### SIFLOW FC070

#### Overview



SIFLOW FC070 is based on the latest developments within the digital processing technology – engineered for high performance, fast flow step response, immunity against process generated noise, easy to install, commission and maintain.

SIFLOW FC070 is available in two versions:

- SIFLOW FC070 Standard
- SIFLOW FC070 Ex

The SIFLOW FC070 transmitter delivers true multi-parameter measurements i.e. mass flow, volume flow, density, temperature and fraction.

 $\mbox{SIFLOW}\mbox{ FC070}$  is designed for integration in a variety of automation systems, i.e.

- Central mounted in S7-300, C7
- Decentralized in ET 200M for use with S7-300 and S7-400 as PROFIBUS DP masters
- Decentralized in ET 200M for use with any automation system using standardized PROFIBUS DP masters
- Stand-alone via a MODBUS RTU master, i.e. SIMATIC PDM

The SIFLOW FC070 transmitter can be connected to all sensors of types MASS 2100, MC2 and FC300.

### Benefits

- Easy integration in SIMATIC S7 and PCS 7
- Support of SIMATIC PDM configuration tool via MODBUS
- Dedicated mass flow chip with high performance ASIC technology
- True 30 Hz update rate securing fast batching and step response
- Superior noise immunity due to a patented DFT (Discrete Fourier Transformation) algorithm
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn down ratio on flow and density accuracy
- Advanced diagnostics enhancing trouble shooting and meter verification
- Built-in batch controller with two-stage control and compensation
- · Digital outputs for direct batch control, frequency/pulse

- MODBUS RTU RS 232/485 interface for connection to SIMATIC PDM or any other MODBUS master
- Digital input for batch control, zero adjust
- Extensive simulation options for measurement values, I/O and errors easy communication/fault finding
- Multiple LED's for easy indication of flow, error and I/O state
- SENSORPROM technology automatically configures the transmitter during start-up providing:
  - Factory pre-programming with calibration data, pipe size, sensor type and I/O settings
  - Any values or settings changed by the user is stored automatically
  - Automatically re-programming of a new transmitter, without loss of settings and accuracy
  - Transmitter replacement in less than 30 seconds
- Four-wire Pt1000 measurement ensuring optimum accuracy mass flow, density and fraction flow
- Fraction flow computation based on 5th order algorithm matching all applications

### Application

SIFLOW FC070 mass flowmeters are suitable for all applications within the entire process industry, where there is a demand for accurate flow measurement. The meters are suitable for measuring on liquid and gas.

The main applications for the SIFLOW FC070 transmitter can be found in the following industries:

- · Food and beverage
- Pharmaceutical
- Automotive
- · Oil and gas
- Power generation and utility
- Water and waste water

### Design

SIFLOW FC070 is designed in an IP20 SIMATIC S7-300 enclosure and for use in central and de-central cabinets where sensors: FC300, MASS 2100 and MC2 are remotely mounted.

### Function

The following key functionality is available:

- Mass flow rate, volume flow rate, density, temperature and fraction flow
- Two built-in totalizers which can freely be set for counting mass, volume or fraction
- 1 frequency/pulse/batch output, 1 two-stage batch output, 1 digital input
- · Low flow cut-off
- Empty pipe detection
- Noise filter settings for different applications
- Simulation
- Two-stage batch controller
- Automatic zero point adjustment with zero point evaluation feed back
- Limit functionality
- · Comprehensive status and error reporting

## SIFLOW FC070

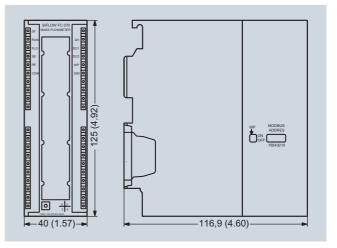
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Flow   Facebon A   Fraction B   Calvanic isolation   Calvanic act of processing of the programmable limits   Single and 2-stage batch function   Processing of the programmable limits   Single and 2-stage batch function   Processing of the programmable limits   Processing of the programmable limits   Processing of the processing of	Measurement functions	111 70		Bus termination: Integrated. Can be enabled by inserting wire
• Totalizer 2         Totalization of mass flow, volume flow, fraction B flow, fraction B flow, fraction B atching function with the use of one or two outputs for dosing in high and low speed         Power           • 4 programmable limits         4 programmable ingliflow limits for mass flow, volume flow density, sensor temperature, fraction A in %. Limits will generate adain in facility of the interference and surface in %. Limits will generate adain in facility. The sector totalizer 1 reset totalizer 1 reset totalizer 2 reset totalizer 1 and 2, zoro.         Embryonemt         Ambient temperature (~40 +70 °C (~40 +138 °F)         Ambient temperature (~40 +70 °C (~40 +138 °F)         Storage -40 +70 °C (~40 +138 °F)         Embryonemt           Fligh signal         • Nominal voltage: 24 V DC (~40 ±100 °F)         Ambient temperature (~40 +70 °C (~40 +138 °F)         Ambient temperature (~40 +70 °C (~40 +138 °F)         Operation 0 60 °C (32 140 °F)         Operation 0 60 °C (32 140 °F)         Operation 0 60 °C (32 140 °F)         Operation 0 60 °C (40 +138	Totalizer 1		Galvanic isolation	<u> </u>
one or two outputs for dosing in high and flow speed  4 programmable limits  5 programmable limits  4 programmable limits  4 programmable limits  5 programmable limits  4 programmable limits  5 programmable limits  5 programmable limits  6 programmable limits  7 programmable limits  8 programmable limits  8 programmable limits  8 programmable limits  9 programmable limits  9 programmable limits  1 programmable limits  2 programmable limits  3 programmable limits  4 programmable limits  5 programmable limits  6 programmable	• Totalizer 2			cation interfaces are galvanically
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- 4 programmable limits			Supply	24 V DC nominal
for mass flow, you'me flow density, sensor temporature, fraction A flow, fraction B flow, fraction A flow, fraction A flow, fraction B flow	• 4 programmable limits		Tolerance	20.4 V DC 28.8 V DC
A flow, fraction B flow, fraction A in %. Limits will generate an alarm if reached.	4 programmable limits	for mass flow, volume flow den-	Consumption	Max. 6 W
Packed			Fuse	
Start batch, stop batch, start/stop batch, start/stop batch, hold/continue batch, reset totalizer 1, reset totalizer 2, reset totalizer 1, reset totalizer 2, reset totalizer 3, zero adjust, force frequency output (feeze frequency feeze frequen		in %. Limits will generate an alarm		user
Functions   Start batch, stort/storp batch, insert fotalizer 1, reset fotalizer 1, reset fotalizer 1, reset fotalizer 1, reset fotalizer 2, adjust, force frequency output, freeze frequency and freeze frequency freeze fr		if reached.		
Communication   Communicati	• .	Q	Ambient temperature	
Page 1 and 2. Zero adjust, force frequency output, freeze frequency output in Noryl, color: athracite over the first output in Noryl, color: athracite output in Noryl, color: athracit	Functions			Operation 0 60 °C
Altitude per local properties of the second position of the second per local per loca		reset totalizer 1, reset totalizer 2,		,
Lower limit: 15 V DC	High signal	adjust, force frequency output, freeze frequency output	Operation conditions	tically mounted rail, the maximum operating temperature is +45 °C
Current: 2 15 mA   Enclosure	r ngri oigridi	• Lower limit: 15 V DC	Altitude	• Operation: -1000 2000 m
Nominal voltage: 0 V DC   Lower limit: -3 V DC   Lower limit: 5 V DC   Lower limit			Enclosure	,
Lower limit: -3 V DC   • Upper limit: 5 V DC   • Upper limit: 5 V DC   • Current: -15 15 mA   Mechanical load   According to IEC 60529	Low signal			Noryl, color; athracite
Current: -15 15 mA   Approx. 10 kΩ   Approx. 10 kΩ     Switching   Max. 100 Hz.     Digital output 1 and 2     Functions   Pulse, frequency, quadrature pulse, quadrature frequency 2-stage batch, batch     Voltage supply   Switching current   Max. 30 V DC (passive output)     Leakage current   Sulf Murent     Switching frequency   Sulf Murent     Switching frequency   Sulf Murent     Switching current   Max. 30 mA at 30 V DC     Load resistance   1 10 kΩ     Functions   Pulse, frequency, quadrature pulse, quadrature frequency 2-stage batch     Switching frequency   Sulf Murent     Switching current   Max. 30 mA at 30 V DC     Switching frequency   Sulf Murent     Switching frequency   Switching frequency     Switching frequency   Switching frequency     Switching frequency   Switching frequency     Switching	Low digital	• Lower limit: -3 V DC		IP20/NEMA 2 according to
Switching Max. 100 Hz.    Signature   Approx. 10 kΩ   Approvals			Mechanical load	
Switching       Max. 100 Hz.         Digital output 1 and 2         Functions       • Output 1: Pulse, frequency, quadrature pulse, quadrature frequency 2-stage batch, batch       SIFLOW FC070 Ex       CE, cULus, UL Haz.Loc., FM, ATEX II 3 G EEx nA II T4 and II (1) G [EEx ia] II C         Voltage supply       • Output 2: Quadrature pulse, quadrature frequency, 2-stage batch       Electromagnetic compatibility       Requirements of EMC law; Noise immunity according to IEC 61000-6-2, tested according to IEC 61000-4-3, IEC 61000-4-3, IEC 61000-4-3, IEC 61000-4-3, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-5, IEC 61000-4-6         Switching current       Max. 30 mA at 30 V DC       Emitted interference according to EN 50081-2, tested according to EN 50081-2, tested according to EN 55011, class A, group 1         Leakage current       ≤ 0.4 mA at max. voltage 30 V DC Load resistance       1 10 kΩ       NAMUR       Within the limits according to "Allgemeine Anforderung" with error criteria A in accordance with NE21         Switching frequency       0 12 kHz 50% duty cycle       Programming tools         Functions       Pulse, frequency, quadrature pulse, quadrature frequency 2-stage batch, batch       SIMATIC PCS7       Configuration trough backplane P-BUS and PLC program P-BUS and PLC pr	Input	Approx. 10 k $\Omega$	Annuavala	(S7-300 devices)
Functions  **Output 1: Pulse, frequency, quadrature pulse, quadrature frequency 2-stage batch, batch  **Output 2: Quadrature pulse, quadrature frequency, 2-stage batch  **Voltage supply  **Voltage supply  **Voltage supply  **Switching current  **Voltage drop  **Leakage current  Leakage current  Load resistance  **In 10 k\Omega  Switching frequency  **Output 2: Quadrature pulse, quadrature frequency, 2-stage batch  **Voltage supply  **Switching current  **Max. 30 mA at 30 V DC  Voltage drop  **Switching current  **Voltage drop  **Leakage current  Leakage current  Load resistance  **In 10 k\Omega  Switching frequency  **In 10 k\Omega  **Switching frequency  **	Switching	Max. 100 Hz.	• •	CE allius ATEVII 20 FEV a A IIO
Functions   Pulse, frequency, quadrature pulse, quadrature pulse, quadrature frequency 2-stage batch, batch   Pulse, frequency 2-stage batch, batch   Pulse, quadrature frequency 2-stage batch   Pulse, quadrature pulse, quadrature pulse, quadrature frequency, 2-stage batch   Pulse, quadrature pulse, quadrature pulse, quadrature frequency, 2-stage batch   Pulse, frequency, quadrature pulse, quadrature frequency 2-stage batch, batch   Pulse, frequency, quadrature pulse, quadrature frequency 2-stage batch, batch   Programming tools   Pulse, frequency quadrature pulse, quadrature frequency 2-stage batch, batch   Programming tools   Pulse, frequency quadrature pulse, quadrature frequency 2-stage batch, batch   Programming tools   Pulse, frequency quadrature pulse, quadrature frequency 2-stage batch, batch   Programming tools   Pulse, frequency quadrature pulse, quadrature frequency 2-stage batch, batch   Programming tools   Pulse, frequency 2-stage batch, batch   Pulse, frequency 2-stage batch, batch   Pulse, frequency 2-stage batch, batch   Programming tools   Pulse, frequency 2-stage batch, batch   Programming tools   Pulse, frequency 2-stage batch, batch   Programming tools   Pulse, frequency 2-stage batch, batch   Pulse, frequency 2-stage batch and pulse pulse, p	Digital output 1 and 2			
2-stage batch, batch   Place   Programming to   Programming to   Programming to   Programming to   Programming to   Programming to   Program   Programming to   Program   Pro	Functions	Pulse, frequency, quadrature	SIFLOW FC0/0 EX	ATEX II 3 G EEx nA II T4 and
Quadrature pulse, quadrature frequency, 2-stage batchIEC 61000-6-2, tested according to: IEC 61000-4-2, 61000-4-3, IEC 61000-4-2, 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6Voltage supply3 30 V DC (passive output)Emitted interference according to IEC 61000-4-6Switching currentMax. 30 mA at 30 V DCEmitted interference according to EN 50081-2, tested according to EN 55011, class A, group 1Leakage current≤ 0.4 mA at max. voltage 30 V DCNAMURWithin the limits according to "Allgemeine Anforderung" with error criteria A in accordance with NE21Load resistance1 10 kΩ"Allgemeine Anforderung" with error criteria A in accordance with NE21FunctionsPulse, frequency, quadrature pulse, quadrature frequency 2-stage batch, batchProgramming toolsCommunicationSIMATIC S7Configuration trough backplane P-BUS and PLC programMODBUS RS 232C• Max. baudrate: 115200 baud • Max. line length: 15 m at 115200 baud • Signal level: according toSIMATIC PDMThrough MODBUS port RS 232C and RS 485			Electromagnetic compatibility	Requirements of EMC law;
Switching currentMax. 30 mA at 30 V DCEmitted interference according to EN 50081-2, tested according to EN 50081-2, tested according to EN 55011, class A, group 1Leakage current≤ 0.4 mA at max. voltage 30 V DCNAMURWithin the limits according to "Allgemeine Anforderung" with error criteria A in accordance with NE21Load resistance1 10 kΩ"Allgemeine Anforderung" with error criteria A in accordance with NE21FunctionsPulse, frequency, quadrature pulse, quadrature frequency 2-stage batch, batchProgramming toolsCommunicationSIMATIC S7Configuration trough backplane P-BUS and PLC programMODBUS RS 232C• Max. baudrate: 115200 baud • Max. line length: 15 m at 115200 baud • Signal level: according toSIMATIC PDMThrough MODBUS port RS 232C and RS 485	Valtage guesti.	Quadrature pulse, quadrature frequency, 2-stage batch		IEC 61000-6-2, tested according to: IEC 61000-4-2, 61000-4-3, IEC 61000-4-4, IEC 61000-4-5,
Voltage drop       ≤ 3 V DC at max. current       EN 50081-2, tested according to EN 55011, class A, group 1         Leakage current       ≤ 0.4 mA at max. voltage 30 V DC         Load resistance       1 10 kΩ         Switching frequency       0 12 kHz 50% duty cycle         Functions       Pulse, frequency, quadrature pulse, quadrature frequency 2-stage batch, batch       Programming tools         SIMATIC S7       Configuration trough backplane P-BUS and PLC program         MODBUS RS 232C       • Max. baudrate: 115200 baud • Max. line length: 15 m at 115200 baud • Signal level: according to       SIMATIC PDM       Through MODBUS port RS 232C and RS 485	9 11 7	" ' '		
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Load resistance  1 10 kΩ  Switching frequency  0 12 kHz 50% duty cycle  Functions  Pulse, frequency, quadrature pulse, quadrature frequency 2-stage batch, batch  Communication  MODBUS RS 232C  • Max. baudrate: 115200 baud • Max. line length: 15 m at 115200 baud • Signal level: according to  *MAMUH  Within the limits according to "Algemeine Anforderung" with error criteria A in accordance with NE21  Programming tools  SIMATIC S7  Configuration trough backplane P-BUS and PLC program  Configuration trough backplane P-BUS and PLC/WinCC face-plates  Through MODBUS port RS 232C  and RS 485	- '			
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• Max. baudrate: 115200 baud  • Max. line length: 15 m at 115200 baud  • Signal level: according to  • Max. line length: 15 m at plates  115200 baud  • Signal level: according to	Communication		0044710 0007	
• Signal level: according to  SIMATIC PDM I hrough MODBUS port RS 232C and RS 485	MODBUS RS 232C	Max. line length: 15 m at	SIMATIC PCS/	P-BUS and PLC/WinCC face-
		Signal level: according to	SIMATIC PDM	

### **SIFLOW FC070**

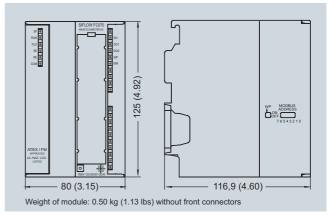
Selection and Ordering Data		
Description	Order No.	
SIFLOW FC070 flow transmitter Remember to order 40 pin front plug connector.	7ME4120-2DH20-0EA0	
40 pin front plug with screw contacts	6ES7392-1AM00-0AA0	
SIFLOW FC070 Ex flow transmit-	7ME4120-2DH21-0EA0	
ter Remember to order 20 pin front plug connector.		
20 pin front plug with screw contacts	6ES7392-1AJ00-0AA0	
Accessories		
Description	Order No.	
Cable with multiplug for connecting MASS 2100 and FC300 sensors		
• 5 m (16.4 ft)	FDK-083H3015	
• 10 m (32.8 ft)	FDK-083H3016	
• 25 m (82 ft)	FDK-083H3017	
• 50 m (164 ft)	FDK-083H3018	
• 75 m (246 ft)	FDK-083H3054	
• 150 m (492 ft)	FDK-083H3055	
Cable without multiplug for connecting MC2 sensors		
• 5 m (16.4 ft)	FDK-083H3001	
• 25 m (82 ft)	FDK-083H3002	
• 75 m (246 ft)	FDK-083H3003	
• 150 m (492 ft)	FDK-083H3004	
SIMATIC S7-300 rail The mechanical mounting rack of the SIMATIC S7-300		
• 160 mm (6.3")	6ES7 390-1AB60-0AA0	
• 482 mm (18.9")	6ES7 390-1AE80-0AA0	
• 530 mm (20.8")	6ES7 390-1AF30-0AA0	
• 830 mm (32.7")	6ES7 390-1AJ30-0AA0	
• 2000 mm (78.7")	6ES7 390-1BC00-0AA0	
Shield connecting element For mounting on S7-300 rail. 80 mm wide with 2 rows for 4 shield terminal elements each (no shield terminal elements included)	6ES7390-5AA00-0AA0	
Shield terminal element for 1 cable with 3 to 8 mm in dia. 2 pieces	6ES7390-5BA00-0AA0	
Shield terminal element for 1 cable with 4 to 13 mm in dia. 2 pieces	6ES7390-5CA00-0AA0	
SIFLOW FC070 Demo suitcase	A5E01075465	

6ES7307-1BA00-0AA0

## Dimensional drawings



SIFLOW FC070, dimensions in mm (inch)

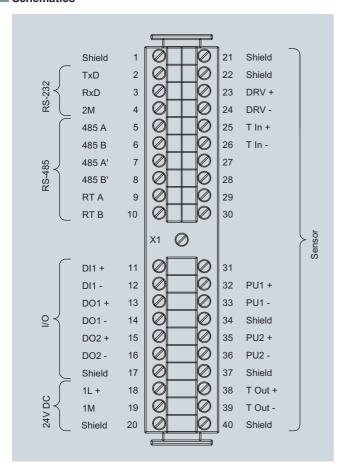


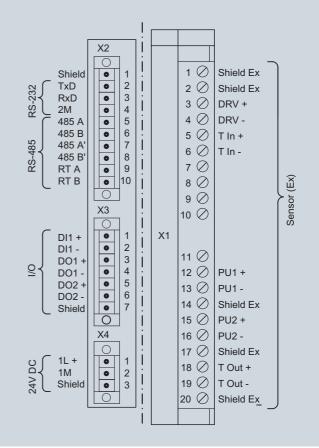
SIFLOW FC070 Ex, dimensions in mm (inch)

Power supply

**SIFLOW FC070** 

### Schematics





SIFLOW FC070, electrical connection

SIFLOW FC070 Ex, electrical connection