1875 Smart Calibrator

for 770MAX Multiparameter Analyzer/Transmitter

Instruction Manual

METTLER TOLEDO

INTRODUCTION

This manual covers operation of the Mettler-Toledo Thornton, Inc. 1875 Smart Calibrator for calibrating, verifying and printing out certificates for the 770MAX Multiparameter Analyzer/Transmitter measuring circuits. The 1875 Smart Calibrator does not calibrate the analog output circuits of the 770MAX. For analog output circuit calibration refer to Service Manual 84373. The 1875 Smart Calibrator can automatically calibrate all Smart resistance, voltage and frequency measuring circuits of the 770MAX instrument.[i] Channel 5 and 6 pulse frequency circuits do not require calibration.

For coverage of the 770MAX instrument itself, refer to Manual 84372.

The 1875 Smart Calibrator accuracy is traceable to NIST standards.

The 1875 Kit includes:

- Smart Calibrator

- Certificate of calibration

- 1005-87 Calibrator-to-770MAX connection cable, 5 ft, (1.6 m)

- 76057 DB9/DB9 male/female null modem cable (for interface to the PC computer RS232 port)

- 36151 100-240 V, 50-60 Hz power supply (used when the calibrator is not connected to a 770MAX, during computer download)

- 74028 Power cord for above

- 05023 3.5" floppy disk with Thornton Cert Manager Program (certmgr.exe) for Windows

Also required for calibration certificate printout:

- PC computer running Windows95 or later

- Printer

IMPORTANT: The 770MAX to be calibrated must have version 2.2 or later Main and Measurement software. If you have an earlier version, consult Thornton for upgrade before attempting calibration. The version may be read by accessing MENUS / Other Menus / Software revs.

OVERVIEW OF OPERATION

The 1875 Smart Calibrator can perform a complete instrument measuring circuit verification or calibration without removing the instrument from the installation and without any additional equipment. If calibration certificate printout is to be provided, a computer with at least Windows95 and printer are needed. The calibration process takes only a few minutes.

The sensor patch cord of the channel to be calibrated is disconnected at the 770MAX instrument. (The 770MAX 4-wire resistance measurement technique eliminates effects of patch cord conductor resistance.) Calibrator communication through the connecting cable is limited to distances of 15 ft (4.6 m) or less.

The Calibrator is connected using the 1005-87 5 ft (1.5 m) cable supplied or a 1015-87 15 ft (4.6 m) accessory cable. The 770MAX automatically goes into a calibration menu. Calibration or verification is initiated either at the 770MAX or the Calibrator and progress is indicated by LEDs on the Calibrator and the display on the 770MAX. Results are available to view on the 770MAX screen and are stored in the Calibrator's memory for subsequent download to a computer and printout as a certificate of calibration.

Each channel of the 770MAX has four internal ranges of resistance measurement, one range of temperature, one range of voltage and one range of frequency. Multiple points on each range are calibrated and verified automatically.

To calibrate or verify another channel, the calibrator cable must be moved to the next sensor input. The calibrator is capable of storing up to 20 channels of calibration or verification data.

The Calibrator has no internal batteries (except in its real time clock chip) and must obtain power either by connection to a 770MAX or to the accessory power supply.

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[i] U. S. patent No. 5,248,933

LED Displays

Power: Stays on while power is being supplied to the calibrator. Upon startup the Error, Verification and Calibration LEDs will also go on briefly.

Error: Flashes when memory is full (when connected to a 770MAX instrument) or stays on to indicate malfunction. May go on briefly during communications interface.

Verification: Flashes when a verification is being performed and during the verification phase of a calibration.

Calibration: Flashes during all phases of calibration.

COMMUNICATIONS SETUP

If the Calibrator is to be used for calibration and verification only, with no printout of certificates, then no setup is required. Go directly to the calibration/verification procedures.

If certificate printout is required then continue below. Communications with the Smart Calibrator requires a computer running Windows95 or later with an open serial communications port.

The Smart Calibrator includes a real time clock that must be set to local time before calibrations or verifications are performed. This establishes the correct time and date which becomes part of the data that will print out on certificates. The computer's date/time must be set correctly since this is used directly to update the calibrator's clock. In addition, the Calibrator resets the nominal clock in any 770MAX when it is connected.

Communications Setup Procedure

On the computer hard drive, create a new file folder such as 'ThorntonMAXCAL' to store the program and calibration certificate files the program will generate. Copy the Thornton Cert Manager (certmgr.exe) program from the 3.5" floppy disk provided into this folder using Windows Explorer.

Connect the Calibrator to the computer serial port using the 76057 DB9 connector cable.

Power the Calibrator using either the AC to DC power supply or connecting it to a 770MAX the same as for calibration/verification.

Set the calibrator's clock by clicking the Set Time/Date button.

CALIBRATION/VERIFICATION PROCEDURE

1. Allow the calibrator to come to ambient temperature equilibrium between 20 and 40°C for at least 30 minutes prior to calibration.

2. Power the 770MAX for at least 2 hours prior to calibration.

3. To prevent process upset during calibration or verification, activate the 770MAX HOLD mode for 20 minutes or more (by pressing MENUS, down arrow, down arrow, Enter keys) to hold all relays and analog outputs at their current level. Exit the menu.

IMPORTANT: All patch cords must be unplugged from all channels of the 770MAX during calibration.

4. Connect the Calibrator to the desired 770MAX channel, using the 1005-87 (1.5 m) cable supplied or a 1015-87 15 ft (4.6 m) accessory cable. All LEDs on the Calibrator will light briefly and the power LED will remain on. The 770MAX will display "Smart Cal on Ch _".

5. If working at the 770MAX instrument and HOLD was not activated, press MENUS key to access the Smart Calibration option menu.

6. Initiate either calibration or verification using the appropriate pushbutton on the Calibrator or the menu on the 770MAX. There will be a few seconds delay before the process begins. The appropriate LEDs will flash on the Calibrator and a status message will appear on the 770MAX. Completion is indicated by calibrator LEDs turning off and a message on the 770MAX.

7. Repeat for each additional channel following the next steps.

8. If it is desired to review the results on the 770MAX display, press page down and use the up/down arrow keys to step through the verification points.

9. Move the cable connection to the next channel to be calibrated or verified and repeat the process.

The 1875 Smart Calibrator has sufficient memory to store 20 channels of calibration/verification data. When its memory is full, the red ERROR LED will light and data must be downloaded or future calibrations will overwrite the memory. Since the error light flashes when the memory is full, users not interested in storing and downloading data should remember to clear all data periodically.

COMPUTER DOWNLOAD PROCEDURE

The computer communications application should have been configured as described in the Communications Setup section.

To provide power for the Smart Calibrator, plug it into a 770MAX as for calibration/verification. Alternatively, connect the AC to DC power supply (Mettler-Toledo Thornton part 36151) to the Calibrator.

Connect the Calibrator to the serial port of the computer running Windows95 or later, using the 76057 9-pin D (RS232) null modem cable (which crosses Transmit and Receive conductors between the computer and the calibrator). The calibrator requires a male connector, the other end must mate with the computer port. Use an adapter if necessary for other types of port connectors.

Communications Summary

Once the Cert Manager program is started up and the calibrator is plugged in, the screen should show "Connected" in the lower right border. A window opens listing all 20 certificate memory locations and their contents. The calibration certificate information is automatically downloaded. Click on appropriate buttons to display/save, print or delete each certificate.

"Display/save" displays the certificate in a window and saves it as a file in the "certificate" file folder.

"Print" sends the certificate directly to the printer. It is not possible to modify certificate information.

"Delete" clears the calibrator memory location but does not affect any saved certificate files. After deleting a certificate listing, click on "View" and "Refresh" to update the display.

SMART CALIBRATOR VERIFICATION/CALIBRATION

The Smart Calibrator itself should be returned to Mettler-Toledo Thornton periodically for NIST-traceable re-calibration. The recommended time interval is one year.

SPECIFICATIONS

Resistance Accuracy:	±0.05% except ±0.075% for 1-10 Mohm
Temperature Accuracy:	±0.1°C
Frequency Accuracy:	±0.03%
Voltage Accuracy:	0.5 mV
NIST traceability:	documented on certificate of calibration for calibrator
Ambient temperature:	20-40°C for rated accuracy
Memory capacity:	20 channels of calibration and/or verification (770MAX has 4 smart channels per instrument)

SPARE PARTS & ACCESSORIES

100-240V, 50-60 Hz to 24 VDC power supply to operate calibrator when downloading data to computer without power from 770MAX, CE compliant, UL listed	36151
Cable for power supply (above)	74028
Calibrator-to-770MAX cable, 5 ft (1.6 m)	1005-87
Calibrator-to-770MAX cable, 15 ft (4.6 m), not part of 1875 kit	1015-87
RS-232 – DB9/DB9 male/female null-modem cable for calibrator-to-computer connection	76057
3.5" floppy disk with Thornton Cert Manager Program (certmgr.exe) for Windows	05023

WARRANTY

Mettler-Toledo Thornton, Inc. warrants products it manufactures against defects in materials or workmanship for one year from start-up or 18 months from the date of shipment from Thornton, whichever is sooner. Warranties do not apply to limited life components such as batteries. Some non-Thornton manufactured resale items may have shorter warranties than one year. Mettler-Toledo Thornton honors only the warranty period of the original manufacturer. Catalog descriptions, although accurate, should not be taken as a guarantee or warranty. Mettler-Toledo Thornton's obligation under the warranty shall be to repair at its facility or replace any products which Thornton finds to be defective. Items returned for warranty must be properly packaged, shipped prepaid and insured, and must be accompanied by the Return Authorization Number described below.

Returned Goods: Please contact us for a Return Authorization Number before any item is returned. Items returned for credit or exchange must be in salable condition. Items returned after 30 days from date of invoice, will be subject to a 10% rehandling charge.

Note: Substitution or modification of cables voids all warranties.

THE ABOVE WARRANTY IS THE ONLY WARRANTY MADE BY METTLER TOLEDO THORNTON, INC. AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.