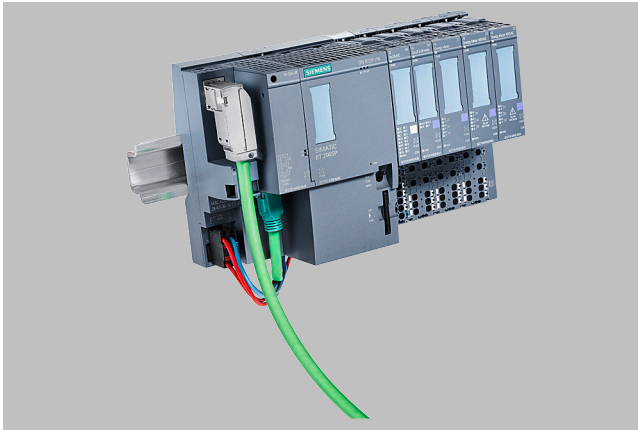


Flow Measurement

SITRANS FS (ultrasonic)

Clamp-on ultrasonic flowmeters / SITRANS FST070 transmitter

Overview



The technology module SITRANS FST070 is an ultrasonic clamp-on flowmeter transmitter for the SIMATIC ET200SP.

The TM SITRANS FST070 flow transmitter can be operated directly in the SIMATIC PCS 7 or in TIA Portal with the FST070 faceplates. SITRANS FST070 offers real-time data processing and the display of all measuring and status data of the Ultrasonic flowmeter.

The TM FST070 can work with all Siemens ultrasonic clamp-on flowmeters. It can be connected to the FS DSL with FSS200 clamp-on sensors.



SITRANS FS DSL with FSS200 clamp-on sensors

Benefits

- Easy integration into automation process control as TIA portal and PCS7 (SIMATIC)
- Easy selection and integration of flowmeters via TIA selector
- Precast face plates for TIA portal and PCS7
- No additional transmitter between automation and clamp-on sensors required
- Cost effective integration of clamp-on flowmeters for water treatments, control rooms with PCS7
- SITRANS FST070 ET 200SP technology module can combined with all other SIMATIC ET200 modules
- Fast and trouble-free communication between the flowmeter and the PLC through digital data communication with up to 10 ms update rate
- SITRANS FST070 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 1/0 Class 1 Div 1 approval

Application

SITRANS FST070 can be used for machine builders, in the chemical industry or water treatments. The meters are suitable for measuring on liquid, hydrocarbon and gas. With ET 200SP the SITRANS FST070 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 FST070 transmitter:

- Chemical
- Pharmaceutical
- District Energy
- Water and waste water
- Oil
- Gas

Design


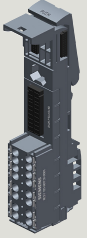

The SITRANS FST070 is designed as ET200 SP module and can directly installed with other ET200 SP modules. The FS DSL cable is directly mounted to the ET 200SP base unit is providing the supply voltage and the data communication. The SITRANS FSS200 clamp-on sensors with FS DSL can be connected directly to the SITRANS FST070. For sensors in ATEX Zone 0 or 1, the SITRANS I300 barrier must be installed between FST070 and the FS DSL.

Function

The following key functionalities are available:

- Volume flow rate, mass flow, flow velocity, density, temperature, pressure, kinematic viscosity, standard volume flow (hydrocarbon)
- Three built-in totalizers which can freely be set for counting volume flow, mass flow
- 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

Selection and ordering data

Description	Article No.	
SITRANS FST070 – Transmitter for ET 200SP	7ME3448-6AA00-0BB1	
BU20-P12+A0+4B, PU1 – BaseUnit plate for ET 200SP	6ES7193-6BP20-0BB1	
SITRANS I300 – Isolating power supply – Ex barrier	A5E39832532	
SITRANS FS DSL M12-SSL cable and FSS200 clamp-on sensors	7ME3720-.....1N..	Configuration with the SIEMENS PIA selector SITRANS FS230 ultrasonic clamp-on
SITRANS FS DSL SSL terminal connection and FSS200 clamp-on sensors	7ME3720-.....1Q..	Configuration with the SIEMENS PIA selector SITRANS FS230 ultrasonic clamp-on

Description	Article No.
SITRANS FST070 system manual	A5E49982949-AA
• English	
• German	

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Technical specifications

SITRANS FST070	
Measurement of	Volume flow rate, mass flow, flow velocity, density, temperature, pressure, kinematic viscosity, standard volume flow (hydrocarbon)
Measurement functions	
• Totalizer 1	Volume flow, mass flow, standard volume flow
• Totalizer 2	Volume flow, mass flow; standard volume flow
• Totalizer 3	Volume flow, mass flow; standard volume flow
General information	
Product type designation	Technology module TM FST070
FW update possible	Yes
Usable BaseUnits	BU 20 type B1
ET 200SP	Yes
Engineering with	<ul style="list-style-type: none"> STEP 7 TIA Portal configurable/integrated as of version V17 or higher STEP 7 configurable/integrated as of version V5.6 SP4 and higher PCS 7 V9.1 or higher PROFINET as of GSD version/GSD revision GSDML V2.35
Cable	
Maximum cable length to FS DSL	75 m (max. 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	<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
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 FS DSL with FSS200 For hazardous area application the SITRANS I300 can be used as barrier/power supply between sensor and FST070

Technical specifications (continued)

SITRANS FST070	
Digital inputs 1 and 2	
Free useable inputs 1 and 2	<ul style="list-style-type: none"> Start/stop totalizer 1, 2 or 3 Reset totalizer 1, 2 or 3 Zero adjust Force outputs Freeze process values
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
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
Potential separation	<ul style="list-style-type: none"> Module and backplane bus Short circuit protection
Isolation test	707 V DC
Cable length	<ul style="list-style-type: none"> Max. 50 m shielded Max. 25 m unshielded
Digital outputs 1 and 2	
Free useable outputs 1 and 2	<ul style="list-style-type: none"> Alarm acknowledgment Out of specification Failure sensor measuring Function check 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 different circuits	Electronic/thermal
Potential separation	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
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 ... +2 000 m)
EMC performance	
Emission	<ul style="list-style-type: none"> EN 61000-6-4
Electromagnetic compatibility	<ul style="list-style-type: none"> IEC 61000-6-2: 2016 IEC 61000-6-4: 2018

Technical specifications (continued)

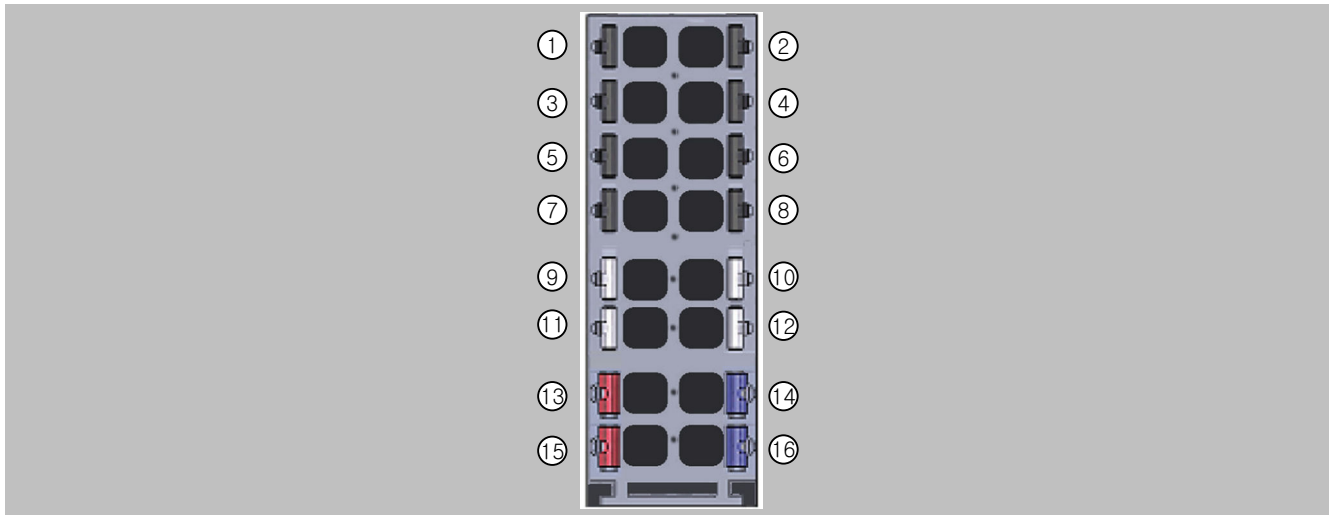
SITRANS FST070	
Emission of radio interference	Class A industrial environment: • IEC 61000-6-4: 2018 • IEC/CISPR 16-2-3: 2008 • EN 55016-2-3: 2006
Emission on power supply cables	Class A Industrial environment: • IEC 61000-6-4: 2018 • IEC/CISPR 16-2-1: 2010 • EN 55016-2-1: 2009
Certification	
CE mark	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
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 FST070 to FC DSL Sensor	75 m (150 m)
Power supply FS sensors	The operating voltage of the sensors is supplied via the sensor cable directly from the FST070

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Circuit diagrams



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

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