RUBINETTERIE INDUSTRIALI s.r.l.

EN	DATASHEET	rev. A
	ST00060	
P73.DN25	**22M.01**	**F09**
P73.DN32	**21M.01**	

HYDRAULIC SEPARATORS

Description

22M.01

P73.DN25

P73.DN32

F09

21M.01

Barberi hydraulic separators, also called decouplers, balancers or hydraulic compensators, are used to make two circuits hydraulically independent: for example, the heat generator circuit (primary circuit) and the distribution circuit to the users (secondary circuit). In this way, the pumps of the two circuits work optimally, avoiding mutual interference. These devices are equipped with connections for the installation of air vents, system drains and temperature probes. The separators are built with steel parts, welded and coated with a protective paint. The separators are supplied with a shell of insulating material, to limit heat loss and, depending on the model, with fixing brackets or floor support.

Range of products

Series 21M.01	Hydraulic separator with thermal insulation, DN 25, for horizontal and vertical installation. Complete with running nuts for the connection to the manifold.
Series 22M.01	Hydraulic separator with thermal insulation, DN 25, with inner mesh to help deaeration and dirt separation.
Series P73.DN25	Hydraulic separator with thermal insulation, DN 25, with wall mounting brackets.
Series P73.DN32	Hydraulic separator with thermal insulation, DN 32, with wall mounting brackets.
Series F09	Hydraulic separator with thermal insulation, DN 100 and DN 150 with telescopic floor support and inner mesh to help deaeration and dirt separation.

Features

Working temperature range:
- P73.DN25, P73.DN32: **-10–110 °C (no frost)**
- 21M.01, 22M.01: **0–110 °C (no frost)**
- F09: **0–110 °C (no frost)**

Maximum working pressure:
- P73.DN25, P73.DN32: **4 bar**
- 22M.01: **10 bar**
- 21M.01, F09: **6 bar**

Suitable fluids: **water for thermal systems, glycol solutions (max 30% for 21M.01 and 22M.01, max 50% for P73.DN25, P73.DN32 and F09)**

Connections: **female EN 10226-1/male ISO 228-1/flanged EN 1092 PN 16**

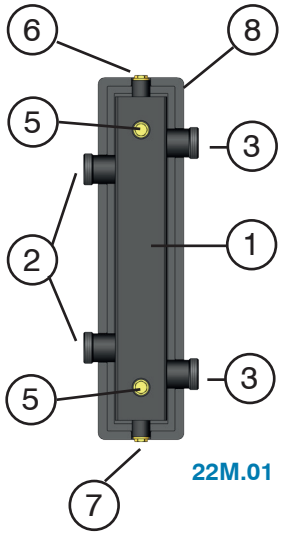
Connection centre distance:
- 21M.01: **125 mm**
- F09 (primary/secondary): **600/300 mm**

Materials

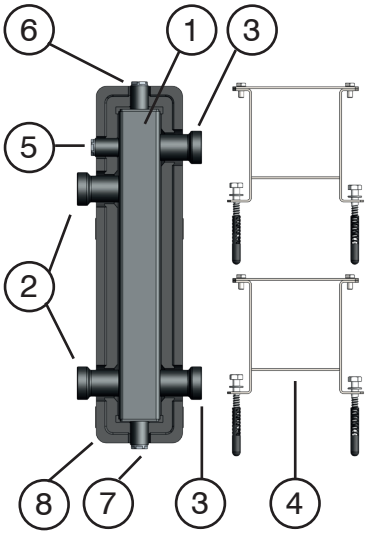
Body and fittings: **painted steel**
Plugs: **brass CW617N**
Gaskets: **EPDM, fiber**
Insulation (21M.01, 22M.01, P73.DN25, P73.DN32):
- Material: **PPE**
- Density: **38 kg/m³**
- Thickness: **37 mm**
- Thermal conductivity: **0,039 W/mK**

Insulation (F09):
- Material: **closed cell expanded PE-X**
- Thickness: **30 mm**
- Density: **30-80 kg/m³ (inner-outer)**
- Thermal conductivity (ISO 2581):
- **- 0,036-0,043 W/(m·K) (10 °C) (inner-outer)**
- **- 0,041-0,047 W/(m·K) (40 °C) (inner-outer)**
- Coefficient of resistance to water vapour diffusion (ISO 12572): **1300**

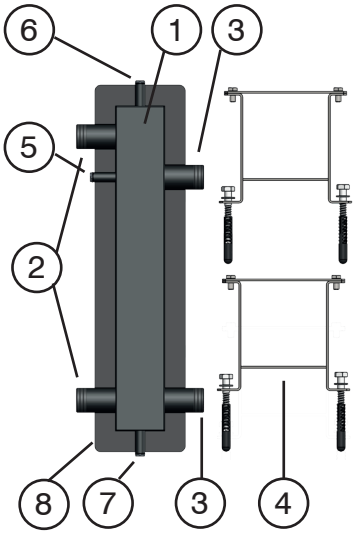
Components



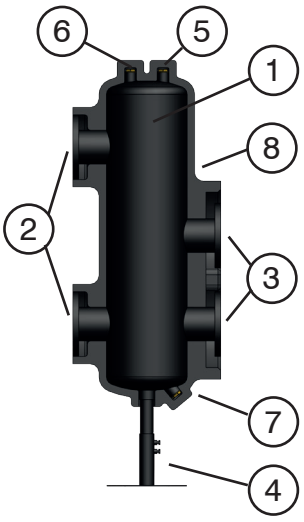
22M.01



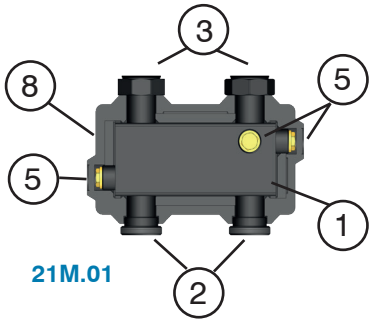
P73.DN25



P73.DN32



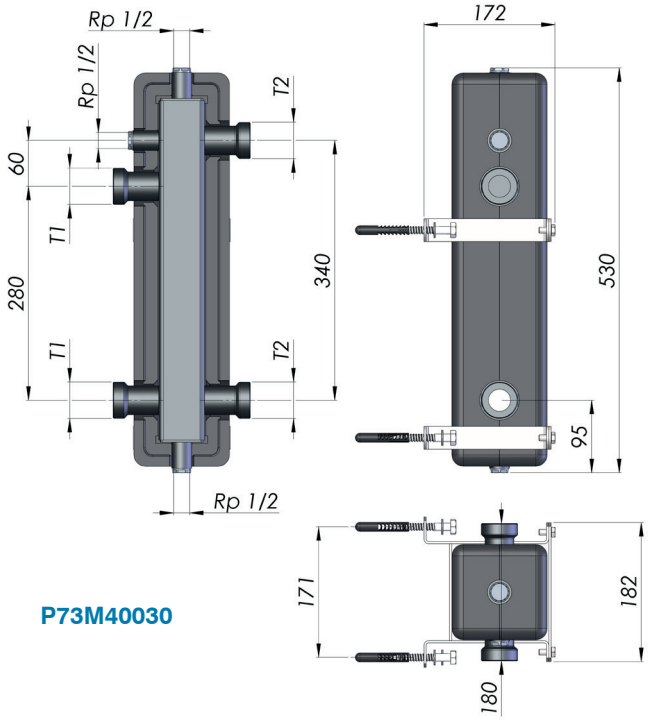
F09



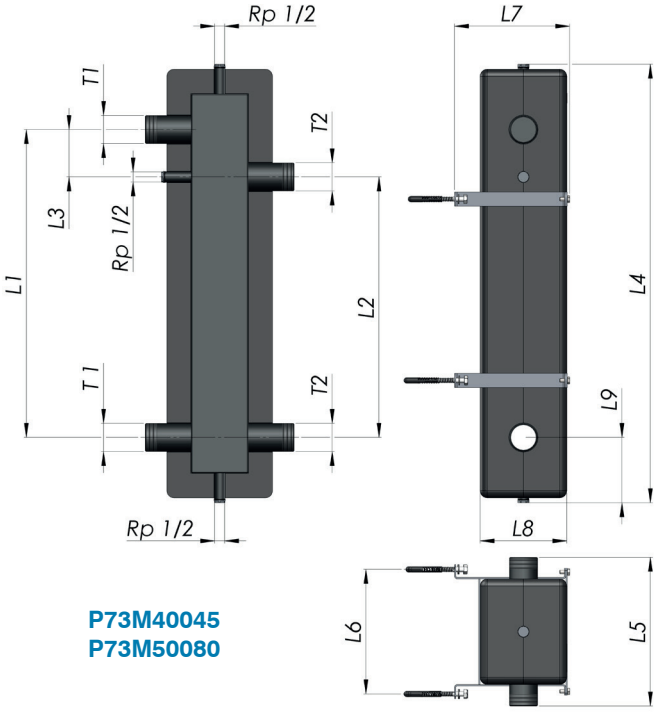
21M.01

21M.01, 22M.01, P73.DN25, P73.DN32, F09	
1	Separator body
2	Boiler side primary connections
3	Manifold side secondary connections
4	Brackets or telescopic floor support
5	Threaded connection (for example for pressure/temperature port)
6	Threaded connection (for example for air vent)
7	Threaded connection (for example for fill/drain cock)
8	Insulation

Dimensions



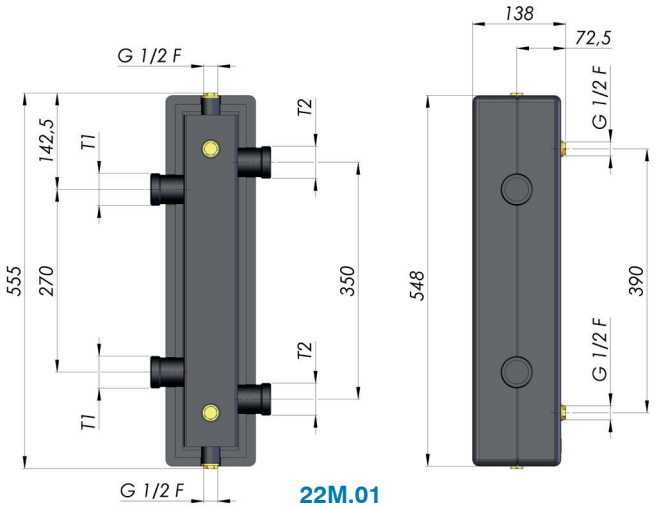
P73M40030



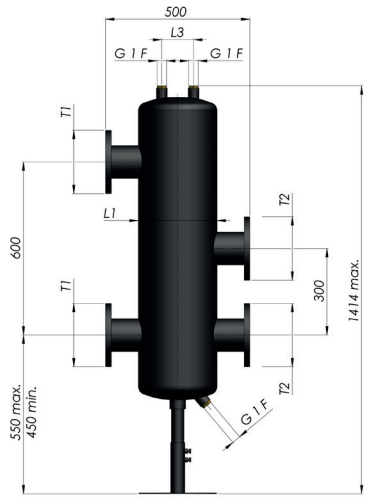
P73M40045
P73M50080

Series	Code	DN	Flow rate max [m³/h]	Power [kW] ΔT=10 K	Power [kW] ΔT=20 K	T1	T2	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	L6 [mm]	L7 [mm]	L8 [mm]	L9 [mm]	Volume [l]	Weight [kg]	N. P/B	N. P/C
P73.DN25	**P73** M40 030	25	3	35	70	G 1 1/2 M	G 1 1/2 M	-	-	-	-	-	-	-	-	-	1,6	5	-	1
	P73 M40 045	25	4,5	53	105	G 1 1/2 M	G 1 1/2 M	360	280	80	585	200	201	182	135	-	2,3	5,85	-	1
P73.DN32	**P73** M50 080	32	8	93	186	G 2 M	G 2 M	650	550	100	926	314	263	243	183	138	7,7	13,5	-	1

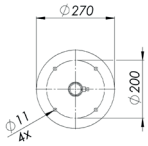
N. P/B: number of pieces in box - N. P/C: number of pieces in carton

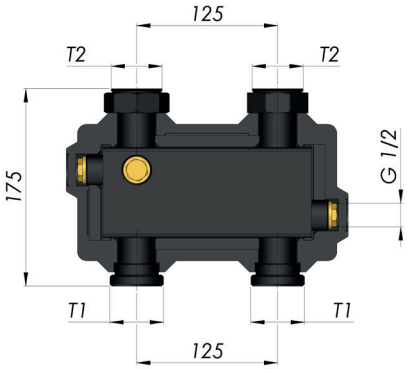


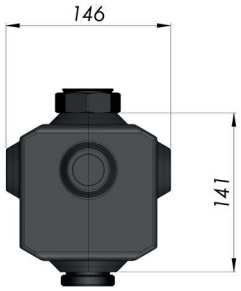
22M.01



F09







21M.01

Series	Code	DN	Flow rate max [m³/h]	Power [kW] ΔT=10 K	Power [kW] ΔT=20 K	T1	T2	Volume [l]	Weight [kg]	N. P/B	N. P/C
22M.01	**22M** 040 000 01	25	4	46,5	93	G 1 1/2 M	G 1 1/2 M	3	3,6	-	1
21M.01	**21M** 040 000 01	25	3	35	70	G 1 1/2 M	G 1 1/2 RN	1,1	2,5	-	1

N. P/B: number of pieces in box - N. P/C: number of pieces in carton

Series	Code	DN	Flow rate max [m³/h]	Power [kW] ΔT=10 K	Power [kW] ΔT=20 K	T1	T2	L1 [mm]	L2 [mm]	L3 [mm]	Volume [l]	Weight [kg]	N. P/B	N. P/C
F09	**F09** 100 000	100	33	384	768	DN 100 PN 16	DN 100 PN 16	275	275	110	60	59	-	1
	F09 150 000	150	74	861	1721	DN 150 PN 16	DN 150 PN 16	355	340	80	101	88	-	1

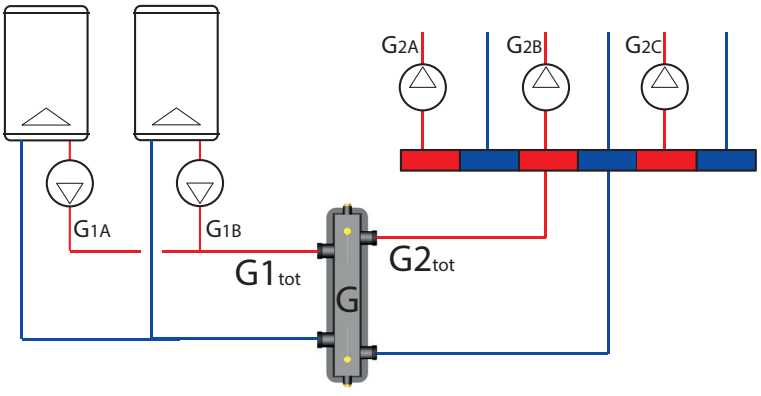
N. P/B: number of pieces in box - N. P/C: number of pieces in carton

Hydraulic characteristics and sizing

For the maximum recommended flow rates as indicated in the previous tables, the head losses of the hydraulic separators are negligible. In this way, the hydraulic separator can be considered as an area with almost zero head losses, thus making independent the two circuits connected to it. The pumps on the primary side do not interfere with those on the secondary side.

Sizing

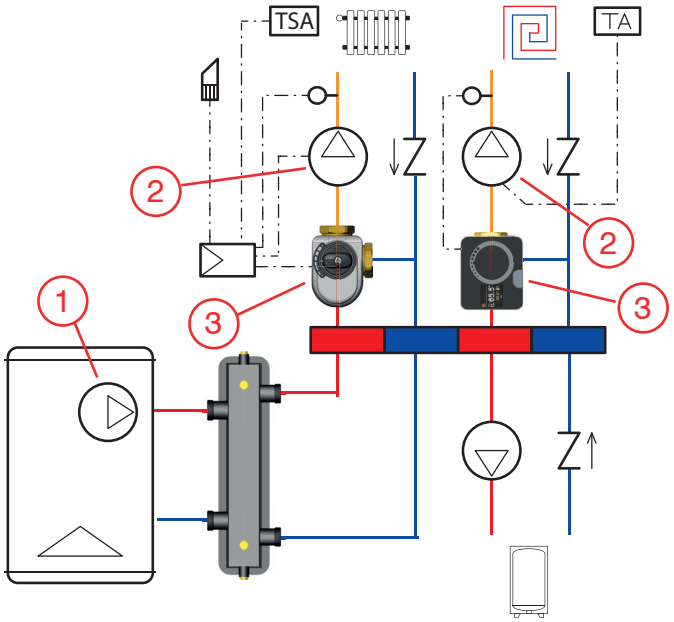
1) Calculate the total flow rate of the primary side ($G1_{tot}$) by summing the flow rates delivered by each single pump of the primary side:
$G1_{tot}=G_{1A}+G_{1B}+...$
2) Calculate the total flow rate of the secondary side ($G2_{tot}$) by summing the flow rates delivered by each single pump of the secondary side:
$G2_{tot}=G_{2A}+G_{2B}+G_{2C}+...$
3) Maximum system flow rate Gsys: it is equal to the higher between the two total flow rates just calculated
$Gsys=MAX\{G1_{tot}; G2_{tot}\}$
4) Select a hydraulic separator whose maximum flow rate G is equal or slightly higher than the maximum system flow rate Gsys:
$G \geq Gsys$



Working way

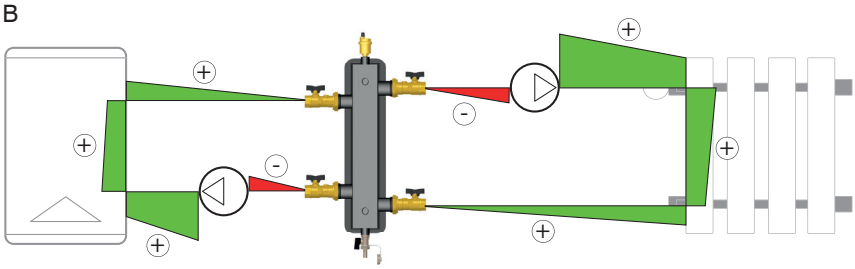
The hydraulic separator represents a disconnection between the pumps in the central heating (primary side) and those in the heating/cooling system (secondary side). It may be necessary in cases such as the following (fig. A):
- the pump in the central heating (1) is not able to directly supply the users, making it necessary to use additional pumps (2);
- in systems with thermal regulation via mixing valves (3), the pumps (2) at the service of (downstream of) the mixing valves would be in series with the pumps on the primary side (1), leading to sum the pump heads;
- in systems with thermal regulation via mixing valves (3), when the thermal comfort of the building is reached, the mixing valve partially or fully closes the hot water inlet from the generator (on going phase): the generator pump (1) could therefore get damaged when trying to supply flow rate towards the hot water inlet port of the mixing valve (3) which is (almost) completely closed.

A



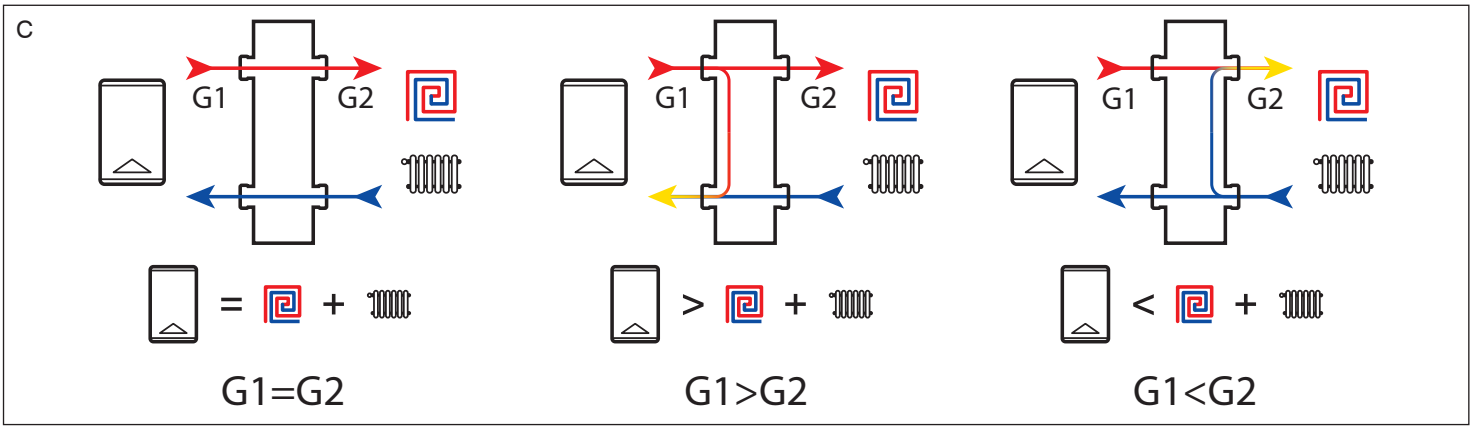
The hydraulic separator, consisting of a suitably sized storage, creates a “calm” zone in the circuit (very low transit speed of about 0,1-0,2 m/s) with almost zero head losses. This makes the primary side pumps independent from those of the secondary side, avoiding mutual interference (fig. B).
Two circuits are created: primary circuit from the generator to the separator chamber, secondary circuit from the separator chamber to the secondary systems, hydraulically independent.
The figure on the side shows the pressure trend in both the circuits. The pressure in the hydraulic separator will be equal to the hydrostatic pressure.

B



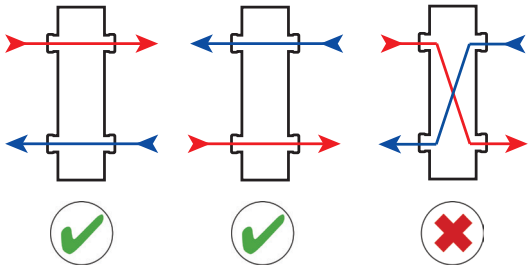
On the primary side one or more pumps can be present as well as on the secondary side one or more groups, with pump operating at different times (variable flow rate). Depending on the flow rate supplied by the primary pumps and the flow rate supplied by the pumps on the secondary side, there may be three operating phases (fig. C):
A) primary flow rate G1 = secondary flow rate G2: the flow rate passes through the separator and does not undergo temperature variations;
B) primary flow rate G1 > secondary flow rate G2: the excess primary flow rate recirculates in the separator chamber and returns to the generator. This results in an increase in the return temperature to the generator;
C) primary flow rate G1 < secondary flow rate G2: the missing flow rate for the secondary pumps is taken from the system return. This results in a lowering of the flow temperature to the secondary circuits.

C

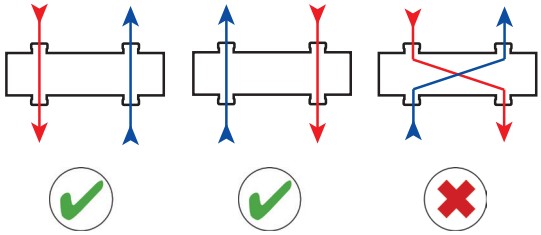


Advantages

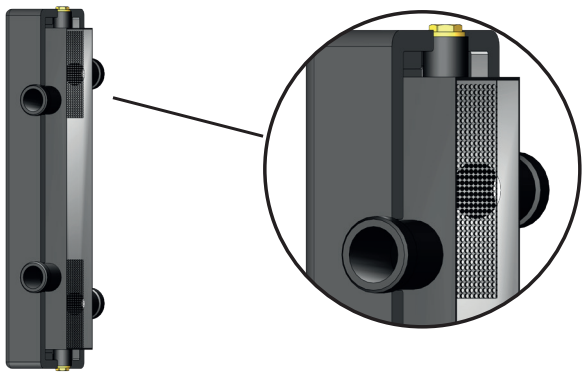
Alignment of flows and returns/Versatility of connections. Usually the upper connections are used for the boiler flow/flow to the secondary system and the lower connections for the return from the system/return to the boiler. However, it is possible to completely exchange the flows with the returns, avoiding however to cross the connections: only flows at the top and returns at the bottom or vice versa are allowed.



Horizontal installation. The P73.DN25, P73.DN32 and 22M.01 hydraulic separators can also be installed horizontally, respecting the rule of aligning the boiler flow with the system flow and, in the other connections, the two returns. The 21M.01 separator was specifically designed for horizontal installation but it can also be used vertically with the same rule.

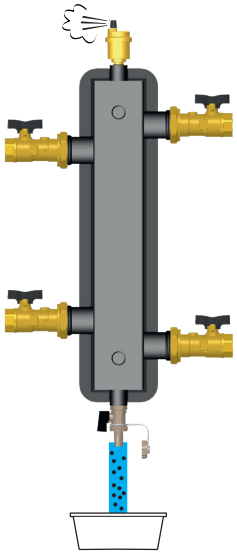


Special features of the 22M.01 and F09. These separators are equipped with a inner mesh which, by slowing down the flow, helps the separation of impurities towards the bottom and the aggregation of microbubbles, with consequent accumulation of air towards the top, from which it can be released with a specific air vent (optional). They are complete with test ports.

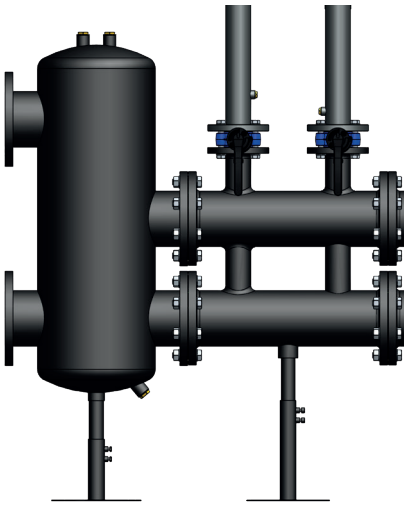


Special features of the 21M.01. It was designed to be immediately coupled to the DN 25 manifolds in horizontal position, thanks to the 125 mm centre distance of the connections and the running nuts on the secondary side. Complete with test ports.

Dirt separation and deaeration. Thanks to the body shape, hydraulic separators can represent also a collecting and discharge point for sludge in the lower side as well as an accumulation point for air microbubbles, that can be released by adding an optional air vent on the top.

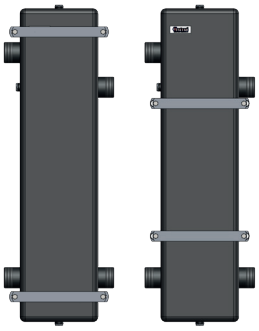


Special features of the F09. It was designed to be immediately coupled to the DN 100 and DN 150 manifolds. Equipped with PE-X insulation for heating and air-conditioning systems, G 1 F connections for optional devices such as air vent and fill/drain cock.

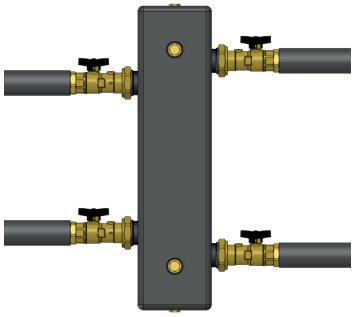


Installation

In P73.DN25 and P73.DN32 separators, collar brackets can be placed in the middle of the connections or at the end.

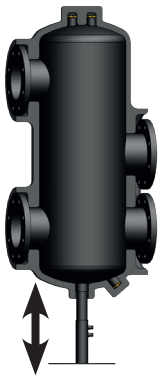


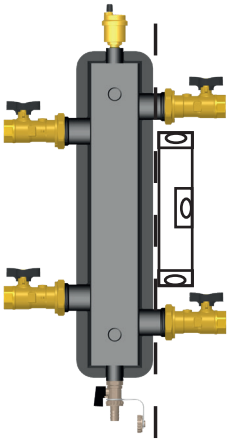
The 22M.01 separator does not include any brackets; it is installed by connecting it to the pipes that support its weight.



The vertical hydraulic separators 22M.01, P73.DN25 and P73.DN32 can also be installed horizontally. In this case it is no longer possible to apply the air vent at the end.

Flanged hydraulic separators are usually installed vertically, placing them on the ground using the telescopic support.



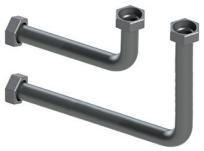


It is recommended to take care about the vertical installation in order to facilitate the correct functioning of the air vent with floating device (optional).

The installation procedure is described in the instructions.

Accessories

20M.01



Pipe connection kit between hydraulic separator 22M04000001 and manifolds P72 and V34

Max working temperature: ***90 °C***
Max working pressure: ***10 bar***

Code	Size	m³/h	
20M 040 000 01	G 1 1/2 RN - G 1 1/2 RN	3	1

Y47L

Automatic air vent.

Max working temperature: ***95 °C***
Max working pressure: ***10 bar***

Code	Size		
Y47 010 000 L	G 3/8 M	10	100
Y47 015 000 L	G 1/2 M	10	100
Y47 020 000 L	G 3/4 M	10	100
Y47 025 000 L	G 1 M	10	100

P82

Drain ball cock - with hose connection and plug

Max working temperature: ***95 °C***
Max working pressure: ***16 bar***

Code	Size		
P82 015 N00	G 1/2 M - G 3/4 M	10	40

39D

Ball shut-off valve with pump connection - male connection

Max working temperature: ***95 °C***
Max working pressure: ***10 bar***

Code	Size	Knob colour		
39D 020 000 R	G 1 1/2 RN - G 1 1/2 M	black	-	25

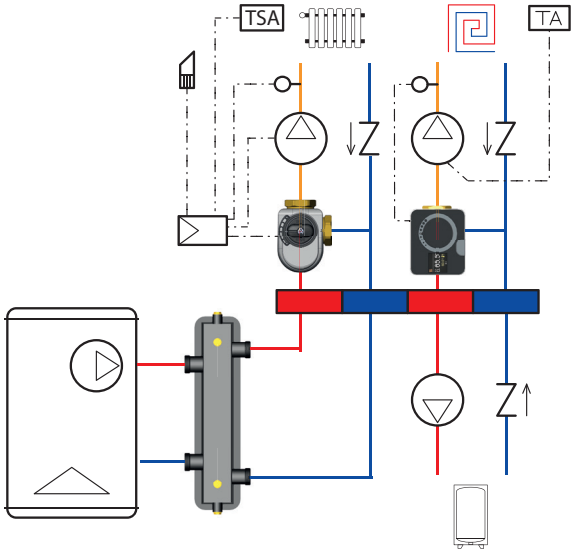
50D.M50

Ball shut-off valve with pump connection with possibility of temperature gauge integration - male connection

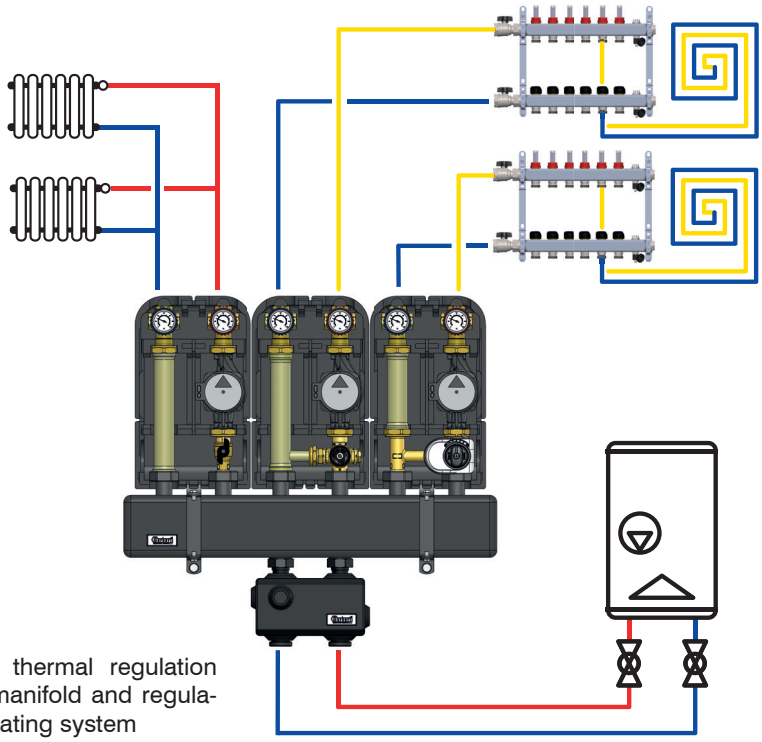
Max working temperature: ***95 °C***
Max working pressure: ***10 bar***

Code	Size	Knob colour		
50D M50 000 R	G 2 RN - G 2 M	red	-	25

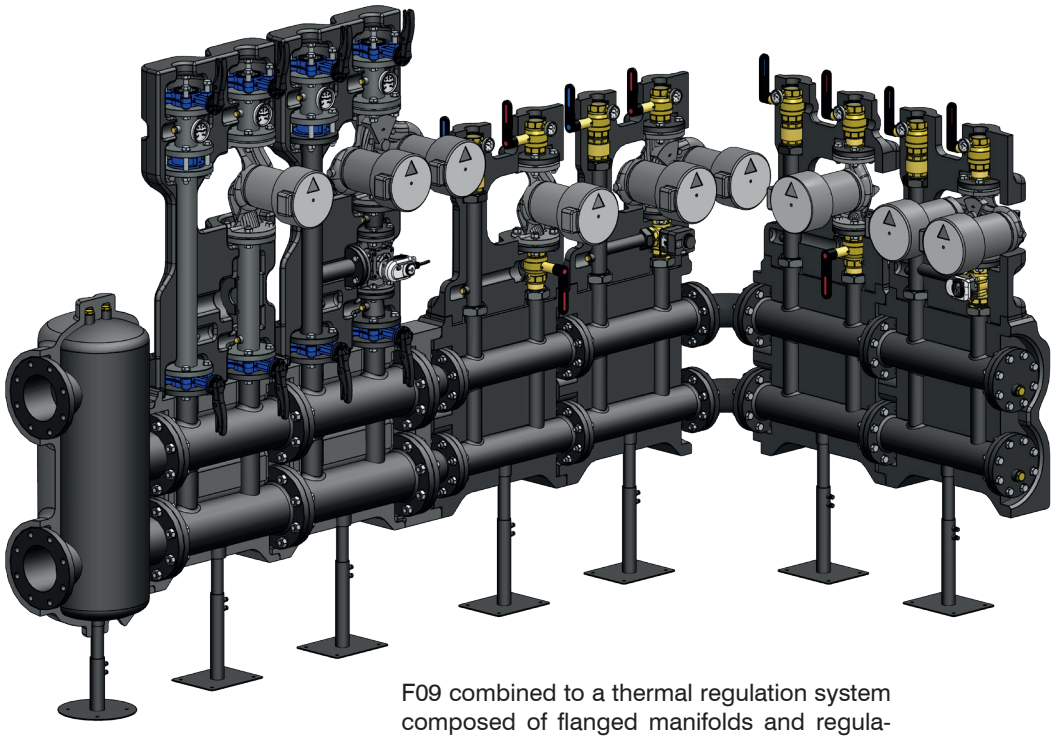
System diagrams



22M.01 combined to a thermal regulation system composed of single parts (manifold, mixing valves, actuators etc)



21M.01 combined to a thermal regulation system composed of a manifold and regulating groups for central heating system



F09 combined to a thermal regulation system composed of flanged manifolds and regulating groups

Specifications

Series 21M.01
Hydraulic separator with thermal insulation, DN 25, for horizontal and vertical installation. Complete with running nuts for the connection to the manifold. Painted steel body. Primary connections G 1 1/2 M, secondary connections G 1 1/2 RN with running nuts, test ports G 1/2 F. Connection centre distance 125 mm. Suitable fluids water for thermal systems, glycol solutions (max 30%). Working temperature range 0–110 °C. Maximum working pressure 6 bar. EPP insulation.

Series 22M.01
Hydraulic separator with thermal insulation, DN 25, with inner mesh to help deaeration and dirt separation. Painted steel body. Connections G 1 1/2 M, test and accessory ports G 1/2 F. Suitable fluids water for thermal systems, glycol solutions (max 30%). Working temperature range 0–110 °C. Maximum working pressure 10 bar. EPP insulation.

Series P73.DN25
Hydraulic separator with thermal insulation, DN 25, with wall mounting brackets. Painted steel body. Connections G 1 1/2 M, test and accessory ports Rp 1/2. Suitable fluids water for thermal systems, glycol solutions (max 50%). Working temperature range -10–110 °C. Maximum working pressure 4 bar. EPP insulation.

Series P73.DN32
Hydraulic separator with thermal insulation, DN 32, with wall mounting brackets. Painted steel body. Connections G 2 M, test and accessory ports Rp 1/2. Suitable fluids water for thermal systems, glycol solutions (max 50%). Working temperature range -10–110 °C. Maximum working pressure 4 bar. EPP insulation.

Series F09
Flanged hydraulic separator with thermal insulation, telescopic floor support, inner mesh to help deaeration and dirt separation, for heating and air-conditioning systems. Painted steel body. Flanged connections DN 100 PN 16 (and DN 150 PN 16), test ports G 1 F. Primary/secondary connection centre distance 600/300 mm. Suitable fluids water for thermal systems, glycol solutions (max 50%). Working temperature range 0–110 °C. Maximum working pressure 6 bar. Insulation in closed cell expanded PE-X.