



Technosystem s.r.l.

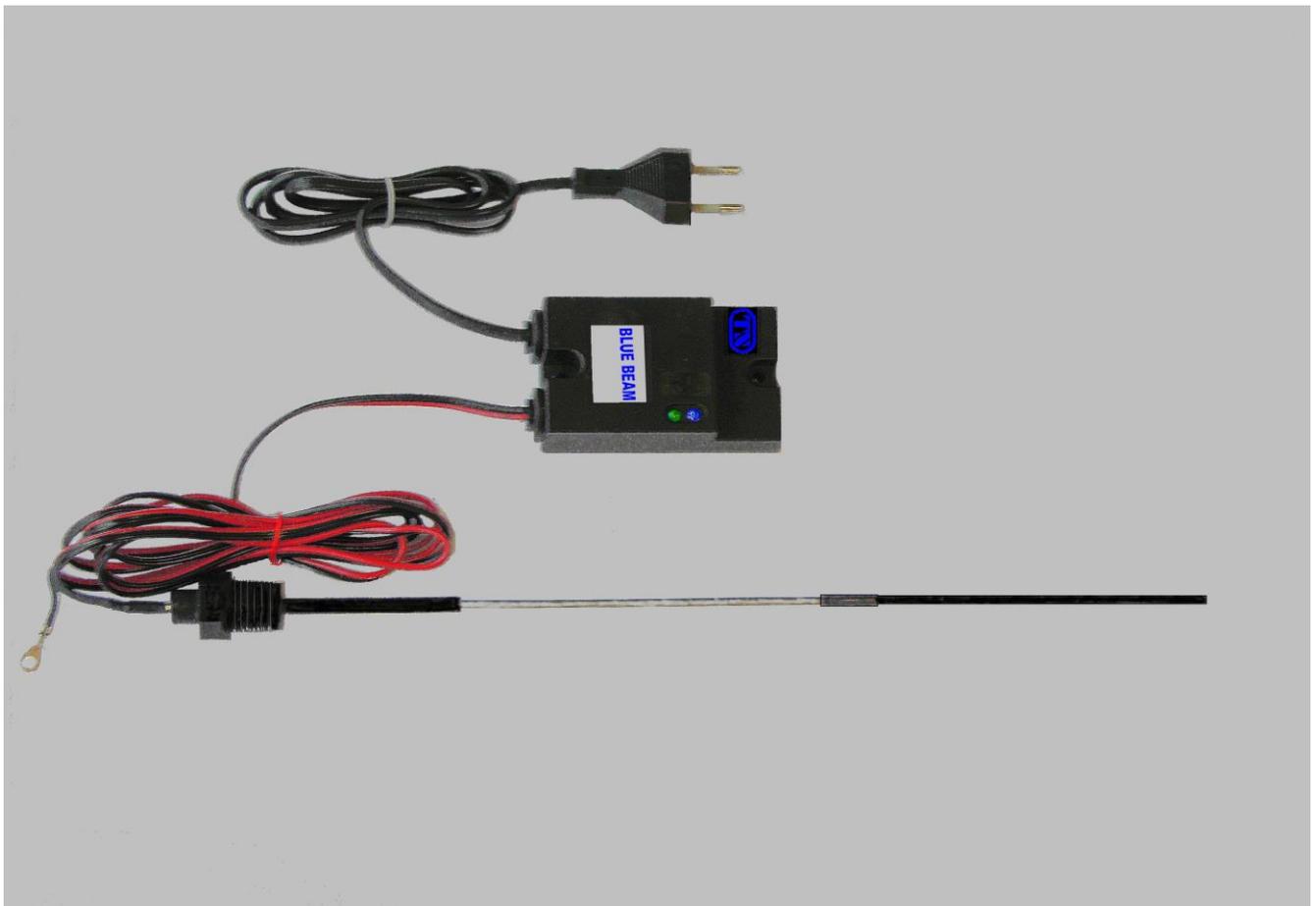
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BLUE BEAM

CATHODIC PROTECTION SYSTEM TO IMPRESSED CURRENT/ DSA





DYNAMIC SYSTEM FOR THE ACTIVE PROTECTION OF BOILERS AGAINST CORROSION

As every metallic structure in direct contact with water the tanks and boilers are subject to the phenomenon of corrosion. Electrochemical reactions provoke the degradation and the re-composition of the elements with which the metals are constituted, thus inevitably jeopardizing their structure. To improve the evident limitations of the protective technologies commonly used in the modern industry, Technosystem has achieved **Blue Beam**, an innovatory system of global protection. **Blue Beam** is able to integrate or to currently replace, in a complete and intelligent way, all the following protective solutions available on the market:

- **Treatment of the internal surfaces of the tanks through enamelling or vitrification.**

The passive protection of the tank realized with these proceedings is often incomplete. Also in respect of the limits imposed by the normative DIN 4753-3 (max. 7cmq/mq) the inside surface that has imperfections and absences of the enamelling annuls in fact the effectiveness of the treatment itself. The use of **Blue Beam** in combination with the treatment of the internal surfaces brings the protection degree of the tanks to its highest level.

- **Use of magnesium anodes**

Despite of being a technically valid solution the use of a magnesium anode introduces big limitations due to the periodic need of substitution because of its exhaustion. Although initially it may seem an economic solution, in little time it reveals as an onerous one and completely ineffective, unless the anode is replaced in due time. The duration of the anode depends on the chemical composition of the water and in the best of any hypotheses it does not exceed from 24 months. Being besides the structure of the magnesium more porous than that of the titanium, as confirmed by recent studies, the magnesium anode presents a fertile ground for harmful bacterial colonies to the health (for ex. the legionella pneumophila). The substitution of the magnesium anode by **Blue Beam** is the optimal solution under every profile. With this special anode of **activated titanium** no periodical substitutions for exhaustion are to be expected, neither any direct or undirect dangers of harmfulness for the health.

- **Employment of impressed current systems of analogic type**

The limit of these systems is intrinsic to their same nature. Having been projected in about the same years or at least on old concepts, their electronics is based in "discreet" components and of analogic type that in virtue of the continuous changes and rapid progress of the technology shows evident signs of aging.

The times of answer, the precision, the reliability, the flexibility and the energetic consumption of these systems belong by now to the prehistory.

Those that nowadays are considered essential requisites for an electronic system are absolutely unattainable targets for the analogic systems.

The flexibility offered by **Blue Beam**, understood as the possibility to adapt itself in an optimal way to the variable operating conditions is absolutely incomparable. **Blue Beam** maintains unchanged its own performances (speed, precision and reliability) even under extreme conditions, while the same performances drastically decay in the analogic systems.

Because of the current engraved systems need to have to work uninterruptedly to guarantee the correct protection of the tanks, **Blue Beam** has been projected to operate consuming little energy in any job conditions.



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DESCRIPTION OF THE **BLUE BEAM** SYSTEM

Blue Beam is the logic application of the method of **impressed current** protection, commonly defined as of "**active type**".

A direct current is sent by the device to the tank to be protected by means of a special anode of **activated titanium** placed in the same tank.

The heart of the system is the innovative electronics completely managed by a microprocessor of last generation able to reach performances until today unthinkable for this specific application.

An accurate firmware, developed on purpose by Technosystem S.r.l., that claims the **intellectual ownership** of the same, controls the perfect performance of the whole system.

The regulation of the value of the impressed current is based on a most efficient calculation algorithm which allows to check its correct intensity according to the instant degree of protection and the reaction time of the tank.

The reading of the potential value of the system, carried out through the same electrode of titanium, takes place in a dynamic mode, enabling once the equilibrium value is reached, to maintain the current flow without frequent interruptions or without, even if partial, intensity variations.

The ability of **Blue Beam** to self-learn and to regulate itself on the actual conditions of the structure submitted to its protection, allows a supply of impressed current in a dynamic way and perfectly balanced for the demands of the system to be protected.

The use of the microprocessor and the architecture of the software allow to **Blue Beam** the fastest times of action and answer that result in the attainment of the potential equilibrium point (state of protection), really unattainable on other impressed current systems.



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THE NATURE

Blue Beam is a "clean" and **ecologic system** respectful of the environment and of its problems, projected and developed to work consuming the smallest possible quantity of energy.

Particular attention has been paid to the level of power supply realized with switching technology which allows the descent of the consumption and maintenance costs, plus a substantial reduction of the weights and impediments, enabling all sorts of advantages about installation and transport.

These characteristics entitle **Blue Beam** as the ideal solution for the **solar system tanks** sharing with them their philosophy.

Obviously **Blue Beam** is also the optimal solution of the conventional type which includes :

- Electric boilers
- Gas Boilers
- Exchange boilers
- Coil pipe boilers

FLEXIBILITY

The intrinsic characteristics of the product allow **Blue Beam** to adapt itself to different conditions of application, such as:

- Different types of the boilers (steel / stainless steel)
- Dimensions
- Surfaces and positions of the exchangers
- Chemical characteristics pressure and temperatures of the water

Blue Beam can be personalized and accommodated in size for applications or particular requests of the customer, either being of commercial kind (regarding aesthetics and or writing) or technical (right size according to the structural features of the tank to be protected).



FUNCTIONS

- Dynamic regulation of the impressed current
- Signaling of the state of operation
- Signaling of the breakdowns or malfunctions

Dynamic regulation of the impressed current

The regulation of the value of current is effected through an algorithm by Technosystem, which allows to control the exact intensity, according to the degree of protection and to the reaction time of the tank, in order to reach and maintain the correct potential of protection in the smallest possible time.

The supply of current and the measures of potential happen through a single electrode made of activated titanium that is an essential and integral part of the whole system.

Besides the normal regulation, the device is able to detect and signal possible misfunctions of the system.

Signaling of the state of operation

The device includes two leds to show the state of operation.

When the protection system works correctly, the **green coloured L2** led shows the correct supply of the device while the **L1 blue coloured** led shows the state of distribution of the impressed current to the anode.

Diagnosis

Through the two above mentioned leds and through their opportune combinations any possible breakdowns on the protection circuit are signaled, as for instance a short circuit between the electrode and the tank, a non connected electrode, etc.

It has to be mentioned that these breakdown conditions do not result in any kind of damage to the device, which comes back to its normal performance, once the correct condition of operation is reestablished.

Signalings

L 1 blue	L 2 green	SIGNALING
OFF	OFF	DEVICE IN POWER OFF
ON / BLINK	ON	DEVICE IN OPERATION / CORRECTED PROTECTION
BLINK	BLINK	ELECTRODE IN SHORT-CIRCUIT (SIMULT. FLASH)
BLINK	BLINK	NON CONNECTED ELECTRODE / WATER FAIL (ALT. FLASH)



TECHNICAL CHARACTERISTICS

Electronics

Power supply	90 - 253Vac 50 - 60Hz
maximum absorption	3W
maximum voltage out	20Vdc
maximum current out.....	100 mAdc
operating temperature	-10 – 85°C.
degree of protection	IP44
mechanical dimensions	85x55x26mm
position of installation.....	any position
length cable of power supply	1mt
length cable electrode (+).....	2,5 mt
length cable ground (-).....	2,5 mt

Electrode

electrode of protection	titanium activated diam. 3mm
fixing.....	1/2"
tightening torque	max. 25 Nm
total length	type <u>A =200 mm</u> / type <u>B =250 mm</u> type <u>C =375 mm</u> / type <u>D =700 mm</u>
activation length.....	type <u>A =50 mm</u> / type <u>B =75 mm</u> type <u>C =125 mm</u> / type <u>D =200 mm</u>

operating temperature

.....	-10 – 100°C.
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Connections

cable of power supply	cable double insulation tmax 105°C.
type of connection.....	electrical plug 2 poles 10A
protection cable	flat cable 2x0,50mm red / black (red cable: electrode)
electrode connection	special contact diam. 3mm
tank connection	buttonhole terminal diam. 5mm.

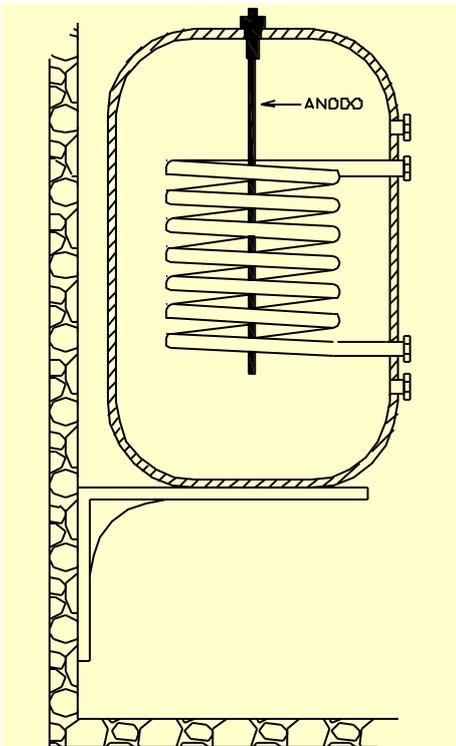
Installation note:

- all the fixing, connection and maintenance operations must be done with the device at **power off**.
- secure the adequate lodging of the device, as well as that it remains free of water spray, sources of direct heat, etc.
- Do not open the device: inside there are no parts to be replaced.
- Do not reverse the connections electrode-tank.
- Do not connect the cables electrode-tank to other power cables, to look for alternative circuits to guarantee the maximum immunity to interferences.

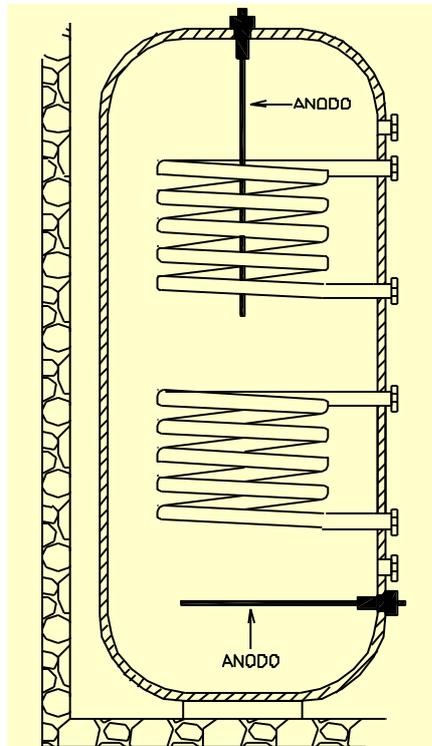


TYPICAL APPLICATIONS

Tank to single heat exchanger



Tank to double heat exchanger



Electric boiler

