



Finapp

“Life from cosmos,,

User Manual

FINAPP SDI-12 PROTOCOL

Finapp probes data logging using SDI-12
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1. Finapp probes data logging using SDI-12

The following information apply to firmware versions 4.0.13 or higher.

1.1 SDI12 module

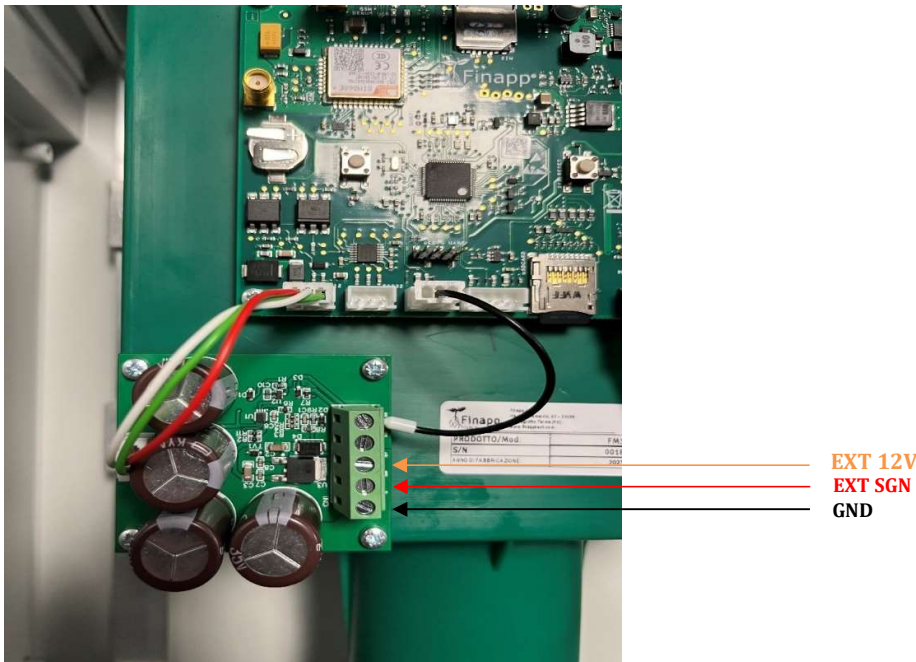
Finapp probe has a SDI12 communication protocol. In order to be able to use it you need the additional SDI12 module.

1.1.1 Cable

There are spikes of absorption current up to 1A and up to some tens of milliseconds long, so it's recommended to use a 1mm² cable for a maximum length of 50 meters. For greater distance it's recommended to use a bigger size of the cable.

1.1.2 Module connection

Starting from the bottom of the terminal block, we need to connect the ground, the signal and the 12V supply cable (see picture below).



1.2 Communication protocol

Finapp follows SDI12 protocol as standard guaranteed by SDI12 Support Group.

1.2.1 Send Identification

The default address can be changed only by producer. If you need different address, please ask to Finapp personnel.

| <i>Command description</i> | <i>Command</i> | <i>Probe answer</i> |
|----------------------------|----------------|---|
| Send Identification | al! | Allccccccmmmmmmvvvxx...xxx<CR><LF> |

| | |
|------------------|--|
| a | sensor address [default "F"] |
| ll | SDI version [default "14"] |
| ccccccc | vendor [default "Finappll"] |
| mmmmmm | model [default "Fprobe"] |
| vvv | major firmware version [default "003"] |
| xxx...xxx | last 13 chars of the IMEI address |

1.3 Master Information

Master information are data measured by the MASTER board, refers mainly to atmospheric data and the status of the battery.

| <i>Command description</i> | <i>Command</i> | <i>Probe answer</i> |
|----------------------------|----------------|----------------------------------|
| Master Information | aM! | atttn<CR><LF> |

| | |
|------------|--|
| a | sensor address [default "F"] |
| ttt | time to have the data ready [default "1"s] |
| n | number of measurements [currently "6"] |

| <i>Command description</i> | <i>Command</i> | <i>Probe answer</i> |
|----------------------------|----------------|--|
| Master Data | aD0! | a<values><CR><LF> |

| | |
|-----------------------|---|
| a | sensor address [default "F"] |
| <values> | 1) measurement progressive counter |
| | 2) battery voltage [mV] |
| | 3) pressure [Pa] |
| | 4) temperature on board [m°C] |
| | 5) external temperature (optional SHT20) |
| | 6) external air humidity (optional SHT20) [mRH] |

1.4 Finapp sensor Information

This command retrieves raw data from different Finapp sensors used in the same installations. N refers to the Finapp ID (N = 1,2,3,4 = Finapp ID), the number of Finapp installed depends on application. Typically, one Finapp is used for soil moisture applications or 2 Finapp are used for SWE applications.

Command description *Command* *Probe answer*

Finapp Information **aMN!** **atttn<CR><LF>**

| | |
|------------|---|
| a | sensor address [default "F"] |
| ttt | time to have the data ready [default "1" s] |
| n | number of measurements [currently "5"] |

Command description *Command* *Probe answer*

Finapp Data **aD0!** **a<values><CR><LF>**

| | |
|-----------------------|--|
| a | sensor address [default "F"] |
| <values> | 1) measurement progressive counter |
| | 2) HV voltage [mV] ! NOT CALIBRATED |
| | 3) acquisition time [ms] |
| | 4) number of neutrons |
| | 5) number of muons |

1.5 Elaborated Data

This command returns the elaborated data from the Finapp sensors (Soil Moisture or Snow Water Equivalent).

N.B. By default the soil moisture is gravimetric (g/g), if the bulk density is provided the output will be Volumetric (m^3/m^3).

Command description *Command* *Probe answer*

Water measurements **aM5!** **atttn<CR><LF>**

| | |
|------------|---|
| a | sensor address [default "F"] |
| ttt | time to have the data ready [default "1" s] |
| n | number of measurements [currently "3"] |

| <i>Command description</i> | <i>Command</i> | <i>Probe answer</i> |
|----------------------------|----------------|---------------------|
|----------------------------|----------------|---------------------|

| | | |
|-------------------|-------------|--|
| Water Data | aD0! | a<values><CR><LF> |
|-------------------|-------------|--|

| | | |
|-----------------------|--|-----------------|
| a | sensor address [default "F"] | |
| <values> | 1) measurement progressive counter | |
| | 2) soil moisture [fraction*1000] (123 = 12.3%) | |
| | 3) SWE [mm*10] | (123 = 12.3 mm) |

WARNING: the measurement progressive counter changes when new measurements are available. Reading with the same counter will be just repeated readings