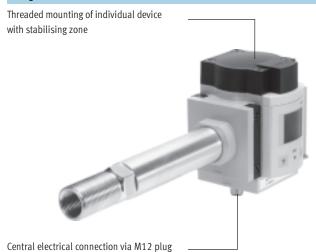
Flow sensors SFAM

FESTO



Key features

At a glance





Can be combined with MS6 or MS9 series service units

- Illuminated LCD display with blue background and white 9-segment display
- Bar graph visualises the current measured value
- Switching point-dependent colour change

Compact and capable of high flow rates

This modular flow sensor can operate either as a standalone unit or can be easily combined with the MS series service units.

The sensor provides:

- Absolute flow rate information
- with threshold values and
- convenient switching point adjustment via a display
- Cumulative air consumption measurement
- Patented adjustable consumption-based switching pulse for cumulative air consumption measurement via the switching output

Systematically more reliable

The sensor covers a large measuring range with a specified accuracy thanks to its high dynamic response of 1:100.

It can provide precise information even when flow conditions are fluctuating and unreliable.

Easy to operate

- A large, illuminated LCD display increases the operational safety and makes the currently displayed flow rate or consumption values easy to read
- Measured values outside the measuring range are visualised: flow rates are shown flashing
- Switching outputs (NPN/PNP) can be switched over via the menu
- Values that fall below or exceed the threshold values can also be identified from a distance or if the sensor is in an inaccessible location by means of the display changing colour

- Simple checking of the current sensor settings in SHOW mode
- Simple switching between consumption and flow rate indication
- Values shown on the display:
 - can be shown for different standard conditions (DIN 1343, ISO 2533, ISO 6358)
 - can be filtered/averaged independently of the analogue output in the case of high measuring dynamics

Convenient

- Festo plug & work solution
- Quick and easy menu prompting
- Fast commissioning thanks to easy-to-use, intuitive teach-in function
- Manual consumption measurement with start/stop and reset functionality

Easy to combine

With MS6 or MS9 series service unit combination thanks to innovative prism clamping technology. This saves additional installation time.

Flexible installation

The SFAM has an extremely compact, space-saving design optimised for flow performance.

Right or left?

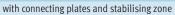
The fluid stream of the unidirectional flow sensor can be selected: either from left to right or from right to left.

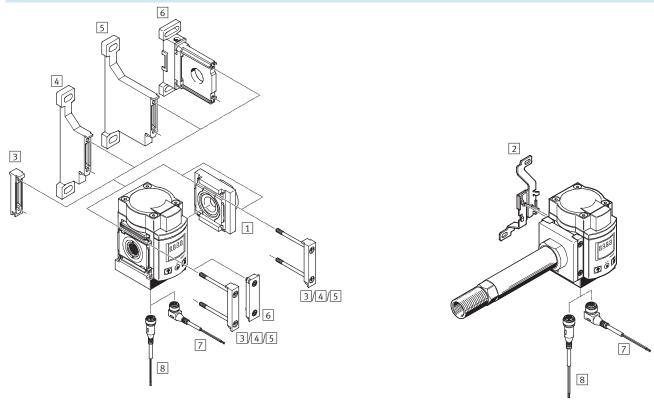
Peripherals overview

${\sf SFAM-62-...-M}\ for\ manifold\ assembly\ in\ MS6\ series\ service\ unit\ combination$

SFAM-62-...-T/-W for individual assembly

with laminar flow cartridge





Moun	ting attachments and accessories			
		In MS6 series service unit combination	Individual device	→ Page/Internet
1	Connecting plate	_	•	ms6-ag
	MS6-AG	_	Included in the scope of delivery	
2	Mounting bracket		-	ms6-wb
	MS6-WB	_	Included in the scope of delivery with	
			mounting type -W	
3	Module connector		_	ms6-mv
	MS6-MV	_	_	
4	Mounting bracket		_	ms6-wp
	MS6-WP	_		
5	Mounting bracket		_	ms6-wpb
	MS6-WPB	_	_	
6	Mounting bracket	_	_	ms6-wpm
	MS6-WPM	_	_	
7	Connecting cable		_	14
	NEBU-M12W5, angled socket	_	_	
8	Connecting cable			14
	NEBU-M12G5, straight socket	_	_	

Note

Additional accessories:

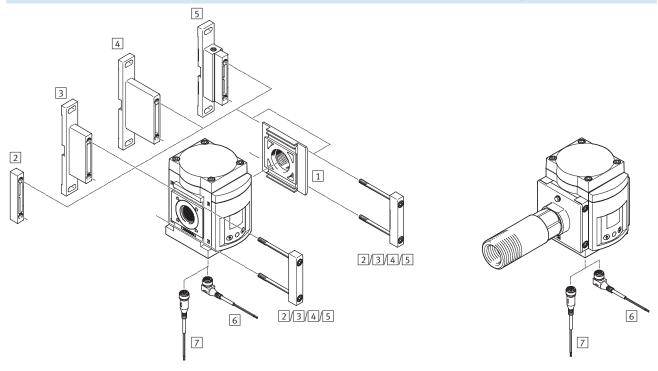
- Module connector for combination with size MS4/MS6 or size MS9
 - → Internet: amv, rmv, armv
- Adapter for mounting on profiles
 → Internet: ipm-80, ipm-40-80, ipm-80-80

Peripherals overview

SFAM-90-...-M for manifold assembly in MS9 series service unit combination with laminar flow cartridge

SFAM-90-...-T for individual assembly

with connecting plates and stabilising zone



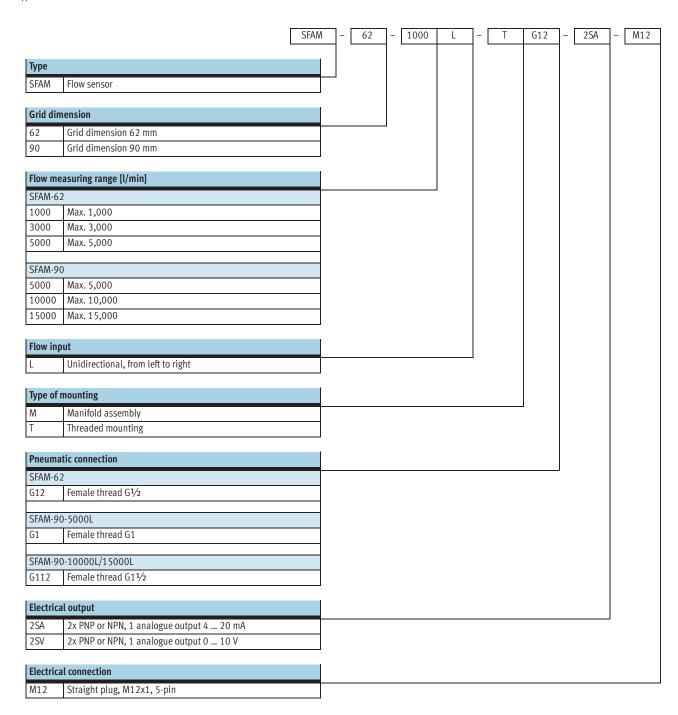
Mount	ing attachments and accessories			
		In MS9 series service unit combination	Individual device	→ Page/Internet
1	Connecting plate	_	•	ms9-ag
	MS9-AG	_	Included in the scope of delivery	
2	Module connector	_	_	ms9-mv
	MS9-MV	_	_	
3	Mounting bracket	_	_	ms9-wp
	MS9-WP	_	_	
4	Mounting bracket	_	_	ms9-wpb
	MS9-WPB	_	_	
5	Mounting bracket		_	ms9-wpm
	MS9-WPM	_	_	
6	Connecting cable			14
	NEBU-M12W5, angled socket	_	_	
7	Connecting cable	•	•	14
	NEBU-M12G5, straight socket	_	_	

Note

Additional accessories:

- Module connector for combinations with size MS6, MS9 or MS12
 - → Internet: rmv, armv

Type codes

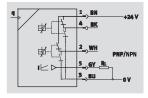


Additional variants can be ordered using the modular product system → 13

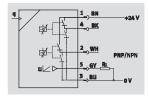
- Flow input
- Type of mounting
- Pneumatic connection
- Electrical accessories
- EU certification (ATEX)

Technical data

Function Current output 2SA



Voltage output 2SV



- Analogue output 0 ... 10 V, adjustable switching outputs 2x PNP or 2x NPN
- Analogue output 4 ... 20 mA, adjustable switching outputs 2x PNP or 2x NPN
- Freely selectable pulse output for consumption measurement

Flow rate

10 ... 1,000 l/min 30 ... 3,000 l/min 50 ... 5,000 l/min

100 ... 10,000 l/min

150 ... 15,000 l/min

Temperature range

0 ... +50 °C

Pressure

0 ... 16 bar



- Analogue filter for setting the rise
 time.
- Digital filter for smoothing the display values

Note

To comply with the specified accuracies, the SFAM must be supplied via the following connections:

- SFAM-62-...-M via a pneumatic connection of at least G½, SFAM-90-...-M via a pneumatic connection of at least G¾.
- SFAM-62-...-T/W via a connection with an inside diameter of at least 10 mm, SFAM-90-...-T via a connection with an inside diameter of at least 20 mm.

Note

When using a filter regulator MS-LFR or a pressure regulator MS-LR, a branching module MS6-FRM-1/2 (with size MS6) or MS9-FRM-G (with size MS9) must be installed between the filter regulator or pressure regulator and the (downstream) flow sensor SFAM in order to maintain the specified accuracies.

General technical data					
Certification	C-Tick				
	cULus recognized (OL)				
CE marking (see declaration of conformity)	To EU EMC Directive ¹⁾				
Note on materials	RoHS-compliant				

¹⁾ For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com

Support

Support

User documentation.

If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

ATEX	
EU certification	EX2
ATEX category for gas	3G
Explosion ignition protection type for gas	Ex nA IIC T5 X Gc
ATEX category for dust	II 3D
Explosion ignition protection type for dust	Ex tc IIIB T80°C X Dc IP54
Explosion-proof temperature rating	0 °C ≤ Ta ≤ +50 °C
CE marking (see declaration of conformity)	To EU Explosion Protection Directive (ATEX)

Input signal/measuring element								
Туре	SFAM-62	SFAM-62			SFAM-90			
Flow measuring range		-1000	-3000	-5000	-5000	-10000	-15000	
Measured variable		Flow rate, consur	nption					
Direction of flow	-L	Unidirectional P1	. → P2					
	-R	Unidirectional P2 ← P1						
Measuring principle	Thermal							
Flow measuring range [l/min]		10 1,000	30 3,000	50 5,000	50 5,000	100 10,000	150 15,000	
Operating pressure	[bar]	016						
Nominal pressure	[bar]	6						
Operating medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4]						
		Nitrogen						
Note on operating/pilot medium		Operation with lubricated medium not possible						
Temperature of medium	0+50							
Ambient temperature	0 +50							
Nominal temperature	[°C]	23						

Output, general ^{1), 2)}	Output, general ^{1), 2)}						
Accuracy of flow rate values		+/- (3% o.m.v. + 0.3% FS)					
Repetition accuracy of zero point in ±%FS	[%FS]	0.2					
Repetition accuracy of margin in ±%FS	[%FS]	0.8					
Temperature coefficient of margin	[%FS/K]	Typically 0.1					
in ±%FS/K							
Pressure dependence of margin	[%FS/bar	0.5					
in ±%FS/bar]						

¹⁾ Accuracy with nominal conditions (6 bar, 23 $^\circ$ C and horizontal installation position) 2) $^\circ$ KFS = $^\circ$ 6 of the measuring range final value (full scale)

Switching output	switching output							
Switching output		2x PNP or 2x NPN, adjustable						
Switching function		Window comparator or threshold value comparator, adjustable						
Switching element function		N/C or N/O contact, adjustable						
Switch-on time		Adjustable (factory setting: approx. 60 ms)						
Switch-off time		Adjustable (factory setting: approx. 60 ms)						
Max. output current	[mA]	100						
Voltage drop	[V]	Max. 1.5						
Inductive protective circuit		Adapted to MZ, MY, ME coils						

Analogue output									
Туре	SFAM-62			SFAM-90	SFAM-90				
Flow measuring range	-1000	-3000	-5000	-5000	-10000	-15000			
Characteristic curve for flow rate [l/min]		0 1,000	0 3,000	0 5,000	0 5,000	0 10,000	0 15,000		
Output characteristic curve for current	4 20								
Output characteristic curve for voltage	[V]	0 10							
Rise time	[ms]	Possible settings: 15, 30, 60 (factory setting), 125, 250, 500, 999							
Max. load resistance at current output	500								
Min. load resistance at voltage output	[kohms]	10							

Output, additional data					
Protection against short circuit	Yes				
Protection against overloading	Yes				

Electronic components							
Operating voltage range DC [V]	15 30						
Reverse polarity protection	For all electrical connections						

Electromechanical components							
Electrical connection		Straight plug, M12x1, 5-pin					
Max. connecting cable length	[m]	30					

Mechanical components										
Туре		SFAM-62	SFAM-62			SFAM-90				
Type of mounting		-M	-TG12/-WG12	-TN12/-WN12	-M	-TG1	-TN1	-TG112	-TN112	
Mounting position	Horizonta	Horizontal								
Pneumatic connection		-	G ¹ / ₂	NPT ¹ / ₂	-	G1	NPT1	G1½	NPT1½	
Product weight	[g]	600	1,100	1,100	1,500	2,400	2,400	2,750	2,750	
Housing materials PA-reinforced, die-cast aluminium										

Display/operation											
Туре		SFAM-62			SFAM-90						
Flow measuring range		-1000	-3000	-5000	-5000	-10000 -150					
Display type Illuminated LCD, blue											
Displayable units		l/min, scfm, l, m ³ , scf									
Setting range for flow rate threshold	[%FS]	1100									
values											
Setting range for consumption pulse	[l]	3 19,999	10 19,999	15 19,999	15 19,999	30 19,999	50 19,999				
threshold values	[m ³]	1 19,999									
	[scf]	0.1 1,999.9	0.4 1,999.9	0.5 1,999.9	0.5 1,999.9	1 1,999.9	2 1,999.9				
Hysteresis setting range	[%FS]	0 90		•		•	•				

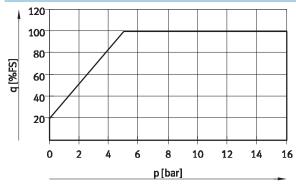
Immissions/emissions											
Туре		SFAM-62			SFAM-90						
Flow measuring range		-1000	-3000	-5000	-5000	-10000	-15000				
Storage temperature	[°C]	-20 +80	-20 +80								
Protection class		IP65	P65								
Pressure drop at 50 %FS flow rate	[mbar]	0 100	0 100	0 100	0 40	0 100	0 200				
and 6 bar with mounting type -M											
Pressure drop at 50 %FS flow rate	[mbar]	0 100	0 100	0 100	0 100	0 100	0 100				
with mounting type -T/-W											
Electrical protection class		III									
Corrosion resistance class CRC ¹⁾ 2											

¹⁾ Corrosion resistance class 2 according to Festo standard 940 070 Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

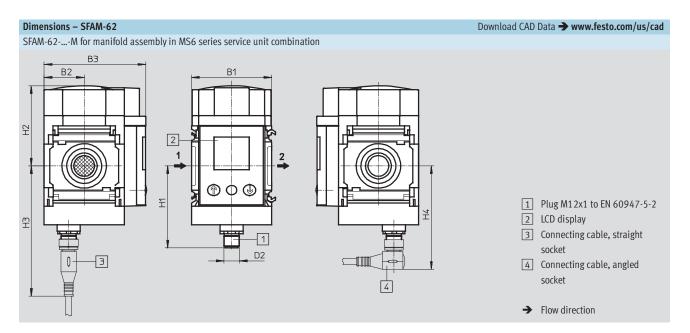
Technical data

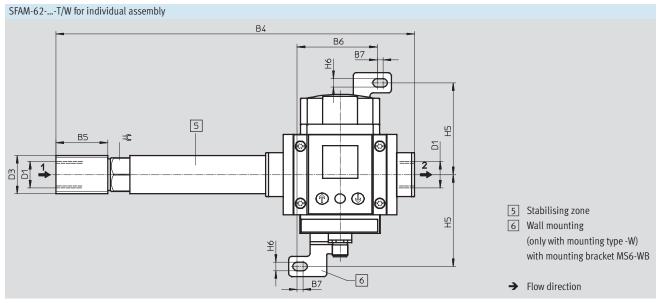
Pin allocation		
Plug M12x1, 5-pin	Pin	Meaning
1	1	Operating voltage +24 V DC
	2	Binary output B
2-(+++)-4	3	0 V
5	4	Binary output A
3	5	Analogue output C

Flow measuring range $^{1)}$ qn as a function of operating pressure p1



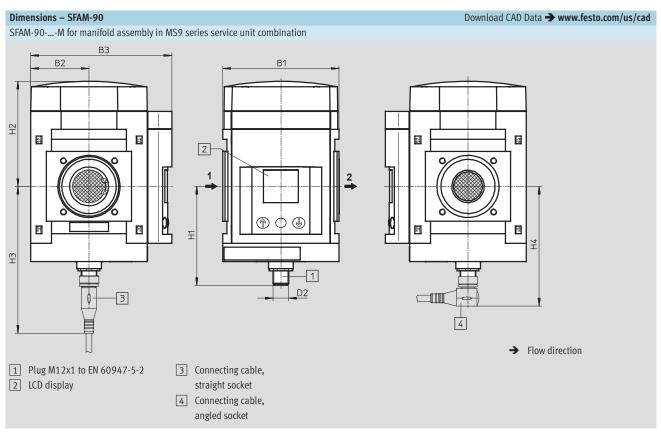
1) For an operating pressure of more than 5 bar, the flow sensor can determine measured values with the specified accuracy over the entire measuring range. For an operating pressure below 5 bar, the measuring range with the specified accuracy is reduced as shown in the graph.

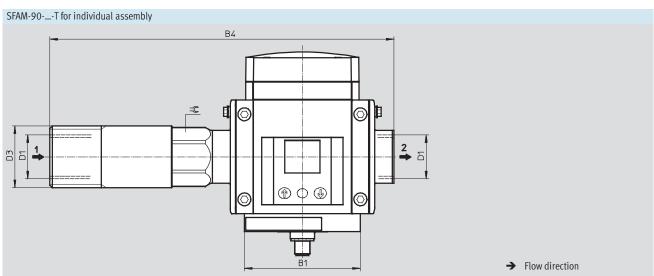




Туре	B1	B2	В3	B4	B5	В6	В7	D1	D2	D3	H1	H2	Н3	H4	H5	Н6	=©
SFAM-62M	62	31	78.7	-	-	-	-	-	M12x1	-	63.5	62.1	101	80	-	-	-
SFAM-62TG12	62	31	78.7	277	40	-	-	G1/2	M12x1	G3/4	63.5	62.1	101	80	-	-	26
SFAM-62WG12	02)1	/0./	2//	40	61.9	4.5	0-72	INITZXI	074	05.5	02.1	101	80	71	6.6	20
SFAM-62TN12	62	31	78.7	277	40	-	-	NPT ¹ / ₂	M12x1	NPT3/4	63.5	62.1	101	80	-	-	26
SFAM-62WN12	02)1	/ 0./	211	40	61.9	4.5	1 11/17/2	IVITZXI	141 174	05.5	02.1	101	00	71	6.6	20

11





Туре	B1	B2	В3	B4	D1	D2	D3	H1	H2	Н3	H4	=©
SFAM-90M	90	45	109	-	-	M12x1	-	76.5	81.3	114	93	-
SFAM-90TG1	90	45	109	267	G1	M12x1	G1½	76.5	81.3	114	93	41
SFAM-90TG112	90	43	109	301	G1½	INIIZXI	G2	70.5	01.5	114	90	55
SFAM-90TN1	90	45	109	267	NPT1	M12x1	NPT1½	76.5	81.3	114	93	41
SFAM-90TN112	90	40	109	301	NPT1½	INITZXI	NPT2	70.5	01.)	114	23	55

Ordering data		,			
ersion	Grid dimension	Electrical output	Flow measuring range	Part No.	Туре
	[mm]		[l/min]		
anifold asse	mbly in MS series serv	ice unit combination			
	62	2x PNP or NPN,	10 1,000	564930	SFAM-62-1000L-M-2SA-M12
		1 analogue output 4 20 mA	30 3,000	564934	SFAM-62-3000L-M-2SA-M12
			50 5,000	564938	SFAM-62-5000L-M-2SA-M12
•		2x PNP or NPN,	10 1,000	564932	SFAM-62-1000L-M-2SV-M12
		1 analogue output 0 10 V	30 3,000	564936	SFAM-62-3000L-M-2SV-M12
			50 5,000	564940	SFAM-62-5000L-M-2SV-M12
		•	•	•	
	90	2x PNP or NPN,	50 5,000	573346	SFAM-90-5000L-M-2SA-M12
		1 analogue output 4 20 mA	100 10,000	573348	SFAM-90-10000L-M-2SA-M12
			150 15,000	573350	SFAM-90-15000L-M-2SA-M12
		2x PNP or NPN,	50 5,000	573347	SFAM-90-5000L-M-2SV-M12
		1 analogue output 0 10 V	100 10,000	573349	SFAM-90-10000L-M-2SV-M12
			150 15,000	573351	SFAM-90-15000L-M-2SV-M12
		•			
readed mou	nting of individual dev	vice			
	62	2x PNP or NPN,	10 1,000	565375	SFAM-62-1000L-TG12-2SA-M12
		1 analogue output 4 20 mA	30 3,000	565379	SFAM-62-3000L-TG12-2SA-M12
			50 5,000	565383	SFAM-62-5000L-TG12-2SA-M12
		2x PNP or NPN,	10 1,000	565376	SFAM-62-1000L-TG12-2SV-M12
		1 analogue output 0 10 V	30 3,000	565380	SFAM-62-3000L-TG12-2SV-M12
			50 5,000	565384	SFAM-62-5000L-TG12-2SV-M12
		•	•		
	90	2x PNP or NPN,	50 5,000	573352	SFAM-90-5000L-TG1-2SA-M12
	170		100 10,000	573354	SFAM-90-10000L-TG112-2SA-M12
		1 analogue output 4 20 mA	100 10,000		,
		1 analogue output 4 20 mA	150 15,000	573356	SFAM-90-15000L-TG112-2SA-M12
		1 analogue output 4 20 mA 2x PNP or NPN,			
			150 15,000	573356	SFAM-90-15000L-TG112-2SA-M12

FESTO

Ordering data – Modular products

		Conditions	Code	Enter code
Module No.	563796			
Function	Flow sensor		SFAM	-SFA
Grid dimension	62 mm		-62	
	90 mm		-90	
Flow measuring range	Max. 1,000 l/min	1	-1000	
	Max. 3,000 l/min	1	-3000	
	Max. 5,000 l/min		-5000	
	Max. 10,000 l/min	2	-10000	
	Max. 15,000 l/min	2	-15000	
Flow input	Unidirectional, from left to right		L	
	Unidirectional, from right to left		R	
Type of mounting	Manifold assembly		-M	
	Threaded mounting		-T	
	Wall mounting	14	-W	
Pneumatic connection	Not specified			
	G½	13	G12	
	G1	23	G1	
	G1½	23	G112	
	1/2" NPT	13	N12	
	1" NPT	23	N1	
	1½" NPT	23	N112	
Electrical output	2x PNP or NPN, 1 analogue output 4 20 mA		-2SA	
	2x PNP or NPN, 1 analogue output 0 10 V		-2SV	
Electrical connection	Plug M12, A-coded		-M12	M12
Electrical accessories	Not specified			
	Angled socket, 2.5 m cable		-2.5A	
	Straight socket, 2.5 m cable		-2.5\$	
	Angled socket, 5 m cable		-5A	
	Straight socket, 5 m cable		-5S	
EU certification	Not specified			
	II 3GD		-EX2	

_					
1	1000,	3000,	G12,	N12,	W

Not with grid dimension 90

2 10000, 15000, G1, G112, N1, N112

Not with grid dimension 62

3 G12, G1, G112, N12, N1, N112

Not with mounting type M

Mandatory data for mounting type T, W

4 W Not with EX2

Transfer order	cod	e										
563796		SFAM	-	_			-	-	M12	-	-	

Accessories

Ordering data	- Connecting cables			Technical data → Internet: nebu
	Number of wires	Cable length [m]	Part No.	Type
M12x1, straig	nt socket			
	5	2.5	541330	NEBU-M12G5-K-2.5-LE5
6 1		5	541331	NEBU-M12G5-K-5-LE5
M12x1, angle	d socket			
	5	2.5	567843	NEBU-M12W5-K-2.5-LE5
%		5	567844	NEBU-M12W5-K-5-LE5

Product Range and Company Overview

A Complete Suite of Automation Services

Our experienced engineers provide complete support at every stage of your development process, including: conceptualization, analysis, engineering, design, assembly, documentation, validation, and production.



Custom Automation Components Complete custom engineered solutions



Custom Control Cabinets Comprehensive engineering support and on-site services



Complete Systems Shipment, stocking and storage services

The Broadest Range of Automation Components

With a comprehensive line of more than 30,000 automation components, Festo is capable of solving the most complex automation requirements.



Electromechanical Electromechanical actuators, motors, controllers & drives



Pneumatics Pneumatic linear and rotary actuators, valves, and air supply



PLCs and I/O Devices PLC's, operator interfaces, sensors and I/O devices

Supporting Advanced Automation... As No One Else Can!

Festo is a leading global manufacturer of pneumatic and electromechanical systems, components and controls for industrial automation, with more than 12,000 employees in 56 national headquarters serving more than 180 countries. For more than 80 years, Festo has continuously elevated the state of manufacturing with innovations and optimized motion control solutions that deliver higher performing, more profitable automated manufacturing and processing equipment. Our dedication to the advancement of automation extends beyond technology to the education and development of current and future automation and robotics designers with simulation tools, teaching programs, and on-site services.

Quality Assurance, ISO 9001 and ISO 14001 Certifications

Festo Corporation is committed to supply all Festo products and services that will meet or exceed our customers' requirements in product quality, delivery, customer service and satisfaction.

To meet this commitment, we strive to ensure a consistent, integrated, and systematic approach to management that will meet or exceed the requirements of the ISO 9001 standard for Quality Management and the ISO 14001 standard for Environmental Management.



© Copyright 2008, Festo Corporation. While every effort is made to ensure that all dimensions and specifications are correct, Festo cannot guarantee that publications are completely free of any error, in particular typing or printing errors. Accordingly, Festo cannot be held responsible for the same. For Liability and Warranty conditions, refer to our "Terms and Conditions of Sale", available from your local Festo office. All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior written permission of Festo. All technical data subject to change according to technical update.



Festo North America

Festo Regional Contact Center

5300 Explorer Drive Mississauga, Ontario L4W 5G4 Canada

USA Customers:

For ordering assistance,

Call: 1.800.99.FESTO (1.800.993.3786)
Fax: 1.800.96.FESTO (1.800.963.3786)
Email: customer.service@us.festo.com
For technical support,

Call: 1.866.G0.FESTO (1.866.463.3786)
Fax: 1.800.96.FESTO (1.800.963.3786)
Email: product.support@us.festo.com

Canadian Customers:

Call: 1.877.GO.FESTO (1.877.463.3786)
Fax: 1.877.FX.FESTO (1.877.393.3786)
Email: festo.canada@ca.festo.com

USA Headquarters

Festo Corporation 395 Moreland Road P.O. Box 18023 Hauppauge, NY 11788, USA www.festo.com/us

USA Sales Offices

Appleton

North 922 Tower View Drive, Suite N Greenville, WI 54942, USA

Boston

120 Presidential Way, Suite 330 Woburn, MA 01801, USA

Chicago

1441 East Business Center Drive Mt. Prospect, IL 60056, USA

Dallas

1825 Lakeway Drive, Suite 600 Lewisville, TX 75057, USA

Detroit – Automotive Engineering Center 2601 Cambridge Court, Suite 320 Auburn Hills, MI 48326, USA

New York

395 Moreland Road Hauppauge, NY 11788, USA

Silicon Valley

4935 Southfront Road, Suite F Livermore, CA 94550, USA

United States



USA Headquarters, East: Festo Corp., 395 Moreland Road, Hauppauge, NY 11788 Phone: 1.631.435.0800; Fax: 1.631.435.8026;

Email: info@festo-usa.com www.festo.com/us

Canada



Headquarters: Festo Inc., 5300 Explorer Drive, Mississauga, Ontario L4W 5G4 Phone: 1.905.624.9000; Fax: 1.905.624.9001; Email: festo.canada@ca.festo.com www.festo.ca

Mexico



Headquarters: Festo Pneumatic, S.A., Av. Ceylán 3, Col. Tequesquinahuac, 54020 Tlalnepantla, Edo. de México Phone: 011 52 [55] 53 21 66 00; Fax: 011 52 [55] 53 21 66 65; Email: [6sto.mexico@mx.festo.com www.festo.com/mx

Central USA

Festo Corporation 1441 East Business Center Drive Mt. Prospect, IL 60056, USA Phone: 1.847.759.2600 Fax: 1.847.768.9480



Western USA

Festo Corporation 4935 Southfront Road, Suite F Livermore, CA 94550. USA

Livermore, CA 94550, US/ Phone: 1.925.371.1099 Fax: 1.925.245.1286



Festo Worldwide

Argentina Australia Austria Belarus Belgium Brazil Bulgaria Canada Chile China Colombia Croatia Czech Republic Denmark
Estonia Finland France Germany Great Britain Greece Hong Kong Hungary India Indonesia Iran Ireland Israel Italy Japan Latvia
Lithuania Malaysia Mexico Netherlands New Zealand Norway Peru Philippines Poland Romania Russia Serbia Singapore
Slovakia Slovenia South Africa South Korea Spain Sweden Switzerland Taiwan Thailand Turkey Ukraine United States Venezuela