ML 3212

Optical test station for visual inspection and measurement of cross sections

Operation Manual
English
Version 1.0.0

Qualitätsmanagement
Umweltmanagement
ISO 9001
ISO 14001
www.dekra-siegel.de

Date created:	August 2016 / M. Egginger		Version: 1.0.0	2016
Date last change:	January 2022 / M. Egginger		Checked by:	Patrick Schwarz
File:	BA_ML3212_EN			

Contents

Please study this handbook carefully before initial use of the equipment. Keep this handbook at the working place, where you can easily find it and hand it over with the equipment to other persons.

1 Safety Regulations for Electrical Machines in Industrial Use

Danger

Electrical machines are equipment for use in industrial plants. During operation of the machine dangers may arise through rotating or moving parts and/or high voltage.
In case of improper use of the machine during commissioning, operation and maintenance **severe injuries to persons and damage of property** may arise. The machine may only be used under the provisions stated in the instruction manual, additionally the local working conditions should be considered.

Warning

- Transportation, installation, commissioning, electrical connection, operation and maintenance may only be carried out by authorized and qualified specialist staff.
- Knowledge of the regulations for the prevention of industrial accidents and first aid measures is a prerequisite for safe and trouble-free operation of this system.
- This instruction manual contains the most important notes for operation of the system in accordance with safety requirements.
- This instruction manual and especially the safety notes contained herein must be observed by all the persons working with the system.

Non-observance is a safety risk!

Our “general sales and supply conditions” always apply as these are available to the user under www.cable-tec.net at any time. Any claims for warranty or liability in case of personal injury or property damage are excluded, if they can be traced back to one or several of the following causes.

- The equipment was not used according to the intended purpose.
- Improper installation, commissioning, operation, and maintenance of the equipment.
- Operation of the equipment with defective safety devices or with improperly mounted or non-functional safety and protection devices.
- Non-observance of the information in the operating instructions concerning installation, commissioning, operation and maintenance of the equipment.
- Unauthorized modifications of the equipment.
- Repair work performed improperly (no original spare parts) by unauthorized personnel.
- Events caused by the effect of foreign bodies and force majeure.

Hotline

In case of breakdown of the machine or in case of danger please call our service hotline :
Tel. +49 (0) 8554 94 23 9-0, Fax + 49 (0) 8554 94 23 9-20, eMail info@cable-tec.net

2 Function of the equipment

The optic unit **ML 3212** is used for the examination of a crimp cross section after the polishing process. It contains a 12x zoom objective with comfortable locking function and coaxial fine and coarse drive for focus adjustment. With the excellent digital colour camera the microsection can be displayed on a monitor. By a powerful and easy to learn PC software the image can be analysed, measured and filed. Calibrated gauge pins are included for calibration of the measuring software. These gauge pins have to be re–calibrated within adequate periods by a calibration service.

3 Intended use

The mass production of wiring harnesses, especially in the automotive industry, must meet and be verified according to the highest quality standards. Failures can lead to substantial claims for damages and loss of money. Specified inspections and tests before production starts and after any interruption in the production process are mandatory to comply with the rules of the manufacturer. Due to the high measuring accuracy and resolution the measurement readings are recorded with a high grade of accuracy.
With the measuring microscope e.g. ML 3212 and the appropriate analysis software the crimp cross section will be analysed, measured and documented according to relevant standards and customers' requirements. Our analysis software X-Scan complies with all significant DIN standards and OEM specifications.
The requirements for temperature and humidity have to be carefully observed. Ignoring these rules can cause accidents or damages. Other use as described in this manual is not allowed and can lead to the loss of warranty claims and liability exclusion of the supplier. Any unauthorized modification of the equipment carried out by user will invalidate the manufacturer's liability to any resulting damage or injury to personnel.

4 Technical specification

Type	ML 3212
Power supply	100 – 240 VAC 50/60 Hz
Camera resolution	2560 x 1920 pixel
Camera interface	USB 3.0 port
Object illumination	Long-living LED ring light source
Recommended room temperature	22°C +/- 5°C
Dimensions (W x D x H)	430mm x 470mm x 550mm (680mm height with ancillary lens and higher stand rod)
Weight	14.5 kg

Overview sample sizes:

	Minimum magnification		Maximum magnification	
	vertical	**horizontal**	**vertical**	**horizontal**
12x zoom	7.3 mm	9.7 mm	0.59 mm	0.8 mm
12x zoom with 0.5x lens	14.6 mm	19.4 mm	1.2 mm	1.6 mm
12x zoom mit 0.25x lens	29.0 mm	39.0 mm	2.4 mm	3.2 mm

5 Scope of delivery

Standard delivery must include:

- Electric power cable EU standard
- USB 3.0 connector cable
- Zoom optics 0.58 – 7x with USB 3.0 CMOS digital camera
- Dust cover for zoom optics
- USB flash drive with X-Scan analysis software
- USB protection dongle for X-Scan analysis software
- Plastic bowl
- Glass container 75 ml for samples
- One roll paper towel (Kleenex)
- Measuring scale in a base
- Operation manual
- Optional: ancillary lens 0.25x or 0.5x for larger objects

6 Packing

The optic unit is packed in a special transportation packing. Please re-use this package again or recycle it according to your local rules.

7 Transportation

The transportation of the unit must be free of vibration and shock. The normal packaging is not seaworthy and cannot be used for water carriage. The packing does not protect against wet conditions. Tumbling of the unit during transportation is not allowed. Handle with care! Throwing or falling down of the packed unit can cause damages or total demolition.

8 Storing

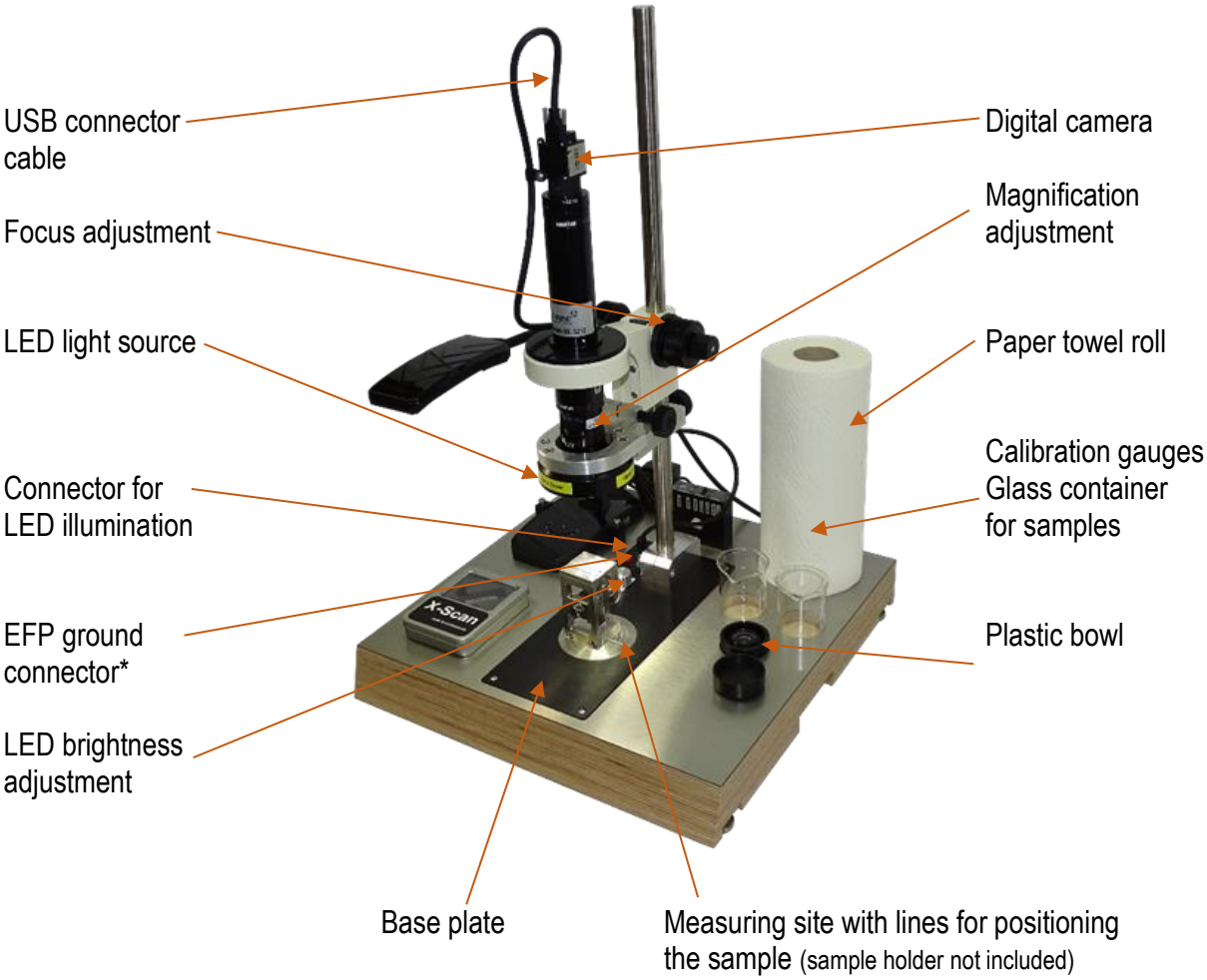
The ML 3212 has to be stored in a dry and well-tempered room. The optimum store temperature is at 20°C. Too high humidity can cause corrosion on important precision parts.

9 Set up

The **ML 3212** has to be set up in a dry, dust free and well-tempered room. It must be protected from improper environment conditions like high or low temperature, direct sun light, vibrations and other mechanical influences, electromagnetic or magnetic fields, humidity or dust. It shall be set up on a stable and safe working table. OP 4001 is furnished with four rubber legs. The front legs can be adjusted in height. Therefore it is quite simple to adjust the lab horizontal. It is not necessary to screw it on the table.
If any defects, improper functions, damages or problems occur, which cannot be solved by the instructions in this handbook, please contact C-tec for support.
DANGER TO LIFE: The unit shall be operated only by grounded power connection or power socket. Before open up the lab, switch off the unit from power supply! Do not open the gauge during operation.

10 Starting up with ML 3212

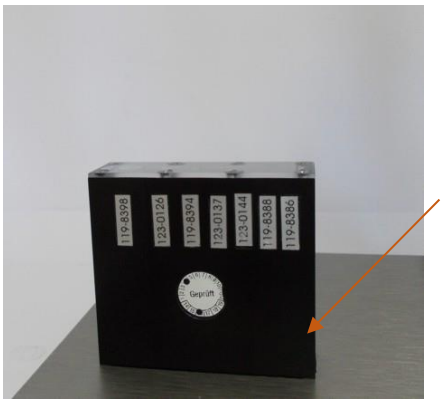
10.1 Parts and tools



* EFP 3.0 = Electronic Fine polishing unit for polishing the microsections

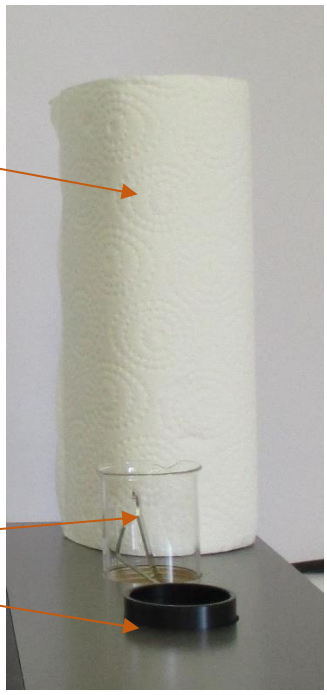
10.2 Necessary preparations

10.2.1 Set up accessories



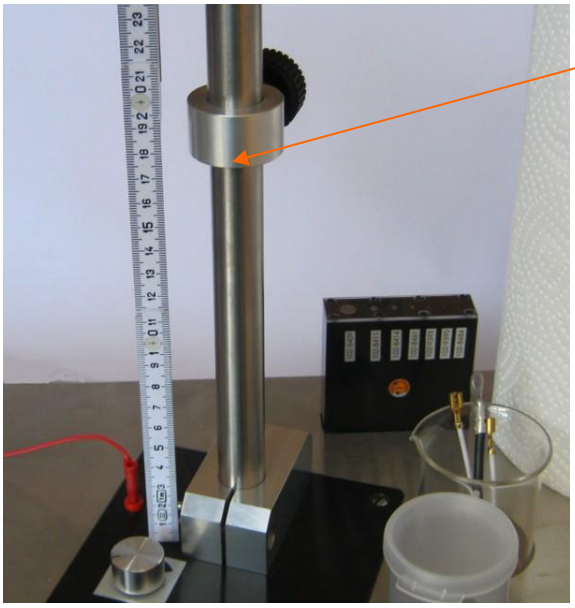
Put the calibration gauge base on its place.

Put paper towel roll on its holder

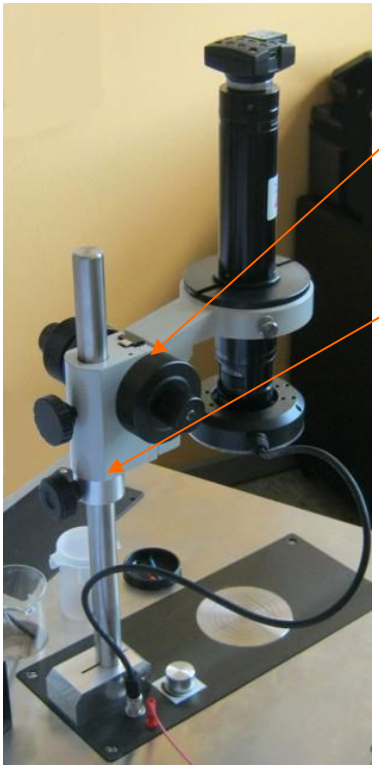


Put the glass container and the plastic bowl in their places

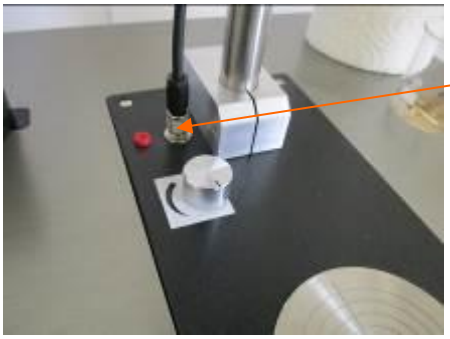
10.2.2 Set up of zoom objective and digital camera



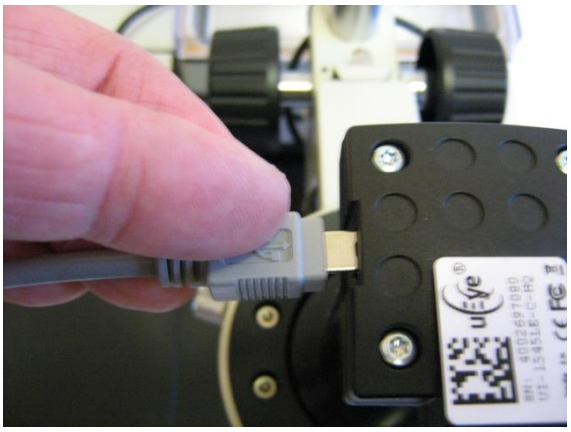
Fix the fall down protection ring in a height from about 200 mm.



Now set the microscope holder with the optics on top of the fall down protection ring and lock it there.



Connect the plug for the LED lighting and fix the connector.



Connect the USB cable to the digital camera but **not to the PC or lap top**. The connection to the PC side has to be done after the software X-Scan has been installed successful.

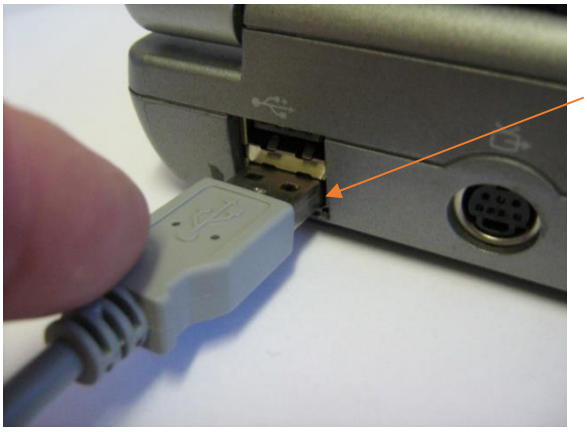
10.2.3 Installation of the analysis software X-Scan

See manual X-Scan Page 5 - 12

10.2.4 Activation of USB digital camera on PC or laptop

See manual X-Scan Page 13 - 15

Close all open PC programmes including X-Scan. Now connect the USB cable, which leads from the USB digital camera to an open USB port on your PC or laptop.



Connect the USB cable coming from the USB digital camera to your PC or laptop.

Note: Choose always the same USB port for the camera. This will save time in recognizing the camera on the PC.

Finally connect the USB dongle to another USB port of your PC or laptop.
An installation of the dongle software is not required.

The preparation works are finished now.

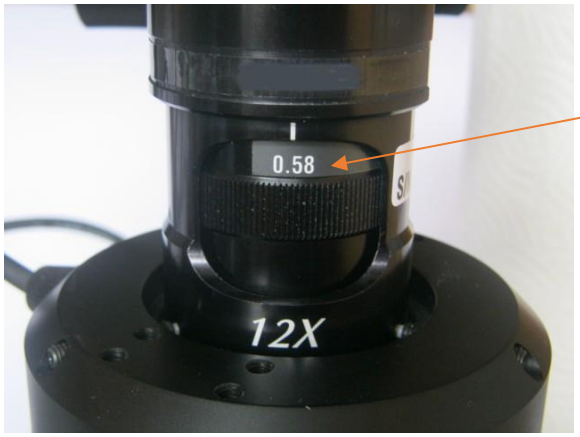
10.2.5 First start of X-Scan

See manual X-Scan page 16 - 24

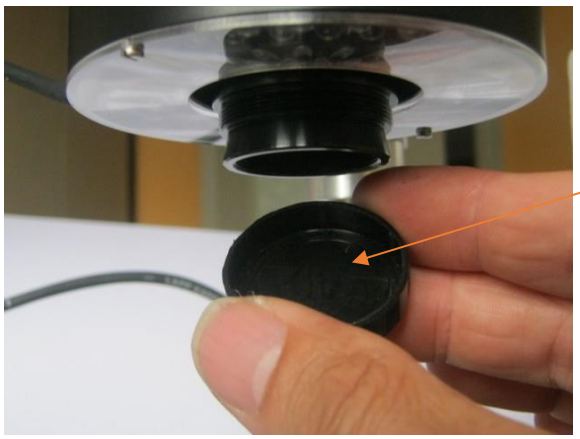
10.2.6 Calibration of the analysis software X-Scan

See manual X-Scan page 25 – 35

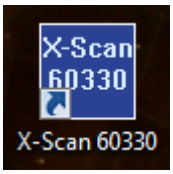
10.2.7 Displaying a microsection



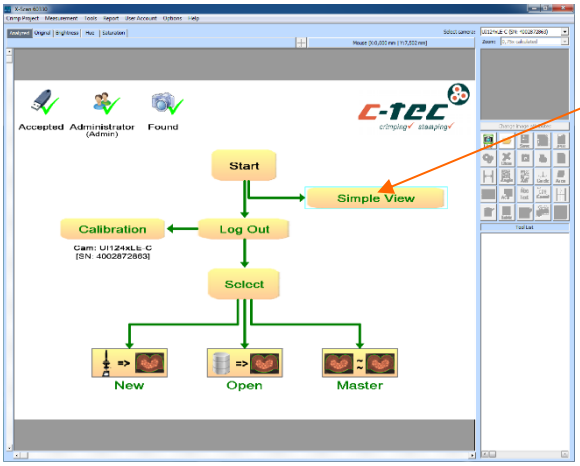
Start with the smallest zoom ratio.



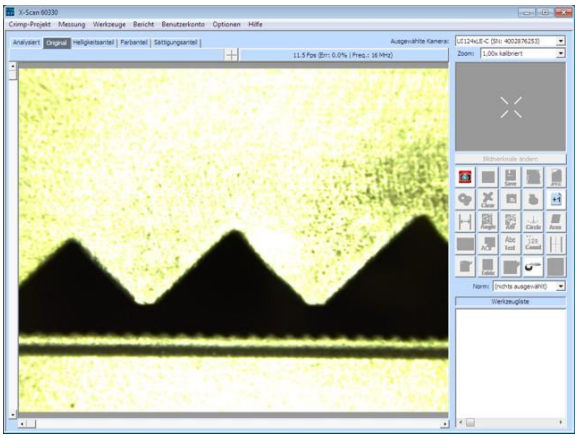
Remove the dust cover from the optics.



Start X-Scan!

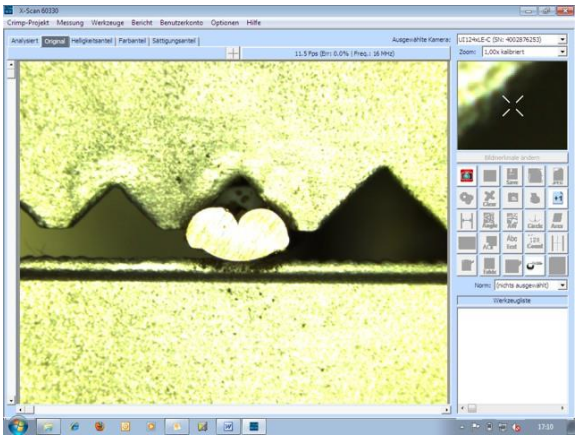


Click on the field “Simple View”.



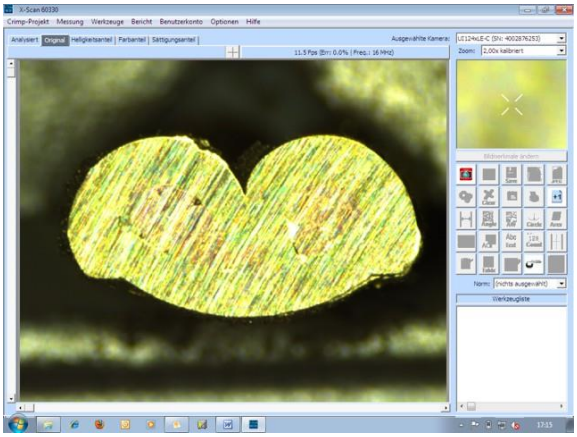
Move the terminal holder left and right until you can see the X-section on the monitor.

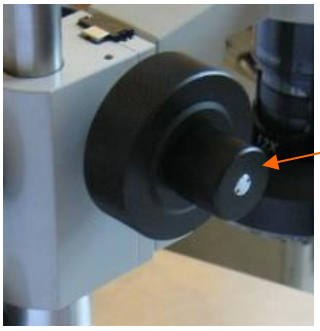
Move the terminal holder along the line.



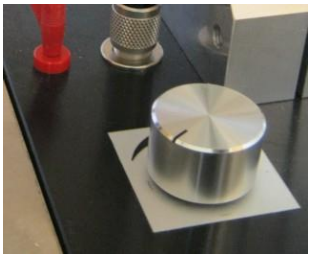
The terminal has to be placed in the middle of the screen.

Now adjust the zoom until the terminal fills up maximum of the screen.

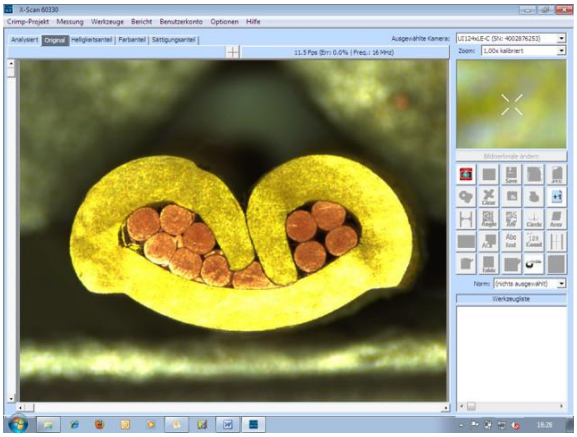




Make the picture sharp by turning the focus knob.

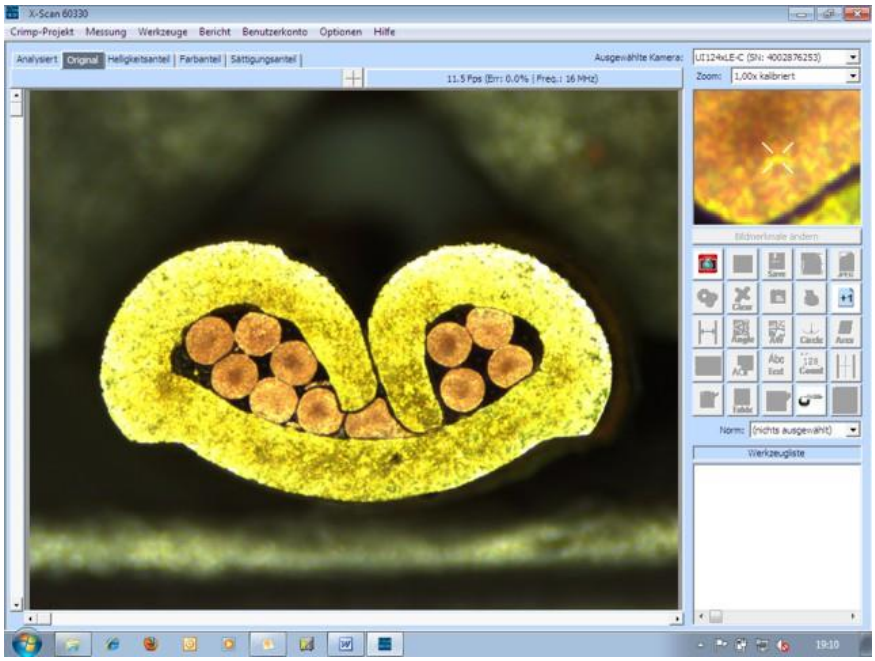


Finally a proper illumination has to be adjusted.



Now the sample is ready for the measuring process.

10.3 Analysis of an X-section picture



See manual X-Scan page: 47 – 61 (Simple measuring)
page: 62 – 94 (Automatic measuring)

11 Handling, Maintenance and Servicing

To keep the ML 3212 in a proper condition the following provisions have to be observed:

- Set up of the unit in a dry and well-tempered room.
- If the unit is not in operation, the optics shall be protected with the dust cover.
- Don't use any strong cleaning chemicals.
- Clean the working surface every day.

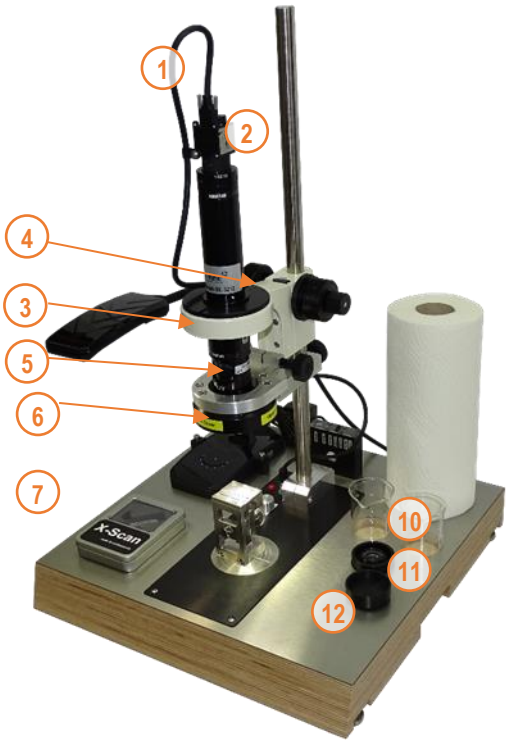
12 Periodical inspections

The calibration of X-scan measuring software should be repeated every month.

13 Decommissioning

Don't dispose the unit with residual waste!
This unit is subject to the European Community Directive for used electrical and electronic devices and may not be disposed in regular household garbage.
After period of use the device can be returned to C-tec for duly recycling.

14 Spare parts



No.	Art.no.	Description
(1)	101711	USB 3.0 connector cable
(2)	101710	USB 3.0 CMOS digital camera
(3)	101141	Clamping ring for camera and lighting
(4)	101108	Microscope holder for optics with fine adjusting
(5)	100047	Zoom optics 0.58 – 7x
(6)	100657	LED ring light LR-45/90
(7)	101074	Base with calibration gauges
(8)	101063	USB flash drive with PC software X-Scan
(9)	101488	USB protection dongle with X-Scan
(10)		Beeker 100ml
(11)		Plastic bowl
(12)		Dust cover for optics
(13)	100375	Ancillary lens 0.5x for large samples (optional)

15 EU Declaration of Conformity

EG – Konformitätserklärung
EU Declaration of Conformity
-Original-

CE

Die Firma: *The Company:*	C-tec Cable technologies GmbH & CoKG Ilztalstrasse 11, 94513 Schönberg, Germany
Produktbezeichnung: *Product:*	Optikstation ML 3212 *Optic station ML 3212*
Typenbezeichnung: *Type:*	ML 3212
Seriennummer: *Serial no.:*	**Herstellungsjahr:** *Year of production:*

Das bezeichnete Produkt erfüllt die Bestimmungen der Richtlinien:
The above mentioned product complies with the regulations of the directives and amendments:

2014/35/EU Niederspannungsrichtlinie *Low voltage directive*
2011/65/EU RoHs Richtlinie *RoHs directive*
2014/30/EU EMV-Richtlinie *directive for electromagnetic compatibility*

durch Einhaltung folgender Normen:
by adhering to the following standards:

DIN EN 12100:2011-03
Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze - Risikobeurteilung und Risikominderung
Safety of machinery - General principles for design - Risk assessment and risk reduction

DIN EN 60204-1:2014-10
Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen - Teil 1: Allgemeine Anforderungen
Safety of machinery - Electrical equipment of machines - Part 1: General requirements

DIN EN 50581:2013-02
Technische Dokumentation zur Beurteilung von Elektro- und Elektronikgeräten hinsichtlich der Beschränkung gefährlicher Stoffe (RoHs)
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances (RoHs)

DIN EN 61000-6-1:2007-10
Elektromagnetische Verträglichkeit (EMV) - Teil 6-1: Fachgrundnormen - Störfestigkeit für Wohnbereich, Geschäfts- und Gewerbebereiche sowie Kleinbetriebe
Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments

DIN EN 61000-6-3:2011-09
Elektromagnetische Verträglichkeit (EMV) - Teil 6-3: Fachgrundnormen - Störaussendung für Wohnbereich, Geschäfts- und Gewerbebereiche sowie Kleinbetriebe
Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments

DIN EN ISO 13849-1:2008-12
Sicherheit von Maschinen - Sicherheitsbezogene Teile von Steuerungen - Teil 1: Allgemeine Gestaltungsleitsätze
Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design

Diese Erklärung wird verantwortlich abgegeben durch:
This declaration is submitted by:

Ort, Datum *Place, Date*	Lothar Schreiner Geschäftsführer *General Manager*

Please consider your environmental responsibility before printing this document.

Notes: