

P.121 - P.122 MOTOR HEAD MODULEX FLEX

*INSTALLATION COMPONENT NON INTENDED FOR PUBLIC USE

UNIVERSAL SPARE MOTOR WITH IMPELLER WITH FREQUENCY CONVERSION AND AUTOADAPT USER AND INSTALLATION GUIDE



EEL≤0,21

Rev. 07/2025



Main features:

- EEL≤0,21
- Function: self adapt – SA
- Constant speed – CS
- Proportional pressure – PP
- Constant pressure – CP
- PWM controller
- Functions display



- ➔ CONNECT EARTH PLATE BEFORE POWER SUPPLY
- ➔ DO NOT TOUCH THE PUMP WHILE FUNCTIONING
- ➔ DO NOT RUN THE PUMP DRY

FIG. 1

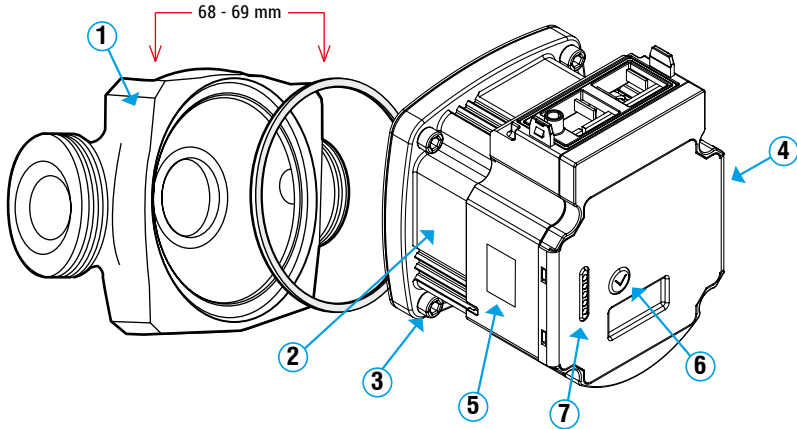


FIG. 2

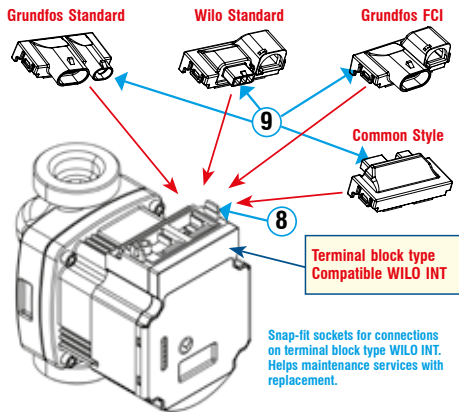
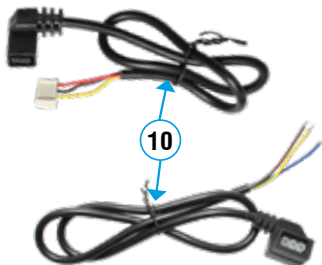


FIG. 3



RELATED ACCESSORIES NOT INCLUDED



Sockets for connections

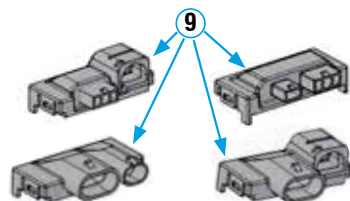


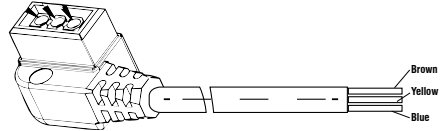
FIG. 7

Wilo Standard

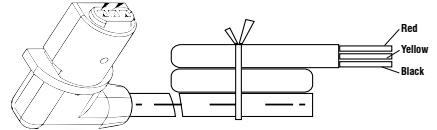
Molex
+
FCI crescent-shaped
art. P.170.02



Power supply cable: 230 Vac



PWM controller cable

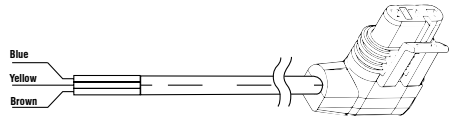


Grundfos Standard

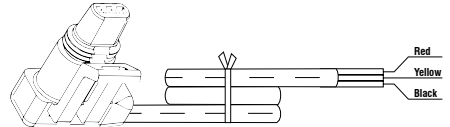
SuperSeal
+
Mini Superseal
art. P.170.01



Power supply cable: 230 Vac



PWM controller cable

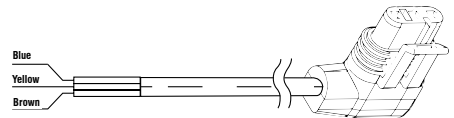


Grundfos FCI

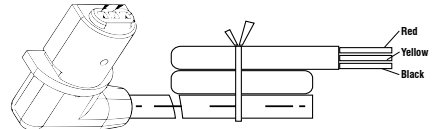
SuperSeal
+
FCI crescent-shaped
art. P.170.03



Power supply cable: 230 Vac



PWM controller cable

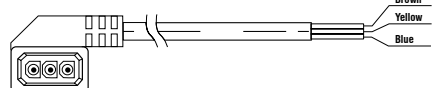


Common Style

Molex
+
FCI rectangular
art. P.170.00

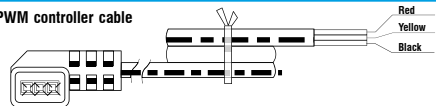


Power supply cable: 230 Vac



Brown: (PH) Phase
Yellow / Green: Ground
Blue: (N) Neutral

PWM controller cable



Yellow: PWM outlet (pump)
Red: PWM inlet (controller)
Black: ground cable (GND)

N.B.: the application of these sockets on the MODULEX FLEX allows for an easy replacement on old models (Grundfos – Wilo and other brands) without the need to adapt the cables for the various types of connections on the replacements.

Components Fig. 1 and Fig. 2

- ① Body of the pump
- ② Wet-rotor motor
- ③ Fixing screws of the motor to the body
- ④ Electrical control box
- ⑤ Pump identification plate
- ⑥ Control key for pump setting
- ⑦ LED lights for usage: selected control mode/damaged
- ⑧ Terminal block type INT
- ⑨ Applicable connections socket
- ⑩ Connection cables
- ⑪ Instruction manual

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Thank you for choosing ANTARES. Please read the instructions carefully before installation and use, and store them safely.



Warning

- This product is not intended for the public, but for professionally specialized companies.
- Read the instructions carefully before installation and use.
- The pump must be reliably grounded and connected to a differential disconnecter.
- It is strictly forbidden to touch the electric pump whilst functioning.



Warning for Children

- It is strictly forbidden for children or vulnerable adults, the use of this product without the supervision of a qualified person.



Electrical warning

- The power supply system may only be used when it is in compliance with safety rules according to the protection measures specified by the regulations in force in the Country.



Pressure Warning

- The pumping system must be able to withstand the maximum pressure of the pump.



Notice regarding alterations

- ANTARES declines all responsibility in case of any tampering with the electric pump or its drive beyond the operating conditions by the User..

Precautions

- The power supply voltage of the electric pump is single-phase 220-240V and the frequency is 50/60Hz.
- Make sure that the pipe system is firmly connected before installation and check that impurities, welding scraps and waste have been removed from inside the pipes. Before installation in an old system, wash it to remove any sludge present with crystallization of salts and substances present in the circulating liquid.
- Make sure the pump is in a dry and ventilated environment to avoid short circuits due to moisture or splashes in the body and ensure its accessibility for service and replacement.
- Before replacing the motor, make sure that in the boiler or in the system there are no leaks or water drops.
- Make sure that the electrical system is safely connected to earth rod.
- After completing the installation of the pump, connect the power supply as a test and set the speed adjustment setting to the maximum level to verify that it is starting properly. NOTE: the test run time cannot be longer than 10 seconds to avoid wearing the life-span of pads.
- Do not touch the pump and/or the pipes when supplying water to the heating system to avoid getting burned.
- Safety warnings concerning the pump must be observed during pump operation to avoid any accident.
- The power supply must be disconnected before positioning the pump and/or before any electrical action to the pump to avoid accidents.
- Check the pump regularly and replace it promptly in case of damage.
- The power supply cable may only be replaced with matching cables or specific components.
- In winter, when the environment temperature is below 0°C, the water in the system must be completely drained, if it is not in use.
- It is not possible to refill the system frequently with non-distilled water to avoid sludge formation over time.

1 - Introduction on functions

The ANTARES MODULEX FLEX is a fundamental part of the circulator, made for an easy replacement of the motor only on faulty circulators. It is high-efficiency, according to the ERP directive, with smart frequency conversion and integrated electronic differential pressure control, with the possibility of setting the regulation module and the head (differential pressure).

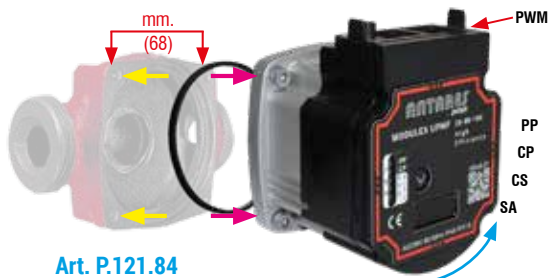
The differential pressure is controlled by the pump's speed. The motor stator is fully shielded and the rotating parts are immersed in clean water, playing an important role in cooling and in lubrication whilst functioning. The shielding sleeve of the electric pump adopts a thin-walled structure to completely shield the internal stator from water in the engine; the traditional mechanical seal structure is eliminated and the problem of water leakage of the conventional pump is solved. The rotating parts consist of ceramic bearings and ceramic rotating shafts, wear resistant and lubricated with clean water, which cool the engine and reduce its noise. The pump will not overload during full operation performance. It can be generally maintenance free as long as used correctly.

1.1 - Technical data

Power voltage	220-240 V, 50/60 Hz	EMC Standard	GB 4343,2 GB 4343,2 GB 17625,1 GB 17625,2
Motor protection	Does not require external protection	Room temperature	-30°C +50°C
Protection level	IP44	Surface temperature	+ 125°C
Insulation level	E	Liquid temperature	+ 2°C ~ + 110°C
Relative room humidity	Max 95%		

Universal motor with spare turbine for domestic circulators (8 mt head)

ANTICLOCKWISE ROTATION for GRUNDFOS and other brands



Art. P.121.84

Art P.121 - Universal high-efficiency spare motor with impeller and frequency conversion inverter for replacement on domestic circulators, GRUNDFOS and other brands, with COUNTERCLOCKWISE rotation (CCW). With PWM control socket and equipped with SELF ADAPT, PP, CP, CS functions. Self-regulating with or without cable connection to PWM controller. 4 years warranty.

Self-regulating, satisfies every replacement need all in one product. Distance between mounting holes 68 mm., comes with gaskets and fixing bolts. Max flow rate: 4,1 mc/h. Max head 8 mt. 4 years warranty.

Table of electrical connections

Item code	Connection type
P121.84	Base socket type INT
P121.81	Grundfos standard: SuperSeal - Mini SuperSeal
P121.83	Grundfos FCI: SuperSeal - FCI crescent

Compatible and interchangeable with: Grundfos UPM3 and other brands



High-efficiency models

- UPM3 (with all types, with or without PWM controller)
- UPM2 (with all types, with or without PWM controller)
- ALFA2 (with all types, with or without PWM controller)

Old models

Grundfos UPS xx xx xxx
And other brands



Universal motor with spare turbine for domestic circulators (8 mt head)

CLOCKWISE ROTATION for WILO and other brands



Art. P.122.84

Art P.122 - Universal high-efficiency spare motor with impeller and frequency conversion inverter for replacements on domestic circulators, WILO and other brands, with CLOCKWISE rotation (CW). With PWM control socket and equipped with SELF ADAPT, PP, CP, CS functions. Self-regulating with or without cable connection to PWM controller. 4 years warranty.

Self-regulating, satisfies every replacement need all in one product. Distance between mounting holes 69 mm., comes with gaskets and fixing bolts. Max flow rate: 4,1 mc/h. Max head 8 mt. 4 years warranty.

Table of electrical connections

Item code	Connection type
P122.84	Base socket type INT
P122.82	Wilo standard: Molex - FCI Crescent
P122.80	Common Style: Molex - FCI Regular

Compatible and interchangeable with:
Wilo PARA and other brands



High-efficiency models

- PARA (with all types, with or without PWM controller)
- PICO (with all types, with or without PWM controller)
- YONOS (with all types, with or without PWM controller)

Old models

RS xx / X
and other brands



2 - Replacement instructions

2.1 - Preliminary checks on the general status of the old circulator to be replaced

1) Make sure that the malfunction is not due to other causes:



- Verify with a voltmeter that the voltage is present on the power supply terminals of the motor, measuring the presence of correct voltage.
- Check the inside of the terminal box for burns, and check the status of the capacitor.
- Check the electrical continuity of the windings to determine any interruptions or burns.
- Measure the insulation resistance.
- The test is considered passed if the insulation resistance is more than 10 Ω.

2) Make sure that the circulator is not blocked by grime. If the release screw is present, proceed with a screwdriver as shown:



With a large screwdriver you unscrew the cap.

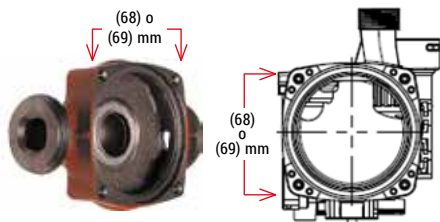


Then, with a small one you move the rotor of the circulator to the right and left, which acts on the slot accessible under the removed cap.

IF THE OLD CIRCULATOR IS DAMAGED BEYOND REPAIR, PROCEED TO REPLACE THE MOTOR AS SHOWN IN THE FOLLOWING INSTRUCTIONS:

PRELIMINARY CHECKS FOR INTERCHANGEABILITY

1 DISTANCE OF THE FIXING FLANGE



2 MOTOR'S DIRECTION OF ROTATION



ATTENTION

The direction of rotation is determined by looking at the circulator in front of the motor.

3 The head of the old circulator is shown on the original label of the circulator that needs replacement

Usually, the label shows the fitting's diameter first, and then the head.

GRUNDFOS:

Model code – diameter – head – height

UPM x 15 - 50 - xxx
ALFA x 15 - 50 - xxx
UPS - 15 - 60 - xxx



WILO:

Model code – diameter – head

type of body – height

PARA 25/6/xxxxx/ xxx
PICO 25/6/xxxxx/ xxx
YONOS 25/6/xxxxx/ xxx
RS 25/6/xxxxx/ xxx

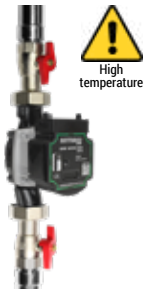


It is preferable to use motors with similar or higher metric head than the old circulator. The motor – circulator with AUTO ADAPT function, is self-regulating and therefore reduces its power in relation to the real and variable needs of the system.

Check carefully that the purchased product meets the 3 conditions defined above of the old circulator to be replaced.

2.2 - Control panel positions (Fig. 1 ref. 4)

The following operations may only be performed by qualified personnel.

 1 - Disconnect power supply before adjustment	 2 - Drain the liquid from the system and close the valves	 3 - Remove hexagonal bolts with a hex key	 4 - Adjust in the desired direction, lock the hexagonal bolts 5 - Open the valves, which must remain open once the power is on
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3 - Instructions for motor replacement

- A. Disconnect the main power switch of the electric system.
- B. Make sure there is a real power failure using a voltmeter.
- C. Disconnect the supply wires of the old circulators.
- D. Close the water power tap of the heating system.
- E. If the circulator is equipped with shut-off valves at the inlet and outlet, close it. If there are none, the system must be completely drained.
- F. Once the system is drained, loosen the bolts (sometimes just two of them) connecting the motor to the body of the pump with an appropriate Allen key diam 4-5 with T-handle.



- G. Let out the remaining water.
- H. Loosen and remove the fixing bolts completely, without throwing them away, and remove the faulty motor.
- I. Insert the new motor in flange, inserting one or two washers provided in the package between the motor flange and the body.

Most frequently encountered when using 1 mm washers.

- Wilo: : no washers
 - Grundfos: - Bodies in cast iron: no washers
- Bodies in plastic: 1 or 2 washers.
- J. Insert the bolts and tighten them completely.
 - K. Use the appropriate Allen key to tighten the bolts progressively with the corresponding counter elements.
 - L. Open the circulator shut-off valves, if present.
 - M. Open the water supply tap of the heating system until the defined filling pressure is reached.
 - N. Check that there are no leaks between the flange of the pump and the motor.
 - O. Connect the wiring in the power supply box of the new motor.
 - P. Once the motor is replaced, it is advisable to set correctly the function of the circulator with button (fig. 1 ref. 6) as specified in the following pages.

The function of the motor/circulator is factory pre-set in CS mode - constant speed.

ATTENTION: in some models of old circulator bodies it is necessary to apply a second washer to avoid the impeller rubbing on the pump body. It is therefore necessary, before fixing the bolts, to check in advance that the coupling does not cause the impeller to rub on the body, in which case you will insert a second spacer washer.



If after having removed the motor, you notice on the old body of the circulator the presence of sludge, fine sand due to the crystallization formed by mineral salts (manganese, iron, calcium or others) or similar dirt, it is advisable to perform or to have performed the total washing of the system, in order to avoid a possible and repeated blockage of the motor.

3 - Electrical connections

3.1 - For replacement on INT models: Art. P.121.84 - Art. P.122.84

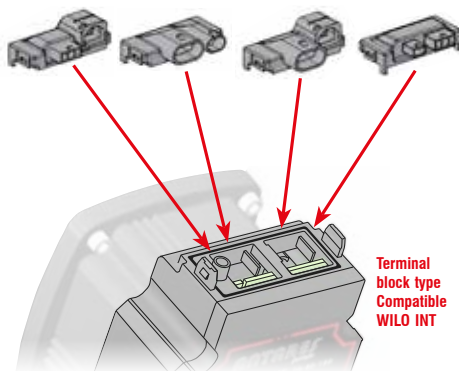
- The INT models (Art. P.121.84 - Art. P.122.84) has got a base terminal block type for electrical connection type INT, therefore compatible with plugs type Wilo INT. In this case, it is enough to plug in the combined electrical plug (electrical power supply and PWM controller) in the connection socket.
- If the cable coming from the device's electronic board does not have the INT plug, find the suitable connection socket (FIG.7) and plug it in the terminal block INT fit.



Many boilers manufacturers equip their circulators with various electrical connections sockets. ANTARES, to help maintenance services with replacement operations, created a system (**model registered with utility patent**) which involves the application on the base INT terminal block of snap fittings (**protection level IP44**) of the various connections used by manufacturers

Art. P.170 -Snap-fit connection socket on INT terminal block for the defined types of connections; PWM signal power supply.

Item code	Snap-fit connections sockets types	
P.170.02	Wilo Standard Molex + FCI Crescent shaped	
P.170.01	Grundfos Standard Super Seal + Mini Super Seal	
P.170.03	Grundfos FCI Super Seal + FCI Crescent shaped	
P.170.00	Common Style Molex - FCI rectangular	



- If the cable coming from the electric board of the device does not has the INT plug and neither the defined connections in FIG.7, proceed with the electrical connections following instructions as of 3.2.2.

3.2 - For replacement with models: Art. P.121.80 - 122.80

- If the electric sockets does not match with the plugs coming from the device's electrical board, use an electric conversion adaptor on the old cable's plug and on those on the new circulator. Various socket adaptors are available on the ANTARES catalogue.

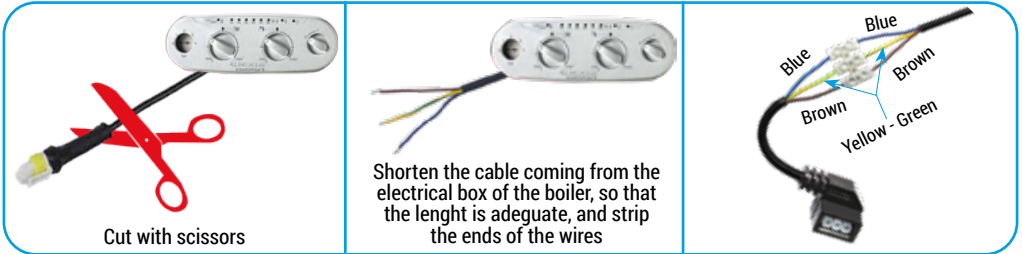
3.2.1 - Power supply cable connection when replacing existing faulty circulators with different connector

- If the electric sockets does not match with the plugs coming from the device's electrical board, use an electric conversion adapter on the old cable's plug and on those on the new circulator.

OR

- Cut the end of the connector (plug) of the circulator to be replaced, shorten the cable coming from the electrical box of the boiler so that it is of adequate length and strip the wires of the cable to connect them to the cable of the new connector through the wiring terminals (see figure below):

Note: make sure that the power supply cable does not come in contact with the piping, nor with the pump itself.



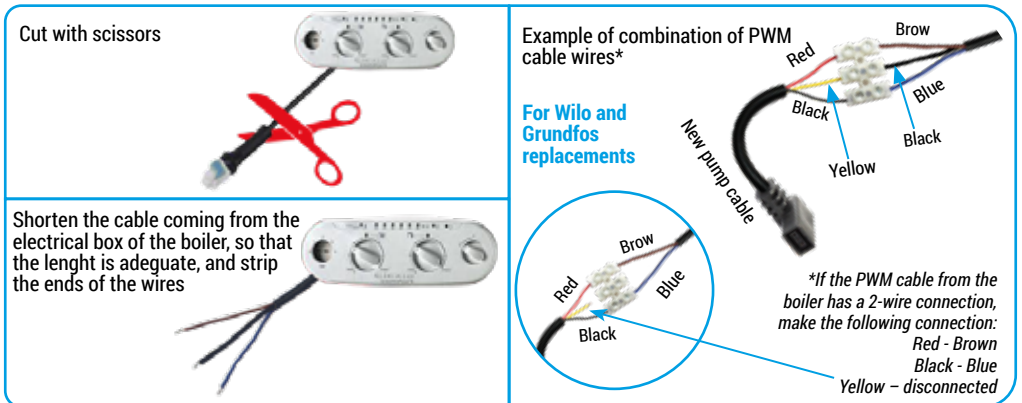
3.2.2 - Cable connection of the PWM Controller when replacing existing faulty circulators with different connector or without PWM connection

- If the boiler does not have the connection to the PWM controller, it is not necessary to make the connection, but select the circulator in the most suitable working function or in the Autoadapt position. The circulator will automatically adapt to the system requirements.
- If the socket of the new circulator does not match the plug of the old one, insert an electrical conversion adapter on the plug of the old cable and that of the new circulator. See in the ANTARES catalogue the socket adapters for Grundfos circulators (our art. P.163.01) or Wilo (our art. P.164.01).



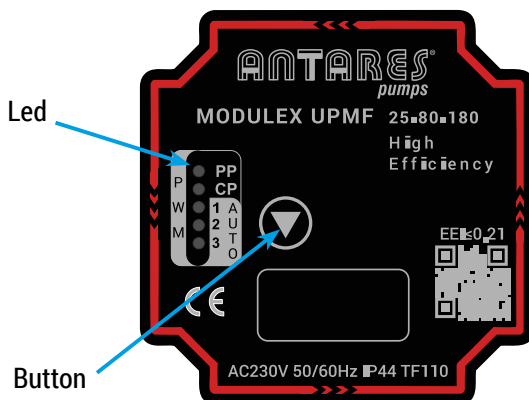
OTHERWISE

- Cut the end of the connector (plug) of the circulator to be replaced, shorten the cable coming from the electrical box of the boiler so that it is of adequate length and strip the wires of the cable to connect them to the cable of the new connector through the wiring terminals (see figure below):



4 - User instructions

4.1 - Control panel



4.2- Performance curves

Pump performance symbols:

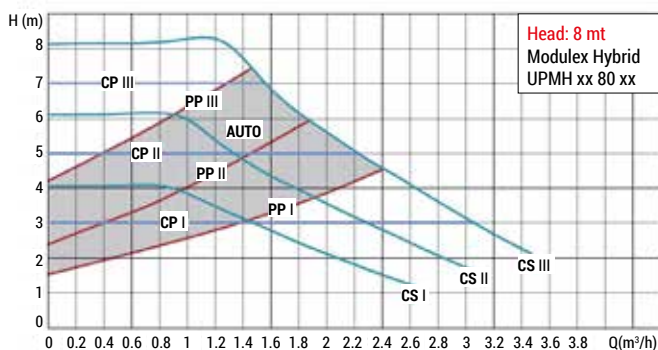
● **PP**= Proportional Pressure

● **CS**= Constant Speed

● **CP**= Constant Pressure

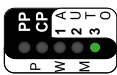
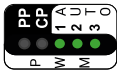
● **AUTO** = Self Adapt – Automatic Control

**Possibility to set the control mode and the head (differential pressure).
The differential pressure is regulated by the pump speed.**



4.3 - Control mode with reference to LED lights

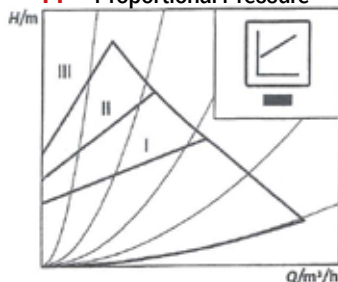
The pump functionality setting is configured with different display of the LED lights.

Press number of times	Model	Descriptions	Display
0	CS III (Factory setting)	Constant curve speed III	
1	AUTO	Automatic adapt mode	
2	PP I	Proportional pressure curve speed I	
3	PP II	Proportional pressure curve speed II	
4	PP III	Proportional pressure curve speed III	
5	CP I	Constant pressure curve speed I	
6	CP II	Constant pressure curve speed II	
7	CP III	Constant pressure curve speed III	
8	CS I	Constant curve, speed I	
9	CS II	Constant curve, speed II	
10	CS III	Constant curve, speed III	
11 & 12	PWM	11- Flashing light: mode PWM1	
		12 - Flashing light: mode PWM2	
		External control of engine speed	

4.4 - Adjustment modes and functions

Variable differential pressure $\Delta p-v$ (I, II, III,)

PP = Proportional Pressure

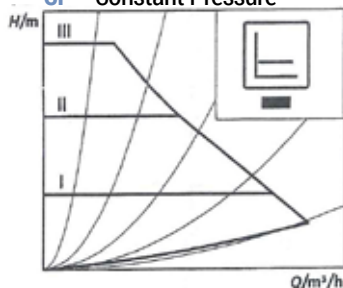


Recommended in case of heating systems with delivery and return pipes with radiators, for the reduction of flow noise on thermostatic valves and zone sections.

The pump halves the head in case of flow reduction in the pipeline network (radiators or closed areas). Electrical energy is saved by adapting the head to the required flow rate and reduced flow speed. Three predefined characteristic curves including (I, II, III) from which you can choose.

Constant differential pressure $\Delta p-c$ (I, II, III,)

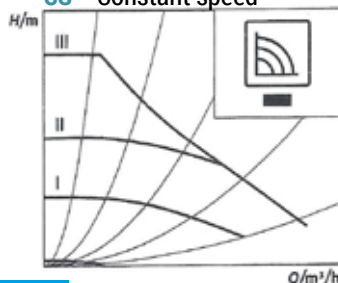
CP = Constant Pressure



Recommended in case of radiant panels (floor heating systems) or large pipes, and for all applications without variable system characteristic curves, (e.g. circulation in accumulators or heaters) and single-pipe heating systems with radiators. The regulation maintains the set head regardless of the conveyed flow rate. Three predefined characteristic curves including (I, II, III) from which you can choose.

Constant number of turns (I, II, III,)

CS = Constant speed



Recommended for systems with steady resistance that require a constant flow rate.

The pump operates in three stages corresponding to numbers of pre-set fixed laps (I, II, III).

NOTICE

Factory setting: (CS III)

Constant speed, constant curve, speed III

External adjustment via iPWM signal

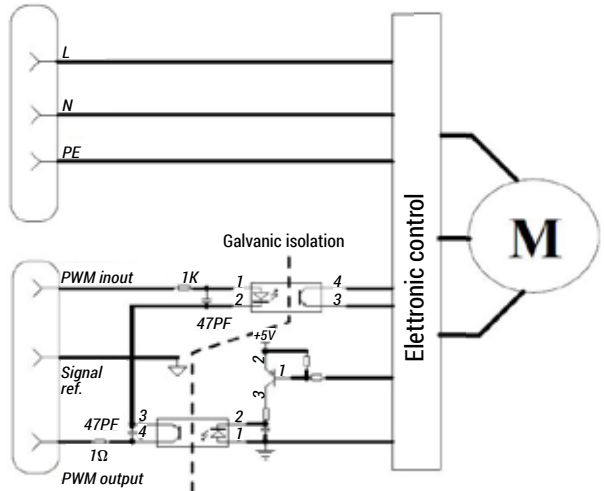
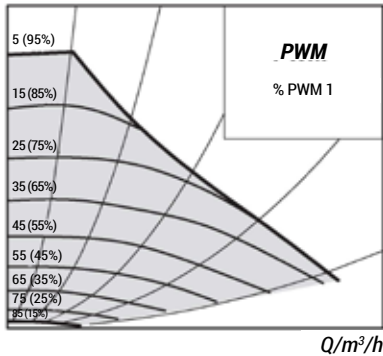
The pump speed is controlled according to the PWM input signal, when connected.

If there is no PWM signal or cable is not connected, the pump functioning is controlled by internal logic.

PWM = External adjustment via iPWM signal

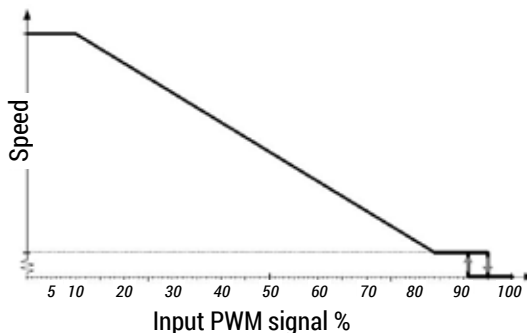
In PWM mode, the rotation speed of the pump is regulated according to the input signal (PWM).

H/m



4.4.1 PWM input signal (P1 heating systems for Modulex Hybrid models)

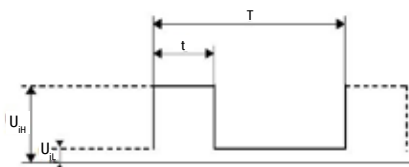
At high PWM signal rates (duty cycles), a hysteresis prevents the circulating pump from starting and stopping if the input signal fluctuates around the change point. At low PWM signal rates the speed of the circulating pump is high for safety reasons. In the event of cable breakage in a system with a gas boiler, the circulating pump will continue to run at maximum speed to transfer heat from the primary heat exchanger.



PWM input signal (%)	Pump status
0	Switch the pump to non-PWM mode (internal control)
$0 < \text{PWM} \leq 10$	Max speed: max
$10 < \text{PWM} \leq 84$	Adjustable speed: from max to mix
$84 < \text{PWM} \leq 91$	Min speed: min
$91 < \text{PWM} \leq 95$	Hysteresis area: on / off
$95 < \text{PWM} \leq 100$	Standby mode: off

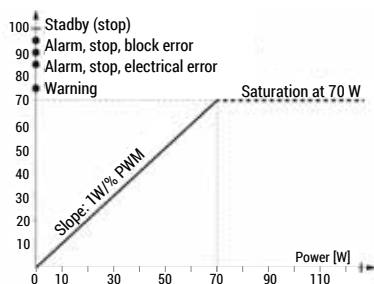
4.4.2 - PWM signal: technical data

Galvanic insulation in the pump	YES
PWM frequency input	100 - 4000Hz
High level inlet voltage U_{iH}	4.0-24V
Low level inlet voltage U_{iL}	<1V
High level inlet current I_H	≤ 10 mA
PWM inlet duty cycle	0-100%
Signal polarity	fixa
Cable signal length	<3m
Rise / fall time span	<T/1000



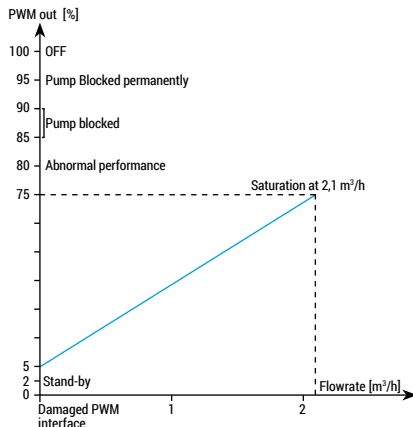
4.4.3 - PWM feedback signal energy consumption (art. P.121)

PWM outlet signal	Qualification time (QT)	Pump information	Disqualification time	Priority
DT(S)	Priority	Standby with PWM signal (STOP)	0	1
90	30	Alarm, stop, block error	12	2
85	0-30	Alarm, stop, electrical error	1-12	3
75	0	Warning	0	5
0-70		0-70W (slope 1W/%PWM)		6
Outlet frequency	75Hz $\pm$ 5%			



4.4.4 - PWM feedback signal flow rate (art. P.122)

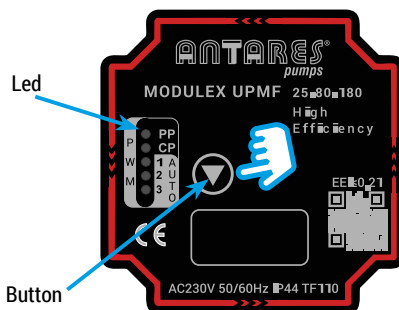
% PWM-out	STATUS
0	Damaged PWM interface
2	Stand-by
5-75	<i>The pump is operating and it shows info on flow rate and power supply (see chapter 4.3)</i>
80	<i>Abnormal performance (the pump works, but the performance is not optimal)</i>
85-90	<i>Abnormal functioning (the pump is temporarily blocked, but still on)</i>
95	The pump is permanently blocked due to a malfunction
100	The pump is off, or the PWM interface is damaged



4.5 - Additional functions

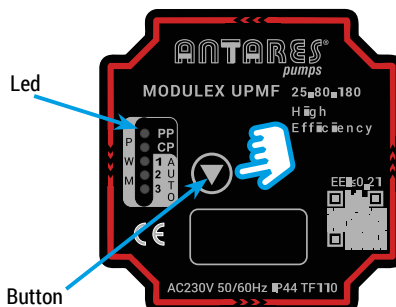
4.5.1 - Vent function

The vent function of the pump is activated by pressing the button until the first three LED lights light up and then releasing immediately. The pump will automatically vent.



4.5.2 - Manual release function after long periods of absence

The manual restart function of the pump is activated by pressing the button until all five LED lights light up and then releasing immediately. It is indicated, for example, after long periods of inactivity during the summer time.



5 - Troubleshooting

Symptom	Probable cause	What to do
The pump is not working	Loosen power supply cable connection	Make sure that the power supply cable is securely connected
	Blown fuse	Replace the fuse
	Damaged capacitor	Replace the capacitor
	The motor impeller can be wrapped with fibers or blocked by other components	Remove fibers and other alien bodies
Noise inside the system or in the body of the pump	Impurities inside the pump	Disassemble the pump and remove impurities
	The set flow rate is too high	Lower the speed
	Air or gas in the system or in the body of the pump	Discharge air/gas
The pump is working but does not generate pressure	Suction valve is closed	Open the valve
	Air or gas inside the piping or the pump	Open the valve to run the pump and loosen the fittings to discharge air and gas

Type of protection	Display	Type of protection	Display
Overcurrent		Overvoltage	
Lack of phase		Overheating	
Blocked rotor		Extreme overheating	
Undervoltage			

MOTOR HEAD MODULEX HYBRID

Smart frequency conversion circulating pump

WARRANTY CERTIFICATE

The product is guaranteed for a period of 48 months from the date of purchase. By guarantee we mean the repair or replacement of the circulator that shows functional faults excluding shipping costs which are charged to the Customer. The guarantee is valid only if this guarantee certificate, completed in all its parts by the Purchaser is stamped and accompanied by the purchase invoice.

The non-compliant product must be returned in its original package, complete of all accessories. The serial number on the product must not be in any way deleted or made illegible, thus the penalty of invalidating the guarantee.

The warranty does not apply in the event of damage caused by neglect, use or installation not compatible with the instructions provided, tampering, product or number changes on serial number, damage due to accidental causes or negligence of the Buyer.

The warranty does not apply in case of faults resulting from connections of the appliance at voltages other than those indicated or at sudden voltage changes in the network to which the appliance is connected, as well as in case of faults caused by infiltration liquids, fire, inductive/electrostatic discharges or discharges caused by lightning, overvoltage or other phenomena external to the appliance.

The warranty does not apply for installations on systems with an antifreeze glycol concentration higher than 50%.

Stamp of the installing company:



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