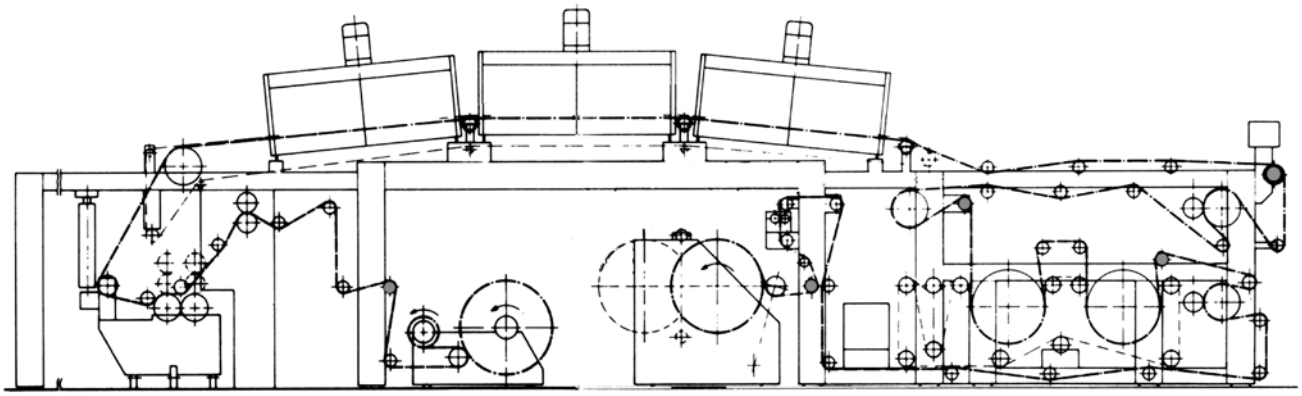
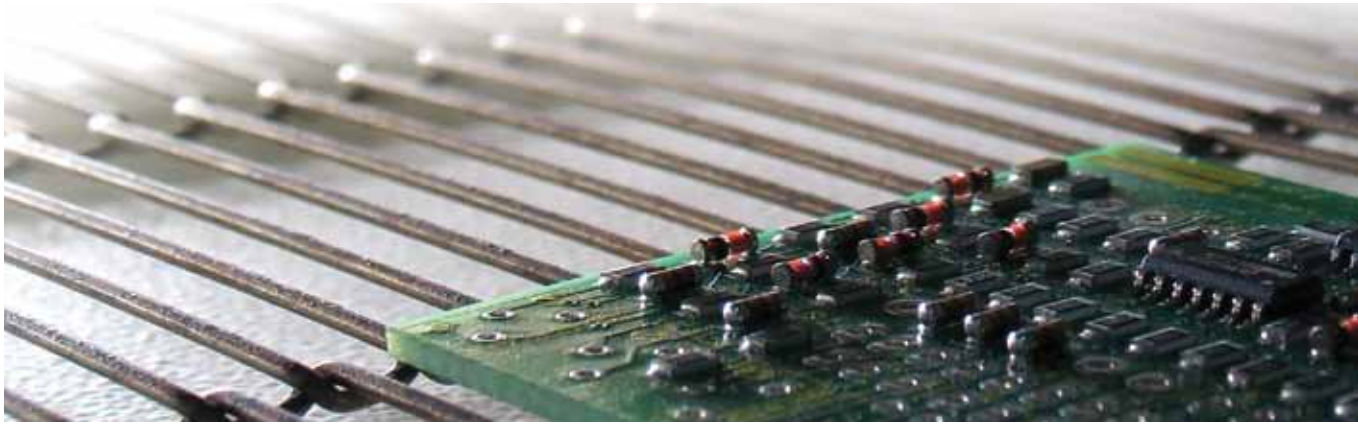
- Magnetic powder clutches | -brakes
- Torque Limiter | Overload Clutch
- Web Tension Measuring Systems | Load Cells
- AC winders | Three Phase AC Controllers
- Switchgear Systems | Automation Technology
- Winding Technology | Upgrading
- Electronic Manufacturing

Product Overview





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PRODUCT INFORMATION

MAGNETIC POWDER CLUTCHES | MAGNETIC POWDER BRAKES

Magnetic powder clutches and brakes only need a low level of driving power to achieve a high torque, regardless of the slip speed. They feature a simple structure, low weight and require little space.

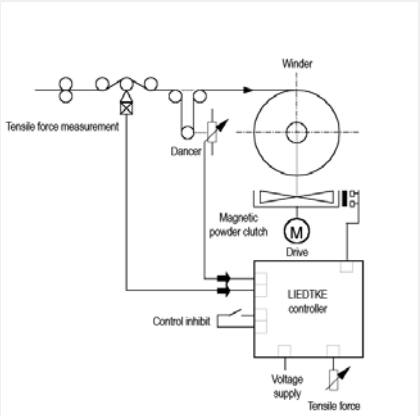
The system consists of two rotors (A and B) run independently from one another. The external rotor – A – contains a countersunk, ring-shaped coil that is fed by an energising current (DC current).
The magnetic powder can be found in the gap between rotors A and B. When the coil is energised, this powder is drawn in the direction of the lines of force of the magnetic field and connects rotors A and B.

The standard unit is operated in a horizontal position. Please get in touch with us if you require a different mounting position.

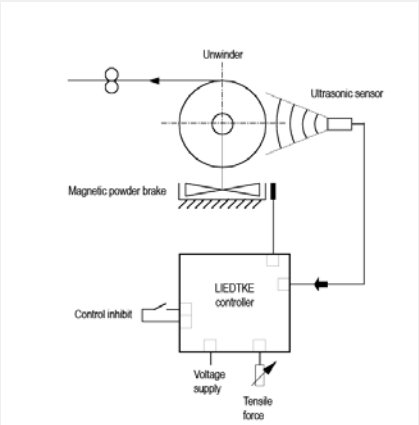
The maximum speed is 2000/3000 rpm. For clutches of more than 12 Nm, the maximum speed is 2000 rpm. The winding temperature must not exceed 140°C, while the operating temperature is 80°C. The clutches and brakes are pre-lubricated.

CONTROLLERS

By using constant current control, the Liedtke controllers M301, M3301, M2302 and M242 ensure that the output current is largely independent of the load resistance, and that the torque remains constant in spite of increases in temperature. As an option, the controllers can be supplied with a display, PID controller and data logger.



Winder



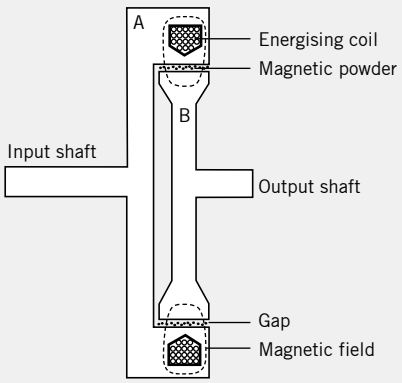
Unwinder with ultrasonic scanning

TENSION CONTROL | DANCER POSITION CONTROL

Material feed tensile forces need to be kept constant on rollstands or winders – this is where dancer position control comes in. The dancer weight determines the level of tension. As an alternative, LIEDTKE tension load cells can be used for tension control purposes.

ULTRASONIC SCANNING | SCANNING ROLLER

Recording the roll diameter makes it possible to keep the tensile force in the material feed constant.
The material winders or unwinders, featuring magnetic powder clutches and magnetic powder brakes, can be controlled using ultrasonic scanning, a scanning roller or a diameter potentiometer.



MAIN FUNCTIONS

Torque control, torque limiting, clutches/brakes, positioning

AREAS OF APPLICATION

Winding machines, unwinding brakes, web tension stations, mills, profiling machines, tool machines, starting control, conveying devices, etc.

Various magnetic powder clutches and brakes: FRAT1200, FAS50, FAT50, EFAS50 with compressed air cooling

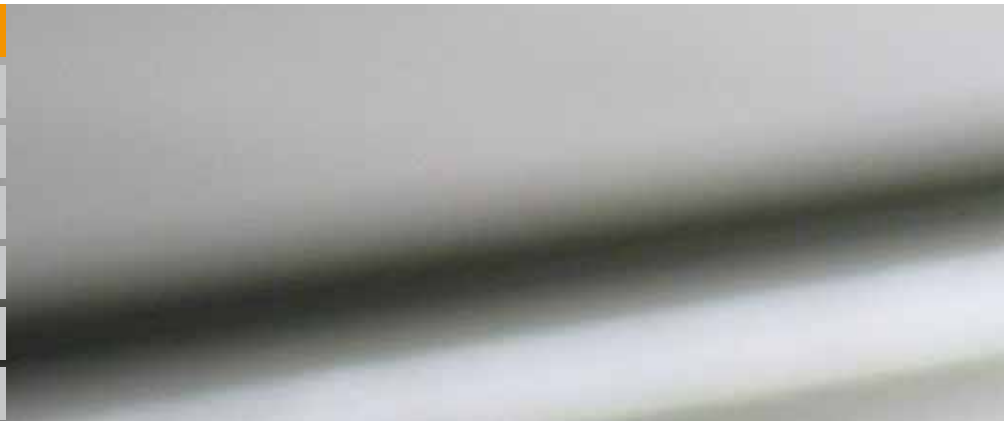
Size II test bench; magnetic powder brake with integrated torque measurement; speed encoder for measuring characteristic values of motors, gears, pumps, etc.

Desk-top box for test bench, Liedtke digital measuring amplifier LP24 for bridge power supply, actual value amplification and data logger. LIEDTKE controller M2303 Z2 with PID controller and display.

Constant current controllers M301(1A), 24 V AC or DC, M2302 II (2/3A), 230 V AC und M242 (2A) 24 V DC (no Fig.) available as an option with PID controller, display. Frontpanel for 19" rack.

Constant current controller M3301 (1A) available as an otion with PID controller, data logger (USB interface) for top hat rail mounting.

DGT 300 digital web tension controller for magnetic powder clutches and brakes, PID controller with direct or indirect tension control, taper control and inertia compensation control.



OVERVIEW OF COUPLING TYPES

EFAS	2	10[4]	17[4]	50[4]	E(R)AT	20	50	120	350	650	1200	2002	3500	5001	10001
M(Nm)	0,2	1,0	1,7	5	M(Nm)	2	5	12	35	65	120	200	350	500	1000

OVERVIEW OF BRAKE TYPES

F(R)AS	2	21	50	F(R)AT(O)	20	50	120[23]	350[2]	650[23]	1200[2]	2002[23]	3500[2]	5001[3]	10001[3]
M(Nm)	0,2	2,0	5	M(Nm)	2	5	12	35	65	120	200	350	500	1000

F=Brake, E=Clutch, R=Heat sink, AS=Standard shaft, AT=Hollow shaft, O=Water cooling
Measures for increasing power loss dissipation:
[2]) Additional radial forced cooling, [3]) Brakes with water cooling, [4]) Compressed air cooling possible for clutches/brakes

AUSLEGUNGSKRITERIEN

v = Velocity (m/min)
d = Outer sleeve diameter (mm)
D = Roll diameter (mm)
F = Tensile force (N)
M = Torque (Nm)
n1 = Drive speed (rpm)
n2 = Output speed (rpm)
n_{max} = Maximum speed
P_V = Power loss
q = Diameter ratio D:d

Brake	$P_V = \frac{M_{max} \times n}{9549} (kW)$
Unwinder	$P_V = \frac{M_{max} \times n_{max}}{9549 \times q} (kW)$
Clutch/ winder	$P_V = \frac{M_{max} \times (n_1 - n_2)}{9549} (kW)$
Maximum Speed	$n_{max} = \frac{v_{max}}{d \times \pi} (rpm)$
total gear ratio	$i_g = \frac{n_1}{n_{max}}$
Maximum torque	$M_{max} = \frac{F \times D}{2} (Nm)$

CHARACTE-RISTIC CURVES

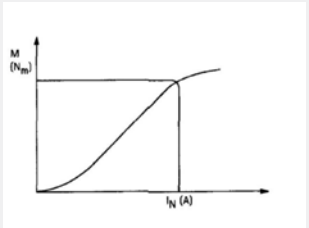


Diagram 1: The torque to be transmitted and the energising current behave are virtually in proportion to one another.

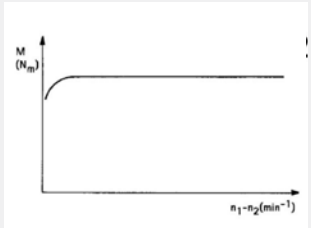


Diagram 2: With a permanently set energising current, the torque acts independently of the differential speed of the two rotors.

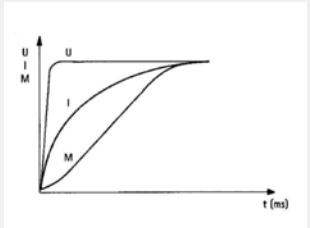


Diagram 3: During start-up, the torque builds with a time delay. Switching on the DC side produces shorter switching times than line-side switching.

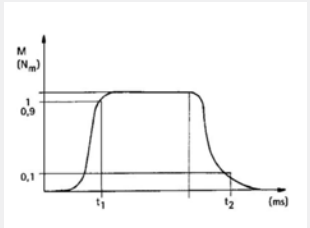


Diagram 4: Switching times for clutches and brakes

PRODUCT INFORMATION

Torque limiters/overload safety clutches with permanent magnets are used for mechanical overload protection; with the exception of a permanently set torque, it is possible to set intermediate values using the setting ring or gap.

FUNCTIONAL PRINCIPLE

The torque limiter consists of two rotors that are run independently from one another. The external rotor contains one or more permanent magnets that are distributed across its circumferences. A non-oxidising magnetic powder is located between the rotors; this is used to connect the rotors according to the lines of force of the magnetic field.

The torque limiter can be operated in any position.

Mounting must be carried out using non-magnetic metal.

APPLICATIONS

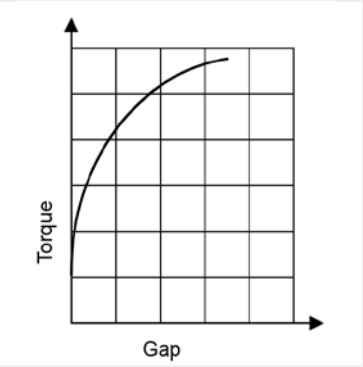
Permanent braking, limitation of torque for transmission, protection and safeguarding of the transmission lines, load protection, load balancing

Torque limiter

Torque limiter cross section

DIMENSIONING

M = Torque (Nm)
n_1= Drive speed (rpm)
n_2= Output speed (rpm)
Q= Quantity of heat to be dissipated

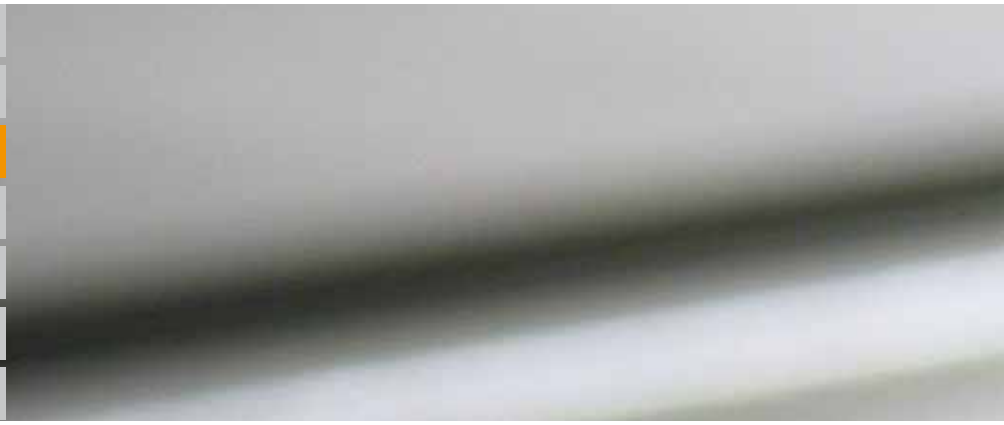


Torque limiter as brake	$Q = \frac{M_{max} \times n}{9549} (kW)$
Torque limiter in slip mode	$Q = \frac{M_{max} \times (n_1 - n_2)}{9549} (kW)$

The transmissible torque is reduced to the minimum value when the setting ring is screwed in; reverse attain the maximum torque. The torque is constant when the setting is specified and is independent of the drive and slip speed.

OVERVIEW OF TORQUE LIMITER TYPES

LC	00.1	0	1	3	10	20	40CS	50	100		150	300	500	700
M(Ncm)	0,1-0,75	2-6	5-15	12-30	30-100	60-200	100-600	200-600	400-1200	M(Nm)	5-15	15-40	25-65	30-85
Design	S	E									I			



PRODUCT INFORMATION

TENSILE FORCE MEASURING STATIONS AND TENSION LOAD CELLS

For measuring, regulating and controlling tensile forces in flexible material webs for a vast range of materials, such as plastic sheets, metal, paper, textiles.
Process engineering requires tensile forces in continuous webs to be measured; this must be carried out without any displacement in order to ensure that the web lead does not change. The electrical output signal serves as an indication of the tensile force while at the same time exerting a controlling effect on the drive system.
The process of measuring tensile forces has proven a reliable method of controlling winders and unwinders (as well as twin and unwinding stations with automatic cutting and locating systems).
In addition to this, tensile force measurements are used to control drive systems in environments including dry or humid areas and cooling zones – in other words, any location in which linear deformations in webs may arise as a result of web processing.

LOAD CELLS

These are used wherever forces or loads are required for display or feedback of the actual value into closed-loop systems.

MEASURING AMPLIFIERS

Electronic measuring amplifiers for all tensile force measuring equipment or torque and force measurements. Available in 1- and 2-channel, analog or digital designs.

DIMENSIONING

$$F_R = 2 \cdot F \cdot \sin \frac{U°}{2}$$

$$F_R = 2 \cdot F \cdot \cos \frac{V°}{2}$$

If the resulting tensile force and the roll weight run vertically, the resulting force on the sensor is calculated as follows:

$$F_{RM} = F_G + F_R$$

This must be taken into consideration in cases where there is a larger roll weight than:

$$F_G = 0{,}3 + F_{RM}$$

as the resulting force on the sensor will be to great.

In this type of situation, the tension load cell or tensile force measuring station will be mounted with a 90° rotation. At this point, the directions of force F_{RM} and F_G will be offset by 90° in relation to one another. This mounting position enables the weight of the metering roll to have a more positive effect on the sensor.

If the tension load cell KM-G1 is mounted with a 90° rotation, the resulting tensile force is calculated as follows:

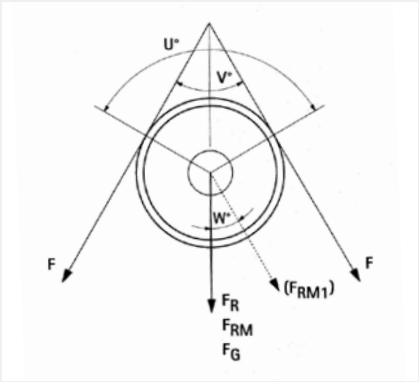
$$F_R = F \cdot 0{,}36$$

Sensors of type KM will only detect forces that are vertical in relation to the mounting position! If forces F_R and F_{RM} form an angle of W°, the resulting force will continue to have an effect on the sensor, as indicated below:

$$F_{RM1} = F_R \cdot \cos W°$$

In the case of tensile force measuring stations KM-G2 and KM-G3, the resulting tensile force must be calculated using the lever arm in order to determine the sensor. The formula is as follows:

$$F_{RM} = F_R \cdot 2{,}5$$



F = Tensile force in material
F_R = Resulting force
F_{RM} = Resulting force in the direction of the sensor
F_G = Metering roll weight
U° = Angle of wrap on the metering roll
V° = Angle between material web infeed and output
W° = Angle between F_R and F_{RM1}

Tension load cell KM-G1/G3
Rated tensile force (N): G1: 200, 1000, 4000; G3: 100, 500, 2000

Tensile force measuring station KM-G2
Rated tensile force (N): 100, 500, 2000

Tensile force measuring station G2.1
500/1000 Rated tensile force (N): 500, 1000

Load cell
KM 2/4/8
Rated tensile force (N): 100, 500, 2000

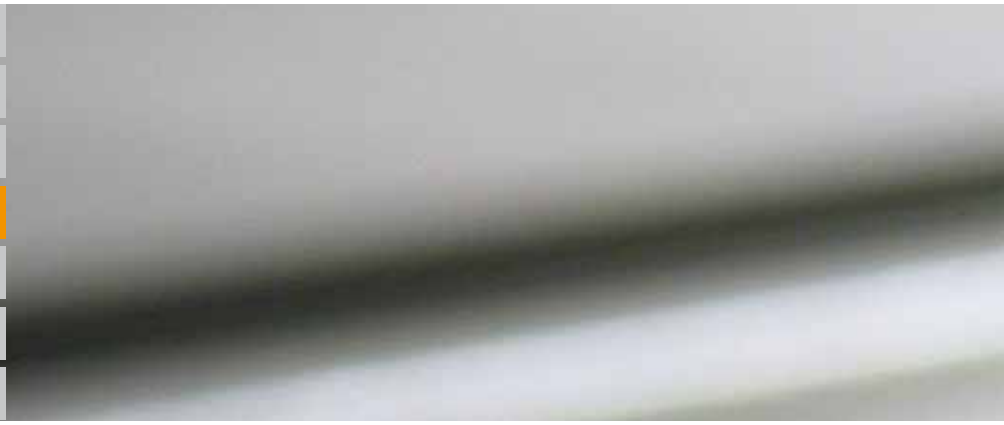
Measuring journal
MLZ 500/1000
Rated tensile force (N): 500, 1000

Torque sensor
TRS 5/50/100/200
Torque (Nm): 5, 50, 100, 200

Measuring amplifier LP26

Measuring amplifiers LP12.1/LP22

Digital measuring amplifier LP24



PRODUCT INFORMATION

AC WINDERS

An AC winder is an induction machine that is able to be operated in continuous slip mode throughout the entire speed range (0 to rated speed) by means of a special rotor. The speed is dependent on the load. During operation, the drive speed results from the current winding diameter and speed of the goods, and is indicated by the characteristic curve.

The speed is preselected by means of either electronic AC voltage regulators (referred to above) or three-phase induction regulators. The drive can be used as a central winder, contact winder or a supporting drive, and is available with or without the gears prefitted.

AC VOLTAGE REGULATORS

AC voltage regulators are used for controlling resistive and inductive loads over three phases. Using phase control, the output voltage can be freely adjusted from the minimum possible voltage setting right up to approximately the main voltage.
Additionally, the AC voltage regulator W3405 is able to control a current range of up to 5 amperes, while the W3412.1S can control a current range of up to a maximum of 12 amperes.

DC INJECTION BRAKING

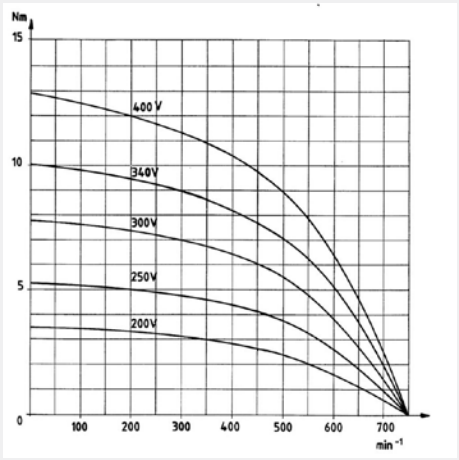
AC winders can be controlled stop with the brake unit B270 and the AC controllers W3405/W3412.1S.

Winding Type	Design IEC	Torque Md (Nm)	Syncronous speed n_S (rpm)	Design speed n_B (rpm)	Winder current consumption (A) 3x400 V, 50Hz	AC Voltage regulator
Degree of protection IP 54						
F 463	63	1,0	1500	1200	0,43	W3405
F 471	71	1,6	1500	1200	0,76	W3405
F 472	71	2,0	1500	1200	0,9	W3405
F 480	80	3,0	1500	1200	1,38	W3405
F 481	80	3,5	1500	1200	1,52	W3405
F 490	90 S	3,7	1500	1200	1,52	W3405
F 491	90 L	4,9	1500	1200	1,66	W3405
F 4100	100	5,0	1500	1200	2,2	W3405
F 4102	100	6,5	1500	1200	3,25	W3405
F 4112	112 S	6,8	1500	1200	2,85	W3405
F 4113	112 M	9,0	1500	1200	4,0	W3405
F 4114	112 ML	11,0	1500	1200	4,6	W3412.1
F 4132	132	15,0	1500	1200	6,4	W3412.1
F 8100	100 L	8,0	750	600	2,0	W3405
F 8112	112 S	13,0	750	600	2,85	W3405
F 8113	112 M	15,0	750	600	3,6	W3405
S 490	90 L	1,0	1500	1200	0,38	W3405
S 4112	112 S	1,6	1500	1200	0,8	W3405
S 871	71	1,0	750	600	0,33	W3405
S 880	80	1,6	750	600	0,43	W3405
S 890	90	2,0	750	600	0,52	W3405
S 8100	100	2,6	750	600	0,59	W3405
S 1280	80	1,1	500	400	0,24	W3405
S 1290	90	2,6	500	400	0,58	W3405
S 12100	100	3,5	500	400	0,67	W3405
S 12112	112	5,5	500	400	1,14	W3405

APPLICATIONS

Setting devices for three-phase motors, AC winders, edge trim reels, heating applications

AC winding drives, Torque: 1–260 Nm,
Design: IEC 63–IEC 132, Degree of protection: IP 54



Torque characteristic curves for different operating voltages

Edge trim winder with IEC AC winder and moving bushing. Control with W3405/W3412.1S; optional with brake unit B270.

AC voltage regulator W3405
Motor voltage: 0 V–3 x 400 V AC
Motor current: 0–5 A
DC braking with braking unit B270

Brake unit B270, DC injection for edge trim winder with three-phase AC controller W3405 and W 3412.1S.

AC voltage regulator W3412.1S
Motor voltage: 0 V–3 x 400 V AC
Motor current: 0–12 A
Available with options of DC braking and/or tension regulator

SYSTEMS TECHNOLOGY |
SWICHGEAR SYSTEMS

AUTOMATION TECHNOLOGY |
PROCESS VISUALISATION

ELECTRICAL DRIVE TECHNOLOGY

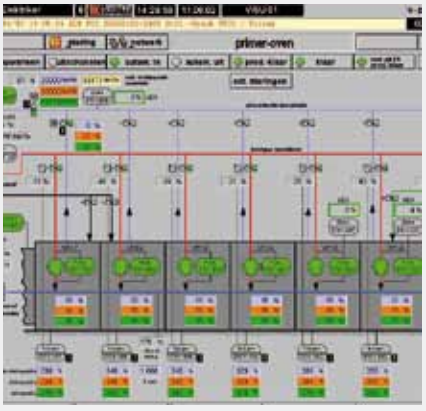
AFTER SALES SERVICES

WINDING TECHNOLOGY | UPGRADING
AC controller/AC motor
DC controller/DC motor

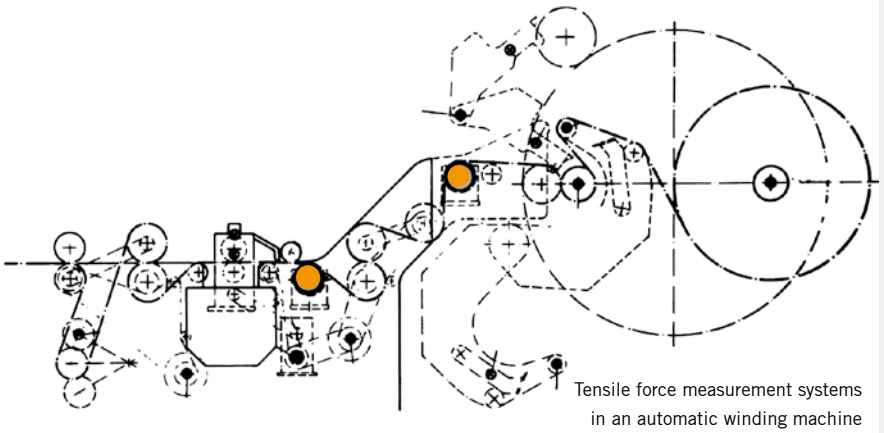
Manufacturing of complete switchgear systems by using CAD processes, standadised in accordance with DIN/VDE/EN. Realization of user-defined concepts with freely programmable logic controllers, with process visualisation systems and operating data acquisition purposes. Upgrading to actual technology, services for existing switchgear systems in DC-technology, DC-motors/DC-controllers.
We supply complete electrical switchgear systems to all areas of the engineering sector.

Tailored to customer requirements – all over the world!

Switchgear system



Process visualisation



Tensile force measurement systems in an automatic winding machine

UPGRADING | SERVICE
for existing switchgear systems,
specially for DC-technology
DC winding technology, DC-motors, Power range: 0,5–200kW
DC-motors Ex ATEX, Power range: 0,5–80 kW

DC-controller
Power range: 0,2–250 kW

ELEKTRONIC MANUFACTURING

DEVELOPMENT

DESIGN AND LAYOUT
of printed circuit boards

ASSEMBLY
- SMD
- CONVENTIONAL
- MANUAL

SOLDERING METHODS
Lead-free Soldering

- REFLOW
- WAVE
- MANUAL

Electronic manufacturing with modern production technologies.

Assembly machine

Powerboards of controller M2302 during production

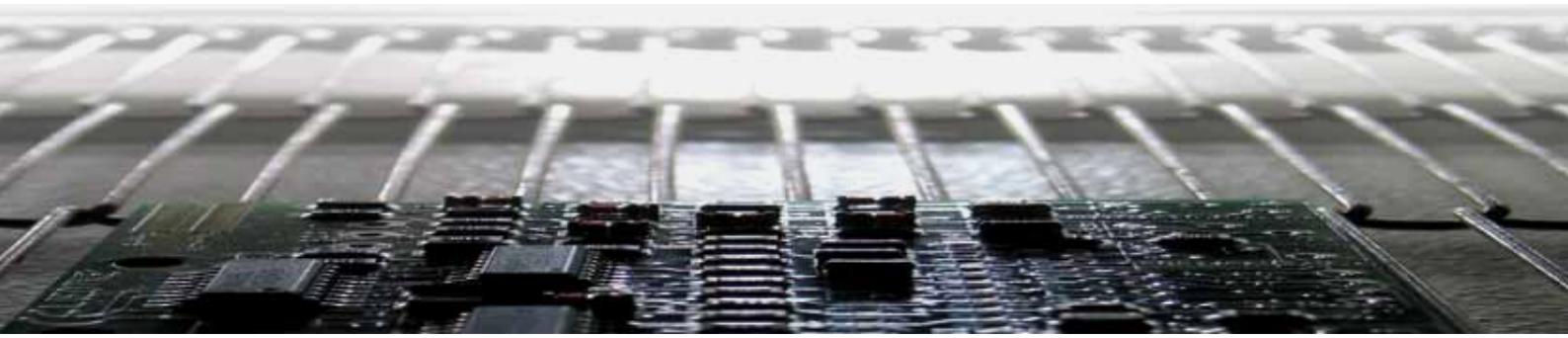
YOUR DEDICATED PARTNER

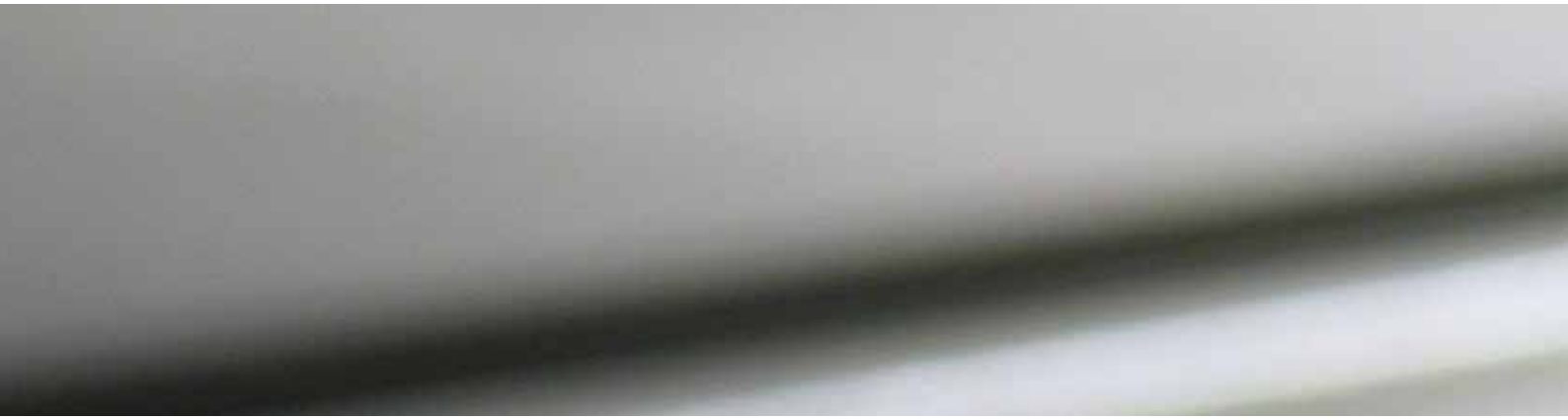
Our team developes and assembles your electronics fast and faithful for you!

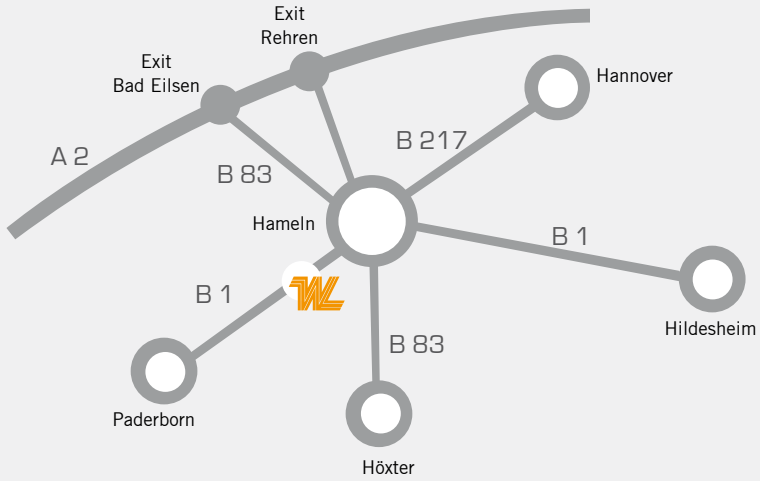
The scale of our benefits are

- Developement
- Layouts
- Developmentally guiding EMV measurements
- Conventional/automatically
- Advanced prototype/series
- Functional check

Conform the EU RoHs directive.







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