

MDPE (characteristics).

Density	0.926-0.940 g/cm ³
Young modulus/ E modulus/ Tensile modulus	172–379 MPa
Tensile strength(σ_t)	12.4–19.3 MPa
Elongation @ break	100–150%
Brittleness, low temperature	-118 °C
Vicat	99-124 °C
Specific heat (c)	1.916 kJ/kg.K

Source: J.Brandrup, E. H. Immergut & E.A. Gulke, Polymer Handbook Fourth edition, ISBN 0-471-48171-8

Product description / details.

- Manufactured & supplied by Larkin Engineering (Tuam, Co. Galway).
- Double sided unit offered to accommodate two document sizes as follows: 220MM (wide) x 907mm (with visible area of 195mm (wide) x 882mm (height) & 220mm (wide) x 594mm (with visible area of 195mm (wide) x 569mm (height)
- Extruded MDPE (Medium Density Polyethylene) manufacturing process. MDPE has good shock and drop resistance properties. It also is less notch sensitive than HDPE. Stress cracking resistance is better than that of HDPE. Due to its material makeup, the unit will not pose any bimetallic corrosion to the Bus Stop Pole or its component parts. The unit is designed for use in all locations, including coastal areas where sea air is prevalent. A realistic lifespan of the unit is 25 years +, with a warranty of 20 years offered on the main body (against material failure) and 10 years on Polycarbonate covers (against discolouration, manufacturer's warranty).
- The unit is designed to be fully adjustable in height on the Bus Stop Pole, by way of the two fixing brackets (supplied). The special bracket fixing system ensures the unit may be replaced without the need to dismantle / replace the Bus Stop Pole. The brackets are concealed from view for safety and security of the unit.
- Colour is moulded into unit to ensure pigment fastness and is (RAL9006), black as requested.
- Designed to rotate 360 degrees (either direction) on pole.
- Designed for long life use and frequent removal / replacement of polycarbonate covers.
- Vandal proof construction & anti tamper fixings used to deter unauthorized access to timetable information. Hidden fixings ensure unit cannot be removed from pole.
- Anti-graffiti nature to carousel extends to the inherent properties of the finish on the Carousel. As it is a smooth finish, paint has great difficulty in adhering to the surface. This makes removing any graffiti quite an effortless task using household thinners. The same applies to the Polycarbonate sheeting.

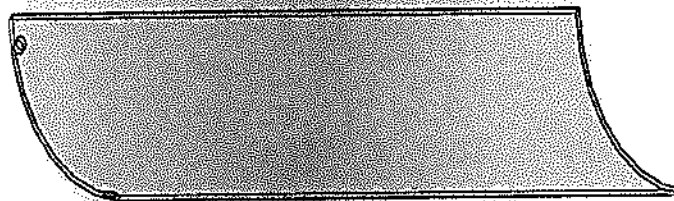
- The entire product is (unlike steel products) highly corrosion resistant. The timetable cover screw receivers are manufactured from brass and the steel plates (covering the access screws) are hot dip galvanised and finished in a 2 Pac polyurethane painted finish (to RAL9006, black).
- Each side of the Carousel is an individual sealed unit, requiring only minimal assembly to the pole itself. The specially designed shape will not allow water to enter from top or sides.
- The whole unit is deemed as water proof / splash proof, once fully assembled. The unit will drain freely of any water / condensation build up internally, exiting at base of unit.
- Due to the nature of use, the unit is designed to be devoid of any sharp edges with all corners rounded for additional public safety. Likewise, the unit has no protruding aspect that would cause potential harm to users / employees / maintenance crew.
- Minimal maintenance required other than periodic cleaning of the polycarbonate sheeting (both sides). If the unit becomes damaged and needs replacing, this may be carried out by a single operative, quickly and with minimal effort / tools.
- There is adequate space on the unit to affix a Braille plaque if necessary. (Front and back) and Larkin Engineering will provide this item (at additional cost) should it be required.
- Larkin Engineering will provide a (complete) working sample of each sized Carousel to the Authority for their consideration within 48hours if requested. Sample to be supplied will be mounted to a pole section (60.3mm) measuring 1000mm long complete with standing plate.

Fixing bolts.

M8 x 40mm long zinc coated fixing bolts are used in securing the double side carousels.

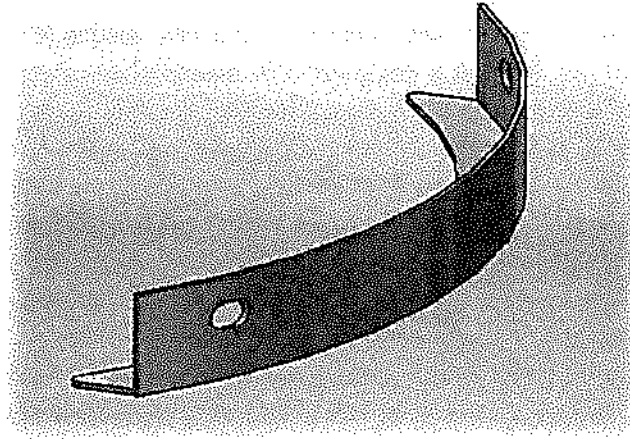
Polycarbonate information covers.

2mm (clear) polycarbonate formed into a radius of 155mm is used as a protection barrier for the timetable or advertisement. 1 x panel to each side is supplied. This polycarbonate is UV protected, scratch & chemical resistant and has a fully clear finish with smooth safe edges. Polycarbonate sheeting used is 200 times the impact resistance of glass, at only half the weight. Dimensions of finished item are 608mm high, 232mm wide, and 2mm thick. The Polycarbonate sheeting is designed to protect the internal information sheet, it is waterproof, vandal resistant and will NOT obstruct the legibility of the internal information sheet. A 10 year (manufacturers) warranty is offered on the Polycarbonate covers, (against discolouration).



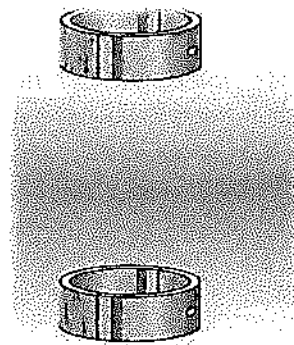
Panel holder.

Panel holder to lower end of counsel is used to secure timetable and polycarbonate in place. This polycarbonate is secured to main carousel body using 2no M5 x 20 anti-tamper bolts. Component has a primed and 2 phase polyurethane RAL 9006 paint finish. Dimensions of finish item are 232mm wide, 26mm high.



Diameter 60.3mm brackets.

5mm Aluminium brackets allow bus carousel to spin (360 DEGREES / both) around the diameter of the 60.3mm pole. 2No 50mm high brackets are fixed to bus pole using 8mm bolt.

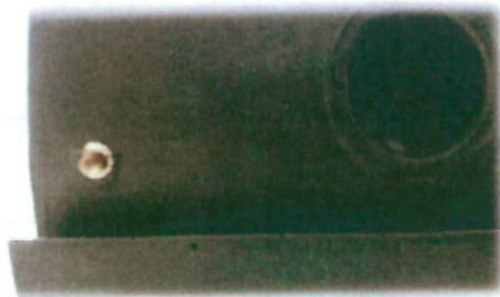


DETAILS OF ALL NECESSARY FIXTURES ETC-

Fittings and Brackets. To secure units to a diameter 60.3mm poles all fixings can be provided by Larkin Engineering. These fixings include 4NO self-tapping screws. 2No anti-tamper screws secured polycarbonate and panel holder in place.

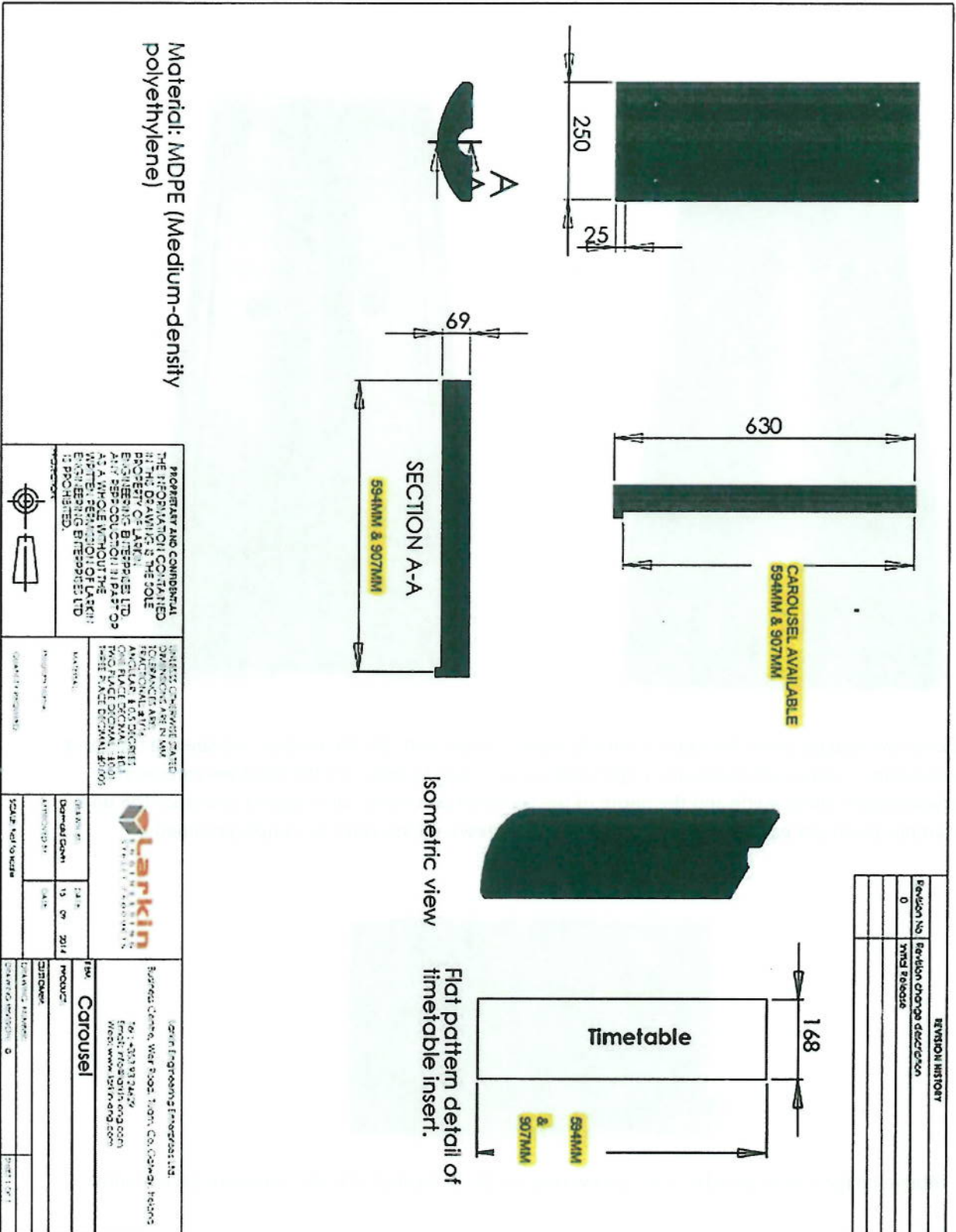


Above two images, show the two sections to make a single unit. On the reverse, we see the recessed pole clamp positions which ensure a tight and secure fitting to pole. On the front we can see the polycarbonate sheet guide and the depth of the recessed bolt holes, all designed to ensure the unit is tamper proof yet easily accessed by maintenance crews. Please refer to sample provided.



Above image shows detail of brass screw receiver (X 2), located at both corners to base of unit.

Detailed Technical drawing of proposed unit. **Note**, both Carousel sizes are mentioned on the drawing (sizes highlighted in yellow).



Material: MDPE (Medium-density polyethylene)

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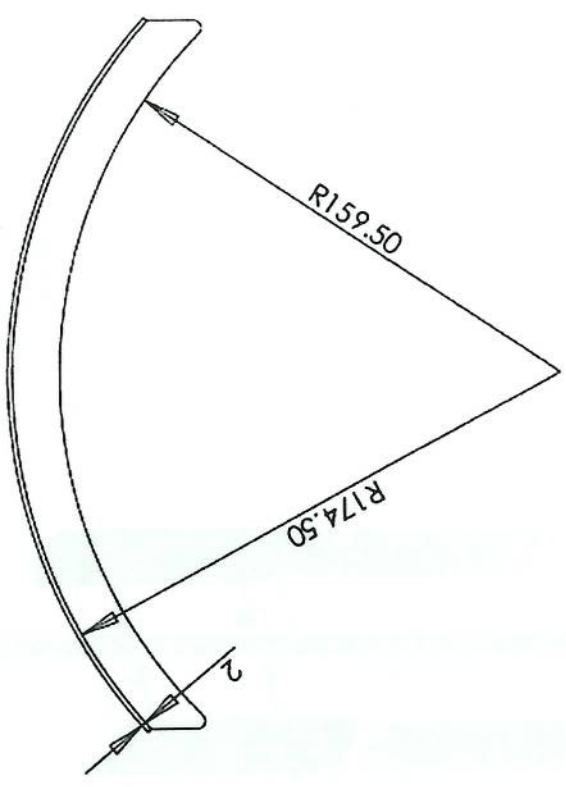
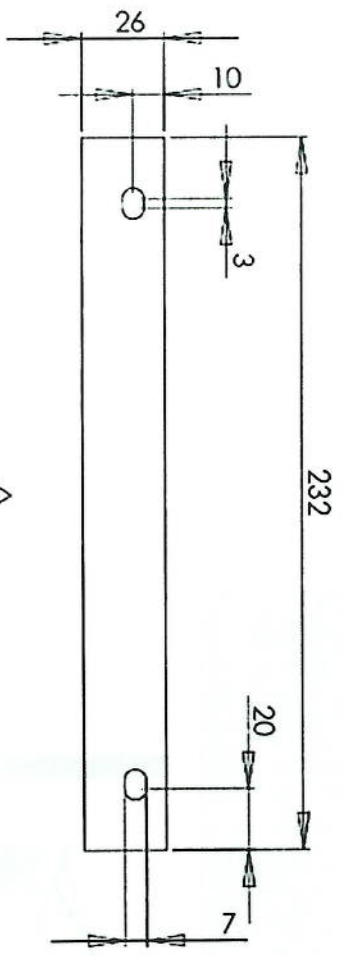
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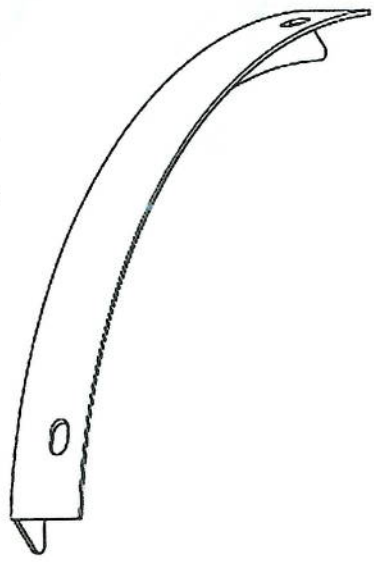
DATE: 13.09.2014
DRAWN BY: [Name]
CHECKED BY: [Name]

Product: **Carousel**
Scale: 1:1
Drawing No: [Number]
Revision: 0

REVISION HISTORY	
Revision No	Revision change description
0	Initial Release



Material options:
 Aluminium
 Rigid Plastic



REVISION HISTORY	
Revision No.	Revision change description
0	Initial Release

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DATE: _____
 DRAWN BY: D. Gavin
 CHECKED BY: _____
 SCALE: NATURAL

Larkin Engineering Enterprises Ltd
 Support Centre, War Foot, Lymington, Hampshire
 Tel: +44 (0) 1329 3447
 Email: rfs@larkin-eng.com
 Web: www.larkin-eng.com

PROJECT: Panel holder
 CUSTOMER: _____
 DRAWING NUMBER: _____
 SHEET 1 OF 1

1. Diameter 60.3mm pole.
2. Bus Carousel
3. M8 x 40mm bolt
4. 2mm Polycarbonate
5. M6 bolt.
6. *Aluminium* steel bracket
7. Panel holder.



REVISION HISTORY	
Revision No.	Revision change description
0	Initial Release

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UNITED KINGDOM PATENT OFFICE REGISTRATION NO. 2481 REGISTERED TRADE MARK LARKIN ENGINEERING ENTERPRISE LTD. ONE BRIDGE STREET BIRMINGHAM B3 1TA			DRAWN BY DATE: 14	
CHECKED BY DATE: 14			SCALE: Not to scale	

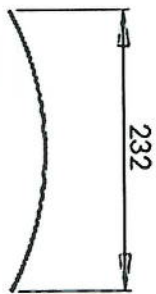
Larkin Engineering Enterprise Ltd.
 Ruford Centre, West Road, Tadm, Co. Down, Ireland
 Tel: +353 53 24457
 Email: ruford@larkin-eng.com
 Web: www.larkin-eng.com

Product: **Assembly Detail**

Quantity: 2

REVISION HISTORY

Revision No.	Revision Change Description
0	Initial Release



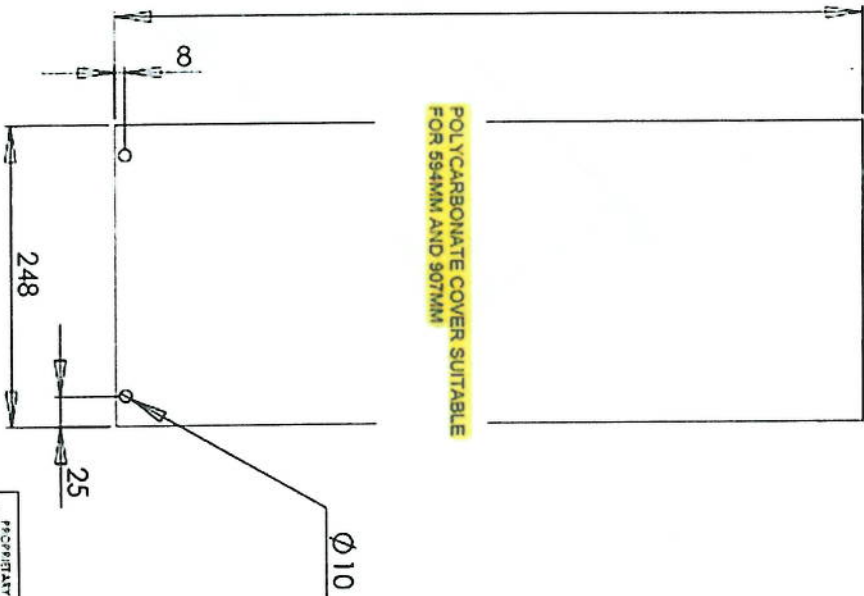
Curve detail

Material: 2mm Polycarbonate



Isometric view

POLYCARBONATE COVER SUITABLE FOR 554MM AND 907MM



Flat Pattern Detail

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 DRAWN BY: D GAVIN
 CHECKED BY: D GAVIN
 SCALE: 1:1 TO SIZE



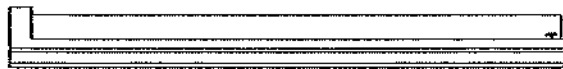
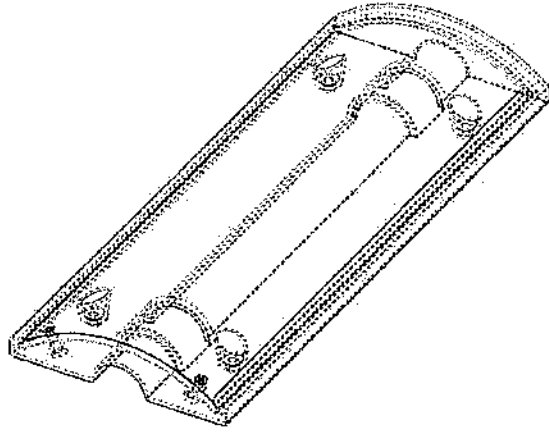
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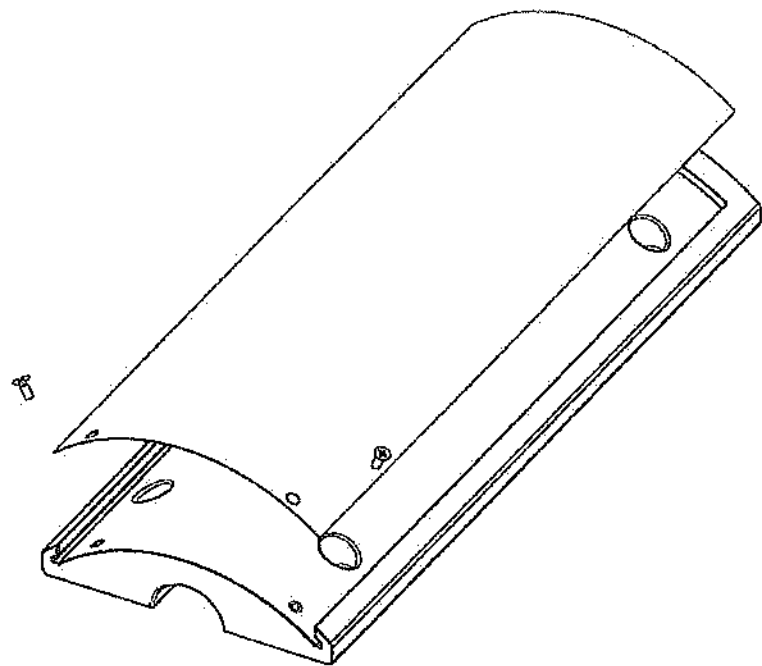
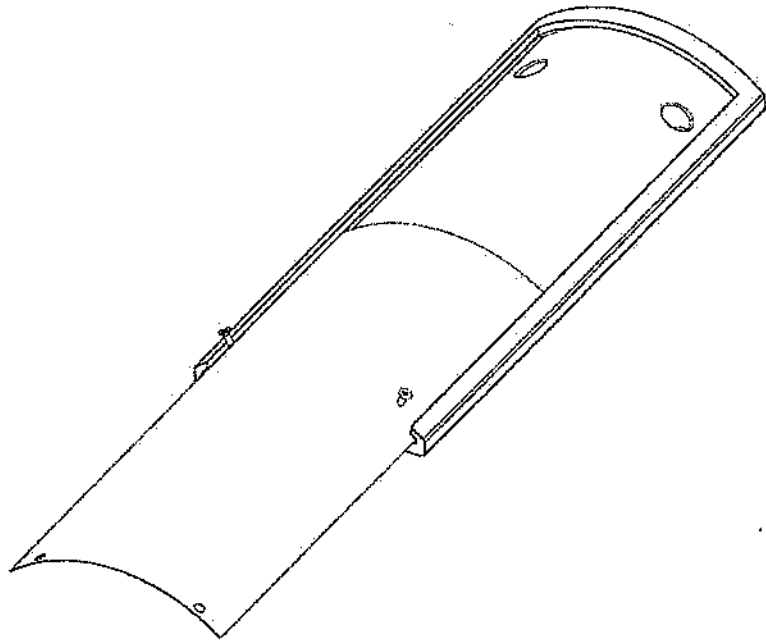
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 WWW: www.larkineng.com

ITEM: Polycarbonate panel
 PRODUCT: Bus carousel

DATE: 06/01/2010
 DRAWING NUMBER: 0
 SHEET NO: 1/1





DETAILS OF LEAD TIMES –

Lead time on batches of Carousel units (in both sizes), is within 2 weeks from date of written order to the locations as set out in section 4 ref Delivery.

CAROUSEL DOCUMENTATION /MANUAL

(A) OPERATION

Personal changing the timetable on the carousel will

1. Remove anti-tamper screws on the retaining bracket
2. Remove bracket and slide the polycarbonate cover downwards
3. Insert new timetable onto carousel
4. Slide cover up into position
5. Secure in place with brackets & anti tamper screw
6. Repeat operation on 2nd side of carousel

(B) CERTIFICATION

SEE ATTACHED

(C) QUALITY CONTROL

Strict quality & procedures are adhered to in product manufacturing, consistent with ISO9001 & ISO14001 procedures see attached certifications.

(D) INSTALLATION

Personal installing the carousel onto existing posts

1. Fix 4no aluminium brackets onto post via 4no self-tapping screw (fixing measurement's will be supplied by Larkin Engineering)
2. Place 2no carousel bodies over the bracket onto post secure both halves together via 4 no m8 x 40 bolts carousel should revolve on post freely at this point.
3. Fit 2no polycarbonate covers onto carousel & secure on place via brackets & anti tamper screws

(E) CARE

Occasional cleaning of the product may be required. A damp soft cloth will suffice to clean. Care must be taken to not over tighten the anti-tamper screws, as this may cause the threads to shear. Training will be supplied to personal involved.

(F) MAINTINANCE

The "Larkin "carousel is virtually maintenance free.

If the polycarbonate cover is heavily scratched due to vandalism the cover can be replaced.

(G) REPAIRS

Polycarbonate covers may become damaged due to vandalism. Replacement is the only option as the covers cannot be repaired.

If the main body of the carousel is damaged one or both sides may need to be replaced, as repairs on the product are not possible. All component items are available from Larkin Eng should they be required, all spares held in stock for immediate despatch.

(H) TESTING

The "Larkin" carousel has been in operation for the past 7 years in Dublin City by Dublin Bus & regionally by Bus Eireann.

Only one product needed to be replaced due to fire damage, in that time period, the remaining units remain fully operational and functioning as required and in daily use.

(I) TRAINING

Larkin Engineering will provide an installation & maintenance video to personal involved. Further training may be supplied by Larkin personal upon request. If preferred, Larkin Engineering will go to office and provide a once off demonstration to personnel on assembly. Larkins will also commit to liase with the clients sub-contractors at all times.

(J) SAFETY

Safety is of paramount importance to the management of Larkin Engineering, both for its personnel and the end user of its products.

Larkin Engineering personnel are fully trained in all aspects of the health and safety both in workshop and on site.

Product safety also receives intensive scrutiny.

The "Larkin Carousel" is designed with the safety of the general public in mind.

The product has rounded edges where possible to avoid injury due to abnormal contact.

The revolving element of the product is also a major safety design. The product has been used by the public for the last 7 years to date without any incident.

(K) STORAGE

The product may be stored indoor or outdoor. The carousel body is scratch resistant and may be stored in bins or on pallets.

The polycarbonate covers will be supplied with packing dividers to avoid scratches or chaffing during transport. When storing the dividers all packing must be kept in place. All brackets and bolts will be supplied in cardboard boxes and indoor storage is advisable.

(L) DISPOSAL

- All components in the Larkin Carousel are fully recyclable
- End of life products may be returned to Larkin Engineering for disposal.
- Alternatively it may be recycled by any registered recycling company.