

METRAHit[®] 18C and METRAWin[®] 90 Modular Calibration System, CP

3-348-828-03

6/10.98

- Universal calibration standard:
mA / mV ... V / °C (Pt100/1000, Ni100/1000,
thermocouples J, L, T, U, K, E, S, R, B, N) /
30 ... 2000 Ω
- Rugged, reliable EMC design
- Automatic blocking system
- Calibration sequence memory
- Easy operation
- Frequency and pulse run generator
- Ramp and step functions
- Modular design for expansion to calibration system
- Retractable test report included as standard feature
- METRAWin[®]90 software and interface
- Transmitter simulator (sink: 0 to 24 mA)
- Current measurement: 0 to 24 mA



Components and Applications

The METRAHit[®]18C calibrator is a precision calibration and simulation instrument for electrical and physical quantities. It can be used on-site as a hand-held instrument for accurate calibration and inspection work, as well as for testing and laboratory applications.

A multitude of functions allow for use of the highly flexible instrument in process engineering applications, the equipping of control rooms, device manufacturing, general measuring technology and a wide variety of other areas. As an integral element of a calibration system (see CP2 on page 7), it serves to calibrate measuring transducers, instrument transformers, insulation amplifiers, transmitters, temperature meters, recorders, controllers, signalling devices and display instruments.

With the METRAHit[®]BD232 plug-in interface adapter (option, see page 6), calibration sequences and complete, measuring point specific calibration cycles can be uploaded to a PC, and can be stored and queried via the keyboard. This substantially shortens set-up at the calibrator and prevents the selection of incorrect settings.

METRAWin[®]90 software, (included with the CP1 and CP2 packages, see page 7) simplifies programming, controls the transmission of data to the calibrator, logs measurement data provided by a multimeter (if used) or from the output of a measuring transducer or an instrument transformer, and compares set-points and actual values. The recorded values can be printed out from a PC as a calibration report.

METRAHit[®]18C Calibrator with Loop Current Measuring Instrument

Universal Calibration Standard

The integrated electronics generate mV, V and mA signals, and are also capable of simulating thermoelectric voltages from various type of thermocouples, as well as Pt and Ni temperature sensors, for prescribed temperatures (°C or °F).

Calibration and Simulation

Measuring transducers with a multitude of input signals (voltage, thermoelectric voltage, RTD and 2-wire resistance telethermometers etc.) can be connected directly and calibrated. If an interface multimeter is used (e.g. the METRAHit[®]18S), the corresponding measurement values from the instrument transformer output can be measured and uploaded via an adapter to the PC where they can be displayed and compared with the appropriate input values with the help of METRAWin[®]90 software. Set-points and actual values can be displayed or printed out in report form. If the function selector switch is set to the "mA Sink" position, the METRAHit[®]18C simulates a 2-wire transmitter and draws the selected current value from the measuring chain.

Current Measurement

The calibration functions are expanded with 0 to 24 mA current measurement. This allows for on-site measurements within the current loop without the help of an additional measuring instrument.

METRAHit[®] 18C

Rugged, Reliable EMC Design

The calibrator is shielded from ambient influences and is protected from rough handling (jolts and impacts) with a sealed, impact resistant housing and a protective rubber case which is provided as standard equipment. Additional protection is provided by the optional ever-ready case. The internal ferromagnetic shield and electronic attenuators protect against interference caused by electrical and magnetic leakage fields, as well as electrostatic discharge.

Automatic Blocking System (ABS)

Our proven mechanical blocking system prevents incorrect connection of measurement cables after the desired sensor function has been selected at the rotary switch.

Data Storage

Calibration sequences and programs can be stored and saved to the integrated memory with the keypad and can be queried either forward or in reverse.

The calibrator can be linked to a PC with the optional METRAHit[®]BD232 plug-in interface adapter. Individual values, intervals and ramps which have been created and stored to a data file with the help of METRAWin[®]90 software can be uploaded to the calibrator and saved to non-volatile memory.

Easy Operation

All calibration and simulation functions are controlled by means of the central rotary switch and four keys.

Stored values and sequences can be selected, one after the other, with the ↑ and ↓ keys.

Frequency and Pulse Run Generator

The METRAHit[®]18C is capable of generating continuous frequency signals for the testing of SPCs, energy meters, flowmeters etc. Generated square-wave pulses have adjustable amplitude and can be used to simulate sensor pulses. A predetermined pulse run can also be generated for a given frequency.

Ramp and Step Functions

The METRAHit[®]18C can be used as a precision generator for dynamic testing. For example, upper and lower scale limits and the number of intermediate steps, or rise and dwell periods, can be used to establish desired test dynamics depending upon requirements. This is especially helpful for long-term cycle testing of laboratory or panel recorders, as well as for one man operation for calibration tasks.

Battery and Mains Mode Operation

The METRAHit[®]18C can be powered with either standard or rechargeable batteries. The integrated battery tester assures uninterrupted operation of the calibrator.

The mains power pack, which is available as an accessory, is suited for stationary operation for long-term testing or in the laboratory.

The easy to replace, environmentally sound NiMH batteries can be charged with a separate battery charger.

Modular Expansion to Calibration System (see also page 6)

The METRAHit[®]18C not only serves as a calibration standard. As a professional calibration tool, it can be readily linked to a PC at any time as well, from which frequently used calibration data and sequences can be uploaded. Measuring point specific data can be loaded for on-site calibration tasks, and device specific data for laboratory applications.

The calibration of measuring transducers or transmitters for process engineering applications can be easily automated through the additional implementation of the METRAHit[®]18S multimeter and METRAWin[®]90 software, which allows for a complete comparison of set-points and actual values, as well as the creation of a test record with a PC and a printer.

The METRAHit[®]BD232 interface adapter, the METRAHit[®]SI232 memory adapter and METRAWin[®]90 software are available as accessories for connection to a PC.

Test Certificate

A traceable calibration certificate is included with every METRAHit[®]18C calibrator at no additional cost.

Automatic Reference Junction

Thermoelectric voltages can be simulated for the ten most common types of sensors. Thermoelectric voltage can be read out with reference to an internal (0 °C) or an external reference junction. The temperature for the external reference junction can be adjusted manually at the calibrator or the PC.

In this way, the device to be calibrated does not have to be connected to the calibrator with a compensation cable: a copper conductor is sufficient.

Output Types for Source and Sink Functions

The read-out of calibration signals can be accomplished either manually (numeric via keys), or automatically by means of intervals (steps) with intermediate steps, or in a stepless fashion by means of a ramp.

The METRAHit[®]18C can thus be used as a precision generator for dynamic testing.

For example, upper and lower scale limits and the number of intermediate steps (intervals) or rise and dwell periods (ramps) can be used to establish desired test dynamics depending upon requirements.

This is especially helpful for long-term cycle testing of laboratory or panel recorders and measuring transducers, as well as for one man operation for calibration tasks.

Numeric Output

Calibration values are read out and adjusted manually via the keypad at the instrument directly after selection of the calibration function.

Interval Output

Continuous read-out of calibration values occurs in steps between the selected minimum and maximum values of the device to be calibrated. The sequence step can be executed automatically (time per step: 1 s to 60 min) or manually.

Ramp

This output mode provides for the continuous read-out of step-less calibration values between the selected minimum and maximum values of the device to be calibrated.

Ramp delay for rising and falling ramps can be adjusted within a range of 1 s to 60 min.

Memory

Values which have been manually stored to non-volatile memory (10 values per measuring range or sensor type) can be queried in steps. Complete calibration sequences for devices or systems can be uploaded from a PC and read out either manually or automatically.

Applicable Regulations and Standards

IEC 61010-1 DIN EN 61010 Part 1 VDE 0411-1	Safety requirements for electrical equipment for measurement, control and laboratory use
DIN 43 751	Digital measuring instruments
DIN EN 50081 Part 1	Generic standard for interference emission; residential, business and light industry
DIN EN 50082 Part 1	Generic standard for interference immunity; residential, business and light industry
VDI/VDE 3540	Reliability of measuring, control and regulating devices
DIN EN 60529 VDE 0470 Part 1	Test instruments and test procedures – Protection provided by enclosures (IP code)
DIN IEC 751	Industrial platinum resistance thermometers and platinum resistance elements

Calibration Ranges and Inherent Deviation

Inherent deviation data are related to a reference temperature of 23 °C ± 3 K. The % values make reference to the respectively selected set-point.

Direct Current

I Source/Sink	Range [mA]	Load [Ω]	Inherent Deviation ±[% + mA]
Fixed Ranges	0 ... 20.000	... 750	0.05 + 2
	4 ... 20.000		
Variable Ranges	0 ... 24.000	... 750	0.05 + 2

Overload limited by PTC thermistor to max. 42 V

Input Voltage 4 ... 27 V in "sink" mode

Direct Voltage

U Source	Range [V]	Load [mA]	Inherent Deviation ±[% + mV]
Fixed Ranges	0 ... 150.000 mV	≤ 0.15	0.05 + 0.02
	0 ... 1.50000	≤ 1,5	0.05 + 0.2
	0 ... 15.0000	≤ 15	0.05 + 2

Load Resistance min. 1 kΩ

Resistance

R Source	Range [Ω]	Sensor Current [mA]	Inherent Deviation ±[% + Ω]
Fixed Range	30 ... 2000	0.05 ... 0.1 ... 1.0 ... 1.4	0.1 + 0.1

Temperature Across Resistance Thermometer

RTD Source DIN/IEC 751	Range [°C]	Inherent Deviation ±[% + K]
Pt100	– 180 ... 850	0.1 + 0.25
Pt1000	– 180 ... 250	0.1 + 0.1
Ni100	– 60 ... 180	0.1 + 0.25
Ni1000	– 60 ... 180	0.1 + 0.1

Resolution 0.1 °C or 0.1 °F

Sensor Current 0.05 ... 0.1 ... 1.0 ... 1.4 mA

Temperature Across Thermocouple

Thermoelectric Voltage Source DIN/IEC 584	Types	Range [°C]	Inherent Deviation ext. ref. junction ±[% + μV]*
Fe-CuNi	type J	– 200 ... 1200	0.1 + 15
Fe-CuNi	type L	– 200 ... 900	0.1 + 15
Cu-CuNi	type T	– 250 ... 400	0.1 + 15
Cu-CuNi	type U	– 200 ... 600	0.1 + 15
NiCr-CuNi	type K	– 250 ... 1350	0.1 + 15
NiCr-CuNi	type E	– 250 ... 1000	0.1 + 15
Pt10Rh-Pt	type S	– 50 ... 1750	0.1 + 15
Pt13Rh-Pt	type R	– 50 ... 1750	0.1 + 15
Pt30Rh-Pt6Rh	type B	+ 50 ... 1800	0.1 + 15
NiCr-NiSi	type N	– 240 ... 1300	0.1 + 15

* With a fixed reference temperature of 0 °C and thermoelectric voltage

Resolution 1 °C or 1 °F

Reference Junction internal: inherent deviation: 2 °C
external: entry: – 50 ... 100 °C

Frequency

Frequency (square-wave pulse)	Resolution [Hz]	Inherent Deviation ±%
0.01 ... 999.99 Hz	0.01 ¹⁾	0.05

¹⁾ A pulse rate of 16 μs reduces resolution within the higher frequency range. The precise frequency is displayed.

Pulse Train continuous or as pulse package, adjustable from 1 to 99,999

Pulse Amplitude 0 ... 15 V

Keying Ratio 50%

Time Functions, Interval and Ramp

Inherent Deviation approx. ±1% of set-point ±0.1 ms

Measuring Function

Measuring Range 0 ... 24 mA, unipolar, resolution: 0.05 mA

Voltage Drop approx. 0.5 V DC + I (mA) x 125 Ω

Measuring Rate approx. 6 measurements per second

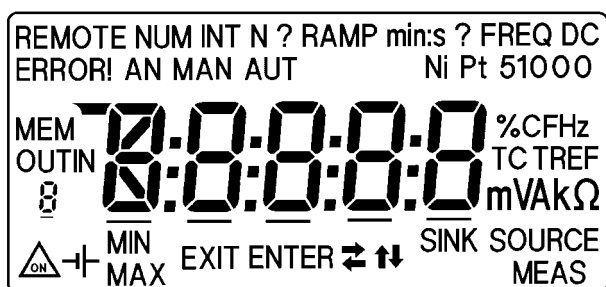
Overload Capacity Input voltage is limited to 24 mA. Signalling occurs when the upper range limit has been reached.

Maximum Input Voltage ±27 V DC

METRAHit[®] 18C

Display

Display Type	99,999 digit LCD with symbols for operator assistance
Character Height	12 mm
Overflow	OL
Battery Test	automatic display of battery symbol if battery voltage is too low



Ambient Conditions

Operating Temp.	-10 °C ... +50 °C
Storage Temperature	-25 °C ... +70 °C
Relative Humidity	max. 75%, no condensation allowed
Climatic Category	2z/0/50/70/75% in compliance with VDI/VDE 3540
Elevation	to 2000 m

Power Supply

Battery Operation	3 alkali manganese mignon cells 1.5 V/2.2 Ah, type IEC LR6
Service Life	approx. 15 h without current drain for $U_{out} \leq 1.5$ V (at 2.2 Ah pre cell) approx. 10 h without current drain for $U_{out} > 1.5$ V approx. 12 h for I source 20 mA/ $\leq 200 \Omega$ approx. 6 h for I source 20 mA/ > 200 to 750 Ω
Automatic Cut-Off	After 10 min via internal timer if no keys or switches are activated
Monitoring	Display of low battery voltage symbol with subsequent shut-down
Mains Operation	With separate mains power pack: installed batteries are automatically disconnected.
Rechargeable Battery Operation	The instrument can also be powered with rechargeable NiCd or NiMH batteries, which can be recharged with a separate battery charger.

Electrical Safety

Nominal Circuit Voltage	50 V
Test Voltage	500 V
Protection Class	II

Electromagnetic Compatibility (EMC)

Interference Emission	EN 50081-1: 1992
Interference Immunity	EN 50082-1: 1992

Mechanical Design

Protection	IP 50 per VDE 0470 / EN 60529 IP 20 at terminals and power pack connector sockets
Dimensions	84 mm x 185 mm x 35 mm
Weight	0.4 kg with batteries

Data Interface

Type	RS232C per DIN 19241
Data Transmission	optical with infrared light through housing
Baud Rate	9600 bits/s

METRAHit[®] 18C Standard Equipment

- 1 METRAHit[®] 18C calibrator with 3 IEC LR6 batteries
- 1 KS17 cable set (yellow), consisting of 2 measurement cables (1 black, 1 yellow) with angle plugs and test probes
- 1 Operating instructions
- 1 GH18 protective rubber case

METRAHit[®] 18C Guarantee

- 3 years material and workmanship
1 year for calibration

METRAHit[®] 18C Accessories

See following pages and order information.

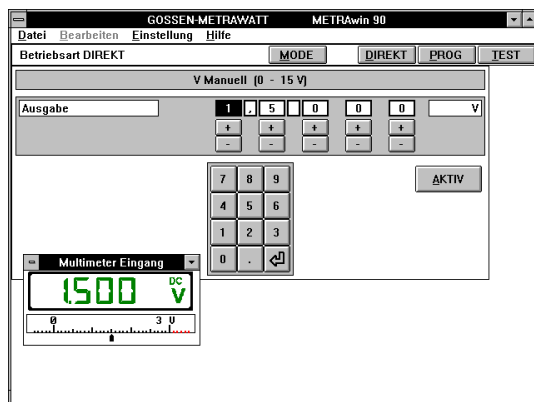
METRAWin® 90 Calibration Software (optional)

METRAWin® 90 calibration software is shipped with the CP1 and the CP2 calibrator pack (see page 7). This allows for convenient configuration of the calibrator, as well as analysis of calibration sequences with the METRAHit® 18C calibration system via PC. The following settings can be configured:

Direct Entry at the Calibrator

The calibrator is controlled by the PC, and preset values are uploaded from the PC directly to the calibrator. The following operating modes are provided with the indicated calibration ranges:

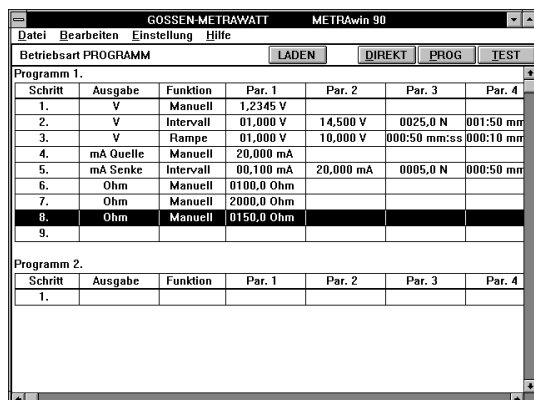
- **DIRECT** A freely selectable, fixed numeric calibration value can be entered.
- **INTERVAL** Continuous read-out of calibration values from a calibration interval which can be subdivided into intermediate steps as desired.
- **RAMP** Continuous, stepless read-out of calibration values from a calibration ramp with definable rise and dwell periods. The ramp function may also be operated continuously.



Direct Entry of Calibration Values

Calibrator Program (sequence operation)

A calibrator test program is created at the PC (e.g. with several test steps for a complex instrument or a group of systems components), stored to a data file and uploaded to memory at the METRAHit® 18C. Each calibration step can then be queried via the keypad at the METRAHit® 18C.



Creation of a Test Program

Calibration "Test" Program in Accordance with ISO9001, 4.11

A calibration sequence can be pre-programmed in the TEST mode which can be run in selectable, individual steps, or fully automatically (compare: applications example on page 6).

The calibration values and a freely definable comment are read out after each calibration step. After the output parameters of the device to be calibrated (e.g. a transducer) have been logged and evaluated with the multimeter, the measurement results are displayed in tabular form. Test sequence results can be saved to a data file or printed out as a calibration certificate. All requirements in accordance with ISO9001 Abs.11.4 are fulfilled.

Schritt	Ausgabe	Funktion	Par. 1	Par. 2	Par. 3	Par. 4
1.	V	Manuell	1,5000 V			
Status:	Text		Warten 0:05	Sollwert 1,5000 V	Min 1,400 V	Max 1,55 V
2.	V	Manuell	00,250 V			
Status:	Text		Warten 0:15	Sollwert 8,2500 V	Min 8,200 V	Max 8,350 V
3.	V	Manuell	0,1500 V			
Status:	Text		Warten 0:05	Sollwert 0,150 V	Min 0,140 V	Max 0,155 V
4.	V	Manuell	12,500 V			
Status:	Text		Warten 0:10	Sollwert 12,500 V	Min 12,4 V	Max 12,65 V
5.	V	Manuell	1,5000 V			

Calibration Sequence for Measuring Transducer ("TEST" function)

Ausfertigendes Labor:	MUSTER KG	Zertifikat Nr.:	
Kalibriert von:	MUSTERMANN	Kalibriergerte:	
Kalibrierdatum:	04.10.1994	METRAHit18C S-Nr.:	XXXXX-YYYYYY-ZZZZZ
Prüfung Fabrikat:	MUSTER	Kalibriertzertifikat:	
Typ:	MULTIMETER	METRAHit18C S-Nr.:	WWW-ZZ-YYYYY
Nummer:	328-45-3334	Kalibriertzertifikat:	
Umgebung:		Hersteller:	GOSSSEN-METRAWATT
Temperatur:	23 °C	Art der Messung:	Multimetertest
Luftfeuchtigkeit:	65 %	Unterschrift:	

Angelegter Wert	Sollwert	Grenzwert Unten	Grenzwert Oben	Prüfung Istwert	Prüfung Abweichung	% Fehler der Spezifikation	PASS/Grenzwert/FAIL
1,3000 V	1,5000 V	1,400 V	1,35 V	1,481 V	-0,0190 V	19%	PASSED
08,250 V	8,2500 V	8,200 V	8,350 V	8,28 V	-0,0800 V	30%	PASSED
0,1500 V	0,150 V	0,140 V	0,155 V	0,148 V	-0,0020 V	20%	PASSED
12,500 V	12,300 V	12,4 V	12,65 V	12,39 V	-0,0900 V	60%	GRENZWERT
1,3000 V	1,300 V	1,45 V	1,65 V	1,482 V	-0,0180 V	36%	PASSED
1,4444 V	1,4444 V	1,400 V	1,4788 V	1,426 V	-0,0184 V	41%	PASSED
1,2500 V	1,25 V	1,2 V	1,3 V	1,233 V	-0,0170 V	34%	PASSED

Zusammenfassung: Messungen = 7
 PASS (0...50%) = 6 Grenzfall (50...100%) = 1 FAIL (>100%) = 0

Printout of a calibration certificate in accordance with ISO9001 including traceability (4.11b), calibration process (4.11c), measurement deviation (4.11d), pass/fail results (4.11g) and ambient conditions (4.11h)

METRAHit[®] 18C and METRAWin[®] 90 Modular Calibration System, CP

METRAHit[®] BD232 Interface Adapter (optional)

The METRAHit[®] BD232 adapter is an RS232C interface which can be plugged into the METRAHit[®] 18C calibrator. It electrically isolates the controls at the METRAHit[®] 18C calibrator from the PC.

The METRAHit[®] BD232 interface adapter is equipped with a 9-pole SUB-D socket at the left hand side for connection to the PC, and a 9-pole SUB-D plug at the right hand side, to which a METRAHit[®] SI232 memory adapter can be attached.

Interface

Type	RS232C, in compliance with DIN 19241
Data Transmission	optical with infrared light
Baud Rate	multimeter: 8192 baud \pm 1% calibrator: 9600 baud \pm 1%

Power Supply

PC (online)	via RS232C from PC
Power Consumption	0.4 ... 2 mA

Temperature Ranges

Operation	0 °C ... + 50 °C
Storage	- 25 °C ... + 70 °C (without batteries)

Mechanical Design

Housing Material	plastic, electrically conductive
Protection	IP20
Dimensions	90 mm x 90 mm x 35 mm
Weight	0.2 kg

METRAHit[®] SI232 Memory Adapter (optional)

Applications

The METRAHit[®] SI232 memory adapter, which can be plugged onto the METRAHit[®] S multimeter, provides for direct transmission of measurement data from a METRAHit[®] S multimeter to the PC, as well as on-site storage and examination of measurement data without a PC, and subsequent uploading of stored measurement data to a PC (see also METRAHit[®] 12S ... 18S data sheet).

CP2 Calibration System (optional)

The METRAHit[®] 18C calibrator can be used together with the METRAHit[®] 18S multimeter for the calibration of measuring transducers, instrument amplifiers and isolation and buffer amplifiers, as well as sensors. Calibration can be performed manually with these two instruments:

The calibrator applies the digitally adjusted calibration signal (set-point) to the input of the device to be calibrated, and the METRAHit[®] 18S multimeter measures the corresponding output signal (actual value). Both values are entered into the calibration report and analyzed.

Computer Aided Calibration

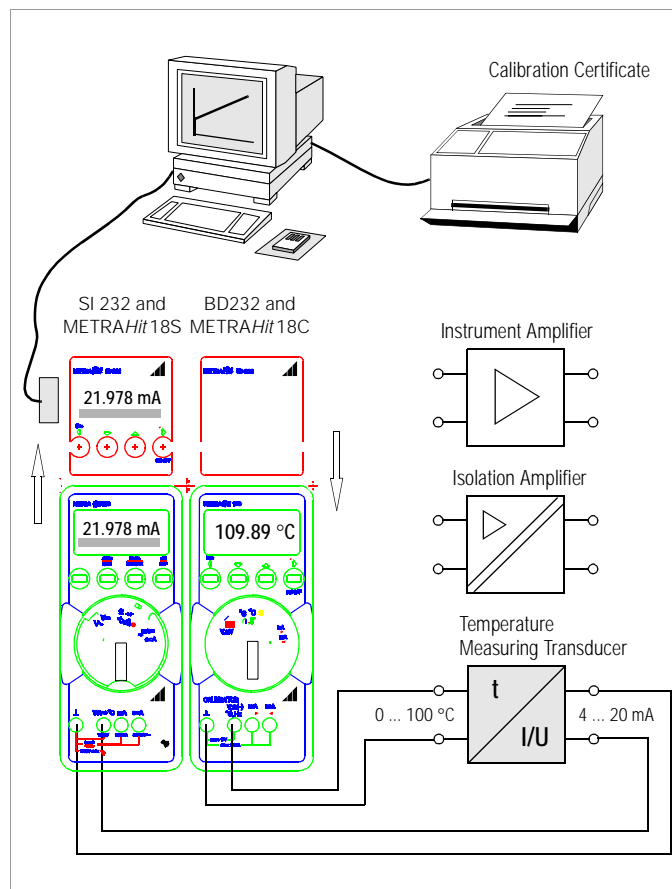
The calibration system described above can be automated with the help of an IBM compatible PC, METRAWin[®] 90 calibration software for Windows and the required data interfaces. Calibration signals are read out and actual values are recorded, and both are evaluated by means of the calibration software (see page 5) at the PC.

The included METRAHit[®] 18S multimeter can also be used together with METRAWin[®] 90 software and the memory adapter as an independent, single-channel recording system.

All of the required components are included in the user friendly CP2 calibration package. See standard equipment for CP2 calibration system.

Applications Example:

Fully Automated Calibration of Transducers and Amplifiers



METRAHit[®] 18C and METRAWin[®] 90 Modular Calibration System, CP

Standard Equipment included with CP2 Calibration System

- 1 METRAHit[®]18C calibrator
including cable set and operating instructions
- 1 METRAHit[®]18S multimeter
including cable set and operating instructions
- 1 METRAHit[®]BD232 interface adapter
- 1 METRAHit[®]SI232 memory adapter
- 1 F840 ever-ready case
- 1 RS-232 bus cable, 2 m, 9-pole – 9-pole
- 1 METRAWin[®]10/METRAHit[®] software package including
3½" program floppy disc and installation instructions
- 1 METRAWin[®]90 software package including 3½" program
floppy disc and installation instructions
- 1 NiMHc set (battery charger and 6 NiMH rechargeable batteries)
- 1 KS32 cable set for METRAHit[®]18C/S consisting of:
4 measurement cables (2 black, 1 red, 1 yellow)
with angle plugs and straight plugs
4 plug-on alligator clips (2 black, 1 red, 1 yellow)
4 plug-on adapters, 2 mm (2 black, 1 red, 1 yellow)

METRAHit[®]18S Technical Data

The METRAHit[®]18S is used within the CP2 calibration system for the recording of actual values from the device to be calibrated with 4³/₄ places and a 30,999 digit display. The METRAHit[®]18S includes all of the functions of a precision multimeter in addition to accurate logging of standard signals ranging from 0 ... 20/24 mA and 0 ... 300 mV/10 V/30 V.

Excerpt from List of Relevant Measuring Ranges
for the Use of the METRAHit[®]18S in Calibrations Systems:

Measurement Function	Measuring Range	Resolution	Inherent Deviation
V \equiv	300.00 mV	10 μ V	0.5 + 30 D (> 500 D)
	3.0000 V	100 μ V	0.3 + 30 D (> 300 D)
	30.000 V	1 mV	0.3 + 30 D (> 300 D)

mA \equiv	30.000 mA	1 μ A	0.5 + 30 D (> 300 D)



For additional information see METRAHit[®]12S ... 18S data sheet.

METRAHit[®] 18C and METRAWin[®] 90 Modular Calibration System, CP

Order Information

Designation	Type	ID Number
Calibrator, see standard equipment for METRAHit [®] 18C	METRAHit [®] 18C	GTM 2018 300 R0001
Calibrator Pack 1, including: BD232 adapter, METRAWin [®] 90, RS232 interface cable	CP1	GTZ 3231 100 R0001
Calibrator Pack 2, including: METRAHit [®] 18S, METRAHit [®] 18C, SI232 and BD232 adapters, KS32 cable set, METRAWin [®] 90 and METRAWin [®] 10/METRAHit [®] soft- ware, NiMH set, F840 ever-ready case	CP2	GTM 2018 200 R0001
Calibrator Pack 3, including: 2 METRAHit [®] 18S, 1 METRAHit [®] 18C, 2 METRAHit [®] SI232 adapters, 1 METRAHit [®] BD232 adapter, METRAWin [®] 90-2 software, NA4/500 power pack, RS232 cable	CP3	M293A
Bidirectional interface adapter for METRAHit [®] 18C (included with CP1, CP2 and CP3)	BD232	GTZ 3242 100 R0001
Power pack for METRAHit [®] 18C calibrator	NA4/500	Z218A
Rechargeable battery set (charger with 6 rechargeable batteries)	Ni MH set	GTZ 3320 001 R0001
Cable set, see standard equipment for CP2 calibration system	KS32	GTZ 3236 001 R0001
Carrying case for METRAHit [®] 18S or 18C	F829	GTZ 3301 000 R0003
Ever-ready case for METRAHit [®] 18S or 18C	F836	GTZ 3302 000 R0001
Ever-ready case for calibration system (included with CP2)	F840	GTZ 3302 001 R0001

F829 Carrying Case



F836 Ever-Ready Case



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