MANY0768A.EN.00
Airmaster P1 hardware Installation Guide

Version 1.0

SAFETY WARNING

Do not operate the Airmaster P1 until you and all personnel concerned have read and understood this installation guide. Failure to follow instructions could result in death or serious injury.

Important notes

This document serves as installation guide for all Airmaster P1 products of CMC NV.

Installation and startup may only be done by trained personnel according to safe engineering practices and with the observance of all relevant local health and safety requirements and regulations.

A requirement of fault-free operation and fulfillment of any rights to claim under guarantee is that the documentation is observed. In case of doubt please contact CMC.

This document could be subject to changes. Please contact our factory in case of doubt in order to ensure that you have received the latest version.

The Airmaster P1 is further referred to as the “controller”.

This document serves as a manual for the installation of the controller. Remark that the controller always acts as a component of a complete system in which it is integrated. As such other documentation for the installation related to the integration of the controller in the complete system will have to be consulted as well. Reference to such other documentation is not possible from within the scope of this document. Regardless of the content of any other documentation, the content of this documentation needs to be fully respected.

Illustration of Airmaster P1. Remark the layout of the front panel can be different from the above picture.

Limit of Liability

The publisher and the author make no representation or warranties with respect to the accuracy or completeness of the contents of this work and specifically disclaim all warranties, including without limitation warranties of fitness for a particular purpose. No warranty may be created or extended by sales or promotional materials. Neither the publisher nor the author shall be liable for damages arising here from. The fact that an organization or website is referred to in this work as a citation and/or a potential source of further information does not mean that the author or the publisher endorses the information the organization or website may provide or recommendations it may make. Further, readers should be aware that internet websites listed in this work may have changed or disappeared between when this work was written and when it is read.

Trademarks

The Airmaster logo is a trademark or registered trademark of CMC NV. All other trademarks are the property of their respective owners.

CMC NV, Industriezone Klein Frankrijk, Klein Frankrijkstraat 40, 9600 Ronse, Belgium

Installation guide

Table of Contents

Section 1: Situation of the product

The controller is an industrial controller.

This hardware installation guide is a guide for the hardware related items. Refer to the software specifications file for information on how to work with the unit.

The application area is restricted to components used in machines that comply with the European machine EMC directive EMC 2014/30/EU and LVD 2014/35/EU. The application area is located in electrical driven compressors and dryers in an industrial environment. Please contact CMC for appliance in other machines.

The controller does not need to comply to the European Pressure Equipment Directive 2014/68/EU, because no parts are under pressure, and the controller is not a safety component.

The controller is a component, which can't operate without other components. However, it is not a safety component, and it is not a machine.

The controller is to be used in a standard industrial environment.

The controller may only be used in places without an explosion risk. So it may never be used where explosion-proof equipment is required.

This controller may not be used for maritime purposes. It may also not be used in any way as part of an assembly that could be used for military or terrorist use.

The controller without additional protection is to be used in areas of pollution degree 1 or 2. Of course the user can add additional protection for higher pollution degrees.

The installation of the controller must be made in accordance with the applicable national and international standards and regulations.

Section 2: Safety

Section 2.1: Safety warning

Symbols used (not necessarily all symbols are used on the controller)

Protective Earth Terminal
The connection referred to by this symbol is to be used as protective earth terminal

Emergency Stop
The connections referred to by this symbol are to be used for the connection of an emergency stop switch

Danger – High Voltage.
Connections referred to by this symbol can carry a high and dangerous voltage.

Manual sign
Indication warning the operators the manual must first be consulted before any actions are taking place.

Warning: Risk of danger
Warning: Risk of electric shock
Warning: Risk of high pressure
Warning: Consult manual
Warning: Risk of burn

Warning risk of fire or electrical shock:
Do not install or operate the controller until you and all personnel concerned have read and established a working understanding of the controller inclusive of duties to be performed while installing, operating and maintaining the controller.

Improper use of the product may compromise the safety and protection of the controller and its environment.

Never use the product in explosive environments.

No serviceable parts inside, return to manufacturer for servicing or dispose according to local regulations.

Do not expose this controller to heat, fire or direct sunlight

When installing, commissioning, operating or carrying out service or maintenance on the controller, personnel must use relevant safe working practice and observe all relevant local health and safety requirements and regulations.

Lethal voltages are used within the controller and the installation it is used in. Electricity has the potential to cause severe personal injury or death. Isolate the source of power to the controller when required to do so. Use extreme caution when carrying out electrical checks.

Never remove or tamper with safety devices, guards or insulation materials fitted to the controller or the compressed air installation.

Compressed air has the potential to cause severe personal injury or death. Use extreme caution when carrying out compressed air related checks.

Hot and cold surfaces of the machinery may be exposed. Use caution when carrying out temperature or dew point sensor related checks.

A requirement of fault-free operation and fulfillment of any right to claim under guarantee is that documentation is observed.

This document is subject to changes without notice, if in doubt, do not proceed!

It is not possible to anticipate every circumstance that might represent a potential hazard. If the operator employs an operating procedure, an item of equipment or a method of working which is not specifically recommended the user must ensure the product will not be damaged or made unsafe and that there is no risk to persons or property. Failure to observe safety precautions or implement safe working practices may be considered dangerous practice or misuse of the product.

Section 2.2: Installation

Installation work must only be carried out by a competent person under qualified supervision. Equipped with the correct tools and appropriate protection against electrical hazards.

Disconnect the power before connecting the controller, never assume power is off but always check the circuit. Be aware that other nearby circuits can still be powered.

Do not open access panels or approach electrical components while voltage is applied.

When hazardous live parts are exposed, use individual protective equipment to prevent risk of shock. Use protective gloves, fire resistant clothes and face protection when working with live conductors. Keep fingers behind protective barriers.

Do not use in environments where vibration or shocks are likely to disrupt the function or compromise the safety of the controller.

Do not wear loose clothes or jewellery like chains or bracelets which could make contact with electrical components.

Allow the compressor installation to cool or heat to acceptable temperatures before attempting to install a pressure, temperature, humidity or other type of sensor.

Always ensure any pressure within a compressed air system is safely vented to atmosphere before attempting to remove or install a sensor device, never assume the compressed air system is vented but always check the air gauge. Be aware that other nearby parts can still be hot, cold or pressurized.

The controller should be installed in such a location as to allow operational and maintenance access to the installation without obstruction or hazard and to allow clear

visibility of indicators at all times.

As this product is installed on and integrated with other machine(s), do read, understand and respect all safety instructions provided by the supplier of these machine(s).

A switch or circuit-breaker shall be installed as means of supply disconnection. This switch or circuit-breaker shall be easy to reach and shall be marked as disconnection device. When the supply is disconnected, all current carrying conductors shall be disconnected.

Over-current protection needs to be fitted according to the specified ratings.

Protective earthing; the controller shall always be earthed. This is done according to the local legislation. Connection of earth shall always be done before any other connection is made. Disconnection of earth is only allowed after all other connections are disconnected. Connector(s) and their connection used for earth connection shall at all times be capable of withstanding at least 30 N traction The protective earth conductor shall have at least the current rating of the maximum rated terminal on the controller.

All connections made to the product need to be made according to the specifications. All electrical cabling need to be compliant with applied maximum voltage and currents. Maximum Temperature rating of the cables needs to be at least 75 °C (unless otherwise noticed in the Connections section). Always use bootlace ferrule with stranded wiring.

All cabling shall be labeled such that, after disconnection of cabling, reconnection of it is possible without any confusion or mistakes. Labeling shall preserve its readability over the lifetime of the installation in the conditions the installation is operated.

Colors of cables and connectors shall be done according to local legislation.

Section 2.3: Operation

Correct operation of the controller may only be checked by trained personnel according to safe practices equipped with appropriate protection against electrical hazards.

The controller must only be operated at the ratings: supply voltage, frequency, pressure, temperature, altitude, humidity and environmental rating for which it is designed.

Do not operate this controller in high humidity environments or with wet hands

Do not open access panels or expose electrical components while controller is operating.

Section 2.4: Maintenance

Maintenance must only be carried out by competent personnel under qualified supervision.

If replacement parts are required use only genuine parts from the original equipment manufacturer.

Before competent personnel under qualified supervision remove any access panels or carry out work on the controller, they have to isolate it from the source of supply power and any other electrical connections interfacing with the environment in which the product is operating using relevant and local safe isolation procedures.

After any intervention, the controller shall be completely re-assembled, all connections need to be verified for their correctness and all applicable checks need to be carried out with success before re-powering the equipment.

Ensure that all instructions concerning operation and maintenance are strictly followed and that the complete controller, with all accessories and safety devices, is kept in good working order.

The accuracy of sensor devices must be checked on a regular basis. They must be renewed when acceptable tolerances are exceeded. Always ensure any pressure within a compressed air system is safely vented to atmosphere before attempting to remove or install a sensor device.

The product shall only be cleaned with a soft cloth dampened with water or a solution of 50% water & 50% alcohol. Use of any substances containing corrosive acids or alkalis is strictly prohibited. Remove all sources of supply before cleaning the product.

Do not paint the control facial or obscure any indications, controls, instructions or warnings

Section 2.5: Batteries

Remark: not all types of controllers are equipped with a battery.

Do not use other types of batteries than type supplied, do not use in other equipment. Replace only by same type batteries.

Use supplied batteries only in controller as intended. Pay attention on the polarization when fitting batteries.

Keep batteries out of the reach of children and animals. Get medical help in case a battery has been swallowed

Never attempt to charge batteries

Do not remove the batteries from their packaging until this is required for use

Do not store batteries in environments with loose metal parts or exposed to moisture, heat, fire or direct sunlight

Do no expose batteries to vibration, impacts or deformation.

Fire, Explosion and sever burn hazard. Do not recharge, crush, disassemble, heat above 100°C, incinerate batteries or expose contents to water.

Consult IATI guidelines describing safe air transport of Li-ion batteries.

Dispose of batteries according to local regulation. A recycle program might be applicable.

Section 3: Ratings

Max operating ratings:

Temperature:	
Operating:	0 °C – 55 °C
Storage:	-25 °C – 75 °C
Humidity:	< 95 % R.H. @ 40 °C without condensation
Power supply:	
AC:	24V AC +/- 15%
Consumption:	30VA
Frequency:	50 / 60 Hz
Altitude:	0 – 2000 m
Construction:	IP65 (front face only after proper installation)
Pollution degree:	II
Overvoltage	
Power supply:	CAT II 24V ac/dc
Relays:	
Overvoltage X04:	
R2 , R3, R4:	CAT III 250V
R1:	CAT II 24V ac/dc
Digital:	
Overvoltage X03:	
C1, C2, C3, C4, C5, C6:	CAT II 24V ac/dc

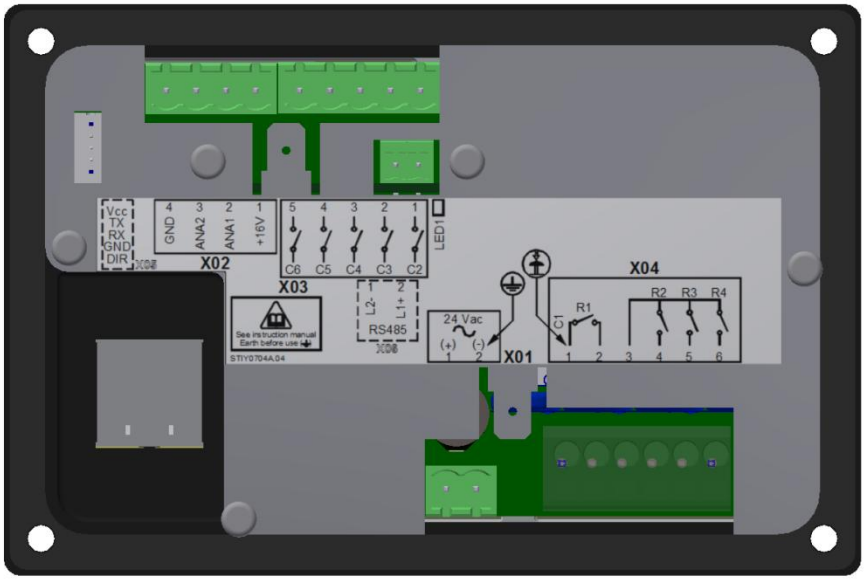
Battery: No battery is used in the Airmaster P1

Section 4: Connections and Protection

Remarks:

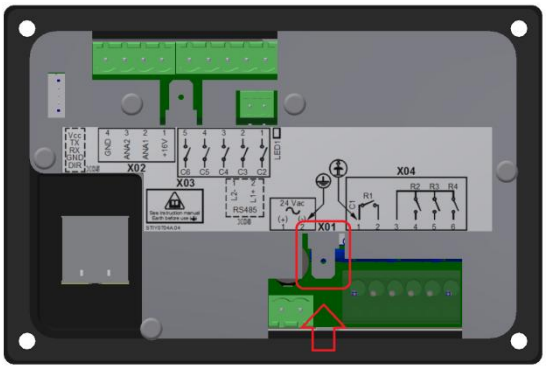
- It remains the responsibility of the integrator of this controller (being a component in the total system) to assure that the integration of the controller (in terms of wiring and use of other components) is done according to all applicable regulations. In this context we remind that the controller is not a safety device and that care must be taken that other components fulfill required safety functionalities.
- The printing of text and symbols might differ slightly from the product you have.

Overview:

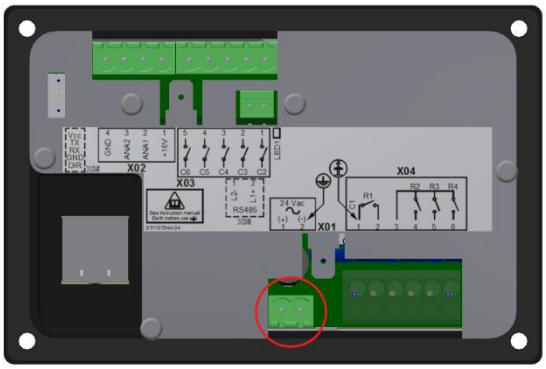


Section 4.1 Earth

Earthing is done using a “Faston” connection on following connection:



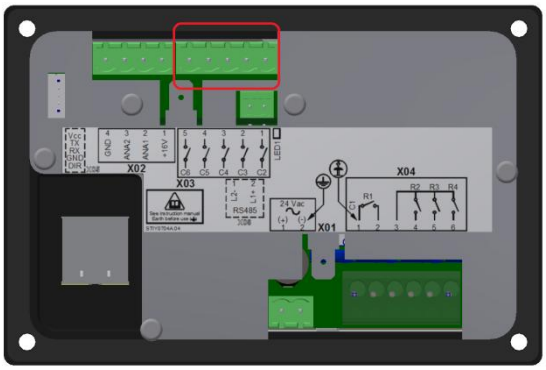
Section 4.2. Power



Indication: 24Vac
External fuse required : Slow 1.6 A
24Vac shall be supplied by transformer in which the primary windings are separated from the secondary windings by reinforced insulation, double insulation or a screen connected to the positive conductor terminal.
Do not connect any of the leads of the secondary winding to earth as this can result in severe damage of the controller.

Connector reference: X01

Section 4.3 Digital

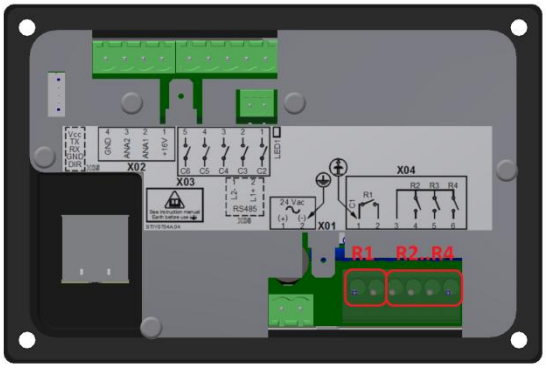


Indication: C2 ... C6

Digital inputs are addressed via external contacts (relay, switch, …) between power supply (pin “1”) connection and the C2 .. C6 connections.

Connector reference: X03

Section 4.4 Relays



Connection R1/C1 provides an emergency interruption functionality[1].
The Emergency Switch shall be connected between power supply (pin “1”) and R1/C1.
R1 shall be protected against over-current. Absolute maximum current is 5A (resistive).

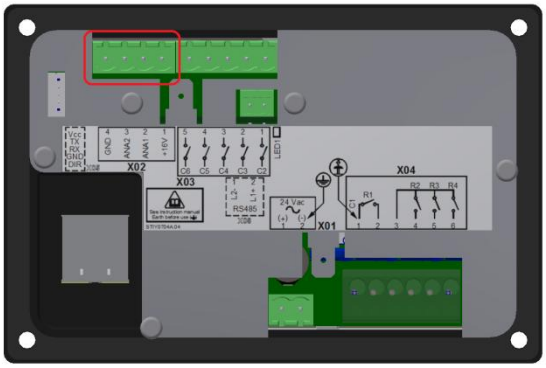
[1] Keep in mind the controller is not a Safety Device!

External fuse required : Slow 5 A

R2 .. R4 shall be protected against over-current. Absolute maximum current is 4A (resistive).
External fuse required common contact: Slow 8 A
External fuse optional R2, R3, R4: Slow 4A

Connector reference: X04

Section 4.5 Analog



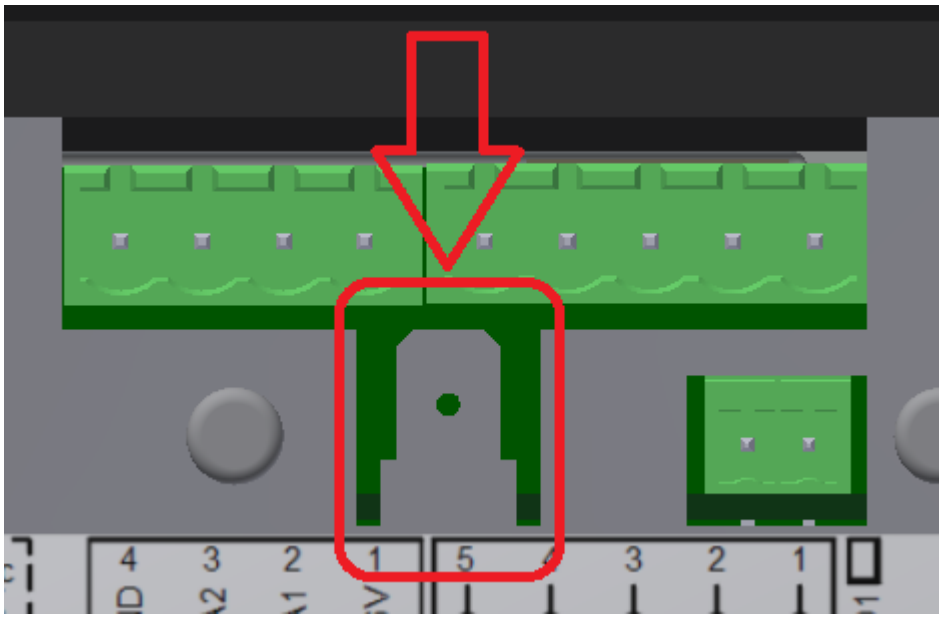
The +16V is a voltage output connection (referred to the GND connection). The maximum current rating is 25mA.

The ANA1 connection receives a current input signal that is provided by a component external to the controller. This signal has to vary between 0 and 20mA. Only connect external components to this input that comply with this specified range.

The ANA2 input can be used in 2 different manners: connection to external resistor (that act as temperature sensor) or connection to an external voltage source.
It depends on the version of Airmaster P1 you have which type of input is implemented.
Assure you know exactly which type of input you have.

- Resistor input (PT100, PT100, KTY)
  Any resistor value can be applied between this input and GND. It is recommended to use shielded cabling.
- Voltage input
  A voltage between 0 and 10V can be processed on this input. Protect this input against any voltage outside of this specified range

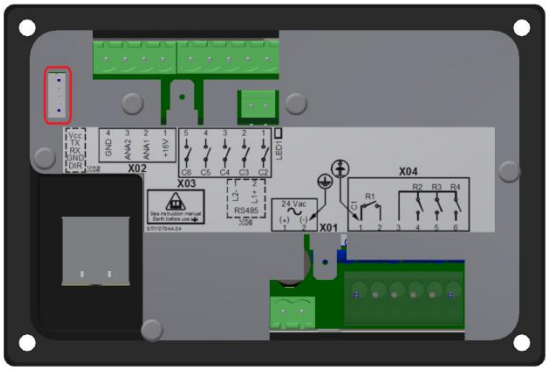
Functional earthing
For all analog inputs, it is recommended to us shielded cabling (which can be classified under “functional earthing”). Shielding of the cables can be done using the dedicated faston connector:



Connector reference: X02

Section 4.6 Communication

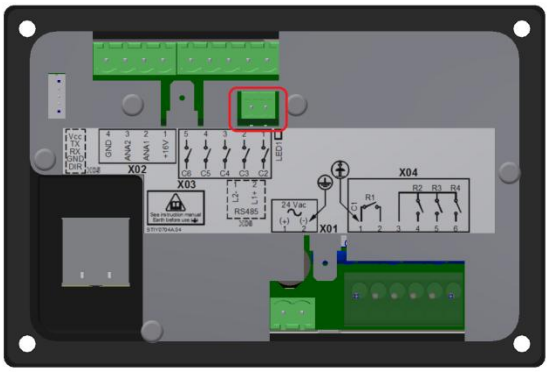
4.6.1 Programming interface



This connection is never used in an installation. Use is restricted to programming and testing. This falls beyond the scope of this document.

Connector reference: X05

4.6.2 RS485 interface



Remark that the RS485 connection is optional and as such is not present with all versions of the Airmaster P1.

This connection shall only be used for connecting the controller with another component's RS485 connection or a RS485 bus.

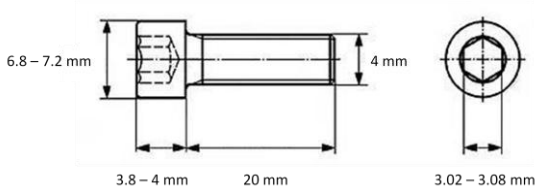
Connector reference: X06

Section 5: Mounting

The Airmaster P1 must be mounted in a front panel, enclosure or housing, which must have a suitable protection degree for the electronics. The dimensions of the apertures in the panel are given in appendix 1.

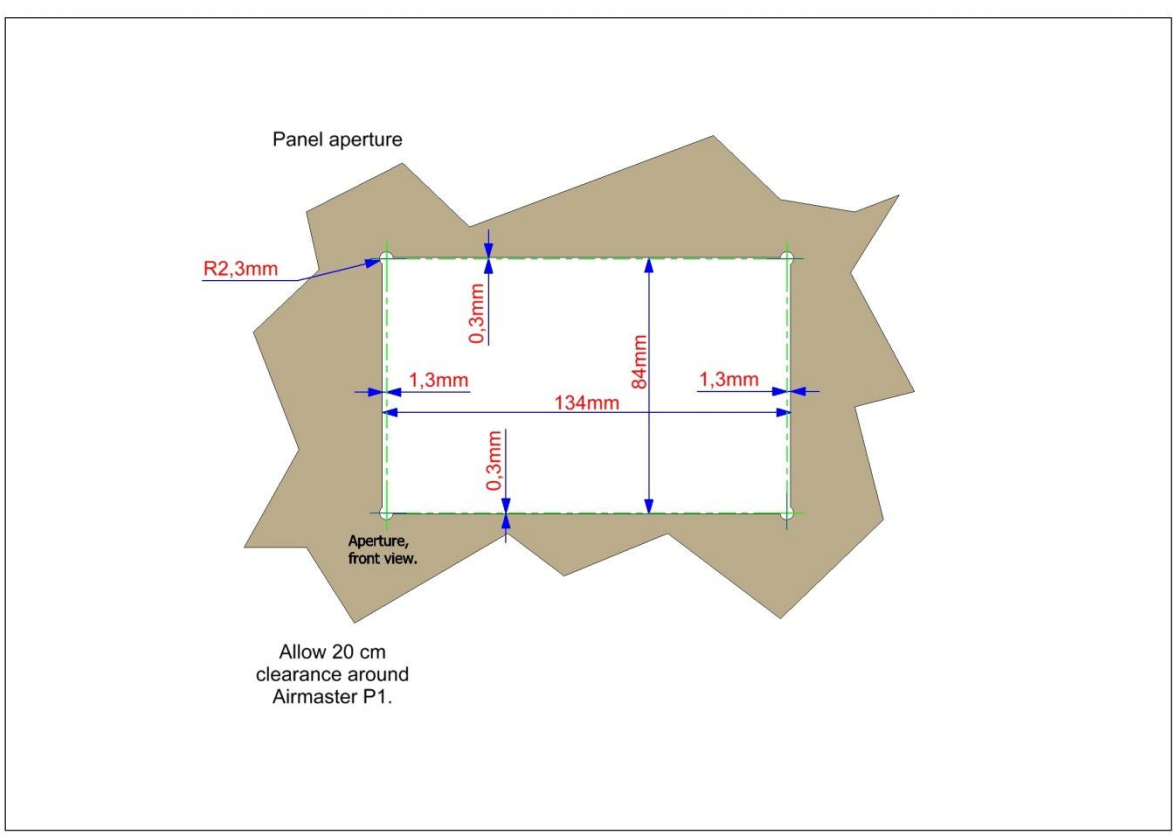
Components required (not delivered with the controller)

- 4 x allen screw M4 x 20



- 4 x serrated lock washer M4
- 4 x nut M4

Dimensions of mounting hole:



Mounting of the controller (do respect the recommended torque setting):

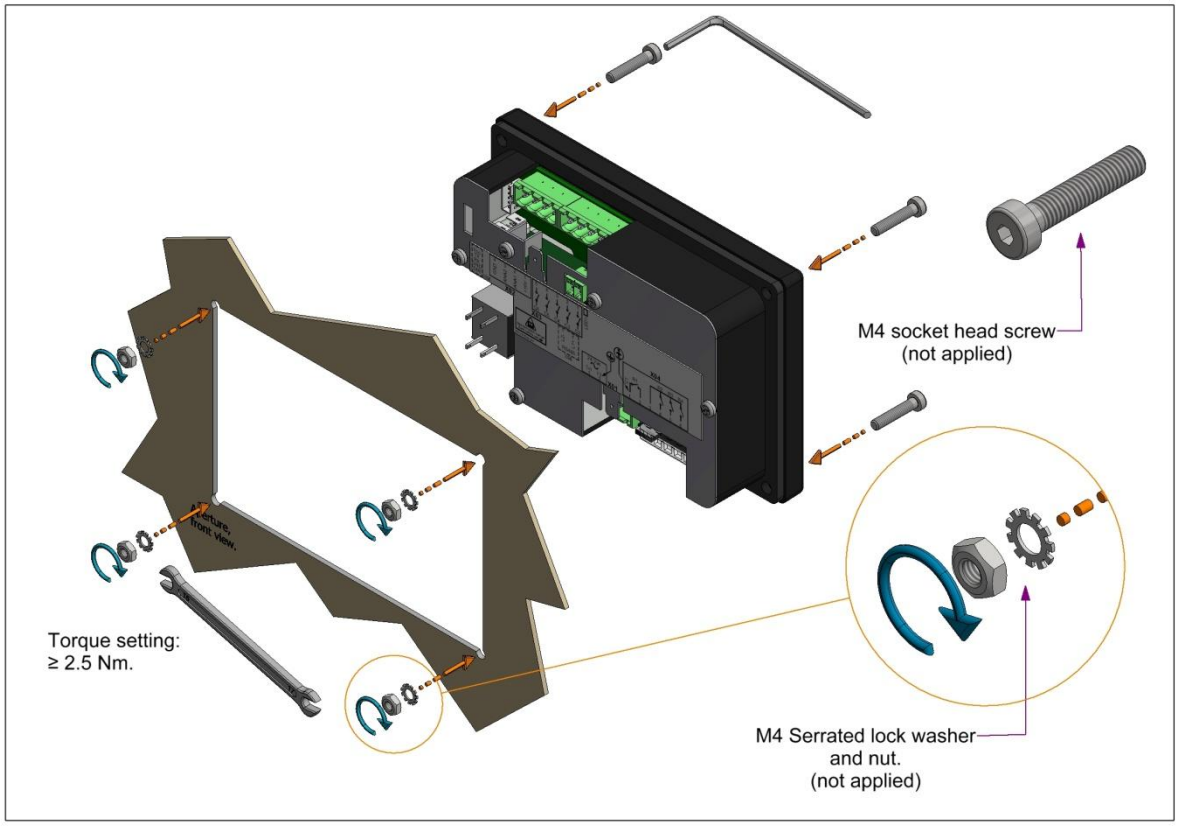


Illustration of a well mounted controller: