

Image sheet

Power Calibrators

MC133 / MC133i
MC133C / MC133Ci

Models / Parameters

MC133 / MC133i

Single phase calibrator



Both models

- AC voltage 1 ... 600V
- DC voltage 1 ... 280V
- AC/DC current 8mA ... 30A
- Frequency DC, 15 ... 1000Hz
- Phase 0 ... 360°
- AC power 0 ... 18kVA
- DC power 0 ... 8.4kW
- AC/DC energy
- Built in process multimeter
- RS232, IEEE488 (SCPI)
- Can be extended up to 3 phase system

MC133 only

- Harmonic distortion (50 harmonic components)
- Interharmonic distortion
- Modulation and flicker
- Dip/Swell

MC133C / MC133Ci

Three phase calibrator



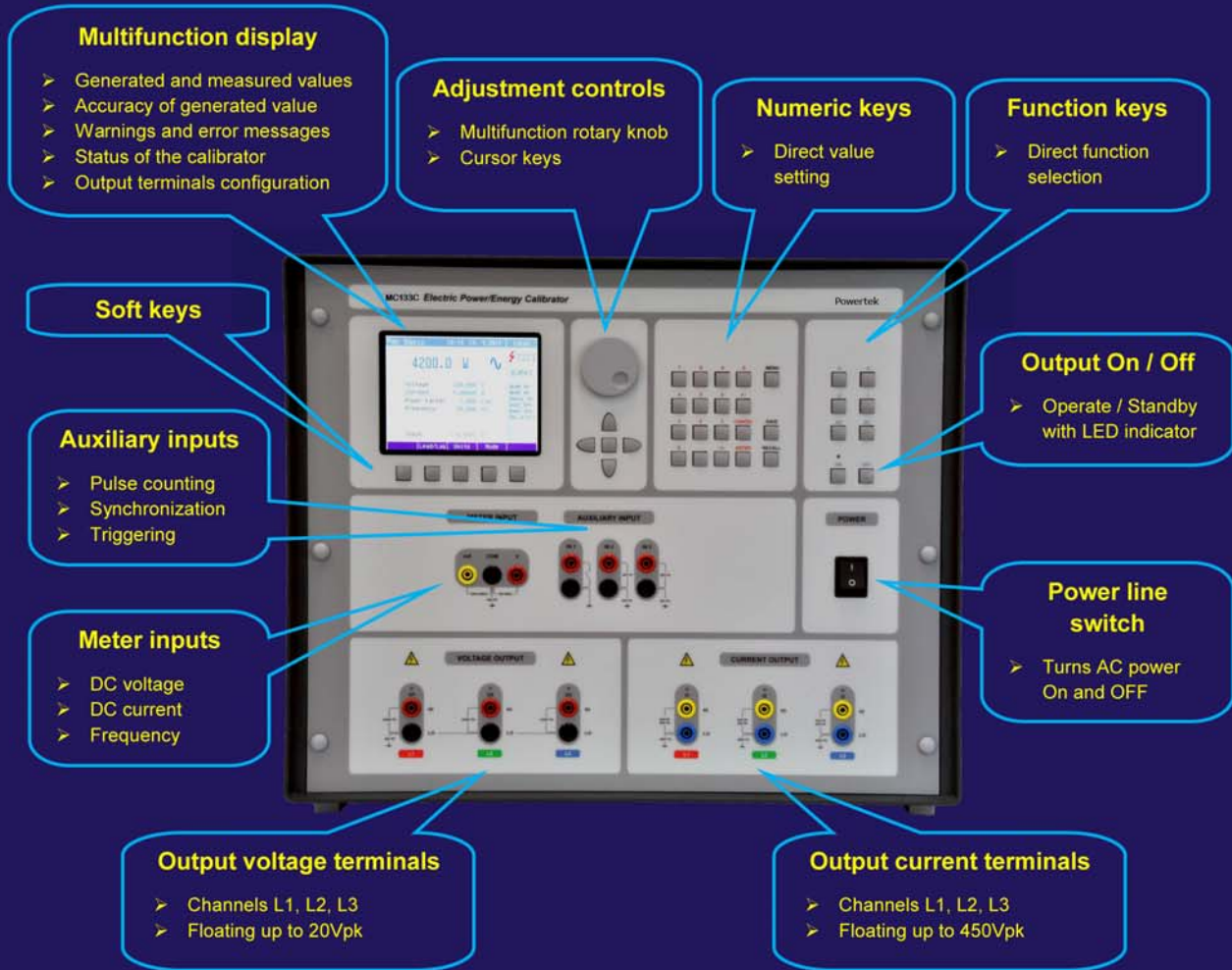
Both models

- AC voltage 1 ... 600V
- DC voltage 1 ... 280V
- AC/DC current 8mA ... 30A (90A single phase)
- Frequency DC, 15 ... 1000Hz
- Phase 0 ... 360°
- AC power 0 ... 54kVA
- DC power 0 ... 25.2kW
- AC/DC energy
- Built in process multimeter
- RS232, IEEE488 (SCPI)

MC133C only

- Harmonic distortion (50 harmonic components)
- Interharmonic distortion
- Modulation and flicker
- Dip/Swell

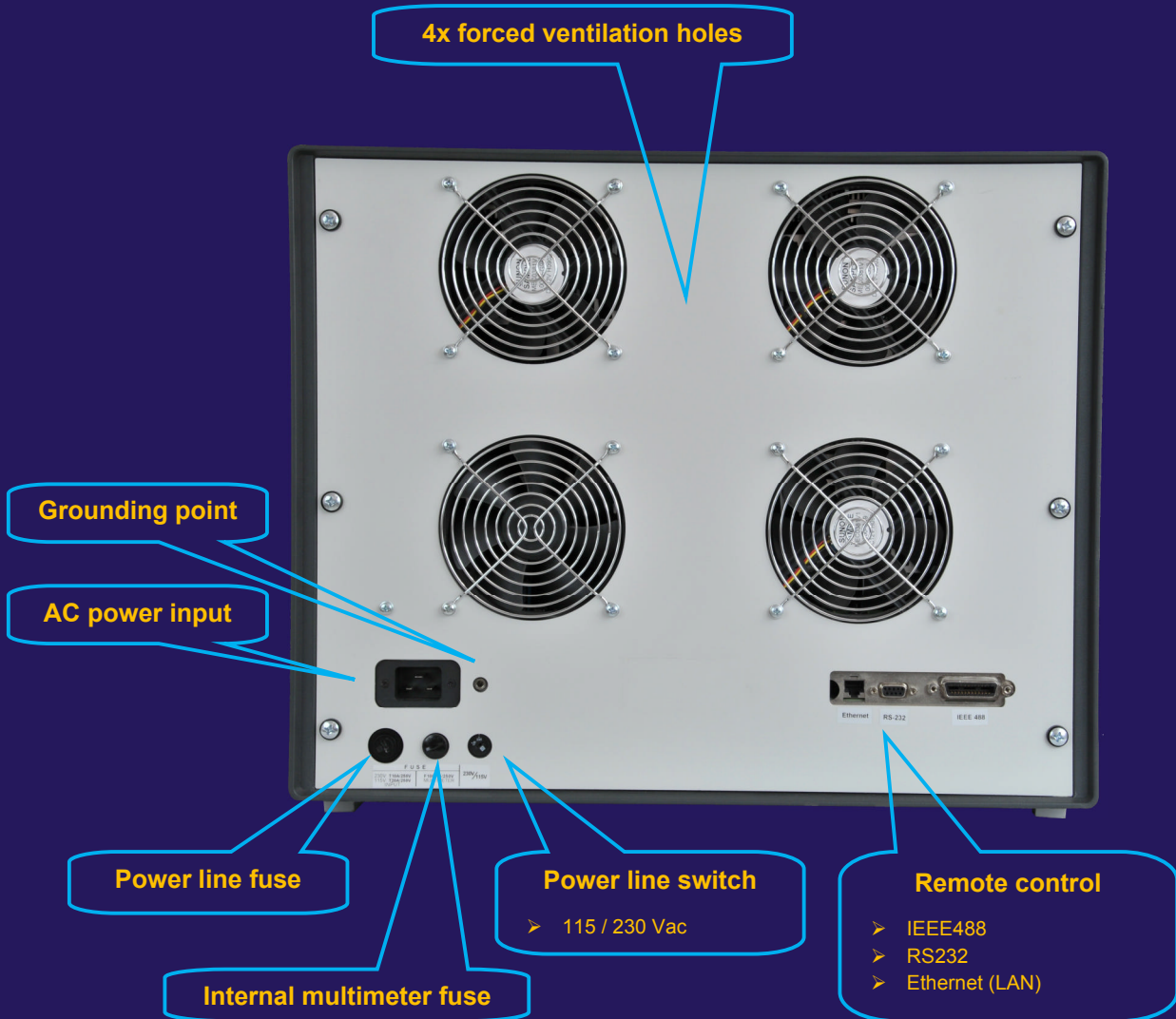
Front panel



Front panel is divided into a few sections:

- Large color TFT display with excellent visibility and soft keys
- Keyboard with the rotary knob and cursor keys
- Input terminals (auxiliary inputs, process meter input)
- Power line switch
- Output voltage and current terminals

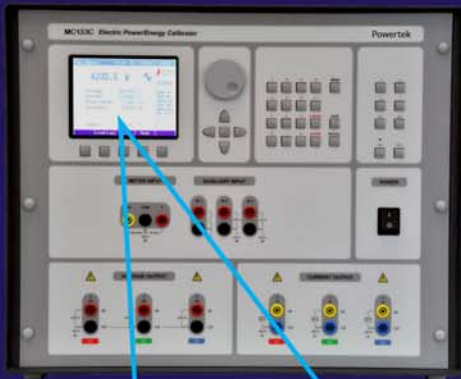
Rear panel



Rear panel contains:

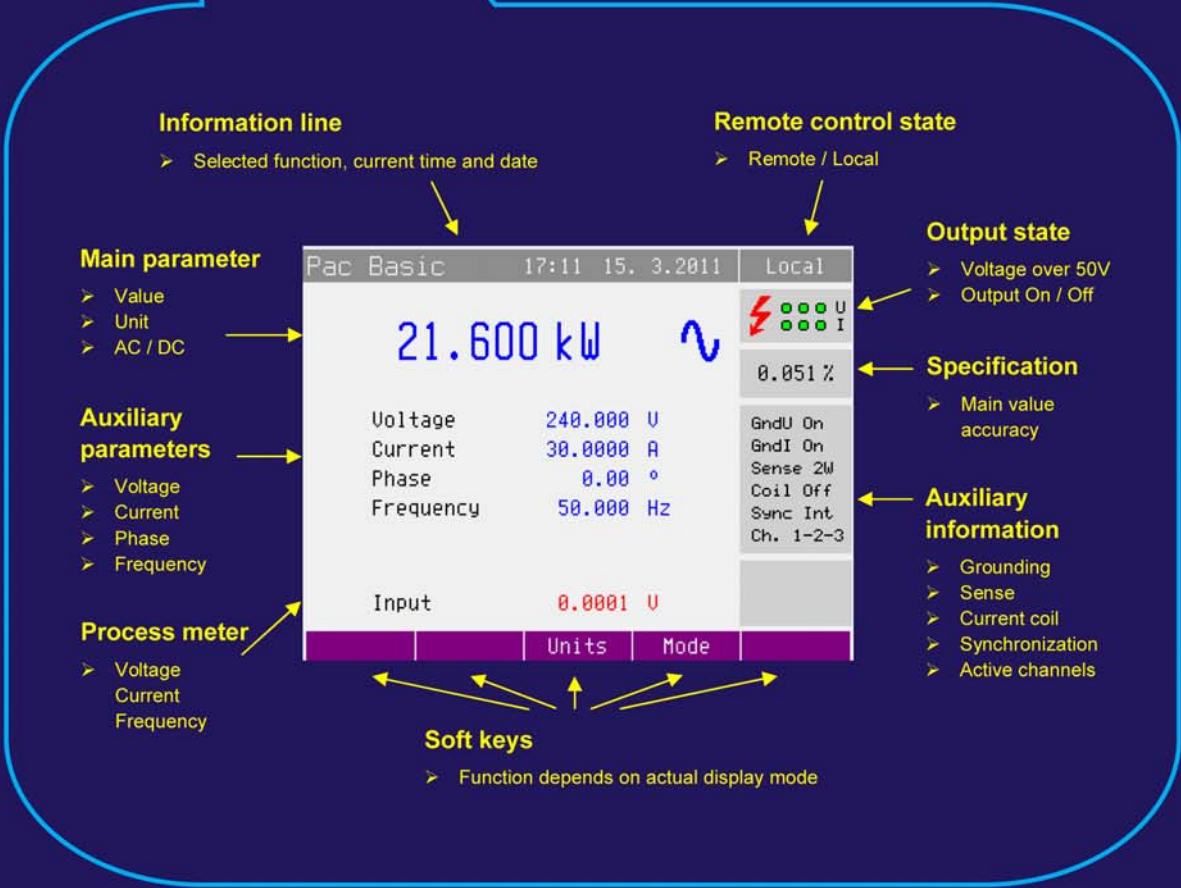
- Ventilation holes
- Power supply input and fuse holder
- Remote control connectors (Ethernet, RS232, IEEE488)

Display



Colors used on display

- Red color indicates measured value
- Blue color indicates parameter or value that can be modified directly
- Black color indicates fix value, label, note or parameter that cannot be modified directly



Terminals



There are three terminal areas:

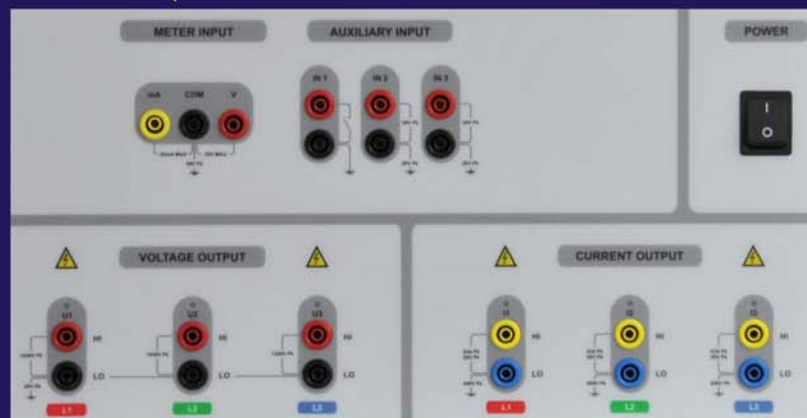
- Input terminals
 - Meter input
 - Auxiliary input
- Voltage output terminals
- Current output terminals

Meter input

- Voltage 10V, Frequency 10kHz
- Current 20mA

Auxiliary input

- Energy pulses counting
- External synchronization
- Dip/Swell trigger



Voltage outputs

- Phases L1, L2, L3
- Common LO terminals floating up to 20Vpk

Current outputs

- Phases L1, L2, L3
- Independent LO terminals floating up to 450Vpk

High Current Adapter

Option MC133C-01

- Parallel connection of three current outputs
- Standard option for three phase system

Pac High I		17:12 15. 3.2011	Local
21.600 kW		~	⚡ U I
Voltage	240.000 V		0.060 %
Current	90.000 A		GndU On
Phase	0.00 °		GndI On
Frequency	50.000 Hz		Sense 2W
			Coil Off
			Sync Int
Input	- 0.0000 V		
	Units	Mode	



Direct current up to 90A



High Current Adapter

Option MC133C-01

- Parallel connection of three current outputs
- Standard option for three phase system

Pac High I		17:12 15. 3.2011	Local
21.600 kW		~	⚡ U I
Voltage	240.000 V		0.060 %
Current	90.000 A		GndU On
Phase	0.00 °		GndI On
Frequency	50.000 Hz		Sense 2W
			Coil Off
			Sync Int
Input	- 0.0000 V		
	Units	Mode	



Direct current up to 90A



High Current Adapter

Option MC133C-01

- Parallel connection of three current outputs
- Standard option for three phase system

Pac High I		17:12 15. 3.2011	Local
21.600 kW		~	⚡ ○ ○ U ○ ○ ○ I
0.060 %			
Voltage	240.000 V		GndU On
Current	90.000 A		GndI On
Phase	0.00 °		Sense 2W
Frequency	50.000 Hz		Coil Off
			Sync Int.
Input	- 0.0000 V		
	Units	Mode	



Direct current up to 90A



High Current Adapter

Option MC133C-01

- Parallel connection of three current outputs
- Standard option for three phase system

Pac High I		17:12 15. 3.2011	Local
21.600 kW		~	⚡ ○ ○ U ○ ○ ○ I
0.060 %			
Voltage	240.000 V		GndU On
Current	90.000 A		GndI On
Phase	0.00 °		Sense 2W
Frequency	50.000 Hz		Coil Off
			Sync Int.
Input	- 0.0000 V		
	Units	Mode	



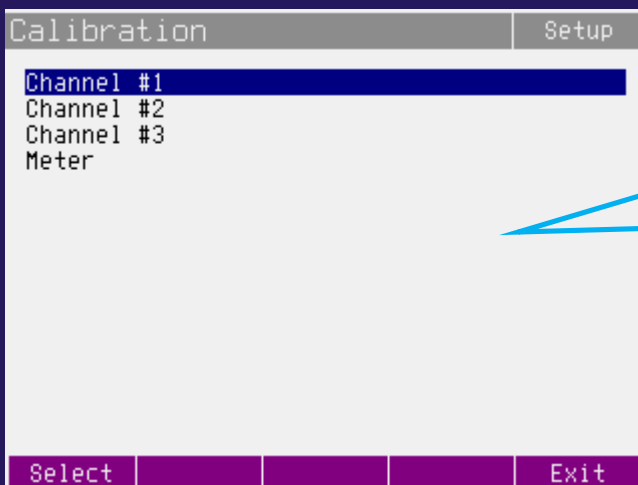
Direct current up to 90A



Recalibration procedure

All internal calibration data can be changed in CALIBRATION mode.

- Access to the calibration mode is protected by password.
- The entire recalibration can be done from instrument's keyboard.
- Instrument can be recalibrated completely or in selected functions (points).



Calibration mode

Main calibration menu

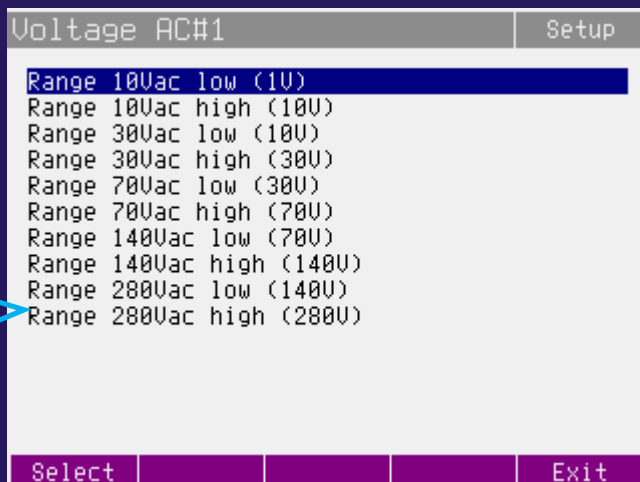
List of Channels (Meter) that can be recalibrated.

Calibration mode

Voltage AC, channel 1

List of calibration point

Recalibration is based on two point calibration. Every range is calibrated in the "low" and "high" calibration point.



Remote control

Calibrator can be used in automated measuring systems.

Connectors for remote control are located on the rear panel.

Following interfaces are available for connection to the controller (PC):

- IEEE488 (SCPI) – standard interface
- RS232 – standard interface
- Ethernet – standard interface
- USB – optional using RS232/USB convertor

Standard interfaces

Ethernet
RS232
IEEE488 (SCPI)



Optional USB interface

Interface converts RS232 to
USB port



All device functions can be controlled via the above mentioned interfaces. User's manual contains description of all commands. Syntax of commands is according to the SCPI standard.

High Current Adapter

Option MC133C-01

- Parallel connection of three current outputs
- Standard option for three phase system

Pac High I		17:12 15. 3.2011	Local
21.600 kW		~	⚡ ○ ○ U ○ ○ ○ I
0.060 %			
Voltage	240.000 V		GndU On
Current	90.000 A		GndI On
Phase	0.00 °		Sense 2W
Frequency	50.000 Hz		Coil Off
			Sync Int.
Input	- 0.0000 V		
	Units	Mode	



Direct current up to 90A



Software

Caliber (licensed software)

- Easy creation of calibration procedure using procedure wizard
- Automatic calibration of instruments
- Instruments control via USB, RS232, IEEE488, RS485, Ethernet, ... (VISA)
- Calculated deviation and uncertainty in each point of test report
- Calibration uncertainty evaluated according to metrology standards
- Up to 20 instruments in one calibration point
- Windows 2000/XP/Vista/7 (32/64 bit)

The screenshot shows the Caliber software interface with several callout boxes pointing to specific features:

- Instruments scheme:** Instruments used in selected calibration point and their configuration.
- Information line:** Description of performed operation.
- User prompt window:** Program messages.
- Camera:** Optional camera module for digital display scanning.
- Readings:** Particular measured values.
- Status window:** Active terminals.
- Test report:** Measured and evaluated values (measured deviation, maximum allowed deviation, measurement uncertainty).

The main window displays a connection scheme diagram, a status window with active terminals, and a table of test results. The table below shows the data from the screenshot:

Function	Range	Standard	UUT	Deviation	%spec	Allowed	Uncertainty	Symbol
VDC-2W	2 V	1.800 V	1.801 V	1.0 mV	10	10.0 mV	1.8 mV	ok
VDC-2W	2 V	-1.800 V	-1.800 V	0.0 mV	0	10.0 mV	1.8 mV	ok
VDC-2W	20 V	2.00 V	2.01 V	10.0 mV	50	20.1 mV	6.1 mV	ok
VDC-2W	20 V	10.00 V	10.00 V	0.0 mV	0	50.0 mV	7.1 mV	ok
VDC-2W	20 V	18.00 V	18.01 V	5 mV	5	100 mV	10 mV	ok
VDC-2W	20 V	-2.00 V	-2.00 V	0.0 mV	0	20.0 mV	6.1 mV	ok
VDC-2W	20 V	-18.00 V	-18.01 V	-8 mV	-8	100 mV	10 mV	ok
VDC-2W	200 V	20 V						
VDC-2W	200 V	180 V						