HEXAGON MINING

MINING OPERATIONS

# Access Point 360A

## Technical Reference Manual

## Software Version: v1.19

Version No.2.0 Issued October 2015 English

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**Devex AP360 Technical Reference v2.0**

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**Revision History**

| Date | Document Version | Software Version | Author | Revision |
|---|---|---|---|---|
| 21 JUL 2015 | 1 | 1.19 | Gustavo Henrique L.Severino | Initial Document Release |
| 13 OCT 2015 | 2 | 1.19 | Marco Antonio Santuci Carvalho | Modifications in label documentation |
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# 1 Document Introduction

The AP360 (Access Point) Technical Reference Manual is part of the Devex Mining´s reference manual suite.

This manual is for **internal use only** and is intended to serve as a commissioning and maintenance guide for the AP360 product when used within a Smartmine system.

The AP360 Technical Reference Manual is to be used as a supplement to the AP360 User Reference Manual. The AP360 User Reference Manual covers the process of how to set up the Smartmine network.

> **WARNING:**
> **Operators must be aware of the physical surroundings of their equipment and drive to conditions and mine requirements at all times.**

It is assumed an operator using this manual is familiar with:

- Site-specific safety procedures, Safe Work Procedures (SWPs) and Standard Operating Procedures (SOPs).

> **Note:**
> The document uses generic images to show general layout and generic information for various procedures. The site-specific screen layout, menu, and procedure information may vary from what is displayed in the manual.

## 1.1 Contacting Support

For all Devex Mining product support:

| Contact Method | Details |
|---|---|
| Web portal | http://devexmining.com/smartmine/suporte-e-servicos/suporte-tecnico and select Suporte ao Cliente Devex |

## 1.2 Document Conventions

This document uses basic conventions to indicate actions:

| Convention Example | Description |
|---|---|
| See xxx<br>Refer to | “See” indicates a reference to another section of this document.<br>“Refer to” indicates reference to another document. |
| WARNING | Warnings alert the user to dangerous procedures which could cause injury or death. |
| CAUTION | Cautions alert the user to dangerous procedures which could cause damage to equipment. |
| Note | Notes supply important information about a procedure which is not covered in the procedure text. |

# 2 Access Point 360 Overview

The Access Point 360 is a communication controller between static and remote device (Data head End - DHE and Trackers360) and the management system SmartMine|UG.

## 2.1 System Information

**Note:**

The document uses generic images to show general layout and generic information for various procedures. The site-specific screen layout, menu, and procedure information may vary from what is displayed in the manual.

Access Point 360 performs the following functions:

- Transmits dispatch orders and messages sent by operator's SmartMine|UG.
- Receives from operators an indication of the situation and current state of the equipment and its appropriation of hours, for example: Maintenance, Queues, etc.
- Receives data stored in the Trackers360, related to remote operations executed in event transfer windows provided by the SmartMine|UG.
- Receives and transmits to the SmartMine|UG system alarms generated by the operator regarding the speeding, improper operations, unjustified stops, etc.
- Receives and transmits to the SmartMine|UG tags's values which informs the equipament's location.

Access Point 360 software provides:

- Intutive setup and use
- Command line configuration
- Upgrade through debug cable

See **Software Installation** for more information

## 2.2 Product Faceplate Description

The display is responsible for showing the expected settings and the keyboard is used to choose what is displayed. Section 5.2 will explain how to use them.

## 2.3 Labels

### 2.3.1 Labels Location

Compliance labels are located on all Access Point 360 in the following locations:

**FCC Certification Label and Serial Number Label Locations**


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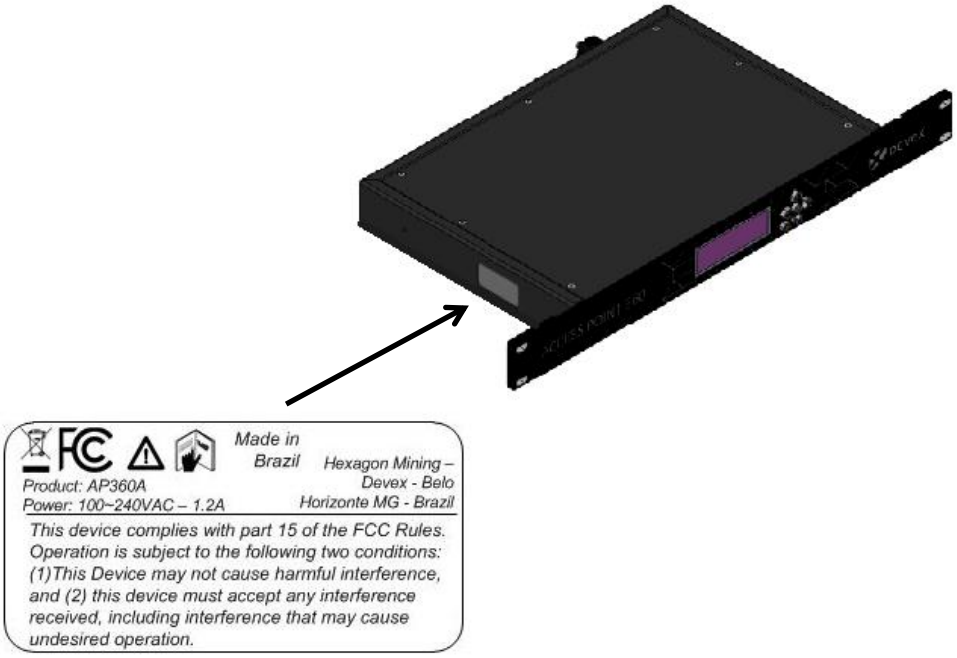
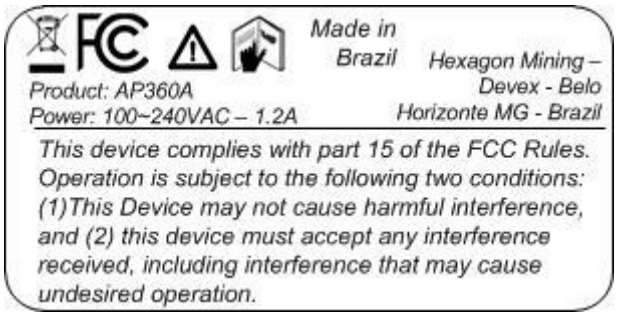

Made in
Brazil
Hexagon Mining –
Devex - Belo
Horizonte MG - Brazil
Product: AP360A
Power: 100~240VAC – 1.2A
This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1)This Device may not cause harmful interference,
and (2) this device must accept any interference
received, including interference that may cause
undesired operation.

HEXAGON
MINING
devex
PN: AP360A
FCC ID: 2AFYJ-AP360A
LOT: 0001/MS
SN: 15410001

### 2.3.2 Access Point 360 FCC Certification Label




### 2.3.3 Access Point 360 Serial Number Label

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# 3 AP Commissioning

## 3.1 Commissioning Workflow

1. See Chapter 4 Hardware Installation.
2. See Chapter 5 Software Installation.

# 4 Hardware Installation

## 4.1 Before Installation

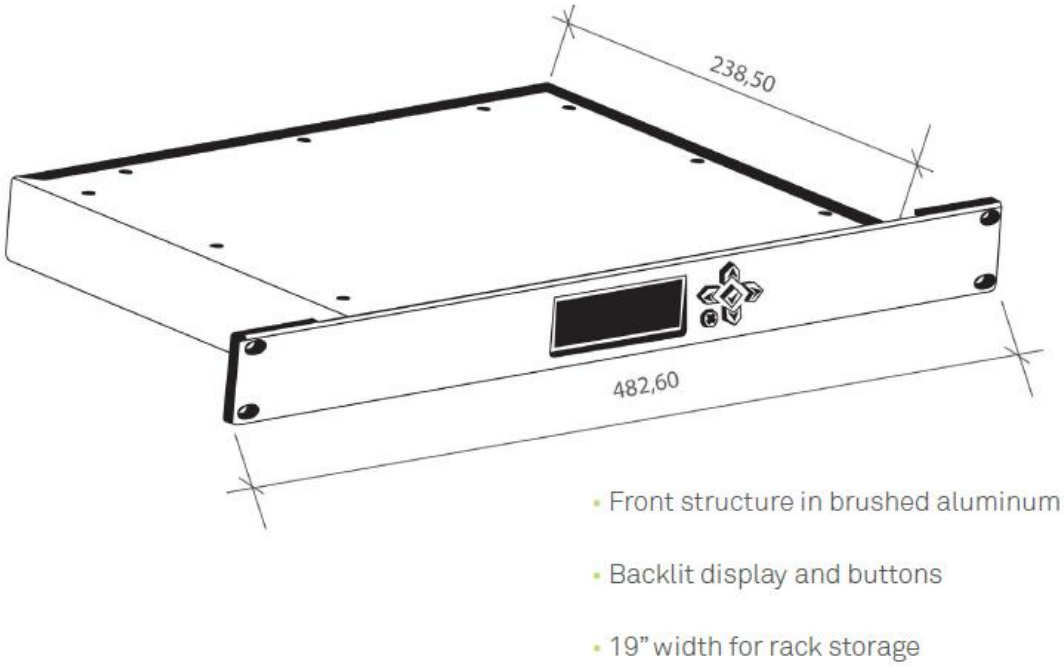
Installation requires specialized knowledge and must be installed by a Hexagon Mining Authorized Installer. Hexagon Mining recommends that installation of the Access Point 360 equipment be performed by a qualified technician because installation requires marking electrical connections and software development.

- Install the system in a clean and workshop environment. Failure to do so may cause the system to short or promote product malfunction.
- Route and secure all cables and wiring to ensure that they not chafe or rub premature failure

## 4.2 Access Point Installation

The installation of AP360 inside the rack must be done using 4 screws to fix the device near to the DHE.

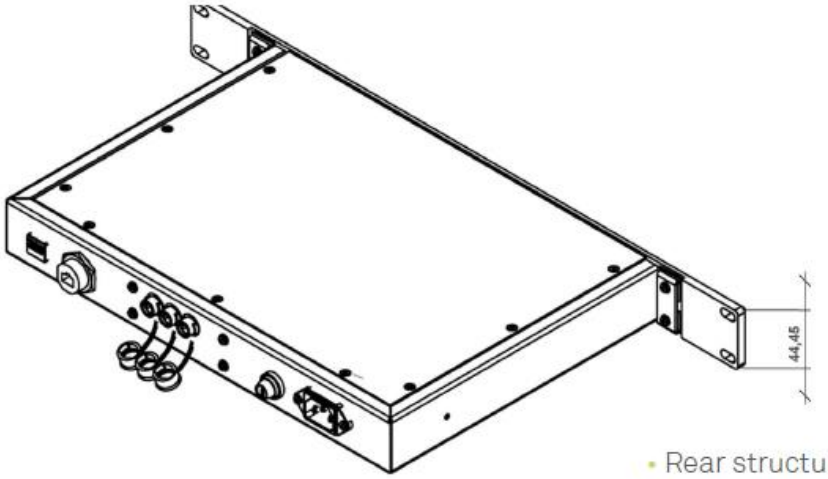
### 4.2.1 Front View





© Devex Mining

### 4.2.2 Rear View




- Rear structure made of steel
- Height of 1U for 19” rack storage

## 4.3 Data Head End – DHE

The AP360 must be fixed near to DHE, as shown in the figure below.

## 4.4 Power Cable Installation

**Caution**
**The Access Point 360 is a 110 – 220 Volts AC system only.**

1. Connect the supplied power cable to a reliable power source, for example, the rack's main power system.
2. Route and secure all cables and wiring to ensure that there is no rubbing, which can cause premature failure.
3. Connect the power cable to the power connector on the rear of the module.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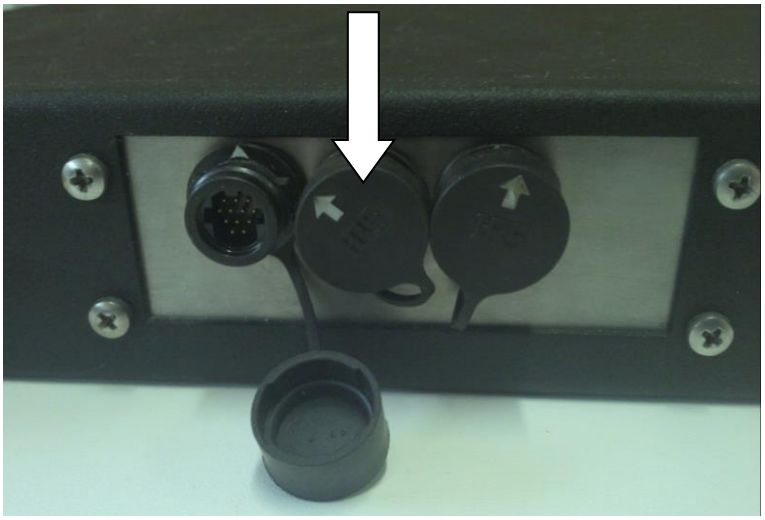
## 4.5 Communication Cable Installation

Connect the communication cable (Part number: DVXHW_CBL0056R02 - Cabo AP360 – DHE) in the middle AP360's connector and other cable extremity in the DHE's connector, as shown in the figure below.

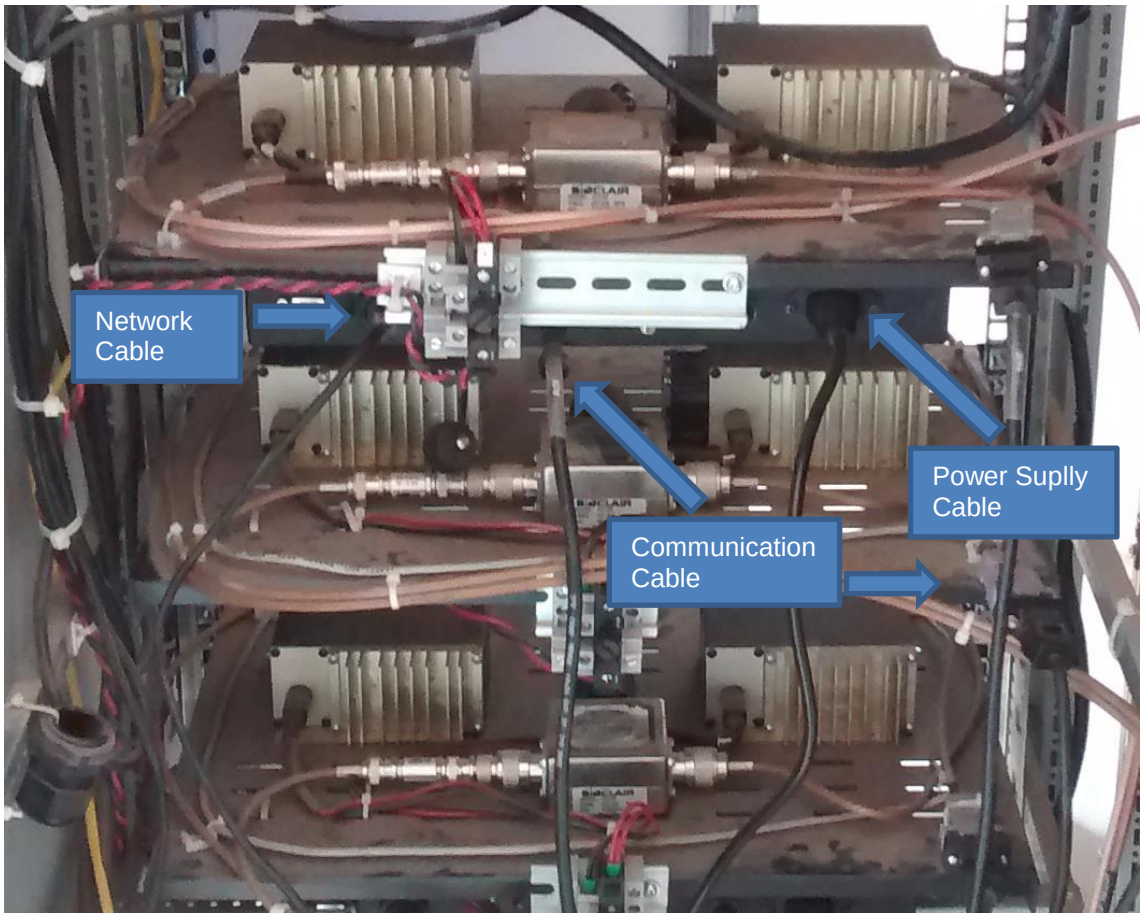


## 4.6 Ethernet Cable Installation

Connect one side of the ethernet cable in the connector of the Access Point 360, show in the figure below. Connect the other connector side in the same network of the system SmartMine|UG.

## 4.7 Final Assembly

The figure X.XX shows the back view of AP360 installed in the rack with the DHEs. The figure shows the three cables installed.





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# 5 Software Installation

The following procedure is used for software upgrades of AP360.

**Note:**

Contact Hexagon Mining | Devex for the required files.

## 5.1 Update Accesst Point 360 using debug cable

**WARNING:**
**Do not turn off the unit, or remove the debug cable while the software upgrade is under way.**

The software is installed using the debug cable. Installation files are provided by Hexagon support and are specific for each installation site.

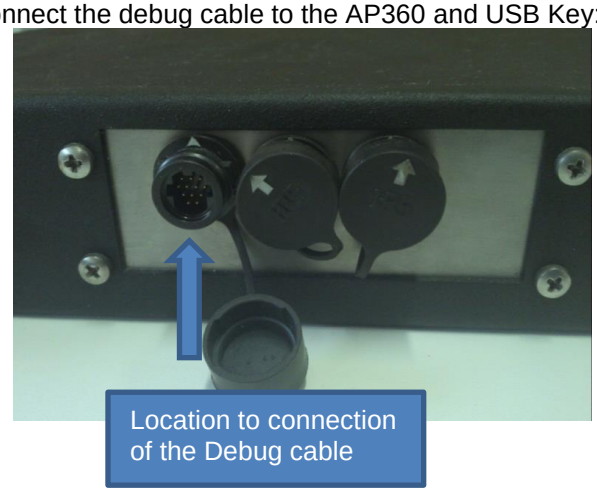
**Procedure Requirements:**

- A Computer
- Debug Cable
- Clean USB Key – to 2 GB

1. Get the latest Linux release image available in the following link:
   http://dev.devexmining.com/svn/produto_releases_dip/EmbeddedTemp/ImagensAccessPoint360/AP05_v119
2. Using the computer, extract the provided files and copy into the clean USB Key
3. The files in the USB Key appear as in the graphic below:

| | | | |
|---|---|---|---|
| buildrootfs-glibc.jffs2 | 17/06/2013 15:16 | Arquivo JFFS2 | 1.792 KB |
| buildrootfs-glibc.ubi | 17/06/2013 15:16 | Arquivo UBI | 42.624 KB |
| first_boot.img | 17/06/2013 15:16 | Arquivo de Imagem ... | 1 KB |
| kernel.img | 17/06/2013 15:16 | Arquivo de Imagem ... | 1.913 KB |
| leiame.txt | 17/06/2013 16:56 | Arquivo TXT | 1 KB |
| ramdisk.img | 17/06/2013 15:16 | Arquivo de Imagem ... | 2.917 KB |

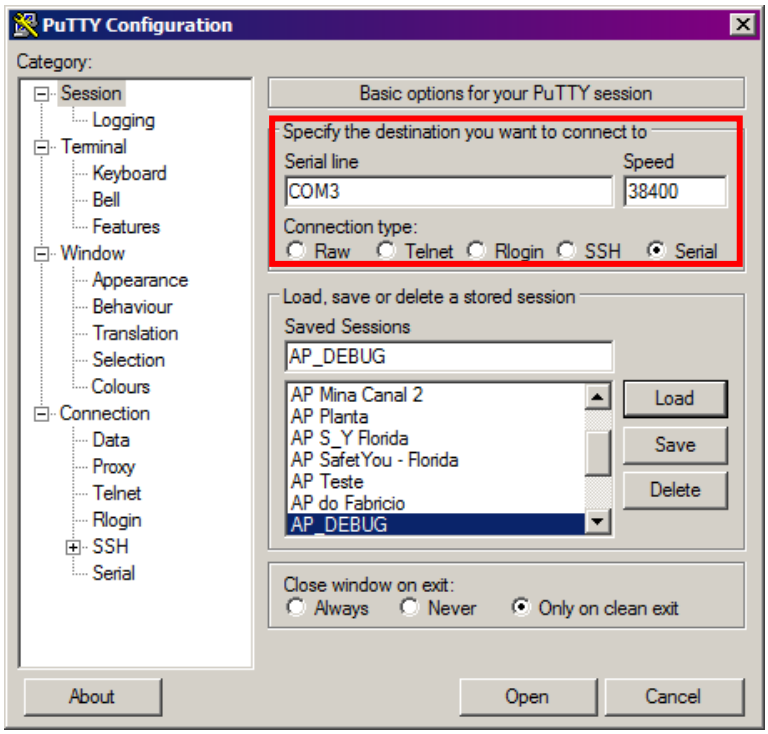
4. To star the unit, connect the debug cable to the AP360 and USB Key:




5. Access the AP360 via serial port, this procedure will use the software "Putty".

6. Open the software and select the "Serial" option under "Connection type". Then, enter the port emulated by USB converter in the field "Serial Line", which in this example is the COM3

port. In the "Speed" field set "38400", as shown in figure below. Finally click "Open" and connect the power supply cable to the AP360.

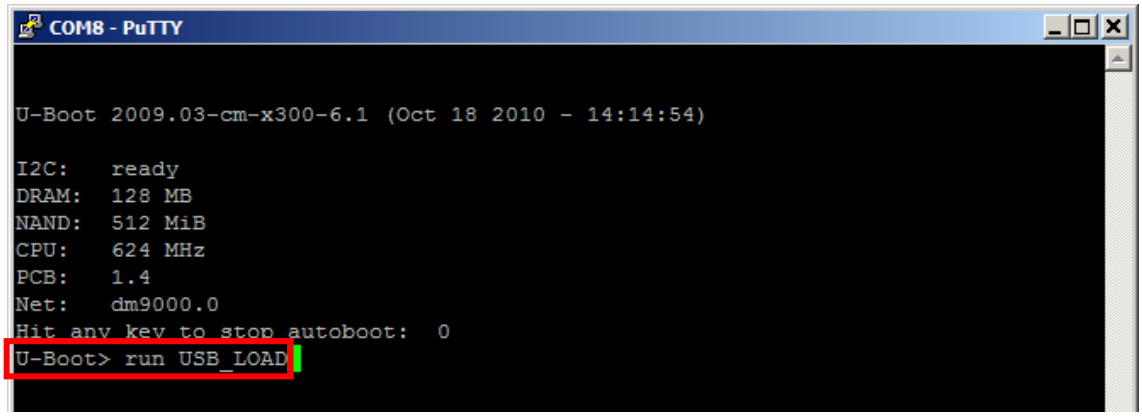



7. Configure the serial interface of your desktop or laptop and open the software “putty” and configure which are serial port and communication speed, as show in figure below:

8. During initialization a message will appear with a countdown of UBOOT: "Hit any key to stop autoboot". Before the counter reaches zero, press "SPACE" to enter the menu UBOOT, as show in figure below:

9. Run the command "run USB_LOAD"

```
> run USB_LOAD
```




After enter this command, several operation status messages will be displayed in the serial terminal connected to the AP360. When finished loading, a Login prompt will appears asking the user name to connect to the operational system.

10. Run the command "root" , as show in figure below: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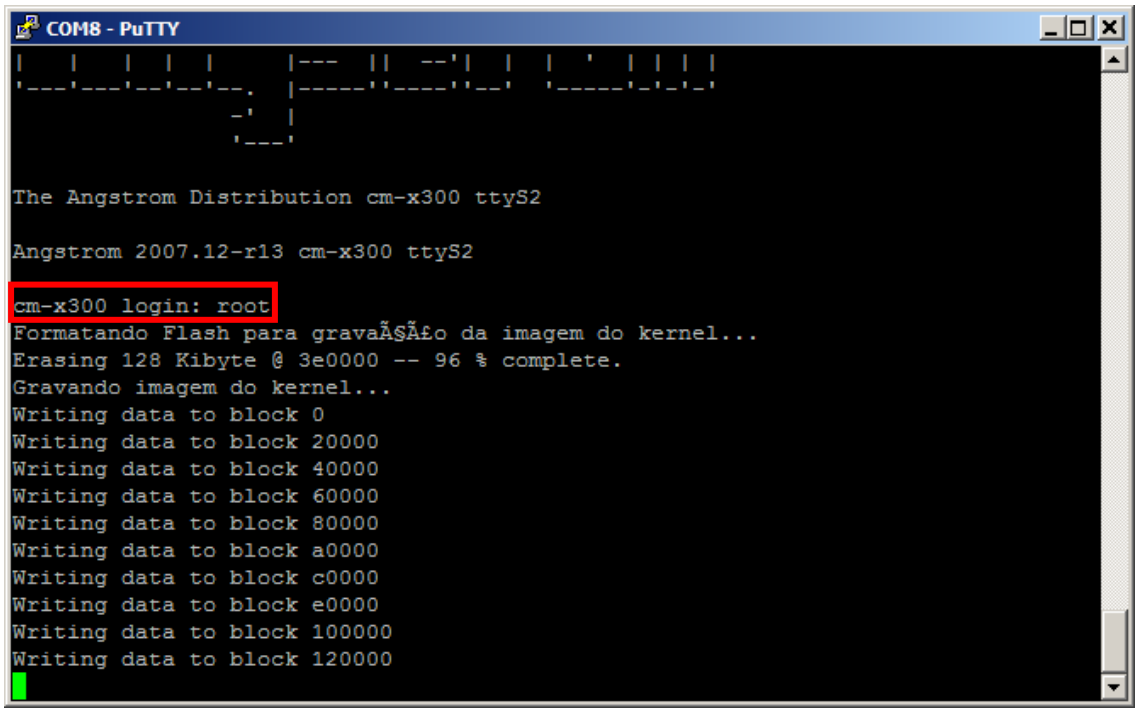
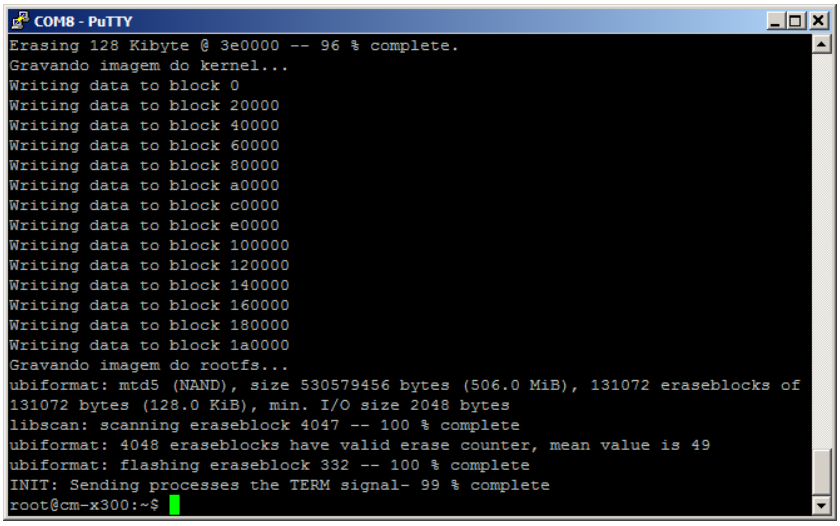
> root




11. Wait the process finalization and the AP360 will be restarted automatically, as show in figure below:




## 5.2 Installation and Configuration Verification

12. Connect the AP360's power cable into the power supply, 110 or 220VAC (50/60 Hz) and Ethernet cable. Wait this boot, as shown figure below.

13. Press the center button, highlighted in Figure below. This prodedure displays the AP360 menu. Press the center button. Note that the device's network settings are displayed.

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# 6 Technical Data

## 6.1 Design

Industrial metal housing

### 6.1.1 User interface

- Display 20x4 Characters
- Console RS232 serial

### 6.1.2 Dimensions

| Length (cm) | Width (cm) | Height (cm) |
|---|---|---|
| 23,85 | 48,26 | 4,44 |

### 6.1.3 Weight

| Wieght (Kg) |
|---|
| 3,300 |

### 6.1.4 Power

| Consumption | External Supply Voltage |
|---|---|
| | Voltage Range 110 to 220 VCA |

## 6.2 Envionmental Specifications

### 6.2.1 Temperature

| Operating Temperature (ºC) | Storage Temperature (ºC) |
|---|---|
| 0 to +45 | -10 to +50 |

### 6.2.2 Protection Against Water, Dust and Sand

| Protection |
|---|
| IP 65 Specified with fitted HRS connector |

### 6.2.3 Humidity

| Protection |
|---|
| 10% to 90% |

## 6.3 Communication Interfaces

| Communication Interface name | Quantity |
|---|---|
| RS232 Serial | 4x |
| RS485 Serial | 1x |

| | |
|---|---|
| Ethernet | 1x |
| K-Line | 1x |
| J1708 | 1x |
| USB | 1x |
| Display | 1x |
| Digital Outputs | 2x |

## 6.4 FCC Statement (Applicable for U.S.)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to pro-vide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.


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# 7 Glossary

| Term | Definition |
|---|---|
| AP | Access Point |
| DHE | Data head End |
| FCC | Federal Communications Commission |
| HRS | Hirose |
| IP | Protection Index |
| USB | Universal Serial Bus |
| VCA | voltage current alternate |
| SOPs | Standard Operating Procedures |
| SWPs | Safe Work Procedures |
| | |
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| | |
| | |

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