



Industrias  
**GALARZA, S.A.**<sup>®</sup>

Leaders in electrical conductivity since 1958

**CATALOGUE 2020**

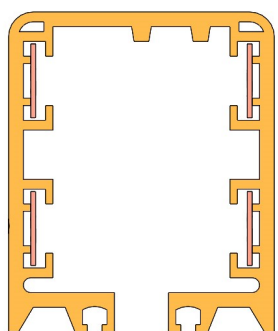
**LM-60 Q**



**PVC HOUSING**

**DESCRIPTION**

**SERIES**



60 AMP  
**“QUICK CONNECTION”**  
PVC INSULATED 4 POLE  
CONDUCTOR  
SYSTEM FOR MOBILE  
POWER FEEDING

**LM-60Q**





# GENERAL SALES CONDITIONS, SUPPLY AND WARRANTY

## 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.

# CERTIFICATIONS

## Certificate of Protection IP 237

**LABEIN**  
CENTRO DE INVESTIGACIONES TECNOLÓGICAS

DPTO. DE ELECTROTÉCNICA EXPEDIENTE N° 99.300-1-E

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

**Protocolo de ensayos**

**OBJETO DE ENSAYO:** Línea móvil  
**DESIGNACIÓN:** LM-4  
**SOLICITANTE:** ELSMA Y CSDA  
Avda nº 19, planta  
48.014 BILBAO (VIZCAYA)  
**FABRICANTE:** ELSMA Y CSDA  
**NORMATIVA:** UNE 20.324-89

Clasificación de los grados de protección proporcionados por las envolventas:  
UNE 20.672.83 párrafo 2-1

**FECHA ENSAYOS:** 20 a 26 de noviembre de 1993

El objeto de ensayo ha sido sometido a las pruebas requeridas por el solicitante, aplicando los procedimientos de ensayo especificados en la Norma antes indicada.

Los procedimientos y resultados de ensayo se recogen en el informe adjunto.

El presente protocolo consta de:  
Página: cuatro. Barrieta a 18 de octubre de 1993

Fco. Javier Soto Jefe de Laboratorio F. Zanabria Jefe de Programa

**1.- MUESTRA DE ENSAYO**  
Se recibieron en este Departamento de Electrotécnica, remitidos por el solicitante, varios elementos de canalización prefabricada, de referencia Línea Móvil modelo LM-4 para alimentación eléctrica a equipos móviles.

**2.- OBJETO**  
Sobre las muestras recibidas se trató de verificar:  
Características declaradas.  
Grado de protección proporcionado por la envolvente IP 237.  
Ensayos relativos a los riesgos de incendio.

**3.- RESULTADOS**  
**3.1.- Verificación de las características declaradas**  
Se procedió a cubrir la canalización, estrictamente, en toda su longitud, con papel aluminio.  
Se aplicó este:  
a) Todos los conductores activos unidos entre sí a la envolvente metálica.  
b) Cada polo activo a los demás unidos entre sí a la envolvente metálica.  
Una vez obtenida esta situación se verificó la resistencia de aislamiento entre los polos de la muestra.  
No se apreció en ningún caso perforación, cortocircuito o deterioro de los aislamientos.

**3.2.- Verificación de las pruebas de resistencia a los impactos**  
Se aplicó el método articulado descrito en la Figura 1 de la norma 20.324-89, con un esfuerzo de 10 N, en todas las curvas de la canalización.  
En ningún caso se produjo penetración del núcleo en el interior de la canalización.  
Primera cifra característica 2

**3.3.- Seguridad contra incendios**  
Protección del material situado en el interior de la envolvente contra la penetración de agua en forma de lluvia, en ángulo inferior a 60° con respecto a la vertical.  
Se sometió la muestra, en toda su longitud, a la prueba artificial proporcionada por el aparato portátil descrito en la Fig 5 de la norma UNE 20.324-89, con un ángulo de inclinación con respecto a la vertical de 60°.  
Duración de la prueba 10 minutos.  
Al final de la prueba no se observa penetración de agua en el interior de la envolvente.  
El ensayo de rigidez eléctrica, repetido después de esta prueba, en forma idéntica y como se describe en 3.2.1, dio resultado satisfactorio.  
Segunda cifra característica 3

**3.3.2.- Pruebas de resistencia**  
Protección proporcionada por las envolventas de los materiales contra los daños mecánicos.  
Se sometió la canalización, al efecto de pruebas mecánicas de energía 0 julios, mediante la caída libre desde una altura de 0,40 m, de una placa de golpeo de masa 1,5 kg, y cuyo extremo conforma un casquillo esférico de radio 50 mm.  
Se eligieron al azar varios puntos de la envolvente, en todos y cada uno de los casos incluída la zona de empalmes, aplicado en cada uno de ellos tres impactos.  
Al final de la prueba no se observaron fisuras ni marcas que perjudicaran el normal funcionamiento de ninguno de los envoltorios.  
Tercera cifra característica 7  
Grado de protección de la canalización IP 237

**3.3.- Ensayos relativos a los riesgos de incendio**  
Ensayo del hilo incandescente.  
De la muestra sometida a la canalización, se tomaron muestras de 30x30 mm.  
Las pruebas se realizaron al equipo de ensayo, se aplicó la punta del hilo incandescente durante 30 segundos.  
El hilo incandescente había sido previamente calentado y estabilizado en temperatura y corriente de calentamiento, durante 60 segundos.

La longitud de generación del hilo incandescente en la muestra se reguló a un valor máximo de 7 mm.  
Señal de ensayo 960 °C.  
Durante el ensayo se observó:  
Se forma llama en la muestra en el mismo instante de aplicación del hilo incandescente.  
La llama no se propaga al resto de la muestra.  
No se produce golpeo de partículas inflamables, sobre la placa de papel de seda situada por debajo de la muestra, a 200 mm.  
Una vez retirado el hilo incandescente, el cable de los 30 segundos de aplicación, la llama se extingue de forma prácticamente inmediata.  
La prueba se realizó sobre tres muestras, con resultados prácticamente idénticos.  
De los resultados obtenidos se deduce que las muestras ensayadas, cumplen las condiciones establecidas en la norma UNE 20.672.83 párrafo 2-1, sobre riesgo de incendio, en cuanto a la seguridad 960 °C, pudiendo ser considerado autoextinguible.

**4.- Ensayo de la bala caliente**  
Por deseo expreso del solicitante, sobre muestras de 30x30 mm, tomadas de la envolvente interior de la línea móvil, se realizó la prueba de temperatura.  
Para la realización de la prueba se usó como base, las especificaciones que se recogen en la norma UNE 21.085 en su apartado 9.3.2.  
Las muestras de material, se templaron en estado de aire a temperatura de 70 °C, durante una hora, junto con el equipo de ensayo, bala de acero de 2,5 mm diámetro.  
Al cabo de este tiempo, se retiró la bala sobre la muestra en ensayo, con una presión de 20 N, y se mantuvieron estas condiciones durante una hora.  
Al final de este tiempo, enfriada la muestra de ensayo en forma rápida, por inmersión de la prueba en agua a 15 °C, se procedió a la observación de la huella dejada por la bala.  
El diámetro de la huella fue inferior a 0,5 mm, no observándose deformaciones en la muestra ensayada.  
La muestra cumple con las condiciones especificadas para seguridad 70 °C

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## 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.

The connections between conductors are made with spring connections which speeds up assembly operation.



The plastic enclosures that cover the junction areas, as well as the junction boxes also have plastic bolts for a quick assembly.



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-60Q

## 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..... 1x10xΩ/cm.

#### MECHANICAL CHARACTERISTICS

Bending Strength.....780Kgs/cm2.  
 Tensile Strength.....≥540Kgs/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±0,02gr/cm<sup>3</sup>.

XPANSION COEFICIENT.....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 ≤ 40°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/cm<sup>3</sup>.

Expansion coefficient: 0,0165mm/m/°C.

Conductivity IACS:100.

REF.	INTENSITY Amp.	VOLTAGE V	IMPEDANCE (Z) Ω/m	SECTION mm <sup>2</sup>	Distance between conductors mm	Voltage Drop V/m/Amp
LM-60Q	60	500	1,75x10 <sup>-3</sup>	12,0	15	0,00303

### VOLTAGE DROP

Values of voltage drop are considered at 20°C y cos φ: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.

For three phase alternating current: ΔU: 3 x I x L x Z

- 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.

ΔU: Voltage drop (Volts).  
 I: Amperage (Amps).  
 L: Length (Meters).  
 Z: Impedance of the conductors (Ohm/m).

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



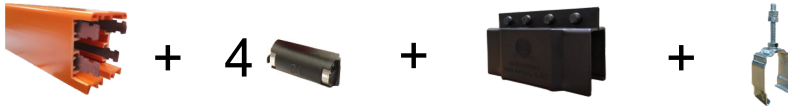


# MODULAR CONDUCTOR SYSTEM LM-60Q

## LINE COMPONENTS

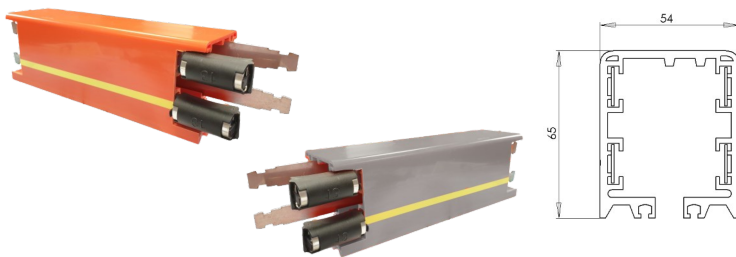
### LM SET

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



ENVIRONMENT	REFERENCE	CODE	INTENSITY MAX.	SET
Indoor	LM-60Q	213634	60 Amp.	PVC Housing + Joints + Sliding Hangers / 2,00m + Quick Connections
Outdoor	LM-60QE	213635	60 Amp.	PVC Housing + Joints + Sliding Hangers / 1,33m + Quick Connections

### MODULAR PROFILE PEM



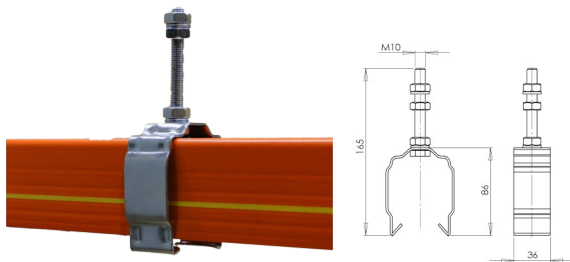
Composed by: PVC housing , 4 Copper conductors and quick connections  
 Orange: LM-60Q  
 Gray: LM-60QE



Line length : 4 mts.  
 Number of conductors: 4

ENVIRONMENT	REFERENCE	CODE	INTENSITY MAX.	SET	WEIGHT
Indoor	LM-60Q	213636	60 Amp	PVC Housing + quick connections	1,66 Kg/m
Outdoor	LM-60QE	213637	60 Amp	PVC Housing + quick connections	1,66 Kg/m

### SLIDING HANGER

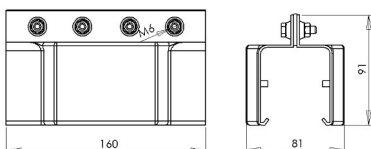


ENVIRONMENT	REFERENCE	CODE	MATERIAL	WEIGHT
Indoor	SO-4	213215	Zinc plated Steel	0,210 Kg
OUTDOOR	SO-4E	213269	Zinc plated Steel coated with EPOXY-POLYESTER paint Screws in stainless steel	0,220 Kg

### JOINT



ENVIRONMENT	REFERENCE	CODE	MATERIAL		WEIGHT
			Lateral	Fixing bolts	
Indoor / Outdoor	EMP-4Q	213638	Insulated material	Polyamide	0,192 Kg

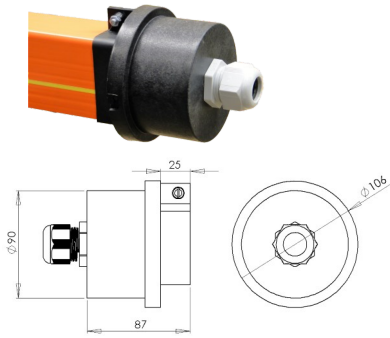


Fixing bolt: reduces assembly time.



# MODULAR CONDUCTOR SYSTEM LM-60Q

## END FEED

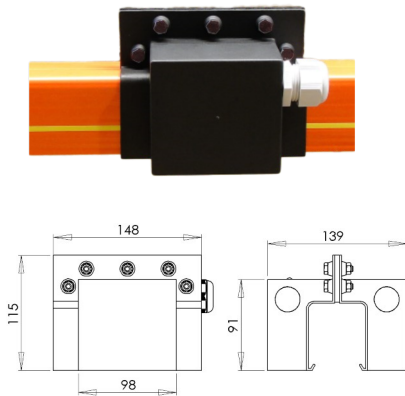


ENVIRONMENT	REFERENCE	CODE	MATERIAL			WEIGHT
			Lateral	Fixing bolts	Cable gland	
Indoor / Outdoor	AE-4Q	213640	Insulated material	Polyamide	1xM25	0,250 Kg



Fixing bolt: reduces assembly time.

## LINE FEED

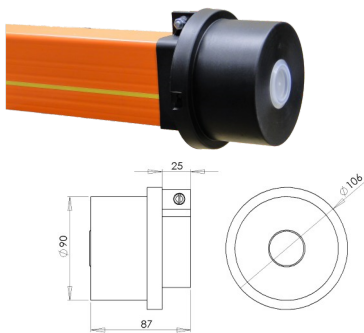


ENVIRONMENT	REFERENCE	CODE	MATERIAL			WEIGHT
			Lateral	Fixing bolts	Cable gland	
Indoor / Outdoor	AI-4Q	213642	Insulated material	Polyamide	1xM25	0,380 Kg



Fixing bolt: reduces assembly time.

## END CAP

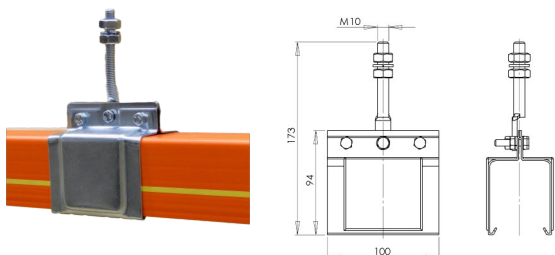


ENVIRONMENT	REFERENCE	CODE	MATERIAL			WEIGHT
			Lateral	Fixing bolts	Cable gland	
Indoor / Outdoor	TE-4Q	213644	Insulated material	Polyamide	Plastic	0,140 Kg



Fixing bolt: reduces assembly time.

## FIXED POINT CLAMP



ENVIRON-MEN	REFERENCE	CODE	MATERIAL	WEIGHT
Indoor	PF-4	213209	Zinc plated Steel	0,389 Kg
Outdoor	PF-4E	213285	Zinc plated Steel coated with EPOXY-POLYESTER paint Screws in stainless steel	0,399 Kg

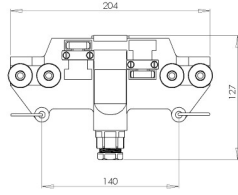
▲ For systems above 60mts, we recommend to install the fixed point clamp in the middle of the system



# MODULAR CONDUCTOR SYSTEM LM-60Q

## CURRENT COLLECTOR

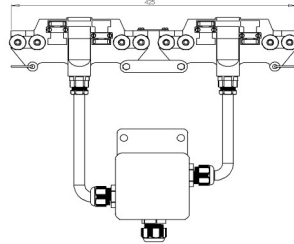
Ref. TO-4x35 A



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.

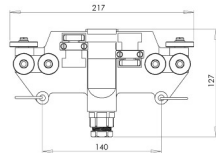
Ref. TO-4x70 A



The use of double current collector is recommended in installations:

- with a consumption greater than 35Amp
- which use speed regulation by frequency control
- with low service voltage
- who want to ensure continuous contact between copper profile and brush.

Ref. TO-4x35 AC (for curved lines)

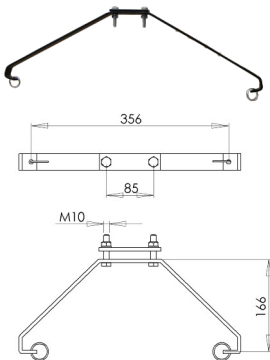


ENVIRONMENT	REFERENCE	CODE	DESCRIPTION	MAX. SPEED	WEIGHT
Indoor	TO-4x35 A	213211	Single trolley 35Amp	160m/min	1,120 Kg
	TO-4x70 A	213236	Double trolley 70Amp	90m/min	1,740 Kg
	TO-4x35 AC	213255	Trolley for curves 35Amp	130m/min	1,162 Kg
Outdoor	TO-4x35 A	213333	Single trolley 35Amp	160m/min	1,120 Kg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

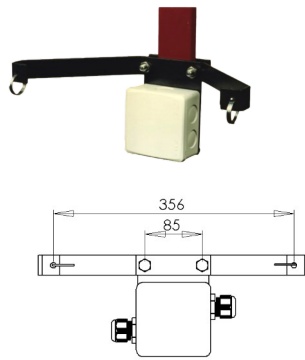
## TOWING ARM

Provides traction on the current collector trolley for its movement in the system. Steel coated with EPOXY-POLYESTER painted in dark gray RAL7021.

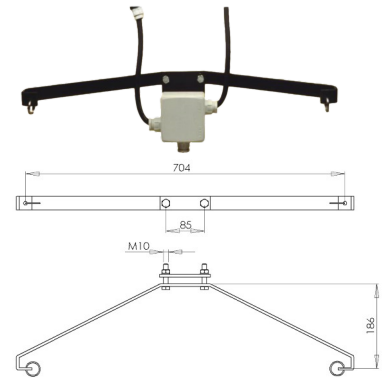
Ref. BA-4



Ref. BA-4C



Ref. BA-70



ENVIRONMENT	REFERENCIE	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
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

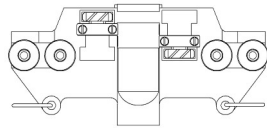




# MODULAR CONDUCTOR SYSTEM LM-60Q

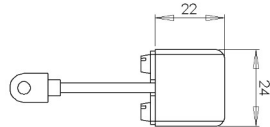
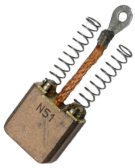
## AUXILIARY COMPONENTS

### CONDUCTOR CLEANER



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

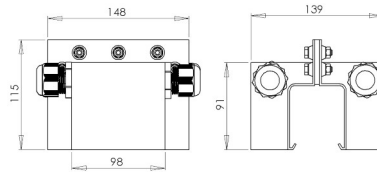
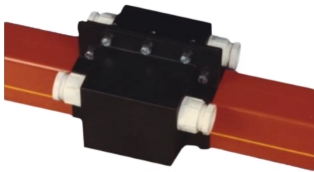
### CARBON BRUSH



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

REFERENCE	CODE	WEIGHT
ETO-4	213235	0,025 Kg

### HOUSING VENTILATION

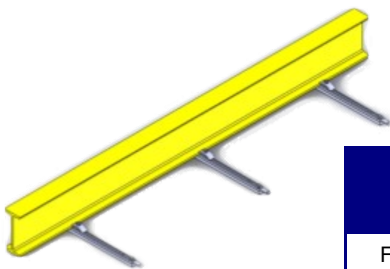


REFERENCE	CODE	WEIGHT
EV-4E	213350	0,400 Kg

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.

## AUXILIARY COMPONENTS

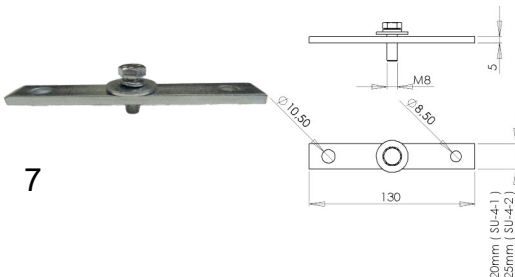
### UNIVERSAL SUPPORT



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	MATERIAL			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	MATERIAL		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



## AUXILIARY COMPONENTS

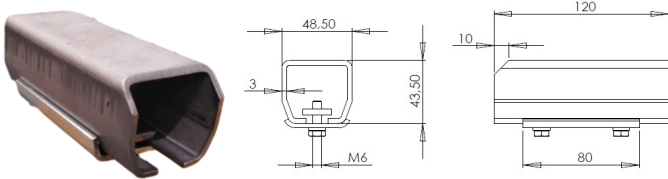
### BEAM CLIP

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



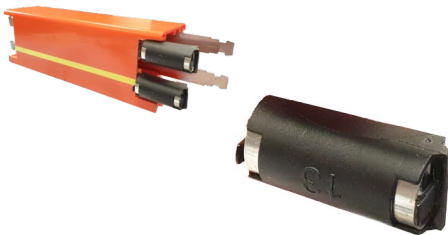
	REFERENCE	CODE	MATERIAL		WEIGHT
			Body	Screws	
For 2331-1 profile	2340-12	309005	Zinc plated steel	Zinc plated steel	0,140 Kg
For 2500-1 profile	2340-12-500	309006	Zinc plated steel	Zinc plated steel	0,156 Kg
For Inox 2331-1 profile	2340-12-Inox	309321	Stainless steel	Stainless steel	0,140 Kg
For Inox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

### QUICK SPRING CONNECTORS CO-4-Q



Quick connectors are sold separately for replacement.

CODE	REFERENCE	WEIGHT
213646	CO-4-Q	0,054 Kg

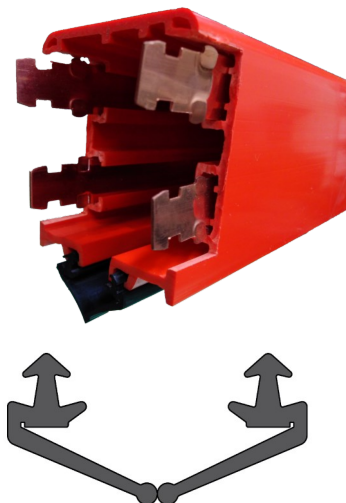
### FIXING BOLT "QUICK"



Fixing bolt, replaces the screws in the mounting function, reducing the assembly time.

REFERENCE	CODE	WEIGHT	UNITS / BAG
EMP/AI-4Q	213647	0,002 Kg	50
EMP/TE-4Q	213648	0,002 Kg	50

### CLOSING PROFILE



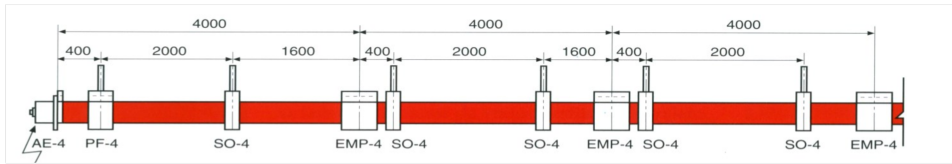
The closing profile PC-4 improves the tightness of the line, making it difficult to get dust inside the PVC casing.

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.

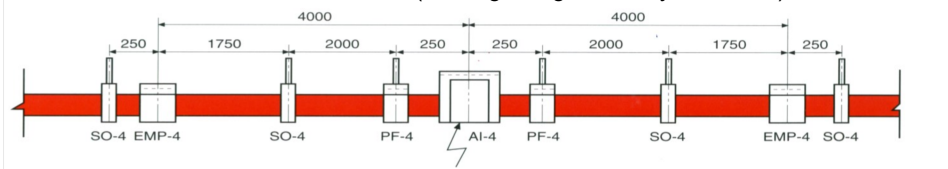
CODE	REFERENCE	WEIGHT
213617	PC-4	0,18 Kg/m

## ASSEMBLY INSTRUCTIONS

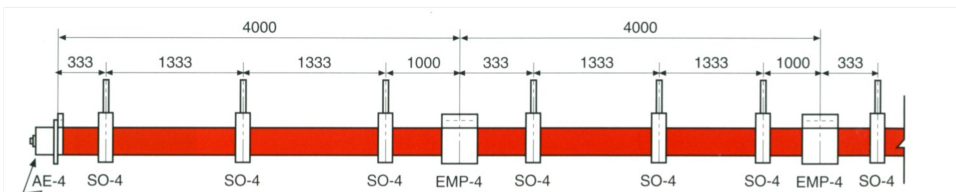
### INDOOR SYSTEM WITH END FEED (Sliding hangers every 2 metres)



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



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



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

## 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.

## 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.



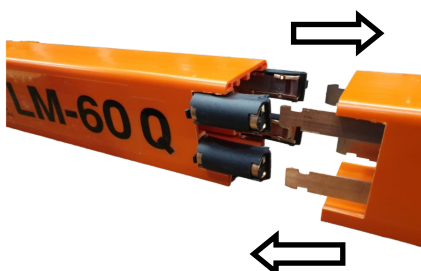
Install universal brackets every 2 or 1.33 meters, according to the assembly scheme



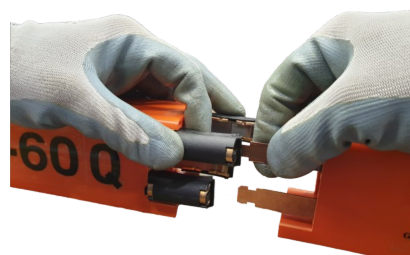
Assemble the sliding hangers SO-4 and the fixed points PF-4 on the support arms by tightening their corresponding screws.



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



Inserted the 4 connectors on one of the lines, slide the second line over the first.



Insert the ends of the copper conductors into the spring connectors one by one approx. 5-10 mm.



Push one line against the other until hearing "Click" and verify that it is properly held and close.

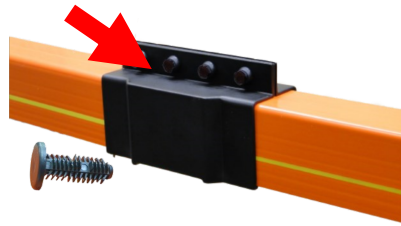




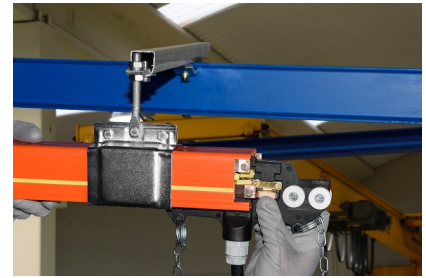
# ASSEMBLY INSTRUCTIONS



Cover the connections with the EMP-4Q 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 EMP-4Q. Check correct alignment between beam and power line.



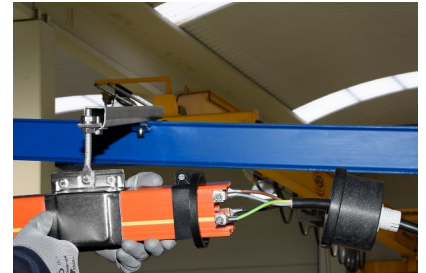
Insert the current collector, with manual pressure of brushes. Respect the unique position to avoid phase exchange.



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



Fix the cover of the end cap TE-4Q 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-4Q making the electrical connection at that point.)



Fix the cover of the end line AE-4Q.



Tighten the electric cable thanks to the cable gland that this cover has. Verify that the cable is installed loosely, so that it can assume possible contractions and dilations of the line.



Assemble the towing arm BA-4 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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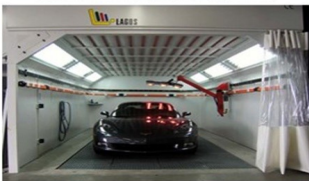
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