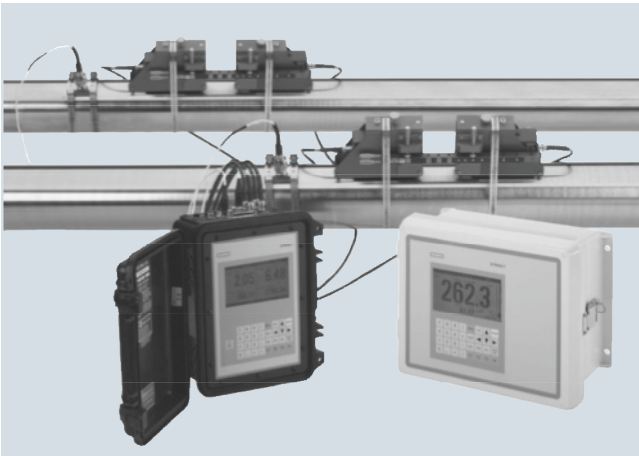


Overview



SITRANS FUE1010 is a highly accurate clamp-on non-intrusive ultrasonic flow transmitter for revenue grade thermal energy sub-metering and energy efficiency distribution monitoring, with a real time coefficient of performance (COP) for HVAC systems.

SITRANS FUE1010 is available in single and dual channel or dual path configurations, with your choice of IP65 (NEMA 4X) dedicated wall mount or IP40 (NEMA 1) portable enclosures.

Benefits

- Measures energy rate and total consumption with highest accuracy available
- Accurately measures at both low flow rates and low differential temperatures
- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to foul or wear
- No pressure drop or energy loss
- Wide turn-down ratio
- Choice of single or dual channel/dual path or dual mode operation:
 - Dual channel operation reduces the cost for the system on a per channel measurement basis and permits measuring hot and chilled water lines at the same time
 - Dual path capability insures high flow measurement accuracy on installations with less than desirable piping runs
- Ability to operate in either Wide-Beam Transit-time or reflexor (Doppler) mode for applications with high aeration
- ZeroMatic Path automatically sets zero without stopping flow and reduces zero drift, even at low flow

Application

SITRANS FUE1010 is ideally suited to thermal energy/power industry applications, including:

- Chilled water sub-metering
- Hot water sub-metering
- Condenser water
- Glycol
- Thermal storage
- Lake source cooling

Design

SITRANS FUE1010 is available in three configurations:

- IP65 (NEMA 4X) wall mount enclosure constructed of fiber-glass reinforced polyester with stainless steel hardware and polyester keypad
 - Single channel
 - Dual channel/dual path
- IP40 (NEMA 1) Portable impact resistant enclosure constructed of mineral reinforced copolymer polypropylene
 - Dual channel/dual path

Function

- Flow transmitter has an integral 33 button keypad and large (128 x 240 pixel) graphic display visible up to 12 m (40 ft) away
- 4-wire 1000 Ω platinum RTD's for supply and return temperature measurements are precision matched to within 0.01 $^{\circ}\text{C}$ (0.02 $^{\circ}\text{F}$)
- Temperature is factory calibrated with built-in field calibrator.
- Built-in energy/BTU mode
- Detection of aeration and cavitation caused by worn or damaged impellers, misaligned shafts, etc.
- Reverse flow and empty pipe detection
- Chiller efficiency analysis: accepts an independent analog input representing kW usage for calculation of the following functions which can be selected for data logging or output purposes:
 - Cooling load (kW/ton)
 - Coefficient of performance (COP)
 - Energy efficiency ratio (EER)
- Optional current inputs
- Digital communication options:
 - MODBUS/Metasys N2 (IP65 (NEMA 4X) only)
 - RS 232 Serial digital port (standard)
- ZeroMatic Path automatically sets zero
- Bi-directional flow operation
- 1 MByte data logger with both site and data logger storage
- English, Spanish, German, Italian and French language options

Flow Measurement

SITRANS F US Clamp-on

SITRANS FUE1010 (Energy)

Technical specifications

Input		Indication and operation	
Flow range	0 ... 12 m/s (0 ... 40 ft/s), bi-directional	Data logger memory	1 Mbyte of storage
Flow sensitivity	0.0003 m/s (0.001 ft/s)	Display	128 x 240 pixel LCD with back-light
Pipe size	6.4 mm ... 9.14 m (0.25" ... 360")	Keypad	33 keypad buttons with tactile feedback
Inputs per channel	<ul style="list-style-type: none"> • Current: 2 x 4 ... 20 mA • Voltage: 2 x 0 ... 10 V DC • Temperature: 2 x 4 wire 1 kΩ RTD • Totalizer commands (clear/hold) 	Language options	English, Spanish, German, Italian, French
Output		Certificates and approvals	
Standard outputs	<ul style="list-style-type: none"> • Current: 2 x 4 ... 20 mA DC (1 kΩ at 30 V DC) • Voltage: 2 x 0 ... 10 V DC (5 kΩ minimum) • Status Alarm: 4 x SPDT Relays • Form C relays • Frequency: 2 x 0 ... 5000 Hz • RS 232 	Dedicated enclosures	<ul style="list-style-type: none"> • Transmitter NI Class I, Div 2 S Class II, Div 2 • Sensor I.S. Class I, II, Div 1 EMC Directive 2004/108/EC ATEX Directive 94/9/EC
Optional outputs	<ul style="list-style-type: none"> • Expanded I/Os (4 additional 4 ... 20 mA outputs) with form c relays 	FM and CSA ratings	
Accuracy	$\pm 0.5\%$... 1.0% of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0015 ... 0.003 m/s (± 0.005 ... 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)	CE	
Batch repeatability		$\pm 0.15\%$ of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)	
Rated operation conditions		C-TICK	<ul style="list-style-type: none"> • Transmitter: Ex II (1) G [Ex ia] IIC Ex II 3 (1) G Ex nC [ia] IIC T5 • Sensors: Ex II 1 G Ex ia IIC T5 • Transmitter: [BR-Ex ia] IIC BR-Ex nc [ia] IIC T5 • Sensors: BR-Ex ia IIC T5
Degree of protection	Wall mount enclosure: IP65 (NEMA 4X) Portable enclosure: IP40 (NEMA 1)	ATEX ratings	
Liquid temperature	<ul style="list-style-type: none"> • Standard -40 ... +120 °C (-40 ... +250 °F) • Optional -40 ... +230 °C (-40 ... +450 °F) 	INMETRO ratings	
Sensor temperature		<ul style="list-style-type: none"> • Standard -40 ... +120 °C (-40 ... +250 °F) • Optional -40 ... +232 °C (-80 ... +450 °F) 	Portable enclosures
Ambient temperature	-18 ... +60 °C (0 ... 140 °F)		CE
Design			
Dimensions	see SITRANS F US Clamp-on "System info and selection guide"		
Weight	see diagrams		
Power supply			
Dedicated	90 ... 240 V AC, 50 ... 60 Hz, 30 VA or 9 ... 36 V DC		
Portable enclosure	Rechargeable battery		

Standard MLFB for quick delivery on SITRANS FUE1010 (Energy system)

Selection and Ordering data	Article No.	Order code
SITRANS FUE1010 (Energy)	7ME350 - - 0	
Design		
<u>Dedicated</u>		
IP65 (NEMA 4X) wall mount	0	K 0 2 + K 0 2 + R 0 2
<u>Portable</u>		
IP40 (NEMA 1) Battery powered	2	K 0 1 + K 0 1 + R 0 1
Number of channels/ultrasonic paths		
<u>Dedicated meters</u>		
Single channel	1	
<u>Portable meters</u>		
Dual channel/Dual path	4	
Flowmeter functions and I/O configurations		
• Portable Standard I/O	C	
- Energy efficiency COP/EER output		
- 2x 4-20mA analog input		
• Dedicated Standard I/O	F	
- Reflexor Capability		
- Energy efficiency COP/EER output		
- 2x 4-20mA analog input		
Meter power options		
90 ... 240 V AC (Dedicated only)	A	
Charger Type A for Europe (CEE7/7)	C	
Charger Type K for U.S. (NEMA 5-15P)	G	
No charger	J	
Communication options		
RS 232 (standard)	0	
RTD temperature sensor pair		
No RTDs (Note: Temperature input is required for Energy systems)	0	
1 x Pair Std clamp-on RTD (NEMA 4X only) ³⁾	1	
2 x Pair Std clamp-on RTD (For Dual Channel NEMA 4X only) ³⁾	2	
1 x Pair Std clamp-on RTD (For NEMA 12 Portable) ³⁾	3	
2 x Pair Std clamp-on RTD (For Dual Channel NEMA 1 Portable) ³⁾	4	
1 x Insertion RTD with Thermowell and Lagging		M 1 A
2 x Insertion RTD with Thermowell and Lagging		M 1 B
Sensor for channel 1		
(includes pipe mounting kit and spacer bar for indicated max. OD listed)		
See "Sensor selection charts" for specifications.		
no sensor		A
A2 universal Trackmount and straps provided up to 75 mm (3")		B
B3 universal Trackmount and straps provided up to 125 mm (5")		C
C3 universal Mounting frame and straps provided up to 300 mm (13")		D
D3 universal Mounting frame and straps provided up to 600 mm (24")		E
E2 universal Mounting frame and straps provided up to 1200 mm (48") ¹⁾⁴⁾		F
C1H (high precision) Mounting frame and straps provided up to 1200 mm (48") ⁴⁾		M
C2H (high precision) Mounting frame and straps provided up to 1200 mm (48") ⁴⁾		N
D1H (high precision) Mounting frame and straps provided up to 1200 mm (48") ⁴⁾		P
D2H (high precision) Mounting frame and straps provided up to 1200 mm (48") ⁴⁾		Q
Doppler to 12" with strap kit (not for IP65 (NEMA7)), for up to 121 °C (250 °F)		S
D1H High temperature range 104 °C/220 °F HP ²⁾	Z	P 1 P

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Flow Measurement

SITRANS F US Clamp-on

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Selection and Ordering data	Article No.	Order code
SITRANS FUE1010 (Energy)	7ME350 - - 0	+ +
Sensor for channel 2 (includes pipe mounting kit and spacer bar for indicated max. OD listed) See "Sensor selection charts" for specifications.		
no sensor		A
A2 universal Trackmount and straps provided up to 75 mm (3")		B
B3 universal Trackmount and straps provided up to 125 mm (5")		C
C3 universal Mounting frame and straps provided up to 300 mm (13")		D
D3 universal Mounting frame and straps provided up to 600 mm (24")		E
E2 universal Mounting frame and straps provided up to 1200 mm (48") ¹⁾⁴⁾		F
C1H (high precision) Mounting frame and straps provided up to 1200 mm (48") ⁴⁾		M
C2H (high precision) Mounting frame and straps provided up to 1200 mm (48") ⁴⁾		N
D1H (high precision) Mounting frame and straps provided up to 1200 mm (48") ⁴⁾		P
D4H (high precision) Mounting frame and straps provided up to 1200 mm (48") ⁴⁾		R
Doppler to 12" with strap kit (not for IP65 (NEMA7)), for up to 121 °C (250 °F)		S
D1H High temperature range 104 °C/220 °F HP ²⁾		Z Q1P
Approvals UL/Portable		0
FM, CSA, CE, Dedicated		1

- 1) Supplied spacer bar supports pipes up to 1050 mm (42 inch). For pipes larger than 1050 mm (42 inch) purchase also, spare part 7ME3960-OMS40 (1012BN-4)
- 2) Supplied spacer bar supports pipes up to 750 mm (30 inch). For pipes larger than 750 mm (30 inch) purchase also, spare part 7ME3960-OMS40 (1012BN-4)
- 3) Requires two R** cables per one RTD pair
- 4) 600 mm (24") for portable systems only

Standard MLFB product offering represents 4 to 6 weeks delivery time
 For sensor and RTD cables for quick delivery see tables at end of section

Flow Measurement

SITRANS F US Clamp-on

SITRANS FUE1010 (Energy)

Selection and Ordering data	Article No.	Ord. code	Selection and Ordering data	Article No.	Ord. code
SITRANS FUE1010 (Energy)			SITRANS FUE1010 (Energy)		
<ul style="list-style-type: none"> Dedicated IP65 (NEMA 4X) wall mount 	7ME3500-		<ul style="list-style-type: none"> Dedicated IP65 (NEMA 4X) wall mount 	7ME3500-	
<ul style="list-style-type: none"> Portable IP40 (NEMA 1) Battery powered 	7ME3502-		<ul style="list-style-type: none"> Portable IP40 (NEMA 1) Battery powered 	7ME3502-	
	■ ■ ■ ■ ■ - 0 ■ ■ ■ ■ ■			■ ■ ■ ■ ■ - 0 ■ ■ ■ ■ ■	
Number of channels/ultrasonic paths			RTD temperature sensor		
Dedicated meter			(includes mounting hardware for pipes above 1.5" outer diameter)		
<u>Dedicated meter</u>			No RTDs (Note: temperature input is required for energy system)	0	
Single channel	1		1 x pair standard clamp-on RTD (NEMA 4X only) ²⁾	1	
Dual channel/Dual path	2		2 x pair standard clamp-on RTD (for dual channel NEMA 4X only) ²⁾	2	
<u>Portables</u>			1 x pair standard clamp-on RTD (NEMA 1 Portable) ²⁾	3	
Dual channel/Dual path	4		2 x pair standard clamp-on RTD (for dual channel NEMA 1 Portable) ²⁾	4	
Flowmeter functions and I/O configurations			1 x Insertion style RTD with thermowell and lagging ²⁾	9	M 1 A
<ul style="list-style-type: none"> Portable Standard I/O <ul style="list-style-type: none"> Reflexor capability Graphic display 2 x 0 ... 10 V 2 x 4 ... 20 mA 2 x pulse output 4 x status logic Energy efficiency COP/EER output 2 x 4 ... 20 mA analog input 	C		2 x Insertion style RTD with thermowell and lagging ²⁾	9	M 1 B
<ul style="list-style-type: none"> Dedicated Standard I/O <ul style="list-style-type: none"> Reflexor capability Graphic display 2 x 0 ... 10 V 2 x 4 ... 20 mA 2 x pulse output 4 x relay C type Energy efficiency COP/EER output 2 x 4 ... 20 mA analog input 	F				
<ul style="list-style-type: none"> Extended output adder plus standard inputs (4 additional 4 ... 20 mA outputs) and form C relay 	Z	J 1 B	Sensor for channel 1		
			Including pipe mounting tracks for sizes A & B sensors indented for pipe with a OD less than 125 mm (5") and mounting frame/spacer bars for sizes C, D & E sensors. Straps provided are for the indicated maximum OD listed below. Strap kits are available to accommodate larger pipes (refer to spare part list). Refer to "Sensor Selection Charts" for the sensor suitability of pipe size and wall thickness.		
Meter power options			No sensor		A
90 ... 240 V AC (Dedicated only)	A		A2 universal Trackmount and straps provided up to 75 mm (3")		B
9 ... 36 V DC (Dedicated only)	B		B3 universal Trackmount and straps provided up to 125 mm (5")		C
Charger Type A for Europe (CEE77)	C		C3 universal Mounting frame and straps provided up to 300 mm (13")		D
Charger Type C for Australia (AS3112)	D		D3 universal Mounting frame and straps provided up to 600 mm (24")		E
Charger Type D for U.K. (BS1363)	E		E2 universal Mounting frame and straps provided up to 1200 mm (48") ¹⁾³⁾		F
Charger Type J for Japan (JIS8303)	F				
Charger Type K for U.S. (NEMA 5-15P)	G		For the following A1H to D4H sensors, temperature range is -40 °C ... 65 °C (-41 °F ... 150 °F), nominal 21 °C (70 °F):		
Charger Type L for Switzerland (SEV1011)	H		For other temperature ranges please see spare parts list.		
No Charger	J		A2H (high precision) Trackmount and straps provided up to 75 mm (3")		H
External 4 hours battery with US plug for Portable	Z	K 1 A	A3H (high precision) Trackmount and straps provided up to 75 mm (3")		J
External 4 hours battery with European plug for Portable	Z	K 1 B	B1H (high precision) Trackmount and straps provided up to 125 mm (5")		K
Communication options					
RS 232 (standard)	0				
Standard MODBUS configurations include Baudrate: 9600, Parity: None, Stop Bits: 1, Data bits: 8, MODBUS data: 16 bit, Data format: word normal, Mode: RTU, and MODBUS format: Gould. For other configurations please select option 9 and L1Y and state requirements in plain text					
MODBUS Single and Dual Channel	1				
MODBUS Dual Path	2				
Other Version, MODBUS, N2, Other Baud Rate, Other Parity, State in Plain Text	9				

¹⁾ Supplied spacer bar supports pipes up to 1050 mm (42 inch). For pipes larger than 1050 mm (42 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4).

²⁾ Requires two R** cables per one RTD pair

³⁾ 600 mm (24") for portable systems only

Flow Measurement

SITRANS F US Clamp-on

SITRANS FUE1010 (Energy)

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Selection and Ordering data		Article No.	Ord. code
SITRANS FUE1010 (Energy)			
• Dedicated IP65 (NEMA 4X) wall mount		7ME3500-	
• Portable IP40 (NEMA 1) Battery powered		7ME3502-	
		■ ■ ■ ■ ■ - 0 ■ ■ ■ ■ ■	
Sensor for channel 1 (continued)			
B2H (high precision)	Trackmount and straps provided up to 125 mm (5")		L
C1H (high precision)	Mounting frame and straps provided up to 1200 mm (48") ²⁾³⁾		M
C2H (high precision)	Mounting frame and straps provided up to 1200 mm (48") ²⁾³⁾		N
D1H (high precision)	Mounting frame and straps provided up to 1200 mm (48") ²⁾³⁾		P
D2H (high precision)	Trackmount and straps provided up to 1200 mm (48") ²⁾³⁾		Q
D4H (high precision)	Trackmount and straps provided up to 1200 mm (48") ²⁾³⁾		R
Doppler	to 12" with strap kit, for up to 121 °C (250 °F)		S
High temperature sensor size 2 for up to 230 °C (446 °F) (30 ... 200 mm diam. (1.18 ... 7.67 inch diam.))		Z	P 1 A
High temperature sensor size 3 for up to 230 °C (446 °F) (150 ... 610 mm diam. (5.90 ... 24 inch diam.))		Z	P 1 B
High temperature sensor size 4 for up to 230 °C (446 °F) (400 ... 1200 mm diam. (15.75 ... 47.25 inch diam.))		Z	P 1 C
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F):			
B1H (high temperature range HP)		Z	P 1 K
B2H (high temperature range HP)		Z	P 1 L
C1H (high temperature range HP)		Z	P 1 M
C2H (high temperature range HP)		Z	P 1 N
D1H (high temperature range HP) ²⁾		Z	P 1 P
D2H (high temperature range HP) ²⁾		Z	P 1 Q
D4H (high temperature range HP) ²⁾		Z	P 1 R
Sensor for channel 2			
(includes pipe mounting kit for indicated max. outer diameter listed) See "Sensor selection charts" for specifications.			
no sensor			A
A2 universal	Trackmount and straps provided up to 75 mm (3")		B
B3 universal	Trackmount and straps provided up to 125 mm (5")		C
C3 universal	Mounting frame and straps provided up to 300 mm (13")		D
D3 universal	Mounting frame and straps provided up to 600 mm (24")		E
E2 universal	Mounting frame and straps provided up to 1200 mm (48") ¹⁾³⁾		F

Selection and Ordering data		Article No.	Ord. code
SITRANS FUE1010 (Energy)			
• Dedicated IP65 (NEMA 4X) wall mount		7ME3500-	
• Portable IP40 (NEMA 1) Battery powered		7ME3502-	
		■ ■ ■ ■ ■ - 0 ■ ■ ■ ■ ■	
Sensor for channel 2 (continued)			
For the following A1H to D4H sensors, temperature range is -40 °C ... 65 °C (-41 °F ... 150 °F), nominal 21 °C (70 °F):			
A2H (high precision)	Trackmount and straps provided up to 75 mm (3")		H
A3H (high precision)	Trackmount and straps provided up to 75 mm (3")		J
B1H (high precision)	Trackmount and straps provided up to 125 mm (5")		K
B2H (high precision)	Trackmount and straps provided up to 125 mm (5")		L
C1H (high precision)	Mounting frame and straps provided up to 1200 mm (48") ²⁾³⁾		M
C2H (high precision)	Mounting frame and straps provided up to 1200 mm (48") ²⁾³⁾		N
D1H (high precision)	Mounting frame and straps provided up to 1200 mm (48") ²⁾³⁾		P
D2H (high precision)	Mounting frame and straps provided up to 1200 mm (48") ²⁾³⁾		Q
D4H (high precision)	Mounting frame and straps provided up to 1200 mm (48") ²⁾³⁾		R
Doppler	to 12" with strap kit, for up to 121 °C (250 °F)		S
High temperature sensor size 2 for up to 230 °C (446 °F) (30 ... 200 mm diam. (1.18 ... 7.67 inch diam.))		Z	Q 1 A
High temperature sensor size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. (5.90 to 24 inch diam.))		Z	Q 1 B
High temperature sensor size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (15.75 to 47.25 inch diam.))		Z	Q 1 C
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up ... 220 °F), nominal 65 °C (150 °F):			
B1H (high temperature range HP)		Z	Q 1 K
B2H (high temperature range HP)		Z	Q 1 L
C1H (high temperature range HP)		Z	Q 1 M
C2H (high temperature range HP)		Z	Q 1 N
D1H (high temperature range HP) ²⁾		Z	Q 1 P
D2H (high temperature range HP) ²⁾		Z	Q 1 Q
D4H (high temperature range HP) ²⁾		Z	Q 1 R
Approvals			
FM/CSA/CE Dedicated			1
UL/ULc/CE Portable			0
¹⁾ Supplied spacer bar supports pipes up to 1050 mm (42 inch). For pipes larger than 1050 mm (42 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4). ²⁾ Supplied spacer bar supports pipes up to 750 mm (30 inch). For pipes larger than 750 mm (30 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4). ³⁾ 600 mm (24") for portable systems only			

Flow Measurement

SITRANS F US Clamp-on

SITRANS FUE1010 (Energy)

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Cable assembly for sensors (add for # of channels) See "Sensor cable selection chart"	K..
Cable assembly for RTDs (add for # of RTDs) See "RTD cable selection chart"	R..
Cable termination kit (for one cable pair) dedicated only	
• Termination for standard, plenum and armored sensor cable	T01
• Termination for submersible sensor cable	T11
• RTD cable termination kit for standard RTD	T21
• RTD cable termination kit for submersible RTD	T31
• Insert RTD cable termination kit	T41
Wet flow transfer calibration (priced on request)	
6 point calibration 2/water (Price per channel)	
• 2SS40 pipe	D01
• 3CS40 pipe	D02
• 4CS40 pipe	D03
• 4SS40 pipe	D04
• 6CS40 pipe	D05
• 6SS40 pipe	D06
• 6CS120 pipe	D07
• 8CS40 pipe	D08
• 8SS40 pipe	D09
• 8CS120 pipe	D10
• 10CS Standard pipe	D11
• 10CS40 pipe	D12
• 10SS40 pipe	D13
• 12CS Standard pipe	D14
• 12CS40 pipe	D15
• 14CS30 pipe	D16
• 14CS40 pipe	D17
• 16CS Standard pipe	D18
• 16CS40 pipe	D19
• 18CS Standard pipe	D20
• 20CS20 pipe	D21
• 20CS30 pipe	D22
• 24CS Standard pipe	D23
• 24CS20 pipe	D24
• 24CS30 pipe	D25
• 30CS Standard pipe	D26
• 36CS Standard pipe	D27
• Other pipe, other liquid, additional points, witness	Y28
Tag name plate	
• Stainless steel tag with 3.2 mm (0.13 inch) character size (68 characters max.)	Y19

MLFB example**Application example**

A dedicated clamp-on energy meter is required for two separate return lines. Both will use clamp-on RTDs for the supply and return lines. AC power is available and data access will be via MODBUS communication.

Pipe 1 is a DN150 (6") schedule 40 carbon steel line
Pipe 2 is a DN 300 (12") ductile iron line

MLFB Article No.: **7ME3500-2DA10-2NE0-Z**
K03 + K05 + R03 + R05 + R02 + R03

Selection and Ordering data	Article No.	Ord. code
SITRANS FUE1010 meter family	7ME3500-2DA10-2NE0-Z	
IP65 (NEMA 4X) enclosure	0	
Dual channel	2	
Dedicated Type 1 I/O option	D	
90 ... 230 V AC power option	A	
MODBUS option	1	
2 pairs of clamp-on RTDs	2	
Sensor code for 6" pipe	N	
Sensor code for 12" pipe	E	
No approval required	1	
30 m (100 ft) sensor cable for channel 1		K03
61 m (200 ft) sensor cable for channel 1		K05
30 m (100 ft) cable for RTD 1		R03
61 m (200 ft) cable for RTD 2		R05
15 m (50 ft) cable for RTD 3		R02
30 m (100 ft) cable for RTD 4		R03

Selection and Ordering data	Order code
Operating Instructions for SITRANS FUE1010	
English NEMA 4X Wall mount	A5E03086491
German NEMA 4X Wall mount	A5E03086492
English IP40 NEMA 1 Battery powered	A5E02951524
German IP40 NEMA 1 Battery powered	A5E02951536

This device is shipped with a Quick Start Guide and a CD containing further SITRANS F literature.

All literature is also available for free at:

<http://www.siemens.com/flowdocumentation>

Flow Measurement

SITRANS F US Clamp-on

SITRANS FUE1010 (Energy)

Universal sensor selection chart IP68

Based on pipe size (all pipe materials)					
Pipe size	Order Code	Outer diameter range (mm)		Outer diameter range (inch)	
		min.	max.	min.	max.
A2	B	12,7	50,8	0.5	2
B3	C	19	127	0.75	5
C3	D	51	305	2	12
D3	E	203	610	8	24
E2	F	254	6096	10	249

High precision sensor selection chart IP68

Based on pipe wall thickness (steel pipes only)					
Pipe Wall	Order Code	Pipe Wall [mm]		Pipe Wall [inch]	
		min.	max.	min.	max.
A1H	G	0,64	1,02	0.025	0.04
A2H	H	1,02	1,52	0.04	0.06
A3H	J	1,52	2,03	0.06	0.08
B1H	K	2,03	3,05	0.08	0.12
B2H	L	3,05	4,06	0.12	0.16
C1H	M	4,06	5,84	0.16	0.23
C2H	N	5,84	8,13	0.23	0.32
D1H	P	8,13	11,18	0.32	0.44
D2H	Q	11,18	15,75	0.44	0.62
D4H	R	15,75	31,75	0.62	1.25

Sensor cable (single pair) selection chart

Sensor cable codes for length and type options				
Cable length m (ft)	Standard (PVC jacket)	Submersible ¹⁾ (polyethylene jacket)	Plenum Rated (teflon jacket)	Armored ¹⁾
	-40...+80 °C (-40...+176 °F)	-40...+80 °C (-40...+176 °F)	-40...+200 °C (-40...+392 °F)	-40...+80 °C (-40...+176 °F)
Order code				
6 (20)	K01²⁾	K11	K21	K31
15 (50)	K02	K12²⁾	K22	K32²⁾
30 (100)	K03²⁾	K13²⁾	K23	K33
46 (150)	K04²⁾	K14	K24	K34
61 (200)	K05	K15	K25	K35
91 (300)	K06²⁾	K16	K26	K36

¹⁾ Submersible and armored sensor cable is not available for portable versions.

²⁾ Standard MLFB for quick delivery

RTD cable (single) selection chart

RTD cable codes for length and type		
Cable length m (ft)	Standard (teflon wrapped)	Insert ¹⁾
	-40 ... +200 °C (-40 ... +392 °F)	-40 ... +200 °C (-40 ... +392 °F)
Order code		
6 (20)	R01²⁾	R21
15 (50)	R02²⁾	R22
30 (100)	R03²⁾	R23
46 (150)	R04	R24
61 (200)	R05	R25
91 (300)	R06	R26

¹⁾ Submersible RTD cable is not available for portable versions.

²⁾ Standard MLFB for quick delivery

Flow Measurement

SITRANS F US Clamp-on

SITRANS FUE1010 (HVAC)
Check metering kit

Overview



The SITRANS FUE1010 dual channel clamp-on check metering kit is an all inclusive HVAC chilled water kit developed especially for verifying the accuracy and performance of any brand or type of flowmeter. The meter's portability makes it capable of verifying the performance of meters based on any existing flow measurement principle: electromagnetic, vortex, insertion turbine, or ultrasonic. Perfect for areas where no metering exists. Ideal for balancing building performance. It accurately computes flow over an extremely wide range and measures practically all conductive or non-conductive clean or moderately aerated liquids or liquids with suspended solids. Dual channel models can measure two separate applications at the same time.

Benefits

- Performance check or verification of any type or brand of flowmeter
- Measures energy rate and total consumption with highest accuracy available
- Accurately measures at both low flow rates and low differential temperatures
- Field use is facilitated by meter portability charge for 4 hours of normal operation
- 1 MByte datalogger capability downloadable to PC via included RS 232 cable
- Performs fast, easy and cost-efficient on-site measurement of any convoluted pipe from 25.4 mm to 9.14 m (1.0" to 360")
- Delivered as an all inclusive kit with all the equipment needed to conduct performance and verification tests (cables, multiple sensors, flow transmitter etc.)
- Comes in a sturdy rolling case with a telescope handle that holds all the equipment needed to conduct performance and verification tests.

Application

The SITRANS FUE1010 Check Metering Kit is a highly accurate clamp-on non-intrusive ultrasonic flow display transmitter or revenue grade thermal energy sub-metering and energy efficiency distribution monitoring, with a real time coefficient of performance (COP) for HVAC systems. This kit is ideal for applications which include:

- Chilled water sub-metering
- Condenser water
- Potable water
- Ammonia and glycol
- River and lake water
- Lake source cooling

Design

- IP40 (NEMA 1) Impact resistant enclosure, constructed of flame retardant ABS with polycarbonate display and polyester keypad
- Dual channel/dual path

Function

- Integral 33 button keypad and large (128 x 240 pixel) graphic display visible up to 12 m (40 ft) away
- 4-wire 1000 Ω platinum RTD's for supply and return temperature measurements are precision matched to within 0.01 °C (0.02 °F)
- Chiller efficiency analysis: accepts an independent analog input representing kW usage for calculation of the following functions which can be selected for data logging or output purposes:
 - Cooling load (kW/ton)
 - Coefficient of performance (COP)
 - Energy efficiency ratio (EER)
- Temperature is factory calibrated with built-in field calibrator
- Built-in energy/BTU mode
- Detection of aeration and cavitation caused by worn or damaged impellers, misaligned shafts, etc.
- Current, voltage, frequency and RS 232 outputs (see specification section for details)
- Optional current, voltage and temperature inputs (see specification section for details)
- ZeroMatic Path automatically sets zero
- Bi-directional flow operation
- 1 MByte data logger with both site and data logger storage
- English, Spanish, German, Italian and French language options

Flow Measurement

SITRANS F US Clamp-on

SITRANS FUE1010 (HVAC) Check metering kit

Technical specifications

Pipe sizes	25.4 mm ... 9.14 m (1 ... 360")
Accuracy	± 0.5 % ... ± 2.0 % of flow rate
Flow range	12 m/s (40 ft/s) bidirectional
Media temperature	-40 ... +104 °C (-40 ... 220 °F)
Enclosure ratings	IP40 (NEMA 1) impact resistant

See page 3/340 for complete technical specifications

Certificates and approvals

Portable enclosures	
Unclassified locations	UL ULc
Classified locations	
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC

Selection and Ordering data

Article No.

Energy check metering kit

CQO:FUEHVACKIT

Content of delivery

1	Dual channel portable submersible flow transmitter
1 pair	Universal sensors C3
1 pair	Doppler sensors
1 pair	High precision sensors C2
1 pair	High precision sensors D1
2 pairs	RTDs
2 pairs	Mounting Ezclamp (4 mounting Ezclamp chains)
1	Battery charger
2 pairs	6 m (20 ft) sensor cables
1	RS 232 cable
4	RTD cable 6 m (20 ft)
4	Mountings for RTDs
1	Spacer bar (Portable)
2	F connector to BNC
1	Flow case
1	Flow meter manual
1	Laminated card set
1	Certificate of intrinsic calibration