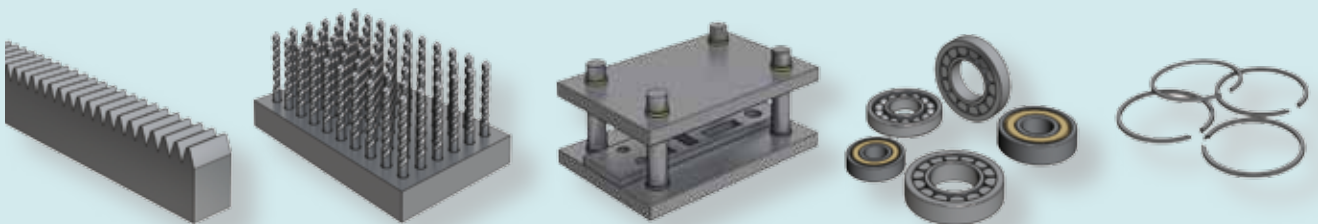


Degaussing

For Work Pieces from 1 g to 4000 kg

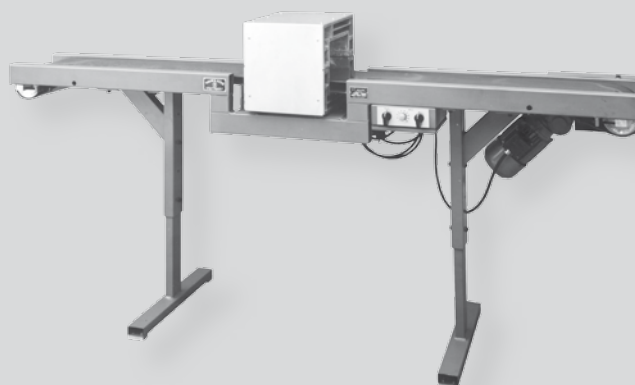
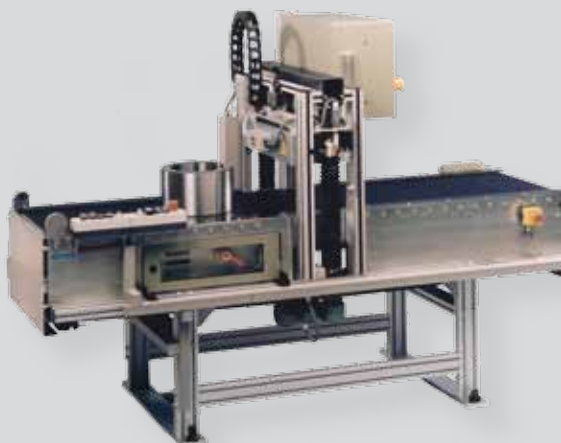


2015

More than four decades of degaussing solutions

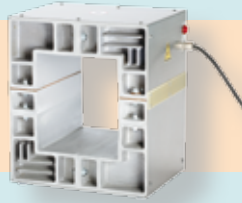
Vallon GmbH

Develops and produces degaussing tools and degaussing systems. Our experience of more than 40 years allows us to offer a versatile and high-capacity product range. Besides our standard degaussing coils and yokes for many applications, we supply special customized solutions, ready for connection. In our own application laboratory, we develop - in close cooperation with the customer - the best degaussing solution, considering not only technical but also economical aspects.



Coils

Page 4



Yokes

Page 10



Low Frequency
Generators

Page 14



Complete
Systems

Page 19



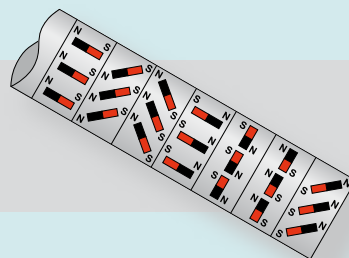
Gauss Meters

Page 21



Theory

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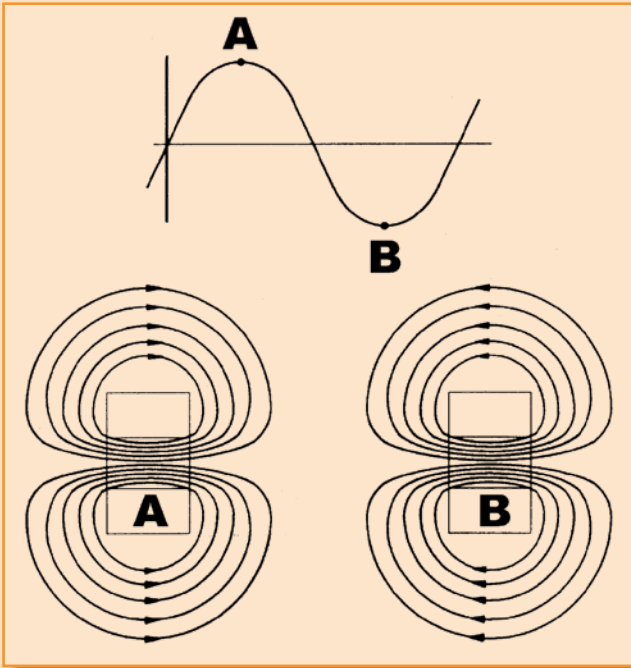


Coils



Functional Principle

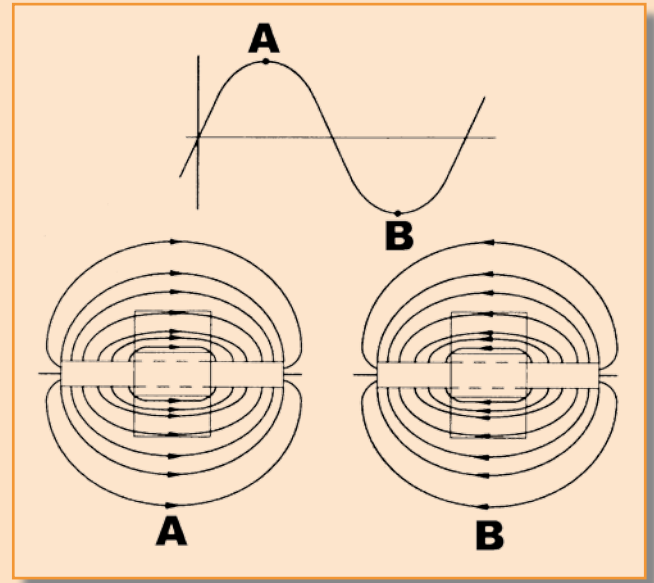
Degaussing coils (also referred to as degaussing tunnels) create an alternating magnetic field in the direction of their passage axis.



Degaussing field at time A or B

The density of magnetic field lines is at its maximum in the coil centre, and is strongly decreasing towards the outside. If a ferromagnetic work piece (steel) is introduced into the coil, the field lines are concentrating and flooding the work piece. The conductivity of steel is up to 800 times higher than that of air. Since the field lines inside the coil run parallel in relation to its axis, the coil is best suited for degaussing of fl at work pieces containing magnetic fields in longitudinal direction.

Degaussing is performed during a continuous movement of the work piece, leading out of the coil. Decreasing field strength is achieved by a slowly passing the work piece through the coil.



Degaussing field at time A or B

Construction

The degaussing coils are made of a solid cast aluminium body with stainless steel covering (except small coils). This allows bolting the coil to a line.

Generally, the aluminium body is sufficient for heat dissipation. For coils with extremely strong magnetic fields, a rotary axial blower is mounted on top of the housing; additionally, a temperature control system can be added.

Small Coils

For degaussing of smaller steel parts as pins, screw drivers, etc., we recommend our small degaussing coils.

The plastic housing (reinforced with glass fibre) comprises the coil itself, a plug for the mains cable and a carrying handle. An integrated thermo contact protects the coil (EM0402, EM1005) from overheating.



Power supply: 230 V/50 Hz or 115 V/60 Hz

Type (Examples)	Passage width mm	Operation time
EM0402	40 x 20	30 min
EM1005	100 x 50	30 min
EM1010	100 x 100	permanent operation

Round Coils

For medium-sized work tubes or rods, we offer degaussing coils with round passage, standard diameters 60 mm and 120 mm.

Customized coils can be produced to specification, e. g. 20 mm or 30 mm, etc. The denomination of the coil type corresponds to the passage size in cm.

Power supply customer specific:

- 230 V/50 Hz, 400 V/50 Hz
(other power configurations on demand)
- LF-Generator EG2422 (for „B“ series coils)



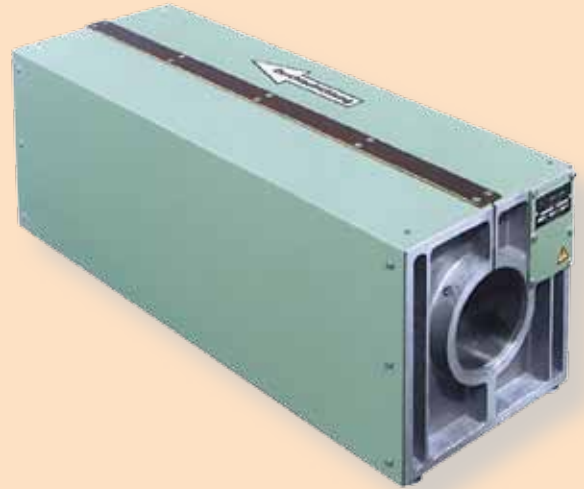
Type	Passage width mm	Length mm
EM03	30	180
EM06	60	120
EM12	120	180

Tunnel Coils

For high transport speeds, we offer customized long coils.

The extended magnetic field of such a tunnel coil allows several reversions of the magnetic polarity of a workpiece while passing through the coil.

Power supply: customer specific



Type (Example)	Passage width mm	Length mm
EM12S-650	120	650

Rectangular Coils (standard version)

For small to medium-sized work pieces or sheet metal casings and wire baskets, we recommend rectangular coils.

These coils are mounted to specifications. The modular system enables many different coil sizes with a great variety in dimensions and shapes.

Passage height and passage width can be adapted in steps of 50 mm, e. g. from 210 mm x 60 mm to 510 mm x 510 mm.

Power supply customer specific:

- 230 V/50 Hz, 400 V/50 Hz
(other power configurations on demand)
- LF-Generator EG2422 (for „B“ series coils)

The dimensions of the coil in cm determines its denomination.

Example EM2116: passage width = 21 cm and inner height = 16 cm.



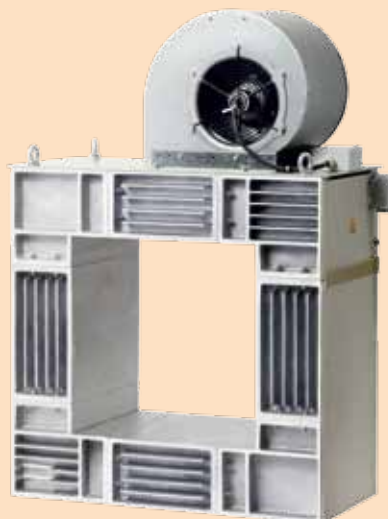
Type (Examples)	Passage width mm	Length mm
EM2106	210 x 60	270
EM2111	210 x 110	270
EM2116	210 x 160	270
EM5151	510 x 510	270

Rectangular Coils („C“ Series)

For thick-walled work pieces, this coil offers an increased performance, in connection with low frequency generator EG2422S.

Passage height and passage width are available in steps of 50 mm, as for example from 110 x 110 mm up to 610 x 610 mm.

Power supply:
Low frequency generator EG2422S



Type (Examples)	Passage width mm	Length mm
EM1111C	110 x 110	410
EM3141C	310 x 410	410
EM6161C	610 x 610	410

High Performance Coils („A“ Series)

For extremely hard steels and / or large work pieces, we offer degaussing coils with extremely high field strength (in connection with low frequency generator EG2426 or EG2440).

The inner passage height and width can be modified according to customer specifications in steps of 50 mm, as for example from 110 mm x 110 mm up to 1410 mm x 1410 mm. Heat dissipation is assured by a rotary axial blower; additionally, the temperature is controlled by the low frequency generator.

Power supply:
LF generator EG2426, EG2440



Type (Examples)	Passage width mm	Length mm
EM5151A	510 x 510	410
EM70101A	700 x 1010	410
EM161161A	1610 x 1610	410

Rotary Field Coils

For degaussing ring-shaped workpieces (like tubular springs, piston rings) already packed as rolls, we offer our rotary field coils.

These special rotary field coils create a strong low frequency rotating magnetic field within the passage zone (in connection with low frequency generator EG2422R). Its special application is the degaussing of ring-shaped work pieces (e.g. tubular springs, piston rings) already packed in stacks.

The magnetic field penetrates the work pieces vertically, and rotates inside the individual parts. When guiding the ring stack slowly through the coil, each individual ring is optimally demagnetized without creating residual magnetism at the touching points. To assure a precise guiding through the coil, a centering device is mandatory.



In order to assure successful degaussing, it is recommended that the distance between work piece and inner cladding of the passage is kept at a minimum. Therefore, we offer only customized solutions.

Type (Examples)	Power supply
EM06R	EG 2422R
EM10R	EG 2422R
EM14R	EG 2422R
EM16R	EG 2422R
EM26R	EG 2422R
EM36R	EG 2422R

For precise guiding, a centering unit made of stainless steel is required.

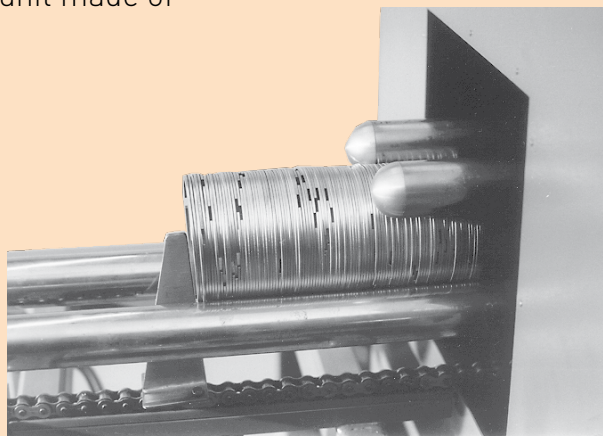
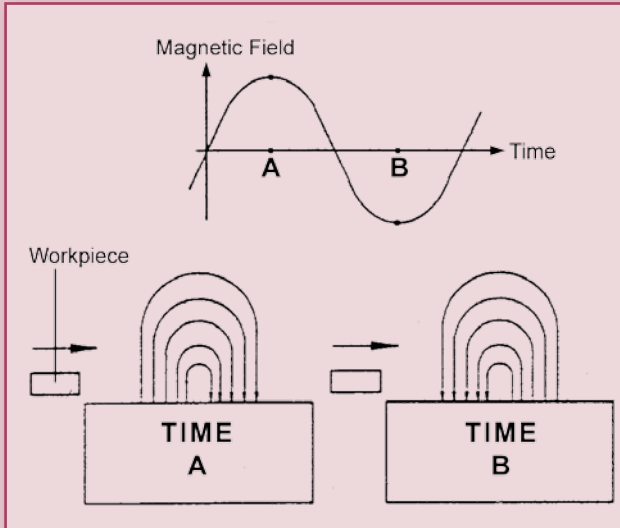


Photo without wrapping for better visualization



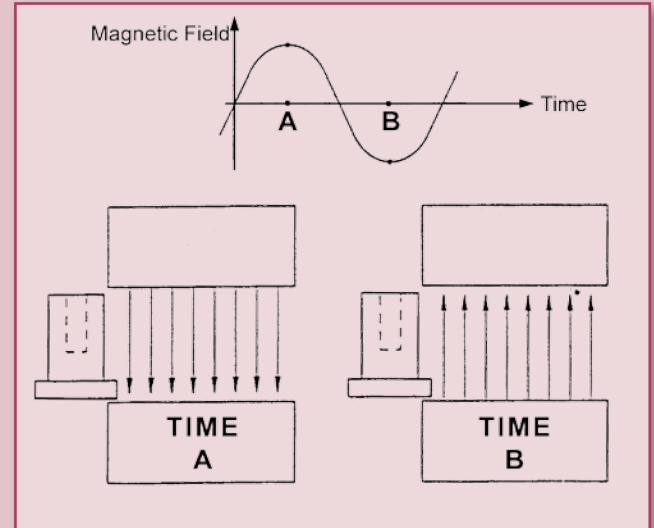
Functional Principle

Degaussing yokes create a magnetic degaussing field which emerges vertically from the active surface. Therefore, degaussing yokes are ideally suited for vertically positioned bar-shaped work pieces and horizontally positioned discs, plates or roller bearings, etc.



The maximum intensity of the magnetic field is at the upper surface of the yoke, and is then decreasing quickly. Therefore, it is recommended that, for work pieces exceeding a height of approx. 60 mm, degaussing is performed from above as well as from below.

This is achieved by a degaussing twin yoke; one yoke is mounted below the transport system, and the second yoke is positioned directly above the work piece.



The adjustment of the passage height is done either by a mechanical lifting device with crank handle or motor-driven with up/down button, or motor-driven via PLC of the production line. The type of the yoke's denomination corresponds to the degaussing width in cm. An additional „B” indicates that the yoke has to be connected to low frequency generator EG2422 only.

Twin yokes are named with a „2” (in addition to the type).

Examples of designation:

EMJ05	Active degaussing width 50 mm, power supply 230 V 50 Hz
EMJ15	Active degaussing width 150 mm, power supply 400 V 50 Hz
EMJ30-2	Active degaussing width 300 mm, power supply 400 V 50 Hz
EMJ50 B	Active degaussing width 500 mm, power supply EG2422
EMJ75- 2B	Active degaussing width 750 mm, twin yoke, power supply EG2422

Small Yokes

Small degaussing yokes are ideally suited for loose small parts or workshop tools (slide gauges, screwdrivers, etc.).

The watertight cast housing (with rubber feet) can be placed on a table, and be connected directly to the mains supply. The field lines enter and exit only from the top of the yoke so that the magnetic field at the sides decreases rapidly. Standard degaussing yokes have a degaussing width of 50 and 100 mm resp.

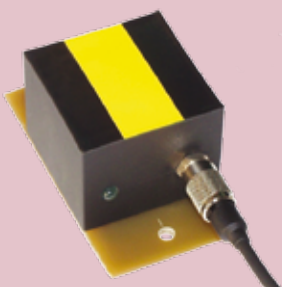


Power supply: 230 V/50 Hz

Type (Examples)	Active width mm	Depth mm (moving sense)
EMJ05	50	160
EMJ10	100	280

Special Yokes

These customized special yokes are made to specifications, adapted to a workpiece or an existing transport system.



Mini yoke for medical technology



Degaussing inside of tubes



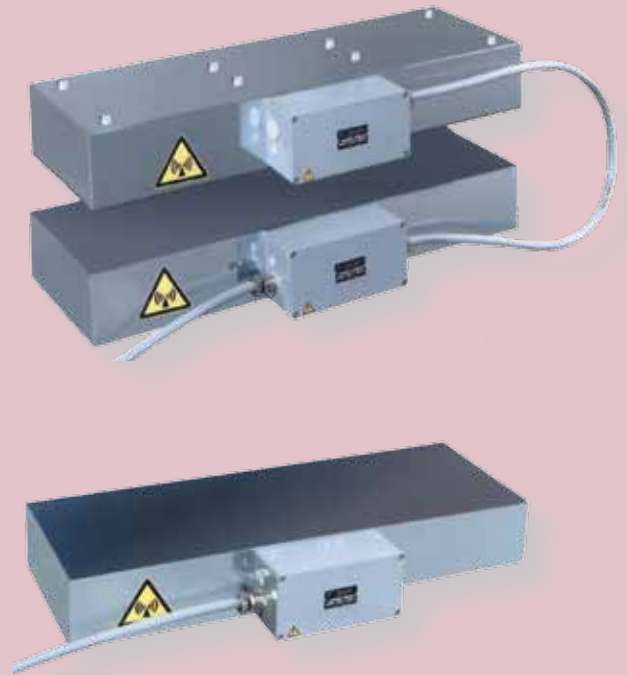
Yoke with extra long pole shoes to reach the workpiece of an existing transport system

High Performance Yokes

These degaussing yokes create an extremely strong magnetic field and are recommended for roller bearings, small parts in trays or grid baskets, etc.

The magnetic windings are sealed watertightly and the active surface is closed with an exchangeable protection plate. Due to its weight, we recommend to always mount the yoke solidly to a degaussing line or frame construction. For this purpose, the yoke has threaded holes M 10. The standard degaussing widths are 150 mm – 1,000 mm.

Power supply: 400 V/50 Hz
EG2422 (for „B” series yokes)



Type	Active width mm	Outer dimensions mm (W x H)	Depth mm (moving sense) without electrical pull box
EMJ15	150	260 x 127	280
EMJ20	200	310 x 127	280
EMJ25	250	360 x 127	280
EMJ30	300	410 x 127	280
EMJ35	350	460 x 127	280
EMJ40	400	510 x 127	280
EMJ45	450	560 x 127	280
EMJ50	500	610 x 127	280
EMJ55	550	660 x 127	280
EMJ60	600	710 x 127	280
EMJ65	650	760 x 127	280
EMJ70	700	810 x 127	280
EMJ75	750	860 x 127	280
EMJ80	800	910 x 127	280
EMJ85	850	960 x 127	280
EMJ90	900	1010 x 127	280
EMJ95	950	1060 x 127	280

Low Frequency Generators



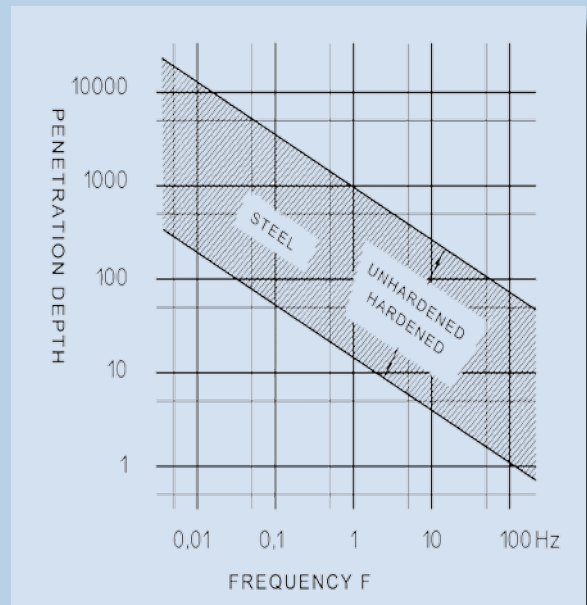
Low Frequency Generators

Functional Principle

In order to obtain good degaussing results, it is not sufficient to have a strong magnetic field, but you need also the appropriate degaussing frequency. In many cases, just the standard line voltage of 50 / 60 Hz is used, since this is the less costly source of energy. However, it is not enough to degauss the surface only if permanent degaussing is to be achieved. The remaining residual magnetic fields in the centre of a work piece will emerge to the surface so that, after a few days, the residual magnetism existing before the degaussing procedure will again be measurable.

For reliable degaussing of work pieces with a wall-thickness > 10 mm, a considerably lower frequency than the standard 50/60 Hz is required for hard steels. Degaussing at low frequency allows the reduction of the secondary eddy currents inside a work piece, as well as larger penetration depths into the forced magnetic field. When degaussing large work pieces (i. e. extruded forms, railroad tracks, punching devices and others), frequencies of down to 0.5 Hz are necessary to keep the work piece magnetically neutral throughout. This is also valid for hard steel bars or large axles and tubes.

The below diagram shows the relation between degaussing depth inside a work piece as a function of the degaussing frequency and material hardness.



Other reasons for the use of low frequencies are metal product carriers, punched / perforated pallets or grid baskets which are creating eddy currents within the degaussing fields and thus produce antagonizing fields shielding the work piece.

We offer diverse electronic generators supplying low frequency.

Software EG-Control

EG-Control

EG-Control enables the control of low frequency generators type EG2422, EG2422M, EG2422S, EG2426 and EG2440 via Windows-PC.

EG-Control is particularly recommended for generators which are not embedded in a degaussing line. When integrated in a complete degaussing system, the low frequency generators are usually controlled via PLC.

EG-Control allows parameter setting and storage of workpiece specific degaussing parameters. It is possible to store more than 1000 default settings which can be selected manually from a list or recalled with or a bar code scanner.

The degaussing process can be started and finished with EG-Control.

Low Frequency Generators

Low Frequency Generator EG2422

For type “B” degaussing coils, yokes and twin yokes.

The generator modifies the mains supply in a way that it supplies the requested power for the degaussing unit.

Possible settings

- Permanent or pulse degaussing
- Symmetry: +25 % to -25 %
- Current intensity: 50 % to 95 %

- Power supply:
- 2 x 400 V 50 Hz
 - Special voltages

The maximum current intensity depends on the connected degaussing system.

The recommended protection ranges therefore from 40 A up to 63 A delay action fuse.

Dimensions (W x D x H): 56 x 48 x 20 cm



Mains frequency	Degaussing frequency							
	0.9	1.7	2.6	4.5	7.1	10.0	16.7	50.0
50 Hz	0.9	1.7	2.6	4.5	7.1	10.0	16.7	50.0
60 Hz	1.1	2.0	3.1	5.4	8.5	12.0	20.0	60.0

Low Frequency Generator EG2422S

Power supply for reinforced degaussing coils “C” series. These rectangular coils are specially designed for connection to low frequency generator EG2422S.

The EG2422S has a higher output rating than the EG2422, as well as a bigger housing with heat exchanger for cooling.

Possible settings

- Permanent or pulse degaussing
- Symmetry: +25 % to -25 %
- Current intensity: 50 % to 95 %

Degaussing frequency:
see table for EG2422

Power supply:

- 2 x 400 V 50 Hz
- Special voltages

Recommended protection: 100 A delay fuse

Dimensions (W x D x H): 65 x 68 x 97 cm



Low Frequency Generators

Low Frequency Generators EG2440 and EG2426

Our top products for degaussing of large tubes, tubes bundles, gear boxes, bar steel, heavy bulk material, large bearings or other big parts of several tons.

These generators are connected to „A“ series degaussing coils enabling the creation of degaussing fields of more than 2000 A/cm*

The outstanding characteristic of these generators is their automatic adaptation of the degaussing frequency to the work piece size. The degaussing frequency goes down as low as approx. 0.5 Hz, depending on the steel mass of the work piece; this allows greater penetration depths into the material.



LF-Generator EG2440

Technical Data

Possible settings

- Permanent or pulse degaussing
- Degaussing current
- Symmetry

Power supply: 3 x 400 V \pm 10 %, 50/60 Hz

Protection fuse: EG2440 with 63 A
EG2426 with 80 A

Dimensions (W x D x H):

EG2440: approx. 63 x 67 x 221 cm
EG2426: approx. 123 x 67 x 221 cm



LF-Generator EG2426

*depending on coil size

Low Frequency Generator EG2422R

Power supply for rotary field coils type EM06R to EM36R.

The generator modifies the mains supply in a way that it supplies the requested power for the degaussing unit.

Possible settings

Current intensity: 50 % to 95 %

Power supply:

- 3 x 400 V 50 Hz
- Special voltages

Dimensions (W x D x H): 56 x 48 x 20 cm



Application: Piston rings, tubular springs, and others

Mains frequency	Frequency of the rotary magnetic field							
	50 Hz	0.5	0.9	1.4	2.6	3.8	5.6	10.0
60 Hz	0.6	1.1	1.7	3.1	4.6	6.7	12.0	60.0

Low frequency generator EG2430

Degaussing of small parts in transport rails.

This degaussing system is controlled by the machine operating cycle, with partial degaussing in line with the material flow.

The low frequency generator EG2430 supplies the predefined current to a degaussing coil or degaussing yoke which is mounted at the transport rail and degausses synchronized with the machine cycle is performed a partition.

Power supply:

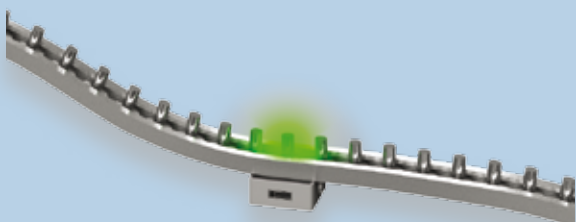
- 230 V / 50/60 Hz, 4 A
- Special voltages

Dimensions (W x D x H): 19 x 35 x 40 cm

Degaussing yoke or degaussing coil: customer specific construction

Pulse duration: 0.68 - 3.76 sec

Repeat interval: 0.1 - 5.0 sec



Example:
Transport rail with degaussing yoke



Degaussing System Series EMS

Examples: Tubes or bars of up to 800 kg

Solution:

- EG2422S
- Degaussing coil EM3636C mounted on motor-driven carrier plate
- Support basin for the tube

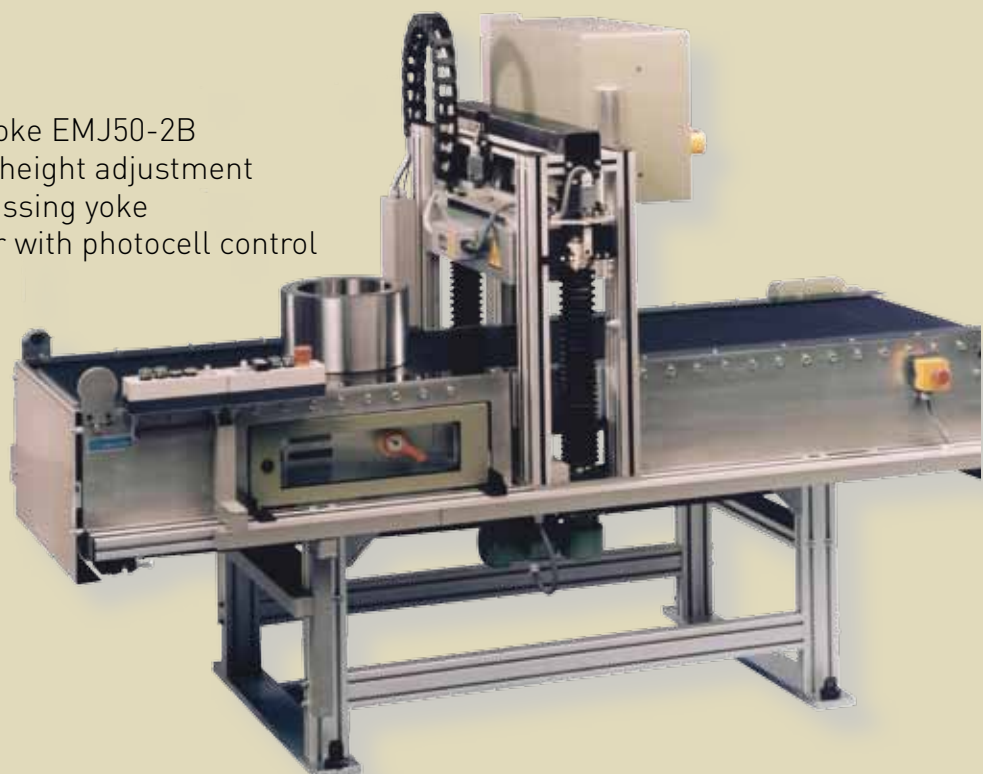


Degaussing System Series EJT

Examples: Roller bearings, anti-friction bearings, tools, bulk material in wire baskets

Solution:

- EG2422
- Twin degaussing yoke EMJ50-2B with motor-driven height adjustment of the upper degaussing yoke
- Transport conveyor with photocell control



Degaussing System Series EJT

Examples: Small work pieces like bearings, anti-friction bearings, tools

Solution:

- Degaussing yoke EMJ15 / EMJ30
- Transport conveyor with division bars for small parts



EJT15



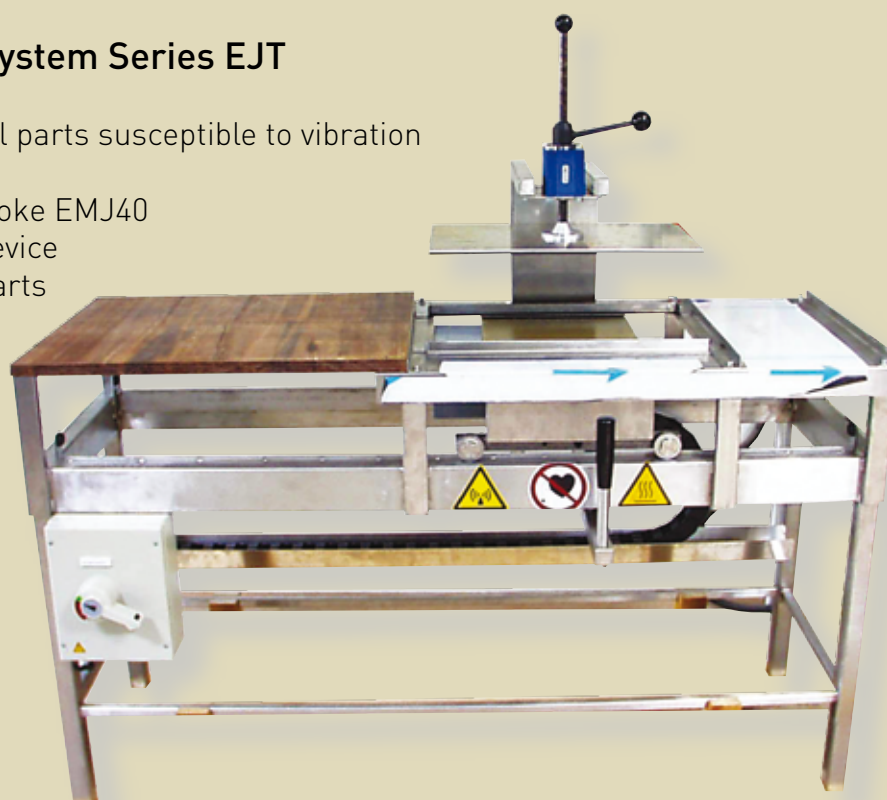
EJT30

Degaussing System Series EJT

Examples: Small parts susceptible to vibration

Solution:

- Degaussing yoke EMJ40
- Hold-down device to keep the parts in place

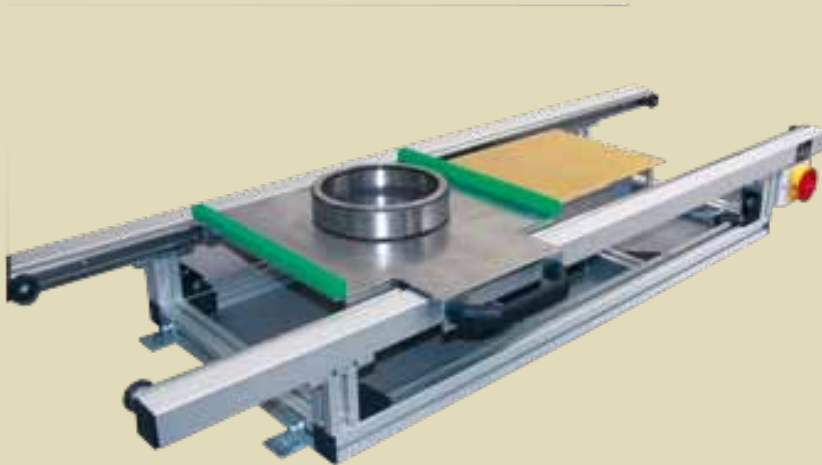


Degaussing System Series EMJ

Examples: Small parts with manual feed

Solution:

- Degaussing yoke EMJ15
- Manual moving carrier plate



Gauss Meters

Field Strength Meter

Vallon Field Strength Meter VFM1

Ideally suited for measuring magnetic DC fields before and after demagnetization

- For workshop and production
- Compact like a mobile phone
- Rugged and shock proof
- Measuring value display in A/cm or Gauss
- Large display
- High accuracy
- Ergonomic design

Technical Data

Measuring range:

± 199.9 G (20 mT) and ± 199.9 A/cm resp.

Resolution: 0.1 G and 0.1 A/cm resp.

Additional measuring range (optional):

± 19.99 G (2 mT) and ± 19.99 A/cm resp.

Resolution: 0.01 G and 0.01 A/cm resp.

Metering precision: $\pm 2\%$ (25°C)

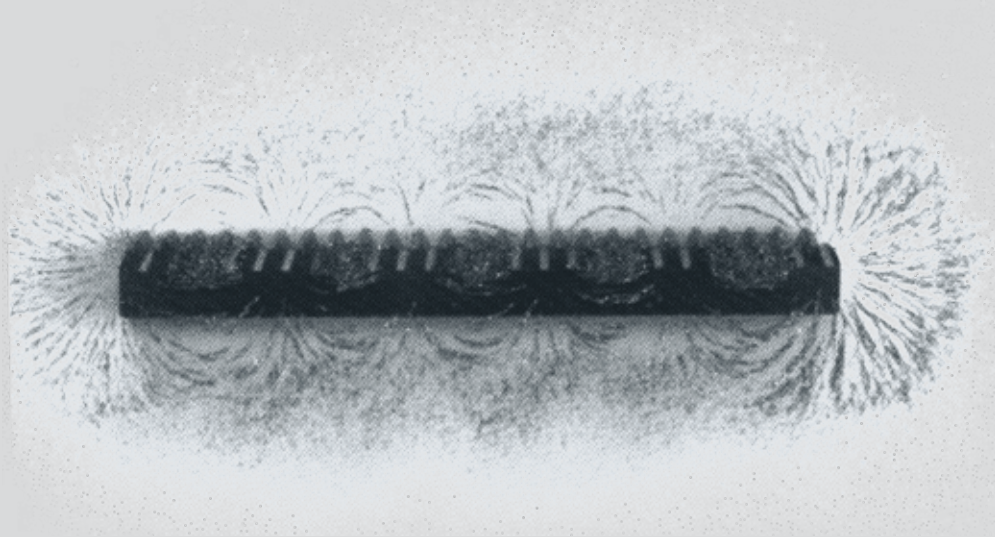
Measuring surface: 6 mm²



Magnetic Work Pieces

Problems due to Magnetism in Practice

- Metal scabs and swarf stick to the work piece.
- Sintering tools wear off faster.
- Down times for robots / automatic feeding systems due to parts sticking together.
- Magnetic field sensors are falsely activated.
- Measurement errors at highly sensitive measuring instruments.
- Faulty welding seams.
- Electron beam welding becomes impossible.
- Irregular thickness of layers at hard chromium plating.
- Edges breaking off during electric discharge wire cutting.



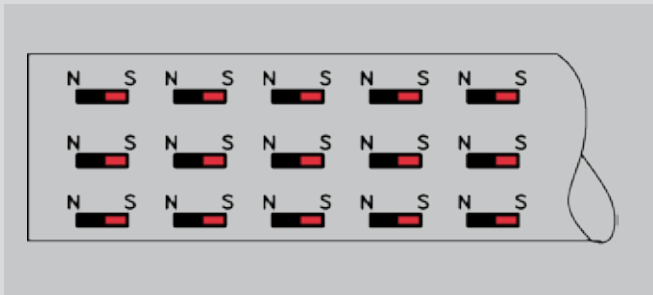
Causes

The causes for magnetization of work pieces are various. Often enough, they cannot easily be ascertained in practice. The main causes are artificial magnetic fields acting in direct vicinity of the work pieces. These magnetic fields can be of intended or unintended origin, as for example: magnetic transport, induction hardening, magnet gripper, magnet chuck devices and others. Mechanical vibrations and cold forming under the influence of those magnetic fields reinforce or enhance the process of magnetization.

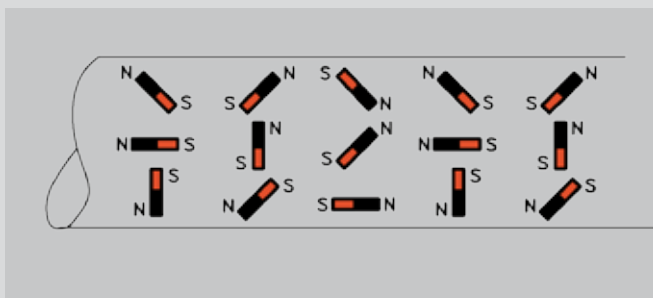
Degaussing

Principle

Inside a ferromagnetic crystal, a larger amount of atoms always has the same orientation. This area can be considered from the outside as a domain (Weiß domain); its volume ranges from 0.001 to 0.1 mm³. If these areas have the same orientation, a work piece is magnetic.



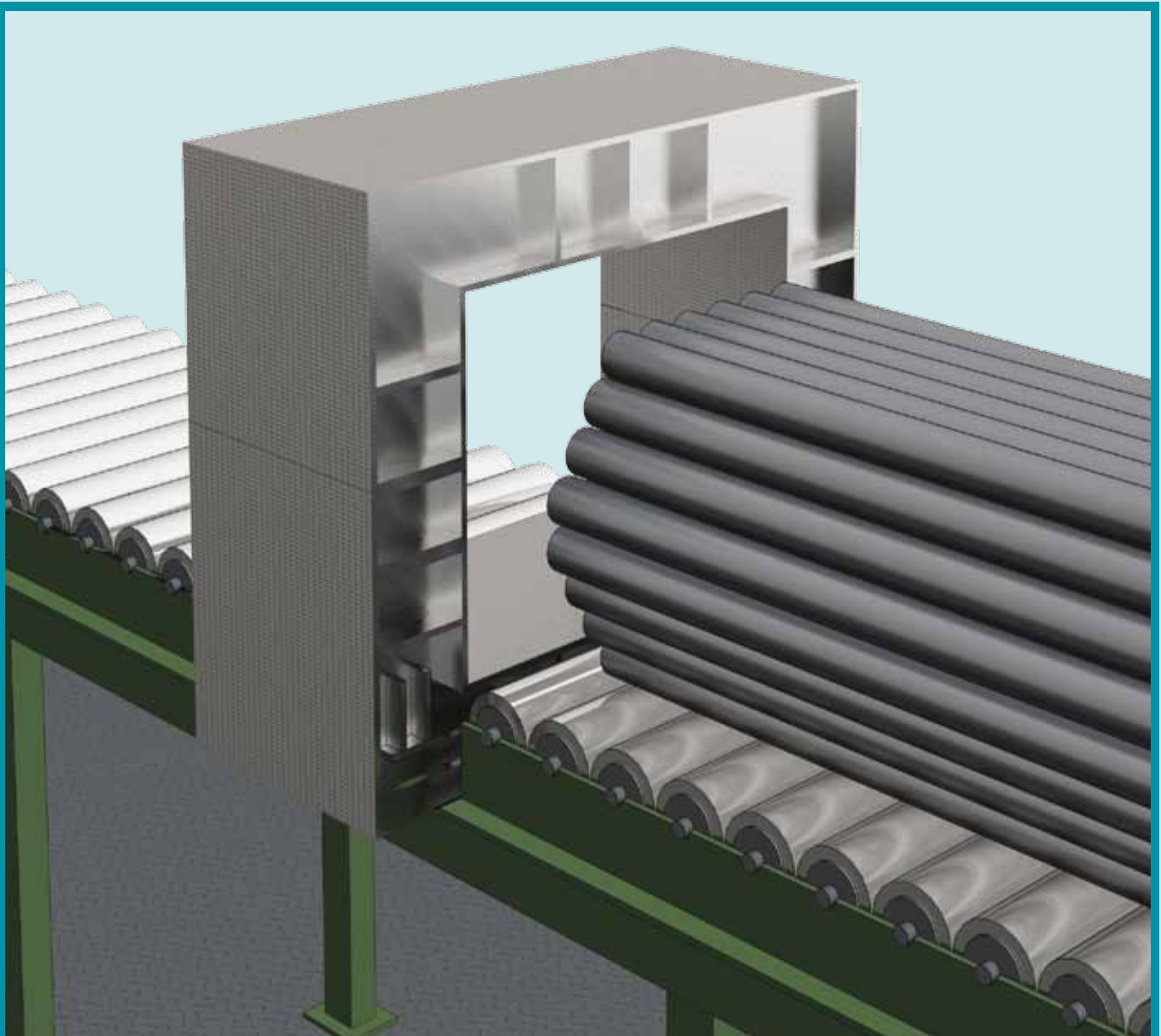
Degaussing is achieved by reversing the homogenous orientation of the Weiss domains and thus creating an extreme disorder with the effect that the magnetic impact of the different areas is neutralized.



In practice, mainly the following methods are used:

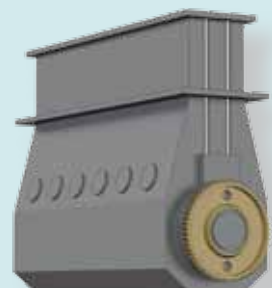
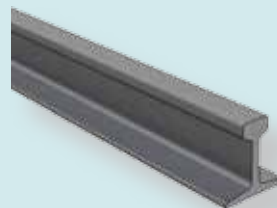
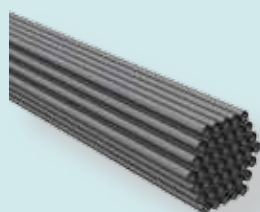
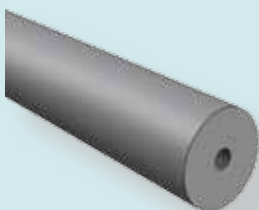
- The work piece is exposed to a strong alternating magnetic field, which is constantly reduced to zero.
- The work piece is lead through a strong alternating magnetic field, at a slow and constant speed.
- The work piece is heated to $>800^{\circ}\text{C}$ (exceeding Curie-point), and slowly cooled down in a neutral spot (which is exposed to the magnetic field of the earth only).

Since the degaussing effect of the alternating field is at its optimum only if it has the same orientation as the magnetic field of the work piece, divers methods of creating the degaussing field will be necessary (degaussing coils, degaussing yokes).



Degaussing

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