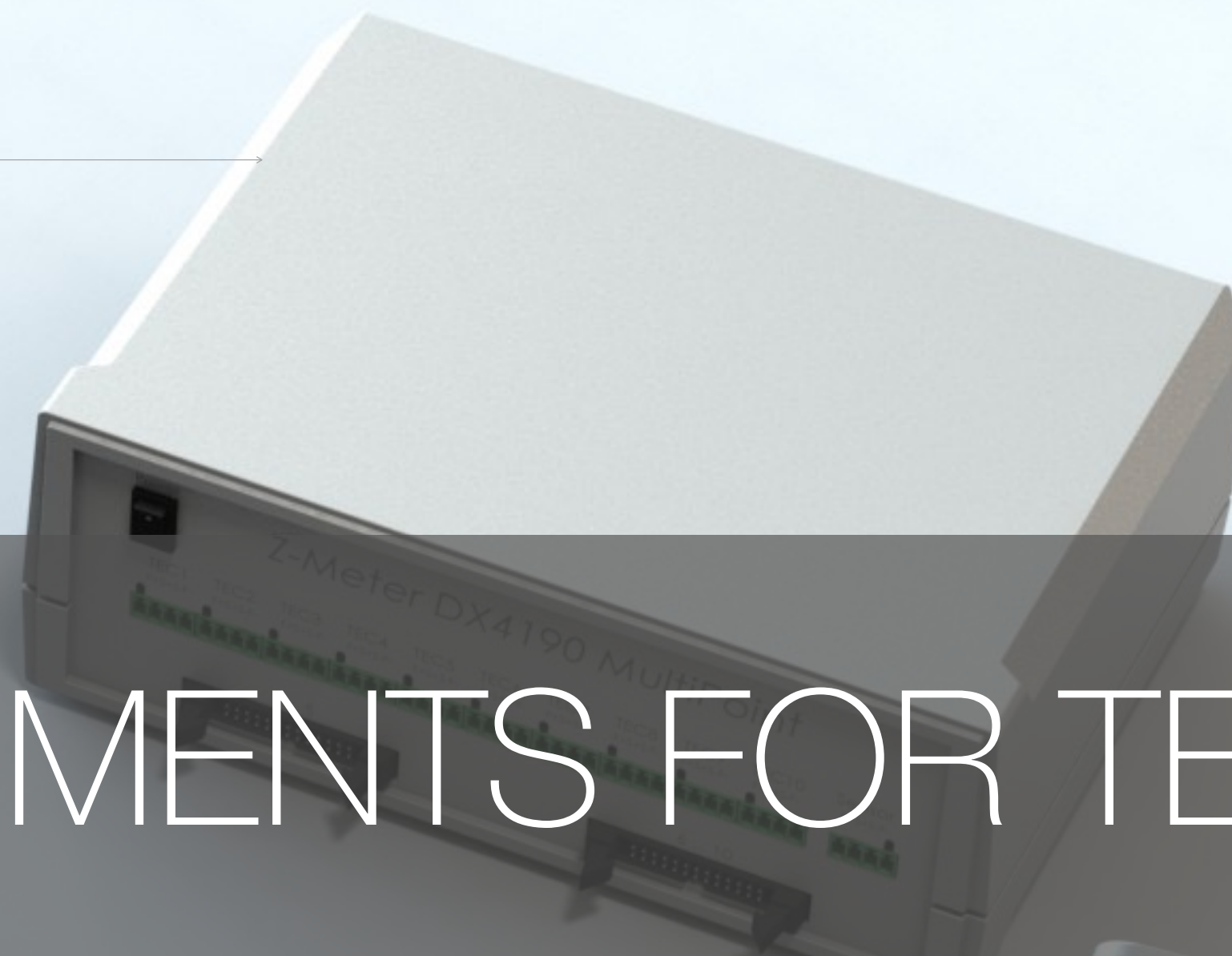




DX4190
(Control Block)



PROFESSIONAL INSTRUMENTS FOR TECs EXPRESS QUALITY CONTROL & TESTING

DX4190
(Measuring block)



100mm



DX4095



DX4085

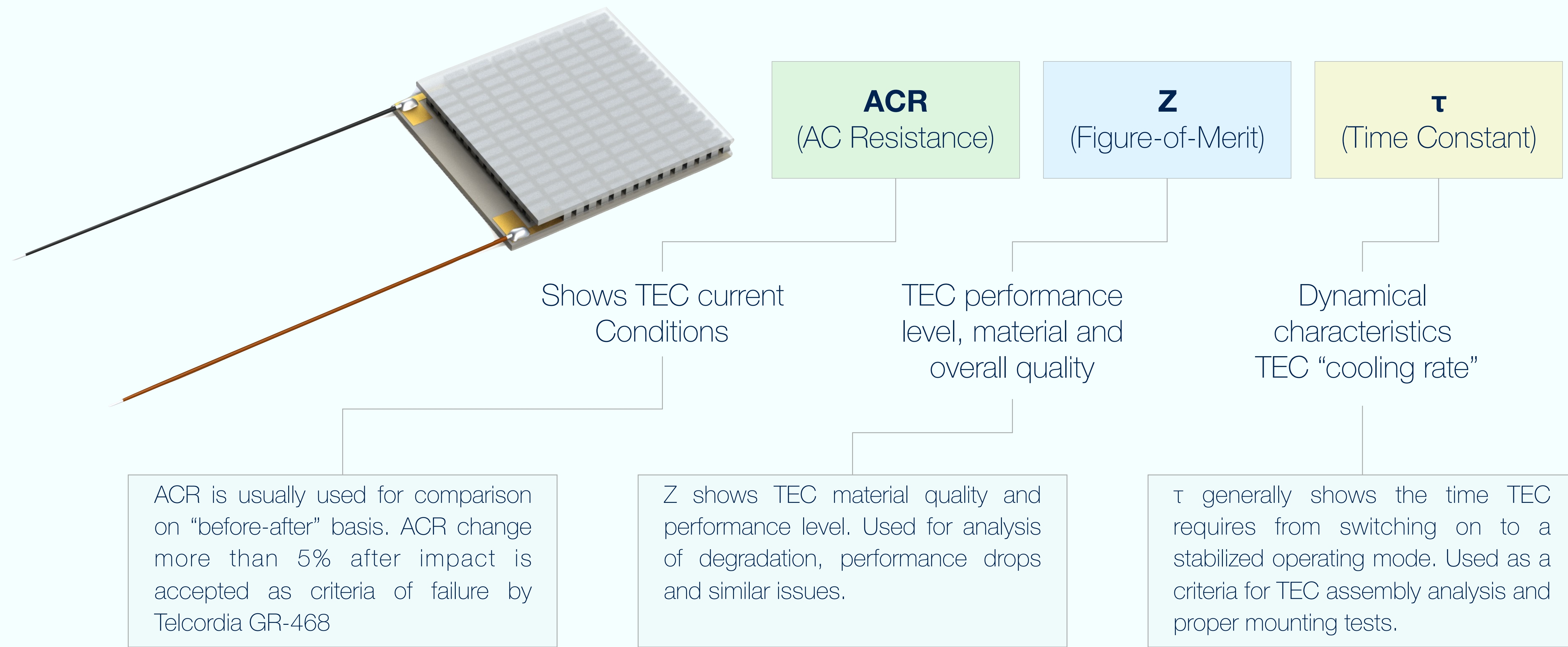


DX4090



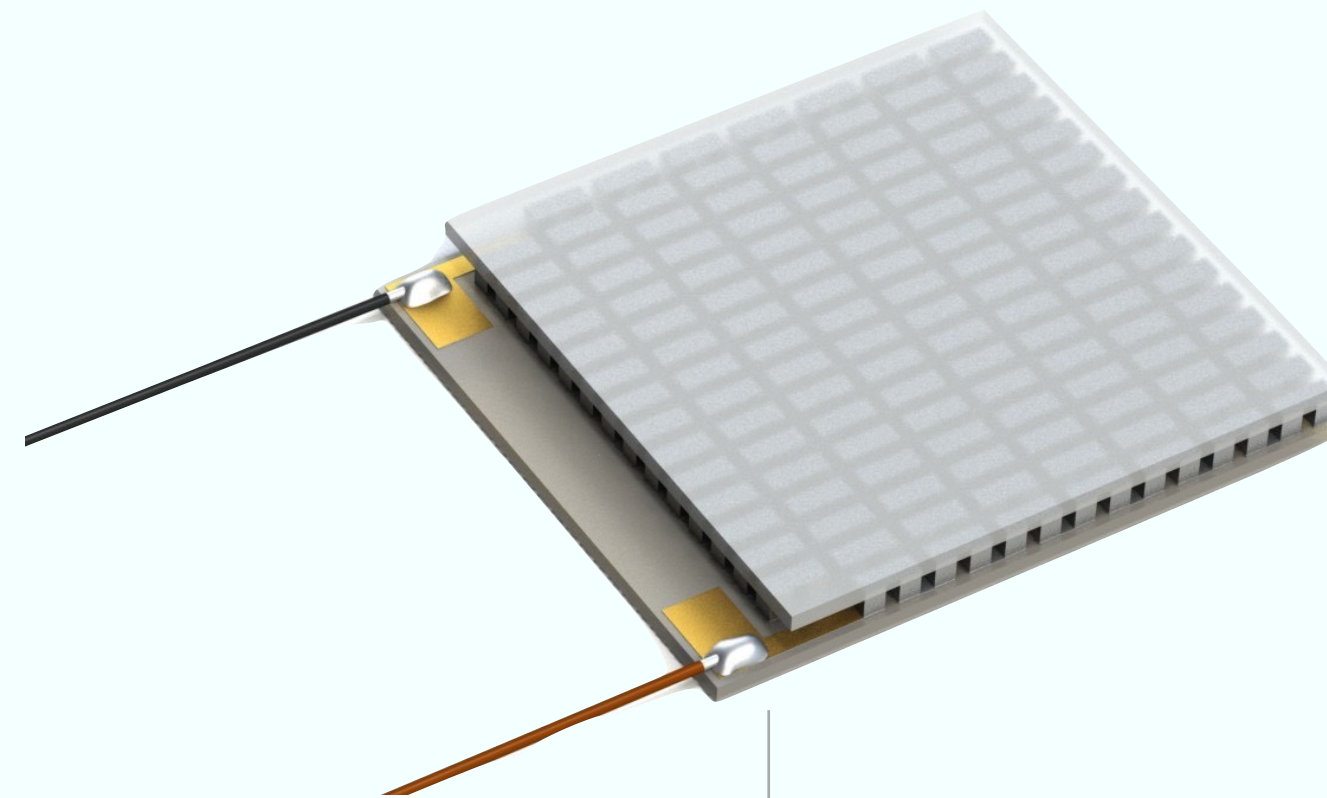


Z-Meter measures three TEC key parameters





Z-Meter Application Areas



TECs Express Quality Control

TECs Manufacturing

TECs Processing

Income/Outcome QC

TECs Performance Analysis & Comparison

TEC Performance analysis

TEC Vendors comparison

RMA Analysis

Mounting/integrating process development

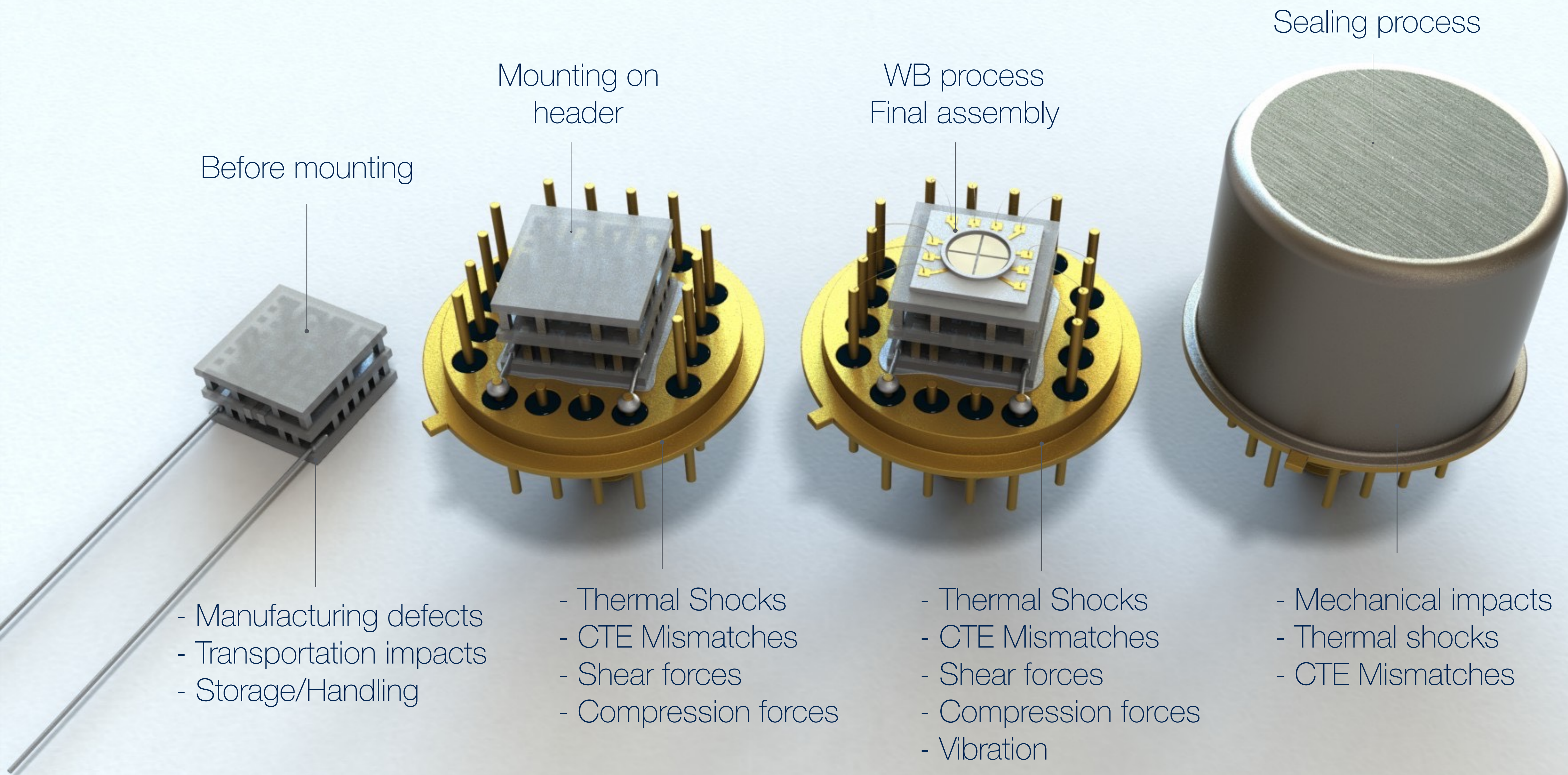
Mounting process analysis

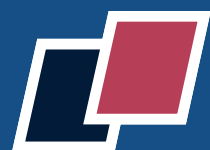
Damage risks reduction

Assembly performance tests

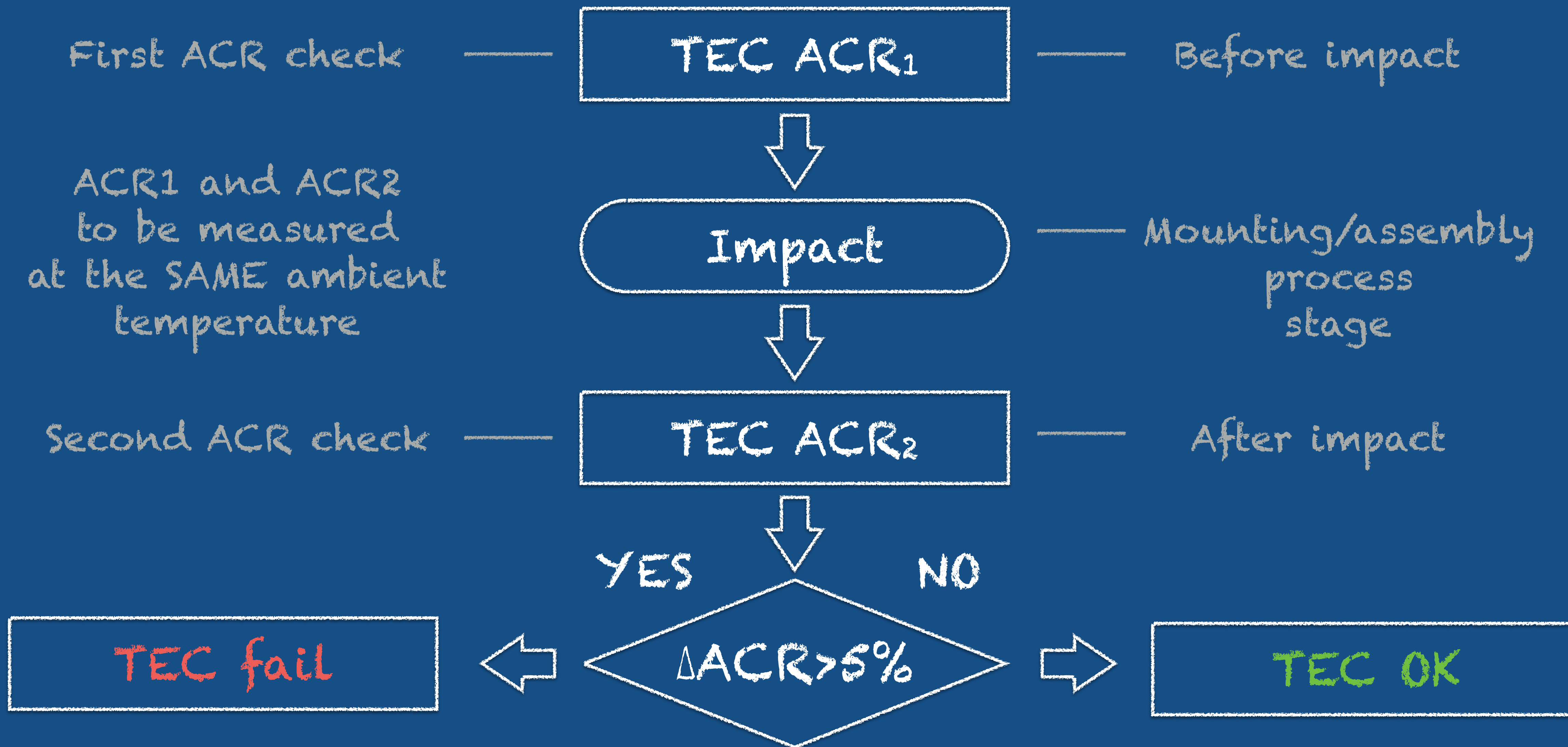


Potential TEC Risks and Impacts (example)



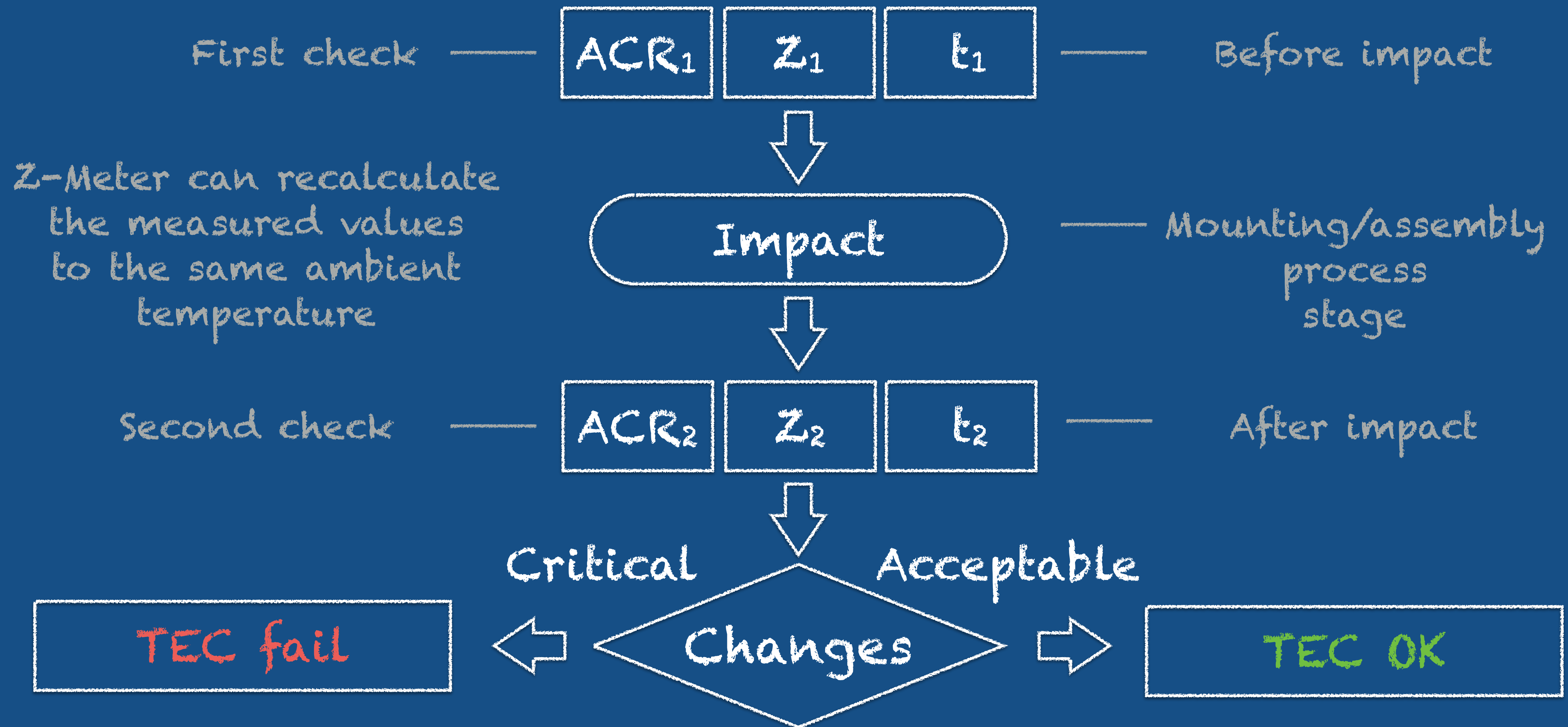


Simplified TEC conditions check by ACR





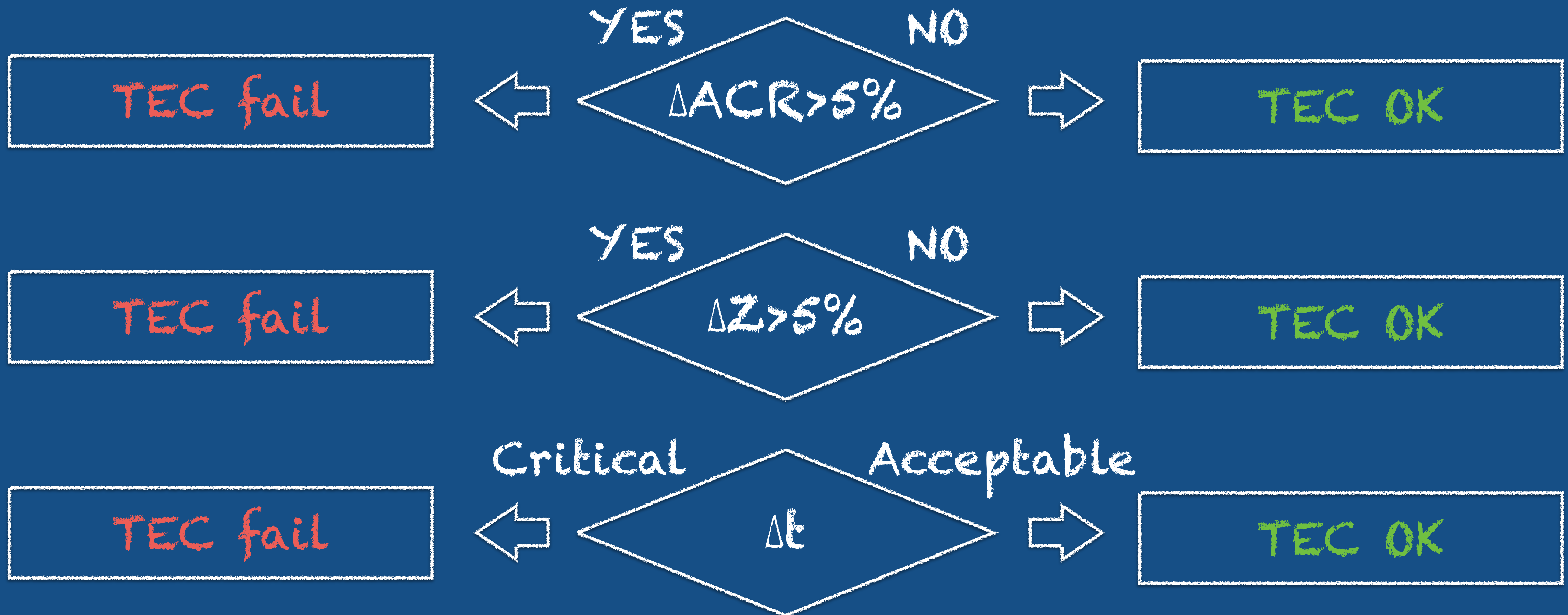
Advanced "Three Criteria" TEC testing with Z-Meter





"Three Criteria" Method brief explanation

After impact



Time Constant (t) criterion depends on impact type



TEC Parameters Combinations

FOR SEPARATE (NOT MOUNTED) THERMOELECTRIC COOLER

#	Reasons of Defect	AC Resistance ACR	Figure-of-Merit Z	Time Constant τ	Comment
1	Metal junctions detachment	~ const	~ const	↑	
2	Confused p-n pellets polarity	~ const	↓	↑	τ ~ const @ low current
3	Thermal Contact between Pellet Side Wall and Solder Meniscus	~ const	↓	↓	
4	Thermal and Electric Contact of Pellet Wall and Solder Meniscus	↓	~ const	↓	
5	TEC Pellets Short Circuit	↓	↓	↓	
6	Two-stage TEC: confused stage polarity	~ const	~ const	↓	τ twice lower to nominal value
7	TE material Degradation	↑	↓	~ const	

FOR MOUNTED (INTEGRATED) THERMOELECTRIC COOLER

#	Reasons of Defect	AC Resistance ACR	Figure-of-Merit Z	Time Constant τ	Comment
1	Operational Degrading of a TE module	↑	↓	↑ or ↓	
2	Poor integrating of a TE Module into the Package	~ const	↑	↓	twice lower τ means total detachment
3	Faulty mounting of a cooled object onto the TE module	~ const	~ const	↓	
4	Environment violation in a TE module construction	~ const	↓	↓	



Z-Meter Device Solutions

DX4190 Z-Meter

DX4190 Control Block

Can operate without Measuring Block

3b

DX4190 Measuring Block

Requires Control Block for operating,
contains 10x internal TEC clips.

3a

DX4085 Tester

Autonomous device

1

DX4095 Z-Meter Mini

The smallest available
Z-Meter, pocket size

4

2

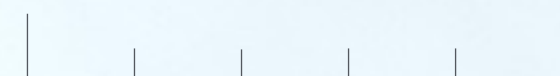
DX4090 Z-Meter

Universal version, suitable for trial and
mid-size TEC batches processing

DX4190 Z-Meter

10-position Z-Meter
Simultaneous measurements of
10x TECs at once. Optimal for large
batches processing, volume manufacturing and
mass production QC. Consists of two blocks -
Control Block and Measuring Block

100mm





DX4095 Z-Meter Mini

AC Resistance (ACR) Measurement
Figure-of-Merit (Z) Measurement
Time Constant (τ) Measurement
dTmax estimations (for single-stage TECs)

USB Interface
for power and
communication

Compact size
USB-stick like
Fits any pocket

Solid Metal Housing

LEMO Connector
for external Clips

Portable design
Measuring Current in a range 0...80 mA
Measurement at direct and reversed current
Results normalization to ambient temperatures
Correction coefficients to Z value
Low power consumption

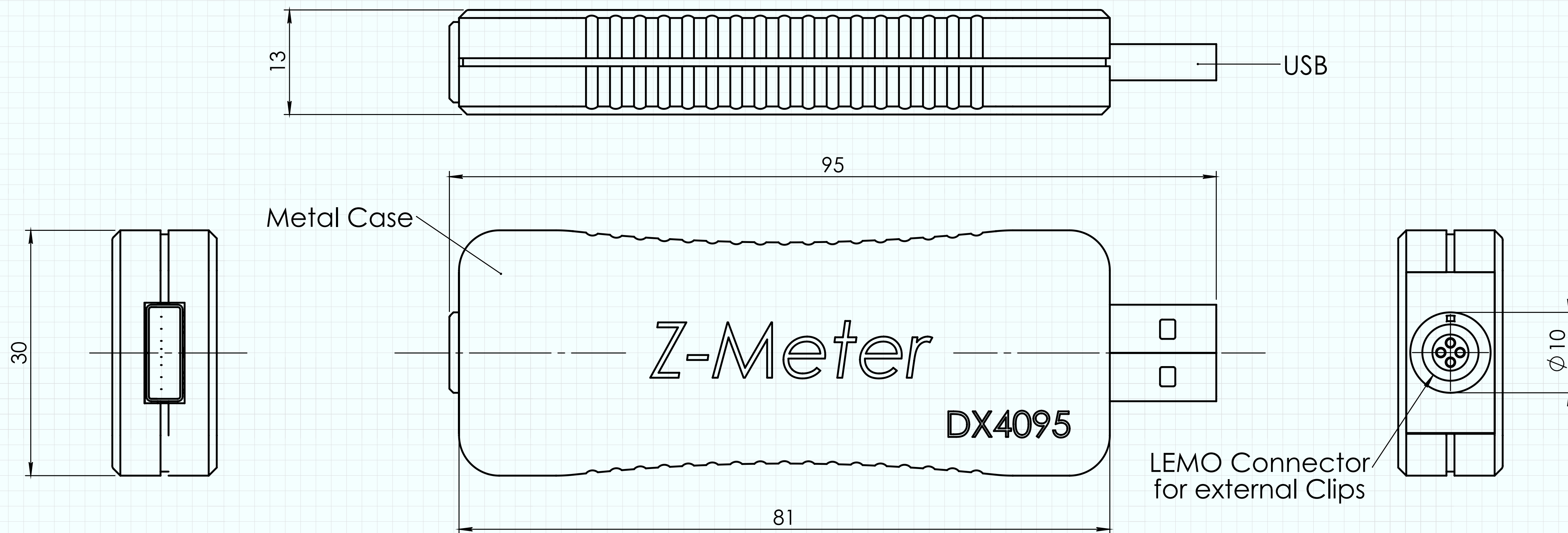
20mm





DX4095 Z-Meter Mini

Dimensions (mm)





DX4095 Z-Meter Mini

Specifications

DX4095 Z-METER MINI SPECIFICATIONS		
Connection to PC		Required
PC Connection Interface		USB type A
Z-Meter Software		Included. Windows version only
Measurement Interface		Internal in Chamber or External with Clips
Measurement Scheme		4-wires method
Ambient Temp. Sensor		Available, integrated
TEC Polarity Check		N/A
Typical TEC Testing Time	sec	20 .. 180 (depending on TEC size)
TEC AC RESISTANCE MEASUREMENTS (ACR)		
Range	Ohm	0.1 .. 100
Accuracy	%	0.6 (but >0.01Ohm)
Repeatability	%	0.3
FIGURE-OF-MERIT MEASUREMENTS (Z)		
Range	10E-3/K	1 .. 4
Accuracy	%	1.5
Repeatability	%	0.4
TEC TIME CONSTANT		
Range	sec	1 .. 100
Accuracy	%	1.5
Repeatability	%	1

OPERATING CONDITIONS		
Ambient Temperature	°C	15 .. 35
Humidity	%	0 .. 95
DX4095 POWER SUPPLY		
External Power Adapter		NOT REQUIRED
Voltage	V	5.0 (from PC USB port)
Current	mA	250
DIMENSIONS AND WEIGHT		
Z-Meter Mini	mm	95 x 30 x 13
Z-Meter Weight	g	20
STANDARD DX4095 KIT		
Z-Meter Mini	1pcs	Can be connected directly into USB port on PC
USB AM-AF	1pcs	Extension cable for Z-Meter to PC connection
External Clips	1pcs	External Kelvin Clips (4-wires scheme)
Z-Meter Software		MS Windows version only
OPTIONAL ACCESSORIES (ORDERED SEPARATELY)		
BNC Adapter		Allows to use BNC tools with Z-Meter
Customized WB Clips		Required for WB TECs measuring process



DX4090 Standard Z-Meter

AC Resistance (ACR) Measurement
Figure-of-Merit (Z) Measurement
Time Constant (τ) Measurement
dTmax estimations (for single-stage TECs)

Passive Thermostat
Chamber for TECs
up to 40x40mm² size

Magnetic Lock Cover

Built-in Temperature
sensor

External TEC Clips

USB Interface is used
for power supply
connection to PC

Internal Clips for
TECs

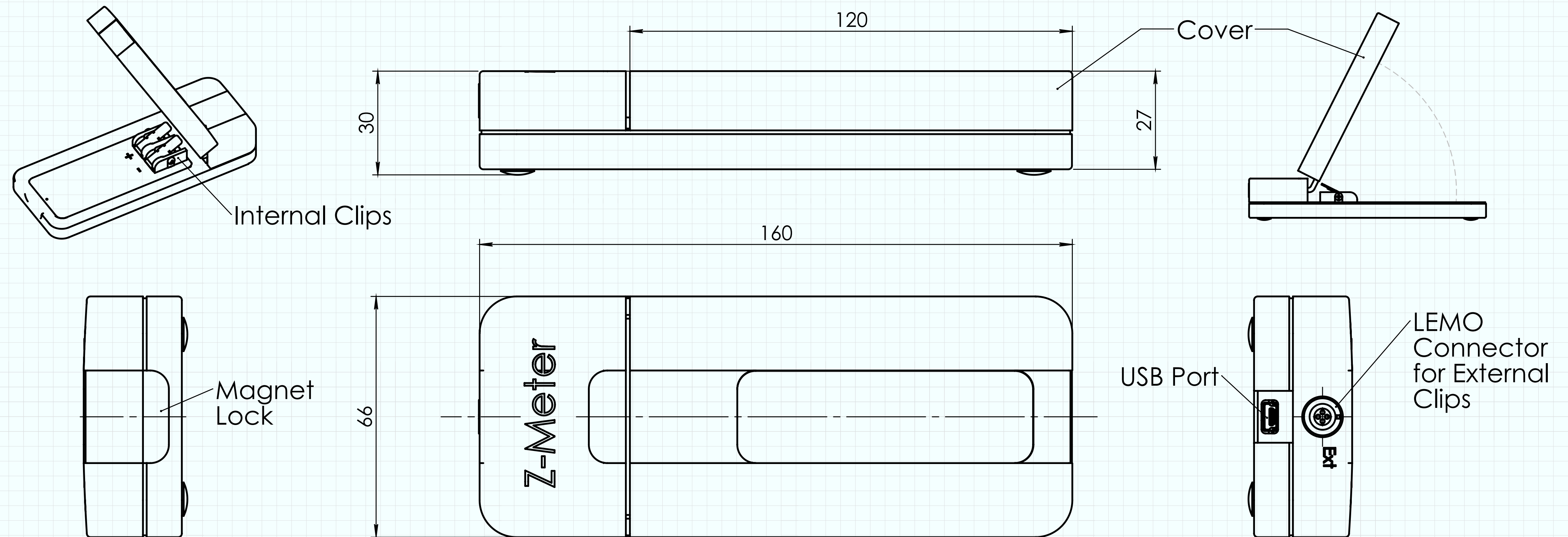
Portable design
Measuring Current in a range 0...80 mA
Measurement at direct and reversed current
Results normalization to ambient temperatures
Correction coefficients to Z value
Low power consumption

50mm



DX4090 Z-Meter

Dimensions (mm)





DX4090 Z-Meter

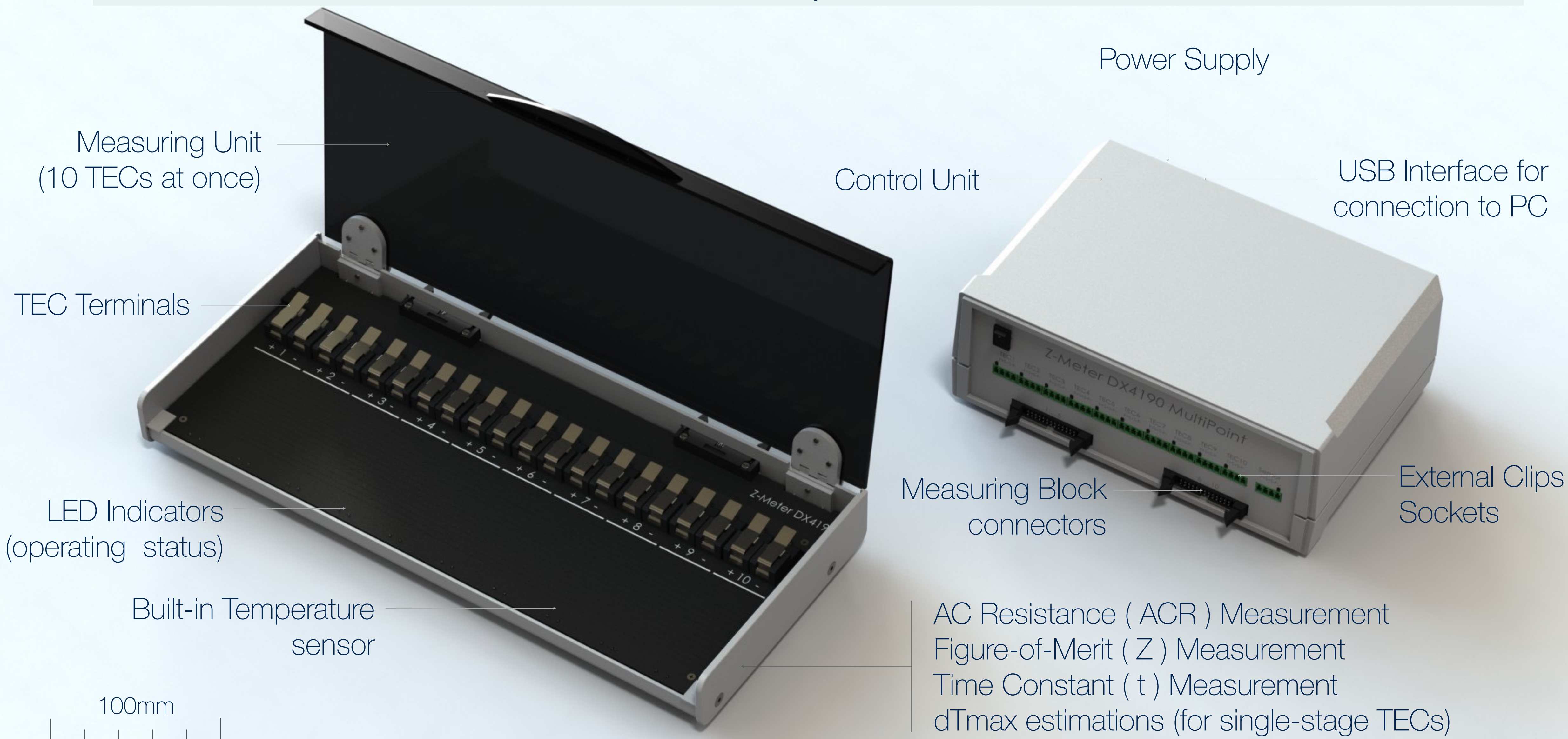
Specifications

DX4090 Z-METER SPECIFICATIONS		
Connection to PC		Required
PC Connection Interface		USB type A
Z-Meter Software		Included. Windows version only
Measurement Interface		Internal in Chamber or External with Clips
Measurement Scheme		4-wires method
Ambient Temp. Sensor		Available, integrated
TEC Polarity Check		N/A
Typical TEC Testing Time	sec	20 .. 180 (depending on TEC size)
TEC AC RESISTANCE MEASUREMENTS (ACR)		
Range	Ohm	0.1 .. 100
Accuracy	%	0.6 (but >0.01Ohm)
Repeatability	%	0.3
FIGURE-OF-MERIT MEASUREMENTS (Z)		
Range	10E-3/K	1 .. 4
Accuracy	%	1.5
Repeatability	%	0.4
TEC TIME CONSTANT		
Range	sec	1 .. 100
Accuracy	%	1.5
Repeatability	%	1

OPERATING CONDITIONS		
Ambient Temperature	°C	15 .. 35
Humidity	%	0 .. 95
DX4090 POWER SUPPLY		
External Power Adapter		NOT REQUIRED
Voltage	V	5.0 (from PC USB port)
Current	mA	250
DIMENSIONS AND WEIGHT		
Z-Meter Mini	mm	160 x 66 x 30 (with cover closed)
Z-Meter Weight	g	240
STANDARD DX4090 KIT		
Z-Meter DX4090	1pcs	
USB AM-AF	1pcs	Extension cable for Z-Meter to PC connection
External Clips	1pcs	External Kelvin Clips (4-wires scheme)
Z-Meter Software		MS Windows version only
OPTIONAL ACCESSORIES (ORDERED SEPARATELY)		
BNC Adapter		Allows to use BNC tools with Z-Meter
Customized WB Clips		Required for WB TECs measuring process



DX4190 10-pos Z-Meter





DX4190 Z-Meter

Specifications

DX4190 10-POS Z-METER SPECIFICATIONS		
Connection to PC		Required
PC Connection Interface		USB type B
Z-Meter Software		Included. Windows version only
Measurement Interface		Internal in Chamber or External with Clips
Measurement Scheme		4-wires method
Ambient Temp. Sensor		Available, integrated
TEC Polarity Check		Available
Typical TEC Testing Time	sec	20 .. 180 (depending on TEC size)
TEC AC RESISTANCE MEASUREMENTS (ACR)		
Range	Ohm	0.1 .. 100
Accuracy	%	0.6 (but >0.01Ohm)
Repeatability	%	0.3
FIGURE-OF-MERIT MEASUREMENTS (Z)		
Range	10E-3/K	1 .. 4
Accuracy	%	1.5
Repeatability	%	0.4
TEC TIME CONSTANT		
Range	sec	1 .. 100
Accuracy	%	1.5
Repeatability	%	1

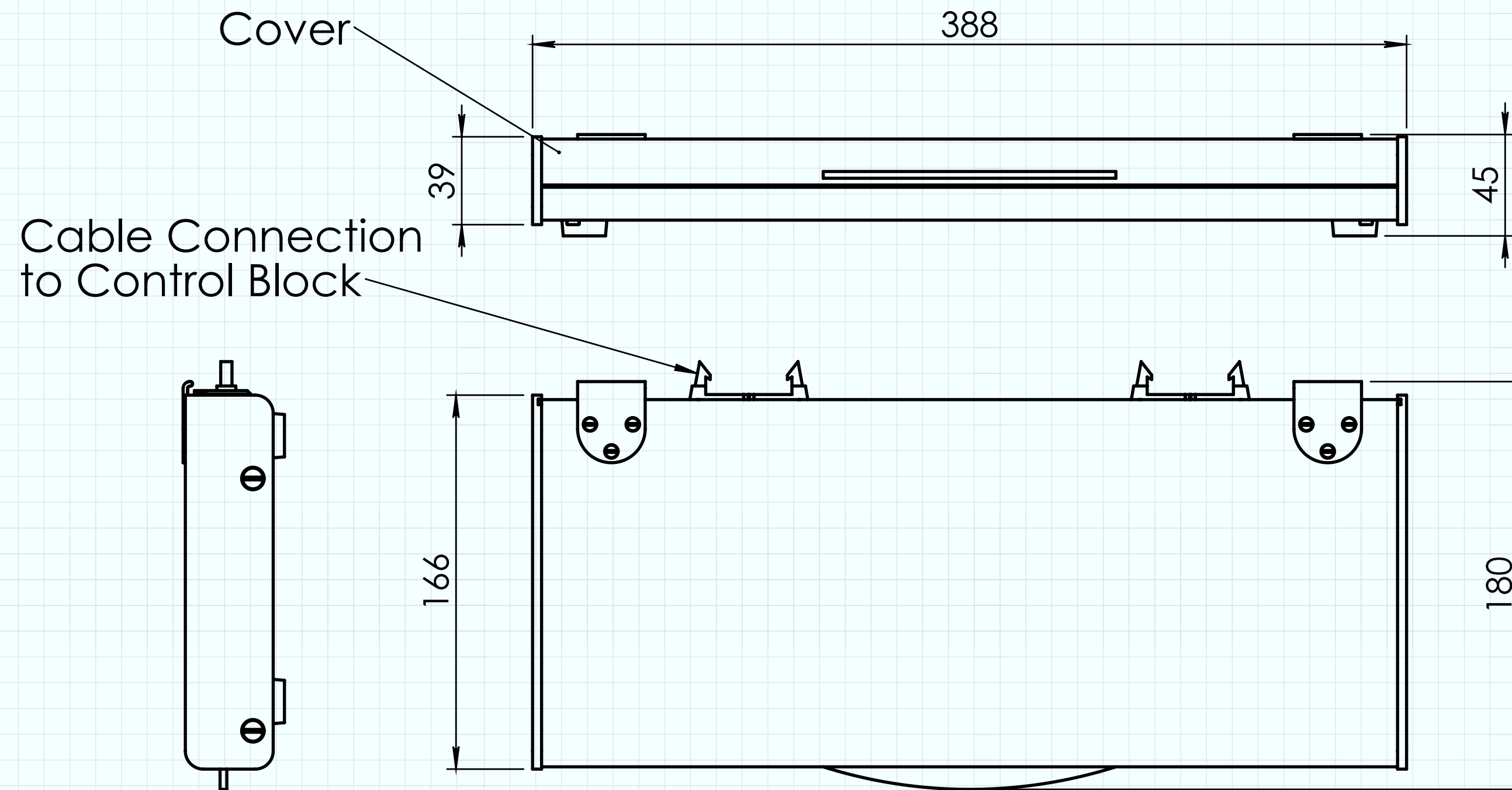
OPERATING CONDITIONS		
Ambient Temperature	°C	15 .. 35
Humidity	%	0 .. 95
DX4190 POWER SUPPLY		
AC Voltage	V	85 .. 260
Frequency	Hz	47 .. 63
Current	A	0.35A/115VAC
DIMENSIONS AND WEIGHT		
Main Block	mm	235 x 180 x 90
Main Block Weight	kg	1.1
Testing Block	mm	388 x 180 x 44
Testing Block Weight	kg	1.6
STANDARD DX4190 KIT		
Main Block	1pcs	Can be used separately (w/o measuring block)
Testing Block	1pcs	Can be used only connected to Main Block
Terminal Cables	2pcs	Connection between Main and Measuring Blocks
Power Cable	1pcs	Standard EU socket type
USB Cable	1pcs	USB SCUAB 1.5m lenght
Z-Meter Software		MS Windows version only
External Clips	10pcs	10x Kelvin Clips 4-wires scheme
OPTIONAL ACCESSORIES (ORDERED SEPARATELY)		
BNC Adapter		Allows to use BNC tools with Z-Meter
Customized WB Clips		Required for WB TECs measuring process



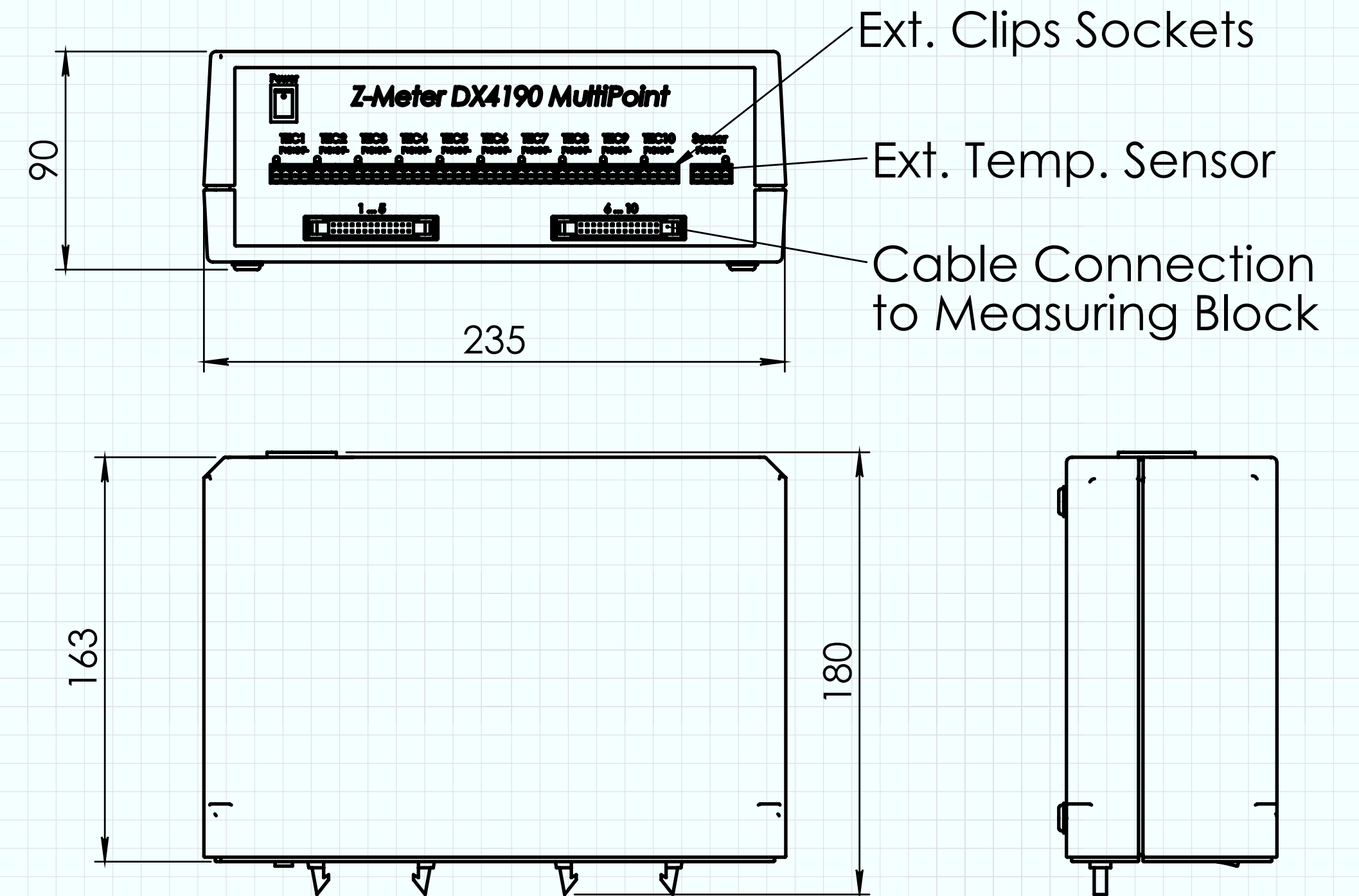
DX4190 10-pos Z-Meter

Dimensions (mm)

DX4190 Measuring Block



DX4190 Control Block





DX4085 Z-Meter Tester

AC Resistance (ACR) Measurement
Figure-of-Merit (Z) Measurement
Time Constant (τ) Measurement
dTmax estimations (for single-stage TECs)

External TEC Clips

USB Interface for
charging and
connection to PC

External Temperature
Sensor

Metal Housing

40mm

Portable design, stand-alone operating
Measuring Current in a range 0...80 mA
Measurement at direct and reversed current
Results normalization to ambient temperatures
Correction coefficients to Z value
Low power consumption



DX4085 Z-Meter Tester Concept

Compact autonomous
palm-size device for every day use



Can provide also TEC operating voltage
measuring and cold side temperature
check if necessary

External accessories

21mm

70mm

160mm

Solid metal
housing
(Aluminium)

Built-in Li-Ion
battery with
up to 8 hours
operating time

Power button

2.4" bright
LCD Screen
for info output

Control
buttons

Z-Meter

up to 8 hours continuous
operating on battery

280g weight

External ambient
temperature
sensor for reference

External temperature sensor
for precise measurements

Sockets for external temperature
sensor and measuring clips

Stand-alone and PC-connected operating modes.

Express measuring in stand-alone mode

Precise measuring with corrections in PC connected mode

External 4-wires
measuring scheme
clips
(Kelvin Clips)

Optional WB clips
customized for
TECs with
WB terminals only

Serial number
QR code for with
web links

USB Mini for device charging
and connection to PC

Customized unit optimized
for a particular TEC type.
Provided by request



DX4085 Z-Meter

Specifications

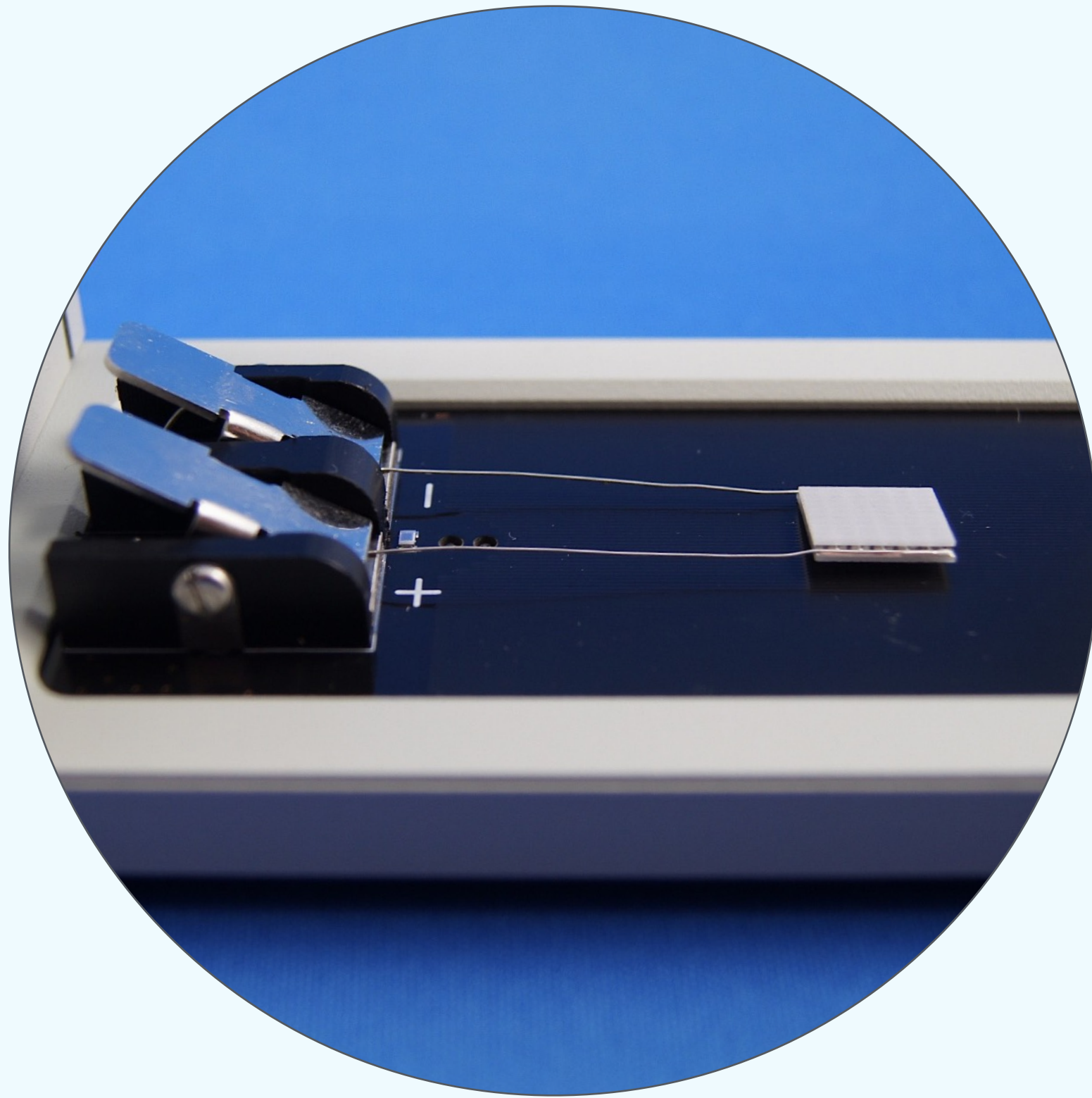
DX4085 Z-METER SPECIFICATIONS		
Connection to PC		Not obligatory
PC Connection Interface		USB type A
Z-Meter Software		Included. Windows version only
Measurement Interface		Internal in Chamber or External with Clips
Measurement Scheme		4-wires method
Ambient Temp. Sensor		Available, external type
TEC Polarity Check		N/A
Typical TEC Testing Time	sec	20 .. 180 (depending on TEC size)
TEC AC RESISTANCE MEASUREMENTS (ACR)		
Range	Ohm	0.1 .. 100
Accuracy	%	0.6 (but >0.01Ohm)
Repeatability	%	0.3
FIGURE-OF-MERIT MEASUREMENTS (Z)		
Range	10E-3/K	1 .. 4
Accuracy	%	1.5
Repeatability	%	0.4
TEC TIME CONSTANT		
Range	sec	1 .. 100
Accuracy	%	1.5
Repeatability	%	1

OPERATING CONDITIONS		
Ambient Temperature	°C	15 .. 35
Humidity	%	0 .. 95
DX4085 POWER SUPPLY		
Built-in Li-Ion Accumulator	mAh	2050
USB Power Adapter	V	110...240
Frequency	Hz	50/60
DC Voltage output	V	5
Power (max)	W	5
DIMENSIONS AND WEIGHT		
Z-Meter DX4085	mm	70 x 160 x 21
Z-Meter DX4085 Weight	g	280
STANDARD DX4085 KIT		
Z-Meter DX4085	1pcs	
USB Cable	1pcs	USB-A / USB - micro type B
Temperature Sensor	1pcs	
External Clips	1pcs	External Kelvin Clips (4-wires scheme)
AC/DC Power Adapter	1pcs	
Z-Meter Software		MS Windows version only
OPTIONAL ACCESSORIES (ORDERED SEPARATELY)		
BNC Adapter		Allows to use BNC tools with Z-Meter
Customized WB Clips		Required for WB TECs measuring process

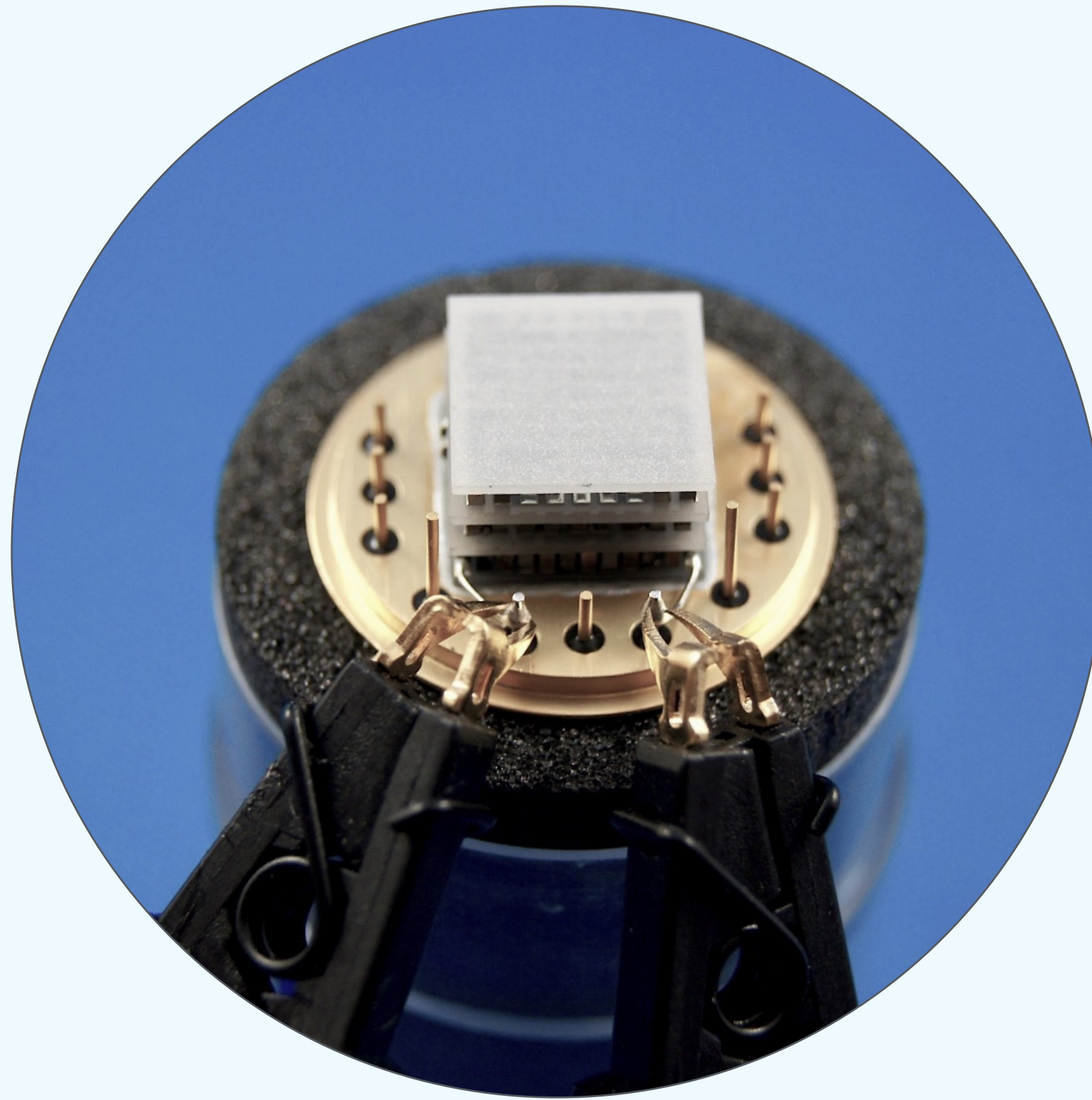


TEC Terminal connection methods

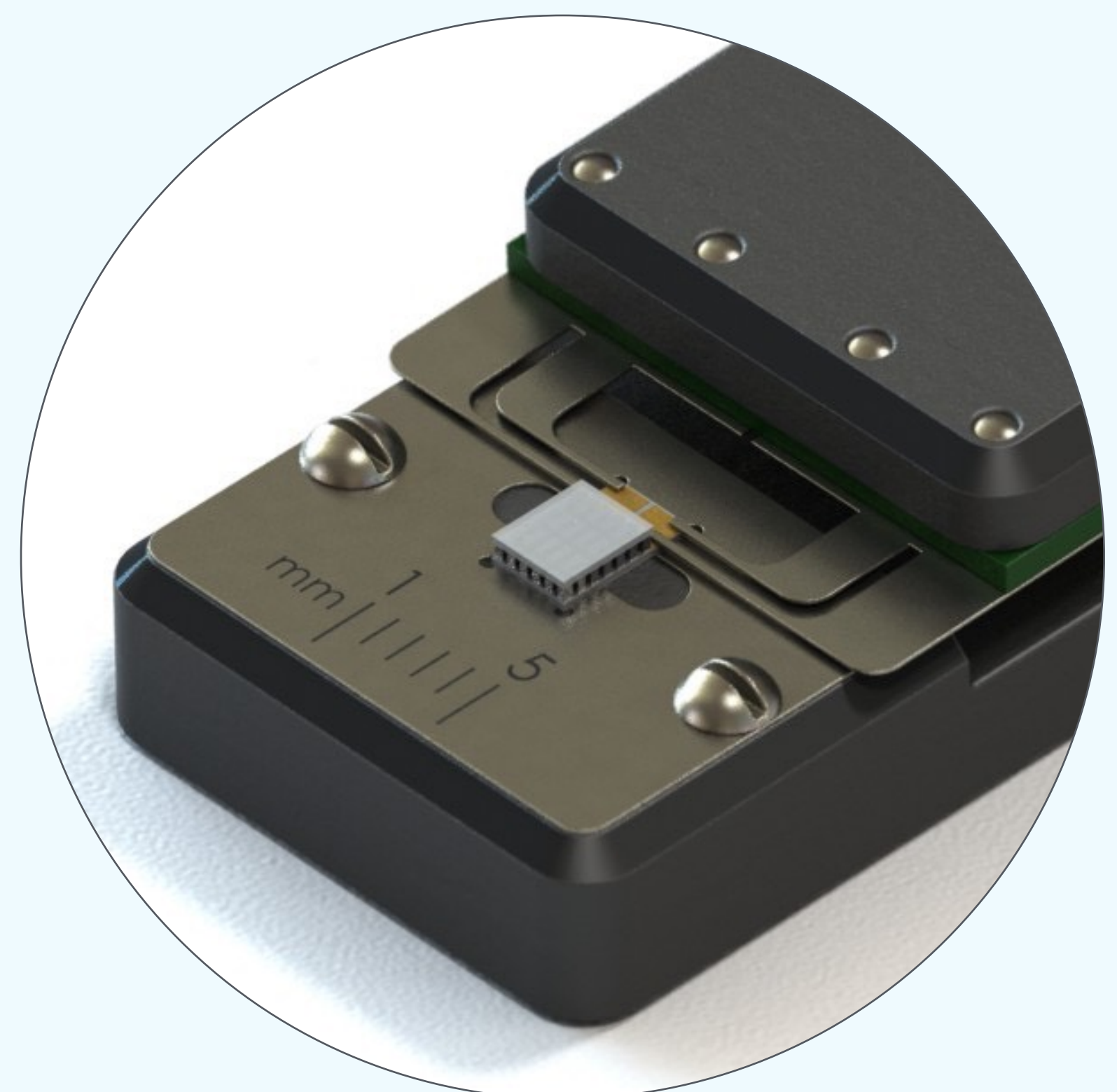
Internal Clips



External Clips



External WB Clips



- Available in DX4090 and DX4190
- 4-wires measurement scheme
- Quick and easy TEC setup

- Available in all Z-Meter versions
- 4-wires precise Kelvin Clips
- Ideal for mounted/integrated TECs

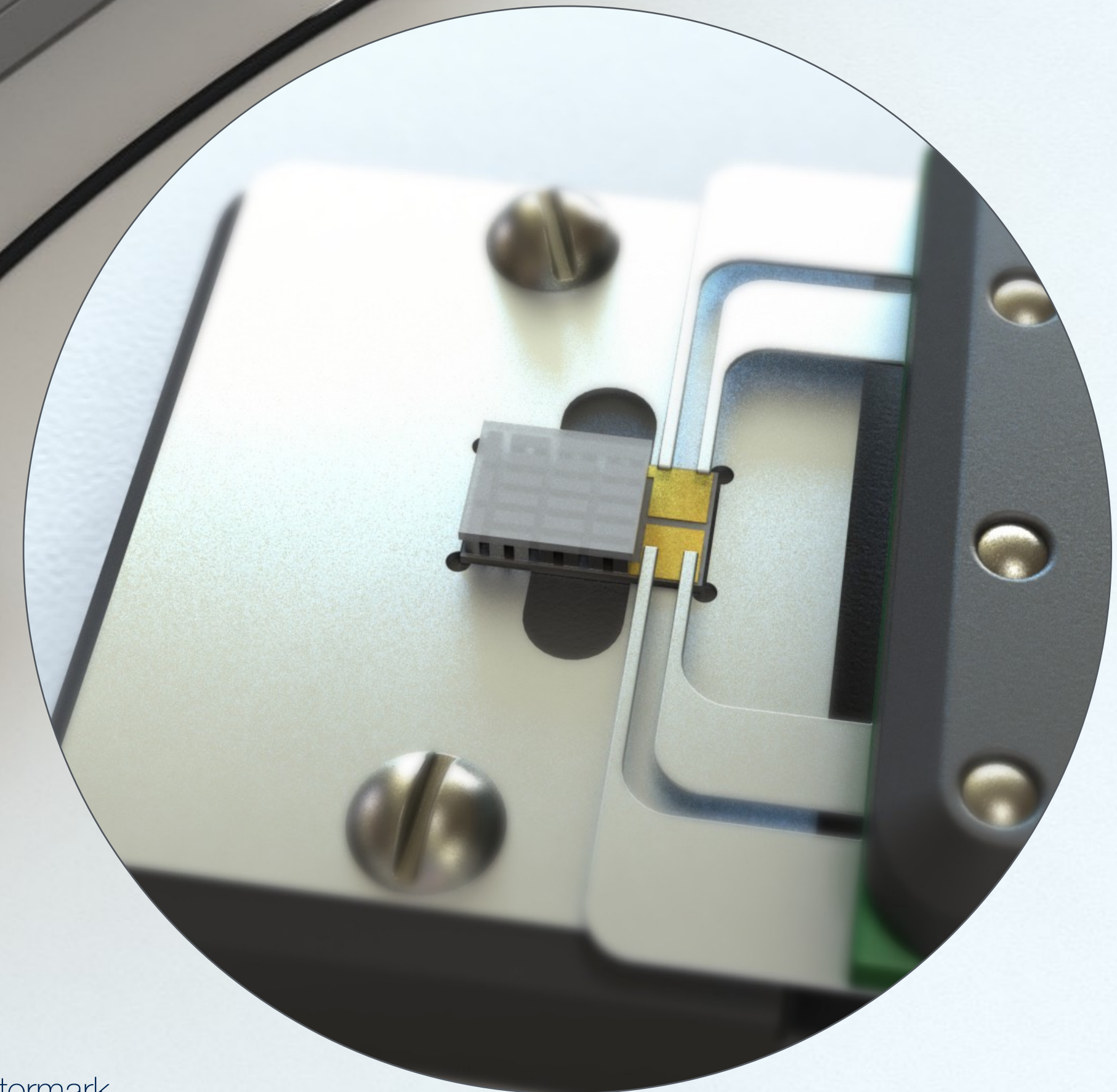
- Optional WB clips for microTECs
- 4-wires measurement scheme
- Available additionally by request



NEW

Z-Meter Accessories - WB Clips

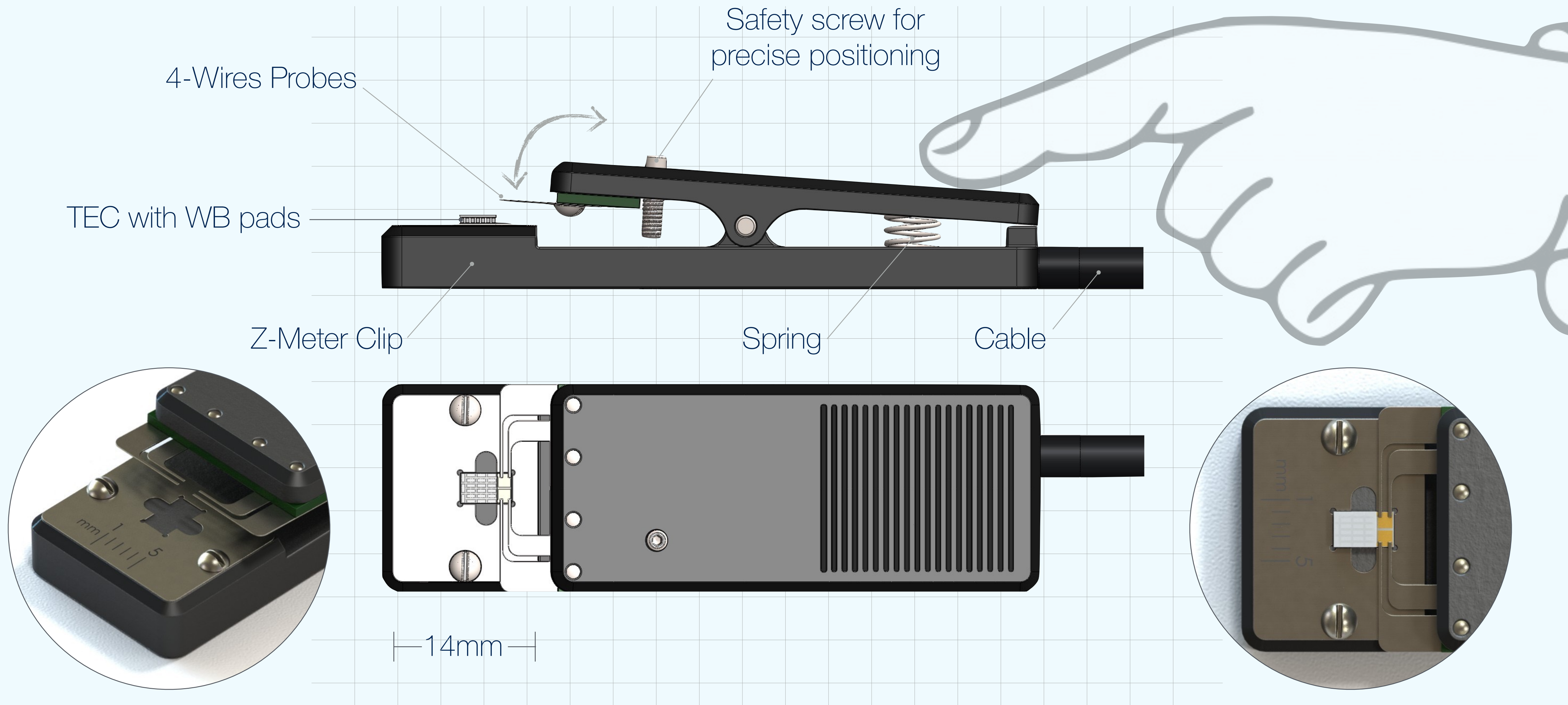
- Z-Meter Clips for wireless TECs (WB)
 - Ideal for express WB TECs testing
 - Replaceable TEC fixtures
 - 4-wires measurement
-
- Easy-to-use instrument
 - Compatible with all Z-Meters
 - Precise adjustable contact
 - Designed for miniature TE Coolers





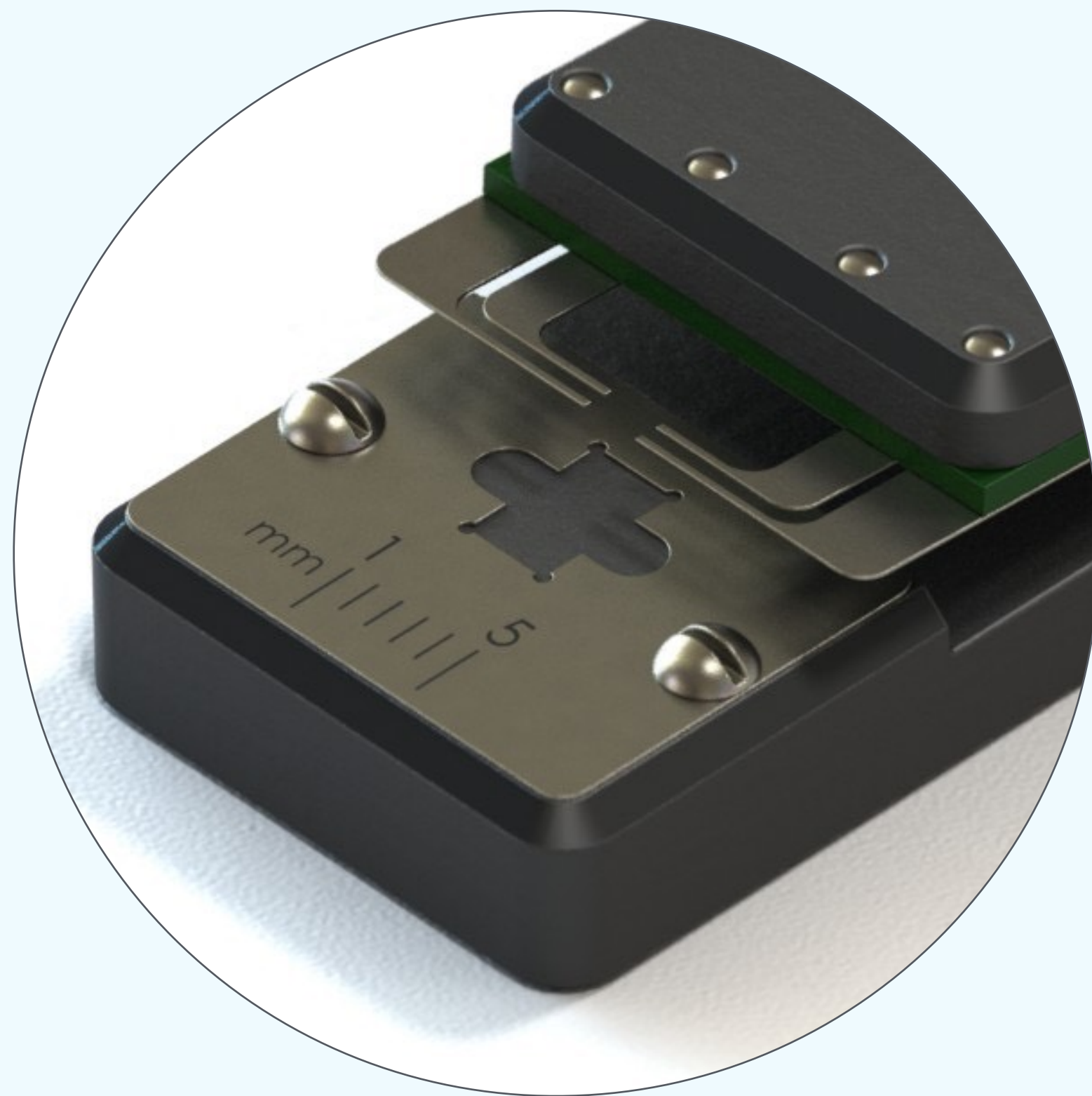
NEW

WB Clips for Z-Meters

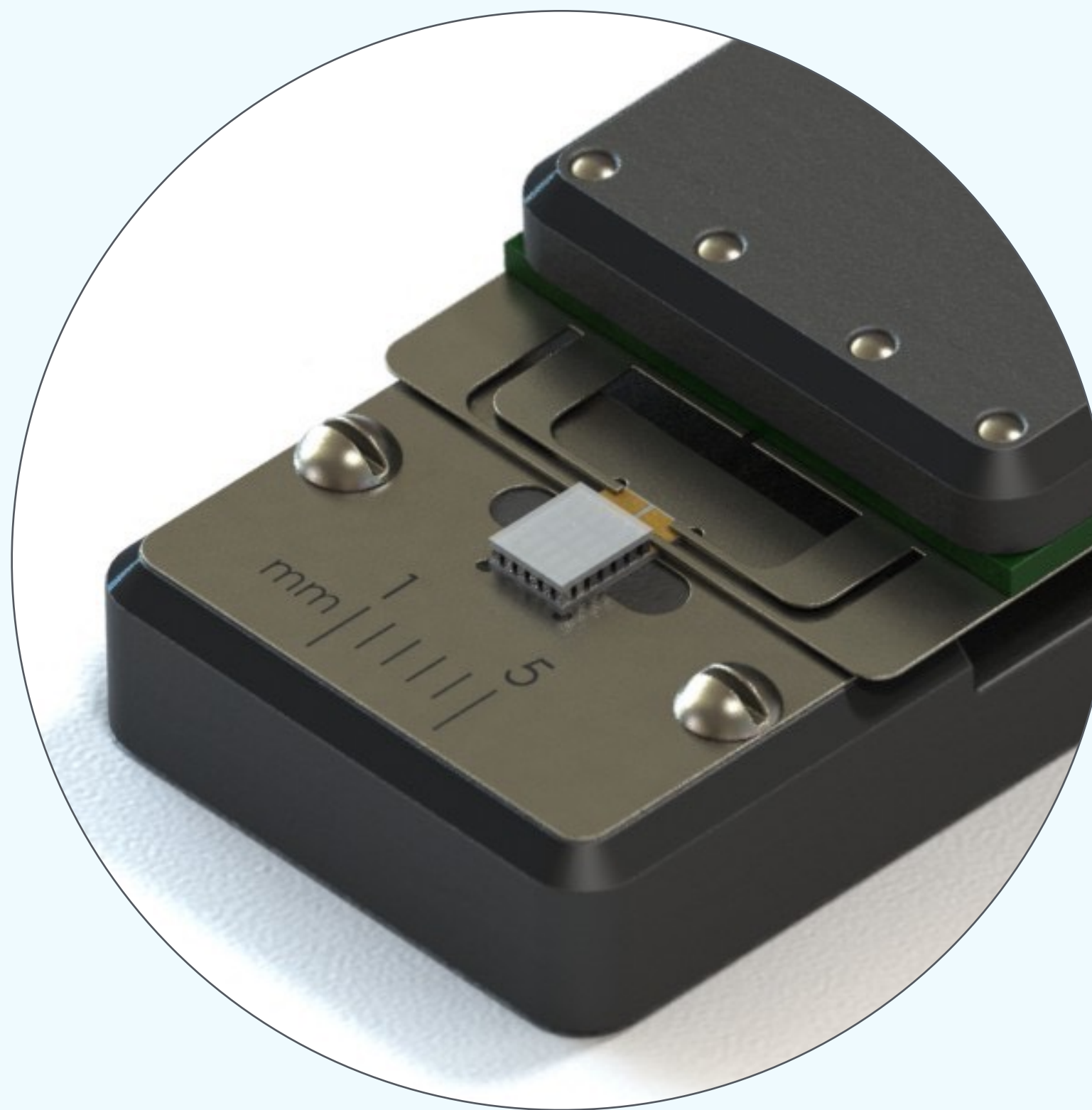




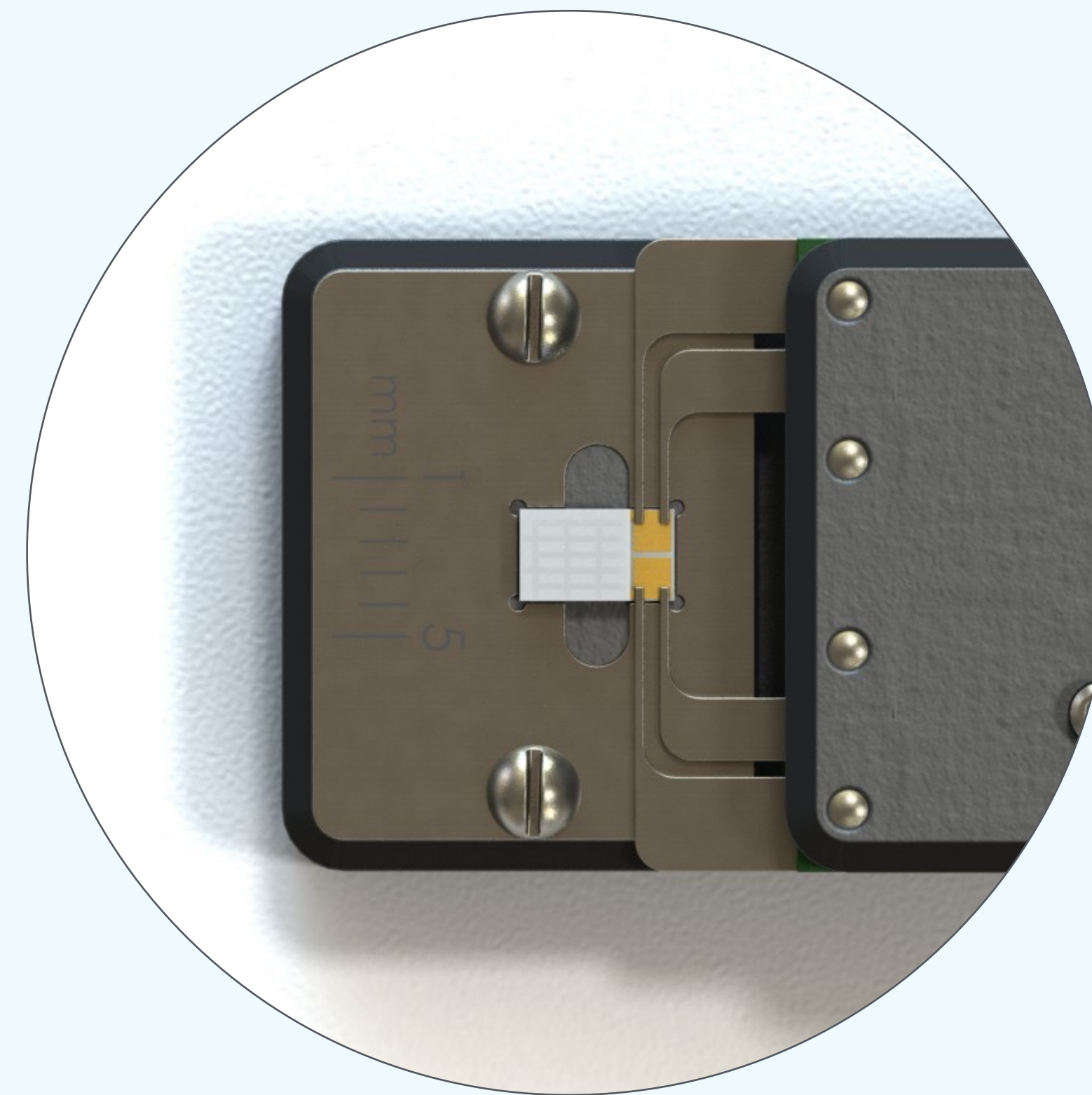
WB Clips for Z-Meters



- Precise stainless steel TEC fixtures
- Accurate TEC positioning
- Easy-to-use spring clips



- Precise accurate contact to WB pads
- Optimal for ultra-miniature TECs
- Simplifies QC process for WB TECs



- 4-wires Measurement scheme
- Safe contact to TEC WB pads
- Quick installation process



WB Clips for Z-Meters

NEW

Replaceable 4-wires probes
for various TEC sizes

Replaceable fixtures
for various TEC sizes

Mounting Screws

Stainless steel with
laser processing

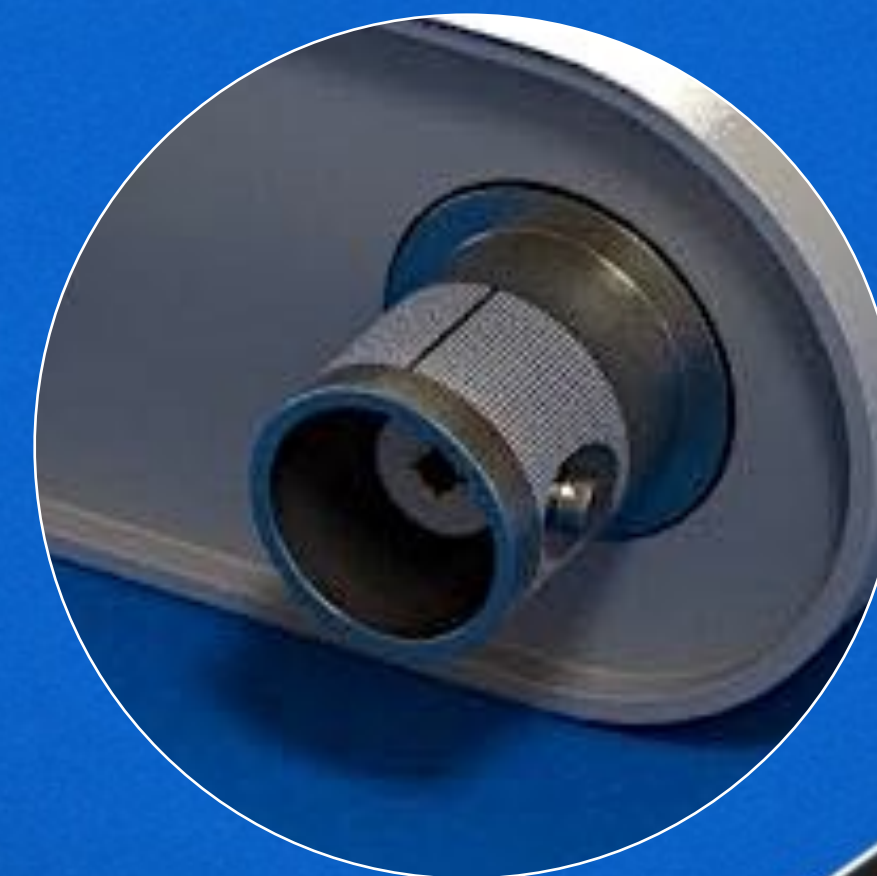
Precise TEC fixtures



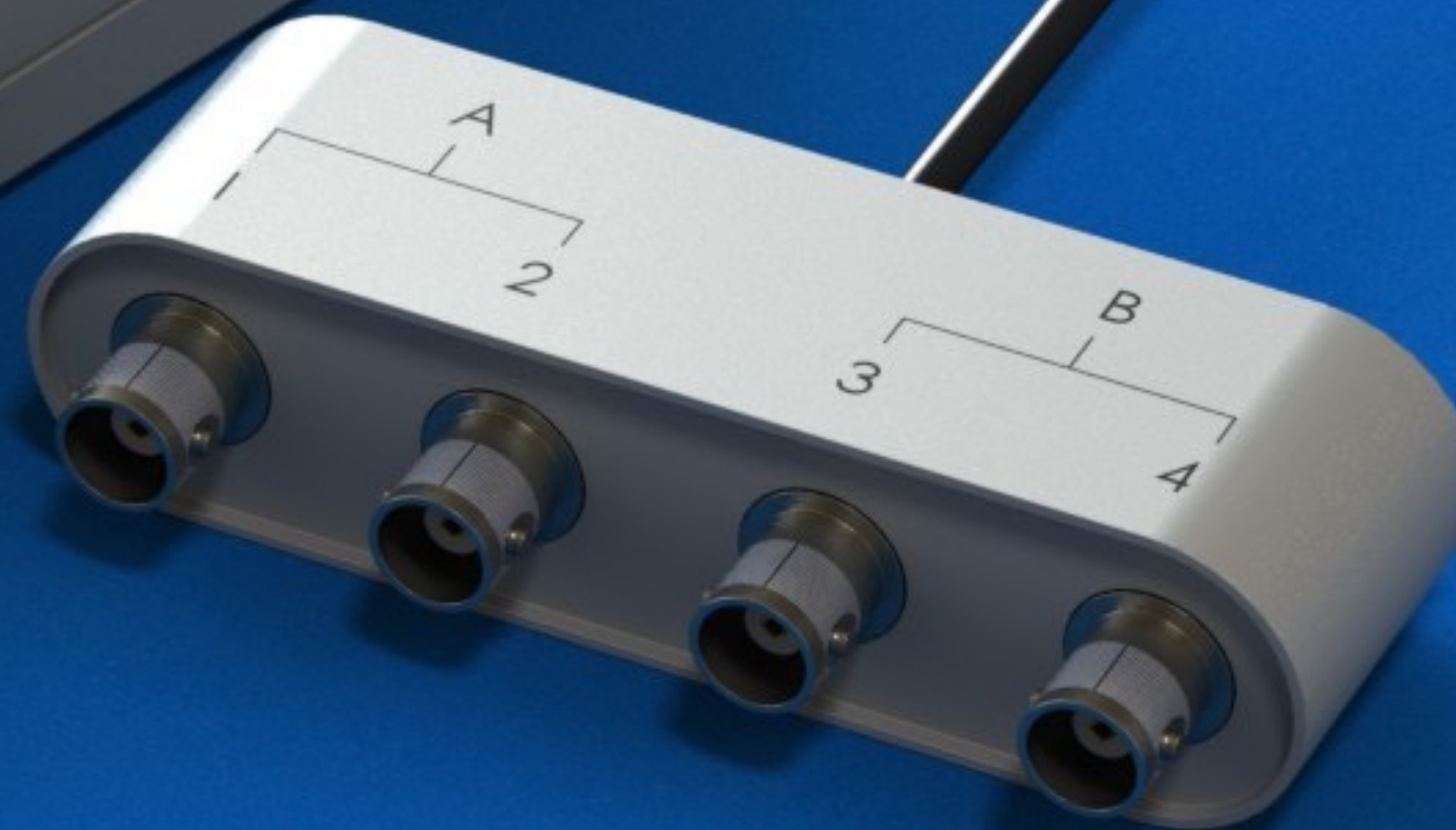
BNC Adapter for Z-Meters

NEW

- BNC Adapter for Z-Meters
- 4 -wires measurement
- Designed for industrial BNC tools (cables and test leads)



- Easy-to-use instrument
- Compatible with all Z-Meters
- Compatible with standard LCR meters
- BNC 4-wires clips
- Solid metal housing





Contacts

Europe/USA

TEC Microsystems GmbH

Schwarzschildstrasse 8, 12489 Berlin
Germany

Tel: +49 30 6789 3314

Fax: +49 30 6789 3315

Web: www.tec-microsystems.com

Email: info@tec-microsystems.com

China

ProTEC Ltd.

深圳市南山区登良路恒裕中心B座207

电话: +86-755-61596066

传真: +86-755-61596036

邮编: 518054

Web: www.protecltd.com

Email: info@protecltd.com

Taiwan

Wellspring & Vim Tech Corp

9F-1, No.657 Pei-an Rd.

Taipei 104

Taiwan

Tel: +886 2-85091756

Fax: +886 2-85091846

Web: www.wellvim.com.tw

Email: info@wellvim.com.tw



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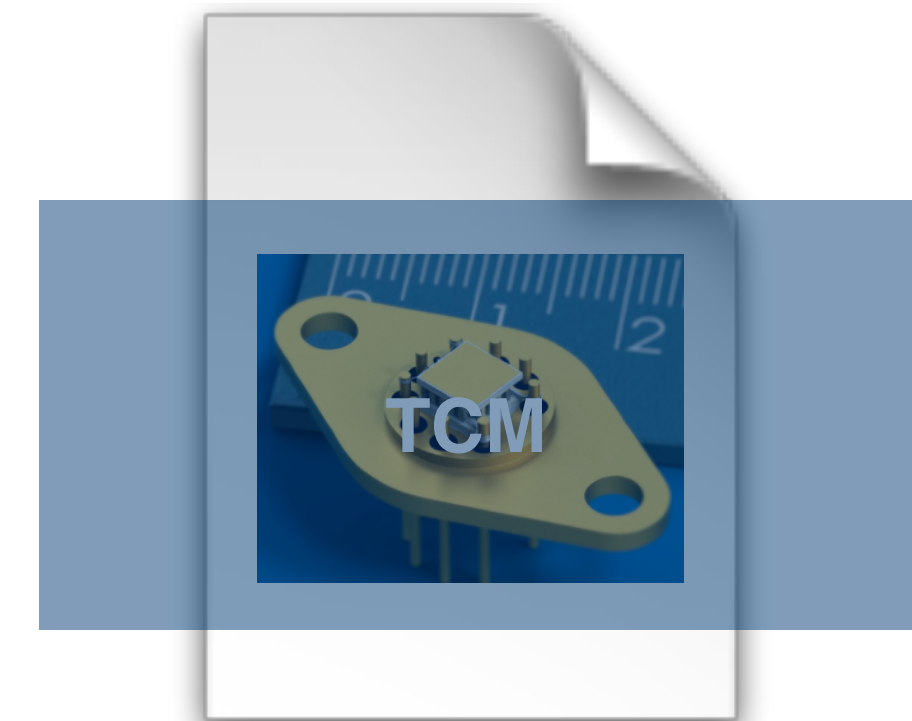
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