



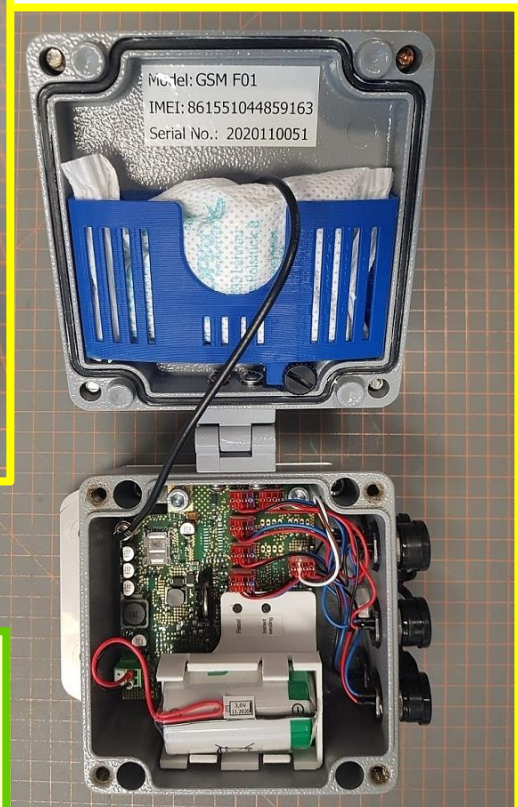
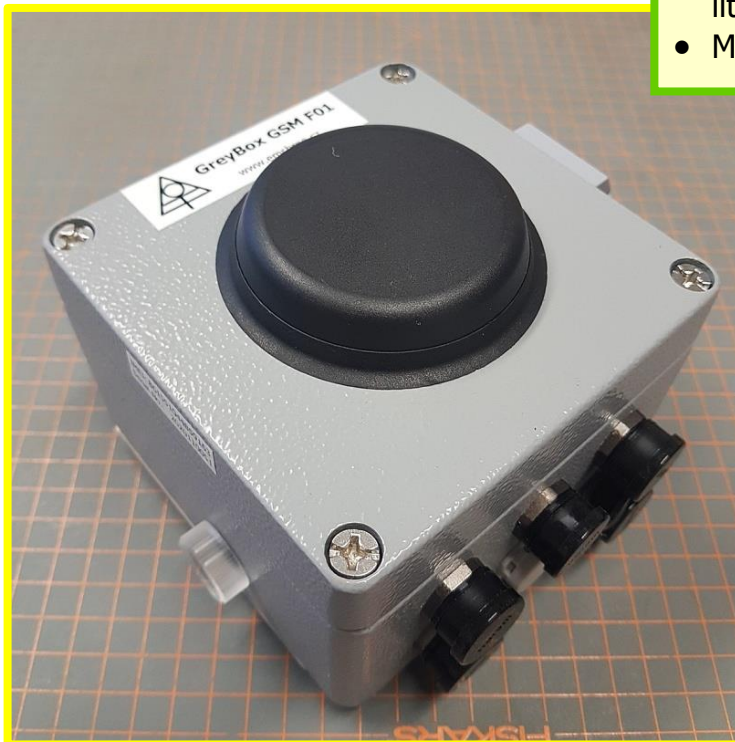
**EMS Brno**

**Data Acquisition Environment**  
Hardware – Software – Cloud application  
[www.emsbrno.cz](http://www.emsbrno.cz)

## Customer-tailored Datalogger GreyBox GSM

### Main features:

- General purpose datalogger intended for collecting data from analog and SDI-12 sensors and for on-line sending via GSM network to EMScloud application
- Ready for harsh environment
- Powered from internal primary lithium cell SAFT LSH20
- Manufactured by EMS



### Specification:

- Memory capacity ca 200,000 values
- Self-adjusting GPRS modem
- Battery saving mode active under -8°C (only measuring and storing; no sending)
- Configuration and data processing fully supported by Mini32 software
- Size 120 x 120 x 100 mm, IP rating IP 66
- Weight 1.5 kg

# GreyBox GSM

GreyBox GSM is datalogger intended for measurement and on-line transmitting data in GSM network to manufacturer cloud application. It contains also a backup memory for ca 200 000 values. This datalogger composes the base of customer-tailored versions for certain measuring purpose. Those versions are configured with respect to connected sensors and time period of data collection makes compromise between battery lasting and data density. Set-up of each version ensures the functionality of the system and it is not recommended to change it without prior consultation with the supplier.

## General specification

Memory capacity	512 kB (2 bytes per value)
SDI-12 ports	max 2 (up to 10 sensor each)
Frequency channels	max 4
Pulse channels	max 2
Voltage channels	max 2
Internal temperature sensor	YES
Internal humidity sensor	YES
Available energy countdown	YES
Measuring interval	1 min up to 4 hrs (limited by number and type of sensors)
Averaging interval	1 min up to 4 hrs (limited by number and type of sensors)
Operating range	-40 to 60 °C
Exciting SDI-12 sensors voltage	9 V (adj. 6 – 15 V)
Modem activity	each 2, 4, 8 or 12 hrs in daily cycles
Power supply	SAFT LSH20 (with connector MRT9-2); 3.6 V; 13 Ah
Protection	IP 66
Weight	1.5 kg
Size (L x W x H)	120 x 120 x 100 mm

## Maintenance notes

Info about datalogger status via LED (response to magnet):

**RED + GREEN** 3 times

- in 0.5 sec interval – correct status

**RED** 5 times

- in 0.1 sec interval – low battery voltage

**GREEN** 5 times

- in 0.1 sec interval – logger time issue, computer needed for further inspection

**RED** alternating with **GREEN** 5 times

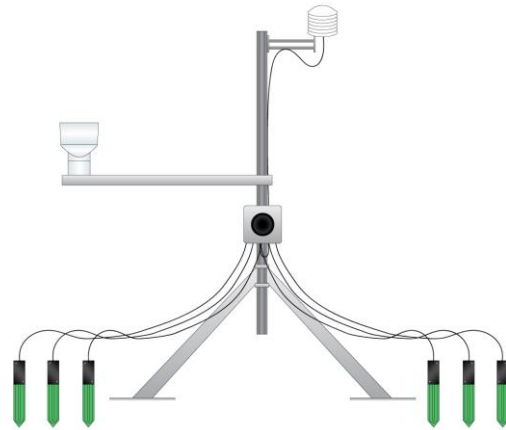
- in 0.1 sec interval – memory issue, computer needed for further inspection

## Software

Mini32 universal software running under Windows® 7, 8 and 10. The software assures all necessary operations – system setup, data saving, data processing. It includes basic statistic features, creates and prints graphs and exports data to different file formats.

# GreyBox GSM F04

GreyBox GSM F04 is the version equipped with rain gauge (with pulse output), six soil water content and temperature sensors (SMT100) and air temperature and humidity sensor (EMS33S). Data visualization, archiving and downloading is fully supported by EMScloud Internet application.



## Specification GreyBox GSM F04

SDI-12 sensors	7 (14 variables)
Pulse sensors	1
Measuring interval	1 h
Averaging interval	1 h
Warm-up	0 sec
Operating range	-40 to 60 °C
Modem activity	each 12 hrs
Backup memory lasting	9 months
Battery lasting	24 months

## Factory default configuration - guaranteed two-year battery lifetime

PC Time: 2.2.2021 12:58:18

Device type: GSM  
Device code 53

Periods: measuring 1 h, storing 1 h  
Warm-up: 0 s, 0 s

ON/off

ON

Data sending  
each 12 h hours

#	Type	ON/off	Range	Gauge	Description
1.	Pulse	ON	2500 mV	$Y = A+B*Ps$	Precipitation [mm]
2.	Voltage	ON	2500 mV	Supply voltage [V]	Supply Voltage [V]
3.	Temperature	ON	16 bit	Temperature [°C]	Internal Temp. [deg.C]
4.	Humidity	ON	16 bit	Humidity [%]	Internal Humidity [%]
5.	Internal	ON	100kHz	Available energy [%]	Available Energy [%]
6.	SDI-12 1(1)/1	ON	---	SWC [%] SMT100	SWC [%] 1/1
7.	SDI-12 1(1)/1	ON	---	Sensor T [°C] SMT100	Sensor T [°C] 1/1
8.	SDI-12 2(2)/1	ON	---	SWC [%] SMT100	SWC [%] 2/1
9.	SDI-12 2(2)/1	ON	---	Sensor T [°C] SMT100	Sensor T [°C] 2/1
10.	SDI-12 3(3)/1	ON	---	SWC [%] SMT100	SWC [%] 3/1
11.	SDI-12 3(3)/1	ON	---	Sensor T [°C] SMT100	Sensor T [°C] 3/1
12.	SDI-12 4(4)/1	ON	---	SWC [%] SMT100	SWC [%] 4/1
13.	SDI-12 4(4)/1	ON	---	Sensor T [°C] SMT100	Sensor T [°C] 4/1
14.	SDI-12 5(5)/1	ON	---	SWC [%] SMT100	SWC [%] 5/1
15.	SDI-12 5(5)/1	ON	---	Sensor T [°C] SMT100	Sensor T [°C] 5/1
16.	SDI-12 6(6)/1	ON	---	SWC [%] SMT100	SWC [%] 6/1
17.	SDI-12 6(6)/1	ON	---	Sensor T [°C] SMT100	Sensor T [°C] 6/1
18.	SDI-12 7(7)/1	ON	---	Temperature [°C] EMS33S	Air Temperature [°C] 7/1
19.	SDI-12 7(7)/1	ON	---	Humidity [%] EMS33S	Air humidity [%] 7/1