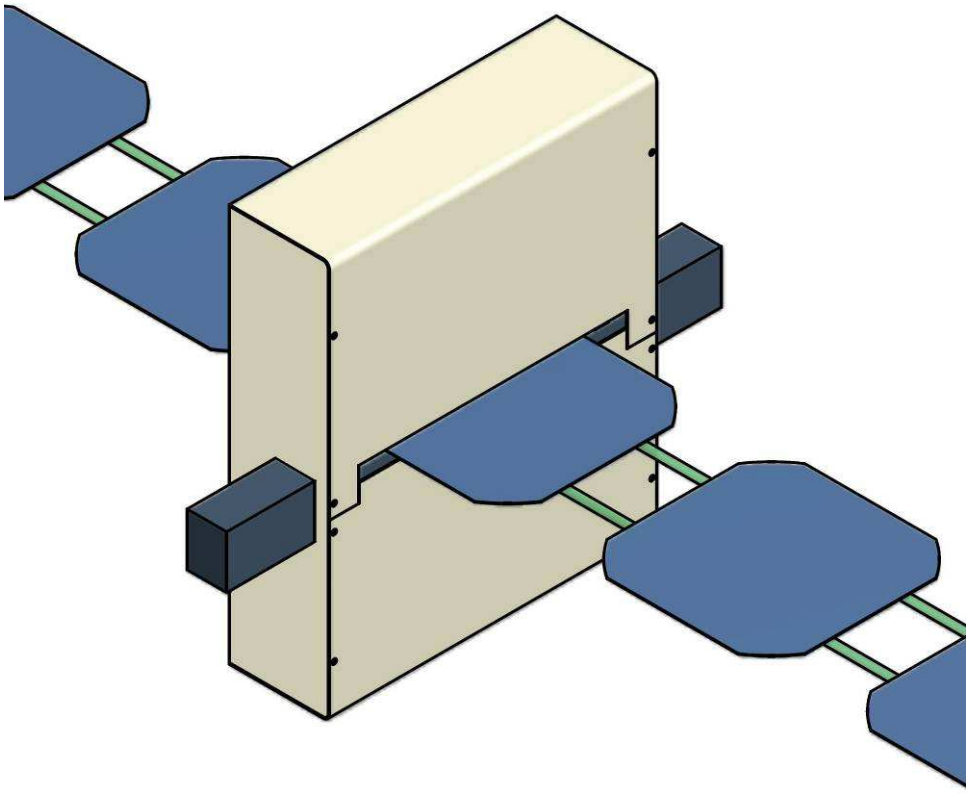
E+H
Metrology GmbH

MX 152

Electronic Thickness and Resistivity Gauge



The system consists of the measuring head, an electronic rack linked by one standard cable with 25-pin D-connector and a PC.

To allow three thickness scans during belt transport at different wafer sizes, two measuring bars, one from top and one from bottom, hold 3 sensors each. The outer sensors pairs left and right are mounted on a linear sledge and can be moved simultaneously equidistant to the center by means of a manually moved lever.
Before and behind of each capacitive sensor are light barriers to validate the measurements of a sensor only if both are covered. This assures safe measurements even with different wafer forms or misalignments. To ensure safe start and finish of measurement the light barriers have to be uncovered between two incoming wafers. Therefore the wafers must be at least 30mm apart.

Optionally a one-scan resistivity measurement can be added within the same case, as well as a one-point P/N sensor.

The electronic rack is connected to a PC which itself is linked with the host PC by an Ethernet connection.
A simple TCP/IP based protocol is used to communicate measurement values and to arm/disarm measurements.

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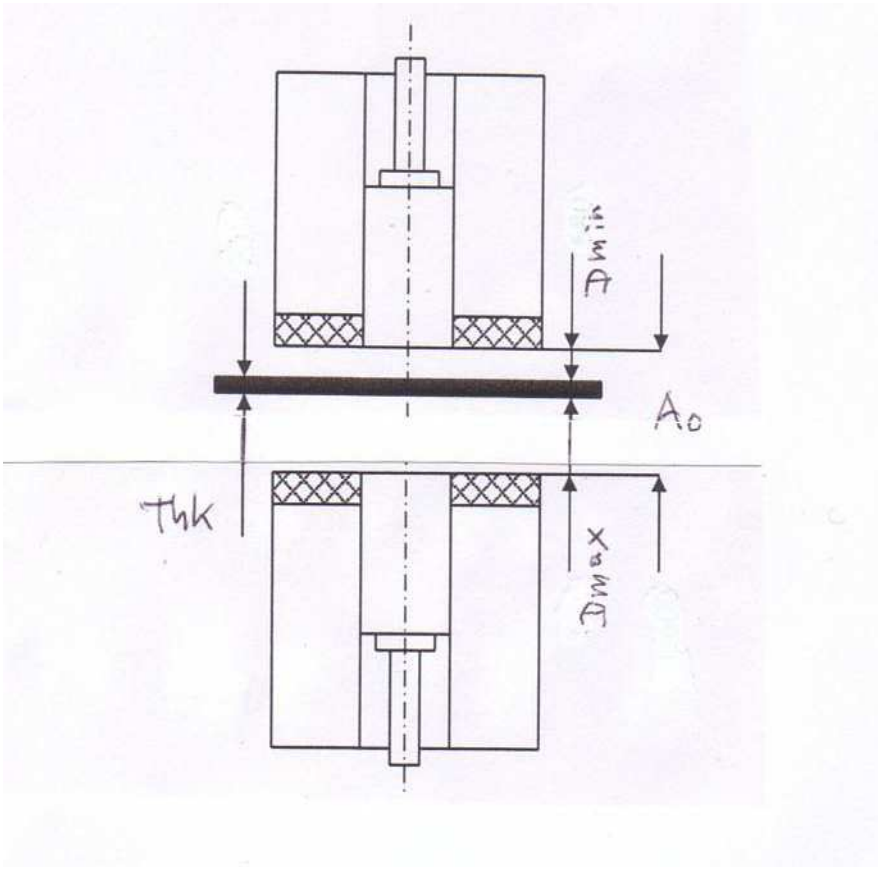
Technical Specifications

Wafer Sizes	125 + 156 mm Square, Pseudo-Square, Round
Thickness	100 – 300 µm
Accuracy	+/- 1 µm
Conditions:	max. height changing +/- 150 µm after calibration with a 200 µm reference wafer
Sensor Diameter	10 mm
Active Area	5.5 mm Ø (lateral sensors)
Active Area	1.5 mmX8.7 mm (center sensor rectangular)
Distance from Edge	5.5 mm
Resistivity	0.2 – 30 Ohm*cm (thk.=240µm)
Sheet Resistance	8 – 1200 Ohm/square
Accuracy	+/- 5 %
Sensor Diameter	18 mm
Active Area	ca. 12 mm Ø
Distance from Edge	11 mm
PN type tester	Resistivity range 20mΩcm to 3000Ωcm
Max .Belt speed	360 mm/s
Distance between Wafers:	
Only Thickness Head	> 20 mm
Thickness + Resistivity	> 30 mm
= max. Throughput	5000 Wafer/h
Power Voltage	100 – 240 VAC
Consumption	15 VA

Sensor gap and max. wafer position changing



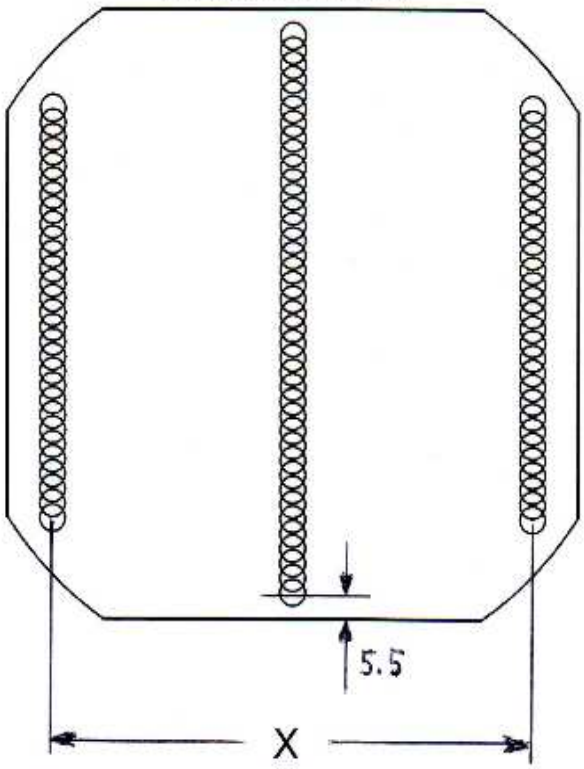
Sensor Gap:

Ao = Dmin + Dmax + minThk = 1600 µm

Dmin = 300 µm
Dmax = 1200 µm

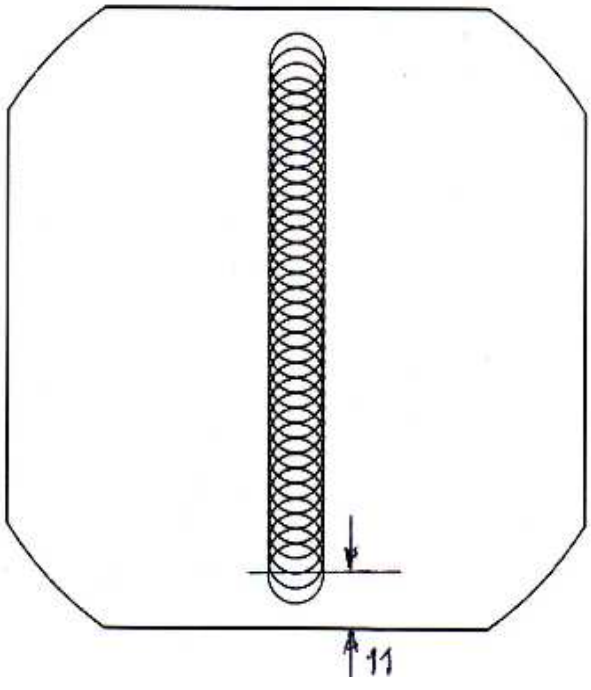
Within these limits,
the Thk changes will be additional to the accuracy +/- 1 µm
utilising the whole gap, additional about +/- 2 µm

Thickness Scans



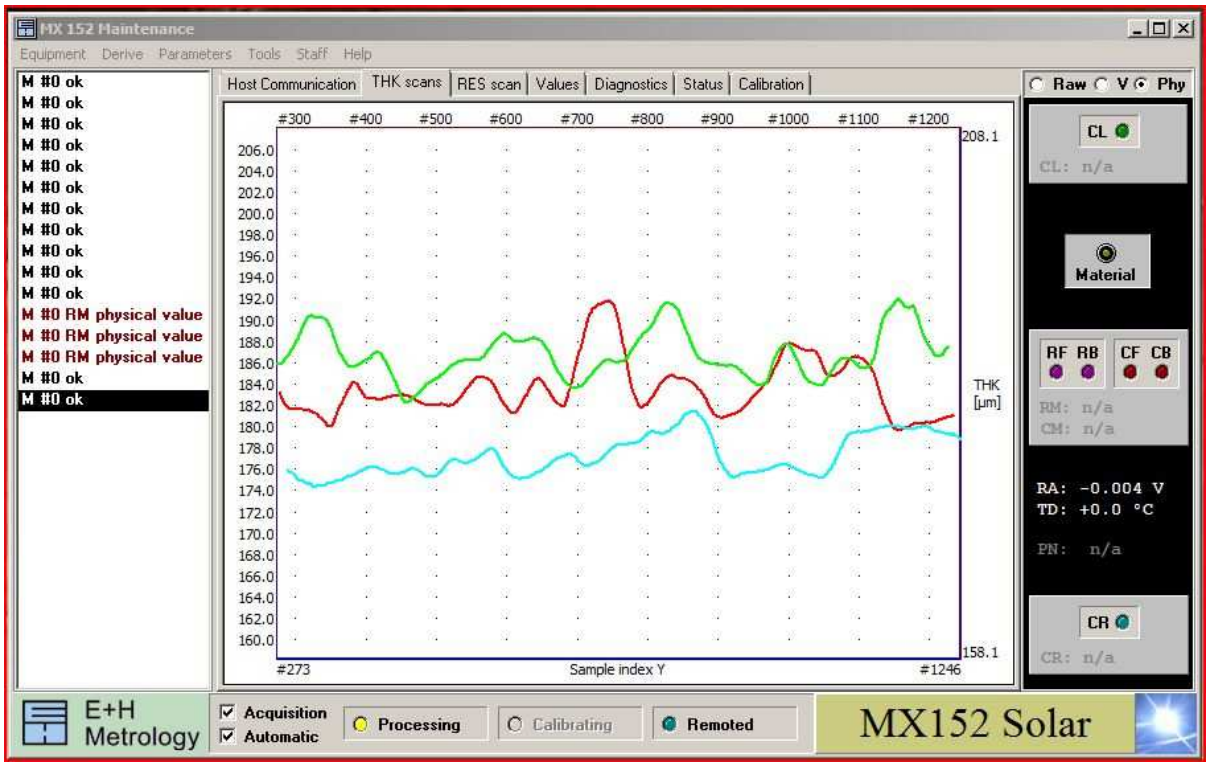
X = 105 / 136 mm (standard E+H)
X = 83.3 / 104 mm (DIN EN 50513)

Sheet Resistance Scan



Example

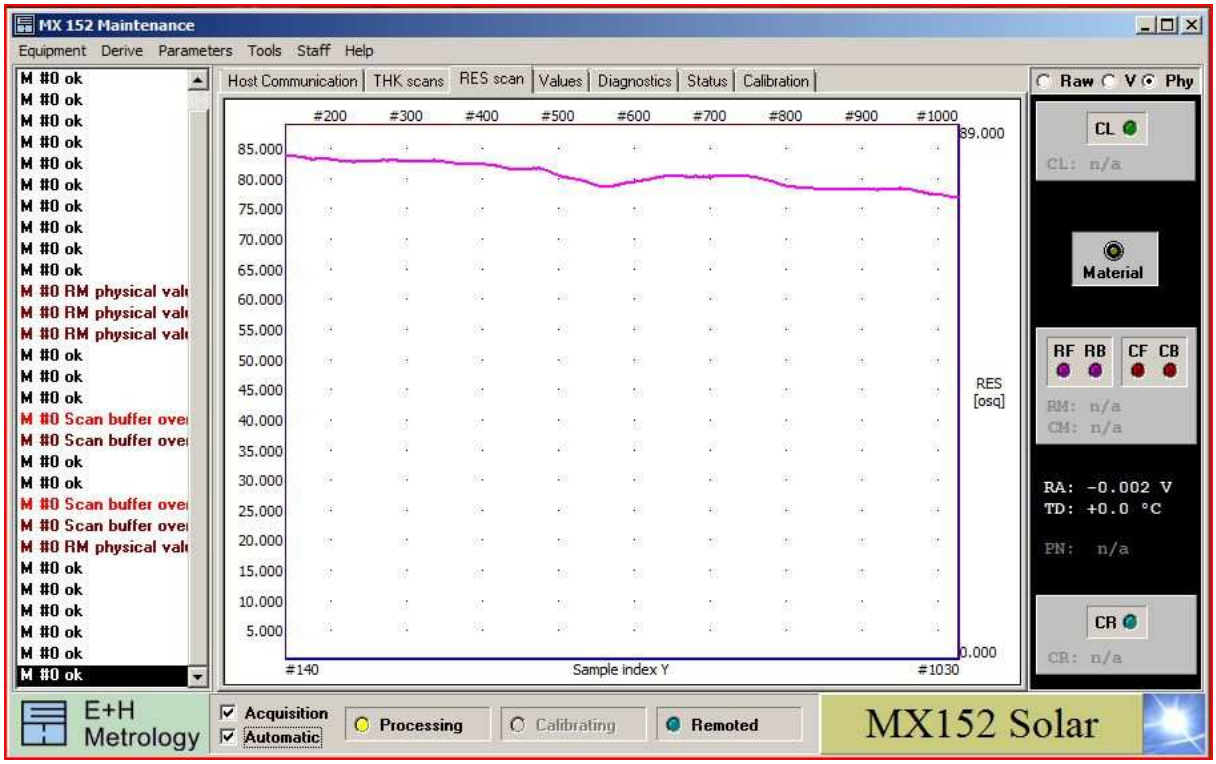
Square Wafer 156 x 156 mm (polycrystalline)



Thickness	184.0	µm
TTV	18.0	µm

Example

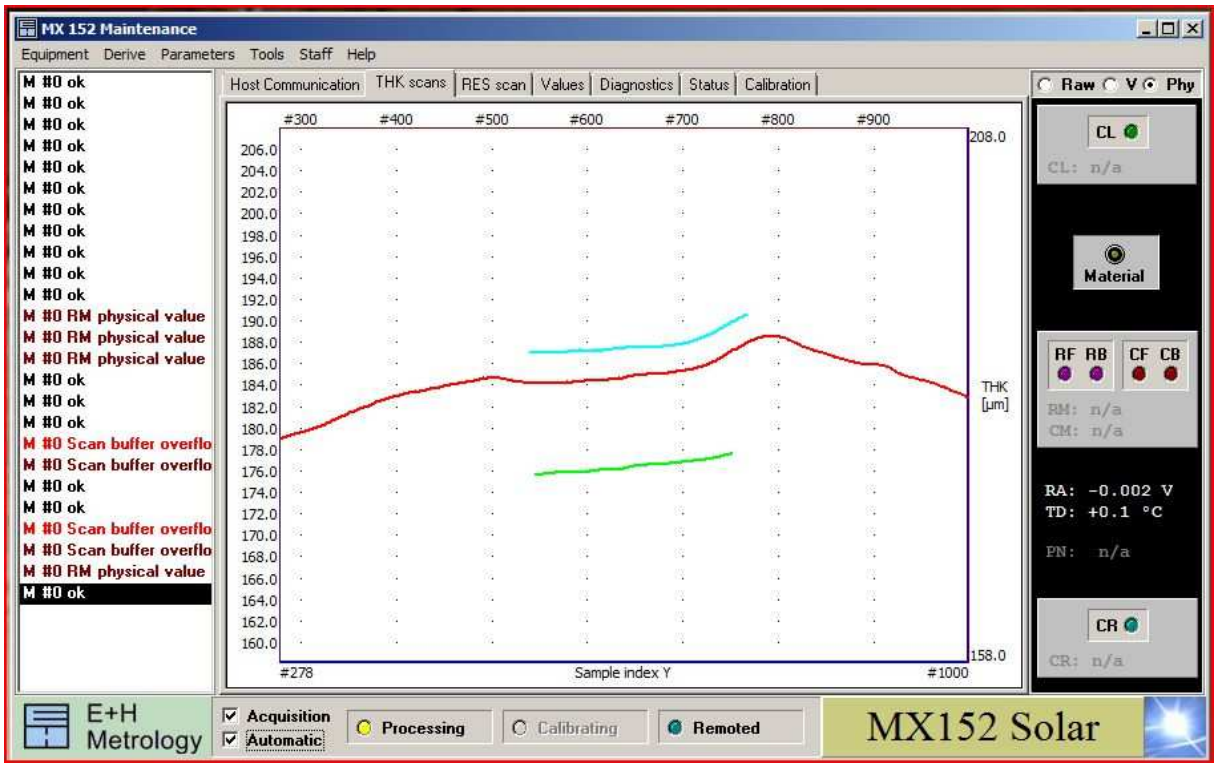
Square Wafer 156 x 156 mm (polycrystalline)



Sheet Resistance	80.8 Ohm/sq
Resistivity	1.84 Ohm*cm

Example

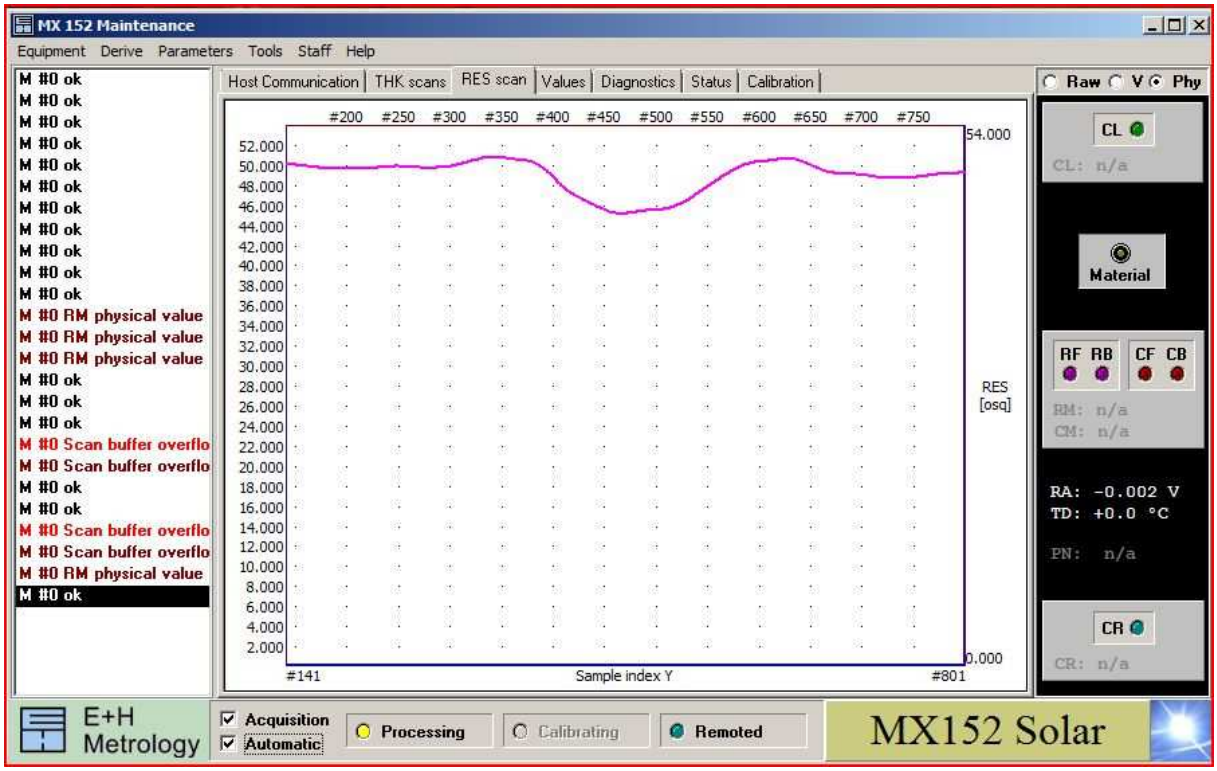
Round Wafer 125 mm Diameter (monocrystalline)



Thickness	184.0	µm
TTV	15.5	µm

Example

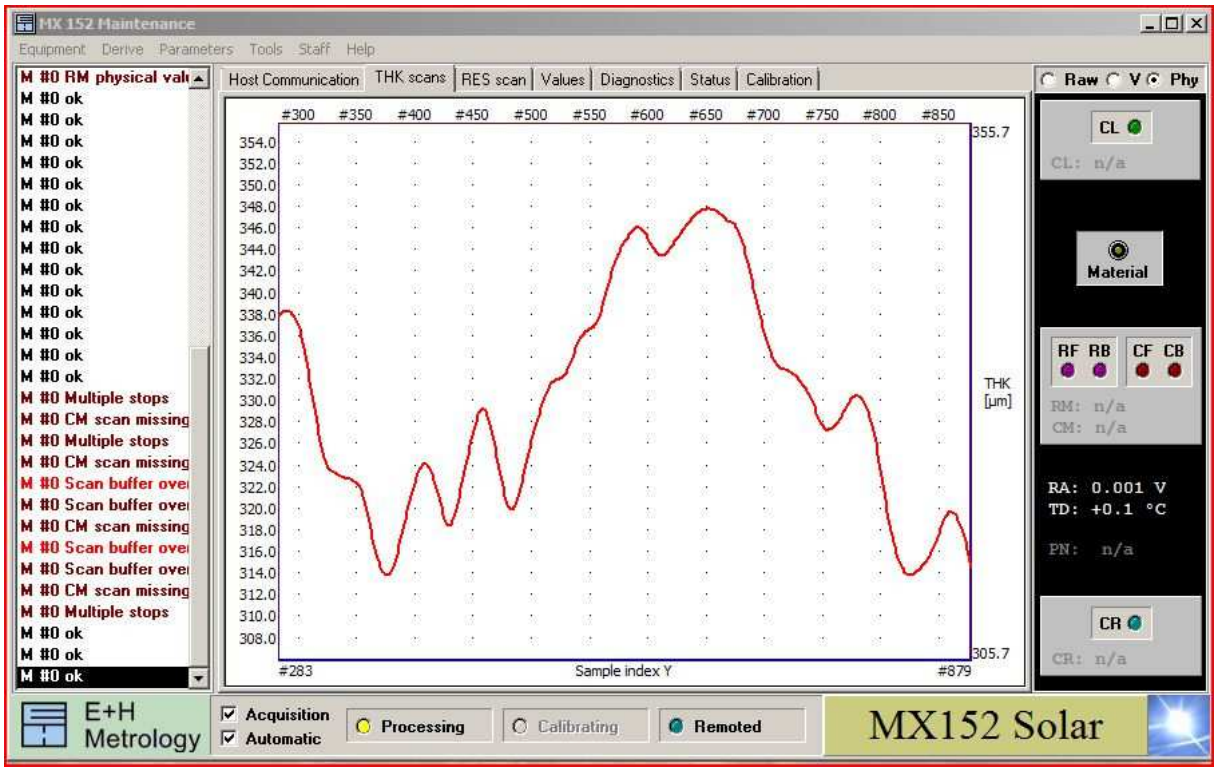
Round Wafer 125 mm Diameter (monocrystalline)



Sheet Resistance	48.5 Ohm/sq
Resistivity	0.89 Ohm*cm

Example

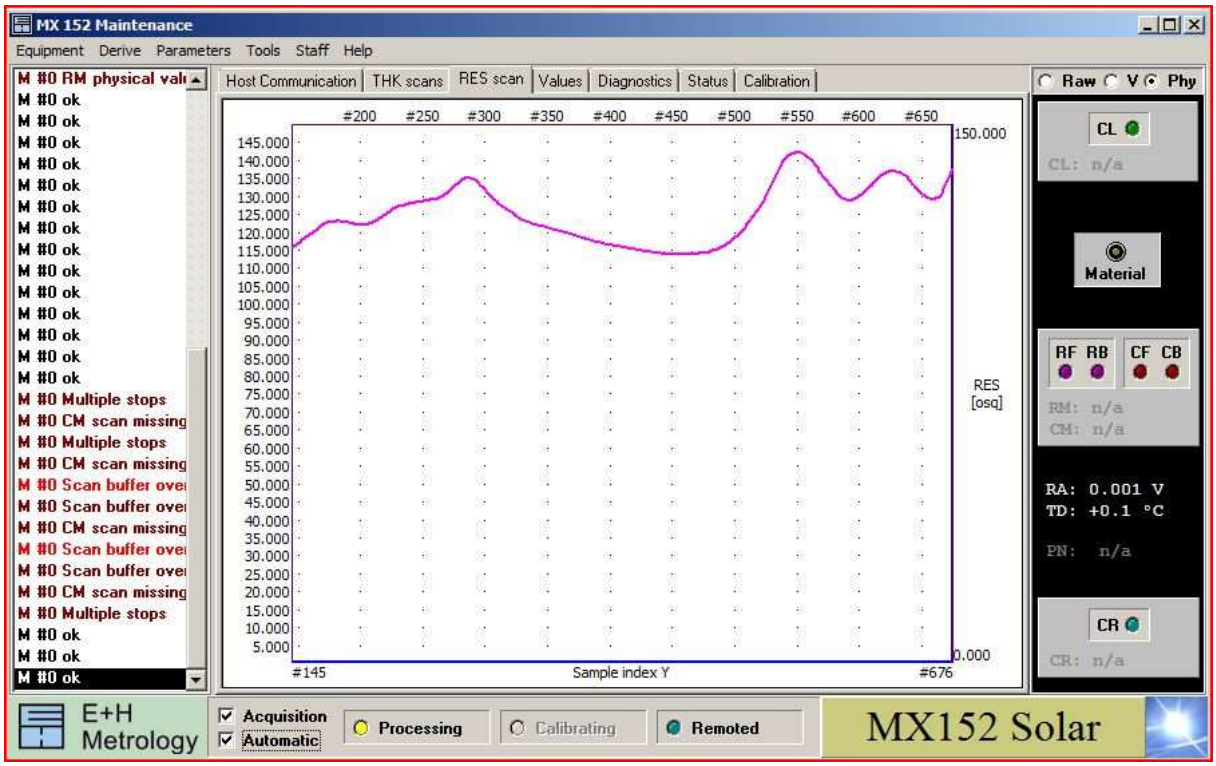
Square **EFG** – Wafer 100 x 100 mm (1 scan)



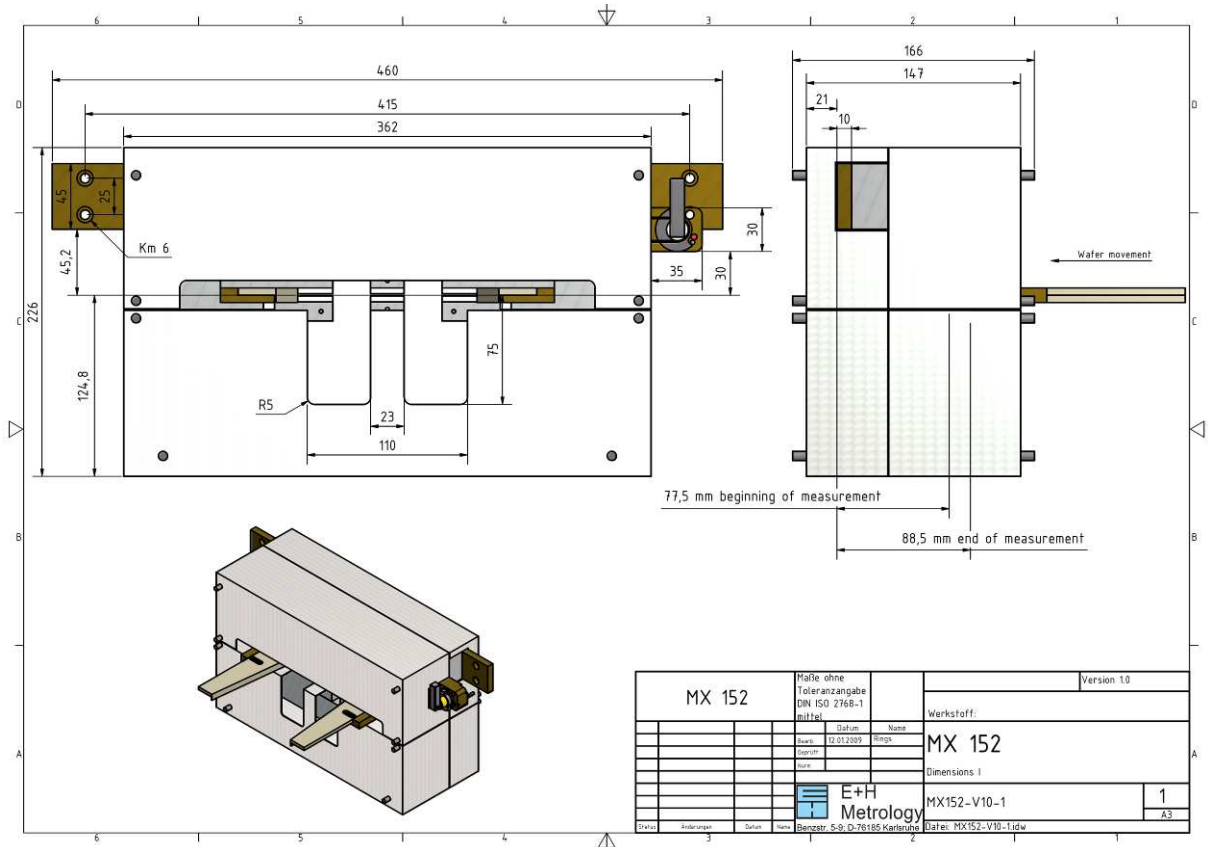
Thickness	331.0	µm
TTV	34.0	µm

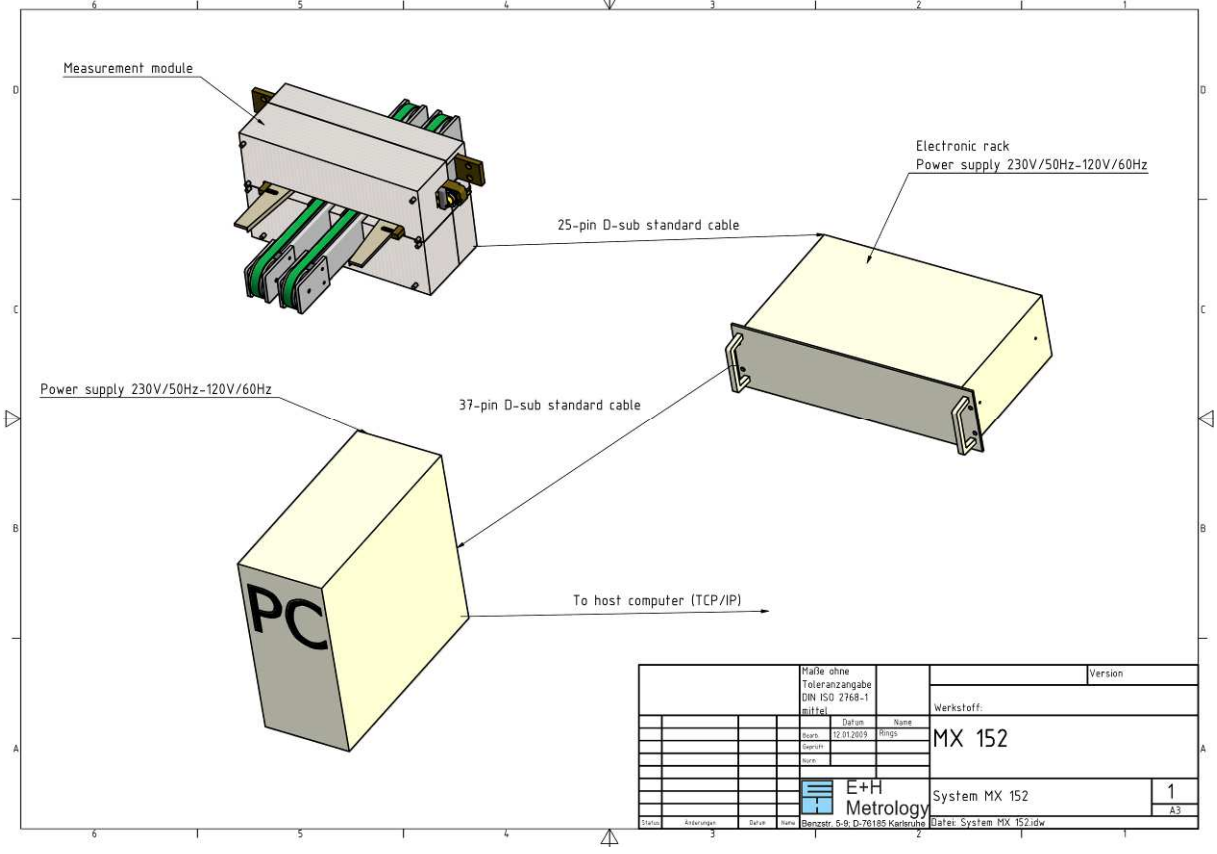
Example

Square **EFG** – Wafer 100 x 100 mm (1 scan)



Sheet Resistance	126.0 Ohm/sq
Resistivity	4.17 Ohm*cm


460
415
362
45
25
Km 6
45,2
226
124,8
R5
23
110
75
35
30
30
166
147
21
10
Wafer movement
77,5 mm beginning of measurement
88,5 mm end of measurement
MX 152
Maße ohne Toleranzangabe DIN ISO 2768-1 mittel
Datum
Name
Bearb. 12.01.2009 Rings
Gepruft
Norm
Version 1.0
Werkstoff:
MX 152
Dimensions !
E+H Metrology
Benzstr. 5-9; D-76185 Karlsruhe
MX152-V10-1
1
A3
Datei: MX152-V10-1.idw


Measurement module
Electronic rack
Power supply 230V/50Hz-120V/60Hz
25-pin D-sub standard cable
Power supply 230V/50Hz-120V/60Hz
37-pin D-sub standard cable
PC
To host computer (TCP/IP)
Maße ohne Toleranzangabe DIN ISO 2768-1 mittel
Datum
Name
Bearb. 12.01.2009 Rings
Gepruft
Norm
Version
Werkstoff:
MX 152
E+H Metrology
Benzstr. 5-9; D-76185 Karlsruhe
System MX 152
1
A3
Datei: System MX 152.idw