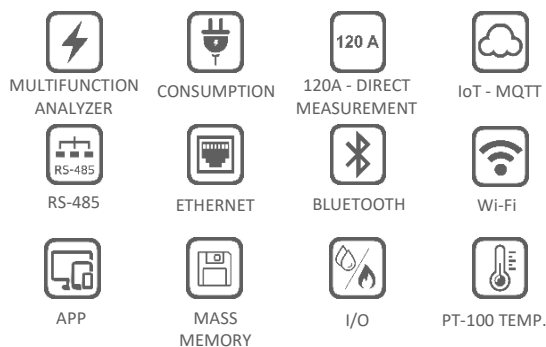## FEATURES

- **M-Box** is a digital measurement unit, suitable for applications in shopping centers and other commercial buildings, with emphasis on submetering and integration in automation systems.
- **Plug & Play** – Very practical installing, with cable input identification, so that, connection errors can be easily avoided.
- **Mbox's** standard model is applicable on mono-phase, two-phase or three-phase systems, with low voltage – up to 460 (Ph-Ph)/265 (Ph-N) Vac - and direct measurement of currents up to 120Aac.
- Besides its electrical measurement functions, can be used as a data concentrator, receiving signals generated by other resources's meters/sensors, like water, gas or oil meters, field transducers and PT-100 temperature sensors. Incorporates two digital outputs (relay) for remote commands (ON/OFF).
- Measurement readings can be obtained locally (through an LCD display) or remotely, using RS-485, Ethernet, Wi-Fi or Bluetooth interfaces for data communication.
- Suitable for use in IoT and 4.0 Industry solutions, integration via MQTT protocol (Ethernet or Wi-Fi interfaces).
- Equipped with mass memory, which allows the recording of a historical database comprising up to 20 electrical parameters, using a minimum registering interval of 1 minute.

APPLICATIONS

- Submetering and Energy Efficiency
- IoT and 4.0 Industry
- Energy Cogeneration systems (4-quadrant metering, delivered and received power)
- Automation Systems
- Analysis of electrical circuits and equipment
- Any application related to energy and electrical parameters measurements

MULTIFUNCTION ANALYZER   **CONSUMPTION**   **120A - DIRECT MEASUREMENT**   **IoT - MQTT**

RS-485   **ETHERNET**   **BLUETOOTH**   **Wi-Fi**

APP   **MASS MEMORY**   **I/O**   **PT-100 TEMP.**

PRODUCT INFO

ELECTRICAL PARAMETERS – 63

- Includes current, voltage, frequency, energy consumption, energy demands, active, reactive and apparent powers, power factor and other parameters

CONNECTION DIAGRAMS

- Mono-Phase, Two-Phase or Three-Phase systems (configurable)

PLUG & PLAY

- Wall fastening (fastening devices included) and cable identification
- Technical support via e-mail, telephone, WhatsApp and YouTube videos

MASS MEMORY

- Mass memory intended to create an internal historical database of the measurements, comprising up to 20 electrical parameters, using a minimum registering interval of 1 minute

WATER, GAS, OIL, TEMPERATURE, COMMANDS...

- Three digital inputs for concentration of external pulses, generated by other resources meters (like water, gas and oil), two analog inputs for field signals collection (transductors) and one PT-100 input for temperature measuring. Two digital outputs (relay) for remote commands (On/Off)
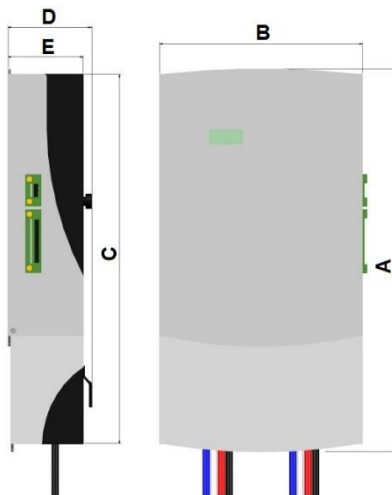
INTERFACES, READINGS & CONFIGURATIONS

- Man Machine Interface (MMI) composed of an LCD display, allowing local reading and configuration checking.
- RS-485, Ethernet, Wi-Fi or Bluetooth communications.
- Softwares for reading and parameterization: RedeMB (RS-485 and Bluetooth), RedeMB-TCP (Ethernet or Wi-Fi), Android Apps (MQTT/Bluetooth).
- Use in IoT systems and 4.0 Industry, via MQTT Broker. Integration to Dashboards, Apps and other IoT tools.
- integration to PLCs, master MMIs, data concentrators and supervisory systems via MODBUS-RTU (RS-485), Modbus TCP or Bacnet IP (Ethernet) protocols

ELECTRICAL GREATNESSES	*Instantaneous*	Voltage (Ph-Ph, Ph-N and 3Ph), Current (Ph, N and 3Ph), Frequency, Active, Reactive and Apparent Power (Ph and 3Ph), Power Factor (Ph and 3Ph), THD-Voltage and Current (Ph until 40 th order)
	Energy	±Active Energy kWh (Consumption and Supply) ±Reactive Energy Varh [Inductive(+) and Capacitive (-) Loads] Active and Apparent Demand (Last and Maximum)
MEASUREMENTS AND INPUT INFO	*Maximum and Minimum*	Voltage, Current, Powers, Power Factor and THD - (Ph and 3F)
	Connections Diagrams	Three-Phase (Star or Delta), Two-phase and Single-Phase
	Voltage – Working Range	148 to 460Vac (Ph-Ph) (1.5 Vmax overload (1s))
	Current – Working Range	120A (min 200mA) 200A or 400A (upon consultation)
	Frequência- Faixa de Trabalho	50Hz: 42.5 to 57,5 Hz | 60Hz: 51 to 69 Hz
	Power Supply	Self-powered (signal obtained from measurement circuit)
	Connection	Quick coupling terminal (IP-00)
	Cable to be Used (section)	Minimum: 2.5mm² , Maximum: 35mm² (120A model)
	Internal Consumption	<12VA
ACCURACY at 25°C (77 °F), referred to the full scale	*Voltage, Current, Powers and Power Factors*	0.5%
	Frequency	0.1Hz
	Energies	1.0%
	THD	± 5% * Tests based on references described in **Table 4 - item 4.6.2 of ANEEL Prodist resolution - Module 8, Revision 7 and in Table 1, item 5.3 of IEC 61000-4-7 - 2002-08**
MASS MEMORY (non-volatile)	*Storage Capacity*	2MB (209,695 registers for 1 electrical parameter configured)
	Number of recordable parameters | Interval	Up to 20* | From 1 to 540 minutes
COMMUNICATION	*Connection/Protocol*	RS-485/Bluetooth: Modbus-RTU Ethernet: Modbus TCP/IP | MQTT | BacNET/IP Wi-Fi: Modbus TCP/IP|MQTT
	RS-485 Cabling	Shielded cables, with at least two twisted pairs (2x24 AWG), minimum section of 0.25mm² and characteristic impedance of 120ohms
	Transmission Speed	RS-485: 9600, 19200, 38400 or 57600bps (configurable) Ethernet :10/100 Mbits/s
	Data Format	8N1, 8N2, 8E1 or 8O1 (configurable for RS-485)
	Addressing	RS-485: 1 to 247 (configurable) Ethernet | Wi-Fi : Modbus TCP/IP, Slave ID: 1 to 255
DISPLAY	*LCD (green)*	8 columns x 2 lines, with backlight
IoT DATA PUBLISHING	*Data Publishing Interval*	Minimum: 1 minute (resolution in minutes)
	Number of parameters to be published	Up to 20*
I/O	*3 Digital Inputs*	Type: Open Collector |Voltage required: 12~24Vdc Maximum Frequency: 2Hz | Admittable pulse width: 200ms
	2 Digital Outputs	Relay Output, 250V – 2A (Ac or Dc)
	2 Analog Inputs	4~20mAdc and/or 0~10Vdc (defined during the ordering process)
	PT-100	2 or 3 wires , 0 to 150°C (32 to 302°F)
CASE	*Material*	Rigid PVC (V0)
	Mass	3.5kg
	Protection Degree	IP-40
ENVIRONMENTAL CONDITIONS	*Temperature*	Operation: 0 to 60°C (32 to 140°F)|Storage:-25 to 60°C (-13 to 140°F)
	Relative Air Humidity	Maximum of 90% (without condensation)
	Temperature Coefficient	50ppm/°C
STANDARDS	*Electrical Parameters*	IEC 61000-4-2 IEC 61000-4-3 IEC 61000-4-4 IEC 61000-4-5 IEC 61000-4-6 IEC 61000-4-8 IEC 61000-4-11 CISPR 11
	Wi-Fi	IEE 802.11 b,g,n |Anatel Certification - 02152-20-11541

**Features included in firmware version 1.7. Older versions allows recording/MQTT data sending of 10 variables max.

DIMENSIONS

Model	A	B	C	D	E
120Aca	434,0	230,0	419,0	85,0	94,5
200Aca	636,0	409,0	618,0	148,0	138,0
400Aca	666,0	600,0	656,0	169,0	133,0

Dimensions in milimeters

How to Specify:

M010015 ☐ ☐ ☐ ☐

Current Measurement

0: Up to 120Aac
1: Up to 400Aac. *
2: Up to 200Aac *

I/O interfaces

00: RS-485
01: RS-485 + Digital Inputs + Digital Outputs
02: RS-485 + Analog Inputs + PT-100
03: RS-485 + Digital Inputs + Digital Outputs + Analog Inputs + PT-100
04: RS-485 + Ethernet
05: RS-485 + Ethernet + Digital Inputs + Digital Outputs
06: RS-485 + Ethernet + Digital Inputs + Digital Outputs + Analog
   Inputs + PT-100

Analog Inputs 1 & 2:

00: **Without Analog Inputs**
22: 4...20mAcc + 4...20mAcc
23: 4...20mAcc + 0...10Vc.c.
32: 0...10Vc.c. + 4...20mAcc
33: 0...10Vc.c. + 0...10Vc.c.

Communication Protocol /Special Feature

0: MODBUS-RTU (RS-485)
1: MODBUS-RTU + MODBUS TCP/IP (RS-485 + Ethernet)
3: Wi-Fi ***+Bluetooth + Modbus-RTU + MODBUS TCP/IP
(RS-485 + Ethernet + Wi-Fi***+Bluetooth)
4: Wi-Fi***+Bluetooth + Modbus-RTU (RS-485 + Wi-Fi*** + Bluetooth)
5: Modbus-RTU + Bacnet IP (RS-485 + Ethernet)**

Upon consultation, please check availability
*** For Bacnet IP protocol, please consult technical support about use and availability.*
**** From August, 2021 onwards, all M-Box models with Bluetooth feature also incorporate Wi-Fi communicaction.*

Standard Model: (Example)

M010015 0 00 00 0
MBox {120Aac – direct measurement} {RS-485} {Without Analog Inputs} { Modbus-RTU}

KRON
MEDIDORES