

Water separators MS-LWS, MS series

FESTO



Key features

Service unit components of the MS series

Solutions for every application

With its large product range, highly effective components and a wide choice of functions, the MS series from Festo offers a complete concept for compressed air preparation. It is suitable for simple standard applications as well as for application-specific solutions with very high-quality requirements.

Available as individual components, pre-assembled combinations ex-stock, application-specific combinations or complete ready-to-install solutions. The five sizes in the MS series achieve maximum flow rates with low space requirements.

Freely combinable functional modules

Pressure regulators, on/off and soft-start valves with safety function, filters, pressure and flow sensors, dryers, sensors and lubricators can be assembled into a suitable solution for every task. Thanks to the modular structure the components can be combined as required. The simple connection system saves time because

there is no need to disassemble the entire combination when replacing individual modules. Many of the components are also UL and ATEX certified.

CAD models and configurator

Engineering tools

Convenient tools for planning and selecting application-specific individual components and combinations. The product configurator can be used to configure customised solutions quickly and to transfer the order data without any hassle.

Selection tool for choosing the right service unit combination without oversizing, and with the right air purity class:

→ www.festo.com/engineering/service-unit

Air quality
This program supports configuring an appropriate service unit. Please insert the required air cleanliness either by your application or an ISO-code or by direct selection of air filters.

Selection criteria: Application
Filter combination is proposed based upon your selected application

- standard pneumatics operation of valves and cylinders, e.g. in automotive industry, secondary packaging
- mining and building industry applications without special air cleanliness requirements
- application of pressure operated tools and machines pneumatic hammer, air engine, positioning with proportional valve
- electronic, flatpanel and solar industry, textile and paper production application with residual oil content <math>< 0.5 \text{ mg/m}^3</math>
- painting, powder coating, air bearing application with residual oil content <math>< 0.01 \text{ mg/m}^3</math>
- food and beverage industry, optics application with residual oil content <math>< 0.005 \text{ mg/m}^3</math> reduction of oil vapours and aromas

Selection criteria: ISO-class
Filter combination is proposed based upon the air cleanliness class according to ISO 8573-1:2010

particle : 4 * : oil

Direct filter selection
Independent selection of filter combination

- 40 µm Filter
- 5 µm Filter
- 1 µm Fine Filter
- 0.01 µm Micro Filter *
- Active Carbon Filter

ISO

* Downstream from the compressor the water content is assumed to be ISO class 4, better classes can be achieved by applying an absorption dryer PDAD or a membrane dryer LDM1

* To enhance the filter lifetime and in consequence the maintenance interval arrange a 1 µm Fine Filter in front of the 0.01 µm Micro Filter as a preliminary filter.

Integrated sensors

Pressure and flow sensors

Safety functions

Soft-start/quick exhaust valves
MS6-SV/MS9-SV

Saving energy

Service unit combinations MSE6

Intelligent mix of sizes



- Maximum machine availability thanks to controlled processes
- Reliable compressed air preparation and system supply
- Integrated or stand-alone
- Easy to connect with M8/M12 plug



- Fast and reliable exhausting of systems up to Performance Level e, certified to EN ISO 13849-1
- Integrated soft-start function



- Fully automatic monitoring and regulation of compressed air supply
- Compressed air is automatically shut off in stand-by mode
- Detection and notification of leakages
- Condition monitoring of relevant process data



- Optimum flow rate with a size that is up to 18% smaller
- Excellent energy efficiency
- Cost-optimised combinations – save up to 30%!

Size differences

Size	MS2	MS4	MS6	MS9	MS12
Grid dimension [mm]	25	40	62	90	124
Connection sizes	M5, QS-6	G1/8, G1/4, G3/8	G1/4, G3/8, G1/2, G3/4	G1/2, G3/4, G1, G1 1/4, G1 1/2	G1, G1 1/4, G1 1/2, G2
Standard nominal flow rate q_{N1} [l/min]	350	1800	6500	20000	22000

1) Using pressure regulator MS-LR as an example

Key features

Note

Information

The next few pages provide a brief overview of the product range for the components of the MS series service units.

You can find detailed information and all the technical data in the documentation for the relevant service unit component.

Accessories such as connecting plates or mounting brackets can be ordered either via the configurator or separately.

Designing a service unit combination

The order of the individual components within a service unit combination is relevant for safety and functionality. The service unit components cannot be combined in any order in the flow direction. They are subject to restrictions and rules.

The configurator for the service unit combination MSB is a reliable and convenient way of combining the individual service unit components and ensures compliance with the applicable rules. As a result, you get a fully assembled unit, including UL or ATEX certification, if necessary. When combining a unit from individually configured and ordered service unit components, the points on the right must be adhered to under all circumstances.

- Regulators MS-LFR/LR/LRP are only permissible in the flow direction with the same or decreasing pressure regulation range
- Filters MS-LFR/LF/LFM/LFX are only permissible in the flow direction with an increasing grade of filtration
- Lubricators MS-LOE are not permitted in the flow direction upstream of a filter MS-LFR/LFM/LF/LFX, water separator MS-LWS or membrane air dryer MS-LDM1
- A micro filter MS-LFM must be installed in the flow direction upstream of an activated carbon filter MS-LFX or membrane air dryer MS-LDM1
- A flow sensor SFAM cannot be installed directly downstream of a regulator MS-LFR/LR; a branching module MS-FRM must be positioned between them
- A soft-start/quick exhaust valve MS-SV must be the last service unit component in the flow direction

Product range for service unit components MS series

Type	Description	Size	Pneumatic connection					Connecting plate with thread	
			Push-in connector	Female thread			G	NPT	
			M	G	NPT	G	NPT		
Combinations									
Service unit combinations MSB-FRC							Datasheets → Internet: msb		
	Combinations of filter regulator and lubricator	4	–	–	1/8, 1/4	–	–	–	
		6	–	–	1/4, 3/8, 1/2	–	–	–	
Service unit combinations MSB									
							Datasheets → Internet: msb		
	7 combinations, predefined	4	–	–	1/4	–	–	–	
		6	–	–	1/2	–	–	–	
	Freely configurable combinations	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8	
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4	
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2	
Service unit combinations MSE6									
							Datasheets → Internet: mse6		
	Combinations with fieldbus connection for measuring pressure, flow rate and consumption	6	–	–	–	–	1/2	–	

Key features

Product range for service unit components MS series								
Type	Description	Size	Pneumatic connection				Connecting plate with thread	
			Push-in connector	Female thread				
			M	G	NPT	G	NPT	
Individual devices								
Filter regulators MS-LFR			Datasheets → Internet: ms2-lfr; ms4-lfr; ms6-lfr; ms9-lfr; ms12-lfr					
	Filter and pressure regulator in a single device, grade of filtration 5 or 40 µm	2	QS-6	M5	–	–	–	–
		4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
Filter regulators MS-LFR-B			Datasheets → Internet: ms4-lfr-b; ms6-lfr-b					
	Filter and pressure regulator in a single device in polymer housing, grade of filtration 5 or 40 µm	4	–	–	1/4	–	–	–
		6	–	–	1/2	–	–	–
Filters MS-LF			Datasheets → Internet: ms4-lf; ms6-lf; ms9-lf; ms12-lf					
	Grade of filtration 5 or 40 µm	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
Fine and micro filters MS-LFM			Datasheets → Internet: ms4-lfm; ms6-lfm; ms9-lfm; ms12-lfm					
	Grade of filtration 0.01 or 1 µm	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
Activated carbon filters MS-LFX			Datasheets → Internet: ms4-lfx; ms6-lfx; ms9-lfx; ms12-lfx					
	For removing liquid and gaseous oil particles	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
Water separator MS-LWS			Datasheets → Internet: ms6-lws; ms9-lws; ms12-lws					
	Removes condensate from compressed air, maintenance-free	6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–

Key features

Product range for service unit components MS series								
Type	Description	Size	Pneumatic connection				Connecting plate with thread	
			Push-in connector	Female thread				
			M	G	NPT	G	NPT	
Individual devices								
Pressure regulators MS-LR			Datasheets → Internet: ms2-lr; ms4-lr; ms6-lr; ms9-lr; ms12-lr					
	For setting the required operating pressure, 4 pressure regulation ranges	2	QS-6	M5	–	–	–	–
		4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
Pressure regulators MS-LR-B			Datasheets → Internet: ms4-lr-b; ms6-lr-b					
	For setting the required operating pressure, in polymer housing	4	–	–	1/4	–	–	–
		6	–	–	1/2	–	–	–
Pressure regulators MS-LRB			Datasheets → Internet: ms4-lrb; ms6-lrb					
	For configuring a regulator manifold with independent pressure regulation ranges. Pressure output is at the front or rear.	4	–	–	1/4	–	1/8, 1/4, 3/8	–
		6	–	–	1/2	–	1/4, 3/8, 1/2, 3/4	–
Precision pressure regulators MS-LRP			Datasheets → Internet: ms6-lrp					
	For precisely setting the required operating pressure, 4 pressure regulation ranges, pressure hysteresis 0.02 bar	6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
Precision pressure regulators MS-LRPB			Datasheets → Internet: ms6-lrpb					
	For configuring a regulator manifold with independent pressure regulation ranges. Pressure output is at the front or rear.	6	–	–	1/2	–	1/4, 3/8, 1/2, 3/4	–
Lubricators MS-LOE			Datasheets → Internet: ms4-loe; ms6-loe; ms9-loe; ms12-loe					
	Add a precisely dosed amount of oil to the compressed air. The amount of oil mist is proportional to the compressed air flow rate.	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–

Key features

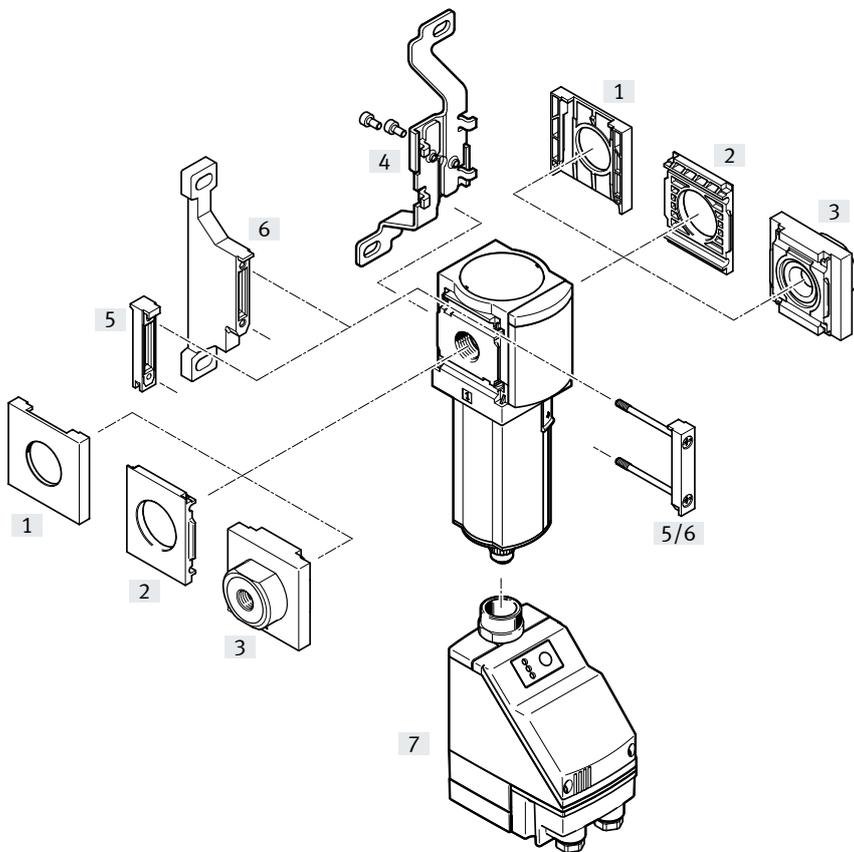
Product range for service unit components MS series								
Type	Description	Size	Pneumatic connection				Connecting plate with thread	
			Push-in connector	Female thread				
			M	G	NPT	G	NPT	
Individual devices								
On/off valves MS-EM Datasheets → Internet: ms4-em; ms6-em; ms9-em; ms12-em								
	Manually actuated on/off valve for pressurising and exhausting pneumatic systems.	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
On/off valves MS-EE Datasheets → Internet: ms4-ee; ms6-ee; ms9-ee; ms12-ee								
	Electrically actuated on/off valve for pressurising and exhausting pneumatic systems.	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
On/off valves MS-EE-B Datasheets → Internet: ms4-ee-b; ms6-ee-b								
	Electrically actuated on/off valve in polymer housing for pressurising and exhausting pneumatic systems.	4	–	–	1/4	–	–	–
		6	–	–	1/2	–	–	–
Soft-start valves MS-DL Datasheets → Internet: ms4-dl; ms6-dl; ms12-dl								
	Pneumatically actuated soft-start valve for slowly pressurising pneumatic systems.	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
Soft-start valves MS-DE Datasheets → Internet: ms4-de; ms6-de; ms12-de								
	Electrically actuated soft-start valve for slowly pressurising pneumatic systems.	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
On/off valves MS-EDE-B Datasheets → Internet: ms4-ed-e-b; ms6-ed-e-b								
	Electrically actuated soft-start valve in polymer housing for slowly pressurising and exhausting pneumatic systems.	4	–	–	1/4	–	–	–
		6	–	–	1/2	–	–	–
Soft-start/quick exhaust valves MS-SV Datasheets → Internet: ms6-sv; ms9-sv								
	For building up pressure gradually and reducing pressure quickly and safely in pneumatic piping systems. Up to category 1, PL c.	6	–	–	1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
	Up to category 3, PL d. Up to category 4, PL e in the case of optional extension.	6	–	–	1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
	Up to category 4, PL e.	6	–	–	1/2	–	1/4, 3/8, 1/2, 3/4	–

Key features

Product range for service unit components MS series								
Type	Description	Size	Pneumatic connection				Connecting plate with thread	
			Push-in connector	Female thread				
			M	G	NPT	G	NPT	
Individual devices								
Membrane air dryer MS-LDM1						Datasheets → Internet: ms4-ldm; ms6-ldm		
	Wear-free membrane dryer with internal air consumption	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
Branching modules MS-FRM								
						Datasheets → Internet: ms4-frm; ms6-frm; ms9-frm; ms12-frm		
	Compressed air distributors with 4 connections	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	–
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	–
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
Distributor blocks MS-FRM-FRZ								
						Datasheets → Internet: ms4-frm-frz; ms6-frm-frz		
	Compressed air distributors with 4 connections and half the grid width	4	–	–	–	–	–	–
		6	–	–	–	–	–	–
Flow sensors SFAM								
						Datasheets → Internet: sfam		
	For absolute flow rate information and cumulative air consumption measurement	6	–	–	–	–	1/2	1/2
		9	–	–	–	–	1, 1 1/2	1, 1 1/2

Peripherals overview

Water separator MS6-LWS



Note

Additional accessories:

- Module connectors for combination with size MS4/MS6 or size MS9
→ Internet: amv, rmv, armv
- Adapters for mounting on profiles → Internet: ipm-80, ipm-40-80, ipm-80-80

Mounting attachments and accessories

		Individual device		Combination		→ Page/ Internet
		Without connecting plate	With connecting plate	Without connecting plate	With connecting plate	
[1]	Cover cap MS6-END	■	–	■	–	ms6-end
[2]	Mounting plate MS6-AEND	■ ¹⁾	–	■ ¹⁾	–	ms6-aend
[3]	Connecting plate SET MS6-AG...	–	■ ¹⁾	–	■ ¹⁾	ms6-ag
	Connecting plate SET MS6-AQ...	–	■ ¹⁾	–	■ ¹⁾	ms6-aq
[4]	Mounting bracket MS6-WB	■	■	–	–	ms6-wb
[5]	Module connector MS6-MV	–	■	■	■	ms6-mv
[6]	Mounting bracket MS6-WP	■	■	■	■	ms6-wp
	Mounting bracket (not shown) MS6-WPB/WPE/WPM	■	■	■	■	ms6-wp
[7]	Fully automatic, electrically actuated condensate drain E2/E3/E4	■	■	■	■	14

1) Module connector MS6-MV [5] or mounting bracket MS6-WP/WPB/WPE/WPM [6] is required for mounting.

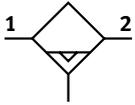
Type codes

001	Series	
MS	MS series	
002	Size	
6	Grid dimension 62 mm	
003	Thread type	
	G thread	
004	Function	
LWS	Water separator	
005	Pneumatic connection	
1/4	Female thread G1/4	
3/8	Female thread G3/8	
1/2	Female thread G1/2	
AGB	Sub-base G1/4	
AGC	Sub-base G3/8	
AGD	Sub-base G1/2	
AGE	Sub-base G3/4	
AGF	Sub-base G1	
006	Bowl type	
U	Aluminium	

007	Condensate drain	
E2	External fully automatic condensate drain, electric, 110 V AC, connection terminals	
E3	External fully automatic condensate drain, electric, 230 V AC, connection terminals	
E4	External fully automatic condensate drain, electric, 24 V DC, connection terminals	
V	Fully automatic, normally open	
VC	Fully automatic, normally closed	
008	Type of mounting	
	Without mounting bracket	
WP	Mounting bracket basic design	
WPM	Mounting bracket for hooking in service unit components	
WB	Mounting centrally at rear (wall mounting top and bottom), connecting plates not required	
009	EU certification	
	None	
EX4	II 2GD	
010	UL certification	
	None	
UL1	cULus ordinary location for Canada and USA	
011	Flow direction	
	Flow direction from left to right	
Z	Flow direction from right to left	

Datasheet

Fully automatic condensate drain



-  Flow rate
2400 ... 3800 l/min
-  Temperature range
+1 ... +60 °C
-  Operating pressure
0.8 ... 16 bar
-  www.festo.com



The maintenance-free water separator removes condensate from the compressed air.

- Constantly high condensate separation (99%) up to the maximum flow rate
- Metal bowl
- Available with fully automatic or fully automatic, electrically actuated condensate drain
- Optional device variant EX4 for use in potentially explosive areas in zones 1, 2, 21 and 22

General technical data

Pneumatic connection 1, 2	
Female thread	G1/4, G3/8 or G1/2
Connecting plate [AG...]	G1/4, G3/8, G1/2, G3/4 or G1
Connecting plate [AQ...]	NPT1/4, NPT3/8, NPT1/2 or NPT3/4
Design	Centrifugal separator
Type of mounting	With accessories In-line installation
Mounting position	Vertical ±5°
Air purity class at the output	Compressed air to ISO 8573-1:2010 [7:7:4] (with variant E2, E3 or E4: [-:7:4])
Bowl guard	Integrated as metal bowl
Condensate drain	Fully automatic Fully automatic, electrically actuated
Degree of condensate separation [%]	99
Max. condensate volume [ml]	38

† Note: This product conforms to ISO 1179-1 and ISO 228-1.

Standard nominal flow rate qnN¹⁾

Pneumatic connection	G1/4, NPT1/4	G3/8, NPT3/8	G1/2, NPT1/2
qnN [l/min]	2400	3500	3800

1) Measured at p₁ = 6 bar and Δp = 1 bar

Datasheet

Operating and environmental conditions		
Condensate drain	Fully automatic V	Fully automatic, electrically actuated E2/E3/E4
Operating pressure [bar]	2 ... 12 (2 ... 10) ¹⁾	0.8 ... 16 (0.8 ... 10) ¹⁾
Operating medium	Compressed air to ISO 8573-1:2010 [7:--:-]	Compressed air to ISO 8573-1:2010 [--:-:-]
	Inert gases	
Ambient temperature [°C]	+5 ... +60	+1 ... +60
Temperature of medium [°C]	+5 ... +60	+1 ... +60
Storage temperature [°C]	-10 ... +60	+1 ... +60
Corrosion resistance class CRC ²⁾	2 - Moderate corrosion stress	
Food safe ³⁾	See supplementary material information	-
UL certification ³⁾	c UL us - Recognized (OL)	

1) Value in brackets applies to MS6-LWS with UL certification.

2) More information: www.festo.com/x/topic/crc

3) More information: www.festo.com/catalogue/ms-lws → Support/Downloads.

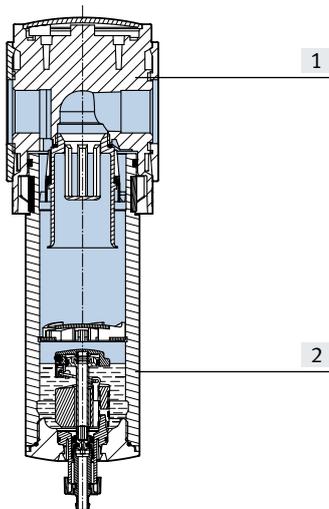
ATEX	
EU certification	[EX4]
ATEX category for gas	II 2G
Type of ignition protection for gas	Ex h IIC T6 Gb X
ATEX category for dust	II 2D
Type of ignition protection for dust	Ex h IIIC T60°C Db X
Explosion-proof ambient temperature	+5°C ≤ Ta ≤ +60°C
Explosion protection certification outside the EU	EPL Db (GB)
	EPL Gb (GB)
CE marking (see declaration of conformity) ¹⁾	To EU Explosion Protection Directive (ATEX)
UKCA marking (see declaration of conformity) ¹⁾	To UK explosion regulations

1) More information: www.festo.com/catalogue/ms-lws → Support/Downloads.

Weight [g]	
Water separator	820
Water separator with fully automatic, electrically actuated condensate drain E2/E3/E4	1800

Materials

Sectional view



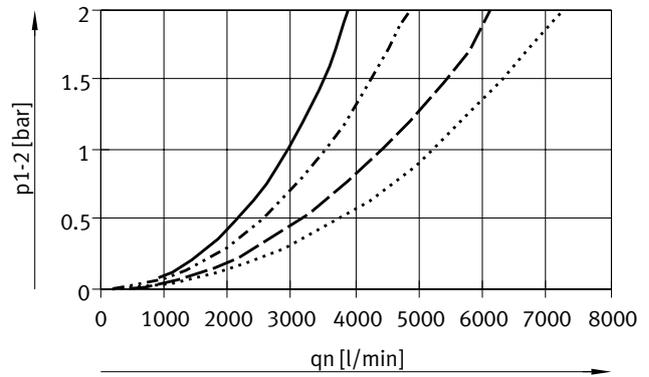
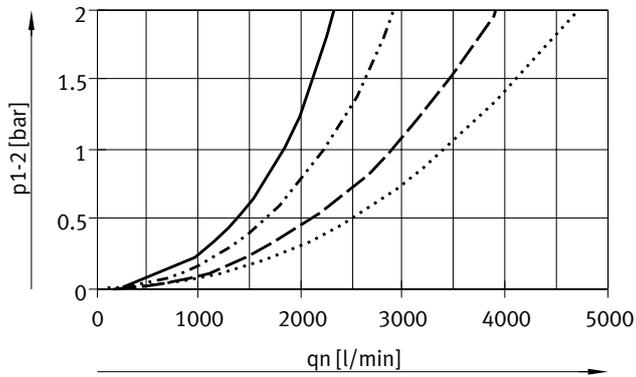
Water separator		
[1]	Housing	Die-cast aluminium
[2]	Bowl	Wrought aluminium alloy
	Inspection window	PA
-	Seals	NBR
Note on materials		RoHS-compliant
LABS (PWIS) conformity		VDMA24364-B1/B2-L

Datasheet

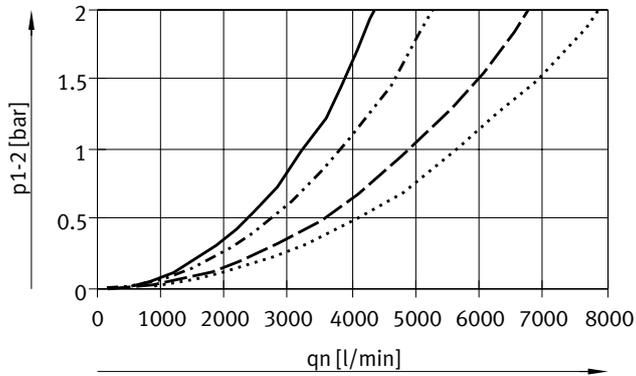
Standard flow rate q_n as a function of differential pressure p_{1-2}

Pneumatic connection G1/4, NPT1/4

Pneumatic connection G3/8, NPT3/8



Pneumatic connection G1/2, NPT1/2



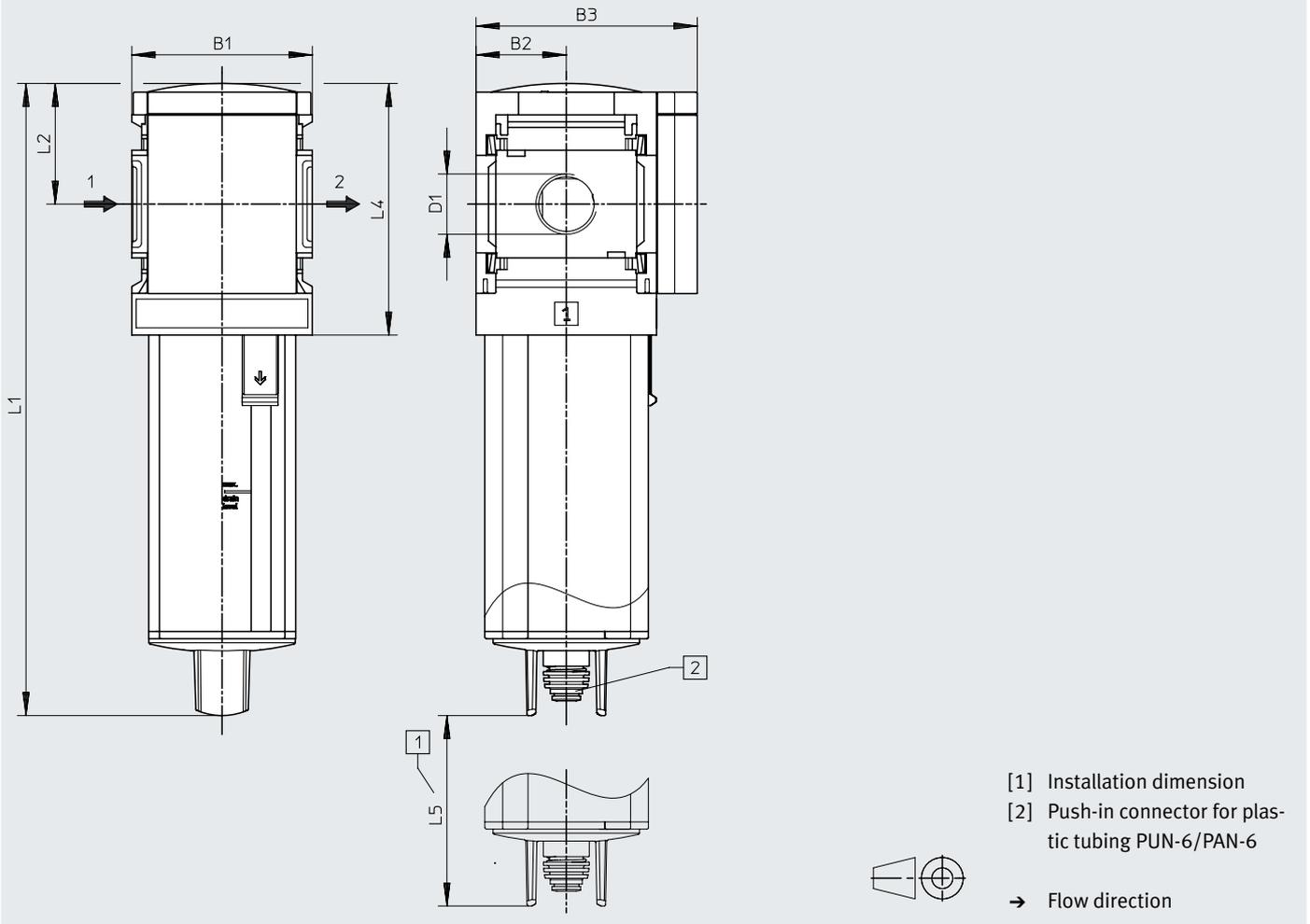
- 4 bar
- · - · 6 bar
- - - 10 bar
- · · · · 14 bar

Datasheet

Dimensions – Basic version

Download CAD data → www.festo.com

[V] Fully automatic condensate drain



Type	B1	B2	B3	D1	L1	L2	L4	L5
MS6-LWS-1/4-...-V	62	31	76	G1/4	220	42	88	50
MS6-LWS-3/8-...-V				G3/8				
MS6-LWS-1/2-...-V				G1/2				

Note: This product conforms to ISO 1179-1 and ISO 228-1.

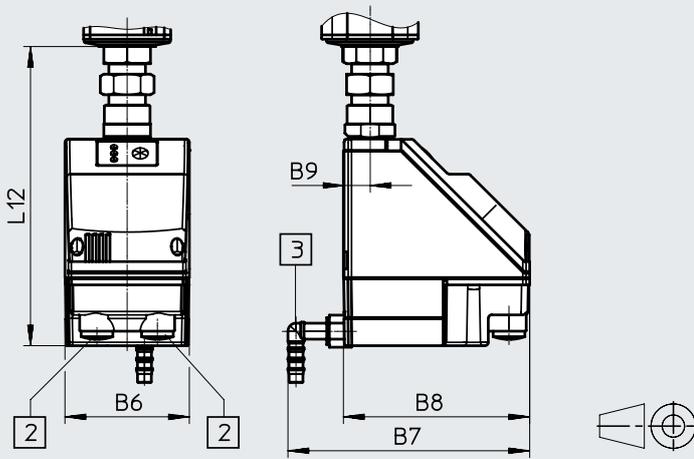
Datasheet

Dimensions – Condensate drain

Download CAD data → www.festo.com

[E2]/[E3]/[E4] Fully automatic, electrically actuated

Datasheets → Internet: pwea



Condensate drain PWEA:

- [2] Electrical connection: screw terminal PG9
- [3] Connection can be rotated 360° for plastic tubing PUN-H-12x2

Type	B6	B7	B8	B9	L12
MS6-LWS-...-E2/E3/E4	72	140	108	15	174.5

Ordering data

Integrated as metal bowl

Size	Condensate drain	Connection	Part no.	Type
MS6	Fully automatic	G1/4	564868	MS6-LWS-1/4-U-V
		G3/8	564869	MS6-LWS-3/8-U-V
		G1/2	564870	MS6-LWS-1/2-U-V

Ordering data – Modular product system

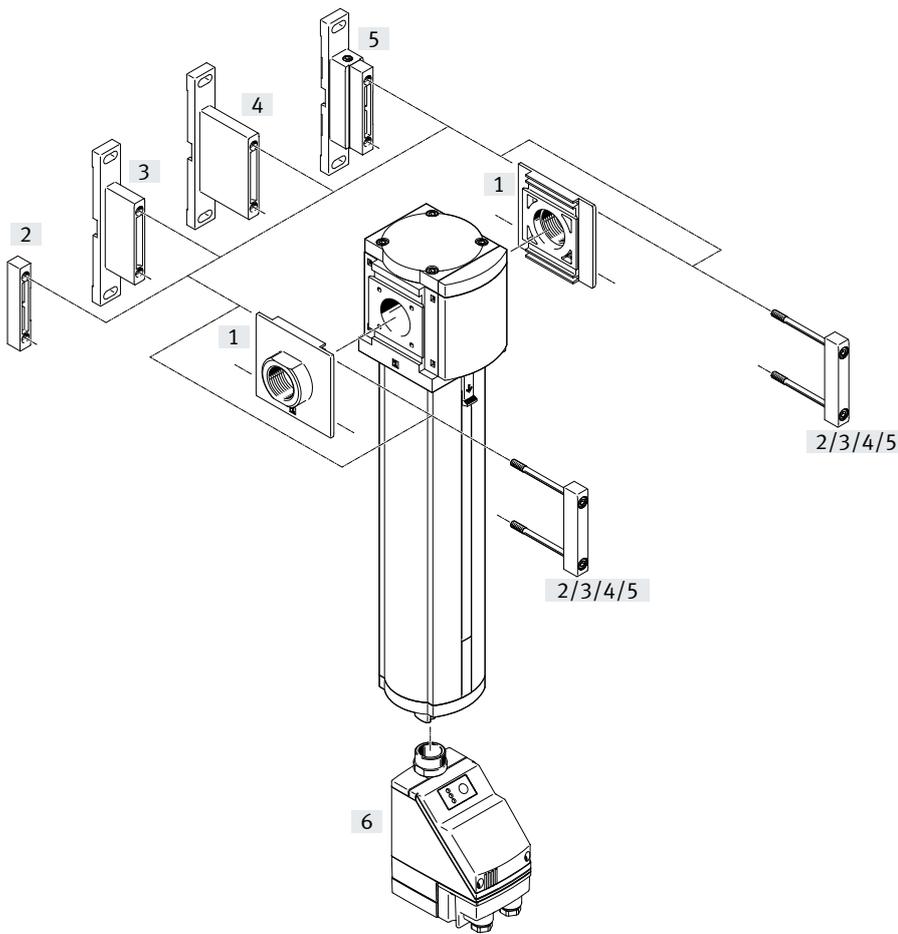
Ordering table		Grid dimension	[mm]	62	Conditions	Code	Enter code
Module no.		564858					
Series		Standard				MS	MS
Size		6				6	6
Function		Water separator				-LWS	-LWS
Pneumatic connection		Female thread G1/4		[1]		-1/4	
		Female thread G3/8		[1]		-3/8	
		Female thread G1/2		[1]		-1/2	
		Connecting plate G1/4				-AGB	
		Connecting plate G3/8				-AGC	
		Connecting plate G1/2				-AGD	
		Connecting plate G3/4				-AGE	
		Connecting plate G1				-AGF	
		Connecting plate NPT1/4		[1]		-AQN	
		Connecting plate NPT3/8		[1]		-AQP	
		Connecting plate NPT1/2		[1]		-AQR	
		Connecting plate NPT3/4		[1]		-AQS	
Bowl guard		Metal bowl				-U	-U
Condensate drain		Fully automatic (P1 max. 12 bar), open without pressure				-V	
		Fully automatic (P1 max. 12 bar), closed without pressure				-VC	
	External, fully automatic, electric	115 V AC, connection terminals (P1 max. 16 bar)		[1]		-E2	
		230 V AC, connection terminals (P1 max. 16 bar)		[1]		-E3	
24 V DC, connection terminals (P1 max. 16 bar)		[1]		-E4			
Type of mounting		Without mounting bracket					
		Mounting bracket standard design		[2]		-WP	
		Mounting bracket for hooking in service unit components		[1][2]		-WPM	
		Mounting bracket centrally at rear (wall mounting top and bottom), connecting plates not required				-WB	
EU certification		None					
		II 2GD to EU Explosion Protection Directive (ATEX)				-EX4	
UL certification		None					
		cULus, ordinary location for Canada and USA				-UL1	
Flow direction		Flow direction from left to right					
		Flow direction from right to left				-Z	

[1] 1/4, 3/8, 1/2, AQN, AQP, AQR, AQS, E2, E3, E4, WPM

Not with EU EX4 certification.

[2] WP, WPM Only with connecting plate AGB, AGC, AGD, AGE, AQN, AQP, AQR or AQS.

Peripherals overview



Note
 Additional accessories:
 • Module connector for combination with size MS6, MS9 or MS12
 → Internet: rmv, armv

Mounting attachments and accessories		Individual device			Combination Module without connecting thread, without connecting plate	→ Page/ Internet
		With female thread	With connecting plate			
			Without EU certification	With EU certification		
[1]	Connecting plate SET MS9-AG...	-	■	■	■	ms9-ag
	Connecting plate SET MS9-AQ...	-	■	-	■	ms9-aq
[2]	Module connector MS9-MV	-	-	-	■	ms9-mv
[3]	Mounting bracket MS9-WP	■	■	■	■	ms9-wp
[4]	Mounting bracket MS9-WPB	■	■	■	■	ms9-wp
[5]	Mounting bracket MS9-WPM	■	■	-	■	ms9-wp
[6]	Electrically actuated condensate drain fully automatic E2, E3, E4	■	■	-	■	22

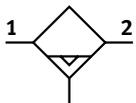
Type codes

001 Series	
MS	MS series
002 Size	
9	Grid dimension 90 mm
003 Function	
LWS	Water separator
004 Pneumatic connection	
3/4	Female thread G3/4
1	Female thread G1
AGD	Sub-base G1/2
AGE	Sub-base G3/4
AGF	Sub-base G1
AGG	Connecting plate G1 1/4
AGH	Connecting plate G1 1/2
N3/4	Female thread 3/4 NPT
N1	Female thread 1 NPT
AQR	Sub-base 1/2 NPT
AQS	Sub-base 3/4 NPT
AQT	Sub-base 1 NPT
AQU	Sub-base 1 1/4 NPT
AQV	Sub-base 1 1/2 NPT
G	Module without connecting thread, without sub-base
005 Bowl type	
U	Aluminium

006 Condensate drain	
E2	External fully automatic condensate drain, electric, 110 V AC, connection terminals
E3	External fully automatic condensate drain, electric, 230 V AC, connection terminals
E4	External fully automatic condensate drain, electric, 24 V DC, connection terminals
V	Fully automatic, normally open
VC	Fully automatic, normally closed
007 Type of mounting	
	Without mounting bracket
WP	Mounting bracket basic design
WPB	Mounting bracket for large wall gap
WPM	Mounting bracket for hooking in service unit components
008 EU certification	
	None
EX4	II 2GD
009 UL certification	
	None
UL1	cULus ordinary location for Canada and USA
010 Flow direction	
	Flow direction from left to right
Z	Flow direction from right to left

Datasheet

Fully automatic condensate drain



-  - Flow rate
12000 ... 15000 l/min
-  - Temperature range
+1 ... +60 °C
-  - Operating pressure
0.8 ... 16 bar



The water separator removes condensate from the compressed air.

- Constantly high condensate separation (99%) up to the maximum flow rate
- Metal bowl
- Available with fully automatic or fully automatic, electrically actuated condensate drain
- Optional device variant EX4 for use in potentially explosive areas in zones 1, 2, 21 and 22

General technical data	
Size	MS9
Pneumatic connection 1, 2	
Female thread	G3/4, G1, NPT3/4 or NPT1
Connecting plate [AG...]	G1/2, G3/4, G1, G1 1/4 or G1 1/2
Connecting plate [AQ...]	NPT1/2, NPT3/4, NPT1, NPT1 1/4 or NPT1 1/2
Module without connecting thread/connecting plate [G]	–
Design	Centrifugal separator
Type of mounting	With accessories In-line installation
Mounting position	Vertical ±5°
Air purity class at the output	Compressed air to ISO 8573-1:2010 [–:7:4]
Bowl guard	Integrated as metal bowl
Condensate drain	Fully automatic Fully automatic, electrically actuated
Degree of condensate separation [%]	99
Max. condensate volume [ml]	220

† Note: This product conforms to ISO 1179-1 and ISO 228-1.

Standard nominal flow rate $q_{nN}^{1)}$ [l/min]			
Pneumatic connection	G3/4, NPT3/4	G1, NPT1	Module without connecting thread, without connecting plate
q_{nN}	12000 ±15%	15000 ±15%	15000 ±15%

1) Measured at $p_1 = 6$ bar and $\Delta p = 1$ bar

Datasheet

Operating and environmental conditions		
Condensate drain	Fully automatic V	Fully automatic, electrically actuated E2/E3/E4
Operating pressure [bar]	2 ... 12	0.8 ... 16
Operating medium	Compressed air to ISO 8573-1:2010 [-:7:4]	
Ambient temperature [°C]	+5 ... +60	+1 ... +60
Temperature of medium [°C]	+5 ... +60	+1 ... +60
Storage temperature [°C]	+5 ... +60	+1 ... +60
Corrosion resistance class CRC ¹⁾	2 - Moderate corrosion stress	
UL certification ²⁾	c UL us - Recognized (OL)	

1) More information: www.festo.com/x/topic/crc

2) More information: www.festo.com/catalogue/ms-lws → Support/Downloads

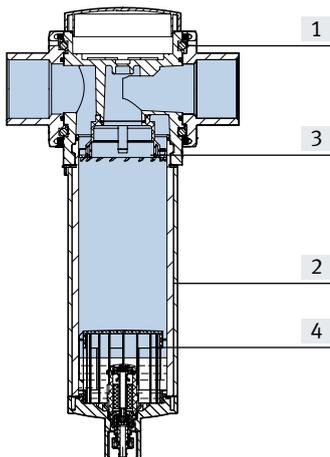
ATEX	
EU certification	[EX4]
ATEX category for gas	II 2G
Type of ignition protection for gas	Ex h IIC T6 Gb X
ATEX category for dust	II 2D
Type of ignition protection for dust	Ex h IIIC T60°C Db X
Explosion-proof ambient temperature	+5°C ≤ Ta ≤ +60°C
Explosion protection certification outside the EU	EPL Db (GB) EPL Gb (GB)
CE marking (see declaration of conformity) ¹⁾	To EU Explosion Protection Directive (ATEX)
UKCA marking (see declaration of conformity) ¹⁾	To UK explosion regulations

2) More information: www.festo.com/catalogue/ms-lws → Support/Downloads

Weight [g]	
Water separator	2000
Water separator with fully automatic, electrically actuated condensate drain E2/E3/E4	2400

Materials

Sectional view

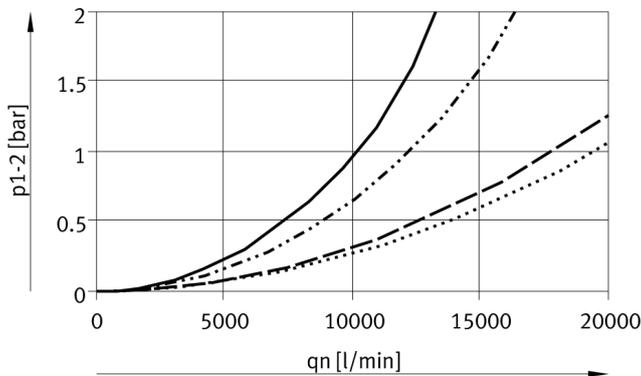


Water separator		
[1]	Housing	Die-cast aluminium
[2]	Bowl	Wrought aluminium alloy
	Inspection window	PA
[3]	Spin disc	POM
[4]	Separating disc	POM
-	Covering	Reinforced PA
-	Connecting plate, module connector, mounting bracket	Die-cast aluminium
-	Seals	NBR
	Note on materials	RoHS-compliant
	LABS (PWIS) conformity	VDMA24364-B1/B2-L

Datasheet

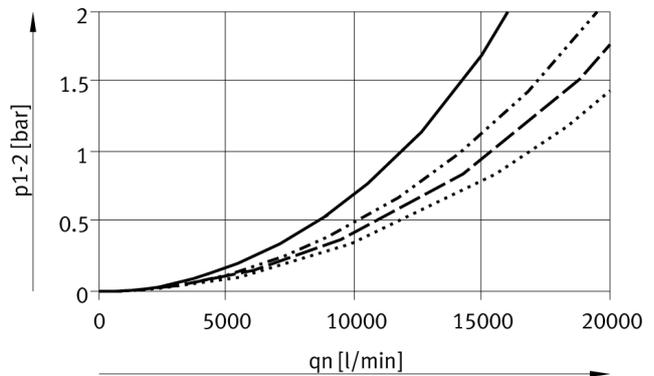
Standard flow rate q_n as a function of differential pressure Δp_{1-2}

Pneumatic connection G3/4, NPT3/4



— 4 bar - - - 10 bar
 - · - · - 6 bar ······ 12 bar

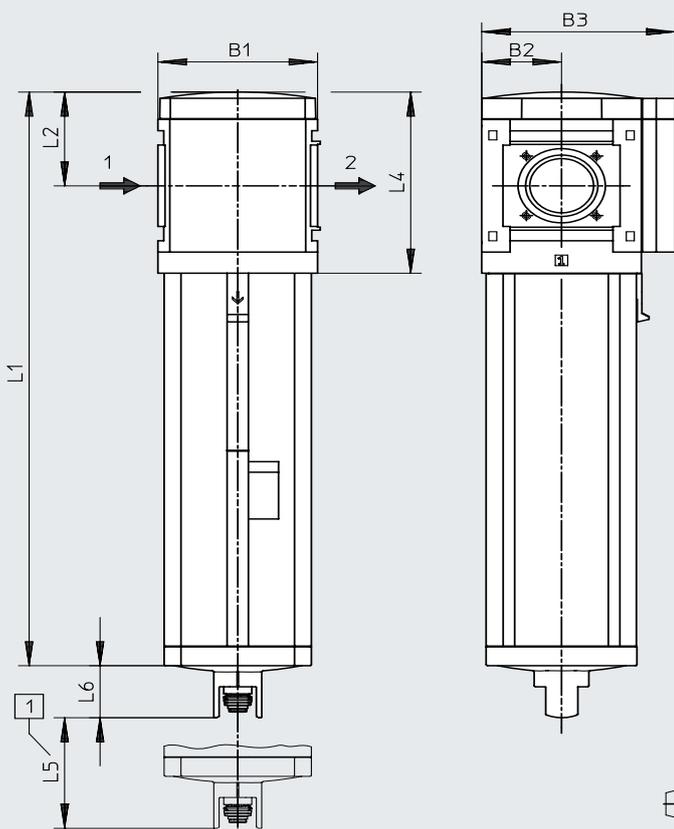
Pneumatic connection G1, NPT1



Dimensions – Basic version

Download CAD data → www.festo.com

Module without connecting thread, without connecting plate G, [V] Condensate drain, fully automatic



[1] Installation dimension

→ Flow direction

Type	B1	B2	B3	L1	L2	L4	L5	L6
MS9-LWS-G	90	45	109	310.5	62	120	50	34.5

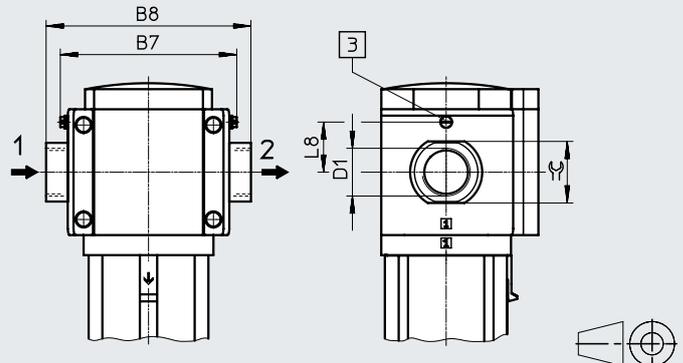
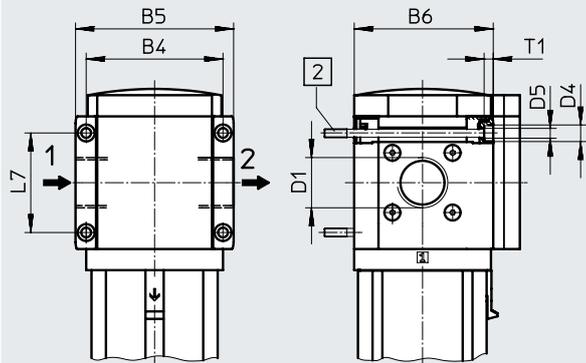
Datasheet

Dimensions – Connecting thread/connecting plate

Download CAD data → www.festo.com

With female thread

With connecting plate AG.../AQ...



[2] Retaining screw M6xmin. 90 to DIN 912 (not included in the scope of delivery) for wall mounting without mounting bracket

[3] Earthing screw M4x8 (only with MS9-...-EX4)

→ Flow direction

Type	B4	B5	B6	B7		B8	D1	D4	D5	L7	L8		T1	≅
					EX4							EX4		
MS9-LWS-3/4	90	104	91.5	-	-	-	G3/4	11	6.5	66	-	6	-	
MS9-LWS-1							G1							
MS9-LWS-AGD	-	-	-	112	122	132	G1/2	-	-	-	35	-	30	
MS9-LWS-AGE						132	G3/4						36	
MS9-LWS-AGF						142	G1						41	
MS9-LWS-AGG						162	G1 1/4						50	
MS9-LWS-AGH						176	G1 1/2						55	
MS9-LWS-N3/4	90	104	91.5	-	-	-	NPT3/4-14	11	6.5	66	-	6	-	
MS9-LWS-N1							NPT1-11 1/2							
MS9-LWS-AQR	-	-	-	112	122	132	NPT1/2-14	-	-	-	35	-	30	
MS9-LWS-AQS						132	NPT3/4-14						36	
MS9-LWS-AQT						142	NPT1-11 1/2						41	
MS9-LWS-AQU						162	NPT1 1/4-11 1/2						50	
MS9-LWS-AQV						176	NPT1 1/2-11 1/2						55	

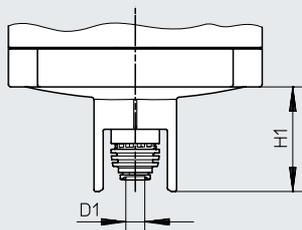
Note: This product conforms to ISO 1179-1 and ISO 228-1.

Datasheet

Dimensions – Condensate drain

Download CAD data → www.festo.com

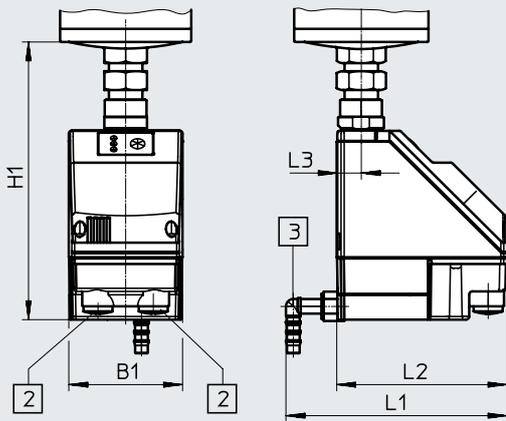
[V] Fully automatic



Push-in connector for plastic tubing PUN-6/PAN-6

[E2]/[E3]/[E4] Fully automatic, electrically actuated

Datasheets → Internet: [pwea](http://pwea.com)



Condensate drain PWEA:

- [2] Electrical connection: screw terminal PG9
- [3] Connection can be rotated 360° for plastic tubing PUN-H-12x2

Type	B1	D1	H1	L1	L2	L3
MS9-LWS-...-V	–	6.2	34.5	–	–	–
MS9-LWS-...-E2/E3/E4	72	–	178	140	108	15

Ordering data

Size	Condensate drain	Connection	Part no.	Type
MS9	Fully automatic	–	571468	MS9-LWS-G-U-V

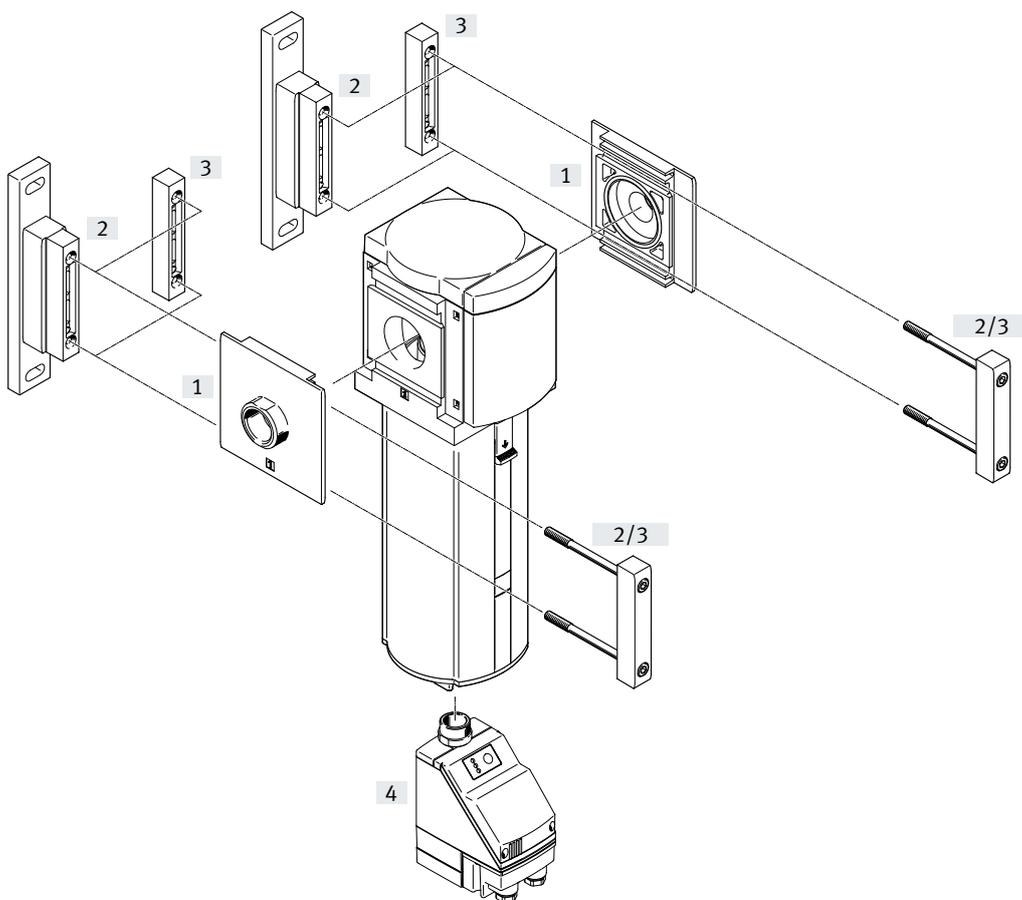
Ordering data – Modular product system

Ordering table		Grid dimension	[mm]	90	Condi- tions	Code	Enter code
Module no.		567857					
Series		Standard				MS	MS
Size		9				9	9
Function		Water separator				-LWS	-LWS
Pneumatic connection		Female thread G3/4			[1]	-3/4	
		Female thread G1			[1]	-1	
		Connecting plate G1/2				-AGD	
		Connecting plate G3/4				-AGE	
		Connecting plate G1				-AGF	
		Connecting plate G1 1/4				-AGG	
		Connecting plate G1 1/2				-AGH	
		Female thread NPT3/4			[1]	-N3/4	
		Female thread NPT1			[1]	-N1	
		Connecting plate NPT1/2			[1]	-AQR	
		Connecting plate NPT3/4			[1]	-AQS	
		Connecting plate NPT1			[1]	-AQT	
		Connecting plate NPT1 1/4			[1]	-AQU	
		Connecting plate NPT1 1/2			[1]	-AQV	
	Module without connecting thread, without connecting plate			[1]	-G		
Bowl		Metal bowl				-U	-U
Condensate drain		Fully automatic (P1 max. 12 bar), open without pressure				-V	
		Fully automatic (P1 max. 12 bar), closed without pressure				-VC	
External, fully automatic, electric		115 V AC, connection terminals (P1 max. 16 bar)			[1]	-E2	
		230 V AC, connection terminals (P1 max. 16 bar)			[1]	-E3	
		24 V DC, connection terminals (P1 max. 16 bar)			[1]	-E4	
Type of mounting		Without mounting bracket					
		Mounting bracket standard design			[2]	-WP	
		Mounting bracket for hooking in service unit components			[1][2]	-WPM	
		Mounting bracket for large wall gap			[2]	-WPB	
EU certification		None					
		II 2GD to EU Explosion Protection Directive (ATEX)				-EX4	
UL certification		None					
		cULus, ordinary location for Canada and USA				-UL1	
Flow direction		Flow direction from left to right					
		Flow direction from right to left				-Z	

1) 3/4, 1, N3/4, N1, AQR, AQS, AQT, AQU, AQV, G, E2, E3, E4, WPM
Not with EU EX4 certification

2) WP, WPM, WPB Not with pneumatic connection G

Peripherals overview



Note
 Additional accessories:
 • Module connector for combination with size MS9
 → Internet: armv

Mounting attachments and accessories

		→ Page/Internet
[1]	Connecting plate SET MS12-AG...	ms12-ag
	Connecting plate SET MS12-AQ...	ms12-aq
[2]	Mounting bracket MS12-WP	ms12-wp
[3]	Module connector MS12-MV	ms12-mv
[4]	Fully automatic condensate drain, electrically actuated E2/E3/E4	29

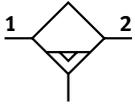
Type codes

001	Series
MS	MS series
002	Size
12	Grid dimension 124 mm
003	Function
LWS	Water separator
004	Pneumatic connection
AGF	Sub-base G1
AGG	Connecting plate G1 1/4
AGH	Connecting plate G1 1/2
AGI	Sub-base G2
AQT	Sub-base 1 NPT
AQU	Sub-base 1 1/4 NPT
AQV	Sub-base 1 1/2 NPT
AQW	Sub-base 2 NPT
G	Module without connecting thread, without sub-base

005	Bowl type
U	Aluminium
006	Condensate drain
E2	External fully automatic condensate drain, electric, 110 V AC, connection terminals
E3	External fully automatic condensate drain, electric, 230 V AC, connection terminals
E4	External fully automatic condensate drain, electric, 24 V DC, connection terminals
V	Fully automatic, normally open
VC	Fully automatic, normally closed
007	Type of mounting
	Without mounting bracket
WP	Mounting bracket basic design
008	Flow direction
	Flow direction from left to right
Z	Flow direction from right to left

Datasheet

Fully automatic condensate drain



-  - Flow rate
25000 l/min
-  - Temperature range
+1 ... +60 °C
-  - Operating pressure
0.8 ... 16 bar



The water separator removes condensate from the compressed air.

- Constantly high condensate separation (99%) up to the maximum flow rate
- Available with fully automatic or fully automatic, electrically actuated condensate drain
- Metal bowl

General technical data

Pneumatic connection 1, 2	
Connecting plate AG...	G1, G1 1/4, G1 1/2 or G2
Connecting plate AQ...	NPT1, NPT1 1/4, NPT1 1/2 or NPT2
Module without connecting thread/connecting plate G	-
Design	Centrifugal separator
Type of mounting	With accessories In-line installation
Mounting position	Vertical ±5°
Air purity class at the output	Compressed air to ISO 8573-1:2010 [-:7:4]
Bowl guard	Integrated as metal bowl
Condensate drain	Fully automatic Fully automatic, electrically actuated
Degree of condensate separation [%]	99
Max. condensate volume [ml]	400

† Note: This product conforms to ISO 1179-1 and ISO 228-1.

Flow rates

Standard nominal flow rate $q_{nN}^{1)}$ [l/min]	25000 ±15%
Max. standard flow rate $q_{n \max}$ [l/min]	40000 ±15%

1) Measured at $p_1 = 6 \text{ bar}$ and $\Delta p = 0.5 \text{ bar}$

Datasheet

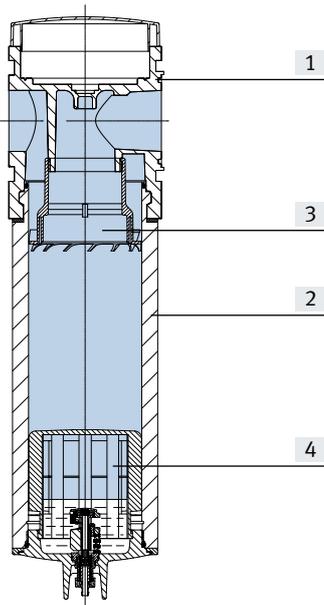
Operating and environmental conditions		
Condensate drain	Fully automatic V	Fully automatic, electrically actuated E2/E3/E4
Operating pressure [bar]	2 ... 12	0.8 ... 16
Operating medium	Compressed air to ISO 8573-1:2010 [-:-:-]	
Ambient temperature [°C]	+5 ... +60	+1 ... +60
Temperature of medium [°C]	+5 ... +60	+1 ... +60
Storage temperature [°C]	+5 ... +60	+1 ... +60
Corrosion resistance class CRC ¹⁾	2 - Moderate corrosion stress	

1) More information: www.festo.com/x/topic/crc

Weight [g]	
Water separator	6300
Water separator with fully automatic, electrically actuated condensate drain E2/E3/E4	7000
Accessories	
Connecting plate AG...	1300
Mounting bracket WP	700

Materials

Sectional view

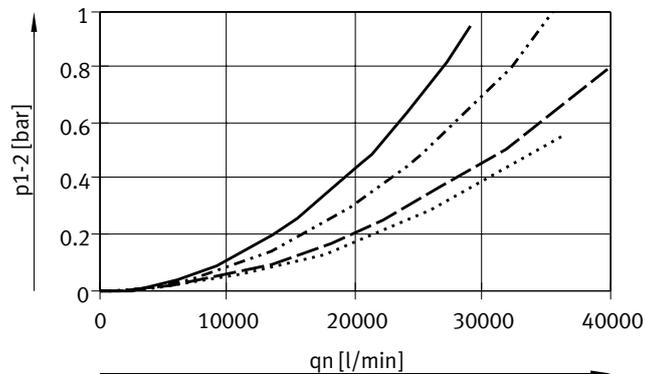


Water separator		
[1]	Housing	Die-cast aluminium
[2]	Bowl	Wrought aluminium alloy
	Inspection window	PA
[3]	Spin disc	POM
[4]	Separating disc	POM
-	Covering	Reinforced PA
-	Connecting plate, module connector, mounting bracket	Die-cast aluminium
-	Seals	NBR
Note on materials		RoHS-compliant
LABS (PWIS) conformity		VDMA24364-B1/B2-L

Datasheet

Standard flow rate q_n as a function of differential pressure Δp_{1-2}

Pneumatic connection G1 1/2, G2, NPT1 1/2, NPT2

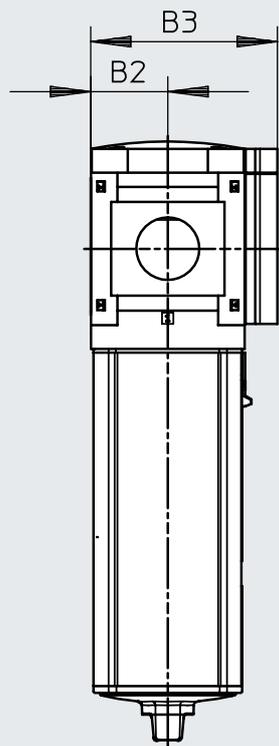
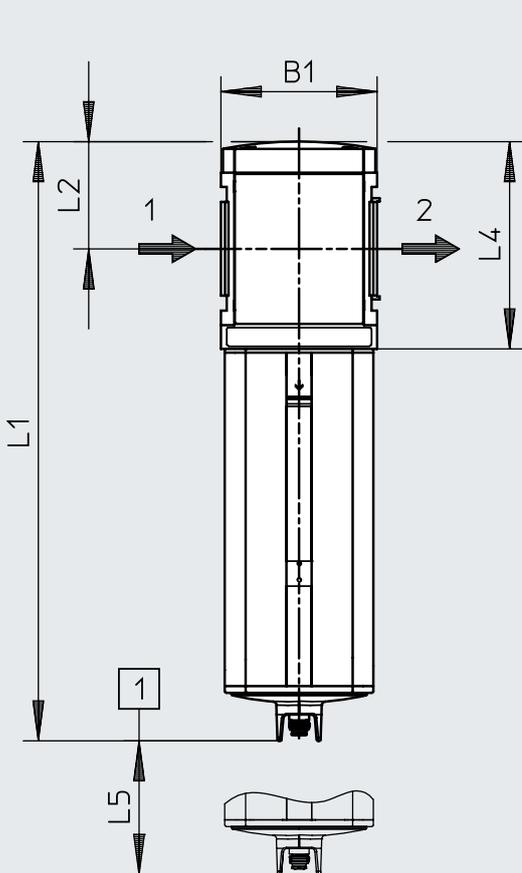


4 bar 10 bar
 6 bar 12 bar

Dimensions – Basic version

Download CAD data → www.festo.com

Module without connecting thread, without connecting plate G, [V] Condensate drain, fully automatic



- Note**
- Connecting plate → ms12-ag
 - Mounting bracket → ms12-wp
- [1] Installation dimension
- Flow direction

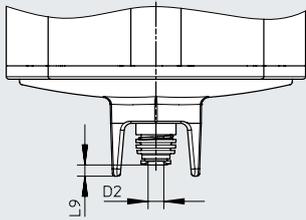
Type	B1	B2	B3	L1	L2	L4	L5
MS12-LWS-G	124	61	148	477	85	165	50

Datasheet

Dimensions – Condensate drain

Download CAD data → www.festo.com

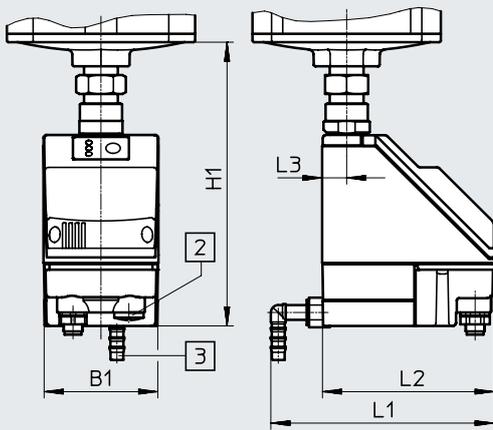
Fully automatic V



Push-in connector for plastic tubing PUN-6/PAN-6

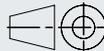
[E2]/[E3]/[E4] Fully automatic, electrically actuated

Datasheets → Internet: [pwea](http://pwea.com)



Condensate drain PWEA:

- [2] Electrical connection: screw terminal PG9
- [3] Connection can be rotated 360° for plastic tubing PUN-H-12x2



Type	B1	D6	H1	L1	L2	L3	L9
MS12-LWS-...-V	–	6.2	–	–	–	–	4.5
MS12-LWS-...-E2/E3/E4	72	–	179	140	108	15	–

Ordering data

Size	Condensate drain	Connection	Part no.	Type
MS12	Fully automatic	–	8005550	MS12-LWS-G-U-V

Ordering data – Modular product system

Ordering table		Grid dimension [mm]	124	Conditions	Code	Enter code
Module no.		569827				
Series	Standard				MS	MS
Size	12				12	12
Function	Water separator				-LWS	-LWS
Pneumatic connection	Connecting plate G1				-AGF	
	Connecting plate G1 1/4				-AGG	
	Connecting plate G1 1/2				-AGH	
	Connecting plate G2				-AGI	
	Connecting plate NPT1				-AQT	
	Connecting plate NPT1 1/4				-AQU	
	Connecting plate NPT1 1/2				-AQV	
	Connecting plate NPT2				-AQW	
	Module without connecting thread, without connecting plate			[1]	-G	
Bowl	Metal bowl				-U	-U
Condensate drain	Fully automatic (P1 max. 12 bar), open without pressure				-V	
	Fully automatic (P1 max. 12 bar), closed without pressure				-VC	
External, fully automatic, electric	115 V AC, connection terminals (P1 max. 16 bar)				-E2	
	230 V AC, connection terminals (P1 max. 16 bar)				-E3	
	24 V DC, connection terminals (P1 max. 16 bar)				-E4	
Type of mounting	Without mounting bracket					
	Mounting bracket standard design			[2]	-WP	
Flow direction	Flow direction from left to right					
	Flow direction from right to left				-Z	

1) G Not with mounting type WP.

2) WP Only with connecting plate AGF, AGG, AGH, AGI, AQT, AQU, AQV or AQW.