

# MAGAZON EBU / SBU SERIES

## MAGNETIC PARTICLE INSPECTION (MPI) BENCHES



Baugh & Weedon Ltd is a trusted supplier of MPI equipment to the NDT industry. Their MAGAZON series of benches have a proven track record for reliability and durability, and are in daily use by most of the leading UK Aerospace companies. The MAGAZON series offers testing for components of all sizes that require substantial magnetising currents.

Our benches are available in varying sizes, a wide range of magnetising modes and current waveforms with a variety of accessories and ancillary equipment. Our build designs allow the freedom to build benches to individual specifications offering the optimum combination of technical and commercial satisfaction.

## Construction

The Magazon MPI Benches are fitted with a stainless steel drain tank and grills (hardwood grills are available on request), incorporating the fixed position headstock and moveable tailstock. The Power Pack is integrally mounted underneath encased in a heavy duty steel cabinet. The cabinet itself is then fitted to a steel plinth that means the whole bench can be easily moved with a fork lift truck.

On the Magazon SBU the clamping pressure can be reduced, which affords the protection of delicate components. A “small piece device” can also be fitted, which enables the rotation of components for easy viewing. For heavier test pieces support rollers mounted on the bed bars are available.

## Controls & Metering

The SBU and its larger counterpart, the EBU, share the same control and digital ammeters. The control panel is designed to reflect your application, with buttons being assigned to work in conjunction with your needs. Digital metering is standard on all units and can be calibrated to display the output current in PEAK, RMS, or 2xMEAN. Two meters are provided, each with independent control. One meter displays HEAD current, and the other displays FLUX/COIL current.

The Magazon SBU has a universal, microprocessor based, electronic system which allows many additional features to be incorporated including current pre-selection and built-in memory for up to 99 sets of test parameters.

## Power Packs

For the Magazon SBU, a nominal 2500A power pack provides AC, with HWDC (half wave rectified) and single phase, or 3-phase FWDC (full wave rectified) waveforms as options. The provision of HWDC (half wave rectified) or FWDC (full wave rectified) waveforms can also be accommodated.

On standard models infinitely variable current control is achieved using thyristors resulting in a complex current waveform. However, where a sinusoidal waveform is required for compliance with some test specifications, the option of variable transformer control is available for both the Magazon SBU and EBU.



## Production Line Operation

Where an SBU MPI Bench is required as part of a production line with a high volume of components to inspect there are additional options that can be added to a standard bench to assist with this:

- **Multi-directional magnetising or “Swinging Field”** allows two magnetising circuits to operate simultaneously, eliminating the need for multiple “shots”. Defects in any orientation are highlighted in a single operation and consequently only one viewing is necessary.
- **Automatic Sequencing** provides a degree of automation which can be selected depending on the application. A semi-automated sequence would limit operator involvement to loading the test piece, initiating the cycle and unloading. The normal sequence of clamping, inking, magnetising and unclamping can be achieved automatically. During this process the operator has time to inspect the previously magnetised component.

## Ink Application & Inspection

The **MAGAZON Series** is suitable for use with either kerosene or water based magnetic particle inspection inks. Ink is applied to the test piece by a manually controlled spray or from an overhead shower, with timed control related to the magnetising shot. Excess ink drains to a separate free standing stainless steel reservoir, fitted with an integral pumped recirculation system which maintains the particles in suspension. The inking system is a self contained unit with its own controls mounted on the reservoir to assist emptying and cleaning.

Where fluorescent inks are specified, inspection conditions are critical. To satisfy specified lighting requirements ultraviolet lamps and a viewing canopy are available. The free standing canopy consists of a metal frame covered in a heavy flame-resistant material with front opening curtains, and can enclose a sufficient area to include an inspection station or a supply of test pieces. The canopy has an extractor fan, white light and power point for the ultraviolet lamp, fitted as standard.

## Optional Features EBU

A wide range of additional equipment may be fitted to or powered by a **MAGAZON EBU series**:

- **Encircling Coils.** A range of interchangeable encircling coils is available. The coil carriage is track mounted at the rear of the bench and is adjustable in height. It can accommodate coils with internal diameters between 300mm and 600mm, while maintaining the centre of the contact pads in line with the coil centre. Head and tailstock design allows coil “parking” behind the faceplate affording clear access to a testpiece. If the coil is not in use it can be folded back, out of the way. Round or square split coils, mounted directly to the bedbars, can also be supplied.
- **Flux Coils.** Magnetising coils with laminated cores built into the head and tailstock provide the “x Flow” or “Mag Flow”.
- **Special Coils.** Alternative coils to meet special applications can be supplied, either mounted on the bench, or on a separate free-standing frame. These include spiral or “pancake” coils, encircling coils with laminated cores and split coils, or knife switch coils, with a turntable to rotate the testpiece.
- **Remote Magnetising.** Components which are difficult to load because of their size or shape can be magnetised off the bench. Output sockets allow the bench power supply to be connected to prods, leeches or wrapped cables.



- **Testpiece Supports.** V-block supports are fitted to the head and tailstock as standard. Adjustable support rollers fitted to the head or tailstock, or mounted on the bed bars, can be supplied. A small piece device affords protection to delicate components is also available.

- **Inspection Hoods.** Ultra Violet viewing canopies manufactured using a stainless steel frame with a covering of 650gm black pvc and front opening curtains, incorporating air extraction and white light, with the option of LED UV lighting if specified.



## SPECIFICATIONS

Specification subject to change without notice.

	Standard Models	Options & Alternatives
<b>Power Pack</b>	EBU: AC waveform with rated output currents as follows:- 1) 3 Series - 3000 A (RMS). 2) 5 Series - 5000A (RMS). SBU: AC waveform, rated output current of 2500 A (RMS). EBU/SBU: Magnetic amperage selectable.	EBU: HWDC (half wave rectified) and single or 3 phase FWDC (full wave rectified) waveforms. SBU: HWDC (half wave rectified) and single phase FWDC (full wave rectified) waveforms. EBU/SBU: Low Current option, 100 Amps. 100 Amps repeatable.
<b>Current Flow Magnetising</b>	EBU: Max nominal outputs AC:- 1) 3 Series - 4200 A (peak) 2) 5 Series - 7000A (peak) measured through a standard shunt. Carriage mounted, 5 turn, 300mm to 600mm ID, length 120mm. SBU: Max output nominal 3500 AC (peak), measured through A standard shunt.	EBU: Max nominal outputs HWDC: 1) 3 Series - 4200 A (peak) 2) 5 Series 7000 A (peak) measured through a standard shunt. SBU: Max output nominal 2800 A FWDC (peak) 3) Current (amperage) "on" safety indicator light.
<b>Encircling Coil Magnetising</b>	Carriage mounted, 5 turn, 300mm ID coil, length 100mm. Magnetising: EBU: Nominal maximum output/centre field strength in an empty coil. 1) 3 Series - 6000 A/T AC (RMS) / 34 kA/m. 2) 5 Series - 9000 A/T AC (RMS) / 47 kA/m. 3) 6 Series - 12500 A/T (Mean) with Quick Break. Coil can be parked at either head or tailstock, or folded away. SBU: Carriage mounted, 5 turn, 12" ID coil, length 4". Nominal maximum output / centre field strength in an empty coil. 4200 AT AC (RMS) / 17.5 kA/m. Coil can be parked at either head or tailstock.	EBU: Alternative sizes 400, 500 and 600mm ID. SBU: Max output nominal 5400 AT HWDC (peak) for a 300mm coil. Smaller ID coils for clamping between head and tailstock.
<b>Flux Flow Magnetising</b>	n/a	EBU & SBU: Head and tailstock integral flux coils powered by AC, HWDC, single or 3-phase FWDC.
<b>Multi-Directional Magnetising</b>	n/a	EBU & SBU: Swinging Field: Simultaneous operation of two Magnetising: magnetising circuits, to produce a "swinging field" or rotating vector.
<b>Current Control System</b>	EBU & SBU: Variable thyristor, with resulting complex waveform. Control System: Manufacturer's proprietary system.	EBU & SBU: A variable transformer can be fitted to provide a sinusoidal current waveform. Control System: Programmable Logic Controller.
<b>Working Range</b>	EBU & SBU: Current range: 10% to 100% of maximum output.	EBU: Extended working range subject to requirements. SBU: Extended working range down to 150 A (peak) minimum.
<b>Metering</b>	EBU & SBU: Digital metering, calibrated to display PEAK, RMS or 2 x MEAN, within 5% over working range to meet customer requirements.	EBU: AC output displayed as rms (variable transformer only). HWDC and FWDC output displayed as peak. SBU: AC output displayed as rms (variable transformer only). HWDC and FWDC output displayed as peak. Calibration outside working range:- 150 to 350 A (peak): 10%
<b>Shot Time</b>	EBU & SBU: Pre-set single shot of 1, 2 or 3 seconds (other timings can be accommodated).	EBU & SBU: Any shot-time combination can be catered for, including multiple shots.
<b>Duty Cycle</b>	Dynamic duty cycle from 20% at maximum output, to 100% at around 1000A PEAK.	n/a
<b>Max "ON" Time</b>	EBU & SBU: 3 seconds at 20% duty cycle.	n/a
<b>Demagnetising</b>	EBU & SBU: Automatic decaying AC DEMAG.	EBU only: FWDC DEMAG: Low frequency, reversing polarity, current step-down method.
<b>Headstock</b>	EBU: Pneumatically operated, manual control. Clamping stroke: 25mm. Flexible Copper Contact pads: 160mm x 160mm, with V-Block. SBU: Pneumatically operated, manual control. Clamping stroke: 25mm. Flexible Copper Contact pads: 100mm x 100mm. Adjustable clamping pressure (optional).	EBU: Special designs of faceplate and contact pads available. SBU: Foot switch operation. Alternative clamping travel.
<b>Tailstock</b>	EBU & SBU: Fully adjustable, manual positioning over entire bed length. Manual quick release locking mechanism.	n/a
<b>Testpiece Support</b>	EBU: V-blocks on head and tailstocks. SBU: V-blocks on head and tailstocks.	EBU: Integrally mounted roller supports. Removable small. piece device for rotating delicate components. Bed bar mounted adjustable supports. SBU: Removable small piece device for rotating delicate components. Bed bar mounted adjustable support.
<b>Inking System</b>	Ink Tank: 13.2 (US gal) stainless steel (covered) reservoir with external re-circulating pump, manual application & integral controls. Magnetization Activation: foot switch and panel button. Manual application gun, with ergonomic trigger.	EBU & SBU: Automatic inking as part of the automated process sequence. Magnetization Activation: Hip/push bar or wireless remote or two-handed safety switches.
<b>Services: Power Supply</b>	EBU: 380/415V 50 Hz, 3 phase + neutral + earth, current drawn as follows: 1) 3 Series - 100A max. 2) 5 Series - 200A max. SBU: 230V 50 Hz, 1-phase + neutral + earth, current drawn approx 60 A. 230V 50Hz, 2-phase + neutral + earth, current drawn approx 30A.	EBU only: 3 phase supplies between 200 - 650 volts, 50/60Hz units can be supplied. SBU only: The multi-directional magnetising option requires 415 V, 50 Hz, 3 phase + neutral + earth: Current drawn approx 65 MAX
<b>Air Supply</b>	EBU & SBU: 6 bar. (FR unit fitted as standard).	n/a
<b>Manufacturing Standards</b>	CE Certified.	Manufactured to further International Standards, details available on request, e.g. UL, CSA.

<b>Max Testpiece:</b>	EBU: 1000 1500 2000 2500 3000	SBU: 800 1000 1200
Length (mm):	1000 1500 2000 2500 3000	800 1000 1200
Weight (kg):	250 250 250 250 250	25 25 25
<b>Equipment Dimensions:</b>		
Width (mm):	2000 2500 3000 3500 4000	1400 1600 1800
Depth (mm):	850 850 850 850 850	650 650 650
Height to bed bar (mm):	885 885 885 885 885	975 975 975
Bed to pad centre (mm):	430 430 430 430 430	200 200 200

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