Flow Measurement
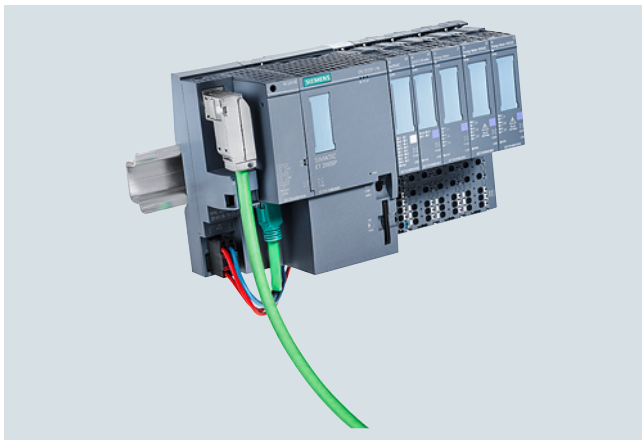## SITRANS FC (Coriolis)
Transmitters

SITRANS FCT070

Overview

SITRANS FCT070 transmitter

Mounting on the SIMATIC ET 200SP ST & HF

The technology module SITRANS FCT070 is a Coriolis flow meter transmitter for the SIMATIC ET 200SP ST & HF.

The TM SITRANS FCT070 flow transmitter can be operated directly in the SIMATIC PCS7 or in TIA Portal with the FCT070 Faceplates.

TM FCT070 offers real-time data processing and the display of all measuring and status data of the Coriolis flowmeter.

The TM FCT070 can work with all Siemens Coriolis flow meters. It can be directly connected to the SITRANS FCS300, SITRANS FCS400 and SITRANS FC MASS 2100 FC300 DN 4.

Benefits

- Easy integration into automation process control as TIA portal and PCS7
- Easy selection and integration of flow meters via TIA-Selector
- No transmitter between automation and flow meter required
- Cost effective integration of Coriolis flow meters for PLC controlled machines

- SITRANS FCT070 is a ET 200SP technology module and can combined with all other SIMATIC ET 200S SP ST & HF modules
- Fast and trouble-free communication between the flow meter and the PLC through digital data communication with up to 10 ms update rate
- SITRANS FCT070 and ET 200SP have the ATEX Zone 2 Class 1 Div 2 approvals. With the barrier SITRANS I300 the flowmeters sensor can be used in Ex Zone 1 & Class 1 Div 1 approval.
- Included advanced batch functionality without additional modules. I/Os are onboard
- Included the 17 standard fraction tables.

Application

SITRANS FCT070 can be used for machine builders and in the process industry plants. The meters are suitable for measuring on liquid and gas. With ET 200SP ST & HF the SITRANS FCT070 can be installed decentralized in small stations, with fast communication to the control room.

The faceplates for TIA-Portal and PCS 7 offer the direct full remote access to the flow meter.

The main industries for the SITRANS FCT070 transmitter:

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

Design

The SITRANS FCT070 is designed as ET 200SP ST & HF module and can directly installed with other ET 200SP modules.

The sensor DSL cable is directly mounted to the ET 200SP ST & HF base unit is providing the supply voltage and the data communication. The SITRANS FC sensors with DSL can be connected directly to the SITRANS FCT070.

For sensors in ATEX Zone 1, the SITRANS I300 barrier must be installed between FCT070 and the FC DSL.

Function

The following key functionalities are available:

- Mass flow rate, volume flow rate, density, temperature and fraction flow
- Three built-in totalizers which can freely be set for counting mass flow, volume flow, standard volume flow and fraction
- Two-stage batch controller
- Two digital inputs
- Two digital outputs
- Low flow cut-off
- Zero point adjustment
- Configurable upper and lower alarm and warning limits for all process values
- Comprehensive status and error reporting

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Technical specifications

Measurement of	Mass flow, volume flow, density, temperature, fraction A flow, fraction A %, fraction B flow, fraction B %
Measurement functions	
• Totalizer 1	**Mass flow**, volume flow, standard volume flow, fraction A, fraction B
• Totalizer 2	Mass flow, **volume flow**, standard volume flow, fraction A, fraction B
• Totalizer 3	Mass flow, volume flow, **standard volume flow**, fraction A, fraction B
• Single and 2-stage batch function	Batching function with the use of one or two outputs for dosing at high and low speed
General information	
Product type designation	Technology module TM FCT070
FW update possible	Yes
Usable BaseUnits	BU 20 type B1
ET 200SP	Yes; from FW V4.2 or higher.
ET 200SP ST & HF	Compatible and tested
	ST: Standard
	HF: High Feature
Engineering with	
	• STEP 7 TIA Portal configurable/integrated as of version V16 or higher
	• STEP 7 configurable/integrated as of version V5.5 SP4 and higher
	• PCS 7 V9.0 or higher
	• PROFINET as of GSD version/GSD revision GSDML V2.34
Cable	
Maximum cable length to FC DSL	75 m (150 m)
Supply voltage	
Load voltage L+	24 V DC
Rated value (DC)	24 V NEC-Class II
Permissible range, lower limit (DC)	19.2 V
Permissible range, upper limit (DC)	28.8 V
Short-circuit protection	Yes
Reverse polarity protection	Yes; against destruction
Input current	
Current consumption, max.	500 mA
Power loss	
Typical power loss, max.	1.7 W
Protection class	
IP protection	IP20
EMV	
	• Electrostatic discharge according to IEC 61000-4-2: 2008
	• Field-related interference according to IEC 61000-4-3: 2006
	• Bursted interference due to Burst according to IEC 61000-4-4: 2012
	• Conducted interference by surge according to IEC 61000-4-5: 2014
	• Conducted interference by high-frequency radiation according to IEC 61000-4-6: 2013

Decentralized operation	
• to SIMATIC S7-300	Yes
• to SIMATIC S7-400	Yes
• to SIMATIC S7-1200	Yes
• to SIMATIC S7-1500	Yes
• to standard PROFINET controller	Yes
Usable with the following flowmeters	
	• SITRANS FCS400 • SITRANS FCS300 • SITRANS FC MASS2100 • SITRANS FC300
	For hazardous area application the SITRANS I300 can be used as barrier/power supply between sensor and FCT070
Digital inputs 1 and 2	
Free usable inputs 1 and 2	• Start dosing • Stop dosing • Pause/resume dosing • Start/stop totalizer 1, 2 or 3 • Reset totalizer 1, 2 or 3 • Zero adjust • Force outputs • Freeze process values
High signal	• Nominal voltage: 24 V DC • Upper limit: +30 V DC • Lower limit: +11 V DC • Current: max 35 mA
Low signal	• Nominal voltage: 0 V DC • Lower limit: -30 V DC • Upper limit: +5 V DC • Current: max 35 mA
Potential separation	• Module and backplane bus • Short circuit protection
Isolation test	707 V DC
Cable length	• Max. 50 m shielded • Max. 25 m unshielded
Digital outputs 1 and 2	
Free useable outputs 1 and 2	• Alarm acknowledgment • Out of specification • Failure sensor measuring • Function check • Status force value • Flow direction
Low signal	Max. 1 V
High signal	Min 23.2 V
Switching capacity	300 mA signal high
On lamp load	8 W
Load resistance	80 … 10 kΩ
Between diffrenet circuits	Electronic/thermal
Potential seperation	Module and backplane bus
Isolation test	707 V DC
Cable length	• Max. 50 m shielded • Max. 25 m unshielded

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Flow Measurement
SITRANS FC (Coriolis)
Transmitters

SITRANS FCT070

■ Technical specifications (continued)

Environment	
Ambient temperature during operation	
Minimum installation	-25 °C
horizontal installation, max.	60 °C; observe derating
vertical installation, max.	50 °C; observe derating
Ambient temperature during storage/transport	
Storage, min.	-40 °C
Storage, max.	70 °C
Transport, min.	-40 °C
Transport, max.	70 °C
Relative humidity	
Operation, min.	5 %
Operation, max.	95 %; no condensation
Height in operation	
Ambient air pressure altitude (relative to sea level)	T_{min} ... T_{max} at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m)
EMC performance	
Emission	• EN 61000-6-4
Electromagnetic compatibilty	• IEC 61000-6-2:2016 • IEC 61000-6-4:2018
Emission of radio interference	Class A industrial environment: • IEC 61000-6-4: 2018 • IEC/CISPR 16-2-3: 2008 • EN 55016-2-3: 2006
Emission on power supply cables	Class A Industrial environment: • IEC 61000-6-4: 2018 • IEC/CISPR 16-2-1: 2010 • EN 55016-2-1: 2009

Certification	
CE mark	Low voltage directive RoHS
UL	ANSI / ISA 12.12.01
CAN/CSA	CSA C22.2 No. 213-M1987 Class I, Div. 2 Group A.B.C.D T4
ATEX	II 3 G Ex ec IIC T4 Gc
IECEx	Ex ec IIC T4 Gc
EAC	Yes
Tick	Yes
KCC	Yes
RoHS	Yes
FM	Class I, Div. 2, Group A.B.C.D T4

Communication	
Digital Sensor Link	460.8 kBits/s
Cable length FCT070 to FC DSL Sensor	75 m (150 m)
Power supply FCS sensor	The operating voltage of the sensors is supplied via the sensor cable directly from the FCT070

■ Selection and ordering data

Description	Article No.
SITRANS FCT070 Transmitter for ET 200SP	**7ME4138-6AA00-0BB1**
BU20-P12+A0+4B, PU1 BaseUnit plate for ET 200SP	**6ES7193-6BP20-0BB0** **6ES7193-6BP20-0BB1**
SITRANS I300 – Isolating power supply – Ex barrier	**A5E39832532**

Compatible Coriolis sensors

SITRANS FCS300	**7ME4637-…**
SITRANS FCS400	**7ME4617-…**
SITRANS MASS 2100	**7ME4817-…**
SITRANS FC300 DN4	**7ME4817-…**

Operating instructions for SITRANS FCT070

Description	Article No.
SITRANS FCT070 system manual • English • German	**A5E47701533-AA**

■ Circuit diagrams

Naming	Con.	PIN	BU20 type B1	PIN	Con.	Naming
Digital input	DI0	1	① ②	2	DQ0	Digital output
Digital input	DI1	3		4	DQ1	Digital output
+24 V DC supply voltage for digital inputs	DI_L+	5	③ ④	6	nc	
Ground for digital outputs	M	7	⑤ ⑥	8	M	Ground for digital outputs
RS 485 data line A for SEN communication	SEN_A	9	⑦ ⑧	10	SEN_L+	+24 V DC supply voltage for SEN
RS 485 data line B for SEN communication	SEN_B	11	⑨ ⑩	12	SEN_M	GND for SEN supply
+24 V DC supply voltage	L+	13	⑪ ⑫	14	M	Ground for supply voltage
	L+	15	⑬ ⑭ ⑮ ⑯	16	M	

Pin assignment of the BaseUnit BU20-P12+A0+4B

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