



Installation

AfiAct II™



Vital know-how in every drop | www.afimilk.com

afimilk®
Vital know-how in every drop

AfiAct II™

Installation

Product: Reader 2.0

Manual P/N 9440311

Version 2.7

Date Completed – June 2016

Afimilk Ltd., Kibbutz Afikim, 15148 Israel
Tel: 972-4-6754812 | Fax: 972-4-6751862
market@afimilk.co.il | www.afimilk.com



Federal Communications
Commission, USA



Conformité Européenne
(European Conformity)



Standards Institute
of Israel



Preface Material

About this Manual and Scope

This manual describes the installation of AfiAct II, either as a standalone system or as part of the larger Afimilk system. For a description of the features and usage of the AfiAct II system, refer to AfiAct II UM.

Intended Users

This manual is intended for Afimilk authorized technicians, experienced in installing electrical systems in non-protected environments, for dealers-technicians and farm technicians.

Contacting Technical Support HelpDesk

Afimilk technical support contact information:

email: support@afimilk.co.il

Tel: +972-4-675-4824.

Notes and Certifications

This device complies with FCC Rules Part 15 and with Industry Canada license-exempt RSS standard(s). Operation is subject to two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference that may be received or that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) l'appareil ne doit pas produire de brouillage, et*
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

NOTE: The digital circuit of this device 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:

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

Changes or modifications to this equipment not expressly approved by the party responsible for compliance (Afimilk Ltd.) could void the user's authority to operate the equipment.



Ensure taking all precautions when working with the high voltage components. To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Legal Notice

Copyright

Copyright © 2016 Afimilk Ltd., All Rights Reserved

Disclaimer

This document contains proprietary information of Afimilk Ltd. and may not be reproduced in any form without the prior written consent of Afimilk Ltd.

No part of this document may be reproduced, translated, stored in a retrieval system or transmitted in any form and by any means, electronic, mechanical, photographic, photocopying, recording, or otherwise, without the prior written permission of Afimilk Ltd.

Information provided in this document is subject to change without notice and does not represent a commitment on the part of Afimilk Ltd.

All products and company names are trademarks or registered trademarks of their respective holders.

Software License Terms

The software and the system design is the property of Afimilk Ltd.

It is supplied to the user to be used solely for its stated purposes. It is strictly forbidden to make copies of the software or transfer it in any way, for any purpose, to any third party.

In addition to application software specifically developed by Afimilk Ltd., the system makes use of certain third party utilities and system software. These are licensed for a single user. They must not be copied in any way, for any purpose, by the user, its employees, or anybody else.

The license to use the software is granted to the user only for the specific system it is installed on by Afimilk Ltd., or its authorized distributors and representatives.

The purchaser shall not modify the software in any way.

It is strictly forbidden to use this product for any purpose other than originally designated for or stipulated by Afimilk Ltd.

Conventions

Important information is highlighted in a frame, as explained below:



Warning

*Actions requiring special attention to avoid serious bodily injury;
For example, working with high voltage components*



Caution

*Actions requiring special attention, to avoid possible damage to equipment
or livestock*



Note

Hints and recommendations for working efficiently



Environment

Environment notice

Safety Instructions and Notice



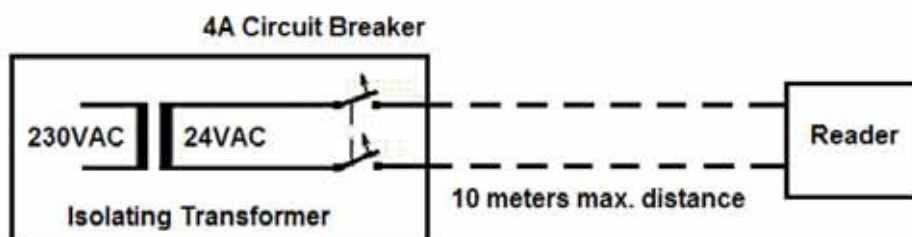
*Electrical connections must only be performed by a certified electrician.
The installation must be performed in accordance with current norms and regulations as well as local and national rules.*

Before installing and operating any equipment, review the safety instructions for any hazards associated with installation and use of the device. Also, review standard and local practices for preventing accidents.

The system and its components are powered by electricity from main power supply. This power supply is sufficient to cause serious personal injury or even death.

Only a (local state) licensed electrician should install power cables and power supply units.

Use only a correctly rated power cable that is certified, as appropriate, for the country of operation.



The AfiAct II must be powered by an external isolating transformer (output 21.6 - 27.5Vac, 75 VA maximum, certified as LPS according IEC 60950-1 clause 2.5) with an accessible circuit breaker and double isolated from mains.

- Read this manual carefully. Proper handling of the equipment is the basis for correct functioning.
- Only technicians who are skilled and authorized by Afimilk, dealer technician together with the farm staff may carry out installation of the equipment.
- The customer is fully responsible for any changes made, either in the system configuration or in the software application data, by the customer or by the customer's agent.
- Afimilk will not be held responsible directly or indirectly for any damage caused to the customer and/or to a third party and/or to the animals, by an action and/or change and/or omission performed in the AfiAct II™ system, either by the customer or by the customer's agent, directly and/or indirectly.

- Afimilk recommends that the customer call for a full system inspection by a qualified technician authorized by Afimilk every six months.
- It is the responsibility of the operator to install, operate, and maintain the system in accordance with all applicable laws, codes and regulations.
- The equipment must be used only for the described purpose.
- This system has been checked for viruses prior to supply. If in the course of a service call, a virus is detected, removal of the virus, and any software or hardware repairs resulting from it, will be charged to the purchaser.

The system and its components are powered by electricity from a main power supply. To avoid personal injury, danger of fire, and possible damage to equipment and materials, all work on electrical and electronic circuits should be done following these basic safety procedures:

- Power to all Afimilk devices must be supplied through an accessible, well-marked circuit breaker (usually placed on the power transformer).
- Before conducting work on any Afimilk device, make sure power to devices is switched off at the circuit breaker (usually placed on the power transformer).
- Remove power from the circuit or equipment prior to working on it. Never assume the circuit is off; check it with a multimeter.
- In case of electrical fire, switch off the circuit and report it immediately to appropriate authority.
- Stay away from live circuits. Do not work on or make adjustments when the power switch is on.
- Never switch on equipment in the presence of water leakage.
- Work in clean, dry areas. Avoid working in damp or wet locations because this increases the chance of electrical shock.
- Wear only nonconductive shoes to lessen the possibility of electrical shock.
- Remove all rings, wristwatches, bracelets, and similar metal items. Avoid working in clothing that contains exposed metal zippers, buttons, or other types of metal fasteners. The metal can act as a conductor, heat up, and cause a bad burn.
- High voltage surges and other power irregularities can cause extensive damage to a system. It is the responsibility of the operator to provide a power protection system.



Do not dispose of WEEE as unsorted municipal waste!



List of Terms and Abbreviations

Term/Abbreviation	Description
RPU	Tag Reading/Programming Unit
AfiAct II	AfiFarm module for generating cow database and providing general fertility reports.
DIM	Days in Milk
ID	Identification
PC	Personal Computer
PD	Pregnancy Diagnosis
RF	Radio Frequency
LR	Long Range radio i.e. 916/868 MHz, communication between Reader and tags
SR	Short Range radio i.e. 200/80 KHz
RT	Real Time system
RTMS	Real Time Setup module
RTG	Real Time GUI module - AfiControl
RTC	Real Time Station Controller module
RPM	Revolutions per Minute
Opcode	Operation Code
AP	WiFi Access Point (antenna)
WLAN	Wireless Local Area Network - links two or more devices using wireless distribution, providing a connection through an access point to the Internet.
Tx	Transmit
IM	Installation Manual

Referred Documents

PN	Document Name
9140233	Tag Reader& Tag RPU user guide
9040946	SR Opcodes (for RPU programming)
9040953	AfiFarm5 installation manual
5096003	AfiFarm5 configuration manual
9040954	AfiFarm 5 integration and prerequisites
9440312	AfiAct II user manual
9040952	AfiAct II Software Upgrade Instructions (R1 → R2)

Revision History

Version	Date	Description
1.00	Oct 2013	Revision one.
1.2	Oct 2013	Add FCC Approvals
2.0	Feb 2014	Update WIFI spec 2.2 PC requirements 2.3.1 re-locate RT quick-start (after RT installation) 4.2 add tag-activation routine 6.1 Update tag management 6 correct troubleshooting flow for disconnection, 7.1 Update antenna names 1.3.1 update location of RID label 0, correct wifi settings 4.4, remove tag survey section (covered by other sections), add backup setup Error! Reference source not found. , add db backup and restore.
2.1	Mar 2014	Correct supported Windows version, section 2.4.1
2.2	Mar 2014	Add Japan radio regulation certification (preface).
2.3	Sep 2014	Add Circuit Breaker warning, see Safety instructions on page vi, 0 Replace reader mounting plate and rod, sections 1.3.1, Error! Reference source not found. , 5.2
2.4	May 2015	Installation and configuration - screens and process updated. RPU flow updated New template implemented
2.5	Sep 2015	Comply with safety regulations (updates in section 1.5)
2.6	Dec 2015	Replace Reader's blue wire + extension by the new white wire Correct names (RT Studio → AfiControl) Update screens and flow Update safety instructions to suit new regulations Update AfiTag arrow pictures
2.7	May 2016	New Reader version 2.0, with internal antennas

Table of Contents

Preface Material	ii
Table of Contents	x
1 Introduction	1
1.1 Principle of Operation	1
1.2 Supported Scenarios	2
1.3 AfiAct II Components	2
1.3.1 Reader Box Components.....	3
1.3.2 Tag Types	4
1.4 AfiAct II Reader – Indicators and I/Os.....	5
1.4.1 Front Panel - LED Indications	5
1.4.2 Back Panel – Inputs and Outputs	6
1.4.3 Reader box - Attributes Label.....	6
1.5 AfiAct II Reader Power Specifications	7
1.6 System Installation Overview.....	8
2 Prerequisites and Site Planning.....	9
2.1 Determine Reader Mounting Location.....	9
2.2 Setup Network and Power Coverage	11
2.3 Prepare the PC Environment	13
2.3.1 Verify Operating System, Processor & Memory.....	14
2.3.2 Network Connections.....	18
2.3.3 Additional Windows OS Preparations.....	21
2.3.4 Verify System is Prepared	31
3 Install and Set AfiAct II Software	32
3.1 For existing AfiFarm: Manual Data Backup	32
3.2 Install AfiFarm5 and AfiControl.....	34
3.2.1 General Notes	35
3.2.2 Set & Initiate the Installation Wizard.....	36
4 Initial Reader Communication.....	46
4.1 Connect the Reader to the Wired Network.....	47
4.2 Set AfiControl (Quick Start).....	49
4.2.1 Navigating AfiControl Tool.....	50
4.2.2 Determine the Required Sampling Sessions.....	51
4.2.3 Set System Mandatory Parameters	53
4.2.4 Additional AfiControl Configurations and Monitoring.....	66
4.3 Verify Reader & AfiControl Communication	67
4.4 If Needed: Set Wi-Fi Communication	68
4.4.1 Set Reader to use Wi-Fi settings different than Default.....	69
5 Mount the Reader	74
5.1 Mount the Power and Electricity Boxes	75
5.2 Mount the Reader on the Pole.....	78

5.3	Connect the Reader to Power	81
6	Handle AfiTag II	82
6.1	Test AfiAct II Tags' Transmission.....	83
6.2	Perimeter Coverage Validation	85
6.3	Attach AfiAct II Tags.....	87
6.4	Replace and re-use Tags	90
6.5	Store Tags	92
7	Fault Identification and Troubleshooting.....	93
7.1	Reader Connection to AfiControl or Network Fault	94
7.2	Tag Problems	95
7.3	Reader and Tag Communication Faults.....	96
7.4	Reader's Luci Cannot be Accessed	96
7.5	Back-to-Back Connection	97
7.6	Region Transmission Setup	98
7.7	AfiFarm Installation Problems	98
Appendix A	: Set Laptop's Static IP	99
Appendix B	: RPU Tool for Tag Management	104
Appendix C	: AfiControl Summary	109
Appendix D	: TieStall	118
Appendix E	: Two AfiFarm Systems	120
Appendix F	: Enter Herd's Data	126

1 Introduction

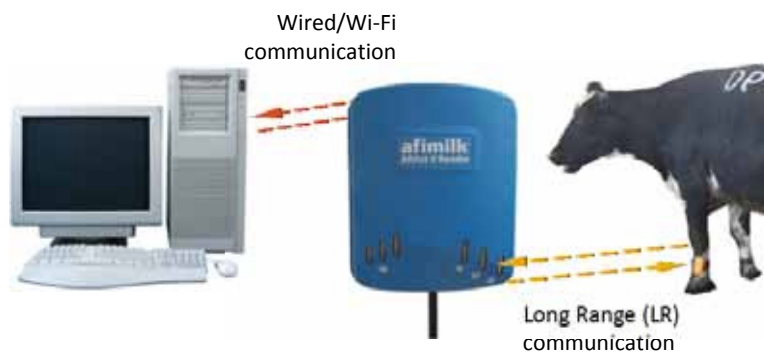
AfiAct II is an estrus and fertility monitoring system that provides at a glance full picture of cows and heifers in estrus. The monitoring system provides thorough tracking of the fertility-related data for the dairy farm herd. It can be implemented either as a standalone system or as part of a comprehensive Afimilk system.

This is done by collecting cows' physical behavior and aggregating them with events information to generate heat lists, fertility reports and fertility disorder alerts.

1.1 Principle of Operation

The following diagram shows the data flow in the AfiAct II system.

Figure 1: AfiAct II system data flow



AfiAct II uses Long Range (LR) communication to collect data from cow tags (AfiTag II sensors) and transfers the information via a standard network (IP based Wi-Fi or wired communication) to a PC based analysis.

Tags are placed on the cows' legs. The AfiTag II holds the unique ID of each cow, and records its number of steps, standing time, rest time and bout. The tags use LR (Long Range) RF (Radio Frequency) communication to send this data periodically (every pre-defined time-interval, default is 15 minutes) to an antenna located inside the AfiAct II Reader device (two antennas that provide optimal coverage).

AfiAct II Reader collects data from the cows' tags which are within its receiving range. The Reader uses either wired or Wi-Fi communication to send the data to the PC for analysis (2 internal antennas are for Wi-Fi, when used).

The AfiAct II software, located on the PC, uses the collected activity data of each cow to calculate when the cow is in estrus and find the best time for breeding. The application generates reports and alerts the farmer.

The communication used by the entire system complies with local regulations and safety tests, corresponding with the 'home appliance' category.

1.2 Supported Scenarios

This document describes the following scenarios:

- Scratch installation
- Upgrade from R1 – see AfiAct II software upgrade instructions

Both scenarios use a single computer (no custom installation)

1.3 AfiAct II Components




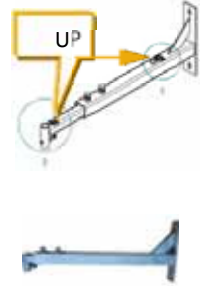


The following table provides a list of the basic AfiAct II system elements. For specific part numbers, refer to the detailed tables of each element.

Table 1-1. System Components

Picture	Name	Description	PNs – see:
	AfiAct II Reader 2.0 (including nounting brackets)	The Reader is the interface between the tags and the AfiAct II Software. Internal antennas allow Reader-tag communication, & Reader-PC Wi-Fi communication.	1.3.1
	AfiTag II (40096xx)	Afimilk's cow-tag, including the attachment strap. A tag should be attached to every cow participating in the AfiAct II group.	0
	AfiAct II software program	USB flash drivewith PC software to control the system.	51960A2


1.3.1 Reader Box Components

Table 1-2.Reader Box Components

Picture	Name	Description	PN
	AfiAct II Reader 2.0 (Display Printed Circuit Board; Tested PCB Assembly)	AfiAct II Reader: <u>International (907-928 MHz)</u>	4256200 (note: above PN also contains: 4256204; note: Reader1= 4256000)
	Mounting plate	<u>Europe (868 MHz):</u>	4256201 (note: above PN also contains: 4256205 Note: Reader1= 4256001)
	Mounting plate	<u>Mounting plate</u> (PN 5001028) connected to the back (for connection to reader bracket arm)	
	Bracket arm	<u>Bracket</u> (with 2 UP stickers, indicating installation direction) (PN 9030050) (screws for wall connection – not supplied. The fasteners must be determined by the installer, according to conditions: surface (e.g. concrete vs wood vs steel, etc.) and other specific variables.	
	5 Cable tie-wraps (8inch, black)	(PN 9030402)	
	Power cable AC/DC 4X0.75 +CONNECTORS ASSY (PN 4000911) Exposed cable length ±1700mm Cable outside diameter: Ø7mm		 <i>Note: the cable enters the enclosure through the cable gland, where cable-gland-PG11 is suitable for a cable of a diameter of Ø5 – 10mm</i>

1.3.2 Tag Types

Table 1-3.Tag Types

Picture	Description	PN
	AfiTag II, Type A, 200 KHz SR, 916 MHz LR	4009600
	AfiTag II, Type A, 200 KHz SR, 916 MHz LR, Israel	4009680
	AfiTag II, Type B, 80 KHz SR, 868 MHz LR	4009610
	AfiTag II, Type E, 200 KHz SR, Japan MHz LR	4009650
	AfiTag II, Type C, 200 KHz LF, 868 MHz LR	4009630

1.4 AfiAct II Reader – Indicators and I/Os






The following sections describe the Reader's indication LEDs, input and outputs.

1.4.1 Front Panel - LED Indications

The following image shows the Reader's fault and indication LEDs.



Table 1-4. External LED Indications

Item	LED Label	Description
1	Tag Comm 	Communication with tags: Blinking Yellow – good communication Off – No communication <i>Note: This LED blinks for a short period every time a tag message is received in the Reader.</i>
2	PC comm 	Communication with the PC AfiAct II application Yellow – The Reader is communicating with the AfiAct II Off – Reader could not connect with AfiAct II <i>During firmware upgrade:</i> PC comm LED and the lowest Wi-Fi signal strength LED blink until upgrade complete
3	Power 	Bi-color LED: GREEN / RED: <ul style="list-style-type: none"> ○ <i>Power/Status OK:</i> Green ○ <i>Startup behavior:</i> LED toggle: in Green/Red. If startup is successful LED becomes Green. ○ <i>No tag is identified</i> for over 30 minutes (default setup): LED blinks in Red ○ <i>Other faults:</i> LED changes to permanent Red ○ <i>HostBoard does not communicate with SubGBoard:</i> LED blinks Red
4	Signal strength 	Indicates Wi-Fi communication strength, after the WLAN LED shows successful association between the Reader and the AP.  <ul style="list-style-type: none"> Good signal strength (> -60 dbm) Medium signal strength (between -60 and -80 dbm) Low signal strength (between -80 and -90 dbm) <p><i>Note: When no strength LED indication is on and the WLAN LED is on, the signal strength is below -90</i></p> <p><i>During firmware upgrade:</i> PC comm LED and the lowest Wi-Fi signal strength LED blink until upgrade complete</p>

1.4.2 Back Panel – Inputs and Outputs

The following image shows the Reader's **Back panel** inputs and outputs.



Note: when the communication is not in use, close the connection using the cap!

1.4.3 Reader box - Attributes Label

On top of the Reader's cable cavity you will find the following label, indicating the Reader's attributes



1.5 AfiAct II Reader Power Specifications

The AfiAct II Reader power connection must comply with the following specifications:

Table 1-5. Power Specifications

Item	LED Label
Voltage	Nominal voltage of 24Vac (minimum 21.6Vac to maximum 27.5Vac)
Current	AC: 0.6A max 50/60Hz DC: 1A max
Power per unit	16.5 Watts (i.e. a VA rating of at least 20 VA for the transformer)

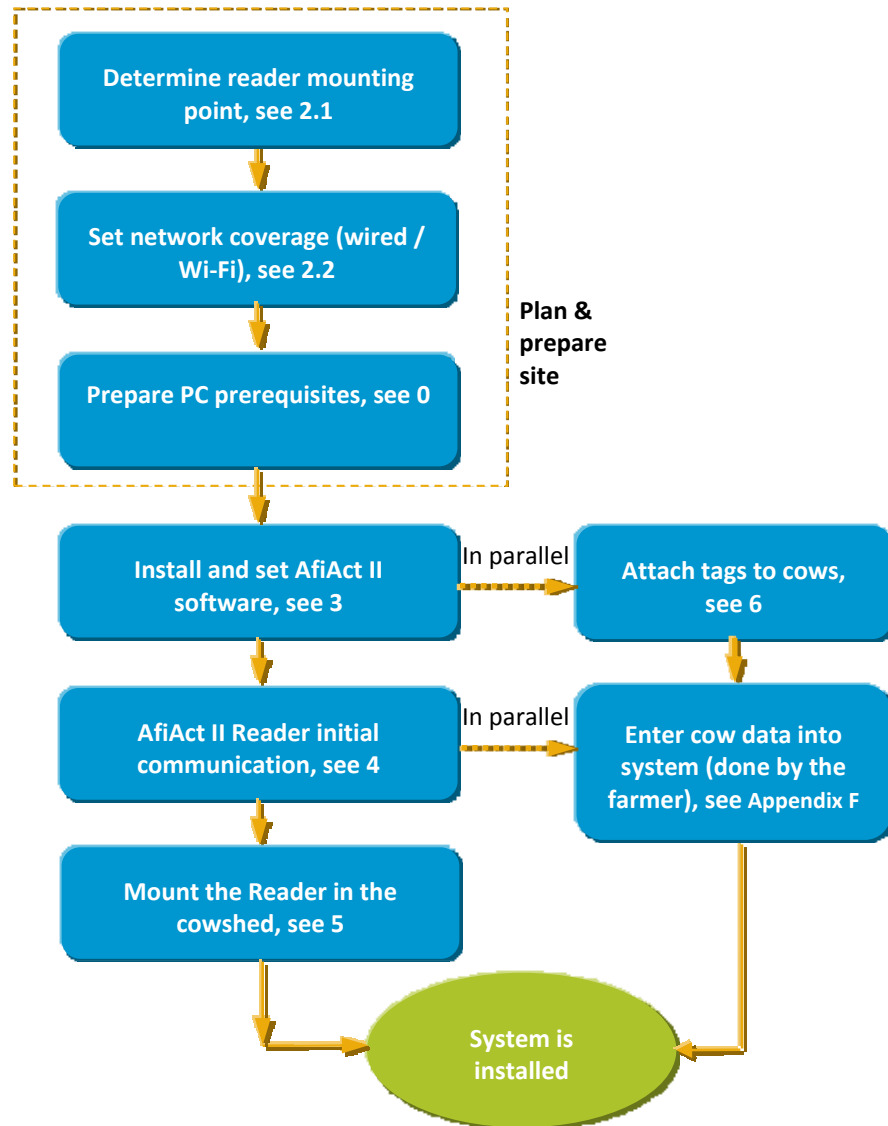


Note

To avoid unacceptable electrical power reduction, the cable length and diameter must be validated, to ensure the cable is not too long per its diameter.

1.6 System Installation Overview

To fully install AfiAct II system, pre-installation preparation is needed; some preparations are done by Dealers' technicians, and others are the farmer's responsibility. The following flowchart presents the preparation and installation phases and the responsible party per phase.



2 Prerequisites and Site Planning

Before starting AfiAct II installation, verify that all pre-requisites are fulfilled:

1. Reader mounting point: Identify a proper location for AfiAct II Reader, see 2.1
2. Verify network coverage in the required area, see 2.2

Note: It is highly recommended that the network technician be present during the Reader installation.

3. Verify system deployment is scratch; (if using a standalone system side-by-side with AfiFarm, you may want to restore the initial animal database to the system after the installation).
4. Validate AfiAct II PC corresponds with the requirements, see 02.3



Note

To determine the system sampling sessions during the installation, investigate the specific site needs. This can be performed during the preparations phase, or during the installation, see 4.2.2.

2.1 Determine Reader Mounting Location

Determining optional Reader mounting points is done by the Dealer technicians. To do this, either get a scheme of the shed dimensions from the farmer (including poles, electricity outlets, distance from the office, etc.), OR visit the farm before the installation to perform a site survey.

The farmer receives from the dealer a list/scheme showing the optional mounting points, and the required coverage radius. It is the farmer's responsibility to provide coverage in these points.



The Reader mounting location is based on the cowshed size and location, and should comply with the following conditions:

- **Height**: The Reader is mounted on a pole, maximum height from the ground: 3 meters high from the ground.
- **Coverage (tags and Wi-Fi/wire)**: (fine-tuning will be performed while mounting)
 - The mounting pole location must allow tag-coverage range for the whole defined area. This is determined according to the shed scheme, and will probably be around the center of the required 80 meters coverage radius, also covering the feeding and water trough areas.



Note

The final coverage and corresponding location determination must be done during a site survey and could vary according to specific farm environment.

- The Reader should have a line of sight towards cow tags, with minimal interference from other sheds/poles/buildings, etc.
- The Reader should have Wi-Fi / wired connectivity to the Access Point / office.
- If located under a roof, avoid transmission interference, according to the following specifications:
 - The structure may be made of metal or wood.
 - The roof should be at least 4 meters high; If possible, the roof should be made of a plastic material (rather than aluminum or sheet metal).
 - If the sides are closed, this siding material should not be metal either.

- If metal fencing is used to keep animals out, it should be a large opening Australian-type fencing material (at least 30 cm) (otherwise the communication signals may be reduced).
- **Power access:** The pole has near access to a power outlet (to be provided by the farmer).
- **Accessibility:** The Reader and power box can be easily viewed and accessed for maintenance (if possible – accessible from the passage).
- **Weather protection:** The Reader is fully outdoor compatible.



Note

The Reader must be fixed to a static connection point.

Do not fix the reader on a connection point that vibrates or moves as a result of ventilating fans, blowers, motors and machinery.

2.2 Setup Network and Power Coverage

The customer may determine the type of network communication used between the PC and the Reader; either wired or Wi-Fi can be used. However, it is the customer's responsibility to ensure power point and network coverage in the office and in the Reader-determined mounting point (in the cowshed – according to the Dealer's technicians). In either case, the office and Reader network coverage setup must be completed and tested before starting the Reader installation (e.g. via a laptop computer, smartphone, or in future releases, via tag-indicator).

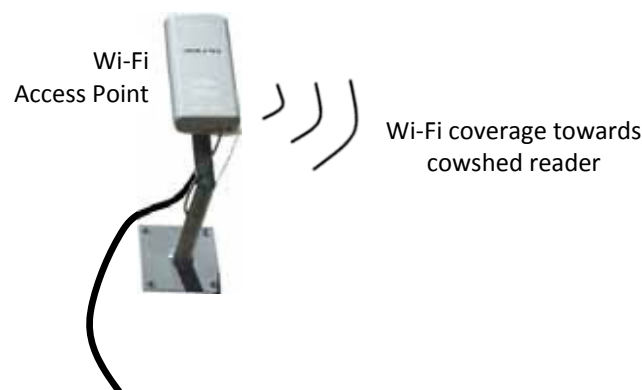
Note: The Wi-Fi network must in turn provide an IP to the Reader's MAC address.

Office Wi-Fi Coverage

The office Wi-Fi coverage is a recommendation, and it is required when configuring the Reader to work with the AfiAct II software.

PC to Reader Wi-Fi coverage

The Reader's network coverage is set after determining the Reader installation point in the cowshed. The following figure shows an example of network coverage in the office and cowshed.





Wired connection towards office Wi-Fi router



Wi-Fi Specifications

Item	Value
Network	TCP/IP protocol network Network shall have an operative DHCP server Any commercial access point Carrier grade (99.999% service).
Access Point	Any commercial access point. In case of an OUTDOOR installation – outdoor weatherproof grade according to the installation environment and lightning protection design. Carrier grade (99.999% service).
WiFi certification supports	802.11g (802.11n is supported only if it can be set to work with 2.4 GHz bandwidth)
Encryption method default	Preferable: WPA-PSK/WPA2-PSK The following methods are also supported: WEP, WPA/WPA2, WPA-PSK/WPA2-PSK and IEEE 802.1X standard
Preferable SSID	afiact2
Preferable password	afimilk123
Signal and Noise	<ul style="list-style-type: none"> The SNR at Reader mounting point must be greater than 15 dB. RSSI must be higher than -80dBm. <p><i>Note: Preferred RSSI is -65 dBm to -55 dBm in the designated Reader mounting point</i></p>

2.3 Prepare the PC Environment

Before starting to install AfiAct II software, verify that your PC corresponds to the following set of requirements:

- The computer uses a **supported operating system, Processor and Memory** see 2.3.1
- **Network connections** comply with the requirements, see 2.3.2
- **Additional Windows OS preparations**, see 2.3.3
- **Verify the PC is prepared**, see 2.3.4

These requirements are detailed in the following sections.



Note

Verifying that you are using correct computer settings is essential for performing the installation correctly, allowing correct operation of AfiFarm5. In systems where there is a network administrator, he or she must be present during the installation.



Note

It is highly recommended to have an internet connection, to allow efficient support when needed.

2.3.1 Verify Operating System, Processor & Memory

The PC minimum requirements are as follows:

- Operating system (Windows edition):
 - **MS Windows 7** – Professional 64 bit
 - **MS Windows 8.1** - Professional 64 bit
- Memory, processor and other requirements: review your specific needs according to the farm type and according to the installed operating system, as detailed in the following table.

Table 2-1. Server PC Requirements

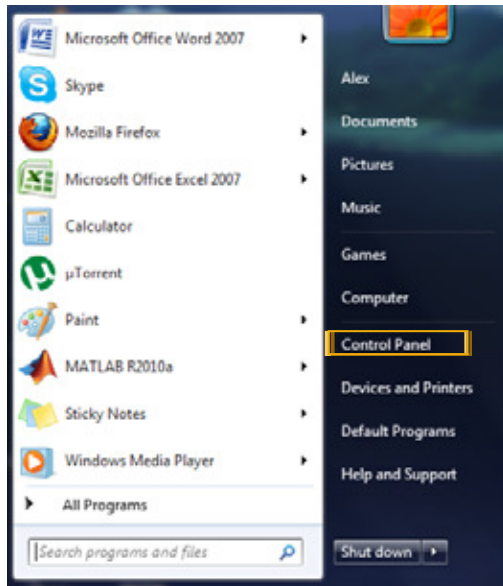
Operating system	Windows7 PRO (64-bit) ; Windows8.1 PRO (64-bit)			
	No. of animals	Up to 1000	1000 - 5000	More than 5000
RAM(GB)	Min: 16 Recommended: 32	Min: 32 Recommended: 32	Min: 32 Recommended: 32	Min: 32 Recommended: 32
Processor	i5	i7	i7	i7
HD type	7200 RPM	64MB cache / 7,200 RPM	64MB cache / 10,000 RPM	64MB cache / 10,000 RPM
HD free space ¹	500GB	500GB	500GB	1000GB
Additional required items	USB Flash drive of 8 GB or other backup device. UPS unit – <i>MUST be Installed!</i> Type is to be discussed with the PC supplier.			

¹ The required free HD space is for the PC drive in which AfiFarm will be installed. By default, it will be in the same drive Windows is installed in – most probably C: drive.

2.3.1.1 Verify RAM and Processor

To verify required RAM and Processor:

1. In your system tray, click the **Start** icon , and select **Control Panel**

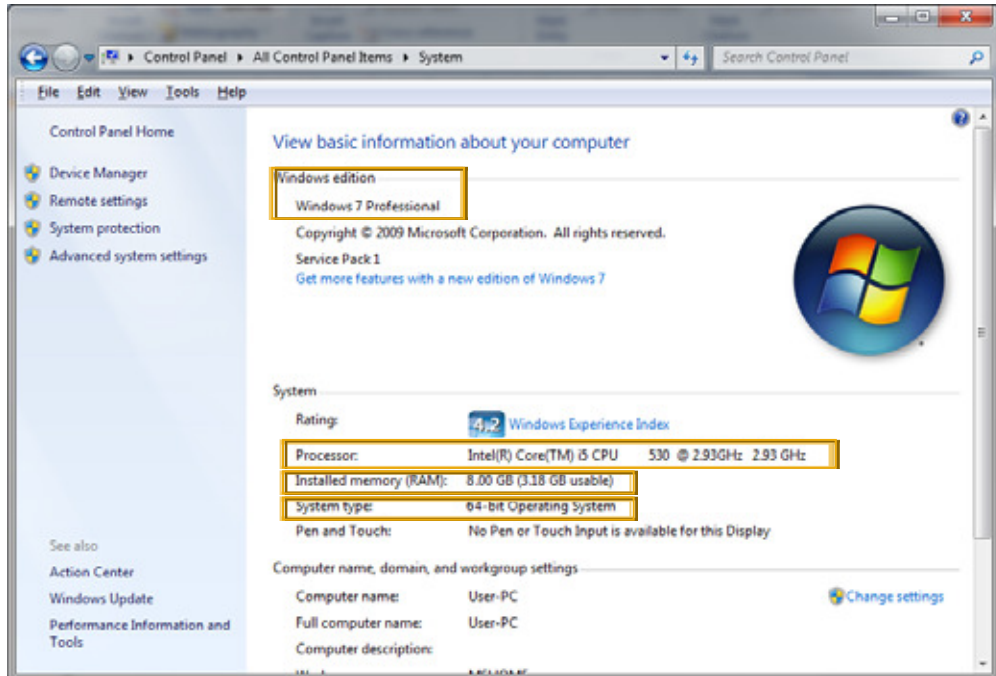


2. Click **System**.



3. Verify the following attributes are in accordance with requirements (see 2.3.1):

- **Windows edition**
- **Processor**
- **System Type**
- **RAM**



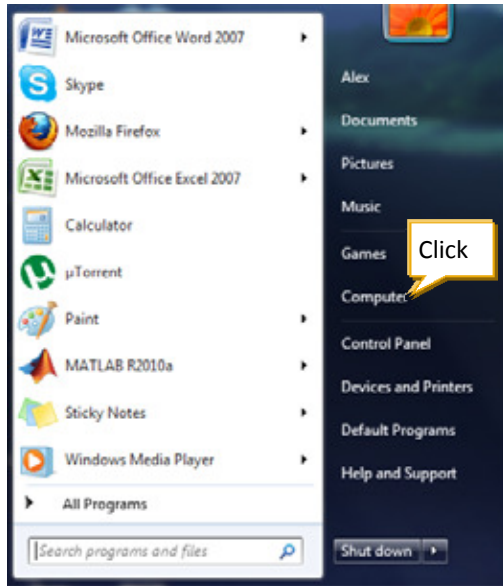
2.3.1.2 Verify HD Free Space and Type



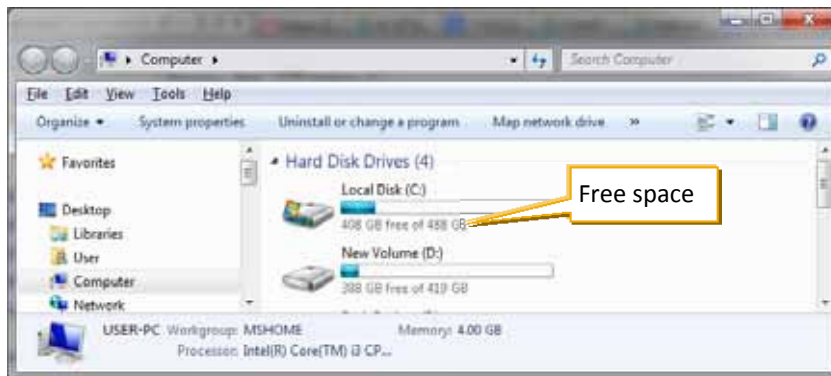
If the installation is done in a folder that is not the installation folder – verify that there is enough disk space in BOTH disks.

To check your HD free space

1. In your system tray, click the **Start** icon , and Double-click on **computer**



2. Check free space on your hard drive.



2.3.2 Network Connections

AfiFarm5 Network connections must comply with the following conditions:

- The network is supported by Windows.
- The network supports TCP/IP.
- The network must be transparent for a UDP broadcast.
- The LAN must have a minimum speed of 100 MBps.

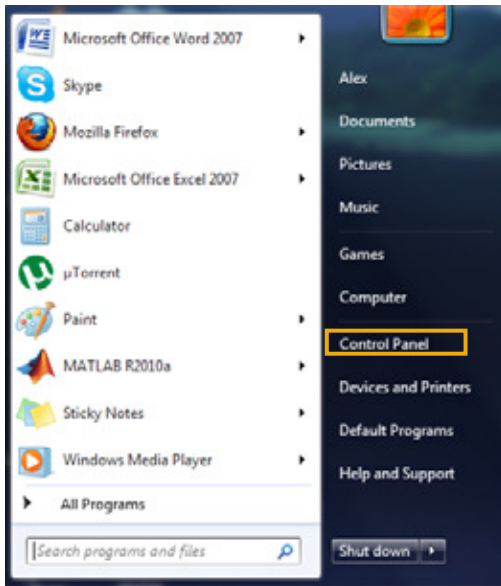


Note

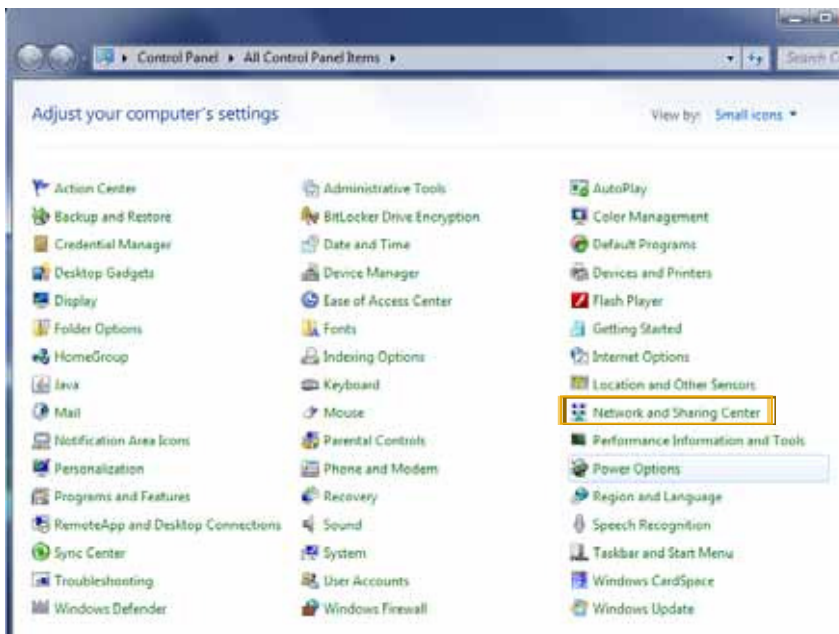
In order to print reports, the system must have a printer, connected either directly to the PC or via the network.

To verify your system has correct network connections

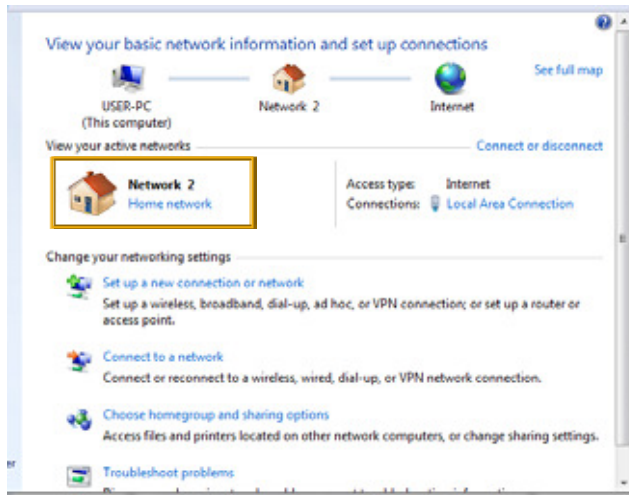
1. In your system tray, click the **Start** icon , and select **Control Panel**



2. Click Network and Sharing Center.



3. In the Network and Sharing Center dialog, verify that the Network is set to **Home**



4. If the Network is not set to **Home**, click on the network value. The Set Network Location dialog appears.

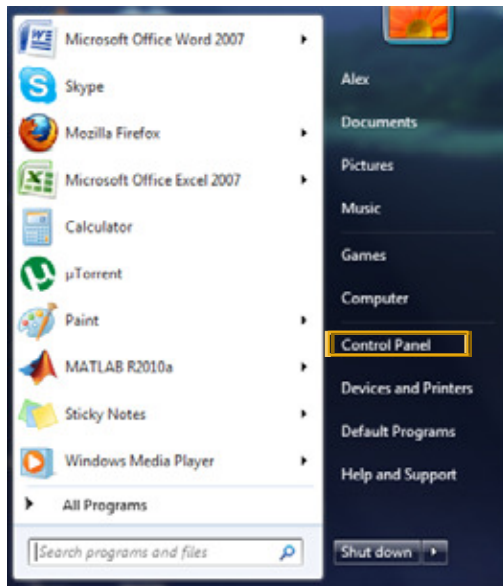


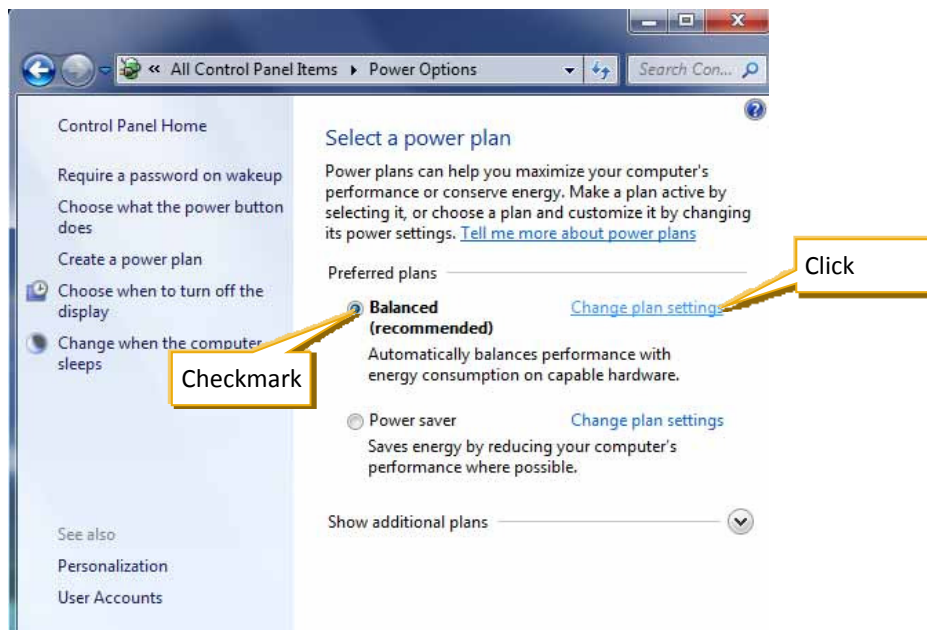
5. Choose **Home Network** and close the dialog.

2.3.3 Additional Windows OS Preparations

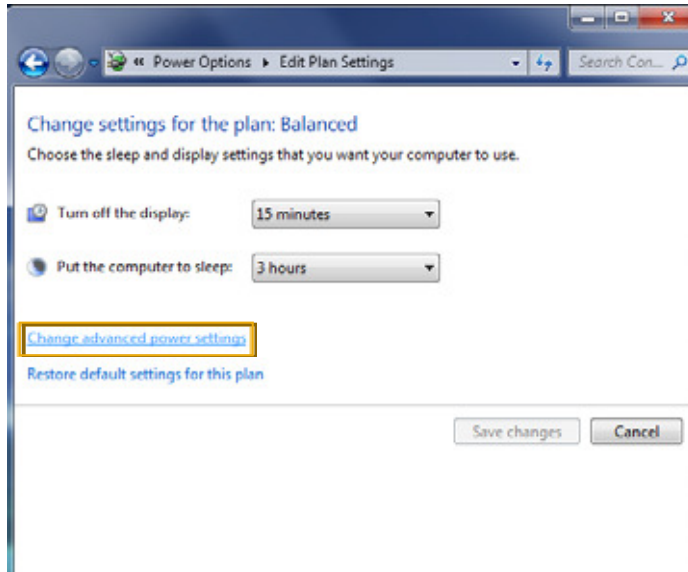
2.3.3.1 Configure Power Settings

1. In your system tray, click the **Start** icon , and select **Control Panel**

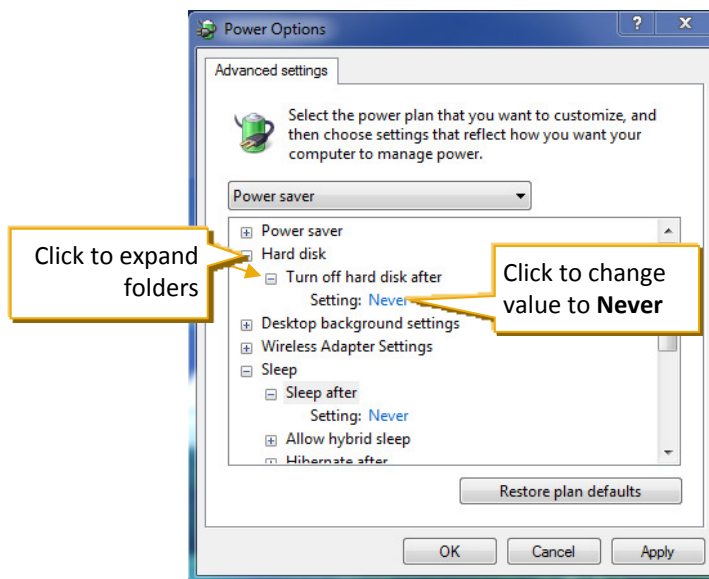


2. Click **Power Options**.3. Checkmark **Balanced** and click **Change plan settings**.

4. Click Change advanced power settings.

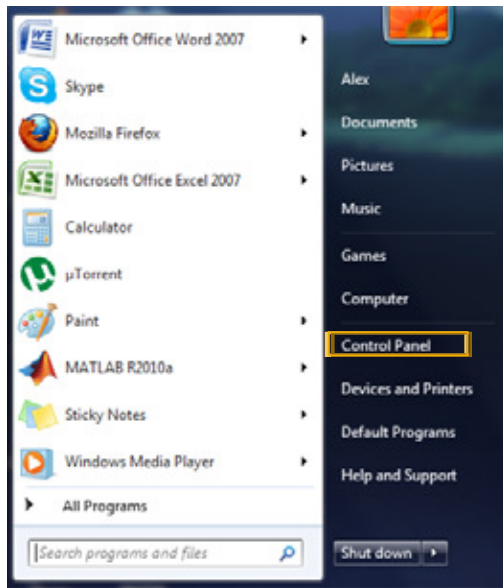


5. Expand the **Hard disk** folder (click the +sign near the folder). Then expand **Turn off hard disk after** and change to **Never**.
6. Expand **Sleep**. Then expand **Sleep after** and change to **Never**.

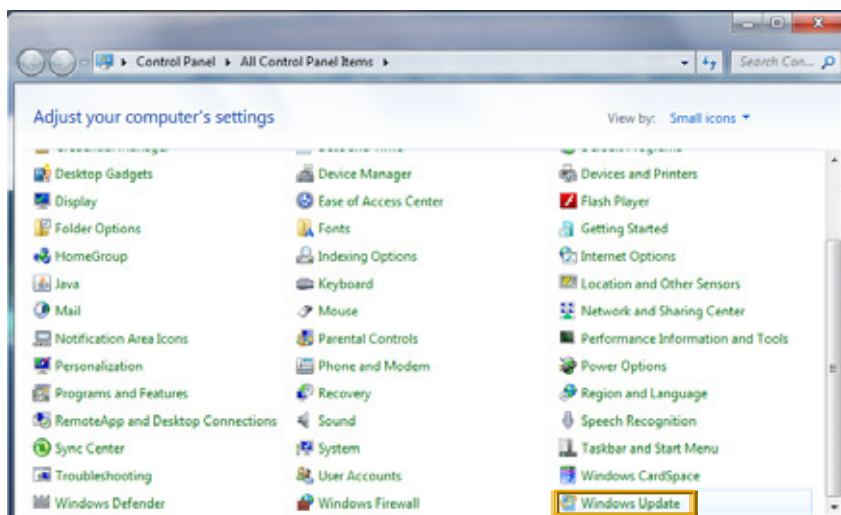


2.3.3.2 Install Windows Updates

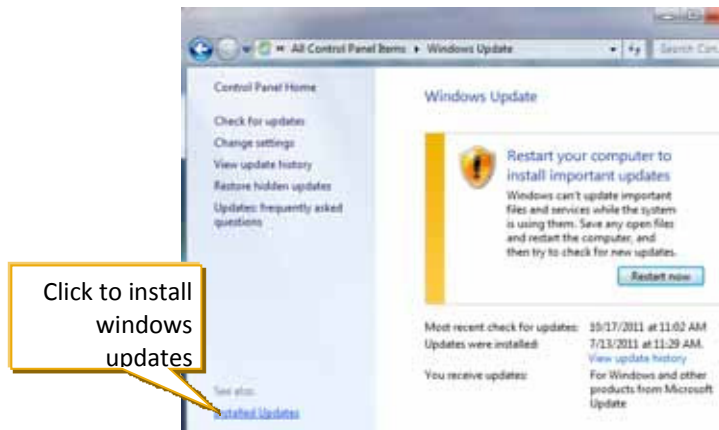
1. In your system tray, click the **Start** icon , and select **Control Panel**



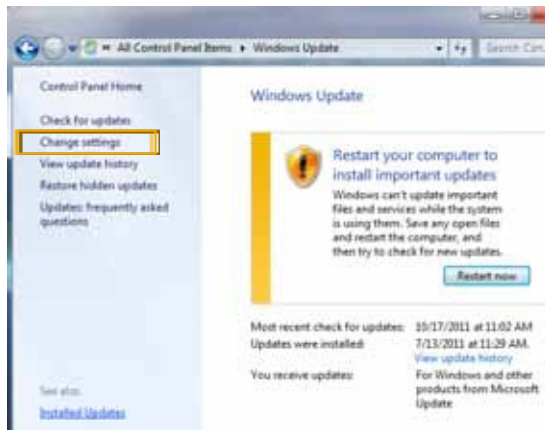
2. Click **Windows updates**



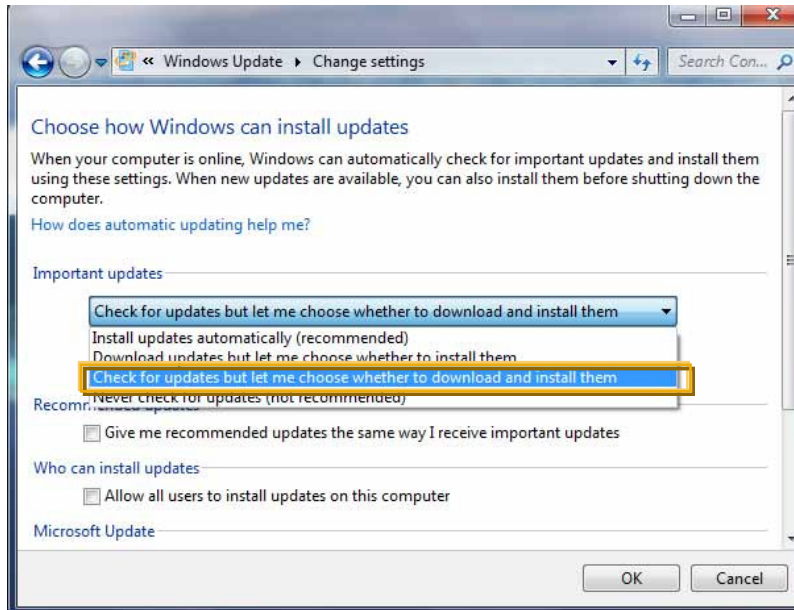
3. Click **Install updates** and follow the windows wizard to install all available updates.



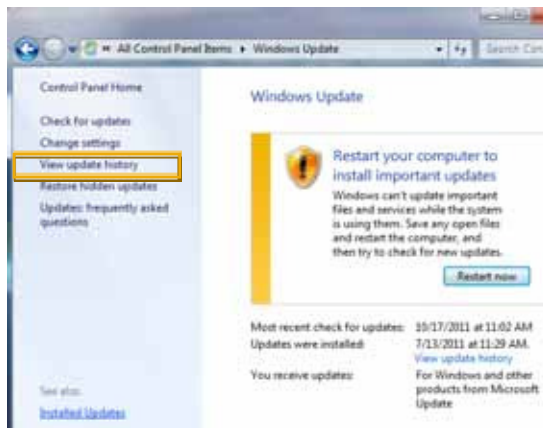
4. Click **Change settings**.



5. In the displayed dialog, choose Check for updates but let me choose whether to download and install them.



6. Click **OK** to return to **Windows update** dialog.
7. Click **View update history**.

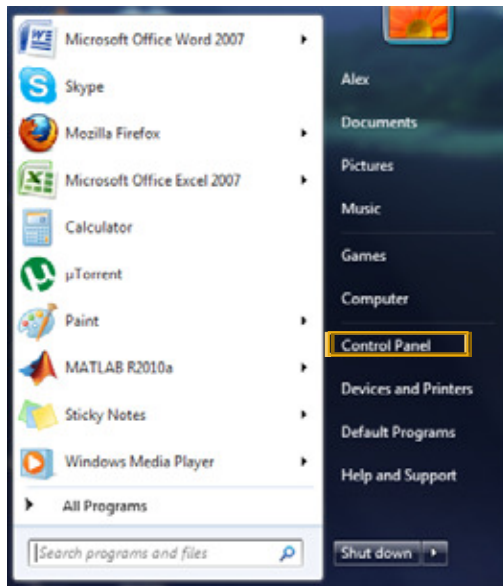


8. Check the status column for any problems and fix if necessary (refer to vendor instructions).

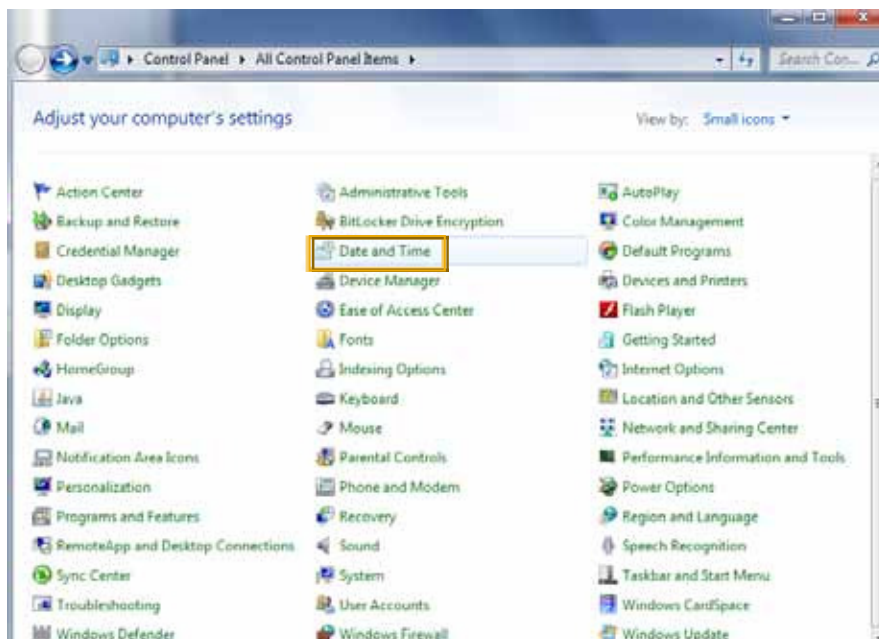
2.3.3.3 Set the Time and Synchronization

Disable the synchronization with the internet time server and check the time zone settings as follows:

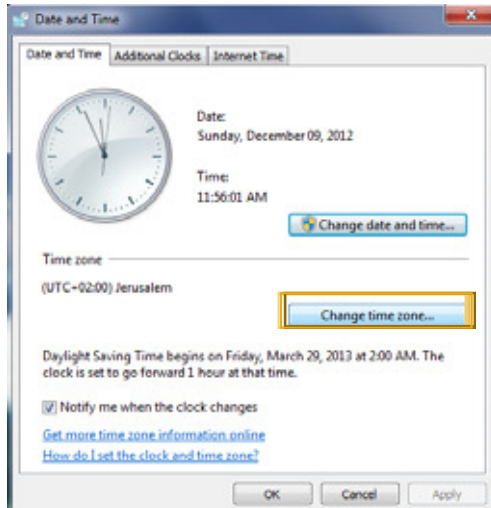
1. In your system tray, click the **Start** icon , and select **Control Panel**



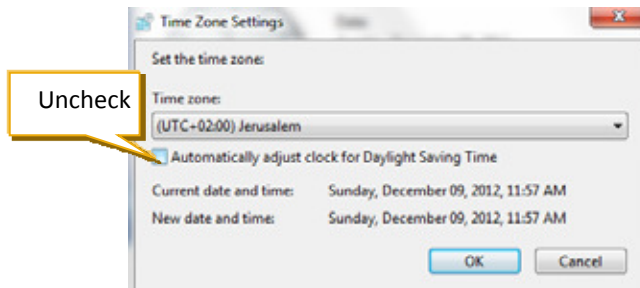
2. Click **Date and Time**



3. Click **Change time zone**



4. Uncheck Automatic adjustment of daylight saving Time.

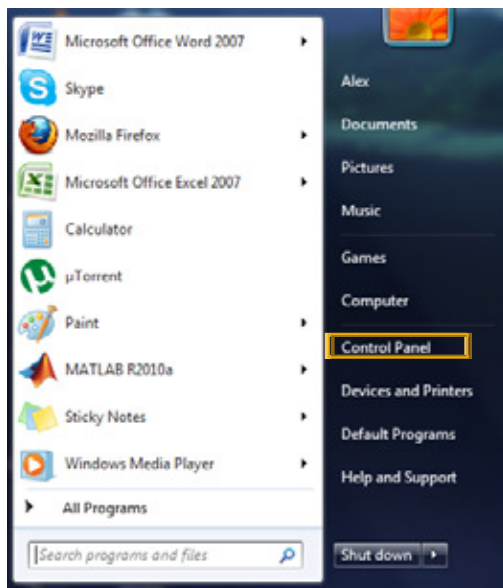


5. Verify that the **time zone** settings are identical in all the used PCs (in a multi PC system) (in the above *example*, all PCs should be set to the same time zone **UTC+02:00**)

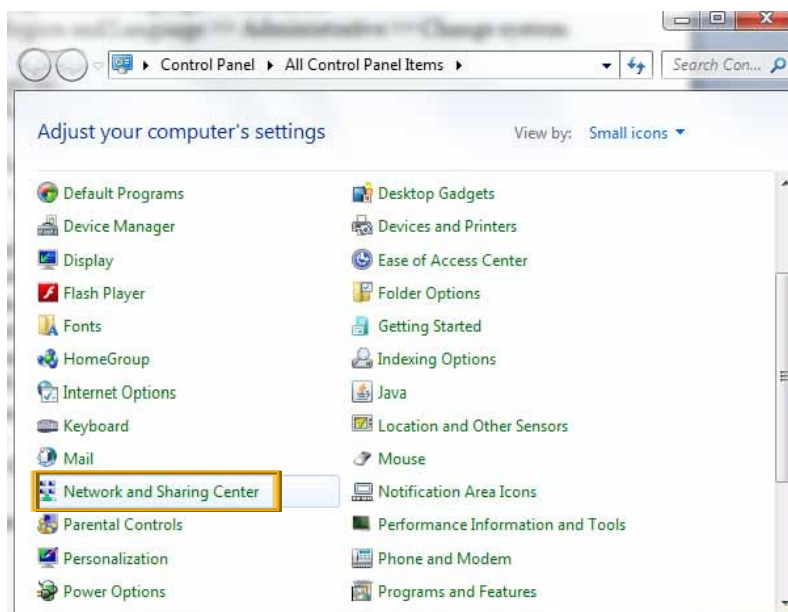
2.3.3.4 Confirm the File Sharing and Network Discovery

Verify proper file sharing setup as follows (for a multi PCs system):

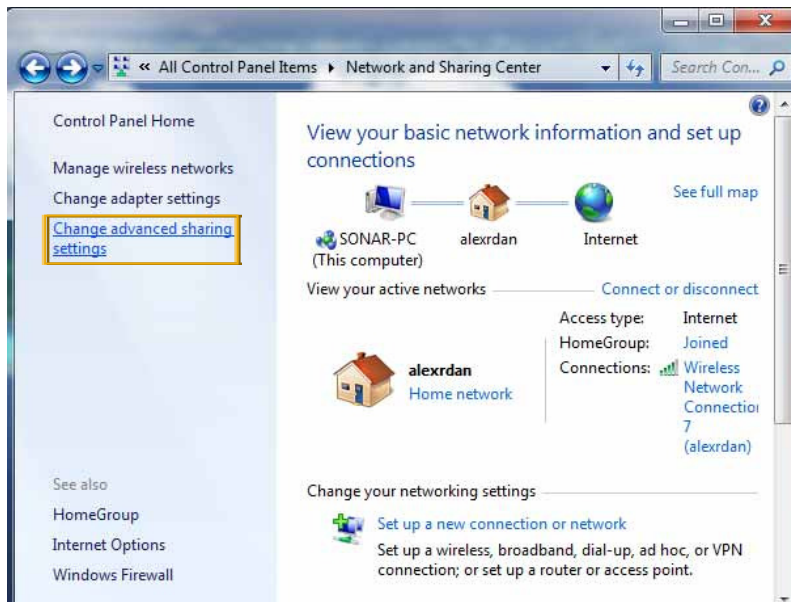
1. In your system tray, click the **Start** icon , and select **Control Panel**



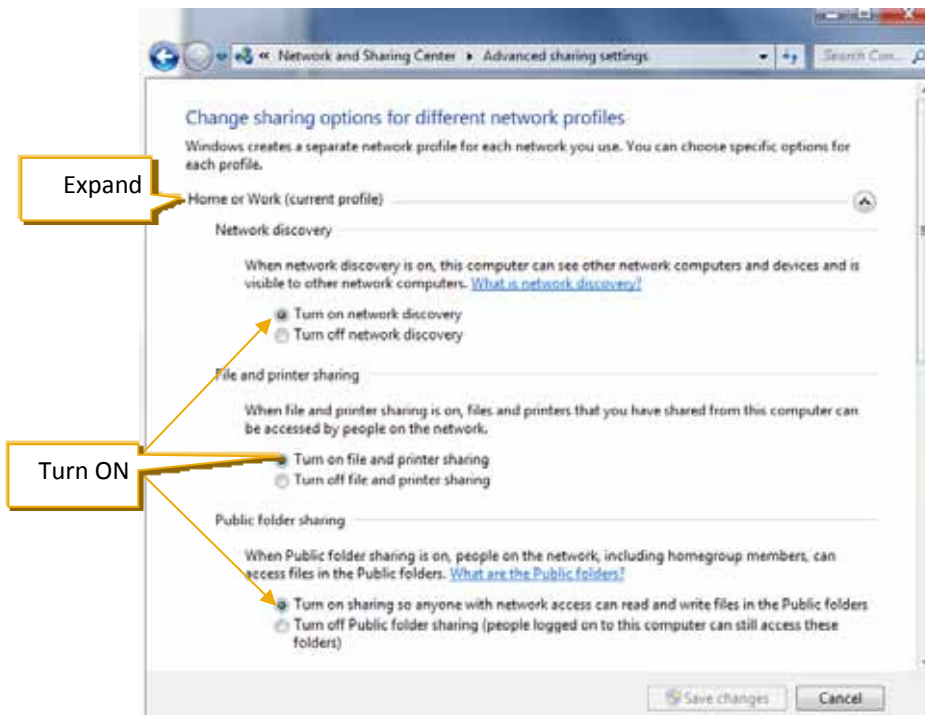
2. Click on Network and sharing center.



3. Click Change advanced sharing settings.



4. Expand **Home or Work** (click the arrow )



5. Verify the following attributes are turned **ON**:
 - Network discovery is **ON**.
 - File and printer sharing is **ON**.
 - Access to read and write files in Public folders for anyone with network access is **ON**.
 - Using user accounts and passwords to connect to other computers is **ON**.

2.3.4 Verify System is Prepared

As the successful completion of the installation process is strongly dependent on the environmental preparations previously performed, it is essential at this phase, before starting to install the system, that the user performs preparations checkup.



Review the pre-requisites list and verify that all of them were implemented.

What Next?

Your system is now ready for installation.

3 Install and Set AfiAct II Software

AfiAct II software is installed on a single PC. It consists of two installed modules:

-  **AfiFarm5** – contains the AfiAct II program and reports. In farms that do not use other AfiFarm elements, the data entry screens and activities are also accessed through this component.
-  **AfiControl RT module**– this module controls and monitors the system and collects data from the animals through the Reader.

This chapter details the installation phases of the two modules:

1. *When upgrading an existing system only:* Backup existing database, see 3.1
2. *Install AfiFarm5 and the RT (Real Time) system,* see 3.2
3. *When using a standalone system side-by-side with existing AfiFarm:* Restore backed-up data, see Appendix E

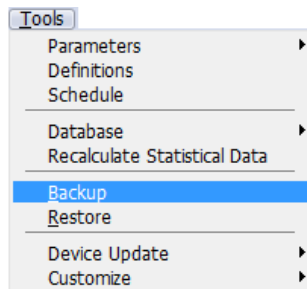
3.1 For existing AfiFarm: Manual Data Backup


This section describes steps performed ONLY when installing a stand-alone AfiAct II system, that will run side-by-side with an existing system from releases 4.x; If your system is installed from scratch – continue to section 3.2

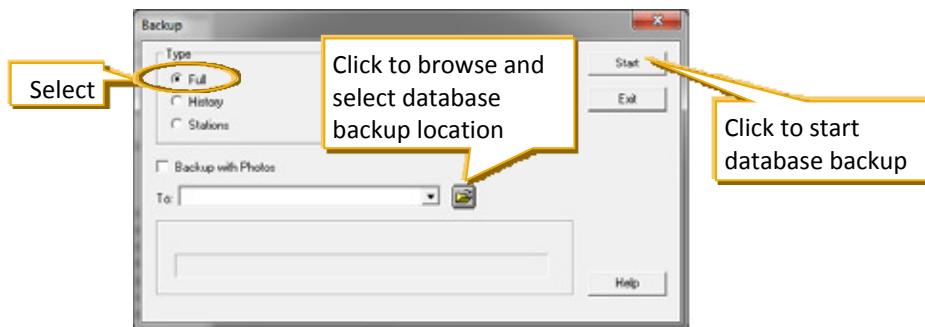
Before starting the installation, backup the database and configuration parameters manually. This process takes time: between 0.5 – 3 hours, depending on the database size and on the specific PC performances.

To backup AfiFarm database:

1. Insert the USB flash drive to which the database will be backed-up into the server PCs' USB connector.
2. Click **Tools** and select **Backup** from the drop down menu.



3. In the Backup dialog that appears, select the **Full** radio button, then click the folder icon  to browse and navigate to your backed-up database location. Then click **Start**.



3.2 Install AfiFarm5 and AfiControl

This section details the AfiAct II installation steps, as performed by following the instructions of the installation wizard. The wizard installs both AfiFarm5 and AfiControl RT (Real Time) modules (including the FarmServer Setup; Real Time Setup (RTMS); Real Time GUI (RTG); Real Time Station Controller).

To install the AfiAct II modules follow these steps:

1. Review general notes before starting, see 3.2.1
2. Install the HASP (software license key),
Initiate and follow the installation
wizard steps, see 3.2.2



3.2.1 General Notes

Before starting, review the following general notes.

Installation time

The installation time varies according to the specific PC characteristics and specific issues or wrong configurations. Generally: clean installations may take around 50 minutes.

Process sub-steps

During the installation, the wizard automatically performs several steps, as required by the specific scenario. These include the installation of various components (SQL, .Net 4, drivers, database operations, configurations, etc.).

Note: In AfiAct II's AfiFarm5, the AfiFarm configuration is done via AfiControl RT System. While the main steps for the configuration are described in this manual (see Appendix C), an additional and more detailed description of the tool usage is provided in AfiControl configuration manual (see referred documents, page viii).

Installation dialog layout

The following main dialog appears during the installation, displaying various messages and indications, allowing the user to follow the background phases. In addition, the lower area provides information on the overall installation progress:



Note

The installation procedure might vary slightly for different operating systems.

3.2.2 Set & Initiate the Installation Wizard

After verifying your PC is prepared for installation (see 2.3.4), initiate the installation wizard according to the following steps.

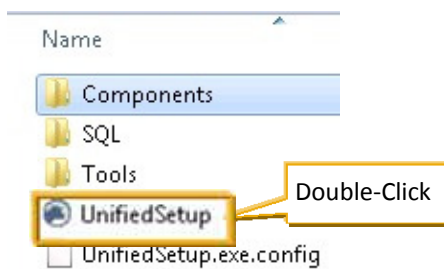


*Screens that are displayed by the wizard but do not require user actions are not always presented in this section. Such screens that appear are **NOT TO BE TOUCHED**.*

1. Insert the provided AfiFarm5 HASP USB key into the USB port of the PC.



2. Open AfiFarm5 DVD and double-click on the installation file: **UnifiedSetup**.



3. The installation wizard is launched. The installation type dialog opens: choose **Install**.

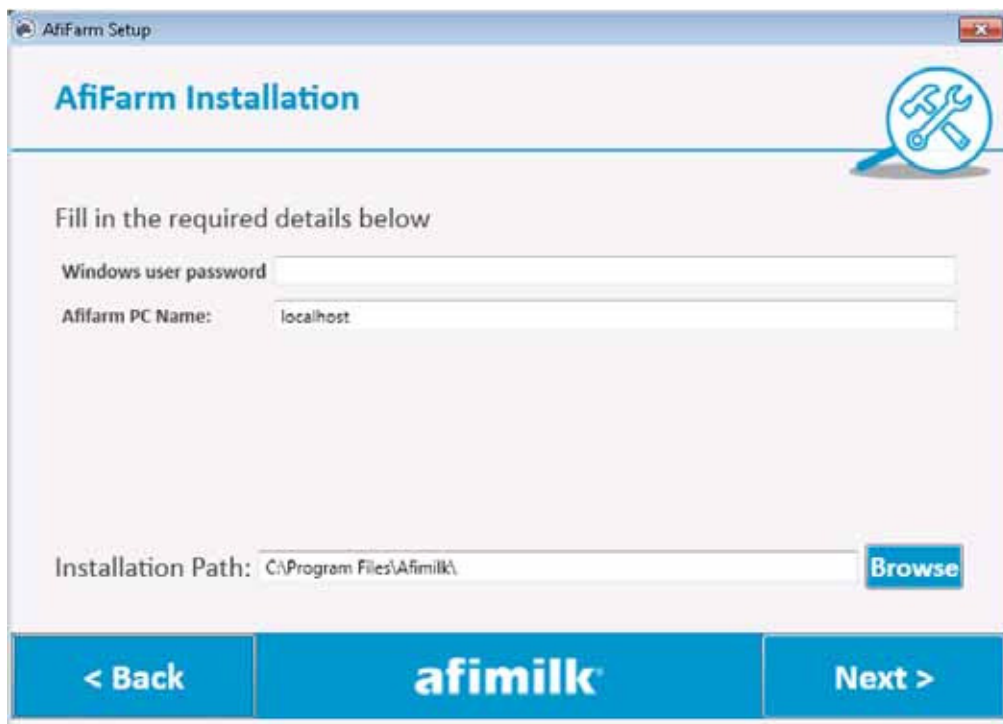


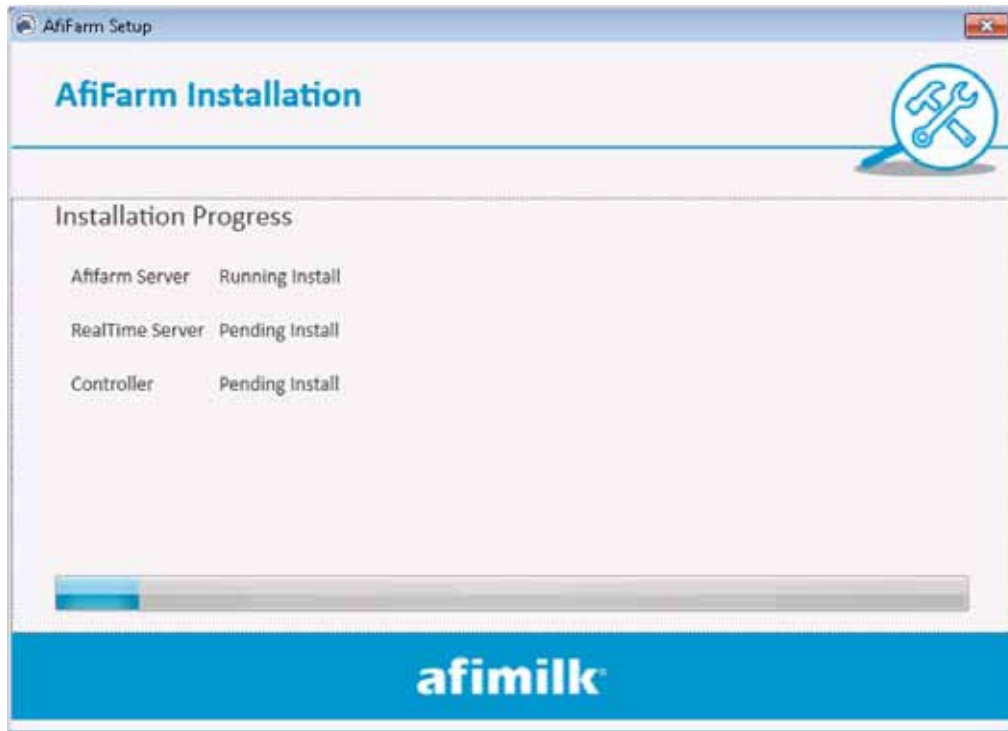
- Click **Next**. The PC Deployment Mode dialog opens. Select *All in one* deployment type (i.e. all components are on the same PC)

Note: Custom installations (i.e. user-selected components are to be installed on the current computer) is not relevant for AfiAct II installations

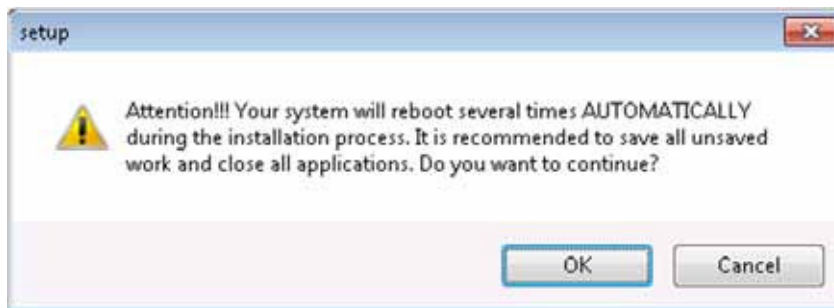


- In the following screen:
 - Type in your *currently used Windows account* username and password
Note: If no password is used, leave the password field empty!
 - Click **Next**

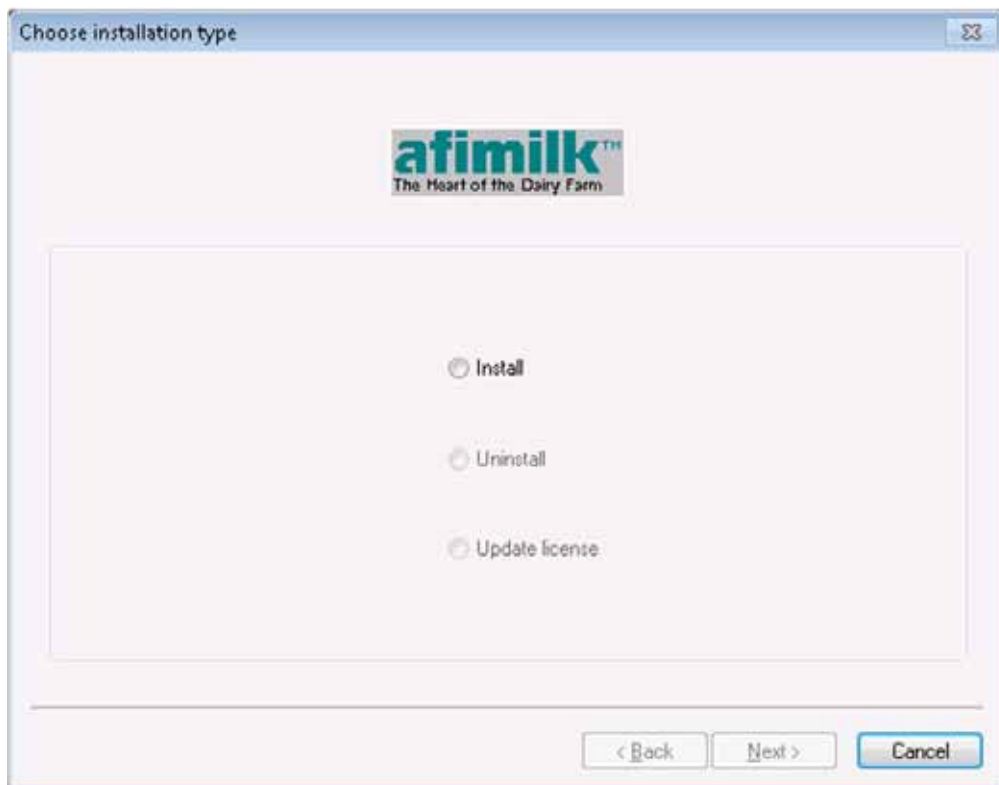




6. The following message appears; Click **OK**



7. In the following screen, select **Install**.



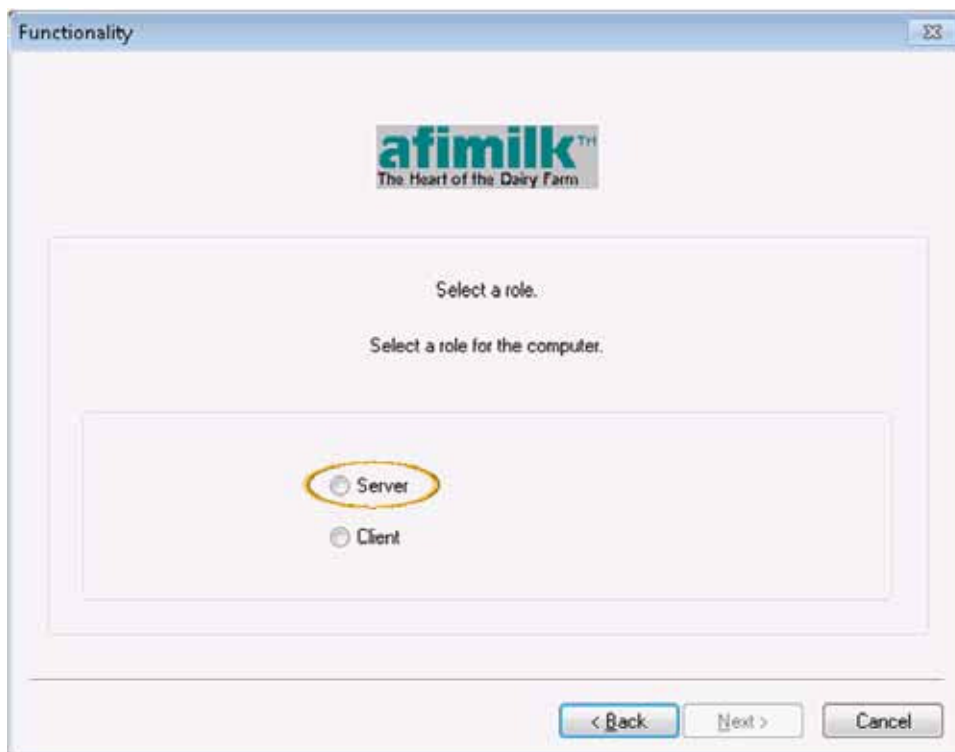
8. Click **Next**. The welcome dialog opens. Make sure you close any programs running in the background.



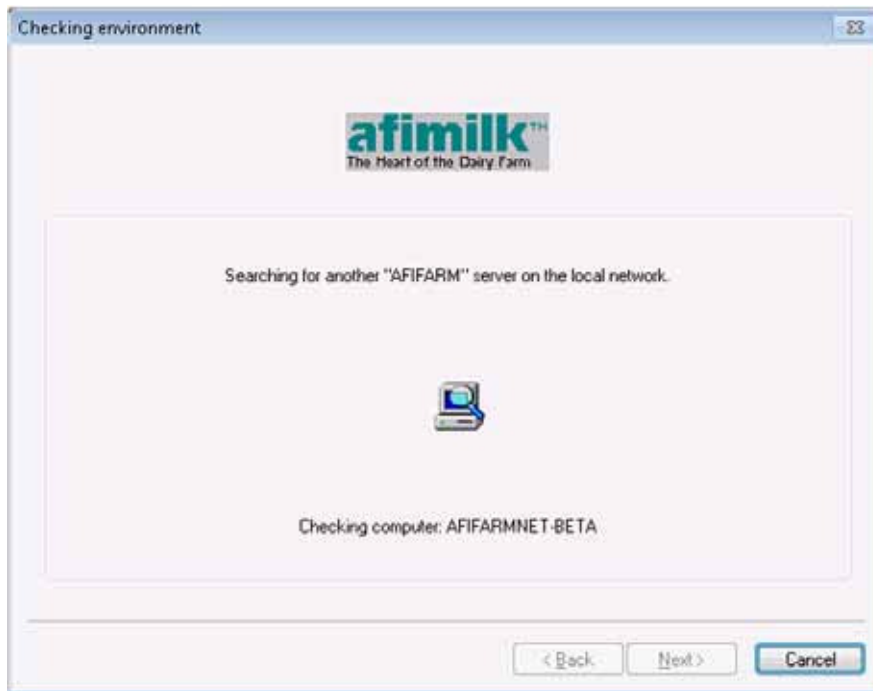
9. Click **Next**. The License Agreement dialog opens



10. Select **I accept the agreement** and click **Next**. The Functionality dialog opens



11. Choose **Server** and click **Next**. The system searches the local network to ensure there are no other servers found. When done searching, the **Next** button becomes available.



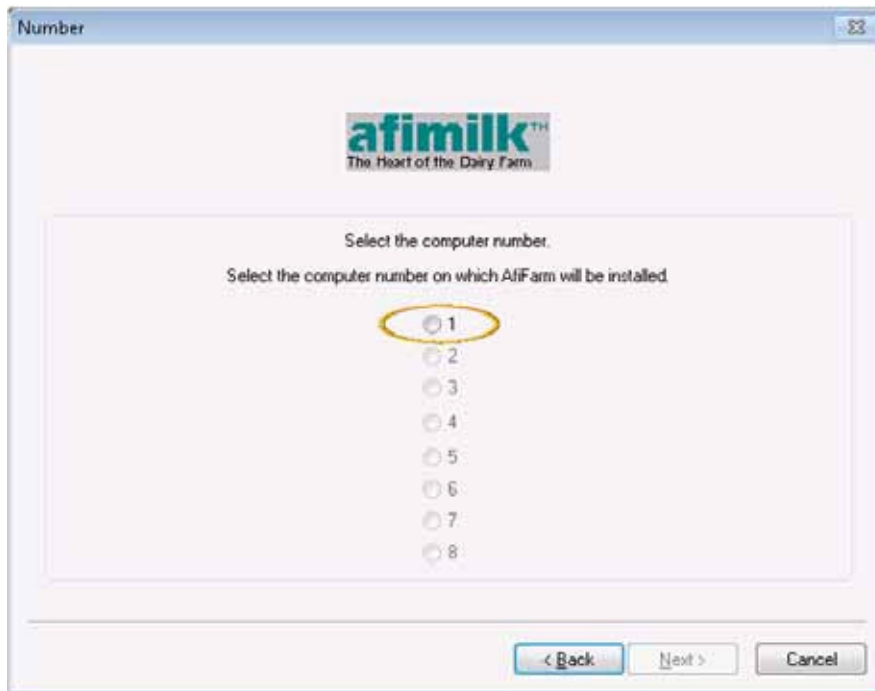
Note

If a server has been detected, the problem must be resolved before continuing the installation. Contact Afimilk helpdesk, see page ii.

12. Click **Next**. The Drive dialog opens.



13. Select the **hard drive** where AfiFarm files are to be installed. This is the hard drive previously prepared, where there are at least 100GB of free space available (see 2.3.1.2). Click **Next**. The **Number** dialog opens:

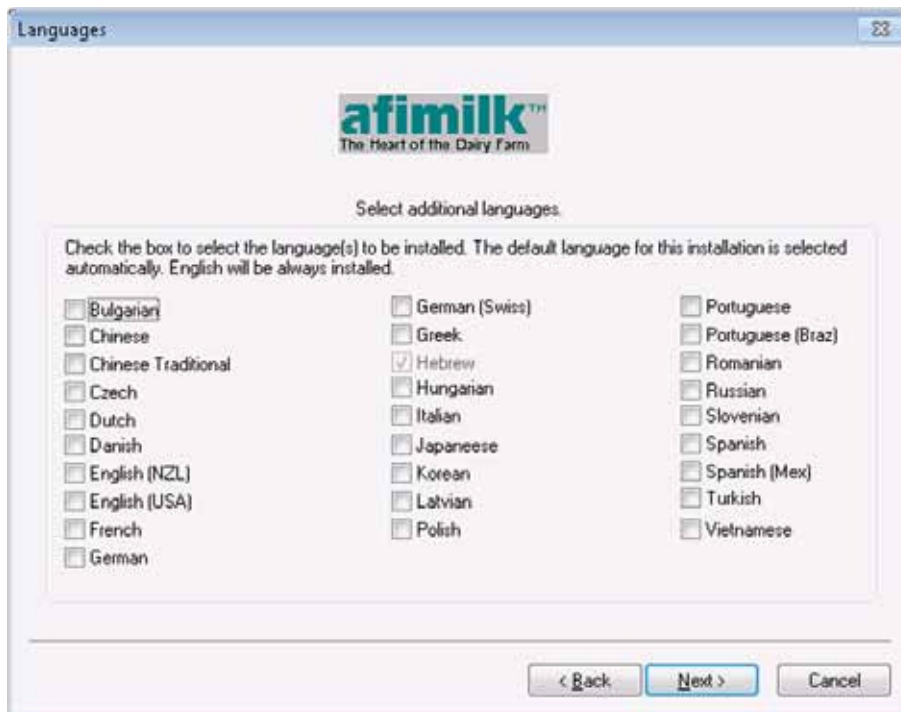


14. Select a unique **computer number** for the computer you are installing (default: #1)
15. Click **Next**. The Password dialog opens, where the default password is **afi**.

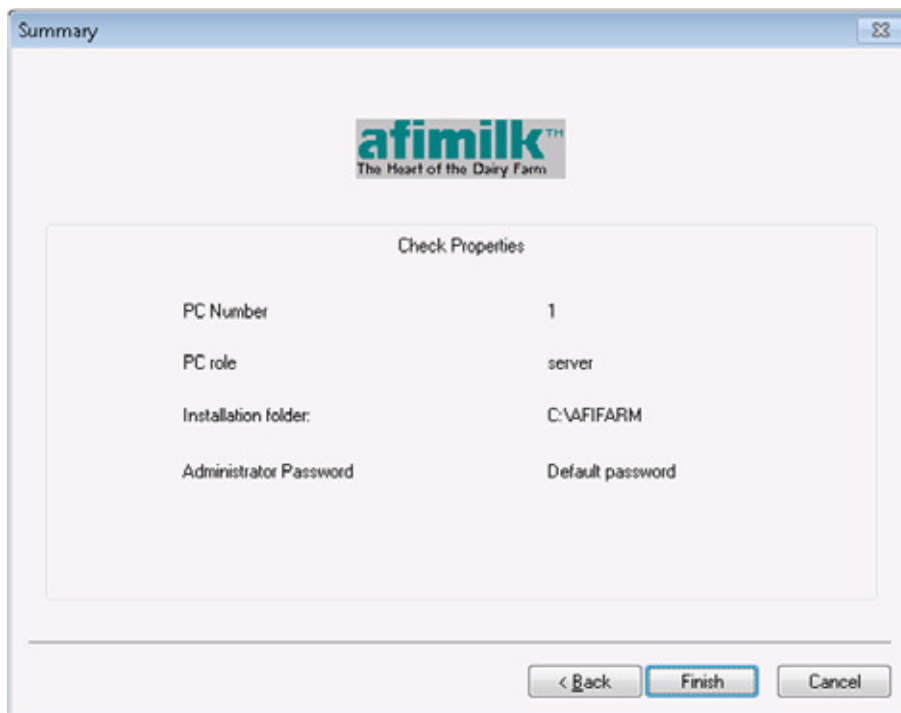
Important Note: do not enter any value in this screen!



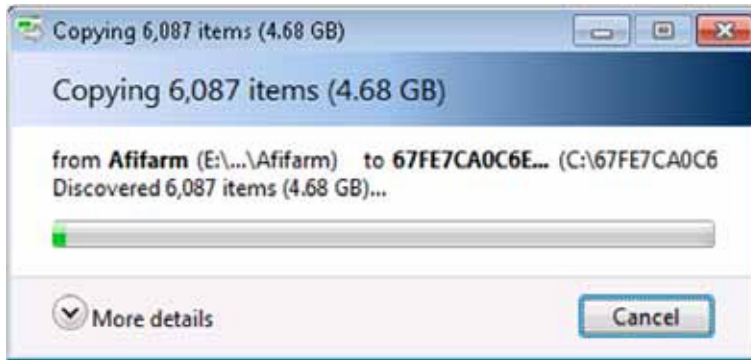
16. To keep your existing password: do not type any value into the boxes.
To change the password: type the **new password**. Then re-type your password in the Confirm password box.
17. Click **Next**. The Language dialog opens, where the default language is check-marked in gray (in the following example: Vietnamese).



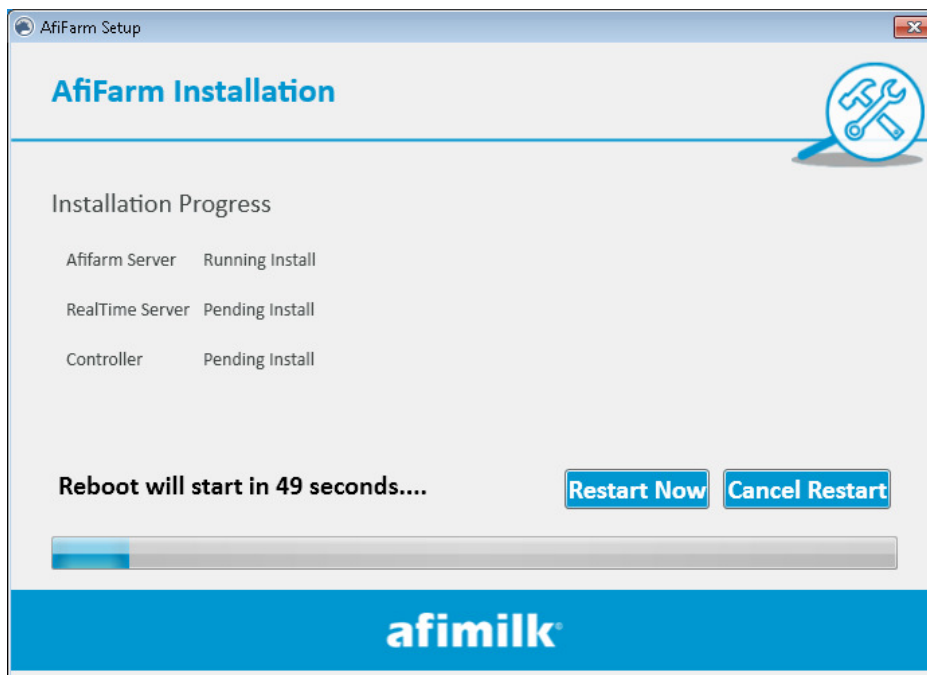
18. Select the desired language(s) and click **Next**. The Summary dialog opens



19. Click **Finish**. The automatic installation process starts, and the following dialog appears and the SQL files are installed. (This may take a few minutes).



20. The system requests permission to restart: Click **Restart Now** or wait for the auto-restart.



Continue to Supervise Automatic Installation Steps

21. After rebooting, a few progress screens appear, while the system installs the required elements. The system requests permission for rebooting a few times. This process may take 10-15 minutes. Make sure that the progress indications show (slow) progress. IMPORTANT! Do not touch any of the screens shown during the process!
22. When the process ends, the following dialog appears. Click **Close**.



23. AfiFarm will automatically open
24. AfiControl installation is complete.



Note

If using a standalone system side-by-side with existing AfiFarm, you may need to restore the initial animal database to the system at this phase. This rare scenario is detailed in Appendix E.

4 Initial Reader Communication



Note

It is recommended that the AfiAct II Reader initial connection is performed immediately after the AfiAct II SW was installed.

Before mounting the Reader, connect the Reader to the local network (same network as the computer) via a network cable, and verify connectivity with the AfiControl RT system. AfiControl locates the Reader's MAC and IP to perform a handshake (RT sends a broadcast message searching for the Reader unique ID; then the Reader replies to the sender (RT) providing its IP address).

Setting the Reader initial communication includes the following steps:

1. Connect the Reader to the wired network, see 4.1
2. Configure AfiControl mandatory parameters (quick start), see 4.2
3. Verify communication (handshake) via AfiControl, see 4.3
4. *If Wi-Fi is used*, connect the Reader to the Wi-Fi network, see 4.4



Note

*After each Reader restart, wait until the Reader's internal boot LED is blinking, see **Error! Reference source not found.***

4.1 Connect the Reader to the Wired Network

A network cable is used for connecting the Reader to the PC. Then the Reader is connected to the power source, and the connectivity is verified via AfiControl.

To connect the Reader to the network and obtain an IP address

1. **Connect network cable:** connect a network cable to the Reader's back-panel network connector. Connect the other side of the network cable to the PC USB connector.



2. **Connect to power (temporary connection):** Use the power supply transformer box to power the Reader on:
 - a. Use the AC terminal block (Brown and Blue) at the edge of the reader's power cable, and connect it to the power transformer box white cable. If needed – strip the insulation to expose cable edges.



- b. Connect the transformer box to the power outlet.

- c. Turn on the transformer box switch, and verify that the Reader's LEDs are on.



3. If a DHCP exists and is configured to provide a dynamic IP to the Reader, the Reader will automatically obtain an IP. If not, the Reader will use the factory IP address 172.20.1.1.



Note

If the Reader does not show correct network connection, restart the reader by turning the power off and on again.



Warning

Ensure taking all precautions when working with the high voltage components.

4.2 Set AfiControl (Quick Start)

AfiAct II components are connected via the network (wired or wireless), where **AfiControl** manages the communication between the components (AfiAct II software, Reader, etc.).

AfiControl's client-server architecture involves three types of computer functions, *all running on the same PC for AfiAct II*: **Server** (manages herd database, system configuration and licensing); **Controller** (manages the real-time processes, and includes a small database to control the stations and collect data when the communication with the server is interrupted), **Client** (for user access to herd data).

To allow basic system functionality and overall system communication, the following basic parameters must be set in AfiControl for quick-start:

- **HW system layout:** PCs, devices (e.g. Reader(s) Unique ID), adaptors, ports, etc.)
- **Logical system definitions,** reflecting the stations (i.e. AfiAct, AfiSort, milking-parlors,...), sites (aggregation of all the stations with the same identification system – usually geographically close to each other), tracks (monitored animals; heifers/milking cows) and required sampling sessions.
- Deployment of the software to support the previously defined site(s) (in this case: AfiAct II) via the tray configurator.

The following sections provide an overview of AfiControl navigation, session-definition requirements, and explain how to set up the mandatory system fields via AfiControl.



Note

For better system monitoring, it is recommended to define a user report that detects tags not assigned to animals), see Appendix C.



Note

The setup done via the RT System interface is checked at a later stage, when the whole system is connected (including the Reader, see 4.2).



Note


The AfiFarm RT system is a powerful tool, allowing the technician to perform Reader settings, tags identified by the system, view map of connected network elements, station reports, etc. For a summary on the AfiFarm RT System capabilities refer to Appendix C.

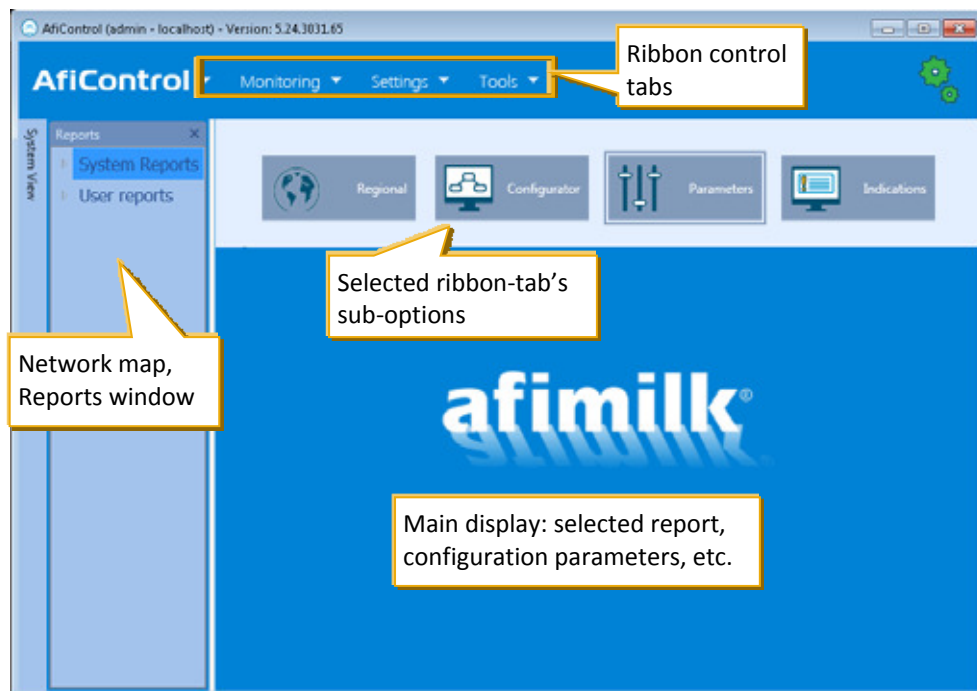
4.2.1 Navigating AfiControl Tool

AfiControl includes two accessible GUI elements:

- **The AfiControl** screens – for configuring the system, managing reports, etc.
- **The Station Controller** screens – used for:
 - Deployment of the specific-site-type supporting software (here: AfiAct II)
 - Monitoring connections with the defined system sites



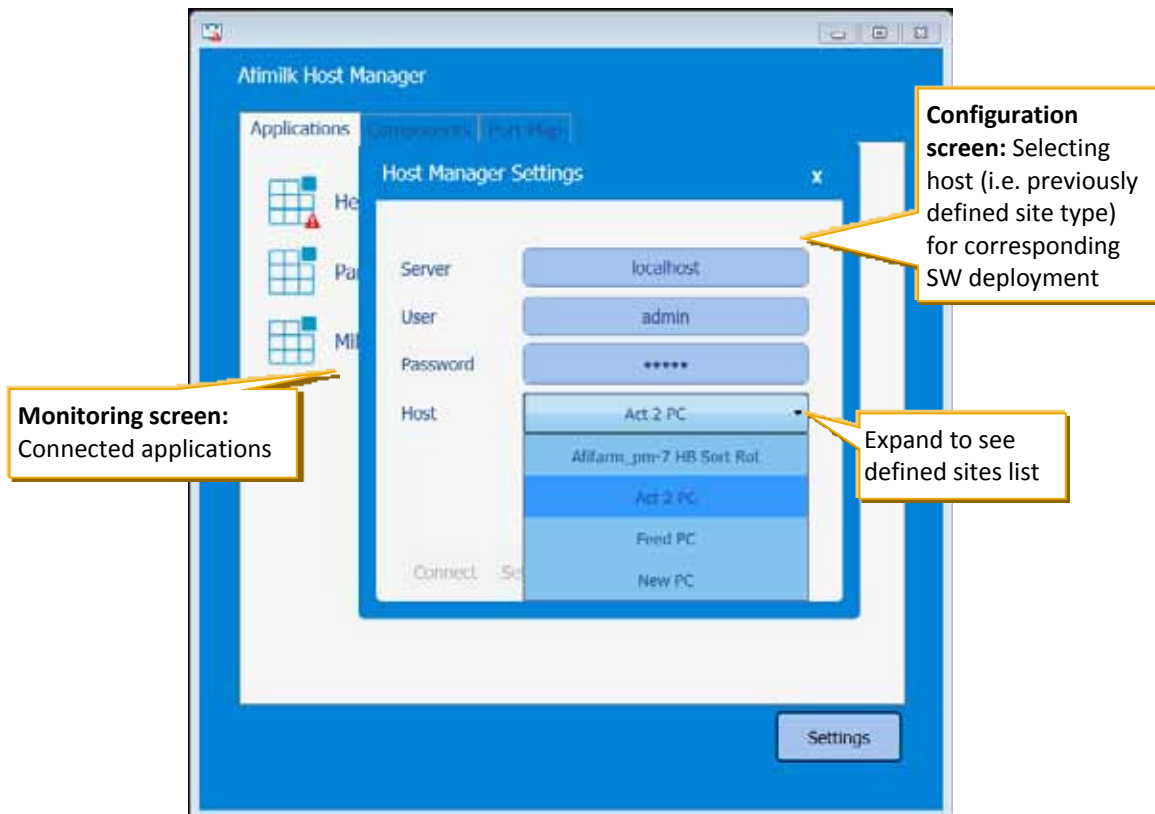
AfiControl screens are accessed via the AfiControl icon , and include the following areas (see Appendix C for details)



The Station Controller screens are accessed from the icon in the system tray



and display the monitoring screen (connected sites) and the configuration screen (connecting to server host):



Note: the above configuration screens are only relevant AFTER the system has been configured!

4.2.2 Determine the Required Sampling Sessions

To allow AfiAct II algorithms to analyze the data correctly, the system must be set to reflect the specific farm monitoring needs. These are set by the following parameters:

- **Tracks** – Determine the type of animals that are monitored (i.e. heifers/cows), and the times in which they are monitored (i.e. sessions, see below).
- **Stations** – Determine the specific monitored activity: milking, AfiAct II, AfiSort, etc.
- **Sites** – The group of stations in the same geographical area, using the same identification system
- **Sessions** – The sessions are set to reflect the specific farm’s daily scheduled activities. (E.g. milking times, breeding times, pasture times, feeding times, and other activities done in the farm).

To determine the above parameters correctly, the dealer personnel together with the farmer must collect and consider the relevant information. The following items provide guidelines for determining the farm’s sessions via AfiControl. Fine tuning may be done after running the system for a test period.

To determine the sessions, refer to the following criteria and guidelines

1. To reflect the *specific animals* monitored (milking cows / heifers / both), check what **types of animals** will be carrying tags.
2. Check when **breeding** is done during the day.
3. **Session times** are set according to the tracked animal as follows:
 - For milking cows: the session times are set based on milking times:
 - Check what are the **milking times** (i.e. when is the first group brought to the milking parlor; when does the last cow leave the milking parlor)
 - Start the session 1-1.5 hours before each milking time, and at least one hour after the preceding milking. If the gap time between milking is not long enough, configure the beginning time of the sessions to 1/2 an hour after the last cow of the preceding milking leaves the parlor.
 - For heifers: Configure one session of 24 hours.
Check the heifers' data after 3-4 days. If there is very high activity during part of the day – configure two sessions: one for the high activity and one for lower activity. Configure the high activity session for 1.5 hours before the high activity occurs, and up to 1.5 hours after the high activity occurs.
4. The recommended number of sessions per day is between 1 and 3.
5. The session times must be continuous, ensuring 24 hours coverage




If the session intervals or schedules are changed, contact Afimilk representative to re-configure the system. For TieStall sessions refer to Appendix D

4.2.3 Set System Mandatory Parameters

To define the system computers (server and system controller)

1. Verify that the Station Controller is up and running by checking the icon in the

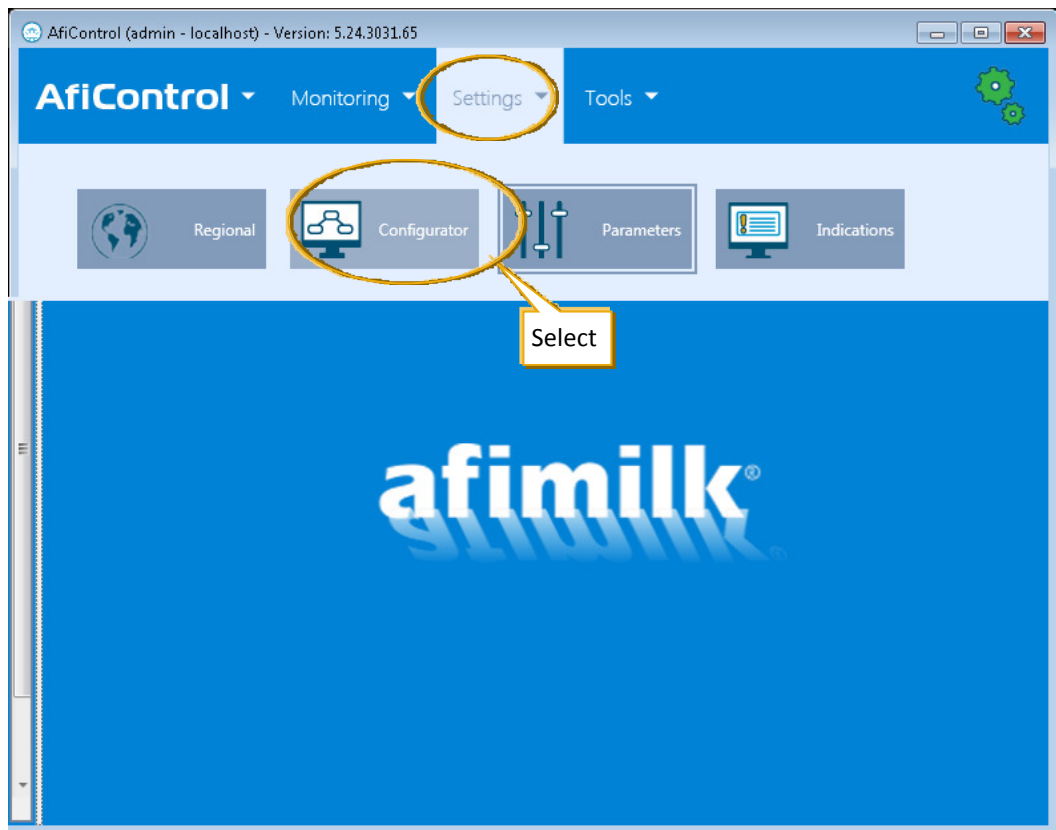


2. Open the AfiControl system (click the  icon).
3. The login screen appears. Enter the following login attributes:
 - **Server:** *localhost*
 - **User:** *admin*
 - **Password:** *admin*

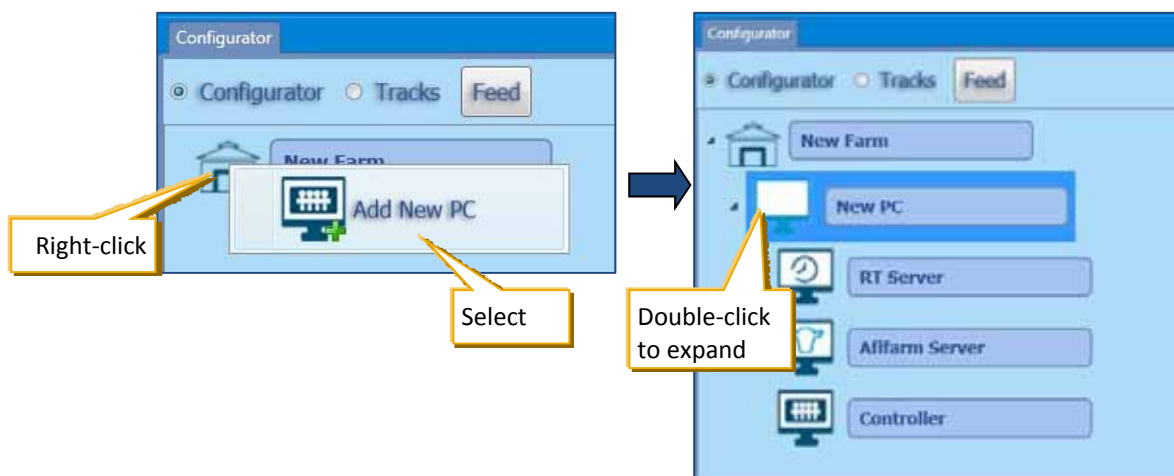


To define the new AfiAct II site

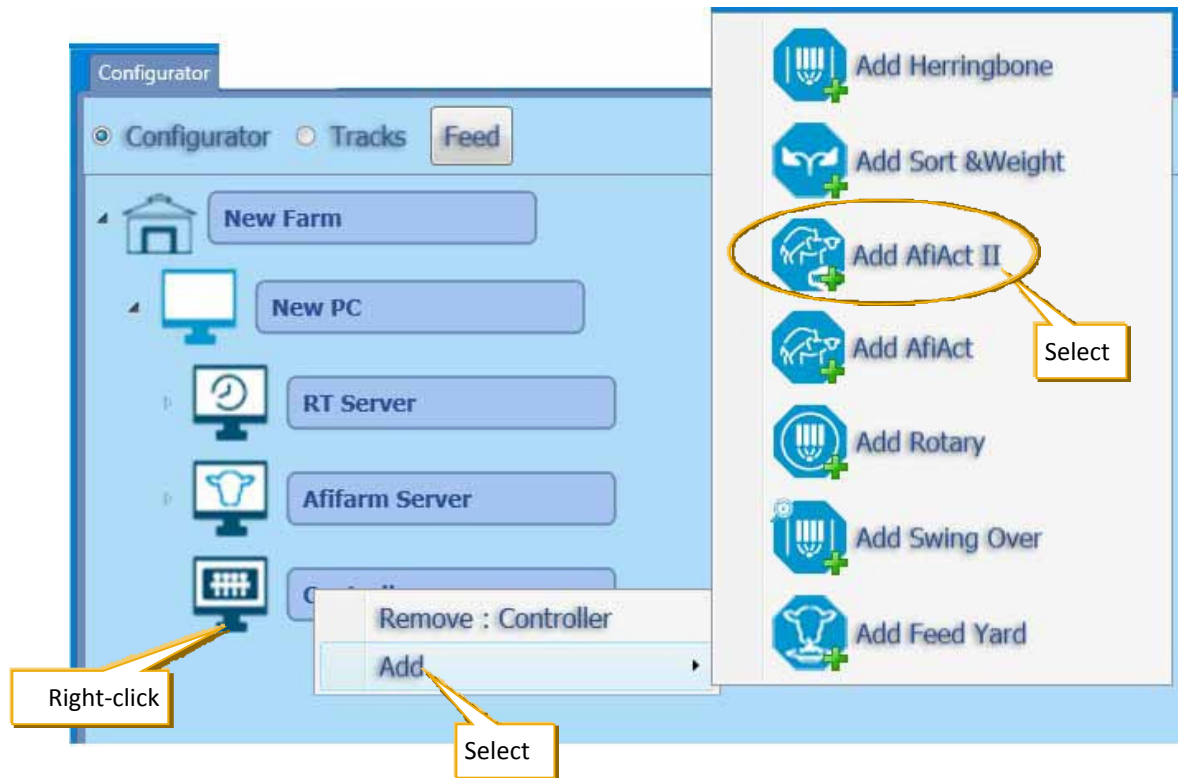
4. In the displayed AfiControl main screen, under the **Settings** tab, select **Configurator** from the tab sub-options.



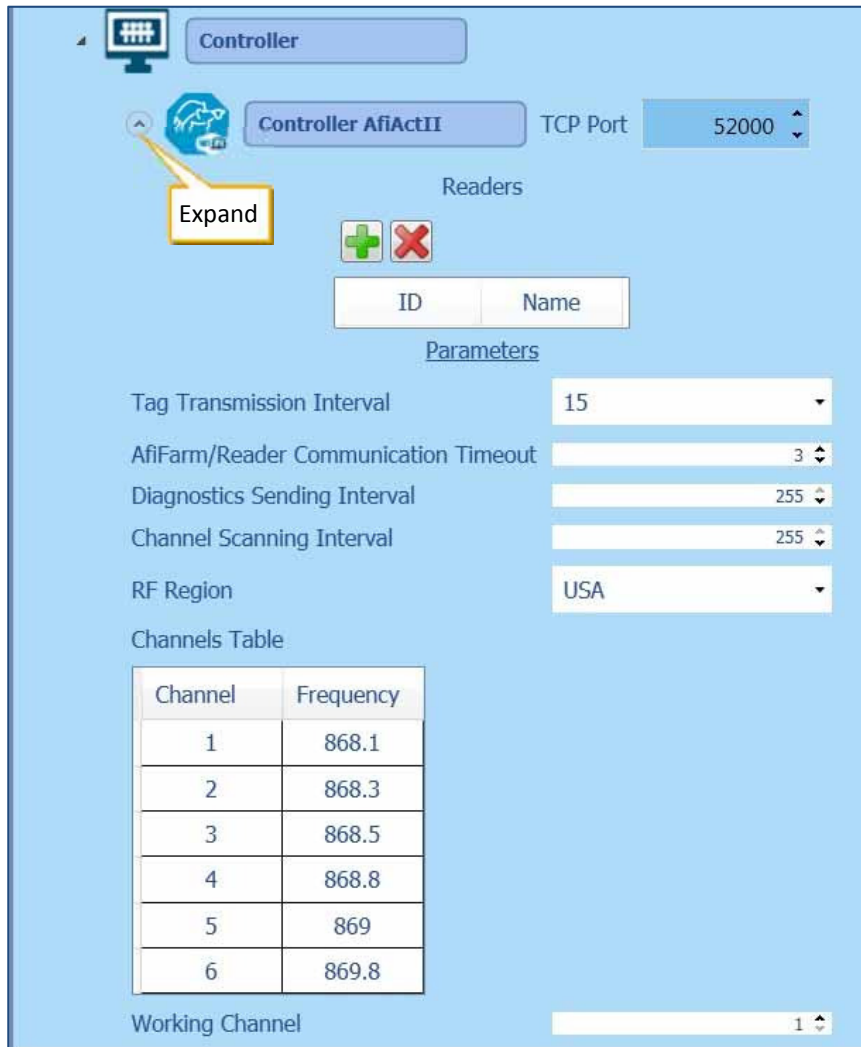
5. In the displayed **Configurator** screen, right-click on **New Farm** and select the **Add New PC** button. Double-click on the new PC presented, to display its sub-elements



- Right-click on **Controller**, select **Add**→**Add AfiAct II** from the displayed roll-down site-types menu.



- The New Controller for AfiAct II is added. Expand the controller to configure its parameters, where RF region channel is set to 1 by default, and must not be changed.



The screenshot shows the configuration interface for a Controller AfiActII. The 'Expand' button is highlighted with a yellow box. The 'Parameters' section includes the following settings:

- Tag Transmission Interval: 15
- AfiFarm/Reader Communication Timeout: 3
- Diagnostics Sending Interval: 255
- Channel Scanning Interval: 255
- RF Region: USA

The Channels Table is as follows:

Channel	Frequency
1	868.1
2	868.3
3	868.5
4	868.8
5	869
6	869.8



The Working Channel is set to 1.

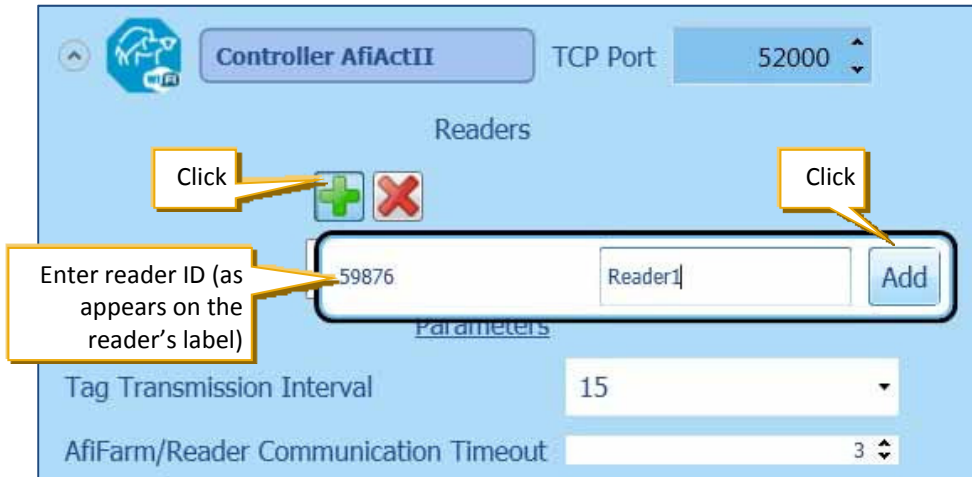


Warning

Do not change the channel! If the channel is changed, you must change the Tags channels as well!

Set the Reader(s) and Ports

8. In the Readers area, click  to add a reader, enter the **Reader UID** (as obtained from the label on the Reader, see 1.4.3). Then enter a **Reader name** and click  Example:



Note: If the system includes more than a single Reader, enter all of the Readers' UIDs and names.

9. Set the relevant parameters

Parameters

Tag Transmission Interval 15 ▾

AfiFarm/Reader Communication Timeout 3 ⇅

Diagnostics Sending Interval 255 ⇅

Channel Scanning Interval 255 ⇅

RF Region USA ▾

Channels Table

Channel	Frequency
1	868.1
2	868.3
3	868.5
4	868.8
5	869
6	869.8

Working Channel 1 ⇅

The following parameters are available:

- **Tag transmission interval** - sets the interval in which the tags send their data to the Reader (default 15)
- **AfiFarm/Reader Communication Timeout** – not to be changed (default 3)
- **Diagnosis Sending Interval** – not to be changed (default 255)
- **Channel Scanning Interval** – not to be changed (default 255)
- **RF Region** – determines the transmission region (e.g. USA; Europe...) with its relevant frequency range. When clicked – a corresponding frequency channel table opens, allowing the user to select a different channel (in case of interferences). The default channel is set to 1 for all regions; your tags are factory-set to the same default channel as the Reader.



Warning

The reader and the tags must be set to the same frequency channel. Therefore - do not change the channel! If the channel is changed, you must change the Tags channels as well. Technicians may manage frequency via the Tag Reading/Programming Unit (RPU). For tag channel update see Appendix B

10. Select your **RF Region** and relevant **working channel**. In the example below, the Europe channels are shown.

RF Region Europe ▾

Channels Table

Channel	Frequency
1	868.1
2	868.3
3	868.5
4	868.8
5	869
6	869.8

Do not use 868.8 and 869 for Europe

Working Channel 1 ▾



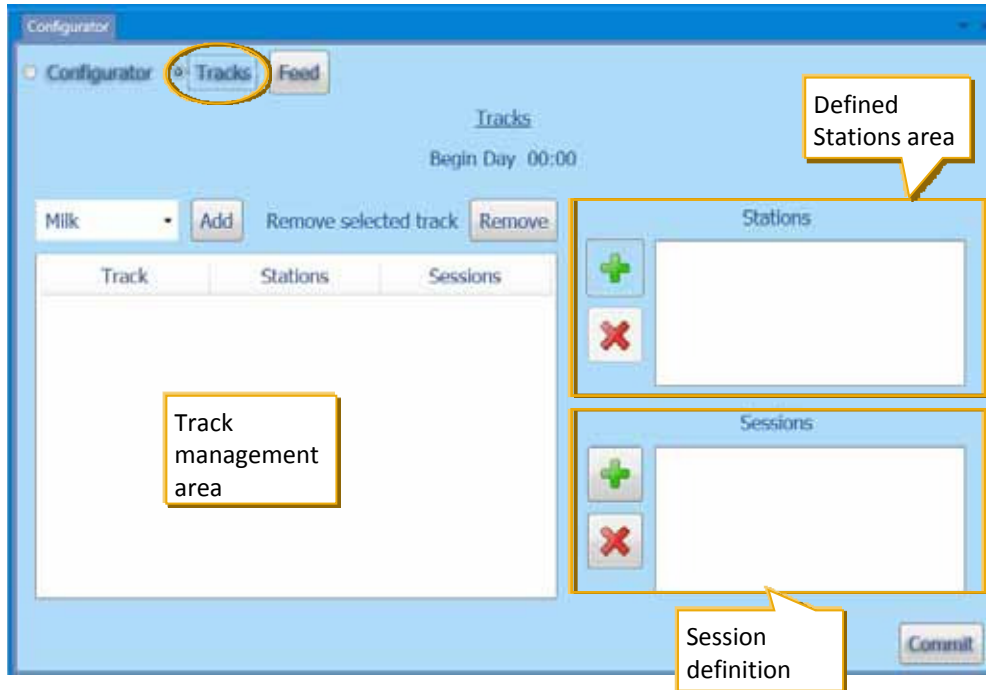
Note

Frequencies 868.8 and 869 must not be used for Europe.

Set the required track(s) (tracking sessions and tracked animals) for the defined station

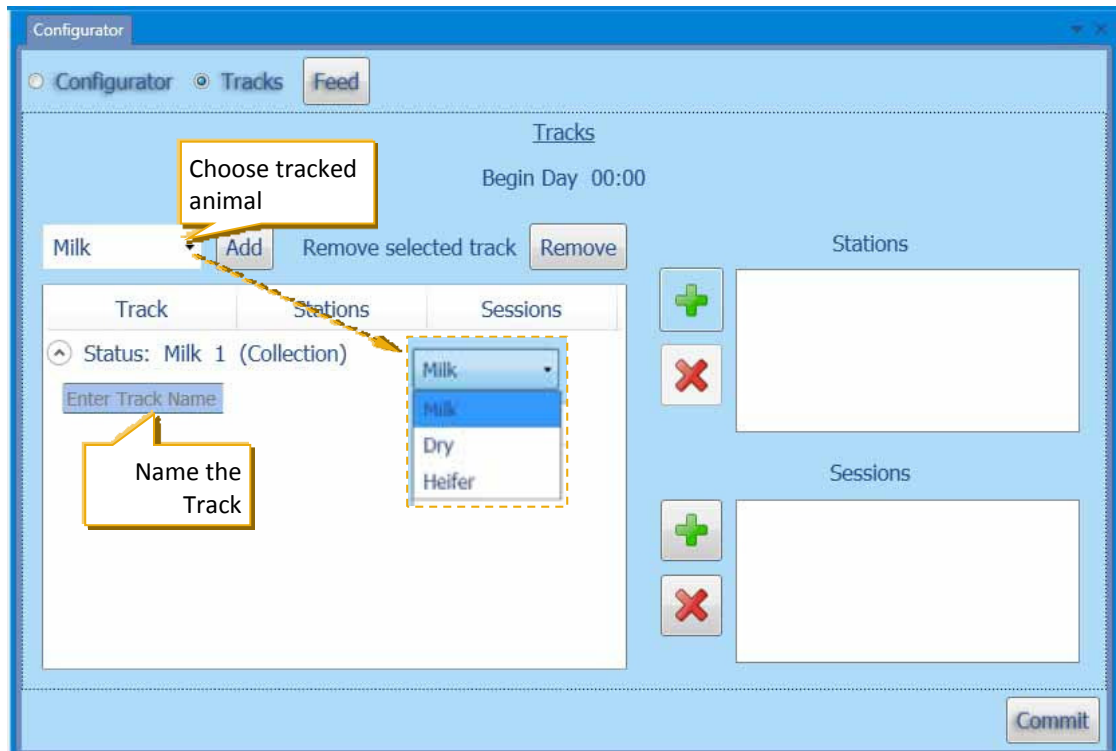
11. Under the **Settings**→**Configurator** tab, select the **Tracks** radio button. The displayed screen shows the following main areas:

- Track management area
- Defined stations area
- Sessions definition area




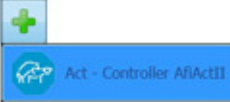
12. Set the required track attributes as follows:


- Select the type of animals to be tracked (**Milk** cows or **Heifers**).
- Enter a meaningful name to the track

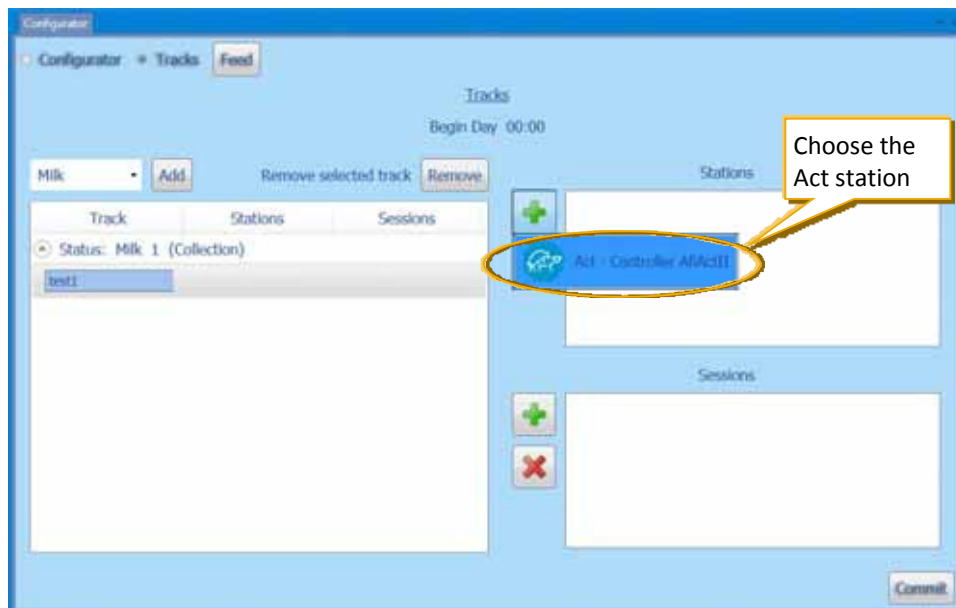


13. Add the AfiAct II station to your track, as follows:


- Select (highlight) the defined track
- In the station definition area, click the  sign.

- Choose the Act station  from the roll-down list

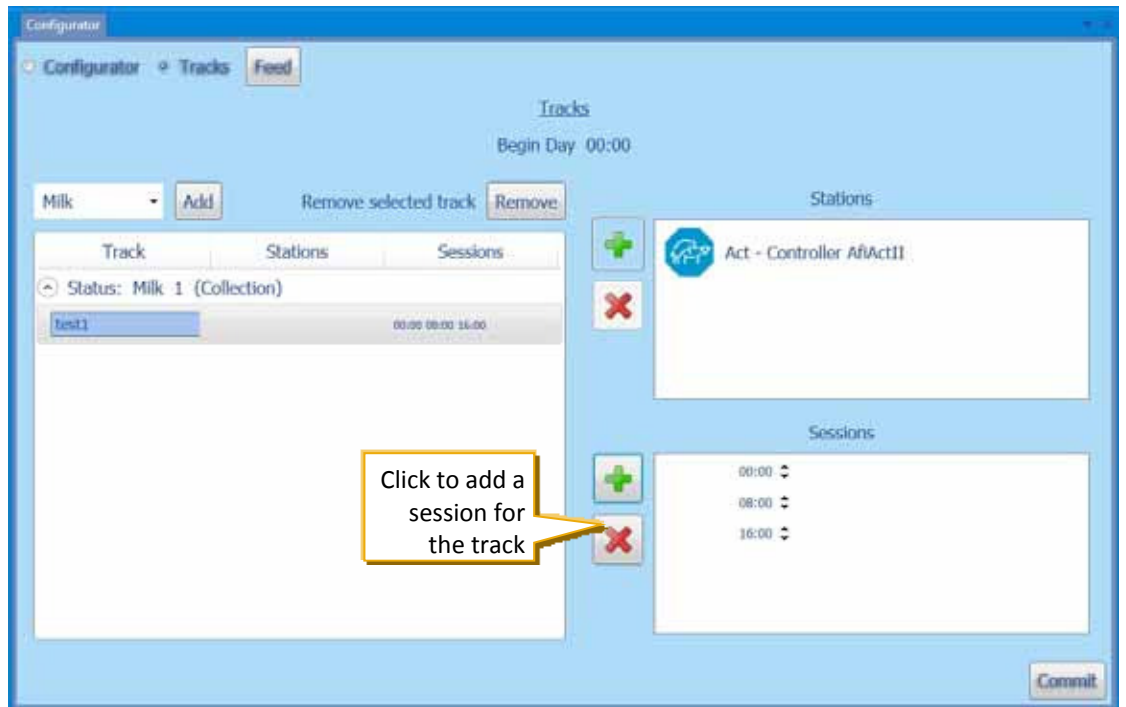
Note: To remove a station, select the required station and click the  sign



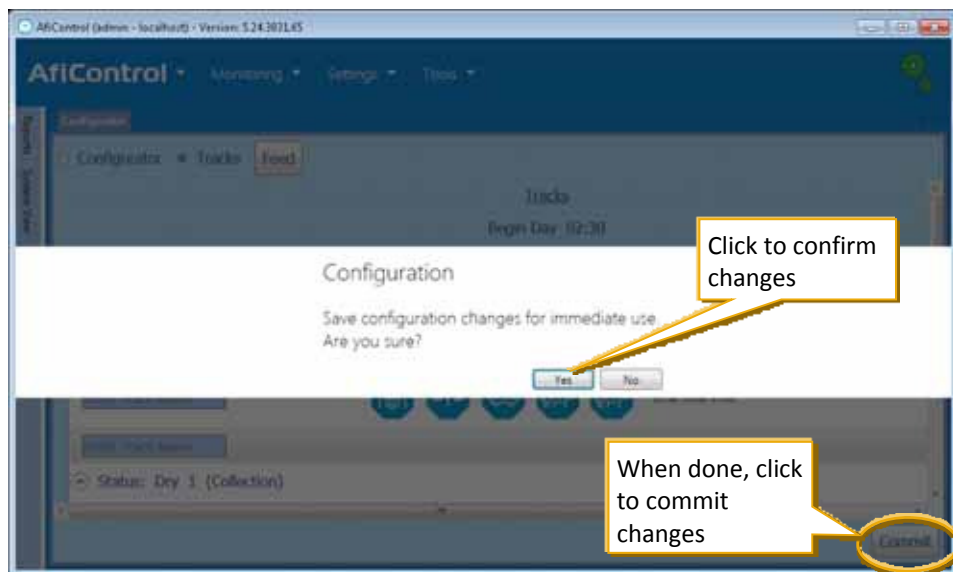
14. Define sessions for each defined track, corresponding to the farm schedule (Heifers will usually require only one or two sessions) as follows:


- In the station definition area, select the station to be updated (in this example: Act on Test contrl).
- In the session definition area, click the  sign to add a session. Repeat this to add the required number of sessions (in the following example: 3)
- If the sessions are not distributed evenly during the 24 hours: For each session, select the time in which the session starts.

Note: To remove a session, select the required session and click the  sign



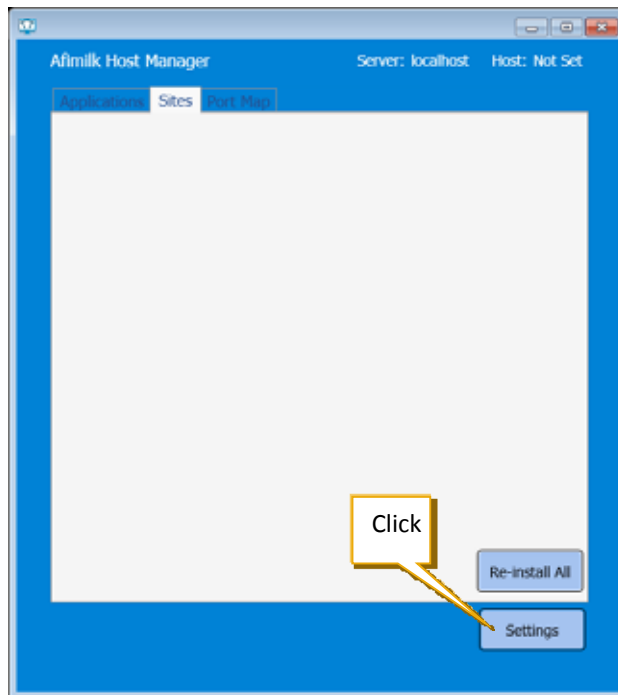
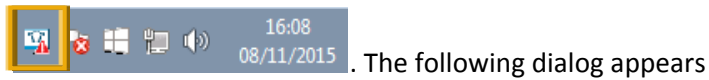
15. When done updating, click **Commit** . A confirmation window appears.



16. Click **Yes** to approve changes, Then wait a few seconds while AfiFarm restarts , and until all the processes are up and running.

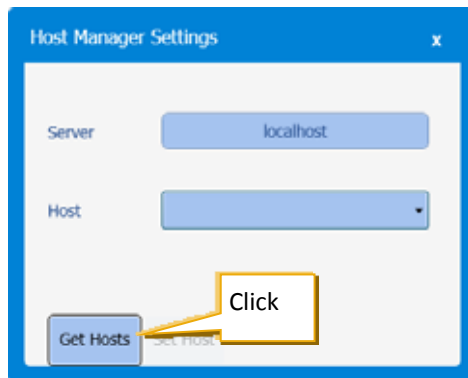
Deployment of the software according to the defined station (i.e. AfiAct)

17. Open the **Station Controller** manager by clicking the icon in the system tray



18. Click **settings**. The following **Station Controller Settings** dialog appears

*Note: you may also choose **Re-install All** button to restart the procedure.*

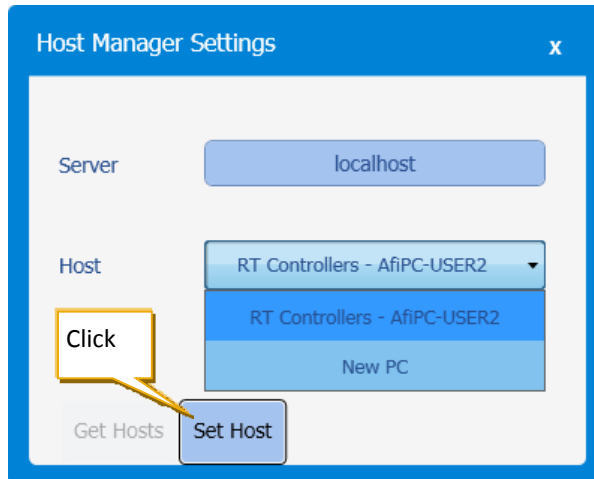


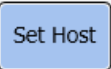
19. Enter the following attributes:


- Server: localhost

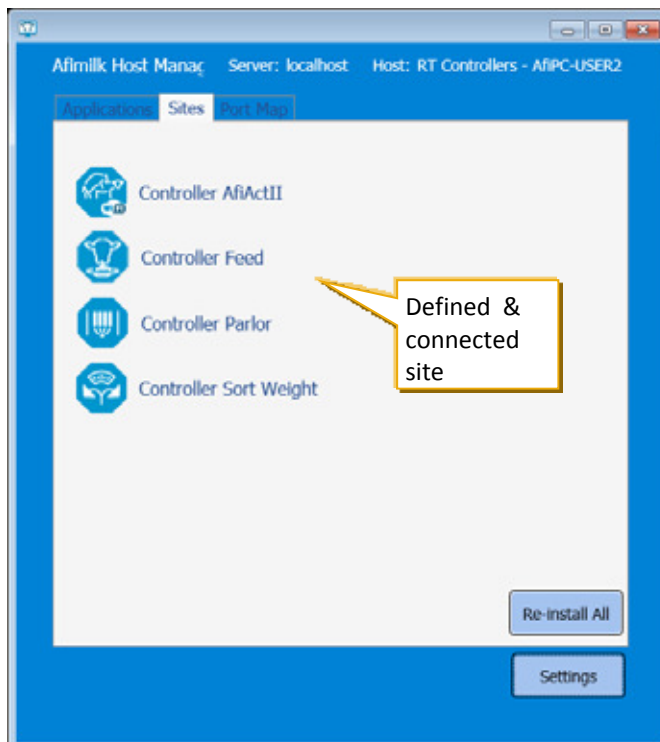
Click the **Get Host**  button.

20. In the updated dialog, from the available list of hosts (i.e. computers with defined controllers), select the desired Host (in this example: AfiPC-USER2).



21. Click the **Set host**  button. The software configuration corresponding to the selected-defined track-station is now installed, and the above settings window is auto-closed.
22. In the **Station Controller** manager (if not already open – re-open by clicking the

icon in the system tray . The following monitoring info appears



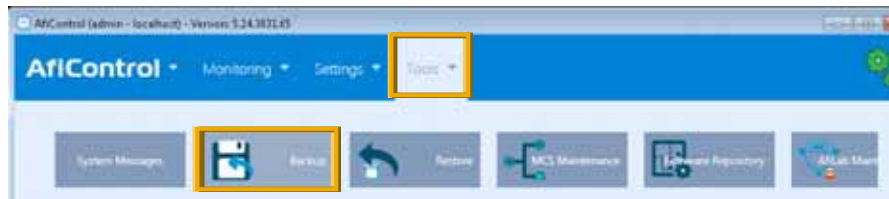
23. You will now be able to monitor the software that manages the defined Reader. (If the defined controller is not displayed, you may click **Reset All**).

Note: after configuring the station controller, when connecting the Reader, the Reader's PC comm. LED should indicate communication between the Reader and PC.

4.2.4 Additional AfiControl Configurations and Monitoring

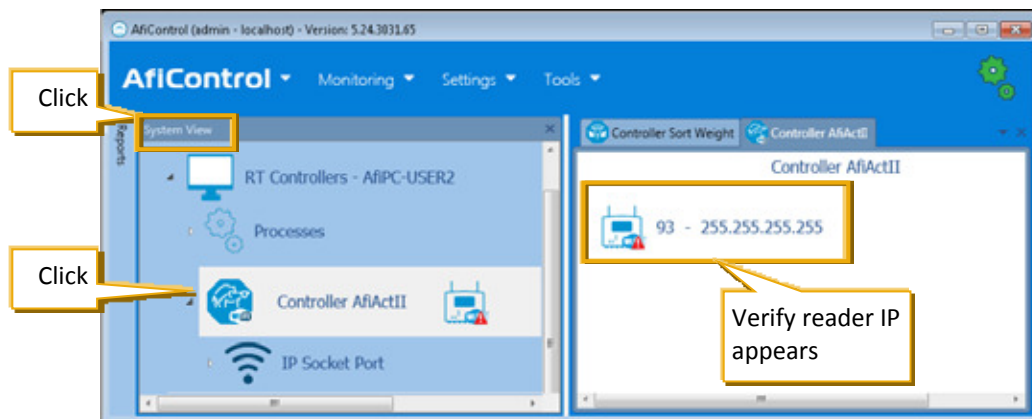
For better system monitoring, it is recommended to perform some basic settings:

- The system performs automatic backup. If needed, you may perform a manual backup via the **AfiControl**→**Tools** tab→**Backup** sub-option:



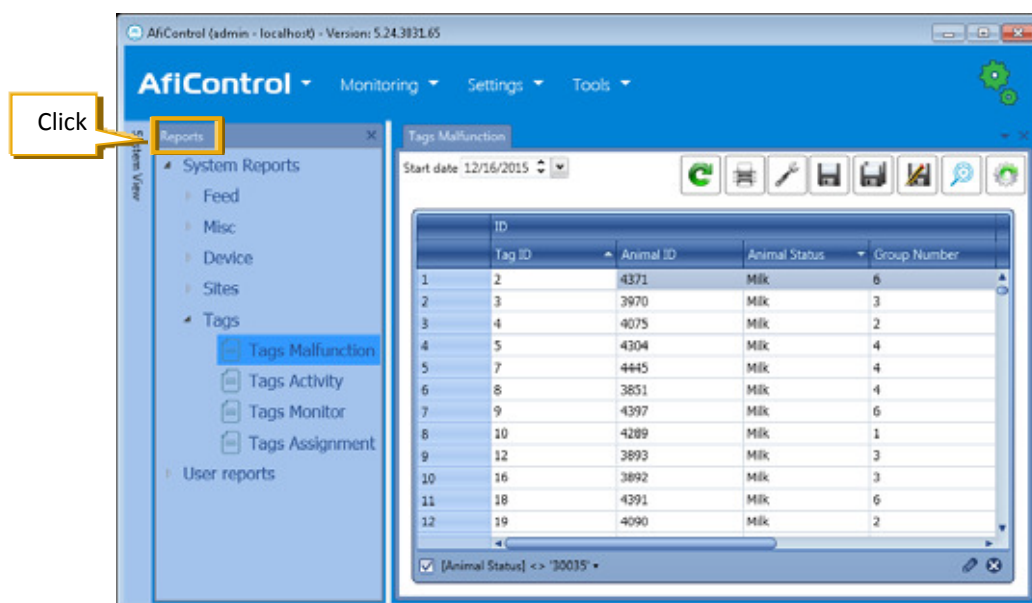
- Verify that the newly defined site appears as an icon in the AfiControl System view:

Click on the **System view** tab→ Click on the AfiAct site to verify that it is connected; if the site is connected: the Reader name and IP_Address will be displayed.



- Check the list of faulty tags:

Click **Reports**→**Tags**→**Tags Malfunction**



- Customize the system to your specific farm.

These setups may be fine-tuned or updated at any time after mounting the Reader. For details on system configurations and maintenance via AfiControl, refer to Appendix C.




Before the system may be used for detecting cows in heat, average behavior performance baseline should be generated by the application. This can take 5 to 6 days.

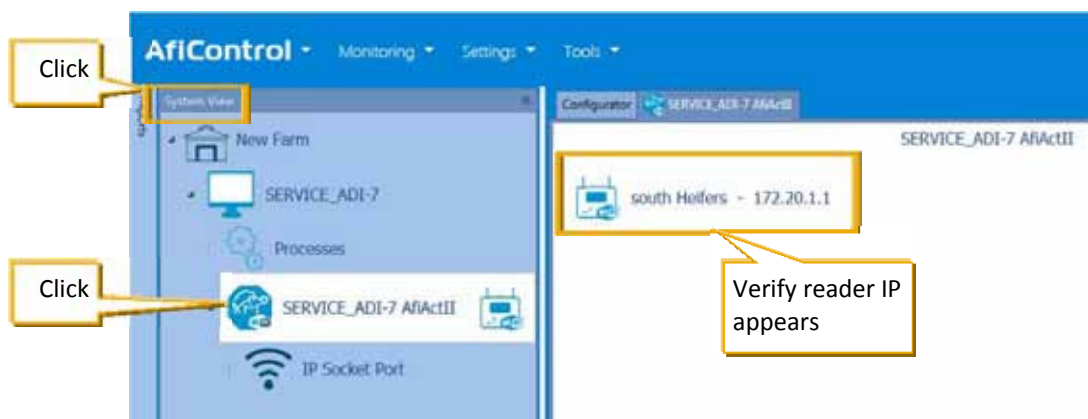
4.3 Verify Reader & AfiControl Communication


To ensure that the Reader handshake has been successful



1. (If not already open), open AfiControl (click the  icon).
2. Click on the **System view** tab → Click on the AfiAct site to verify that it is connected

if the site is connected: the Reader name and IP_Address appears.



3. The connected elements (readers) are most likely to appear as disconnected (with a red sign: ) during the first few seconds.

4. Wait a few seconds for the reader-controller connection to be established. When the connection is established, AfiControl will show the reader as connected, with its relevant IP address, indicating that the Reader and AfiControl Controller are now communicating. In addition, the Reader's PC Comm LED will show that the Reader and PC are communicating.

Write down this reader's dynamic IP address.

Note: When there is no DHCP mechanism, you may use the Reader's default static IP address 172.20.1.1 for back-to-back connection, see 7.5



Note

For troubleshooting - The Reader is provided with a label showing its ID (and MAC), to which an IP address will be assigned during the connection procedure. You may obtain the IP address that has been assigned to your Reader, by using a standard IP/MAC scanner application (e.g. ip-scanner).

4.4 If Needed: Set Wi-Fi Communication

If the Reader is to use Wi-Fi communication, the Reader should be connected to the Wi-Fi network at the office, before proceeding with the Reader mounting.

By default, the reader uses credentials detailed in section 2.2 (also listed below); therefore, it is recommended that – if possible – the Access Point wireless settings are set according to these defaults. In this setup, the Reader automatically connects to the wireless network.

To use default reader credentials

Set the Access Point wireless to the following:

- SSID (access point name): **afiact2**
- Encryption method: **WPA-PSK/WPA2-PSK2**
- Password: **afimilk123**

If, for some reason, the Access Point cannot be set according to the above defaults, set the reader to use different credentials (refer to 4.4.1)



Note

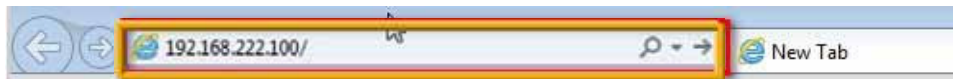
If there is NO Wi-Fi coverage in the office, the Wi-Fi network assignment will be set in the office as shown below, and the verification will be performed in the shed (Wi-Fi communication LEDs).

4.4.1 Set Reader to use Wi-Fi settings different than Default

When Access Point setup differs from default credentials, setup the Wi-Fi communication via the Reader's direct **Wi-Fi networking GUI application (LuCI)**, (accessed via the PC browser), which allows manual management and troubleshooting of the connection between the Reader's main board and the local network (e.g: entering the Wi-Fi network SSID (Service Set Identifier) manually).

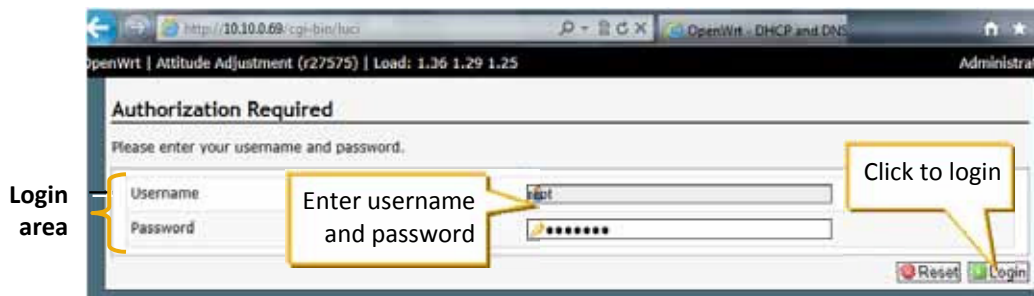
To set the Reader Wi-Fi credentials (not as in default) via LUCI interface

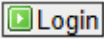
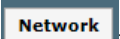
1. Open your PC browser and access the Reader interface by typing in the browser's navigation bar the IP address obtained from the Reader's map:
http://reader_ip_address



(Note: If there is no automatic address (DHCP), and the default factory address is used, you may also enter the following IP address: <http://172.20.1.1>)

The login screen appears:





2. Enter the Reader username and password (default: user: *root*, password: *afimilk*). Then click the  button.
3. In the displayed Reader communication options, select the  tab from the navigation options and choose **Interfaces**

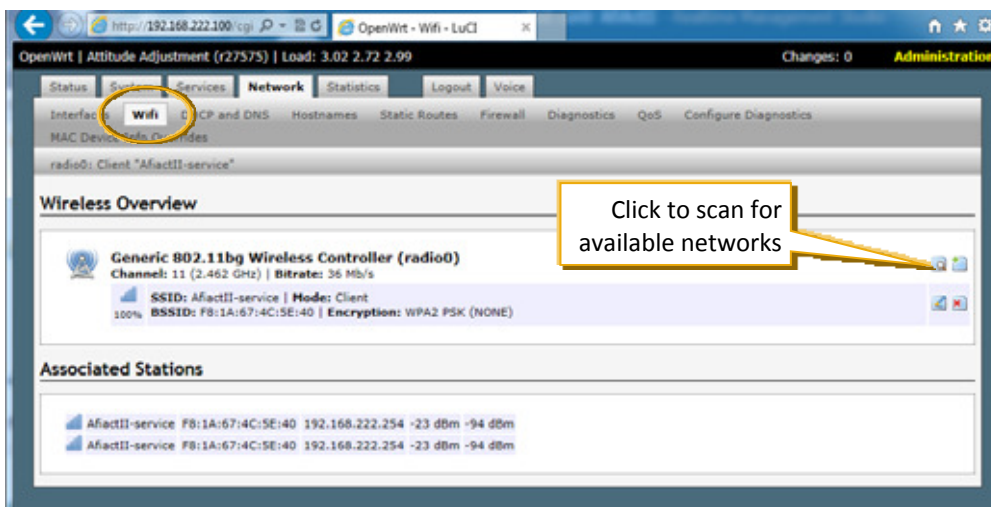


- To ensure that the connection to the wireless network is generated with the correct parameters, clear the default **wwan** interface as follows:

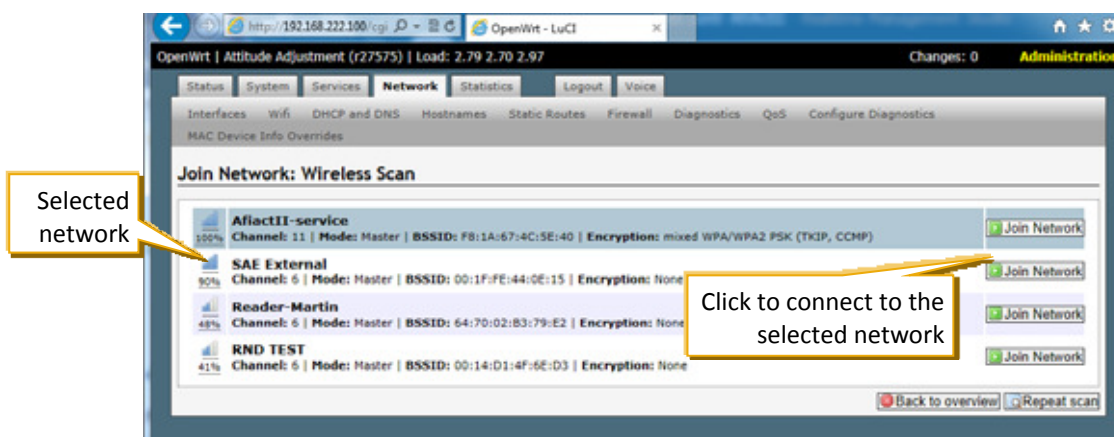
Scroll to the **wwan** row, and click the 



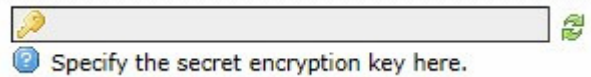
- Under the Network tab sub-options select **Wi-Fi**, and click the  (OR ) button at the bottom of the page to obtain the list of available Wi-Fi networks.



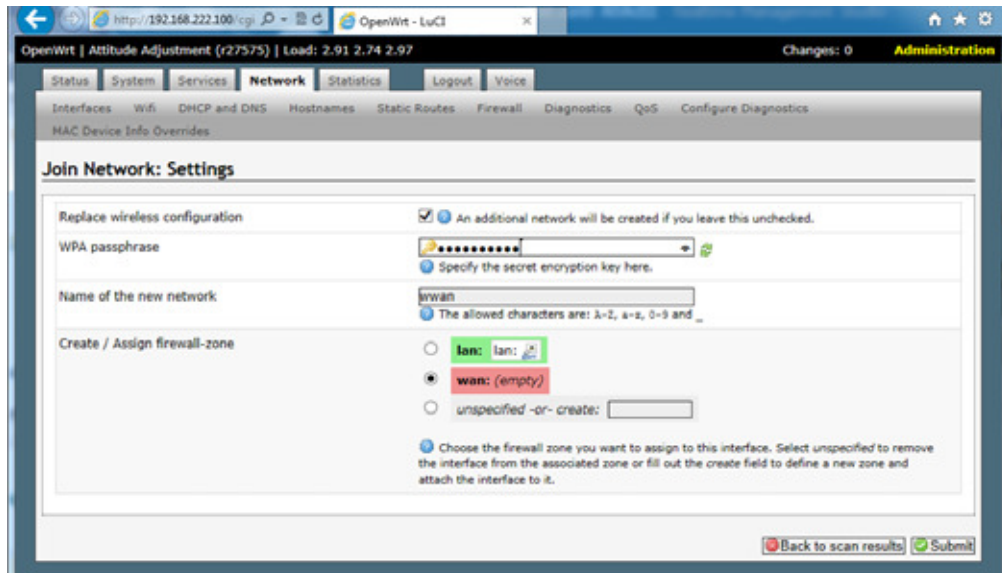
- From the displayed list of available networks, select the requested network and click the **Join Network** button.



- If the network is secured, the system will wait for the user to enter the protocol used and the password. Type the Wi-Fi Network password in the correct place:



Specify the secret encryption key here.



OpenWrt | Altitude Adjustment (r27575) | Load: 2.91 2.74 2.97

Changes: 0 Administration

Network

Join Network: Settings

Replace wireless configuration An additional network will be created if you leave this unchecked.

WPA passphrase Specify the secret encryption key here.

Name of the new network The allowed characters are: a-z, 0-9 and _

Create / Assign firewall-zone

lan: lan

wan: (empty)

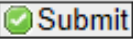
unspecified -or- create:

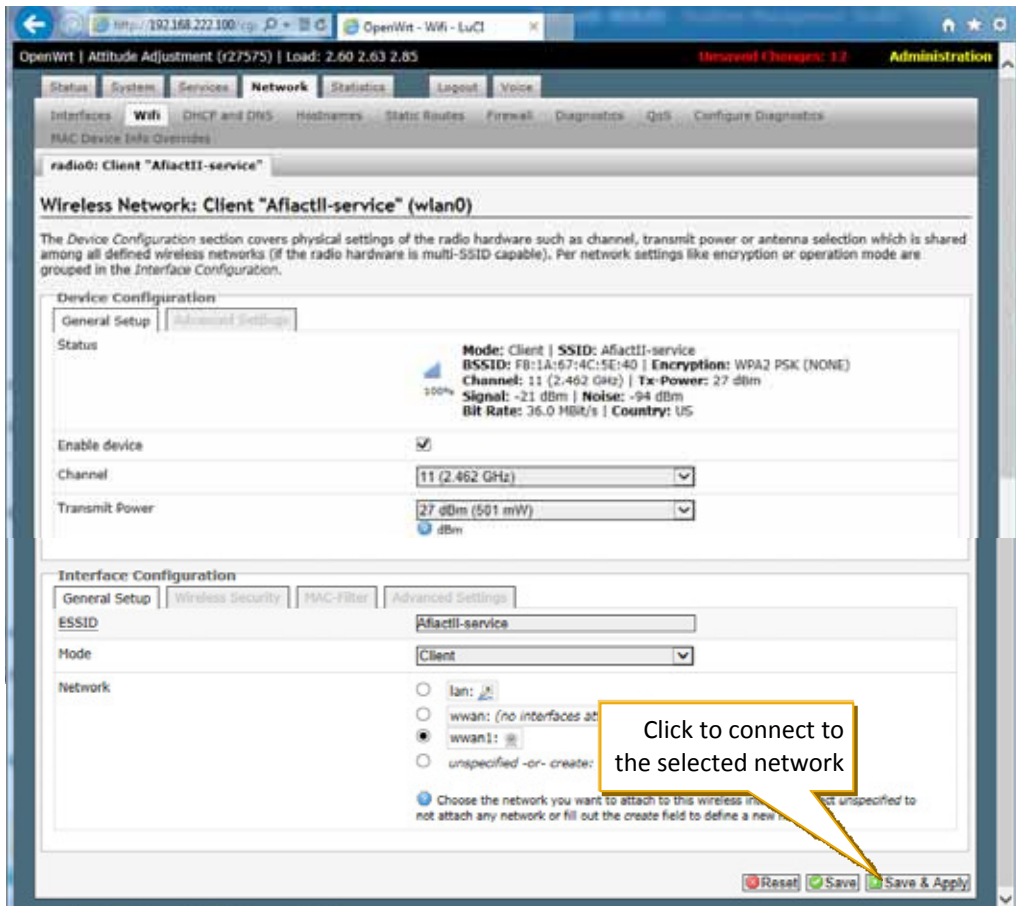
Choose the firewall zone you want to assign to this interface. Select unspecified to remove the interface from the associated zone or fill out the create field to define a new zone and attach the interface to it.

Back to scan results Submit



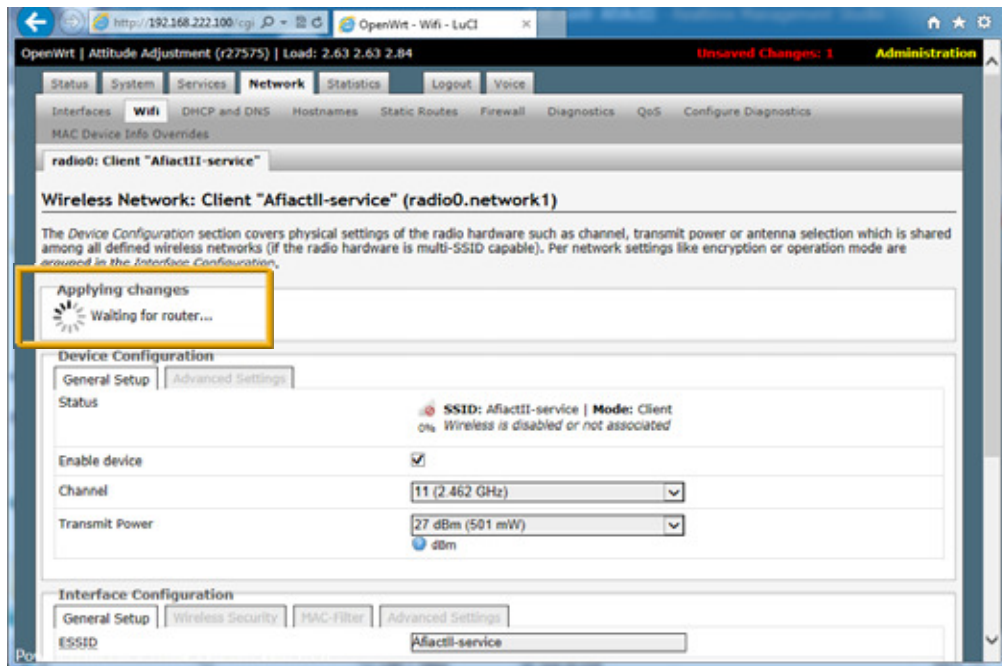
It is the user's responsibility to verify that the correct password had been entered. Entering a wrong password will end with no network connection, and the whole process will need to be performed again (starting at phase 1 above).

- Click  at the button to submit the new configuration.



- In the displayed screen all the details that will be sent to the device are displayed. Roll down and click **Save & Apply**.

10. Wait until the system is connected.



Note: If the connection takes too long (more than 3 minutes), restart the Reader (POWER OFF and then back ON).

11. Verify that all the Wi-Fi LEDs (WLAN & signal strength) on the Reader are ON (see 1.4.1). If the Wi-Fi LEDs don't work then you will have to start this stage from the beginning.
12. After connecting to the wireless network, disconnect the network cable and restart the Reader:
 - a. Use the transformer power button to turn the device off.
 - b. Disconnect the network cable.
 - c. Power the Reader ON using the transformer switch
 - d. Wait for the device to locate the network (~1 minute).
 - e. The communication verification is now done by checking:
 - At least 2 communication LEDs are ON

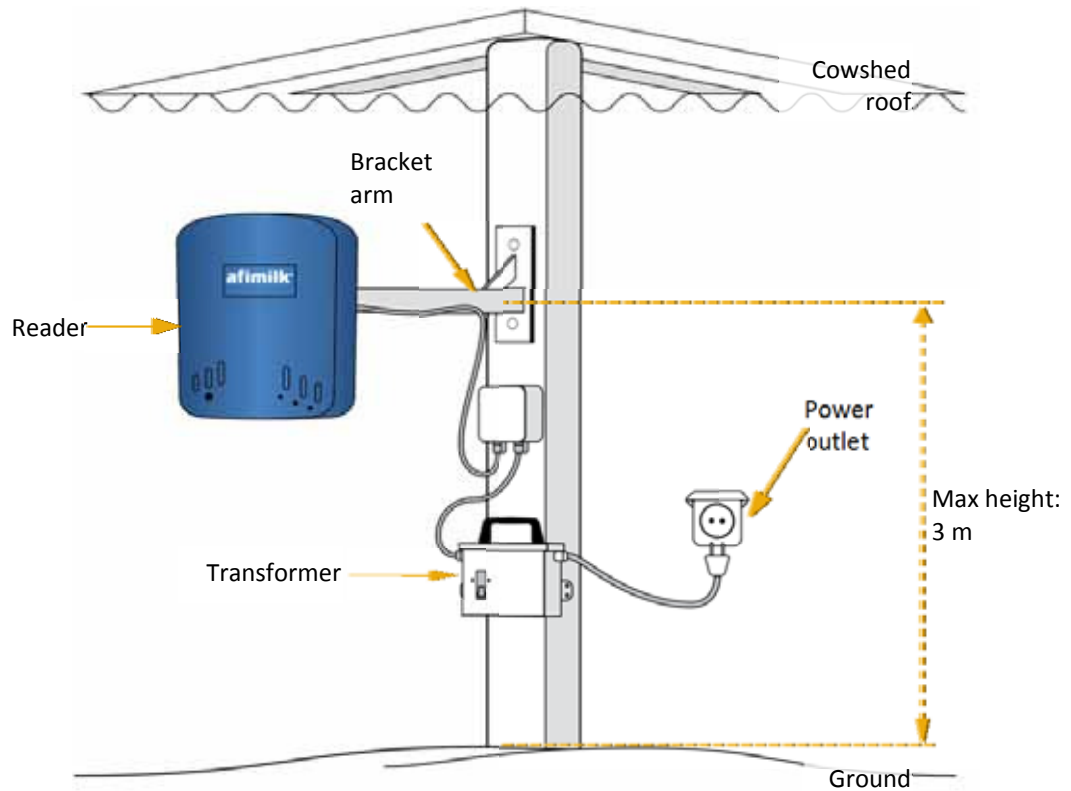


- AfiControl displays the Reader's IP, see 4.2
 - f. Close the Reader configuration interface (browser)

Initial Reader communication is complete. Disconnect and Take the Reader to the Shed.

5 Mount the Reader

After configuring the Reader, mount the Reader and its power elements in the location determined previously (see 2.1, 2.2), after verifying that there is both tag and network coverage in the cowshed (Wi-Fi or cable, as determined by the customer).



5.1 Mount the Power and Electricity Boxes



Power to all Afimilk devices must be supplied through an accessible, well-marked circuit breaker (usually placed on the power transformer).

Before conducting work on any Afimilk device, make sure power to devices is switched off at the circuit breaker (usually placed on the power transformer).



*This section provides an **example** for the connection, using Afimilk devices.*

Note: for outdoor power connection, you may either use AC via the power supply unit or DC.

To mount the power and transformer box

1. Connect the power supply unit (recommended: graded IP55) to the pole, near the power outlet access:
 - Locate the box on the pole, higher than the cows can reach but accessible for maintenance. In the example transformer demonstrated below- the bracket connecting plate was bent manually to fit the pole.
 - Use the electric screwdriver to screw the bracket to the pole.



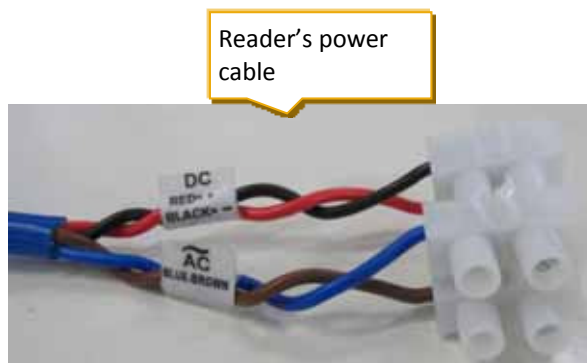
2. Connect the transformer box: Open the electricity box and screw it to the pole, preferably close above the power box, using the supplied screw and an electrical screwdriver.

Note: The electrical connection box is the local technician's responsibility



3. From the ***free end*** of the power cable, strip 2 inches of the insulation to expose the conductors. Then insert the cable into the electrical box through its lower connection holes.
4. Thread the exposed blue and black conductors into a cable terminal box previously removed from the reader's cable.
5. ***For AC power connection:*** Identify the **blue and brown** conductors exposed from the Reader's power cable's ***free end***. Insert the exposed blue and brown cable-ends into the electrical box and thread the conductors into the cable terminal box.

For DC power connection: Identify the **red and black** conductors exposed from the Reader's power cable's ***free end***. Insert the exposed red and black cable-ends into the electrical box and thread the conductors into the cable terminal box.



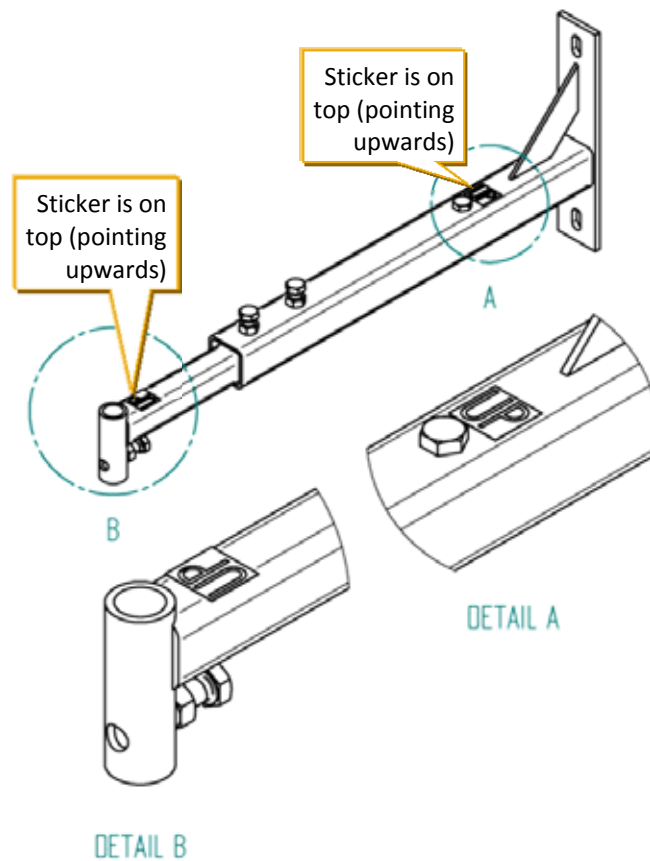
6. If the cable has loose ends, secure the cable to the power box using cable ties.
7. Close the electrical connection box.



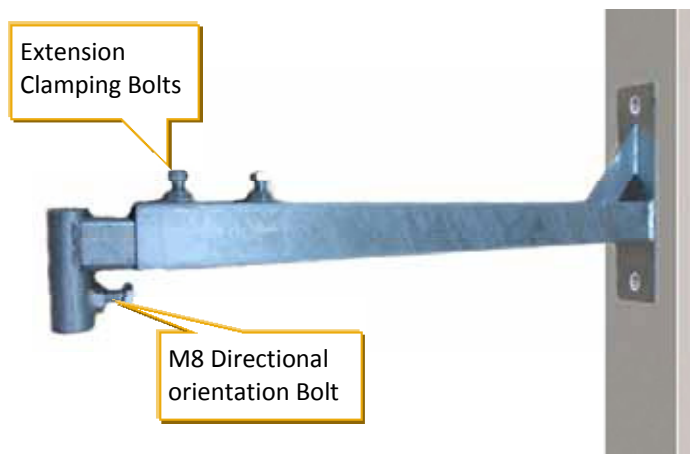
5.2 Mount the Reader on the Pole

To mount the Reader on the pole

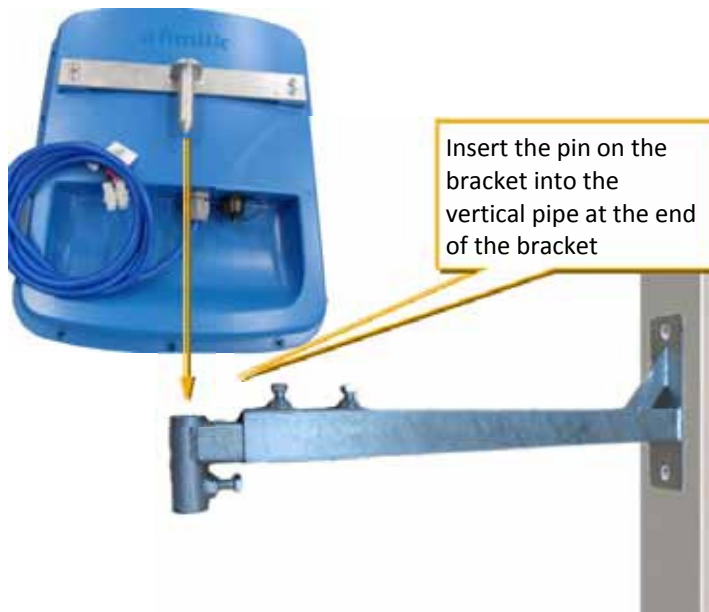
1. Attach the bracket arm to the pole using screws (*screws are not supplied*). The attachment must be done well to ensure long lasting connection of the arm to the pole:
 - a. Verify that the mounting location complies with all the requirements (*height, stability, etc.*)
 - b. Ensure that the bracket elements with the stickers are pointing upwards, as shown in the figure below:



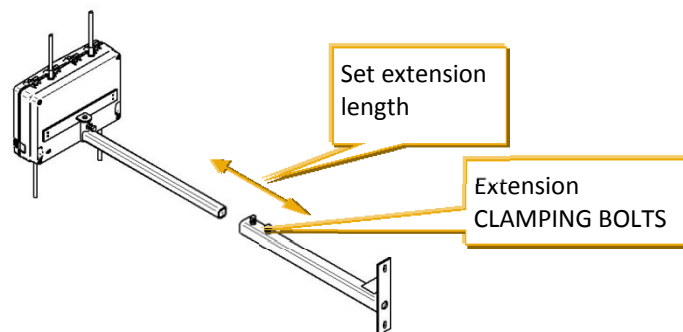
- c. Verify that the bracket arm is leveled (use a leveling device)



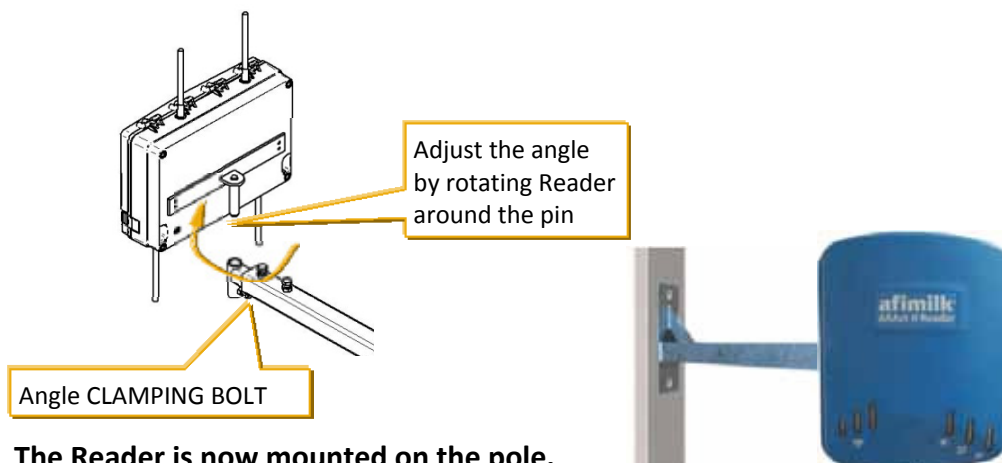
2. Connect the Reader to the bracket arm by inserting the pin on the bracket into the bracket arm's free end.



3. Adjust the extension and angle of the Reader:
 - Set the extension length by pulling the inner extension arm in and out from the bracket (Max length: 300 mm from the end of the larger profile). Then



- Rotate the Reader to its required angle. Then tighten the M8 clamping bolt using a 13mm wrench



The Reader is now mounted on the pole.



If Wi-Fi is used: test the mounting point for proper Wi-Fi coverage verification

Verify that at least two stable Wi-Fi Signal Strength LEDs (i.e. Low and Medium) are ON, indicating strong signal, see 1.4.1

Note: If the 2nd (Medium-strength) LED is not lit steadily (i.e. blinking) it is not good enough!



3 GREEN LEDs: Good signal strength

2 GREEN LEDs: Medium signal

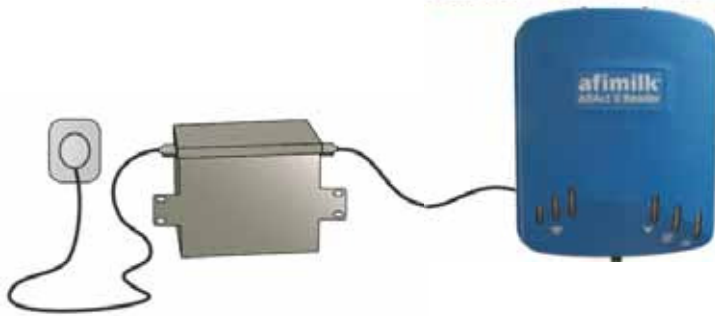
1 GREEN LED: Low signal strength



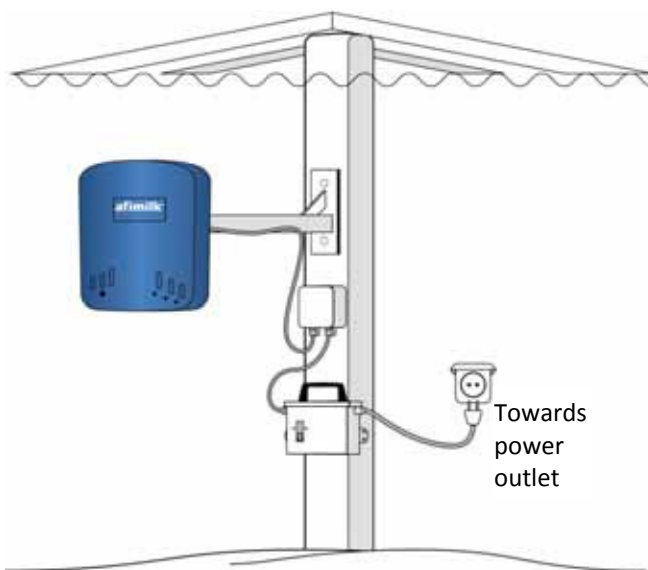
Note

For troubleshooting the connection, use back-to-back connection to your laptop, see 7.5

5.3 Connect the Reader to Power



1. Make sure that the power cable does not dangle under the Reader. Secure the connector and remaining white cable to the bracket arm using cable ties.



2. Connect the power box to the power outlet.
3. Power the Reader on, using the power switch located on the power box. Verify that the LEDs show good reception for both tags and Wi-Fi, see 1.4.1
4. When done with the installation, wait to see that the **Activity Log Report** is being updated with tag messages.

Note: You may set the Reader's transmission interval via AfiControl configurator to 5 minutes (see 4.2.3), so that you will be able to check that all tags transmit, within no longer than 15 minutes, and then change it back to 15 minutes. The tags can be viewed in the Activity log report, see Appendix C



Note

Before using the system for detecting cows in heat, average behavior performance baseline must be generated by the application. This can take 5 to 6 days.



Note

At this point, the Herd's data is entered into AfiFarm. Refer to Appendix F for guidelines on this procedure.