257	40 Amp	PVC Housing + Joints + Sliding Hangers / 2,00m + Connections
		LM-60	213258	60 Amp	PVC Housing + Joints + Sliding Hangers / 2,00m + Connections
		LM-80	213259	80 Amp	PVC Housing + Joints + Sliding Hangers / 2,00m + Connections
		LM-100	213261	100 Amp	PVC Housing + Joints + Sliding Hangers / 2,00m + Connections
		LM-140	213264	140 Amp	PVC Housing + Joints + Sliding Hangers / 1,33m + Connections
		LM-160	213600	160 Amp	PVC Housing + Joints + Sliding Hangers / 1,33m + Connections
		LM-200	213601	200 Amp	PVC Housing + Joints + Sliding Hangers / 1,33m + Connections
	OUTDOOR	LM-40E	213266	40 Amp	PVC Housing + Joints + Sliding Hangers / 1,33m + Connections
		LM-60E	213274	60 Amp	PVC Housing + Joints + Sliding Hangers / 1,33m + Connections
		LM-80E	213275	80 Amp	PVC Housing + Joints + Sliding Hangers / 1,33m + Connections
		LM-100E	213276	100 Amp	PVC Housing + Joints + Sliding Hangers / 1,33m + Connections
		LM-140E	213993	140 Amp	PVC Housing + Joints + Sliding Hangers / 1,33m + Connections
		LM-160E	213602	160 Amp	PVC Housing + Joints + Sliding Hangers / 1,33m + Connections
		LM-200E	213603	200 Amp	PVC Housing + Joints + Sliding Hangers / 1,33m + Connections

PEM MODULAR HOUSING



PVC housing in 4 mts. units with copper conductors and connections.

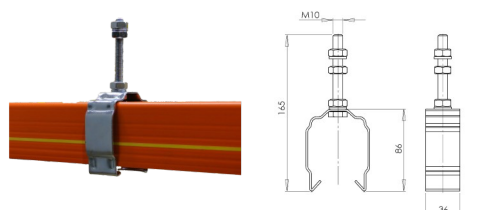
Length: 4 mts.

Number of Conductors: 4.

ENVIRONMENT	REFERENCE	CODE	WEIGHT
INDOOR	PEM-40	213238	1,63 Kg/m
	PEM-60	213239	1,66 Kg/m
	PEM-80	213240	1,81 Kg/m
	PEM-100	213241	1,96 Kg/m
	PEM-140	213265	2,25 Kg/m
	PEM-160	213596	2,50 Kg/m
	PEM-200	213597	3,00 Kg/m

ENVIRONMENT	REFERENCE	CODE	WEIGHT
AGGRESSIVE ENVIROMENTS + OUTDOOR	PEM-40E	213278	1,63 Kg/m
	PEM-60E	213279	1,66 Kg/m
	PEM-80E	213280	1,81 Kg/m
	PEM-100E	213281	1,96 Kg/m
	PEM-140E	213282	2,25 Kg/m
	PEM-160E	213598	2,50 Kg/m
	PEM-200E	213599	3,00 Kg/m

SLIDING HANGER

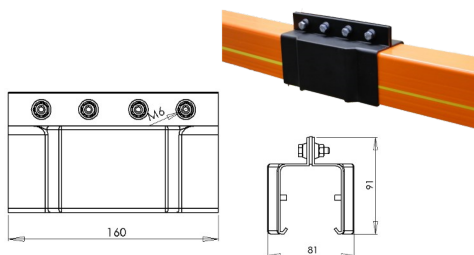


ENVIRONMENT	REFERENCE	CODE	MATERIALS	WEIGHT
INDOOR	SO-4	213215	Zinc plated steel	0,210 Kg
AGGRESSIVE ENVIROMENTS + OUTDOOR	SO-4E	213269	Zinc plated Steel coated with EPOXY-POLYESTER paint Screws in stainless steel	0,220 Kg



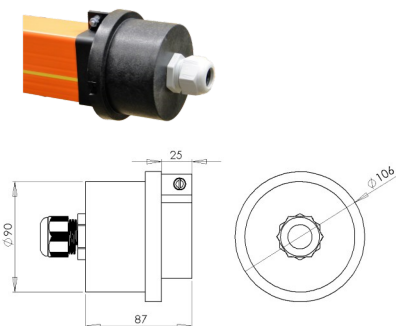
MODULAR CONDUCTOR SYSTEM LM-4

JOINT



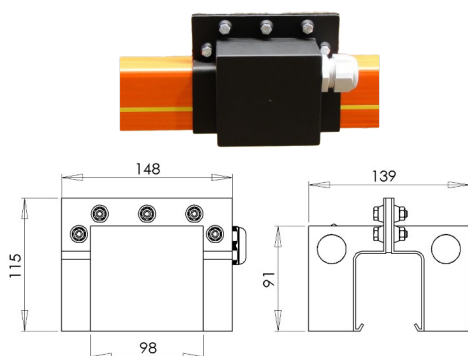
ENVIRONMENT	REFERENCE	CODE	MATERIALS	WEIGHT
INDOOR	EMP-4	213242	Insulated material Screws in Zinc plated steel	0,212 Kg
AGGRESSIVE + OUTDOOR	EMP-4E	213268	Insulated material Screws in Stainless steel.	0,212 Kg

END FEED



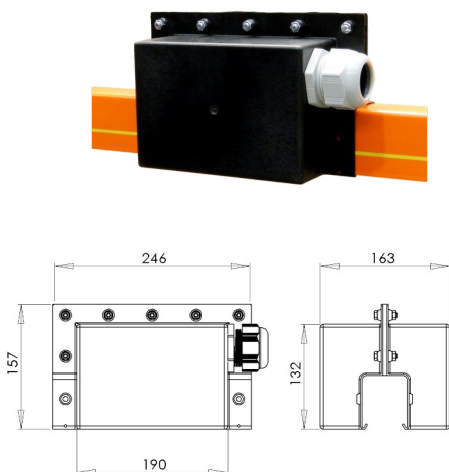
ENVIRONMENT	REFERENCE	CODE	CABLE ENTRY VIA 1 CABLE GLAND	WEIGHT
INDOOR	AE-4	213208	M25 for LM-40 and LM-60	0,231 Kg
	AE-4-100	213307	M32 for LM-80 and LM-100	0,261 Kg
	AE-4-140	213308	M40 for LM-140	0,278 Kg
AGGRESSIVE + OUTDOOR	AE-4E	213283	M25 for LM-40 and LM-60	0,231 Kg
	AE-4-100E	213315	M32 for LM-80 and LM-100	0,261 Kg
	AE-4-140E	213316	M40 for LM-140	0,278 Kg

LINE FEED



ENVIRONMENT	REFERENCE	CODE	CABLE ENTRY VIA CABLE GLAND M25	WEIGHT
INDOOR	AI-4	213216	1 pc. for LM-40 and LM-60	0,368 Kg
	AI-4-100	213309	2 pcs. for LM-80 and LM-100	0,406 Kg
	AI-4-140	213314	4 pcs. for LM-140	0,421 Kg
AGGRESSIVE + OUTDOOR	AI-4E	213284	1 pc. for LM-40 and LM-60	0,368 Kg
	AI-4-100E	213317	2 pcs. for LM-80 and LM-100	0,406 Kg
	AI-4-140E	213318	4 pcs. For LM-140	0,421 Kg

END FEED—LINE FEED FOR 160-200Amp



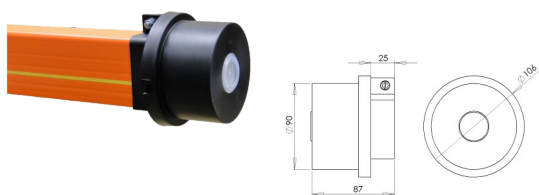
ENVIRONMENT	REFERENCE	CODE	CABLE ENTRY VIA CABLE GLANDS	WEIGHT
INDOOR	AG-4-1xM25	213605	1 pc. M25	1,050 Kg
	AG-4-1xM32	213606	1 pc. M32	1,060 Kg
	AG-4-1xM40	213607	1 pc. M40	1,100 Kg
	AG-4-1xM63	213608	1 pc. M63	1,130 Kg
	AG-4-4xM25	213609	4 pcs. M25	1,120 Kg
	AG-4-4xM32	213610	4 pcs. M32	1,200 Kg
AGGRESSIVE + OUTDOOR	AG-4E-1xM25	213611	1 pc. M25	1,050 Kg
	AG-4E-1xM32	213612	1 pc. M32	1,060 Kg
	AG-4E-1xM40	213613	1 pc. M40	1,100 Kg
	AG-4E-1xM63	213614	1 pc. M63	1,130 Kg
	AG-4E-4xM25	213615	4 pcs. M25	1,120 Kg
	AG-4E-4xM32	213616	4 pcs. M32	1,200 Kg

We use the same power feed for both, the end and the intermediate point.
For extreme feeding, a closing cap is provided, which must be fixed to the box.



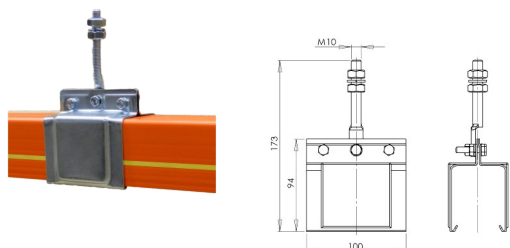
MODULAR CONDUCTOR SYSTEM LM-4

END CAP



ENVIRONMENT	REFERENCE	CODE	MATERIALS	WEIGHT
INDOOR	TE-4	213210	Insulated material Screws in Zinc plated steel	0,122 Kg
AGGRESSIVE + OUTDOOR	TE-4E	213267	Insulated material Screws in Stainless steel	0,122 Kg

FIXED POINT CLAMP

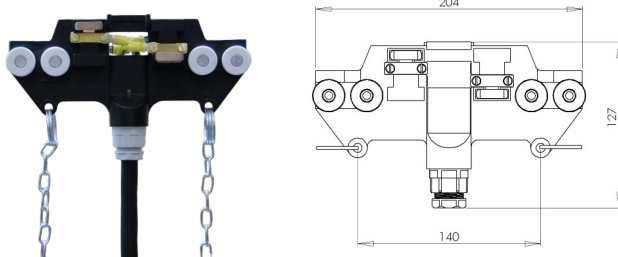


ENVIRONMENT	REFERENCE	CODE	MATERIALS	WEIGHT
INDOOR	PF-4	213209	Zinc plated steel	0,389 Kg
AGGRESSIVE + OUTDOOR	PF-4E	213285	Zinc plated Steel coated with EPOXY-POLYESTER paint	0,399 Kg

▲ For systems above 60mts, we recommend to install the fixed point clamp in the middle of the system.

CURRENT COLLECTOR

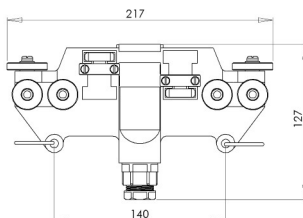
Ref. TO-4x35 A



Ref. TO-4x70 A

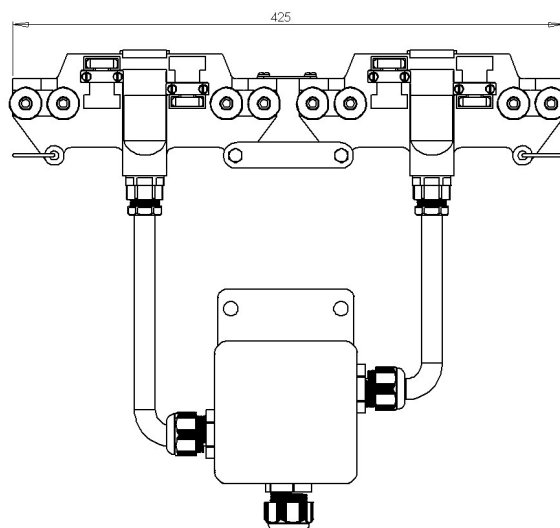


Ref. TO-4x35 AC



Each current collector includes:

- Insulated support.
- Ball bearings.
- Provided with 2m of extra-flexible 4G4 cable.
- Cable gland PG-16.
- Spring loaded carbon brushes 24 x 7 x 22mm.
In N51 quality (Ref. ETO-4).
- Springs in stainless Steel AISI302.

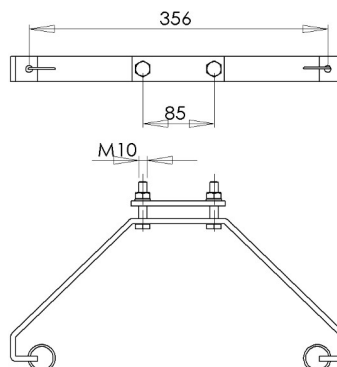


ENVIRONMENT	REFERENCE	CODE	DESCRIPTION	MAX. SPEED	WEIGHT
INDOOR	TO-4x35 A	213211	Single trolley 35Amp	160m/min	1,120 Kg
	TO-4x70 A	213236	Double trolley 70Amp	90m/min	1,740 Kg
	TO-4x35 AC	213255	Trolley for curves 35Amp	130m/min	1,162 Kg
AGGRESSIVE + OUTDOOR	TO-4x35 A	213333	Single trolley 35Amp	160m/min	1,120 Kg
	TO-4x70 A	213336	Double trolley 70Amp	90m/min	1,740 Kg
	TO-4x35 AC	213334	Trolley for curves 35Amp	130m/min	1,162 Kg

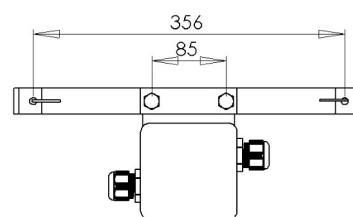
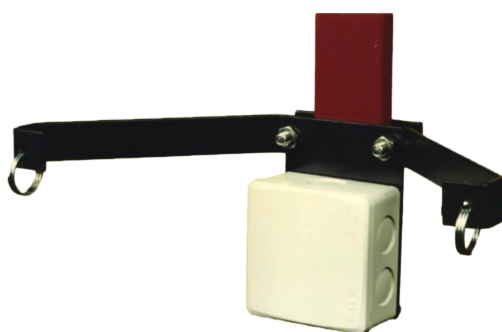
TOWING ARM

Provides traction on the current collector trolley for its movement in the system.
Steel coated with EPOXY-POLYESTER paint.

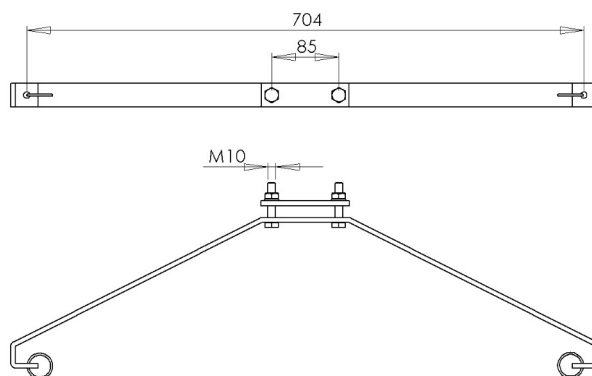
Ref. BA-4



Ref. BA-4C



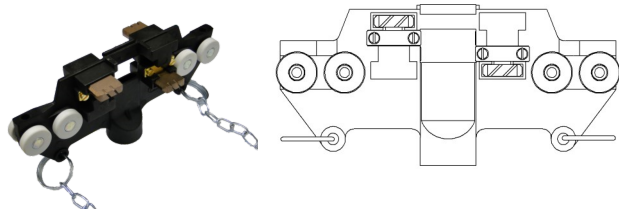
Ref. BA-70



ENVIRONMENT	REFERENCE	CODE	DESCRIPTION	WEIGHT
INDOOR	BA-4	213212	Single arm for trolley TO-4x35A y TO-4x35AC	0,813 Kg
	BA-4C	213319	Single arm with connection box for trolley TO-4x35A y TO-4x35AC	1,275 Kg
	BA-70	213270	Double arm for trolley TO-4x70A	1,600 Kg
AGGRESSIVE + OUTDOOR	BA-4E	213322	Single arm for trolley TO-4x35A y TO-4x35AC	0,813 Kg
	BA-4CE	213324	Single arm with connection box for trolley TO-4x35A y TO-4x35AC	1,275 Kg
	BA-70E	213323	Double arm for trolley TO-4x70A	1,600 Kg

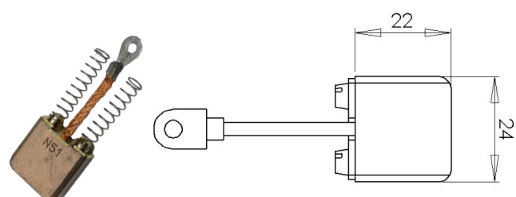
AUXILIARY COMPONENTS

CONDUCTOR CLEANER



REFERENCE	CODE	MADE OF	WEIGHT
TO-4L	213527	Grooved carbon brushes	0,350 Kg

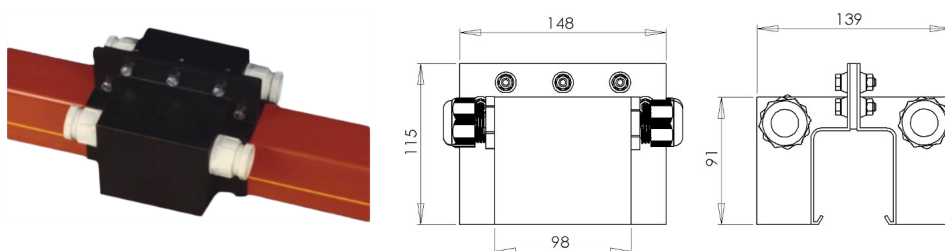
CARBON BRUSH



Metalgraphite N51 quality.
Provided with 2 springs in stainless steel AISI302.

REFERENCE	CODE	WEIGHT
ETO-4	213235	0,025 Kg

HOUSING VENTILATION



REFERENCE	CODE	WEIGHT
EV-4E	213350	0,400 Kg

To provide air ventilation in the assembly between two modular sections.
It is necessary to allow the exit of air from the interior of the system, preventing possible condensation. It is used in installations with different temperature changes, for example, systems with mixed zones of indoor and outdoor.

ISOLATION POINT



Designed to interrupt the flow of electric current in a determined section of the system.
For this type of installations the use of double trolleys allows current to flow along the sectioned area .
Supplied to be connected between 2 Modular lines LM-4.

REFERENCE	CODE	LENGTH	APPROX.
SC-4-40	213461	1m	4,82 kg
SC-4-60	213415	1m	4,85 kg
SC-4-80	213540	1m	5,00 kg
SC-4-100	213433	1m	5,15 kg
SC-4-140	213332	1m	5,44 kg
SC-4-180	213628	1m	5,69 kg
SC-4-200	213629	1m	6,19 kg

CONNECTIONS CO-4

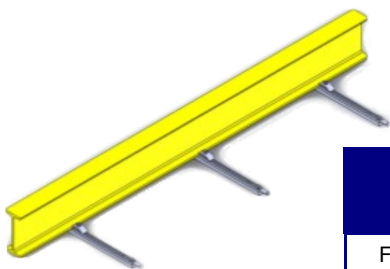


The connections between plates are sold separately as spare parts.
Each connection set consists of a piece of copper with its corresponding nuts and clamping washers.
They are indicated by the reference CO-4 adding the amperage of the line to connect.
Examples: CO-4-60, CO-4-200, etc.

(The LM-140 line has square head screws for connection).

AUXILIARY COMPONENTS

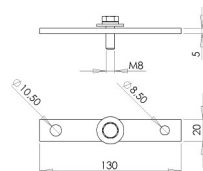
UNIVERSAL SUPPORT



Prior to ordering, point out total length (L) of the cross support arm ref. 2331-1 or 2500-1.
Example: SU-500-1.

	REFERENCE	CODE	MATERIALS			WEIGHT
			Anchoring device	Beam clip	Track support	
For profile 2331-1	SU- -1	--	Zinc plated Steel	Zinc plated Steel	Zinc plated steel	-- kg
For profile 2331-1 Inox	SU- -1-Inox	--	Stainless Steel	Stainless steel	Stainless steel	-- kg
For profile 2500-1	SU- -2	--	Zinc plated Steel	Zinc plated Steel	Zinc plated steel	-- kg
For profile 2500-1 Inox	SU- -2-Inox	--	Stainless Steel	Stainless steel	Stainless steel	-- kg

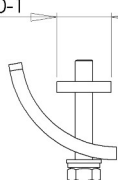
SUPPORT ARM CLIP



REFERENCE	CODE	MATERIALS		WEIGHT
		Body	Screws	
SU-4-1	713114	Zinc plated Steel	Zinc plated Steel	0,121 Kg
SU-4-1-Inox	713115	Stainless steel	Stainless steel	0,121 Kg
SU-4-2	713134	Zinc plated Steel	Zinc plated Steel	0,150 Kg
SU-4-2-Inox	713135	Stainless steel	Stainless steel	0,150 Kg

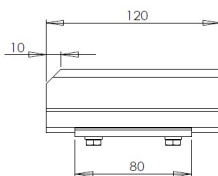
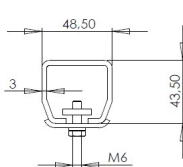
BEAM CLIP

45x20x5mm para perfil 2331-1
25x25x5mm para perfil 2500-1



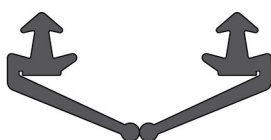
	REFERENCE	CODE	MATERIALS		WEIGHT
			Body	Screws	
For 2331-1 profile	2340-12	309005	Zinc plated steel	Zinc plated steel	0,140 Kg
For 2500-1 profile	2340-12-500	309006	Zinc plated steel	Zinc plated steel	0,156 Kg
For Inox 2331-1 profile	2340-12-Inox	309321	Stainless steel	Stainless steel	0,140 Kg
For Inox 2500-1 profile	2340-12-500-Inox	309316	Stainless steel	Stainless steel	0,156 Kg

WELD-ON BRACKET FOR SUPPORT ARM



	REFERENCE	CODE	MATERIAL	WEIGHT
For 2331-1 profile	2331-100	302561	Steel	0,369 Kg
For 2500-1 profile	2600-120	310011	Steel	0,600 Kg

CLOSING PROFILE



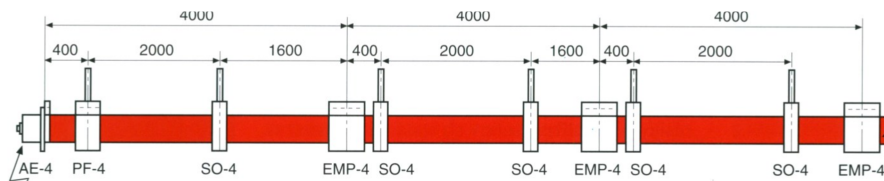
REFERENCE	CODE	WEIGHT
PC-4	213617	0,18 Kg/m

The closing profile PC-4 improves the tightness of the line, making it difficult to get dust inside the PVC casing.

This accessory is assembled once the line has been assembled in its entirety by inserting it by hand into the lower part of the PVC profile.

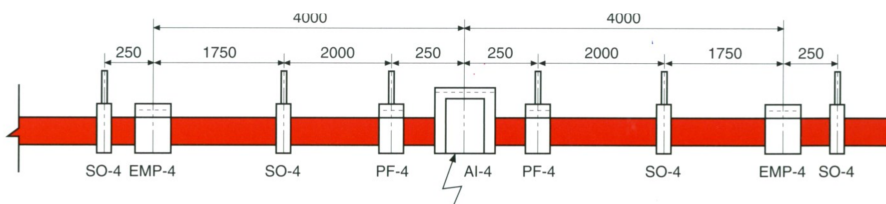
ASSEMBLY INSTRUCTIONS

INDOOR SYSTEM WITH END FEED (Sliding hangers every 2 metres)

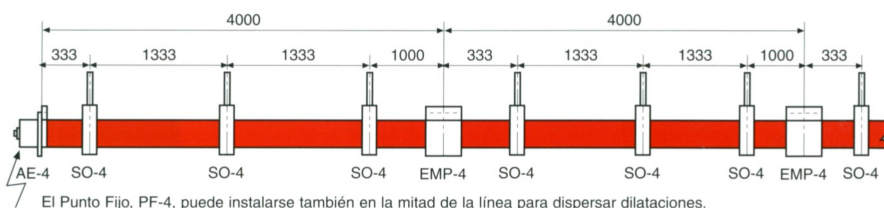


The fixed point clamp, PF-4 can also be installed in the middle of the system to disperse expansion.

INDOOR SYSTEM WITH LINE FEED (Sliding hangers every 2 metres)



OUTDOOR SYSTEM WITH END FEED (Sliding hangers every 1,33 metres)



1) SAFETY

Disconnect the electrical current from the system before beginning any assembly operation.
Do not use the Modular Line LM-4 for higher loads than the specified voltage and current.
The fixed point clamp, PF-4 can also be installed in the middle of the system to disperse expansion.

2) INSTALLATION

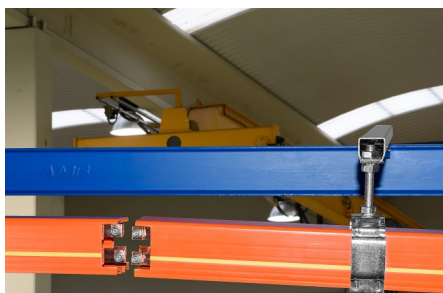
The support structure for the power line must be capable of supporting the total weight of the system. Place the support points along the beam through which the hoist will move. These points should be located every 2m or every 1,333m depending on the type of line in question and according to previous sketch.



UNIVERSAL SUPPORTS



Assemble the sliding hangers SO-4 and the fixed points PF-4 on the support arms by tightening their corresponding screws.



Install the LM-4 line bars at the support points, respecting that the yellow "earth" signal line is always on the same side.



Connect the conductors to each other through their corresponding connections CO-4.

ASSEMBLY INSTRUCTIONS



Cover the connections with the EMP-4 joints, taking care to ensure that the sides are correctly fitted in the lower part of the PVC profile. The central joint must be assembled between both sides.



Tighten the screws on the joints. The previous steps are advantageous to perform them in sections of 8-12 m. Check correct alignment between beam and power line.



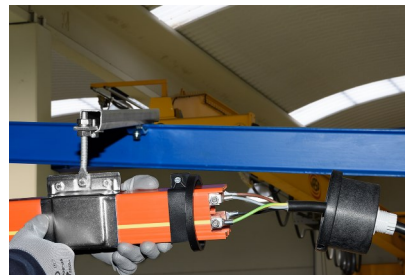
Insert the current collector, with manual pressure of brushes. Respect the unique position to avoid phase exchange.



Assemble the clips of the end feed AE-4 and / or the end cap TE-4 at both ends of the line.



Fix the cover of the end cap TE-4 to avoid unwanted electrical contacts.



Perform the electrical connection to the line at the end. (If the connection is made in the central part of the line, a joint is replaced by a line feed AI-4 making the electrical connection at that point.).



Fix the cover of the end line AE-4.



Tighten the electric cable thanks to the cable gland that this cover has.



Assemble the towing arm on the structure of the crane or hoist by aligning the pull of the chain with the central axis of the modular profile. The towing arm should be between 30mm and 50mm below the profile.

3) OPERATION

3.1 Previous tests

Carry out several travels by hand with the current collector to check that it moves throughout its length without problems. The extra-flexible cable of the current collector must be connected to the towing arm in a loop, without causing torsion of the trolley. Make the electrical connection to the line and test its insulation.

3.2. Final tests

Once the electric current is connected, check that the current collector moves forward and backward without problems. Check that the device that the LM-4 system is powered on works correctly.

3.3 Normal functioning

Do not exceed the maximum voltage and / or amperage specified for LM-4.
Use the LM-4 line within its corresponding electrical and / or mechanical specifications.

4) MAINTENANCE

Perform periodic maintenance tasks to ensure the status of the LM-4 line. The maintenance operations will depend on the use given to the system.

During each inspection the following points should be checked:

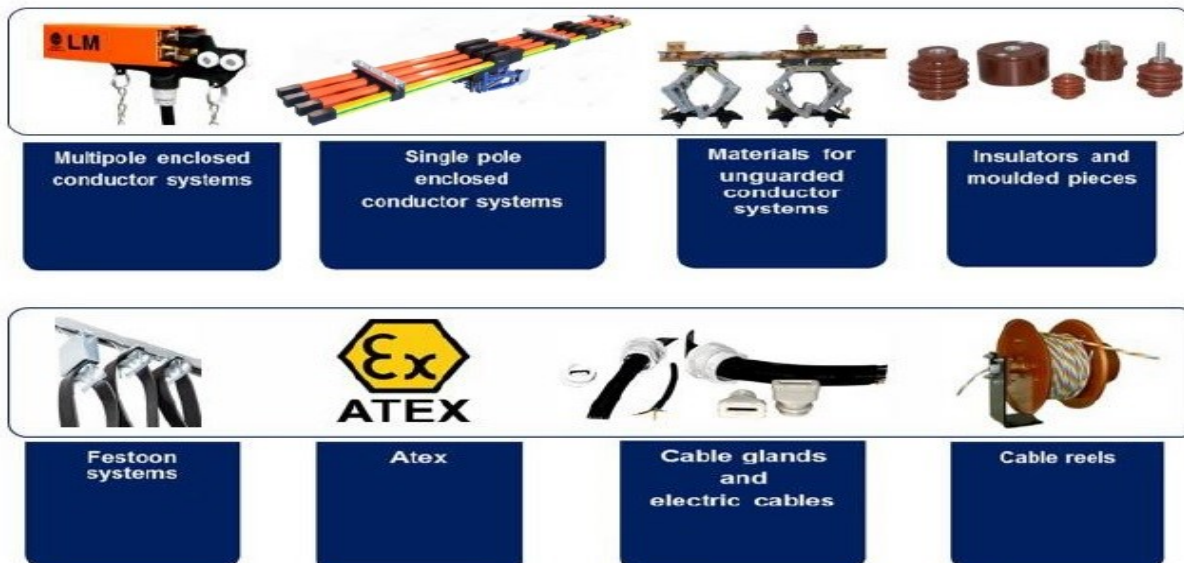
- Wear of ball bearings.
- Ensure screws are correctly tightened.
- Separation or alignment in the joints.
- Electric cables: cuts, cracks, etc...
- The profile must be clean in the running edges.



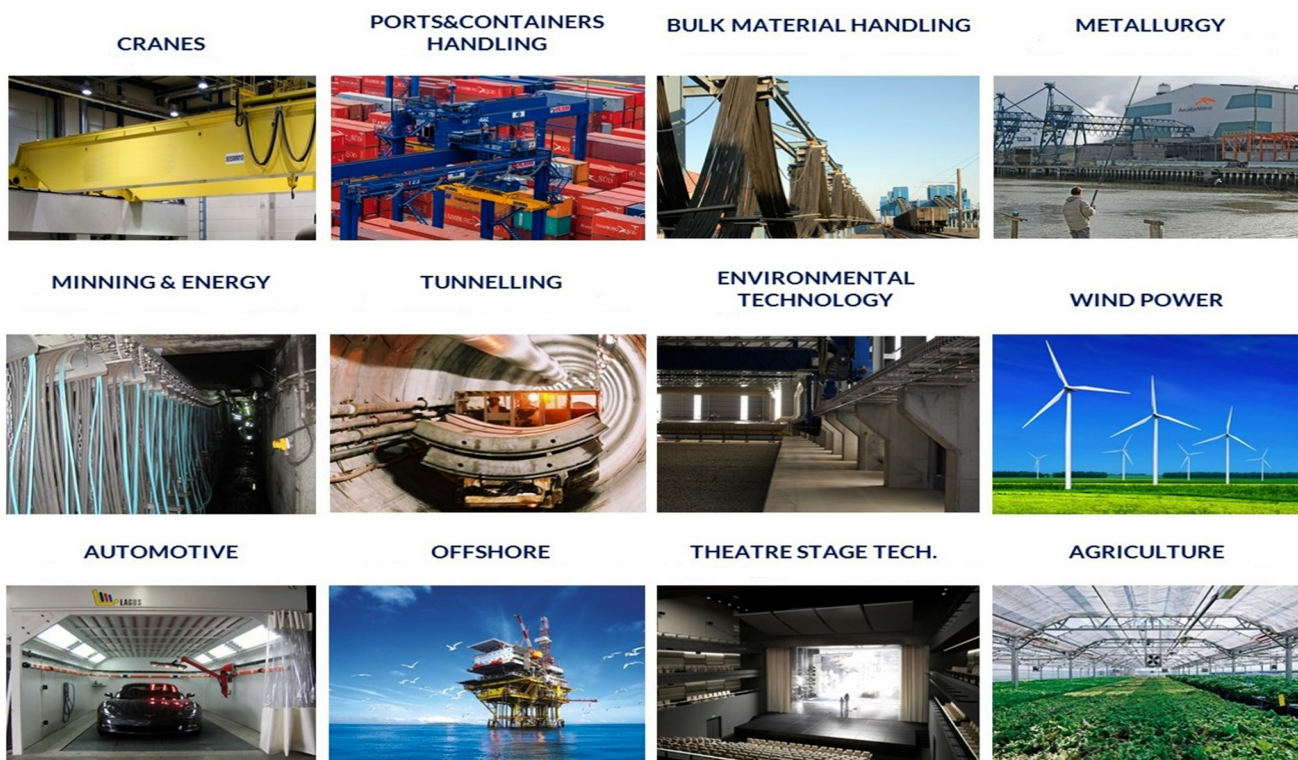
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