LAMPES OBSTA

système Obsta

Pour signaler les obstacles à la navigation aérienne (bâtiments, cheminées, poteaux, grues etc...) la Société CLAUDE met à la disposition des installateurs une gamme complète de lampes OBSTA, lampes à décharge dans le néon, émettant directement de la lumière rouge «aviation». Cette production de lumière rouge par décharge offre deux avantages essentiels pour cette application :

1/ Une efficacité lumineuse de l'ordre de 7 lumens rouges par watt contre 4 lumens rouges par watt pour les lampes à incandescence classiques équipées d'une verrine rouge.

2/ Une durée de vie moyenne supérieure à 25.000 heures en fonctionnement continu contre 1.000 à 2.000 h. pour les lampes à incandescence, d'où une diminution considérable des coûts de maintenance.

Pour faire face aux différentes utilisations, aux différentes situations géographiques, CLAUDE propose les 3 systèmes OBSTA suivants :

1/ Les OBSTA standard HI alimentés sur le secteur 115/230 volts 50 Hz (60 Hz sur demande).

2/ Les OBSTA secourus alimentés sur le secteur 230 volts 50 Hz (115 V et 60 Hz sur demande) avec batterie de secours pour suppléer aux défaillances temporaires du secteur.

3/ Les OBSTA autonomes avec alimentation par batteries solaires ou piles de longue durée à grande capacité.

description

Les éléments de base des systèmes OBSTA sont :

1/ La lampe à décharge dans le néon : elle est constituée d'une hélice en verre dur remplie sous une faible pression de néon et munie de deux électrodes froides de longue durée. L'ensemble est logé à l'intérieur d'une cloche de verre dur (borosilicate résistant aux intempéries, au choc thermique, ayant un bon comportement mécanique). Un grillage métallique fin constitue une protection contre les parasites radioélectriques.

Dans le cas d'utilisation alimentation secteur (non secouru), cette hélice comporte 13 spires. Dans tous les autres cas, 5 spires.

2/ Un socle en fonte d'aluminium de dimensions identiques pour tous les cas. Ce socle est muni de pattes de fixation pour une surface d'appui horizontale ou verticale, d'une boîte de raccordement avec presse-étoupes pour les branchements en parallèles et d'une cheminée dans laquelle vient se ficher la lampe. Deux crochets situés sur la cheminée maintiennent fermement la lampe même en cas de fortes rafales de vent.

Ce socle contient les éléments nécessaires pour faire fonctionner la lampe selon l'utilisation choisie.

Fonctionnement selon l'utilisation choisie

1/ Utilisation sur secteur non secouru (i.c. qu'en absence de courant fourni par le secteur, la lampe ne s'allume pas) ou sur secteur secouru.

Dans ces cas d'utilisation, la lampe fonctionne grâce à un transformateur haute tension à fuite magnétique placé dans le socle, et qui fournit la tension à vide nécessaire pour l'amorçage de la lampe et stabilise le courant pour un régime correct de décharge.

2/ Utilisation sur secteur impérativement secouru ou fonctionnement autonome, la lampe devant rester allumée.

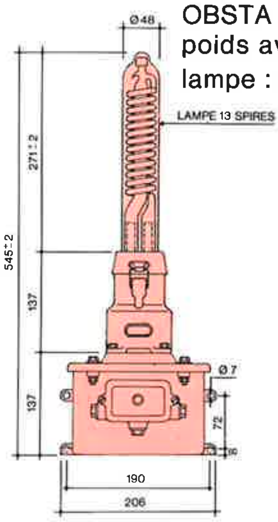
Dans ce cas, c'est un convertisseur courant continu 48 volts / 20 K Hz qui est placé dans le socle et alimente la lampe.

Nos lampes sont conformes aux normes de l'O.A.C.I.
Annexe 14 à la convention relative à l'Aviation Civile Internationale.

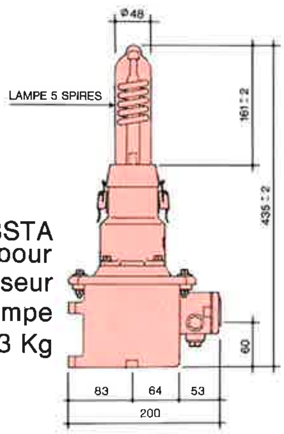
Attention : Ne jamais mettre une lampe OBSTA HI (13 spires) sur un convertisseur sous risque de détruire par surcharge le convertisseur. Par contre la lampe 5 spires peut-être mise sur socle HI.

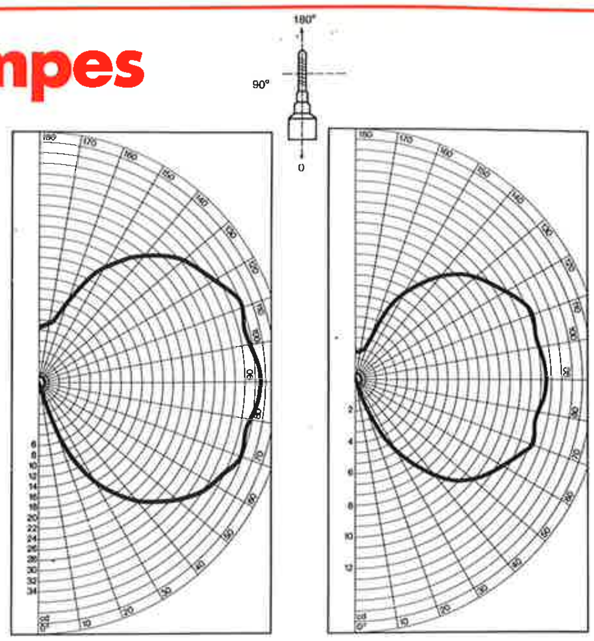
caractéristique des lampes

OBSTA HI
poids avec
lampe : 9 Kg



OBSTA
pour
convertisseur
avec lampe
poids : 3 Kg





OBSTA HI　　　　OBSTA

Tension d'alimentation	115 V	230 V	48 V
Fréquence :	50 Hz ou 60 Hz		continu
Courant absorbé :	1.75	0.87	0,26 A
VA absorbé :	207	195	
Puissance absorbée :	72,5	68	12,5 W

Possibilité de redressement du Cos φ avec un condensateur de 10 µF 250 volts branché en parallèle sur le secteur. Cependant, il n'est pas prévu de place pour le loger dans le socle.

les alimentations

OBSTA Standard HI : Le socle est alimenté directement par le secteur 115 / 230 volts 50 Hz (60 Hz sur demande)

OBSTA Secouru : Le socle, avec son convertisseur est alimenté par un ensemble comprenant un redresseur et une batterie tampon 48 volts. Cet ensemble a pour rôle de :

1/ fournir 48 volts continus au convertisseur quand le secteur est présent,

2/ basculer les batteries tampons sur le convertisseur quand le secteur est temporairement coupé,

3/ de recharger la batterie, quand le secteur est à nouveau présent, le redresseur fournissant alors du courant 48 volts continus au convertisseur.

Les batteries pour OBSTA Secourus sont des batteries au plomb gellifiées de préférence. Pour les batteries Cd-Ni. Nous consulter.

Les capacités des alimentations s'échelonnent de 5,5 AH à 120 AH pour alimenter de 2 à 42 convertisseurs.

Le choix des batteries dépend des situations géographiques des feux, de leur nombre, de l'autonomie désirée etc... Nous consulter.

OBSTA Autonome : La source d'énergie utilisable pour alimenter le convertisseur peut-être, suivant les calculs économiques propres à chaque installation,

soit des piles longue durée,
soit des piles solaires avec batteries de stockage à faible perte.

La capacité des batteries ainsi que le nombre de panneaux solaires dépendent de l'ensoleillement annuel ainsi que de sa répartition mensuelle.

Ces batteries sont d'une fabrication spéciale ayant la solidité mécanique nécessaire et autorisant une grande réserve d'électrolyte avec faible perte par autodécharge.

Un régulateur de tension évite toute surcharge susceptible de provoquer une évaporation du liquide en fin de charge. Toutes ces performances permettent à la station de fonctionner d'une manière parfaitement autonome avec un entretien annuel qui se réduit en général à la mise à niveau de l'électrolyte.

Dans tous les cas, les OBSTA peuvent être mis en marche manuellement ou allumés ou éteints par une cellule photoélectrique en option. Dans le cas de l'alimentation sur secteur secouru, il est prévu sur le boîtier d'alimentation des bornes de raccordement ainsi que les manettes de commande de cette cellule.

les sources

Les lampes OBSTA Standards ou 5 spires sont de couleur rouge. Cependant, pour des applications spéciales (navigation maritime, etc...) d'autres couleurs sont possibles (blanche, bleue, verte). Nous consulter.

Par ailleurs, il apparaît sur les courbes polaires de l'intensité lumineuse que les lampes 5 spires (pour les applications secourues ou autonomes) ne donnent au maximum que 12 cd. Ceci pour des raisons évidentes d'économie sur la capacité des batteries. A noter que les règlements de l'O.A.C.I. exige un minimum de 10 cd. Des lampes avec convertisseurs spéciaux sont également envisageables pour satisfaire les exigences supérieures. Tous les OBSTA sont susceptibles d'être commandés par un clignoteur alimentant 3 lampes à la fois. La cadence de battements est de 45 coups/mn (2/3 du temps allumé, 1/3 du temps éteint).

Réf. 2630 – JANVIER 1977

CLAUDE

Département **A**pplications **P**rofessionnelles

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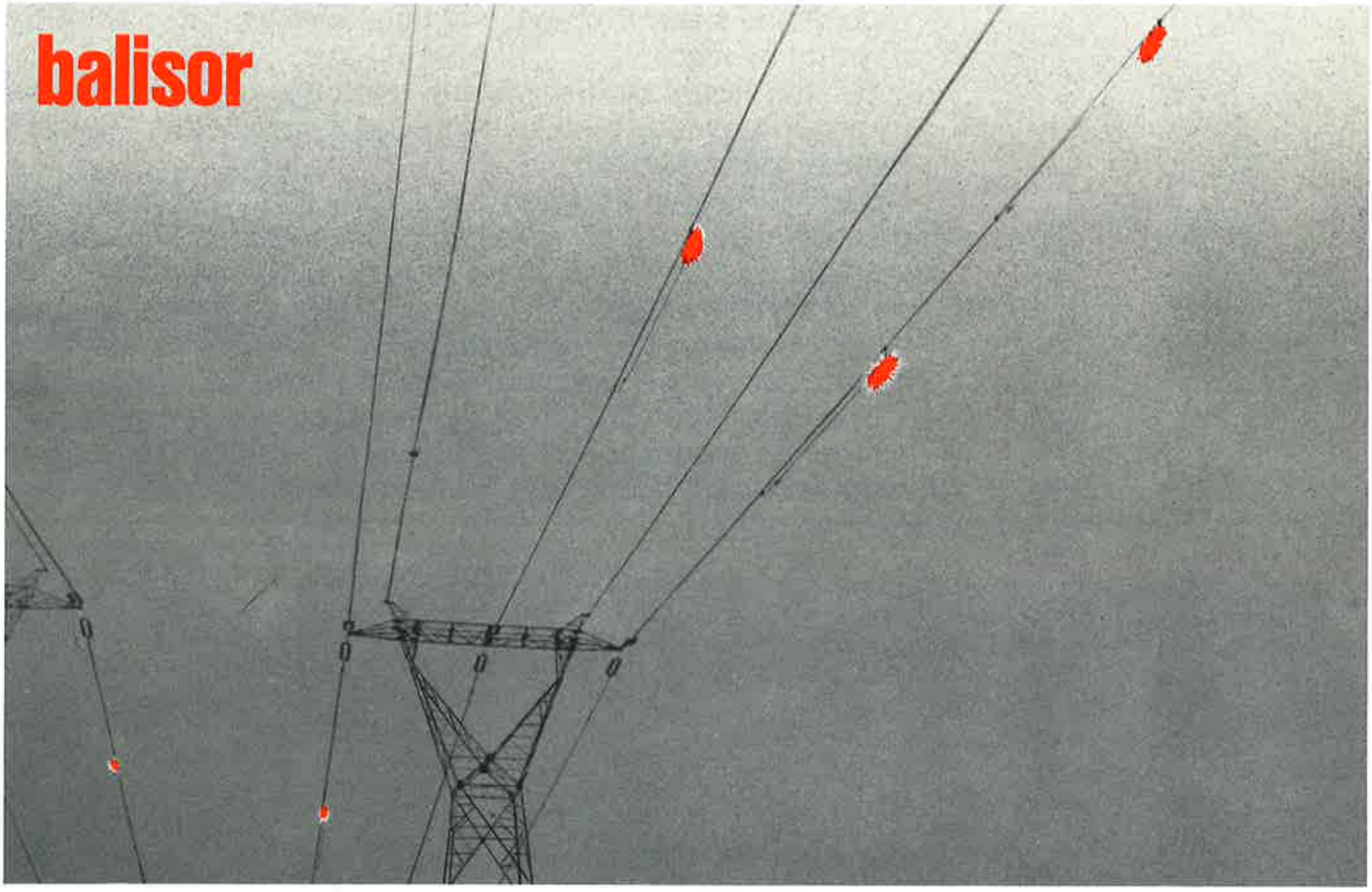
signalling of obstacles to aviation



balisor

The development of air traffic necessitates increased safety measures for aircraft, particularly in the vicinity of airports.

In view of this fact, many countries have adopted regulations laying down measures to be taken and, in particular, making it compulsory for any obstacles which might constitute a danger in such areas to be indicated by warning signals.

Sections of electric power lines which are subject to these regulations have to carry warning signals visible both by day and by night.

For the hours of daylight the lines are rendered visible by attaching metal balls to them, but the problem of lighting them at night remains.

The H.T. lines in question are usually distant from centres of population, so that there can be no question of using L.T. for lighting them, and there are considerable difficulties about transforming the H.T. current locally; a simple solution to the problem was discovered by CLAUDE as far back as 1937, using the "BALISOR" lighting device.

The "BALISOR-CLAUDE" device is merely a simple and economic means of taking the small amount of power required direct from the H.T. lines to be illuminated.

operating principle

A power line sets up around itself an electrostatic field. In the case of alternating current, if we place near it an insulated auxiliary line, there is a difference of potential between the main and auxiliary lines capable of supplying a judiciously selected source of light.

the source of light

The "BALISOR" lamp is designed to function at the high tensions of several thousands volts between the principal and auxiliary lines. It consists of a tube discharging into a neon atmosphere and has the following advantages:

- great flexibility as regards the supply voltage,
- negligible consumption owing to its high degree of luminous efficacity,
- can be worked into any shape required: the tube is in spiral form so as to increase the intensity of light emitted,
- it gives a red light (neon luminescence), which is the colour normally used as a sign of danger. Its long expectation of life, which is characteristic of neon tubes, renders it adaptable to the safety conditions governing the operation of power lines.

description of the balisor lamp

This consists of a neon tube 7 mm (about 0.27") in diameter, rolled into a spiral, fitted with two cold electrodes and mounted in a protective tube closed at each end by a metal plug.

The whole is housed in a cylindrical pyrex container, of 50 mm (about 2") external diameter, which is filled with a liquid absorbing both shocks and radio interferences.

The two plugs are sealed so as to render them impervious to the liquid, and each contains a resistance in series with the lamp to stabilize the discharge, and prevent high frequency radiations. The lamp is suspended from the principal and auxiliary lines by two flexible connectors, which absorb the shock of any vibrations in the lines themselves. Thus protected, the lamp has excellent properties of mechanical resistance.

auxiliary line

The difference of potential between the principal and auxiliary lines should be sufficient to start the lamp.

Moreover, for a given tension between the principal line and earth, there is a linear relation between the capacity of the auxiliary line and the strength of current passing through the light, and thus the brilliancy emitted.

Lastly, to attain a given degree of brilliancy, the length of auxiliary line required is in inverse proportion to the tension of the principal line.

The "CLAUDE" type of auxiliary line, the efficacity of which has been confirmed in numerous cases where it has been installed, consists of one or more tubular conductor elements of treated aluminium, each 4 meters (about 13 feet) long.

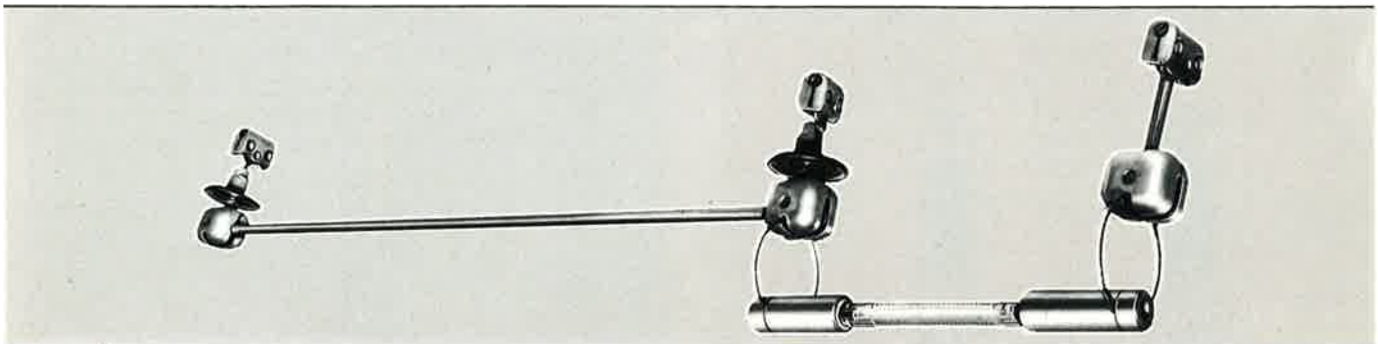
These elements are joined together and attached to collars clamped on the principal line by means of insulators.

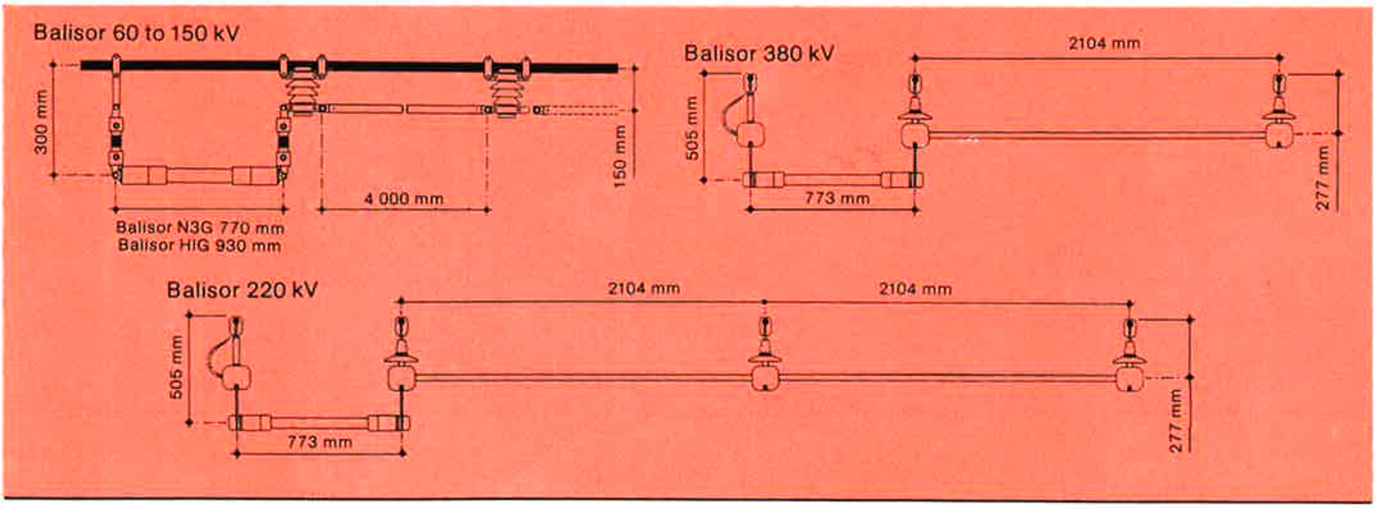
The following table shows the number of elements and accessories required for a minimum brilliance of 10 candle-power at the various line voltages generally used.

composition of balisor units for different voltages

description	number of parts according to tension (kV) 60	90	150	220	380	weight of part (kg)
BALISOR HIG or N3G LAMP.	1	1	1	–	–	3.100
END BRACKET	1	1	1	–	–	0.250
FLEXIBLE CONNECTOR	2	2	2	–	–	0.650
CAPACITANCE ELEMENT	7	4	2	–	–	1.100
INSULATOR WITH COLLARS	8	5	3	–	–	2.350
COLLAR LINERS	17	11	7	–	–	–
BALISOR 380 LAMP				1	1	4.100
BEARING SWINGLE BAR 380 KV				2	2	2.140
END SWINGLE BAR 380 KV				2	1	1.560
EQUIPED INSULATOR 380 KV				4	3	1.800
CAPACITANCE ELEMENT 380 KV				2	1	0.670
GRIPPING-JAWS (for brace Ø 32)				4	3	2.000
GASKET 380 KV				1	1	0.200

NB.: When placing an order, please indicate the diameter of the wire.





"BALISOR" references:

French civil and military airports:

- ORLY
- LE BOURGET
- ROISSY-EN-FRANCE
- MARSEILLE
- ...

All over the world:

- EUROPE
- EAST EUROPE
- AFRICA
- LATIN AMERICA

CLAUDE

obsta

Apart from power lines, the obstacles covered by aviation safety regulations include buildings of above what is considered a dangerous height, such as factory chimneys, pylons, water towers, etc., all of which have to be fitted with warning lights.

Such buildings are to be found in the vicinity of a low tension supply, to which the warning lights can easily be connected.

For this purpose, CLAUDE has devised a warning light based on the principle of discharge tubes. This is known as "OBSTA", and since it has a long life, maintenance is reduced to a minimum – an important consideration with devices which are not easily accessible.

The "OBSTA" consists of:

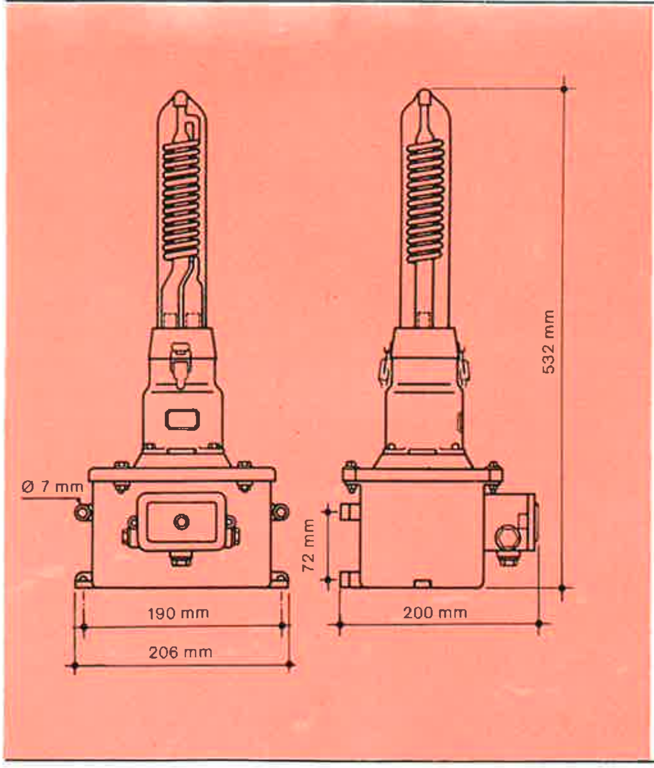
- a combined junction box and transformer housed in a watertight casing fitted to the pole or pylon. The junction box is threeway and incorporates a fuse. The secondary winding of the transformer provides the current for the special lamp, while the primary may be fed either with 110 or 220 volts.
- a red (neon), green, white or blue (fluorescence) lamp consisting of a discharge tube in spiral form contained in a glass protecting sleeve, and with a plug at one end for fixing the lamp to the junction box.

Red "OBSTA" lamps are fitted with a device acting as a Faraday cage to protect them against static discharges. The device is fitted inside the glass containing the spiral tube.

Consumption: 69 W.

Weight of complete unit: 6.75 kg (14 lb 12 oz).

For OBSTA Lamp delivering "flickering light", please consult us.



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CLAUDE

REF. 2901 - OCTOBRE 1974

the Obsta system CLAUDE

Contributing to safety in civil air traffic CLAUDE supplies a whole range of beacons for signalling obstacles in the flight path.
The main common feature of these beacons is a neon discharge lamp, giving out directly aviation red light. This red discharge light has two basic advantages namely :

1/ Luminous efficiency of about 7 red lumens per watt compared with 4 red lumens per watt for classic incandescent lamps equipped with red filter.

2/ Average life of more than 25.000 hours continuous operation as against 1.000 to 2.000 hours for incandescent lamps, hence a considerable decrease in maintenance cost.

In order to meet different utilisations in various geographical situations CLAUDE suggests the following 3 OBSTA systems :

1/ The Standard HI OBSTA powered by the mains 115/230 Volts 50 Hz (60 Hz upon request).

2/ OBSTA models with built-in reserve powered by the mains 115/230 Volts 50 Hz (115 V 60 Hz upon request) with a buffer battery to take over temporary mains failures.

3/ Autonomous OBSTA powered by Solar panels or long life, high capacity chemical batteries.

description

The basic elements of OBSTA systems are :

1/ A neon discharge lamp : it is composed of a heavy duty, hard glass helicoidal low pressure discharge tube equipped with two long life cold cathodes. All this is mounted within a hard glass outer sleeve (Borosilicate glass withstanding bad weather, thermal shocks and mechanical stress). A fine metal mesh guards against RF perturbations.

In the case of mains supply (without energy reserve) this tube is composed of 13 turns. In all other cases 5 turns.

2/ A base in aluminium cast of the same dimensions for every case. This base is fixed to horizontal or vertical supporting surfaces by means of anchor flanges.

There is a connecting box with watertight seal for parallel connexions of several units.

There is also a chimney-shaped lamp-holder. One screw on the side of the chimney maintains the lamp firmly in position even in case of strong gusts of wind.

This base houses the necessary elements to operate the lamp.

LAMP OPERATION.

1/ Utilisation on the mains, without power reserve (i.e. in case of mains failure the lamp does not light) or on the mains with auxiliary generator.

This transformer supplies the proper open voltage to ensure the striking of the discharge and stabilizes the current for a correct discharge value.

2/ Utilisation on mains, or operating autonomously, when the lamp must in no account stop lighting :

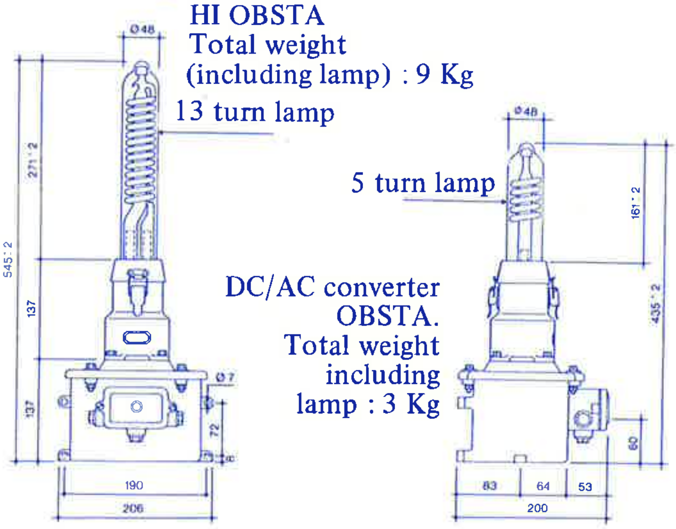
In this case a converter D.C. 48V/20 kHz is placed in the base and powers the lamp.

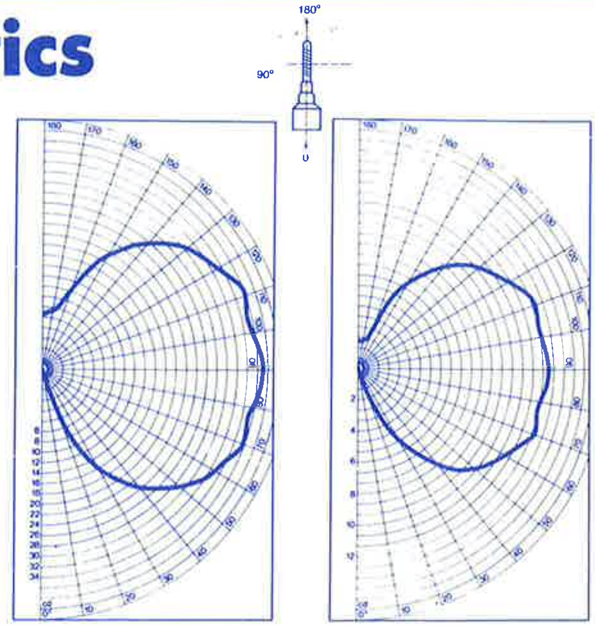
Our beacons fulfill the requirements & recommendations issued by the ICAO.

Annex 14 to the Convention relative to the International Civil Aviation.

Caution : Never overload the DC-AC converter by matching a high power consuming 13 turn HI lamp onto it.
On the contrary a 5 turn low power lamp may be perfectly matched to the standard HI transformer.

lamps characteristics





HI OBSTA OBSTA

Supply voltage	115 V	230 V	48 V
Frequency	50 Hz or 60 Hz DC		
Supply current	1.75	0.87	0.26 A
VA consumption	207	195	
Power consumption	72,5	68	12,5 W

The power factor can be improved by connecting a 250 V AC 10 μF capacitor in parallel with the transformer. However there is no room for it in the base.

power supplies

The Standard HI OBSTA : The transformer located in the base is directly powered by the mains. The standard voltages are 115/230 V 50 Hz (60 Hz upon request).

The OBSTA with power reserve : The DC/AC converter located in the base is powered by an energy pack that includes rectifiers, charging circuit and 48 V buffer batteries.

The pack is so designed as to ensure

- the supply of the converter with 48 V DC directly through the rectifiers, when the mains is on,
- the supply of the converter with power from the buffer batteries, when there is mains failure,
- the recharging of the batteries, when the mains is restored.

The buffer batteries can be of various types, lead-acid, gellified electrolyte or Cd-Ni.

The storage capacity of the batteries ranges from 5.5 AH to 120 AH.
The corresponding numbers of converters that can be powered are 2 to 42.

The choice of the energy pack depends upon different parameters. Upon request, our technical department will provide you with guide line for the appropriate assembly to suit your particular requirements.

Autonomous OBSTA :

The power sources can be either long life chemical batteries or solar panels with low loss storage batteries. The criteria are mainly economic considerations.

The number of solar panels and the capacity of the storage batteries are function of the average sunshine time in a year and of its distribution through the 12 months.

The storage batteries are of rugged construction ; a large provision of electrolyte and the low self discharge rate enable the once a year servicing schedule.

In all cases the switching of the OBSTA could be done manually or with a light sensitive cell.

The energy packs are wired with automatic switching terminals as well as manual ones.

the light sources

The Standard 13 turns OBSTA and the low power consuming 5 turn OBSTA are both red light emitting lamps. However for other purposes they could be white, blue or green.

The polar diagrams show that the smallest OBSTA has a minimum 12 Cd as compared to the 10 Cd recommended by the ICAO.

Special converters could be considered for special applications.

All types of OBSTA can be converted to an intermittent operation by simply inserting a blinker into the supply circuit.

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CLAUDE

Réf. 2634

NOUVEAU

NEW

CONVERTISSEURS HI

HI OBSTA CONVERTERS

Nous disposons dès à présent de convertisseurs plus puissants pour lampes Obsta HI et HIG. Ils sont destinés au cas où une intensité lumineuse supérieure à 35 Cd est exigée avec une alimentation secourue.

La consommation électrique est de 50 Watts. L'encombrement est identique à celui de l'Obsta HI secteur avec un poids restant pratiquement à 3 Kg.

Les batteries de stockage d'énergie doivent avoir une capacité de 10 AH par lampe à secourir pour assurer toujours une autonomie de 10 heures.

Ainsi :
l'ensemble d'énergie 48V 10 AH peut alimenter 3 ou 4 Obsta avec convertisseurs normaux ou 1 Obsta avec convertisseur HI

l'armoire d'énergie 48V 20 AH permet d'alimenter 7 Obsta convertisseurs normaux ou 2 Obsta convertisseurs HI

l'armoire d'énergie 48V 36 AH permet d'alimenter 12 Obsta convertisseurs normaux ou 3 Obsta convertisseurs HI.

Up to now, people who require beacons with light intensity higher than the 10 red light candelas provided by regular Obsta converters have to use the HV transformer HI Obstas which operate on the mains (115/230V 50 Hz/60 Hz).

Without the possibility of a stand by D.C. power supply for emergency.

We are now in a position to supply our customers with HI converters that operate the High Intensity 13 glass turn HI Obsta lamps ;
The power consumption is 50 W. Dimensions are the same as regular HI Obstas. Lamp and HI converter together weight approximately 3 Kg

- operating voltage is 48V DC
- battery storage capacity must equal 10 AH per converter

So our :
10 AH power pack may operate 3 or 4 regular 12 Watt converters or 1 50 W HI converter

20 AH cabinet may operate 7 regular 12 Watt converters or 2 50W HI converter

36 AH cabinet may operate 12 regular 12 Watt converters or 3/4 50W HI converter.

CLAUDE

Division Composants

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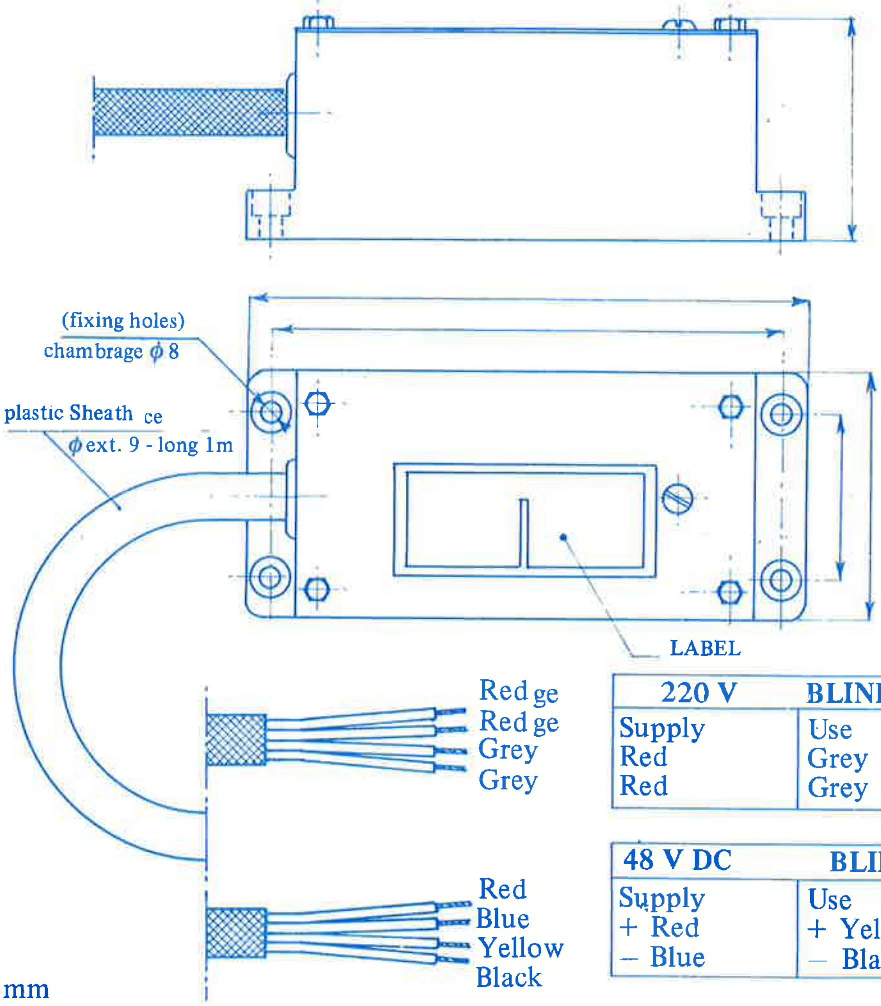
Blinkers for Obsta Lights



220 V	BLINKER
Supply	Use
Red	Grey
Red	Grey

48 V DC	BLINKER
Supply	Use
+ Red	+ Yellow
– Blue	– Black

All dimensions are in mm

The OBSTA beacons used as warning lights for the air navigation are steady lights operated either on the mains or on the batteries through DC invertors.

For high obstacles several level signalisation is necessary with blinking levels that alternate with steady state levels. All the lights of the same level (usually 3 per level) must be synchronous.

For the OBSTA warning lights, CLAUDE has, as optional accessories, 2 blinkers :

- One for the standard HI 230V A.C. OBSTA, the other for the 48V - DC Invertor operated 5 Turn lamp. (24V. DC upon request).

These blinkers are to be inserted between the power supplies and the OBSTA lamps.

The common characteristics of the blinkers are :

- Blinking frequency : 45 operations/minute
- 2/3 of time on, 1/3 of time off
- Monitoring capacity = up to 3 OBSTAS per blinker.

Presentation : The housing of the components is a plastic box with a metallic lid that serves as thermal radiator for the unit.

The drawing gives details on dimensions and shape.

Electronic components are embedded with silicone compound ; The connection wires are supplied 1 m. long, in supple plastic sheath.

Wire code :

	Supply	Utilisation
220V AC	Red - Red	Grey - Grey
48V DC	+ Red – Blue	+ Yellow – Black

CLAUDE

Département Applications Professionnelles

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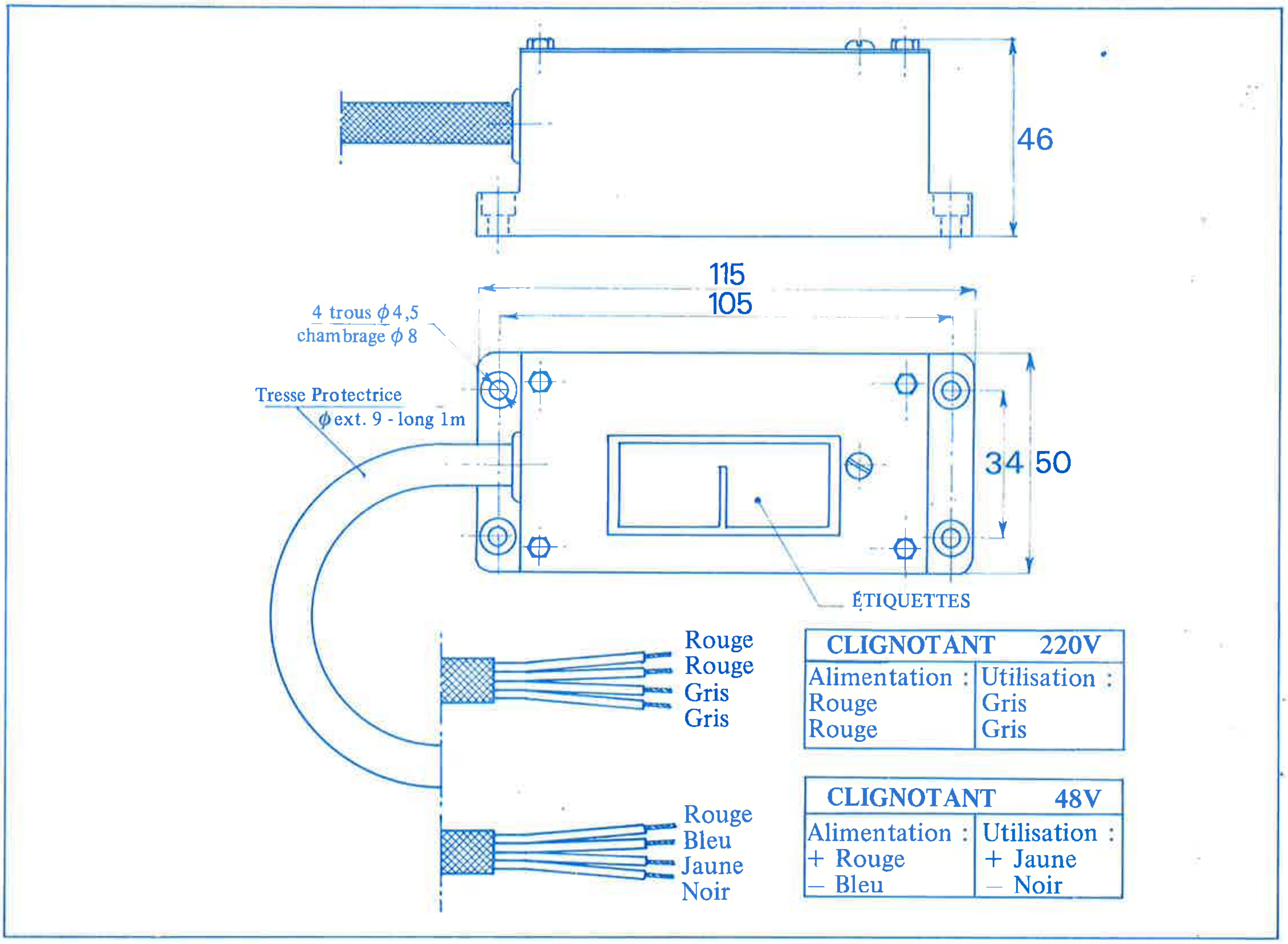
clignoteurs Obsta



Les lampes OBSTA servant de balises des obstacles à la navigation aérienne sont des feux fixes, qu'elles soient alimentées par le socle 230V 50Hz (ou 60Hz) ou par le convertisseur courant continu.
Pour certains obstacles très importants, il s'est avéré nécessaire de baliser par plusieurs étages de feux OBSTA alternativement fixes et clignotants. Par ailleurs, les feux clignotants d'un même niveau doivent être synchronisés. CLAUDE a prévu, pour sa ligne de produit OBSTA, 2 clignoteurs : l'un fonctionnant sous 230V-50Hz (60 Hz à la demande) l'autre sous 48V continu (24 volts à la demande).
Ces clignoteurs sont à intercaler entre la source d'énergie correspondante et les OBSTA à alimenter. Les caractéristiques communes à ces deux versions sont :

- Fréquence de clignotement : 45 coups/mn.
- Forme d'utilisation : 2/3 du temps allumé, 1/3 du temps éteint.
- Capacité de commande : 3 OBSTA simultanément.

Présentation : Boîtier plastique avec une face métallique servant de radiateur aux semi-conducteurs de puissance.
Dessin d'encombrement et de fixation suivant plan. Le circuit est rempli avec du silicone. Les fils sont sortis dans une gaine plastique, longueur 1 mètre environ.

Repère des fils :

	alimentation	utilisation
220V alternatifs	rouge - rouge	gris - gris
48V continus	+ rouge – bleu	+ jaune – noir

Division Composants CLAUDE

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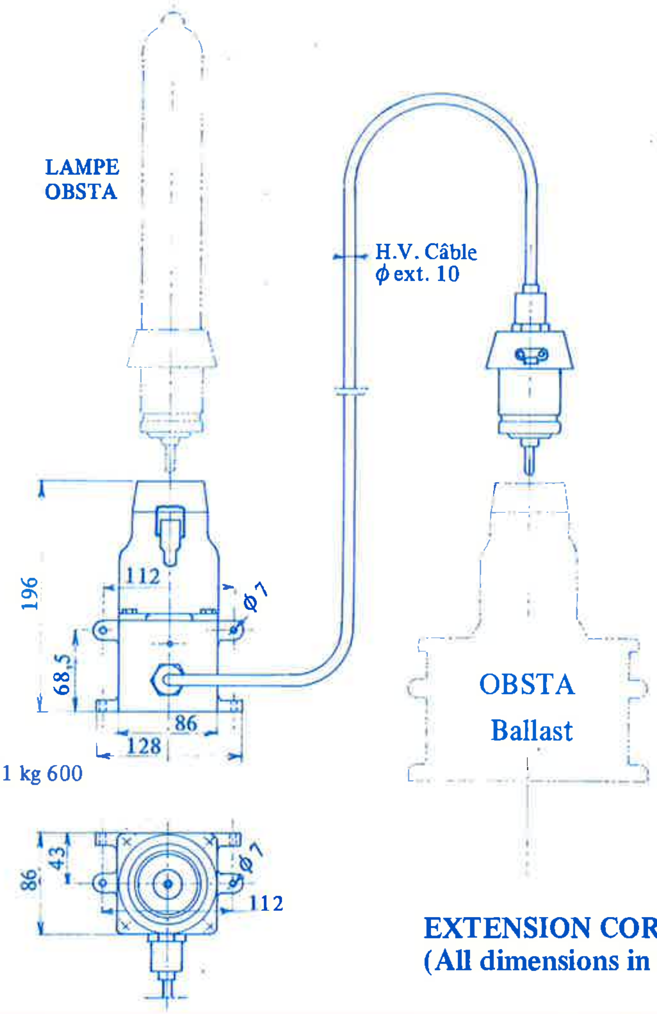
Réf. : 2643 - Décembre 78.

Obsta extension cord



WEIGHT, with lamp and without cable = 1 kg 600

EXTENSION CORD FOR OBSTA LAMP
(All dimensions in millimeter)

Essentially the OBSTA beacon is intended to be installed at the highest points of obstacles to air navigation with the exception of chimneys, for which a leeway of 5 feet to 10 feet is allowed because of corrosion and light screening due to smoke and fumes.

In the upper part of the obstacles it is not always easy to install an OBSTA with its base containing the transformer weighing approximately 20 pounds. In the same way certain supports do not offer enough space to fix the OBSTA base because of its size even already reduced to a minimum.

To meet these particular situations successfully, CLAUDE has developped an extension cord for the OBSTA beacons. This extension consists of an intermediary device between the conventional base located below the obstacles, or in any other suitable place, and the lamp installed above.

It is composed of a cable, the length of which is prepared according to request ; at one end of this cable there is a terminal to be plugged into the base, and at the other end a socket of reduced size and weight, which enables it to be fixed easily to the top of the obstacles.

One extension cord per lamp is required ; in the same way one socket per lamp is also required, as it is already the case with the non dissociated OBSTA.

This extension cord makes it possible to fix the OBSTA lamp up to 300 feet from its base at 50 Hz or 60 Hz operation.

For lamps operated by DC invertors, the weight of which is already reduced, the extension cord length is not longer than a few feet owing to the frequency (20 kHz). For these individual cases, please consult us.

FEATURES :

- High voltage coaxial cable.
- Water resistant seal.
- Vertical position - as for all the OBSTA bases.

CLAUDE

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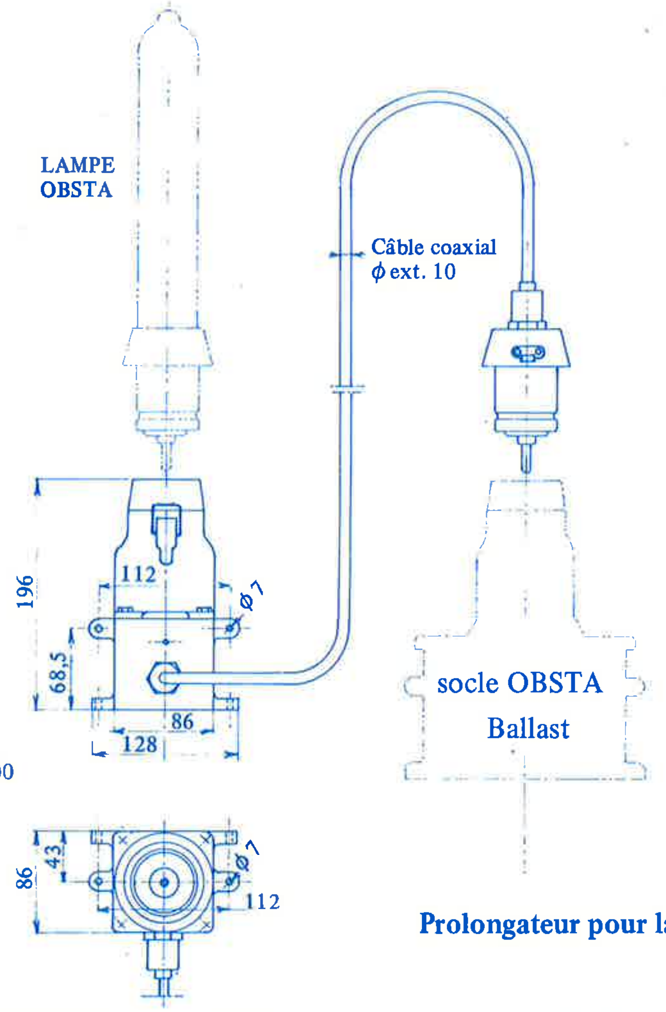
prolongateur Obsta



Prolongateur pour lampe OBSTA

Par vocation, l'OBSTA est destiné à être installé aux endroits les plus élevés des obstacles à la navigation aérienne, à l'exception des cheminées pour lesquelles une tolérance de 1,5 m à 3 m est admise pour des raisons de corrosion et d'occultation de la lumière, dûes à la fumée.

La partie supérieure des obstacles ne se prête pas toujours facilement à l'installation d'un OBSTA avec son socle contenant le transformateur d'un poids voisin de 9 Kg ; de même, certains supports ne permettent pas la fixation du socle OBSTA à cause de ses dimensions, même quand elles sont réduites au minimum.

Pour répondre efficacement à ces situations particulières, CLAUDE a mis au point un prolongateur pour lampe OBSTA.

Ce prolongateur constitue la pièce intermédiaire entre le socle, situé en bas de l'obstacle ou à tout autre place convenable, et la lampe située en haut.

Il est composé d'un câble dont la longueur est préparée à la demande ; ce câble est muni à une extrémité d'un culot qui vient s'enficher dans la cheminée du socle OBSTA et à l'autre extrémité d'une embase de dimensions et poids réduits, ce qui lui permet d'être fixée facilement en haut de l'obstacle.

Il faut un prolongateur par lampe. De même, il faut un socle par lampe comme c'est le cas de l'OBSTA non dissocié.

Ce prolongateur permet d'alimenter la lampe OBSTA, Standard H I (50 Hz ou 60 Hz) jusqu'à 100 mètres de son socle.

Pour les lampes alimentées par convertisseurs (dont le poids est déjà réduit) qui travaillent à 20 kHz, les capacités réparties du câble en limitent la portée à quelques mètres. Pour ces cas particuliers, veuillez nous consulter.

CARACTÉRISTIQUES :

- Cable coaxial haute tension
- Passages étanches
- Position verticale - comme pour tous les socles OBSTA.

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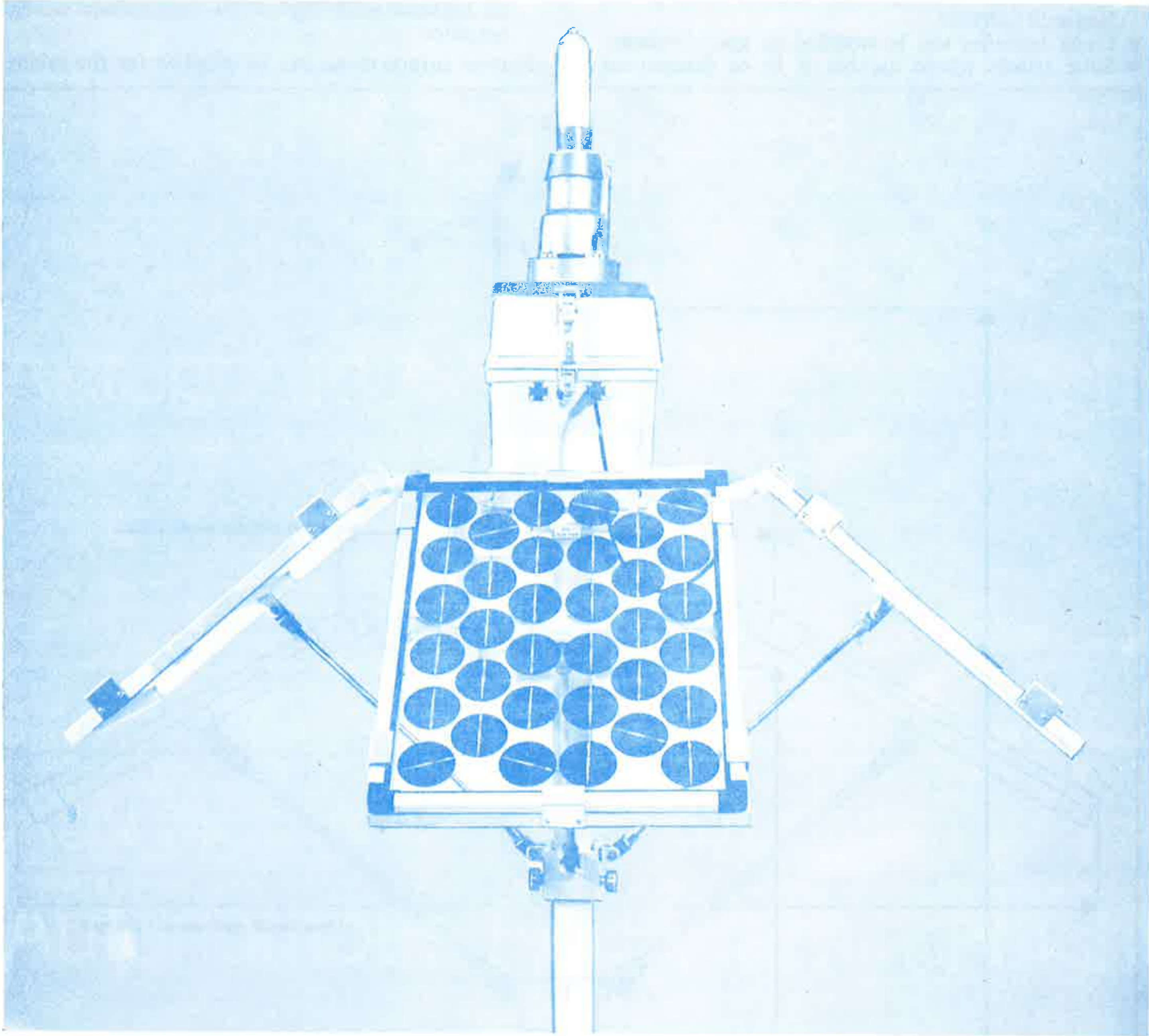
Réf. 2640 - Novembre 77

Autonomous Red Warning Light



It appears that a need of little airfields or helipads exists all over the world. But the main characteristic of these landing paths is the fact that they are usually very ill equipped and very often they are installed in isolated areas far from electrical power sources.

Even the main use of these airfields is intended for private aviation with business purposes (maintenance or routine checking of pipes, industrial equipments . . .) or for tourism, they could be used by regular small aircrafts in emergency conditions.

In order to fulfill the minimum requirements, the landing path has to be equipped with land marks at night. For this purpose CLAUDE has developped a set of warning light which can be switched on for a short time only, when necessary, without the need of external power.

This is the AUTONOMOUS RED WARNING LIGHT.

CHARACTERISTICS

Light emitter :

- Helicoïdal discharge tube with long life cold cathodes
- 12 candelas neon red light
- Heavy duty thermal shock resistant outer sleeve
- Metal mesh wrapping of the discharge tube in order to damp the RF perturbations
- Easy plug-in and plug-out end cap
- Intermittent operation possible with optional blinkers

Control case :

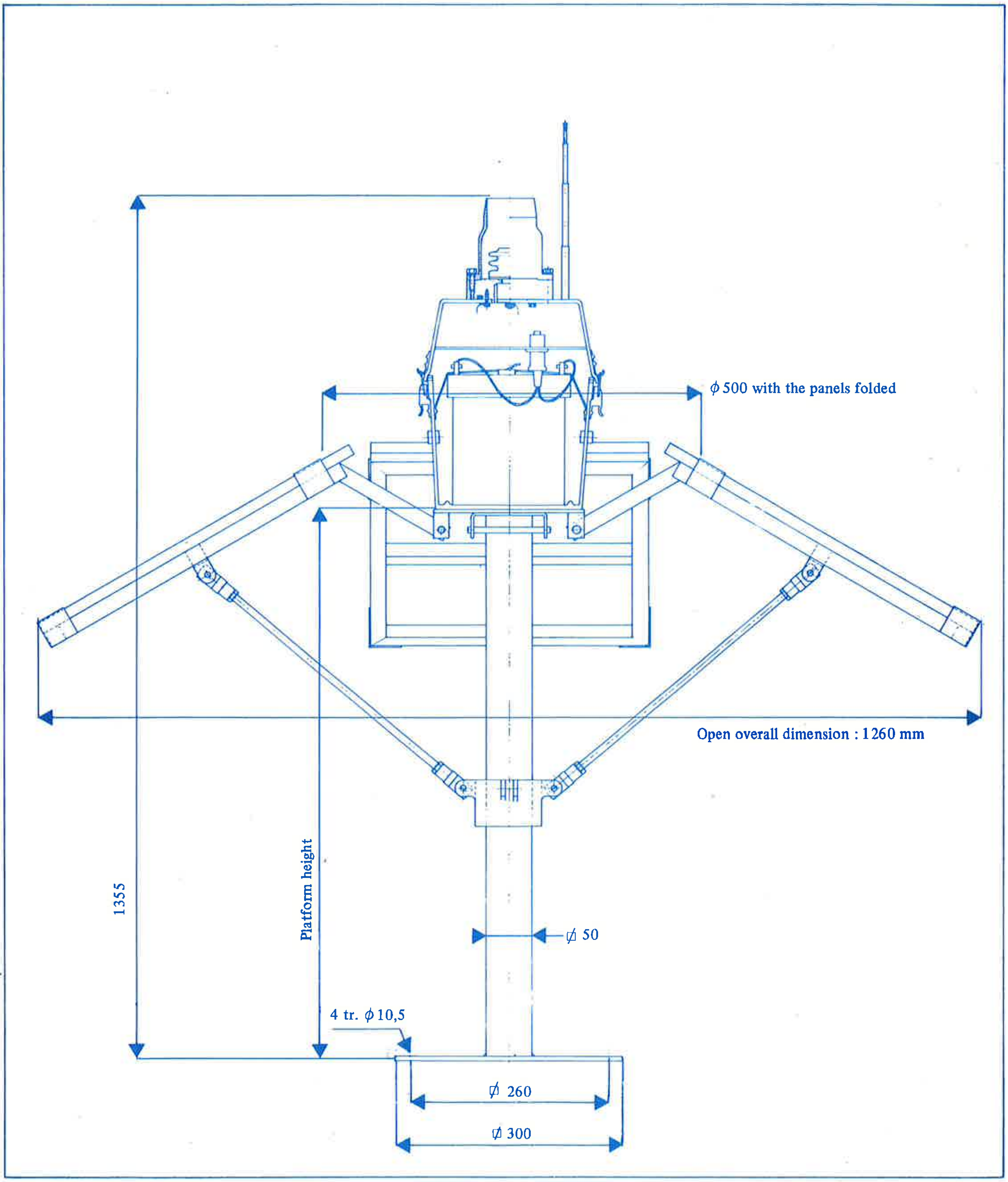
- A 12 V DC inverter provides the lamp with the high voltage to initiate the discharge and the necessary stabilization of the current
- A radio receiver in the VHF range with a built in decoder for remote wireless control (control tower, or in coming air craft)
- Provision is made for cable remote control
- 24 or 48 V inverter available on request
- Rugged plastic fiber-glass case
- Aluminium cast case available as an option.

Power supply :

Power provision is ensured by sealed storage batteries.

- Normal type beacons are equipped with gelled lead-acid batteries
- Cd-Ni batteries will be supplied on special request
- Solar panels whose number is to be determined for each case involving knowledge of sunshine hours, charge the batteries
- When the operations of the lights are not required very often, long shelves life and high power chemical batteries might replace the conventional storage batteries.

Further informations can be supplied for the asking.



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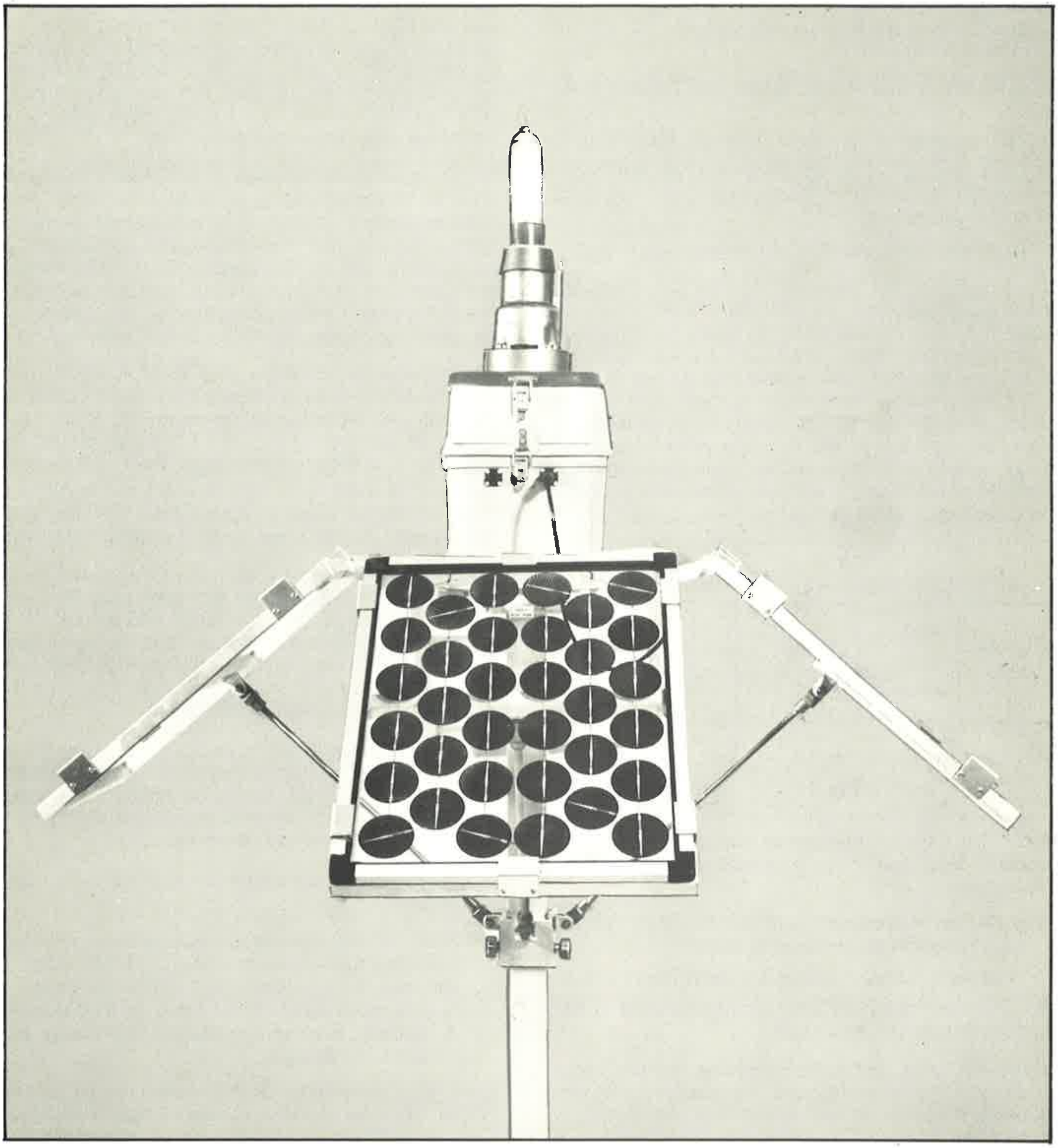
Réf. 2641 - Novembre 77



determination of the solar panels in a small unit of direct conversion by Si cells

by M. NGUYEN DAT
Product Line Manager

This study is a tentative method to determine various parameters in a small electricity production station (a few tens watts generally).

The parameters that will be taken into consideration are :

- The number of a given type of solar panels.
- Their inclinaison on the horizontal plane (Southward in the Northern hemisphere and Northward in the Southern).
- The capacity of the storage batteries.

These elements are function of the site (latitude, annual sunshine time, its distribution etc . . .). Of course they also depend upon the power consumption of the receptor. When practical data are involved, we will use those of solar panels that deliver 9 watts at 12 volts when uniformly lighted with a flux density of 1 KW per square meter. The cell temperature is the one that results from the previously stated energy density at a fairly still air. However a transposition can be easily made with any other cells provided that they have a plane geometry.

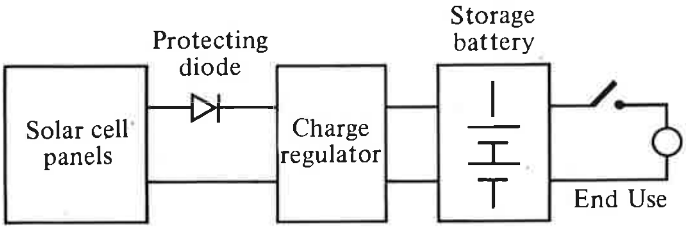


Fig. N° 1

Fig. N° 1 is a typical diagram of a solar power station, generally less than 100 W nominal, intended for isolated area.

Given the random occurence of meteorology phenomena two remarks are implicitely made :

a/ The computing is based on statistics of climat.

b/ Therefore mathematical approximations in the computing program are justified.

At the sea level, the solar radiations are composed of direct rays and diffused illumination. In the following sections we will admit that the direct ray energy density is 1 KW per square meter perpendicular to the propagation direction, at sea level.

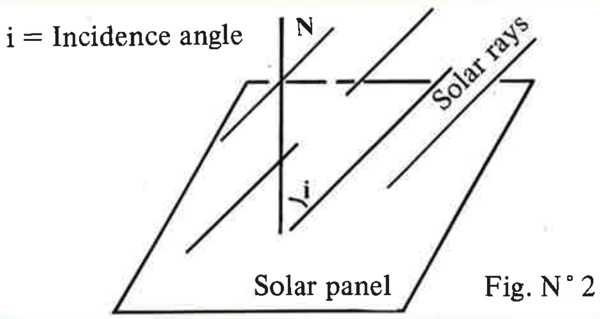


Fig. N° 2

Although the diffused energy is not negligible, specially at sea level, in this type of generator stations the action of the direct rays is the most effective.

Thus for the efficiency's sake, the solar panels have to be orientated directly toward the sun, or at the very least the incidence angle i must be as small as possible during the longest part of the sunshine time.

Due to the fact that an aiming device is expensive and not justified in that type of installation the solar panels have a fixed orientation respective to the earth. So during time t to t + Δt, a nominal W watt panel will not deliver WΔt Joules, but it will only deliver WΔt Cos i (t) Joules ; i (t) is the mean value of the incidence angle between t and t +Δt.

On the otherhand the solar panels require a minimum dose of incoming energy in order to actually deliver useable electric energy. Since we assume a constant solar radiation, the previous remark implies that the solar panels will only deliver electric energy when the solar ray direction remains inside of a cone centered on the perpendicular direction to the panels with the half top angle equal to the incidence limit i_1.

From the quick reference data sheet supplied by the manufacturers one can roughly say that the required minimum of incoming energy is ca 500 W per square meter. In our assumption of a 1 KW per square meter radiation sun, the incidence angle limit i_1 is such that $\cos i_1 = 0.5$ i.e $i_1 = 60°$. In other words when the solar incidence angle is larger than 60° the panels are useless in the respect of electricity generating.

From the same data we also deduce that the electric output is proportionnal to the input radiations when their energy remains in the range 500 W to 1 KW per square meter. This fact means that the solar panels will deliver W cos i Joules during unit time when illuminated under an incidence angle i compared to W Joules when normally illuminated.

Now if we consider the electric receptor (light beacon, TV transmitter, water pump motor . . .) they must be provided with enough energy to operate. Then araise immediately the following questions for a given power consumption and operating time :

1°) How many solar panels are necessary for a given place ?

2°) How big must be the storage batteries in order to provide proper power supply at proper time since the energy production and consumption are not synchronous most of the time. As an example : A warning light to be installed on a rocky pike closed to an airfield.

Solar panels produce electric energy during day time (!) an the consumption occurs at night without any overlapping time ; worse still, the consumption is not the same throughout the year but it reaches the highest level in winter when the nights are the longest but also when the days are the shortest with an ensuing lowest electric production.

1 - NUMBER OF PANELS REQUIRED.

1.1. Generalities.

We have seen in the previous section that the electric energy produced monthly by solar panels that are fixed with respect to the earth coordinates varies during the year. This variation is not only due to the fact that sunshine time is not constant but it is also due to the courses of the sun on the sky.

So we will first compute the mean path of the sun for different months ; next we will proceed to divide that path into finite elements Δη. Of these elements we will only retain those that make an incidence angle less than i_1, the maximum incidence angle allowed.

Thus, for a 24 hour revolution of the sun we will define the following quantities (fig. 3)

$S_1 = \sum_{\text{whole path}} \Delta\eta$ = equal to 24 hours.

$S_2 = \sum_{\text{Sun above the horizon}} \Delta\eta$ = day time

$S_3 = \sum_{\cos i > \cos i_1} \Delta\eta$ = useable day time

$S_4 = \sum_{\cos i > \cos i_1} \Delta\eta \cos i$ = Incidence weighted useable day time

The proportion of useable day time for a given month is then $\frac{S_3}{S_2}$ and the equivalent normal incidence time is $\frac{S_4}{S_2}$

Concerning the actual sunshine time for month n we only know the global statistical data supplied by meteorological organisations such are the world meteorological Organisation based in Geneva. But except for particular microclimats we can assume that the sunshine time for a month is throughoutly and evenly distributed over the day. (No periode of the day is more favored by sunshining than others regarding its occurence).

Thus from the WMO data one can compute the useful portion of the sunshine time at a given place for each month of the year by the relation :

$$(1)\quad h'_n = h_n \times \frac{\sum \Delta\eta \cos i \ (\cos i > \cos i_1)}{\sum \Delta\eta \ (\text{sun above the horizon})} = h_n \times \frac{S_4}{S_2}$$

1.2. Mathematical expressions

On the fig. 4 is represented the celestial sphere. The earth is located in the center E.

P'P = Direction of the poles.

QQ' = Projection of the equatorial circle of the earth onto the celestial sphere

$E, \vec{x}, \vec{y}, \vec{z}$ = Direct reference axes.

$\vec{Ez}$ = Zenith of the place.

$\vec{Ex}$ = South direction.

$\vec{Ey}$ = East direction.

$\vec{Ez}$ and $\vec{EQ'}$ define an angle in the xEz plane. This angle is equal to the latitude of the place. We will adopt the rule that $(\vec{Ez}, \vec{EQ'})$ is counted positive when $\vec{EQ'}$ is on the side of $\vec{Ex}$ respective to $\vec{Ez}$.

$\alpha > 0$ for the Northern Hemisphere

$\alpha < 0$ for the Southern Hemisphere.

The sun path for each day is an element of a spiral wound on the celestial sphere. In the approximations of our problem we will consider it to be a circle. Furthermore we only consider a mean circle for each month. One of such a circle is materialized by AA'. The plane that contains AA' is perpendicular to P'P. $\overline{ER}$ is the distance of the center of AA' to the origine E of the reference axis.

Taking the radius of the celestial sphere to be unit, we easily find that :

At the equinoxes $\overline{ER} = 0$; Sunpath : Circle QQ'

At the soltices $\overline{ER} = \pm \sin 23°27'$: Circle AA' or BB'.

For the other months of the year we will admit that $\overline{ER}$ varies as a sine function of time. So the general expression of ER is represented by.

$$(2)\qquad \overline{ER} = \sin n'\frac{\pi}{6} \sin 23°27' \text{ with}$$

$n' = n - 3$ if $n \geq 3$
$n' = n + 9$ if $n < 3$ n being the rank of the month.

From the obvious symetrical pattern $\vec{ER}$ is located in the xEz plane and its coordinates are :

$$(3)\quad \vec{ER} \begin{cases} \sin 23°27' \sin n'\frac{\pi}{6} \cos(\pi - \alpha) \\ 0 \\ \sin 23°27' \sin n'\frac{\pi}{6} \sin(\pi - \alpha) \end{cases}$$

x,y,z, being the coordinates of the sun S, the two equations that represent the path of the sun are :

(4) $\vec{ER}.\vec{RS} = 0$ (The sun is on the plane perpendicular to $\vec{P'P}$ at the distance $\overline{ER}$).

(5) $x^2 + y^2 + z^2 = 1$ (The sun is on the Celestial sphere)

(6) Since $\vec{ER}.\vec{RS} = \vec{ER}(\vec{ES} - \vec{ER}) = \vec{ER}.\vec{ES} - \overline{ER}^2$

(4) and (5) became :

$$(7)\quad x \sin 23°27' \sin n'\frac{\pi}{6} \cos(\pi - \alpha) + z \sin 23°27' \sin n'\frac{\pi}{6} \sin(\pi - \alpha) - \sin^2 23°27' \sin^2 n'\frac{\pi}{6} = 0$$

(8) $x^2 + y^2 + z^2 = 1$

Obvously the symetry of the figure suggests that the solar panel axis N is to be on the xEz plane. β is the angle $(\vec{Ez}, \vec{EN})$ with the same sign rule as for α. So $\vec{EN}$ is represented by :

$$\vec{EN} \begin{cases} \sin\beta \\ 0 \\ \cos\beta. \end{cases}$$

The condition that the solar rays fall on the panel in the useful range is expressed by :

$$(9)\qquad \cos(\vec{ES}, \vec{EN}) \geq \cos i_1$$

or

$$(10)\qquad x \sin\beta + z \cos\beta \geq \cos i_1$$

1.3. Practical micro-computer procedure.

As we can see one possible program that has been written on Serie 2200 Wang micro computer, the main steps to follow are :

First, one has to enter, α, latitude of the place considered, and β the angle between the solar panels and the horizontal plane.

The panels will be facing Southward in the Northern Hemisphere and conversely Northward in the Southern Hemisphere.

Next the computer is to be fed with the maximum incidence angle tolerated, either by its value i_1 or by its cosine function $\cos i_1$. This parameter is the expression of the lowest energy density that will activate the solar panels. In the case of usual cells it will be $\cos i_1 = 0.5$.

In order to calculate the ratio between the actually useful time and the total sunshine time, the following items will be computed in the stated order :

- Determination of $\overline{ER}$ value corresponding to the month n.

$\overline{ER} = \sin 23°27' \sin n'\frac{\pi}{6}$ $n' = n + 9$ if $n < 3$
$= n - 3$ if $n \geq 3$

– Determination of $z_{max.}$ (The highest z coordinate of the sun in the Celestial sphere).

(11) $z_{max.} = \cos [\alpha - \sin^{-1} (\sin 23°27' \sin n' \frac{\pi}{6})]$

– Determination of z_{min} (The lowest z coordinate of the sun).

(12) $z_{min.} = \cos [\alpha - \frac{\pi}{2} - \cos^{-1} (\sin 23°27' \sin n' \frac{\pi}{6})]$

The total range of variation of the z coordinate is then

$$\Delta z = z_{max} - z_{min}$$

– The iterative computing will be performed from z_{min} to z_{max} with a step that is a fractional part of Δz. Usually one can find that, in the approximations we seek for, 1/50 th of Δz is considered small enough.

$$\delta z = \frac{\Delta z}{50}$$

Remark : the symetry of the path allows to consider half of it only, i.e. from Q to Q' for example. That means from the two possible values of y we will systematically choose $y \geqslant o$.

- Start the following operation with the sun at its lowest position, ie at the real midnight time as a begining.

- $z_o = z_{min}$ of the sun

- compute $x_o = f(z_o)$; from equation N° (7)

(13) $x = f(z) = z \tan \alpha - \frac{\sin 23°27' \sin n' \frac{\pi}{6}}{\cos \alpha}$

- Compute $y_o = g(x_o, z_o)$

(14) $y = g(x,z) = + [\,|\,1 - (x^2 + z^2)|\,]^{1/2}$

The absolute value signs are intended to avoid error in computing in case where the approximations of the computer induce an x value from (13) that makes $1 - (x^2 + z^2)$ a very small but negative number.

- Store the set of coordinate x_o, y_o, z_o.

- Let z_1 be $z_o + \delta z = z_o + \frac{\Delta z}{50}$

- Then compute x_1, y_1

- Compute the finite elementary arc $\Delta\eta$ followed by the sun between $S_o (x_o, y_o, z_o)$ and $S_1 (x_1 . y_1 . z_1 .)$

by (15) $\Delta\eta = \cos^{-1} (x_1 . x_o + y_1 y_o + z_1 z_o)$

- Sum $\Delta\eta$ up in Register S_1, total sun path length

-Test if $z_1 > o$ in case of a positive answer sum $\Delta\eta$ up in Register S_2, day time sun path length.

- Test if $\cos (\overrightarrow{EN}, \overrightarrow{ES_1}) > \cos i_1$ in case of a positive answer sum $\Delta\eta$ up in S_3, useful sun path length ;

Sum $\Delta\eta \cos (\overrightarrow{EN}, \overrightarrow{ES})$ up in S_4, incidence weighted sun path length.

- Then restart the whole computing procedure with a new z_o which is equal to the former z_1 until z_1 is larger than z_{max}.

Then $\frac{S_2}{S_1} \times 24$ = mean value of day length for month n.

$h_n \times \frac{S_3}{S_2}$ = useful time for month n

an $h'_n = h_n \times \frac{S_4}{S_2}$ = useful time equivalent to normal incidence exposure.

1.4. Exploiting the program.

If we have the h_n, sunshine time distribution for a given place, we can compute the useful portion h'_n and the total $\sum_{n=1}^{12} h'_n$ for a determined slope of the panel (β). We might equally want to search for optimizing h'_n and $\sum_{n=1}^{12} h'_n$ by doing the computing with different value of β.

The optimizing does not necessarity mean maximizing $\sum_{n=1}^{12} h'_n$. In Some case we had better smooth the useful sunshine time curve through the year by favoring the months with the lowest sun time figures with a particular value of β. Usually this smoothing has for effect to reduce the storage battery capacity even with a lower useful hour figure.

Anyway by choossing a particular slope for the solar panels, we have determined the quantity $\sum_{n=1}^{12} h'_n$ and therefore the quantity of electric energy delivered by the panel.

$$W = W_1 \sum_{n=1}^{12} h'_n \text{ in watthour}$$

W_1 being the power delivered by the panel when illuminated with 1 KW per square meter of solar light.

Let ρ be the efficiency of the battery charging and let p be the number of panels connected in serie - parallel pattern, then the total energy produced in a year is in average :

$$p \rho W_1 \sum_{n=1}^{12} h'_n \text{ watthour}$$

The condition of no shortage of power is

(16) $p \rho W_1 \sum_{n=1}^{12} h'_n \geqslant$ nominal consumption X $\sum_{n=1}^{12}$ monthly running time

or

(17) $p \geqslant \dfrac{\text{nominal consumption} \times \sum_{n=1}^{12} \text{monthly running time}}{\rho W_1 \sum_{n=1}^{12} h'_n}$

Since the rated voltage of the solar panel is not always the one of the end use, two additional conditions are compulsory :

First : the receptor voltage must be an integer K if the panel voltage is to be taken as an unit.

Second : the eventual total number of panels p' must be a multiple of the integer K.

(18) Then $p' = K [\frac{p}{K}]$ the brackets mean the first integer immediatly greater than $[\frac{p}{K}]$

II - DETERMINATION OF THE STORAGE BATTERY CAPACITY

For the month n, the p' panels will statistically deliver $p'\rho\, W_1 h'_n$ watthours and the receptor will consumme J_n, with J_n = nominal consumption time the month running hours.

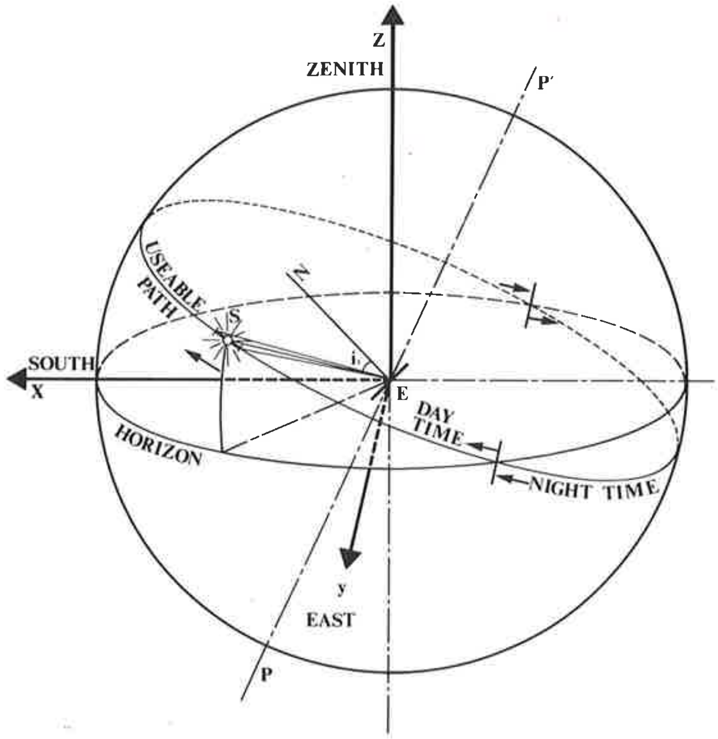
The balance of the energies for the month n is then $p'\rho\, W_1 h'_n - J_n$.

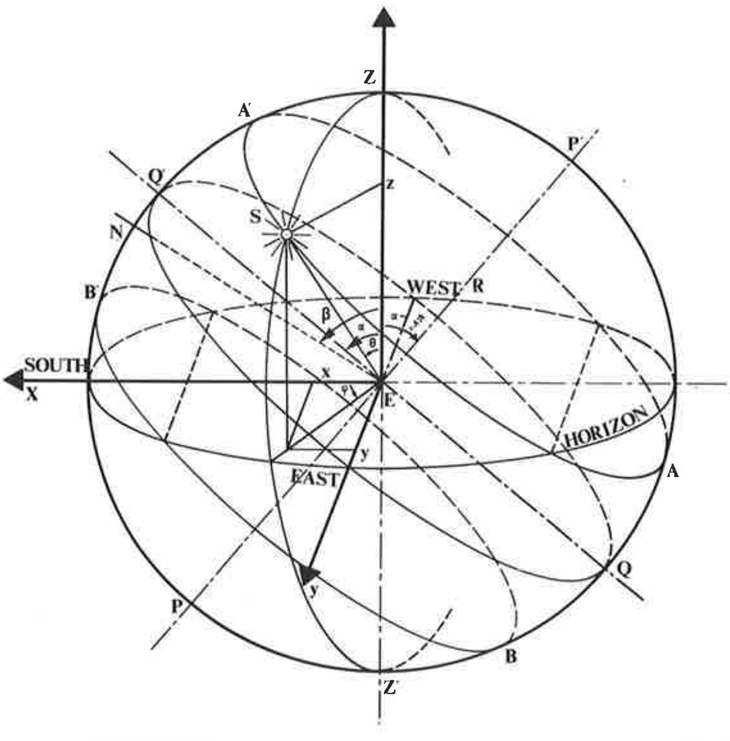
Generally speaking there always is a periode of the year when the previous expression is negative for a certain number of consecutive months. During such months the storage battery must supply the user with the difference of energy to ensure the continuous running. Then, at a more favorable period the battery will be recharged.

The power storage capacity of the battery must exceed the total of the negative values of $p'\rho W_1 h'_n - J_n$, divided by their voltage the expression $\frac{I}{V} \sum_{<o} p'\rho\, W_1 h'_n - J_n$ yields the storage capacity in AH

Conclusions

Since the direct conversion solar energy is very costly one has to determine very carefully the number of different components involved. Unfortunately the experimental determination is lengthy and the needs often urgent, this computing provides with a fairly good estimate of the station despise the few shortcomings such as the difference in energy of the solar radiations between winter and summer due to the atmospheric absorption.





```
0010 REM "ENG.LAT"
0020 DIM H(12),N$(12),H1(12),S(12),L(12)
0030 N$(1)="JANUARY"
     :N$(2)="FEBRUARY"
     :N$(3)="MARCH"
0040 N$(4)="APRIL"
     :N$(5)="MAY"
     :N$(6)="JUNE"
0050 N$(7)="JULY"
     :N$(8)="AUGUST"
     :N$(9)="SEPTEMBER"
0060 N$(10)="OCTOBER"
     :N$(11)="NOVEMBER"
     :N$(12)="DECEMBER"
0070 INPUT "CONSIDERED PLACE",A$
0080 INPUT "LATITUDE OF THE PLACE, + HEM
     .NORTH",A
0090 PRINT HEX(0E)
     :PRINT "CONSIDERED PLACE:"; A$
0100 PRINT "LATITUDE OF THE PLACE: ";A;"
     DEGREES"
0110 INPUT "LIMIT COSINE FOR THE CELL",D
0120 PRINT
     : PRINT "LIMIT COSINE FOR THE CELL:
     ";D
0130 INPUT "NOMINAL POWER, WATTS",P
0140 PRINT "NOMINAL POWER AT 48 VOLTS:";
     P;"WATTS"
0150 PRINT
     :PRINT "SUNSHINE HOURS OF THE PLACE"
0160 FOR I=1 TO 12
0170 INPUT H(I)
0180 PRINT N$(I),
0190 PRINTUSING 200,H(I)
0200 % ###
0210 NEXT I
0220 FOR B = A - 20 TO A + 20 STEP 5
0230 PRINT
     :PRINT
     :PRINT HEX(0E)
     :PRINT "INCLINATION OF SOLAR PANELS"
     ;B;" DEGREES"
0240 SELECT D
0250  F=SIN(23.45)
     :REM SIN(23 DEGREES 27 MINUTES)
0260 FOR N=1 TO 12
0270 IF N >= 3 THEN 300
0280 N1 = N+9
0290 GOTO 310
0300 N1 = N-3
0310 S1 = 0
     : S2 = 0
     : S3 = 0
     : S4 = 0
0320 F1 = F*SIN(N1*30)
0330 W1 = COS(A-ARCSIN(F1))
0340 W2 = COS(A-90-ARCCOS(F1))
0350 D1 = (W1-W2)/50
0360 Z = W2
0370 X = Z*TAN(A)-F1/COS(A)
0380 Y = SQR(ABS(1-(X↑2+Z↑2)))
0390  FOR J = 1 TO 50
0400 Z1 = W2 + J*D1
0410 X1 = Z1*TAN(A)-F1/COS(A)
0420 Y1 = SQR(ABS(1-(X1↑2+Z1↑2)))
0430 S1 = S1 +ARCCOS(X*X1+Y*Y1+Z*Z1)
0440 IF Z1 <0 THEN 490
0450 S2=S2+ARCCOS(X*X1+Y*Y1+Z*Z1)
0460 IF X1*SIN(B)+Z1*COS(B) < 0 THEN 490
0470 S3 = S3 + ARCCOS(X*X1+Y*Y1+Z*Z1)
0480 S4 = S4 + ARCCOS(X*X1+Y*Y1+Z*Z1)*(X
     1*SIN(B)+Z1*COS(B))
0490 X = X1
     : Y = Y1
     : Z = Z1
0500 NEXT J
0510 H1 = H(N)*S4/S2
0520  PRINT N$(N),
0530 PRINTUSING 540, H1
0540 % ###.##
0550 H2 = H2 + H1
0560 H1(N)=H1
0570 S(N)=(S1-S2)*24/S1
0580 NEXT N
0590 PRINT
     :PRINT HEX(0E)
     :PRINT "USEABLE HOURS PER YEAR:";
0600 PRINTUSING 610, H2
0610 % ####.##
0620 FOR N = 1 TO 12
0630 S = S+S(N)
0640 H3 = H3+H1(N)
0650 NEXT N
0660 K = S*30*P/(H3*9*.75)
0670 K1 = (INT(K/4)+1)*4
0680 PRINTUSING 690, K1
0690 % "NUMBER OF PANELS , n =" ##
0700 FOR N = 1 TO 12
0710 L(N) = (.75*9*K1*H1(N))-(S(N)*30*P)
0720 IF L(N)>0 THEN 740
0730 L = L+L(N)
0740 NEXT N
0750 L = -L/48
0760 PRINT "STORAGE CAPACITY:";
     :PRINTUSING 770,L;
0770 % ### AH/48 VOLTS
0780 H1 = 0
     :H2 = 0
0790 H3 = 0
     : S = 0
     : L = 0
0800 NEXT B
0810 PRINT "END"
0820 END
```

```
CONSIDERED PLACE:PARIS
LATITUDE OF THE PLACE:  48 DEGREES

LIMIT COSINE FOR THE CELL:  .5
NOMINAL POWER AT 48 VOLTS: 12 WATTS

SUNSHINE HOURS OF THE PLACE
JANUARY          49
FEBRUARY         75
MARCH           144
APRIL           181
MAY             219
JUNE            230
JULY            224
AUGUST          201
SEPTEMBER       158
OCTOBER         118
NOVEMBER         53
DECEMBER         40

INCLINATION OF SOLAR PANELS 48  DEGREES
JANUARY          34.61
FEBRUARY         48.11
MARCH            80.14
APRIL            87.69
MAY              88.50
JUNE             86.92
JULY             90.52
AUGUST           97.38
SEPTEMBER        87.93
OCTOBER          75.70
NOVEMBER         37.44
DECEMBER         29.91

USEABLE HOURS PER YEAR:  844.90
 "NUMBER OF PANELS , n =" 12
STORAGE CAPACITY: 194 AH/48 VOLTS
```

CLAUDE

Département Applications Professionnelles

CLAUDE société anonyme au capital de 30 497 670 F - siège social 27-29, rue de Sèvres, 92103 Boulogne-Billancourt - Tél. : 604.91.84 - Télex 260 086
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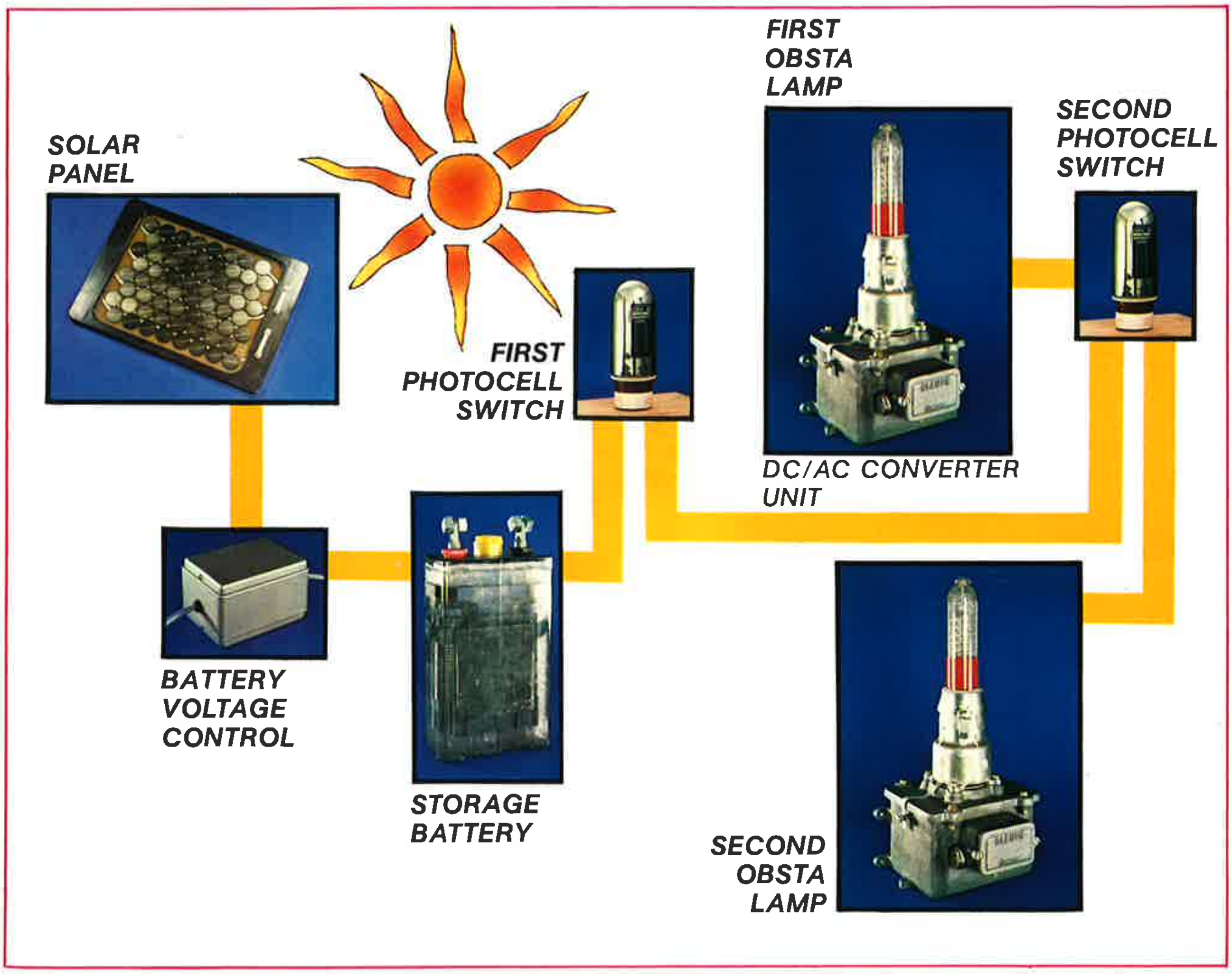
Réf. 2638 - novembre 77

SOLAR ENERGY POWERED WARNING LIGHT

CLAUDE



The development of air traffic requires increased safety measures for aircraft, particularly around the airports. In view of this fact, many countries have adopted regulations making it compulsory for any obstacles which might constitute a danger in such areas to be indicated by warning lights.

Sections of electric high voltage lines already carry Claude BALISOR lamps which are selfpowered by capacitive effect.

Obstacles such as high buildings, chimneys, cranes with power lines are signaled to the aircraft by standard Claude OBSTA lamps. These operate from a 115/230 V, 50 or 60 Hz supply. An external device could provide it with power for 10 hours in case of failure of the mains.

But, for isolated airports or airports situated in mountainous surroundings, there were no satisfactory solutions up to now. In these cases power is often lacking where it is needed most; for example, rocky peaks in the line of take-off and landing paths.

In such cases the solar energy powered OBSTA from Claude can provide satisfactory warning lights with minimum maintenance and comparatively low costs.

This unit consists of:

- A red, green, white or blue discharge tube obtained by winding a glass tube around a central core. The helicoidal tube of rugged construction is contained in a hard glass protective sleeve and is matched with a plug for fixing the lamp to the junction box.

Red OBSTA lamps are fitted with a Faraday cage to protect them from receiving static discharges and provide a screen to RF perturbations that could be emitted by discharge tube.

The cold cathode lamps operate reliably for over 20,000 hours.

- A DC/AC converter which is housed in the junction box. This converter, powered by a 48 V lead-acid battery delivers high voltages at 20 kHz.

Open circuit voltage is high enough to fire the lamp with accuracy. Stabilization of the lamp is obtained by a high permeability ferrite core transformer.
From the use of 20 kHz result better lumen per watt efficiency and no RF perturbations to electronic equipments. French radio and TV broadcasting administration tested and gave certification of RF perturbation-free in navigational bands.

- A lead-acid battery and solar panels to recharge the battery during sunshine time.

The battery is made with special requirements to low losses and large electrolyte provision specifications.

- A voltage limitator stops the charging process when the battery is fat and thus suppresses the boiling of electrolyte which is the main cause of its evaporation; maintenance is carried out with a liquid adjustment once a year.
- In order to limit power consumption, a photocell switches the lamp on only when it is required at night time or in bad weather conditions. A second photocell would detect any failure of the lamp and in such a rare case will automatically switch the battery to a second lamp standing by with its own converter.
- An optional blinker to make the warning light blink at the specified rate of 45 times per minute. The light is then turn on during 2/3 of the time and off the remaining 1/3.

The solar panels are standardized in 12 V units and are assembled in serie/parallel in order to obtain the right voltage. Their number and the capacity of the storage battery depend on:

- power consumption of the electrical parts,
- number of switch-on hours per day,
- number of sunshine hours per year of the considered place. This figure is provided by the clino book issued by the world meteorological organisation.

LAMP

Luminous intensity: 10 cd perpendicular to the lamp axis (Min.)
Dimensions: see drawing.
Color: red, green, white, blue (the last three are obtained by fluorescent powders; then the luminous intensity depends upon the color).

CONVERTER

Input voltage: 48 V.
Power consumption: 10 W.
Output frequency: 20 kHz.

BATTERY

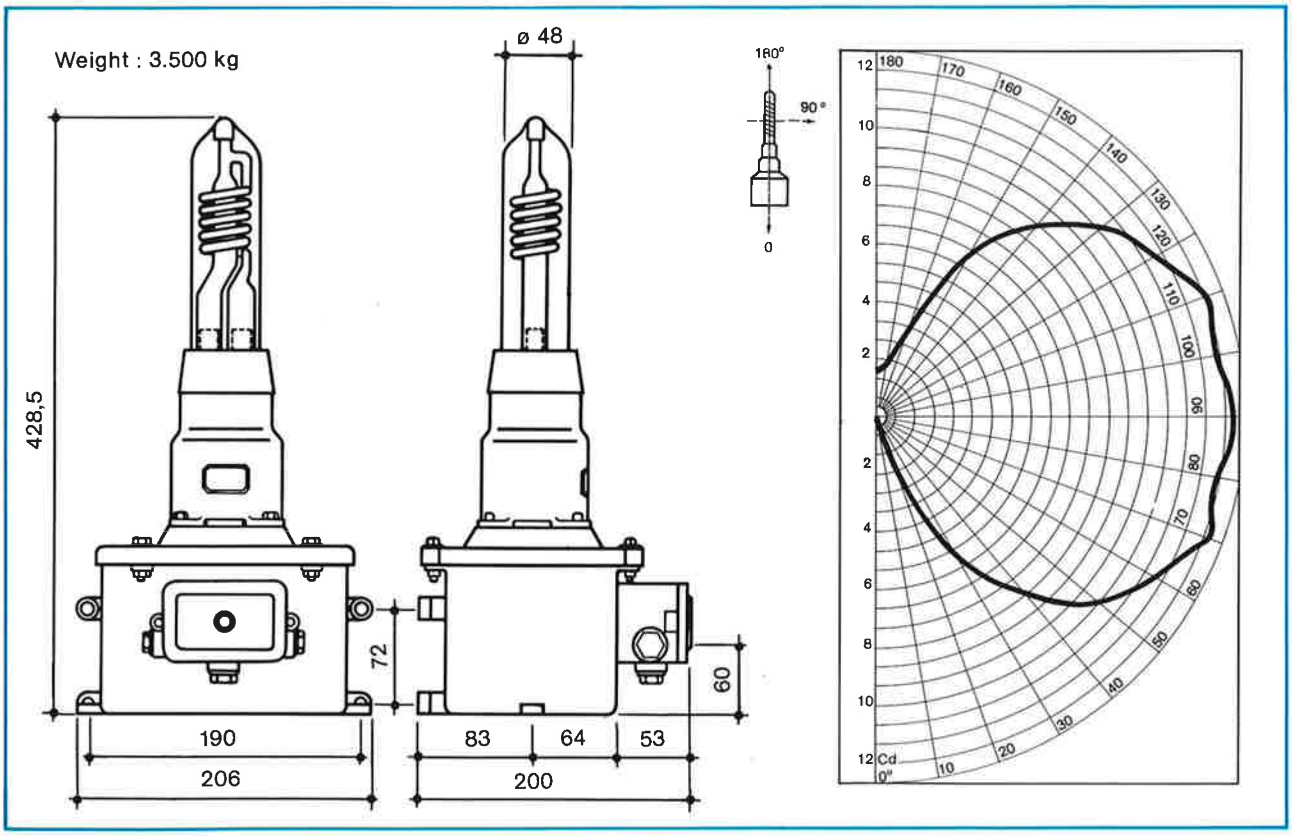
Type: lead-acid.
Voltage: 48 V.
Capacity: depends on locations.

SOLAR PANEL

Type: silicon.

BLINKER

Type: solid state circuitry.
Rate: 45 times/minute.
On time: 2/3.
Off time: 1/3.



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CLAUDE

Février 80 Réf 2647

LAMPE OBSTA ADF
SYSTEME ANTIDEFLAGRANT

.es obstacles à la nagivation aérienne au voisi-
ıage des aérodromes et héliports doivent être
ıalisés suivant les recommandations de
'Organisation de l'Aviation Civile Internationale,
:ventuellement modulées par les normes nationales
intensité lumineuse minimale, caractéristiques
:richromatiques de la lumière émise...).

ı'autre part cette signalisation se trouvant la
ılupart du temps dans des endroits peu accessibles,
ıne lampe de grande durée de vie rend un service
ppréciable à l'utilisateur, lui évitant ainsi
:'avoir à procéder fréquemment à l'entretien.

LAUDE, en plus de sa ligne de produits normaux
lampe au néon, grande durée de vie, 20.000 heures
t plus) bien connus, a mis au point un ensemble
BSTA ADF pour des applications, où un tel service
st requis. Exs : réservoirs de gaz, portiques de
échargement du gaz, plateformes de forage,
affineries ...

aracteristiques

ampe à décharge dans le néon, cathodes froides,
ongue durée de vie.

umière rouge aviation se trouvant dans le domaine
éfini par

$\leq$ 0.335

$\geq$ 0.980-x

ntensité lumineuse 12 cd dans le plan horizontal.

limentation : soit 48 V continu, soit 220 V 50 Hz,
) Hz suivant bornes d'entrée.

› d'agrément du Ministère des Industries : 142/79.

‹iste en classe hydrogène
classe autres gaz.

EXPLOSION PROOF
OBSTA WARNING LIGHT

Obstacles to the air traffic close to airports
and helipads must bear warning lights, whose
features are defined in Annex 14 to the
Convention of International Aviation.

An other aspect of the problem is that the
obstacles are often in places with difficult
access, so a long life is a real plus of
the lighting system.

Besides the well known standard OBSTA lamps
and gears, CLAUDE has now Explosion proof,
long life gas discharge red warning lights
for cases where such features are needed
(gas tanks, drilling platforms ...).

Like the other neon discharge OBSTA lamps
Explosion proof OBSTAS have a life expectancy
higher than 20.000 hours.

Characteristics

Cold cathode neon discharge lamp.

Red light which is defined by

purple boundary y = .980 - x
yellow boundary y = .335

Light intensity : 12 candelas in the
horizontal plane.

Power supply either 48 V DC or 220 V AC, 50Hz
or 60 Hz to be connected to appropriate inlet.

Gas class or hydrogen class.

LAMPE A ECLATS

rtaines applications demandent une source lumineuse
grande puissance instantanée pendant des durées
èves.

lampe ADF à éclats CLAUDE a la même enceinte ADF
e l'OBSTA ADF avec les caractéristiques suivantes :

ampe alimentée en 220 V AC ou 12 Volts =.

ergie 3,6 joules ou 5,6 joules.

équence 80 coups/minute.

existe différents filtres, si des
ıleurs telles que rouge, bleu, vert, orange
ıt désirées.

STROBE LIGHT

There are cases where strobe lights are
required.
The Explosion proof housing can be equipped
with a strobe light.

Power supply : 220 AC or 12 V DC.

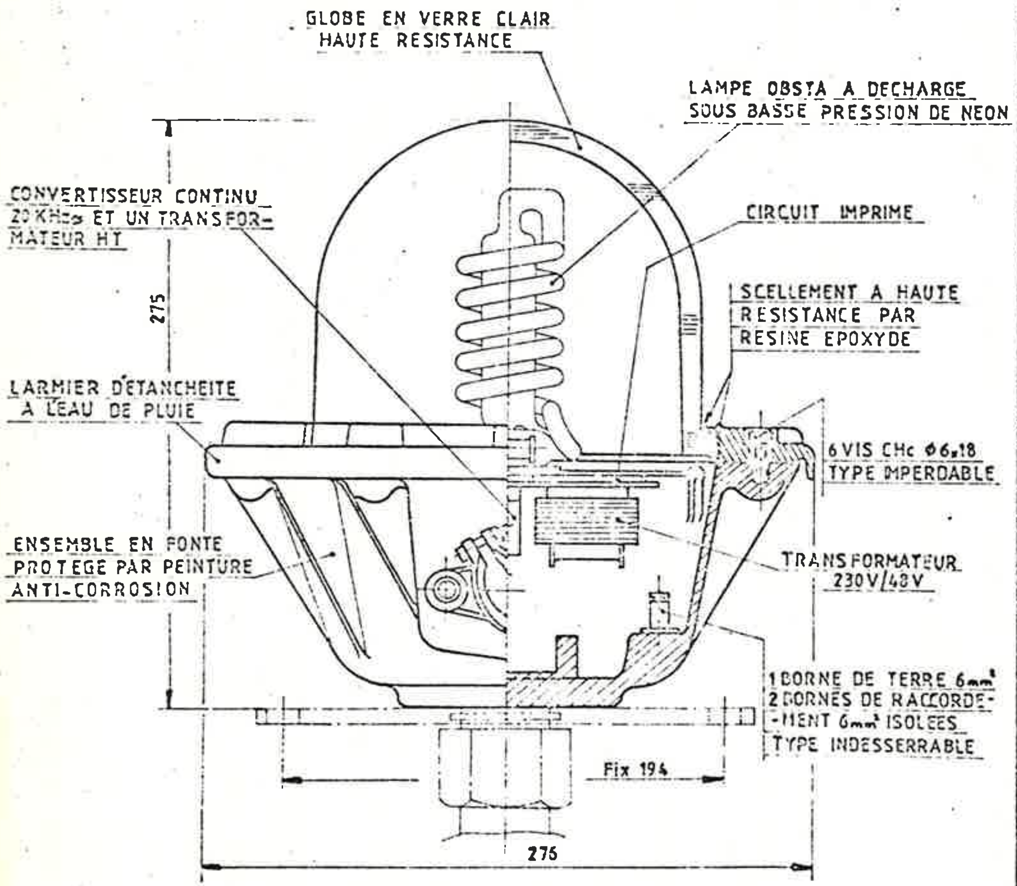
Energy per flash : 3,6 or 5,6 joules.

80 flashes per minute.

High impact polycarbonate colored filters
available (red - orange - green - blue).

APPAREIL ANTIDEFLAGRANT DE SIGNALISATION – OBSTA

EXPLOSION PROOF OBSTA WARNING LIGHT

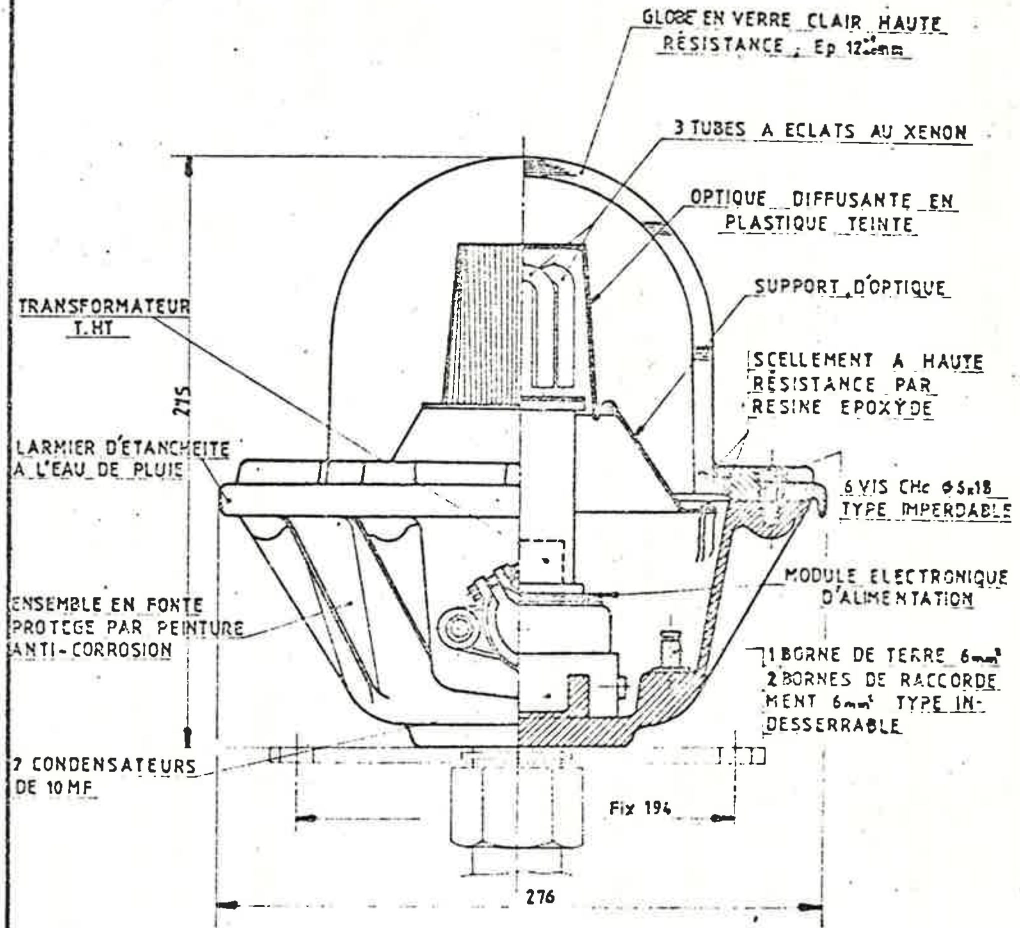


NOUVEAU!

POIDS : 11 Kg	TYPE : 10 157.0B
DATE : 9-7-79	

APPAREIL ANTIDEFLAGRANT DE SIGNALISATION A FEUX A ECLATS

EXPLOSION PROOF STROBE LIGHT



CLAUDE	DIVISION COMPOSANTS 27-29, rue de Sèvres 92103 BOULOGNE CEDEX (France)	POIDS : 11 Kg	TYPE : 10 157. FE
		DATE : 9-7-79	