

MiniLog2



Manual

Content

Content	1
General	3
Basics for using the keypad	3
Cancel Input	3
Charging Battery	3
USB PC Connection.....	3
GPS Synchronisation	3
Software Reset.....	3
LCD Symbols Description	4
Mode: Switching	7
Starting-, Stopping and using Pre Set Cycles.....	7
Programming Switching Cycle	8
Sleep Mode	9
GPS Synchronisation	10
External Synchronisation	11
Manual Synchronisation.....	12
Mode: Logger	15
Multimeter.....	15
Data Logging	16
Mode DCVG	21
DCVG- or CIPS measurement.....	21
Electrodes Setup.....	21
Accessories for the DCVG survey	23
Measuring Ranges and Accuracy	25
DC - Inputs	25
AC - Inputs	25
Duration of Datalogging	26
Battery Duration	27
Mode : Data Logging	27
Mode : Switching	27
Mode : DCVG / CIPS Survey	27
Technical Data	29
Item Numbers	31

General

Basics for using the keypad

A user input via the keypad always starts with the press of one of the three mode keys:

SWITCH or **LOGGER** or **DCVG**

If there's no additional key pressed during 3 seconds time, MiniLog2 returns to the standard display (Battery capacity left "Batt" in change with firmware version "Mini 1.007").

Cancel Input

If being in a mode already, another press of one of the three mode keys:

SWITCH or **LOGGER** or **DCVG**

takes MiniLog2 directly back to the standard display ("Batt").

Charging Battery

Connect the blue USB cable with the connector "**USB Charge**" on the bottom of the MiniLog2. The charging can be done via USB mains connector, the USB car adapter or directly via the USB of the PC. The LED named "**Charge**" lights red during charging, and green when the charging is completed.

USB PC Connection

The connection with the PC/Notebook is done via the blue USB cable and the "USB Charge" socket. With this connection, the battery of the MiniLog2 will be charged, too.

GPS Synchronisation

If the GPS antenna is connected, every 6 hours an attempt for synchronising is done. If the last trial was successfully, the LED "GPS" constantly flashes shortly in green, whereas a failure attempt lets the LED flashing red.

Beside a GPS synchronisation can always be started directly via the keypad. (see also "Switching", "Starting GPS Synchronisation manually")

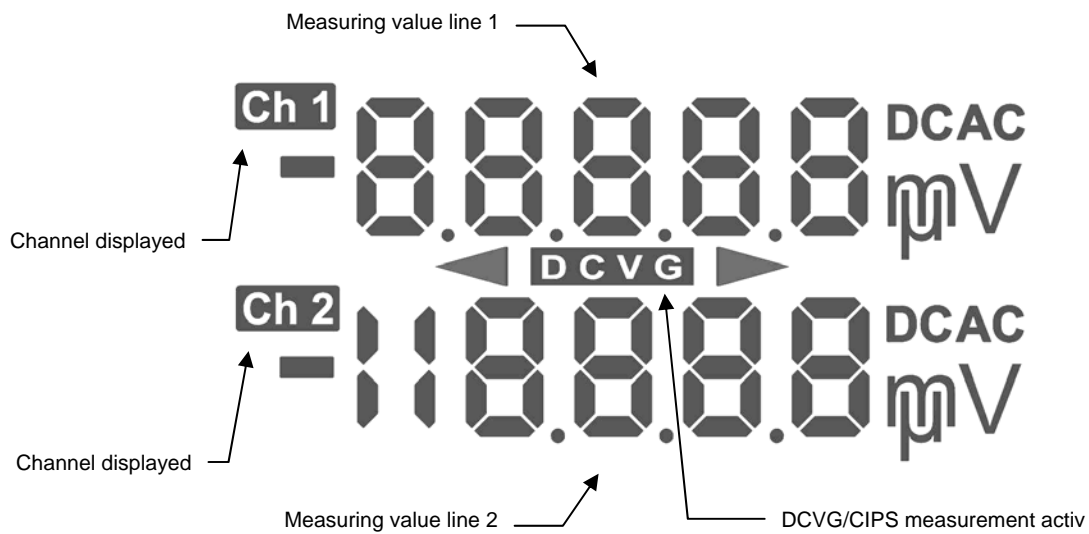
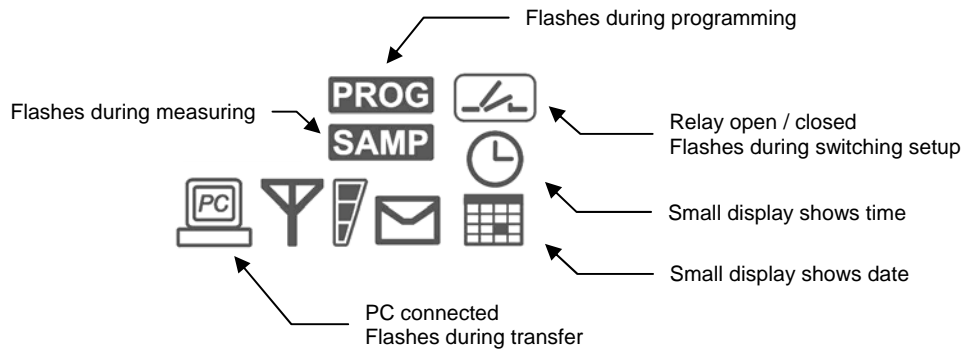
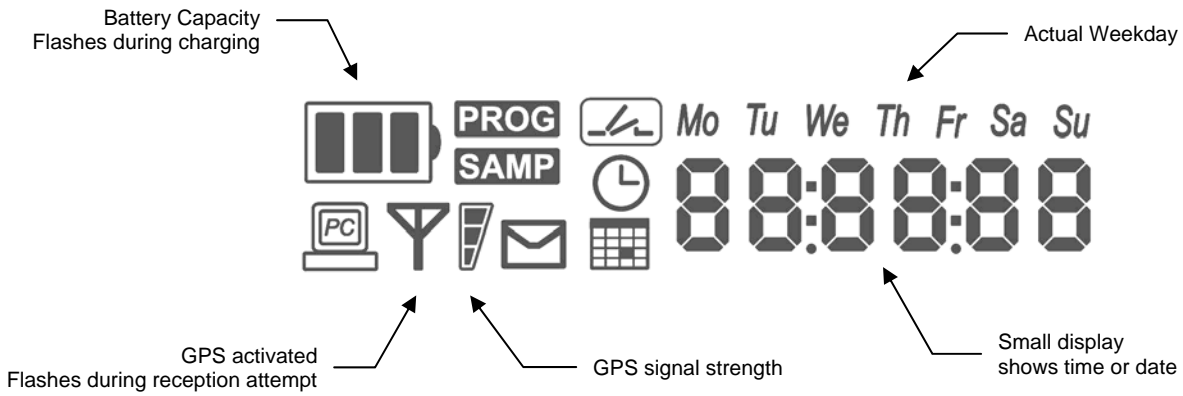
Software Reset

Press the three keys simultaneously for about 5s (display goes blank), to force the MiniLog2 to reset.

START + **▲** + **▼**

No data logging or DCVG data will be lost while the reset.

LCD Symbols Description



Mode

SWITCH

Mode: Switching

Starting-, Stopping and using Pre Set Cycles

The temperature compensated clock of the MiniLog2 allows synchronised switching even when being rarely synchronised.

Typical time difference without synchronising is 20ms per day for 10°C to 30°C.

Start Switching

SWITCH → **START** → **OK**

MiniLog2 starts switching with the last selected switching cycle.

The LED between the two relay sockets (black = mechanic, blue = electronic) lights green when closed, and red for an open contact.

In the LCD display the status of the contact will also be shown.

Stop Switching

SWITCH → **STOP** → **OK**

Choosing a Pre Set cycle

SWITCH → **CYCLE**

▲ / ▼

Choose cycle

CYCLE
1203

12s ON / 3s Off

OK

= Confirmation

Chooseable pre set cycles (On / Off):
01/01, 02/01, 03/02, 04/01, 04/02, 05/05, 06/04,
08/02, 10/10, 12/03, 15/05, 27/03, 25/05, 45/15
and 57/03.

Mode: Switching

Programming Switching Cycle

Beside the fix preset switching cycles, MiniLog2 allows manual programming of the on and off time. The times can be programmed from 0 to 4s with 0.1s, and above with 1s resolution.

Programming Switching Cycle

SWITCH → **CYCLE**

▲ / ▼

Select Cycle "Pro"

CYCLE
PRO

Programming Mode

OK

= Confirmation for Pro Mode

Display of the actual chosen programmed switching cycle

4.0
2.0

4.0s On (flashing)

2.0s Off

▲ / ▼

Change to the On

Programming the On time

0.8
2.0

0.8s On (flashing)

2.0s Off

OK

= Confirmation for the On

▲ / ▼

Change to the Off

Programming the Off time

0.8
0.2

0.8s On

0.2s Off (flashing)

OK

= Confirmation for the Off

Confirmation of the programming

CYCLE
PRO

Programming

is finished

Mode: Switching

Sleep Mode

With activated sleep mode, the switching will be paused in the night (08:00pm till 07:00am) and during the weekend (Saturday and Sunday).

Activate Sleeping Mode

SWITCH → **SLEEP**

▲ / ▼

Choosing Yes / No

SLEEP
YES

Activate

Sleep Mode

OK

= Confirmation

Deactivate Sleeping Mode

SWITCH → **SLEEP**

▲ / ▼

Choosing Yes / No

SLEEP
NO

Deactivate

Sleep Mode

OK

= Confirmation

Mode: Switching

GPS Synchronisation

If the GPS receiver is connected with the GPS input socket, MiniLog2 automatically tries to synchronise itself every 6 hours with the GPS signal.

If a synchronisation at once is required, one can start a GPS synchronisation manually.

Instant GPS Synchronisation

SWITCH → **SYNC**



Selecting Sync Mode
(GPS, Man or Ext)

SYNC
GPS

GPS Sync selected

OK

= Confirmation

If MiniLog2 recognizes a connected GPS receiver, at first the red GPS light will start to flash with a slow rhythm.

As soon as a good reception is assured (this may take 1 to 3 min when the sky is in view) the GPS light turns into green, still flashing in slow rhythm.

If the GPS signal stays sufficient, the GPS synchronisation will be done 20 seconds after the light started to flash in green.

MiniLog2 confirms the reception success by stopping the GPS receiver and flashing the green light in fast rhythm. The LCD shows the GPS antenna symbol and a steady bar graph for the signal quality of the last GPS reception attempt.

If the GPS signal was too weak for a GPS synchronisation, MiniLog2 stops the GPS reception after 10 minutes and the red GPS light flashes shortly to signalize the failed reception. The LCD shows just a GPS antenna symbol, without a bar graph as no signal quality for a failed GPS reception can be acquired.

Mode: Switch

External Synchronisation

For the synchronisation of the MiniLog2 with an external switcher, choose the external synchronisation. The external switcher functions as "Master", while the MiniLog2 reacts on the opening of the external contact as a "Slave".

The relay contact of the external switcher has to be connected in advance between the channel 1 input and GND. Setup the common cycle in advance with the "Switch Cycle" menu.

Selecting External Synchronisation

SWITCH → SYNC

▲ / ▼

Selecting Sync Mode
(GPS, Man or Ext)

SYNC

External Sync selected

EXT

OK

= Confirmation

MiniLog2 is searching for the opening of the contact on channel 1

SRCH

= "Search Sync"

SYNC

As soon as MiniLog2 recognizes the opening of the external contact, the display confirms the synchronisation :

External synchronisation finished

SYNC

= "Sync done"

DONE

Mode: Switch

Manual Synchronisation

For manual synchronisation of the MiniLog2, choose the manual synchronisation mode. The MiniLog2 will react on pressing the "Start" key, and taking this moment as the start of the off-period of the chosen switching cycle.

Selecting Manual Synchronisation

SWITCH → **SYNC**

▲ / ▼

Selecting Sync Mode
(GPS, Man or Ext)

SYNC
MAN

Manual selected

OK

= Confirmation

MiniLog2 waits for
the "START" key to
synchronize itself

PRESS
STRT

= "Press Start"

START

(when switching off)

As soon as MiniLog2 recognizes the press of the "START" key, the synchronisation is finished. The displays confirms the synchronisation:

Manual synchronisation
finished

SYNC
DONE

= "Sync done"

Mode

LOGGER

Mode: Logger

Multimeter

When used as a multimeter, MiniLog2 measures in fixed range only, without auto ranging. The range has to be changed manually.

The input resistance is $10\text{M}\Omega$ for range "Hi" (100V) and "Lo" (10V). For the range "Mic" (100 mV) the input resistance is $250\text{K}\Omega$.

Start Multimeter

LOGGER

Change the displayed Channel



Ch1_{DC} + Ch1_{AC}



Ch2_{DC} + Ch2_{AC}



Ch1_{DC} + Ch2_{DC}



Ch1_{AC} + Ch2_{AC}

Change Range



HI

= Range up to 100V



LO

= Range up to 10V



MIC

= Range up to 0.1V

Stop Multimeter

Press one of the mode keys (i.e.):

LOGGER

Mode: Logger

Data Logging

MiniLog2 uses the ranges pre set in the multimeter mode for data logging. Therefore one has to select the range for each channel before starting the data logging. For example "Lo" for potential logging on channel 1, and "Mic" for shunt voltage drop logging on channel 2. See also section "Mode Multimeter", "Change Range".

For the ranges "Hi" and "Lo" auto range is used during data logging. MiniLog2 will choose the best range automatically for each channel separately. Only if the range "Mic" is pre set, no auto ranging will take place. Therefore an overflow in range "Mic" (> 100 mV), will not result in changing the range up to "Lo".

The input resistance is $10\text{M}\Omega$ for range "Hi" (100V) and "Lo" (10V).
For the range "Mic" (100 mV) the input resistance is $250\text{K}\Omega$.

Setup channels in the multimeter mode

LOGGER

Select the displayed channel and its range as described in Mode "Multimeter" in advance for the data logging process.

Setup Sampling Rate

RATE

rate shown in top right corner



slower rate



faster rate

1 ms	1000 samplings / s (not yet activated, soon to be released)
100 ms	10 samplings / s
500 ms	2 samplings / s
1000 ms	1 samplings / s
...	
60000 ms	1 sampling every 60 s

Start Data Logging

START



OK

Note:
Starting the data logging will delete any old data logging in memory

LOG
99,9

Free left memory shown,
in exchange with actual values

Stop Data Logging

STOP

Key pressed > 3s

Mode

DCVG

Mode DCVG

DCVG- or CIPS measurement

Electrodes Setup

For DCVG measuring, one connects channel 2 (red) and GND (blue) only.

For CIPS, the channel 1 takes the test point potential, the channel 2 takes the gradient electrode, and the GND is connected with the electrode above the pipe.

Note: For every measuring point, both channels with their on- and off-values are stored. Setting up the "Measuring Mode" (see below) just changes the display, not the way the data is stored.

Start DCVG/CIPS

DCVG → **START** → **OK**

Delete all previous DCVG/CIPS measuring

START (Key pressed > 3 s)

Setup Display Mode

MODE

DIFF

= DCVG in high resolution
1st line : actual measured gradient
2nd line : diff. between on and off

LO

= DCVG bar graph (lower range)
1st line : actual measured gradient
2nd line : bar graph displaying
on - off diff., 1 bar = 0.2 mV

HI

= DCVG bar graph (higher range)
1st line : actual measured gradient
2nd line : bar graph displaying
on - off diff., 1 bar = 2 mV

POT

= CIPS displays potential and gradient
1st line : actual measured potential
2nd line : actual measured gradient

Storing the actual displayed values

with the keyboard

OK

Stores the on- and off-values of both channels together with the actual GPS coordinates and displays thereafter shortly the amount of already taken measuring points

i.e.:

POINT
12

with the OK button
mounted on the electrode

If the OK button (accessory of the metal carrying kit) has been connected to the "Feature" connector, a press of the OK button will store the data as if the "OK" key of the keyboard has been pressed.

Stopping DCVG / CIPS

Press one of the mode keys, i.e.:

DCVG

Important:

Stopping and re-starting the DCVG/CIPS mode is recommended if you change the measuring direction, as the calculation of the meter difference out of the GPS data needs to be re-arranged after each direction change.

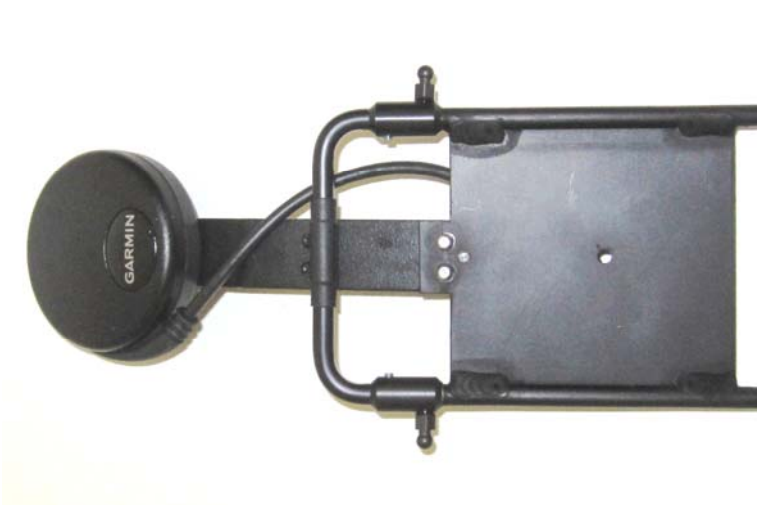
Mode: DCVG

Accessories for the DCVG survey

Metal carrying kit with "Spring" strap and mounted MiniLog2



GPS- und MinLog2 mounting kit



OK button mounted on electrode



Measuring Ranges and Accuracy

DC - Inputs

2 Channels

Name	Range	Resolution	Accuracy
Hi	100 V > X > 50 V	0,1 V	± 1,0% ± 0.2 V
	50 V > X > 0 V	0,01 V	± 0,5% ± 0,02 V
Lo	10 V > X > 0.2 V	1 mV	± 0,5% ± 2 mV
	200 mV > X > 0 mV	0,1 mV	± 0,5% ± 0,5 mV
Mic	100 mV > X > 10 mV	10 µV	± 0,5% ± 10 µV
	10 mV > X > 0 mV	1 µV	± 0,5% ± 10 µV

Note: Alle definitions for negative and positive values valid

AC - Inputs

2 Channels

Name	Range	Resolution	Accuracy
Hi	100 V > X > 70 V	0,1 V	± 5,0% ± 1.0 V
	70 V > X > 0 V	0,1 V	± 1,0% ± 0.1 V
Lo	10 V > X > 0.2 V	0,01 V	± 1,0% ± 20 mV
	200 mV > X > 0 mV	0,01 V	± 1,0% ± 20 mV
Mic	100 mV > X > 10 mV	1 mV	± 1,0% ± 2 mV
	10 mV > X > 0 mV	0,1 mV	± 1,0% ± 0.5 mV

Frequency 16 Hz < X < 100 Hz

Duration of Datalogging

(without / **with** regards to battery duration)

Sampling Rate	4 Channels (2 x DC, 2 x AC)	2 Channels (1 x DC, 1 x AC)	1 Channel (1 x DC)
	300.000 measurements	600.000 measurements	1.200.000 measurements
1 ms			20 min
100 ms	8h 20min	16h 40min	32h 20min
500 ms	41h 40min	3.5 d	7 d
1 s	3.5 d	7 d	14 d / 10 d
2 s	7 d	14 d / 10 d	28 d / 10 d
5 s	17 d / 15 d	34 d / 15 d	69 d / 15 d
10 s	34 d / 19 d	69 d / 19 d	138 d / 19 d
30 s	104 d / 75 d	208 d / 75 d	416 d / 75 d
60 s	208 d / 150 d	416 d / 150 d	832 d / 150 d

Note:

The sampling rate 1ms has not yet been activated:

The sampling with disactivated channels for doubling the duration has not yet been activated.

Battery Duration

Mode : Data Logging

Sampling Rate	Battery Duration
1 ms	4 d
100 ms	8 d
500 ms	9 d
1 s	10 d
2 s	10 d
5 s	15 d
10 s	19 d
30 s	75 d
60 s	150 d

Mode : Switching

Cycle On / Off	Mechanic Relay		Elektronic Relay	
	with GPS	w/o GPS	with GPS	w/o GPS
0,8 / 0,2	9 d	9 d	30 d	35 d
2 / 1	10 d	10 d	25 d	30 d
4 / 1	14 d	15 d	30 d	35 d
4 / 2	20 d	22 d	25 d	30 d
12 / 3	30 d	36 d	30 d	35 d
15 / 5	30 d	36 d	30 d	35 d
27 / 3	30 d	36 d	35 d	40 d
57 / 3	30 d	36 d	35 d	40 d

Mode : DCVG / CIPS Survey

Type	Duration	Measureings
	with GPS	with GPS
DCVG	20 h	10000
CIPS (Pot + Gradient)	20 h	10000

Technical Data

Input Resistance	:	> 10 M Ω (Microvolt 250 K Ω)
Filters (only for DC)	:	16 Hz = 60 dB, 50 Hz = 80 dB, 100 Hz = 100 db
Switching Power	:	15 A 100 VDC / 70 VAC (mechanic) 18 A 100 VDC / 70 VAC (electronic)
Time accuracy	:	< 10 ms / 24h (-20°C - 70°C, with GPS reception) < 30 ms / 24h (10°C - 30°C, w/o GPS reception) < 100 ms / 24h (-20°C - 70°C, w/o GPS reception)
Battery	:	Li-Ion, 3.7V, 1900 mAh
Charging	:	über USB 5V, 500mA
Temperature	:	- 20°C till 70°C Data Logging - 5°C till 70°C LCD Display
Humidity	:	0 % - 100%
Protection	:	IP 68
Size	:	148 x 68 x 42 mm
Weight	:	355g

Item Numbers

MiniLog2	:	with mechanic relay	130111
complete with USB cable, 230V and 12V USB charger		with electronic relay	130121
Accessories	:	GPS Receiver	130131
		Combined device and accessories bag	130141
for DCVG surveys	:	Metal carrying kit with "Sprint" carrying strap and OK button for the reference electrode	130161
for rectifier installations	:	GPS cable extension 5m	160191
		DIN rail kit	130171