

# ENVIROPRO<sup>®</sup> CONFIGURATION UNIT - EPCU



## MANUAL

Version 1.13

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### Warranty

Entelechy Pty Ltd offers a 12 month, return-to-factory warranty on this product. The warranty applies to hardware and firmware defects only. The warranty does not cover acts of misuse by the user or third parties, including misuse arising from failure to install or operate a system or its components in accordance with relevant system documentation, or failure to seek advice from Entelechy regarding correct installation or operation of a system or its components.

This product is guaranteed against faulty workmanship or defective material for a period of 1 (one) year from date of purchase.

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## MANUAL

### 2. Introduction

Thank you for purchasing an EnviroPro<sup>®</sup> Configuration Unit (EPCU) from Entelechy. This guide tells you how to use and operate your EPCU correctly.

### 3. Equipment Required

- 1 x EnviroPro<sup>®</sup> Configuration Unit V1.13<sup>(1)</sup>
- 1 x USB cable<sup>(2)</sup>
- 1 x 3.5mm stereo plug to 3 x Alligator cable assembly<sup>(3)</sup>
- 1 x EnviroPro<sup>®</sup> Soil Moisture Probe
- 1 x PC / Laptop running a Terminal Emulator



Figure 1



Figure 2



Figure 3



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## 4. Terminal Emulator

The EPCU requires a Terminal Emulator to be installed on a computer or laptop. There are many Terminal Emulators available from various vendors.

For example: <https://sites.google.com/site/terminalbpp/>  
<http://ttssh2.osdn.jp/index.html.en>  
<http://www.commfront.com/commfront-downloads.htm>

## 5. Terminal Emulator Settings

Open the Terminal Emulator. (The appearance of the Terminal screen will vary depending on the software being used). Check the settings of the Terminal Emulator.

**COM PORT** : Ensure correct port is selected  
**BUAD RATE** : 9600  
**DATA BITS** : 8  
**STOP BITS** : 1  
**HANDSHAKING** : None  
**DATA FORMAT** : ASCII

**NOTE:** Some terminal emulators require the 'Add line feed to carriage return' enabled (CR+LF) in order to display commands sent and responses received correctly.

<input type="button" value="Connect"/> <input type="button" value="ReScan"/> <input type="button" value="Help"/> <input type="button" value="About.."/> <input type="button" value="Quit"/>	<b>COM Port</b> <input type="text" value="COM5"/> <input type="button" value="COMs"/>	<b>Baud rate</b> <input type="radio"/> 600 <input type="radio"/> 14400 <input type="radio"/> 57600 <input type="radio"/> 1200 <input type="radio"/> 19200 <input type="radio"/> 115200 <input type="radio"/> 2400 <input type="radio"/> 28800 <input type="radio"/> 128000 <input type="radio"/> 4800 <input type="radio"/> 38400 <input type="radio"/> 256000 <input checked="" type="radio"/> 9600 <input type="radio"/> 56000 <input type="radio"/> custom	<b>Data bits</b> <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input checked="" type="radio"/> 8	<b>Parity</b> <input checked="" type="radio"/> none <input type="radio"/> odd <input type="radio"/> even <input type="radio"/> mark <input type="radio"/> space	<b>Stop bits</b> <input checked="" type="radio"/> 1 <input type="radio"/> 1.5 <input type="radio"/> 2	<b>Handshaking</b> <input checked="" type="radio"/> none <input type="radio"/> RTS/CTS <input type="radio"/> XON/XOFF <input type="radio"/> RTS/CTS+XON/XOFF <input type="radio"/> RTS on TX <input type="checkbox"/> invert
	<b>Settings</b> <input type="button" value="Set font"/> <input type="checkbox"/> Auto Dis/Connect <input type="checkbox"/> Time <input type="checkbox"/> Stream log <input type="text" value="custom BR"/> <input type="button" value="RxClear"/> <input type="button" value="ASCII table"/> <input type="button" value="Scripting"/> <input type="checkbox"/> AutoStart Script <input type="checkbox"/> CR=LF <input type="checkbox"/> Stay on Top <input type="text" value="9600"/> <input type="text" value="27"/> <input type="button" value="Graph"/> <input type="button" value="Remote"/>					
<b>Receive</b> <input type="button" value="CLEAR"/> <input type="button" value="Reset Counter"/> <input type="text" value="13"/> Counter = 131 <input type="radio"/> HEX <input type="checkbox"/> Dec <input type="checkbox"/> Bin <input checked="" type="radio"/> ASCII <input type="checkbox"/> Hex <input type="button" value="StartLog"/> <input type="button" value="StopLog"/> <input type="button" value="REQ_RES"/>						

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## 6. Connecting the EPCU to a PC or Laptop

Connect the EPCU to the computer using the USB cable supplied to any available USB port. The EPCU will initialise a self-test after which the Green Idle LED will flash slowly indicating the EPCU is now ready.

## 7. Required USB Drivers

A USB driver may be required if using the EPCU first time. Please allow the computer to install automatically or download and install the USB driver manually. Drivers are can be downloaded at:  
<https://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx>

## 8. Connecting the EPCU to the EnviroPro<sup>®</sup> Soil Moisture Probe

Ensure the 3.5mm stereo plug is fully inserted into the EPCU 3.5mm socket. Connect the 3 x alligator clips matching each colour of each alligator clips to the coloured wires on the EnviroPro<sup>®</sup> soil probe.

**NOTE: DO NOT connect or disconnect the probe from the EPCU while the RED Powered LED or ORANGE Active LEDs are on. Only connect and disconnect when the GREEN Idle LED is flashing slowly**

## 9. EnviroPro<sup>®</sup> Wiring

Function	EnviroPro <sup>®</sup> Wiring
PWR [+6 V to +15 V]	Red
DATA	Blue
GND [0 V]	Black
Not used	Yellow

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## 10. Using the Terminal Emulator

Press “Connect” on the Emulator Terminal.

## 11. EPCU Firmware version

**NOTE: Send commands (shown in red)**  
**Responses (shown in blue)**

To check the EPCU firmware version type “ ? ” (without quotation marks)  
The following will be returned showing the EPCU firmware version and firmware date.

EnviroPro<sup>®</sup> CONFIG  
V 1.13, (2015.08.31)

**NOTE: If you are using an earlier version please return to your supplier or Entelechy Pty. Ltd. for a free upgrade. This manual is written for EPCU V1.13 only.**



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## 12. Probe ID

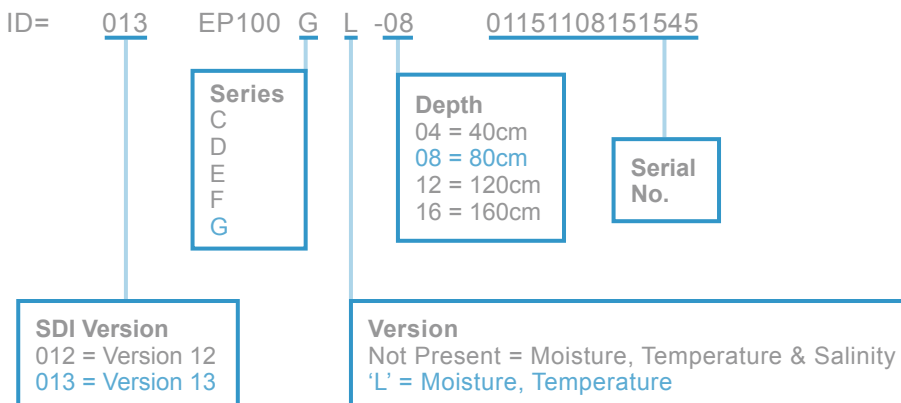
Press the **space** bar.  
The following response will be received.

CHECKING PROBE, PLEASE WAIT  
SDI-12 MODE, A=1, ID=113EP100GL-08 01151108151545  
Options:  
0=CHANGE\_ADDRESS 1=MEASURE 2=UPGRADE 3=EXPLORE\_SDI-12\_LINE 4=ADVANCED

## 13. Probe ID Number Breakdown

A= address of probe

ID= Type of probe connected and unique identification serial number



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## 14. Changing the probe address

To change the address of the EnviroPro<sup>®</sup> Probe From the main menu select “ 0 ” and enter the required address number.  
For example “ 1 ”

Options:

0=CHANGE\_ADDRESS 1=MEASURE 2=UPGRADE 3=EXPLORE\_SDI-12\_LINE 4=ADVANCED

CHANGE ADDRESS

ADDRESS=1

CHECKING PROBE PLEASE WAIT

SDI-12 MODE, A=1, ID=113EP100GL-08 01151108151545

A=1 showing the probe address changed to 1



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## 15. Probe measurements

To take a measurement from the main menu select “ 1 ”

Options: 0=CHANGE\_ADDRESS 1=MEASURE 2=UPGRADE 3=EXPLORE\_SDI-12\_LINE 4=ADVANCED

The probe will output moisture, salinity\* and temperature in C° and F° measurements from each sensor.

\*Salinity readings will be 0 for lite version (NO EC)

1C!  
moisture  
01: 001.62 %VWC  
02: 000.95 %VWC  
03: 000.79 %VWC  
04: 000.41 %VWC

1C1!  
salinity  
01: 00.000 dS/m ECe  
02: 00.000 dS/m ECe  
03: 00.000 dS/m ECe  
04: 00.000 dS/m ECe

1C2!  
temperature  
01: 025.81 degC  
02: 025.84 degC  
03: 025.70 degC  
04: 025.96 degC

1C5!  
temperature  
01: 078.19 degF  
02: 078.26 degF  
03: 077.99 degF  
04: 078.46 degF

Example of 4-sensor probe reply

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## 16. Upgrade the EnviroPro<sup>®</sup> with EC

**NOTE:** An EC upgrade key will be required. Please obtain the ID number from each probe and contact your supplier to purchase an EC upgrade key. Each probe will require its own unique EC upgrade key.

Once the ID number has been provided to Entelechy an EC upgrade key that is unique to that probe will be supplied. For example:

0801151108151545 ; 16 digit probe ID  
KEY 64429 ; EC key for upgrade via EPCU  
XKEY FBADE841 ; EC Xkey for remote upgrade\* (\*for probes version G or later)

To upgrade the probe with EC (salinity) ensure the EPCU and probe are connected as described at the beginning of this manual. From the main menu select option “ 2 ” and enter the EC key supplied, for example “ 64429 ”

Options:

0=CHANGE\_ADDRESS 1=MEASURE 2=UPGRADE 3=EXPLORE\_SD12\_LINE 4=ADVANCED

Serial No.0801151108151545

KEY: 64429

UPGRADE 0801151108151545

PLEASE WAIT

EP100G-08 01151108151545-1

CHECKING PROBE, PLEASE WAIT

SDI-12 MODE, A=1, ID=113EP100G-08 01151108151545

CHECKING PROBE PLEASE WAIT

SDI-12 MODE, A=1, ID=113EP100G-08 01151108151545

SUCCESS

The new ID is EP100G-08 confirms the probe is now a G = Full EC version (GL = Lite (no EC) version

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## Remote Upgrade - Version G Only

The following SDI-12 extended commands enable remote upgrade of the EnviroPro sensor to measure EC using telemetry/loggers that support transparent mode.

For example:

ID=013EP100GL-0801151108151545 ; probe ID  
XKEY FBADE841 ; EC Xkey for remote upgrade (supplied by Entelechy)

In transparent mode send the extended command **0XUFBADE841!** via the logger or telemetry system. Where "0" is the probe address followed by the command "XU" and then the 8 digit Xkey. (Note the upgrade Xkey is not case sensitive).

Once transmitted the probe will then be upgraded to a full EC version and will return the following message:

**01 PASS**

The new ID will display 013EP100G-0801151108151545 confirming the probe has been successfully upgraded with EC measurements enables (G = Full EC version).

If the message 00 FAIL is received the probe ID will still show "GL" meaning the probe has not been upgraded with EC.



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## 17. Testing upgraded EnviroPro<sup>®</sup>

To test the EC upgrade hold the probe with one hand or place the probe into a saline solution. While holding the probe with one hand or while in a saline solution from the main menu select “ 1 ” to measure.

Options:

0=CHANGE\_ADDRESS 1=MEASURE 2=UPGRADE 3=EXPLORE\_SDI-12\_LINE 4=ADVANCED

In the example below the probe was being held by hand at the very end where the 8th sensor is located (80cm depth).

Note the value at sensor 08 which shows some salinity was measured off the hand

1C1!

salinity

01: 00.000 dS/m ECe

02: 00.000 dS/m ECe

03: 00.000 dS/m ECe

04: 00.000 dS/m ECe

05: 00.000 dS/m ECe

06: 00.000 dS/m ECe

07: 00.000 dS/m ECe

08: 00.732 dS/m ECe

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## 18. Explore SDI-12 Line

To explore and list all SDI-12 units connected to the SDI-12 data line select option “ 3 ” from the main menu.

Options:

0=CHANGE\_ADDRESS 1=MEASURE 2=UPGRADE 3=EXPLORE\_SDI-12\_LINE 4=ADVANCED

The following example found one EnviroPro<sup>®</sup> soil probe at address 1

```
0! 1!  
113EP100G-08 01151108151545  
2! 3! 4! 5! 6! 7! 8! 9! A! B! C! D! E! F! G! H! I! J! K! L! M! N! O! P! Q! R! S! T! U! V! W! X!  
Y! Z! a! b! c! d! e! f! g! h! i! j! k! l! m! n! o! p! q! r! s! t! u! v! w! x! y! z!
```

CHECKING PROBE, PLEASE WAIT

SDI-12 MODE, A=1, ID=113EP100G-08 01151108151545

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## 19. Advanced Options

From the main menu select option “ 4 ”

Options:

0=CHANGE\_ADDRESS 1=MEASURE 2=UPGRADE 3=EXPLORE\_SDI-12\_LINE 4=ADVANCED

A new menu called ADVANCED Options will be displayed

ADVANCED Options:

0=TRANSPARENT\_MODE 1=SDI-12\_or\_CMOS 2=NINE\_SENSORS 3=DEMO\_SET 4=VERSION\_D\_FIX

## 20. Transparent Mode

In transparent mode any valid SDI-12 command can be entered via a keyboard.

For more information regarding the SDI-12 protocol and standard please visit:

[http://www.sdi-12.org/current%20specification/SDI-12\\_version1\\_3%20January%202028,%202016.pdf](http://www.sdi-12.org/current%20specification/SDI-12_version1_3%20January%202028,%202016.pdf)

Select option “ 4 ” from the main menu

Options: 0=CHANGE\_ADDRESS 1=MEASURE 2=UPGRADE 3=EXPLORE\_SDI-12\_LINE 4=ADVANCED  
w! x! y! z!

Select “ 0 ” for transparent mode or when finished press “ Q ” to exit

ADVANCED Options: 0=TRANSPARENT\_MODE 1=SDI-12\_or\_CMOS 2=NINE\_SENSORS 3=DEMO\_SET 4=VERSION\_D\_FIX

TRANSPARENT\_MODE , press 'Q' to exit



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## 21. Examples of SDI-12 commands

Below are examples of SDI-12 commands that can be sent while in transparent mode.

**NOTE: Send commands (shown in red)**  
**Responses (shown in blue)**

<b>?!</b> 1	; query probe address ; probe response (Address = 1)
<b>1!</b> 113EP100G-08 01151108151545	; request probe ID ; probe response
<b>1A0!</b> 0	; change probe address from 1 to 0 ; probe response (Address = 0)
<b>0C!</b> 000208	; measure moisture with salinity compensation ; time taken 0002 seconds, 08 sensors measured
<b>0D0!</b> 0+001.84+001.52+001.58+001.61+000.96+000.04+000.00+000.05	; read probe data ; eight moisture measurements as a percentage % of VWC returned
<b>0C1!</b> 000208	; measure salinity ; time taken 0002 seconds, 08 sensors measured
<b>0D0!</b> 0+00.000+00.000+00.000+00.000+00.000+00.000+00.000+00.000	; read probe data ; eight salinity measurements in ECe, dS/m returned

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## 21. Examples of SDI-12 commands (cont.)

Below are examples of SDI-12 commands that can be sent while in transparent mode.

**NOTE: Send commands (shown in red)**  
**Responses (shown in blue)**

<p><b>0C2!</b> 000208</p>	<p>; measure temperature in °C ; time taken 0002 seconds, 08 sensors measured</p>
<p><b>0D0!</b> 0+028.06+027.97+027.90+028.08+029.05+028.77+028.05+027.02</p>	<p>; read probe data ; eight temperature measurements in °C returned</p>
<p><b>0C3!</b>  000208</p>	<p>; measure moisture without salinity compensation ; time taken 0002 seconds, 08 sensors measured</p>
<p><b>0D0!</b> 0+001.80+001.56+001.62+001.58+000.95+000.02+000.00+000.03</p>	<p>; read probe data ; eight moisture measurements as a percentage % of VWC without salinity compensation returned</p>
<p>0C4!</p>	<p>; reserved (factory use only)</p>
<p><b>0C5!</b> 000208</p>	<p>; measure temperature in °F ; time taken 0002 seconds, 08 sensors measured</p>
<p><b>0D0!</b> 0+082.48+082.30+082.22+082.49+084.26+083.61+082.30+080.39</p>	<p>; read probe data ; eight temperature measurements in °F returned</p>

\* Older M commands are also supported however, if number of enabled sensors exceeds nine (9) than "C" commands are recommended.

\*\*C6 to C9 commands reserved for future features.

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## 22. Advanced Options 2-4

ADVANCED Options:

0=TRANSPARENT\_MODE 1=SDI-12\_or\_CMOS 2=NINE\_SENSORS 3=DEMO\_SET 4=VERSION\_D\_FIX

NOTE: There are a number of additional functions in the Advanced menu (Options 1 to 4)  
It is recommended these only be used if advised by Entelechy to do so.