

# SIEMENS

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### English

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## SITRANS F I Gardex

Flowmeter

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## SITRANS F I Intra/Prima

Flap Flowmeter

SITRANS F I Intra/Prima **3**

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Instructions

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# General Information

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**Dear customer,**

Please read this manual before starting work!

It contains important information and data which guarantee the device's availability and save you service costs when observed. This makes handling this measuring instrument much easier and leads to reliable measuring results.

The product described in the manual has left the factory in a perfect, tested condition with regard to its safety. In order to maintain this condition and to ensure fault-free and safe operation of the product, it may only be used in the manner described by the manufacturer. In addition, the fault-free and safe operation of this product is conditional upon proper transportation, proper storage and installation and careful operation and maintenance. This manual contains the information required to use the product described for its intended purpose.

This manual is an integral part of the scope of delivery even if it was delivered separately for logistical reasons. For reasons of simplicity it does not contain full details of all versions of the product described, nor can it cover every situation which could arise during installation, operation, maintenance and use in systems. If you require further information, or if problems which are not dealt with in sufficient detail in this document arise, please request the desired information from your local or responsible Siemens branch.



**Note**

Particularly before using the device for new applications, for example in research and development, we recommend consulting our advisors about your application.

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**Note**

The devices described in this instruction book are not yet approved for use in areas with risks of explosions. Due to this they may **only** be installed **in areas without risks of explosions**.

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## 1.1 Warning and information texts

This manual describes how to use, start, operate and maintain the device.

Special attention must be paid to warning and information texts. These are separated from the rest of the text and marked by special pictograms (see the examples below). They provide you with valuable tips for avoiding operating errors.

The warning notices in this manual and on the device itself have the following meanings:

**Danger**

means that failure to take the necessary safety precautions will result in death, serious injury and/or considerable material damage.

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**Warning**

means that failure to take the necessary safety precautions could result in death, serious injury and/or considerable material damage.

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**Caution**

**with a warning triangle** means that failure to take the necessary precautions may lead to minor injury.

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**Caution**

**without a warning triangle** means that failure to take the necessary precautions may lead to material damage.

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**Attention**

means that failure to observe the appropriate notice may lead to an unwanted event or condition.

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**Note**

is an important piece of information about the product itself, the handling of the product or the part of the manual to which particular attention is being drawn.

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We would like to point out that the contents of this manual are not part of a previous or existing agreement, promise or legal relationship or an amendment thereto. All obligations of Siemens AG result from the contract of purchase, which also contains the full and solely valid warranty agreement. These contractual warranty conditions are neither extended nor restricted by the contents of this manual.

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### Warning



This device may only be installed and operated if qualified personnel have previously ensured that a suitable power supply is used, which guarantees that no dangerous voltages can reach the device in normal operation or in the event of a fault in the system or its components.

Fault-free and safe operation of this device depends upon proper transportation, storage, installation and assembly and on careful operation and maintenance.

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## 1.2 Qualified Personnel

Qualified personnel means people who are familiar with the installation, assembly, commissioning and operation of the product, and who possess appropriate qualifications for their respective activities, e.g.:

- training, instruction or authorization to operate and maintain devices/systems according to the safety standards for electrical circuits, high pressures and corrosive media.
- For devices with explosion protection: training, instruction or authorization to carry out work on electrical circuits for systems with a risk of explosion.
- training or instruction according to safety engineering standards for the care and use of suitable safety equipment.

## 1.3 Pressure Equipment Directive

### 1.3.1 SITRANS F I Gardex

The SITRANS F I Gardex flowmeter meets the requirements of Article 3 Paragraph 3 of the Pressure Equipment Directive 97/23/EC. It should only be used for Group 1 gases.

For the nominal diameters DN 25 to 150 the maximum permissible pressure is 10 or 16 bar; for nominal diameter DN 200 10 bar; for nominal diameter 250 6 bar and for nominal diameter DN 300 4 bar.

The device is primarily designed for steady loads.

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#### Caution



It must be ensured that the materials selected for the parts of the meter coming into contact with the media are suitable for the process media used.

A touch guard must be provided at surface temperatures of  $> 70\text{ }^{\circ}\text{C}$ . The touch guard must be designed in such a way that the maximum permissible ambient temperature for the device is not exceeded.

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### 1.3.2 Intra/Prima

The SITRANS F I Intra/Prima flowmeter meets the requirements of Article 3 Paragraph 3 of the Directive on Pressurized Equipment 97/23/EC. The most hazardous permissible media are Group 1 liquids.

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#### Caution!



It must particularly be ensured that the materials selected for the parts of the meter coming into contact with the media are suitable for the process media used.

No external loads may act on the meter.

A touch guard must be provided at surface temperatures of  $> 70\text{ °C}$ . The touch guard must be designed in such a way that the maximum permissible ambient temperature for the device is not exceeded.

The device may only be used within the pressure and voltage limits specified on the rating plate.

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# SITRANS F I Gardex Flowmeter

# 2

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## 2.1 Application

The SITRANS F I Gardex flowmeter is a robust device for measuring and monitoring the flow of liquid and gaseous media in any flow direction. The measured value is indicated on a scale, and is optionally available via contact switches or a current output. Standard scales are available for liquids with a density of 1 kg/l (62.43 lbs/cu.ft). The accuracy corresponds to  $\pm 3\%$  of the full-scale value. When selecting the size, it is recommendable for the normal flow (operating point) to be approx. 75% of the maximum flow listed in the Table in Section 2.1.6.



Fig. 2-1: SITRANS F I Gardex flow meter

### 2.1.1 Special Features

- Product scale for liquids and gases
- Simple installation resulting from rugged sandwich design
- Can be optionally fitted with limit contact and remote transmitter.

### 2.1.2 Dimensions

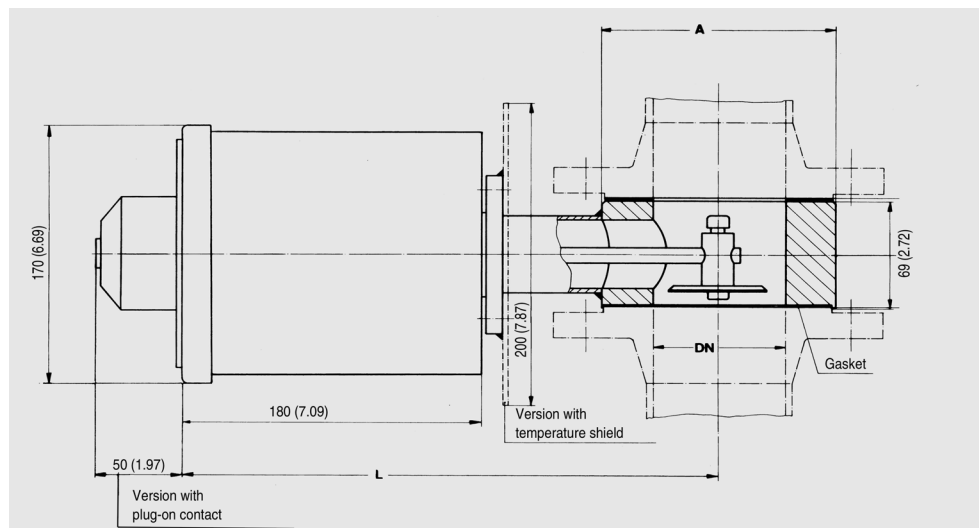


Fig. 2-2: SITRANS F I Gardex, dimensions

### 2.1.3 Design and Mode of Operation

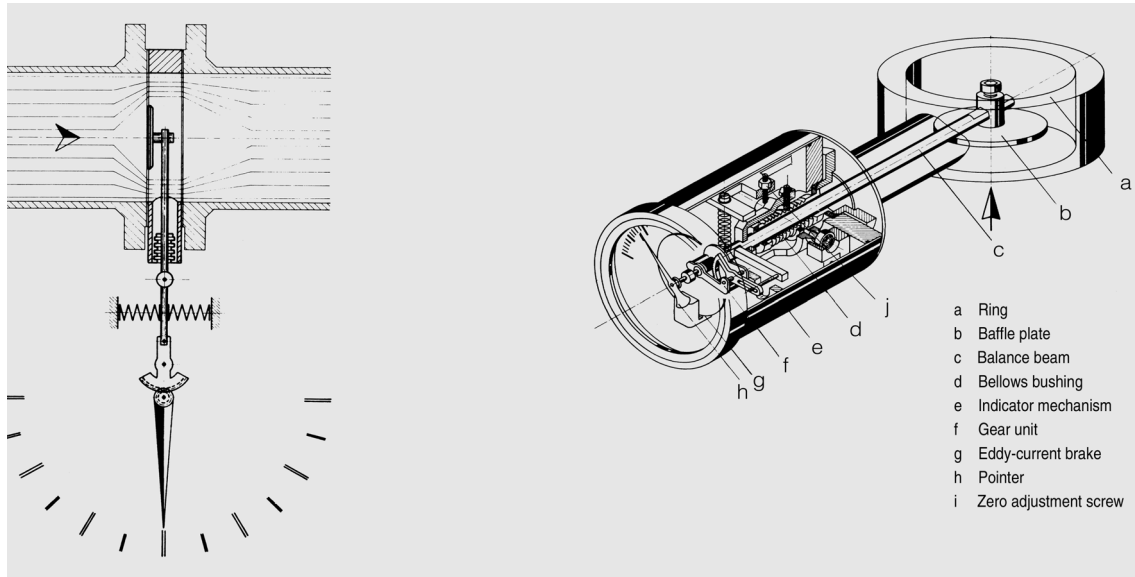


Fig. 2-3: SITRANS F I Gardex, design

The sensor of the SITRANS F I Gardex flowmeter consists of a baffle plate with balance beam and operates according to the deflection method (Fig. 2-3). The baffle plate (b) causes a back-pressure in the medium, and the balance beam (c) is deflected. This movement is transmitted via the beam to the indicator mechanism (e) using a bellows bushing (d). A gear unit (f) converts the deflection of the balance beam into a rotary movement of the pointer (h). The pointer movement is damped by an eddy-current brake (g). The bellows bushing isolates the measured medium from the display unit.

### 2.1.4 Contact Assembly

Various contacts/remote transmitters are available:

- Magnet spring contacts as twin contacts
- Inductive contacts as single or twin contacts
- Current output

### 2.1.5 Versions

Version	Type 1	Type 2	Type 3	Type 4	Type 5
Ring and transverse pipe	Steel DN 25 to 40 (1 to 1¼") ST-37 DN 50 to 65 (2 to 2½") ST-52.3 DN 80 (3") and above ST-37	Stainless steel Mat. No. 1.4571/316Ti		Steel DN 25 to 40 (1 to 1¼") ST-37 DN 50 to 65 (2 to 2½") ST-52.3 ab DN 80 (3") and above ST-37	
Liner				Hard rubber	Hastelloy C
Baffle plate, balance beam, bellows	Stainless steel, mat. No. 1.4571/316Ti		Stainless steel, mat. No. 1.4571/316Ti	Hastelloy C	Hastelloy C
Gasket (between transverse pipe flange and cast housing)	Buna N up to 90 °C (194 °F) Viton up to 160 °C (320 °F) Klinger SIL C 4500 up to 250 °C (482 °F)		Buna N up to 90 °C (194 °F) Viton up to 90 °C (194 °F)		PTFE up to 160 °C (320 °F)

### 2.1.6 Measuring ranges, pressure losses and dimensions (liquids and gases)

Nominal diameter of pipe DN	Full-scale value for water [m <sup>3</sup> /h]			Full-scale value for air [m <sup>3</sup> /h]			Min. inlet pressure [bar]	Pressure loss *) [mbar]	PN 10/16 dimensions [mm]		Weight [kg]
	Measuring range			Measuring range					L	A	
	Small	Medium	Large	Small	Medium	Large					
25	2	4	6	60	120	180	06	270-380	280	71	6.5
40	3	9	15	90	270	450	05	100-250	295	92	7.5
50	9	27	45	270	810	1350	04	50-150	305	106	8.5
65	12	36	60	360	1080	1800	04	50-150	315	126	9.5
80	18	54	90	540	1620	2700	04	50-150	325	142	10.5
100	30	90	150	900	2700	4500	04	50-150	330	162	11.5
125	55	160	270	1650	4875	8100	04	50-150	345	192	13.5
150	70	205	345	2100	6225	10350	03	40-120	365	217	15.5
200	120	360	600	3600	10800	18000	03	40-120	390	273	19.5
250	200	585	975	6000	17625	29250	03	40-120	425	327	23.5
300	270	810	1350	8100	24300	40500	03	40-120	450	377 (PN 10) 385 (PN 16)	27.0

Nominal diameter of pipe inch	Full-scale value for water [USgpm]			Full-scale value for air [USgpm]			Min. inlet pressure [psi]	Pressure loss *) [psi]	PN 10/16 dimensions [inch]		Weight [lbs]
	Measuring range			Measuring range					L	A	
	Small	Medium	Large	Small	Medium	Large					
1	8.8	17.6	26	264	528	793	8.7	3.9-5.5	11.02	2.80	14.3
1½	13.2	40	66	396	1189	1981	7.25	1.45-3.6	11.61	3.62	16.5
2	40	119	198	1189	3566	5944	5.8	0.73-2.2	12.01	4.17	18.7
2½	53	159	264	1585	4755	7925	5.8	0.73-2.2	12.40	4.96	20.9
3	79	238	396	2378	7133	11888	5.8	0.73-2.2	12.80	5.59	23.1
4	132	396	660	3963	11888	19814	5.8	0.73-2.2	12.99	6.38	25.4
5	242	704	1189	7265	21465	35664	5.8	0.73-2.2	13.58	7.56	29.8
6	308	903	1519	9246	27409	45571	4.4	0.58-1.74	14.37	8.54	34.2
8	528	1585	2642	15851	47552	79254	4.4	0.58-1.74	15.35	10.75	43.0
10	881	2576	4293	26418	77603	128788	4.4	0.58-1.74	16.73	12.87	51.8
12	1189	3566	5944	35664	106993	178322	4.4	0.58-1.74	17.72	14.8 (PN 10) 15.2 (PN 16)	59.5

Standard measuring ranges for liquid ( $r = 1 \text{ kg/l}$  (62.43 lbs/cu.ft), viscosity  $1 \text{ mPa}\cdot\text{s}$  (1 cp)) and air ( $Pe = 0 \text{ bar}$  above atmospheric,  $T = 0 \text{ }^\circ\text{C}$  (32  $^\circ\text{F}$ ))  
(dynamic range 1:5)

\*) The pressure loss defines the range from the small to the large measuring range.

## 2.2 Connection and Installation Guidelines

The flowmeter can be used for any flow direction and in any mounting position. However, because of the possibility of contamination of the bellows, installation with the indicator pointing downwards should be avoided. The desired flow direction must already be specified when ordering so that the weight of the sensor (baffle plate) can be taken into consideration in the calibration. Subsequent changing of the flow direction may result in larger inaccuracies and may necessitate a subsequent correction of the zero point.

The calibration is carried out at defined conditions of the medium. Deviations in the density, pressure or temperature of gases, or changes in the density or viscosity of liquids, result in errors. It is therefore essential to observe the calibration conditions which are specified on the scale. Therefore the measured medium, density and viscosity at operating temperature and pressure must be specified when ordering. With gases, it is additionally necessary to specify the exact pressure reference point (pressure above atmospheric, or absolute pressure).

To avoid oscillations of the baffle plate when measuring gases, the full static pressure must be applied to the device. The valve must therefore be installed downstream of the flowmeter. The position of the valve is unimportant when measuring liquids. The recommended inlet and outlet pipe sections must always be provided.

The ring (sandwich design) is installed, centered and screwed tight together with the corresponding gaskets between two flanges of the pipeline. The arrow on the device indicates the flow direction for the medium.

## 2.3 Operation

### 2.3.1 Zero correction

A corresponding correction can be made if the pointer zero is offset (e.g. resulting from a changed mounting position). The flowmeter need not be dismantled to do this.

Remove the housing cover to the front by loosening the three screws and rotating. You can then adjust the zero point using the screw (j, Fig. 2-3). It is recommendable to first bring the pointer into a positive indication, and to then turn it back until it rests properly on the limit pin.

It is recommendable to subsequently check the function. To do this, apply a flow to move the indicator up to 60 to 100%. Alternatively, you can press in the bushing rod. With a zero flow, the pointer must again rest on the limit pin.

### 2.3.2 Maintenance

No maintenance work is necessary.

## 2.4 Technical Data

SITRANS F I Gardex	
<b>Application</b>	See section 2.1
<b>Design and mode of operation</b>	See section 2.1.3
Measuring principle	Baffle plate
<b>Input</b>	
Measuring range	See section 2.1.6
• For liquids	0.4 to 1350 m <sup>3</sup> /h (1.76 to 594.4 USgpm)
• For gases	12 to 40500 m <sup>3</sup> /h (53 to 178322 USgpm)
Dynamic range	1 : 5
Dimension of measured variable	m <sup>3</sup> /h
Max. permissible pressure	
• DN 25 to DN 150 / 1 to 6 inch	16 bar (232 psi)
• DN 200 / 8 inch	10 bar (145 psi)
• DN 250 / 10 inch	6 bar (87 psi)
• DN 300 / 12 inch	4 bar (58 psi)
• Option: ANSI B 16.5	
<b>Rated operation conditions</b>	
Mounting position	Vertical or horizontal
Flow direction	No limitations
Inlet and outlet pipe sections	
• DN 25/1" to DN 150/6"	At least 5 D (with v < 2.5 m/s (8.2 ft/s)), otherwise 10 D
• DN 200/8" to DN 300/12"	At least 10 D (with v < 2.5 m/s (8.2 ft/s)), otherwise 20 D
<u>Medium conditions</u>	
• Accuracy	± 3% of full-scale value; ± 5% of full-scale value with magnet spring contact and electric remote transmitter
<u>Temperature of medium</u>	Dependent on gasket material and version
• Standard version	≤ 90 °C (194 °F)
• With temperature shield	≤ 130 to 250 °C (266 to 482 °F)
<u>Viscosity limits</u>	
Q <sub>max</sub>	Viscosity
m <sup>3</sup> /h	mPa·s (cp)
≤ 0.1	(≤ 0.44)
> 0.1 to 0.5	(> 0.44 to 2.20)
> 0.5 to 3	(> 2.20 to 13)
> 3 to 10	(> 13 to 44)
> 10 to 25	(> 44 to 110)
> 25 to 50	(> 110 to 220)
> 50 to 100	(> 220 to 440)
> 100	(> 440)
<b>Design</b>	
Ring connection	DN 25 to DN 300: DIN 2501 1" to 12": ANSI B 16.5 RF
Material	
• Indicator housing	Mat. No. 1.4301/304
• Ring and transverse pipe, baffle plate, balance beam, bellows and gasket	See section 2.1.5
Degree of protection (indicator unit)	
• Standard design	IP 65
• Version with contact/remote transmitter	IP 54
Weight	See section 2.1.5
<b>Certificates and approvals</b>	
Classification according to pressure equipment directive (DGRL 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice SEP)

**Technical data of contacts**Switching principle

Connection  
 Hysteresis  
 Degree of protection  
 Ambient temperature  
 Max. switching frequency  
 Max. rating

**Magnet spring contact, twin contact**

Pg 9  
 $\pm 3\%$  of full-scale value  
 IP 54  
 $-20$  to  $+70$  °C ( $-4$  to  $158$  °F)  
 5/min  
 AC 250 V / 1 A / 50 VA  
 DC 250 V / 1 A / 30 W  
 Rating data apply to resistive loads; a suppressor circuit is required for inductive loads

Switching principle

Connection  
 Rated voltage  
 Degree of protection  
 Self-inductance  
 Self-capacitance  
 Ambient temperature

**Inductive contact, single contact, twin contact as option**

Pg 9  
 DC 8 V  
 IP 65  
 100  $\mu$ H  
 30 nF  
 $-20$  to  $+70$  °C ( $-4$  to  $158$  °F)

Switching principle

Connection  
 Rated voltage  
 Self-capacitance  
 Short-circuit current  
 Output, three-wire system  
 Load at 24 V  
 Ambient temperature  
 Ex approval  
 Remark

**Rotation angle transmitter**

(see Fig. 3/122)  
 Appliance plug with Pg 7  
 DC 24 V ( $-5$  to  $+25\%$ )  
 1  $\mu$ F  
 Max. 100 mA  
 0 to 20 mA or 4 to 20 mA  
 Max. 750  $\Omega$   
 $-20$  to  $+80$  °C ( $-4$  to  $176$  °F)  
 None  
 To comply with EN 50 082-2 (EMC), a screened cable must be used which is earthed at one end





# SITRANS F I Intra/Prima Flap Flowmeters

# 3

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### 3.1 Application

The SITRANS F I flap flowmeter is used to check and display the flow of liquids in closed pipelines. The device can be optionally fitted with an inductive contact for remote transmission of switching points.

The main applications for the SITRANS F I flap flowmeters can be found in the following fields:

- Chemical industry
- Water, waste water
- Building installations

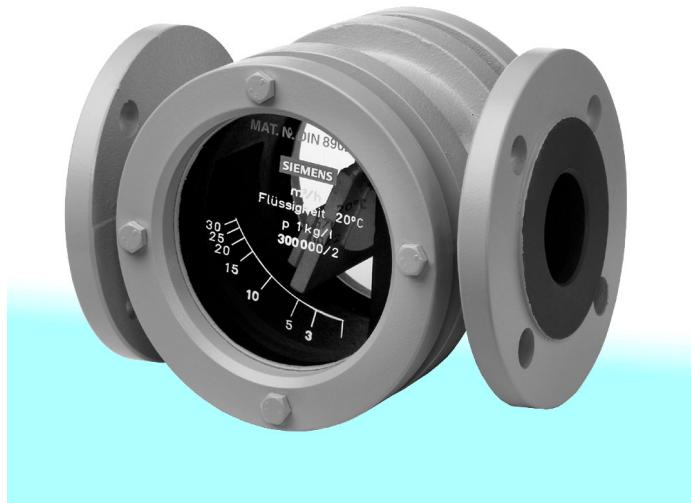


Fig. 3-1: SITRANS F I Intra flap flowmeter for transparent liquids

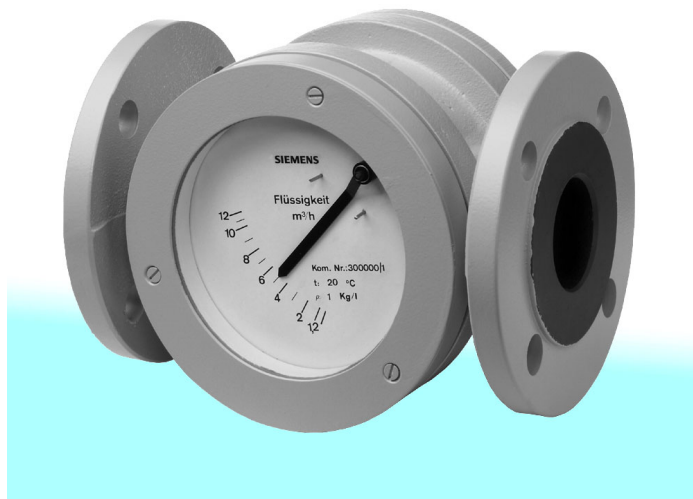


Fig. 3-2: SITRANS F I Prima flap flowmeter for opaque liquids

### 3.1.1 Special Features

- Extremely robust design
- Suitable for transparent and turbid liquids
- Vertical or horizontal installation
- Simple, maintenance-friendly design
- Liquid temperatures up to 250 °C (482 °F)
- Inductive contact for flow monitoring (option).

### 3.1.2 Design and mode of operation

The SITRANS F I operates according to the flap principle. The fitting (1) contains a measuring flap (2) which can be rotated around an axis (3). At rest (i.e. no flow), the flap closes the pipeline by its own weight. As soon as there is a flow, the flap is lifted depending on the flow velocity. The respective flow quantity can be read directly in transparent liquids from the position of the flap. The bottom edge of the flap is the reference edge.

In turbid or opaque liquids, the movement of the flap is transmitted by a magnet (5) mounted on the flap to an external mechanical pointer (8), and the flow is displayed on a scale. The scale and pointer are protected against external effects and contamination by a Plexiglass or glass pane.

The scale has the standard dimension  $\text{m}^3/\text{h}$ , and can be calculated for an application-specific medium and operating pressure/temperature if the density differs from 1  $\text{kg}/\text{l}$  (62.43  $\text{lbs}/\text{cu. ft}$ ). Special scales are available at extra charge.

An inductive contact is triggered by a contact lug mounted on the pointer.

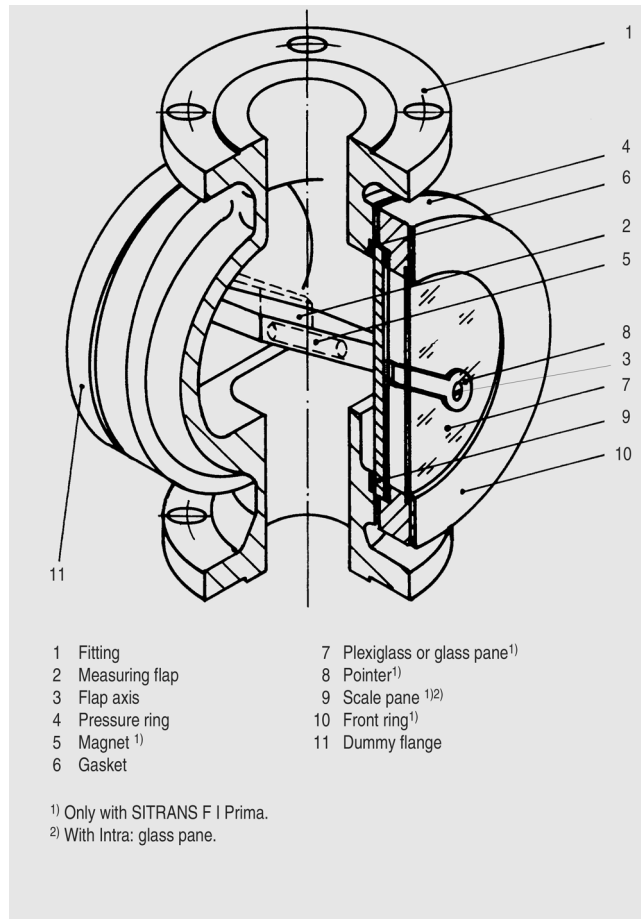


Fig. 3-3: SITRANS F I flap flowmeter, dimensions

### 3.1.3 Versions

#### SITRANS F I Intra

Version	Type A	Type AA	Type C	Type D
Fitting	EN-GJL-250 (GG 25)		EN-GJL-250 (GG 25), rubber-coated	Stainless steel, mat. No. 1.4581
Pressure ring	GG 25			
Rear cover	Dummy flange GG 25	Hard glass (at temp. > 90 °C (194 °F): borosilicate glass)		
Scale pane	Hard glass (at temp. > 90 °C (194 °F): borosilicate glass)			
Max. temperature of medium	150 °C (302 °F), dependent on gasket and scale pane		90 °C (194 °F)	150 °C (302 °F), dependent on gasket and scale pane
Max. operating pressure Connection DIN 2501, PN 10 to 16 ANSI B 16.5 RF 150 lbs/sq.inch	DN 25: 16 bar DN 40 to 50: 10 bar DN 65 to 150: 8 bar 1": 232 psi 1½ to 2": 145 psi 2½ to 6": 116 psi		DN 40 to 50: 10 bar DN 65 to 150: 8 bar 1½ to 2": 145 psi 2½ to 6": 116 psi	DN 25: 16 bar DN 40 to 50: 10 bar DN 65 to 150: 8 bar 1": 232 psi 1½ to 2": 145 psi 2½ to 6": 116 psi

Standard designs for clear and transparent liquids

#### SITRANS F I Prima

Version	Type A	Type C	Type D
Fitting	EN-GJL-250 (GG 25)	EN-GJL-250 (GG 25), rubber-coated	Stainless steel, mat. No. 1.4581
Pressure rings		EN-GJL-250 (GG 25)	Stainless steel, mat. No. 1.4581
Dummy flange, rear		EN-GJL-250 (GG 25), rubber-coated	Stainless steel, mat. No. 1.4571/316Ti
Scale cover	Temperature ≤ 70 °C (158 °F): acrylic glass Temperature > 70 °C (158 °F): safety glass		
Scale pane	Stainless steel, mat. No. 1.4571/316Ti		
Max. temperature of medium	250 °C (482 °F), dependent on gasket	90 °C (194 °F)	250 °C (482 °F), dependent on gasket
Max. operating pressure Connection DIN 2501, PN 10 to 16 ANSI B 16.5 RF 145 to 232 psi	DN 25 to 150: 16 bar 1 to 6": 232 psi	DN 40 to 150: 16 bar 1½ to 6": 232 psi	DN 25 to 150: 16 bar 1 to 6": 232 psi

Design versions for turbid and opaque liquids; transmission of flap movement via magnetic coupling

### 3.1.4 Measuring ranges and pressure losses

Connection DIN 2501	Measuring ranges in m <sup>3</sup> /h for the selected flow directions for liquids with density $\rho = 1 \pm 0.05$ kg/l (pressure loss in mbar shown in brackets)					
	Vertical flow			Horizontal flow		
	Small measuring range Column A	Large measuring range Column B	Measuring range for rubber-coated design	Small measuring range Column A	Large measuring range Column B	Measuring range for rubber-coated design
DN 25	0.5 to 2.5 (16)	1.0 to 5.0 (60)	-	0.5 to 2.5 (8)	0.5 to 5.0 (58)	-
DN 40	1.0 to 6.0 (14)	1.2 to 12.0 (35)	2 to 10 (35)	1.0 to 6.0 (13)	1.2 to 12 (16)	1 to 10 (16)
DN 50	2.0 to 12 (26)	2.0 to 20 (50)	2 to 16 (50)	1.2 to 12 (8)	3.0 to 30 (69)	2 to 20 (69)
DN 65	3.0 to 20 (28)	5.0 to 40 (46)	2.2 to 22 (46)	2.5 to 25 (36)	5.0 to 50 (146)	3.5 to 35 (146)
DN 80	5.0 to 30 (24)	5.0 to 50 (58)	5 to 40 (58)	5.0 to 50 (50)	7.0 to 70 (118)	5 to 50 (118)
DN 100	7.0 to 50 (32)	10 to 100 (83)	10 to 80 (83)	5.0 to 50 (19)	10 to 120 (147)	10 to 100 (147)
DN 125	8 to 60 (13)	12 to 120 (91)	10 to 100 (91)	5.0 to 50 (10)	10 to 140 (92)	10 to 120 (92)
DN 150	10 to 70 (10)	15 to 160 (24)	15 to 140 (24)	5.0 to 60 (5)	10 to 160 (39)	15 to 140 (39)

Measuring ranges and pressure losses with vertical and horizontal flows

Connection ANSI B16.5 RF	Measuring ranges in USgpm for the selected flow directions for liquids with density $\rho = 62.43 \text{ lbs/cu.ft} \pm 3.12 \text{ lbs/cu.ft}$ (pressure loss in psi shown in brackets)					
	Vertical flow			Horizontal flow		
inch	Small measuring range Column A	Large measuring range Column B	Measuring range for rubber-coated design	Small measuring range Column A	Large measuring range Column B	Measuring range for rubber-coated design
1"	2.2 to 11 (0.23)	4.4 to 22 (0.87)	-	2.2 to 11 (0.12)	2.2 to 22 (0.84)	-
1½"	4.4 to 26 (0.20)	5.3 to 53 (0.51)	8.8 to 44 (0.51)	4.4 to 26 (0.19)	5.3 to 53 (0.23)	4.4 to 44 (0.23)
2"	8.8 to 53 (0.38)	8.8 to 88 (0.73)	8.8 to 70 (0.73)	5.3 to 53 (0.12)	13 to 132 (1.00)	8.8 to 88 (1.00)
2½"	13 to 88 (0.41)	22 to 176 (0.67)	9.7 to 97 (0.67)	11 to 110 (0.52)	22 to 220 (2.12)	15 to 154 (2.12)
3"	22 to 132 (0.35)	22 to 220 (0.84)	22 to 176 (0.84)	22 to 220 (0.73)	31 to 310 (1.71)	22 to 220 (1.71)
4"	31 to 220 (0.46)	44 to 440 (1.20)	44 to 352 (1.20)	22 to 220 (0.28)	44 to 530 (2.13)	44 to 440 (2.13)
5"	35 to 264 (0.19)	53 to 530 (1.32)	44 to 440 (1.32)	22 to 220 (0.15)	44 to 616 (1.33)	44 to 530 (1.33)
6"	44 to 308 (0.15)	66 to 704 (0.35)	66 to 616 (0.34)	22 to 264 (0.07)	44 to 704 (0.57)	66 to 616 (0.57)

Measuring ranges and pressure losses with vertical and horizontal flows

### 3.1.5 Dimensions and weights

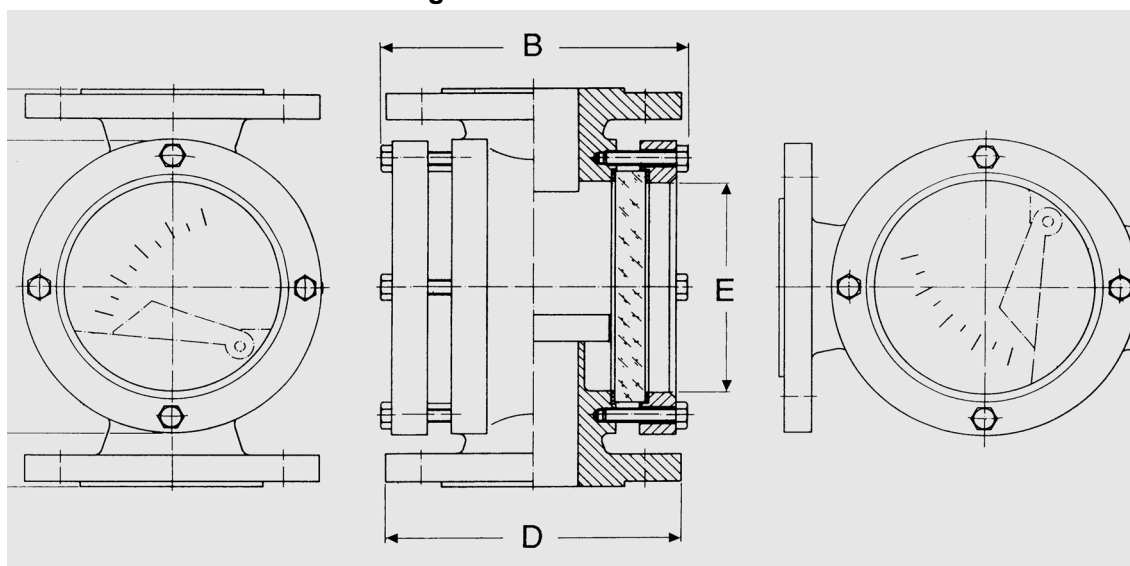


Fig. 3-4: SITRANS F I Intra/Prima, dimensions

Flange connections (to DIN 2501, PN 16)	Dimensions in mm (inches)					DIN flange	Max. pressure				Approx. weight	
	A	With attached contact		C	E		D	bar	(psi)	bar	(psi)	kg (lb)
25 (1")	160 (6.30)	136 (5.35)	127 (5.00)	107 (4.21)	68 (2.68)	115 (4.53)	16	(232)	16	(232)	6.0 (13.22)	5.5 (12.12)
40 (1½")	200 (7.87)	157 (6.18)	147 (5.79)	140 (5.51)	94 (3.70)	150 (5.91)	16	(232)	10	(145)	11.5 (25.35)	12.5 (27.55)
50 (2")	230 (9.06)	172 (6.77)	169 (6.65)	170 (6.69)	122 (4.80)	165 (6.50)					15.5 (34.17)	14.0 (30.86)
65 (2½")	290 (11.42)	192 (7.56)	194 (7.64)	210 (8.27)	144 (5.67)	185 (7.28)	16	(232)	8	(116)	27.0 (59.52)	20.0 (44.09)
80 (3")	310 (12.20)	217 (8.54)	240 (9.45)	235 (9.25)	170 (6.69)	200 (7.87)					40.0 (88.18)	27.0 (59.52)
100 (4")	350 (13.78)	243 (9.57)	276 (10.87)	280 (11.02)	210 (8.27)	220 (8.66)					54.0 (119.04)	48.0 (105.82)
					220 (8.66)	250 (9.84)					64.0 (141.09)	64.0 (141.09)
125 (5")	400 (15.75)	258 (10.16)	291 (11.46)	300 (11.81)	218 (8.58)	285 (11.22)	71.0 (156.52)	71.0 (156.52)				
150 (6")					220 (8.66)	218 (8.58)						

SITRANS F I Prima, dimensions and weights; shaded values apply to SITRANS F I Intra

## **3.2 Installation, operation and maintenance**

### **3.2.1 Installation guidelines**

The flowmeter is delivered protected in a PVC sleeve, and is ready for operation. It has been checked for correct functioning prior to delivery. Before installing, check that the flap moves freely. Inlet and outlet pipe sections are not required.

### **3.2.2 Start-up**

When starting up new plants, material residues are carried over in the medium and could be deposited on the transmission magnets (measuring flap). The flowmeter must be cleaned in such cases.

To prevent pressure surges resulting from gas bubbles, start with a closed valve which is then slowly regulated to the operating pressure. The valve can be mounted either upstream or downstream of the flowmeter.

If the magnetic coupling between the flap and the pointer is interrupted, the pointer can be lifted again using a separate magnet. Alternatively, the flap can be fully opened and then closed again. The magnetic coupling is then effective again.

### **3.2.3 Cleaning**

Remove the dummy flange at the rear or the glass pane including the gasket. The fitting can then be cleaned; in the process, check that the measuring flap moves freely. Remove the flap if necessary, and clean its bearing. To prevent coating with residues, always clean the flowmeter if the plant is to be shut down for a longer period. The glass panes can be carefully cleaned using a gentle solvent.

### **3.2.4 Sealing and replacing the hard glass plate**

The hard glass plate is secured between two gaskets by a pressure ring on the housing, and can be removed by unscrewing the ring. When refitting the plate, ensure that the zero mark on the scale coincides with the rest position of the flap (bottom edge). It is recommendable to check the gasket following installation or an extended operating period. If necessary, gently tighten the pressure ring screws with uniform distribution of the pressure.

The gaskets must be replaced each time the flowmeter is dismantled.

### 3.3 Technical Data

#### Technical Data SITRANS F I

<b>Application</b>	See section 3.1
<b>Design and mode of operation</b>	See section 3.1.2
Measuring principle	Flap principle
<b>Input</b>	
Measuring range	See section 3.1.4
Pressure rating	Connection PN 10 to 16 Permissible operating pressure 8 to 16 bar (116 to 232 psi) depending on design (see Tables below)
<b>Rated operating conditions</b>	
Mounting position	Vertical or horizontal
Ambient temperature	< 80 °C (176 °F) (with contact displays: see there)
<u>Medium conditions</u>	
• Accuracy	±5% of full-scale value
<u>Temperature of medium</u>	Dependent on gasket material and design
For SITRANS FI Intra	
• Gasket: Buna N, scale pane: hard glass	≤ 90 °C (194 °F)
• Gasket: Viton, scale pane: borosilicate glass	≤ 150 °C (302 °F)
For SITRANS FI Prima	
• Gasket: Klinger-SIL-C 8200, scale pane: stainless steel 1.4571	≤ 150 °C (302 °F)
• Gasket: Klinger-SIL-C 4500, scale pane: stainless steel 1.4571	≤ 250 °C (482 °F)
<u>Viscosity limits</u>	
$Q_{max}$ m <sup>3</sup> /h	Viscosity mPa·s (cp)
≤ 0.1	1.0
> 0.1 to 0.5	1.0 to 3.0
> 0.5 to 3	1.0 to 5.0
> 3 to 10	1.0 to 8.0
> 10 to 25	1.0 to 10
> 25 to 50	1.0 to 15
> 50 to 100	1.0 to 25
> 100	1.0 to 50
<b>Design</b>	
Flanges	DIN 2501 PN 10 to 16 ANSI B 16.5 RF 150 lbs/sq.inch
Material	
• Fitting	EN-GJL-250 (GG25), EN-GJL-250 (GG25) rubber-coated, stainless steel mat. No. 1.4581
• Flap	Stainless steel, mat. No. 1.4571/316Ti
• Flap axis	Stainless steel, mat. No. 1.4571/316Ti
Degree of protection (display unit)	Design with contact: IP 54
<b>Certificates and approvals</b>	
Classification according to pressure equipment directive (DGRL 97/23/EC)	For liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice SEP)

**Technical Data Contacts**

**SITRANS F I Prima**

Switching principle

Inductive contact, single contact  
Power supply via disconnecter unit (relay)

Connection

Pg 11

Rated voltage

DC 8 V

Self-inductance

160  $\mu$ H

Self-capacitance

20 nF

Ambient temperature

-20 to +70 °C (-4 to 158 °F)