

Flow Measurement

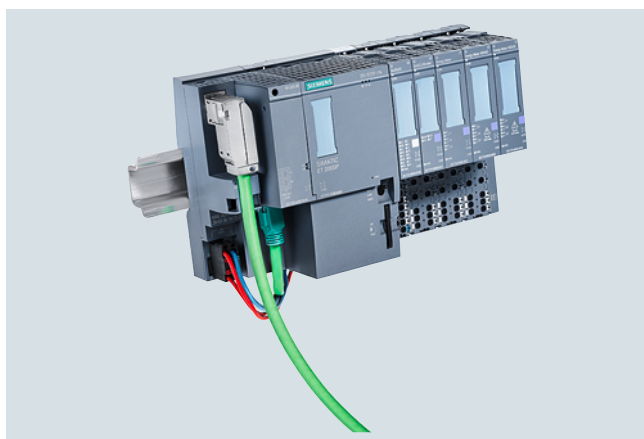
SITRANS FC (Coriolis) Transmitters

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 be 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

Technical specifications

Measurement of	Mass flow, volume flow, density, temperature, fraction A flow, fraction A %, fraction B flow, fraction B %	Decentralized operation	<ul style="list-style-type: none"> to SIMATIC S7-300 to SIMATIC S7-400 to SIMATIC S7-1200 to SIMATIC S7-1500 to standard PROFINET controller 	<ul style="list-style-type: none"> Yes Yes Yes Yes Yes
Measurement functions	<ul style="list-style-type: none"> Totalizer 1 Totalizer 2 Totalizer 3 Single and 2-stage batch function 	<p>Mass flow, volume flow, standard volume flow, fraction A, fraction B</p> <p>Mass flow, volume flow, standard volume flow, fraction A, fraction B</p> <p>Mass flow, volume flow, standard volume flow, fraction A, fraction B</p> <p>Batching function with the use of one or two outputs for dosing at high and low speed</p>	Usable with the following flowmeters	<ul style="list-style-type: none"> SITRANS FCS400 SITRANS FCS300 SITRANS FC MASS2100 SITRANS FC300 <p>For hazardous area application the SITRANS I300 can be used as barrier/power supply between sensor and FCT070</p>
General information	<p>Product type designation</p> <p>FW update possible</p> <p>Usable BaseUnits</p> <p>ET 200SP</p> <p>ET 200SP ST & HF</p>	<p>Technology module TM FCT070</p> <p>Yes</p> <p>BU 20 type B1</p> <p>Yes; from FW V4.2 or higher.</p> <p>Compatible and tested</p> <p>ST: Standard</p> <p>HF: High Feature</p>	Digital inputs 1 and 2	
Engineering with	<ul style="list-style-type: none"> 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 		Free usable inputs 1 and 2	<ul style="list-style-type: none"> 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
Cable	Maximum cable length to FC DSL	75 m (150 m)	High signal	<ul style="list-style-type: none"> Nominal voltage: 24 V DC Upper limit: +30 V DC Lower limit: +11 V DC Current: max 35 mA
Supply voltage	Load voltage L+	24 V DC	Low signal	<ul style="list-style-type: none"> Nominal voltage: 0 V DC Lower limit: -30 V DC Upper limit: +5 V DC Current: max 35 mA
	Rated value (DC)	24 V NEC-Class II	Potential separation	<ul style="list-style-type: none"> Module and backplane bus Short circuit protection
	Permissible range, lower limit (DC)	19.2 V	Isolation test	707 V DC
	Permissible range, upper limit (DC)	28.8 V	Cable length	<ul style="list-style-type: none"> Max. 50 m shielded Max. 25 m unshielded
	Short-circuit protection	Yes	Digital outputs 1 and 2	
	Reverse polarity protection	Yes; against destruction	Free useable outputs 1 and 2	<ul style="list-style-type: none"> Alarm acknowledgment Out of specification Failure sensor measuring Function check Status force value Flow direction
Input current	Current consumption, max.	500 mA	Low signal	Max. 1 V
Power loss	Typical power loss, max.	1.7 W	High signal	Min 23.2 V
Protection class	IP protection	IP20	Switching capacity	300 mA signal high
EMV	<ul style="list-style-type: none"> Electrostatic discharge according to IEC 61000-4-2: 2008 Field-related interference according to IEC 61000-4-3: 2006 Burst 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 		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	<ul style="list-style-type: none"> Max. 50 m shielded Max. 25 m unshielded

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Transmitters

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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)	$T_{min} \dots T_{max}$ at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m)
EMC performance	
Emission	• EN 61000-6-4
Electromagnetic compatibility	• 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	DIO	1	①	②	2	DQ0
Digital input	DI1	3			4	DQ1
+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
RS 485 data line A for SEN communication	SEN_A	9	⑦	⑧	10	SEN_L+
RS 485 data line B for SEN communication	SEN_B	11	⑨	⑩	12	SEN_M
+24 V DC supply voltage	L+	13	⑪	⑫	14	M
	L+	15	⑬	⑭	16	M
			⑮	⑯		

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