Siemens nye flowmåler FMT020/FMS500

Dagens **vært**

Niels Christian Christensen

Agenda

SITRANS FMT020/FMS500

- Nye funktioner
- Opbygning / koncept
- Releaseplan
- Communication
- Display and Menu struktur
- Indbygningsforhold

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Fordele ved velkendt Mag5000/6000 er bibeholdt, og nye er kommet til

Unchanged advantages:

- The **Modularity** of the FMT020 is unchanged:
  - Compact-Remote free to decide during installation
- The **Sensorprom Technology** remains the biggest asset

New:

- Full graphical Display with 14 digits, Capacitive keypads
- Reduced height, compact design
- Ethernet IP, Profinet communication module
- Measuring conductivity
- Log data via micro-SD memory card
- Temperature spec. down to -40°C
- Robust Enclosure
- Bluetooth (available later)
- MI001, MI004, OIML R 49 Class ½ (available later)
- EX zone 2 approvals: ATEX, FM/CSA, Nepsi, IEC (available later)
- IP68 in remote: 2m – 10 days when unpotted, 10m continuously potted
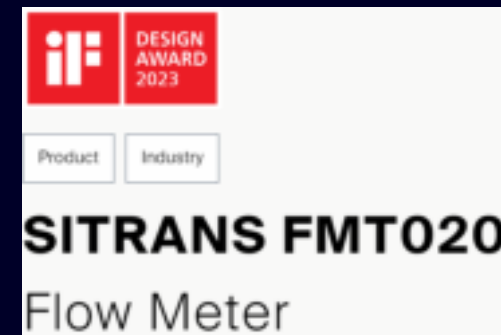
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From SITRANS MAG 5000 / 6000 to SITRANS FMT020

Going beyond than a successor

Sitrans FMT020 offers:

- Lower design

- Modern shape, award winning

- Additional certifications

- More communication protocols

- High degree of flexibility

- Backward compatibility

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ENVIRONMENTAL PRODUCT DECLARATION

SITRANS FM520 DN100
7ME6532-3TC12-1GA3-Z

Type II according to ISO 14021 including life cycle impact assessment (LCIA)

Climate change – total	kg CO2 eq
Climate change – fossil	kg CO2 eq
Climate change – biogenic	kg CO2 eq

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General information

This environmental product declaration (EPD) is based on the international standard ISO 14021 ("Environmental labels and declarations – Self declared environmental claims – Type II"). The data in this EPD has been evaluated on a full-scale life cycle assessment (LCA) study according to ISO 14040/44, taking into account the product category rules (PCR) for electronic and electrotechnical products and systems defined in EN 50693.
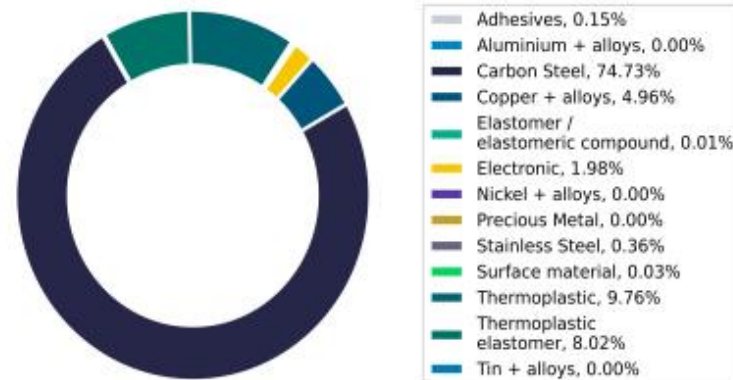
Siemens is dedicated to an environmentally conscious design of its products in line with IEC 62430 and has implemented an integrated management system according to ISO 9001, ISO 14001 and ISO 45001.

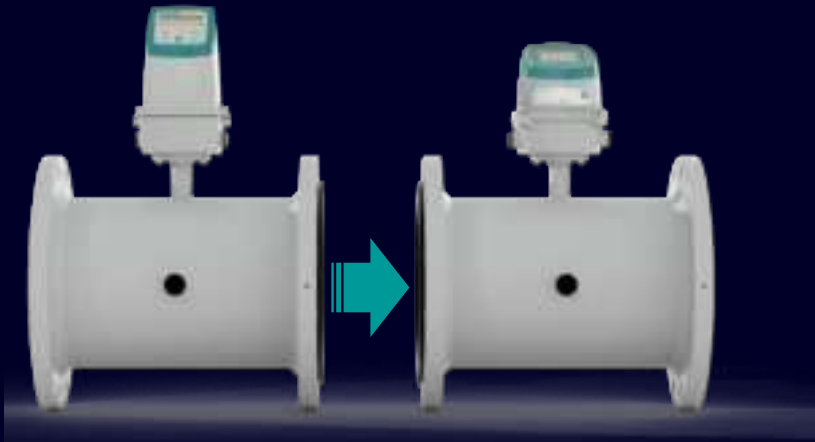| Products	7ME653(A)-(BB)(C)(D)(E)-1(F)A(G)-Z (A=0,2); (BB=3F,3M,4B,4H,4P,4V,5B); (C=A...W); (D=0,1); (E=2,3); (F=A,G,J); (G=0,2,3)
Represented by	7ME6532-3TC12-1GA3-Z A00
Product Description	Electromagnetic flow meter, flanged, diameter DN 15 to DN 1200 (1/2" to 48"). Suitable for volume flow measurement of liquids (conductive), for applications in water abstraction, water & wastewater treatment, water distribution networks, custody transfer metering.
Functional Unit	Production of 1 SITRANS FM520 DN100 and use over the reference service lifetime of 10 years.

Material composition

The following chart outlines the overall material composition of the calculated reference product. Product weight of 15.43 kg adds up with packaging weight of 3.03 kg to a total weight of 18.46 kg. Packaging consists of Box, Fixing material, Foil Film Wrap Bag Label, Paper.

Product Weight 15.43 kg

- Adhesives, 0.15%
- Aluminium + alloys, 0.00%
- Carbon Steel, 74.73%
- Copper + alloys, 4.96%
- Elastomer / elastomeric compound, 0.01%
- Electronic, 1.98%
- Nickel + alloys, 0.00%
- Precious Metal, 0.00%
- Stainless Steel, 0.36%
- Surface material, 0.03%
- Thermoplastic, 9.76%
- Thermoplastic elastomer, 8.02%
- Tin + alloys, 0.00%

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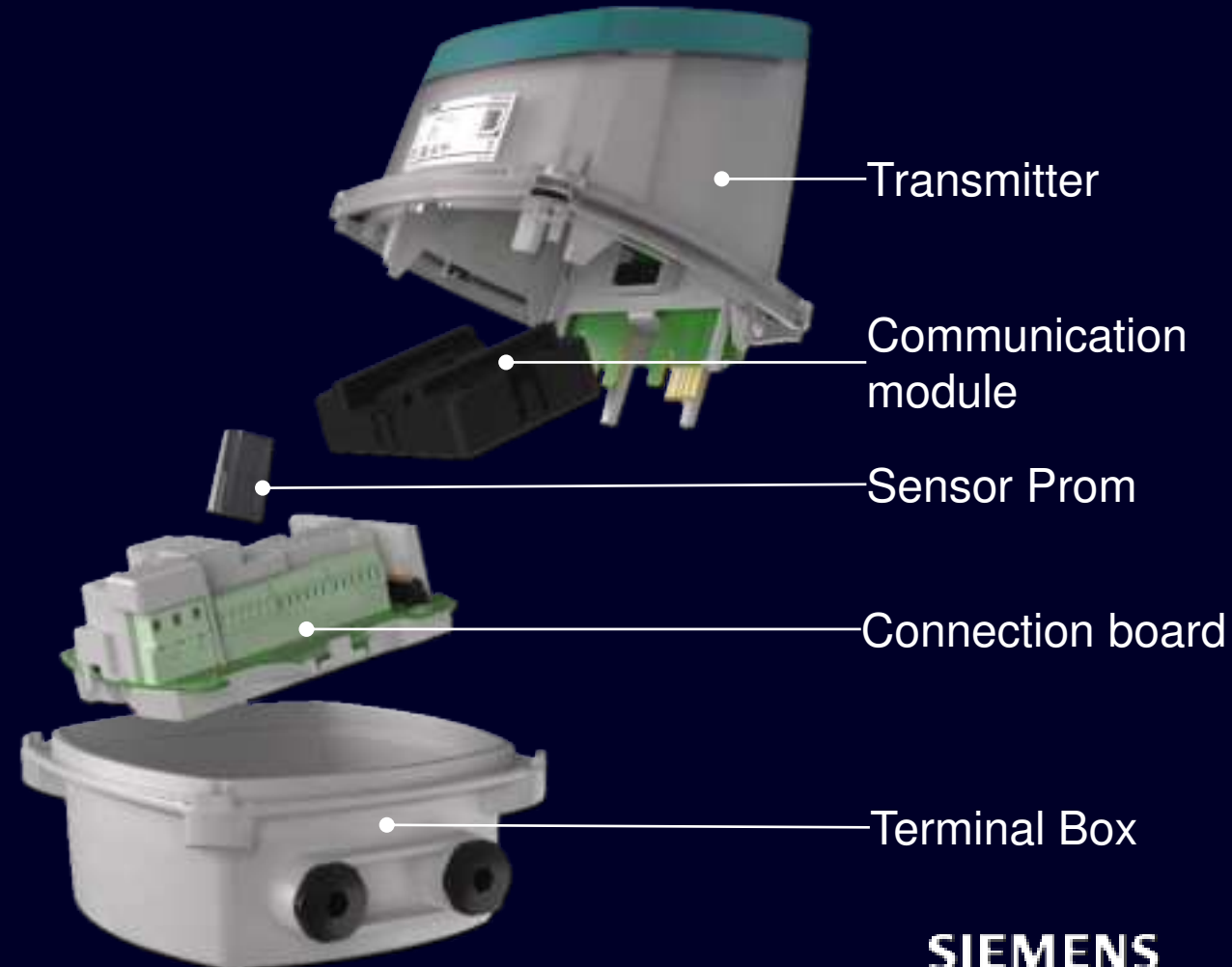# SITRANS FMT020
Product Design

Identical to MAG5/6000:
- Pluggable communication modules
- SensorProm placed inside the terminal box

Differently from MAG5000/6000:
- Connection board with power supply unit (PSU)
- 0,2% accuracy are now on FMS500 and not on signalconverter

Transmitter

Communication module

Sensor Prom

Connection board

Terminal Box

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SITRANS FMT020
Technical Features – SensorPROM

MAG 5000/6000 SensorPROM

Automatic upload of:

- Sensor identity
- Calibration data
- Factory settings
- User-specific settings
- Fingerprint value for coil boost time measurement
- If needed easier to burn a new sensorprom

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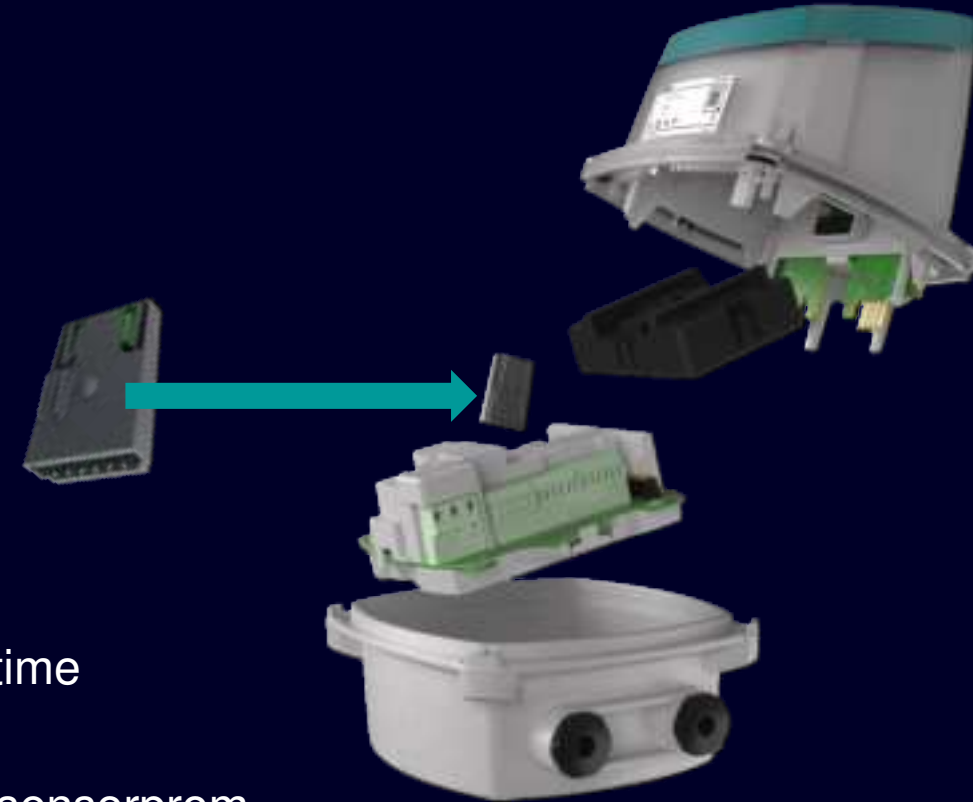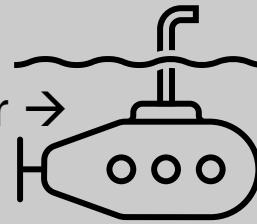
SITRANS FMT020
Technical Features – Display unit

-180°/-90°/+90°/+ 180°

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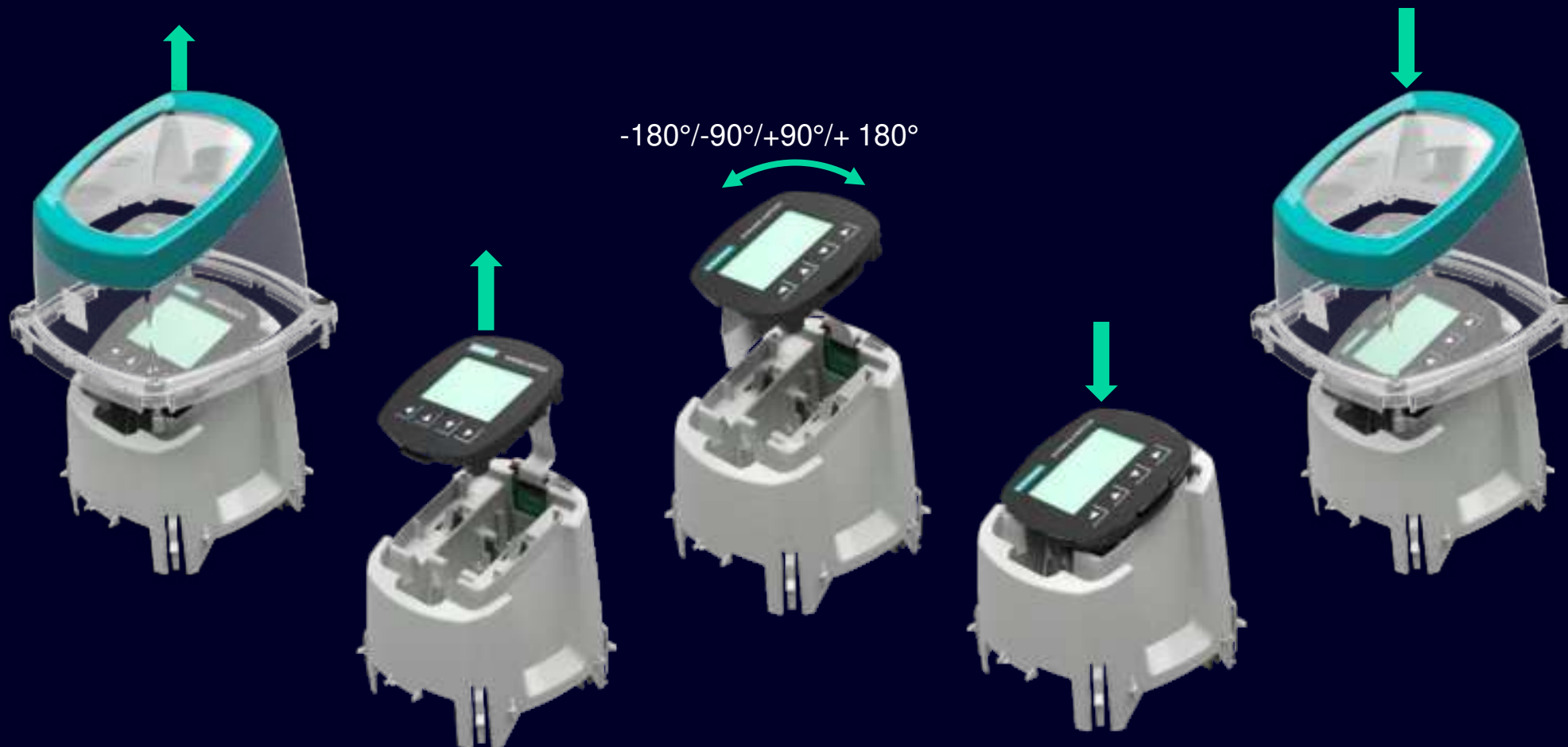
SITRANS FMT020 Design
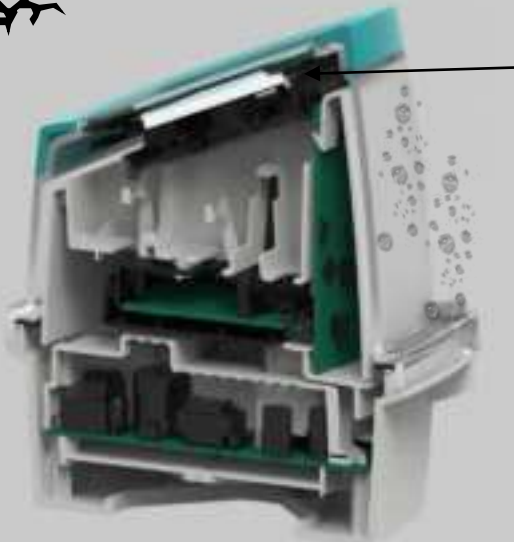Technical Properties based on exhaustive testing

Protection class transmitter → IP66, 67 and 68

Impact-resistant plastic enclosure

Protection class sensor
IP68 without potting → 2m, 10 days
IP68 with potting → 10m, continuously

Display inside the enclosure → Always protected

ENERGY EFFICIENCY

15% less power than MAG5/6000

Ambient temperature: -40…65°C

SITRANS FMT020
Technical Features – Micro-SD Memory Card

To access the Micro-SD card memory, the user will remove the top enclosure.
The Micro-SD card holder is located on top of the main board and will be accessible through a slot on the main PCB cover.

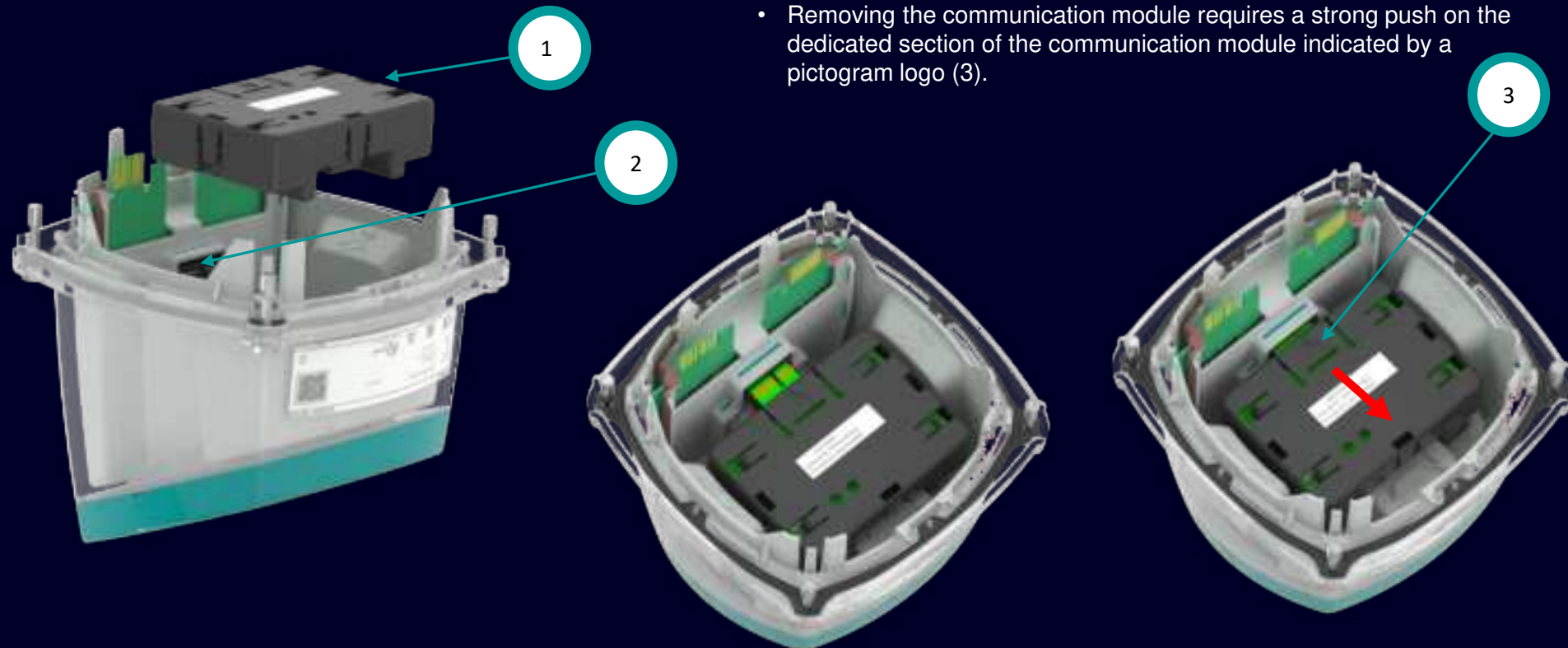SD-card will allow the user to log data, save settings, and update the firmware.

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SITRANS FMT020
Technical Features – Bus Communication Add-on Module

- The correct positioning of the communication module is controlled by dedicated shapes on the communication module (1) and the PCB cover which enables the module to slide and to be guided inside the connector of the main board (2).

- Position maintaining is ensured by connectors and plastic shapes around it.

- Removing the communication module requires a strong push on the dedicated section of the communication module indicated by a pictogram logo (3).

Digitalization Standardization
Overview of existing Libraries

Fields of Automation with SIMATIC

Factory Automation	Process Automation
TIA Portal & S7-1200/1500	PCS7 & S7-400/AS410

Library of Basic Controls (LBC)

LINK

General Functions (LGF)
LINK

Communication Library
LINK

Technological Libraries
LINK

Library for Basic Processes (LBP)

LINK

Advanced Process Library (APL)

Industry Library (IL)
Functional Add-On for the APL

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Webserver commissioning

SITRANS FMT020 and Verificator
Three layers for peace of mind

External verification of the FMT020:
- On-demand confirmation of operational reliability
- External verification report confirming system's accuracy specification
- Traceability to International Standards via yearly calibration

Self-verification:
- Evidence of proper device operation
- Self-verification report available via Webserver and PDM and visible via HMI
- Enables condition-based maintenance

Self-diagnostics:
- Deviation against factory reference values (acc. NAMUR 107)
- Continuous testing during operation of 100+ alarms
- Quick, concise remedy steps in case of failures

Continuum of self-verification of the flowmeter

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FMT020 Product overview
First release

Process values	• Volume flow • Flow velocity • Electrical conductivity
Outputs	• Current output • Digital output • Relay output
Communication modules	• HART • Modbus RTU • Profinet • Ethernet IP
Ambient temperature	• -40 ... +65 °C (-40 ... +149 °F) (max. humidity 98% RH)
Enclosure IP rating	• IP66/67, NEMA6P
Display	• 14-digits • 4 capacitive touch keys
Power supply	• AC version 100 ... 240 V AC, 50/60 Hz, 25 VA • DC version 24 V DC ±20 %, 12 W
Approvals	• CE (LVD, EMC, RoHS), UKCA • UL, CSA certified per standard EN / IEC 61010-1 • EAC (Kazakhstan)

FM520 Product overview
First release

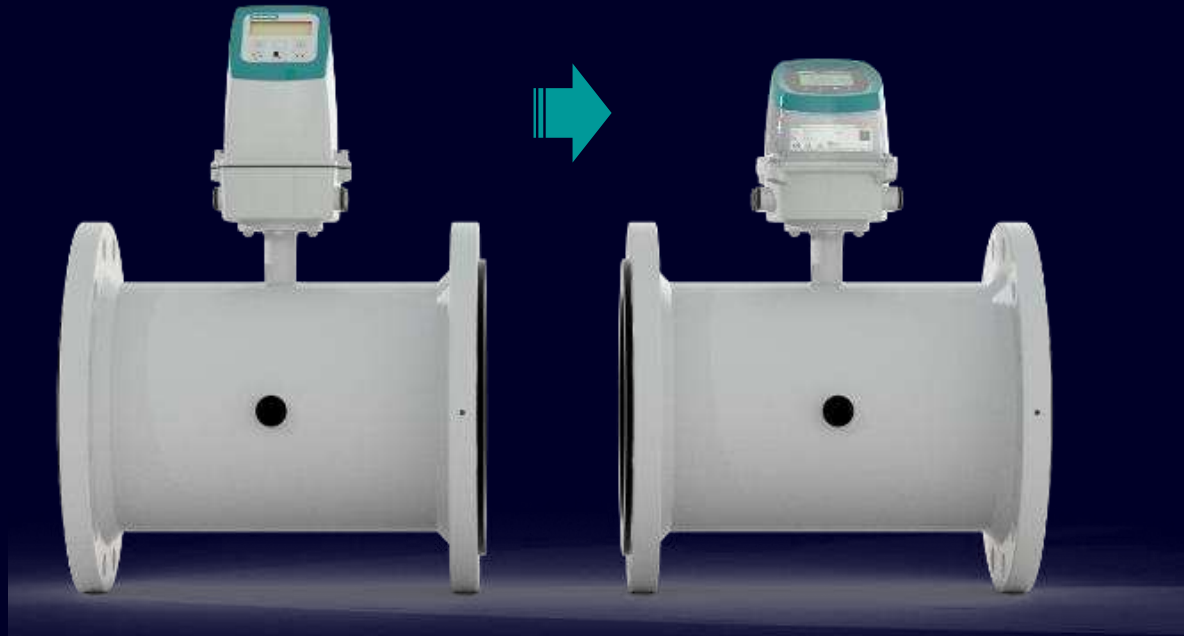| Nominal diameter	• Coned sensor (octagon liner): DN 15 ... 40 (1/2" ... 1 1/2") • Coned sensor: DN 50 ... 300 (2" ... 12") • Full bore sensor: DN 350 ... 1200 (14" ... 48")
Ambient temperature	• Sensor -20 ... +70 ° C (-40 ... +158 ° F) • Compact with transmitter -20 ... +65 ° C (-40 ... +149 ° F)
IP rating	• Standard IP66/67, NEMA 4X/6 • Optional IP68 and NEMA 6P (2m, 10 days) for sensor in remote design • IP68 and NEMA 6P (10m, continuously) for sensor in remote design
Accuracy	• Standard : 0,4% • Optional : 0,2%
Calibration • **Standard** • **Optional**	• Zero-point, 2 x 25 % and 2 x 90 % • 5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Qmax • 10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Qmax • Matched pair calibration: default, 5-point or 10-point • ISO/IEC 17025 accredited, 5-point, matched-pair calibration
Approvals	• CE (LVD, EMC, RoHS), UKCA • Drinking water • EAC (Kazakhstan)

New MAG Product Names completes the SITRANS FLOW Platform

Naming terminology and MLFB roots

New Product Name

① MAG 5100W

SITRANS FMS500
- 7ME6530

FMT020

SITRANS FMT020
- 7ME6942

SITRANS FM520
- 7ME6532

② MAG 3100

SITRANS FMS300
- 7ME6360

+

=

SITRANS FM320
- 7ME6362

③ MAG 1100

SITRANS FMS100
- 7ME6160

SITRANS FM120
- 7ME6162

Conversion kit
## From SITRANS MAG5/6000 to SITRANS FMT020 on existing SITRANS MAG5100W

Conversion operation needs 2 orders:

- Transmitter SITRANS FMT020

- Conversion kit for compact product
    in version M20 or NPT
  serial number and MLFB from MAG must be provided
    - ➤ to deliver the converted and programmed SENSORPROM
    - ➤ to deliver the new product label (in Compact configuration)

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Local User Interface
Multiple Languages for a friendly and easy commissioning
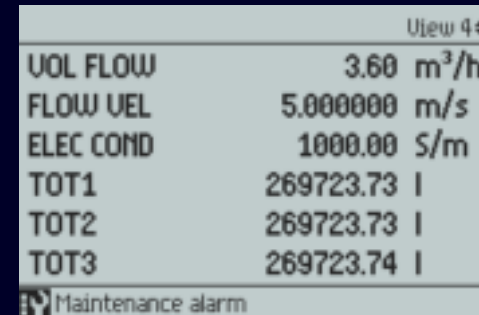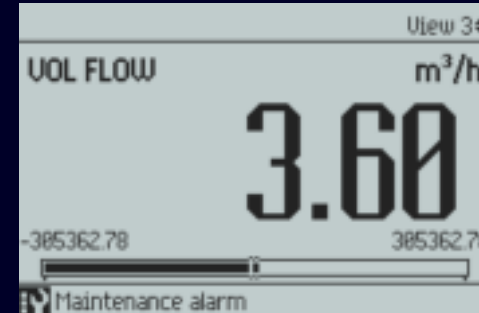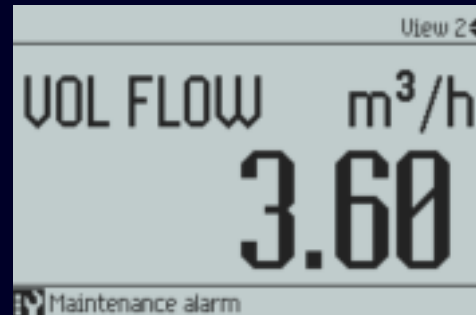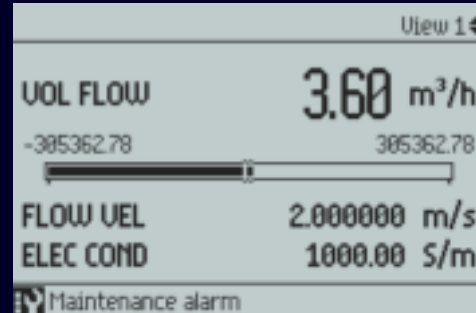
Samme menustruktur som på øvrige instrumenteringsprodukter:
- 4 trykknapper
- Clamp on
- Niveau controller, radar
- Positioner, Tryktransmitter
- ETC

Quick Start Wizards
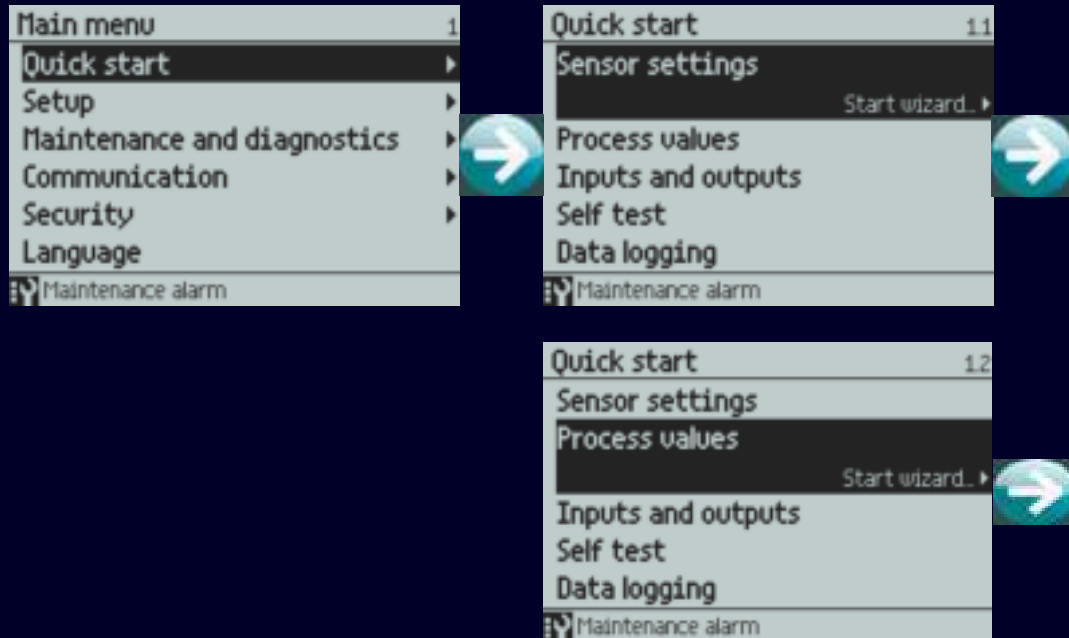
QR-kode som giver nem adgang til produktindentitet manual osv.

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SITRANS FMT020

Next generation flow measurement transmitter

More robust
New compact and very robust design secures use under harsh conditions.
Recognized by Design award 2023.

More reliable
Both, internal and external verification available.
Highest standard on metrology.

Easier to commission
The SENSORPROM memory enables automatic use of sensor identity, calibration data, user specific data and more. Quick Start Wizards.

Easier to service
Comprehensive device check, self-diagnosis and onboard verification functions.

More versatile
Simultaneous measurement of volume flow, flow velocity and electrical conductivity.

More sustainable
15% lower power consumption in comparison with previous generation MAG5000/ 6000.
Large Spare Parts catalog for easy repairs.

Greater flexibility
Compact or remote installation with the same transmitter and sensor.
Large, rotatable, 14-digit graphic display.

Better connectivity
Plug & play communication modules: HART, Profinet, Ethernet/IP, Modbus RTU and more to come. Integrated in TIA Portal and PCS7.

Spare Parts and Accessories

Connection board (PSU subsets AC / DC)	Top Housing	Terminal Box	HMI unit	Sensorprom 1pcs Programmed or 10 pcs blank	Main PCB cover

Display frame (Bumper) Petrol green	Terminal box lid Siemens color	Gasket top housing	Sensor board (connection plate)	Plug-in connector set Screw terminal PSU+IO, Earthing-clips	Transmitter & Sensor Nameplate

See FMT020 catalog pages for ordering Article No.

Communication add-on modules	Wall mounting unit M20 or ½"NPT with adapter	Cable glands 4pcs M20 or ½"NPT with adaptor Not UL approved	Conversion kit Compact or remote systems

Industrial MicroSD	Sun shield for remote mount	Sun shield for integral mount	Cables Standard or special	Potting kit For IP68 and NEMA 6P

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SITRANS FM

Zero Inlet and Outlet installation

Vi har i forvejen MI001 godkendelse med 0*Di før og efter måler, nu er indbygningsforholdet testet yderligere

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SITRANS FM
Standard Inlet / Outlet Conditions

- For the SITRANS FM flowmeters to provide accurate flow measurements allow 5xD at inlet and 3xD at outlet from the electrode.

Figure 4-5   Inlet and outlet conditions
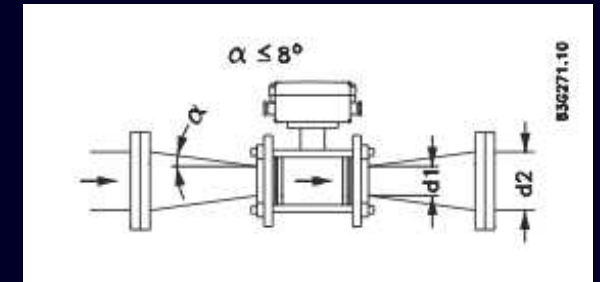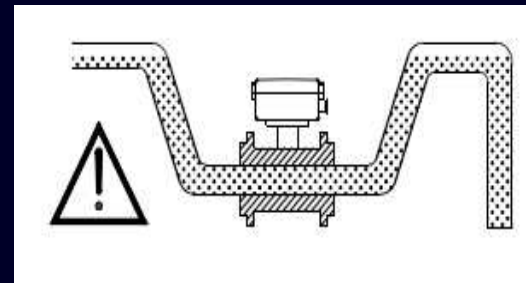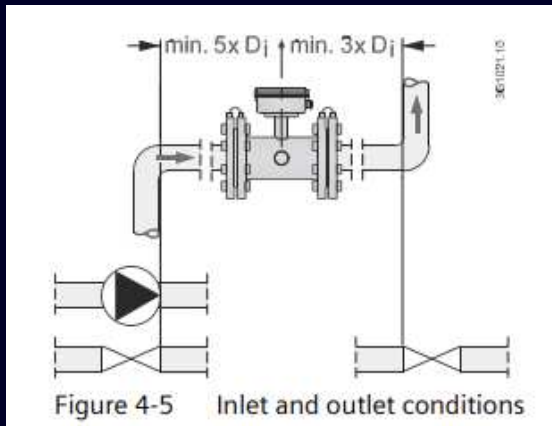
Straight pipe conditions

Avoid the following:
- Inlet conditions which might cause flow disturbances – installing Elbows, Tee's & Reducers at inlet.
- Installation of partially open valves < 10xD at inlet.

U-tube installation

- For partially filled pipes.
- For pipes with downward flow.
- Free outlet flow.

With reducer installation

- Between two reducers (for example DIN 28545) at α ≤ 8 (pressure drop curves apply).

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SITRANS FM
Flow installation in 0xD inlet and outlet conditions – non-optimal piping – Test conditions

Objective
- To verify that SITRANS FM flowmeter complies with the requirements of OIML R 49-2:2013, 7.10 (Flow disturbance tests) for forward flow with the following number of straight pipe lengths →
  - Upstream: 0D
  - Downstream: 0D

Test description and sequence
- Using the flow disturbers of types 1, 2, and 3, determine the error of indication of the meter for each of the installation below →

Test 0: Initial calibration – No flow Disturber	
Test 1: Type 1 – Upstream	Test 4: Type 2 – Downstream
Test 2: Type 1 – Downstream	Test 5: Type 3 – Upstream
Test 3: Type 2 – Upstream	Test 6: Type 3 – Downstream

Flow disturbance scheme

1	type 1 disturber — swirl generator sinistrorsal	4	straightener
2	Meter	5	type 2 disturber — swirl generator dextrorsal
3	straight length **= 0 mm**	6	type 3 disturber — velocity profile flow disturber
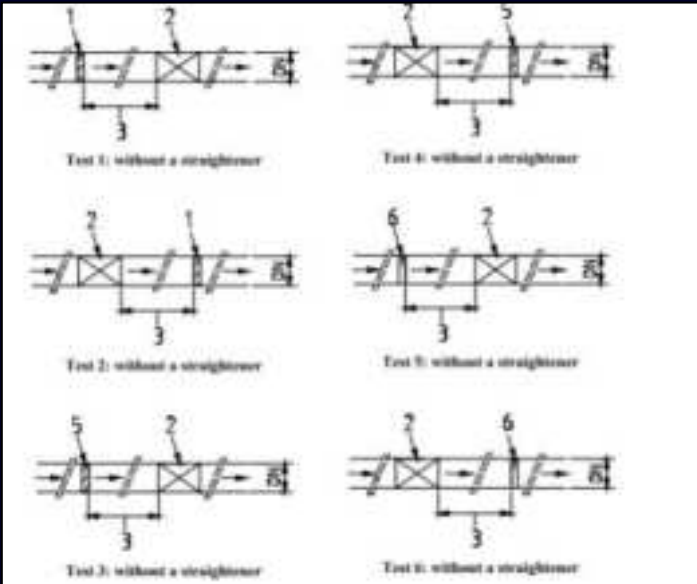
Results and Conclusion

Results

- The test reports show that even if the flow meter is not installed as recommended by Siemens, we can still expect to have an relative good accuracy of the measurement [*]

- With Zero Inlet and Zero Outlet straight runs, we can offer accuracy between ±0.2 to 0.6% ± 2 mm/s (max.)

- The liquid has to be conductive and homogeneous

Conclusion

- The flowmeter must be installed following the installation guidelines for ideal performance.

- We offer performance of between ±0.2 to 0.6% ± 2 mm/s (max.) of rate when…

  - The optimal mechanical piping conditions don't exist

  - The modification of the process piping is impossible and expensive

[*] Please note that the results reflect the flow meter performance under controlled installations and can only be used as guidance or indication of accuracy under 0xD installation conditions

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Kontakt

Niels Christian Christensen

niels.c.christensen@siemens.com

+45 4060 9141

Find mig
på
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