

### Applications overcoming arc blow

- Pipe butt welds
- Tie ins
- Plate or large diameter pipe
- Pipe end degauss
- Weld joint degauss



### Features

- Simple manual magnetic field nulling control
- Fast 2 button automatic mode, start and stop
- Built in gaussmeter
- Rugged air cooled stainless steel probe
- 50m demagnetizing cable
- 50m extension for demagnetizing cable
- Options for bobbins for specific pipe size
- Options for clam coils for specific pipe size
- Supplied in strong aluminium 4U case
- Calibration to NPL traceable standard
- Supplied with a protective shipping and storage cases

### Overview

Everything needed to overcome magnetic arc blow in one package. At its heart the world leading Zeromag machine which measures and neutralizes magnetic fields which may be present in the weld preparation region of mating steel components. This is a portable machine that can be carried by one person to the site where it is needed. The kit comprises:

- Zeromag ZM100A demagnetizer
- Air cooled magnetic probe
- Demagnetizing cable
- Magmeter MF300H+ gaussmeter
- Demagnetizing and probe extension cables
- Storage and shipping cases

The Zeromag ZM100A is designed to demagnetize pipes. Zeromag ZM100A, working with up to 100m of demagnetizing cable can provide the necessary reverse magnetic field for most pipe welding scenarios. The ZM100A has a power output of 1.5KW and can be used with any ac supply from 90V to 265V. Zeromag can balance up to 1000G in steel components allowing welding to proceed without problem hen, without Zeromag, welding would be totally impossible. Zeromag can be used in sub sea welding chambers to 15m.

Zeromag can be used hyperbarically if it is in a pressurised case. It has its own cooling and does not require any other services. It weighs approx 25Kg, which means that it can easily be moved from site to site.

Other components of the kit include the MF300H+, the tool of choice for measuring in magnetism in weld preparations.

The ZM2PG air cooled probe is built from stainless steel and is sufficiently robust that it can be used close to active welding in the weld prep.

A full cable set of demagnetizing cables and extension cables is provided.

Finally, the whole kit is supplied in 2 robust packing cases for transport and storage.

## DKPW: Performance Specification

Magnetic field reduction	Typically reduced 20x for most weld scenarios magnetic field reduced to <10 Gauss
Maximum static field that can be nulled	1800 Gauss (depends on pipe material and geometry)
Range of pipe sizes	For circumferential winding any diameter up to 2m. For lay on coils coils no restriction including plate
Minimum size of weld prep	5mm operating, 2mm at setup
Magnetic field nulling time	3 seconds typical
Space from weld line to demagnetizing cables	0.5m typical
Weld passes	Always use on root pass - check field levels for additional passes
Materials	All ferritic steels, bonded lined pipes with stainless steel or inconel, high nickel or chrome steels
Material or wall thickness	Unlimited - but thick material requires longer to get good nulling field penetration
Welding types	TIG, MIG, (GMAW), stick, FCAW
Auto welders/bots/robot welders	Deploy probe on the weld head
Pre-heat temperature	to 85C. Above this insulating blankets required for the demagnetizing cables (available from Diverse)
Environmental	-Temperature -20C to 50C For arctic operations there is a case heating option. Humidity 0-90% non condensing Not water proof so do not operate or store in a wet environment
Sub sea	The equipment is not hyperbaric - operation in sub sea dry environments to a maximum depth of 50 feet.
Support	Call/email Diverse for support for use of DKPW for different weld scenarios
Training	One day of training application and hands on training available



### Components of the system

#### Zeromag ZM100A

The Zeromag ZM100A is at the heart of the DKPW. It is light, fast and simple to use. Simply the best way to remove magnetism for pipe welders.



In manual mode, the user has full control over the demagnetizing current allowing accurate trimming of the magnetic field to zero. In automatic mode Zeromag takes control of the reversing current. For the user there are just 2 operating buttons: GO and STOP!

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

#### Air cooled probe ZM2PG and extension cable

The probe senses the magnetic field close to where the welding takes place. This is a harsh environment and the Zeromag probe is up to the task. The sensitive element is embedded in stainless steel and the air cooling system allows the probe to be kept at ambient temperature without placing any thermal compromise on the welding operation. The extension cable is useful for large diameter pipes or if Zeromag is to be operated away from the job. Additional extension cables can be added for larger distances.



#### Demagnetizing cables

ZM2DMC is 50m of heavy duty demagnetizing cable and connectors suitable for use in the harsh welding environment. The ZM2CE extension cable is also 50m but is designed to extend the ZM2DMC to give a total cable length of 100m.

The demagnetizing cables are suitable for low temperature pre-heat. For pre-heat above 80C then insulation blankets should be used.

#### Magmeter MF300H+

The MF300H+ is a gaussmeter, but it is not a delicate instrument. It is a robust handheld device with a strong slim stainless steel probe ideal for use at the root of weld preps. Key features include autoranging, a choice of measurement units and a robust carry case.



This is an ideal instrument to assess whether demagnetizing is required. Its tough slim probe can be used into the bottom of a 'V' or 'J' prep to give an accurate measurement of what field the welder will have.

#### Options

The DKPW can be extended with the ZM150 degauss unit, clam coils and bobbins - see application discussion for more information.



## Applications of the DKPW

The DKPW can be used in a wide variety of pipe and plate welding applications e.g.

### Pipe laying

The DKPW is the tool of choice for both on-shore and lay barge pip laying. It is used by many of the world's leading petrochemical and oil project companies. It can be used on an ad hoc basis to guarantee that welding will never stop because of arc blow. However, many of our users deploy the DKPW within the production environment so that it is used for every joint. The reason is that even low levels of magnetism can cause unwanted arc wander and result in zones of porosity which will need to be ground out and re-welded. With Zeromag deployed this situation never occurs so overall production rates are increased and weld quality improves.



For any demagnetizing job, it is essential to understand the magnitude and sign of the magnetic field; this then allows an informed choice of demagnetizing method. The Diverse Magmeter MF300H+ is a robust tool for measuring magnetic fields at the ends of pipes or in narrow weld preps. Rather than using a delicate ceramic detector, the MF300H+ uses a high performance semiconductor encased in stainless steel.



### Tie ins to old pipe

Tie ins to old pipes can present some very difficult problems. The pipe that has been in the ground for a time will become magnetized by the earth's magnetic field, especially if its lay is north to south. This does not matter until welding a new section or T-joints to it when the high magnetic field can completely prevent welding. The DKPW has been used on some tie in projects especially for natural gas where magnetic field levels have exceeded 1000 gauss (note that for welding it is important that the field should be less than 50 gauss).

### Plate and large diameter pipe

For plate steel and steel used for large diameter pipes it is not possible to wind the demagnetizing cables around. The way in which the equipment can be deployed is to use a non-magnetic framework with the demagnetizing cables pre-wound on the frame.

In use, the frame is brought to the plate and welding progresses along a line central to the frame. This technique is used for LNG or gas tank construction.



### Production scenarios

In production, eg. Spool or pipe lay barge, Zeromag is only really required for the first few passes. Consequently it is often deployed at these stations only, with the demagnetizing cable applied through bobbins or clam coils. These stay in place as the pipe is fed forward.

### Pipe end and joint degauss

Often the need for high production throughput demands the fastest possible demagnetization. The ZM150 degauss add-on for Zeromag allows pipe end or joint degauss. For pipe end degauss, the end of the pipes to be joined is processed ahead of welding so that the field is substantially reduced. The magnetism will return from the rest of the pipe after a few hours.

Potentially the fastest production method is joint degauss, where clam coils are placed over the joint to be degaussed, a fast single loop degauss is programmed into the ZM150, and within about 1 minute the joint is ready for magnetism free welding. This process can be repeated as required.

### General purpose demagnetizing

The DKPW can be used for more general demagnetizing, but its application is dependent on the material and geometry of the job. Diverse would be pleased to discuss any specific application areas.



**DKPW: Zeromag ZM100A 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
Current Output range	0 to +/-100 Amps max
Output voltage range	0V to 15V
Magnetic field nulling time	3 seconds typical
Manual Control	-100A to +100A continuously variable with 10 turn control
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
Weight	26kg
Dimensions WxLxH	520 x 220 x 550mm
Storage/shipping case dimensions Zeromag Accessories	WxLxH 62 x 26 x 63, weight 35kg WxLxH 62 x 26 x 53, weight 28kg
Calibration	Calibrated by Diverse to NPL traceable standard
Housing	Built into a carrying case to enable it to be used on site; 19" portable rack, 4U
Demagnetizing cable:	50m + 50m. Options: bobbins and clam coils
EMC	CE approved for emissions and immunity standards
Warranty	12 months

**DKPW Magmeter MF300H+ Specification**

Manual Ranges: (Full scale)	0-19990 gauss in 3 ranges
Auto range:	Automatically adjusts range with field
Measurements modes	Average, absolute peak, bipolar peak, true RMS
Probe size	2.2mm x 6.5mm 100mm long
Probe cable length	1.5m typical
Power:	4 standard AA cells , typical lifetime 12 months. Continuous use 30 hours
Instrument size:	165 x 100 x 50mm
Weight in case:	1.1kg
Environmental:	-20 to 50C operating, -20 to 80C storage
Humidity	0-90% non condensing
Warranty	12 months