



# ***n-DNet Data Concentrator***

*Product model: C1000/2000/3000*

# ***Manual***

Version 1.0

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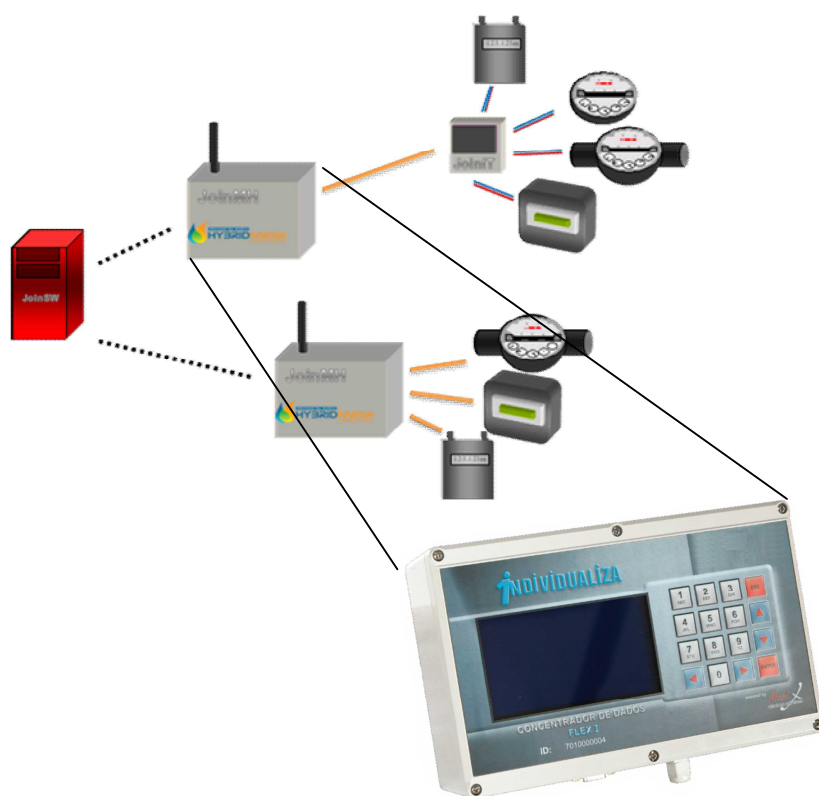
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## General

The n-DNet™ Concentrator is a key component in managing segments of the Mobix patented n-Dimensional Network (see box for n-DNet™ description.) On one end, the Concentrator controls communications with a cluster of up to 1000 meters and on the other end it connects to the MDM Server. The Concentrator communicates with the meters over the simultaneous RF and PLC n-Dimensional mesh network. Mobix advanced n-DNet™ technology provides unprecedented advantages in data availability, solution topology and price/performance.

Actual meter connectivity is achieved either by a meter embedded/connected n-DNet™ component or through a network node such as an n-DNet™ Hub. To connect to the MDM server, the Concentrator supports multiple IP based options such as wireless GPRS, LAN or Wi-Fi.





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## **Major Components**

The Concentrator has many major hardware components on board – altogether bring the power and flexibility to adapt it for almost any end system.

- **Power supply**

- Smart protecting operational power supply unit. The hardware is equipped with power stabilizers and filters, protecting the board from hazardous input voltage levels and ensuring the operational power is steady and strong.
- The PS unit is built to meet international safety and noise filtering standards.

- **Internal Modem (incase of an upgrade)**

- The concentrator needs to communicate not just with the meters but also with the 'outside world' - it communicates with a remote server (Management) for receiving commands or sending information.
- The concentrator has an internal GPRS modem for that cause.

- **Secondary serial communication ports (RS232)**

- In addition to the serial port associated with the modem, the concentrator provides 2 second serial RS232 ports, allowing for connecting to an n-DNet NIC, PLC modem, RF transceiver, Bluetooth device or a direct serial connection to a meter.
- An external serial connector is located on the concentrator box and used to connect a handheld reader for data download.

- **RTC**

- For providing an accurate time keeping even without external updates the concentrator includes an internal Real Time Clock mechanism. It is capable of keeping the time and date



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for long periods without external power (in case of power shutdowns for example).

- **LCD**

- The concentrator has a built in LCD for 240x128 dots display.

- **Memory**

- In addition to a large internal RAM, the concentrator is equipped with a 2MB flash memory for storing data. This memory is non-volatile and can store the data even without power.

- **n-DNet NIC**

- The concentrator communicates with the n-DNet network using the internal n-DNet NIC. It provides simultaneous communication over both PLC (power line) and RF.



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## Specifications

### Input Voltage

Power supply unit: 100-130VAC (47-440Hz)

internal circuit: 9 – 30 VDC

Circuit operational voltage 5 VDC

Current consumption 200mA (Normal)

550mA – 1500mA (OEM modem attached)

### Interfaces

External RS232 port (D-type 9-pin connector)

Two 6 pin connectors (internal) for different operation modes (Prog, Normal, AVL, Modem).

Software download through main RS232 port.

2 LEDs (internal).

External 4x4 keypad.

RF 915MHz

PLC 100-400KHz FCC, Cenelec and ARIB compatibility

### Enclosure

IP65

Length: 250 mm

Width: 160 mm

Height: 92 mm

### Environmental

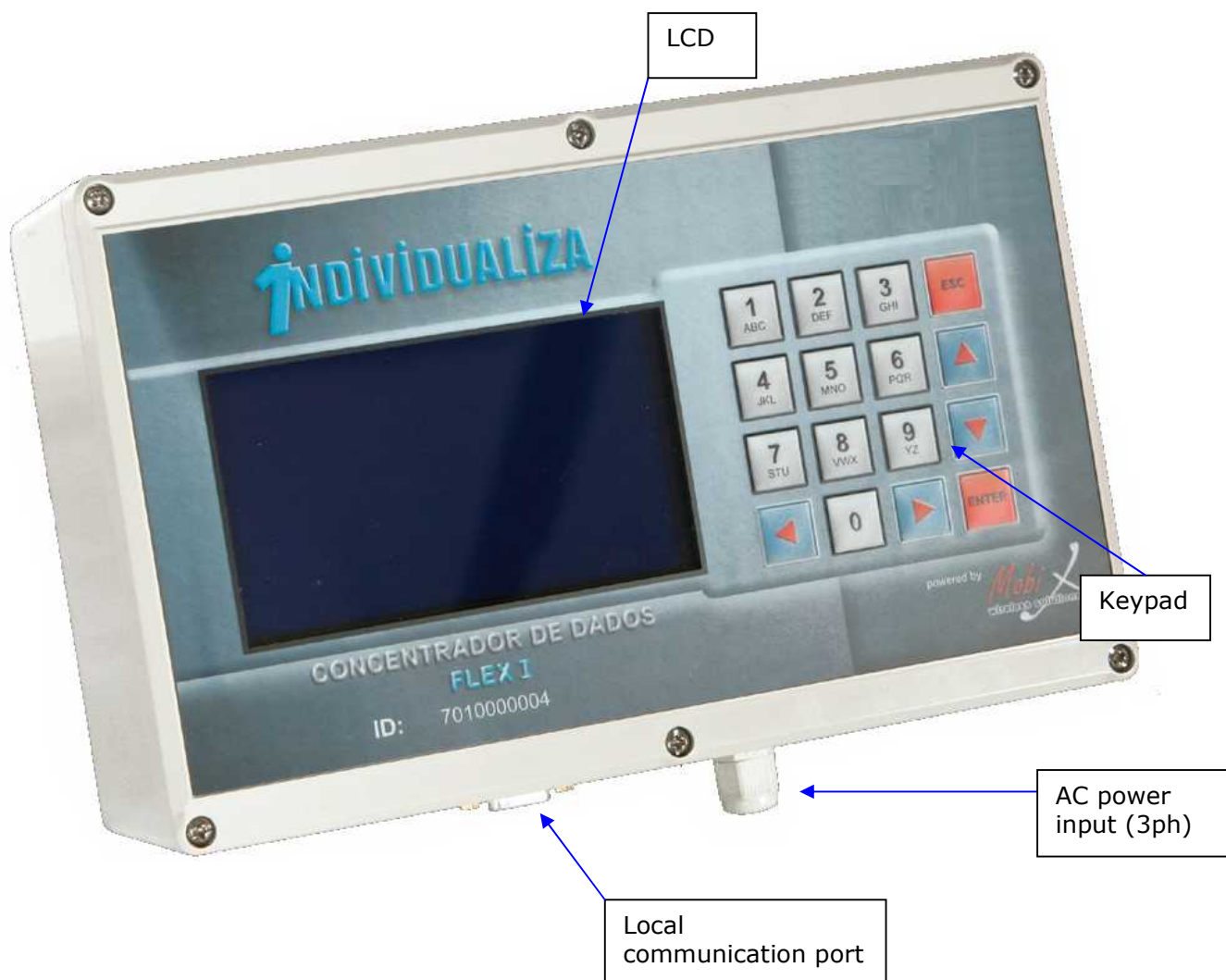
Operating temperature Range: -30° to +70°C

Humidity: 0% to 95% noncondensing

For installation indoors or semi outdoors (protected by roof)

## Connectors and Peripherals

### General view



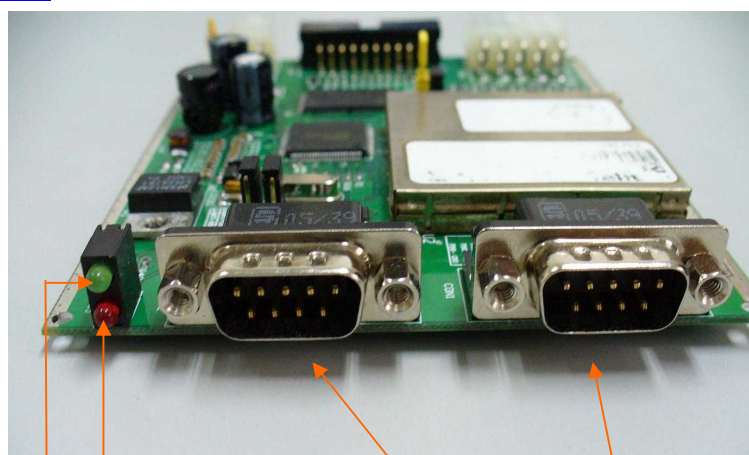
## Light Emitted Diodes (LED)

Two internal LED on the board provide useful visual information while running and maintaining the BB2.

LED Legend:

LED	DEFINATION	STATE
Top	MCU Module State	
Bottom	Power	ON - Normal OFF- NO Power

## BB2 board



Power State

Con 2

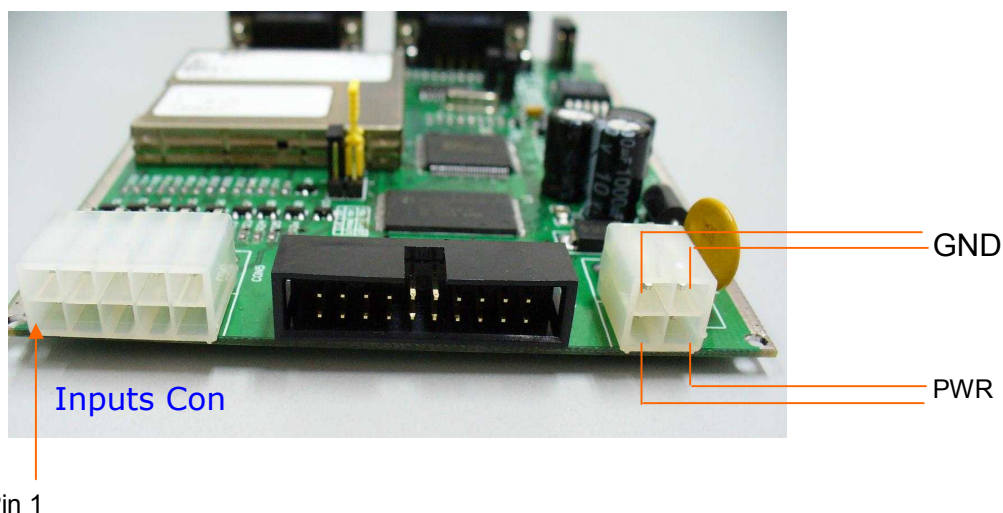
Con1

MCU State



## Connectors

CONNECTOR	Pin #	DEFINATION	STANDARD VALUE	FUNCTION
<b>POWER</b>	1,2	Top 2 Pins	GND	GND
	3,4	Bottom 2 Pins	9V-40V DC MAX Current 2.0A	MCU + modem Power
<b>Inputs Con</b>	1-3	Input 1-3	0-5V	Dry Contact input
	4-6	Input 4-6	0-5V	Analog input
	7-9	Output 7-9	0-5V	Dry Contact output
	10	GND	GND	GND
<b>Con 1 DB9</b>	2	TX1	RS232	Programming comm. port
	3	RX1	RS232	Programming comm. port
	5	GND	GND	GND
<b>Con 2 DB9</b>	2	TX0	RS232	PLC/RF comm. port
	3	RX0	RS232	PLC/RF comm. port
	5	GND	GND	GND





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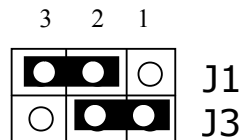
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## Jumpers configurations

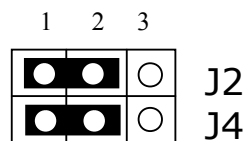
The BB2 (internal) PCB offers 4 jumpers (J1,J2,J3,J4) for different operations such as programming, communication, testing etc.

In normal operation mode, the jumper configurations should be as follows:

CPU mode jumpers:



Communication port (CON2) jumpers:





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## **Installation**

### **Mounting:**

The concentrator should be mounted on a wall or pole using at least two mounting points. The mounting is done using the supplied mounting plates, connected to the back of the concentrator box.

### **Power:**

The required power supply is 85-265VAC (47-440Hz). The concentrator has an internal connector for a standard power cable (Line, Neutral, Gnd) coming from existing power source in the field.

This source will supply both power and the communication medium for the system, therefore, it should be of the highest quality possible.

The cable should be passed through the PG connector at the bottom of the box, and then the connector should be tightened on it for sealing.

**Safety Note:** The power should be connected after all settings and mounting were done

### **LCD (display):**

The LCD will turn on when power is supplied to the unit.

## **Safety**

The concentrator is compliant with various safety standards including FCC/CE. Its internal power

supply is compliant with UL and CE standards. The concentrator should be connected only to 100-230Vac power source. Damages to the phone caused by using other unsupported power

sources would not be covered by the manufacturer's warranty.



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## **Operating:**

### **Turning ON the Concentrator Unit:**

- 1) Connect the mains cable to the internal connector
  - If power is not turned on (power led stays off), check for live power in the mains.
- 2) The LCD will show the application software version
- 3) Meanwhile, the BB2 LED will start functioning, as followed:
  - POWER LED (RED) should be always ON
  - MCU LED (Green) – Starts blinking slowly, and after a few minutes (when modem connects to the network) it should stay permanently ON.
- 4) The concentrator will show the current time as stored in the RTC.
  - **Important notice:** The concentrator will get a time update from a connected hand held terminal or from the remote server if modem is installed.
- 5) At that point the system is ready for complete operation



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## The FCC Wants You to Know

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- a) Reorient or relocate the receiving antenna.
- b) Increase the separation between the equipment and receiver.
- c) Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- d) Consult the dealer or an experienced radio/TV technician.

### FCC Warning

A distance of at least 20cm. between the equipment and all persons should be maintained during the operation of the equipment.

Modifications not expressly approved by the manufacturer could void the user authority to operate the equipment under FCC Rules.

NOTE: THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY RADIO OR TV INTERFERENCE CAUSED BY UNAUTHORIZED MODIFICATIONS TO THIS EQUIPMENT. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

## **Troubleshooting**

Please follow the troubleshooting section in case of encountering troubles with this sub-section

### **1) The BB2 is plugged to the power supply but Power LED or LCD remains in OFF state.**

- Check if power supply is turned ON (if this option exists)
- Check if power supply plug is connected well to the BB2
- Check if LCD cable is connected to the BB2
- Check the input voltage level of the BB2. It should be in range of 9 – 30 VDC
- Consider replacing the power cable
- Consider replacing the BB2

### **2) The BB2 is plugged to the power supply but LCD shows a static black/half black display**

- Verify correct jumper configuration on J3 (see jumper configurations)
- Verify LCD cable is connected correctly
- Make sure BB2 was programmed with the current sw version

### **3) The MCU LED blinks continuously without switching to permanent ON state – modem cannot connect to the network (if modem is connected)**

- Make sure the communication parameters are correct (APN domain, IP, Port etc)
- Check the SIM card – it should be inserted correctly in place and with a correct GPRS package
- Make sure the modem is firmly connected to the board

### **4) No time appears on the display after 5 minutes from power on (if modem is connected)**

- In GSM modems: Ensure the SIM card is installed properly inside the modem
- There are few countries (like Peru) where this procedure takes long time. That is normal
- Change the position of the modem's antenna. Either the receiving signal is poor or the network cannot 'hear' the modem well.



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- Turn the power OFF and ON
- Consider replacing the antenna
- Consider locating the BB2 elsewhere (if possible)

**5) A request was sent to the concentrator by the handheld reader, but nothing happened afterwards**

- Ensure RS232 serial cable is correctly connected
- Verify Bluetooth device operation (if existing)
- Make sure you are using a compatible handheld reader with latest sw
- Power reset the concentrator and try again

**6) The concentrator shows meters in its list but there are no readings**

- Make sure that the meters details are correct (ID)
- Check that the communication wires are connected to CON2 on BB2
- Check that the communication wires are connected to PLC
- Verify that TX LED on the PLC is blinking from time to time
- Verify correct jumper configuration on J4 (see jumper configurations)

**7) The PLC shows constant TX or none at all**

- Check that the communication wires are connected to CON2 on BB2
- Check that the communication wires are connected to PLC
- Verify correct jumper configuration on J4 (see jumper configurations)



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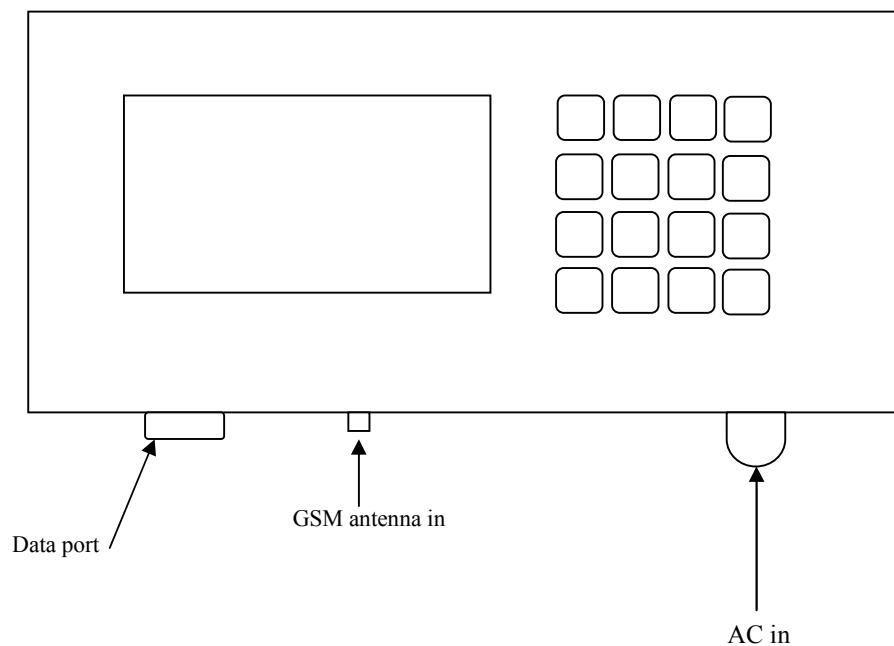
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## **APPENDIX**

### **General schematic**







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## **Mounting**

