

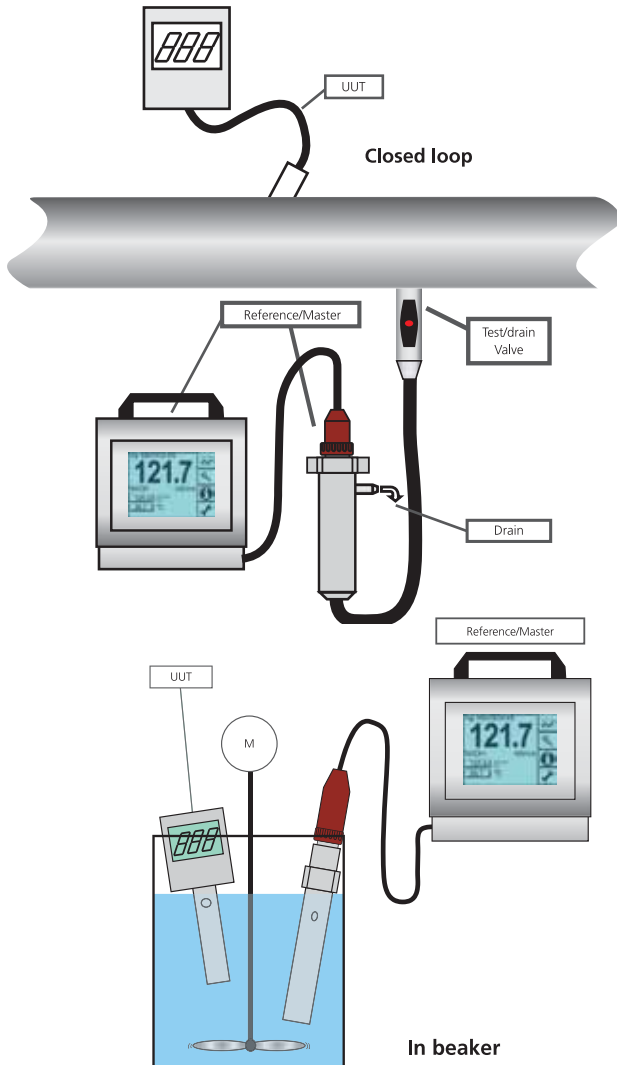
# Conductivity Master Meters with accredited calibration

# insacal™



# Easy and accurate conductivity calibration with an insacal™ master meter

With an INSACAL™ master meter you get a very flexible calibration tool. You can calibrate by closed loop procedures or in an open beaker. This allow you to choose whether your cell is calibrated on-site in-situ or not.



INSACAL™ master meters are always delivered with a closed sensor to avoid influence from the surroundings. The transmitter settings can be protected with password to avoid unintended changes in settings e.g. cell constant.

## Standard accuracy:

Transmitter:  $U_t$   $\pm 0,5\%$ . Distribution: square  
 Ambient temperature  $U_{ta}$   $\pm 0,05\%$  per. °C Distribution: square  
 Cell constant determination  $U_{cc} > \pm 0,4\%$  when determined with a standard solution.  
 $\pm 1\%$ . Interval 1,3 to 99,9  $\mu\text{S}/\text{cm}$  when determined by comparison  
 $\pm 0,5\%$  Interval 0,1 to 239  $\text{ms}/\text{cm}$  when determined by comparison  
 Confidence interval: 2.

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**See [www.insacal.com](http://www.insacal.com)**

Transmitter calibration  $U_{tc}$  In short:  $\pm$  (last significant digit +10%).  
 Confidence interval: 2.

$$\text{Total: } \sqrt{(U_t/\sqrt{3})^2 + (U_{ta}/\sqrt{3})^2 + (U_{cc}/2)^2 + (U_{tc}/2)^2 + (\text{resolution}/2/\sqrt{3})^2} \times \text{Coverage factor}$$

E.g.

Master displays 100,0  $\mu\text{S}/\text{cm}$ .  
 Ambient temperature = 30°C

Cell constant determined by a 100  $\mu\text{S}/\text{cm}$  standard solution ( $U_{cc} = 0,36\%$ )  
 Coverage factor =2 (level of confidence of approximately 95%)

**Total uncertainty = 0,75%.**

## Enhanced accuracy.

The indicator/transmitter is calibrated using a High precision resistor prior to the loop-calibration.

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Master displays 100,0  $\mu\text{S}/\text{cm}$ .  
 Ambient temperature = 30°C

Cell constant determined by a 100  $\mu\text{S}/\text{cm}$  standard solution ( $U_{cc} = 0,36\%$ )  
 Coverage factor =2 (level of confidence at approximately 95%)

Standard resistor acc= 0,05% . Distribution: square

Calibration of standard resistor : 10 ppm Confidence interval: 2.

Temperature influence of standard resistor 15 ppm Distribution: square

**Total uncertainty = 0,37%.**





For Pharmaceutical and Medical purposes the quality of water, as an excipient has been defined by the European Pharmacopoeia (EP) as well as the United States Pharmacopoeia (USP). In order to ship/sell your product in Europe or the United States of America, you must be able to prove that these requirements are met.

For Purified Water and Water for Injection (WFI) the USP defines the following requirements:

- Meter reports uncompensated Conductivity or uncompensated Resistivity.
- The display resolution is 0.1  $\mu\text{S}/\text{cm}$  or better.
- The meter reads accurately to  $\pm 0.1 \mu\text{S}/\text{cm}$  when a 0.1% precision resistor replaces the sensor (to calibrate/verify the meter).
- The sensor cell constant is calibrated/verified to  $\pm 2\%$
- Temperature accurate to  $2^\circ\text{C}$  (effective USP 28)

Yokogawa have years of experience in the development of highly accurate conductivity instrumentation for your on-line measurements.

Irish Power and Process and Insatech have jointly developed the Insacal Conductivity Calibrator in order to help you achieve these difficult requirements.

This is the first master Conductivity standard, accredited to 0.4% or better, in order to allow you meet your WFI quality requirements of 2% cell constant verification with a 4:1 TAR.

## Insacal™ configuration

	INSACAL	Model
OPTION		
Measuring System	-R	Conductive system
Transmitter	-SC2G	SC202G single channel 24 VDC Conductive
	-SC2S	SC202S ATEX single channel 24 VDC Conductive
	-SC4	SC450G single channel Conductive
Case	-2	Portable unit 202
	-5	Portable unit 450
Power supply	-2	230 VAC
	-4	24VDC
	-B	Battery version ( 8 hours)
	-1	115 VAC
Range / Sensor	-1	0,01 / cm with range 0,01 $\mu\text{S}/\text{cm}$ to 50 $\mu\text{S}/\text{cm}$ (SC42-SP34)
	-2	1 / cm with range 1 $\mu\text{S}/\text{cm}$ to 250 $\text{mS}/\text{cm}$ (SC42-EP18)
	-3	10 / cm with range 10 $\mu\text{S}/\text{cm}$ to 1000 $\text{mS}/\text{cm}$ (SC42-EP08)
	-4	0,02 / cm with range 0,055 $\mu\text{S}/\text{cm}$ to 50 $\mu\text{S}/\text{cm}$ (SC4A-E-SB-XX-002-XX-XX)
	-5	0,10 / cm with range 0,5 $\mu\text{S}/\text{cm}$ to 200 $\mu\text{S}/\text{cm}$ (SC4A-E-SB-XX-010-XX-XX)
Cable	-2W	2 meter WU40 (only with sensor -1, -2, -3)
	-5W	5,5 meter WU40 (only with sensor -1, -2, -3)
	-5F	5 meter cable (only with sensor -4, -5,)
Flow fitting	-SR	Stainless steel
	-PR	Polypropylene
	-VR	PVC
Documentation	-3.1	3.1. Material Certificate *
Documentation	-RA	2.1 Certificate - surface roughness *

Contact Insatech for special configuration or calibration - [www.insacal.com](http://www.insacal.com)

## Calibration - using standard solutions

Cell constant calibration	DFM100	100 $\mu\text{S}/\text{cm}$ [ 10 $\text{mS}/\text{m}$ ] (with sensor -1, -2, -3, -5) **
	DFM1000	1 $\text{mS}/\text{cm}$ [ 100 $\text{mS}/\text{m}$ ] (with sensor -1, -3) **
	DFM10000	10 $\text{mS}/\text{cm}$ [ 1 $\text{S}/\text{m}$ ] (with sensor -3) **
	DFM100000	100 $\text{mS}/\text{cm}$ [ 10 $\text{S}/\text{m}$ ] (with sensor -3) **
Enhanced accuracy (electrical calibration)	Y	Yes
	N	No

## Calibration - comparison (reference rig)

Comparison calibration conductivity	1	0 ... 1,3 $\mu\text{S}/\text{cm}$ (traceable calibration)
	2	1,3 $\mu\text{S}/\text{cm}$ ... 99,9 $\mu\text{S}/\text{cm}$ (Accredited calibration)
	3	100 $\mu\text{S}/\text{cm}$ .... 239 $\text{mS}/\text{cm}$ (Accredited calibration)
Comparison calibration temperature	- PRE	>0, 20, 25, 50, 75, 90° C
	- DEF	Specify temperature within range 0..90° C (min. 3 points)

Assesories:

PVC tube

Process connection

Calibration resistors

Hamilton standard solutions

\* Only for steel wetted parts

\*\* See scope on backpage for measuring ability

## Calibration Laboratory

The Insatech Calibration Laboratory is accredited by DANAK (Danish Accreditation and Metrology Fund) under accreditation CAL Reg.No. 484.



To achieve this accreditation our laboratory Quality Assurance system, calibration methods and technical competences have been inspected and audited by the Danish authority DANAK, and meets all requirements of ISO17025:2005.

We know that our customers appreciate working with professional and competent partners. Having worked in the field of calibration for a long time, we have built up a large knowledge base and a lot of experience. To document the quality of the work being done, we decided to seek accreditation in the field of conductivity, to enable primarily our customers in the pharmaceutical industry to be able to get a well documented and traceable means of calibrating their conductivity equipment to the standards required by USP (United States Pharmacopeia) or EP (European Pharmacopeia). The Insatech Calibration Laboratory will ensure you quick and competent handling of your conductivity calibrations with full documentation.

Measurement	Measuring range	Measuring ability	Standard solution	Method	Comment
Temperature	0,01°C ... 90°C	± 0,041°C		Insatech KF5.5	
Conductivity (cellconstant)	100 µS/cm (10 mS/m)	0,34%	DFM100	Insatech KF5.6	At T-sol. 25°C ±1°C
Conductivity (cellconstant)	1 mS/cm (100 mS/m)	0,27%	DFM1000	Insatech KF5.6	At T-sol. 25°C ±1°C
Conductivity (cellconstant)	10 mS/cm (1 S/m)	0,26%	DFM10000	Insatech KF5.6	At T-sol. 25°C ±1°C
Conductivity (cellconstant)	100 mS/cm (10 S/m)	0,24%	DFM100000	Insatech KF5.6	At T-sol. 25°C ±1°C
Conductivity (comparison)	1,300 µS/cm ≤ Act. ≤ 99,9 µS/cm	0,96% Act.		Insatech KF5.7	
Conductivity (comparison)	100,0 µS/cm ≤ Act. ≤ 239 mS/cm	0,53% Act.		Insatech KF5.7	

### Why use an accredited laboratory...?

#### Reduce costs and avoid expensive retesting:

Documented knowledge – you save costs and time, minimising the cost of errors due to inaccurate or invalid measurements, misleading measurement results etc.

#### Enhance Your Customers and authorities confidence:

Confidence in your product is enhanced if your customers and authorities know that critical measuring instruments has been evaluated by an independent, competent calibration facility, that has been evaluated by a third party (DANAK)

We offer 2 types of conductivity calibration.

Our Conductivity calibration (cell constant) is done using traceable solutions from Danish Fundamental Metrology, and our Comparative conductivity calibrations are carried out according to accredited methods.

#### Technically competent partner:

Our laboratory has been evaluated by DANAK to meet the internationally accepted standard ISO/IEC 17025:2005, this evaluation

includes: Technical competence of employees, validity and appropriateness of methods, traceability of measurements and calibrations to national standards

Suitability, calibration and maintenance of reference equipment, laboratory environment, Quality assurance of calibration data.

#### Other reasons to work with a competent partner:

Let us help you manage your calibration intervals – make sure that your calibration equipment is always calibrated and up to date before the period of validity expires

- Training courses and education of your staff to ensure optimal efficiency.
- Consultation and advice in setting up and maintaining calibration facilities.
- SOP (Standard Operating Procedure)
- Validation

**Contact us for a specific and detailed quotation based on your requirements [www.irishpowerandprocess.com](http://www.irishpowerandprocess.com) or [noel@irishpowerandprocess.com](mailto:noel@irishpowerandprocess.com)**



**Irish Power & Process** is a major supplier of advanced measurement and calibration solutions to high-end industries. ISO 9001 approved employing motivated and highly competent people. With **Irish Power & Process** as your partner you will benefit from our knowledge and experience since 1983.

We offer a wide range of products and services to the pharmaceutical industry with the necessary documentation and validation assistance.

- Periodic maintenance of your instruments - control and replacement
- Managing calibration interval on your instruments and loops
- Validation of instruments
- Optimising your process
- Project Management
- Consultancy and training
- On-site repair and maintenance
- Trouble shooting
- Energy measurements

- Perform calibrations on-site or in our laboratories:
- Pressure: (0,1 to 700 bar abs/rel)
- Conductivity: (from ultrapure water to high concentrations)
- Temperature: (-80 to 600°C)
- Flow: (½" to 3" pipes - liquid) (5 ml/m to 416 l/m gas)
- pH-calibration

Who is:

**DFM** DFM is the Danish National Metrology Institute. DFM is a private company owned fully by the Technical University of Denmark - DFM is our main supplier of accredited standard solutions.

**DANAK** DANAK is a Service Company handling the administration of accreditation and metrology in Denmark based on a contract with The Danish Safety Technology Authority which is part of The Danish Ministry of Economics and Business Affairs.