



HYDROSET PM821

Smart water pump controller — steady pressure, soft start and stop, and full protection for your pump.



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1 What the controller does for you

- Holds the water pressure of your building steady.
- Starts and stops the pump gently, so the pump lasts longer.
- If the water runs out, it switches the pump off and retries on its own.
- Works both with and without a pressure vessel.
- Suitable for homes, shops and gardens.

2 Choosing the model

Choose the model by the **current of your pump**. That figure is printed on the pump nameplate.

Current on the pump nameplate	Pump power	Suitable model
up to 8 A	up to 1.5 hp	PM821-8
8 to 16 A	up to 3 hp	PM821-16

If you do not know the pump current

Use the number of floors and units instead. This table shows the pump normally fitted in such a building and the matching model.

Floors	Units	Typical pump	Suitable model
1 – 2	1 – 2	0.5 to 1 hp	PM821-8
3 – 4	3 – 6	1 to 1.5 hp	PM821-8
5 – 6	6 – 10	2 hp	PM821-16
7 – 8	10 – 14	2.5 hp	PM821-16
9 – 10	14 – 20	3 hp	PM821-16

Important

This table is an approximation. The final criterion is always the current on the pump nameplate.

Three-phase pumps

The controller can drive a three-phase pump through an intermediate contactor: the output of the controller energises the contactor coil. In that arrangement the pump current does not pass through the controller, so set **F4** to **0** and detect dry running by pressure (**F10**) instead.

3 What is in the box

Before installing, check that the box contains the following items.

- HYDROSET PM821 controller
- 20 bar pressure sensor with a fixed 1.2 m cable (the O-ring is already fitted to the sensor)
- Pump cable and terminal, 1.2 m long
- Wall bracket
- Size 6 screws and wall plugs
- Wall drilling template

4 Safety notes

Warning

- Disconnect the power before doing any work.
- Fit a suitable miniature circuit breaker on the supply side. Choose its size from the table below.
- Connect the pump body to the earth wire.
- Install the sensor and the check valve first. Connect the controller to the mains last.
- Keep the unit away from direct sunlight, rain and snow.

Model	Pump power	Miniature circuit breaker
PM821-8	up to 1 hp	C16
PM821-8	1.5 hp	C10 – C16
PM821-16	2 hp	C16 – C20
PM821-16	2.5 hp	C20 – C25
PM821-16	3 hp	C25 – C32

5 Installation

Where to mount the controller

- Mount it where you can reach it.
- The location must be ventilated so the unit stays cool.
- Drill two holes with a 3.5 mm bit, 3 cm deep.
- Screw the wall bracket to the wall and hang the unit on it.

Fitting the pressure sensor

- The sensor takes the place of the pressure switch on the five-way fitting. Its thread is **G1/4 female**.
- The sensor must sit **after the check valve**.
- The sensor cable is fixed. Before tightening, turn the sensor backwards a few turns and then screw it in, so the cable does not twist.
- There is a green light on the back of the sensor. If it is lit, the sensor is working.

Pipework

- Fit the check valve at the pump outlet, before the five-way fitting.
- Leave at least 15 cm between the pump outlet and the check valve.
- Do not place an elbow or bend within 50 cm after the outlet.

Important

Do not take any branch off the pipe between the pump outlet and the check valve.

Wiring

The controller has terminals for the incoming supply and for the pump. Each cable carries a label showing whether it goes to the pump or to the mains.

- Read the label next to each cable.
- Connect the output cable to the pump terminal.
- Connect the incoming supply last.

Important

The quality of the connections affects how well the unit works. Push the wires fully into the terminals and tighten the terminal screws. A loose connection causes heating, voltage drop and faults.

6 Display and keys

The display shows the water pressure, the pump current or a fault code.

Shown	Meaning	How to read it
1.0b	Water pressure	in bar — the letter b follows the number
1.0A	Pump current	in amperes — the letter A follows the number
E 3	Fault code	flashing — see section 13

Normally the pressure is displayed. While the pump is running you can press the Down key to see the current; when the pump stops, the display returns to pressure.

Keys

OK	Enter settings, open a parameter, save a value
Up	Next parameter, increase a value, show pressure
Down	Previous parameter, decrease a value, show current
Cancel	Leave without saving, exit settings, clear a fault

Note

To clear a fault, press the Cancel key on the main screen.

7 Commissioning in five steps

Commissioning needs four settings: **F1**, **F2**, **F3** and **F4**. You set all four in the five steps below.

1. Install the unit and switch on the power. It shows its name and prepares itself for about 30 seconds. The pump does not start during this time.
2. Set **F1** and **F2**. Section 8 explains how to calculate them.
3. Leave a tap open so the pump keeps running. Press the Down key and read the pump current. Save that figure in **F3**, plus at least 0.5 A.
4. Close the pump inlet valve and wait a few moments. The current now shown is the dry-running current. Save that figure in **F4**, plus at least 0.5 A. Then open the inlet valve again.
5. Press Cancel to leave the settings. The unit is ready to work.

Tip

F2 must be lower than **F1**. A difference of 1 to 1.5 bar between them works well.

Important

F4 must stay below the normal running current of the pump; otherwise the controller will read normal operation as dry running.

8 Choosing the right pressure

The right pressure depends on the height of the building. Measure the height in metres, from where the pump is installed up to the highest tap. You only need two formulas:

F1 = (building height ÷ 10) + 2 — every 10 m of height needs 1 bar; the 2 is the pressure you want at the highest tap.

F2 = F1 – 1.5

Example. For a building 10 m high: F1 = (10 ÷ 10) + 2 = 3 bar, and F2 = 3 – 1.5 = 1.5 bar.

Building height	Suggested F1	Suggested F2
10 m (3 floors)	3.0 bar	1.5 bar
15 m (5 floors)	3.5 bar	2.0 bar
20 m (7 floors)	4.0 bar	2.5 bar
30 m (10 floors)	5.0 bar	3.5 bar

Important

Avoid more pressure than you need. Excess pressure damages the solenoid valves of washing machines and dishwashers and shortens the life of the fittings.

Warning

The pump must be able to reach the **F1** pressure, otherwise it will never switch off. A simple check: the pump head in metres, printed on its nameplate, should exceed "building height + 20 m".

Connected directly to the mains water pipe

The pressure of the mains supply adds to the pump pressure, so a smaller pump is enough in that case.

9 How the parameters work

The controller has 15 parameters, from **F1** to **F15**, in three groups.

Group	Parameters
Pump pressure control	F1 cut-out pressure · F2 cut-in pressure · F7 start delay · F8 stop delay
Pump protection	F3 maximum current · F4 minimum current · F5 dry-run detection time · F6 retry time · F10 dry-run pressure
Starting and display	F11 soft-start time · F12 soft-stop time · F9 display brightness

F13, **F14** and **F15** configure the pressure sensor and are only used when the sensor is replaced (section 10).

Pressure control — F1 and F2

The pump works between two values. When the pressure falls to **F2** the pump starts. When it reaches **F1** the pump stops. Between the two, the pump keeps its current state.

Delays — F7 and F8

These two parameters let you postpone starting and stopping. That prevents the pump from switching on and off repeatedly. A value of 0 means no delay.

- pressure reaches F2 → wait F7 seconds → the pump starts
- pressure reaches F1 → wait F8 seconds → the pump stops

Dry-run protection — F4, F5, F6 and F10

When there is no water, the pump current falls and the pressure does not rise. The controller detects this, stops the pump and retries after a while.

- 1 the pump is running
- 2 the current is below F4, or the pressure is below F10
- 3 this condition lasts for F5 seconds
- 4 the pump stops — dry-running fault
- 5 wait F6 minutes
- 6 the pump starts again

The cycle repeats until the water returns. Once it does, the fault clears by itself and the pump goes back to normal operation.

Overload protection — F3

If the pump current rises above **F3**, the controller stops the pump and shows a fault.

Soft start and stop — F11 and F12

The controller does not switch the pump on all at once. It raises the pump power gradually, and lowers it gradually when stopping. This prevents water hammer.

10 Full parameter guide

What each parameter does. Ranges and factory values are in sections 11 and 12.

F1 Pump cut-out pressure

bar

When the water pressure reaches this value, the pump stops. Calculate it as shown in “Choosing the right pressure”. The pump must be able to reach this pressure.

F2 Pump cut-in pressure

bar

When the water pressure falls to this value, the pump starts. It must be lower than **F1**; a difference of 1 to 1.5 bar works well.

F3 Maximum pump current

A

The allowed limit for the pump current. Read the running current from the controller as described in section 7 and store it plus at least 0.5 A, or take it from the pump nameplate. If the current stays above this value, the pump stops and fault **E 1** is shown.

F4 Minimum pump current

A

The pump current with no water. The controller uses this value to detect dry running from the current. To measure it: close the pump inlet valve and wait a few moments, read the current shown — that is the dry-running current — and store it plus at least 0.5 A in **F4**, then open the valve again. A value of 0 turns this detection off. If the controller output drives a contactor, set this value to 0.

F5 Dry-run detection time

s

The dry-run condition must last this long before a fault is recorded. A short time makes detection faster but more sensitive.

F6 Retry time

min

After a dry-running fault the controller waits this long, then starts the pump again to check whether the water has returned.

F7 Start delay

s

The pressure must stay below **F2** for this long before the pump starts. 0 means no delay.

F8 Stop delay

s

The pressure must stay above **F1** for this long before the pump stops. 0 means no delay.

F9 Display brightness

0 – 7

Brightness of the display; 7 is the brightest. The effect is visible on the display as you change the value.

F10 Dry-run detection pressure

bar

If the pump is running and the pressure stays below this value for **F5** seconds, dry-running fault **E 4** is recorded. This value must be lower than the normal working pressure of the pump. A value of 0 turns this detection off.

F11 Soft-start time

s

How long the pump takes to go from stopped to full power. 0.2 to 1 second is suggested.

F12 Soft-stop time

s

How long the pump power takes to fall to a complete stop. 0.2 to 1 second is suggested.

F13 Maximum sensor pressure

bar

The full-scale pressure of the fitted sensor. Change it only when the sensor is replaced. The sensor supplied with the unit is 20 bar.

F14 Pressure sensor calibration

—

The calibration factor of the pressure sensor. It is calibrated at the factory for each individual unit and may differ from one unit to another. Write this value down and do not change it, except when replacing the sensor, where it must be reset to 150 (see the procedure below).

F15 Pressure sensor offset

command

The command that trims the sensor offset. Setting it to 1 starts the trim, and it returns to 0 by itself when finished. Use it only when replacing the sensor, following the procedure below.

Replacing the pressure sensor

If the pressure sensor is damaged, use a standard sensor with a 0.5 to 4.5 V output.

1. Enter the full-scale pressure of the new sensor in **F13**.
2. Reset the calibration factor **F14** to **150**.

3. Unscrew the sensor from the pipe. Make sure there is no pressure on it.
4. Open **F15** and set its value to **1**.
5. Leave the settings. The controller trims the sensor and stores the value.

Warning

Carry out the steps in this order. If something goes wrong, repeat the procedure from the beginning.

11 Parameter table

To enter the settings, press the OK key.

#	Parameter	Minimum	Maximum	Unit
F1	Pump cut-out pressure	0.1	value of F13	bar
F2	Pump cut-in pressure	0.1	value of F1	bar
F3	Maximum pump current	1.0	8 or 16	A
F4	Minimum pump current	0	value of F3	A
F5	Dry-run detection time	0	600	s
F6	Retry time	0	600	min
F7	Start delay	0	600	s
F8	Stop delay	0	600	s
F9	Display brightness	0	7	—
F10	Dry-run detection pressure	0	value of F1	bar
F11	Soft-start time	0.1	600	s
F12	Soft-stop time	0.1	600	s
F13	Maximum sensor pressure	1	100	bar
F14	Pressure sensor calibration	0	2000	—
F15	Pressure sensor offset	0	1	command

12 Factory values

The unit leaves the factory with these values.

#	Parameter	PM821-8	PM821-16	Unit
F1	Pump cut-out pressure	3.0	3.0	bar
F2	Pump cut-in pressure	1.5	1.5	bar
F3	Maximum pump current	7.5	10.0	A
F4	Minimum pump current	1.0	1.0	A
F5	Dry-run detection time	20	20	s
F6	Retry time	20	20	min
F7	Start delay	0	0	s
F8	Stop delay	0	0	s
F9	Display brightness	7	7	—
F10	Dry-run detection pressure	1.0	1.0	bar
F11	Soft-start time	0.2	0.2	s
F12	Soft-stop time	0.2	0.2	s
F13	Maximum sensor pressure	20	20	bar
F14	Pressure sensor calibration	calibrated per unit at the factory		—
F15	Pressure sensor offset	1	1	command

Note

F14 is calibrated separately for each unit and may differ from one unit to another. Write it down and do not change it.

13 Faults and how to clear them

When a fault occurs, the display flashes the fault code and the pump stops. Find the code below and carry out the steps in order.

Note

To clear a fault, press the Cancel key on the main screen.

E 1 Over current

the pump current is too high

1. Compare **F3** with the current on the pump nameplate.
2. Make sure the pump is not more powerful than the model rating.
3. Clear the fault with the Cancel key and start the pump again.
4. If the fault returns, contact your dealer.

E 2 Load missing

the controller sees no current

1. Check the cable between the controller and the pump, and its terminals.
2. Check the pump capacitor.
3. Check the pump temperature. The thermal switch inside the pump may have cut the current because of excessive load; let the pump cool down.
4. Clear the fault with the Cancel key.
5. If the fault returns, contact your dealer.

E 3 Dry running, detected by current

water is not reaching the pump

1. Make sure water reaches the pump inlet.
2. Open the pump inlet valve fully.
3. Bleed the pump.
4. If there is water and the fault keeps returning, reduce **F4** slightly.

Clears by itself

This fault clears once the water returns. The controller retries every **F6** minutes.

Connected through a contactor

If the controller output drives a contactor, the pump current does not pass through the controller. Set **F4** to 0 so **E 3** is ignored, and detect dry running by pressure (**F10**).

E 4 Dry running, detected by pressure

the pressure does not build up

1. Make sure water reaches the pump inlet.
2. Check **F10**; it must be lower than the normal working pressure of the pump.
3. Check where the sensor is fitted; it must be after the check valve.
4. Check the bypass valve. It may look closed but still leak because of a fault.

Clears by itself

This fault clears once the water returns. The controller retries every **F6** minutes.

E 6 Pressure sensor

the sensor cable is broken or the sensor has failed

1. Check the green light on the back of the sensor. If it is off, the sensor or its cable is faulty.
2. Inspect the sensor cable along its whole length.
3. If the problem remains, replace the sensor (section 10, Replacing the pressure sensor).
4. To obtain a new sensor, contact your dealer.

E 7 Temperature sensor

the internal temperature sensor has failed

1. Clear the fault with the Cancel key.
2. If the fault returns, contact your dealer. The unit needs service.

E 8 Over temperature

the inside of the unit is too hot

1. Wait a few minutes for the unit to cool down.
2. Improve the ventilation where it is installed and keep it out of direct sunlight.
3. If the fault returns, compare the pump power with the model rating.

Clears by itself

This fault clears once the unit has cooled down.

14 Technical specifications

Specification	PM821-8	PM821-16	Unit
Maximum pump current	8	16	A
Maximum pump power	1.5	3	kW
Maximum inrush current	10	30	A
Pressure range of the supplied sensor	0 – 20	0 – 20	bar
Pressure sensor thread	G1/4	G1/4	female
Input voltage	180 – 240	180 – 240	V
Output voltage	same as input	same as input	V
Own consumption	< 5	< 5	W
Operating temperature	–15 – 55	–15 – 55	°C
Weight, packed	650	650	g

15 Warranty and after-sales service

2

years of warranty

Free replacement or repair for any parts or manufacturing defect.

5

years of after-sales service

Spare parts, repair and technical support after the warranty period.

Warranty conditions

- The warranty starts on the date of purchase. The purchase invoice or the serial-number label on the unit is the reference.
- The unit must have been installed and used in accordance with this manual.
- The warranty covers replacement: in the event of a parts or manufacturing defect, the unit is replaced or repaired free of charge.

What voids the warranty

- Opening or repairing the unit outside an authorised service centre
- Physical damage, impact, or water entering the unit
- Connection to a supply outside 180 – 240 V, or damage caused by lightning
- A defaced serial-number label

Thank you for choosing HYDROSET

HYDROSET is designed and built with high-quality components and materials, and every unit is tested individually before it leaves the factory — so it works quietly and reliably for years.

If you ever need help, contact the dealer you bought it from, or reach us at [KFGTECH.COM](https://www.kfgtech.com). We are here for you.

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