



APT-X1

Acoustic Pulse Technology System

USER MANUAL

Armenta's Proprietary Information
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NOTE: The Acoustic Pulse Technology is indicated for trained personnel in health care facilities. The APT-X1 system, in its current application and use in Veterinary, is assigned to be used in dairy farms environments only.



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1. INTRODUCTION

1.1 Background and Principle of Operation

The APT (Acoustic Pulse Technology) developed by Armenta Ltd. is an acoustic wave, also called a shockwave, which is adapted to carry mechanical energy to body tissues. An acoustic pressure pulse is characterized by a major and rapid change in pressure, high amplitude, and non-periodicity.

The APT-X1 system produces low power acoustic pulses based on ballistic energy principals. The shockwaves are generated by repeatedly driving a projectile using high pressurized air to collide against an anvil. The impact produced by the collision is converted into a shockwave, later transferred to the target areas of the animal to be treated. The device's applicator is placed over the skin of the udder. A coupling medium (i.e., ultrasound gel) is used to ensure good transfer of the acoustic pulse into the body.

1.2 Indication for Use

The APT-X1 (*Acoustic Pulse Technology*) is intended to be used on the surface of the Cow's udder.

Intended place for using the system: Dairy Farms.

Intended users: Authorized personnel to work at the dairy farm and who are qualified to use the APT-X1.

The APT-X1 system consists of 6 main parts: APT-X device, Applicator module (AM), Remote control (CU), Air pipe, Compressed air tank, Pressure regulator and dedicated Cart¹.

2. SAFETY INSTRUCTIONS

As with any system, certain precautions must be taken to ensure your safety and the safety of the animals. Note that the air pressure values specified for this system is essential for the safe use of the device. Note also that presence in EM environment beyond what specified in the tables (provided at the end of this manual), can lead to hazardous situation.

2.1 Precautionary Definitions

The precautionary instructions found in this section and throughout this manual are indicated by specific symbols. Understand these symbols and their definitions before operating this equipment.

The definitions of these symbols are as follows:

	(Warning)	"WARNING" indicator explains possible safety infractions that may cause serious injury and equipment damage.
	(Caution)	"CAUTION" indicator explains possible safety infractions that could have the potential to cause minor to moderate injury or damage to equipment.

Table 1: Precautionary Symbols and Definitions

The system is designed for safe and reliable operation when used in accordance with proper operation and maintenance procedures. The operator and all other personnel operating or maintaining the system should be familiar with the safety information provided in this chapter.

¹ Air Tank and Cart are not provided with the system.

2.2 Cautions



- Read this chapter to become familiar with all the safety requirements and operating procedures prior to System operation.
- In order to protect the APT-X1 System from use by unqualified personnel, turn the system off (see section 5.4) while the system is not in use and lock it in a secure place.
- Do not disconnect any of the system components or accessories while the system is switched on.
- Keep the applicator and the APT-X1 clean. See cleaning instructions in section 7.0 of this user manual.
- Always keep the system's cart stable to avoid uncontrolled movement and \ or turning over the APT-X1 system, which may result in damage to the system. When movement of the cart is necessary, move it slowly and carefully. The APT-X1 system may cause injury if proper care is not taken when moving it.
- Switch off the system before moving the cart.
- Check all connections before turning the system "on".
- Pay attention to the control unit screen quality, to ensure that it is acceptable during the first few seconds of the system operation. In case of display failure or no screen after 30 seconds, stop system operation.
- Before every session verify that all the components are intact.
- If the APT-X1 falls before, during or after use, check the APT-X1 carefully. Make visual check, and if needed, clean the APT-X1 with dry paper. If cracks are observed, contact your local distributor for service. If no cracks are observed, turn the system "on". If the operation sound is unusual, turn off the APT-X and contact your local distributor for service.
- Always use consumables which were approved and supplied by Armenta or its legal representatives.
- When cleaning the device with water, make sure the AM is fully assembled. Do not clean the APT-X1 with water if the place for loading the AM is empty and \ or the AM is not assembled properly.

2.3 Warnings



- Before attempting to operate the APT-X1 System, be sure to read this manual to become familiar with all safety requirements and operating procedures.
- No modification of this equipment is allowed! **Do not dismantle the APT-X1 or its accessories.**
- The system is operated using specific pressure. do not use any Pressure Regulator which is not provided or authorized by Armenta.
- Do not fill the air tanks with pressure above 200 bars (2900.75 psi).
- There may be risks associated with acoustic pulses delivery to the skin that are yet unknown.
- Check device for any damage prior to use.
- Do not operate the device over any area of the Cow's body other than the udder.
- Regularly inspect the accessories for possible damage; in particular, air pipes.
- Ultrasound gel should be applied on the udder surface and on the applicator's head before using the device.
- Upon reaching its maximum number of pulses, return the Applicator module to your local distributor. Do not discard.
- The system may generate a significant level of noise. Please use noise protection (such as earplugs) when using the device. A continuous usage for more than two hours (in 24-hour period) without earplugs, might result in a hearing impairment.
- Working at less than 10°C is possible with a fully charged CU only.

2.4 Electrical & Mechanical Safety Warnings



- High air pressure is present inside the APT System. Always take proper precautions as described in sections 2.2 and 2.3 above. Make sure to remove air pressure from the APT-X1 system and from the air pipes upon completion of use.
- Only company authorized personnel are allowed to supply service to this equipment.
- Do not remove/modify/add to the inner parts of the system; service is supplied only by company's authorized personnel.
- Keep all covers and panels of the system securely closed at all times when in use. Removal of the covers or panels can create a safety hazard.
- Perform maintenance procedures (see section 7.0) when the system is shut down and disconnected from power.
- The Control unit of the APT-X1 system includes Lithium-Ion batteries. If the charger does not charge, contact your local distributor for service.
- Use the Battery Charger only between sessions when the device is not being operated.
- Use only the provided Battery Charger that comes with the device.
- When batteries are depleted contact Armenta's Service counter for adequate maintenance. Batteries are not replaceable and the whole Control Unit need to be replaced.

2.5 Fire Hazards



- Do not use the system in the presence of explosive or highly flammable materials like alcohol, methanol, acetone, etc. (The suggested use of the ultrasound gel for usage is in no way an explosive or highly flammable material and is approved for usage).
- Do not have flammable substances on the session area when preparing the cow's udder surface.

2.6 Safety Features

The system is designed for safe and reliable use when used in accordance with proper operation and maintenance procedures. The operator and all other personnel operating or maintaining the system should be familiar with the safety information provided in this chapter.

Safety Features of the System:

- Activate the control unit. Output is generated only after activating the control unit & APT-X1 start button is pressed down.
- An independent sensors and electronic circuits stop the operation of the system in case the pressure decreases below the required working pressure or batteries voltage decreases below the required working voltage.

3. SYSTEM DESCRIPTION

This chapter provides a detailed description of the APT-X1 system, including its main components, controls, and technical specifications. Please review this chapter carefully to familiarize yourself with the controls, ports and connectors used during operation.

3.1 System Components & Controls

The APT-X1 system consists of the following main components:

1. Main Unit (APT-X1 device)
2. Control Unit (CU)
3. Applicator module (AM) *(the Device's Applied Part)*
4. 4-meter Air Pipe
5. Pressure Regulator
6. Battery Charger

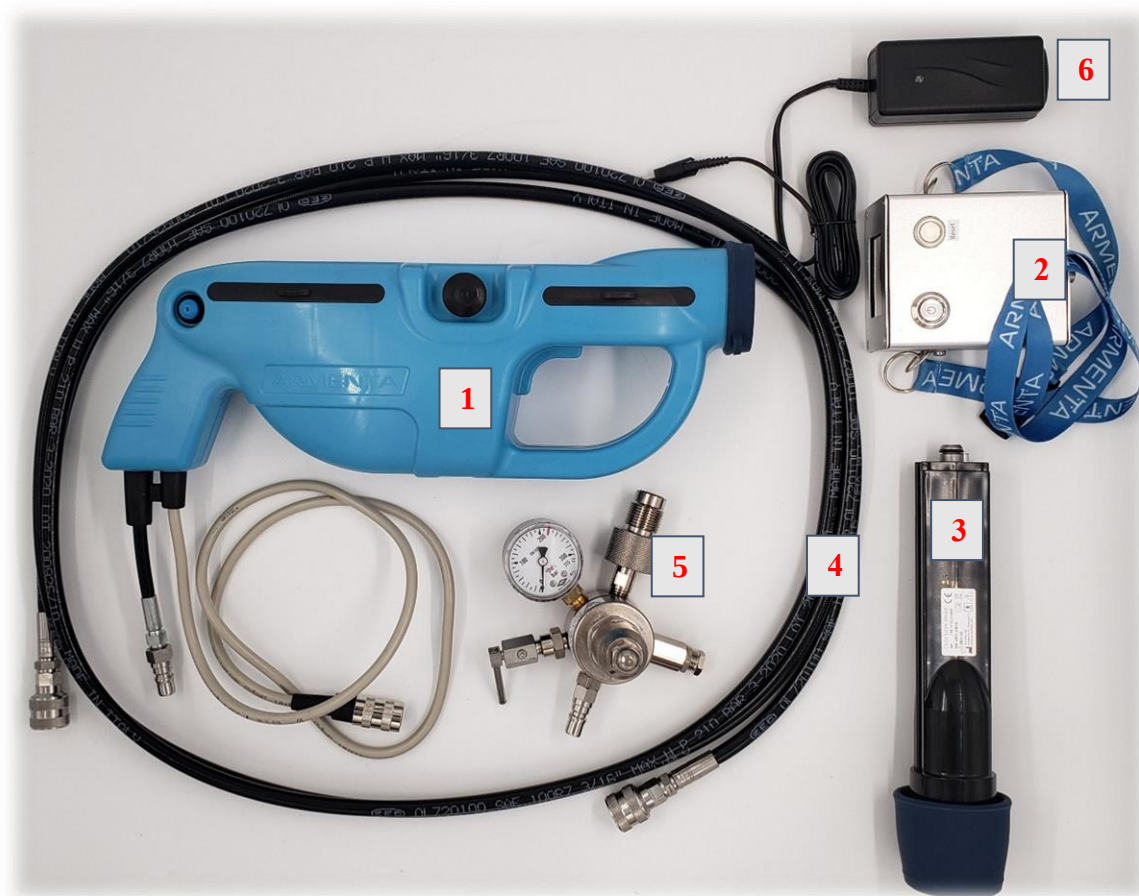
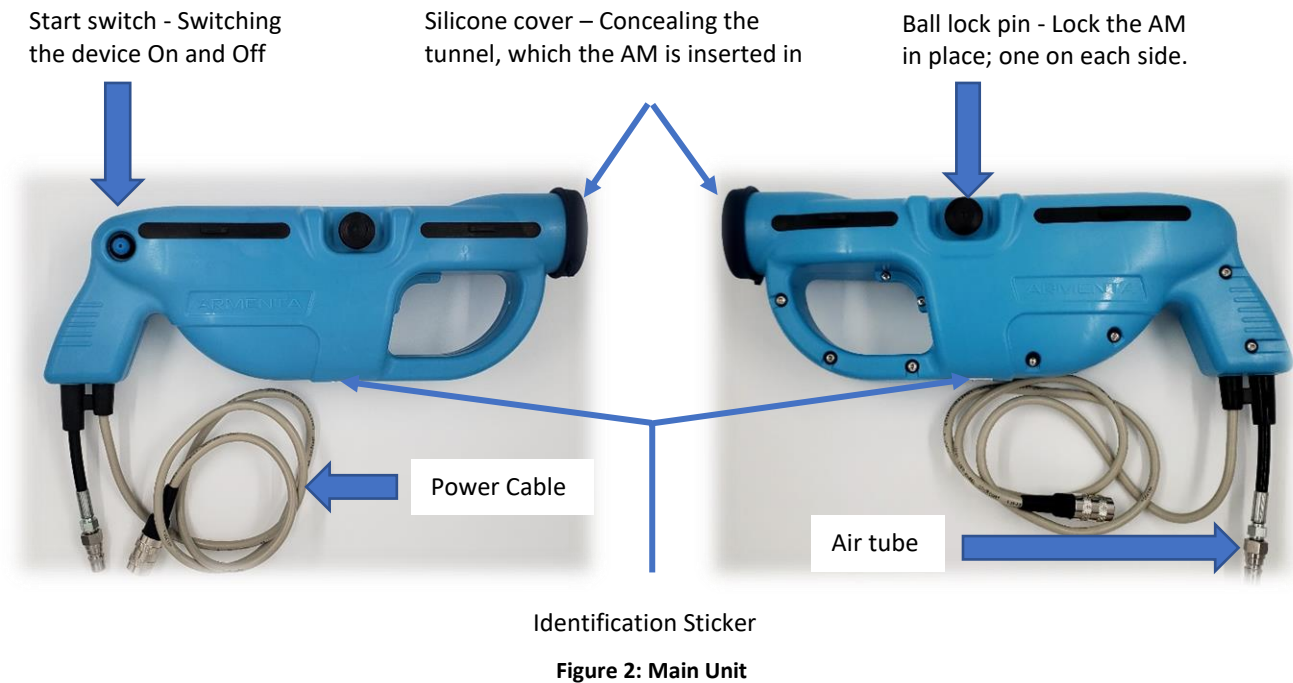


Figure 1: General View – APT-X1 System Components

3.1.1 Main Unit (APT-X1 device)

The Main Unit that generates the acoustic pulses when the applicator module is connected.



3.1.2 Control Unit (CU)

The Control unit controls the operation of the entire system. It is used for system activation upon pressing the Power switch and includes 3 Lithium-Ion batteries. The Control unit serves as the user interface and is connected to the Main Unit by a male/female 19 pins connector – see figure 2c. The Control Unit is equipped with buckles and a strap to ease holding it when placed around the neck of the user.



Figure 2a: Remote Control Front Panel



Figure 2b: Remote Control Top Panel

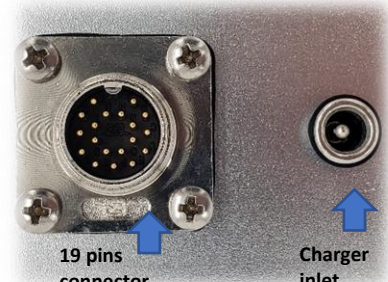


Figure 2c: Remote Control Back Panel

It has a digital counter of the acoustic pulses and a compatible display, which shows the number of pulses generated during each session. The Control unit incorporates two modes of operation: “down” or “up” counter. The Control unit displays icons that help the operators to understand the mechanical status of the system in real time. See section 5, **User Interface** for details.

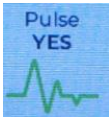
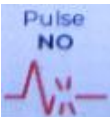
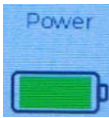
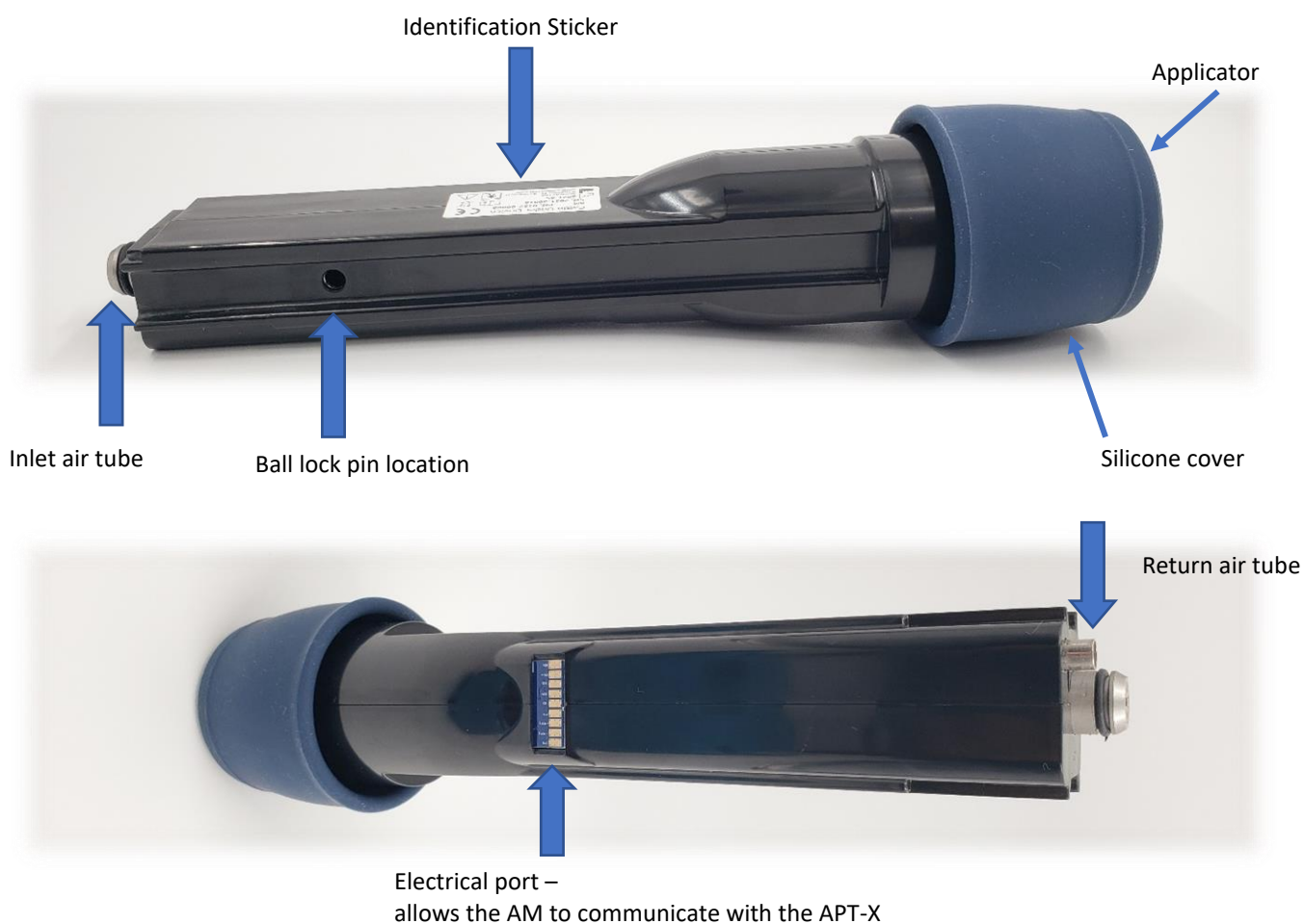
Icon		Description
		Green = YES; Red = No pulses
		Battery power
		Remaining pulses in percentage
		Green = OK; Red = Low pressure

Table 2: Control Unit Icons

3.1.3 Applicator Module (AM)

The Applicator Module is the unit which generates the acoustic pulses. The tip of this unit, the *applicator*, is made of stainless-steel which has direct contact with the cow's udder surface. The AM outer body is made of PC-ABS.



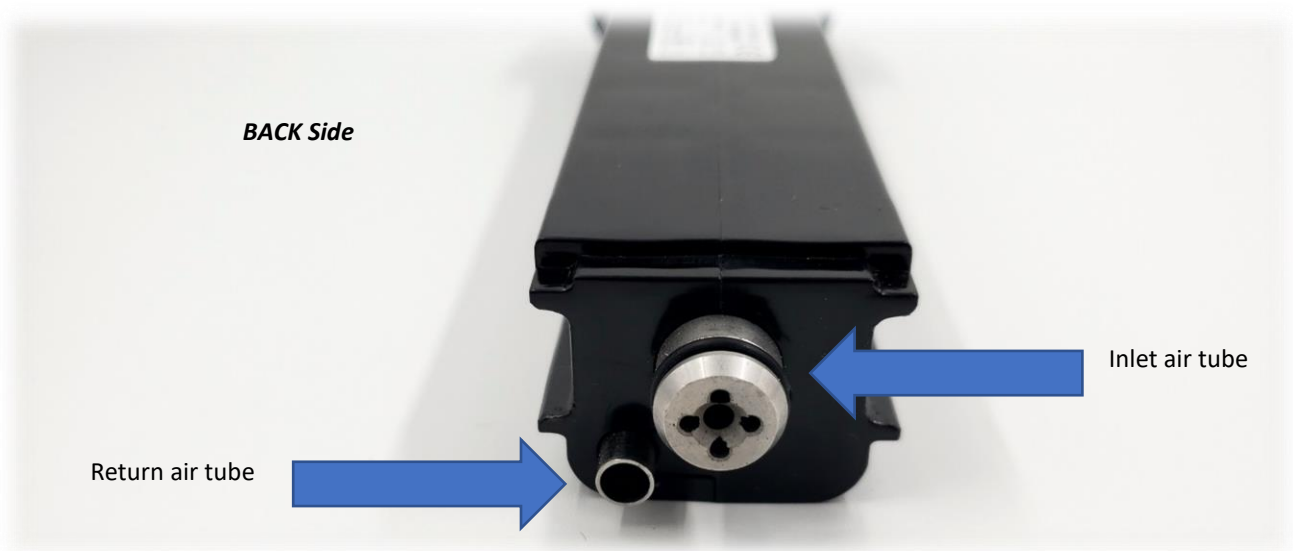


Figure 3a: Applicator Module (back & profile sides)

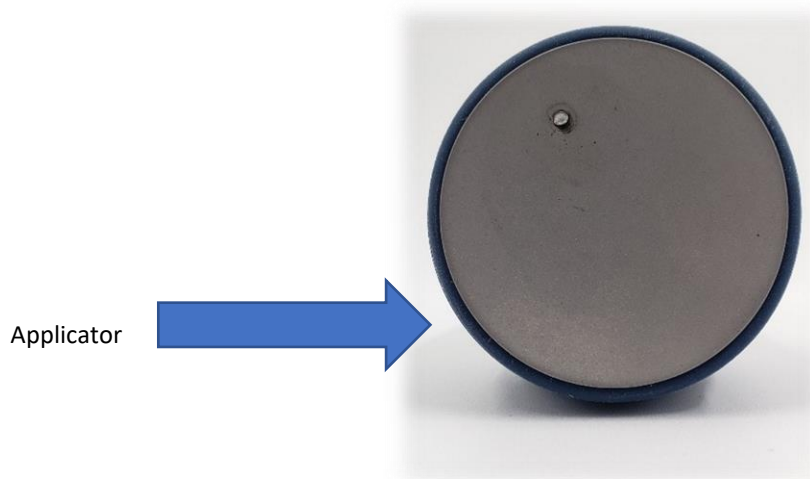


Figure 3b: Applicator Module (front side)

3.1.4 Air Pipe

Air pipe is connecting the main unit to the compressed air tank and is equipped with two female quick connectors.



Figure 4: Air Pipe

3.2 Relating Parts

The APT-X1 system is used with the following parts:

1. Compressed Air Tank²
2. Pressure Regulator³ (accessory)
3. Battery Charger⁴
4. Air Compressor⁵

3.2.1 Compressed Air Tank

The compressed air tank, which should be used with the APT-X1 system, shall not be filled with pressure greater than 200 bar. It should be connected via the pressure regulator and be equipped with 5/8" G female outlet thread.

Max working pressure	200 bar, 3000 psi
Valve outlet tread	5/8 G (female)
Additional Features	Bursting disk (265 bar) + Mono gauge
Certifications	ANSI/NGV NGV2-2007 (Female); UNI EN 144-2 (Female); DIN-477-13N (Female)

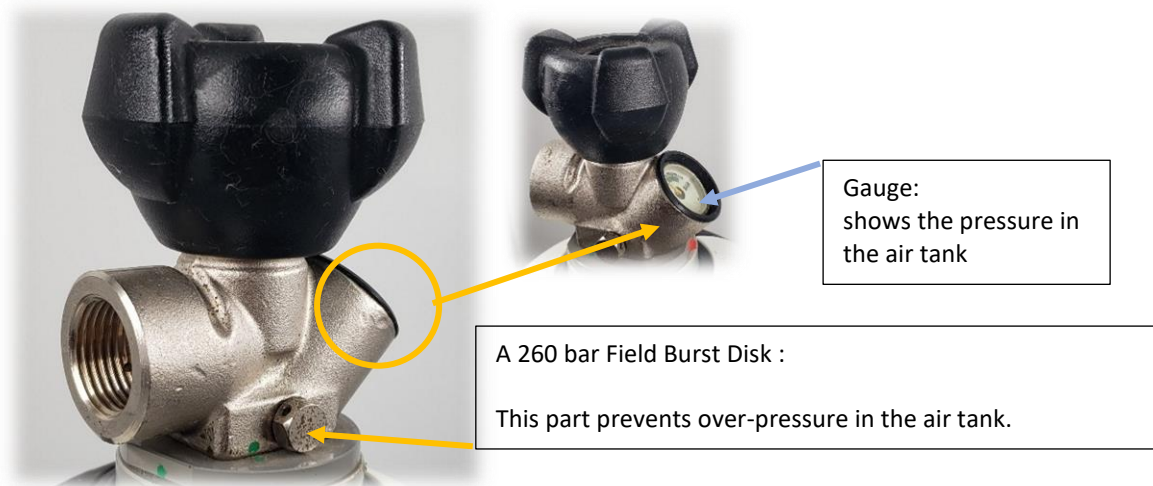


Figure 5: Mono gauge & Bursting disk

To fill the air tank, we recommend that the **air compressor** will have the minimal following attributes:

Minimum Operating pressure	210bar
Auto-stop	210bar
Outlet thread	5/8 G (male)
Additional Features	Pressure gauge + Bleeder valve
Certifications	ANSI/NGV NGV2-2007 (male); UNI EN 144-2 (male) DIN-477-13N (male)
Capacity (~20min for 9 liters compressed air tank)	6.0 m ³ /h, 100 lit/min, 3.53 cfm

² Not provided with the system

³ Provided

⁴ Provided

⁵ Not provided with the system

3.2.2 Pressure Regulator

The pressure regulator is connected to the air tank on one side (5/8" G male; DIN 447-13N) and to the 4-meter Air Pipe on the other side (1/8" BSP male quick-connect; ISO 7241-1 "B"). The pressure regulator decreases the pressure from the air tank so that the APT-X1 will receive the required pressure to operate. It has also an "Air Bleeder" valve which serves as a vent pipe after use and a Release valve which serves as a safety measure in case the pressure in the regulator is above the required limits..

Inlet Pressure	200±20 bar, 3000±300 psi
Outlet	Port 1: APT-X1 port: Size 1/8" BSP male for quick connect assembly (ISO 7241-1 "B", size: 5.0 mm ISO), free flow
	Port 2: Release valve
	Port 3: high-pressure bleeder valve
Inlet	Port 1: Air tank port: size: 5/8" G (male); DIN-477-13N
	Port 2: Pressure gauge: 1/4" BSP + cork
Fluid	Compressed air @ standard temperatures, (-10C to +40C)



Figure 6: Pressure Regulator

3.2.3 Battery Charger

Input	100-240V 50/60Hz
Output	Voltage: 12.6V; Current: 2A
Output Cable	20 AWG 1.2m
Connection	Size: L=9.5, D=5.5, DI=2.45÷2.50 (Preferable 2.45)
	Central pin +, external pin -

Note: this is a **charger** and not a power supply or power adaptor.



Figure 7a: Charger's socket polarity



Caution: Battery charger is supplied with the device. Always make sure the Charger's socket polarity is as indicated above.



Led indicator: Red = Charging; Green = Fully charge

Figure 7b: Battery Charger

3.3 APT-X1 Technical Specifications

Parameter	Value/Data
Physical	
Energy depth penetration	Up to 300 mm
Electrical	
Input voltage	12 v
APT-X1 pulse frequency	3.9 Hz
Mechanical	
Pneumatic pressure source	50 – 200 bars
Weight: APT-X1: Control Unit: Applicator Module:	2.5kg 600 grams 680 grams
Dimensions: APT-X1: Control Unit: Applicator Module:	400 X 140 X 100 mm 120 X 90 X 60 mm Dia. 65 mm X length 270 mm
Environmental Conditions for Operation	
Temperature	-20 ÷ 45° C
Relative humidity	0% up to 98%
Atmospheric pressure	0.5 atm up to 1 atm
Environmental Conditions for Transportation & Storage	
Temperature	-20 ÷ 60° C
Relative humidity	0% up to 70%
Atmospheric pressure	0.5 atm up to 1 atm

Table 3: Technical Specifications

3.4 Symbols & Labels

This section describes the symbols used throughout this user manual (Table 4) and the labels affixed to the APT-X1 System (Table 5). It is recommended that users review the meaning of these labels for everyday usage, and in case any details are needed for service purpose. Table 4 briefly reviews several internationally recognized symbols that are found on the APT-X1 main unit.

3.4.1 Symbols used in this User Manual

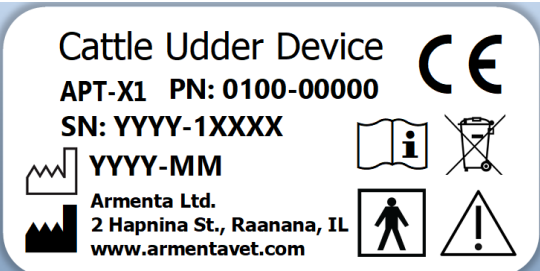
No.	Symbol	Description
1		Consult the User Manual
2		Attention: Read All Warnings and Cautions in the User Manual

No.	Symbol	Description
3		Waste of Electrical and Electronic Equipment (WEEE) compliance symbol
4		Manufacturer
5		Date of Manufacturing
6		Product Serial Number
7		Indicates the temperature limits to which the device can be safely exposed
8		CE Mark – Industrial Safety
9		Type BF Applied Part

Table 4: Symbols used throughout this User Manual

3.4.2 Labels affixed to the APT-X1 System

The labels shown in the following table (Table 5) are affixed to the Main Unit of APT-X1 as well as the other system components. These include serial numbers of system parts and a few usage warnings.

	Label on Device
	Label on Applicator module (AM) + Applicator House. X2 Labels

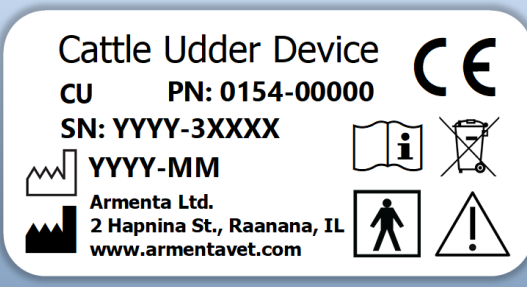
 Cattle Udder Device CU PN: 0154-00000 SN: YYYY-3XXXX YYYY-MM Armenta Ltd. 2 Hapnina St., Raanana, IL www.armentavet.com CE Icons: Information (i), No Open Flame, Person, Warning (exclamation mark)	Label on Control Unit (CU)
--	----------------------------

Table 5: Labels affixed to the System

4. INITIAL SET UP

The System is designed for simple installation. To install the system, follow the subsequent procedure:

4.1 Unpacking the System

Unpack the system and verify that the system is intact and that all its components are present. It is recommended for future safe transport of the device, that the original box and internal packaging be saved. Make sure to remove all covers and wrappings from all parts prior to the installation of the system.

What's in the box?

1. Main Unit - The APT-X1 device
2. Control Unit
3. Battery Charger
4. Applicator Module (AM) + AM container
5. Air Pipe
6. Pressure Regulator
7. Treatment Instructions

4.2 General Overview & Installation Requirements

4.2.1 Electrical Requirements

The System is operated by 3 Lithium-Ion batteries (12V).

Batteries are located inside the control unit. Batteries are chargeable.



Caution: Do not remove the batteries out of the control unit

4.2.2 Environmental Requirements

Corrosive materials can damage electronic parts. Therefore, the system should only be operated in a non-corrosive atmosphere. The following environmental conditions are required for optimal operation of the system:

Temperature: -20°C up to 45°C

Relative Humidity: 0% up to 98%

Atmospheric Pressure: 0.5 atm up to 1 atm

4.2.3 System Mobility

4.2.3.1 Moving the APT-X1 between treatments of different cows

1. Follow cleaning instructions as in section 7.0.
2. Carefully place the system on the cart and slowly move the cart.

4.2.3.2 Moving the APT-X1 within the farm

1. Turn the system off by pressing the Power switch of the control unit.
2. Release air using the air bleeder located on the pressure regulator
3. Follow cleaning instructions as in section 7.0.
3. Carefully place the system on the cart and slowly move the cart.

4.2.3.3 Moving the APT-X1 between farms (see below section 5.5.1)

1. Turn the system off by pressing the Power switch of the control unit.
2. Disconnect the APT-X1 device from the control unit, air pipes, pressure regulator and the compressed air tank and release air using the air bleeder located on the pressure regulator
3. Follow cleaning instructions as in section 7.0.
4. Pack all system components in the cardboard box.



CAUTION

PUSHING OR PULLING THE CART RAPIDLY MAY TURN THE SYSTEM OVER AND RESULT IN DAMAGE TO THE SYSTEM OR THE USER.

4.3 APT-X1 System Assembly Procedure

4.3.1 AM Assembly

4.3.1.1 Remove the AM box cover and pull the AM out.

4.3.1.2 Remove the Silicon Cover from the Device's AM tunnel and the two Ball Lock Pins, each from its side.



Figure 8: Silicon Cover and Ball Lock Pins

4.3.1.3 While the Electrical port faces downward and the Identification Sticker (SN Label) upward, insert the AM into its tunnel in the APT-X1.

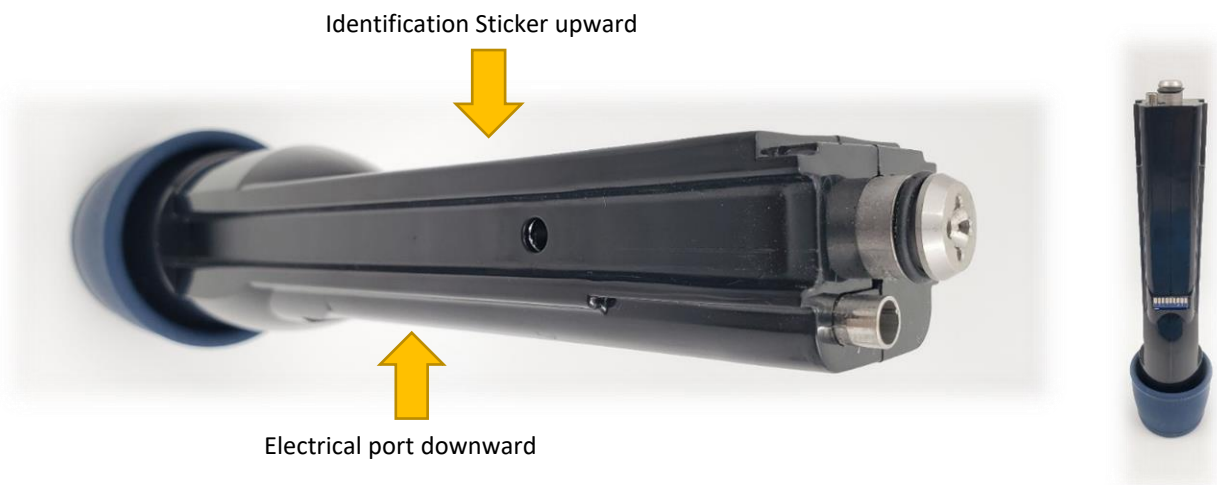


Figure 9: Electrical port should face downward

4.3.1.4 Ensure you slide the AM until its side holes are parallel to the holes in the blue plastic cover.



Figure 10: AM insertion method

4.3.1.5 When holes are paralleled, lock the AM by inserting back the Ball Lock Pins, each from its side.



Figure 11: AM insertion completion

4.3.1.6 After mounting the AM, it is highly recommended not to remove until completion of pulses charged.

4.3.1.7 Multiple insertion and removal procedure of the AM, may harm the electrical connection to the APT-X.

	CAUTION
WHEN INSERTING OR REPLACING AN AM, CHECK THAT THE AM DATA SHOWN ON THE CU SCREEN (figure 18) ("AM NUMBER" & "REMANINIG PULSES") MATCHES THE AM DATA IN YOUR ORDER.	

4.3.2 Pressure Elements Assembly

4.3.2.1 Connect the regulator to the air tank with the gauge (figure 12)

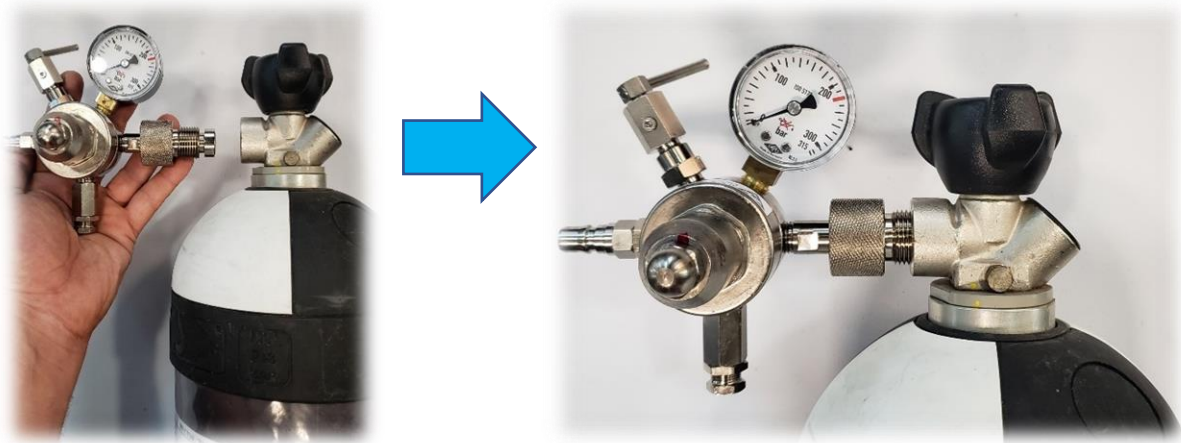


Figure 12: Pressure regulator connected to air pressure gauge on the air tank

4.3.2.2 Take the air pipe & APT-X1 out of the box.

4.3.2.3 Push in the connector at the edge of the air pipe to its receptacle at the edge of the pressure regulator until a click sound is heard (figure 13a), then push in the connector on the other side of the air pipe to its receptacle port in the APT-X1.(figure 13b).

4.3.2.4 Verify that connectors are properly connected and locked.



Figure 13a: Connecting air pipe to the pressure regulator



Figure 13b: Connecting port of the air pipe to the APT-X1 device



⚠ Warning: Air pipes may blow off in case of connection failure. Noise of running air or air leakage will indicate semi-connection failure.

4.3.3 Control Unit Connection

4.3.3.1 Push the APT-X1 pins connector into its socket in the control unit box rear panel. Pay attention to the **spline fitting connection – Male on the CU, female on the cable.**

4.3.3.2 Fasten with the connector's screws.

4.3.3.3 Verify that connector is properly connected and locked.

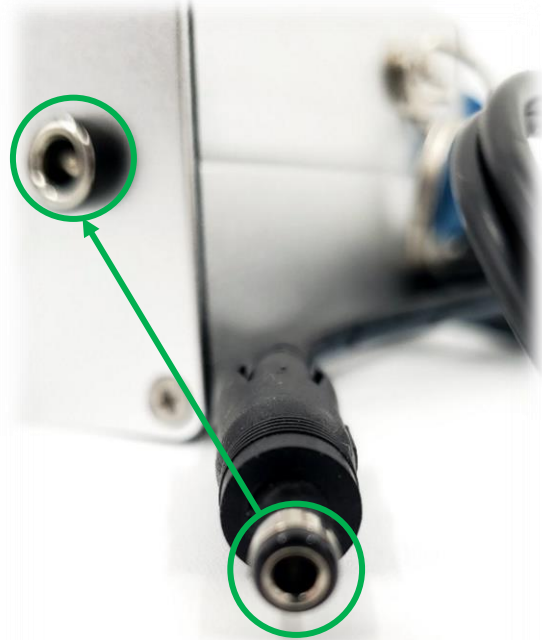
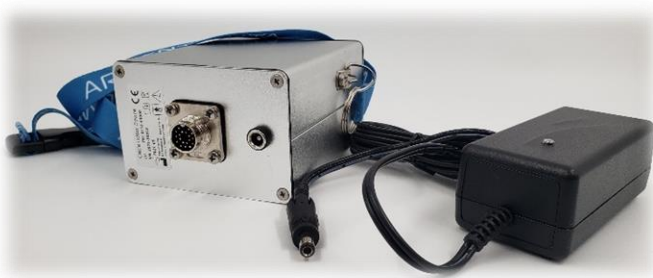


Figure 14: Connection of control unit



CAUTION

MAKE SURE CONTROL UNIT IS SWITCHED OFF PRIOR TO PLUGGING IN/OUT THE APT-X1 UNIT CABLE



The APT-X1 system is provided with a charging station for the Lithium-Ion batteries. The control unit display shows the power of batteries. In case of charging station failure, contact your local distributor for service.

Figure 15: Connection of control unit to the charger

5. USER INTERFACE

5.1 Turning the System On

Before turning the system on, first verify that the air pressure in the air-tank is sufficient and that the APT-X1 is properly connected to air tank via the pressure regulator. Before turning the control unit on, verify that it is connected properly to the APT-X1 device.

Warning: The system needs to be charged before the first use for at least 4 hours. Check all connections before turning on the system.

Language selection:

The system default language is English.

There are additional three options: Spanish, German and French.

To choose a language, activate the CU by pressing the “Power switch” button. After few seconds, the screen with the AM details appears (see figure 16a1). Press the “Reset” button once, until the next screen appears (see figure 16a2). By pressing the reset button, you can scroll down using the arrow marker, and choose the desired language.

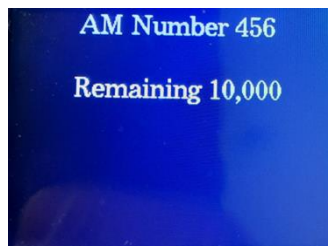


Figure 16a1 S/N & pulses amount display



Figure 16a2: language choosing screen

After selecting the desired language, turn off the CU by pressing the “Power switch” button. When turning on the CU again, the selected language will appear. To turn on the system, press the Power switch button on the top panel of the control unit so that the red light turns on.

Power switch on the control unit upper panel

- Pressed position – ON
(Red LED on)
- Not pressed position – OFF
(Red LED off)

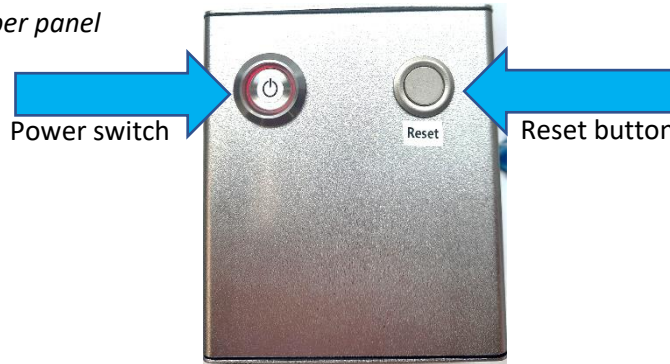


Figure 16a3: Control unit Top Panel

Caution: Pay attention that the red LED indicator on the top panel is ON after switching on the system. Pay attention that the APT-X1 device will start when pressing the “start” button and start delivering pulses. Consult your local distributor for service in case the APT-X1 does not deliver pulses once the system is ON.

Caution: In case of sound of air flow, from within the APT-X1 device when opening the Air tanks’ valve, conduct the RESET procedure, to recalibrate air valves (P.29).

The Control unit has two modes of action:

- 1) Count down: from 400 to 0.
- 2) Count up: from 0 to unlimited.

Figure 16b: “Start” button



Mode of action selection:

Count down mode – press once the RESET button on the upper panel of the control unit.

Count up mode – is the default mode.

Count up mode:

After turning ON the system, the control unit screen will first present Armenta details (see Fig.17). The second display will present the AM details (see Fig.18) and then it will go to its default mode when displaying “0” (see Fig.19) in the pulse counter location and on its bottom part, 4 icons will show up. The 1st from the bottom left icon indicates the status of the system pressure. When the pressure is sufficient, icon will show with the word “Pressure OK” and it will be Green in color. If the pressure is too Low, icon will turn Red, and the word “Pressure Low” will appear. The 2nd to the left icon will give indication if pulses are generated. Green Pulse Icon and writing “Pulse YES”. Red pulse icon and writing “Pulse NO”. The 3rd icon will show the batteries power and the 4th icon will inform the remaining pulses in the AM in percentage. When pulses reach 10% of allowed pulses value, the icon will turn red, and the number will show 10%.



Figure 17: Control Unit First display

Count down mode:

For count down mode, press once on the RESET button, which is located on the CU’s top right panel and the screen will display “400” (see Fig.19a) that is the number of pulses recommended for single session. The control unit will count down from 400 to 0 – a short beep will sound after each 200 pulses and the APT-X1 system will automatically stop when reaching 0 (after total of 400 pulses).

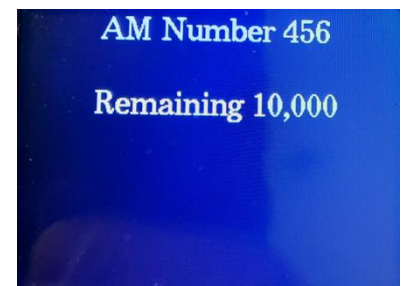


Figure 18: S/N & pulses amount display

Warning: In count up mode the APT-X1 system will not automatically stop when reaching 400 pulses.



Figure 19: Default mode display



Figure 19a: Count down mode display

5.2 Pulses Application

The system does not enable starting a session until all components are well connected. Acoustic pulses will not be generated unless:

- there is sufficient air pressure level in the air tank
- the control unit batteries are sufficiently charged
- there are sufficient pulses remaining in the Applicator module

Warning: Air pipes may blow off in case of connection failure. Noise of running air or air leakage will indicate semi-connection failure.

- Be aware that pulses will be generated when the control unit button has been pressed and “start” button on the APT-X1 has been engaged
- Note that system's default can NOT be changed by the end user, except on the language selection screen.
- Use only air pipes supplied by Armenta

Warning: Only qualified personnel who have been trained by Armenta Ltd. or its official representatives are allowed to provide service for this equipment.

5.3 Sound Indications

5.3.1 Control Unit (CU) Indication

- After pressing the CU ON/OFF button, a beep is sound.
- In a countdown mode, after 200 pulses a beep is sound, and after 400 pulses the operation is stopped automatically (another beep is sound at the end of session).

5.3.2 APT-X1 Applicator Indication

- In case of in-complete contact or no-contact of the applicator with the udder's skin, a louder sound of the pulses will be noticed. When the applicator is placed correctly and tight to the udder's skin, the sound of the pulses are more dimmed.

! Warning: pay attention to changes in the sound of APT-X during treatment. Incorrect placement of applicator, will result in pulses which are not effective AT ALL!

5.3.3 Air Pressure Indication

- In case of low pressure, the icon will turn red, and the system will stop.

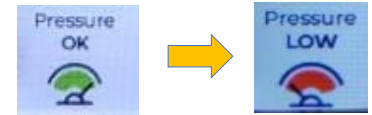


Figure 19b: Pressure indication

5.4 Turning the System Off

1. To turn the system off, press the power switch button to the OFF position on the upper panel of the control unit.
2. Close the air pressure valve of the air tank by turning it according to the instructions supplied with the valve.
3. Drain the remaining air in the pipes by using the bleeder (figure 20a) on the pressure regulator (figure 20b)
4. Close the bleeder (figure 20c).



Figure 20a: Bleeder

! Warning: After turning off the system, and before any further action, make sure to drain out all the air trapped in the system's air pipes using the bleeder.



Figure 20b: To open the bleeder and release Air, turn the Valve Nob Counter-Clockwise.

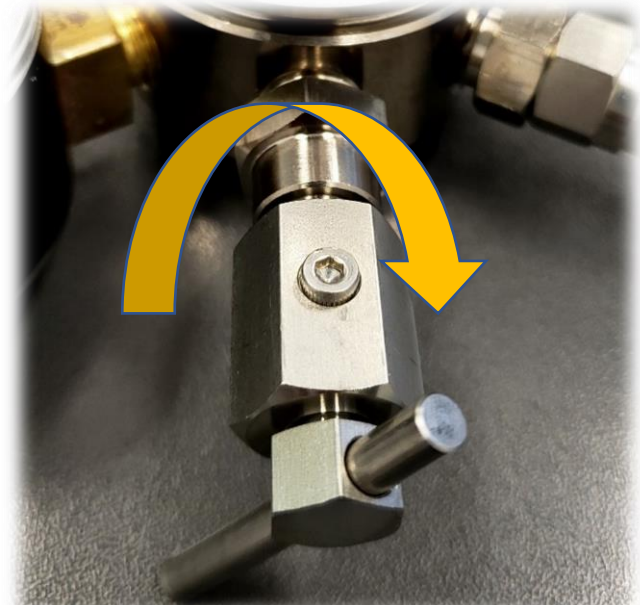


Figure 20c: To close the bleeder, turn the Valve Nob Clockwise

5.4.1 APT-X1 dismantling procedure:

5.4.1.1 Disconnect the APT-X1 pins connector from its socket in the control unit box. Do not bend to avoid pins breaking or bending. Pull pins connector in a straight line to the control unit connection port.

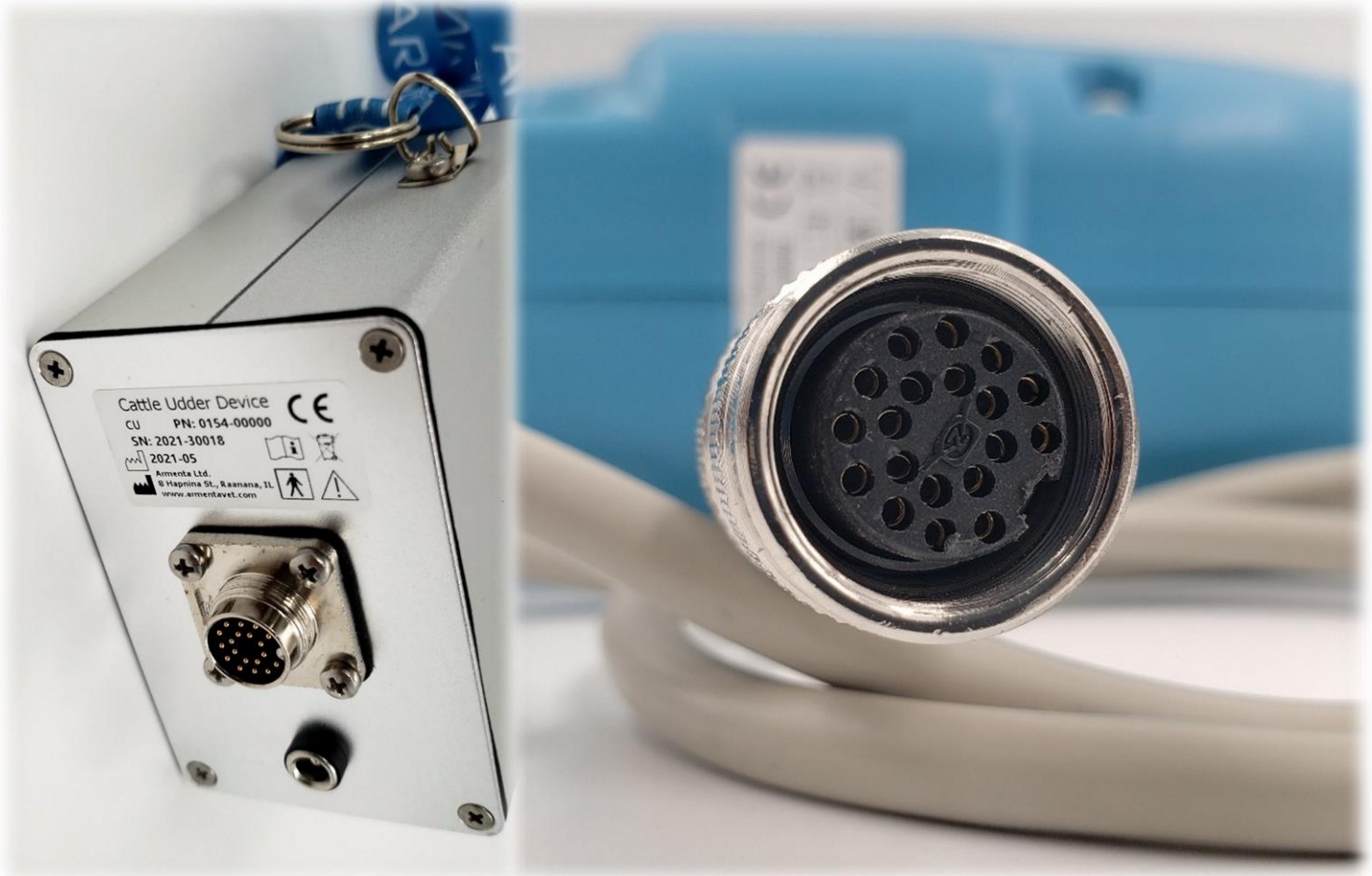


Figure 21: Control Unit Box disconnection

5.4.1.2 Disconnect the connector at the edge of the APT-X1 device from its receptacle at the edge of the air pipe. (Quick connect)



Figure 22: APT-X1 air pipe edge disconnection

5.4.1.3 Disconnect the connector at the edge of the air pipe from its receptacle at the edge of the pressure regulator.

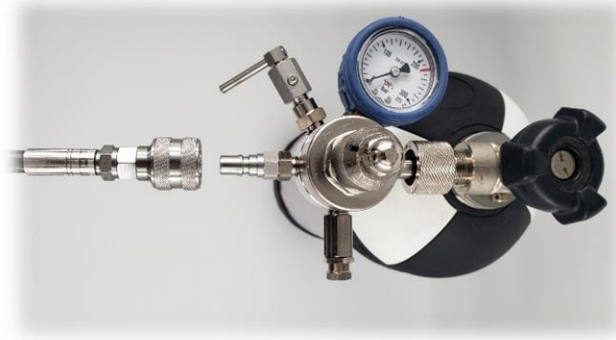


Figure 23: Pressure regulator air pipe edge disconnection

5.4.1.4 For safety reasons, disconnect the pressure valve from the air tank when transferring the system to other cowshed or while filling the air tank.

5.4.1.5 Clean the system components according to cleaning instructions in section 7.0.

5.4.1.6 Return all system components to the case for storage.

6. APT-X1 OPERATION

The following are safe start guidelines for working with the APT-X1 System. This is intended as a guide, and it is not a replacement for actual training, certification or supervised experience. Please follow the instructions in this User Manual.

⚠ Warnings:

- Skin reaction on the udder could be followed immediately and a few days after session. If there is an excessive and progressive skin reaction lasting more than 2-3 days, stop using APT-X1 on this cow.
- Cow safety can be ensured only when well-trained personnel operate the system.
- Never use on a cow in areas besides the udder.

6.1 Pre-Use Preparation

Determine if the cow is suitable for APT-X1. Perform CMT test when applicable. Do not apply APT-X1 on a dirty udder.

6.2 Operation Guidelines

- Generously apply coupling medium (i.e. ultrasound gel) on a clean surface of the quarter and on the device's applicator.
- Place the applicator on the skin with slight pressure to ensure you have good contact.
- Place the applicator in such a way the pulses are delivered upwards (see figure 24).



Figure 24: Placing APT

⚠ Warnings: This system is intended only for the udders, do not use for other body parts of the cow.

6.3 Pressure Operating Parameters

Make sure the air tank is filled with at least 50 bar before treatment. Maximum pressure in the air-tank should not exceed 200bar.

6.4 Session Procedure

- Apply coupling medium such as ultrasound gel on the quarter.
- Apply ultrasound gel to the APT-X1 applicator.
- Hang the remote control on your neck to be able to see its display.
- Hold the APT-X1 device by its handle and place the applicator facing upwards and perpendicular to the skin surface of the infected quarter, next to the teat - while applying mild pressure to ensure full contact.

⚠ Warnings: the angle of applicator should not be smaller than 45 degrees to the ground surface.

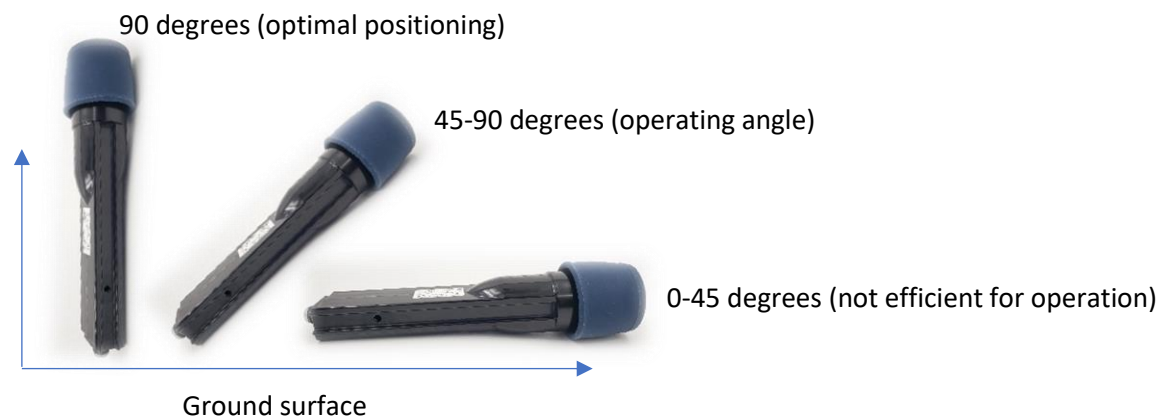


Figure 25: AM optimal positioning

- Turn the system on using the ON button on the control unit.
- After pressing the “start” button, the acoustic pulses sound will be heard when the pulses are generated.
- After 200 pulses counted by the remote control, move the applicator to an adjacent area on the infected quarter and continue the session. No need to stop the system operation while moving the applicator.
- Monitor the cow’s behavior regularly throughout the session.
- Examine the skin after the session. Immediate and transient responses of skin erythema (redness) might develop.
- After each session the applicator should be cleaned according to section 7.0 of this User Manual.

7. MAINTENANCE

7.1 Cleaning the System

Between Cows:

- Turn the APT-X1 system off.
- Wipe all surfaces with a soft, damp, non-abrasive cloth
- Wipe applicator surface with alcohol wipes

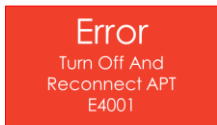
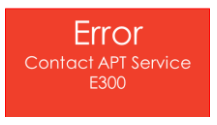
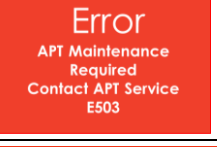
Before packaging the system:

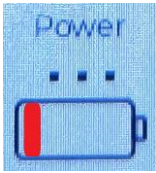
- Turn the system off
- Swab lightly all surfaces with a damp cloth.

 **Warnings:** Do not soak the APT-X system or any of its components under water or any liquid.

- Use a soft, dry cloth to dry the surfaces.
- Wipe the control unit with a soft, damp, non-abrasive cloth. Be careful not to spill any liquids on the control unit.

8. TROUBLESHOOTING

No.	Description	Cause of Failure	Action
1.		Failure of contact of the APT-X1 to the Control unit.	Turn off the control unit, re-connect it to the device and turn it on again. If Error message still appears, contact local Armenta representative for service.
2.		Electrical failure.	Turn off the control unit, re-connect it to the device and turn it on again. If Error message still appears, charge the control unit. If error continues, contact local Armenta representative for service.
3.		The number of pulses left in the AM is 5,000 – you have enough pulses for complete cycle of no more than 4 cows.	Order new AM.
4.		The number of pulses left in the AM is 200 – you don't have enough pulses to complete a session of one cow.	Replace AM.
5.		There are no more pulses left in the AM	Replace AM.
6.		The system towards it's end of lifetime.	Contact local Armenta representative for service.
7.		Service required. The system has reached the end of the lifetime – <i>(up to SWR V 9.1 inclusive)</i>	Contact local Armenta representative for service.
		Service required. The system has reached the end of the warranty period / lifetime – <i>(under SWR V 9.2 onward)</i>	Contact local Armenta representative for service.
8.	No sound of acoustic pulses is heard	Air leakage from Air tank	Check the air tank valve. If damaged, contact air tank supplier representative for service. Replace with a new air tank.

No.	Description	Cause of Failure	Action
9.	No sound of acoustic pulses is heard.	Applicator connection problem.	Check that all system pipes and connectors are intact and well connected. Verify that the air tank valve is open, and pressure is above 50 Bar. Make sure the AM is properly connected via the Ball Lock Pins.
10.	Harsh sound is heard	Failure of contact of the applicator to the skin.	Apply mild pressure of the applicator to ensure full contact of the applicator head to the udder skin surface to reduce sound level. If applicator still does not operate properly, contact local Armenta representative for service.
11.		Batteries are low. When this message appears, you have up to 1200 pulses left before the battery will drain completely.	Charge the control unit using the charger. Disconnect APT-X when charging. If control unit still does not operate properly, contact local Armenta representative for service.
12.	Unable to see the number of pulses displayed.	Electrical failure.	Contact local Armenta representative for service.
13.		Mechanical failure.	Contact local Armenta representative for service.

Reset Procedure: In case of sound of air flow, from within the device when opening the Air tanks' valve, press simultaneously on the "Reset" button on the Control Unit AND on the "Start" button of the APT-X, to recalibrate the air valves.



Figure 26: RESET Procedure

9. WARRANTY TERMS

This product has been subjected to strict quality control performed by the manufacturer. For this reason, the distributor in your country guarantees proper function of your product for 36 months from date of actual purchase. If you use the device properly, follow all instructions outlined in the user manual, you can enjoy the product to your ultimate satisfaction.

This policy warrants the support that the distributor provides for the device, should it happen that failures attributable to manufacturing defects be found. In such case, you shall be entitled to make full use of the benefits of this warranty. This implies the reason and replacement of parts, free of charge (regarding both service and parts) at any authorized service provider. Within its validity term, you are entitled to make use of the warranty, if necessary, to have a fully enjoyable product, provided the above-indicated conditions are fully met. This warranty is valid for the device marketed by the distributor in your country.

The warranty is not valid when:

1. Amendments in the warranty policy, sales receipt or invoice, or the absence of any of these original documents.
2. Dismantle the APT-X device or its accessories.
3. Damage or deterioration of the device due to improper use or if the device has been modified or repaired by an unauthorized third party.
4. Damage of the product due to defects incurred during transportation, such as bumps, bangs, or improper handling.
5. Damage due to humidity or any kind of liquids, foreign bodies inside the device or the use of unapproved, unauthorized accessories with the device contradictory to the user manual.
6. When the device is not used in accordance with the respective user manual or with its supplied accessories.
7. Partial or total damage or loss of the device, due to natural disasters (such as earthquakes, floods, fire, lightening, etc.), force majeure or accident.
8. If the product's serial number has been amended or erased.
9. To cosmetic damage, including but not limited to scratches and dents.

Please Note:

1. The applicator module (AM) should be returned to Armenta or local representative of Armenta after its pre-determined number of pulses were used. The AM has a restricted shelf-life, established at 300,000 pulses. Do not use the AM after this number is reached.
2. After 1,000,000 pulses or 3 years (the earliest) APT-X device services should be ordered.

10. CONVERSION OF AIR PRESSURE UNITS

1 bar	14.5 psi	0.1 MPa	0.99 atm
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11. ELECTROMAGNETIC COMPATIBILITY SAFETY GUIDELINES

The APT-X device has been tested and found to comply with the EMC limits set for medical devices by the IEC 60601-1-2 standard. These limits are designed to provide reasonable protection against harmful interference in a typical healthcare facility installation. This device generates, uses and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to other devices in its vicinity. However, there is no guarantee that the interference to other devices, which can be determined by turning the device off and on, is caused by this instrument.

- a. Use of this equipment adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally.
- b. Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.
- c. Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the device, including cables specified by the manufacturer. Otherwise, the performance of this equipment could degrade.
- d. NOTE: The EMISSIONS characteristics of this equipment make it suitable for use in dairy farms, industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this equipment might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.

Guidance and manufacturer's declaration – electromagnetic emissions		
The APT-X1 is intended for use in the electromagnetic environment specified below. The customer or the user of the APT-X1 should assure that it is used in such an environment.		
Emissions test	Compliance	Electromagnetic environment – guidance
RF emissions CISPR 11	Group1 Class A	The APT-X uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
Harmonic emissions IEC 61000-3-2	Class A	The APT-X is suitable for use in all establishments other than domestic, and may be used in domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes, provided the following warning is heeded: Warning: This equipment/system is intended for use by dairy farm teams trained by Armenta and healthcare professionals only. This equipment/ system may cause radio interference or may disrupt the operation of nearby equipment. It may be necessary to take mitigation measures, such as re-orienting or relocating the APT-X or shielding the location.
Voltage Fluctuations and Flicker IEC 61000-3-3:2013	Complies	

Guidance and manufacturer's declaration – electromagnetic immunity

The APT-X1 is intended for use in the electromagnetic environment specified below. The customer or the user of the APT-X1 should assure that it is used in such an environment.

IMMUNITY test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Electrostatic discharge (ESD) IEC 61000-4-2	8 kV contact 2, 4, 8, 15kV air	8 kV contact 2, 4, 8, 15kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	2 kV for power supply lines 1 kV for input/output lines	2 kV for power supply lines N/A	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	1 kV line(s) to line(s) 2 kV line(s) to earth 2 kV Signal input/output to earth	1 kV line(s) to line(s) 2 kV line(s) to earth N/A	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	0% UT; 0.5cycle at 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0% UT; 1cycle and 70% UT; 25/30 cycles Single phase at 0° 0% UT; 250/300 cycle	0% UT; 0.5cycle at 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0% UT; 1cycle and 70% UT; 25/30 cycles Single phase at 0° 0% UT; 250/300 cycle	Mains power quality should be that of a typical commercial or hospital environment. If the user of the APT-X1 requires continued operation during power mains interruptions, it is recommended that the APT-X1 be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	30 (A/m)	30 (A/m)	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE UT is the A.C. mains voltage prior to application of the test level.			

Guidance and manufacturer's declaration – electromagnetic immunity

The APT-X1 is intended for use in the electromagnetic environment specified below. The customer or the user of the APT-X1 should assure that it is used in such an environment.

IMMUNITY test	IEC 60601 TEST LEVEL	Compliance level	Electromagnetic environment – guidance
Conducted RF IEC 61000-4-6	3V, 6V	3Vrms, 6V	Portable and mobile RF communications equipment should be used no closer to any part of the APT-X1, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance $d = \left[\frac{3,5}{V_1} \right] \sqrt{P}$
Radiated RF IEC 61000-4-3	3V/m	3V/m	$d = \left[\frac{12}{V_2} \right] \sqrt{P}$ $d = \left[\frac{12}{E_1} \right] \sqrt{P} \quad 80 \text{ MHz to } 800 \text{ MHz}$ $d = \left[\frac{23}{E_1} \right] \sqrt{P} \quad 800 \text{ MHz to } 2,5 \text{ GHz}$ where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. D Interference may occur in the vicinity of equipment marked with the following symbol: 
	3V/m from 0.15 to 80MHz; 6V/m from 0.15 to 80MHz and 80% AM at 1kHz	3V/m from 0.15 to 80MHz; 6V/m from 0.15 to 80MHz and 80% AM at 1kHz	
	3V/m from 80MHz to 2.7GHz	3V/m from 80MHz to 2.7GHz	

Recommended separation distances between portable and mobile RF communications equipment and the APT-X1				
Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter (m)			
	150 kHz to 80 MHz outside ISM bands $d = [\frac{3,5}{V_1}] \sqrt{P}$	150 kHz to 80 MHz in ISM bands $d = [\frac{12}{V_2}] \sqrt{P}$	80 MHz to 800 MHz $d = [\frac{12}{E_1}] \sqrt{P}$	800 MHz to 2,5 GHz $d = [\frac{23}{E_1}] \sqrt{P}$
0.01	0.12	0.2	0.4	1
0.1	0.37	0.64	1.3	2.6
1	1.17	2	4	8
10	3.7	6.4	13	26
100	11.7	20	40	80