



C-tec

Quality for your crimp process!

C-tec - your quality is our motivation

We are a technology company that provides measuring and testing equipment for the wire harnessing industry as well as for the metal sheet processing. Our focus is on the self-development of innovative products and services directed at the customers' needs. The ultimate goal in everything we do is to satisfy our customers by contract-compliant and on-time performance.

What we can do for you



Development

- Mechanical engineering
- Software CAD PTC Creo Parametric
- Electrical engineering
- Firmware programming of μ controllers
- Layout of PCB
- PC software development with VB and C++



Production / Assembly

- Mechanical production:
 - CNC milling, lathing, drilling
- PCB assembly
- Assembly of our electro-mechanical products
- Testing and documentation



Sales

- Direct sale to end users or distribution via qualified resellers
- Implementing of our devices nationally and internationally
- Training of operating personnel



After-Sales-Service

- Hotline 24/7
- On-site-service
- Repair inhouse
- Works calibration service with DKD calibrated reference standards

We are successfully certified as per ISO 9001 and ISO 14001 since January 2005. This is our commitment to the highest quality standards and to the engagement for an environmentally sustainable production.



C-tec - service around the globe

From our start on in 2002 our headquarter is located in Schönberg, near the Bavarian Forest National Park and only a few kilometers away from the border to the Czech Republic.

Boundary region in former times - now a location in the heart of Europe!

Customers in almost all industrialised countries of the world make use of our products. There we cooperate with competent and longtime partners.



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Product portfolio Crimping Line

Here it's all about the crimp!

Quality and accuracy of crimp connections in the serial production of wire harnesses are of great importance. So 100% quality control during the crimping process is state-of-the-art.

Also crimping presses have to be checked periodically because quality products can only be produced with capable machines and tools.

Our Crimping Line offers you all necessary testing and checking devices to safeguard the quality of your crimp processes.



Complete micrograph laboratories

Compact tabletop or mobile laboratories for the comfortable preparation of microsections

- ML 3700
- ML 3600
- ML 3030
- ML 3002



Modules for micrograph laboratories

Components for the individual configuration of micrograph laboratories

- ML 3300
- EFP 3.0
- FC 4001
- Optical units



Software

● X-Scan
for measuring and documentation of microsections

● HeRo 5000
for determination of the headroom of the crimp contacts



Pull test measurement

Testing devices for pull force measuring of crimp connections

- PT 2500
- PT 10k HG-i
- APT 250/500/1000



100% Quality control

Crimp force analyser for monitoring of the crimping process

- CFM MX
- Piezo sensors for load measuring



Capability check of tools

Devices for checking of crimp presses and clip guns

- PAL 4000
- PT Clip

Product portfolio Stamping Line

Everywhere where metals are being stamped or formed an oiling of the metal sheets or stamped parts is necessary. The Minimal Oil Spraying System MOSS 8000 is used in the stamping and forming industry for lubricating sheet and die and for preservation of single parts.



- MOSS 8000
- MOSS 8000 Dual
- MOSS 8000 preservation system

Product portfolio Metal Detectors

The metal detector MDC 2.0 is used for the detection of metal contamination in a product stream to protect the manufacturing facilities, especially die casting machines, against damage.



- Metal detector MDC 2.0
- Detector heads

Product overview

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Microlab ML 3700

Professional tabletop laboratory for preparation of microsections



Equipped with a high quality 12x zoom objective the micrograph laboratory **Microlab ML 3700** is the ideal tool to conduct quality tests of crimp cross sections quickly and comfortably. The high resolution camera delivers first class microsections which can be easily measured with the automatic function of the analysis software X-Scan. Automatically generated records can be used as proofs of quality. Of course, X-Scan complies with all relevant DIN standards and OEM specifications.



Cutting and grinding unit



Polishing with acid-free electrolyte



First class zoom optics



Optional ancillary lens 0.5x

Performance features in detail

- ▶ Complete system, integrated ergonomically and functionally in a MDF board laminated with stainless steel
- ▶ High quality optic with 12x zoom objective and convenient focussing (coarse and fine adjustment)
- ▶ High performance digital colour camera with photosensitive 1/1.8" CMOS sensor, USB 2.0, resolution 1280x1024 pixel
- ▶ Longlife LED illumination at the microscope
- ▶ Standard terminal holder for cross sections up to 5 mm² (further sizes available on request)
- ▶ Suitable for small and medium contact sizes from 0.1 to 10 mm²
- ▶ LED working lamp for the Cutting/Grinding unit
- ▶ Appropriate tool set for the sample preparation
- ▶ Polishing of the cross section with acid free electrolyte
- ▶ Compact dimensions
- ▶ Software calibration based on traceable standards incl. calibration certificate
- ▶ Fitting gas tight mount for 7 calibration gauges
- ▶ Cross-sectioning of the sample can be carried out without any disturbance of the terminal and cable stranding
- ▶ With comfortable analysis software X-Scan

Optional: ancillary lens 0.5x for 12x zoom objective for larger cross sections

*The ML 3700 is also available as version **ML 3700-pc with integrated mini pc and digital colour camera USB 3.0**. Included in the delivery are the license for Windows 7 professional as well as a monitor, mouse and keyboard.*

Microlab ML 3600

Basic tabletop laboratory for preparation of microsections



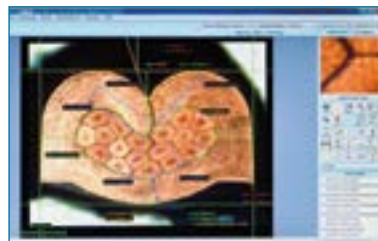
The **Microlab ML 3600** is the ideal tool to conduct quality tests in a quick and economic way. The proven 4x zoom optic is easy to use and delivers very good microsections. For the analysis you use the innovative and comfortable analysis software X-Scan which of course complies with all relevant DIN standards and OEM specifications. Automatically generated records can be used as proofs of quality.



Safety cover for the Cutting and Grinding unit



Fine polishing of the crimp



Microsection analysis with X-Scan

Performance features in detail

- ▶ Complete system, integrated ergonomically and functionally in a MDF board laminated with stainless steel
- ▶ Proven zoom objective with 4 optical zoom grades
- ▶ Digital colour camera with 1/3" CMOS sensor, USB 2.0, resolution 1280 x 1024 pixel
- ▶ Longlife LED illumination at the microscope
- ▶ Standard terminal holder for cross sections up to 5 mm² (further sizes available on request)
- ▶ Suitable for small and medium contact sizes from 0.1 to 10 mm²
- ▶ LED working lamp for the Cutting/Grinding unit
- ▶ Appropriate tool set for the sample preparation
- ▶ Polishing of the cross section with acid free electrolyte
- ▶ Compact dimensions
- ▶ Software calibration based on traceable standards incl. calibration certificate
- ▶ Fitting gas tight mount for 5 calibration gauges
- ▶ Cross-sectioning of the sample can be carried out without any disturbance of the terminal and cable stranding
- ▶ With comfortable analysis software X-Scan

*The ML 3600 is also available as version **ML 3600-pc with integrated mini pc and digital colour camera USB 3.0**. Included in the delivery are the license for Windows 7 professional as well as a monitor, mouse and keyboard.*

Mobile Lab ML 3030

The mobile micrograph laboratory on four wheels



The **Mobile Lab ML 3030** has been designed to meet the requirements of a fast and accurate production of microsections in the shop floor area. Due to the mobile design and battery operation, the Mobile Lab **ML 3030** can be flexibly used anywhere in the production area.

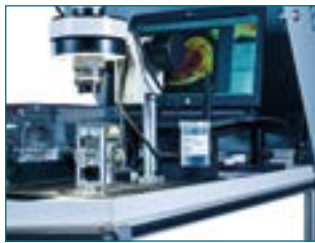
A quality check by microsection due to material or tool change can be done on the spot within a few minutes. If the result of the sample check is "ok" then production can continue in the certainty that all quality criteria are met.

Performance features in detail

- ▶ Complete mobile laboratory on wheels
- ▶ Mobile use by battery operation
- ▶ Short processing time between 3-5 minutes per micrograph
- ▶ Proven zoom objective with 4 optical zoom grades
- ▶ Digital colour camera with 1/3" CMOS sensor, USB 2.0, resolution 1280 x 1024 pixel
- ▶ Longlife LED illumination at the microscope
- ▶ Standard terminal holder for cross sections up to 5 mm² (further sizes available on request)
- ▶ Suitable for small and medium contact sizes from 0.1 to 10 mm²
- ▶ Appropriate tool set for the sample preparation
- ▶ Polishing of the cross section with acid free electrolyte
- ▶ Software calibration based on traceable standards incl. calibration certificate
- ▶ Fitting gas tight mount for 5 calibration gauges
- ▶ Swivel mouse tray
- ▶ Laptop is powered by the battery of the Microlab
- ▶ Lockable safety cover
- ▶ Integrated charger
- ▶ Cross-sectioning of the sample can be carried out without any disturbance of the terminal and cable stranding
- ▶ With comfortable analysis software X-Scan



Sophisticated concept



Space saving arrangement



Lockable top cover



Proven microscope

Microlab ML 3002

Compact micrograph laboratory in a case



The portable laboratory **Microlab ML 3002** facilitates the reliable processing of microsections anywhere in the production area without electricity or water connection. It can operate with a fully charged battery for about eight hours and is assembled and ready for use in about 90 seconds!

The proven optical unit with 4x zoom and digital colour camera delivers excellent microsections which can be analysed comfortably with the innovative software X-Scan. The scope of delivery includes all necessary accessories like terminal holder, calibration gauges etc.



Powerful measuring microscope with 4x zoom



Maximum use of minimum space



Accessories for the fine polishing

Performance features in detail

- ▶ Fully equipped micrograph laboratory in a handy case
- ▶ Flexible due to a powerful battery
- ▶ In about 90 seconds ready for operation
- ▶ Short processing time between 3-5 minutes per micrograph
- ▶ Proven zoom objective with 4 optical zoom grades
- ▶ Digital colour camera with 1/3" CMOS sensor, USB 2.0, resolution 1280 x 1024 pixel
- ▶ Longlife LED illumination at the microscope
- ▶ Standard terminal holder for cross sections up to 5 mm² (further sizes available on request)
- ▶ Suitable for small and medium contact sizes from 0.1 to 10 mm²
- ▶ Appropriate tool set for the sample preparation
- ▶ Software calibration based on traceable standards incl. calibration certificate
- ▶ Fitting gas tight mount for 5 calibration gauges
- ▶ Polishing of the cross section with acid free electrolyte
- ▶ Cross-sectioning of the sample can be carried out without any disturbance of the terminal and cable stranding
- ▶ With comfortable analysis software X-Scan

Microlab ML 3300 Cutting and Grinding Unit

The module **ML 3300** is used to cut and grind crimp connections - time saving in one step. Manual feeding and the screw for fine adjustment ensure a precise cut through the crimp. After processing the terminal holder with the crimp can be removed and passed forward to the next working steps.



Performance features in detail

- ▶ Clamping tool with guide to cut and grind the crimp
- ▶ Suitable for small and medium contact sizes from 0.1 to 10 mm²
- ▶ Feed wheel for exact transportation of the crimp to the cutting wheel and grinding disc
- ▶ Spring-mounted grinding disc avoids damages
- ▶ Safe working with a plexiglas safety cover



Cutting and grinding in one step



Precise cut through the crimp



Tool set for sample preparation

EFP 3.0 Electronic Fine Polishing Device

The **EFP 3.0** facilitates the fast, reproducible and reliable polishing of cut and ground crimp surfaces. After the polishing the microsection can be measured and documented. Our polishing liquid does not contain any harmful substances. Only for special applications we use electrolyte liquids with a weak acid level.



Performance features in detail

- ▶ Polishing pen with exchangeable polishing tips for different cross sections
- ▶ Infinitely adjustable polishing voltage from 1 - 16 V and polishing performance 1% - 100%
- ▶ Three presets for polishing parameters
- ▶ Flexible in use for various electrolyte liquids
- ▶ Reversible for processing of crimps with aluminium wires (fitting electrolytes also available)



Presets for polishing parameters



Fine polishing of the crimp cross section



Acid-free electrolyte for polishing

Fine Cutter FC 4001

Fine cutter for large cross sections



The fine cutting machine **FC 4001** allows a fast cutting and milling of crimps with large cross section of 16 – 70mm². After the precise cutting / milling the crimp can be polished, measured and the result recorded. The fine cutter **FC 4001** is a further step of the Microlab product family to process micro sections more efficient, safe and user friendly.



Crimp clamped in a terminal holder



Precise cutting



Milling disc



Large tool set

Performance features in detail

- ▶ Appropriate for cable cross sections from 16 to 70 mm²
- ▶ Speed range adjustable from 20 – 2000 rpm
- ▶ Drive motor with immediate stop function (< 0.5 sec)
- ▶ Cooling of the cutting point by air flow
- ▶ Lighting of the cutting area by super bright LED
- ▶ Chip extraction through integrated chip collector with connection for suction
- ▶ Integrated socket for chip suction
- ▶ Spring-mounted resetting of the saw blade
- ▶ Emergency stop for maximum operator safety
- ▶ Precise ball bearing guidance
- ▶ High-performance motor
- ▶ Inclusive terminal holder with four clamping jaws for different cross sections from 16 – 70 mm²
- ▶ Terminal holder for smaller cross sections available on request
- ▶ Inclusive tool set for preparing the specimen
- ▶ Housing made of robust, powder coated aluminum sheet
- ▶ Optional with milling disc also appropriate for epoxy samples

Besides our innovative and user-friendly software X-Scan we offer you a variety of optical units in order to find the best possible solution tailored to your needs. All our optic stations are installed on a stainless steel laminated MDF board and include the innovative and comfortable analysis software X-Scan.

Optic unit ML 3212 with 12x zoom

The **ML 3212** is a first class measuring microscope for examination of the crimp after the grinding process. The optics contains a 12x zoom objective with outstanding combination of zoom range and resolution and an excellent digital colour camera. The **ML 3212** delivers microsections in a very good quality.



Performance features in detail

- ▶ First class zoom optic with 12:1 image enlargement
- ▶ Lowest enlargement factor 0.58x: object size 9 x 11 mm
- ▶ Highest enlargement factor 7x: object size 0.75 x 1 mm
- ▶ Object size 130-11x on a 17" monitor
- ▶ Comfortable click locking function
- ▶ Microscope mount with coaxial fine and coarse drive for focus adjustment
- ▶ LED ring light LR-45/90 with Fresnel lens AA 100 mm to illuminate the field of view
- ▶ High performance digital colour camera with photosensitive 1/1.8" CMOS sensor, USB 2.0, resolution 1280 x 1024 pixel
- ▶ With comfortable analysis software X-Scan
- ▶ Optional: ancillary lens 0.5x for large samples

Optic unit ML 3204 with 4x zoom

The **ML 3204** optics offers four optical zoom steps and a high-quality digital colour camera with a resolution of 1.3 megapixel. The good price-performance ratio makes this measuring microscope also interesting for an occasional use.



Performance features in detail

- ▶ High quality zoom optic VZM 0.75 – 3x
- ▶ Lowest enlargement factor 0.75x: object size 5 x 6 mm
- ▶ Highest enlargement factor 3x: object size 1.1 x 1.5 mm
- ▶ Mechanical click locking
- ▶ Microscope mount with 2 knobs for adjustment of the focus (coarse drive)
- ▶ LED ring light LR-45/90 with Fresnel lens AA 100 mm to illuminate the field of view
- ▶ Digital colour camera with 1/3" CMOS sensor, USB 2.0, resolution 1280 x 1024 pixel
- ▶ With comfortable analysis software X-Scan

Optic unit OP 4001 with 6x zoom

The zoom objective **OP 4001** covers a large zoom range and is very bright due to the large aperture, so even large objects can be measured. The OP 4001 is also appropriate for measuring of the longitudinal or lateral bending of crimped terminals.



Performance features in detail

- ▶ High quality zoom optic for large measuring objects
- ▶ Lowest enlargement factor (Index 18): object size 31 x 39 mm
- ▶ Highest enlargement factor (Index 108): object size 6 x 7.5 mm
- ▶ Microscope mount with 2 knobs for adjustment of the focus (coarse drive)
- ▶ LED ring light LR-60/110 to illuminate the field of view
- ▶ High performance digital colour camera with photosensitive 1/1.8" CMOS sensor, USB 2.0, resolution 1280 x 1024 pixel
- ▶ With comfortable analysis software X-Scan

Dual optic units



OP 4002 - Dual optics with 4x zoom & 6x zoom

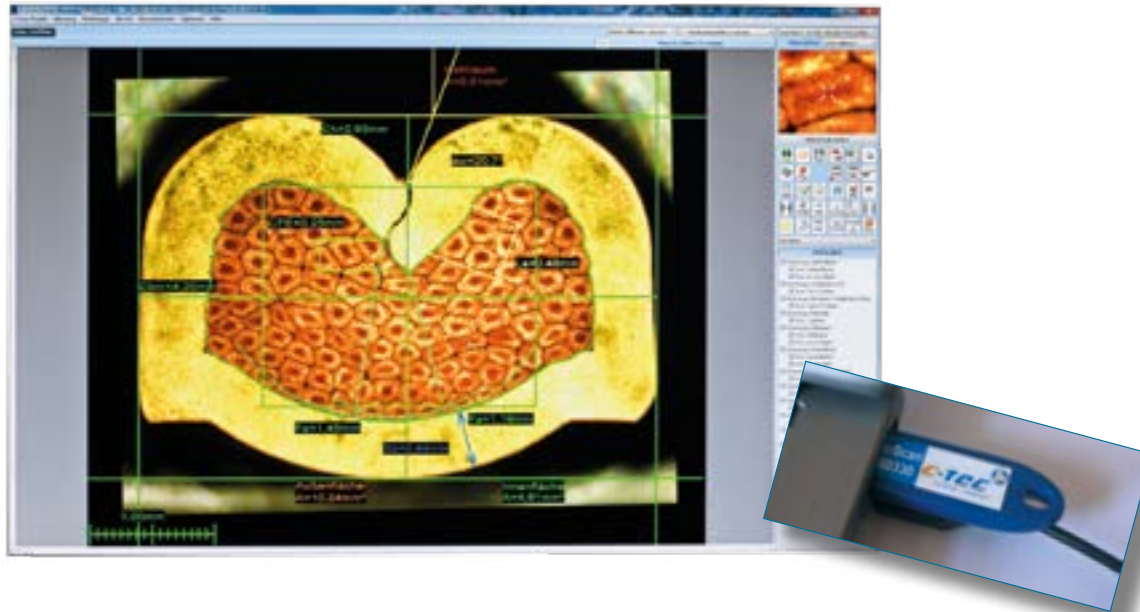
combines the performance features of ML 3204 and OP 4001

OP 4003 - Dual optics with 12x zoom & 6x zoom

combines the performance features of ML 3212 and OP 4001

Analysis software X-Scan

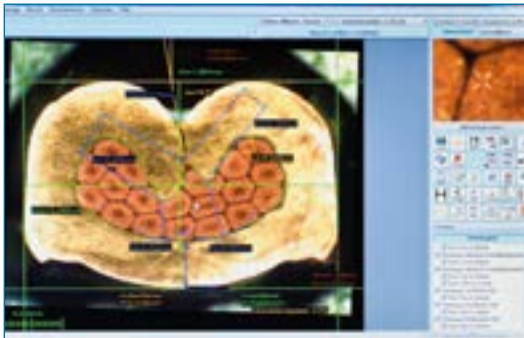
Visualize, measure and report your microsections!



The **analysis software X-Scan** allows a quick and comfortable visualisation, evaluation, measurement and documentation of crimped terminals. Due to the documentation of the microsections according to DIN EN ISO1463 the crimp quality can be proved at every time and the duty of care towards product liability has been consequently fulfilled. Of course, all relevant DIN standards and OEM specifications are considered in the software. Many innovative features like automatic contour detection, assisted measuring functions, different calculation functions and a user-defined report generation make **X-Scan** to the preferred software of the leaders!

Performance features in detail

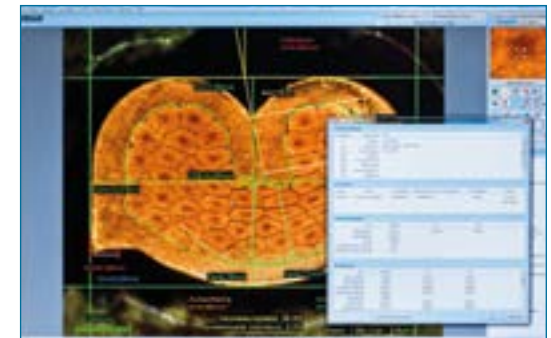
- ▶ Simple and intuitive handling
- ▶ Live picture and still image
- ▶ Supports DirectShow conform cameras
- ▶ User accounts and permission management
- ▶ Automatic calibration of the zoom levels
- ▶ Infinitely variable zoom
- ▶ 2D measuring function
- ▶ Measuring assistant
- ▶ Automatic detection of the crimp contours
- ▶ Calculation functions (Target-performance comparison, ratio calculation)
- ▶ Detection of surface areas (z.B. inner surface of the crimp, porosity rate / voids and comparison with specification)
- ▶ Report editor (report templates) and user-defined report generation
- ▶ Export as pdf or jpeg, for Excel or printer
- ▶ Database driven storage system with thumbnail function
- ▶ Corresponds to international standards
- ▶ Appropriate for documentation as per DIN EN ISO 1463
- ▶ Measuring programs according to current OEM standards
- ▶ Multilingual (expandable)



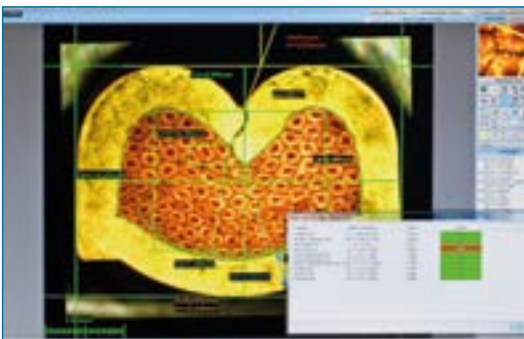
Measurement of a microsection



Management and storage of the single measurement projects



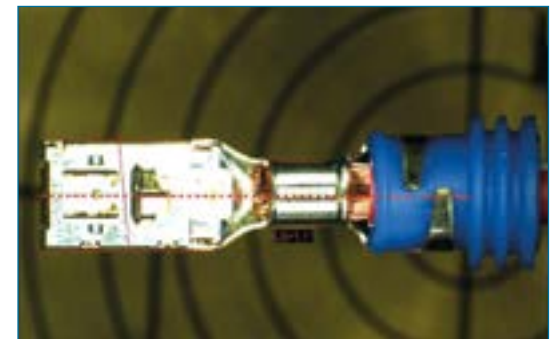
Saving all necessary project information directly with the measurement data



Presentation of the results table



The measurement data can be set in an Excel template or exported as pdf or jpg files.



Measurement of the lateral bending

Pulltester PT 2500

Testing device for the pull force measurement



The **Pulltester PT 2500** is an innovative motorised pulltester to check the tensile strength of crimp connections, splice connections etc. The measurement result does not only show whether the test has been passed or not, the graphical display of the force/path diagram allows also to draw conclusions about the pull-break behaviour of the crimp. The measurement is recorded path and time synchronously and presented as a high resolution graph on the display. Thanks to the modern touch screen no additional PC is needed for displaying the results and operating the machine.

Performance features in detail

- ▶ Path and time synchronous measurement and graphic presentation of the curves in real time
- ▶ Displaying of all relevant measuring data, for instance minima, maxima etc
- ▶ Measuring range from 0 to 2500 N
- ▶ Speed-controlled motor guarantees even pull rates up to 300 mm/min.
- ▶ Modern touch screen with intuitive and multilingual operating possibility
- ▶ Easygoing quick start for the tests during production
- ▶ Independent useable checking device without requesting an additional PC
- ▶ Possibility to generate individual measuring procedures according to application
- ▶ Measurements can be stored directly in the pulltester
- ▶ Interfaces for export or import of data
- ▶ Option for serial measurements in table format or for detailed measurements with complete sets of measuring points
- ▶ Measurement data can be imported in Excel as .csv file
- ▶ Multiple options like languages, system of units (metric/imperial or N/kgf/kp), etc.
- ▶ Universal use due to a flexible mount for the sample holder
- ▶ Changing of the sample holder with few hand grips

Possible test routines:

- 1) Pull till break
- 2) Pull till defined force and hold force
- 3) Pull till defined force and hold way
- 4) Pull till defined force and release



Universal clamping jaws for different sizes of crimps, e.g. break behaviour of a cable with $\text{Ø } 0.75\text{mm}^2$



Testing of cables with a larger diameter, e.g. pull force measuring of a battery terminal crimp



Quick-change system for the sample holder



Modern touch screen for intuitive and comfortable operation



Presentation of the graphs in real time directly in the display



Emergency stop for safe working conditions

Pulltester PT 10k HG-i

Motorised gauge for tensile tests - heavy duty model for large crimps



The **Pulltester PT 10K HG-i** is designed to make tensile tests on crimps with very large cable cross sections. The test load can rise up to 10 000 N. Selection between destructive and non-destructive testing mode is possible. For a quick assessment of the test result a table with the DIN extraction forces is deposited in the firmware. To secure the clamping of the contact element there are interchangeable inserts in different sizes available. The cable end itself is held by a particularly stable fixture. Depending on the specifications given it is possible to program different tensile speeds. The last 100 measuring results remain constantly stored. The measuring values can be automatically copied into an Excel form.

Performance features in detail

- ▶ Firm fixing of the sample by use of interchangeable inserts and a heavy cable clamber
- ▶ Up to 10 000 N maximal force
- ▶ Pulling speed variable 50 - 120 mm/min
- ▶ Five interchangeable inserts for different sample sizes
- ▶ Tensile force is indicated on the LCD display in real time
- ▶ Maximum tensile force and target value are shown in the display
- ▶ Storage of the last results and automatic export in Excel
- ▶ Constant pull force allows a stable and precise measuring
- ▶ DIN table deposited in the firmware for quick assessment
- ▶ Complies with international standards and guidelines
- ▶ Calibration works certificate on request



Clamp for fixing the sample



Clear and user friendly operating panel



Tool set included

Pulltester APT 250 / 500 / 1000

Motorised pulltester for crimp connections



The **Pulltester series APT** consists of three models of motorised pull force test devices. They are used for the destructive pull tests of crimp connections. Thereby the crimp connector is pulled off from the cable. The connector and the cable will be destroyed between insulation crimp and wire crimp in most cases.

The peak value of the measuring is indicated in the display. Depending on the requirements different pull speeds can be set. The test results can be automatically transmitted into an Excel file. Also the pull off curve can be monitored on the PC.

Available models:

APT 250 for 250 N maximal force

APT 500 for 500 N maximal force

APT 1000 for 1000 N maximal force

Performance features in detail

- ▶ One touch clamber for firm fixing at connector-wire sides
- ▶ Displaying of the pull force values in real-time mode on the device display
- ▶ Automatical output in Excel format
- ▶ Peak force is displayed in kg, N, lb.
- ▶ Constant pull force makes stable and exact monitoring
- ▶ Pull speed selectable: 25 - 50 / 50 - 100 / 100 - 200 mm/min.
- ▶ Wire-wire (joint) pull force test is possible, too
- ▶ Complies with international standards
- ▶ Simple handling
- ▶ Compact dimensions
- ▶ Calibration certificate available on request
- ▶ PC software on Windows basis available



Pull till break



Standard wedge gripper



Optional clamping crown

CFM MX Crimp Force Analysis



The **crimp force monitor CFM MX** is designed for use in the mass production of wire harnesses. The testing device is mounted on the crimping press and receives the signals of a piezoelectric quartzsensor, which is installed in the press. The measuring signals of the force sensor are continuously compared with reference values of a „good“ crimp. If a measured value is outside of the preset tolerance, the device raises an acoustic alarm and stops the machine. The quality inspection system CFM MX gives you the assurance that only quality-tested parts will be delivered to your customers!



Piezoelectric quartzsensor for installation at the press frame



Piezoelectric quartzsensor for installation in the crimp press

Performance features in detail

- ▶ Easily adaptable to most types of manual presses, semi-automatic stripper crimper machines and automatic wire processing machines
- ▶ High accuracy, 300 readings per crimp, 256 gain levels
- ▶ Automatic trigger system, no proximity sensors required, but it's use is possible on request
- ▶ Simple T1, T2, T3 & TD analysis tools
- ▶ Many output signals available
- ▶ Pro MX software for visualising the crimp curve
- ▶ Protected from unauthorized use by either using a code word or a security dongle
- ▶ Equipment standards for a lot of crimp presses available

Models:

- ▶ CFM MX 10 (single channel) for benchtop presses and semi-automatic stripper crimper presses
- ▶ CFM MX 20 (dual channel) for automatic wire processing machines

Piezoelectric quartzsensors

For use with crimp force monitoring devices

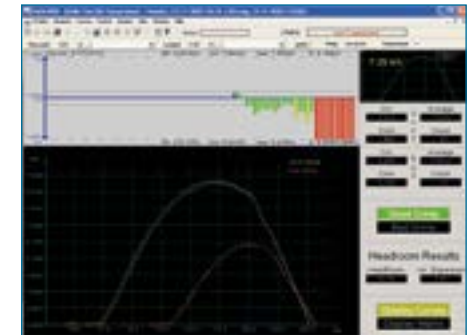
For the measurement of the crimp force in the production process of crimp connections so called piezoelectric quartzsensors are used. These are available in different types and can be installed either in the crimp press or on the press frame.

We can deliver the following types of sensors:		
	Application	Sensitivity
Sensors with fixed cable		
FTW01	up to 1 kN	4.00 mV/N +/- 10%
FTW05	up to 5 kN	1.00 mV/N +/- 10%
FTW20	up to 20 kN	0.26 mV/N +/- 10%
FTW255	up to 25 kN	0.204 mV/N +/- 10%
Sensors with screwed cable		
FTC2083	up to 20 kN	0.26 mV/N +/- 10%
FTC4083	up to 40 kN	0.128 mV/N +/- 10%
RH 202M45	up to 44 kN	112.4 mV/kN
RH 203M42	up to 89 kN	56.2 mV/kN
RH 204M49	up to 178 kN	27.0 mV/kN
RH 205M38	up to 266 kN	17.98 mV/kN
Sensors for measuring the press strain		
240M16	Frame mount	50 mV/ $\mu\epsilon$ (strain)
PSS 25	Frame mount	25 mV/ $\mu\epsilon$ (strain)
PSS 50	Frame mount	50 mV/ $\mu\epsilon$ (strain)

Software HeRo 5000

For determination of the monitoring ability of wire terminal combination

HeRo 5000 allows you to determine the "headroom" of crimped wires fast and traceable. So the analysis of the headroom gives you a qualified evidence for the monitoring capability of special wire/terminal combinations. Terminals, which cannot be monitored safely by the crimp force monitor, can be filtered out before production starts.



Performance features in detail

- ▶ Fast and reliable
- ▶ Immediate analysis on PC
- ▶ Measurement results can be recalled from a data base
- ▶ Printing of reports in different format possible
- ▶ "Comment" function

The headroom analysis compares the peak force of a terminal crimped with a wire and the peak force of crimping a terminal without wire. The headroom should be >35%.

PAL 4000

The new generation of press analysis tools

NEW



Our new **Press Analyser PAL 4000** is a most efficient and innovative tool for the maintenance and capability check of your crimping machines.

New and unique features like colour touch display, integrated memory and USB interfaces in combination with our proven quality make the **PAL 4000** to an essential tool for quality assurance in the wire harness production.

Due to the modern touch screen an easy and comfortable operation as well as an immediate presentation of the measuring results directly at the device is possible. There is no need for an additional PC.

Up to 100 measurements can be recorded in the integrated memory. The powerful battery allows a flexible use without electric hook-up.

Performance features in detail

- ▶ Large colour display with touch screen for easy operation
- ▶ Displaying and analysis of the crimp monitor force curve on the PAL touch screen
- ▶ Display of shut height, force or histogram
- ▶ Selection of colour combinations for the display
- ▶ Data entry directly in PAL 4000 possible
- ▶ Storage of up to 100 measurements in the device
- ▶ Electrical motor for force selection
- ▶ Standard shut height is 135.78 mm, adapter for other shut heights available
- ▶ High measuring resolution
- ▶ USB interface for PC
- ▶ Synchronisation function between PAL 4000 and Computer
- ▶ Integrated RS232 interface for crimp monitors
- ▶ Calibration of various crimp force monitors via PAL 4000
- ▶ Counter for calibration cycles
- ▶ Auto power off (if not in use)
- ▶ Real time clock
- ▶ Logbook with memory for overloads
- ▶ Count down function for relay box (delay time to shut the safety cover)
- ▶ Powerful battery for up to 6 hours constant operation
- ▶ Charger for fast recharging
- ▶ Robust case for storage and transport



Safely stowed in a robust case



Modern colour touch display



USB interface for PC



Presentation of the measurement results

PT Clip

Motorised checking device for cable tie's tighten pistols



Faulty or incorrectly adjusted cable tie tension guns can cause serious damage to wiring harnesses.

The motorised **tester PT Clip** determines the tension of cable tie hand tools (clip guns). The test is performed with cable ties which are drawn with the gun power and cut off. The tensile force is displayed and can be compared with the specifications of the manufacturer and readjusted if required.

Already successfully tested clip guns:

Hellermann Tyton: MK3SP, MK3PNSP2, MK6, MARK7, MARK7P, MARK9, MK9RE, MARK9P, EVO7

Panduit: GS2BL, GS4H, PPTS Tension

Thomas & Betts: ERG50P



Test with clamped cable tie



Universal holder for different types of clip guns



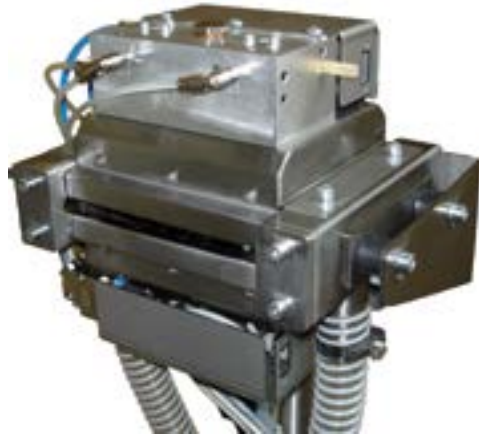
Display shows the peak force

Performance features in detail

- ▶ One single tester for different makes and models of cable tie hand tools
- ▶ The maximum pull force is indicated on the LCD display in real time mode
- ▶ The pull force can be displayed in N, lb. or kg
- ▶ Steady and repeatable measuring due to electric motor drive
- ▶ The maximum pull force is being calculated
- ▶ Complies with international standards
- ▶ Calibration certificate on request
- ▶ PC Software Windows-based with interface to Excel
- ▶ No damage of the clip gun during testing due to safety clutch
- ▶ No risk of injury due to limited force
- ▶ Annual calibration of the PT-Clip can be carried out at customer premises
- ▶ Even pneumatic clip guns can be tested (adapter necessary)
- ▶ Serial interface for transmission of the measuring data to a PC
- ▶ Input-/Output interface for controlling and output of functions
- ▶ Power supply 100 – 240 Volt 50/60 Hz

MOSS 8000

For lubrication and preservation in the metal sheet industry



The lubrication of tool and coil in the sheet metal forming is state-of-the-art. It increases process reliability and boosts the quality of the products as well as die life.

The **Minimal Oil Spraying System MOSS 8000** is used in the stamping and forming industry for lubricating sheet and die and for preservation of single parts.



Service module



Remote control
"easy touch"



Preservation unit with conveyor belt

Performance features in detail

- ▶ Contact-free application of lubricants and suspensions
- ▶ Up to 70% savings on consumption of lubricants
- ▶ Applicable for a large variety of viscosities
- ▶ Multi-level filtering
- ▶ Adjustment of the film application without any time lag
- ▶ Pump-injector or common-rail principle
- ▶ All actuators can be triggered by remote control
- ▶ Spraying chambers in several standard sizes available, special sizes on request
- ▶ Self-cleaning filter – low maintenance cost
- ▶ Compact design with fully integrated oil sump
- ▶ Easy to maintain through modular construction
- ▶ Data base for consumption of lubricant
- ▶ Finest proportioning of the oil film
- ▶ Closed system: no leak of harmful oil vapor
- ▶ Excessive lubricant will be recirculated into the primary cycle
- ▶ Multi-Oil-Extension Kit for automatic change from oil 1 to oil 2 without mixing

Metal detector MDC 2.0

For the ejection control at die cast facilities



The **metal detector MDC 2.0** is used for the detection of metal contamination in a product stream to protect the manufacturing facilities, especially die casting machines, against damage. It is particularly suitable for ferromagnetic material, stainless steel, copper, brass, aluminium, zinc and all other conductive materials.

The **MDC 2.0** is appropriate for conveyor belt application as well as for free-fall or suction-pressure conveying. Different adjustments can be made e. g. detection sensitivity or conveying speed. Subsequent following working processes or material separators can be controlled by several independent switching / signal outputs with adjustable delay and switching time.

Performance features in detail

- ▶ 10-stage adjustment of the detection sensitivity
- ▶ Clearly visible signal lights
- ▶ USB connection possible
- ▶ Easy and user-friendly operating
- ▶ Three selectable conveying speeds
- ▶ Suitable for conveyor belt, free-fall or suction-pressure application
- ▶ Reliable detection under proper use
- ▶ Combination with different detector heads which can have different detection cross sections, forms and arrangements according to the application requirements



Signal lights are clearly visible



Various detector heads are available

Our services for you

Consulting services

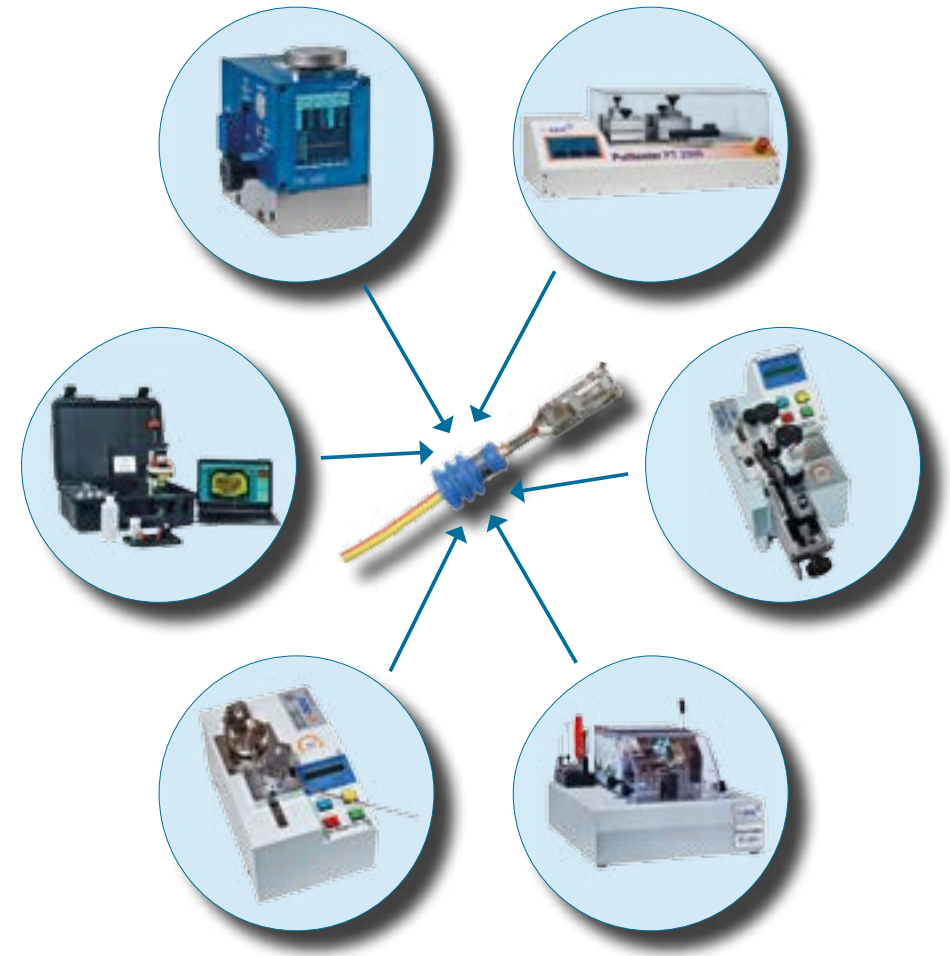
- Expertise in the quality assurance of the crimping process by years of experience
- The ultimate goal of our advice and recommendations is the satisfaction of our customers
- Our advice is free for you - call us !

Supporting services

- Installation and commissioning of our measurement and test systems at the customer's place
- Repairs inhouse and at customer site
- Operator training on site or at our premises
- Factory calibration of our measurement and test systems with DKD certified measuring equipment

Inspection services

- Machine capability study of your crimping presses
- Microsections of your crimps including report according to DIN EN ISO 1463, RCC-E Kap.E4210 as well as to the rules of the OEM's
- Pull test of your crimps as per DIN EN 60512-16-4



Notes



All information provided is based on current technical data. Further relevant test reports, assessments and installation guidelines to our products have to be observed.

All technical data is subject to change without prior notice and is governed by our Terms and Conditions of Sales. Errors and omissions excepted. Printing errors excepted.

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