

PROTECTED ELECTRIC RAILS WITH MOBILE AND FIXED COLLECTORS



TROLLEY RAIL

PATENTED FRENCH PRODUCT



VILMA S.A.

Z. A. - HEIDEN - OUEST - TELEPHONE 89 55 23 23
F - 68310 WITTELSHEIM - TELECOPIE 89 55 57 09

THE PRODUCT AND ITS APPLICATIONS



Fig. 1 — Protection against accidental contact with conductors under load (CEI 529)



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7

The above views show various applications for Trolley rails supplying power to a travelling crane, television sets, photocopiers, machine-tools...

SOME APPLICATIONS



Fig. 1



Fig. 2



Fig. 3

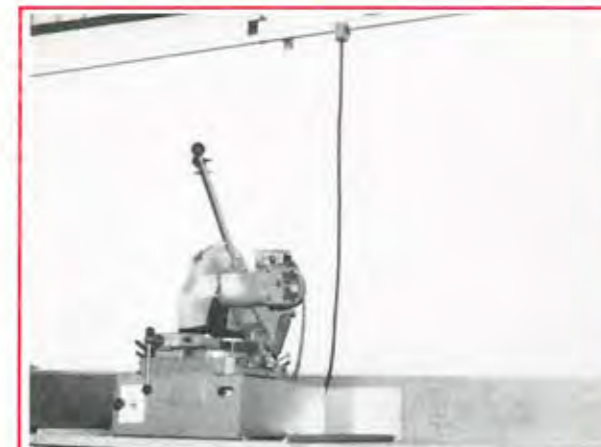


Fig. 4

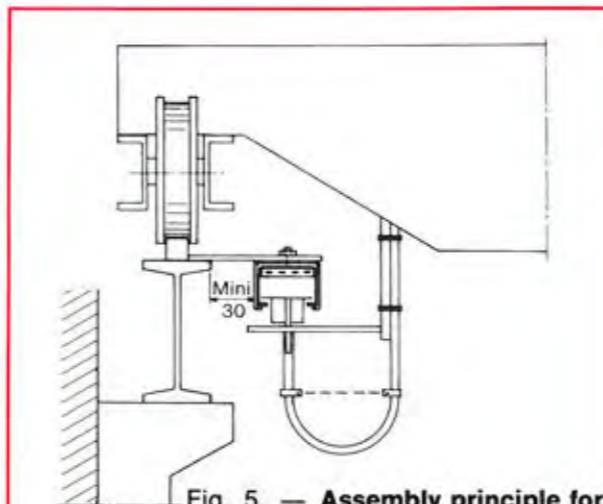


Fig. 5. — Assembly principle for travelling crane.

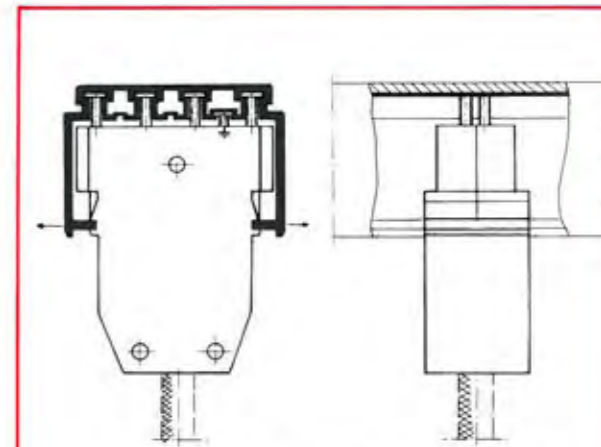


Fig. 6. — Electrical plug engaged.

APPLICATIONS

VILMA TROLLEY RAIL prefabricated electrical rail is designed to provide power both under cover and outdoors for travelling cranes and electric hoists on mono-rails via mobile collectors and also other power consumers such as, overhead or ground rail-mounted electrical industrial trucks, mobile lighting, etc...

Since this open sheath is specially designed to accommodate conductors protected and arranged in a horizontal strip, it can also be used for adapting fixed power collectors anywhere in the system for electrical connection of static machine tools, portable tools, textile machines, industrial sewing-machines, lighting units, plastic injection press, etc...

SAFETY

SAFETY considerations have prompted the manufacturer to create a product meeting the latest standards drafted by the International Electrotechnical Commission — I E C 529.

- Degree of protection : IP 23.

CHARACTERISTICS

4 Conductor models	Nominal Current		Impedance Ohms/m	Voltage drop V/m	Type and Cross section of conductors	Mass Kg/m	Nominal Insulation Voltage	Working Temperature
	Under cover-	Out-doors						
4 CP 32	40A -	32A	0,00220	0,125	Copper 8 mm ²	1,70		
4 CP 50	60A -	50A	0,00150	0,133	Electro. copper 12 mm ²	1,90	500 V	- 30 to + 60° inside and outside**
4 CP 100	100A -	80A	0,00072	0,130	Electro. copper 25 mm ²	2,30		
4 CP 140	140A -	120A	0,00055	0,130	Electro. copper 35 mm ²	2,70		

Other types : 2 CP 32 - 3 CP 32 (2 or 3 32 A conductors)
 2 CP 50 - 3 CP 50 - 5 CP 50 (2 - 3 or 5 50 A conductors)
 2 CP 100 - 3 CP 100 (2 or 3 100 A conductors)
 2 CP 140 - 3 CP 140 (2 or 3 140 A conductors)
 4 CP 140/100 (3 140 A conductors plus 1 conductor (PE) 100 A for earthing).

(**) Possibility for adapting a heater cable to Trolley-rail exposed to icing. Consult us.

DESIGN

This electrical sheathing represents a major breakthrough in that the passage reserved for the mobile collector is COMPLETELY OPEN and that conductors are isolated INDIVIDUALLY.

This design offers substantial advantages :

- Total unobscured visual access to conductors and to their insulating coverings, thereby facilitating periodic checking of splices, expansion joints, electrical isolations, etc...
- INDIVIDUAL isolation of the 4 conductors housed in a narrow, stable practical slot shielded against accidental insertion of fingers (IEC standard finger tests).
- Smooth movement of the mobile collector through a generously proportioned opening.
- Good protection against weather for the mobile collector.
- Perfect access to the inside of the sheath for removal of atmospheric dust by brushing or blowing.
- Natural evacuation of conductive dust deriving from normal use of the contacts.
- Fast easy removal of the mobile collector after spreading apart the two side walls.
- In some circumstances and under cover, use of TROLLEY RAIL in the on-edge, reversed or vertical position.
- Flexible snap on fixed collectors with electrical contact pins for connection of static (machine tool) or limitedly moving consumers.

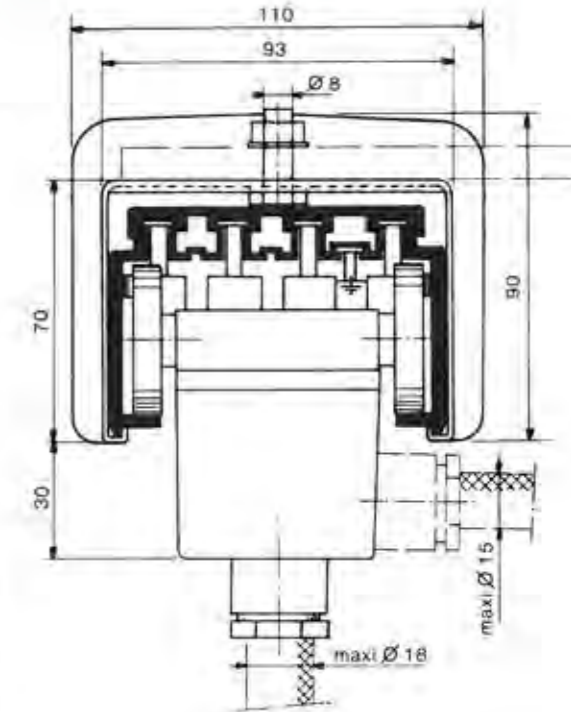


Fig. 1 — Section through Trolley-rail showing the overall dimensions for
 — Mobile collector MA 432
 — Holder CP 506
 — Twin splice CP 504

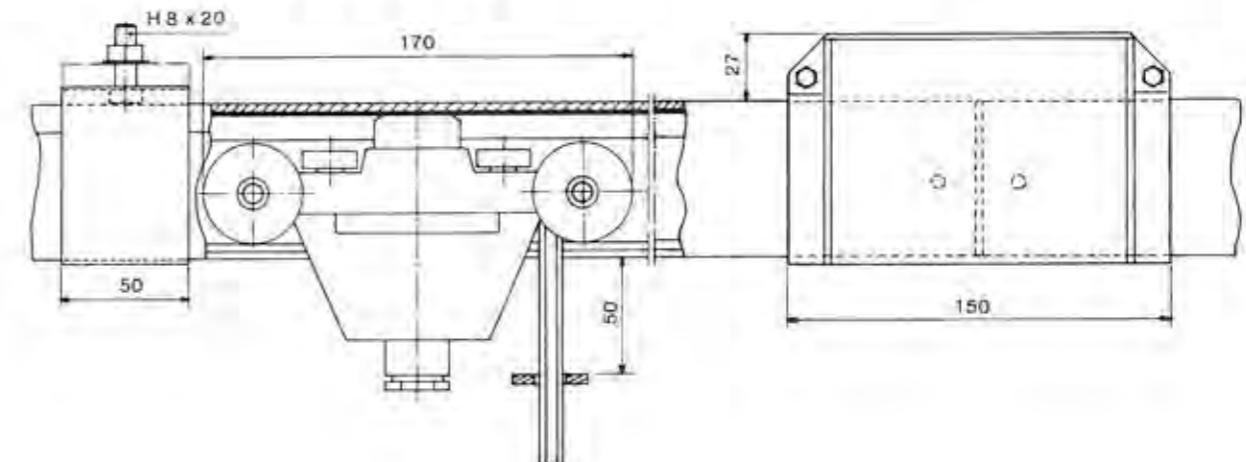


Fig. 2 — Side view showing the holder and the mobile collector (MA 432).

DESCRIPTION

The Trolley rail is available in 5000 mm lengths. Shorter lengths are available on request. They can be cut to length during assembly (see assembly instructions).

CURVES : Radii from R 1300 mm can be supplied on request. Maximum length : 2,200.



Fig. 1 — Horizontal curve.

Main components of a TROLLEY-RAIL element :

1. — **COVERING** : White PVC. Softening point = 84°C.
 - Self-extinguishing.
 - Good resistance to acid vapours except for highly concentrated nitric and hydrofluoric acids.
 - Mediocre resistance to aromatic and chlorinated hydrocarbons, ketones and esters.
2. — **CONDUCTORS** :
 - Electrolytic copper.
- 5 **Conductor version** :

The 5th conductor located outside the alignment of the 4 conductors is used mainly as a safety conductor (PE) for installations of average length and in the CP 50 version. Continuous coiled conductor, unspliced with element junctions and connected up on assembly.
Draws supply via connecting end cover (3-ph + N + PE)
3. — **UNIONS**. — Components providing the mechanical and electrical junction for conductors. Pinch-fit by tightening screws.
4. — **INTEGRAL ARRANGEMENTS** :
 - a) **expansion joints**. Tailored to the size of the model, these joints can be incorporated on conductors if the TROLLEY RAIL comprises curves or forms a closed circuit. In the case of straight systems, in principle, expansion joints are unnecessary in enclosed premises up to a length of 200 m except where there are certain local heat sources.

When fitting outdoors, consult us stating the length required, the location of the connection, the country of installation, the installed power in kW.

 - b) **Electrical separator** : Incorporated at the factory in short or long versions as requested.
5. — **ACCESSORIES AND MOBILE COLLECTORS** : Please refer to pages 7, 8 and 9.

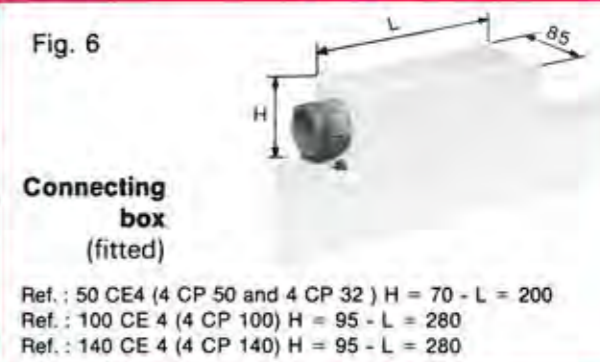
ACCESSORIES

Fig. 1



Joint CP 504
(Mechanical junction between 2 elements)

Fig. 6



Connecting box
(fitted)

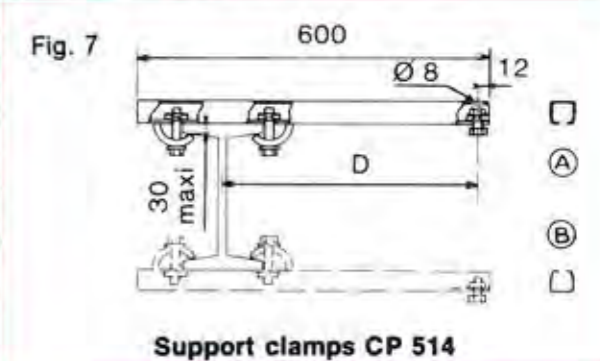
Ref. : 50 CE4 (4 CP 50 and 4 CP 32) H = 70 - L = 200
Ref. : 100 CE 4 (4 CP 100) H = 95 - L = 280
Ref. : 140 CE 4 (4 CP 140) H = 95 - L = 280

Fig. 2



Holder CP 506
(with H8 x 20 bolt)
H8 x 60 bolt with 3 nuts for height adjustment by request

Fig. 7



Support clamps CP 514

Fig. 3



End Cover CP 502

Fig. 8



Transfer end (fitted)
— Ref. TE 16 140 (Trolley-collector enters from 1 track into a contiguous or switching track. Alignment plus/minus 3 mm. Gap 2 to 10 mm between 2 Transfer-ends.

Fig. 4



Connection joint EC 4
For types 4 CP 32 and 4 CP 50
(cable 4 x 6 mm²)

Fig. 9



Splayed Entry (fitted)
— Ref. CE 16.140 (discontinuous zones, gaps or chambers, door openings, etc...)

Fig. 5



Connecting End cover
EMD 4 (or EMD 5)
For the 4 CP 32 - 4 CP 50 - 5 CP 50 series

Fig. 10



Anchor-holder CP 550

MOBILE COLLECTORS



Fig. 1 — Mobile collector MA 432
Nominal current :
32 A at 100%
40 A at 60%

MA 432
(3-ph + PE)
MA 532
(3-ph + N + PE)

4 (or 5) contact shoes.
Entry for 2.5 to 6 mm² flexible cable.
Max. speed 300 m/min.

MA 432 - C
(3-ph + PE)
MA 532 - C
(3-ph + N + PE)

Equipped with a flexible cable 4 mm²
(or, upon request, 2.5 or 6 mm²). Length : 1.50 m.

Applications : Supply to electrical mobile equipment : travelling cranes - monorail - motor-powered gates — motor-powered hangar doors, etc...

NB : For cable side exit : see figure 1, page 5.



Fig. 2 — Mobile collector MA 463
Nominal current : 63 A

MA 463

Collector with 2 x 4 contacts.
Maxi cable : 4 x 10 mm².
Maxi speed 200 m/min.

MA 463 - C

Collector fitted with a 4 x 10 mm² flexible cable, length : 1.50. Greater lengths by request.

APPLICATIONS : Same as for collectors MA 432.



Fig. 3 — Mobile collector ML 410 F
with manual shift
(circuit breaker version)

ML 410F - 10 A

3-ph + PE with 3 10 A circuit breakers.

ML 510F - 10 A

A 3-ph + N + PE with 3 10 A circuit breakers.

ML 432 - 32 A
ML 532 - 32 A

Same design, without circuit breakers.

Applications : Power brought to manually movable accommodations via vertical electric cable such as : portable tools, cutting shears, welding equipment, lighting, etc...

MOBILE COLLECTORS



Fig. 1 — Mobile collector MA 416 P fitted with a lockable power point.

MA 416 P - 16 A

Equipped with a vertical lockable point outlet.
With 3-ph + PE contacts.

MA 516 P - 16 A

3-ph + N + PE

Applications : Any mobile equipment for which quick disconnection is required.



Fig. 2. — Mobile collector MA 432 TC with transfer socket.

MA 432 TC -32 A

With elastic device and transfer socket integral with the mobile equipment - 4 x 4 mm² wired.
Length : 1.5 m.

MA 532 TC -32 A

Ditto with 3-ph + N + PE
5 x 4 mm² wired.
Length : 1.50 m.

Applications : Partial or discontinuous electrification whereby the runner has to exit from the sheathing and be reintroduced via the splayed entry (fig. 9 - page 7).

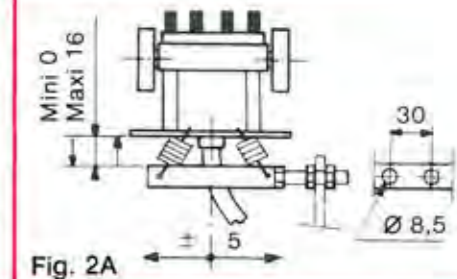


Fig. 2A



Fig. 3. — Driving plate ED 32.

Applications : Secured to the mobile unit supplied (travelling cranes hoists) by one of its oblong openings, the detachable drive is engaged via the second oblong opening in the vertical drive dog secured to the mobile collector which it is driving (fig. 2, page 5). Bendable drive plate if necessary.

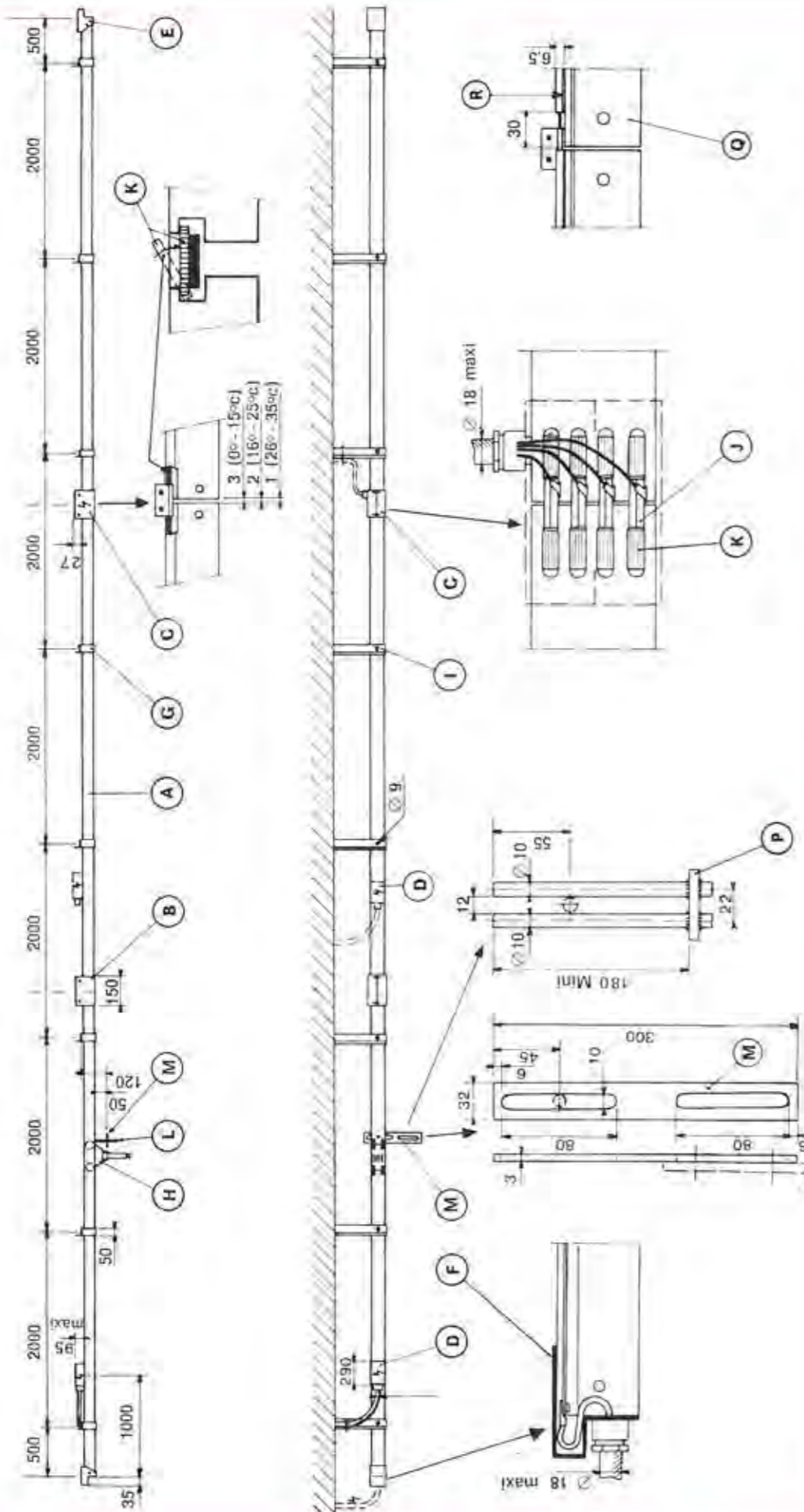
NOTES : — Mobile moulded polyester collector.

— Metallo-graphite contact shoes.

— Mobile collectors removed by pushing apart the two sides (off tension).

— Easy replacement of contact shoes.

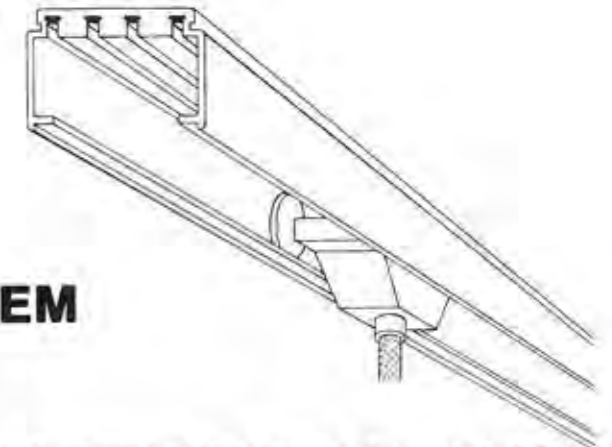
TECHNICAL DATA SHEET



ASSEMBLY DIAGRAMS

1) Min
2) Max

COMPONENT PARTS OF A **VILMA** TROLLEY RAIL SYSTEM



Code as per the Data Sheet on page 10 :

- A - STANDARD COMPONENT comprising the electrical conductors and their splices. Available in 2-3 or 4 lead versions (for a specification, see page 4). The fifth continuous lead (earth) can be incorporated in the underneath recess on assembly (type 5CP50).
- B - JOINT, plastic, ref. CP 504, for mechanically joining two sheets. Non-slip, insulates splice connectors.
- C - CONNECTING JOINT also accommodates the incoming power line in the flexible series up to $4 \times 6 \text{ mm}^2$. Not used for 5 conductor models.
- D - CONNECTING BOX. Comes mounted on a 5000 mm (1000 mm ended) unit and is fitted either at the end or in-line.
- E - END COVER to plug up the track end. Hollow part projecting to allow for conductor expansion.
- F - CONNECTING END COVER, styled to take power cables of up to $4 \times 10 \text{ mm}^2$ max., flexible series. Used for models of the CP 32 and CP 50 series only.
- G - HOLDER CP 506 made of galvanised steel bolted underneath the mounting with an 8 mm diameter bolt. Scope for suspension by two H 8 x 60 screws with 3 nuts for height adjustment.
TROLLEY RAIL components secured by engagement in two flexible metal sideways-opening hooks opening owing to metal elasticity.
- H - COLLECTOR. Driven by means of a detachable pin (code L) or by applying traction to a power cable possibly encased in rope. Available with 2-3-4 or 5 sliding contacts.
- I - MOUNTING made of bar steel appropriate for the distances between supports (60/6 flat - L 40/40, U 50/25 angle, etc...) or a flanged mounting per figure 7, page 7 (supplied by VILMA on request).
Distance between mountings $2000 \pm 100 \text{ mm}$.
First and last mounting 500 mm from the end.
For line lengths which are multiples of 10 metres, the last mounting being located 500 mm away from the other end, will be 1000 mm away from the penultimate mounting.
- J - UNION CP 503 providing the mechanical and electrical connection for conductors in discontinuous versions (conductors as long as the casings). This connector also accommodates the power supply cable in connecting splices for the CP 50 and CP 32 series.
- K - ANCHOR CHOCK. For the connecting joint only. To be housed in the recess beneath the two edges as shown in the diagram. Located on either side of the connectors, they are vital for holding the conductors in place.
- L - DRIVE PIN integral with the trolley collector in all driven applications. Retracted in free, manually moved versions. Can be unscrewed if the carriage has to be removed without dismantling drive drum M or P.
- M - DRIVING PLATE ED 32 on mountings integral with the machine drawing the supply. Can be furnished by the maker, upon request.
Can be folded at right angles when fitted on vertical cable channel. Secured by $2 \times 10 \text{ mm}$ dia. bolts.
- P - DRIVE YOKE consisting of two 10 mm dia. cylindrical rods, secured by nuts or welded onto drive plate. User-designed and supplied.
- Q - COMPONENT CUT WHEN MOUNTED. Cut with a metal saw then file finished. The blade should be made to cut along the two fine grooves 5,5 mm from the back of the INSULATOR (R). Particularly useful for complex non-straight systems with adjustable component parts. In straight systems, the end component should preferably be cut. Redrill both holes without machining the back.

FITTING INSTRUCTIONS

The diagrams on page 10 (Technical data sheet) show the overall arrangement of a trolley rail system. On page 11, there is a full description of the main working components.

A FEW RECOMMENDATIONS :

- Before commencing assembly, identify the location of the power supply cable.
- On fitting, check that the conductors line up properly where lengths are joined together. Although the casing may appear to be symmetrical, unequal spacing between conductors ensures that the collectors are not connected the wrong way round, thus ensuring that the system is foolproof.

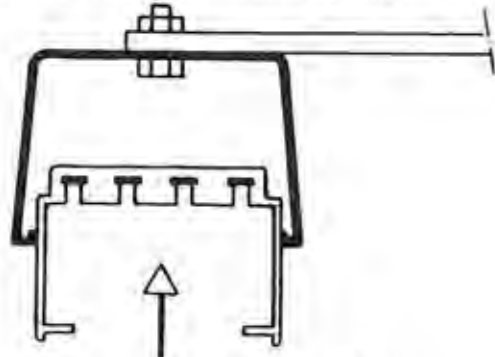


Fig. 1. — Positive engagement in the suspension mechanism.



Fig. 2. — Wire splicing (please see paragraph 4).

FITTING

1. - Horizontal mountings need to be arranged at 2000 m intervals, where possible over a 10 m plus zone. The first should be 500 mm away from the end of the trolley rail to be laid.
2. - Insert the suspension mechanism (G.), tightening the 8 mm diameter bolt.
3. - Working from the underside upwards and forcing the housings apart, positively engage the first unit into each of the bottom ribs in turn (fig. 1). Align the four conductors as necessary.
4. - Assemble the UNION CP 503 (J) into the ends of the conductors of the next unit prior to fitment. Leave a small gap between the 2 units (see page 10). Slide the splice connectors half-way along the conductors of the unit already installed, starting with the unit furthest away and with the screw heads pointing towards the operator (fig. 2). The conductors can be contiguous or with a clearance of up to 4 mm. Tighten the screws firmly using a socket wrench or ring spanner. Examine the underside to ensure that the conductors are properly aligned. Insert the next splice connector. The procedure is repeated for subsequent components.
5. - Join the housings by installing the twin splice. First of all, engage the hooked part on the bottom, inclining the component at 45°. Then align so that the 2 locking studs engage in the holes. Assemble the half-clamp using 2 x 5 mm diameter bolts.
6. - Insert the trolley collector into the trolley rail sheath. Run it manually, making sure that it runs easily particularly at splices (by moving it back and forth over the entire track length). Then remove the trolley collector and connect it to the flexible power cable. Allow a generous loop of cable to eliminate any strain.
7. - Using the diagrams, fit the drive-prop 50 mm below the POLYGAIN sheath. **POSITIONING THE 5th ELECTRICAL CONDUCTOR:** The 5th conductor reserved for earthing (PE) is supplied in coil form. Thread the lead into the underneath accommodation, then PULL it with a screwdriver no more than 5 mm in dia. inserted perpendicularly in the end hole. The coil will be held by a second operator standing beside power supply fitting of the unit. Never PUSH the lead to avoid distortion. After sliding the whole way, cut off any surplus lead and connect to the lug at the end opposite to the draw hook.
8. - Once installation has been completed, connect the power supply cable to the connecting box or to the connecting joint or connecting end cover.

MAINTENANCE - SPARES

WEARING PARTS

The main wearing parts are on the collectors. The brushes are replaced if their exposed length (18 mm when new) is only 14 mm in the 4 CP 32 and 4 CP 50 versions - 12 mm in the 4 CP 100 and 4 CP 140 versions.

Should soiling or wear occur, replacement of the runners and collector or even the complete collector is recommended.

PERIODIC CHECK

The user will make periodic checks on the working condition of the collectors - brushes - runners - collector - drive pin...

This inspection involves removing the collector by parting the two sides of the casing with the line off-load. The casing can be held open with two plastic or wooden chocks, 85 mm wide, approx. 10 mm thick inserted between the two raceways as per figure 1. The unequal spacing between conductors prevents inadvertent reversal of phase and protective brushes. The system is thus irreversible (foolproof).



CLEANING

The Trolley rail wide-aperture design makes for easy cleaning, where needed, in foundry, paper mill or textile mill locations, for example...

Cleaning can be done manually using a brush, compressed air and even in some cases, a water hose. Such operations must always be carried out offload.

BRUSH CHANGE

When tightening the screw connecting the elongated brush lug and the cable lug, keep the brush fully compressed to make spring positioning easier.

Check that any brushes replaced slide properly.

FIXED COLLECTORS

VILMA TROLLEY-RAIL lends itself to 3 versions for the entire range up to 140 A :



Fig. 1

Fixed 50 A or 100 A collector point (3-ph + PE)
Ref. PCB 450
Ref. PCB 4100



Fig. 2

32 A fixed collector point (3-ph + PE)
Ref. PEB 432



Fig. 3

Electrical plug
Ref. See table
Fig. 4

Spacing :

- As desired for PCB 450 and PCB 4100
- Every 5 meters in the case of PEB 432 or as desired for lesser spacings.
- Variable and adjustable for lockable points.

Current input :

Current supplied to the channel via the connecting boxes shown in fig. 6, page 7.

POWER SUPPLY FOR :

- Machine tools
- Injection presses
- Portable tools
- Static inspection stations
- Suspended extension points
- Textile machines
- Production machines
- Spotlights
- Welding stations
- Any medium powered static industrial power consumers (less than 50 kW - 380 V in principle).



Fig. 4
Electrical plug.

PVF 416	16 A	3-ph + PE	3 x 16 A circuit breakers
PV 416.....	16 A	3-ph + PE	- without circuit breakers
PV 516.....	16 A	3-ph + N + PE	without circuit breakers
PV 432.....	32 A	3-ph + N + PE	without circuit breakers
PVF 516	16 A	3-ph + PE	- 3 x 16 A circuit breakers
PV 532.....	32 A	3-ph + N + PE	- without circuit.

NB. : Adaptation of a box with special equipment by request.

FROM THE VILMA PRODUCTION RANGE...

(Documentation available upon request)

MONOFIL (Single line)

Electrical power conductor protected for mobile equipment supplies.
Compact size. Modular structure.



- Electrolytic copper conductor
- Rigid PVC sheathing
- Screwed splice union
- Horizontal or vertical strip assembly
- Curves in two planes
- Single-pole contact



Electrification of hoist of a curved monorail.

MONOCONDUCTOR (Single conductor)



Specially designed to supply power to travelling cranes, gantries, etc... drawing high currents of 80 A or 400 A.

CABLE-CARRYING MONORAIL



Power supplied by flat cable, on travelling crane, etc...