

AMIAD Water Systems Ltd.

ADI-P - Smartphone Operated Controller for Single Filter



Installation, Operation and Maintenance Instructions



Original Instructions

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Patent Pending

ADI-P Controller for Sigma Pro – 700103-001636

ADI-P Controller for Mini Sigma – 700103-001707

AMIAD Water Systems Ltd.

ADI-P - Patent Pending Smartphone Operated Controller for Single Filter

Amiad's ADI-P is a Smartphone Operated Controller that controls a single Amiad filter. The ADI-P is available in two main configurations: An Integrated Component of a new filter or a Standalone Device for controlling an existing filter. The ADI-P system consists of two major components: The ADI-P Controller and the Mobile Application.

This document is the installation and operation manual of the ADI-P system; it describes the installation processes of the Hardware (the ADI-P controller) and the Software (the cellular application) and specifies the end-user operation procedures.

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Table of Contents

Safety First.....	4
General Safety Instructions.....	4
Installation	4
Commissioning.....	5
Operation and Control	5
Before any maintenance or non-regular operation.....	5
Introduction:.....	6
Getting to know the ADI-P Controller:	6
ADI-P - Smartphone Operated Controller for Single Filter - Quick Guide.....	7
Downloading the Mobile Application:	7
Pairing the controller with you phone:	8
Getting to know the ADI-P Application:	10
Understanding the application's screens data items:.....	11
Download and Export Reports:	14
Specifications Table.....	14
Annex A. Chaining ADI-P Controllers:.....	15
Amiad Limited Warranty	18

Safety First

General Safety Instructions

- The manufacturer's filtration products always operate as components in a larger system. It is essential for the system designers, installers and operators to comply with all the relevant safety standards.
- Prior to installation, operation, maintenance or any other type of action carried out on the controller, read carefully the installation and operation instructions.
- During installation, operation or maintenance of the controller all conventional safety instructions should be observed in order to avoid danger to the workers, the public or to property in the vicinity.
- The system has to be used for non-hazardous liquids only!
- Please note: The filter controlled by the controller, enters into a flushing mode automatically, without any early warning.
- No change or modification to the equipment is permitted without a written notification given by the manufacturer or by its representative, on the manufacturer's behalf.
- Always observe standard safety instructions and good engineering practices whilst working in the filter's vicinity.
- Use the controller only for its intended use as designed by the manufacturer, any misuse of the controller may lead to undesired damage and may affect your warranty coverage. Please consult with the manufacturer prior to any non-regular use of this equipment.
- System's cleaning and maintenance shall be carried out only when explosive atmosphere is not present!

Installation

General

- Install the controller according to the detailed Installation Instructions provided with the controller by the manufacturer and according to the description given in this manual.
- Make sure to leave enough clearance, side and top, so as to enable easy access for future treatments and safe maintenance operations.
- The user should arrange suitable lighting at the area of the filter to enable good visibility and safe maintenance.
- The user should arrange suitable platforms and safety barriers to enable easy and safe access to the controller without climbing on pipes and other equipment. The user should verify that any platform, barrier, ladder or other such equipment is built, installed and used in accordance with the relevant local authorized standards.
- Use only appropriate standard tools and equipment operated by qualified operators when installing, operating and maintaining the controller.
- When installation is required in hazardous environment sites, underground or high above ground, make sure that the site design and the auxiliary equipment are appropriate and that installation procedures are carried out in accordance with the relevant standards and regulations.
- Ensure walking areas about the installation are slip free when wet.

Shipment and transporting

- Shipping and transporting the controller must be done in a safe and stable manner and in accordance with the relevant standards and regulations.

Electricity

- Electric wiring should be performed by an authorized electrician only, using standardized and approved components.
- Installation of the filter should be performed so as to avoid direct water splashing on the electrical components of the controller.

Commissioning

- Read carefully the Commissioning and the First Start-up Operation instructions prior to any attempt to operate the controller.
- In order to achieve maximum performance and smooth operation of the controller it is crucial to perform the startup and first operation procedures exactly as described in this manual.

Operation and Control

- Do not operate the controller before reading carefully and being familiar with its operation instructions.
- Observe the safety stickers on the controller and never perform any operation contradicting the instructions given.
- Never operate or use the controller for purposes other than its original design and operational envelope.
- The system has to be used for non-hazardous liquids only!
- System's cleaning and maintenance shall be carried out only when explosive atmosphere is not present!

Before any maintenance or non-regular operation

- Servicing the controller should be done only by technicians authorized by the manufacturer.
- System's cleaning and maintenance shall be carried out only when explosive atmosphere is not present!
- Disconnect the controller and the filter from the power supply and lock the Main Power Switch.

Introduction:

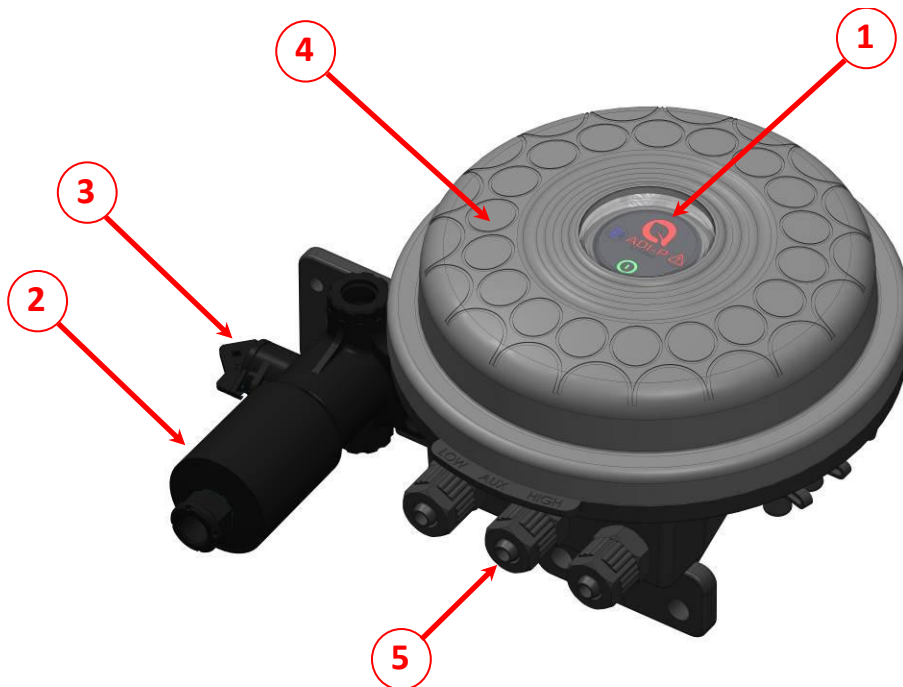
Thank you for acquiring Amiad's ADI-P controller - a Bluetooth Operated Controller for Controlling a Single Filter. The system consists of two major components, the **ADI-P Controller** and the **Mobile Application**.

The ADI-P controller can be supplied in two different configurations: as an integral component of a new filtration system where the controller is already connected to the filter and configured for that specific filter model or as a stand-alone unit to be connected and configured for an existing installed filter.

This document covers the product's both configurations.

Getting to know the ADI-P Controller:

Take few moments to familiarize yourself with the ADI-P components:



1. ADI-P Panel for manual flushing button and indication leds
2. 3-Way 12VDC solenoid latch
3. Solenoid's Manual Operation Handle
4. ADI-P Cover
5. 8 mm Pressure Input

ADI-P - Smartphone Operated Controller for Single Filter - Quick Guide

Use this quick guide for controller supplied as an integral component of a new filtration system where the controller is already connected to the filter and configured for that specific filter model.

Starting the ADI-P Controller operation:

Open the cover of the ADI-P Controller by turning it counterclockwise [1] and insert a set of four alkaline 1.5V AA batteries [2]. The Power led lights-up and the ADI-P controller starts operating according to its pre-defined default flushing program; flushing by 0.5 bar DP signal and 4 hours time intervals.



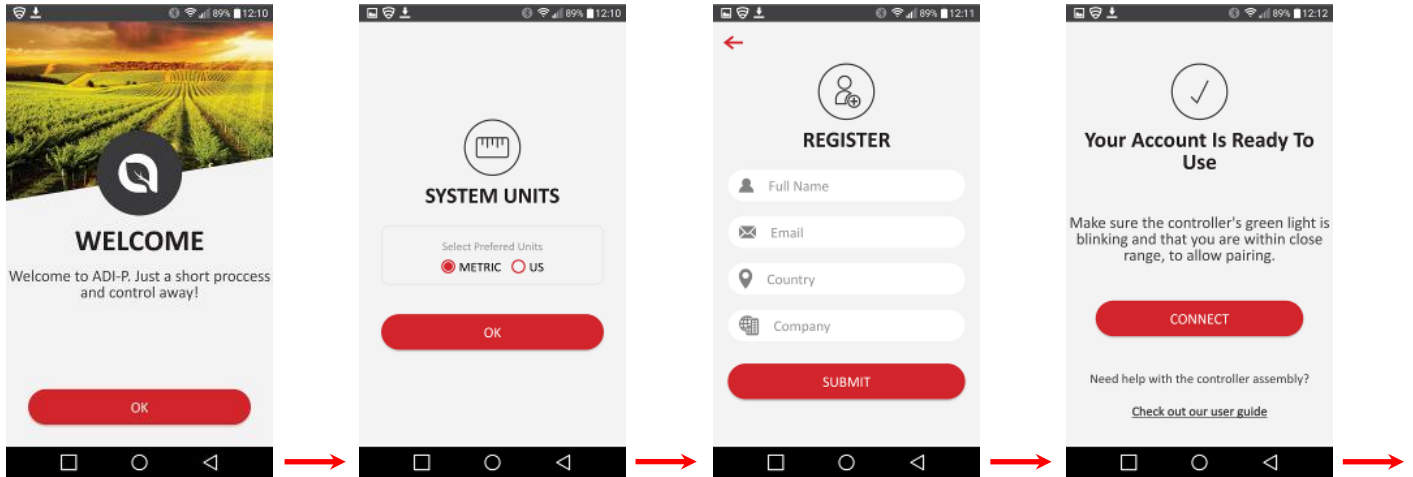
Downloading the Mobile Application:

Download and install the ADI-P application on your phone. The application is available for Android (version 5 and up) and iPhone (IOS version 9 and up). Search for the app **ADI-P by Amiad Water Systems**.

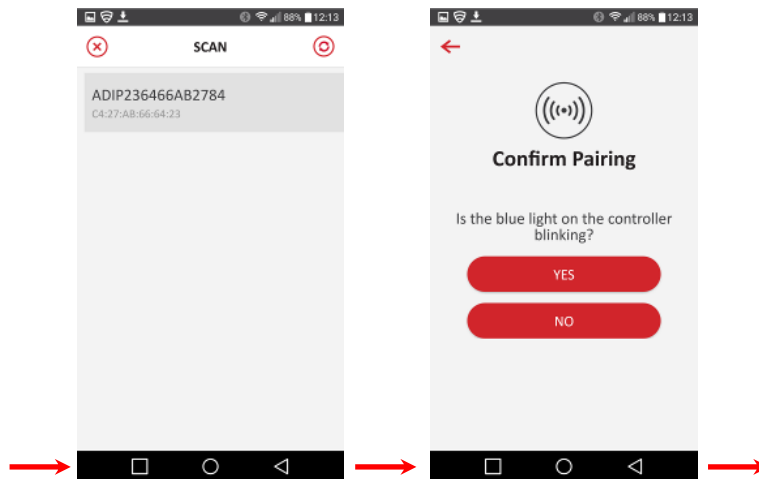
- For Android - at the Play Store: <https://play.google.com/store/>
- For iPhone - at the Apps Store: <https://www.apple.com/ios/app-store/>

Pairing the controller with you phone:

1. Put your phone in Bluetooth discovery mode and start ADI-P application.
2. Select the required System Units
3. Register your filter to create an account



4. Click Connect, the application scans and finds the in-range controller, the blue light on that controller starts blinking
5. Select the found controller, the system starts the pairing process with this controller
6. Confirm the pairing process

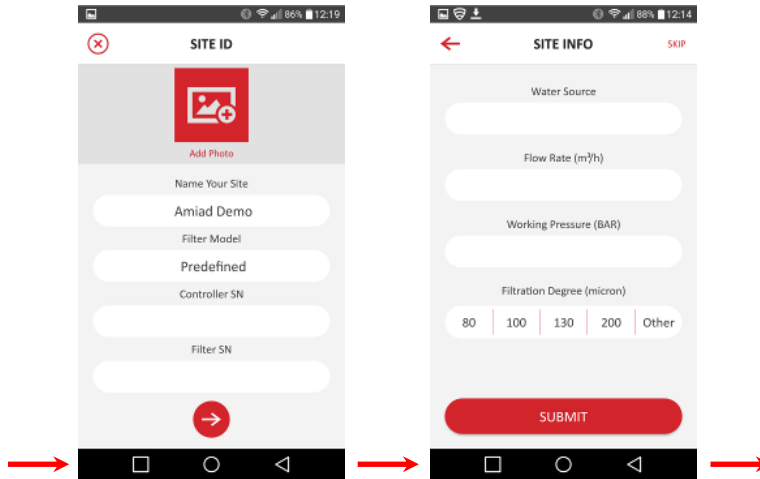


7. Complete the site ID form; Name your site and select the filter model (if not already defined). You may add a picture of the site by clicking on the picture icon.

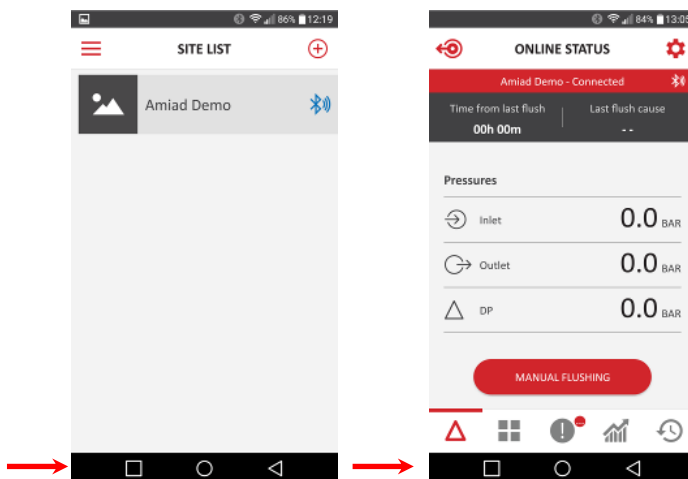
Important:

- In case the controller is sold as a spare part, or as a standalone product, select the correct filter model.
- Select "Predefined" when the controller is supplied as an integrated component of a new filter; the application reads the controller's S/Number automatically

8. Enter the Site info details (optional)



9. Select the active controller (the line with an active Bluetooth icon next to the site name)



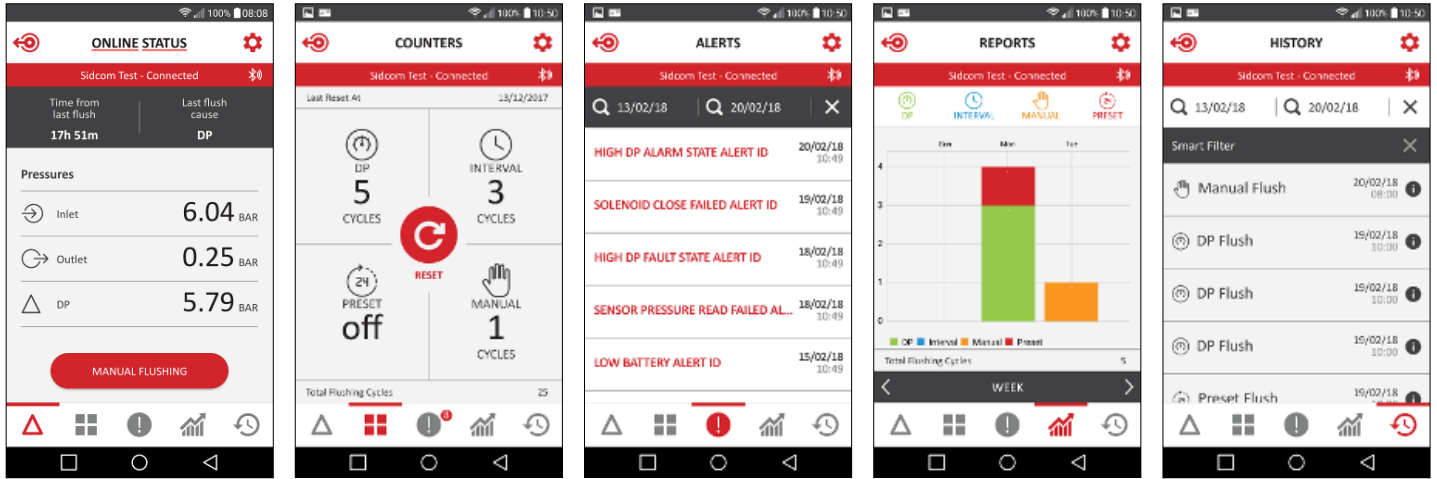
10. The Online Status screen appears. Your controller and application are set; you may start using the system

Getting to know the ADI-P Application:

Take few moments to familiarize yourself with the ADI-P Application HMI:

Generally, the application complies with the regular conventions of standard smart phones applications.

Once running and controlling the filter, the application has 5 main screens. Scroll through these screens by sliding to the right or to the left.



You may also jump to the desired screen by clicking on its designated icon in the lower line of each screen.



Understanding the application's screens data items:

The Online Status screen:

The upper red line	Displays the name of the currently connected controller together with the communication status
Time from last flush	The time passed since the end of the last flushing of the filter
Last flush cause	The trigger that initiated the previous flushing
Pressures - Inlet	The current reading of the filter's inlet pressure
Pressure - Outlet	The current reading of the filter's outlet pressure
Pressure - DP	The pressure differential across the filter; calculated by subtracting the outlet pressure from the inlet pressure
Manual Flushing	Press this icon in order to start a manual flushing cycle of the filter

The Counters screen:

The upper red line	Displays the name of the currently connected controller together with the communication status
Last reset at:	The date of the last resetting of the counters
DP Cycles	The number of flush cycles started due to a DP signal
Interval Cycles	The number of flush cycles started due to the time intervals program
Preset	The number of flush cycles started due to the preset daily start time and the current status of this program
Manual Cycles	The number of flush cycles started due to a manual start command issued by the user
Total Flushing Cycles	The number of flush cycles started from any reason
Reset Button	Press this button in order to reset the counters to zero

Alerts screen:

The upper red line	Displays the name of the currently connected controller together with the communication status
The second line	Enables sorting of the alerts between two dates and resetting an alert
The alerts lines	Display the alert messages according to their occurrence time and date

Alarms and faults list:

Alert	Possible cause	Recommended Action
Low battery	Low battery voltage	Replace all 4 controller batteries
Low battery pause	Controller paused due to low battery voltage	Replace all 4 controller batteries
High DP alarm	DP value is \geq HDA threshold (units: bar/100)	Alert only
High DP fault	DP value is \geq HDF threshold (units: bar/100)	Alert only
Continuous mode alert	Controller exceeded number of consecutive flushes for alerts	Check configuration/check DP: If high, perform manual flush with downstream valve closed, open the filter for inspection
DFU failed	Firmware update fail	Validate cellular reception and try again
Out of range app connection	Controller out of range during connection session	Get closer to the controller with the smartphone (in bluetooth range)
Sensor pressure read failed	The number of the sensor that failed to read. Inlet(0), Outlet(1), Piston(2)	If continues - contact support
Capacitor charger start failed	Unable to charge capacitor	Contact support
Load capacitor timeout	Capacitor charge timeout	Check battery voltage level, contact support
Low downstream pressure	The outlet pressure is less than 1.5 bar	Check the filter and the water system.
High upstream pressure	The inlet pressure is greater than maximum allowed pressure for the filter	Adjust the water system inlet pressure

Reports screen:

The upper red line	Displays the name of the currently connected controller together with the communication status
The second line	Displays icons of the different flushing types. Select the desired icons to be displayed on the chart
The chart window	Displays the number of flushing cycles according to the selected icons
Total flushing cycles	The total number of flushing cycles currently displayed in the chart window
The lower black line	Enables the user to select the time span of the chart (day, week, month)

History screen:

The upper red line	Displays the name of the currently connected controller together with the communication status
The second line	Enables sorting of the events between two dates and deleting an event
The black line	Enable filtering the events according to the four types of flushing types
The events' lines	Display the events' messages according to their occurrence time and date

The application's setup screens:

Enter the setup screens by tapping on the Settings Icon on the upper right corner of any main screen:

The upper red line	Displays the name of the currently connected controller together with the communication status.
Controller State	Displays the current controller state and enables the user to switch the controller OFF and ON.
DP Set Point	Displays the DP level for starting a flushing cycle and allows the user to enable or disable the DP operation. The recommended setting is displayed on the lower line of the screen.
Interval	Allows the user to set the time intervals for flushing and to enable or disable the flushing according to time intervals. The recommended setting is displayed on the lower line of the screen.
Daily Pre-set Flush	Enables the user to set specific start flushing timings. Such start time can be a daily start time or a single-time start time. The user can set up to 8 such start times.
Flush Time	Allows the user to set the duration of the flushing operation. The recommended setting is displayed on the lower line of the screen.
Battery	Displays the current charge level of the controller's battery.
ID	Enables the user to set the site's Picture, Name and ID parameters such as: Filter Type, Controller's Serial Number and Filter Serial Number. The second screen allows the user to select the type of the Water Source, the Flow-rate, the Working Pressure and the Filtration Degree of the filter. Press the SUBMIT icon for submitting the data.
Technician Settings	See the following table
About	Displays the current device ID, App version, Firmware version, Hardware version and the Controller's Installation date. In case an updated firmware id available this screen prompts the user to update the system by pressing the Update Now button.

Technician Settings screens:

This section of the application contains the very basic and fundamental settings of the system. Do not change any of these settings if you are not totally familiar with the specific filtration system, filters and controller. Incorrect setting may turn the system un-operational.

Entering the technician setting screens requires a password. Please contact your dealer for obtaining a password.

The upper red line	Enables the technician to search for specific data item.
Filter Type	Select the specific filter model controlled by the current controller.
Mode of Operation	Select the operation mode of this controller; Master = the first controller in a chain of controllers or a stand-alone controller. Slave = a member of a chain of controllers which is controlled by a master controller. DP Sensor = set this controller as the source of DP signal for the controllers chain.
Pause if the DP reading is less than X	Set a DP value for serving as a minimal DP level for allowing start of a flush cycle by time intervals parameter. If the DP reading is lower than this value the flush cycle by time interval will not start.
SW Pause	Enable or disable the operation of the Time Operation Mode Threshold parameter.
DP Delay	Set the time that the DP signal should be ON before starting the flushing according to a DP signal. This parameter is used to eliminate un-necessary flushing due to a momentarily high differential pressure.
High DP Alarm (HDP Set Point)	Set the DP level for issuing a High DP Alarm Message (System Log).
High DP Fault (HHDP Set Point)	Set the DP level for issuing a High High DP Alarm Message (System Log).
Time in HDDP Before Fault	Set the time for the system to be in HDDP reading level before entering to fault mode.
End of Cycle	Set the time for the end of cycle signal to be ON after the flush cycle ends.
Number of Consecutive Cycles	Set the number of consecutive flush cycles for the system to enter to fault mode.
Minimum Interval for Continuous	Set the duration of time for counting a flush cycle as a consecutive flushing. If the time between two flushing cycles is longer than this parameter, they are counted as consecutive flushing.
Ignore DP After Flush	Set the time duration after the end of a flush cycle during which the DP reading is ignored.
Relay Output	Set the operation of the Output relay to ON or OFF.
IO Screen	This screen displays the numbers of the hardware outputs numbers 1 & 3 and their designated tasks. This screen also displays the Minimum Downstream Pressure, the Maximum Upstream Pressure and the Piston Pressure. The technician can set the operation mode of the Solenoid and the Output Relay operation to ON or OFF.

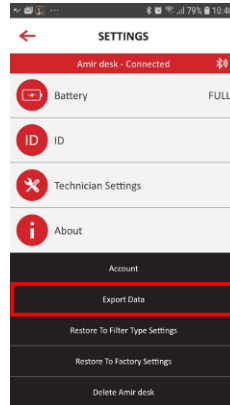
Additional Settings screens:

Account	This screen allows the user to set and edit his registration parameters; Name, E-mail address, Country and organization. Press "SUBMIT" to save the updated data.
Export Data	This screen enables the user to export the controller's data (as an Excel file). The screen displays a list of supported applications for exporting the data (depends on the applications already installed on the user's smart-phone).
Reset to Filter Type Settings	Enables the user to reset the controller's data and restoring the default parameter for the current filter type which is controlled by this controller.
Restore to Factory Settings	Enables the user to delete the entire controller's data and restoring the factory default settings; The default filter is a Mini Sigma Filter.
Delete a Site	Enables the user to delete a site from his smart-phone.

Download and Export Reports:

In addition to the on-screen report, the ADI-P is capable of logging, storing, downloading and exporting status and operation data through the user's phone.

1. Enter the "Export Data" section of the Setting Screen; In order to make sure that the system exports the latest data, refresh the screen by sliding your finger along the screen from top down.



2. Depends on the general communication applications installed on your phone, the ADI-P application displays the various options for sending the reports.
3. Select the required application (Mail, WhatsApp, G-mail, Dropbox, etc.) and the recipient and send the reports.
4. ADI-P sends 5 reports in CVS file format (Excel): *system-id*, *parameters-setup*, *flush-events*, *alarm-events* and *params-setup-audit*.

Specifications Table

Catalog numbers:	ADI-P Controller for Sigma Pro ADI-P Controller for Mini Sigma	700103-001636 700103-001707	
Nominal Operation Pressure	0-10 bar	0-150 psi	
Burst pressure	20 bar	300 psi	
Power	Internal	4x1.5V AA batteries	
	External	7-14 VDC	1A external fuse, min 22 AWG wires
Temperature range	(-)10°C to (+) 70°C	(+)14°F to (+) 158°F	
Weight	0.5 Kg	1.1 Lb	
DP sensor	Internal		
Internal Piston Pressure Sensor	Optimized flush time duration		
IP Rating	IP65		
User Interface	Via Smartphone Application		
Filters models	Sigma Pro, Mini Sigma, SK Compact, Filtomat series 100		
Digital Inputs	DP Switch, Pause		
Chain Controller Options	Onboard End of Cycle Pulse	NO, NC	
Standards	FCC 47CFR part 15: 2017, subpart B , Class B ICES-003 : 2016 Issue 6 , Class b AS/NZS CISPAR 32 :2015 Class B EN 61326-1: 2013, basic immunity requirements , Class B		

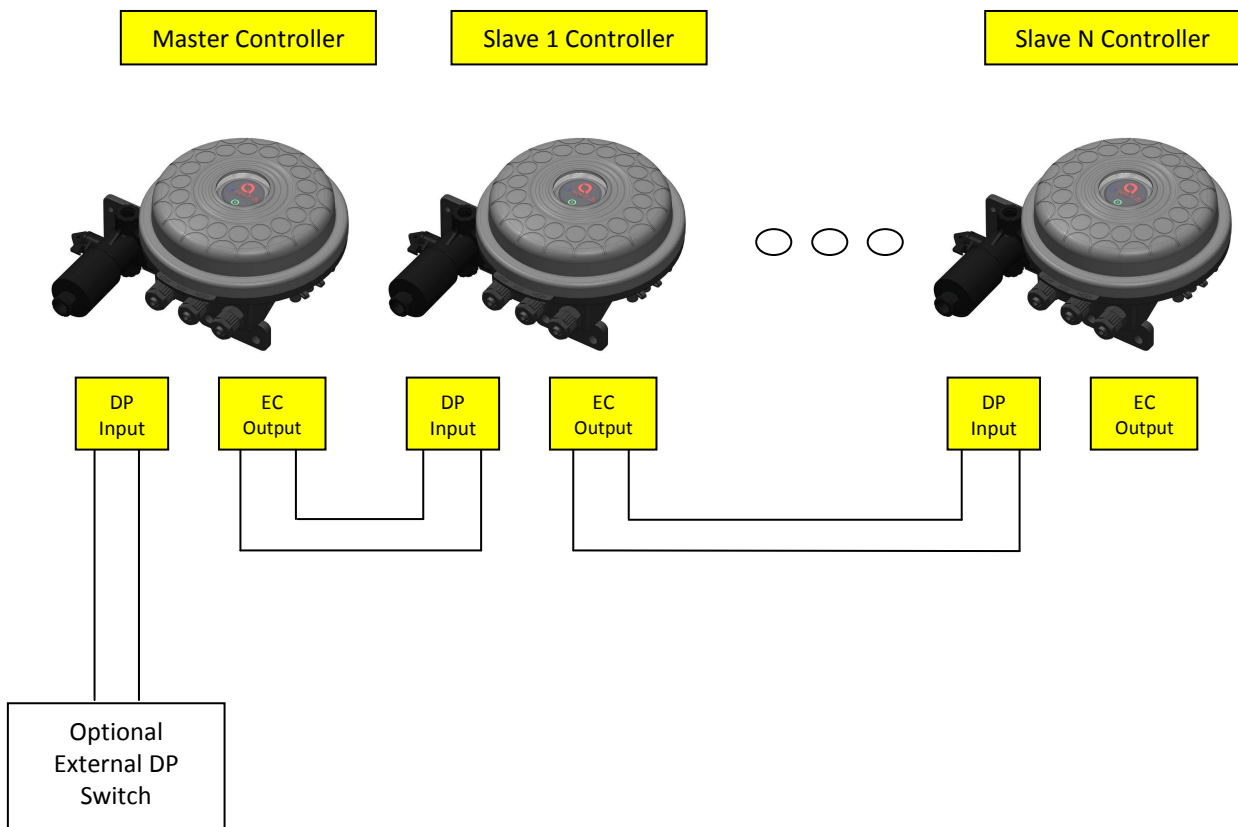
Annex A. Chaining ADI-P Controllers:

General:

In order to operate a battery of filters flushing according to a single DP switch (either internal or external), it is possible to daisy-chain few ADI-P controllers for the job.

The D.P. switch that reads the pressure drop across the battery is the internal DP switch of the first controller of the chain (the Master) or an external DP switch connected to the master controller. The End of Cycle output of the master controller is connected to the External D.P. input of the second controller of the chain (the first slave) and this controller EC output is connected to the D.P. input of the next. This type of connection can be spanned over as many controllers as needed.

When the actual D.P. switch send a signal, the master controller starts a flushing cycle, once this cycle is completed the master controller sends a signal through its EC output to the second controller to start its flushing cycle, and so on till the last controller in the chain as illustrated in the following drawing.

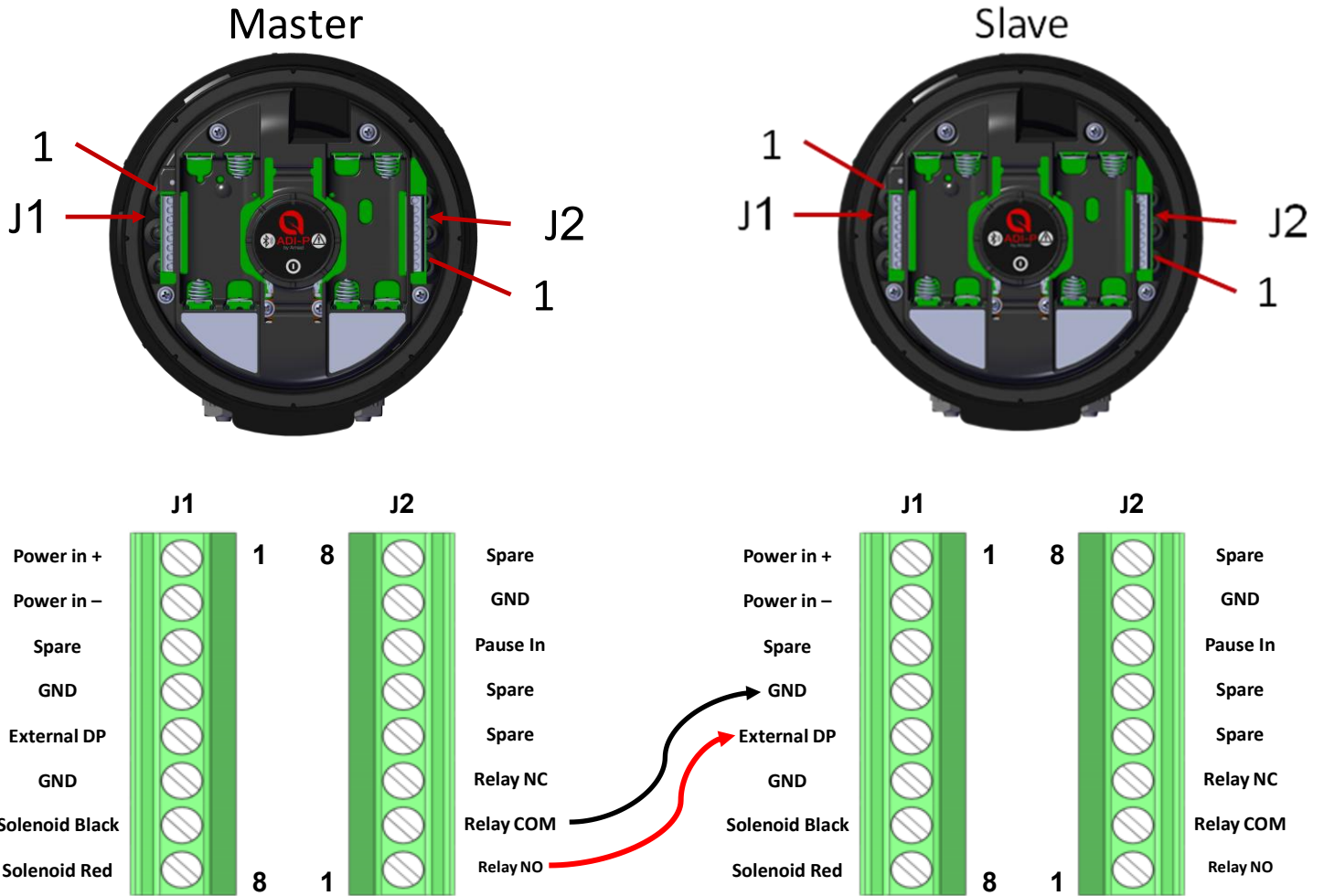


Important Note: Please make sure that the DP delay in the chained controllers is set to not longer than 5 seconds. This ensures proper transition from the last filter in the first controller to the first filter in the next controller.

Connection Instructions:

The connecting process is divided into two stages; the first stage is the wires connection and the second stage is the setting of the controller's application for chained operation.

Stage 1: Wires Connection

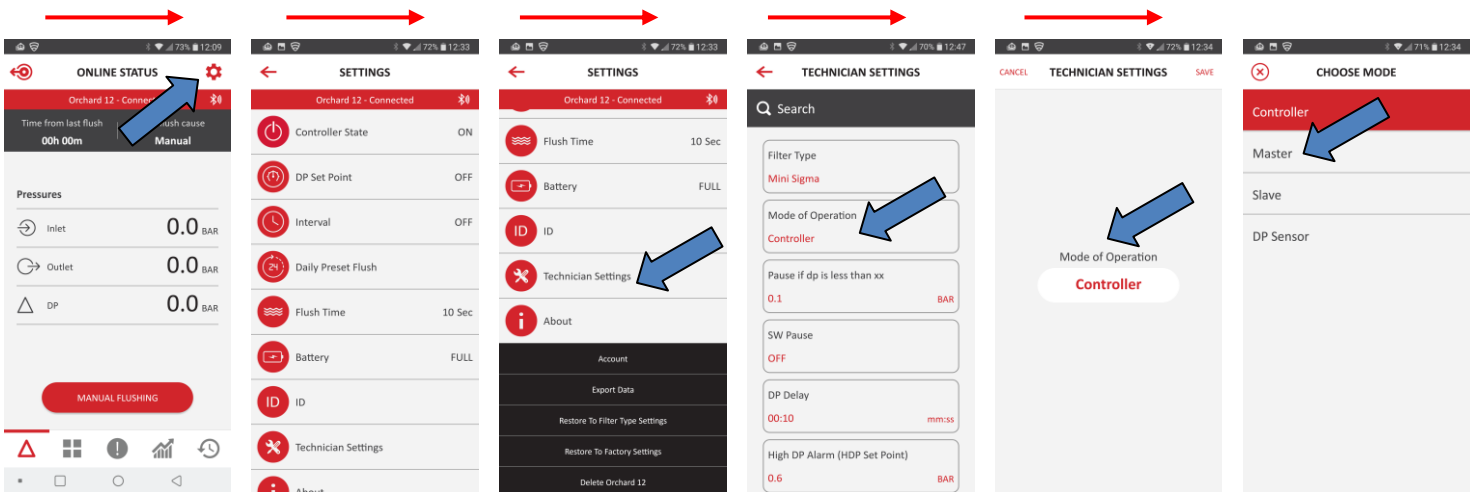


1. Connect between the NO relay output of the master controller and the external DP input of the Slave controller. Important: for your safety and for not damaging the controller remove the batteries before starting the wiring process.
2. Make sure that the wires gauge (the diameter of the cable) used is similar to the solenoid wires gauge (~4 mm) this is critical for maintaining the IP65 rating of the controller (water and dust proof).

Stage 2: Setting the Application

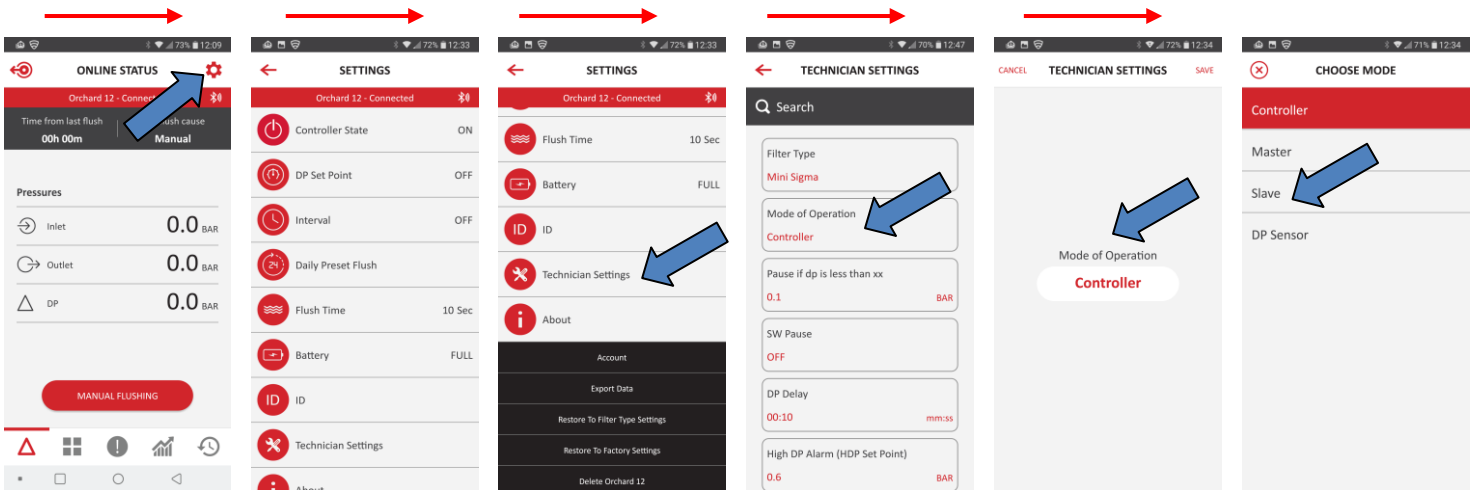
Connect the Adi-P application to the master controller and perform the following:

- On the top left side of the home screen click on the settings (the gear shaped) icon.
- Scroll down through the setting screen.
- Select the technician settings.
- Enter the password – 1234.
- In the technician settings screen select the "mode of operation" tab.
- Click on the current status of the controller (generally this is "controller")
- Select the desired master mode for the current controller.



Disconnect the Adi-P application from the master controller, connect it to the controller to be the slave controller, and perform the following:

- On the top left side of the home screen click on the gear shaped icon.
- Scroll down through the setting screen.
- Select the technician settings.
- Enter the password – 1234.
- In the technician settings screen select the "mode of operation" tab.
- Click on the current status of the controller (generally this is "controller")
- Select the desired slave mode for the current controller.



Check the controllers operation by starting a flush cycle through the application or by the controller's button.

Amiad Limited Warranty

This certificate applies to Amiad Products purchased by You from Amiad or an Amiad authorized Distributor (“**Distributor**”). This limited warranty extends only to the original purchaser, and is not transferable to anyone who subsequently purchases, leases, or otherwise obtains the Product from the original purchaser.

1. Amiad hereby warrants that the Products are and will be free from defects in material and workmanship under normal use and service. Amiad warrants that it will correct manufacturing defects in the Products, in accordance with the conditions set out in this warranty.
2. This warranty is enforceable for a period of 12 months after the date Bill of Lading or equivalent (the “**Warranty Period**”).
3. In the event that during the Warranty Period the Distributor discovers a defect in material and/or workmanship in any Product or part (the “**Defective Product**”), it shall submit a written complaint to Amiad using Amiad's standard customer complaint form. For the receipt of the customer complaint form, the submission of the complaint or any questions please contact your customer service representative.
4. Upon written demand by Amiad the Distributor shall return the Defective Products – or a sample thereof – to Amiad, at Amiad's cost. If the customer ships any such Product, Amiad suggests the customer package it securely and insure it for value, as Amiad assumes no liability for any loss or damage occurring during shipment. Provided however that in the event Amiad determines that the warranty does not apply to such Product, Distributor shall promptly reimburse Amiad for such cost (including freight and customs). Any returned Product or part must be accompanied by the warranty certificate and the purchase invoice. It is clarified that the Distributor may not return the Defective Product unless such return was coordinate and approved by Amiad in advance.
5. Amiad's obligation under this warranty shall be limited to, at its option, the repair or exchange, free of charge, of the Product or any part which may prove defective under normal use and service during the Warranty Period. The provision of a repaired or replacement Product during the Warranty Period will result in an extension of the Warranty Period by an additional period of 12 months, provided that the total accumulated Warranty Period shall in any event be no more than 18 months from the original Bill of Lading.
6. This warranty is valid on the condition that the Products are installed according to Amiad's instructions as expressed in Amiad's instruction manuals and according to the technical limitations as stipulated in Amiad's literature or as stated by a representative of Amiad.
7. This warranty will not apply to damaged or defective Products resulting from or related to:
 - (i) Fire, flood, power surges or failures or any other catastrophe/and or unforeseen occurrence, such as but not limited to those for which the customers are customarily insured;
 - (ii) Fault, abuse or negligence of the customer;
 - (iii) Customer's responsibilities, including the failure of the intake water to meet the agreed standards, as set forth in a written document, approved by Amiad or improper storage.
 - (iv) Improper or unauthorized use of the Product or related parts by the customer, including the customer's failure to operate the Product in conformity with the recommendations and instructions of Amiad, as set forth in Amiad's manuals and other written materials, the operation of the Product other than by a trained and qualified operator, or improper installation of the Product by a third party not authorized by Amiad;
 - (v) Performance by the customer of maintenance and other services other than by a trained and qualified advanced operator, or other than in conformity with the recommendations and instructions of Amiad, or other than in accordance with procedures defined in the literature supplied for Products;
 - (vi) Any alteration, modification foreign attachment to or repair of the Products, other than by Amiad or its authorized technical representatives.
8. In no event shall Amiad be liable to the customer or any third party for any damages, including indirect, special, exemplary, punitive or consequential damages, or lost profits arising out of or in connection with this warranty, or arising out of or in connection with the Product's performance or failure to perform, even if it has been advised of the possibility of such damages.
9. Amiad will be excused for failure to perform or for delay in performance hereunder if such failure or delay is due to causes beyond its reasonable control or force majeure preventing or hindering performance.
10. The limited warranty set forth herein is the only warranty given by Amiad and is provided in lieu of any other warranties created by any documentation, packaging or otherwise.
11. Amiad makes no warranty whatsoever in respect of accessories or parts not supplied by Amiad. In the event that Amiad is required to correct a defective Product or product not covered by this warranty, it will do so solely in consideration for additional fees.