ENERTRAG
SYSTEMTECHNIK

procandela®

BEACON SOLUTIONS
FOR WIND TURBINES

PRODUCT CATALOGUE

EXPERTS IN
BEACONING

ENERTRAG
SYSTEMTECHNIK

ENERTRAG Systemtechnik develops and supplies wind turbine components, with an emphasis on beaconing systems for low-emission daytime and nighttime marking.

The company has been supplying beaconing technology to wind turbine manufacturers since 2003 and provides innovative products for projects on a global level. A new production location was commissioned in 2010 in Prenzlau in which all company divisions work closely together in every aspect from product development to logistics.

Thanks to intensive committee work in sector associations, ENERTRAG Systemtechnik employees are always at the heart of our activities and have a deep understanding of beaconing technology. Together with many years of experience, this makes them **experts in every aspect of beaconing.**

ENERTRAG

PRODUCT CATALOGUE
Content

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EXPERIENCE

We were one of the first companies in Germany to certify an LED beacon in 2003 pursuant to the new "W, red" specification and place it on the market. Every since, we have focused on beacons, their use and control on a daily basis, from 10 cd to 100,000 cd. Each of our employees in production has both manufactured these products personally and installed and maintained them in the field. It's no accident that we describe ourselves as experts for beaconing.

PRODUCT DEVELOPMENT

We know our products, right down to the finest detail. Our engineers work every day on documentation, support or new developments, and no question posed by our customers or distributors goes unanswered. The fruits of this daily work are new product ideas and, ultimately, new products. Solutions for specific customers or projects can also be realised quickly and flexibly if necessary.

SUSTAINABILITY

The efficient and durable operation of our products contributes as much to sustainability as a reliable and monitored development and production process which ensures that our customers enjoy a reliable, long-term supplier relationship. Our business operations are also characterised by sustainability and efficiency - combined with a fair pricing policy which benefits both our employees and customers.

OPTIMISING FOR WIND ENERGY

A wind turbine is a particularly special aviation obstacle, a fact which we grasped at an early stage and which made us into a provider of special wind energy solutions. In addition to special testing (e.g. for vibration and specific climatic requirements), it is the emissions in particular which we keep as low as possible - because a wind turbine seldom poses an obstacle on its own.

UP TO DATE

We place a special importance on association work, enabling us to share our vision and observe market developments. We have contributed to the development of beaconing for aviation obstacles for many years now in significant technical bodies, both nationally and internationally. Our customers value this experience and exploit our expertise when tackling new challenges

INNOVATION LEADER

Whether beacon marking of blade tips, visibility measurement or needs-based beaconing is involved: we were faced with a lot of pioneering work when we first addressed these issues. And, even if every innovation has not been adopted, we still take note of every new idea and develop it further. The result is occasionally a minor revolution, as with needs-based beaconing, a field which we have worked in for ten years.

PHILOSOPHY

procandela

- UNIVERSAL BEACON FOR EVERY APPLICATION
- INTEGRATED SENSORS
- FLEXIBLE CONNECTION OPTIONS
- STANDARDISED FIXING DIMENSIONS
- UPS-FRIENDLY SUPPLY VOLTAGE
- PRECISION RADIATION
- HIGH-QUALITY COMPONENTS
- COST-OPTIMISED DESIGN
- OEM QUALITY – MADE IN GERMANY

We have been focusing on the use of LED technology in obstacle and hazard beaconing for more than a decade, at all times following current trends and offering our customers products which we fundamentally believe in in terms of their practicality and durability.

As a consequence, we have also frequently cooperated with external partners and, as a result, needed to compromise on occasion when it came to solving detailed questions. We have now developed our new pro-series free of external specifications and without any compromises.

Everything began with a white sheet of paper and a specification which, while aimed at use in the area of wind energy in particular, also addressed conventional aviation obstacles. On completion of development, our procandela beacon is a perfect combination representing the best of our reliable products and future requirements, all supplemented by a wealth of practical features which make working with it simpler, easier to plan and more efficient.

From the integrated cable socket to the standardised hole circle pattern - every detail reflects our procandela philosophy.

OUR PROCANDELA STANDARD FOR YOU

Through our high standards, we set benchmarks for the beaconing of tomorrow.
You can expect the following from all our products:

OEM Quality – Made in Germany

A guarantee of up to 5 years on our systems

Products certified pursuant to ICAO and AVV

Can also be used at extreme
temperatures from -40° to +50°C

Sturdy seawater-resistant aluminium

Superior workmanship

24VDC power supply

Degree of protection

High-precision optical systems

Optimised thermal management

Energy-efficient solutions

Integrated GPS and
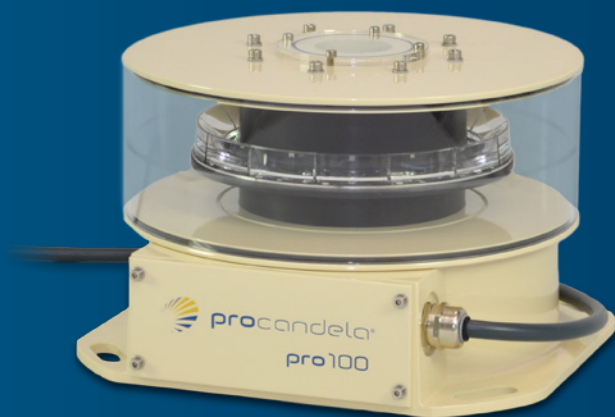twilight sensor system

Versatile installation options

Individual control cabinet technologies
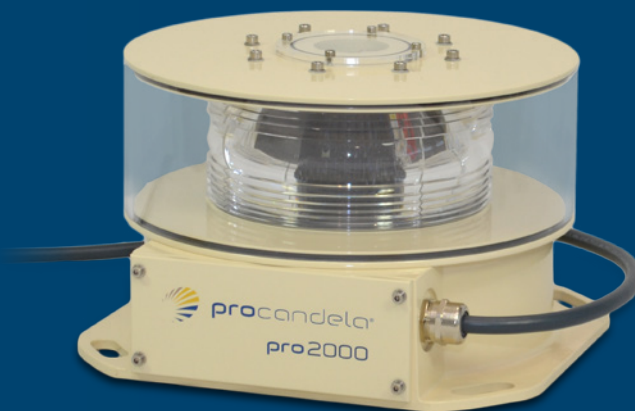to suit your needs

The pro-series
Night marking

Our pro-series is the result of rigorous further development of modern beaconing concepts. Integrated electronics and sensors transform each beacon into an independent beaconing system. Both variants for night marking form the basis of the series.

Technical Data	pro100	pro2000
Effective luminous	100 cd	2.000 cd
Illuminants	14 LEDs, red	36 LEDs, red
Power consumption	5 W (flashing)	7 W (flashing)
Dimensions	321 x 321 x 210 mm	321 x 321 x 210 mm
Weight	11,5 kg	11,5 kg
Approval	AVV; W,red ES	ICAO medium-intensity type B

![procandela logo]

pro100

pro2000

The pro-series
Daytime marking and combinations

Combinations of different light colours and strengths are also available for different national specifications in a housing format identical to the night marking variant and based on a stage with white daytime marking.

Technical Data	pro20A	pro20B	pro20BF*	pro20W
Effective luminous	20.000 cd	20.000cd (Day) 2.000cd (Night)	20.000cd (Day) 2.000cd (Night)	20.000cd (Tag) 100cd (Nacht)
Illuminants	48 LEDs, white	48 LEDs, white 36 LEDs, red	48 LEDs, white 36 LEDs, red	48 LEDs, weiß 14 LEDs, rot
Power consumption (flashing)	55W	55W (Day) 7W (Night)	49W (Day) 6W (Night)	55W (Tag) 5W (Nacht)
Dimensions	321 x 321 x 210 mm	321 x 321 x 320 mm	321 x 321 x 320 mm	321 x 321 x 320 mm
Weight	12 kg	15,5 kg	15,5 kg	15,5 kg
Approval	ICAO medium-intensity type A	ICAO medium-intensity type A+B	STAC (France)	ICAO medium-intensity type A + W,rot ES

*Corresponds to pro20B design, in certification

pro20 B

pro20 A

pro20 W

Obstacle beacons

Obstacle beacons are required to mark towers, supplement gondola marking or for marking other aviation obstacles. These design types are extremely varied.
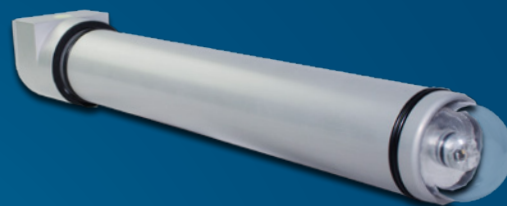
Technical Data	ETL03-H-N5	ETL03-H-N2	ETL03-Uni	ETL03-360
Effective luminous	10cd, 32cd, 50cd	10cd, 32cd, 50cd	10cd, 32cd, 50cd	10cd, 32cd
Illuminants	3 LEDs, red	3 LEDs, red	3 LEDs, red	6 LEDs, red
Power consumption	1,2 W, 2,5 W, 4 W	1,2 W, 2,5 W, 4 W	1,2 W, 2,5 W, 4 W	1,5 W, 4,5 W
Dimensions	Ø 16,5 x 109mm	Ø 50 x 402 mm	78 x 70 x 50 mm	100 x 115 x 70 mm
Weight	0,2 kg	1,0 kg	0,3 kg	0,8 kg
Emission	>180°	>180°	>180°	360°
Approval	AVV; Obstruction light ES ICAO low-intensity type A ICAO low-intensity type B	AVV; Obstruction light ES ICAO low-intensity type A ICAO low-intensity type B	AVV; Obstruction light ES ICAO low-intensity type A ICAO low-intensity type B	AVV; Obstruction light ES ICAO low-intensity type A ICAO low-intensity type B

Features
- Aluminium, seawater-resistant, anodised
- Various housing designs available: Screw fixing with flange, magnet fixing, push-through installation, special solutions, ...
- Simple installation
- Integrated fault contact facilitates fault monitoring
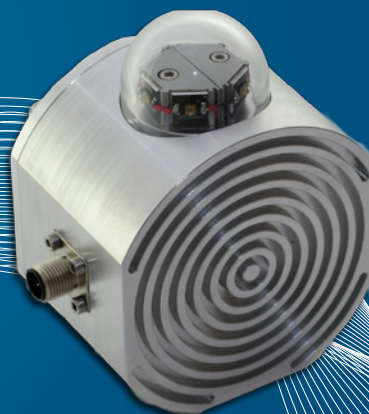- Low power consumption
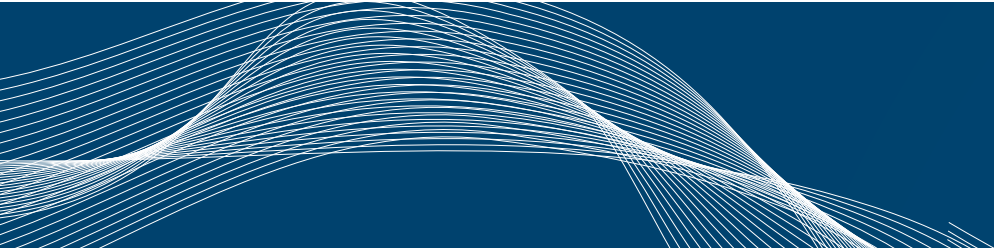
procandela®

ETL03-H-N5
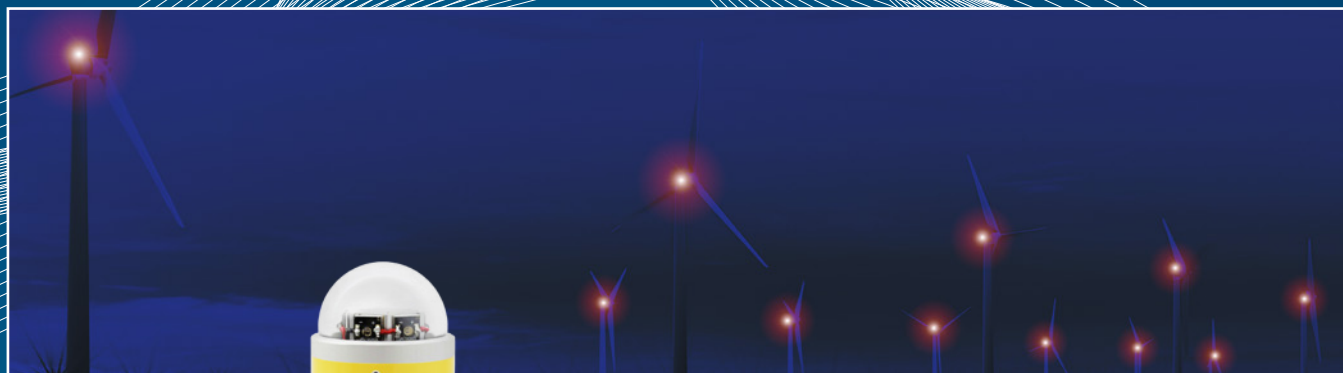
ETL03-H-N2

ETL03-Uni

ETL03-360

Infrared beacons (((IR)))

Obstacle beacons are required to mark towers, supplement gondola marking or for marking other aviation obstacles. These design types are extremely varied.
All infrared beacons operate with a wavelength of 850 nm, making them ideally suitable for the use of night vision devices.
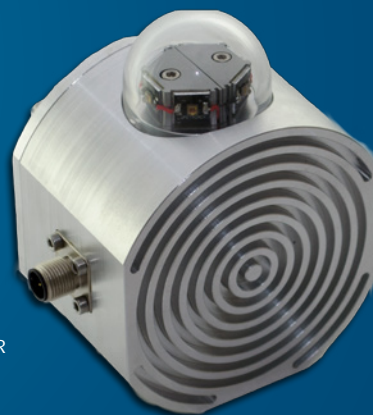
Technical Data	pro360-IR	ETL03-360-IR
Effective luminous	25 mW/sr - 600 mW/s	25 mW/sr - 600 mW/s
Illuminants	6 LEDs, infrared	6 LEDs, infrared
Wavelength	850 nm	850 nm
Power consumption	1,5 W, 18 W	1 W, 15 W
Dimensions	Ø 50 x 190 mm	100 x 115 x 70 mm
Weight	0,6 kg	0,8 kg
Emission	360°	360°
Approval	Trafi, MOD	Trafi, MOD

Features
- Aluminium, seawater-resistant, anodised
- Various housing designs available: Screw fixing with flange, magnet fixing, push-through installation, special solutions, ...
- Simple installation
- Integrated fault contact facilitates fault monitoring
- Low power consumption
- Compatible with night vision devices
- Combinations with red obstacle beacon levels available

pro32-360 IR

ETL03-360-IR

Control cabinet solutions

Control cabinets are required for the supply and actuation of pro-beacons. We recommend our reliable proBox or the intelligent proCoBox with the proControl remote monitoring system. The UPS capacity of systems can be modularly expanded using battery cabinets.

Technical Data	proBox	proCoBox	CP-B-52	CP-B-78
Function	Central control cabinet	Central control cabinet	Battery cabinet	Battery cabinet
Dimensions	500 x 500 x 210 mm	500 x 500 x 210 mm	500 x 500 x 210 mm	700 x 500 x 210 mm
Power supply	230VAC	230VAC	24VDC (Output)	24VDC
UPS time (load-dependent)	0 - 12 h	0 - 12 h	12-36h	12-48 h
Housing	Sheet steel, powder coated	Sheet steel, powder coated	Sheet steel, powder coated	Sheet steel, powder coated
Protection class	IP65	IP65	IP65	IP65
Remote monitoring	Status reports	Status reports / webserver	-	-

Control cabinet interfaces
- Up to 2 hazard beacons
- Tower beacon link
- WEA link
- Visibility measuring instrument
- UPS expansion

Features
- Proved industrial components
- Major UPS capacities available
- Modular structure facilitates retrofitting of functions
- Comprehensive product testing in accredited labs

![procandela logo]

CP-B-52

proBox

proCoBox

proControl

- Powerful control module with web server
- Network interface for status integration in WEA control and transmission of visibility data
- Intuitive user interface
- Remote control via web browser (PC, Mac, tablet, smartphone, etc.)
- Control of different parameters (e.g. flash rate, GPS offset, twilight threshold,...)
- Monitoring of visibility measurement
- Monitoring of beaconing system
- Automatic FTP upload of status logs possible
- Easy test option and commissioning of beaconing

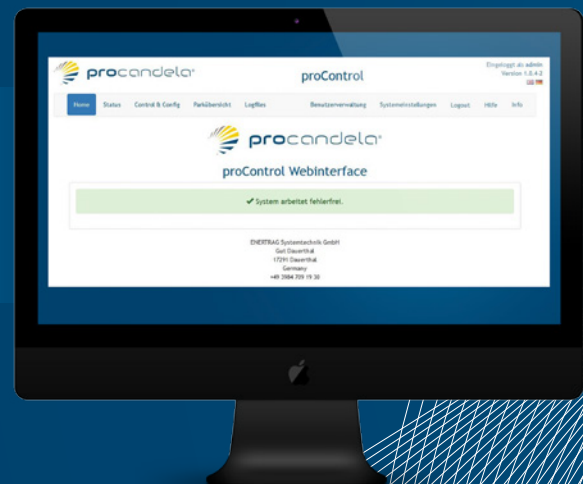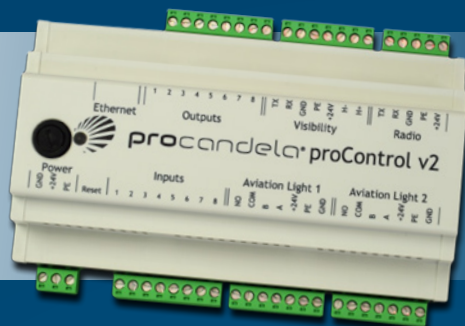# proControl: The smart solution for integration

Guided installation

With proControl, you are guided step by step through your system installation, ensuring commissioning only takes a few minutes. This browser-based system enables system accessing from anywhere at any time without the need for separate software.
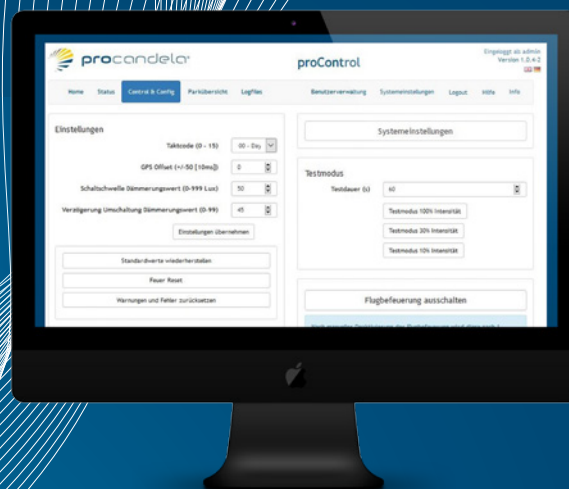
Detailed status monitoring

proControl automatically recognises the system status.
In the event of an alarm or fault, proControl indicates this to the operator in a clearly visible manner with detailed fault localisation.
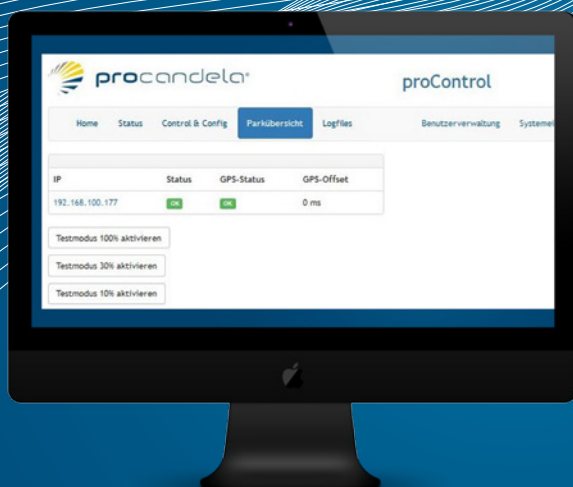
Intuitive configuration options

The proControl configuration menu enables on-site and remote configuration of the beaconing system, intuitive and complete. Service operations which were once commonplace for every modification request can be dispensed with, as you can configure the system remotely in just a few clicks.

Clear monitoring of beaconing

The proControl software provides an overview of all proCandela beaconing systems installed in the wind farm. This means that the functioning of all systems can be monitored at a glance.
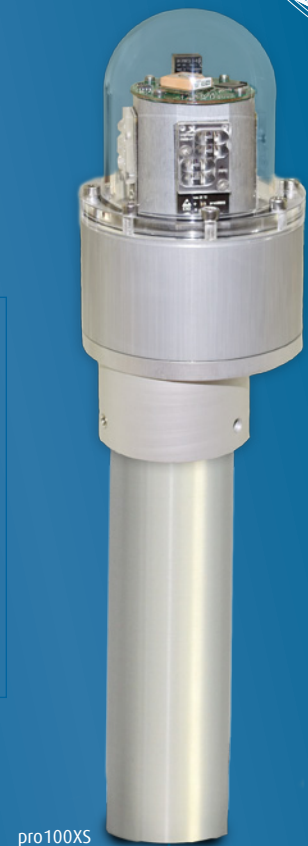
The proXS-series
pro100XS

The pro100XS beacon stands out from the serial concept behind the pro-series, providing the performance of a "W, red ES" beacon in a compact design. It is therefore particularly suitable for mounting on wind turbines to ensure that regulations governing the clearance to rotor blade tips which apply in Germany are observed.

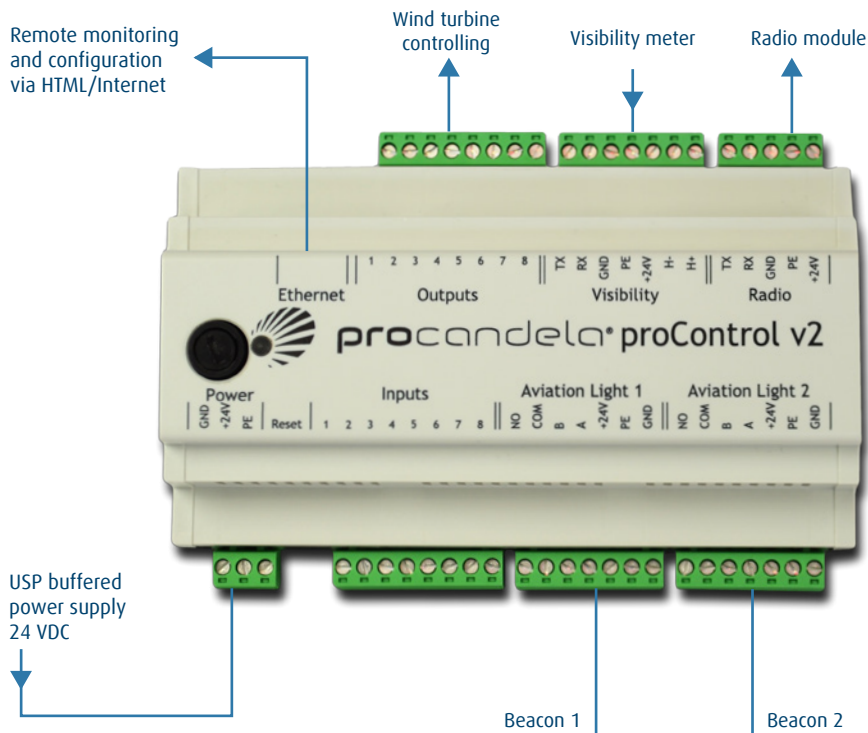| Technical Data	pro100XS
Effective luminous	100 cd
Illuminants	16 LEDs, red
Power consumption	2,8 W (flashing)
Temperature range	-40°C to +50°C
Housing	Anodized aluminium, seawater resistant
Protection class	IP 66
Dimensions (WxHxL)	Ø90 x 164 mm
Weight	0,7 kg
Power supply	24V DC
Approval	AVV; W, red ES

Features pro100XS

- Weight < 1 kg
- Power consumption < 5 W
- Plug-in mounting on tubular masts
- Cable routing in mast possible
- Connection via plug
- Integrated sensors for
- twilight and GPS
- Bus communication with control
- Compatible with proControl v2

pro100XS

![procandela logo]

proControl
proControl v2

proControl v2 combines the web server functions of the standard version with a few additional features for integration of the pro100XS beacon in existing system concepts. All control functions required to operate the beacons are provided in a single device. Consequently, beaconing concepts can be realised together with the customer without duplicating central functions such as UPS or overvoltage (surge) protection.

Remote monitoring and configuration via HTML/Internet

Wind turbine controlling

Visibility meter

Radio module

USP buffered power supply 24 VDC

Beacon 1

Beacon 2

Features proControl v2
- Connection of beacons via bus system
- Integrated fusing for beacon circuits
- Integrated overvoltage protection
- All connections of plug-in design
- Interface to optional radio module
- Guided start-up
- Preparation for airspex© remote control (user control station)

The proXS-series `NOVELTY`
pro2000XS

The pro2000XS adds a 2,000 cd red illuminating hazard beacon conforming to ICAO medium-intensity type B/C to the proXS series. The hazard beacon sets new standards in flight obstacle marking with a compact design, integrated electronics and intelligent cable routing. An interface to proControl v2 also means that the system can be controlled and completely monitored at a distance as part of an intelligent beaconing system!

Technical Data	pro2000XS
Effective luminous	2.000 cd
Illuminants	48 LEDs, red
Wavelength	Red: 625 nm
Power consumption	8 W (flashing)
Temperature range	-40°C bis +50°C
Housing	Anodized aluminium, seawater resistant
Protection class	IP 66
Dimensions	Ø100 x 220mm
Weight	1,0 kg
Power supply	24V DC
Approval	ICAO medium-intensity Type B/C*

pro2000XS

*in Vorbereitung

The proXS-series **NOVELTY**
pro100XS IR (((IR)))

The pro100XS IR adds an infrared level to the proXS series which can be operated parallel to "W, red" beaconing or as a stand-alone solution. Different performance classes ranging from 25mW/sr to 600mW/sr at a wavelength of 850nm, enabling flexible use to meet the most varied demands and best-possible visibility with and without night vision devices. An interface to proControl v2 also means that the system can be controlled and completely monitored at a distance as part of an intelligent beaconing system!

Technical Data	pro100XS IR
Effective luminous	100 cd + 25mW/sr to 600mW/sr
Illuminants	16 LEDs, red + 12 LEDs, Infrared
Wavelength	Red: 625nm + Infrared: 850nm
Power consumption	4W to 20W (flashing)
Temperature range	-40°C to +50°C
Housing	Anodized aluminium, seawater resistant
Protection class	IP 66
Dimensions	Ø100 x 200 mm
Weight	0,9 kg
Power supply	24V DC
Approval	AVV, W,red ES + Infrared Trafi* and MOD*

pro100XS IR

*in Vorbereitung

GPS SYNCHRONISATION

Studies have indicated that synchronised beaconing is a less intrusive solution and, for this reason, only synchronised beacons are permitted on wind turbines under current regulations. We use GPS receivers for synchronisation with the exact satellite time. We already support standard referencing to UTC 0.00 as a sequence starting point. This also ensures that we are at all times synchronised with other manufacturers.

VISIBILITY MEASUREMENT

Visibility measurement enables the reduction of light intensity for projects in Germany by up to 90% through determination of the meteorological visibility using special measuring instruments. One or more instruments are distributed in the wind farm for this purpose, with the data collected being exchanged via Ethernet or radio transmission. We have been using this technology for many years now, and it has become standard for projects on the German market.

NEEDS-BASED BEACONING

The needs-based activation of beacons is a simple concept which, however, first requires detection of air traffic in the surround area if it is to be realised. Our airspex® system solves this problem using primary radar, a proven and reliable technology. airspex© is the first product in Germany to be recognised by Deutsche Flugsicherung, the company responsible for air traffic control in Germany. It can therefore be used for needs-based marking with immediate effect.

SERVICES

INSTALLATION

A beaconing system is only as good as the quality of its installation. We continually optimise our systems with regard to user friendliness, but it is still sometimes advisable to entrust installation to a specialised team. We realise this task in a professional and cost-effective manner. This ensures that you enjoy reliable system operation right from the very first day.

MAINTENANCE

Does anybody know their system better than the manufacturer? You can trust us when it comes to the maintenance of beaconing or radar systems, replacement of wear parts or the conducting of regular inspections. Scheduled checking gives you the assurance you need and avoids any later repairs. Talk to us about a service contract or arrange your own individual maintenance concept.

REPAIR

Regardless of whether LED, xenon or halogen are involved, we have already used these technologies ourselves and are familiar with the numerous finer details of both older and newer systems. We are more than happy to try to repair a defective system again and, if this is not possible, we will be delighted to advise you on a cost-efficient overhaul with the latest components. We can even provide temporary solutions in situations where a speedy resolution is needed.

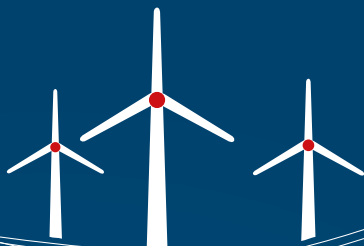procandela®

UPDATING
OBSTACLE BEACONING SYSTEMS

The prescribed marking of wind turbines is important for safe operation. An optimised, low-emission and reliably synchronised LED beaconing system pursuant to the latest regulations ensures long-term efficiency through low operating costs.

- Beacon pursuant to specification "W, red ES"
- Modern LED technology
- Low power consumption
- Sensors integrated in beacon
- Prepared for visibility measurement and user control station

OUR OFFER

A complete system consisting of two beacons, a control cabinet and accessories for retrofitting of night marking systems with the latest LED technology, including GPS synchronisation. Visibility measurement and installation optionally possible.

procandela®

OEM QUALITY – MADE IN GERMANY
MANY PRESTIGIOUS SYSTEM MANUFACTURERS TRUST IN PROCANDELA QUALITY!
WOULD YOU LIKE TO PROFIT FROM IT TOO?

procandela®

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