



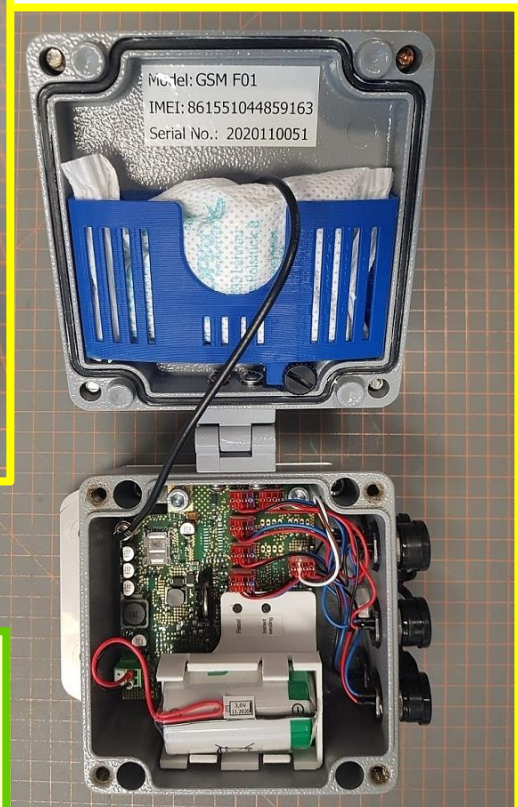
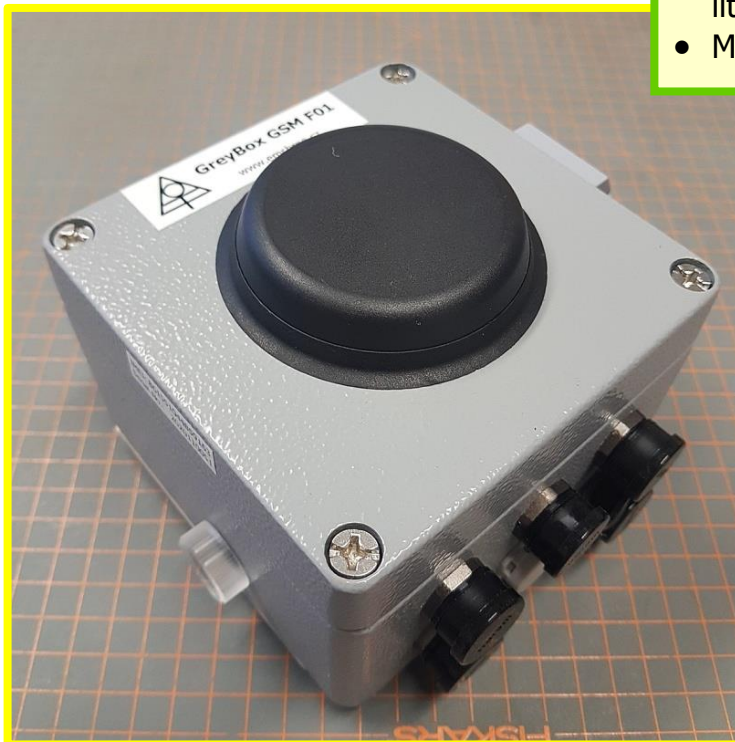
EMS Brno

Data Acquisition Environment
Hardware – Software – Cloud application
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

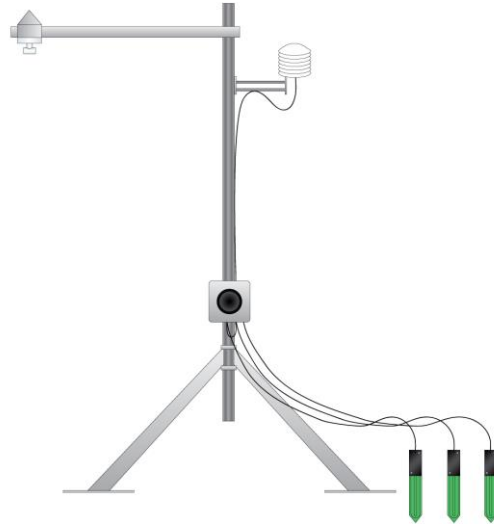
- in 0.1 sec interval – memory issue, computer needed for further inspection

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 F01

GreyBox GSM F01 is the version equipped with ultrasonic depth sensor (Judd), air temperature and humidity sensor (EMS33S) and three sensors of soil water content and temperature (SMT100). Data visualization, archiving and downloading is fully supported by EMScloud Internet application.



Specification GreyBox GSM F01

SDI-12 sensors	4 (8 variables)
Voltage sensors	1
Measuring interval	30 min
Averaging interval	30 min
Warm-up	3 sec
Operating range	-40 to 60 °C
Modem activity	each 12 hrs
Backup memory lasting	12 months
Battery lasting	12 months

Factory default configuration - guaranteed one-year battery lifetime

PC Time: 13.1.2021 16:29:13	Device type: GSM F01	Periods: measuring 30 m	Warm-up: 3 s
<input type="button" value="ON/off"/> <input checked="" type="button" value="ON"/>	Device code SD	storing 30 m	3 s

Data sending

each 12 h hours

#	Type	ON/off	Range	Gauge	Description
1.	Voltage	ON	2500 mV	$Y = A+B*V+C*V^2$	Sensor/surface dist. [cm]
2.	Voltage	ON	---	Supply voltage [V]	Supply Voltage [V]
3.	Temperature	ON	---	Temperature [°C]	Internal Temper. [deg.C]
4.	Humidity	ON	---	Humidity [%]	Internal Humidity [%]
5.	Internal	ON	---	Available energy [%]	Available batt. energy [%]
6.	SDI-12 1(1)/1	ON	---	Temperature [°C] EMS33S	Air Temperature [°C] 1/1
7.	SDI-12 1(1)/1	ON	---	Humidity [%] EMS33S	Air humidity [%] 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