

FMK 3 manual

Software Version: FMC3.2.9.0

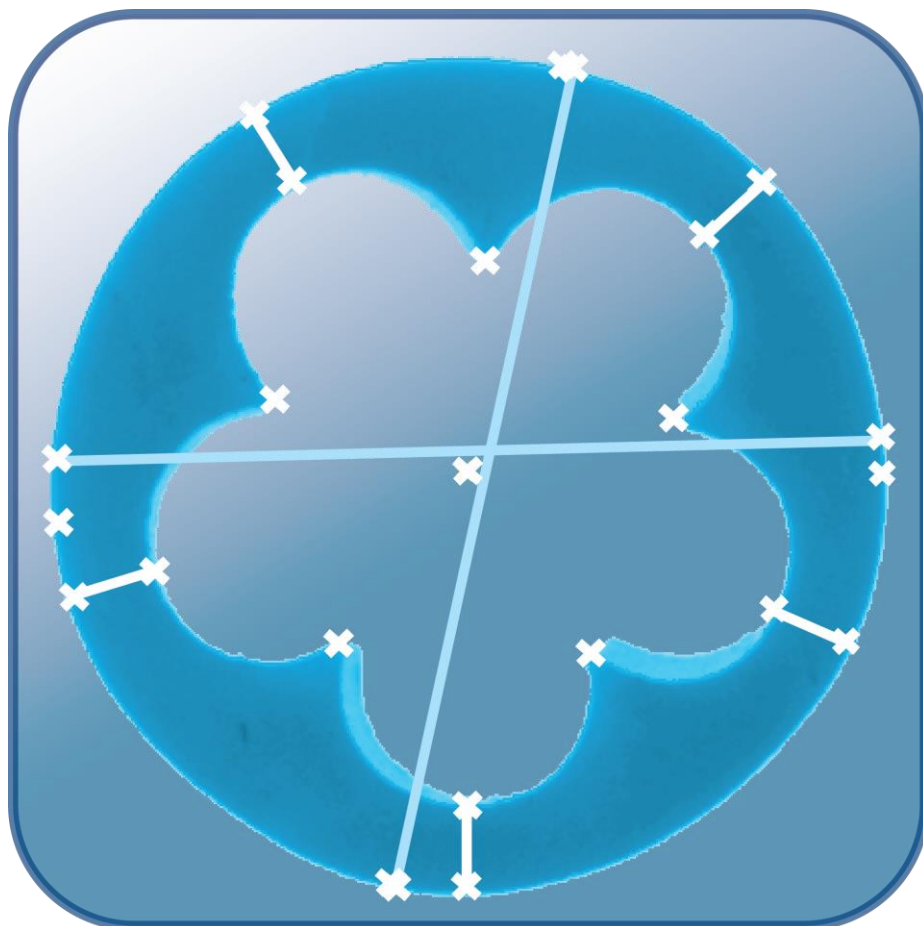
User information for measurement software.

Basis: IEC60811-201/202/203

Language: English

Date: 27.06.2016

Author: MA



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1. System Buttons

**New**

- All measurements will be deleted
- Command lines (from part programme) will be deleted

**Load**

- Saved part programme (*.ktp) can be loaded

**Save**

- Command lines will be saved as a part programme (*.ktp)
- Further performed measurements will overwrite the current part programme

**Print**

- Selected report will be printed out
(values from activated report will be used)

**Print/Preview**

- Selected report will be shown as preview
- Various export possibilities (PDF, Excel, etc.)
- Save the selected report
- Print

**Camera and Light Dialogue**

- Fade in/fade out

**Delete Overlay**

- The overlay lines from the contours and walls will be deleted

**Cross Hair 60/90**

- Fade in 60° and/or 90° cross hair
- Profile Projector mode



Cross Hair Colour

- For changing the cross hair colour
- Red, Green, Blue



Calibration Circle

- For checking the outer diameter (Gaussian)
- Only for checking! Not for changing!



Modification/Alignment

- For using after the Calibration Circle
- Changes the calibration value! Measurements will be different!
- **Attention! Only for trained personnel!**



Save Image

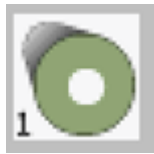
- The current live image will be saved in the selected report (e.g. after zooming)



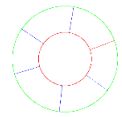
Zoom

- Live image will be zoomed in (**digitally**)
- Width and Height must diagonally be defined for zooming into the image

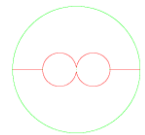
2. Cable measurements (automatic)



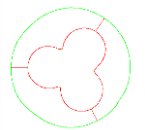
- 1 – Wire, round
- Classic round, more than 6-wire (e.g. sheaths, braids)
 - 6 wall thicknesses



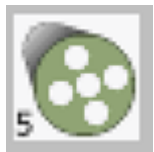
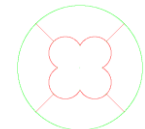
- 2 – Wires, round
- 2 wall thicknesses



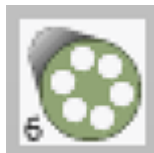
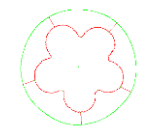
- 3 – Wires, round
- 3 wall thicknesses



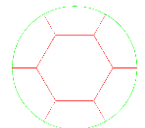
- 4 – Wires, round
- 4 wall thicknesses



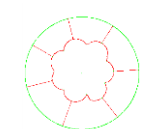
- 5 – Wires, round
- 5 wall thicknesses



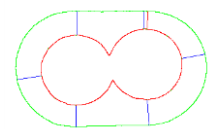
- 6 – Wires, round
- 6 wall thicknesses
 - More than 6-wires should be measured as 1-wire



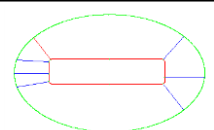
- 7 – Wires, round
- 7 wall thicknesses
 - **Attention! Special button! Not according to standard!**



- Oval
- 7 wall thicknesses (6 walls at defined locations + Min wall)
 - 2 cores



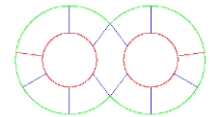
- Flat Cable
- 7 wall thicknesses
 - 1 core





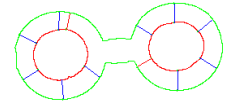
Speaker

- 2x6 wall thicknesses
- 2xcore w/o separator



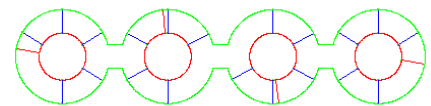
Twin

- 2x6 wall thicknesses
- 2xcore with separator



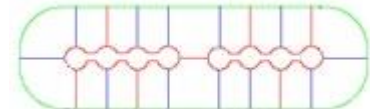
Flat Cable

- nx6 wall thicknesses
- n cores



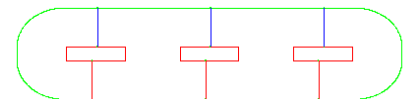
Flat Cable

- Several groups
- Several cores



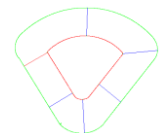
xFC – Special Cable

- Several groups
- Several cores



Sector

- 6 wall thicknesses



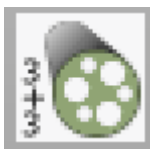
Conductor with carrier

- Each 6 wall thicknesses
- Separator Height



ASI-Bus

- Special Cable



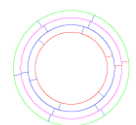
High Voltage and Signal Cable

- Special Cable



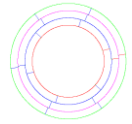
Layer Button

- 1 Layer

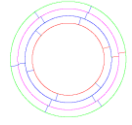




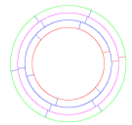
Layer Button
- 2 Layers



Layer Button
- 3 Layers



1 of n Layer
- Selected layers will be detected
- Results will be calculated from the total sample
- More options possible (1 of n, 3 of n, 3 of n + 1 of n)



Mode for cut samples
- 0 = deactivated
- 1 = activated

3. Cable measurements (manual)



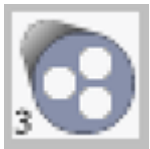
- 1 – Wire, round
- Classic round & more than 6 wires
 - 6 wall thicknesses
 - 12 measurement points



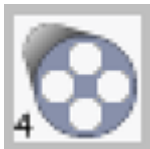
- Colour portion
- After automatic measurement
 - Up to 3 colour portions
 - Result in %



- 2 – Wires, round
- 2 wall thicknesses
 - 6 measurement points



- 3 – Wires, round
- 3 wall thicknesses
 - 9 measurement points



- 4 – Wires, round
- 4 wall thicknesses
 - 8 measurement points



- 5 – Wires, round
- 5 wall thicknesses
 - 15 measurement points



- 6 – Wires, round
- 6 wall thicknesses
 - 12 measurement points



- 7 – Wires, round – **Not according to standard!**
- 7 wall thicknesses
 - 21 measurement points



- Layer Button
- Up to 7 layers
 - **Simple Mode! Not according to standard!**



Oval

- 7 wall thicknesses
- 2 cores
- 22 measurement points



Flat Cable

- 7 wall thicknesses
- 1 core
- 16 measurement points



Speaker

- 2x6 wall thicknesses
- without separator
- 16 measurement points



Twin

- 2x6 wall thicknesses
- with separator
- 18 measurement points



Flat Cable

- nx6 measurement points
- nx16 measurement points (can be different, is calculated by separators and cores)



Sector

- 6 wall thicknesses
- 12 measurement points



Conductor with carrier

- 6 measurement points each
- separator height



Flat Cable

- Each group has 4 wires
- N groups
- 20 measurement points per group (can be different, is calculated by separators and cores)



Flat Cable

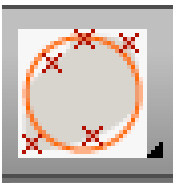
- n wires
- 22 measurement points per wire (can be different, is calculated by separators and cores)



Flat Cable – Special Cable

- n wires
- 20 measurement points per wire (can be different, is calculated by separators and cores)

4. Outer Diameter



Gaussian Circle

- Calculated by all pixel points around the sample
- Resolution 20.000 – 30.000 points
- Calculation by Gaussian Algorithm (Best fit circle)



Tschebyscheff Circle

- Calculated by all pixel points around the sample
- Resolution 20.000 – 30.000 points
- Calculation by Tschebyscheff Algorithm



Inscribed Circle - Hüllkreis

- Calculation by Gaussian algorithm
- Smallest circle around the sample
- „Which is the smallest hole my cable will fit through?“



Circumscribed Circle - Pferchkreis

- Calculation by Gaussian algorithm
- Biggest circle inside the sample / that fits into the sample

Outer Diameter from wall thicknesses points

Is calculated by up to 6 wall thicknesses (standard setting). The value you can find here: **Tolerances – outer diameter – best fit circle from wall thicknesses points**

Outer Diameter <25mm IEC60811

Samples with outer diameter <25 mm will be calculated by two measurements perpendicular to one another.

Outer Diameter >25mm IEC60811

Samples with outer diameter >25 mm will be calculated by circumference ($d=U/\pi$).

5. Inner Diameter

Inner Diameter will always be calculated by wall thicknesses points!
Each geometry can be up to 6 measurement points (standard setting).

6. Measurements 2D



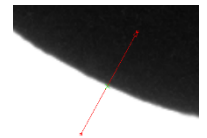
Point

- For measuring one point by manually clicking the right position
- 1x left click
- Display in the Geometry Report



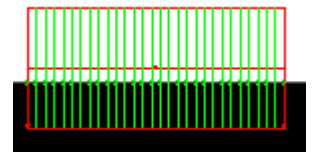
Edge

- For measuring an edge (point)
- 3x click – left, left, right
- Display in the Geometry Report



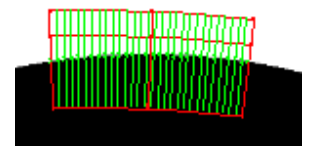
Straight Line

- For measuring a line with multiple measurement lines
- 4x click – left, left, left, right (define search lines)
- Display in the Geometry Report



Arc

- For measuring an arc with different measurement lines (search lines point to centre)
- 5x click – left, left, left, left, right
- Display in the Geometry Report



7. Calculations 2D



Distance

- For calculating the distance between two objects
- Point to point, line to line, line to point
- Display in the Geometry Report

Geometries				
Nr.	Bezeichnung	X	Y	
1	Point	3.013	4.571	
2	Point	2.645	2.026	
3	Distance	0.368	2.545	2.572



Angle

- Calculation of angle
- line to line
- Display in the Geometry Report

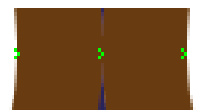
Geometries				
Nr.	Bezeichnung	X	Y	Winkel
1	Line	2.711	4.042	180.000°
2	Line	5.049	3.603	90.000°
3	Angle	-90.000°		



Symmetry point

- Point to point
- Display in the Geometry Report

Geometries			
Nr.	Bezeichnung	X	Y
1	Point	1.871	4.310
2	Point	3.690	2.229
3	Point	2.781	3.269



Construct a line

- Point to point
- Display in the Geometry Report



Construct a circle

- Minimum 3 points
- Display in the Geometry Report

8. Material Usage



Helix

- Calculation
- To fill out, use "cm"

Helix
✕

Length:	<input type="text" value="10"/>	OK
Diam. under shield:	<input type="text" value="0.697"/>	Cancel
Diam. of wire:	<input type="text" value="0.02"/>	
Wire count of complete shield:	<input type="text" value="16"/>	
(Length in cm)		

Wendel:

Schlaglänge	:	10,000 cm
Durchmesser unter Schirm	:	0,697 cm
Drahtdurchmesser	:	0,020 cm
Drahtzahl	:	16
Flechtwinkel	:	77.18'21"
Bedeckung	:	14,56 %



Shielding

- Calculation
- To fill out, use "mm"

Shielding
✕

Gradient:	<input type="text" value="7.5"/>	OK
Outer Diam. w/o shield	<input type="text" value="6.973"/>	Cancel
Coil count:	<input type="text" value="16"/>	
Count of wires per coil	<input type="text" value="6"/>	
Diam. of wind wires:	<input style="border: 1px solid blue;" type="text" value="0.25"/>	
(Length in mm)		

Schirm:

Steigung	:	7,500 mm
Aussendm. Kabel o. Schirm	:	6,973 mm
Spulenzahl	:	16
Drahtzahl pro Spule	:	6
Durchm. Flechtdraht	:	0,250 mm
Flechtwinkel	:	17.43'00"
Bedeckung	:	53,81 %

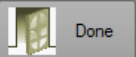


Material usage


- Calculation calculation with real cross sectional area
- Result in volume and weight
- Length and Gravity are to fill in

Material Usage

Measurement:


Area: mm² 

Settings:

Length: m 

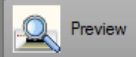
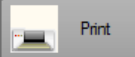
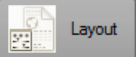
Spec. Gravity: g/cm³

Results:

Volume: cm³ 

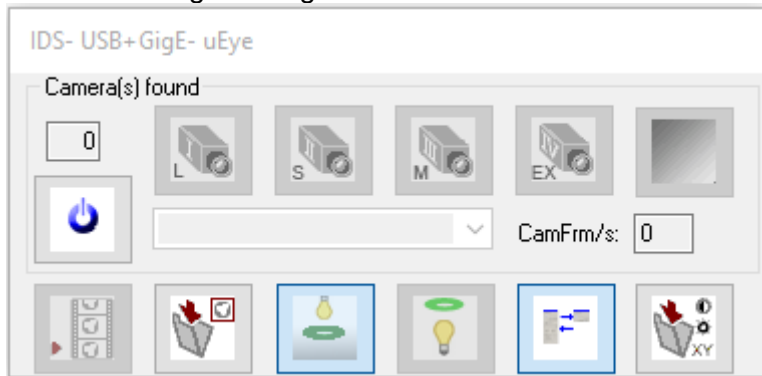
Weight: kg

Protocol

 Preview  Print  Layout

9. Dialogue Window

Camera and light dialogue window



On/Off switch for Hardware (light and camera)



Switch - Live image / freeze image



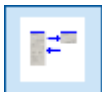
Save live image as *.bmp



On/Off Backlight (Standardly on)



on/off Frontlight (Standardly off), only for layer measurements and colour portion, etc.)



Expand dialogue window (Administrator)



Fix dialogue window (the position)



Camera switch for switching between cameras

Image buffer



Upload an image into the buffer



Download an image from the buffer



Go back to the live image



Fix dialogue window (the position)



Shadow switch (Administrator settings)

10. Light Settings

BL	Backlight	Durchlicht	Hintergrundlicht
FL	Frontlight	Auflicht	Frontlicht

BL = ON FL = OFF	<p>schematicly draft</p>	<p>Software image</p>	Note:
			contur wall thickness diameter cross section
BL = OFF FL = ON	<p>schematicly draft</p>	<p>Software image</p>	Note:
			contur wall thickness diameter cross section surface layer color portion
BL = ON FL = ON	<p>schematicly draft</p>	<p>Software image</p>	Note:
			contur wall thickness diameter cross section surface layer color portion

Light combinations

	BL	FL mono	FL color
Standard	x		
optional	x	x	
optional		x	
optional	x		x
optional			x