HIGH MASTS

High Mast Lighting Columns
up to 55 metres.

CU
LIGHTING

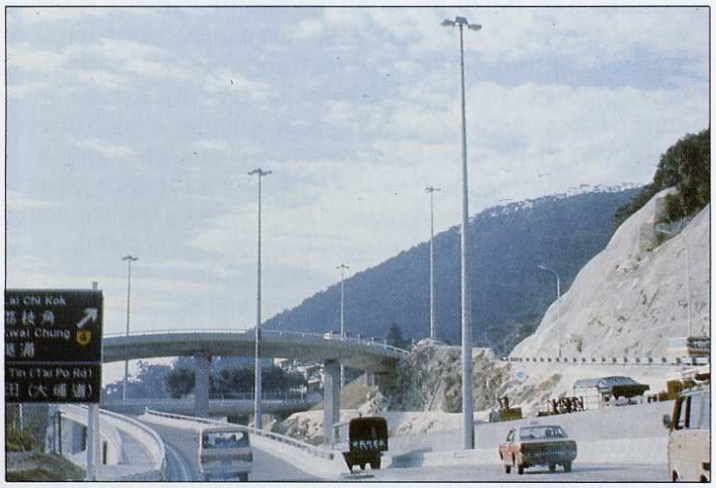
HIGH MAST LIGHTING

CU Phosco LIGHTING


7
9
A
British airways
G-BOAC

Manchester, U.K.

Lilongwe Airport, Malawi



Hong Kong Road Lighting

Toll Area, Humber Bridge, U.K.

We export throughout the world. Below are some countries who are already users of our High Mast Lighting.

Australia
Brunei
Burma
Canada
China
Eire
Egypt
France
Gibraltar
Hong Kong
India
Indonesia
Iran
Iraq
Jamaica
Kuwait
Libya
Macau
Malawi
Malaysia
Oman
Netherlands
Nigeria
N. Yemen
Philippines
Portugal
Qatar
Sabah
Sarawak
Saudi Arabia
Seychelles
Singapore
S. Yemen
Sri Lanka
Tanzania
Thailand
United Arab Emirates –
Abu Dhabi
Dubai
Sharjah
Ras Al Khaimah
Venezuela
W. Germany
Zambia

Cover: Dubai Airport, U.A.E.

Left: Tullamarine Airport Melbourne Australia

High Mast Specification

High mast Lighting is the most space efficient method of lighting large areas.

CU/Phosco – pioneers in the field – with innovation and thrusting development have held their position as the leading high mast lighting company, building on their expertise in worldwide markets.

The mechanical design services of CU and the lighting design of Phosco's B.S.I. Laboratory – both C.A.D. based – are freely used by many Lighting Consultants, Architects and National and Local Government Authorities globally.

Girding the earth, CU + Phosco high masts light stadia to docks, from the equator to the Poles.

Proven performance, reliability and service are assured with CU/Phosco.

Mast Structure

CU masts are continuously tapered of polygonal cross section (Duo-Decagon) presenting good visual appearance acceptable to the Design Council.

Dynamic Loading

Designed to ILE Technical Report 7 on the maximum wind speed (3 second gust) likely to be exceeded only once in 50 years, measured at a height of 10 metres above level ground.

Wind excited oscillation is damped by the method of construction and adequate allowance made for the related stress.

If required, full design calculations for the mast will be provided.

Mast Construction

All steel used in the construction of the masts complies with BS 4360 of appropriate grade.

Welding is in accordance with BS 5135.

The masts are constructed from mild steel plates cut and folded to form a polygonal section, telescopic jointed and fillet welded with the exception of site joints.

Each mast section delivered to site over 6m in length includes at least one telescopic and welded joint which provides diaphragm stiffness to maintain the structural section during delivery and in service.

A door is provided in the base of the mast to permit clear access to equipment. The door is weather and vandal resistant with a heavy duty lock.

The base flange welded connection to the mast fully develops the strength of the section. In addition, supplementary gussets are provided between bolt holes.

The mast is delivered to site in sections and joined with stressing equipment, thus forming a sleeve joint – no site welding or bolted joints being necessary or desirable.

Foundations

Guaranteed performance high tensile holding down bolts are supplied complete with anchor plate for casting into the foundation. A precision made steel template with tubed holes to ensure correct vertical and horizontal bolt alignment is also provided.

Metal Protection

The entire mast is hot dip galvanised after fabrication, internally and externally, in accordance with BS 729.

Mechanical Arrangements

For installation and maintenance purposes it is usual to raise or lower the lantern carriage using a winch in the base of the mast. The steel wire rope supporting the lantern carriage is in tension at all times and does not depend on latches for security.

Top Pulley Assembly

The pulleys are of large diameter, appropriate to the multicore flexible cable being used. They are of non-corrodible material and run on self-lubricating bearings with stainless steel spindles. Arrangements are provided to ensure that the electric cables and steel wire ropes are separated before passing over their respective pulleys to prevent ropes and cables leaving the pulley grooves.

The pulleys are housed in a chassis integral with a sleeve which slips over the top of the mast and is secured axially and in azimuth. Guides and stops are provided for docking the lantern carriage. For two-point suspension carriages an anchor point is securely welded to the assembly to receive the safety maintenance equipment where relevant. The complete chassis assembly is hot dip galvanised after fabrication.

The pulley assembly is protected by a weatherproof cover.

Winches

Winches are completely self-sustaining without the need for brakes, springs or clutches which require adjustment or which can be affected by moisture or lubricant. The gear ratio is 53:1. The winches are self-lubricating by means of an oil bath and lubricant recommended by the supplier shall be used.

Termination of the winch ropes does not involve distortion or twisting of the rope structure. At least four turns of rope shall remain on the drum when the lantern carriage is fully lowered and in the case of multi-drum winches each rope is direct from lantern carriage to winch and does not include any intermediate connection. The winch is designed to be installed or removed through the door opening. Winch drums are grooved to ensure a tidy rope lay and are fitted with a device to ensure smooth return of the rope for each layer. A test certificate is supplied with each winch. The capacity, operating speed and recommended lubricant is clearly marked on each winch with an indelible label. The winch is capable of operation by hand or by means of a power tool. The driving spindle is positively locked when not in use by automatic means. Each winch is supplied with a fitted waterproof cover.

Steel Wire Ropes

Steel wire ropes are flexible 'marine grade' stainless steel of 7/19 construction. Thimbles and terminals are of compatible material. Eye bolts and bulldog grips are not used for adjustment of individual ropes on multi drum winches. Ropes with hemp on nylon cores are not used.

Winch Driving Tools

The power tool is a multi-speed reversible tool incorporating torque limiting device which can be readily adjusted and locked. A remote control switch is incorporated to allow the equipment to be operated from a distance of 5 metres.

Arrangements are provided to support the power tool accurately and securely during operating.

Handles are provided for manual operation of the winches and they also incorporate a torque limiting device which can be adjusted and locked.

Lantern Carriages

The standard lantern carriage is of durable steel tube designed to act as electric conduit, with cable holes fully protected by grommets. It is fitted with junction box mounting plate(s). It is in two halves joined by bolted flanges to permit removal from the erected mast.

Lantern fixing arms and plates are welded. The carriage incorporates buffer arrangements to prevent damage to the mast finish and does not require rollers or other moving parts.

Cable and Cable Connections

Multi core flexible round sheath power cables are provided terminating in the base compartment of the mast fitted with metal cased plugs and sockets and a guard ring. At the mast head cables are connected to a weatherproof junction box on the lantern ring equipped with suitable nylon glands. The equipment is suitably rated for the required duty. Steel wire ropes and power cables are factory cut and pre-rigged for ease of installation.

Extension Lead

An extension lead or leads of multicore cable equal to that within the mast and fitted with a plug and socket is provided to enable the lanterns to be tested when in the lowered position, using the base compartment socket supply.

Earthing Terminal

A 12 mm diameter stainless steel stud is attached to the mast structure at a convenient point within the base compartment to provide a lightning and cable earthing point.

Maintenance Cage – See Page 8

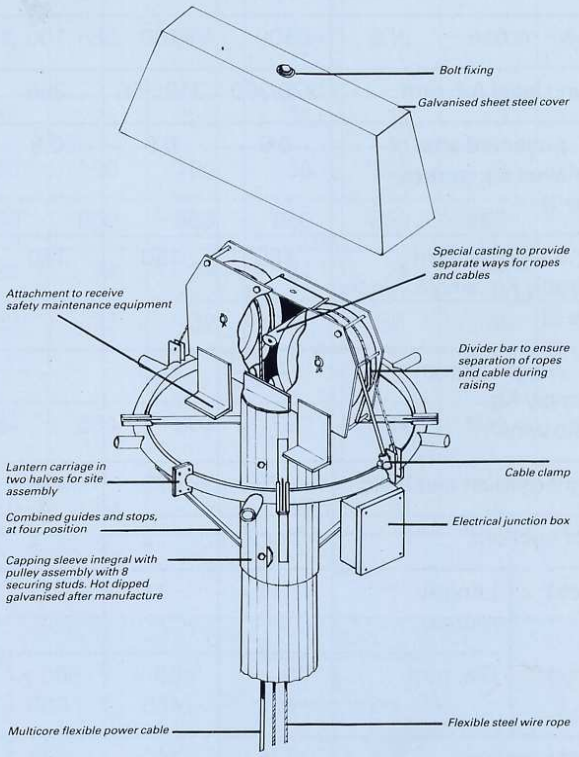
In the UK CU Lighting offer a complete service including demolition and disposal of obsolete towers; design, manufacture and erection of masts and structures; the provision of appropriate lighting, planned and manufactured by our associated company – Phosco Ltd. Lighting systems from other leading floodlighting manufacturers can be incorporated if specified.

CU Phosco lighting products are installed in Stadia, Airports, Dock Complexes, Motorways and City Centres throughout the world.

On overseas projects a supervising engineer can be provided to work with the installation contractor.

Once installed CU Services Division can contract to provide electrical and mechanical maintenance on a regular basis, using experience crews for whom working at heights in excess of 30 metres is routine.

Mast Head Assembly



Base Compartment

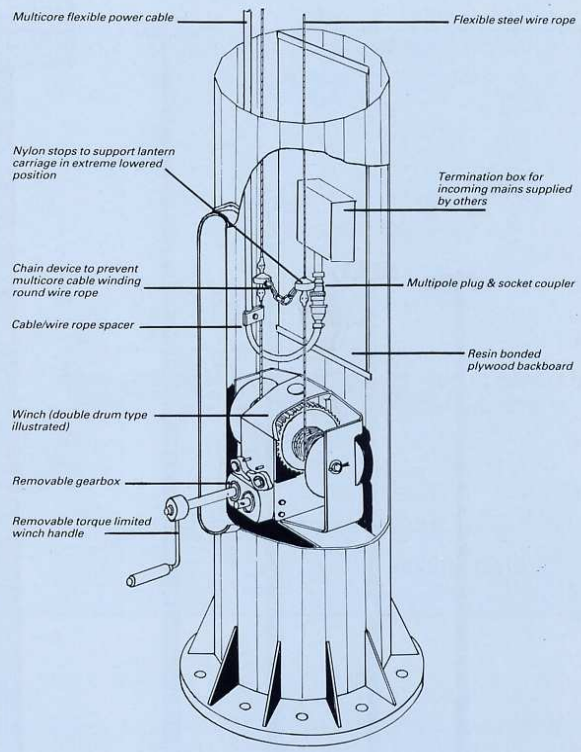
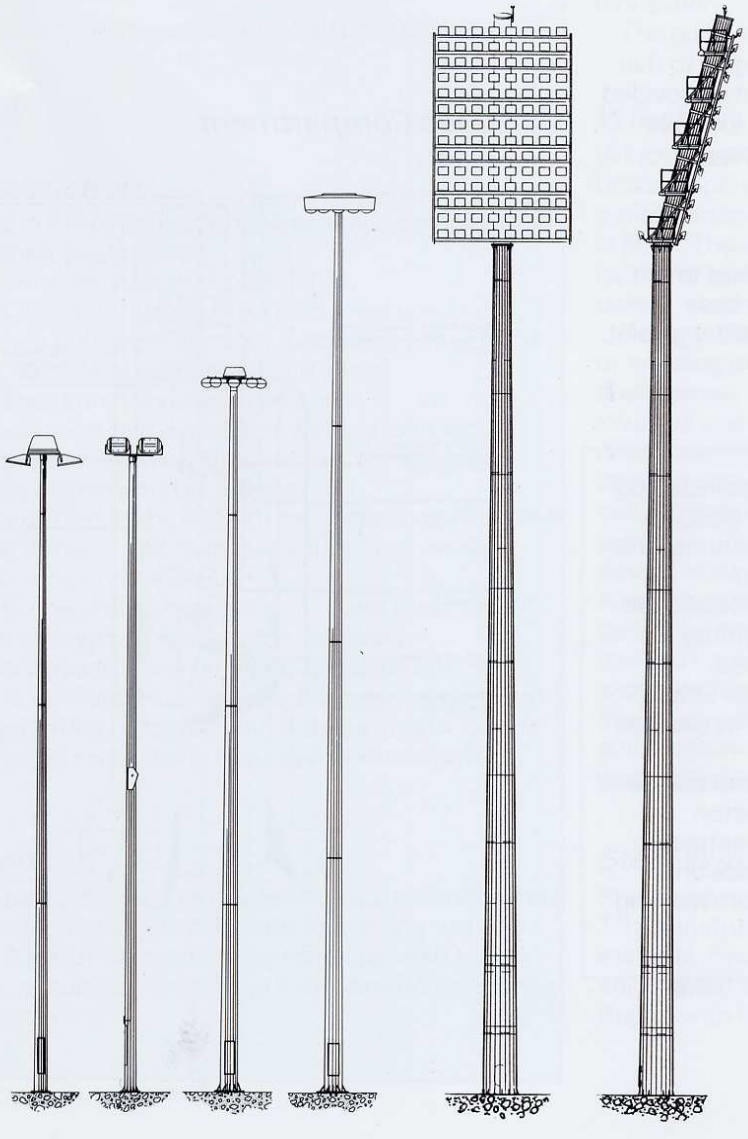


Table 1. *Range of Standard Masts (see Note 3)*

Type		*14 Duo-Decagon*			*17 Duo-Decagon*			*24 Duo-Decagon*				
Height metres		8/14	15/18	20	20	25	30	18	25	30	35	40
Top A/F mm		100	100	100	150	150	150	150	150	150	150	150
Ground level A/F mm		270/300	312/356	386	440	440	440	450	520	610	680	750
Max. projected area of luminaires sq. metres (Note 1)		0.8	0.8	0.8	2.1	0.9	0.9	2.9	2.7	2.8	2.6	2.7
Max. weight lantern assembly Kg. single winch (Note 2)		150	150	150	350	350	350	350	350	350	350	350
Max. weight lantern assembly Kg. double winch		—	—	—	750	750	750	750	750	750	750	750
Weight of mast and head		276	375	430	750	886	1200	710	1080	1600	2080	2750
No. of sections		1 or 2	2	2	2	3	3	2	3	3	4	4
Largest Section	Length metres	11	11	11	11	11	11	11	11	11	11	11
	Dia. mm	400 × 400	450 × 450	500 × 500	686	686	686	686	762	838	940	990
Largest section weight Kg.		178 (14)	249 (18)	273	483	501	627	479	584	847	968	1168



A *B* *C* *D* *E* *E*

NOTES

(1) This area is related to lantern shape, aspect ratio or array and shielding factor. We can advise an appropriate area for a known type, number and disposition of lanterns. The area shown in the table relates to gust speed of 100 m.p.h. (45 m/s).

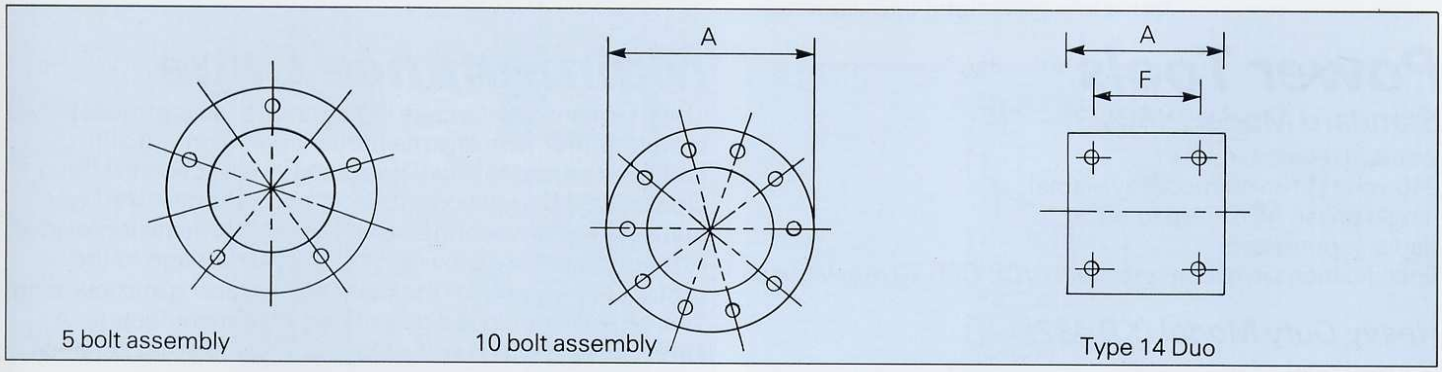
(2) The weight of lantern carriages shown relates to the capacity of standard winches operating at recommended speeds, using 6 mm stainless steel wire ropes.

(3) Special masts for other windspeeds or to provide limited deflection, larger or heavier lantern arrays or greater mounting heights can be designed and supplied.

A 18m Type 14
B 18m Centre Hinge
C 20m Type 17
D 25m Type 24
E 40m Stadia

Table 2. *Base and Foundation Dimensions*

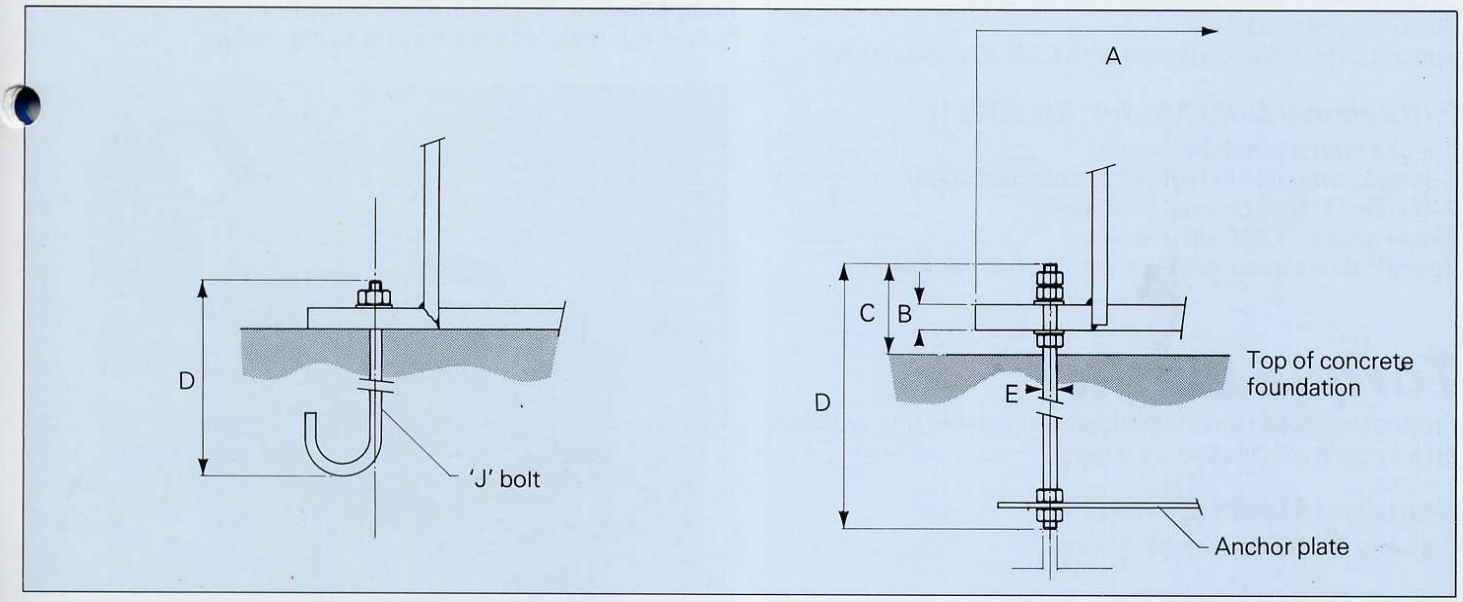
Type	*14 Duo-Decagon*			*17 Duo-Decagon*			*24 Duo-Decagon*				
Height metres	8/14	15/18	20	20	25	30	18	25	30	35	40
Baseplate dia. Dim. A mm	400 sq	450 sq	500 sq	686	686	686	686	762	838	940	990
Dim. B mm	20/25	25	25	25	25	25	25	25	25	40	40
Dim. C mm	150	150	150	150	150	150	150	150	150	170	170
Dim. D mm	500	850	850	850	850	850	850	850	850	850	850
Dia. E mm	24	24	24	24	24	24	24	24	24	27	27
Hole dia. mm	30	30	30	32	32	32	32	32	32	35	35
Dim. F mm	300	350	400								
Stud P.C.D. mm	300 CRS	350 CRS	400 CRS	584	584	584	584	660	737	838	890
No. studs	4	4	4	5	10	10	5	10	10	10	10



5 bolt assembly

10 bolt assembly

Type 14 Duo



Power Tool and Torque Limiter

Maintenance Cage

Power Tools

Standard Model (KR 223)

2-speed reversible.
240 volts (115 volt model available).
Single phase AC/DC up to 60 Hz.
Radio suppressed.
Specifications in accordance with VDE CEE 20 regulations.

Heavy Duty Model (KR 432)

4-speed reversible.
240 volts (115 volt model available).
Single phase AC/DC up to 60 Hz.
Radio suppressed.
Specifications in accordance with CEE 20 regulations.

Extra Heavy Duty Model (KR 550)

(for use with triple drum winch).
5-speed reversible (2 highest speeds not used).
240 volts (115 volt model available).
Single phase AC/DC up to 60Hz.
Specifications in accordance with CEE 20 regulations.

Torque Limiter

Proprietary, precision made, finely adjustable unit working on a system of balls and springs.

Standard Model (204/AC/1)

Capacity to 400 Kg with 53:1 winch.

Heavy Duty (204/AC/2)

Capacity to suit heavier loads up to 1250 Kg.

Extra Heavy Duty (204/AF/2)

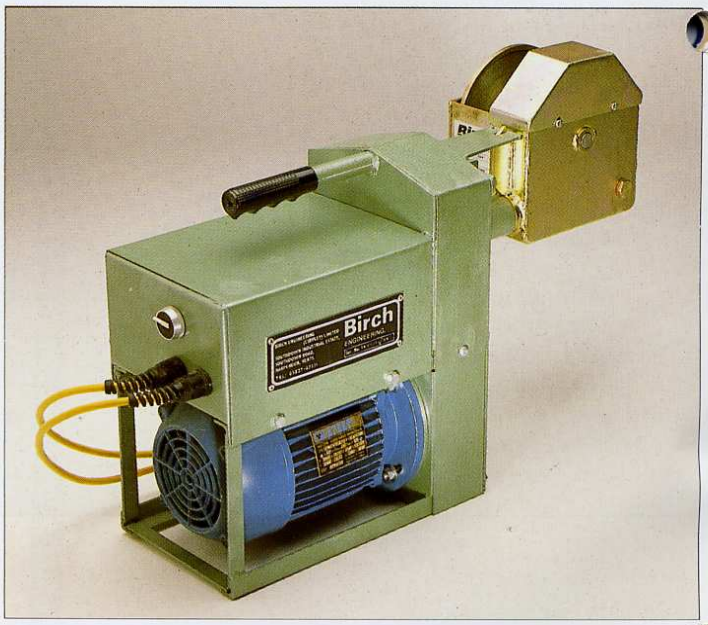
For use with KR 550 Power tool.
Capacity to suit loads up to 1500 Kg.

Remote Control Switch

For operating either power tool. Very robust, moulded rubber case. Requires constant switch pressure for operation.

Maintenance Cage

The CU maintenance cage is designed to accommodate two men together with any maintenance equipment and complies where relevant with the Constructional (Lifting Operations) Regulations 1961. A permanently fixed label states the safe working load and a test certificate is provided. Arrangements are provided to prevent damage to the protective systems of the mast during raising and lowering. The cage is hot dipped galvanised after manufacture. A safety device which will support the loaded maintenance cage in the event of a failure of the hoist ropes or any part of the hoisting gear can be incorporated if required. The suspension ropes have a safety factor of not less than ten when the maintenance cage is being used.



Type 14 Winch

Fully self-sustaining. Gear ratio 50:1. Grooved drum to suit 4 mm stainless steel wire ropes. Max. load 150 Kg. Self lubricating with oil bath. Suitable for manual or power tool operation. "Illustrated with portable electric drive."

ingle Drum Winch

SINGLE DRUM WINCH

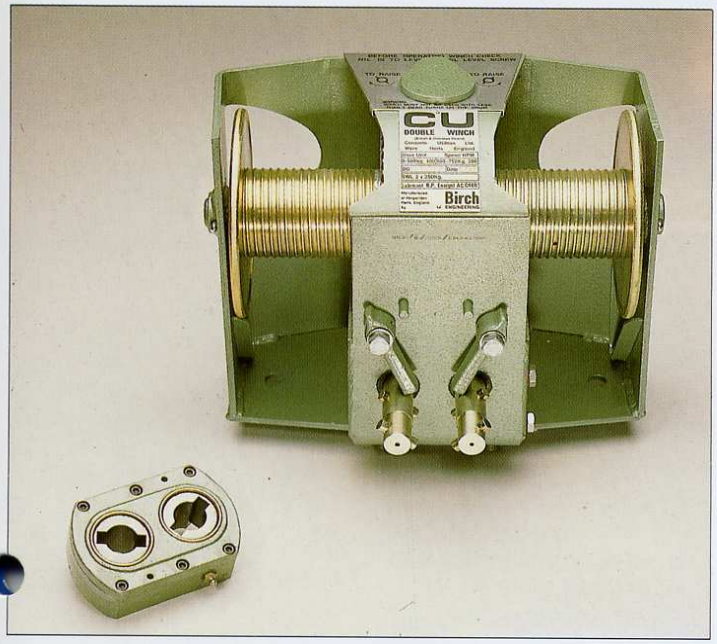
Fully self sustaining. Gear ratio 53:1. Grooved drum. Tested and certified. Accessible rope drum fixing. Power or hand operated. Torque limiting handle. Specially designed to be dismantled for assembly in masts through limited door openings. Self lubricating.

DOUBLE DRUM WINCH

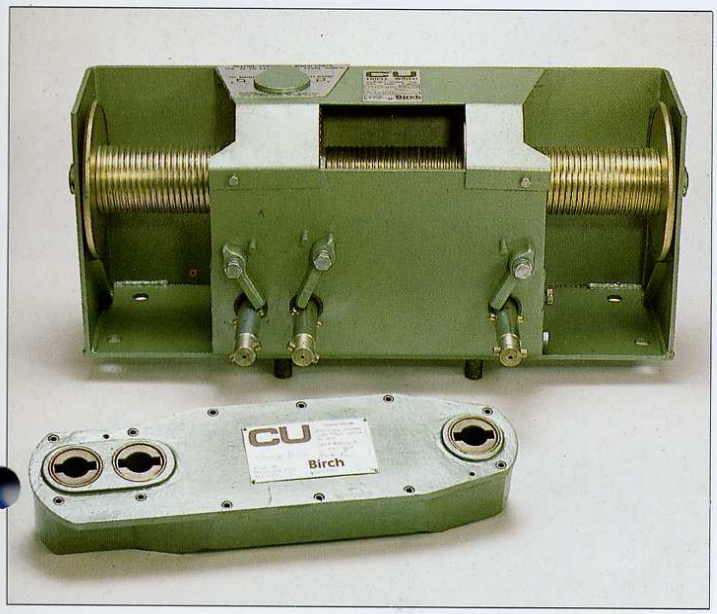
Fully self sustaining. Gear ratio 53:1. Grooved drums. Two separate ropes. Tested and certified. Accessible rope drum fixing. Power or hand operated. Torque limiting handle. Drive through removable linking gearbox and individual drum adjustment with gearbox removed. Designed to be dismantled for assembly in mast through limited door openings. Self lubricating. Patented.

TRIPLE DRUM WINCH

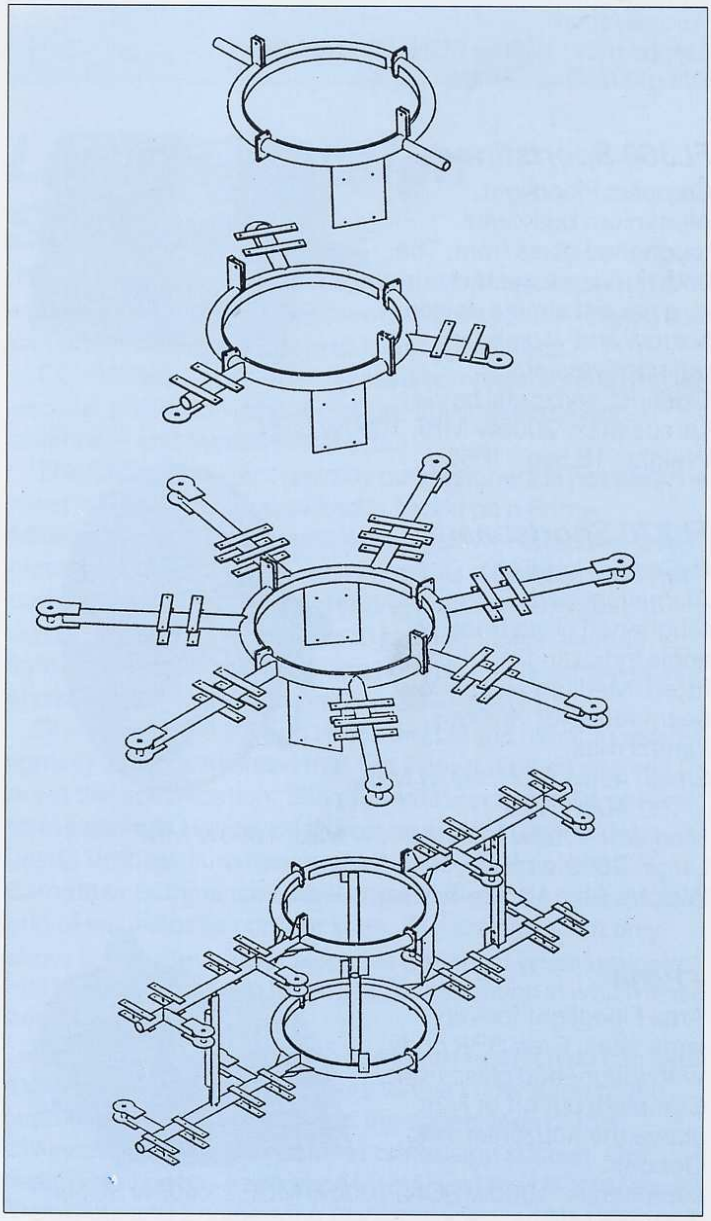
Fully self sustaining. Gear ratio 53:1. Grooved drums. Three separate ropes. Tested and certified. Accessible rope drum fixing. Power operated. Torque limiting handle for adjustment. Drive through removable linking gearbox and individual drum adjustment with gearbox removed. Specially designed to be dismantled for assembly in mast through limited door openings. Self lubricating. Patented.



Double Drum Winch



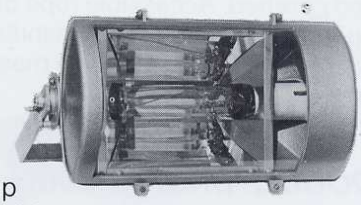
Triple Drum Winch



Typical Lantern Carriages

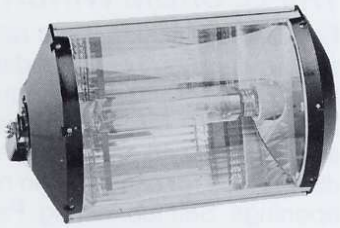
FLOODLIGHTS

FL300



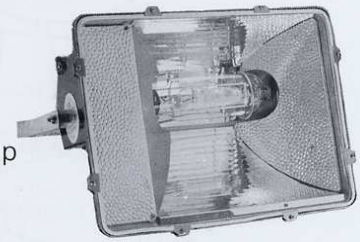
Compact Floodlight. Design Council Award Winner. Cast aluminium body with toughened glass front. The body is fixed to a steel stirrup by a pre-set aiming device. Wide, medium and narrow beam reflector versions. Options: horizontal baffle, vertical louvre, wire guard, instant restrike lamp, IP65, Zone 2 .
Lamps max: 400w SON, 400w MBI, 35w SOX, 1000w Tungsten Halogen.
Weight: 6.4kg IP 54.

FL310



Compact Floodlight. Aluminium body with toughened glass front. The body is fixed to a steel stirrup by a pre-set aiming device. Narrow and medium beam reflector versions. Options: horizontal baffle, vertical louvre.
Lamps max: 1000w SON, 1000w MBI.
Weight 8.75kg IP 54

FL360 Sportsflood

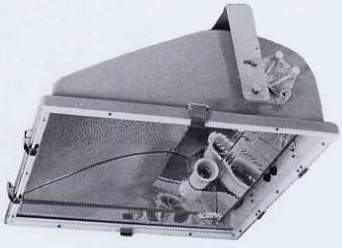


Compact Floodlight. Aluminium body with toughened glass front. The body is fixed to a steel stirrup by a pre-set aiming device. Narrow and wide beam reflector versions. Options: horizontal baffle.
Lamps max: 2000w MBI, 1000w SON.
Weight: 18.5kg IP55

FL370 Sportsbeam

Projector Floodlight. Aluminium body with toughened glass front, an angle indicating quadrant is fitted. Medium and narrow beam reflector versions.
Lamps max:
Small: 400w SON, 400w MBI, 400w MBF
Medium: 1000w SON, 1000w MBI, 1000w MBF
Large: 2000w MBI.
Weight: 9kg, 12.7kg & 15kg. IP54

FL404



Area Floodlight for very large sites. Grey GRP body with toughened glass front. Complete cut off of light above the horizontal axis. Options:
Lamps max: 1000w SON, 1000w MBI, 2×400w SON, 2×400w MBI.
Weight: 21.8kg IP54

LUMINAIRES

P213 Canopy System

High mast lighting systems to incorporate a variety of luminaires in a single unit. Up to 10 no. high mast luminaires (P220/2) can be contained within a single well designed GRP canopy. The standard colour is white but other colours can be produced.

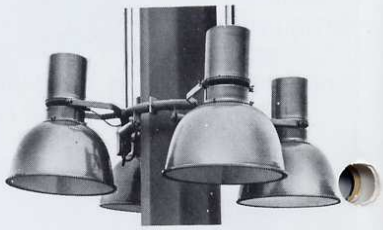
P220/4

High mast luminaire with integral control gear and variable optics to enable the designer to aim the light beams where required whilst maintaining a good daylight appearance. The light is aimed by adjusting the lamp and reflector unit within the fitting to achieve the optimum performance on the ground.
Lamp max: 400w SON/T, 400w MBI/T.
Weight: 7.5kg IP54 BS4533

P370 Drum

High mast luminaire, with integral control gear. Design Council approved. Variable beam optics. As P220/4 above. Polycarbonate vandal resistant bowl.
Lamps Max: 400w, SON/T, 400w MBI/T.
Weight: 8.2kg IP54 BS4533

P212



High mast luminaire. Aluminium body with toughened glass bowl, with integral control gear. Can be tilted through 20°.
Lamp Max: 1000w MBF, 1000w SON, 1000w MBI.
Weight: 17kg IP23 BS4533

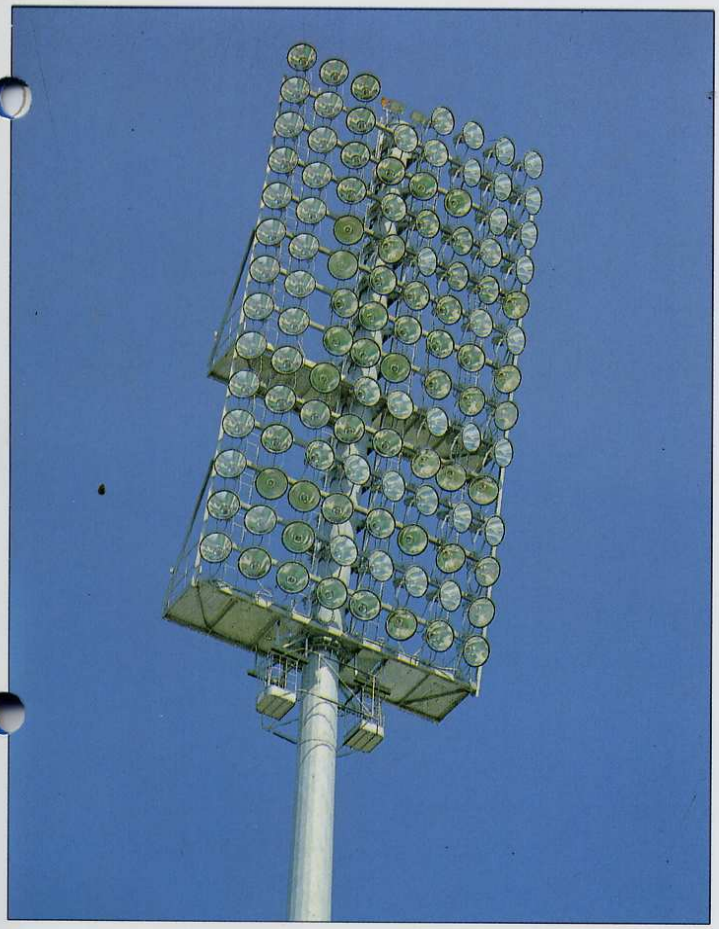
P380

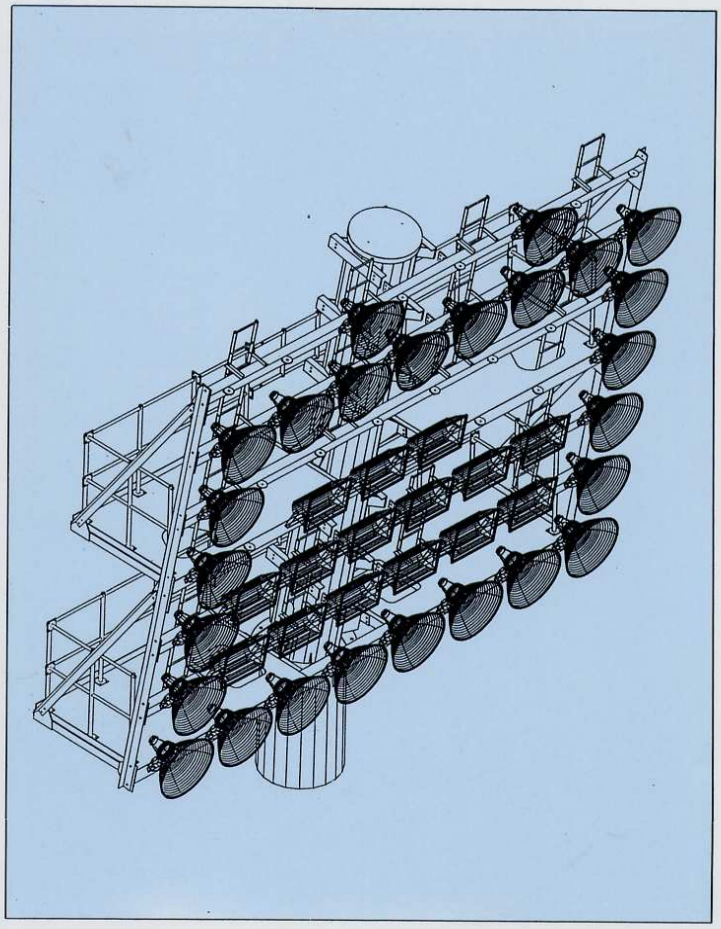
Large high mast luminaire with variable optics for lighting very large areas or very high lighting levels. The variable beam system is similar to that on the P220/4 and enables a downward light output ratio of 85% to be achieved.
Lamp Max: 1000w SON/T, 1000w MBI.
Weight: 11kg IP54 BS4533

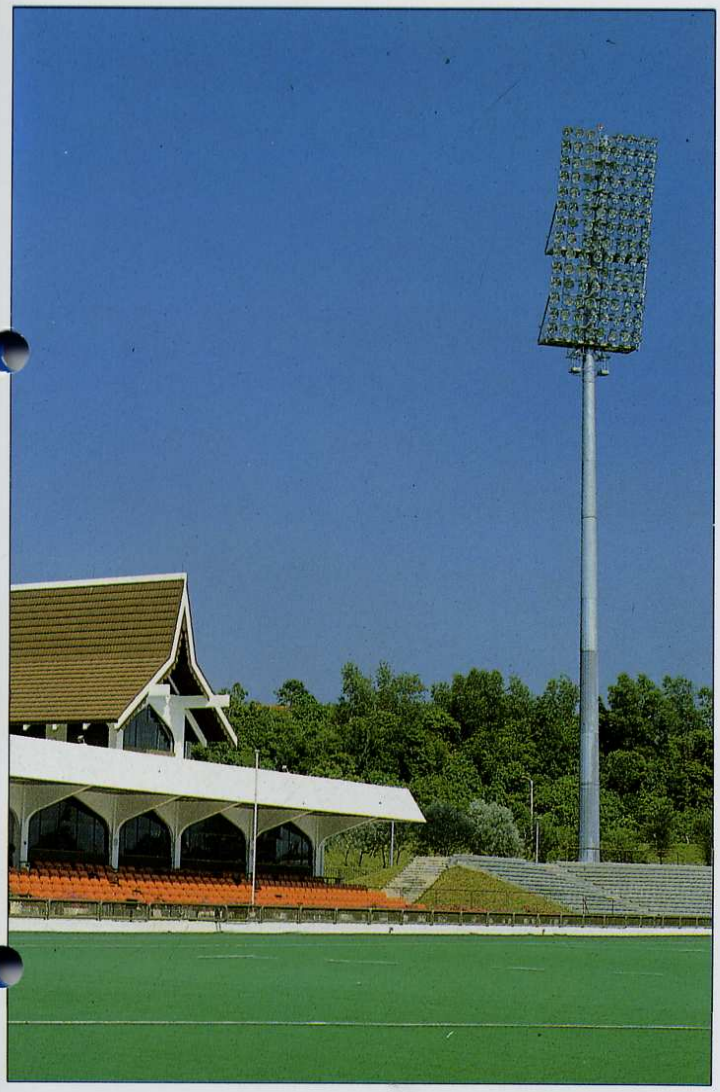
Control Gear

Weatherproof Metal Boxes are available to accommodate the control gear required to be used for all these fittings.

WB 520 – 250/400W
WB 530 – 1000W
WB 550 – 2000W







Tun Razak Stadium

Lighting Design Service

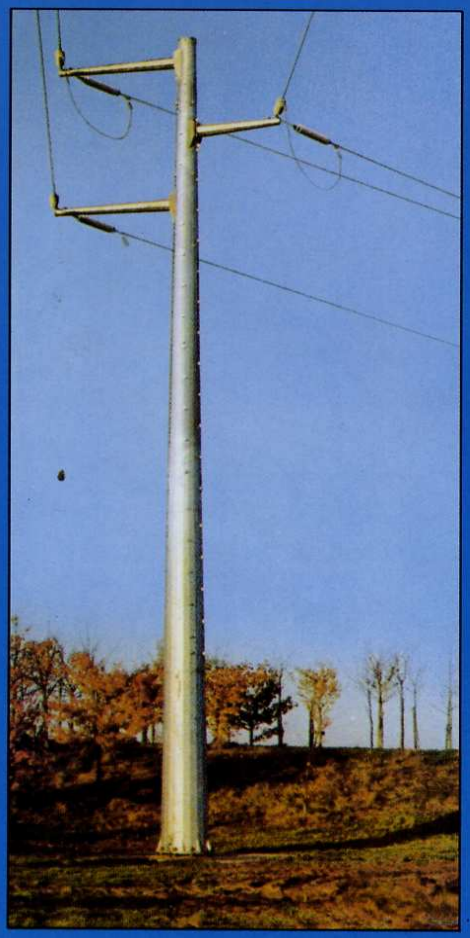
The preparation of exterior lighting schemes without the necessary computer equipment is a time consuming job that can only be done by a trained lighting engineer.

CU PHOSCO offer their clients a complete lighting design service, provided without charge, utilising experienced engineers and modern methods.

The CAD equipment used by our designers is possibly the most advanced in Europe and is based on a Prime Minicomputer which drives 4 graphics workstations, 2 AO plotters and an AO digitiser. Using this hardware together with 2D and 3D drafting software, and our own lighting design software we are able to provide highly finished lighting schemes. The average lighting levels achieved as shown on our presentations are GUARANTEED.

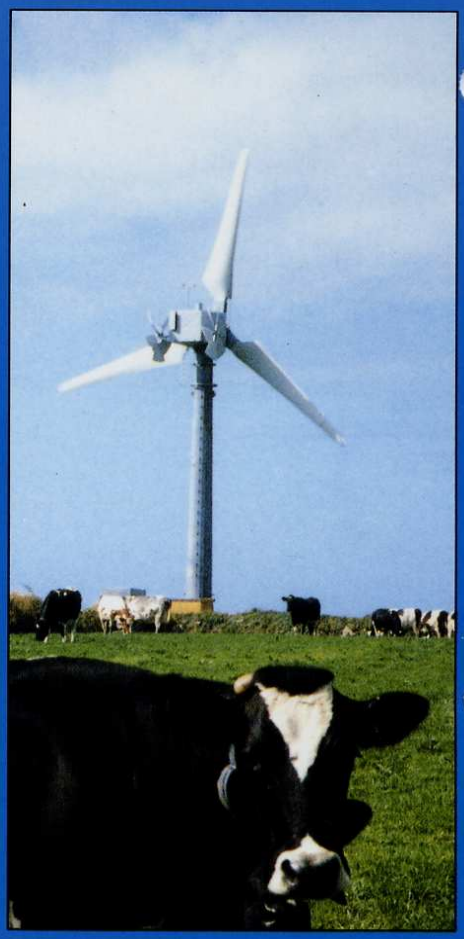
GUARANTEED lighting levels enable the client to use a lighting scheme assured that the illumination on site will meet the specification. The presentation may take several forms such as Horizontal Illuminance (most commonly used), Vertical Illuminance, Illuminance Normal to a T.V. Camera or Luminance. This can be shown on a site plan as a grid of values or as contour lines. Our schemes not only show lighting levels but also give details of what luminaire has been used at what height and the direction in which it has been aimed.

Lighting is an art which no computer or machine can ever master. Experienced designers with a knowledge of the customer's requirements and the capabilities of the luminaires are the backbone of our design section. Our design service has been used by many of the UK's foremost Architects and Engineering Consultancies, and by National and Local Government Departments throughout the World.



Transmission Masts

Aerial Masts



Wind Turbines

CU Group of Companies:

CU Lighting Ltd
Phosco Ltd
CU Bridges Ltd
CU Pontoons Ltd
CU Power Towers Ltd

New Headquarters of CU Ware PLC

Factory Locations:

Ware Herts
Corby Northants
Cleckheaton Yorkshire
Kirkby Lancashire
Coleford Gloucestershire

CU Phosco Lighting

CU Phosco Lighting
Charles House Great Amwell Ware Hertfordshire SG12 9TA
Telephone (0920) 462272 Telex 81398 Facsimile (0920) 461370
International Telephone (44) 920 462272