Solid Flowmeters

6

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Introduction

Overview

Milltronics solids flowmeters from Siemens accurately measure and control flow rates of product so that quality and plant efficiency are consistently maintained. These flowmeters have a totally enclosed design to eliminate product waste or contamination and reduce plant maintenance. Since the units are dust-tight, they provide a healthier work environment, especially when hazardous substances are monitored.They are specifically designed for minimum plant down-time.

Materials

Milltronics solids flowmeters monitor dry bulk materials in sizes from powders to granules more than 25 mm (1") in diameter, handling flow rates from 200 kg/h to 300 t/h (440 lbs/hr to 330 STPH). (For higher flow rates, contact factory.) Material density varies from puffed wheat to iron ore while fluidity ranges from fluidized powder such as fly ash to sluggish flowing materials such as lathe turnings.

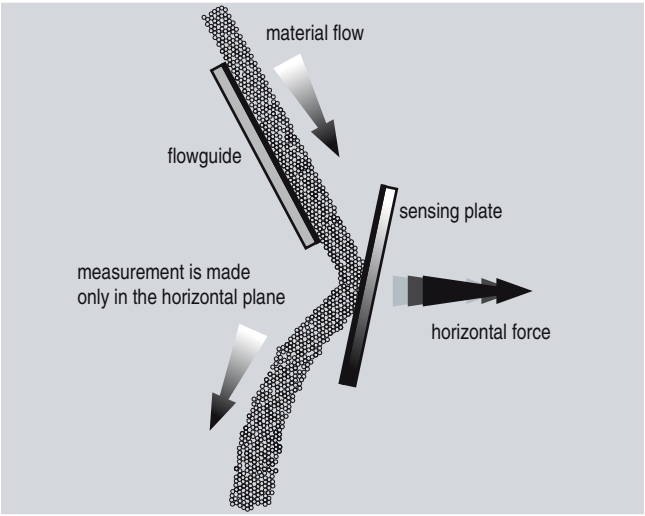
Solids flowmeter with sensing plate detail

Mode of operation

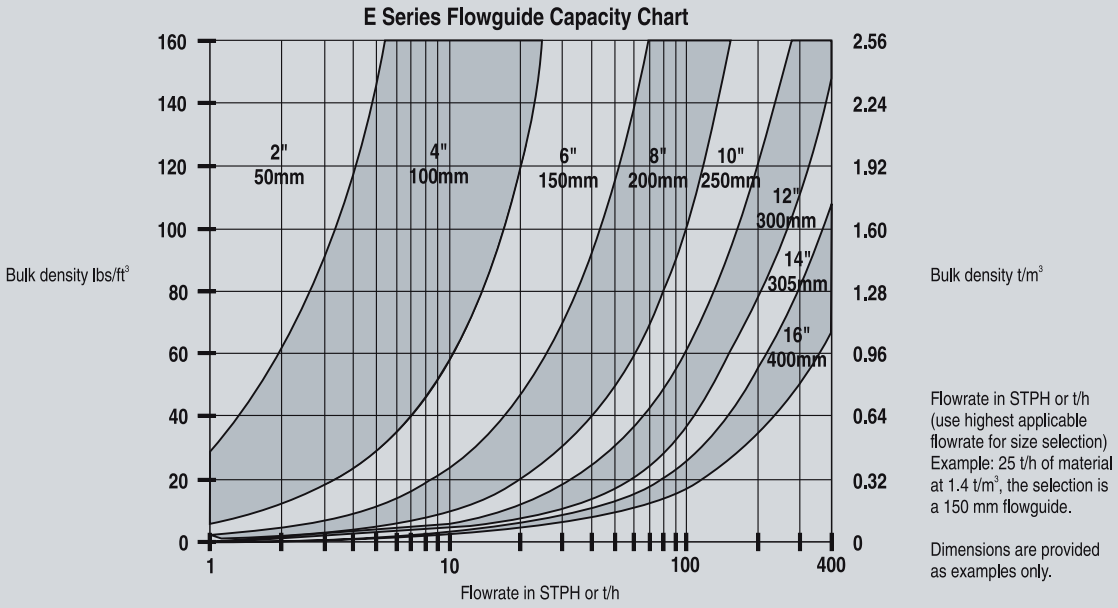
Dry bulk solids material enters the flowguide producing a mechanical deflection as it strikes the flowmeter's sensing plate. It then continues on through the process unhindered, ensuring no disruption in the process or production.

The horizontal force of this deflection is converted into an electrical signal by a deflection sensing LVDT (Linear Variable Differential Transformer). The signal is then monitored and processed by the associated electronic integrator, which instantaneously displays the flow rate and integrated total weight.

Since only the horizontal force is measured, vertical force due to material build-up in the non-impinging area has no effect. There is no zero drift and the need for frequent recalibration is eliminated. To ensure correct product selection for your application, copy and fill out the Solids Flowmeter Application Questionnaire on page 6/4, and return it to your Siemens representative.



Mode of operation



Circular Flowguide Selection Chart

SIEMENS

Solids Flowmeter Application Questionnaire

Customer information

Contact: _____ Prepared By: _____

Company: _____ Date: _____

Address: _____ Notes on the Application: _____

City: _____ Country: _____ _____

State/Province: _____ Zip/Postal Code: _____ _____

Phone: ( ) _____ E-mail: _____ Fax: ( ) _____

Material Information

Material being measured: _____ **Particle size:** _____ mm / inch / mesh

Bulk density: _____ kg/m^3 or lb/ft^3 **Moisture content:** _____ %

Angle of repose: _____ degrees **Is material aerated?** _____ Yes _____ No

Material temperature: _____ °C/°F

Material properties: ☐ Hygroscopic ☐ Corrosive ☐ Easily aerated ☐ Abrasive ☐ Other _____

Material flow characteristics: ☐ Smooth ☐ Sluggish ☐ Sticky/Clumping ☐ Other _____

Application Information

(Supply sketch where possible showing pre-feed and out-feed device dimensions) Sketch attached ☐

Feed rate: _____ maximum t/hr or kg/hr or lb/hr or LTPH or STPH

_____ normal t/hr or kg/hr or lb/hr or LTPH or STPH

_____ minimum t/hr or kg/hr or lb/hr or LTPH or STPH

Accuracy required: + / - _____ %

Pre-feed type: ☐ Rotary valve ☐ Belt ☐ Screw ☐ Vibratory pan ☐ Aerated gravity conveyor ☐ Bucket elevator ☐ Other (specify) _____

Flow rate: ☐ Constant ☐ Variable ☐ Pulsing **Flowmeter will discharge into:** _____

Headroom available: _____ ft / m **Temperature at flowmeter:** ____ max. ____ min.°C/°F

Sensing plate subjected to air flow: ☐ None ☐ Some **Material test can be performed:** ☐ Yes ☐ No

Estimated distance from pre-feed discharge to flowmeter: _____ mm / inches

Electrical classification in flowmeter environment: _____

Integrator Requirements

(indicate all that apply) **Power available:** _____

Inputs required:	**Outputs required:**	**Communications:**
☐ 4 to 20 mA(specify) _____	☐ 4 to 20 mA	☐ AB Remote I/O
☐ PID	☐ PID	☐ DeviceNet
☐ LVDT	☐ Remote totalizer	☐ PROFIBUS DP
☐ Load Cells (#):_____	☐ Relays (#): _____	☐ RS-232/RS-485 Modbus

Products suggested: _____

Preferred Construction *(flowguide and sensing plate enclosure)*: ☐ Painted mild steel ☐ 304 SS ☐ 316 SS ☐ Other (specify) _____

www.siemens.com/processautomation

Form# 2-772R4

Solids Flowmeter Application Questionnaire

Technical specifications

Solids Flowmeter Selection Guide

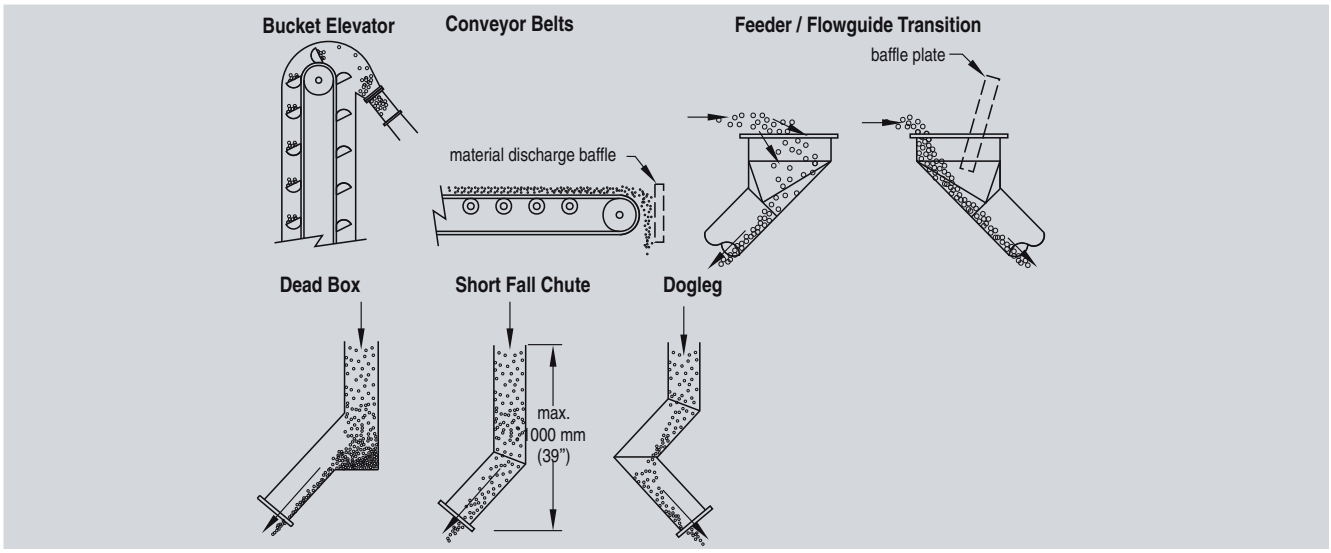
Criteria	E-40/V-40	E-300/V-300	A-40	A-300
Typical industries	Chemicals, grain, minerals, cement	Aggregates, grain, minerals, cement	Cement, mineral processing, mining	Cement, mineral processing, mining
Typical applications	Fly ash, lime dosing in gold ore processing, cement flow control in mine backfill operations, flour stream monitoring	Fly ash load-out, lime dowsing in gold ore processing, gypsum flow for board forming line	Powders and granules conveyed by aerated gravity conveyors Flyash load-out, precipitator dust	Powders and granules conveyed by aerated gravity conveyors Raw meal cement, gypsum flow control
Typical capacity	0.2 ... 40 t/h (0.2 ... 44 STPH)	20 ... 300 t/h (22 ... 330 STPH)	0.2 ... 40 t/h (0.2 ... 44 STPH)	20 ... 300 t/h (22 ... 330 STPH)
Maximum particle size	13 mm (0.5")	25 mm (1")	2 mm (0.1")	2 mm (0.1")
Maximum product temperature	+232 °C (+450 °F) Optional: +400 °C (+750 °F)	+232 °C (+450 °F) Optional: +400 °C (+750 °F)	+232 °C (+450 °F) Optional: +400 °C (+750 °F)	+232 °C (+450 °F) Optional: +400 °C (+750 °F)
Sensing heads	ILE-37	ILE-61	ILE-37	ILE-61
Inlet sizes	E-40: 50 ... 250 mm (2 ... 10") in ASME or DIN flanges V-40: 76 x 152 mm (3 x 6"), 102 x 254 mm (4 x 10") or 127 x 305 mm (5 x 12")	E-300: 152 ... 406 mm (6 ... 16") in ASME or DIN flanges V-300: 127 x 406 mm (5 x 16") or 152 x 508 mm (6 x 20")	203 or 305 mm (8 or 12")	254, 356 or 508 mm (10, 14 or 20")
Accuracy[1)]	± 1 %	± 1 %	± 1 %	± 1 %
Specified range[2)]	33 ... 100 %	33 ... 100 %	33 ... 100 %	33 ... 100 %
Approvals	CE, optional CSA Class I, Groups C and D, Class II Groups E, F, G, C-TICK	CE, optional CSA Class I, Groups C and D, Class II Groups E, F, G, C-TICK	CE, optional CSA Class I, Groups C and D, Class II Groups E, F, G, C-TICK	CE, optional CSA Class I, Groups C and D, Class II Groups E, F, G, C-TICK

[1)] Accuracy subject to: On factory approved installations the flowmeter system's totalized weight will be within the specified accuracy when compared to a known weighed material test sample. The test rate must be within the specified range of the design capacity and held constant for the duration of the test. The minimum material test sample must be equivalent to a sample obtained at the test flow rate for at least ten minutes running time.

[2)] Specified range can be improved to 20 to 100% with use of SF500 integrator linearizer function.

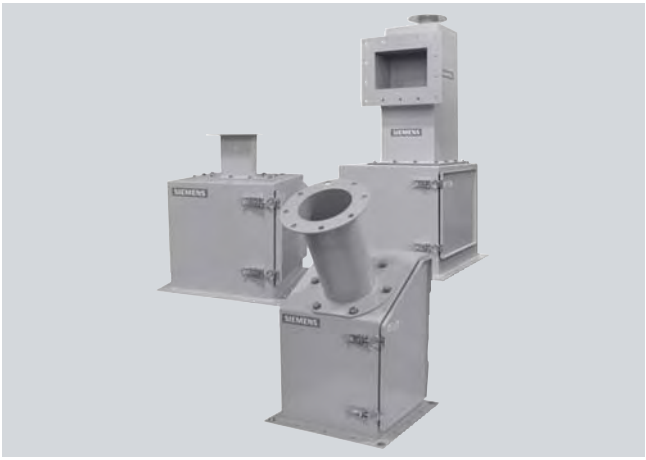
Common Flowmeter Infeed Types

A solids flowmeter's performance will be as repeatable and consistent as the flow of material it is measuring. The following arrangements are typical of pre-feed chute configurations used to ensure consistent flow patterns. Arrangements will vary depending on the upstream equipment or chute work. Applications should be reviewed by a Siemens solids flowmeter specialist to achieve best results. During initial setup, use pre-weighing or post-weighing of material samples to calibrate flowmeter and verify accuracy using the material sample weights.



Milltronics E,V, and A Series

Overview



Milltronics E, V, and A Series are low- to medium-capacity flowmeters for various product sizes, densities, and fluidities.

Benefits

- For specialized pre-feed applications
- Sensing element mounted outside process
- Flowrates from 0.2 to 300 t/h (0.2 to 330 STPH)
- Process temperature to +232 °C (+450 °F)

Application

With weighing mechanics located externally, the E, V, and A Series solids flowmeters are unaffected by corrosive, abrasive, or hot materials. Handling a wide range of product sizes, densities, and fluidities including fine powders such as cement, they operate at process temperatures to +230 °C (+450 °F). The flowmeters help to improve final product, increase operating efficiency, and realize significant cost savings.

Operating with the appropriate ILE sensing head and a microprocessor-based integrator package, the E, V, and A Series flowmeters provide a display of the flow rate, totalized flow, and alarms. Outputs are 0/4-20 mA proportional to rate, and open collector output for remote totalization.

Dry bulk solids enter the flow guide producing a mechanical deflection as they strike the flowmeter sensing plate before continuing through the process unhindered. The LVDT in the sensing head converts the deflection of the horizontal force into an electrical signal. The integrator processes this signal into a display of flowrate and integrated total weight. The weighing process is immune to the effect of product build-up as only the horizontal force is measured.

E Series flowmeters are totally enclosed, with external weighing mechanics, operating with corrosive, abrasive or hot materials. The A Series operates with aerated gravity conveyors, and includes integral vents and baffles for air separation. For applications with little available headroom, the V Series flowmeters provide the answer.

Technical specifications

	E Series	V Series	A Series
Mode of operation			
Measuring principle	Deflection measurement using LVDT (linear variable differential transformer)		
Typical application	General purpose for most pre-feed applications	Designed for applications requiring a compact construction	Suitable for flowrate measurements downstream of an aerated gravity conveyor
Flow input			
Particle size	E-40: Fine powder up to 13 mm (0.5") E-300:Fine powder up to 25 mm (1")	V-40: Fine powder up to 13 mm (0.5") V-300: Fine powder up to 25 mm (1")	A-40: Fine powder up to 3 mm (0.13") A-300:Fine powder up to 3 mm (0.13")
Capacity range[1]	E-V-A-40: 0.2 ... 40 t/h (0.2 ... 44 STPH) E-V-A-300: 20 ... 300 t/h (22 ... 330 STPH)		
Measuring accuracy			
Accuracy[2]	± 1 %, 33 ... 100 % of design capacity; extended accuracy range with linearization function of integrator		
Repeatability	± 0.2 %		
Medium conditions			
Product temperature (optional)	-40 ... +232 °C (-40 ... +450 °F) -40 ... +400 °C (-40 ... +750 °F)	-40 ... +232 °C (-40 ... +450 °F) -40 ... +400 °C (-40 ... +750 °F)	-40 ... +232 °C (-40 ... +450 °F) -40 ... +400 °C (-40 ... +750 °F)
Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)	-40 ... +60 °C (-40 ... +140 °F)	-40 ... +60 °C (-40 ... +140 °F)
Design	Standard: Painted mild steel enclosure and 304L (1.4306) stainless steel sensing plate Optional: Special coatings for flowguide and sensing plate		
Sensing heads	E-V-A-40: ILE-37 E-V-A-300: ILE-61		
Integrator	Milltronics SF500, SIWAREX FTC		
Approvals	See ILE-37 and ILE-61 specifications		

1) Flowrates are based on material bulk density and flowguide selection.

2) Accuracy subject to: On factory approved installations the flowmeter system's totalilzed weight will be within the specified accuracy when compared to a known weighed material test sample. The test rate must be within the specified range of the design capacity and held constant for the duration of the test. The minimum material test sample must be equivalent to a sample obtained at the test flow rate for at least ten minutes running time.

Selection and Ordering data

Order No.

Milltronics E Series Flowmeters	C)	**7MH7102-**
Low- to medium-capacity solids flowmeters for various product sizes, densities, and fluidities, particularly fine powders. A sensing plate, sensing head and integrator are required to complete the system.		■■■■ **0**
Version		
E-40 base mount, 40 t/h maximum design capacity		**1**
E-40 side mount, 40 t/h maximum design capacity		**2**
E-300 base mount, 300 t/h maximum design capacity		**3**
Flowguide size		
No flowguide		**A**
2" ASME flange pattern [1]		**B**
4" ASME flange pattern [1]		**C**
6" ASME flange pattern [2]		**D**
8" ASME flange pattern [2]		**E**
10" ASME flange pattern [2]		**F**
12" ASME flange pattern [3]		**G**
14" ASME flange pattern [3]		**H**
16" ASME flange pattern [3]		**J**
DN50 flange pattern [1]		**K**
DN100 flange pattern [1]		**L**
DN150 flange pattern [2]		**M**
DN200 flange pattern [2]		**N**
DN250 flange pattern [2]		**P**
DN300 flange pattern [3]		**Q**
DN350 flange pattern [3]		**R**
DN400 flange pattern [3]		**S**
Flowguide construction		
No flowguide		**A**
Mild steel, polyester painted		**B**
Mild steel, epoxy painted with zinc primer [1]		**C**
Mild steel, epoxy painted with zinc primer [3]		**D**
304 (1.4301) stainless steel [1]		**E**
304 (1.4301) stainless steel [3]		**F**
316 (1.4401) stainless steel [1]		**G**
316 (1.4401) stainless steel [3]		**H**
Cabinet construction		
Mild steel, polyester painted		**1**
Mild steel, epoxy painted with zinc primer [1]		**2**
Mild steel, epoxy painted with zinc primer [3]		**3**
304 (1.4301) stainless steel [1]		**4**
304 (1.4301) stainless steel [3]		**5**
316 (1.4401) stainless steel [1]		**6**
316 (1.4401) stainless steel [3]		**7**
Further designs		Order Code
Please add "**-Z**" to Order No. and specify Order code(s).		
Stainless Steel tag [69 x 38 mm (2.7 x 1.5")], Measuring-point number / identification (max 16 characters), specify in plain text.		**Y15**
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000		**C11**
Inspection Certificate Type 3.1 per EN 10204		**C12**

Milltronics E Series Flowmeters	C)	**7MH7102-**
Low- to medium-capacity solids flowmeters for various product sizes, densities, and fluidities, particularly fine powders. A sensing plate, sensing head and integrator are required to complete the system.		■■■■ **0**
Instruction manual		
English	C)	**7ML1998-5CT01**
German	C)	**7ML1998-5CT31**
French	C)	**7ML1998-5CT11**
Note: The instruction manual should be ordered as a separate item on the order.		
Additional instruction manuals		
Solids Flowmeter Application Guide, English	C)	**7ML1998-5GK01**
Solids Flowmeter Application Guide, German	C)	**7ML1998-5GK31**
This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.		

[1] For version 1 and 2 only.
[2] For version 1, 2 or 3.
[3] For version 3 only.
C) Subject to export regulations AL: N, ECCN: EAR99.

Selection and Ordering data

Order-No

Milltronics V Series Flowmeters Compact vertical flow, low- to medium-capacity solid flowmeters for various product sizes, densities, and fluidities, particularly fine powders. A sensing plate, sensing head and integrator are required to complete the system.	C)	**7MH7104-** ■■■■ **0**
Version		
V-40 base mount, 40 t/h max. design capacity		**1**
V-40 side mount, 40 t/h max. design capacity		**2**
V-300 base mount, 300 t/h max. design capacity		**3**
Flowguide size		
No flowguide		**A**
3" x 6" (76 x 152 mm) [1]		**B**
4" x 10" (102 x 254 mm) [1]		**C**
5" x 12" (127 x 305 mm) [1]		**D**
5" x 16" (127 x 406 mm) [2]		**E**
6" x 20" (152 x 508 mm) [2]		**F**
Flowguide construction		
No flowguide		**A**
Mild steel, polyester painted		**B**
304 (1.4301) stainless steel [1]		**C**
304 (1.4301) stainless steel [2]		**D**
316 (1.4401) stainless steel [1]		**E**
316 (1.4401) stainless steel [2]		**F**
Mild steel, polyester painted with PTFE liner		**G**
Mild steel, polyester painted with abrasion resistant liner		**H**
304 (1.4301) stainless steel, with PTFE liner [1]		**J**
304 (1.4301) stainless steel, with PTFE liner [2]		**K**
Mild steel, epoxy paint with zinc primer [1]		**L**
Mild steel, epoxy paint with zinc primer [2]		**M**
Other flowguide materials available upon request.		

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Milltronics E,V, and A Series

Selection and Ordering data

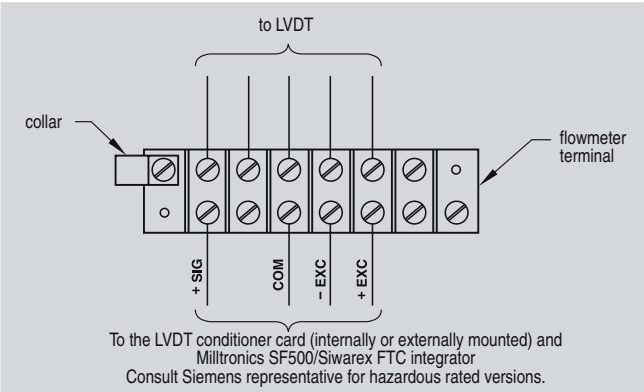
		Order No.
Milltronics V Series Flowmeters Compact vertical flow, low- to medium-capacity solid flowmeters for various product sizes, densities, and fluidities, particularly fine powders. A sensing plate, sensing head and integrator are required to complete the system.	C)	**7MH7104-** ■■■■**0**
Cabinet construction		
Mild steel, painted		**1**
304 (1.4301) stainless steel[1)]		**2**
304 (1.4301) stainless steel[2)]		**3**
316 (1.4401) stainless steel[1)]		**4**
316 (1.4401) stainless steel[2)]		**5**
Mild steel, epoxy paint with zinc primer[1)]		**6**
Mild steel, epoxy paint with zinc primer[2)]		**7**
Further designs Please add "**-Z**" to Order No. and specify Order code(s).		Order Code
Stainless Steel tag [69 x 38 mm (2.7 x 1.5")], Measuring-point number / identification (max 16 characters), specify in plain text.		**Y15**
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000		**C11**
Inspection Certificate Type 3.1 per EN 10204		**C12**
Instruction manual		
English	C)	**7ML1998-5CU01**
German Note: The instruction manual should be ordered as a separate line on the order.	C)	**7ML1998-5CU31**
Additional instruction manuals		
Solids Flowmeter Application Guidelines, English	C)	**7ML1998-5GK01**
Solids Flowmeter Application Guidelines, German	C)	**7ML1998-5GK31**
This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.		

[1)] For models 1 and 2 only.
[2)] For model 3 only.
C) Subject to export regulations AL: N, ECCN: EAR99.

		Order No.
Milltronics A Series Flowmeters Low- to medium-capacity flowmeters for powders conveyed by aerated gravity conveyors. A sensing plate, sensing head and integrator are required to complete the system.	C)	**7MH7106-** ■■■■■
Version		
A-40, 40 t/h maximum design capacity		**1**
A-300, 300 t/h maximum design capacity		**2**
Flowguide size		
8" (203 mm), A-40		**B**
10" (254 mm), A-300		**C**
12" (305 mm), A-40		**D**
14" (356 mm), A-300		**E**
20" (508 mm), A-300		**F**
Flowguide construction		
Mild steel, polyester painted		**B**
304 (1.4301) stainless steel		**D**
316 (1.4401) stainless steel		**E**
Cabinet construction		
Mild steel, polyester painted		**1**
304 (1.4301) stainless steel		**3**
316 (1.4401) stainless steel		**4**
Venting flange		
ASME flange pattern		**1**
DIN flange pattern		**2**
Further designs Please add "**-Z**" to Order No. and specify Order code(s).		Order Code
Stainless Steel tag [69 x 38 mm (2.7 x 1.5")], Measuring-point number / identification (max 16 characters), specify in plain text.		**Y15**
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000		**C11**
Inspection Certificate Type 3.1 per EN 10204		**C12**
Instruction manual		
English	C)	**7ML1998-5CV01**
German Note: The instruction manual should be ordered as a separate item on the order.	C)	**7ML1998-5CV31**
Additional instruction manuals		
Solids Flowmeter Application Guide, English	C)	**7ML1998-5GK01**
Solids Flowmeter Application Guide, German	C)	**7ML1998-5GK31**
This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.		

C) Subject to export regulations AL: N, ECCN: EAR99.

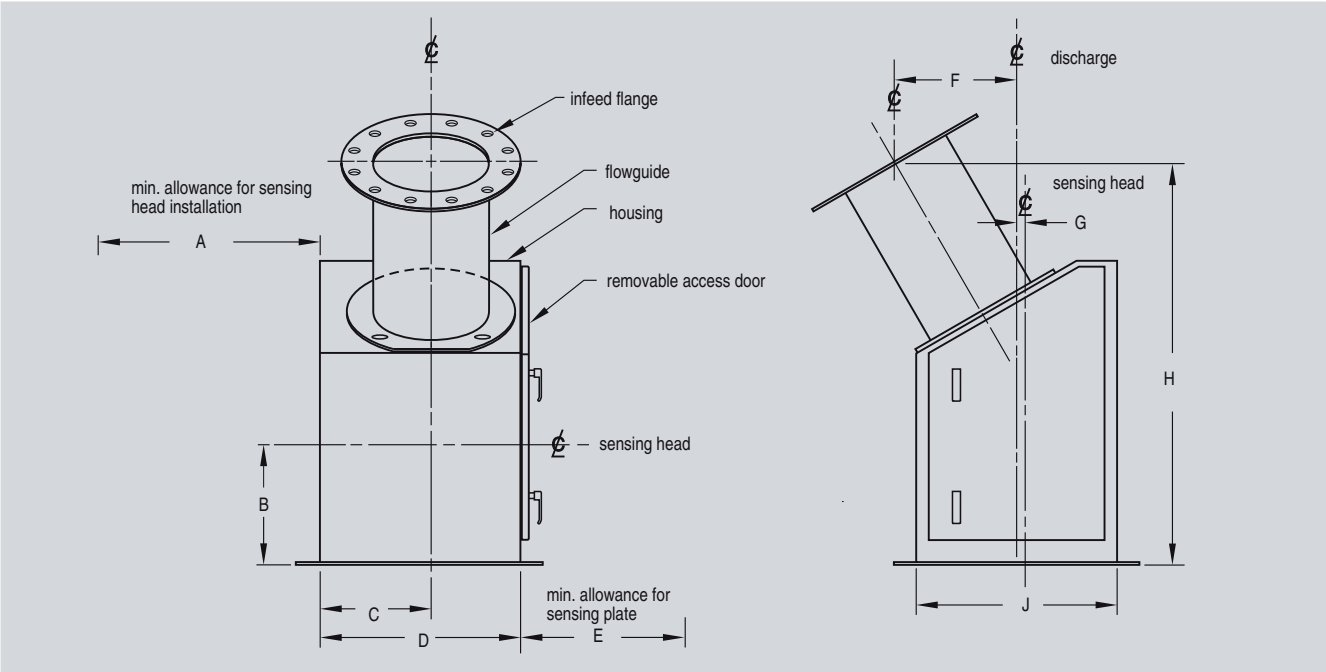
Schematics



E, V, and A Series connections

Dimensional drawings

E Series



E Series dimensions

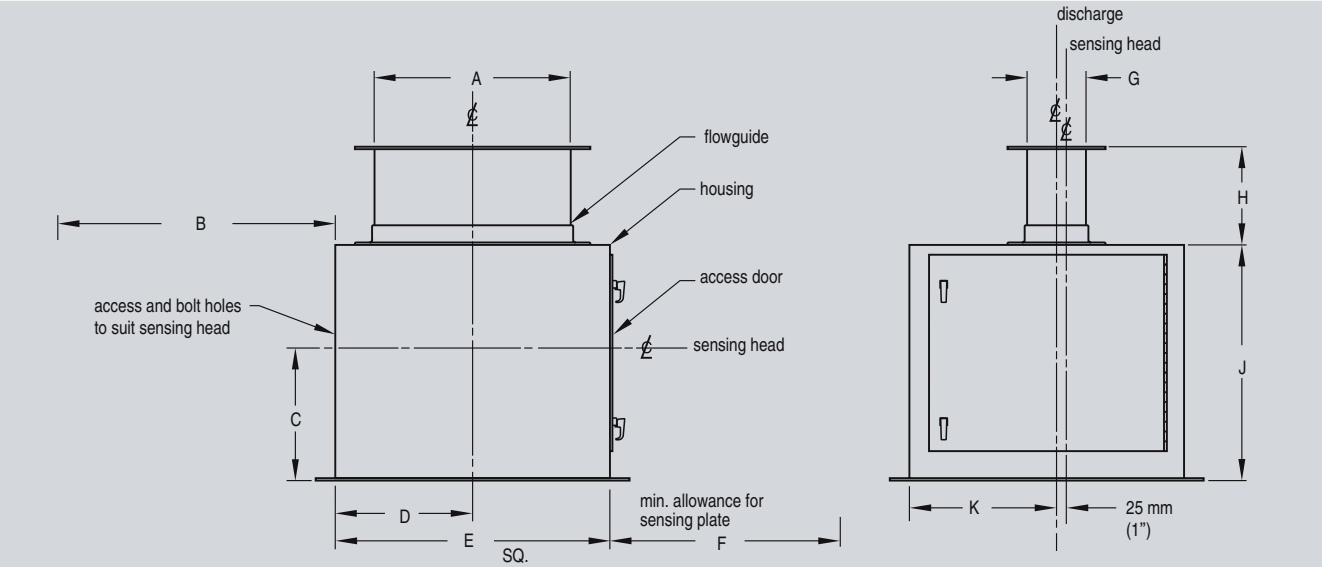
Model	A	B	C	D	E	F	G	H	J
E-40 Series	686 mm (27")	356 mm (14")	254 mm (10")	457 mm (18")	610 mm (24")	279 mm (11")	25 mm (1")	914 mm (36")	457 mm (18")
E-300 Series	1042 mm (41")	457 mm (18")	305 mm (12")	610 mm (24")	610 mm (24")	330 mm (13")	38 mm (1.5")	1270 mm (50")	610 mm (24")

E-40 Inlet Sizes				
51 mm (2")	102 mm (4")	152 mm (6")	203 mm (8")	254 mm (10")

E-300 Inlet Sizes					
152 mm (6")	203 mm (8")	254 mm (10")	305 mm (12")	356 mm (14")	406 mm (16")

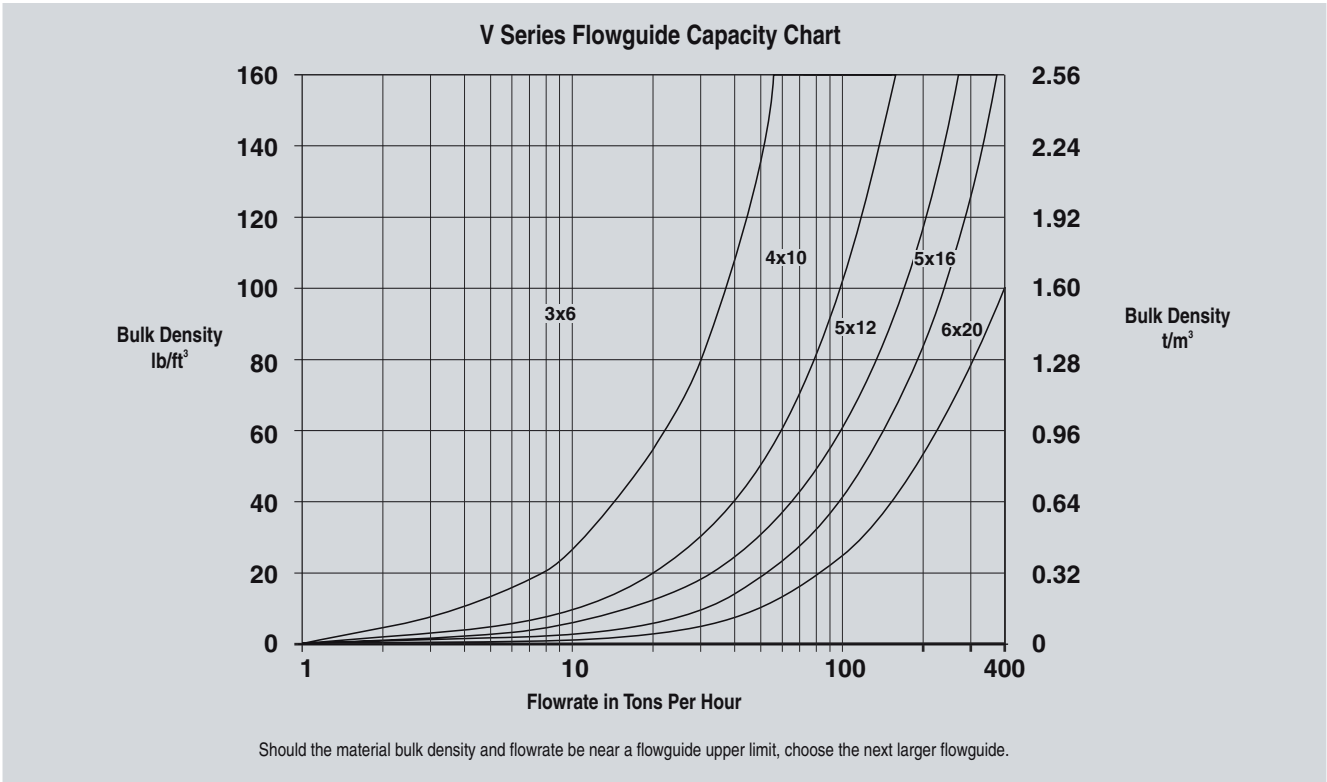
Milltronics E,V, and A Series

V Series



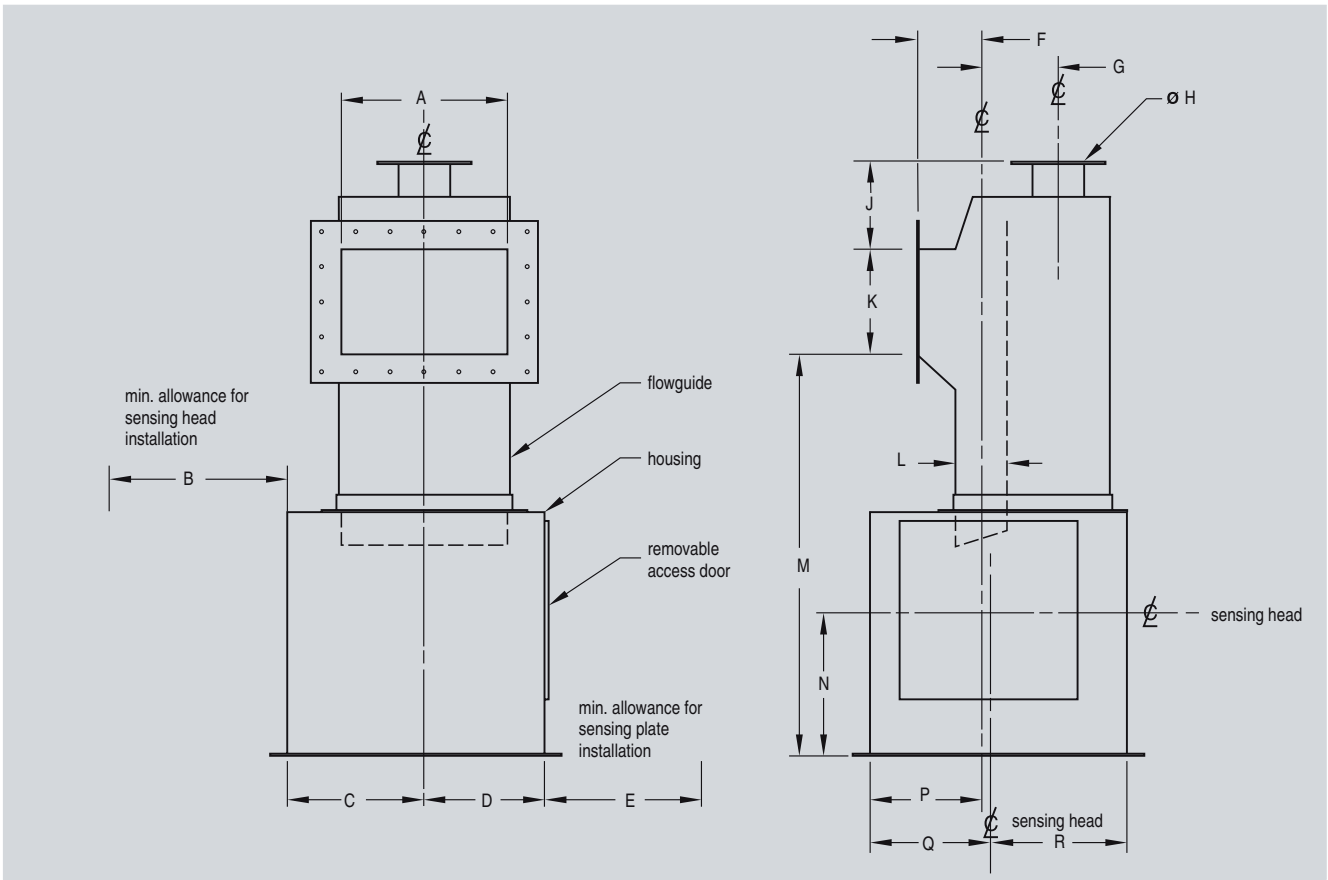
V Series dimensions

Size	A	B	C	D	E	F	G	H	J	K
V-40	152 mm (6")	686 mm (27")	304 mm (12")	254 mm (10")	508 mm (20")	457 mm (18")	76 mm (3")	203 mm (8")	508 mm (20")	254 mm (10")
V-40	254 mm (10")	686 mm (27")	304 mm (12")	254 mm (10")	508 mm (20")	457 mm (18")	102 mm (4")	203 mm (8")	508 mm (20")	254 mm (10")
V-40	305 mm (12")	686 mm (27")	304 mm (12")	254 mm (10")	508 mm (20")	457 mm (18")	127 mm (5")	203 mm (8")	508 mm (20")	254 mm (10")
V-300	406 mm (16")	1041 mm (41")	343 mm (13.5")	305 mm (12")	610 mm (24")	762 mm (30")	127 mm (5")	254 mm (10")	610 mm (24")	330 mm (13")
V-300	508 mm (20")	1041 mm (41")	343 mm (13.5")	356 mm (14")	711 mm (28")	762 mm (30")	152 mm (6")	254 mm (10")	610 mm (24")	381 mm (15")



V Series flowguide capacity chart

A Series



A Series dimensions

Size	A	B	C	D	E	F	G	H
A-40	203 mm (8")	686 mm (27")	305 mm (12")	254 mm (10")	711 mm (28")	127 mm (5")	203 mm (8")	102 mm (4")
A-40	305 mm (12")	686 mm (27")	305 mm (12")	254 mm (10")	711 mm (28")	127 mm (5")	203 mm (8")	102 mm (4")
A-300	254 mm (10")	1041 mm (41")	406 mm (16")	356 mm (14")	889 mm (35")	191 mm (7.5")	229 mm (9")	152 mm (6")
A-300	356 mm (14")	1041 mm (41")	406 mm (16")	356 mm (14")	889 mm (35")	191 mm (7.5")	229 mm (9")	152 mm (6")
A-300	508 mm (20")	1041 mm (41")	406 mm (16")	356 mm (14")	889 mm (35")	191 mm (7.5")	229 mm (9")	152 mm (6")

Size	J	K	L	M	N	P	Q	R
A-40	229 mm (9")	203 mm (8")	76 mm (3")	914 mm (36")	305 mm (12")	229 mm (9")	229 mm (9")	330 mm (13")
A-40	229 mm (9")	203 mm (8")	102 mm (4")	914 mm (36")	305 mm (12")	229 mm (9")	229 mm (9")	330 mm (13")
A-300	254 mm (10")	305 mm (12")	127 mm (5")	1168 mm (46")	419 mm (16.5")	330 mm (13")	356 mm (14")	406 mm (16")
A-300	254 mm (10")	305 mm (12")	152 mm (6")	1168 mm (46")	419 mm (16.5")	330 mm (13")	356 mm (14")	406 mm (16")
A-300	254 mm (10")	305 mm (12")	178 mm (7")	1168 mm (46")	419 mm (16.5")	330 mm (13")	356 mm (14")	406 mm (16")

Milltronics ILE Sensing Heads

Overview

Milltronics ILE-37 and ILE-61 Sensing Heads are out-of-the-process sensing elements for series E, V, and A solids flowmeters.

Benefits

- Easy installation with modular assembly
- ±1% accuracy (or better) with high repeatability
- Totally enclosed, dust-tight, flow metering of bulk solids
- Sensing mechanism is outside the process, protected from contamination
- No zero drift, due to unique sensing mechanism
- Low maintenance; only the sensing plate is in the process
- No restriction of product flow

Application

Milltronics ILE-37 and ILE-61 Sensing Heads are used in applications such as product ratioing, batch load-out, and process feed rate control, the ILE series of sensing heads has been field-proven in thousands of applications with some units providing over a quarter century of reliable performance.

The ILE sensing heads use only the horizontal force created by impact of product upon the sensing plate and then apply the horizontal deflection to a highly reliable Linear Variable Differential Transformer (LVDT).

Friction-less pivots exclude the vertical force from the sensing process and the LVDT travel range is controlled by a coil spring selected for the specified full-scale flow rate. A viscous fluid damper provides mechanical damping in the event of pulsating flows.

The LVDT converts the horizontal movement, proportional to the impact forces into an electrical signal, which is converted by the integrator to time-based flow rate indication and totalling. This method of sensing material flow has been proven best in thousands of applications all over the world.

Technical specifications

	ILE-37	ILE-61
Mode of operation		
Measuring principle	Deflection measurement using LVDT (linear variable differential transformer)	
Typical application	For use in all E,V, and A Series flowmeters	
Flow input		
Maximum particle size	13 mm (0.5")	25 mm (1")
Minimum flow rate	0 ... 0.2 t/h (0 ... 0.2 STPH)	0 ... 20 t/h (0 ... 22 STPH)
Maximum flow rate	0 ... 40 t/h (0 ... 44 STPH)	0 ... 300 t/h (0 ... 330 STPH)
Performance		
Accuracy[1)]	± 1% or better of full scale, higher accuracy with linearizing features offered by integrators	
Repeatability	± 0.2 %	
Specified range	33 ... 100 %	
Medium conditions		
Ambient temperature		
• without internally mounted LVDT card	-40 ... +60 °C (-40 ... +140 °F)	-40 ... +60 °C (-40 ... +140 °F)
• with optional internally mounted LVDT card	-40 ... +50 °C (-40 ... +122 °F)	-40 ... +50 °C (-40 ... +122 °F)
Maximum product temperature	+232 °C (+450 °F)	+232 °C (+450 °F)
Design	Aluminum body, fiberglass cover, 304L (1.4306) stainless steel sensing plate	
Options	CSA certified for Class I, Groups C and D; Class II Groups E, F and G; Class III hazardous areas Epoxy paint coating of external aluminum casting surfaces High temperature, to +400 °C (+750 °F) product temperature Sensing Plate • 316L (1.4401) stainless steel sensing plate construction • Abrasion-resistant and non-stick sensing plate coating/liners Internally mounted LVDT Conditioner Card for use with SF500 integrator Externally mounted LVDT Conditioner Card in NEMA 4 (IP65) enclosure for use with Milltronics SF500 or SIWAREX FTC integrator when sensing head is mounted in hazardous area or with high ambient temperatures	
Approvals	CE, C-TICK	CE, C-TICK

1) Accuracy subject to: On factory approved installations the flowmeter system's totalilzed weight will be within the specified accuracy when compared to a known weighed material test sample. The test rate must be within the specified range of the design capacity and held constant for the duration of the test. The minimum material test sample must be equivalent to a sample obtained at the test flow rate for at least ten minutes running time.

Milltronics ILE Sensing Heads

Selection and Ordering data

		Order No.
Milltronics ILE-37 Sensing Head	C)	**7MH7110-** ■■■■■
Out-of-the-process sensing element for E-40, V-40, and A-40 solids flowmeters. A flowguide, sensing plate and integrator are required to complete the system. Order flowguide, sensing plate and integrator separately.		
Mounting		
Base		**0**
Side		**1**
Base, explosion proof, CSA Class I Groups C and D; Class II Groups E, F and G		**3**
Side, explosion proof, CSA Class I Groups C and D; Class II Groups E, F and G		**4**
Note: Externally mounted LVDT Conditioner in NEMA 4 enclosure required for use with SF500 or Siwarex FTC and mounting option 3 and 4. See optional equipment.		
Range (Range spring size/leaf spring thickness/ viscosity of damping fluid)		
C2/A2/1000		**A**
C3/A2/1000		**B**
C4/A2/1000		**C**
C5/A2/1000		**D**
C6/A2/1000		**E**
C7/A2/1000		**F**
C8/A2/3000		**G**
C9/A2/3000		**H**
C10/A2/3000		**J**
C11/A3/5000		**K**
C12/A3/5000		**L**
C13/A3/5000		**M**
C14/A3/5000		**N**
C0/A2/500		**P**
C0/A3/500		**Q**
C10/A3/3000		**R**
Gasketing		
Silicone		**A**
Silicone, light duty		**B**
PTFE		**E**
Coating (process side only)		
None, standard aluminum		**0**
Epoxy - white/aluminum, external castings only		**1**
Sensing head mounted LVDT conditioner		
Not required[1)]		**0**
Required for use with SF500 or SIWAREX FTC integrator[2)]		**1**

1) For use with Compu Series integrators or when externally mounted LVDT conditioner required. See Note under Mounting.
2) Applicable for mounting options 0 and 1 only.
C) Subject to export regulations AL: N, ECCN: EAR99.

		Order No.
Further designs Please add "**-Z**" to Order No. and specify Order code(s).		Order Code
Stainless Steel tag [69 x 38 mm (2.7 x 1.5")], Measuring-point number / identification (max 16 characters), specify in plain text.		**Y15**
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000		**C11**
Instruction manual		Order No.
English	C)	**7ML1998-5CW01**
German	C)	**7ML1998-1CW31**
French	C)	**7ML1998-5CW11**
Solids flowmeter Application Guidelines, English	C)	**7ML1998-5GK01**
Solids flowmeter Application Guidelines, German	C)	**7ML1998-5GK31**
Note: The instruction manual should be ordered as a separate item on the order.		
This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.		
Calibration hanger weights		
20 g (0.04 lb)	C)	**7MH7724-1AC**
50 g (0.1 lb)	C)	**7MH7724-1AD**
100 g (0.2 lb)	C)	**7MH7724-1AE**
200 g (0.4 lb)	C)	**7MH7724-1AF**
500 g (1.1 lb)	C)	**7MH7724-1AG**
1000 g (2.2 lb)	C)	**7MH7724-1AH**
2000 g (4.4 lb)	C)	**7MH7724-1AJ**
5000 g (11 lb)	C)	**7MH7724-1AK**
Spare Parts		
LDVT conditioner in NEMA 4 enclosure (to interface SF500 or Siwarex FTC and LVDT sensor)	C)	**7MH7723-1AJ**
Silicone inner diaphragm	F)	**7MH7723-1DN**
Silicone outer diaphragm		**7MH7723-1DP**
PTFE inner diaphragm	F)	**7MH7723-1AL**
PTFE outer diaphragm	F)	**7MH7723-1AM**
LVDT transformer and core, standard spare		**7MH7723-1DS**
Encapsulated LVDT replacement kit	C)	**7MH7723-1DE**
LVDT transformer and core, standard spare		**7MH7723-1DS**
Damping fluid, 1000 CS, 1 lb bottle	C)	**7MH7723-1EU**
Damping fluid, 3000 CS, 1 lb bottle	C)	**7MH7723-1EV**
Damping fluid, 5000 CS, 1 lb bottle	C)	**7MH7723-1EW**
Range spring assembly, C2		**7MH7723-1EX**
Range spring assembly, C3		**7MH7723-1EY**
Range spring assembly, C4		**7MH7723-1FA**
Range spring assembly, C5		**7MH7723-1FB**
Range spring assembly, C6		**7MH7723-1FC**
Range spring assembly, C7		**7MH7723-1FD**
Range spring assembly, C8		**7MH7723-1FE**
Range spring assembly, C9		**7MH7723-1FF**
Range spring assembly, C10		**7MH7723-1FG**
Range spring assembly, C11		**7MH7723-1FH**
Range spring assembly, C12		**7MH7723-1FJ**
Range spring assembly, C13		**7MH7723-1FK**
Range spring assembly, C14		**7MH7723-1FL**
Leaf spring, A2, kit	C)	**7MH7723-1BN**
Leaf spring, A3, kit	C)	**7MH7723-1BP**
Circuit card, LVDT, internal mount	C)	**7MH7723-1ET**
ILE-37 replacement O-ring kit	F)	**7MH7723-1DC**

C) Subject to export regulations AL: N, ECCN: EAR99.
F) Subject to export regulations AL: 91999, ECCN: N.

Selection and Ordering data

		Order No.
Milltronics ILE-61 Sensing Head	C)	**7MH7112-**
Out-of-the-process sensing element for use with E-300, A-300 and V-300 flowmeters. A flowguide, sensing plate and integrator are required to complete the system. Order flowguide, sensing plate and integrator separately.		
Classification		
Non-hazardous		**1**
Hazardous, CSA Class I, Groups C and D; Class II, Groups E, F and G		**2**
Note: Externally mounted LVDT conditioner in NEMA 4 enclosure required for use with SF500 or Siwarex FTC and classification option 2. See Calibration Weights.		
Range (Range spring size/viscosity of damping fluid)		
D1/1000 Position 1		**A**
D1/1000 Position 2		**B**
D1/1000 Position 3		**C**
D2/1000 Position 1		**D**
D2/1000 Position 2		**E**
D2/1000 Position 3		**F**
D3/3000 Position 1		**G**
D3/3000 Position 2		**H**
D3/3000 Position 3		**J**
D4/5000 Position 1		**K**
D4/5000 Position 2		**L**
D4/5000 Position 3		**M**
D5/5000 Position 1		**N**
D5/5000 Position 2		**P**
D5/5000 Position 3		**Q**
Gasketing		
Silicone		**A**
PTFE		**D**
Other gasketing available upon request.		
Coating (process side only)		
None, standard aluminum		**0**
Epoxy - white/aluminum, external castings only		**1**
Other coatings available upon request.		
Sensing head mounted LVDT conditioner		
Not required1)		**0**
Required for use with SF500 or Siwarex FTC integrator2)		**1**

1) For use with Compu Series integrators or when externally mounted LVDT conditioner required. See Note under Classification.
2) Available with classification option 1 only
C) Subject to export regulations AL: N, ECCN: EAR99.

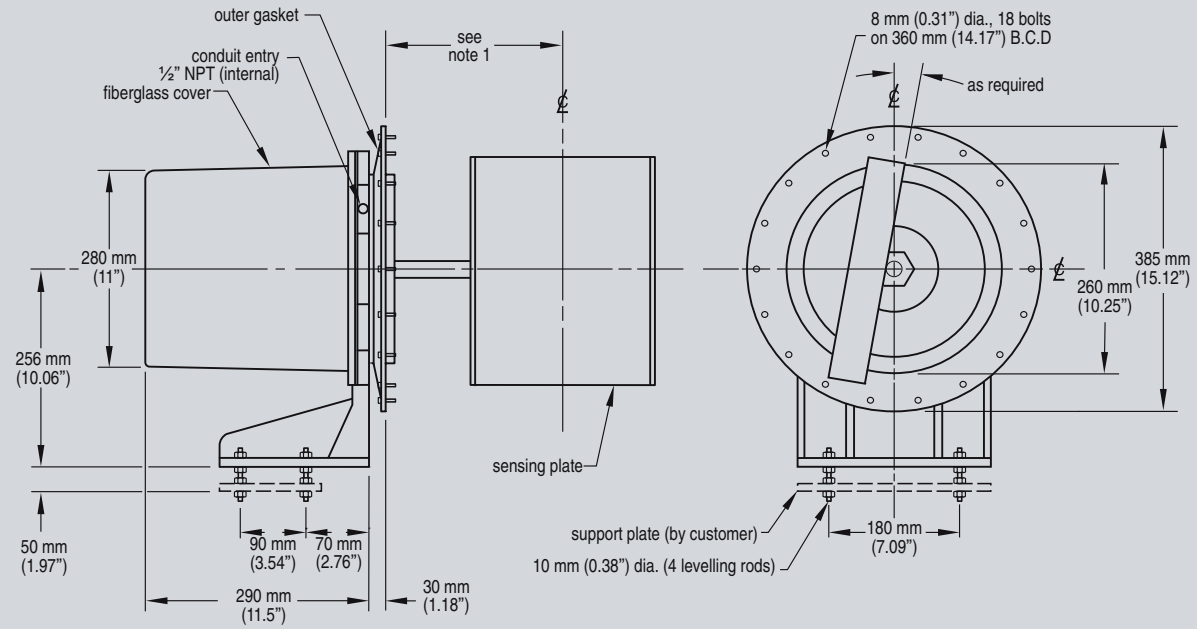
		Order No.
Further designs		Order Code
Please add "**-Z**" to Order No. and specify Order code(s).		
Stainless Steel tag [69 x 38 mm (2.7 x 1.5")], Measuring-point number / identification (max 16 characters), specify in plain text.		**Y15**
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000		**C11**
Instruction manual		Order No.
English	C)	**7ML1998-5CX01**
German	C)	**7ML1998-1CX31**
Note: Instruction Manual should be ordered as a separate item on the order.		
This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.		
Calibration hanger weights		
20 g (0.04 lb)	C)	**7MH7724-1AC**
50 g (0.1 lb)	C)	**7MH7724-1AD**
100 g (0.2 lb)	C)	**7MH7724-1AE**
200 g (0.4 lb)	C)	**7MH7724-1AF**
500 g (1.1 lb)	C)	**7MH7724-1AG**
1000 g (2.2 lb)	C)	**7MH7724-1AH**
2000 g (4.4 lb)		**7MH7724-1AJ**
5000 g (11 lb)		**7MH7724-1AK**
Spare Parts		
LVDT conditioner in NEMA 4 enclosure to interface SF500 and LVDT sensor)	C)	**7MH7723-1AJ**
Silicone inner diaphragm	F)	**7MH7723-1DQ**
Silicone outer diaphragm	F)	**7MH7723-1DR**
PTFE inner diaphragm	F)	**7MH7723-1BA**
PTFE outer diaphragm	F)	**7MH7723-1BB**
LVDT transformer and core, standard spare		**7MH7723-1DS**
ILE-61 replacement O-ring kit	F)	**7MH7723-1DD**
Encapsulated LVDT replacement kit	C)	**7MH7723-1DE**
Damping fluid, 1000 CS, 1 lb bottle	C)	**7MH7723-1EU**
Damping fluid, 3000 CS, 1 lb bottle	C)	**7MH7723-1EV**
Damping fluid, 5000 CS, 1 lb bottle	C)	**7MH7723-1EW**
Range spring assembly, D1		**7MH7723-1FM**
Range spring assembly, D2		**7MH7723-1FN**
Range spring assembly, D3		**7MH7723-1FP**
Range spring assembly, D4		**7MH7723-1FQ**
Range spring assembly, D5	C)	**7MH7723-1GJ**
Leaf spring kit, 4 required	C)	**7MH7723-1BQ**
Circuit card, LVDT, internal mount	C)	**7MH7723-1ET**
ILE-61 replacement o-ring kit	F)	**7MH7723-1DD**
ILE-61, Taper Pin, spare		**7MH7723-1GD**

C) Subject to export regulations AL: N, ECCN: EAR99.
F) Subject to export regulations AL: 91999, ECCN: N.

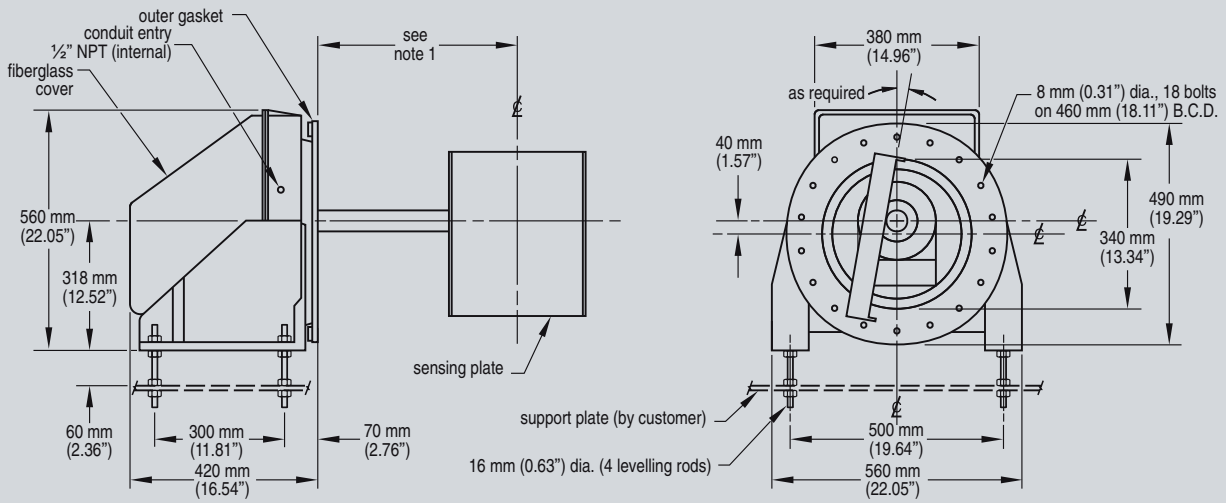
Milltronics ILE Sensing Head

Dimensional drawings

ILE-37 Sensing Head



ILE-61 Sensing Head



Notes:
1. Refer to flowmeter drawing for sensing head mounting hole to flowguide centerline dimension.
2. Sensing head support plate should be rigid and independent of flowmeter housing.
3. Ensure outer gasket seals dust tight to flowmeter housing wall.

ILE sensing head dimensions

Overview

The sensing plate transfers the impact force to the sensing head of the flowmeter.

Selection and Ordering data

		Order No.
Milltronics Flowmeter Sensing Plates	C)	**7MH7114-**
The sensing plate transfers the impact force to the sensing head of the flowmeter.		■■■■ **0**
Plate size		
18" x 10" (457.2 x 254 mm), for E-40 with 2, 4 or 6" (50.8, 101.6 or 152.4 mm) flowguide[1]		**1 A**
20" x 12" (508 x 304.8 mm), for E-40 with 8" (203.2 mm) flowguide[1]		**1 B**
20" x 14" (508 x 355.6 mm), for E-40 with 10"(254 mm) flowguide[1]		**1 C**
22" x 12" (558.8 x 304.8 mm), for E-300 with 6 or 8" (152.4 or 203.2 mm) flowguide[1]		**5 D**
24" x 16" (609.6 x 406.4 mm) for E-300 with 10 or 12" (254 or 304.8 mm) flowguide[1]		**5 E**
24" x 20" (609.6 x 508 mm) for E-300 with 14 or 16" (355.6 or 406.4 mm) flowguide[1]		**5 F**
12" x 12" (304.8 x 304.8 mm), for A-40 with 8" (203.2 mm) flowguide[2]		**4 G**
16" x 14" (406.4 x 355.6 mm), for A-40 with 12" (304.8 mm) flowguide[2]		**4 H**
14" x 18" (355.6 x 457.2 mm), for A-300 with 10" (254 mm) flowguide[2]		**7 J**
18" x 20" (457.2 x 508 mm), for A-300 with 14" (355.6 mm) flowguide[2]		**7 K**
24" x 22" (609.6 x 558.8 mm), for A-300 with 20" (508 mm) flowguide[2]		**7 L**
12" x 10" (304.8 x 254 mm), for V-40 with 3 x 6" (76.2 x 152.4 mm) flowguide[3]		**3 M**
14" x 14" (355.6 x 355.6 mm), for V-40 with 4 x 10" (101.6 x 254 mm) flowguide[3]		**3 N**
16" x 16" (406.4 x 406.4 mm), for V-40 with 5 x 12" (127 x 304.8 mm) flowguide[3]		**3 P**
18" x 20" (457.2 x 508 mm), for V-300 with 5 x 16" (127 x 406.4 mm) flowguide[3]		**6 Q**
20" x 24" (508 x 609.6 mm), for V-300 with 6 x 20" (152.4 x 508 mm) flowguide[3]		**6 R**
12" x 12" (304.8 x 304.8 mm), for C-40 with 6" (152.4 mm) flowguide[4]		**8 S**
12" x 14" (304.8 x 355.6 mm), for C-40 with 10" (254 mm) flowguide[4]		**8 T**

Selection and Ordering data

		Order No.
Milltronics Flowmeter Sensing Plates	C)	**7MH7114-**
The sensing plate transfers the impact force to the sensing head of the flowmeter.		■■■■ **0**
Plate material		
304 (1.4301) stainless steel[5]		**A**
304 (1.4301) stainless steel[6]		**B**
316 (1.4401) stainless steel[7]		**C**
316 (1.4401) stainless steel[6]		**D**
304 (1.4301) stainless steel[7]		**E**
304 (1.4301) stainless steel, heavy-duty[6]		**F**
316 (1.4401) stainless steel, light-duty[8]		**G**
316 (1.4401) stainless steel, heavy-duty[7]		**H**
316 (1.4401) stainless steel, heavy-duty[6]		**J**
Plate liner		
No liner		**1**
Polyurethane[7]		**2**
Polyurethane[6]		**3**
PTFE[7]		**4**
PTFE[6]		**5**
Alumina ceramic tiles[7]		**6**
Alumina ceramic tiles[6]		**7**
Plasma A/R[7]		**8**
Plasma A/R[6]		**0**
Further designs		Order Code
Please add "**-Z**" to Order No. and specify Order code(s).		
Inspection Certificate Type 3.1 per EN 10204		**C12**
Instruction manual		
Solids Flowmeter Application Guidelines, English	C)	**7ML1998-5GK01**
Solids Flowmeter Application Guidelines, German	C)	**7ML1998-5GK31**
Note: Instruction Manual should be ordered as a separate item on the order.		
This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.		

[1] See 7MH7102.
[2] See 7MH7106.
[3] See 7MH7104.
[4] Available as spare part only.
[5] Available with flowmeter version 1 ... 4 and 8 only.
[6] Available with flowmeter version 5 ... 7 only.
[7] Available with flowmeter version 1 ... 4 only.
[8] Available with flowmeter version 1, 2 and 3 only.
C) Subject to export regulations AL: N, ECCN: EAR99.

Milltronics Flowmeter Sensing Plates

Selection and Ordering data

Description		Order No.
Flow meter spare load cells		
Millflo flowmeters stainless steel, with hardware		
1 lb (0.5 kg)		**Replace with 2 lb**
2 lb (0.9 kg)	C)	**PBD-23900176**
5 lb (2.3 kg)	C)	**PBD-23900177**
10 lb (4.6 kg)	C)	**7MH7725-1AA**
20 lb (9.2 kg)	C)	**7MH7725-1AB**
Millflo L, M, and MA series flowmeters stainless steel, with hardware		
50 lb (22.7 kg)	C)	**7MH7725-1AC**
100 lb (45.4 kg)	C)	**7MH7725-1AD**
Millflo 304 Stainless Steel sensing plates		
100 mm (4")		**PBD-25570-1AA0**
150 mm (6")		**PBD-25570-2AA0**
200 mm (8")		**PBD-25570-3AA0**
250 mm (10")		**PBD-25570-4AA0**
250 mm (10") light duty		**PBD-25570-5AA0**
300 mm (12")		**PBD-25570-6AA0**
Millflo 304 Stainless Steel, PTFE coated sensing plates		
100 mm (4")		**PBD-25570-1BA0**
150 mm (6")		**PBD-25570-2BA0**
200 mm (8")		**PBD-25570-3BA0**
250 mm (10")		**PBD-25570-4BA0**
250 mm (10") light duty		**PBD-25570-5BA0**
300 mm (12")		**PBD-25570-6BA0**
Millflo 304 Stainless Steel, polyurethane lined sensing plates		
100 mm (4")	C)	**PBD-51027413**
150 mm (6")	C)	**PBD-51027371**
200 mm (8")		**PBD-51027463**
250 mm (10")		**PBD-51027486**
300 mm (12")	C)	**PBD-51027369**
Millflo 316L Stainless Steel sensing plates		
100 mm (4")		**PBD-25570-1AB0**
150 mm (6")		**PBD-25570-2AB0**
200 mm (8")		**PBD-25570-3AB0**
250 mm (10")		**PBD-25570-4AB0**
250 mm (10") light duty		**PBD-25570-5AB0**
300 mm (12")		**PBD-25570-6AB0**
Millflo 316L Stainless Steel, PTFE coated sensing plates		
100 mm (4")		**PBD-25570-1BB0**
150 mm (6")		**PBD-25570-2BB0**
200 mm (8")		**PBD-25570-3BB0**
250 mm (10")		**PBD-25570-4BB0**
250 mm (10") light duty		**PBD-25570-5BB0**
300 mm (12")		**PBD-25570-6BB0**

C) Subject to export regulations AL: N, ECCN: EAR99.