



AIR-485[®]

INSTALLATION MANUAL

April 2014



Cutting edge simplicity



CA-AIR485

Important Notice:

Do not operate the *AIR-485*[®] modem with the antenna removed. This will cause irreparable damage which is not covered under warranty.

Mounting Requirements - CRITICAL

HEIGHT

Both indoor and outdoor AIR-485 units absolutely must be installed a minimum of ten (10) feet above the ground – higher is better.

OFFSET FROM METAL

Do not install AIR-485 units directly on metal surfaces or reinforced concrete. If you have to do this, make sure that the AIR-485 is a minimum of six (6) inches away from the surface.

MOBILE OBSTRUCTIONS

Do not locate AIR-485 units where their line of sight to the other unit(s) can be obstructed by trucks or other mobile equipment.

TECHNICAL SUPPORT: Prior to calling Technical Support, please send pictures of the installed units to support@cansec.com.

ANTENNA ORIENTATION

The antenna must be oriented vertically.

Baud Rate & Format Compatibility

NOTE:

The supported baud rates are 4800, 9600, 19.2K and 38.4K. Data format supported is 8 bit, no parity, one start bit, one stop bit, and no hardware flow controls. **A site test must be done in all instances to confirm performance. There are no short cuts!**

Overview:

Air-485[®] is a high performance 900MHz frequency-hopping spread spectrum (FHSS) long-range wireless modem. It provides a reliable wireless data link to RS-485 serial devices and offers a simple yet cost-effective alternative to running costly RS-485 data cables, especially in commercial environments that make wire connections challenging or impractical.

Air-485[®] is optimized to work with Cansec's SmartLock, Hurricane & Maestro, and Zodiac products but can also be used with most products that support 2-wire RS-485 communication. The wireless link that *Air-485*[®] modems provide is totally transparent to the connected devices.

Features

Plug and Play Communications

Unlike most wireless modems, *Air-485*[®] does not require the use of a PC or the installation of complicated software to set up the radio and communication parameters. Instead, *Air-485*[®] modems are configured through simple DIP switch settings (see Figure 1 and 2 on the following pages).

Long Range

Indoor/Urban: up to 400 m (1,300 feet) depending on antenna height and RF interference.

Outdoor line-of-sight: up to 10 Km (6 miles) with standard antenna provided.

USB and RS-485 Support

Air-485[®] modems support both USB and 2-wire RS-485 connections. When connected to the PC using USB, the device is powered from the USB. When connected to an RS-485 data cable, an external power supply must be used. *Air-485*[®] automatically detects the type of connection and configures itself automatically. Support for both types of connections provides greater flexibility in accommodating even the most complex configuration (examples provided later in this document.)

Adjustable RF Power Level

Four output power levels (10, 250, 500 and 1000 milliwatts) can be easily set in the field using two DIP switches. The RF power level should be set higher as needed for longer range. Note that setting the RF power to a high level when doing testing at very short range (under 2 m/6 feet) can overload the receiver and cause erratic operation.

Visual Signal Level Indication

The built-in continuous signal strength diagnostic test that can be initiated from any remote *Air-485*[®] modem references the base modem and provides real-time signal strength indication using three green LEDs (Figure 2). This feature helps the installer in terms of choosing the correct location and elevation of the *Air-485*[®] modems and the alignment of the antennas for maximum signal strength. This also eliminates the need for expensive tools and power meters.

Multiple Network Support

Because the range of the *Air-485*[®] modems can be up to 10 Km (6 miles) line-of-sight, it is possible that installations in close proximity could interfere with each other. To address this, the modems have two DIP switches which allow up to four Network ID numbers to be specified. For example, an *Air-485*[®] Master which is set to ID 1 will only wirelessly communicate with *Air-485*[®] Slaves with ID 1. Transmission from other ID numbers will be ignored.

Secure Data Communications

Air-485[®] modems use 128-bit Advanced Encryption Standard (AES) to ensure that the data integrity is not compromised.

Multiple Slave Units

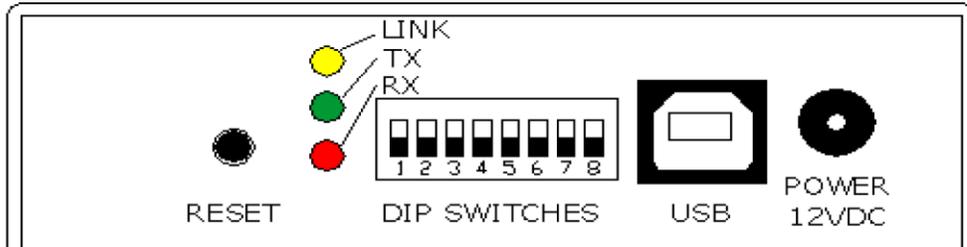
A single master AIR-485 unit can communicate with up to 16 slave units.

Setup

DIP Switch Settings

There are two sets of DIP switches which must be set.

Figure 1: Front



Mode

Mode	Switch #1
Master	Down <input type="checkbox"/>
Slave	Up <input type="checkbox"/>

Power Level

Level	Switch #2	Switch #3
Low	Down <input type="checkbox"/>	Down <input type="checkbox"/>
Medium	Up <input type="checkbox"/>	Down <input type="checkbox"/>
High	Down <input type="checkbox"/>	Up <input type="checkbox"/>
Max	Up <input type="checkbox"/>	Up <input type="checkbox"/>

Region

Region	Switch #4
North America	Down <input type="checkbox"/>
Australia	Up <input type="checkbox"/>

Baud Rate

Baud (Hardwired)	Switch #5	Switch #6
4,800	Up <input type="checkbox"/>	Up <input type="checkbox"/>
9,600	Down <input type="checkbox"/>	Down <input type="checkbox"/>
19,200	Down <input type="checkbox"/>	Up <input type="checkbox"/>
38,400	Up <input type="checkbox"/>	Down <input type="checkbox"/>

Signal Strength Test

(Applies to Slave Only)

Test Mode	Switch #7
On - Enable Test	Up <input type="checkbox"/>
Off - Disable Test	Down <input type="checkbox"/>

RFU (Reserved for Future Use) Switch

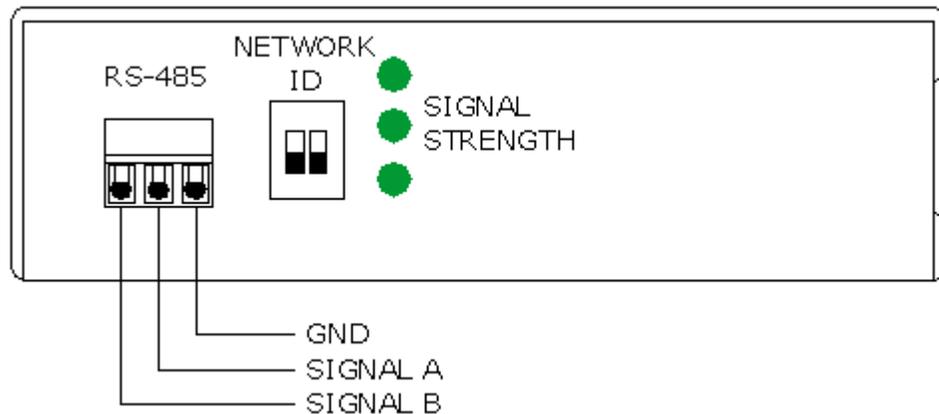
Mode	Switch #8
Off	Down <input type="checkbox"/>

NOTE: The RESET button must be pressed whenever a DIP switch setting is changed.

Front:

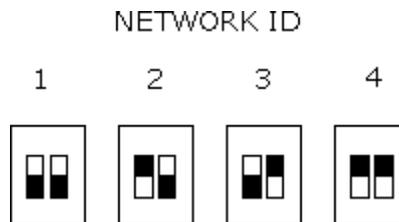
- 1) LINK LED (Figure 1) – For a Master unit, if this LED is on SOLID, it indicates that the unit is successfully connected to at least one Slave. For a Slave unit, this LED indicates that it is successfully connected to a Master.
- 2) TX\RX LEDs (Figure 1) – These LEDs indicate the transmission and receipt of data.
- 3) When the *Air-485*[®] Master is connected to a PC using USB, the modem is powered from the USB port. Because of the limited current available on a PC's USB port, only the two lowest power settings can be used when powering the modem using USB. If a higher power setting is required, the optional plug-in power supply can be used.
- 4) Switch 1 – For a Point-To-Point network, set one *Air-485*[®] modem to Master and the other modem to Slave. If a modem is connected to the PC using USB, that modem must be set to Master. For a Multipoint network, set the unit connected to the PC using USB as the Master. If one is not connected to the PC using USB, set the one hardwired on the RS-485 bus as Master and set the field units as Slaves.
- 5) Switches 2 and 3 – The factory default setting is Low Power. If the distance between the Master and Slave(s) is MORE THAN 100 feet, set the switches to HIGH POWER on both the Master and Slave(s). Note that the Master and Slave(s) should always be set to the same power level. If the distance from the Master to the Slave(s) is LESS THAN 100 feet, start with both units set to LOW POWER and progressively increase the power level until an acceptable signal level is reached (see Signal Level Test below). This is important because using a power setting that is too high for a Master and Slave in close proximity to each other will result in a poor communications link.
- 6) Switch 4 – Set to DOWN (default) for North America. Set to UP for Australia.
- 7) Switches 5 and 6 – Used to set the hardwired baud rate. The baud rate through the air is fixed and is 115 Kbps.
- 8) Switch 7 – Applies to Slave units only. When this switch is UP, the unit is in Signal Test Mode. In this mode, the Slave modem communicates with the Master to determine the signal strength. The three green LEDs display this relative signal strength (see Signal Strength note for Figure 2 on the following page).
- 9) Switch 8 – Must be DOWN.

Figure 2: Back

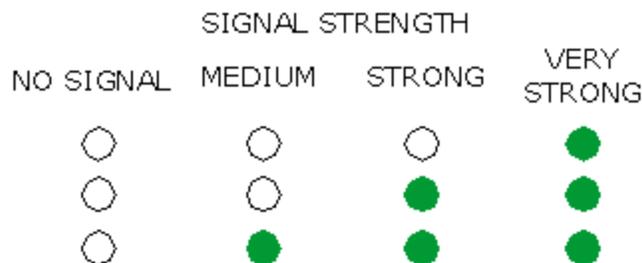


Back:

- 1) RS-485 Input – Used for RS-485 communication up- and down-stream. If the *Air-485*[®] modem is connected to a PC using USB, this connection cannot be used.
- 2) Network ID – This is used to set the network ID for the group of *Air-485*[®] modems communicating together. The Master and corresponding Slaves should all be on the same Network ID. Setting the Network ID can be done using the DIP switches, as shown in the diagram below:



- 3) Signal Strength – Signal Strength LEDs indicate the strength of the received signal only when DIP switch 7 on the front side of the *Air-485*[®] modem is UP (Figure 1). The rule of thumb is that more LEDs are better. However, as long as you have at least one LED and it is on SOLID, there is a solid data connection. In NORMAL mode, the lower LED will be on SOLID and indicates that the unit is powered on.



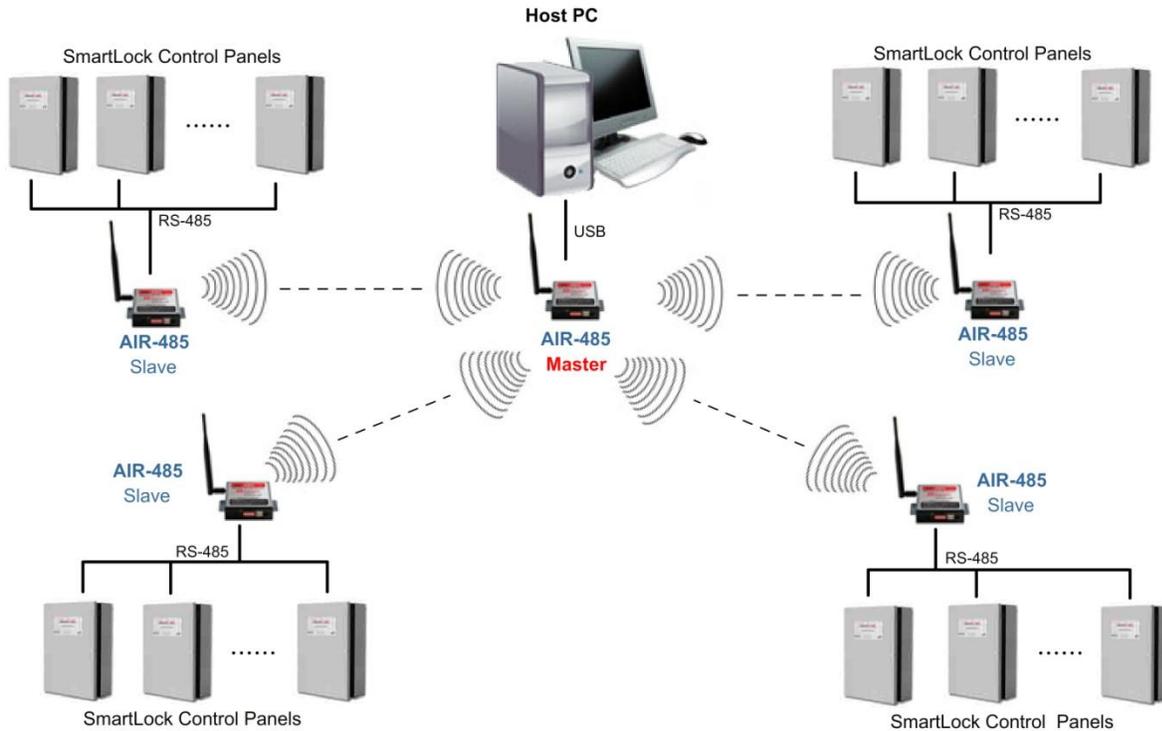
Outdoor Installation

For outdoor applications, use the CA-AIR485-N which consists of an *Air-485*[®] modem and a plastic NEMA enclosure. This configuration is temperature rated for -40°C to +85°C (-40°F to +185°F). The housing will not affect the range of the *Air-485*[®] modem.

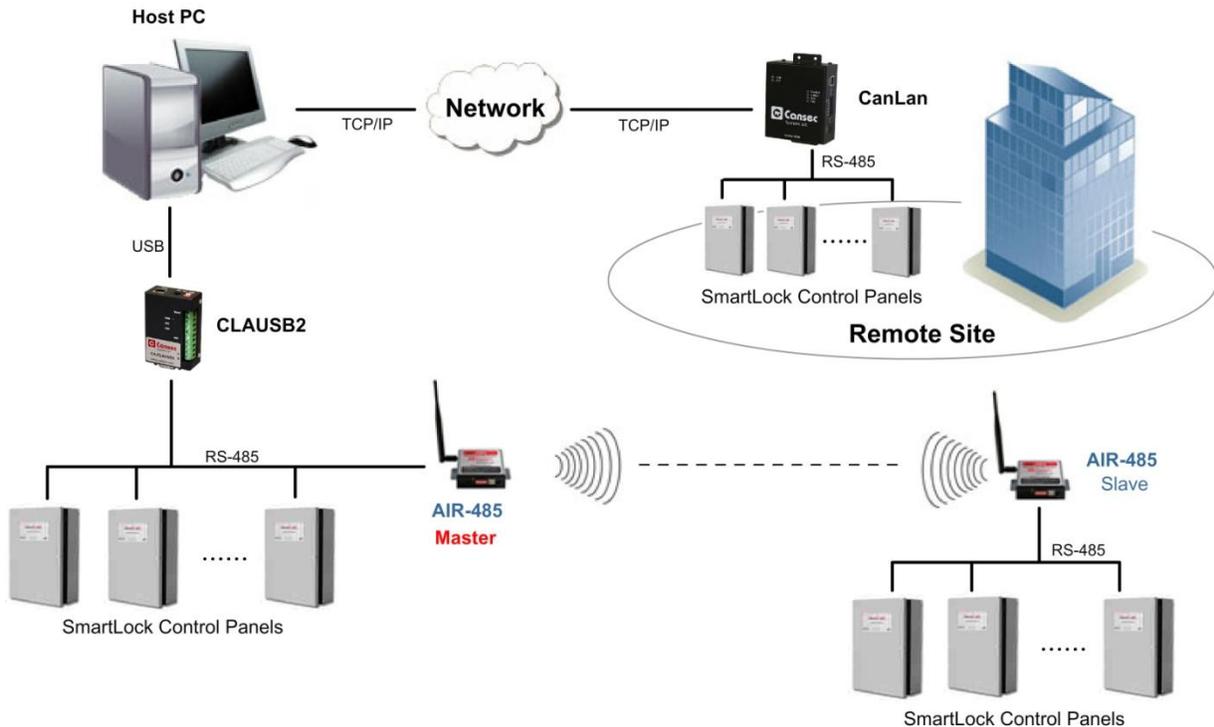


Typical Air-485™ Configuration for SmartLock

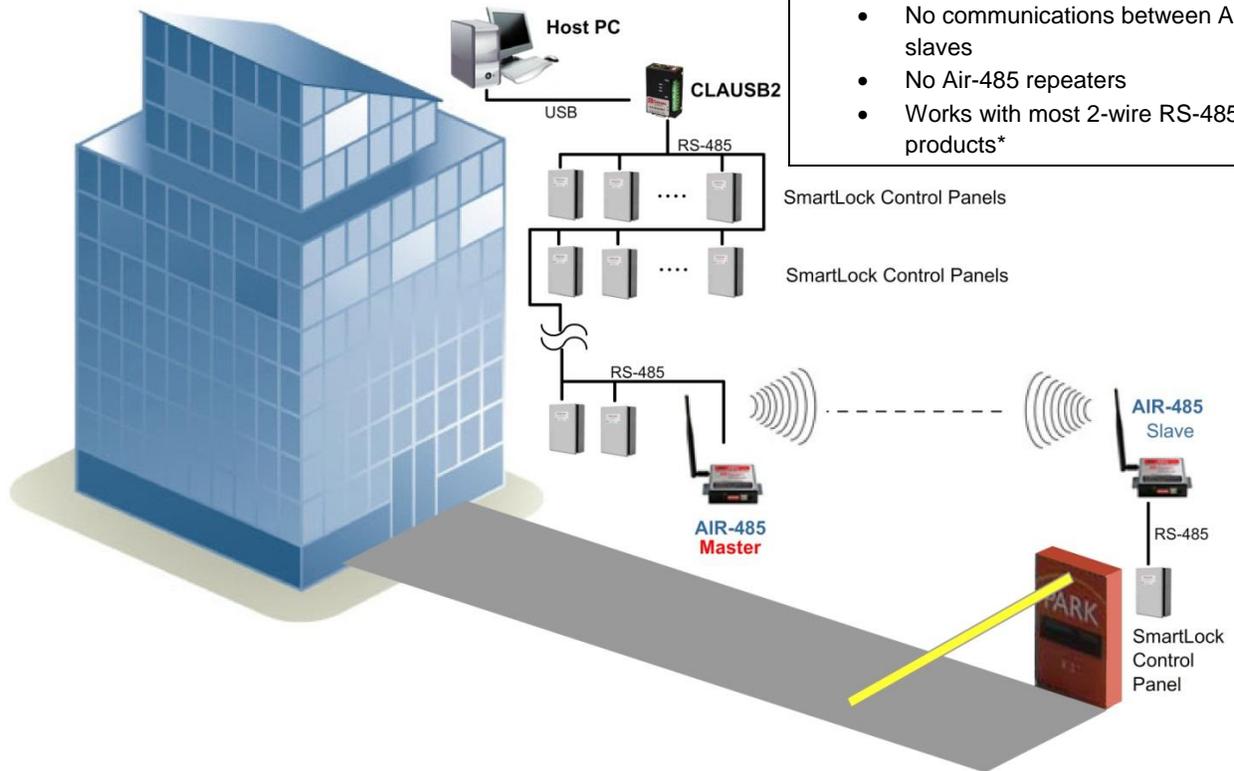
Air-485 Without CLAUSB2 or CanLan



Air-485 With CLAUSB2 & CanLan on Remote Site



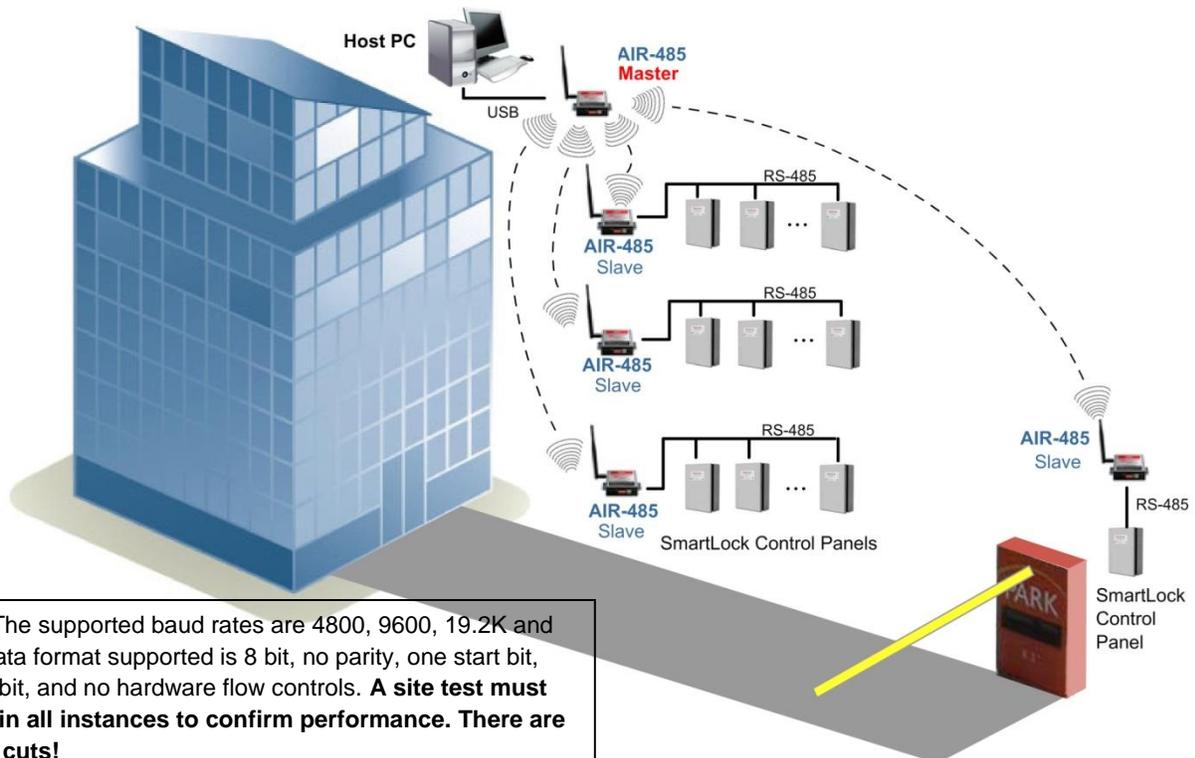
Air-485 With Remote Parking Gate Using CLAUSB2



IMPORTANT:

- Each panel must have a unique address
- Supports maximum 30 panels
- Supports maximum 16 Air-485 slaves
- No communications between Air-485 slaves
- No Air-485 repeaters
- Works with most 2-wire RS-485 products*

Air-485 With Remote Parking Gate, No CLAUSB2 or CanLan



***NOTE:** The supported baud rates are 4800, 9600, 19.2K and 38.4K. Data format supported is 8 bit, no parity, one start bit, one stop bit, and no hardware flow controls. **A site test must be done in all instances to confirm performance. There are no short cuts!**

Applications

- Access Control
- Security
- Industrial Controls and Robotics
- Oil Fields
- Agriculture

Specifications

- | | |
|------------------------------------|---|
| ▪ Operating Frequency Range | 902 - 928 MHz |
| ▪ Number of RF Channels | 50 |
| ▪ Modulation | FSK |
| ▪ Serial Data Rates | 4800, 9600, 19200, 38400 Kbps |
| ▪ RF Data Transmission Rate | 115.2 Kbps |
| ▪ Receiver Sensitivity | -102 dBm 0.00001 BER @ 115.2 Kbps |
| ▪ Transmission Output Power | 10, 250, 500 and 1000 mW |
| ▪ Power Requirement | USB Power (low RF output) or
12VDC 1A (high RF output) |
| ▪ Network Topologies | Point-to-Point, Multipoint |
| ▪ Optimum Antenna Impedance | 50 Ohm |
| ▪ Antenna | 3dBi |
| ▪ Antenna connection | RPSMA |
| ▪ Peak Transmit Mode Current@1 W | 1200 mA |
| ▪ Base Operating Receive Current | 105 mA |
| ▪ Remote Operating Receive Current | 60 mA |
| ▪ Operating Temperature Range | -40 °C to +85 °C |
| ▪ Dimensions | 11.2 cm x 9.0 cm x 2.7 cm |
| ▪ Weight | 220 g |