

QFlow Coriolis Mass Flowmeter - QMASS 55100

DN100 Coriolis meter for very high-capacity measurement with mass, density and temperature.

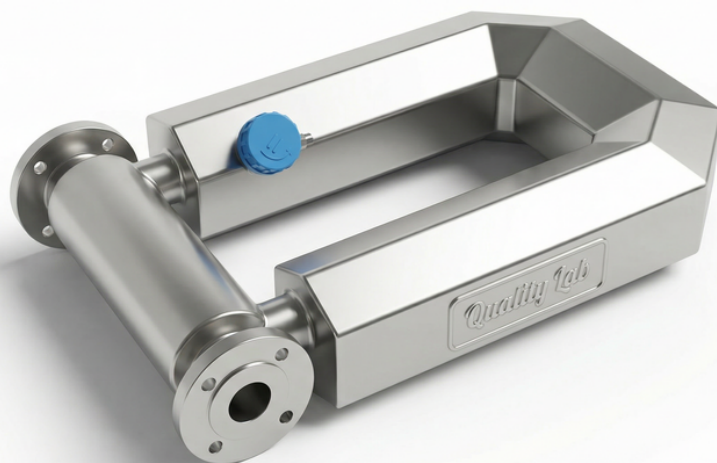
Certifications

Quality Lab Solutions data sheet R4



Applications

- Chemical processing – transfer, batching and reactor feeds on DN80.
- Oil and gas – blending and additive skids on DN80.
- Food and beverage – syrups, concentrates and CIP chemical measurement.
- Power and utilities – treatment chemicals and process liquids.
- General industrial – skids and high-flow measurement where mass and density are required.



Special Features

- DN100 bent-tube Coriolis sensor up to 260,000 kg/h
- Mass flow accuracy grades $\pm 0.1\%$, $\pm 0.15\%$, $\pm 0.2\%$, $\pm 0.5\%$
- RS485, pulse and 4–20 mA with HART
- IP65/IP67
- ATEX/IECEx.

QMASS 55100

Description

The QMASS 55100 is a DN100 bent-tube Coriolis mass flow meter designed for very high-capacity process measurement. It directly measures mass flow and provides density and process temperature, with RS485, pulse and 4–20 mA plus HART output options. Maximum mass flow is up to 260,000 kg/h depending on application. IP65/IP67 protection and the transmitter platform support industrial installations, while accuracy grades down to $\pm 0.1\%$ of reading and 12 kg/h zero stability support batching and material balance use cases.

Specifications

Performance Specifications	
Measurement Principle	Coriolis mass flow
Primary Measurement	Mass flow
Secondary Measurement	Density; Temperature; Volume flow; Mass and volume totalisers
Line Sizes	DN100 measuring tube; DN100 flange end connection
Flow Range	0...260,000 kg/h mass flow
Accuracy	Mass flow accuracy $\pm 0.1\%$, $\pm 0.15\%$, $\pm 0.2\%$, $\pm 0.5\%$
Repeatability	Repeatability 0.05%, 0.075%, 0.1%, 0.25% of reading depending on selected grade
Zero stability	12 kg/h
Density Accuracy	$\pm 0.002 \text{ g/cm}^3$
Temperature accuracy	$\pm 1 \text{ }^\circ\text{C}$ $\pm 0.5 \%$ of reading
Process & Environment	
Medium	Single-phase liquids and slurries; suitable for non-Newtonian fluids and suspensions; acceptable for clean or moderately contaminated process media
Pressure Rating	Max working pressure options 40 bar, 70 bar
Medium Temperature	$-70...+160 \text{ }^\circ\text{C}$ or $-200...+60 \text{ }^\circ\text{C}$ (standard options); additional $-40...+200 \text{ }^\circ\text{C}$ and $-40...+300 \text{ }^\circ\text{C}$ variants available
Ambient Temperature	$-30...+60 \text{ }^\circ\text{C}$ / $-40...+60 \text{ }^\circ\text{C}$
Mechanical/ Wetted Parts	
Process connections	DN100 flange end connection; pressure rating options 40 bar or 70 bar
Wetted Parts	Measuring tubes and process connections in stainless steel 316L
Housing / Ingress Protection	IP65 / IP67
Installation	Install so the sensor remains completely full; mount at the high point of gas lines and the low point of liquid lines; avoid strong vibration and mechanical stress; align flow arrow with actual process flow direction
Grounding	Normally grounded via process piping with additional M4 grounding screws on transmitter and junction box plus an internal grounding point inside the junction box
Gross Weight	161 kg
Electrical & I/O	
Power supply	85–265 VAC or 12–24 VDC
Analogue Outputs	Pulse and 4–20 mA output options; HART supported
Communication	RS485 communication option; HART supported
Display	Integral OLED display with optical keys for local configuration, zeroing and diagnostics
Diagnostic	On-board diagnostics including sensor drive, temperature and signal-status monitoring plus totaliser and parameter backup functions
Approvals/Certification	
Hazardous area Approvals	ATEX and IECEx certified Sensor: Ex II 2G Ex ib IIC T6...T1 Gb Transmitter: Ex II 2G Ex db [ib] IIC T6...T1 Gb
General Approvals	CE; factory management system certifications ISO 9001, ISO 14001 and ISO 45001
Functional Safety	Functional safety assessed per IEC 61508:2010 Parts 1–7. Systematic Capability SC 3 (SIL 3 capable). Random capability: Type B element. SIL 2 @ HFT = 0 and SIL 3 @ HFT = 1 (Route 2H) in low-demand mode; PFDavg and architectural constraints must be verified for each application.
Metrological	Calibration laboratory accredited to ISO/IEC 17025
Warranty	2-year warranty

Sensor model / line size

Sensor model code (QFlow)	DN (mm)	DN (inch)	Minimum mass flow (kg/h)	Maximum mass flow (kg/h)	Zero stability (kg/h)
55100	100	4"	12	260000	12

Design Pressure

Order code	Description / options
P2	Design pressure 40 bar (standard option).
P4	Design pressure 70 bar (high-pressure option).
P9	Custom design pressure in bar (engineering review required).

Accuracy

Order code	Description / options
A1	±0.1 % of rate
A2	±0.15 % of rate
A3	±0.2 % of rate (standard configuration)
A5	±0.5 % of rate (economic grade)

Medium Temperature Class

Order code	Description / options
T1	−70...+160 °C
T2	−40...+200 °C
T3	−40...+300 °C
T4	−200...+60 °C

Process connection

Order code	Connection
C10	DN100 flanged connection (standard for QMASS 55100).
C9	Custom end connection (special flange / thread; engineering review required).

Wetted Material

Order code	Description / options
W1	316L stainless steel (standard for QMASS 55100)
W9	Custom wetted material (e.g. Hastelloy C276)

Transmitter

Order code	Description / options
TR1	CF1 field transmitter (standard for QMASS 55100)

Transmitter type

Order code	Description / options
I1	Remote transmitter (3 m cable standard)
I2	Compact mounting on sensor body

Display

Order code	Description / options
D0	Transmitter without local display
D1	Transmitter with local display (standard)

Power supply

Order code	Description / options
V1	85...265 VAC mains supply
V2	24 VDC (18...36 VDC)
V9	Custom supply (e.g. self-switching range)

Communication & Outputs

Order code	Description / options
O1	Pulse + Modbus RS-485
O2	4–20 mA + pulse + Modbus RS-485
O5	HART + 4–20 mA + pulse + Modbus RS-485

Cable Entry

Order code	Description / options
E1	M20×1.5 female cable entry
E9	Custom cable entry

Mounting Bracket

Order code	Description / options
B0	Without mounting bracket
B2	With mounting bracket supplied

Explosion Protection

Order code	Description / options
XG	ATEX/IECEx approval
XN	No Approvals

IP Rating

Order code	Description / options
I5	IP65 enclosure (standard)
I7	IP67 enclosure

Flow Direction

Order code	Description / options
FD1	Standard flow direction as per body arrow
FD2	Mechanically reversed flow direction

Ambient temperature

Order code	Description / options
TA1	–40...+60 °C (default)
TA3	Custom ambient temperature requirement

Documentation

Order code	Description / options
CE	CE Certificate
UK	UKCA Certificate
RO	RoHS

Measurement principle

QMASS 55100 is a Coriolis mass flowmeter for direct mass flow measurement. During operation, the measuring tubes are driven into a controlled vibration. With no flow present, the upstream and downstream sections of the tubes oscillate in phase. As fluid flows through the vibrating tubes, Coriolis forces act on the tubes and create a measurable phase shift between these sections.

Pick-off sensors detect this phase difference, which is directly proportional to mass flowrate. The transmitter conditions these signals and outputs the mass flow value. At the same time, it tracks the tubes' natural resonant frequency to determine flowing density, while an integrated temperature sensor provides process temperature. From these primary variables, the instrument can calculate volume flow and totalised mass or volume according to the user configuration

Design and measuring system

The QMASS 55100 measuring system consists of:

- A compact, intrinsically safe Coriolis sensor with a DN100 measuring path, 316L stainless-steel vibrating tube and DN100-class process connections. The mechanical design supports maximum working pressures up to 40 bar, with higher-pressure variants available up to 100 bar depending on the selected pressure class.
- A field transmitter with OLED display and optical keys for non-contact local operation, available as a compact or remote version.
- A shielded, explosion-protected multi-core cable linking the sensor and transmitter on remote configurations.

Figure 1 illustrates the two basic mechanical layouts:

- Remote version: sensor and transmitter mounted separately.
- Compact version: transmitter mounted directly on the sensor.

In both cases the process connections carry the weight of the sensor, no additional external support is normally required, and the meter must never be used as a pipe support.

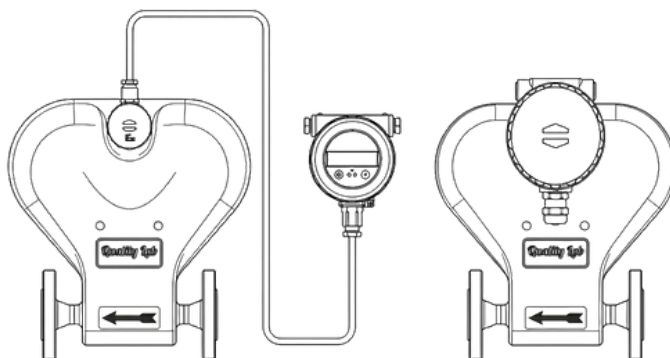


Figure 1

The transmitter housing includes:

- A circular OLED display and three touch-free optical keys (SET, STATUS, SELECT) for configuration and operation (see Figure 2 and Figure 3).

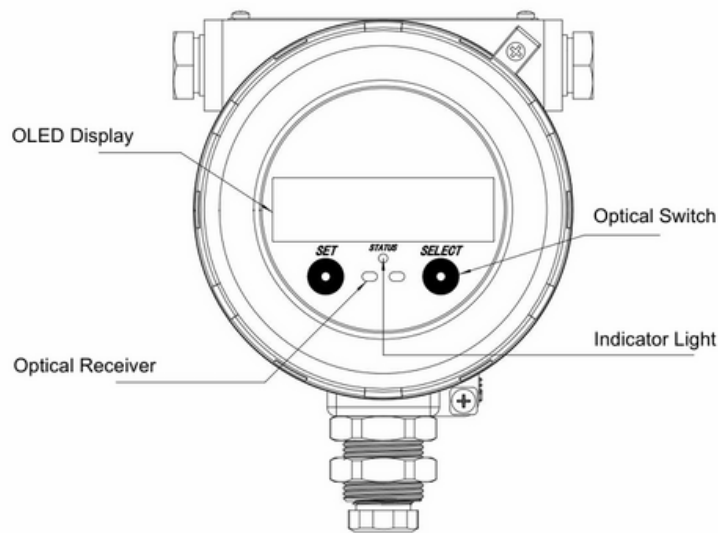


Figure 2

Interface 1				Interface 2		Interface 2	
Process Variables				Mass Total		M FlowRate	
TOTAL:		0.000 kg		0.000		0.000	
FLOW:		0.000 kg/min					
D: 0.000	g/cm3	T: 0.00	°C	M TOTAL: kg		M FLOW: kg/min	

Figure 3

- Cable entries for AC or DC power, 4...20 mA, pulse, RS-485 and grounding.
- External M4 grounding lugs on transmitter and junction box for reliable earthing (see Figure 3).
- Robust aluminium or stainless-steel enclosures with ingress-protection options up to IP67, suitable for harsh industrial environments. Ambient temperature variants cover ranges down to around $-40\text{ }^{\circ}\text{C}$ and up to $+60\text{ }^{\circ}\text{C}$, depending on the selected version.

Internal grounding and shield routing inside the junction box are highlighted in Figure 4

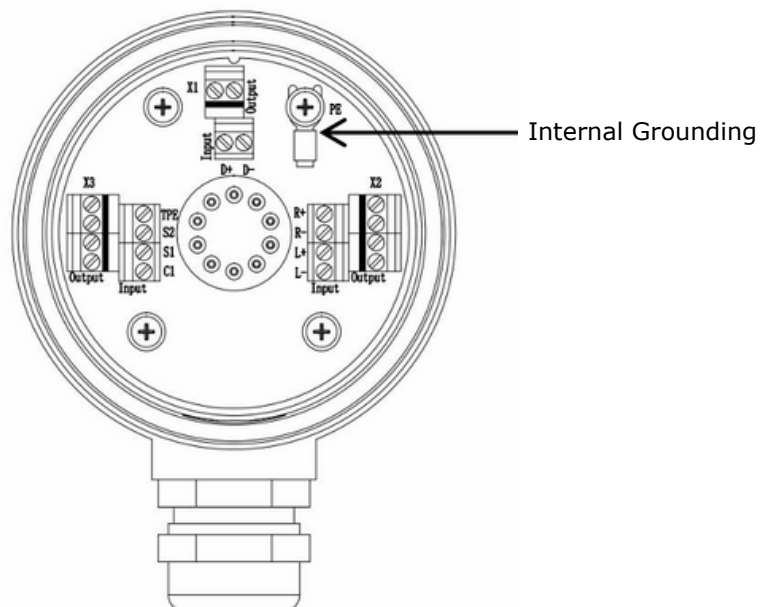


Figure 4

Performance characteristics

QMASS 55100 measures mass flow directly, then derives volume flow and volume totals using either real-time density or a fixed density value that you enter. This is particularly useful for gas applications, where you can enter the standard density of the gas and obtain standard volume totals while the display still shows “m³”.

Every meter is calibrated on our own flow rigs in a dedicated calibration laboratory with an uncertainty of 0.05%. Each instrument carries a factory calibration factor, and there is a separate user calibration factor that you can adjust via the transmitter interface or configuration software when you replace a transmitter or when you have verified a difference between meter reading and a reference. Together with the small zero stability and no-moving-parts design, this gives a very stable and repeatable low-flow performance.

Operating and installation conditions

QMASS 55100 is certified for use in explosive gas atmospheres in Zones 1 and 2, gas group IIC. Installation must follow the relevant rules for electrical equipment in explosive environments. We supply the sensor and transmitter as a matched pair; always ensure that the serial numbers on the sensor and transmitter match before putting the meter into service.

To achieve reliable measurement:

- Install the meter so that the tube remains completely filled during operation. For liquids and slurries, a low point in the line is preferred; for gases, a high point is often better. Figure 5 shows the preferred orientations for gas, liquid and slurry.

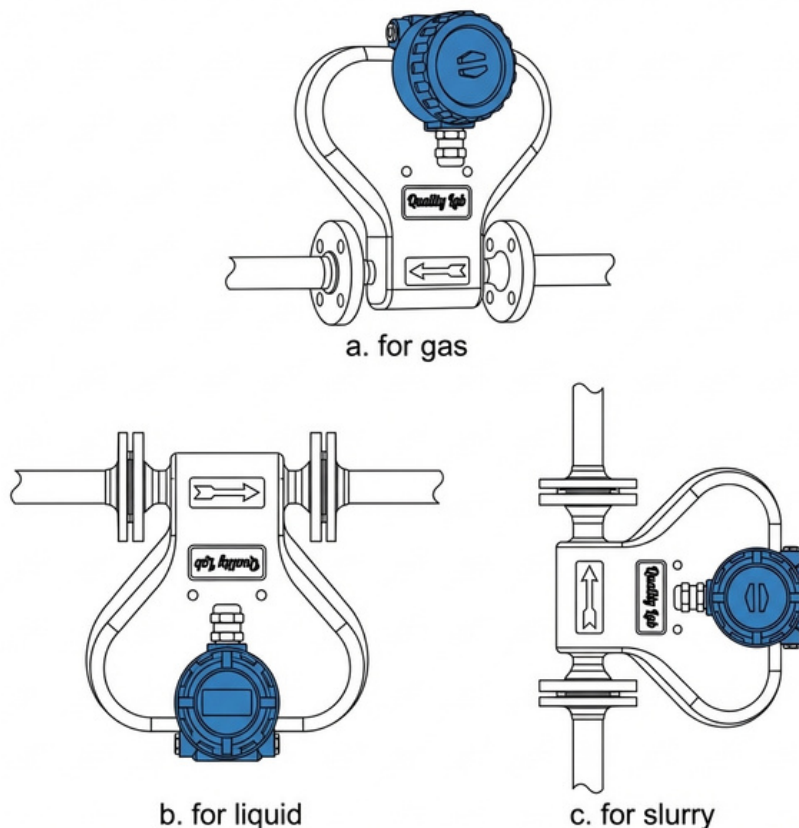


Figure 5

- Keep the meter away from direct sunlight, rain, corrosive liquids, strong vibration and sudden temperature changes.
- Respect our specified limits for external magnetic fields and do not place the sensor close to strong magnets.
- Ensure upstream piping is clean and free of welding debris or foreign objects.
- Align the pipework independently and then bolt the meter in; do not use the sensor to pull misaligned flanges together.
- Minimise torque and bending loads on the process connections, and avoid rigid contact between the sensor casing and nearby structures.

The flow direction arrow on the sensor body must match the desired forward flow direction. In the transmitter you can then choose whether to count only forward flow, only reverse flow, the absolute sum of both, or a bidirectional total that increases in one direction and decreases in the other.

The transmitter and junction box have cover grooves for optional sealing devices. When sealing is fitted, the enclosures cannot be opened without tools, which protects the Ex integrity; see Figure 6.

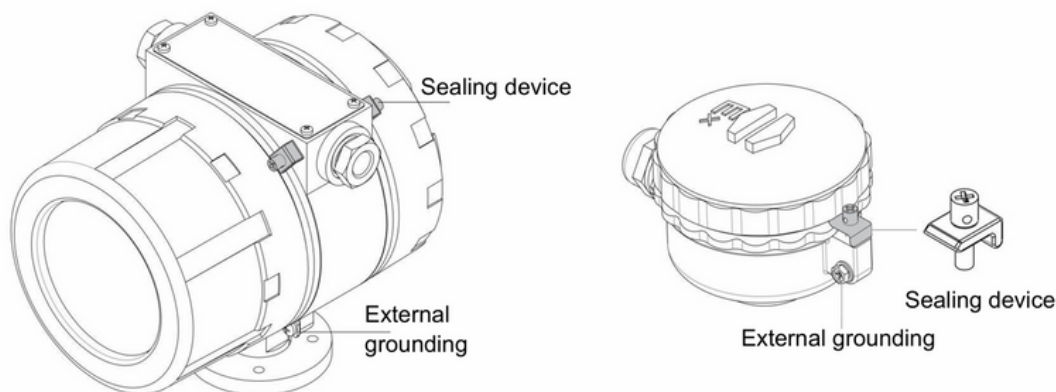


Figure 6

To reduce the risk of condensation, avoid mounting the transmitter or junction box with cable entries pointing upwards. A clamp allows you to rotate the junction box by 180° where access requires it.

Ambient operating conditions for the transmitter include temperature ranges down to -30 °C or -40 °C and up to +60 °C (depending on variant), relative humidity up to 95% non-condensing and atmospheric pressure from 86 to 106 kPa, as given in the transmitter specifications.

Process conditions and medium limitations

QMASS 55100 is intended for single-phase liquids and slurries, including many non-Newtonian fluids and suspensions, and is suitable for clean or slightly contaminated process media, subject to material compatibility and erosion limits.

Typical process limits for the DN100 versions include:

Medium pressure rating:

- Standard versions up to 40 bar.
- Higher-pressure variants engineered up to 70 bar, depending on the selected sensor design and process connection.

Process temperature:

- Cryogenic and low-temperature builds down to approximately $-200\text{ }^{\circ}\text{C}$.
- High-temperature builds up to approximately $+300\text{ }^{\circ}\text{C}$, depending on the selected temperature class.
- Ambient temperature: typically from $-30\text{...}+60\text{ }^{\circ}\text{C}$ or $-40\text{...}+60\text{ }^{\circ}\text{C}$ depending on the chosen enclosure and approval combination.
- Wetted materials: 316L stainless-steel measuring tube and flow-splitter assembly; other exposed parts as specified in the mechanical data.
- Ingress protection: sensor and transmitter enclosures up to IP65 / IP67 for outdoor and washdown environments.

Always verify that pressure, temperature, corrosion resistance and erosion risk are compatible with your process conditions and local regulations.

Grounding and potential equalization

Good grounding is essential for both measurement stability and explosion protection.

- The sensor is normally grounded through the process piping. In addition, we provide M4 external grounding screws on the transmitter housing and on the junction box; see Figure 6.
- Inside the sensor junction box, the terminal board has a dedicated internal grounding point, where the shield of the sensor cable is connected; see Figure 4.
- The multi-core shielded cable between sensor and transmitter uses colour-matched cores at both ends to simplify correct wiring of drive coils, pick-offs, temperature sensor and shielding.
- During installation, connect all grounding points to the plant earth in line with your site standards. During maintenance, periodically check that all external and internal grounding screws are tight and free of corrosion.
- On non-conductive piping or where additional equipotential bonding is required, ensure that the flanges and meter body are reliably connected to earth, consistent with the Ex-protection requirements.

Electrical connections, outputs and communication

You can power QMASS 55100 from either AC or DC supplies:

- AC supply: 85...265 VAC (L, N, PE terminals)
- DC supply: 12...24 VDC (V+ and V– terminals)

We also offer supply variants that accept both a defined DC range and a high-voltage AC range automatically. Typical DC and AC wiring examples are shown in Figure 7.

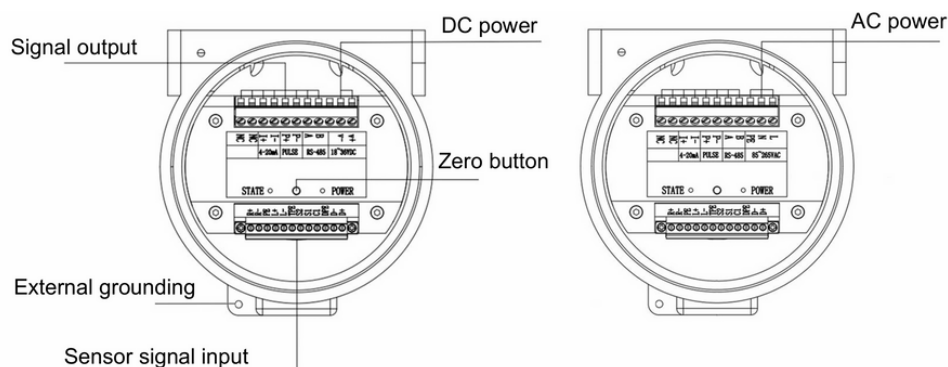


Figure 7

Between sensor and transmitter, a shielded multi-core cable carries all drive, pick-off, temperature and grounding signals. The manual provides full terminal and colour coding for both ends, so you can verify every connection. The maximum cable cross-section and a maximum cable length of 300 m are defined to preserve signal integrity and intrinsic safety. Unused cable entries must always be sealed using suitable Ex-approved plugs.

QMASS 55100 supports a wide range of outputs:

- 4...20 mA analogue output (active by default)
 - Assignable to mass flow, density or temperature.
 - Configurable upper and lower range limits.
 - Damping options and a fixed-current test mode to simplify loop checking.
 - Typical wiring is shown in Figure 8.

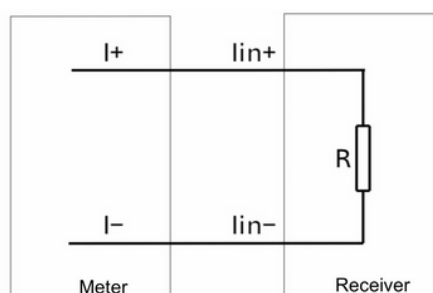


Figure 8

- Pulse / frequency output
 - Passive output, configurable for mass or volume.
 - Adjustable pulse equivalent so you can balance receiver resolution and maximum counting frequency.
 - Max. pulse frequency setting and a fixed-frequency test mode are included to verify receiver performance.
 - Pulse wiring examples are shown in Figure 9

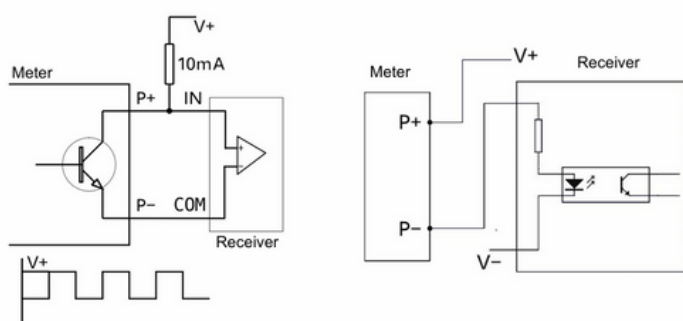


Figure 9

- Digital communication
 - Modbus RS-485 interface with configurable address, baud rate, parity, stop bits and float format.
 - HART communication available as an option on the 4...20 mA loop in specific output configurations.

Output configurations in our ordering structure combine these functions in different ways, for example:

- Pulse + Modbus RS-485
- 4...20 mA + pulse + Modbus RS-485
- Dual 4...20 mA + pulse
- 4...20 mA + pulse + HART

PC-based configuration is available using a USB-to-RS-485 converter. Connect A+ to A+, B- to B- and GND to GND, select the correct COM port and then connect from the software. From there you can access the same output, communication and meter-setup menus as on the local display.

For batching duties, QMASS 55100 can be combined with our explosion-protected batch controller. The controller runs on 24 VDC or 220 VAC and provides relay outputs for valve and pump control, allowing you to build a complete batching station around the flowmeter.

The following tables provide comprehensive definitions for the terminal connections and wiring configurations of the device. Table 1 outlines the general terminal definitions, detailing the function of each connection point. Subsequent tables, Table 2 and Table 3, offer specific wiring definitions for the transmitter and sensor ends, respectively, including color codes and corresponding functions to ensure accurate and reliable installation.

Table 1 - Terminal Definitions

Terminal	Definition
A(+), B(-)	RS-485
I+, I-	HART/ 4-20mA (optional)
P+, P-	Pulse
NC	Empty, reserved for future function
L, N, PE	AC power
V+, V-	DC power

Table 2 - Transmitter Terminal Definitions

Code	R+	R-	PE	L+	L-	TPE	S2	S1	C1	DPE	D-	D+
Color	White	Yellow	Black (Shield)	Gray	Purple	Transparent (Shield)	Brown	Green	Orange	Black (Shield)	Red	Blue
Function	Right pickoff detection			Left pickoff detection			Temp. detection			Coil Drive		

Table 3 - Sensor Terminal Definitions

Code	R+	R-	L+	L-	TPE	S2	S1	C1	D-	D+	PE
Color	White	Yellow	Grey	Purple	Transparent (shield)	Brown	Green	Yellow	Red	Blue	Black (shield)
Function	Right pickoff detection		Left pickoff detection			Temp. detection			Coil drive		Grounding

Diagnostics and verification functions

QMASS 55100 includes integrated diagnostics to help you identify issues quickly:

- The transmitter displays error codes at the top of the screen if it detects a problem, such as a sensor error, temperature sensor out-of-range, zero-calibration failure or transmitter initialisation.
- A front-panel status indicator shows green in normal operation and red when any error is active.
- In the configuration software, a dedicated status screen gives you the same information remotely.

Tables 4 and 5 show resistance and voltage ranges for all sensor terminals (left and right pick-off coils, drive coil and temperature elements). With a simple multimeter you can confirm whether the sensor is within these ranges, which greatly speeds up troubleshooting. The left and right coil values should be close to each other; if not, the sensor may be damaged.

Table 4 - Resistance of the Sensor Terminal

Name	Cable color	Terminal	Normal value (Ω)
Left coil	Grey & purple	L-, L+	70~200
Right coil	Yellow & white	R-, R+	70~200
Drive coil	Red & blue	D-, D+	10~200
Temp. 1	Green & black	S1, S2	100-110
Temp. 2	Orange & black	C1, TPE	100-110

Table 5 - Voltage of the Sensor Terminal

Name	Cable color	Terminal	Normal value (V)
Left coil	Grey & purple	M-, L+	0.1~0.35
Right coil	Yellow & white	R-, R+	0.1~0.35
Drive coil	Red & blue	D-, D+	0.3~5

Several functions support commissioning, adjustment and verification:

- Zero calibration – guided procedure via the transmitter or software. You simply warm up the meter, stabilise process temperature, ensure the sensor is fully filled and at zero flow, then run the zero calibration. The status LED flashes green while the procedure is active.
- Density calibration and density cut-off – dedicated menu items for fine-tuning density performance when justified, including low and high density settings and calibration times.
- Flow cut-off – independent cut-offs for mass and volume to suppress residual counts when the flow is effectively zero.
- Fixed-frequency pulse test and fixed-current test – simulation of stable pulse or current outputs to check the receiving instruments without running the process.
- Parameter backup and restore – allows you to store a complete configuration set in the transmitter and restore it after service or replacement.

The optical keys on the front panel are operated by holding a finger a short distance from the glass. Short and long activations are used to navigate menus, change parameters, reset totals and return to the main screen. Figure 2 and 3 show the key locations and example display layouts.

Certifications and Approvals

QMASS 55100 is designed and built to recognised standards for Coriolis mass flowmeters and explosion-protected equipment.

- The sensor uses an intrinsically safe design suitable for gas group IIC.
- The transmitter uses a flameproof design with intrinsically safe circuits for the sensor connection.
- Typical markings include Ex II 2G with temperature classes from T6 to T1, depending on process and ambient conditions, and the associated EN/IEC 60079 standards are listed in the product manual.

The range carries IECEx and CE conformity, and we hold dedicated certificates for explosion-proof performance, functional safety (SIL), production approval and metrology. Our manufacturing facilities operate under ISO 9001 quality management, ISO 14001 environmental management and ISO 45001 occupational health and safety management systems.

Device versions and configuration options

QMASS 55100 is the DN100 member of the QMASS Coriolis mass-flow family. The range spans several nominal diameters and flow capacities, from ultra-compact low-flow meters up to large line sizes handling very high flowrates. All sizes share the same measuring principle, transmitter platform and configuration philosophy, which simplifies standardisation across a plant.

QMASS 55100:

- Nominal diameter: DN100 measuring path.
- Typical mass-flow range: up to approximately 260000 kg/h, with a zero stability around 12kg/h.
- Wetted materials: 316L stainless-steel measuring tube and splitter assembly.
- Medium-pressure classes: selectable versions up to 40 bar and 70 bar.
- Medium temperature: build options for cryogenic, standard and high-temperature duties, typically spanning $-200...+300$ °C depending on the selected variant.
- Process connections: DN100 process connections according to the selected mechanical version (threaded or flanged design as defined in the order code).
- Enclosures: IP65/IP67 options for the sensor and transmitter with compact or remote mounting arrangements.
- Outputs/communication: combinations of 4...20 mA (single or dual), pulse/frequency, RS-485 and optional HART.

On the functional side, every QMASS meter offers:

- Mass and volume totalisers plus a separate inventory total.
- Flexible flow-direction handling (forward only, reverse only, absolute value or bidirectional counting).
- A broad set of engineering units for mass, volume, flowrate, temperature and density.
- Multi-language display options and customisable display layouts, including selectable main-screen variables and adjustable screen timeout.

Order Guide

Segment	Order code	Options
Product family	QMASS	QMASS Coriolis mass flowmeters
Sensor model / line size	55100	DN100 bent-tube Coriolis sensor
Design pressure / MWP	P2 / P4 / P9	See Design Pressure
Medium temperature class	T1 / T2 / T3 / T4	See Medium Temperature class
Mass-flow accuracy grade	A1 / A2 / A3 / A5	±0.1 / ±0.15 / ±0.2 / ±0.5 % of rate
Process connection	C10 / C9	C4 = DN100 flanged; C9 = custom connection
Wetted material	W1 / W9	W1 = 316L stainless steel; W9 = custom material
Transmitter type	TR1	TR1 = CF1 field transmitter
Display	D0 / D1	D0 = no local display; D1 = with local display
Power supply	V1 / V2 / V9	V1 = 85...265 VAC; V2 = 24 VDC; V9 = custom supply
Communication & outputs	O1 / O2 / O5	O1 = pulse + Modbus; O2 = 4–20 mA + pulse + Modbus; O5 = HART + 4–20 mA + pulse + Modbus
Cable entry	E1 / E9	E1 = M20×1.5; E9 = custom
Mounting bracket	B0 / B2	B0 = without bracket; B2 = with bracket
Transmitter installation	I1 / I2	I1 = remote transmitter; I2 = compact mounting
Explosion protection	XG	XG = ATEX/IECEX
Ingress protection	I5 / I7	I5 = IP65; I7 = IP67
Flow direction	FD1 / FD2	FD1 = default arrow; FD2 = reversed flow direction
Ambient temperature class	TA1 / TA3	TA1 = –40...+60 °C default; TA3 = custom ambient
Documentation	CE/UK/RO	CE = CE cert; UK= UKCA Cert; RO=RoHS

Ordering Example *DN100 Coriolis, 70 bar, –70...+160 °C, ±0.2 % of rate, DN100 flanged, 316L, CF1 transmitter with local display, 4–20 mA + pulse + Modbus RS-485, 24 VDC, remote install with bracket, ATEX/IECEX, IP67, CE.*

Product family	Sensor model / line size	Design pressure / MWP	Medium temperature class	Mass-flow accuracy grade	Process connection	Wetted material	Transmitter type	Display	Power supply	Communication & outputs	Cable entry	Mounting bracket	Transmitter installation	Explosion protection	Ingress protection	Flow direction	Ambient temperature class	Documentation
QMASS	55100	P4	T1	A3	C10	W1	TR1	D1	V2	O2	E1	B2	I1	XG	I7	FD1	TA1	CE

Notes

Ensure media compatibility with wetted parts.

