

# MTC-650 A

## Marine Temperature Calibrator



# Save Time, Save Money

## Up to 3 Year Calibration Interval



Maximize accuracy with a one year recommended calibration interval, or lower your cost of ownership by extending your interval up to three years! Reduce costs associated by recalibration and managing assets by 66%.

## Fast Calibration



The MTC-650 A contains an innovative heating block profile, which heats up to 650° C / 1202° F in only 18 minutes. The special heating profile minimizes mass and yet, still accepts an insertion tube with a 1 in (26 mm) outer diameter. It's the perfect compromise between temperature stability, homogeneity, and rapid heating and cooling.

## Easy to Read, Intuitive Operation



The MTC-650 A temperature calibrator is simple to operate. Access to the most commonly used functions, such as Set, Preset, Switch test and Auto step, is only one click away. An easy-to-read and very informative color display offers a full overview of the calibration task you are currently performing. The editable fields are marked in light blue. Navigating is fast and easy using arrow keys and the enter key.

With wide temperature ranges from 28 to 650° C / 82 to 1202° F, the MTC-650 A portable temperature calibrator facilitates correct readings on all of your temperature monitoring devices.

### Maintain and Calibrate monitoring devices for:

- Fuel oil inlet
- Exhaust gas
- Crankcase protection
- Turbine & gear bearings
- Steam
- Servo oil propeller pitch
- Purifiers
- Starting air
- Hydraulic systems
- Oil burner
- Generators
- Safety Valves
- Turbo-charger lubrication
- Cylinder/piston/fuel valve cooling media
- Thrust/shaft/plane/stern tube bearings
- Lubricating oil systems
- Scavenge air
- Sea water cooling
- Charge air
- Uptake gas
- Feed water
- Cooling water outlet
- Refrigeration systems
- Gland steam
- Condensing system
- Main steam
- Condensers

# Multi-Information Display

## Status Bar

Shows information about recalibration due status and hot/cold safety warnings and keeps track of date and time.

## Calibration Settings

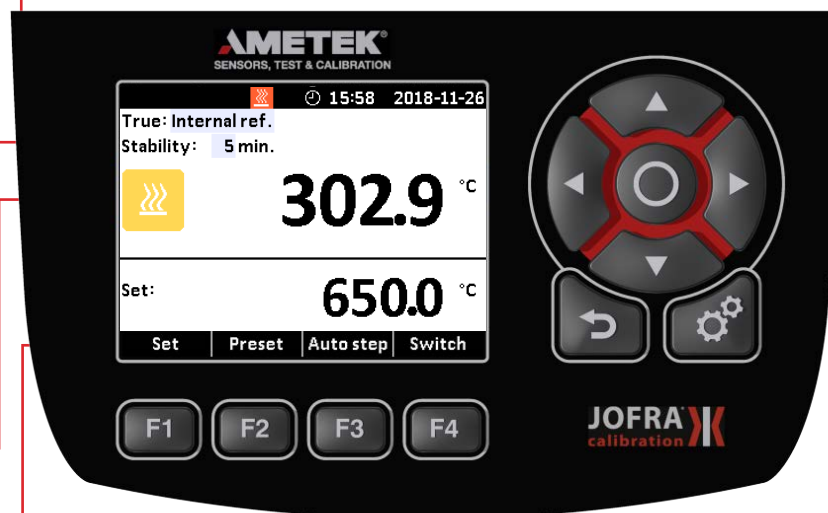
Shows the actual calibration settings for reference sensor and stability criteria. Can be accessed and changed directly in the display by use of the arrow keys.

## Calibration Status

Shows current status of the calibrator, like heating/cooling, stability achieved and expected time to stability.

## Function Bar

Shows the current possibilities of the function keys.

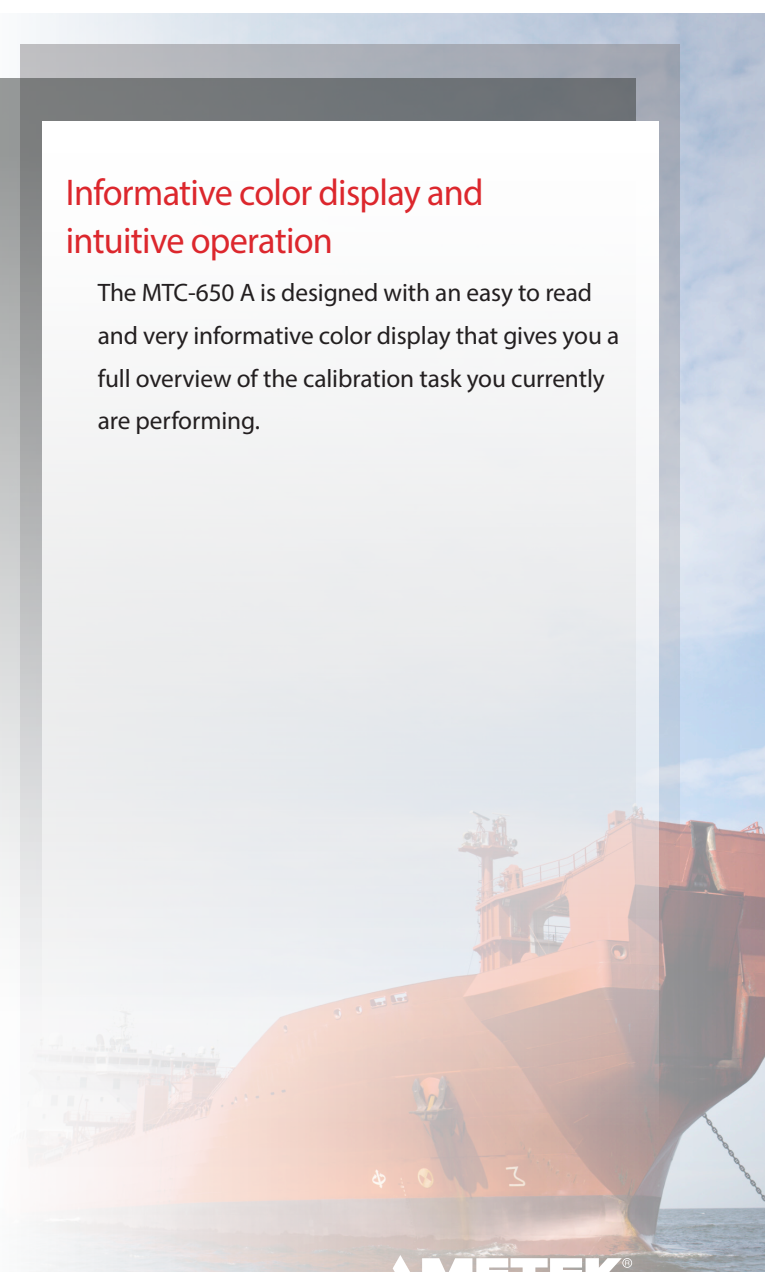
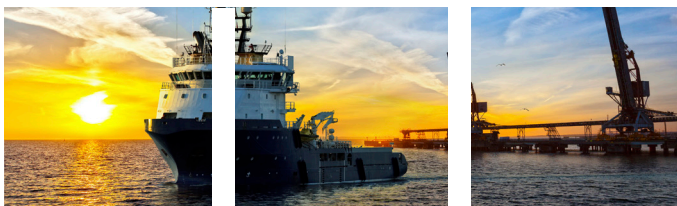


## Function Keys

The function keys serve as shortcuts to the main functions like Set, Preset, Auto step and Switch test. When entering one of the functions the function key shows the options within the selected function.

## Informative color display and intuitive operation

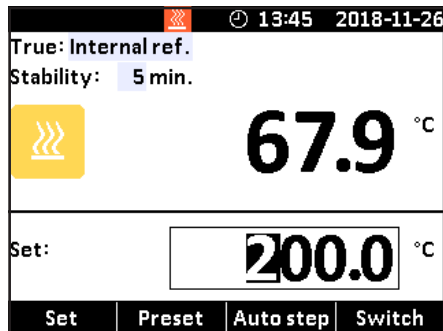
The MTC-650 A is designed with an easy to read and very informative color display that gives you a full overview of the calibration task you currently are performing.



# Useful Features

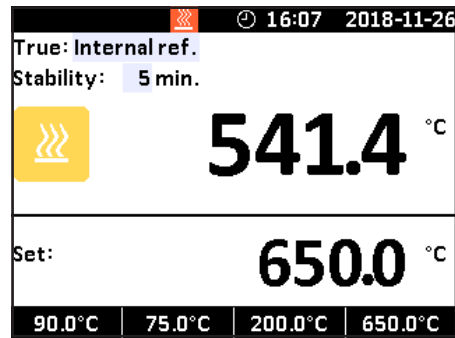
The MTC-650 A is a very versatile calibrator with many integrated functions - you can run the calibration in four different ways.

## Set function



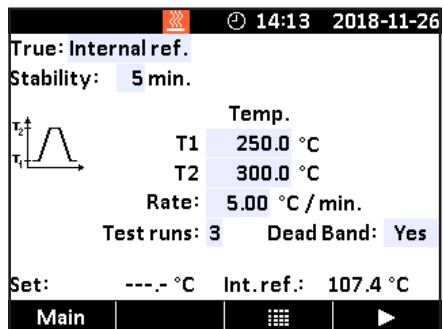
The fastest and simplest way of starting the calibrator. Simply press SET and type in the wanted temperature and off you go.

## Preset mode



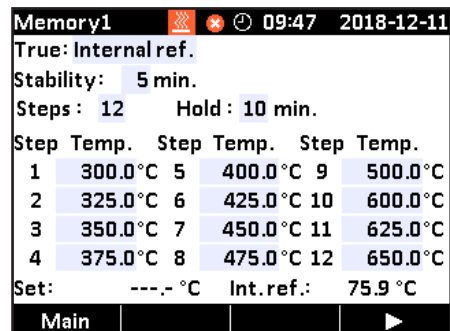
In Preset mode you just activate one of the preset temperatures. Naturally the presets are programmable for your specific needs.

## Auto Switch Test



Switch test calibration is a perfect time saver. Start the switch calibration and come back to note the results after the test. You decide if you want the deadband or not - and the test can be repeated automatically in up to three subsequent runs.

## Auto Stepping

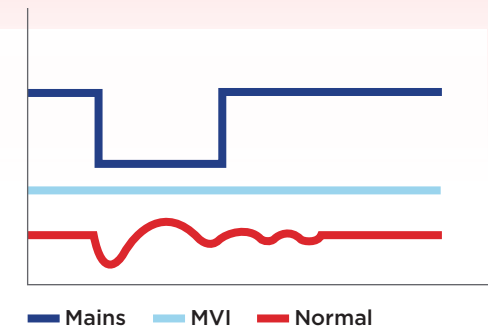


In AUTOSTEP mode you can program as much as 12 temperature steps and at the same time set the dwell time. Even the stability criteria can be programmed. Just start the sequence and the calibrator will run through the steps.

## MVI – Mains Power Variance

### Immunity improves temperature

**stability** Unstable mains power supplies are a major contributor to calibration inaccuracies. Traditional temperature calibrators often become unstable in industrial environments where large electrical motors, heating elements, and other devices are periodically cycled on and off. The cycling of supply power can cause lower quality temperature regulators to perform inconsistently, leading to both inaccurate readings and unstable temperatures. The MTC-650 A employ the MVI, thus avoiding such stability problems. The MVI circuitry continuously monitors the supply voltage and ensures a constant energy flow to the heating elements.



# Specifications MTC-650 A

## Temperature

### Temperature Range

Range ..... **28 to 650°C / 82 to 1202°F**  
 Lowest calibration temperature ..... **ambient +5°C / 9°F**

### Accuracy

MTC-650 A 1 year ..... **±0.9°C / ±1.62°F**  
 MTC-650 A 3 years ..... **±1.8°C / ±3.24°F**

### Stability

MTC-650 A ..... **±0.1°C / ±0.18°F**

*Measured after the stability indicator has been on for 10 minutes.  
 Measuring time is 30 minutes.*

### Radial Homogeneity (difference between holes)

MTC-650 A ..... **0.1°C / 0.18°F**

### Settings

Resolution ..... **1 or 0.1**  
 Units ..... **°C or °F or K**

### Heating Time

MTC-650 A ..... **23 to 650°C / 73 to 1202°F ... 18 minutes**

*All specifications are given with an ambient temperature 23° C/73.4° F  
 ± 3° C/5.9° F. Specified at 115 V/230 V.*

### Cooling Time

MTC-650 A ..... **650 to 100°C / 1202 to 212°F ... 39 minutes**  
 MTC-650 A ..... **100 to 50°C / 212 to 122°F ... 18 minutes**

### Time to Stability (typical)

MTC-650 A ..... **8 minutes**

## Mains Power

Voltage ..... **115 V (90-127) / 230 V (180-254)**  
 Max Power Consumption ..... **1150 VA**  
 Frequency, US deliveries ..... **60 Hz ±3**  
 Frequency, non US deliveries ..... **.50 Hz ±3, 60 Hz ±3**

## Physical Specifications

Dimension L x W x H... **248x148x305 mm / 9.76x5.83x12.01 in**

### Weight

MTC-650 A ..... **6.1 kg / 13.4 lb**

### Immersion Depth

MTC-650 A ..... **115 mm / 4.53 in**

### Well diameter

MTC-650 A ..... **26 mm / 1.02 in**

### Insert Dimensions (diameter x length)

MTC-650 A ..... **25,7 mm x 120 mm / 1.01 x 4.72 in**

## Electrical

### Switch Input (dry contact)

Test Voltage ..... **Maximum 14 VDC**  
 Test Current ..... **Maximum 1 mA**

### Digital Interface

USB 2.0

## Environmental

### Operating Temperature

0 to 50°C / 32 to 122°F

### Storage Temperature

-20 to 50°C / -4 to 122°F

### Humidity

5 to 90% Rh, non-condensing

### Protection Class

IP-10

## Certificates

CE ..... **2014/30/EU : EN61326-1:2013**  
**2014/35/EU : EN61010-1:2010 • EN61010-2-030 : 2010**  
 DNV ..... **Marine type approval from Det Norske Veritas.**  
 See the certificate at [ametekcalibration.com](http://ametekcalibration.com)

## Shipping Weight

### With Standard Accessories

MTC-650 A ..... **9.5 kg / 21 lb**  
 Size: L x W x H ..... **410 x 250 x 370 mm / 16.2 x 9.8 x 14.6 in**

### With Standard Accessories and Rugged Carrying Case

MTC-650 A ..... **12.5 kg / 27.6 lb**  
 Size: L x W x H ..... **515 x 200 x 390 mm / 20.3 x 7.9 x 15.4 in**



# Inserts

Inserts for MTC-650 A are made of brass. All specifications on hole sizes refer to the outer diameter of the sensor-under-test. The correct clearance size is applied in all predrilled inserts.

Predrilled Inserts–metric (mm)

Probe Dia.	Part Numbers	
	Insert Code*	MTC-650 A
3 mm	003	129459
4 mm	004	129460
5 mm	005	129461
6 mm	006	129462
7 mm	007	129463
8 mm	008	129464
9 mm	009	129465
10 mm	010	129466
11 mm	011	129467
12 mm	012	129468
13 mm	013	129469
14 mm	014	129470
15 mm	015	129471
16 mm	016	129472**
18 mm	018	129473**
20 mm	020	129474**
Package of the above inserts	—	129506
Multi-hole	M01	129493

Predrilled Inserts–imperial (in)

Probe Dia.	Part Numbers	
	Insert Code*	MTC-650 A
1/8 in	125	129477
3/16 in	187	129478
1/4 in	250	129479
5/16 in	312	129480
3/8 in	375	129481
7/16 in	437	129482
1/2 in	500	129483
9/16 in	562	129484
5/8 in	625	129485
11/16 in	688	129486**
3/4 in	750	129488**
13/16 in	813	129487**
Package of the above inserts	—	129507
Multi-hole	M02	129494

Undrilled Inserts

Inserts	Part Numbers	
	Insert Code*	MTC-650 A
5-pack	UN1	129475
5-pack with ref. hole	UN2	129476

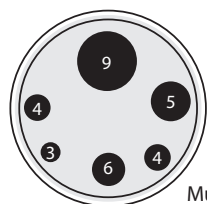
MTC-650 A Inserts

Typical Weight
MTC-650 A: 17.8 oz/510 g

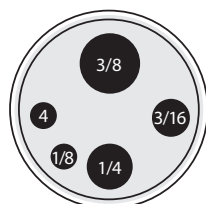
*Use of other inserts may reduce performance of the calibrator. To get the best results out of the calibrator, the insert dimensions, tolerance and material is critical. We highly advise using Jofra inserts, as they guarantee trouble free operation.*

\* Use this insert code when ordered as the standard insert together with a new calibrator.

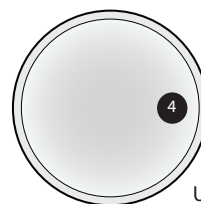
\*\* Is not supplied with hole for 4 mm reference sensor.



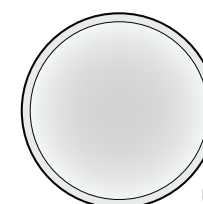
Multi-hole M01



Multi-hole M02



Undrilled with ref. hole



Undrilled

# Ordering Information

Base Model Number	
MTC650A	MTC-650 A, 28 to 650° C (82 to 1202° F)
Power Supply (US deliveries 60 Hz only)	
115	115 VAC
230	230 VAC
Mains Power Cable Type	
A	European 230 V
B	USA/Canada 115 V
C	UK 240 V
D	South Africa 220 V
E	Italy 220 V
F	Australia 240 V
G	Denmark 230 V
H	Switzerland 220 V
I	Israel 230 V
Insert Type and Size	
NON	Without insert (standard delivery)
UNX	1x undrilled insert (Please see insert section for correct code)
XXX	1x single hole insert (Please see insert section for correct code)
MXX	1x multi hole insert (Please see insert section for correct code)
SIM	Complete set of imperial inserts - inch (Please see insert section for correct code)
SMM	Complete set of metric inserts - mm (Please see insert section for correct code)
Calibration Certificate	
F	Traceable Certificate to International Standards
H	Accredited Certificate - ISO17025 (Optional)
Option	
C	Rugged Carrying Case

MTC650A 230 A M01 FC... JOFRA MTC-650 A with standard accessories, 230 VAC, European power cord, multi-hole type M01, traceable certificate, and carrying case.

## Standard Delivery

- MTC dry-block calibrator
- Mains power cable (user specified)
- Traceable certificate - temperature performance
- Tool for insertion tubes
- Test cables (1 x red, 1 x black)
- USB cable
- USB key with JOFRACAL calibration software and manuals
- Thermal protection shield



## Accessories

**122832** . . . . Cleaning Brushes - 4 mm - Package of 3 pcs

**60F174** . . . . Cleaning Brushes - 6 mm - Package of 3 pcs

**122822** . . . . Cleaning Brushes - 8 mm - Package of 3 pcs

**129244** . . . . Carrying Case



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