ZM50 Zeromag demagnetizer

Dynamic magnetism control to stop arc blow

For subsea habitat operations

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www.diverse-technologies.net

Applications using Zeromag

- Overcoming Arc blow
- Pipe butt welding
- Plate and pressure vessel welding
- Use with TIG, MIG, MMA and Sub-arc processes
- Dynamic compensation in variable fields

Features

- Portable low cost weld preparation demagnetism
- 100% success rate
- Cancels magnetism to prevent arc blow
- Uses proprietary DIVERSE technology
- Reduces or eliminates weld repairs caused by magnetic arc blow
- Compact rugged construction
- Can be used in conjunction with preheat
- Rapidly deployed and simple to operate

Overview

The Diverse ZEROMAG measures and neutralizes magnetic fields which may be present in the weld preparation region of mating steel components.

The Zeromag ZM50 is designed to demagnetize pipes in subsea habitat environments. Zeromag ZM50, working with up to 100m of demagnetizing cable can provide the necessary reverse magnetic field for most pipe and plate welding scenarios. The ZM50 has a power output of 1.5KW and can be used with any ac supply from 90V to 265V. Normally specified to be used with the Zermag Clam coils, the ZM50 can typically balance up to 500G in steel components allowing welding to proceed without problem when, without Zeromag, welding would be totally impossible.

Zeromag ZM50 is cased in stainless steel, with a compression gasket sealing the front panel. Although not sealed to immersion levels it is rated to IP54B can be used in sub sea welding chambers to 15m. Zeromag can be used hyperbarically to any depth provided it is in a pressurised case at 1 ATM. It has its own cooling and does not require any other services. It weighs 36Kg, which means that it can easily be moved on and off vessel and from site to site.

There are a range of clam coil cables for fast deployment of the demagnetizing cable. They provide 25 turns with a single action cam; diameter is specific to customer requirements. For preheat weld scenarios there is an insulating blanket available.

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Technical overview

Background

The Zeromag system finds its key application in arc welding. Magnetic fields may cause arc instability, and at worst can cause magnetic arc blow. The fields can be caused by induction of the earth's magnetic field in large structures and pipes. Alternatively, the steel may be magnetised at manufacture or by the use of magnetic clamps or magnetic pipe pigs.

Arc blow occurs when welding is attempted in the presence of a magnetic field. Some processes are more prone to arc blow than others, but TIG welding is particularly sensitive. Disruption of the welding arc generally occurs in a magnetic field of greater than 20 gauss. Arc blow can be expected with magnetic fields of greater than 40 gauss.

The shape of the weld prep effects the shape and direction of the magnetic field, often magnifying the magnetic effect over 100 times. The effect of shape can be extended to the shape of the cut of the pipe: if cut at an angle then there will be preferential routes for the magnetic flux which will concentrate in specific zones.

The Zeromag ZM50 is at the heart of the of the system It is light, fast and simple to use. Simply the best way to remove magnetism for pipe welders.

This is the system favoured by many of the worlds leading pipe welders and has a 100% success record, excellent post sales support and a variety of options.

Applications

One of the most attractive features of Zeromag is its simplicity of use: simply wind the demagnetizing cables around the pipe (or over the surface if working with plate steel) site the magnetic sensing probe and press start. Welding can then proceed with a near zero magnetic field.

Usually Zeromag is only used when magnetism is encountered so is not normally made part of the pre job weld validation process. For critical welding tasks where validation is obligatory, the important point about Zeromag is that it does not change the state of the pipe, and only reduces magnetism to the levels used at validation allowing approvals all previously obtained approvals to be valid.

Typical applications are sub sea pipelines, tie-ins, subsea structures and oil and gas drilling operations,

Options

The ZM50 is the basic instrument. It is available in 50A and 100A versions and includes all cables and gaussmeter probe. Diverse recommend the robust Magmeter MF300H+ gaussmeter for assessment of magnetic field in weld preps.

For some applications it is useful to have one or more of the Zeromag optional products:

Clam coils used for joint degauss

ZM150 Pipe end/joint degauss controller

Bobbins used for pipe end degauss

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ZM50 Performance Specification

Magnetic field reduction	Typically reduced 20x for most weld scenarios magnetic field reduced to <10 Gauss
Gaussmeter measurement range	0 to +/-1800 Gauss
Resolution	1 Gauss
Magnetic Probe Size	5mm x 20mm x 100mm long. Encased in stainless steel
Controls	Auto/Manual switch 2 push buttons to start and stop automatic mode Manual adjustment control used for manual override Gaussmeter null
Current Output range	0 to +/-50 Amps max Option: 0 to +/-100 Amps max
Output voltage range	0V to 18V
Magnetic field nulling time	3 seconds typical
Manual Control	-50A to +50A continuously variable with 10 turn control Option: -100A to +100A
Auto Control	Auto-tracking and nulling of magnetic field
Line Power	Line voltage range 90V - 265V ac 48 - 62Hz Power 1.8kVA
Temperature - operating	-20C to 50C
Temperature - storage	-40C to 85C
Humidity	0 - 90%, non-condensing
Environmental	Not water proof so do not operate or store in a wet environment
Weight	36kg
Dimensions diaxH	370 x 580mm
Storage/shipping case dimensions Zeromag Accessories	 WxLxH 50 x 50 x 75, weight 47kg WxLxH 62 x 26 x 53, weight 30kg
Calibration	Calibrated by Diverse to NPL traceable standard
Housing	Stainless steel construction outside. Inside assembly is stainless steel and painted aluminium. Unit has a welded circular handle to facilitate handling.
Demagnetizing cable:	50m + 50m. Options: bobbins and clam coils
EMC	N/A ZM100A validated to CE and FCC standards for emissions and immunity
Warranty	12 months