

Welcome for Training Magnetic flow

ฟรี

อบรมเรื่อง Flow Instrument

1. Overview Instrument
2. Overview Flow meter
3. หลักการทำงาน ข้อมูลพื้นฐาน
4. การ Communication
5. การติดตั้ง set ค่า Flow meter

ผ่านโปรแกรม ZOOM

วันที่ 17/6/64 เวลา 10.00-12.00 AM

โดยวิทยากร...
คุณเสกพร

zoom

097-361-9703 GreatOrientalTrading @gotrading



Overview Instrument

Overview Flow meter

หลักการทำงาน ข้อมูลพื้นฐาน

การ Communication

การติดตั้ง set ค่า flow meter



Certified Partner

Member of Siemens Partners Network ASEAN

This is to certify that the company below is a member of Siemens Partners Network ASEAN

Great Oriental Trading Co., Ltd.

With company address:

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- Process Automation
- Process Instruments (PA PI)

within the Sales Territory of Thailand

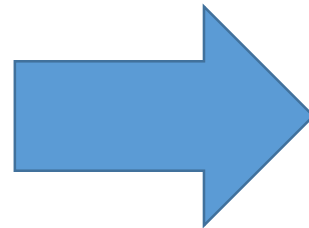
This certificate is valid from 01 Oct 2019 to 30 Sep 2020



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ความสำคัญของระบบวัดคุมต่างๆในกระบวนการผลิต



GOTRONIC DATA LOGGER

Siemens Flow meter



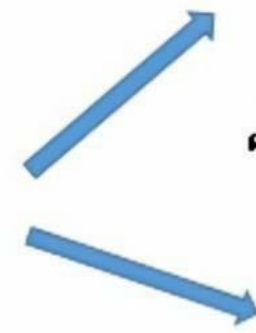
Mini PLC
รับค่าจาก Flow meter และ
ประมวลผลค่า อัตราการไหล
และผลรวมของการไหล ส่งไป
ยังหน้าจอ HMI



หน้ารับค่าเพื่อแสดงผล
และบันทึกค่า



หน้าตาโปรแกรมแสดงผล
สามารถปรับรายละเอียดตามที่ต้องการ



ดึงข้อมูลจากหน้าจอ ลง
คอมพิวเตอร์ เป็น Excel file

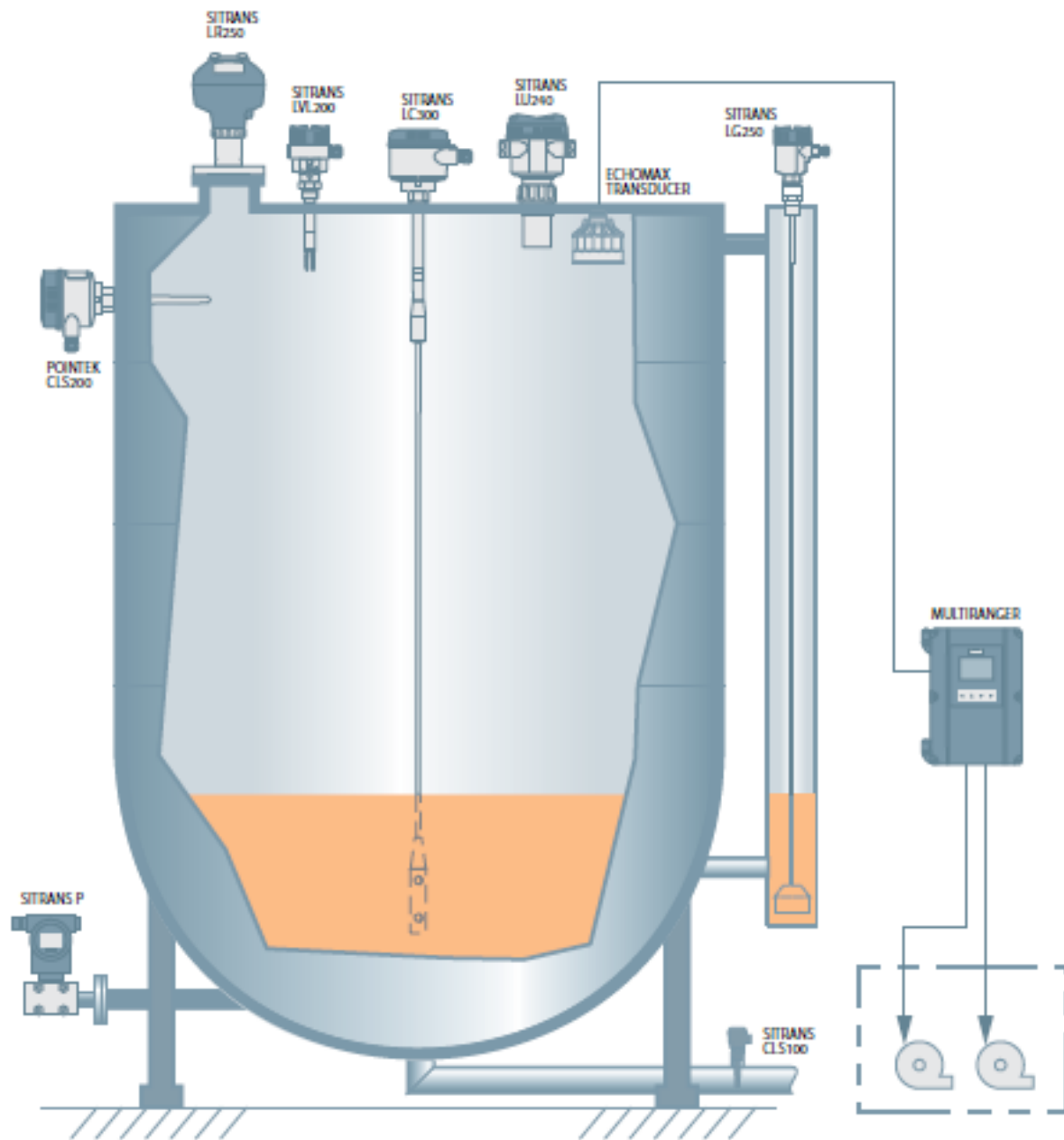


ส่งสัญญาณในมือ

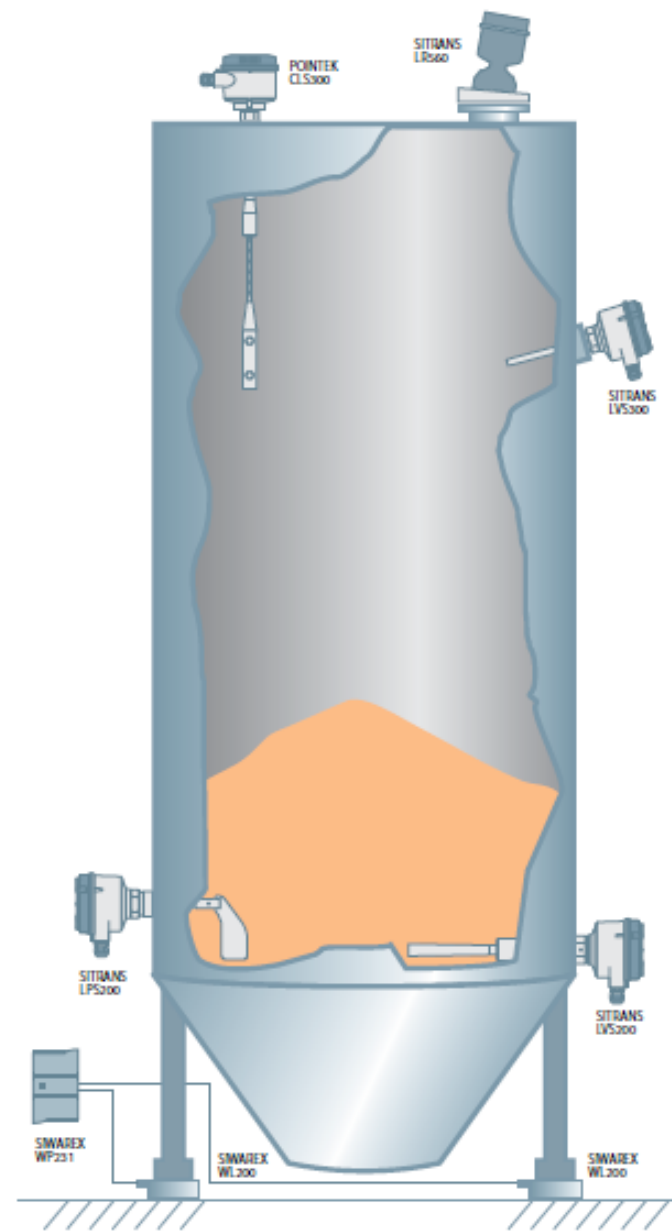


สามารถเข้าดูข้อมูลออนไลน์กับมือถือ
ในระยของ wifi

Time	Flow	Sum	...
00:00:00	10.5	10.5	...
00:00:10	10.5	21.0	...
00:00:20	10.5	31.5	...
00:00:30	10.5	42.0	...
00:00:40	10.5	52.5	...
00:00:50	10.5	63.0	...
00:01:00	10.5	73.5	...
00:01:10	10.5	84.0	...
00:01:20	10.5	94.5	...
00:01:30	10.5	105.0	...
00:01:40	10.5	115.5	...
00:01:50	10.5	126.0	...
00:02:00	10.5	136.5	...
00:02:10	10.5	147.0	...
00:02:20	10.5	157.5	...
00:02:30	10.5	168.0	...
00:02:40	10.5	178.5	...
00:02:50	10.5	189.0	...
00:03:00	10.5	199.5	...
00:03:10	10.5	210.0	...
00:03:20	10.5	220.5	...
00:03:30	10.5	231.0	...
00:03:40	10.5	241.5	...
00:03:50	10.5	252.0	...
00:04:00	10.5	262.5	...
00:04:10	10.5	273.0	...
00:04:20	10.5	283.5	...
00:04:30	10.5	294.0	...
00:04:40	10.5	304.5	...
00:04:50	10.5	315.0	...
00:05:00	10.5	325.5	...
00:05:10	10.5	336.0	...
00:05:20	10.5	346.5	...
00:05:30	10.5	357.0	...
00:05:40	10.5	367.5	...
00:05:50	10.5	378.0	...
00:06:00	10.5	388.5	...
00:06:10	10.5	399.0	...
00:06:20	10.5	409.5	...
00:06:30	10.5	420.0	...
00:06:40	10.5	430.5	...
00:06:50	10.5	441.0	...
00:07:00	10.5	451.5	...
00:07:10	10.5	462.0	...
00:07:20	10.5	472.5	...
00:07:30	10.5	483.0	...
00:07:40	10.5	493.5	...
00:07:50	10.5	504.0	...
00:08:00	10.5	514.5	...
00:08:10	10.5	525.0	...
00:08:20	10.5	535.5	...
00:08:30	10.5	546.0	...
00:08:40	10.5	556.5	...
00:08:50	10.5	567.0	...
00:09:00	10.5	577.5	...
00:09:10	10.5	588.0	...
00:09:20	10.5	598.5	...
00:09:30	10.5	609.0	...
00:09:40	10.5	619.5	...
00:09:50	10.5	630.0	...
00:10:00	10.5	640.5	...
00:10:10	10.5	651.0	...
00:10:20	10.5	661.5	...
00:10:30	10.5	672.0	...
00:10:40	10.5	682.5	...
00:10:50	10.5	693.0	...
00:11:00	10.5	703.5	...
00:11:10	10.5	714.0	...
00:11:20	10.5	724.5	...
00:11:30	10.5	735.0	...
00:11:40	10.5	745.5	...
00:11:50	10.5	756.0	...
00:12:00	10.5	766.5	...
00:12:10	10.5	777.0	...
00:12:20	10.5	787.5	...
00:12:30	10.5	798.0	...
00:12:40	10.5	808.5	...
00:12:50	10.5	819.0	...
00:13:00	10.5	829.5	...
00:13:10	10.5	840.0	...
00:13:20	10.5	850.5	...
00:13:30	10.5	861.0	...
00:13:40	10.5	871.5	...
00:13:50	10.5	882.0	...
00:14:00	10.5	892.5	...
00:14:10	10.5	903.0	...
00:14:20	10.5	913.5	...
00:14:30	10.5	924.0	...
00:14:40	10.5	934.5	...
00:14:50	10.5	945.0	...
00:15:00	10.5	955.5	...
00:15:10	10.5	966.0	...
00:15:20	10.5	976.5	...
00:15:30	10.5	987.0	...
00:15:40	10.5	997.5	...
00:15:50	10.5	1008.0	...
00:16:00	10.5	1018.5	...
00:16:10	10.5	1029.0	...
00:16:20	10.5	1039.5	...
00:16:30	10.5	1050.0	...
00:16:40	10.5	1060.5	...
00:16:50	10.5	1071.0	...
00:17:00	10.5	1081.5	...
00:17:10	10.5	1092.0	...
00:17:20	10.5	1102.5	...
00:17:30	10.5	1113.0	...
00:17:40	10.5	1123.5	...
00:17:50	10.5	1134.0	...
00:18:00	10.5	1144.5	...
00:18:10	10.5	1155.0	...
00:18:20	10.5	1165.5	...
00:18:30	10.5	1176.0	...
00:18:40	10.5	1186.5	...
00:18:50	10.5	1197.0	...
00:19:00	10.5	1207.5	...
00:19:10	10.5	1218.0	...
00:19:20	10.5	1228.5	...
00:19:30	10.5	1239.0	...
00:19:40	10.5	1249.5	...
00:19:50	10.5	1260.0	...
00:20:00	10.5	1270.5	...
00:20:10	10.5	1281.0	...
00:20:20	10.5	1291.5	...
00:20:30	10.5	1302.0	...
00:20:40	10.5	1312.5	...
00:20:50	10.5	1323.0	...
00:21:00	10.5	1333.5	...
00:21:10	10.5	1344.0	...
00:21:20	10.5	1354.5	...
00:21:30	10.5	1365.0	...
00:21:40	10.5	1375.5	...
00:21:50	10.5	1386.0	...
00:22:00	10.5	1396.5	...
00:22:10	10.5	1407.0	...
00:22:20	10.5	1417.5	...
00:22:30	10.5	1428.0	...
00:22:40	10.5	1438.5	...
00:22:50	10.5	1449.0	...
00:23:00	10.5	1459.5	...
00:23:10	10.5	1470.0	...
00:23:20	10.5	1480.5	...
00:23:30	10.5	1491.0	...
00:23:40	10.5	1501.5	...
00:23:50	10.5	1512.0	...
00:24:00	10.5	1522.5	...
00:24:10	10.5	1533.0	...
00:24:20	10.5	1543.5	...
00:24:30	10.5	1554.0	...
00:24:40	10.5	1564.5	...
00:24:50	10.5	1575.0	...
00:25:00	10.5	1585.5	...
00:25:10	10.5	1596.0	...
00:25:20	10.5	1606.5	...
00:25:30	10.5	1617.0	...
00:25:40	10.5	1627.5	...
00:25:50	10.5	1638.0	...
00:26:00	10.5	1648.5	...
00:26:10	10.5	1659.0	...
00:26:20	10.5	1669.5	...
00:26:30	10.5	1680.0	...
00:26:40	10.5	1690.5	...
00:26:50	10.5	1701.0	...
00:27:00	10.5	1711.5	...
00:27:10	10.5	1722.0	...
00:27:20	10.5	1732.5	...
00:27:30	10.5	1743.0	...
00:27:40	10.5	1753.5	...
00:27:50	10.5	1764.0	...
00:28:00	10.5	1774.5	...
00:28:10	10.5	1785.0	...
00:28:20	10.5	1795.5	...
00:28:30	10.5	1806.0	...
00:28:40	10.5	1816.5	...
00:28:50	10.5	1827.0	...
00:29:00	10.5	1837.5	...
00:29:10	10.5	1848.0	...
00:29:20	10.5	1858.5	...
00:29:30	10.5	1869.0	...
00:29:40	10.5	1879.5	...
00:29:50	10.5	1890.0	...
00:30:00	10.5	1900.5	...
00:30:10	10.5	1911.0	...
00:30:20	10.5	1921.5	...
00:30:30	10.5	1932.0	...
00:30:40	10.5	1942.5	...
00:30:50	10.5	1953.0	...
00:31:00	10.5	1963.5	...
00:31:10	10.5	1974.0	...
00:31:20	10.5	1984.5	...
00:31:30	10.5	1995.0	...
00:31:40	10.5	2005.5	...
00:31:50	10.5	2016.0	...
00:32:00	10.5	2026.5	...
00:32:10	10.5	2037.0	...
00:32:20	10.5	2047.5	...
00:32:30	10.5	2058.0	...
00:32:40	10.5	2068.5	...
00:32:50	10.5	2079.0	...
00:33:00	10.5	2089.5	...
00:33:10	10.5	2100.0	...
00:33:20	10.5	2110.5	...
00:33:30	10.5	2121.0	...
00:33:40	10.5	2131.5	...
00:33:50	10.5	2142.0	...
00:34:00	10.5	2152.5	...
00:34:10	10.5	2163.0	...
00:34:20	10.5	2173.5	...
00:34:30	10.5	2184.0	...
00:34:40	10.5	2194.5	...
00:34:50	10.5	2205.0	...
00:35:00	10.5	2215.5	...
00:35:10	10.5	2226.0	...
00:35:20	10.5	2236.5	...
00:35:30	10.5	2247.0	...
00:35:40	10.5	2257.5	...
00:35:50	10.5	2268.0	...
00:36:00	10.5	2278.5	...
00:36:10	10.5	2289.0	...
00:36:20	10.5	2299.5	...
00:36:30	10.5	2310.0	...
00:36:40	10.5	2320.5	...
00:36:50	10.5	2331.0	...
00:37:00	10.5	2341.5	...
00:37:10	10.5	2352.0	...
00:37:20	10.5	2362.5	...
00:37:30	10.5	2373.0	...
00:37:40	10.5	2383.5	...
00:37:50	10.5	2394.0	...
00:38:00	10.5	2404.5	...
00:38:10	10.5	2415.0	...
00:38:20	10.5	2425.5	...
00:38:30	10.5	2436.0	...
00:38:40	10.5	2446.5	...
00:38:50	10.5	2457.0	...
00:39:00	10.5	2467.5	...
00:39:10	10.5	2478.0	...
00:39:20	10.5	2488.5	...
00:39:30	10.5	2499.0	...
00:39:40	10.5	2509.5	...
00:39:50	10.5	2520.0	...
00:40:00	10.5	2530.5	...
00:40:10	10.5	2541.0	...
00:40:20	10.5	2551.5	...
00:40:30	10.5	2562.0	...
00:40:40	10.5	2572.5	...
00:40:50	10.5	2583.0	...
00:41:00	10.5	2593.5	...
00:41:10	10.5	2604.0	...
00:41:20	10.5	2614.5	...
00:41:30	10.5	2625.0	...
00:41:40	10.5	2635.5	...
00:41:50	10.5	2646.0	...
00:42:00	10.5	2656.5	...
00:42:10	10.5	2667.0	...
00:42:20	10.5	2677.5	...
00:42:30	10.5	2688.0	...
00:42:40	10.5	2698.5	...
00:42:50	10.5	2709.0	...
00:43:00	10.5	2719.5	...
00:43:10	10.5	2730.0	...
00:43:20	10.5	2740.5	...
00:43:30	10.5	2751.0	...
00:43:40	10.5	2761.5	...
00:43:50	10.5	2772.0	...
00:44:00	10.5	2782.5	...
00:44:10	10.5	2793.0	...
00:44:20	10.5	2803.5	...
00:44:30	10.5	2814.0	...
00:44:40	10.5	2824.5	...
00:44:50	10.5	2835.0	...
00:45:00	10.5	2845.5	...
00:45:10	10.5	2856.0	...
00:45:20	10.5	2866.5	...
00:45:30	10.5	2877.0	...
00:45:40	10.5	2887.5	...
00:45:			



ชุดวัดคุมประเภทวัดฤดูบเป็นของเหลว



ชุดวัดคุมประเภทวัดฤดูบเป็นของแข็ง

Overview Instrument



ชุดวัดอุณหภูมิ



ชุดวัดแรงดัน



ชุดวัดปริมาณ



ชุดวัดอัตราการไหล



Continuous level measurement - Ultrasonic transducers



ST-H: ETFE or PVDF transducer for chemicals
XRS-5: Standard transducer for applications to 8 m (26 ft)

Continuous level measurement - Radar transmitters

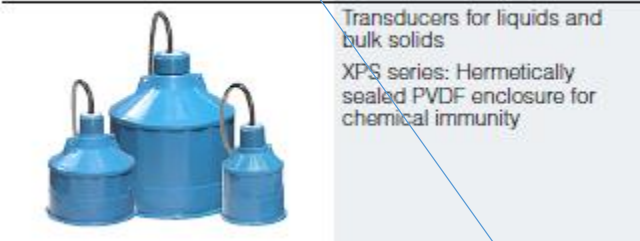


2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).

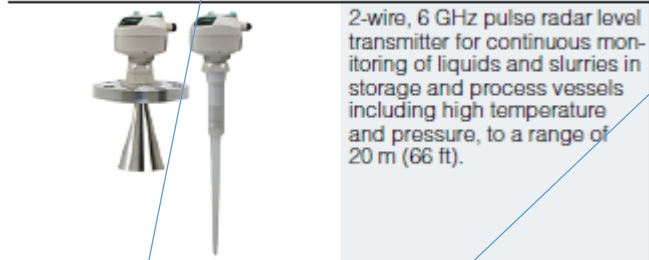
Continuous level measurement - Guided wave radar transmitters



Guided wave radar transmitters for short- and medium-range level, level/interface, and volume measurement of liquids, slurries, and solids. The four LG models are unaffected by changes in process conditions, high temperatures and pressures, and provide a wide range of hygienic options.



Transducers for liquids and bulk solids
XPS series: Hermetically sealed PVDF enclosure for chemical immunity



2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).

Continuous level measurement - Capacitance transmitters



For liquids and solids applications, ideal for standard industrial applications in chemical, hydrocarbon processing, food and beverage, and mining, aggregate and cement industries.



Continuous level

Point level

Conditions	Ultrasonic	Radar	Guided wave radar	RF Capacitance	Gravimetric	Hydrostatic pressure	Vibration	Capacitance	Paddle	Ultrasonic
Measurement										
Level	●	●	●	●	●	●	●	●	●	●
Interface (liquid/liquid)			●	●		●		●		
Interface (liquid/solid)	●			●			●	●		
Volume	●	●	●	●	●	●				
		●			●	●				
Level Application										

การวัดแบบต่อเนื่อง

Point level measurement - Vibrating switches



Reliable vibrating point level switches for liquid and slurry applications across all industries.

Point level measurement - RF Capacitance switches



Powerful range of level switches suitable for a variety of industries.

Point level measurement - Rotating paddle switches



Reliable rotating point level switches for bulk solids in a wide variety of applications.

Point level measurement - Ultrasonic switch



Ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries.



Reliable vibrating point level switches for bulk solids in a wide variety of applications.

Continuous level

Point level

Conditions	Continuous level						Point level			
	Ultrasonic	Radar	Guided wave radar	RF Capacitance	Gravimetric	Hydrostatic pressure	Vibration	Capacitance	Paddle	Ultrasonic
Measurement										
Level	●	●	●	●	●	●	●	●	●	●
Interface (liquid/liquid)			●	●		●		●		
Interface (liquid/solid)	●			●			●	●		
Volume	●	●	●	●	●	●				
					●	●				
		●								
Level Application										

การวัดแบบเฉพาะจุด

Overview Instrument



ชุดวัดอุณหภูมิ



ชุดวัดแรงดัน



ชุดวัดปริมาณ



ชุดวัดอัตราการไหล



1



Transmitter



% ความแม่นยำ
จุดติดตั้ง
สัญญาณ out put

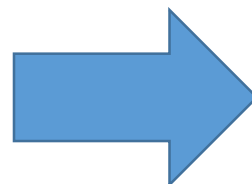
2



Sensor



ขนาดท่อ
ชนิดของน้ำ
อุณหภูมิ
ชนิดของท่อ / หน้าแปลน / แรงดัน
ตำแหน่งการติดตั้ง
แหล่งจ่ายพลังงาน



Flow meter

Overview Flow Merter



Overview

Application	Description	Catalog page	Software for parameterization
SITRANS FM electromagnetic flowmeters – Pulsed DC magnetic flowmeter			
 <p>Designed in robust IP67 polyamide enclosures for compact or remote mounting. 19", back of panel and front of panel enclosure program.</p>	Transmitter MAG 5000/6000 <ul style="list-style-type: none"> Superior signal resolution for optimum turn down ratio Comprehensively self-diagnostic, for error indication and logging Multi-lingual display and keypad interface Communication modules: HART, Modbus, PROFIBUS, FOUNDATION Fieldbus, DeviceNet Custody transfer approval: MI-001, PTB K7.2 	3/31	SIMATIC PDM
 <p>Designed in robust die-cast aluminum enclosure for demanding applications and where explosion proof protection is necessary.</p>	Transmitter MAG 6000 I/6000 I Ex <ul style="list-style-type: none"> Remote and compact mounting with all sensors Communication modules: HART, Modbus, PROFIBUS, FOUNDATION Fieldbus, DeviceNet Ex Approval: ATEX, IECEx, FM, UL, CSA Multi-lingual display and touchpad keypad Comprehensively self-diagnostic 	3/43	SIMATIC PDM
 <p>Designed for the general industry environment. The obstructionless performance of the MAG 1100 is unaffected by the suspended solids, viscosity and temperature challenges.</p>	Flow sensors MAG 1100 and MAG 1100 HT <ul style="list-style-type: none"> Metering tube DN 2 ... 100 (1/12 ... 4") flangeless design. Corrosion-resistant AISI 316 stainless steel housing. Highly resistant liner (ceramic or PFA) and electrodes fitting most extreme process media. Temperature rating up to 200 °C (390 °F) Ex Approval: ATEX, FM 	3/48	
 <p>Specially designed for the food & beverage and pharmaceutical industry.</p> 	Flow sensor MAG 1100 F <ul style="list-style-type: none"> AISI 316 stainless steel enclosure Hygienic seal, 3A and EHEDG Easy to clean Supplied with connections according to your specification Ex Approval: ATEX, FM 	3/56	
 <p>The MAG 3100 series with its flexibility in the choice of liner, electrode and flange material allows the measurement of even the most extreme process media.</p>	Flow sensors MAG 3100 and MAG 3100 HT <ul style="list-style-type: none"> For a wide range of pipe dimensions: DN 15 ... 2000 (1/2 ... 78") Wide range of liner and electrode materials High-temperature version for application with temperatures up to 180 °C (355 °F) High-pressure solutions 	3/78	

Overview (continued)

Application	Description	Catalog page	Software for parameterization
 <p>The SITRANS FM MAG 3100 P sensor is designed to meet the most common specifications within the chemical and process industries.</p>	Flow sensor MAG 3100 P <ul style="list-style-type: none"> For pipe dimensions DN 15 ... 300 (1/2 ... 12") Fully welded construction that is extremely rugged and can withstand special process conditions using extreme measurement electrodes Approvals for hazardous areas: ATEX, FM, CSA, IECEx Comprehensive self-diagnostic for error indication and error logging Temperature resistant up to 150 °C (302 °F) 	3/82	
 <p>Designed for all water and waste water applications in water plants and industrial applications.</p>	Flow sensor MAG 5100 W <ul style="list-style-type: none"> Metering tube DN 15 ... 1200 (DN 2000) (1/2" ... 48" (78")) Hard Rubber or EPDM lining Integral grounding electrodes as standard Increased low flow accuracy for water leak detection Drinking water approvals and custody transfer approvals, OIML R 49, MI-001 and PTB K7.2 	3/91	
 <p>The SITRANS FM100 is an electromagnetic flow meter for measuring and monitoring small and medium flows.</p>	Flow meter SITRANS FM100 NEW <ul style="list-style-type: none"> Connection 1/2", 3/4", 1", 2" Flow- and temperature measurement IO-Link communication Dosing function with external control output Flexible usage in different applications due to two individual configurable outputs Bidirectional measuring Robust stainless-steel design 	3/104	
SITRANS FM electromagnetic flowmeters – High-power AC magnetic flowmeter			
 <p>Designed for heavy-duty applications like pulp & paper stock over 3%, heavy mining slurries and mining slurries with magnetic particles.</p>	Transmitter Transmag 2 <ul style="list-style-type: none"> Magnetic flowmeter with a very strong pulsed AC magnetic field PROFIBUS PA or HART communication Comprehensive self-test function 	3/109	SIMATIC PDM
 <p>Designed for heavy-duty applications like pulp & paper stock over 3%, heavy mining slurries and mining slurries with magnetic particles.</p>	Flow sensor MAG 911/E <ul style="list-style-type: none"> Metering tube: DN 15 ... DN 1000 (1/2" ... 40") Metering tube liner: Hard Rubber, Linatex, Soft rubber, PTFE and Novolak Integral smartPLUG for storing of calibration values Multi-lingual display and touchpad keypad Only remote version 	3/109	
SITRANS FM electromagnetic flowmeters – Battery-operated magnetic water meter			
 <p>Battery-operated electromagnetic water meter for water applications within abstraction, distribution network and revenue metering.</p>	Water meter MAG 8000 <ul style="list-style-type: none"> Battery- and/or mains power operated water meter Metering tube DN 25 ... 1200 (1 ... 48") Remote and compact installation IP68/NEMA 6P enclosure Custody transfer approval: PTB K7.2, OIML R 49 and MI-001 Drinking water approvals Communication modules: GSM/GPRS, Modbus, Encoder 	3/119	SIMATIC PDM and Flow Tool



Overview Flow Merter



Overview (continued)

Application	Description	Catalog page	Software for parameterization
SITRANS FC mass flowmeters			
 <p>Designed for a variety of liquid and gas applications in the process industry. Measurement of mass flow, density, temperature and fraction.</p>	<p>Flowmeters FC330 (Dual tube design)</p> <ul style="list-style-type: none"> • DN 15, DN 25, DN 50, DN 80, DN 100 and DN 150 • Flow from 70 ... 860 000 kg/h - water • Pipe material: AISI 316L or Nickel-Alloy C4 • Accuracy, typically: Flow: $\leq 0.1\%$ or 0.2% version, Density: down to ≤ 0.002 g/cm³ • Liquid temperature/pressure: -50 ... +205 °C (-58 ... +400 °F) up to 100 bar (1450 psi) • Approvals: ATEX, IECEx, cCSAus, CRN, PED (depending on configuration) 	3/176	
 <p>Designed for a variety of liquid and gas applications. Measurement of mass flow, density, temperature. Modbus RS 485-RTU communication for direct integration into skids, OEM and pre-assembled plant packages</p>	<p>Flowmeters FC310 (Dual tube design)</p> <ul style="list-style-type: none"> • DN 15, DN 25, DN 50, DN 80, DN 100 and DN 150 • Flow from 70 ... 860 000 kg/h • Pipe material: AISI 316L or Nickel-Alloy C4 • Accuracy, typically: Flow: $\leq 0.1\%$ or 0.2% version, Density: down to ≤ 0.002 g/cm³ • Liquid temperature/pressure: -50 ... +205 °C (-58 ... +400 °F) up to 100 bar (1450 psi) • Approvals: ATEX, IECEx, cCSAus, Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping (depending on configuration) 	3/180	
 <p>Designed for a variety of liquid and gas applications. Measurement of mass flow, density, temperature and fraction</p>	<p>Flowmeters FC430 (Dual tube design)</p> <ul style="list-style-type: none"> • DN 15, DN 25, DN 50 • Flow from 20 ... 70 700 kg/h - water • Pipe material: AISI 316L • Accuracy, typically: Flow: $\leq 0.1\%$, Density: down to 0.005 g/cm³ • Liquid temperature/pressure: -50 ... +200 °C (-58 ... +392 °F) up to 100 bar (1450 psi) • Approvals: ATEX, IECEx, EAC Ex, cCSAus, NEPSI, CRN, PED, Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping 	3/193	
 <p>Designed for a variety of liquid and gas applications. Measurement of mass flow, density, temperature. Modbus RS-485 RTU communication for direct integration into skids, OEM and pre-assembled plant packages</p>	<p>Flowmeters FC410 (Dual tube design)</p> <ul style="list-style-type: none"> • DN 15, DN 25, DN 50 • Flow from 20 ... 70 700 kg/h • Pipe material: AISI 316L • Accuracy, typically: Flow: $\pm 0.1\%$, Density: down to ± 0.005 g/cm³ • Liquid temperature/pressure: -50 ... +200 °C (-58 ... +392 °F) up to 100 bar (1450 psi) • Approvals: ATEX, IECEx, EAC Ex, cCSAus, NEPSI, Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping 	3/197	






Overview (continued)

Application	Description	Catalog page	Software for parameterization
 <p>Designed for low flow applications</p>	<p>Flowmeter MASS 2100 and FC300 with transmitter FCT010 or FCT030 (single tube design)</p> <ul style="list-style-type: none"> • MASS 2100: DI 1.5, DI 3, DI 6, DI 15 • FC300: DN 4 • Flow from 0.1 ... 5600 kg/h • Pipe material: Stainless steel AISI 316L/1.4435; Hastelloy C22/2.4602 • Accuracy, typically: <ul style="list-style-type: none"> - Flow: down to 0.1% - Density: down to 0.0005 g/cm³ • Liquid temp./pressure: -50 ... +180°C (-58 ... +356 °F) / Up to 410 bar (5946 psi) • Approvals: ed according to ATEX, IECEx, c-UL-us, CRN, PED 	3/203	
 <p>SITRANS FCT070 can be connected to all Coriolis type Sensors FCS300, FCS400, MASS 2100 and FC300 DN4. 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.</p>	<p>Transmitter SITRANS FCT070 NEW</p> <ul style="list-style-type: none"> • Easy integration into automation process control as TIA portal and PCS7 • 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 • ATEX Zone 2 FM Class 1 Div 2 approvals. • Included advanced batch functionality without additional modules. 	3/164	
SITRANS FS inline ultrasonic flowmeters			
 <p>SITRANS FST030 inline is designed for all ultrasonic flow metering. FST030 is released for water application on SONOKIT up to all pipe sizes in dual path</p>	<p>SITRANS FST030 transmitter</p> <ul style="list-style-type: none"> • For SONOKIT up to DN 3000 and more • 1 or 2 path option • Analog output and relay • FDK085X6329 - HART • FDK085X6366 - Modbus 	3/320	SIMATIC PDM
 <p>SITRANS FUS060 is a time-based transmitter designed for ultrasonic flowmetering in pipes for the F US inline industry series up to DN 3000</p>	<p>SITRANS FUS060 transmitter</p> <ul style="list-style-type: none"> • Die cast aluminum enclosure • Ex approved according to ATEX • HART communication + 1 analog output, 1 digital output for frequency or pulse and 1 relay output for alarms and flow direction • PROFIBUS PA communication with 1 digital output for frequency or pulse 	3/252	SIMATIC PDM
 <p>SITRANS FUS080 is a time-based transmitter designed for ultrasonic flowmetering in pipes for the SONOKIT, FUS380 and FUE380 series up to DN 1200</p>	<p>SITRANS FUS080/FUE080 transmitter</p> <ul style="list-style-type: none"> • Battery or mains-powered • Easy one-button operation • Bidirectional measuring • IrDA optical eye communication • Robust polyamide enclosure 	3/259	SIMATIC PDM





Overview Flow Merter



Overview (continued)

Application	Description	Catalog page	Software for parameterization
 <p>The main application for SONO 3300 ultrasonic flowmeters is to measure the volume flow of:</p> <ul style="list-style-type: none"> Water and treated waste water Hot water/cooling systems 	<p>SONO 3300/FUS060</p> <ul style="list-style-type: none"> ATEX-approved DN 50 ... DN 500 (2" ... 12") steel pipes PN 10 ... PN 40 or class 150 ... class 300 pressure rates Flow 0.3 ... 3 200 m³/h (1.3 ... 14 089 GPM) No pressure drop FUS060 transmitter for separate mounting Signal cables from sensor to transducer are highly protected from aggressive environment by stainless steel pipes 	3/268	SIMATIC PDM
 <p>The main application for SONO 3100 ultrasonic flowmeters is to measure the volume flow of:</p> <ul style="list-style-type: none"> Water and treated waste water District heating systems 	<p>SONO 3100/FUS060</p> <ul style="list-style-type: none"> DN 100 ... DN 600 (4" ... 24") Pipe in carbon steel Transducers can be replaced under pressure FUS060 transmitter for separate mounting ATEX-approved Measure of all liquids less than 350 Cst, conductive or non-conductive No pressure drop 1-track, 2-path; 4-path on request Special material on request 	3/273	SIMATIC PDM
 <p>Installation of one, two or four transducer sets in existing concrete or steel pipes. Typically installed in pipes with large diameters or in hot/cold water applications</p>	<p>SONOKIT</p> <ul style="list-style-type: none"> FUS060 or FUG000 transmitter for separate mounting DN 100 ... 3000 (4 ... 120") Control and display unit Temperature of medium: -20 ... +200 °C (-4 ... +395 °F) Installation on empty pipes or pipes under pressure (hot-tap installation) Standard 1-path or 2-path (4-path on request) 	3/282	SIMATIC PDM
 <p>Battery or mains-powered ultrasonic flowmeter for use within water-based district heating, cooling systems and utility. The FUS380 can also be used for water irrigation systems. SITRANS FUS380/FUE380 are designed to work with the SITRANS FUE950 energy calculator.</p>	<p>FUS380/FUE380</p> <ul style="list-style-type: none"> FUS380/FUE380: DN 50 ... 1200 (2 ... 48") FUE380: Approved for custody transfer according to MID M1004 (according to EN 1434 Class 2, OIML R 75) FUS380/FUE380: Red brass or painted carbon steel flanges and metering tube. AISI transducers Water temperatures 2 ... 200 °C (35.6 ... 392 °F) Battery or mains-powered 	3/292	SIMATIC PDM
 <p>Universal thermal energy calculator for district heating and cooling applications.</p>	<p>SITRANS FUE950</p> <ul style="list-style-type: none"> Battery or mains-powered 24 periods memory 2 ports for plug-in modules as data output, extra input, M-Bus, RS 232/RS 485, current output Complete set with temperature sensors and pockets MID heating approval, PTB K7.2 cooling approval, MID04 type approval 	3/311	


Overview (continued)

Application	Description	Catalog page	Software for parameterization
SITRANS FS clamp-on ultrasonic flowmeters			
 <p>SITRANS FS clamp-on ultrasonic flowmeters provide highly accurate measurement while minimizing installation time and maintenance expense. These dedicated flowmeters are suitable for a wide variety of liquid applications, including those in the:</p> <ul style="list-style-type: none"> Water Industry Wastewater Industry HVAC Industry Power Industry Processing Industry Hydrocarbon Industry 	<p>SITRANS FS230</p> <ul style="list-style-type: none"> Suitable for virtually any liquid, even those with high aeration or suspended solids Hydrocarbon functions are ideal for applications carrying crude oil, refined petroleum or liquefied gas Choice of single and dual path versions to suit your operating conditions and requirements. Easy installation; no need to cut pipe or stop flow Minimal maintenance; external sensors do not require periodic cleaning Easy to read display with intuitive menu system Hazardous area approvals for ATEX Zone 2, IECEx Zone 2 FMc Class I Div. 2 	3/322	
 <p>SITRANS FS220 basic is a fast-to-install clamp-on ultrasonic flowmeter for accurate measurements with minimal maintenance. Based on latest technology, this flow meter is ideal suitable for applications like:</p> <ul style="list-style-type: none"> Water Industry Wastewater Industry HVAC Industry Power Industry Process controls 	<p>SITRANS FS220</p> <ul style="list-style-type: none"> Easy installation during process condition, no need to cut pipe or stop flow Minimal maintenance; external sensors do not require periodic cleaning No media-contacting parts, no wear, no pressure drop, no energy loss Wide turn-down ratio, very sensitive in low flow condition Optional WideBeam technology ensures high performance Compatible with all previously fielded transit time sensors 	3/344	
 <p>The thickness gauge can be used in any field application where there is a need for flow measurement. Including but not limited to:</p> <ul style="list-style-type: none"> Water and waste water Energy measurement Oil and gas industries 	<p>Thickness gauge</p> <p>The hand-held micro-processor controlled gauge is designed to measure the thickness of various metallic or non-metallic pipes.</p> <ul style="list-style-type: none"> Materials include steel, aluminum, titanium, plastics and ceramics Measurements shown in millimeter or inches Simple-to-read 4-digit LCD display Weights 150 g (5.3 oz) Battery operation for 250 h 	3/357	
SITRANS FX Vortex flowmeter			
 <p>Measurement of steam, gases and liquids in:</p> <ul style="list-style-type: none"> Chemical HVAC / Power plants Oil & Gas Food & Beverage Pharma 	<p>SITRANS FX300</p> <ul style="list-style-type: none"> Flange DN 15 ... DN 300 (½" ... 12") Sandwich DN 15 ... DN 100 (½" ... 4") 2-wire device 4 ... 20 mA, with integrated temperature and pressure sensors for compensation HART communication Medium temp.: -40 ... +240 °C (-40 ... +464 °F) Medium pressure: up to 100 bar (1450 psi) Hazardous area approvals: FM, CSA, ATEX Compact or remote mounted transmitter 	3/361	


Overview Flow Merter




Overview (continued)

Application	Description	Catalog page	Software for parameterization
 <p>Very versatile and flexible for use in many process applications. Flow sensors combines flow, pressure and temperature measurement into one user-friendly, two-wire device.</p> <ul style="list-style-type: none"> • Measurement of saturated steam and superheated steam • Heat metering of steam and hot water • Measurement of consumption in compressed air systems • Evaluation of Free Air Delivery (FAD) • SIP and CIP processes in the food, beverage and pharmaceutical industries • Measurement of conductive and non-conductive liquids • Safety-related measurement in SIL applications (SIL2). 	<p>SITRANS FX330</p> <ul style="list-style-type: none"> • Integrated pressure and temperature compensation • Temperature compensation for saturated steam included as standard • SIL2 certified according to IEC 61508 Edition 2 • Use in hazardous areas • Integrated reduction of nominal diameter for space-saving and economic installation • Exchange of electronics without loss of calibration and configuration data • Gross and net heat calculation to support energy management • Remote version with cable length up to 50 m (164 ft) 	3/379	

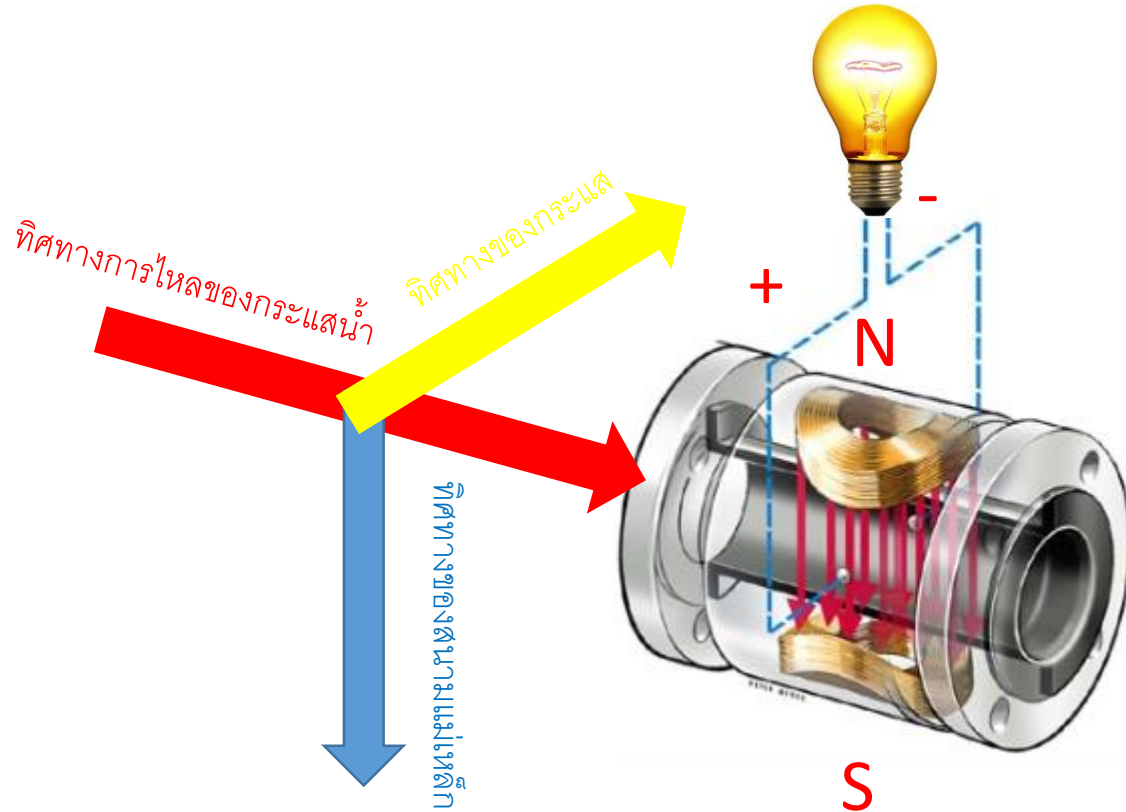
SITRANS FVA variable area meters

	<p>Measurement of flow of liquids and gases, also highly suitable for corrosive media, high temperatures and high pressures.</p>	<p>FVA250</p> <ul style="list-style-type: none"> • All-metal variable area meter with various float materials • Connections: DN 15 ... DN 100 (1/2" ... 4") • Temperature of medium: -20 °C ... +300 °C (-4 ... +572 °F) • Optionally available with analog output or contacts 	3/395	
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SITRANS FP differential pressure flow measurement **NEW**

	<p>SITRANS FP product line is suitable for all kinds of applications – liquids, dry or wet gases and steam. Due to the robust though variable design it has been and still is one of the main technologies for flow measurement in various industries.</p> <p>A new digital sizing process ensures minimum effort during presales and full traceability in aftersales. The differential pressure portfolio consists of</p> <ul style="list-style-type: none"> • pitot tube measuring system SITRANS FPS300 • differential pressure sensors acc. to ISO 5167 (orifices) SITRANS FPS200 	<ul style="list-style-type: none"> • Suitable for a vast range of different applications • Available as pre-mounted compact system as well as remote parts • Advanced intelligent sizing procedure • Web-based sizing and data storage enables full traceability and easy communication • All benefits of SITRANS P320 available 	3/405	
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Method Magnetic Flow Meters



$$e = b \cdot l \cdot v (\text{ความเร็ว})$$

$$e(\text{volt}) = v (\text{ความเร็ว})$$

$$e^{\wedge}(\text{volt}) = v^{\wedge} (\text{ความเร็ว})$$

ข้อจำกัด ไม่สามารถนำไปใช้กับน้ำที่มีค่าการนำไฟฟ้าต่ำกว่า 5 โมโคโนซีเมนส์ต่อเซนติเมตร ($\mu\text{s}/\text{cm}$)

Family Of Magnetic Flow Meter



Mag 5000

Housing : IP 67
Accuracy: 0.4 % of rate
Material : Polyamide
Communication : Option
Hart



Mag 5000 IP20

Housing : IP 20
Accuracy: 0.4 % of rate
Material : 19" Rack
Communication : Option
Hart



Mag 6000

Housing : IP 67
Accuracy: 0.2 % of rate
Material : Polyamide
Communication : Option
Hart, Profibus PA/DP,
Fieldbus, DeviceNet, Mod
bus RTU/485



Mag 6000 IP20

Housing : IP 20
Accuracy: 0.2 % of rate
Material : 19" Rack
Communication : Option
Hart, Profibus PA/DP,
Fieldbus, DeviceNet, Mod
bus RTU/485



Mag 6000 I

Housing : IP 67
Accuracy: 0.2 % of rate
Material : 19" Rack
Communication : Option
Hart, Profibus PA/DP,
Fieldbus, DeviceNet, Mod
bus RTU/485

Option : Hazardous area

Transmitter (ตัวประมวลผลสัญญาณ)

Family Of Magnetic Flow Meter



Mag 5100W

Housing : IP 67
Material : Case iron
Steel/powder coating
Sensor : Hastelloy C
Liner : NBR,EDPM
Water and Waste water

Temperature Working :
70 C



Mag 3100/P/HT

Housing : IP 67
Material : Case iron
Steel/Powder coating
Sensor : Hastelloy C,Other
Liner : PTFE.PFA,Other
Water and Waste water
,Chemical,Food

Temperature Working :
Standard : PTFE 100 C
P : PTFE 130 C
HT : PTFE 180 C



Mag 1100/F/HT

Housing : IP 67
Material : Case iron Steel ,STL
Sensor : Hastelloy C,Other
Liner : PTFE.PFA,Other
Water and Waste water
,Chemical

Temperature Working :
Standard/F : 150 C
HT : Ceramic 200 C



Mag 8000/CT

Housing : IP 67
Material : Case iron Steel
Sensor : STL 316
Liner : EDPM
Water and Waste water ,Royal
Irrigation
Option : Battery ,GSM Module

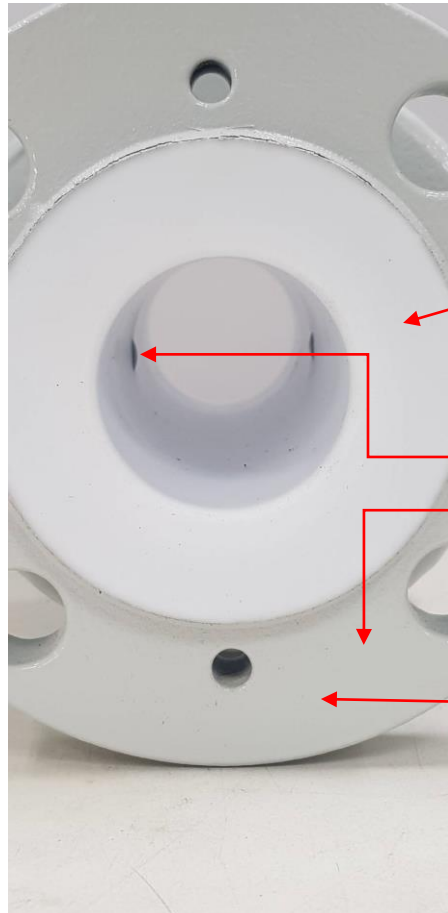
Temperature Working : 70 C

Sensor (ตัวส่งสัญญาณ)

SENSOR



มีให้เลือกทั้งแบบ 24 VDC กับ 220 AC



Liner material

- Soft Rubber
- EPDM
- PTFE
- Ebonite
- Linatex
- PFA

Electrode material

- Stainless steel AISI 316Ti / 1.4571
- Hastelloy C
- Platinum
- N0A Ceramic coated AISI 316 Ti incl. ground electr.

Flange material and coating

- carbon steel flanges ASTM A 105, corrosion-resistant coating of category C4
- Stainless steel flanges AISI 304/1.4301, corrosion-resistant coating of category C4

Flange norm / Pressure rating

- EN1092-1, PN6
- EN1092-1, PN40
- ANSI B16.5, Class 150
- ANSI B16.5, Class 300
- AS 4087, PN 16
- AS 4087, PN 21

Transmitter



- ลักษณะการติดตั้ง (IP)
- Accuracy: 0.4 % / 0.2 %
- Output Communications
 - 4-20mA, Hart (สัญญาณพื้นฐาน มีมาให้พร้อม)
 - Profibus PA/DP,Fieldbus,DeviceNet,Modbus RTU (สัญญาณที่ต้องการเพิ่มสามารถกำหนดได้)

สัญญาณ 4-20mA

(อังกฤษ: 4-20mA Signal) คือสัญญาณกระแสไฟที่ถูกใช้เป็นมาตรฐานสำหรับส่งสัญญาณของเครื่องมือวัดในอุตสาหกรรมซึ่งเป็นที่นิยมและแพร่หลายในปัจจุบัน โดยสัญญาณ 4-20mA ได้ถือกำเนิดขึ้นในช่วงยุคปี ค.ศ. 1950 (พ.ศ. 2493) หลังจากการประสบความสำเร็จอย่างมากของ มาตรฐานสัญญาณควบคุมนิวเมติก 3-15 psi ต่อมาเมื่ออิเล็กทรอนิกส์กลายเป็นของราคาถูกและนำเชื่อถือเพียงพอ การเปลี่ยนผ่านได้เป็นไปได้ง่ายไปอย่างค่อยเป็นค่อยไปจนมาถึงศตวรรษที่ 21 จนทำให้สัญญาณ 4-20mA เป็นที่นิยมสำหรับการส่งข้อมูลของเครื่องมือวัดในอุตสาหกรรม

หลักการทำงาน 4-20mA

การทำงานนั้นสัญญาณจะถูกส่งเป็นแบบ Linear ยกตัวอย่างเช่น เครื่องมือวัดที่มีช่วงการวัด 0-100 % ที่ 0 % เครื่องมือวัดจะส่งสัญญาณออกไป 4 mA และที่ 100 % เครื่องมือวัดจะส่งสัญญาณออกไป 20 mA ตามภาพตัวอย่าง

Type of installation

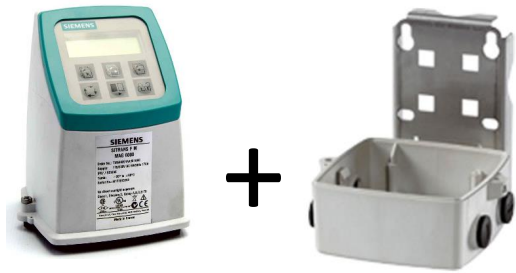
Remote

Transmitter



Compact

Control Room/Safety Area



=



Transmitter



Sensor

Cable LIYCY
3x1.5 mm²

Cable LIYCY
Double
shielded 3x
0.25 mm²



Sensor

Working Area /Pipe

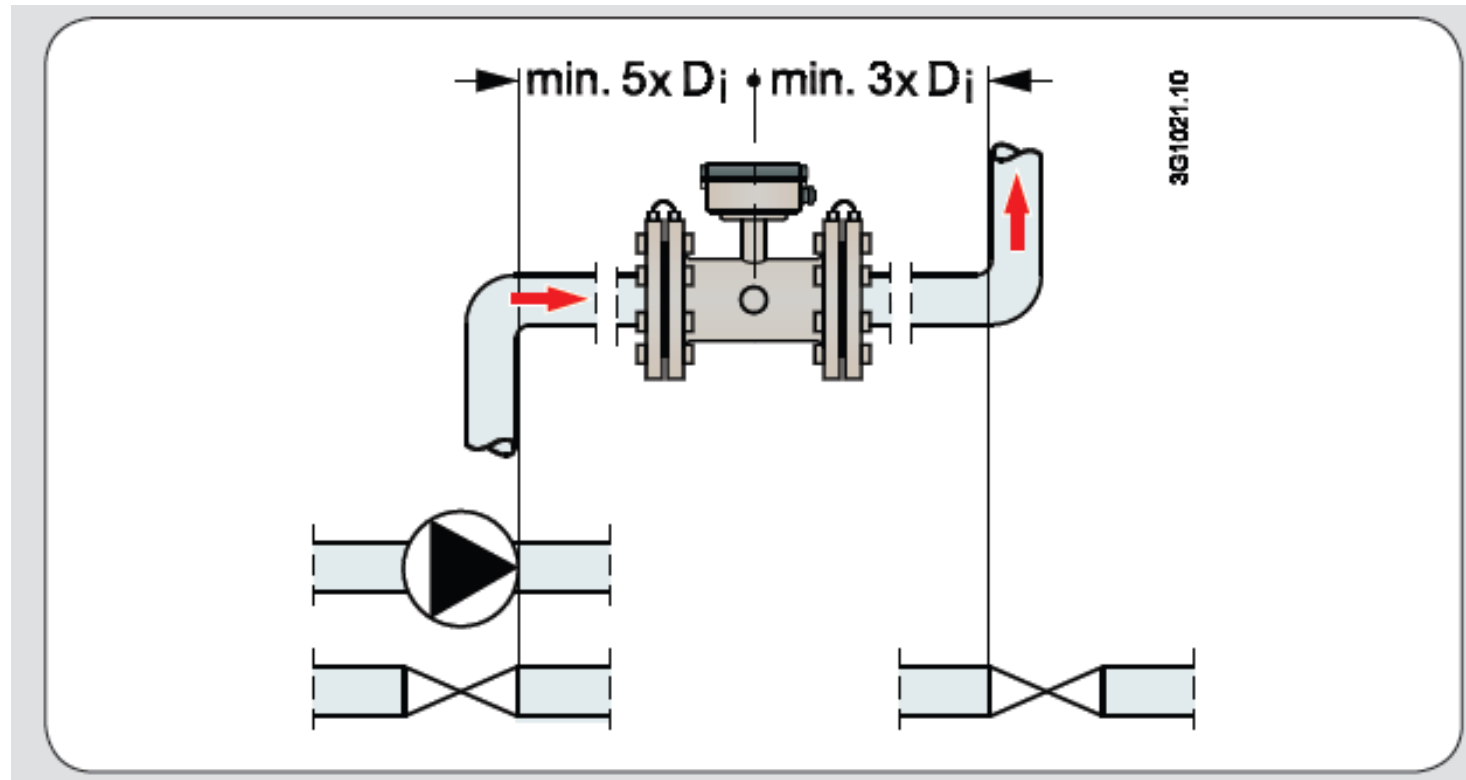
ตัวอย่างการประยุกต์ใช้ สำหรับ Flow meter



Installation

Selecting a suitable location

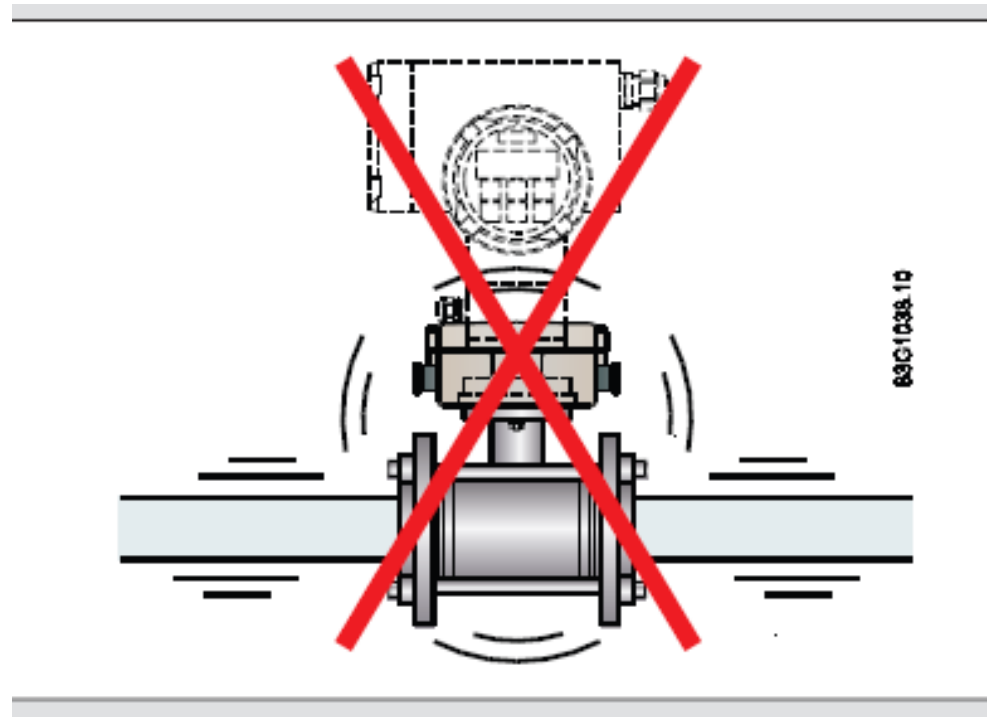
Choose a location that provides at least 5 x diameters before and 3 x diameter after the sensor



Installation

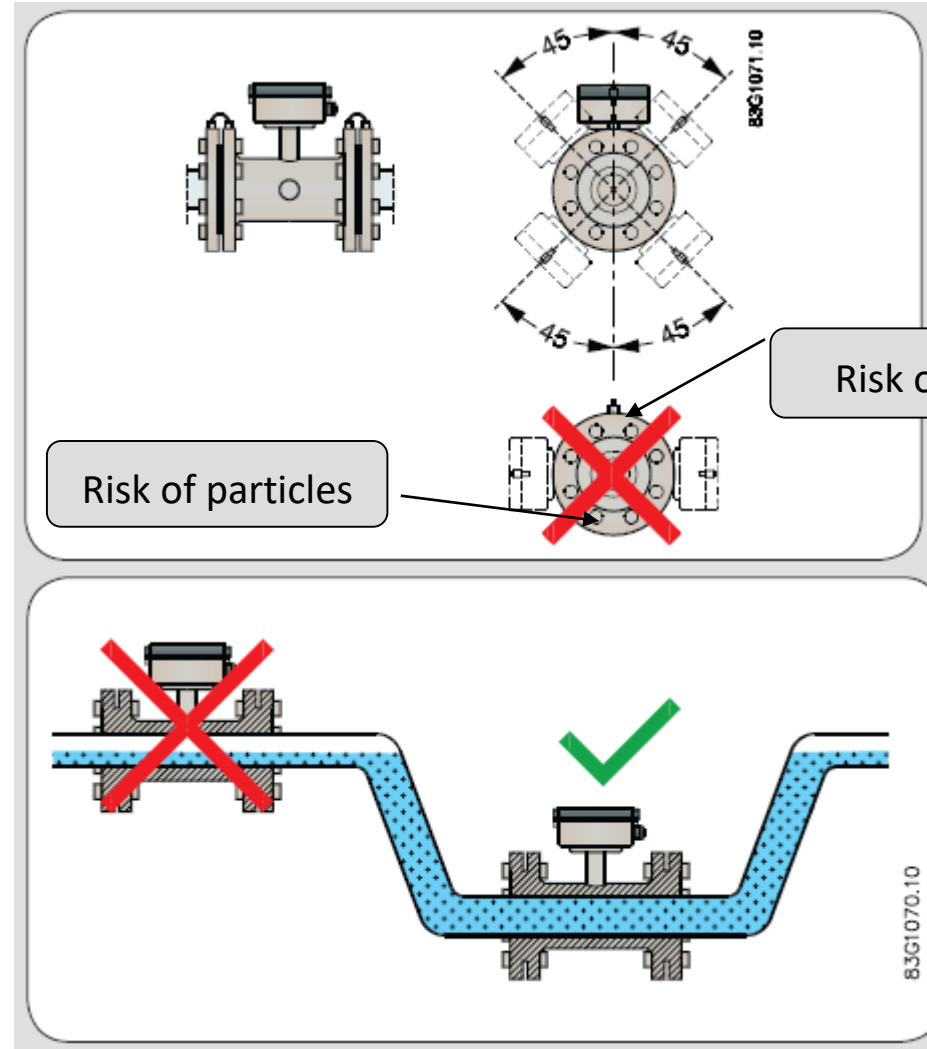
Selecting a suitable location

Avoid strong vibrations!



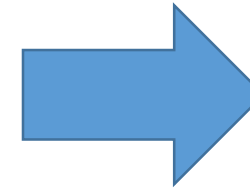
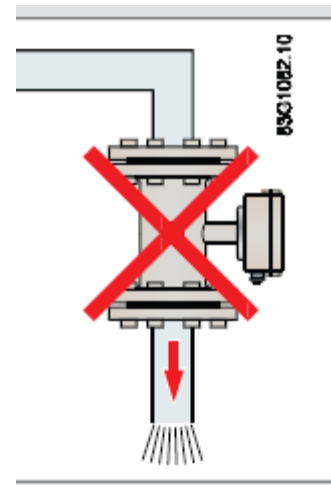
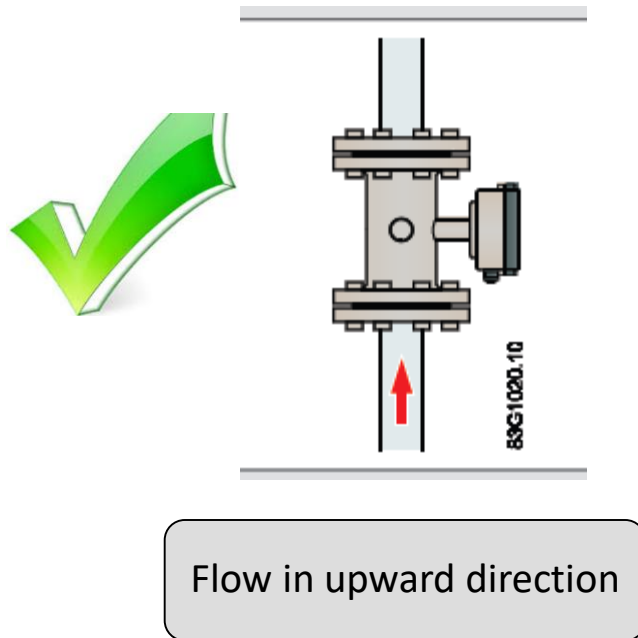
Installation

Horizontal pipes

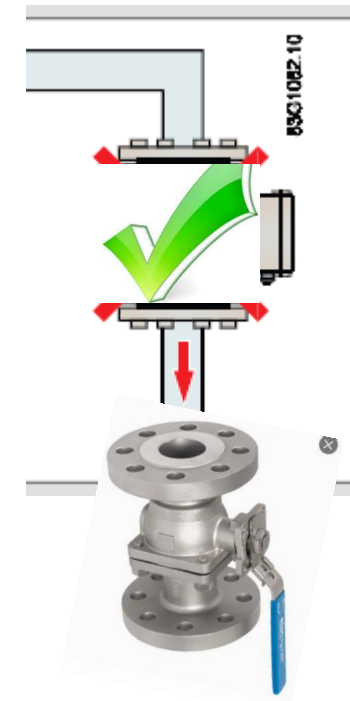


Installation

Vertical pipes



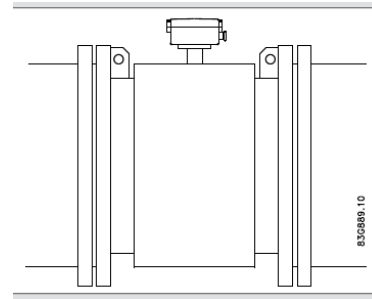
Sol: หลิ Valve



Installation

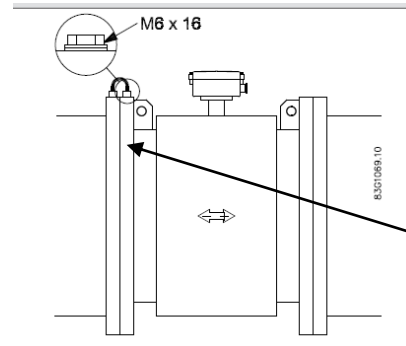
Grounding MAG 3100 and MAG 5100W

- Sensors with build in earthing electrodes
 - **Mag 5100 W**



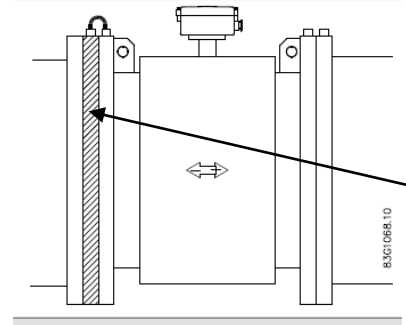
Grounding via grounding electrodes

- Sensors with no earthing electrodes
(MAG 3100 PTFE/PFA)
 Conductive pipe (Steel ,STL)



Use grounding strap

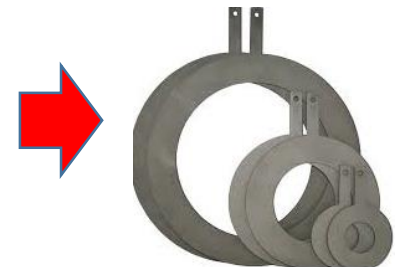
- Sensors with no earthing electrodes
(MAG 3100 PTFE/PFA)
 Non Conductive pipe(PVC ,HDPE)



Use grounding ring

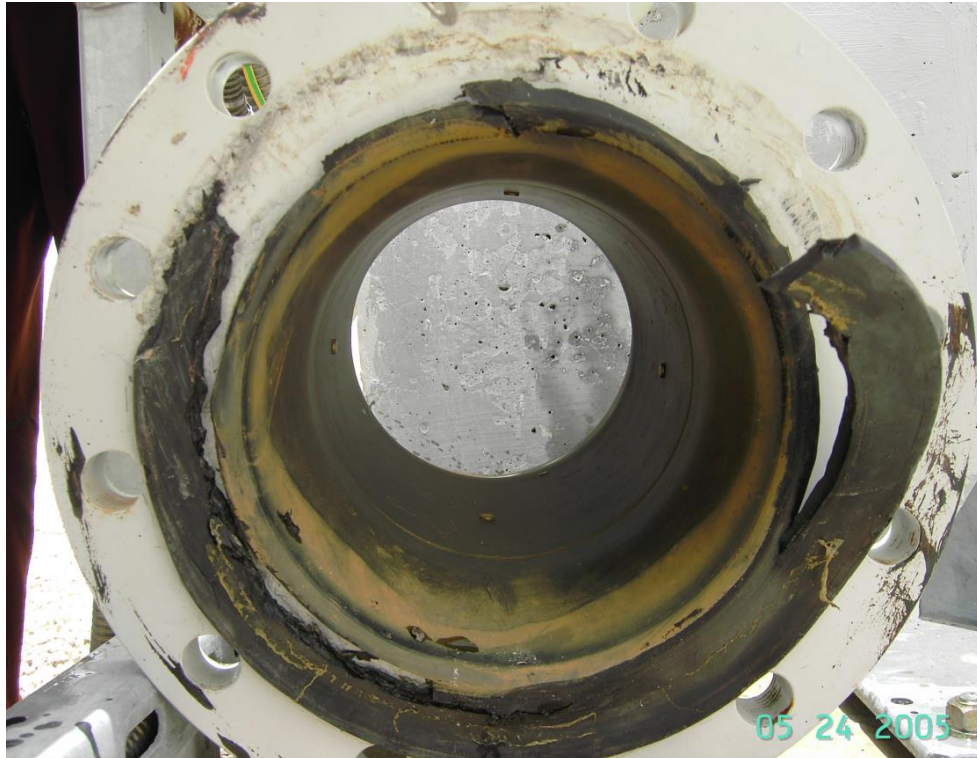


Sol : ต้องใส่ Ground Dis

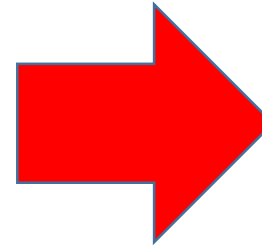


Most common errors and defective of sensor MAG 5100W (MAG 3100) Liner EDPM, Hard Rubber ,Ebonics

Overtightning and/or no gasket used



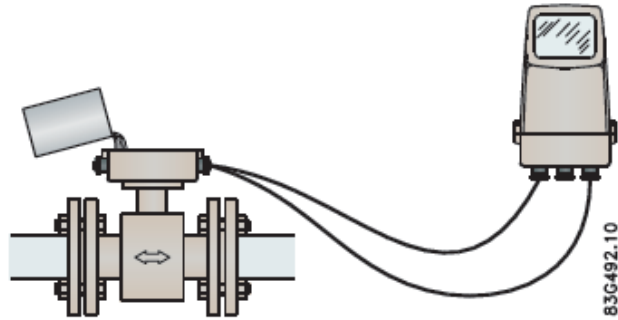
Sol : ต้องใส่ปะเก็น



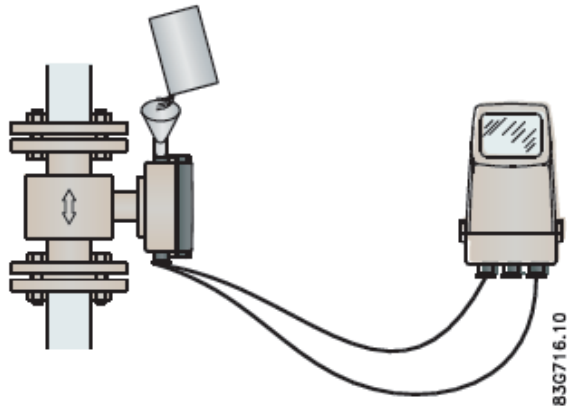
Additional for flow meter IP 68

Update to IP68

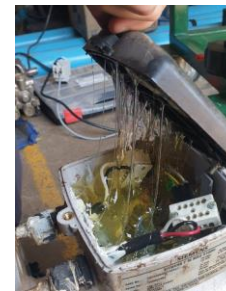
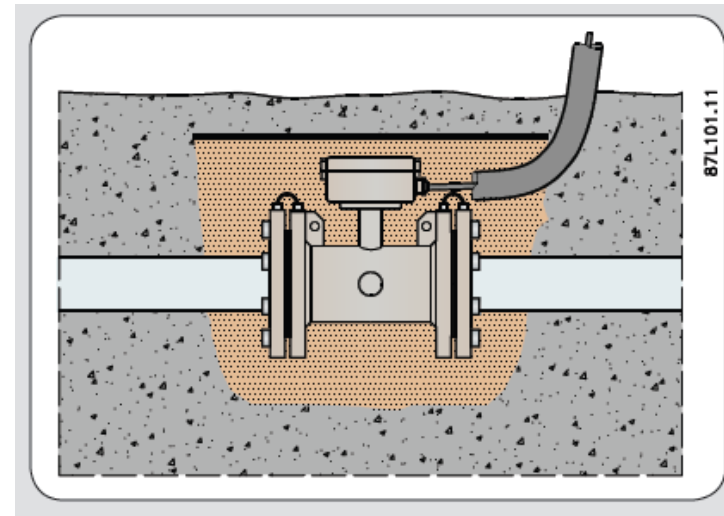
Horizontal



Vertical



Direct burial



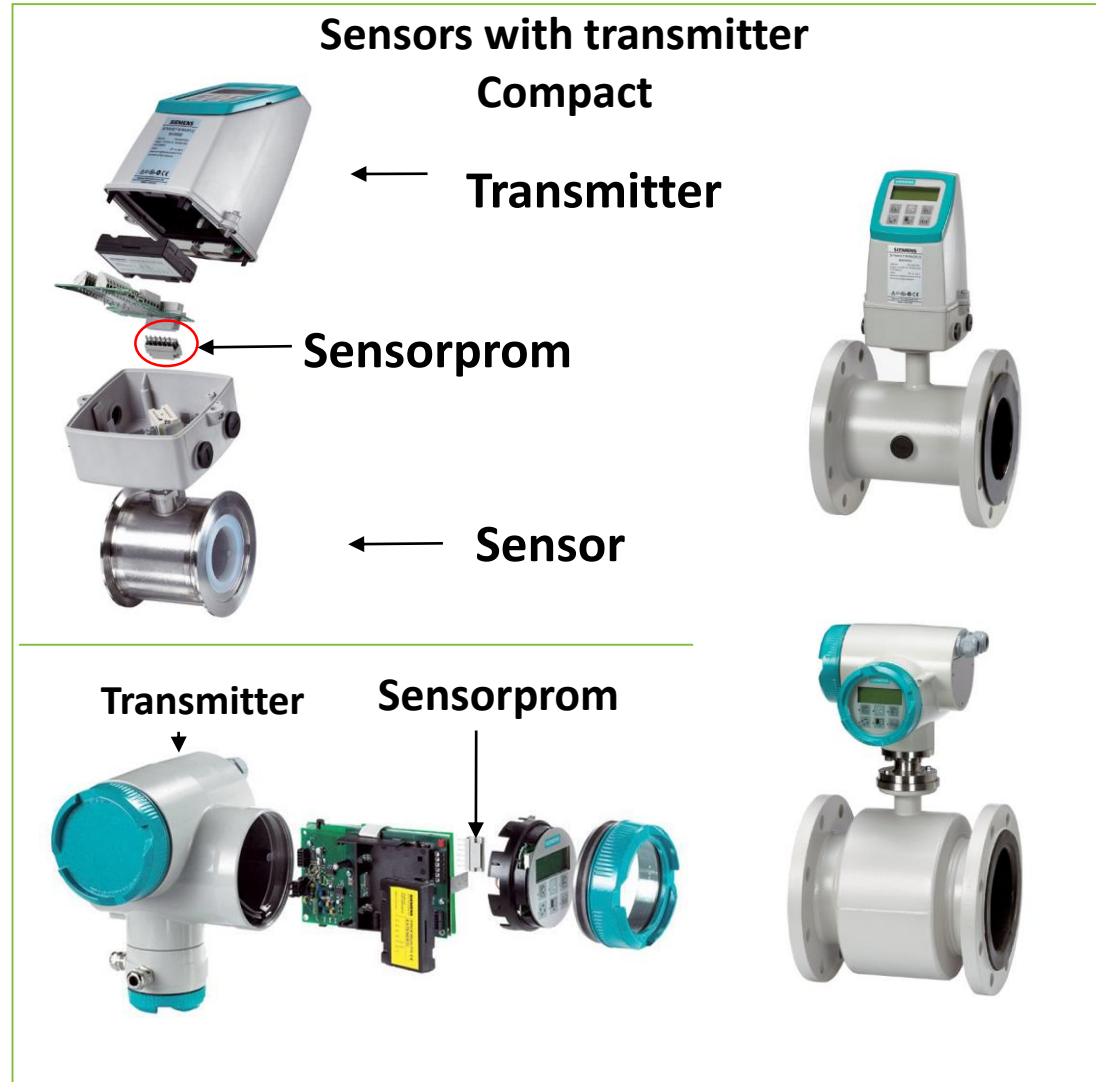
potting Kit

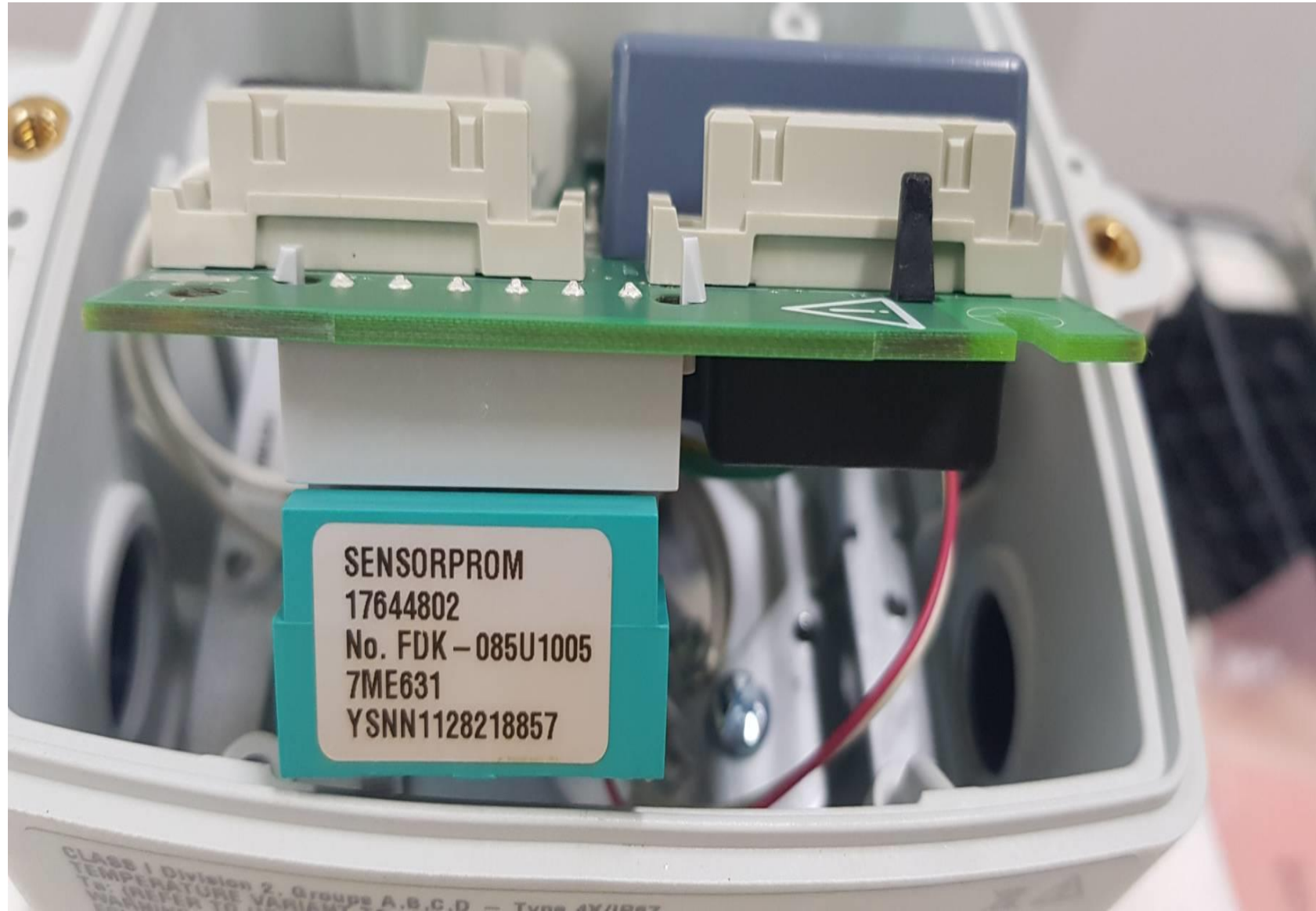
FDK:085U0220

Service Department

https://drive.google.com/file/d/1MC1VEcWxsFIDfVUQ1qzDvEOhjE-D_A_k/view?usp=sharing

How are MAG flow meters build up?





Calibration test point

Test points for default calibration at 25% and 90% of factory Q_{max} .

Size mm	Q_{max} m^3/h	90% m^3/h	25% m^3/h
2	0.055	0.0495	0.01375
3	0.127	0.1143	0.03175
6	0.5	0.45	0.125
10	1.4	1.26	0.35
15	3	2.7	0.75
25	9	8.1	2.25
40	23	20.7	5.75
50	35	31.5	8.75
65	60	54	15
80	90	81	22.5
100	140	126	35
125	220	198	55
150	320	288	80
200	550	495	137.5
250	900	810	225
300	1300	1170	325
350	1700	1530	425
400	2250	2025	562.5
450	2800	2520	700
500	2800	2520	700
600	2800	2520	700
700	6000	5400	1500
750	6000	5400	1500
800	6000	5400	1500
900	6000	5400	1500
1000	6000	5400	1500
1050	6000	5400	1500
1100	6000	5400	1500
1200	6000	5400	1500
1400	7000	6300	1750
1500	7000	6300	1750
1600	7000	6300	1750
1800	7000	6300	1750
2000	7000	6300	1750

ตารางอ้างอิงสำหรับค่า Q_{max}



Thanks you

สินค้าของเรามีอีกมากมายนะครับ.... โปรดคิดถึงเรา.....