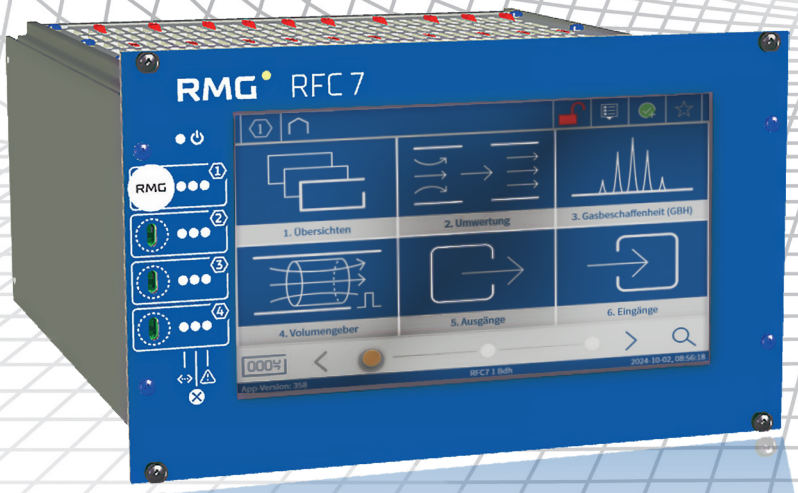
RMG
ONE STEP AHEAD

RMG FLOW COMPUTER

RFC 7

Technical data sheet



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Document information

This document is the translation of the original German Technical data sheet.

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Version	Version date	Changes
V00	October 2024	Initial creation
V01	March 2025	Additions

Protection notice pursuant to DIN ISO 16016

Technical data sheet

General information	
The Flow Computer RFC 7 is a device from the platform, a universal device concept developed by RMG Messtechnik. This platform is designed to cover many applications and the connection of all individual RMG Messtechnik devices.	
Functionality	
As a compact analysis computer, the Flow Computer RFC 7 essentially fulfils the following three functions:	
Functions	■ Measurement data logging from gas meters, gas analysers, pressure and temperature sensors and monitoring of measurement data logging. ■ Processing of measurement data and calculation of process variables such as standard volume flow, K-number and calorific value using suitable calculation methods for various gas models. ■ Archiving and output of the measured values and calculated process variables or visualisation in graphical form, as well as sending alarm and warning messages in the event of limit value violations.
Depending on the connected devices and the recorded measurement data, the flow computer can be used with different software and parameterisation for the following applications:	
Applications	■ -Vol: Status flow computer for determining the K coefficient and the standard volume of gas mixtures, such as natural gas and biogas ■ -Energy: Calorific value flow computer for determining the K coefficient and the energy content of gas mixtures, such as natural gas and biogas
Structure	
Device variants	■ Single-Stream (1 Stream; the data from one measuring point is processed by the RFC 7.) ■ Multi-Stream (2 – 4 Streams; the data from up to four measuring points is processed by the RFC 7.) **(Please note: The Multi-Stream variant is currently not available!)**
Housing variants	■ 19"-enclosure for 1 – 2 Streams, dimensions: 213.36 (42 TE) x 133.35 (3 HE) x 230 mm (W x H x D) ■ 19" enclosure for 3 – 4 Streams 426.72 (84 TE) x 133.35 (3 HE) x 230 mm (W x H x D)
Weight	■ 1 Stream: 1.75 kg ■ 2 Streams: 2.25 kg
Material	FR4 (front panel) and aluminium (enclosure)
Protection class	IP 20 (protection against foreign bodies > 12.5 mm, no splash protection)
Components in the housing	■ Power supply 24 V DC ■ Intercom (for Multi-Stream variants) additionally 5 plug-in boards per stream: ■ **CoM base** for communication and calculation ■ **IO system** for time-critical communication with actuators and sensors, consisting of: - **IOC-EX-IO** as an interface to the Ex zone with galvanically isolated inputs - **IOC-Digital-IO** as an interface for digital inputs and outputs outside the E-zones - **IOC-CPU** for processing all analogue and digital inputs and outputs - **IOC-Analogue-Out** as an interface for analogue outputs outside the Ex zone

	All the intended functions can be executed with these plug-in boards. An extension with plug-in boards for additional functions is not planned.
Range of application	
Ambient, operating and storage temperature	-20…50°C
Humidity class	EN12405-3 SL1 inside 85% non-condensing
EMC class	Class A (radiated interference field strength) Class B (EN 55032)
Explosion protection	The device is not intended for use in potentially explosive atmospheres! Nevertheless, devices and sensors located in a potentially explosive area (Ex zone 1) can be connected to the Ex inputs and outputs of the RFC 7.
Approvals according to	
EU directives	■ Measuring Instruments Directive 2014/32/EU ■ EMC Directive 2014/30/EU ■ Rohs Directive 2011/65/EU
EX approvals	Interface for Ex zone 1 devices: ■ ATEX Directive 2014/34/EU ■ IECEX
National laws and regulations	■ Measurement and Calibtration Act - MessEG, from 25/07/2013 ■ Measurement and Calibration Regulation - MessEV, from 11/12/2014
Calculation methods for the compressibility coefficient K	
Available methods	■ k = constant ■ Full analysis: - AGA 8 DC92 - AGA 8:2017 - GERG-2004 - GERG-2008 ■ Gross values: - GERG-88 S - GERG-88 S Satz B - GERG-88 S Satz C - AGA NX-19 L - AGA NX-19 H - AGA Gross Meth. 1 - AGA Gross Meth. 2 - SGERG-mod-H2 ■ Pure substances: - Van der Waals - Beattie & Bridgeman
Operation	
Via front panel:	
Display	7" touchscreen Active area of the touchscreen: 154.2 x 85.92 mm (W x H) 1024 x 600 pixel

LEDs	■ Alarm/fault/error (red) ■ Warning (yellow) ■ Measurement (green) ■ Power supply on (blue)
Calibration switch	■ can be moved up and down with additional tool ■ is sealed for custody transfer use
Software	integrated GUI
Via PC or local network:	
Connection to Ethernet interface	■ Connect network cable optionally to Eth 1 - 4 ■ Enter the IP address of the RFC 7 in the address bar (URL bar)
Software	integrated Web-UI
Available languages	German, English, Chinese
Technical data	
Power supply	24 V DC +10%/-15%
Power consumption	0.8 A, typical for 1 stream
Output power	max. 20 W
Overvoltage protection	yes
Design of system hardware	
System controller (CoM basis)	
Processor	Quad Core ARM Cortex®-A53 based NXP: i.MX8M mini
CPU clock frequency	up to 1,6 GHz
On-board operating system	Linux
Real-time clock	Battery buffered
Watchdog-Timer	yes
Safety function	Integrated firewall
Memory	2 GB SDRam memory
	4 GB eMMC programme (permanent) memory
Serial interfaces (2x per stream, 1x optional)	
Ser 1 (RJ45)	RS 485
Ser 2 (RJ45)	RS 485
(Ser 3 optional via adapter)	(RS 485 optional)
Available communication protocols	■ Modbus-RTU Client/Server ■ Modbus-ASCII Client/Server ■ Modbus-Client for USM (Instance F) ■ Modbus-Client for gas quality
Baud rate	9600 - 115,200 depending on the communication protocol
Data interfaces (Ethernet 4 x per stream)	
Eth 1	RJ45
Eth 2	RJ45
Eth 3	RJ45
Eth 4	RJ45

Available communication protocols	■ Modbus-TCP/IP ■ http ■ SNTP
IO controller IOC	
Microcontroller	STM32F429, ARM-Cortex M4
CPU clock frequency	100 MHz
Memory	1 MB Flash
Digital inputs per stream	
Quantity	4 x status inputs, optically isolated: ■ DI1 – DI4
U_{max}	5 V
I_{max}	15 mA
f_{max}	2 Hz
Digital outputs per stream	
Quantity	6 x digital outputs: ■ DO1 – DO2: Pulse output with max. 5 kHz ■ DO3 – DO6: Digital output
U_{max}	24 VDC +10%
I_{max}	20 mA
Analogue inputs per stream	
Quantity	5 x analogue inputs, safely separated: ■ AI1 – AI2: Analogue input with HART interface ■ AI3: Analogue input ■ AI4 – AI5: Analogue input in intrinsically safe design with HART interface, - Ex limit values must be observed! - Recommended for pressure and temperature measurement.
Range	4 – 20 mA
Resolution	24 Bit ADC
U_{max}	22 V
I_{max}	21 mA
Measuring time	~ 500 ms
Measuring rate	2 Hz
Analogue outputs per stream	
Quantity	4 x Analogue outputs: ■ AO1 – AO4: Analogue output
Range	4 – 20 mA
Resolution	PWM 14 Bit

Pulse and encoder inputs per stream	
Quantity	■ 2x pulse input (PI1 and PI2) in intrinsically safe design, - Ex limit values must be observed - N1 and N2: for reed (LF) or Namur (HF) ■ 1x encoder input in intrinsically safe design, - Ex limit values must be observed - N3 ■ 2x pulse input (PI3 and PI4) not intrinsically safe in open collector design - DI1 and DI2
Measuring range	■ Reed: 0 – 5 Hz ■ Namur: 0 – 10 kHz ■ OC: 0 – 5 kHz
U_{max}	8.2 V
I_{max}	16 mA
4-wire PT100 input per stream	
Quantity intrinsically safe	1x PT100 input with 4 terminals for resistance measurement (T --, T-, T+, T++) - The PT100 input is intrinsically safe, Ex limit values must be observed!
Quantity **not** intrinsically safe	1x PT100 input with 4 terminals for resistance measurement (T1 --, T1-, T1+, T1++)
Temperature range	-20°C…60°C
Resolution	24 Bit ADC
U_{max}	5 V
I_{max}	1.6 mA, typ. 0.8 mA
Measuring rate	>2 Hz
Alarm/warning outputs per stream	
Quantity	2x warning output and 2x alarm output ■ W-NC and W-NO ■ A-NC and A-NO
U_{max}	24 V DC
I_{max}	30 mA
f_{max}	2 Hz

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Subject to change without notice!

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