Flow-X

Flow computing excellence

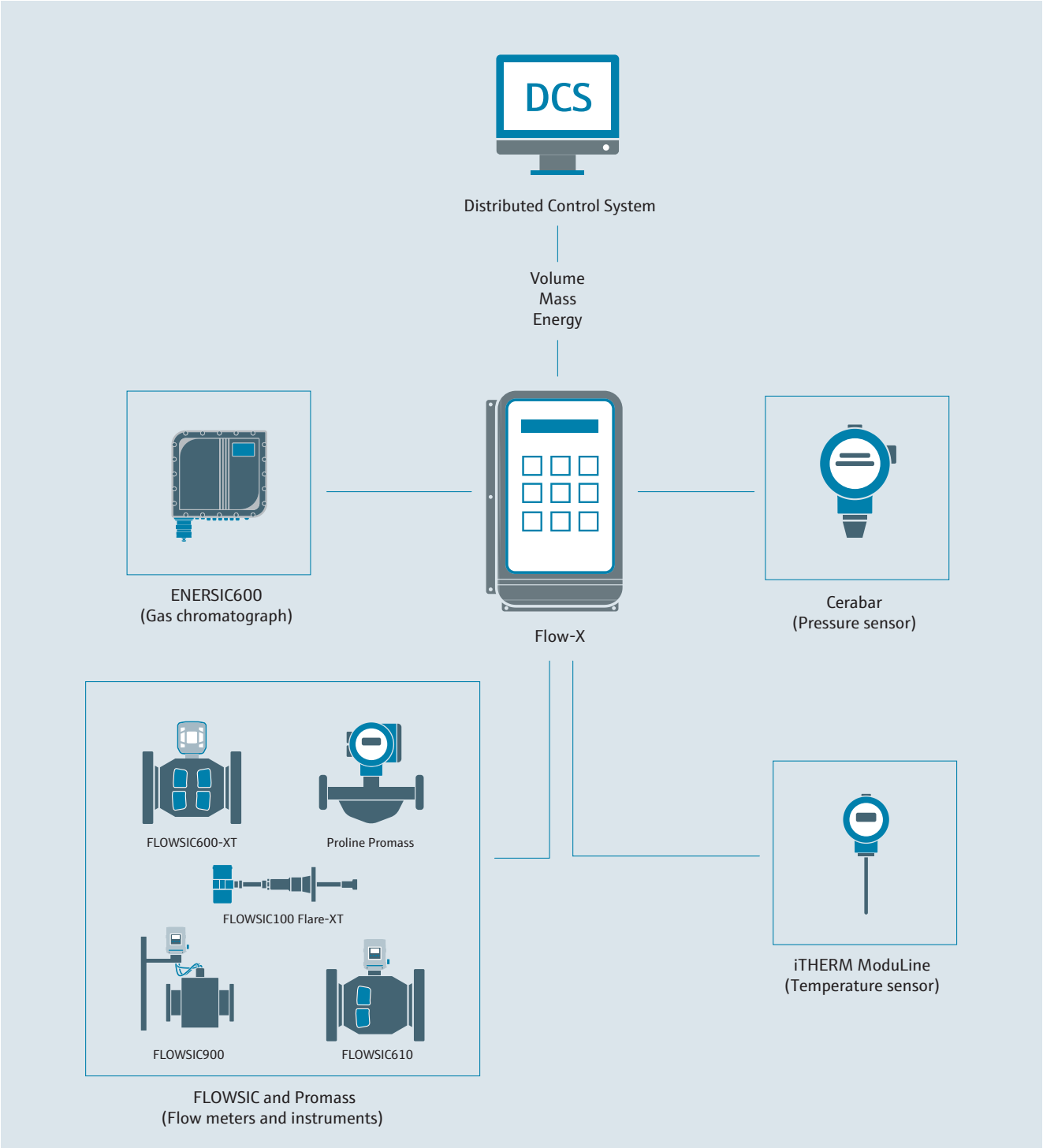
- Reduced planning and installation costs thanks to standard configurations
- Very exact flow conversion due to multiple calculation cycles per second
- High reliability thanks to independent modules with their own volume conversion and storage of measured values, counter readings, and events
- Systems are easy to extend thanks to modules with standardized inputs/outputs that are fully configurable via software
- Very simple operation thanks to intuitive user interface featuring identical menus and displays on the device and in the control room
- Reduced service and maintenance costs with tamper-proof remote maintenance
- Cost-efficient and flexible system integration of multiple measuring instruments and equipment



Endress+Hauser
People for Process Automation

The perfect combination – Flow-X and FLOWSICs

The FLOWSIC and Promass volume and mass flow meters have been setting standards in terms of design, usability, and reliability for decades. The Flow-X flow computer complements these meters perfectly. It offers latest technology, both in hardware and software, and also promotes an intuitive user interface. The Flow-X series is based on powerful, single-run modules that can be combined in various housings depending on the application.
Flow-X converts sensor data from flow meters, gas chromatographs and pressure and temperature transmitters to standardized volume, mass or energy.



Flow-X – Flow computing excellence

The perfect combination

To ensure the commissioning process runs quickly and smoothly, the flow computers in the Flow-X family come complete with predefined parameterization settings for standard gas measurement applications in combination with Endress+Hauser instruments.

Reliable gas volume conversion

The Flow-X offers volume conversion in accordance with international standards and is based on leading edge hardware with its 64-bit double-precision processor. Conversion cycles of no more than 250 ms ensure that volumes are calculated with the utmost precision.

Data logging

Every Flow-X module has a large internal flash memory (1 GB) for logging operations, events, and primary data.

Sophisticated user interface

The Flow-X offers a compelling user interface that can be operated using the touchscreen on the device or even via the integrated web server. The colored icons and menu texts create an entirely intuitive user experience to make operation and configuration of the Flow-X remarkably simple.

Outstanding versatility

Each module offers advanced measurement technology in combination with a high storage capacity and data communication functions. Even the process of adding a new measuring run is straightforward: Simply install the module and update the parameterization settings for the Flow-X – that's all there is to it.

Remote access

It is as easy to access the device via the integrated web server (support for secure protocols) as it is via the touchscreen on the device itself. This means the Flow-X can be operated in exactly the same way no matter whether the user is in the control room or standing in front of the device.

	Flow-X/P	Flow-X/C	Flow-X/S	Flow-X/R
				
Supported runs	4 (by hardware)	4 (by software)	4 (by software)	8 (by hardware)
Redundancy possibility	x	-	-	x
Mounting	Panel	Panel	DIN rail or wall	19" rack
Station control	x	x	x	x
Batching	x	x	x	x
Sample control	x	x	x	x

Flow-X
The ideal flow computer for metering solutions



Product description

The Flow-X flow computer provides gas and liquid volume, mass and energy conversion, event logging, parameter logging, and reports using latest technology. Identical modules are combined in different housings, offering a multi-run version Flow-X/P for 1–4 metering runs with a local touch screen, or the Flow-X/S version for cost efficient installations. Each module combines high-precision measurement technology, fast digital signal processing, abundant processing power, versatile data communication, and high storage capacity in a fully equipped flow computer. The Flow-X flow computer meets the requirements of even the most demanding applications and is the ideal partner for custody transfer measurements using the Endress+Hauser flow meters.

At a glance

- Configurations for meter runs compliant to international standards incl. MID, OIML, AGA
- Powerful modules for demanding applications
- Each module features CPU, memory, and standardized inputs/outputs
- Appealing 7" graphics display with touch operation
- Intuitive user interface for graphics display and in web browser
- Remote access via Ethernet
- Station computer for up to 8 meter runs

Your benefits

- Reduced planning and installation costs thanks to standard configurations
- Very exact flow conversion due to multiple calculation cycles per second
- High reliability and redundancy thanks to independent modules with their own volume conversion and storage of measured values, counter readings, and events
- Systems are easy to extend thanks to modules with standardized inputs/outputs that are fully configurable via software
- Very simple operation thanks to intuitive user interface
- Reduced service and maintenance costs with tamper-proof remote maintenance
- Cost-efficient and flexible system integration of multiple meter runs

Fields of application

- Custody transfer, fiscal and allocation gas and liquid measurement
- On- and offshore, natural gas, LNG, flare gas, process fluids, CO_2, H_2
- Loading and un-loading

CE Ex MID

More Information online
For more information, enter the link or scan the QR code to get direct access to technical data, operating instructions, software, application examples, and much more.
www.endress.com/flow-x

Technical data

The exact device specifications and product performance data may vary and are dependent on the respective application and customer specifications.

Flow-X

Ambient temperature	
Flow-X/S	-40 °C ... +75 °C (–40 °F ... +167 °F)
Flow-X/C, Flow-X/P, Flow-X/R	0 °C ... +60 °C (32 °F ... +140 °F)
Storage temperature	
Flow-X/S	–40 °C ... +85 °C (–40 °F ... +185 °F)
Flow-X/C, Flow-X/P, Flow-X/R	-20 °C ... +70 °C (–4 °F ... +158 °F)
Ambient humidity	5% ... 90%; relative humidity; non-condensing
Sunlight	Store and operate out of direct sunlight
Electrical connection	
Voltage	24 V DC, ± 10%, with redundant connections
Current consumption	Flow-X/P0, X/M, X/S: ≤ 0.4 A nominal; ≤ 0.8 A maximal Flow-X/C: ≤ 0.6 A nominal; ≤ 1.0 A maximal
Conformities	
EU directives	2014/32/EU Measuring Instruments Directive (MID) 2014/30/EU Electromagnetic Compatibility Directive 2012/19/EU WEEE Directive (WEEE 2) 2011/65/EU RoHS
Hazardous area	Applies for Flow-X/M and X/S (requires optional housing) Class I, Division 2, Groups A, B, C, and D, T4 Class I, Zone 2, Group IIC, T4 IECEx Ex ec IIC Gc ATEX II 3 G Ex ec IIC Gc
Electrotechnical & Metrology standards	EN12405-1, A2 IEC 60068-2-1 IEC 60068-2-2 IEC 60068-2-3 IEC 60068-2-31 IEC 60068-2-36 IEC 60654-2 IEC 61000-4-2 IEC 61000-4-3 IEC 61000-4-4 IEC 61000-4-5 IEC 61000-4-6 IEC 61000-4-8 IEC 61000-4-17 IEC 61000-4-29 IEC 61000-6-2 IEC 61000-6-4 IEC 63000 OIML R117-1 WELMEC 7.2, 8.3, 8.8 API 21.1

System	
CPU and memory	800 MHz, 2 GB RAM, 1 GB flash memory
Clock	Real-time clock, accuracy better than 0.5 sec/day Gold cap for date and time retention
Watchdog	Hardware and software watchdog timer
Multi run capability	Support up to 4 gas or 4 meter runs per module (Flow-X/M, Flow-X/C)
Tamper switch	Mechanical tamper switch to prevent changing of the application and vital parameters within that application
Dimensions	See dimensional drawings
Weight	
Flow-X/P1	3.7 kg (8.2 lbs)
Flow-X/P2	4.5 kg (9.9 lbs)
Flow-X/P3	5.3 kg (11.7 lbs)
Flow-X/P4	6.1 kg (13.4 lbs)
Flow-X/S	2.5 kg (5.5 lbs)
Flow-X/C	2.7 kg (6.0 lbs)
Supported gas chromatographs	Supports all common gas chromatographs (including Endress+Hauser ENERSIC600, ABB NGC8200 series, ABB BTU8100, Danalyser, Yamatake HGC, Encal 3000, Angus GQA, Siemens Maxum and Sitrans)
Supported* flow meters	Endress+Hauser FLOWSIC600 Endress+Hauser FLOWSIC600-XT Endress+Hauser FLOWSIC900 Endress+Hauser Promass 300/500 ABB CoriolisMaster Sensia Caldon LEFM 380CI FMC MPU GE Panametrics GF868 Faure Herman 8400 RMG USZ08 Honeywell Q.Sonic Emerson Micro Motion Krohne ALTOSONIC V12 *MODBUS mapping table pre-configured for mentioned devices, other instruments supported with individual mapping

I/O per Flow-X/M module or Flow-X/C

Analog inputs*	6x analog transmitter input, high accuracy Input types are 4 to 20 mA, 0 to 20 mA, 0 to 5 V, 1 to 5 V Accuracy mA inputs; 0.002% FS at 21 °C (69.8 °F), 0.008% at full ambient range of 0 ... 60 °C (32 °F ... 140 °F), long-term stability 0.01% per year Resolution 24 bits. Analog inputs share same ground floating in relation to all other electronics.
4-wire PRT inputs	2x resolution 0.02 °C (0.04 °F) for 100 ohms input. Error depending on range 0 ... 50 °C (32 °F ... 122 °F): Error <0.05 °C (0.09 °F) or better; -220 to +220 °C (–396 °F ... +428 °F): Error <0.5 °C (<0.9 °F.) or better
HART*	4x Independent HART loop inputs, on top of 4 to 20 mA signals Support includes multi-drop for each transmitter loop, as well as support for redundant FC operation
Analog outputs	4x Analog output for process outputs and flow / pressure control. Resolution 14 bits, 0.075% FS. Analog outputs share same ground floating in relation to all other electronics.
Pulse Inputs**	4x Single or dual pulse input. Adjustable trigger level at various voltages. Frequency range up to 10 kHz for single and dual pulse. Compliant with ISO6551, IP252, and API 5.5. True Level A and level B implementation.
Density/viscosity**	4x Periodic time input, 100µs to 5000µs. Resolution < 1ns
Digital inputs**	16x Digital status inputs. Resolution 100ns (10MHz)
Digital outputs**	16x Digital output, open collector. Rating 100mA @24V
Pulse outputs**	4x Open collector, 0.01 to 500 Hz
Sphere detector inputs**	4x Supports 1, 2 and 4 detector configurations mode. Resolution 100ns (10MHz)
Prover bus outputs**	1x Meter pulse output for remote proving flow computers. Resolution 100ns (1MHz)
Frequency outputs**	4x Frequency outputs for emulation of flowmeter signals. Maximum frequency 10KHz, accuracy 0.1%
Serial	2x RS485 / RS232 serial port for ultrasonic meter, printer or generic, 115kb Flow-X/P: 4x RS485 / RS232 and 1x RS232 Flow-X/C: 2x RS485 / RS232 and 1x RS485 optional 2x RS485 / RS232 and 2x RS485"
Ethernet	2x RJ45 Ethernet interface, TCP/IP

* There are 6 analog inputs per module. Analog inputs 1 through 4 support HART

** Total number of pulse inputs + digital inputs + digital outputs + pulse outputs + density inputs + sphere detector inputs + prover bus outputs + frequency outputs = 16

Volume Correction

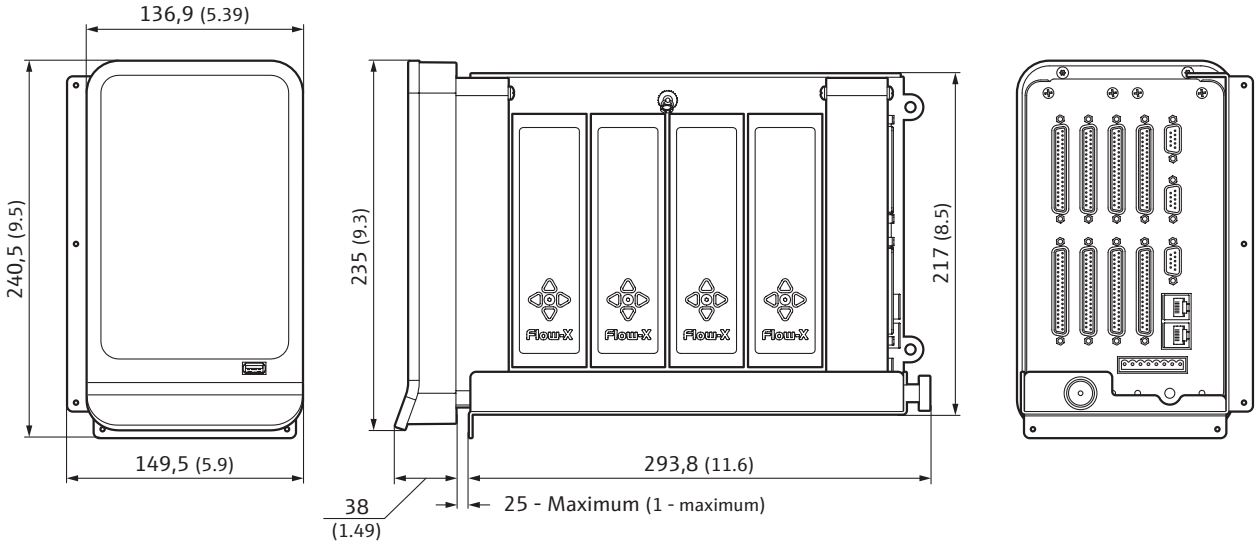
Correction method	PTZ
Gas property calculations	AGA 5, AGA 8 Part 1, AGA 8 Part 2 (GERG-2008), AGA 10 AGA NX-19 GERG-2008 GERG91mod (GOST 30319.2-1996) GOST 30319.2-2015 GSSSD MR-113 ISO 6976, ISO 12213 Parts 2 and 3 S-GERG
Liquid property calculations	API MPMS 11.1 :2004 incl. Add 1:2007 and Add 2:2019, Tables 5,6,23,24,53,54,59 and 60, Tables A,B,C,D API MPMS 11.2.1, API 11.2.1M, API 11.2.2, API 11.2.2M API MPMS 11.2.4 LPG/NGL Table E API MPMS 11.3.2.1 Ethylene (API-2565) API MPMS 11.3.2.2 Propylene API MPMS 11.3.3 Ethanol API MPMS 11.4.1 Water API 2540 5,6,23,24,53,54 API historical 1952 tables 5,6,23,24,53,54 ASTM D1250 1952, 1980, 2004, 2007, 2019 ASTM D1550 Butadiene ASTM D4311 Asphalt GOST 8.595 GPA TP15, GPA TP25, GPA TP27, STD 8117, STD 8217 IAPWS-IF97 Water IUPAC Ethylene ISO 91-1 (IP2), ISO 91-2 (IP3) LNG (Klosek-McKinley, ISO-5678, ASTM D4784) NIST 1045 Ethylene, NIST CO2 OIML R22 Ethanol/Alcohol R 50.2.040, R 50.2.076 STO 5.9 B1, B2, B3
Flow rate and proving calculations	AGA3, AGA6, AGA7, AGA9, AGA11 API MPMS 4.2, 4.5, 4.6, 4.8, 5.2, 5.3, 5.6, 5.8, 13.2 API 5.6 Coriolis pressure compensation GOST 8.586.2, GOST 8.611, GOST 8.740, ISO 5167-1, 2, 3 and 4, ISO/TR15377 MI 3213 STO 5.2 V-cone Wet gas (De Leeuw, Reader-Harris)

Ordering information

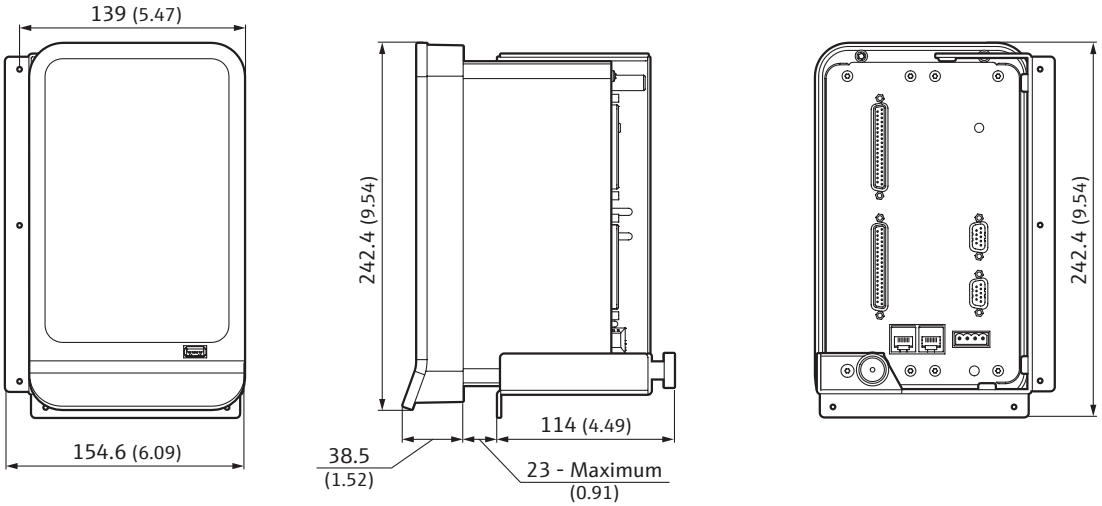
Our regional sales organization will help you to select the optimum device configuration.

Dimensional drawings

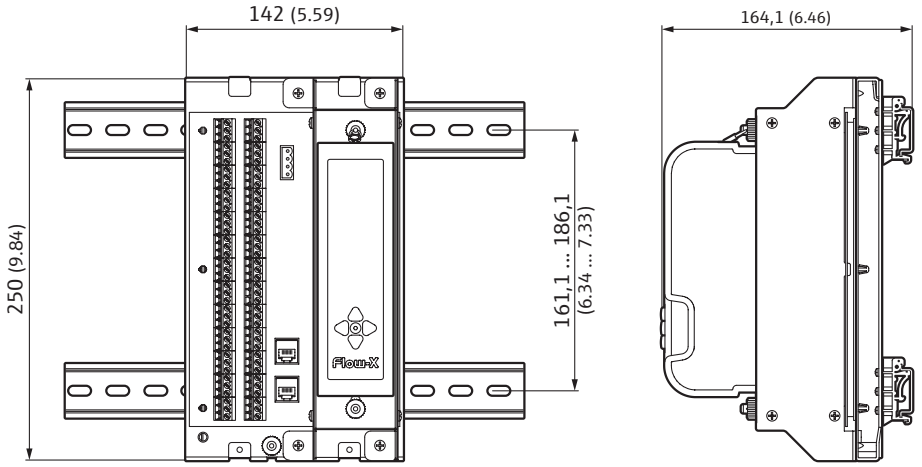
Flow-X/P (dimensions in mm (inch))



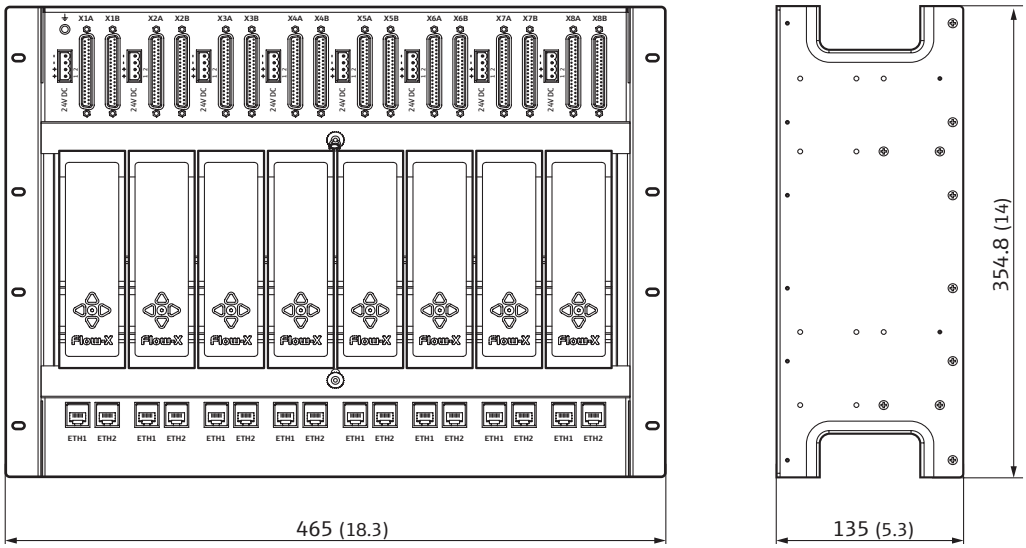
Flow-X/C (dimensions in mm (inch))



Flow-X/S (dimensions in mm (inch))



Flow-X/R (dimensions in mm (inch))



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