

ABB PROCESSMASTER WATER

FEW630

Electromagnetic Flowmeter

Condensed product and selection datasheet



DN25-DN3000

$\pm 0.4\%$ standard

IP65/67 | IP68

HART 7.6 | ETHERNET

Manufacturer: ABB | Product family: ProcessMaster Water

Technical content condensed from ABB DS/FEW630-EN Rev. A (March 2024).

Final specifications depend on size, flange, material, mounting, output, calibration and approval options.

Product overview

A high-functionality electromagnetic flowmeter for water, wastewater, sewage, sludge and distribution applications.

ProcessMaster Water FEW630 combines full-bore flow measurement with integral or remote mounting, Sensor Memory, guided setup, onboard verification and connected diagnostics.

Key standard capabilities

- Bidirectional measurement with configurable measuring range.
- Standard 0.4% flow accuracy; higher-accuracy calibration options.
- Hard-rubber full-bore sensor for demanding water and wastewater service.
- Onboard fingerprint-based health check and grounding/noise check.
- Four-direction rotatable backlit display with Through-the-Glass setup.
- HART/4-20 mA plus two digital outputs and optional expansion cards.



Measurement principle

A conductive liquid moving through a magnetic field generates a voltage under Faraday's law. Two electrodes detect this voltage, which is proportional to average flow velocity. The transmitter converts it into volumetric-flow, totalizer, analog and digital signals.

FEW630 models

Model	Configuration	Transmitter	Nominal size	Sensor protection
FEW631	Integral mount	Integrated FET632	DN25-DN3000	IP65/IP67
FEW632	Remote sensor	Remote FET632	DN25-DN3000	IP65/IP67/IP68 sensor

Applications

- Potable-water distribution and treatment plants.
- Wastewater, pumping stations and irrigation.
- Raw water, district metering and abstraction.
- Sewage, sludge, influent and effluent.
- Utility-water and approved conductive process liquids.

Selection limits

- Minimum conductivity: >5 µS/cm.
- 20 µS/cm stated for demineralized water.
- Pipe must remain completely full during measurement.
- Not suitable for gases, steam or non-conductive hydrocarbons.
- Material and pressure selections must match the liquid and flange.

Measuring performance - DN25 to DN600

The configured full-scale flow can be set between $0.02 \times Q_{\max DN}$ and $2 \times Q_{\max DN}$.

Range interpretation: the lower and upper columns are the configurable limits. $Q_{\max DN}$ is the nominal reference flow for each meter size.

DN	Size	Lower range	$Q_{\max DN}$	Upper range
25	1 in	4 L/min	200 L/min	400 L/min
32	1¼ in	8 L/min	400 L/min	800 L/min
40	1½ in	12 L/min	600 L/min	1,200 L/min
50	2 in	1.2 m³/h	60 m³/h	120 m³/h
65	2½ in	2.4 m³/h	120 m³/h	240 m³/h
80	3 in	3.6 m³/h	180 m³/h	360 m³/h
100	4 in	4.8 m³/h	240 m³/h	480 m³/h
125	5 in	8.4 m³/h	420 m³/h	840 m³/h
150	6 in	12 m³/h	600 m³/h	1,200 m³/h
200	8 in	21.6 m³/h	1,080 m³/h	2,160 m³/h
250	10 in	36 m³/h	1,800 m³/h	3,600 m³/h
300	12 in	48 m³/h	2,400 m³/h	4,800 m³/h
350	14 in	66 m³/h	3,300 m³/h	6,600 m³/h
400	16 in	90 m³/h	4,500 m³/h	9,000 m³/h
450	18 in	120 m³/h	6,000 m³/h	12,000 m³/h
500	20 in	132 m³/h	6,600 m³/h	13,200 m³/h
600	24 in	192 m³/h	9,600 m³/h	19,200 m³/h

Accuracy

Standard pulse-output accuracy: $\pm 0.4\%$ of measured value plus $\pm 0.02\% Q_{\max DN}$.
Optional calibrations are $\pm 0.3\%$ or $\pm 0.2\%$ of measured value plus $\pm 0.02\% Q_{\max DN}$; availability is size-dependent.

Dynamic performance

Repeatability: $\leq 0.11\%$ of measured value at $t_{\text{meas}} = 100 \text{ s}$ and $v = 0.5\text{--}10 \text{ m/s}$.
Current-output response to 99% is at least 200, 400 or 500 ms depending on excitation frequency.

Current-output accuracy equals the selected pulse-output accuracy plus $\pm 0.1\%$ of measured value and $\pm 0.01 \text{ mA}$.

Measuring performance - DN700 to DN3000

Large-diameter FEW630 configurable metric flow ranges.

DN	Size	Lower range	QmaxDN	Upper range
700	28 in	264	13,200	26,400
750	30 in	312	15,600	31,200
800	32 in	360	18,000	36,000
900	36 in	480	24,000	48,000
1000	40 in	540	27,000	54,000
1050	42 in	616	30,800	61,600
1100	44 in	660	33,000	66,000
1200	48 in	840	42,000	84,000
1350	54 in	1,020	51,000	102,000
1400	54 in	1,080	54,000	108,000
1500	60 in	1,260	63,000	126,000
1600	66 in	1,440	72,000	144,000
1650	66 in	1,512	75,600	151,200
1800	72 in	1,800	90,000	180,000
2000	80 in	2,280	114,000	228,000
2100	84 in	2,520	126,000	252,000
2200	88 in	2,760	138,000	276,000
2300	92 in	3,000	150,000	300,000
2400	96 in	3,240	162,000	324,000
2600	104 in	3,820	191,000	382,000
2800	112 in	4,440	222,000	444,000
3000	120 in	5,080	254,000	508,000

Sizing item	FEW630 guidance
Units	All flow values in the table above are m ³ /h.
Configuration	The transmitter range can be configured from $0.02 \times Q_{\max DN}$ to $2 \times Q_{\max DN}$.
Large-meter body	DN450-DN3000 uses welded steel sensor housing; meter tube is stainless steel.
Support	Devices larger than DN400 require a sufficiently strong foundation and edge-positioned supports.
Sensor length	Installation length follows the ABB / ISO-based selected flange and size configuration.

Sensor and process specifications

FEW630 full-bore sensor data; final limits depend on selected size, flange, liner and approval.

Functional specification

Parameter	FEW630 specification
Nominal diameter	DN25-DN3000
Measuring medium	Conductive liquids
Minimum conductivity	>5 µS/cm; 20 µS/cm stated for demineralized water
Process temperature	-5 to 80 °C with hard-rubber liner
Ambient at sensor	Steel flange: -10 to 60 °C; stainless flange: -15 to 60 °C
Pressure rating	PN6-PN40; ASME Class 150/300 and other listed standards
Process connection	Flanged connections to EN/DIN, ASME, JIS, AWWA and Australian standards
Flow direction	Bidirectional; forward is factory default
Protection	Integral IP65/IP67; remote sensor IP65/IP67/IP68; NEMA 4X

Materials of construction

Component	Standard / option
Liner	Hard rubber
Electrodes	316Ti standard; Hastelloy C-22 and Hastelloy C-4 options; others on request
Grounding ring	Stainless steel, optional
Flanges DN25-DN400	Galvanized steel standard; stainless steel option
Flanges DN450-DN3000	Painted steel
Sensor housing DN25-DN400	Painted cast aluminium; coating ≥80 µm, RAL 9002
Sensor housing DN450-DN3000	Painted welded steel; coating ≥80 µm, RAL 9002
Meter tube	Stainless steel
Terminal box / gland	Painted aluminium terminal box; optional plastic; polyamide gland

Process connections

Connection family	Available FEW630 ratings / standards
EN 1092-1	PN6, PN10, PN16, PN25, PN40
ASME	Class 150 and Class 300; B16.5 and B16.47 variants by size
JIS	5K and 20K
AWWA C207	Classes B, D and E
Australian	AS4087 PN16 / PN35; AS2129 Table D / E

Approvals and certificates

Approval / document	Availability
Potable water	WRAS, NSF-61 and AS/NZS 4020 for qualified hard-rubber configurations; ACS in preparation
Calibration	ABB standard, third-party witnessed and ISO 17025 five-point options
Inspection	EN 10204 3.1 option
Hazardous area	ATEX / IECEx / UKEX Zone 1 and 2; FM / cFM Division 1 and 2 options
Verification	Fingerprint-based health check and ABB verification-tool support

Potable-water approvals are listed for qualified hard-rubber FEW6XX configurations, generally DN40-DN2400. Confirm the exact approval, size and factory eligibility before ordering.

Transmitter, outputs and diagnostics

FET632 functionality applies to remote FEW632 systems; equivalent transmitter functions are integrated in FEW631.

Power and outputs

Item	Specification
AC supply	100-240 V AC (-15%/+10%), 47-64 Hz, <20 VA
DC supply	16.8-30 V DC, ripple <5%, <20 W
Current output	4-20 mA active or passive; active load 250-300 Ω ; passive load 250-600 Ω
Current repeatability	<0.1% of measured value
Digital output 1	Passive; pulse, frequency or switch output
Digital output 2	Passive; pulse or switch output
Digital ratings	16-30 V DC, up to 30 mA; frequency to 10.5 kHz
Pulse width	0.05-2000 ms

Display and setup

- High-contrast graphical LCD.
- Current and totalized flow display.
- Two configurable operator pages.
- Four-button menu and Easy Set-up.
- Configuration through the front glass with housing closed.

Communication

Interface	Specification
HART	Version 7.6; 1200 baud; active or passive current loop
HART network	Bell 202 FSK; 250 Ω minimum load; cable up to 1200 m
Modbus RTU	Optional RS485 module with two terminal sets
PROFIBUS	Optional DP or PA communication
Industrial Ethernet	Optional EtherNet/IP, PROFINET or Modbus TCP
Typical Modbus response	<100 ms; configurable response delay 0-200 ms
Remote signal cable	Maximum 200 m; 5 m included with remote-mount design

Diagnostics and verification

- Continuous sensor, transmitter and process monitoring.
- Plain-text fault diagnostics and prioritized alarms.
- Fingerprint-based onboard health check.
- Noise and grounding check.
- Output simulation, service-interval monitoring and empty-pipe detection.

Environmental and mounting data

Transmitter / environmental item	Specification
Ambient temperature	-20 to 60 °C
Storage temperature	-20 to 70 °C
Transmitter enclosure	Integral or remote IP65/IP67, NEMA 4X
Housing	Painted cast aluminium, RAL 9002; polyamide cable gland
Vibration	0.15 mm max deflection at 10-58 Hz; 2 g max acceleration at 58-150 Hz
Remote transmitter weight	Approximately 4.5 kg
Cable entry	M20 × 1.5 or 1/2 in NPT, selected by order code

Empty-pipe detection requires liquid conductivity $\geq 20 \mu\text{S/cm}$ and nominal diameter $\geq \text{DN}10$.

Installation and commissioning guidance

Correct full-pipe installation, grounding and straight-run practice are essential for stable electromagnetic measurement.

Mechanical installation

- Match the flow-direction marking; the meter measures both directions.
- Install without torsion, bending or unacceptable pipe forces.
- Use compatible gaskets and keep them out of the flow cross-section.
- Keep the electrode axis horizontal where possible, or within 45° of horizontal.
- For horizontal installation, keep the tube completely full; use a slight incline for degassing.
- For abrasive liquids, prefer vertical installation with upward flow.
- Support meters larger than DN400 on a strong foundation at the housing edges.

Location and straight runs

- Typical straight run: 3 × DN upstream and 2 × DN downstream.
- Reference test conditions: 10 × DN upstream and 5 × DN downstream.
- Do not install fittings, manifolds or valves immediately upstream.
- Avoid free discharge at a pipe high point and prevent the measuring tube from emptying.
- Keep about 1 m from powerful electromagnetic sources and 100 mm from steel mounting parts.
- Use flexible damping beyond the supported flowmeter section where strong vibration exists.
- Provide sun protection and install remote transmitters in a low-vibration location.

Grounding

Grounding situation	Required practice
General	Connect the sensor to ground potential equal to the measuring-medium potential.
Metal pipe	Bond the sensor ground terminal to the pipe/flange grounding point.
Plastic or insulated pipe	Use grounding rings to establish measuring-medium potential.
Stray potentials	A grounding ring is recommended at both ends of the sensor.

Connection overview

Terminal	Function
Uco/32 or 31/32	Active or passive 4-20 mA / HART output
41/42	Passive digital output 1: pulse, frequency or switch
51/52	Passive digital output 2: pulse or switch
L/N/PE; 1+/2-/PE	AC or DC supply and protective earth
V1/V2; V3/V4	Optional plug-in card connections

Commissioning check

Confirm pipe fullness, flow direction, grounding, supply voltage, selected range, output scaling, damping, low-flow cut-off, totalizer units and alarm settings. Run the built-in health and grounding/noise checks after commissioning.

Ordering and selection checklist

Complete these application details before requesting a quotation or final ABB order code.

Ordering field	Required customer selection
Model	FEW631 integral / FEW632 remote with FET632 transmitter
Meter size	DN25-DN3000; confirm minimum, normal and maximum flow
Process liquid	Liquid identity, conductivity, solids, temperature and chemical compatibility
Connection	Flange standard, pressure class, face-to-face length and gasket requirement
Wetted materials	Hard-rubber liner; electrode and grounding-ring selection
Calibration	Standard 0.4% or optional 0.3% / 0.2% where available
Power	100-240 V AC or 16.8-30 V DC
Outputs	HART/4-20 mA, two digital outputs and optional Modbus, PROFIBUS or Ethernet
Installation	Integral/remote, cable length, preamplifier, IP requirement and transmitter orientation
Certificates	Calibration, ISO 17025, EN 10204 3.1, potable-water, hazardous-area and regional requirements
Options	Customer configuration, test points, sensor length, documentation language and verification

Common accessories

Accessory / module	ABB order code / availability
Passive 4-20 mA output card	3KQZ400029U0100
Passive digital output / input cards	3KQZ400030U0100 / 3KQZ400032U0100
24 V DC supply / Modbus RTU cards	3KQZ400031U0100 / 3KQZ400028U0100
PROFIBUS DP / PA cards	3KQZ400027U0100 / 3KQZ400061U0100
Ethernet / PoE cards	3KQZ400037U0100 / 3KQZ400039U0100
FZA100 infrared service adapter	FZA100
NPT gland kit / M20-NPT adapter	3KXF081300L0001 / D365B269U01
Remote signal cable	5, 10, 15, 20, 25, 30, 35, 40, 50, 80, 100, 150 or 200 m
ABB Ability Verification Tool	SRV500; available from ABB Service
Terminal-box potting kit	3KXF094102L0001

Final selection check

Before ordering, confirm the selected DN is inside the desired operating velocity range, the pipeline remains full, the liquid meets conductivity requirements, and every requested approval is available for the selected size and material combination.

Important: This is a condensed selection datasheet prepared from ABB DS/FEW630-EN Rev. A. It does not replace the current manufacturer datasheet, certified dimensional drawing, approval certificate, calibration certificate or final order code.