HB-THERM®
FLOW-5

Flow Meter

Product Catalogue 2018-10

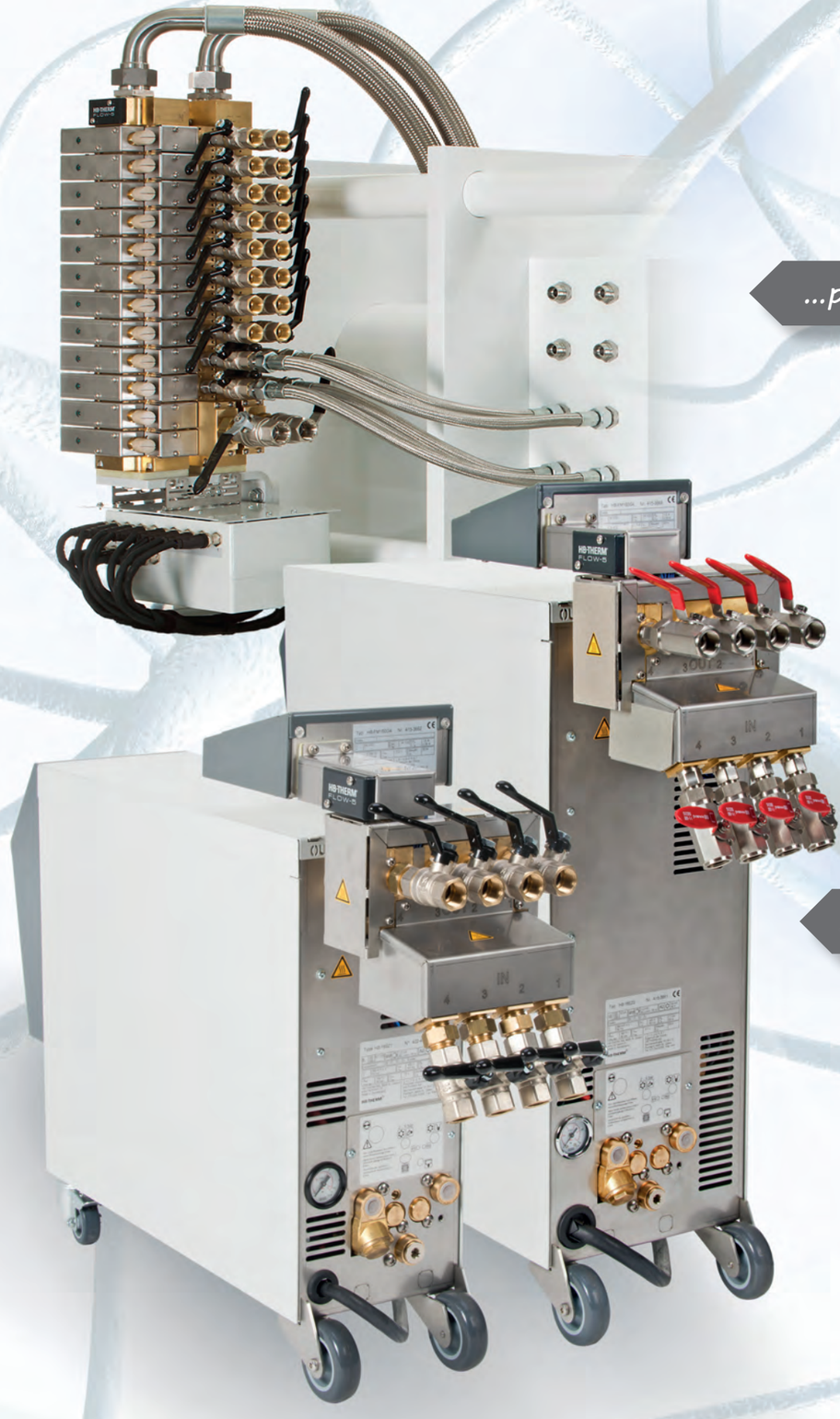
Flow Meter Flow-5

In parallel connected circuits flow changes might remain undetected as the flow of medium is distributed among the remaining channels.

External flow meters Flow-5 monitor parallel circuits individually and detect changes early on, before production quality begins to be compromised.

The Flow-5 are easy to operate and provide highly accurate ultrasonic measurements.

HB-THERM®
FLOW-5



...parallel, more power, and still reliable

Constant temperature control and high part quality
- Larger overall flow
- Smaller temperature difference between main line and return line
- Better homogeneity in temperature distribution

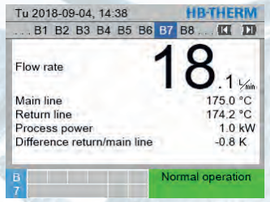
Saves costs and energy
- Fewer temperature control units necessary

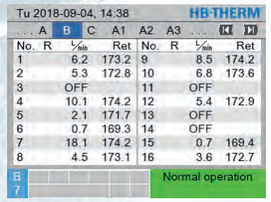
...precise, powerful and efficient

Large scope of application
- Smallest flow rates from 0,4 L/min
- High temperatures up to 200 °C
- Different configurations

...easy, intelligent and convenient

- Determination of process power per circuit
- Automatic limit value setting
- Assistant for manual flow adjustment
- Recording of data via USB and analysis in Excel





...safe, reliable and low on maintenance

Fully automated process monitoring
- Continuous monitoring of flow and temperature per circuit
- Highly accurate ultrasonic flow rate measurement

Durable construction
- Solely non-corroding materials in the hydraulic circuit
- Flow rate measurement without any moving parts

Improved protection for the mould
- Early detection saves costly maintenance

Some features may not apply, depending on the model

Model: Unit attachment

Standard Equipment

Hydraulics		Continuous maintenance-free ultrasonic flow meter
		Nominal measuring range 0,4 to 20 L/min per circuit
		4 circuits
		Hydraulic circuit made of non-corroding materials
		Common temperature sensor in the main line Pt 1000
		Temperature measuring in the return line of each circuit Pt 1000
Command / Display		Three coloured LEDs show the status of the unit
		Info button for switching display
		Determination of individual process power
		Automatic limit value setting
Interface	HB (IN/OUT)	HB-Therm data interface CAN for connection to a temperature control unit Thermo-5 or control module Panel-5
		2 sockets Sub-D 15 pin (1 male and 1 female)
	AUX	Frequency output (20 L/min @ 200 Hz)
		1 socket Sub-D 25 pin (male)
Power supply		Power supply via interface HB
		24 VDC; 1,5 W

Additional Equipment

ZH	**Shut-off valves**	Shut-off valves for all circuits

Communication (→P. 8, Fig. 1)

Technical Specifications

Flow meter	Model		Unit attachment		
	Temperature control unit		Thermo-5		
	Heat transfer medium		Water		Oil
	Maximum main line temperature	°C	160	180	200
	Housing size of temperature control unit		1 or 2	2	2
Type			**HB-FM160**	**HB-FM180**	**HB-FM200**
	Unit attachment		**G**	**G**	**G**
	Maximum number of circuits		**4**	**4**	**4**
Circuits	Number of circuits	**4**	●	●	●
Connection	Cable HB, 1 m		●	●	●
Additional equipment	Shut-off valves	**ZH**	o	o	o

Ordering example: HB-FM160G4-4-ZH, English

Nominal measurement range	Per circuit	L/min	0,4–20	0,4–20	0,4–20
Connection circuits	Thread		G½	G½	G½
	Resistance	bar, °C	20, 180	25, 200	8, 220
Dimensions (→P. 9, Fig. 2)	Height	mm	246	246	246
	Width	mm	180	184	184
	Depth	mm	348	348	348
Weight max.		kg	9	9	9

● Standard specification o Optional

Model: Autonomic assembly

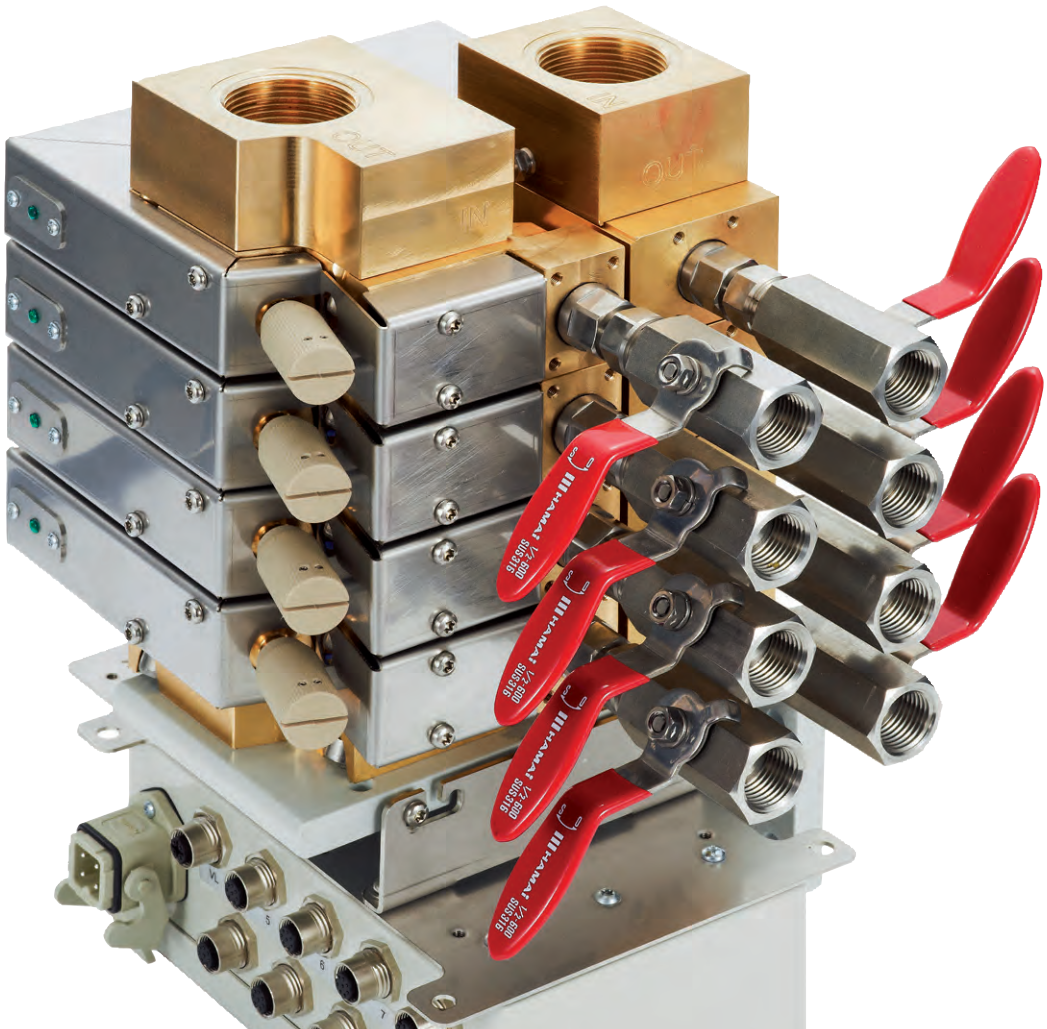
Standard Equipment

Hydraulics		Continuous maintenance-free ultrasonic flow meter
		Nominal measuring range 0,4 to 20 L/min per circuit
		Expansion of measuring range up to 40 L/min by parallel connection of two circuits (accessories)
		Manual flow rate setting with fine adjustment valve per circuit
		Modular-design with up to a maximum of 16 circuits
		Hydraulic circuit made of non-corroding materials
		Common temperature sensor in the main line with sensor Pt 1000
		Temperature measuring in the return line of each circuit with sensor Pt 1000
Command / Display		Signalling lights for visualising flow rates
		Determination of individual process power
		Automatic limit value setting
Interface	HB (IN/OUT)	HB-Therm data interface CAN for connection to a temperature control unit Thermo-5 or control module Panel-5
		2 sockets Sub-D 15 pin (1 male and 1 female)
Power supply		Power supply via interface HB
		24 VDC; 2,2 W/4 circuits

Additional Equipment

ZA	**Connection for alarm**	Alarm using potential-free contact (rating max. 250 VAC, 4 A)
		1 socket Harting Han 3A (male)
ZH	**Shut-off valves**	Shut-off valves for all circuits (without parallel connections)

Communication (→P. 8, Fig. 1)



Technical Specifications

Flow meter	Model		Autonomic assembly							
	Heat transfer medium		Water							
	Maximum main line temperature	°C	160				180			
Type			**HB-FM160**				**HB-FM180**			
	Mounting left [2]		**L**				**L**			
	Mounting right [2]		**R**				**R**			
	Maximum number of circuits		**4**	**8**	**12**	**16**	**4**	**8**	**12**	**16**
Circuits	Number of circuits	**2**	●				●			
		3	o				o			
		4	o				o			
		5		●				●		
		6		o				o		
		7		o				o		
		8		o				o		
		9			●				●	
		10			o				o	
		11			o				o	
		12			o				o	
		13				●				●
		14				o				o
		15				o				o
		16				o				o
Additional equipment	Connection for alarm	**ZA**	o	o	o	o	o	o	o	o
	Shut-off valves G½	**ZH**	o	o	o	o	o	o	o	o

Accessories (→P. 11, Fig. 3)	Cable HB, 5 m	O/ID	T25066-3	T25066-3
	Parallel connection set G¾	O/ID	T26243-1	T26243-4
	Parallel connection set with shut-off valves G¾	O/ID	T26243-2	T26243-3
	Adjustable screw joint set (per circuit) G½	O/ID	T26173	T26173

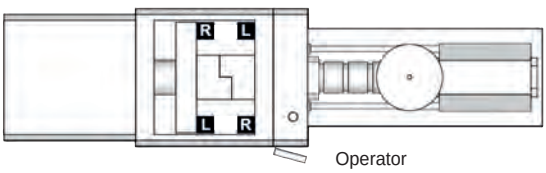
Ordering example: HB-FM160L8-5-ZH, English

+ 1x Parallel connection set with shut-off valves G¾ (O/ID T26243-2)
+ 1x Cable HB, 5 m (O/ID T25066-3)

Nominal measurement range	Per circuit	L/min	0,4–20				0,4–20			
	Parallel connection	L/min	0,8–40				0,8–40			
Connection main manifold	Thread		G1 ¼				G1 ¼			
	Resistance	bar, °C	20, 180				25, 200			
Connection circuits	Thread		G½				G½			
	Parallel connection; Thread		G¾				G¾			
	Resistance	bar, °C	20, 180				25, 200			
Dimensions (→P. 10/11, Fig. 3)	max. Height	mm	352	504	687	839	352	504	687	839
	Width	mm	336	336	336	336	336	336	336	336
	Depth	mm	245	245	265	265	245	245	265	265
Weight max.		kg	25	41	57	73	25	41	57	73

● Standard specification o Optional

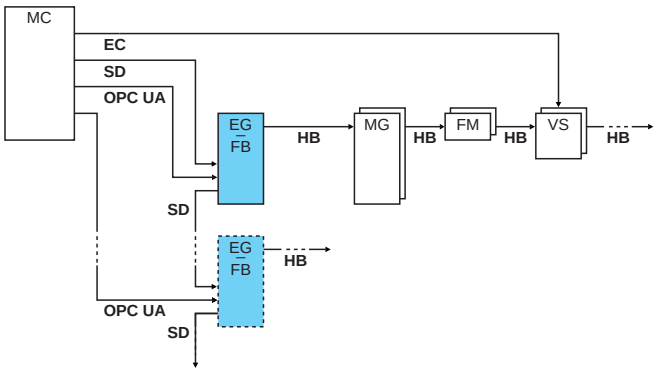
[2] Note for mounting left/right:

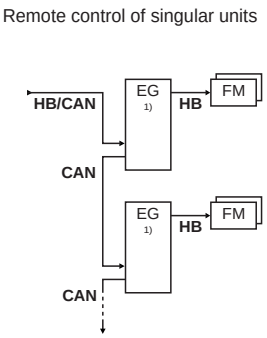


Operator

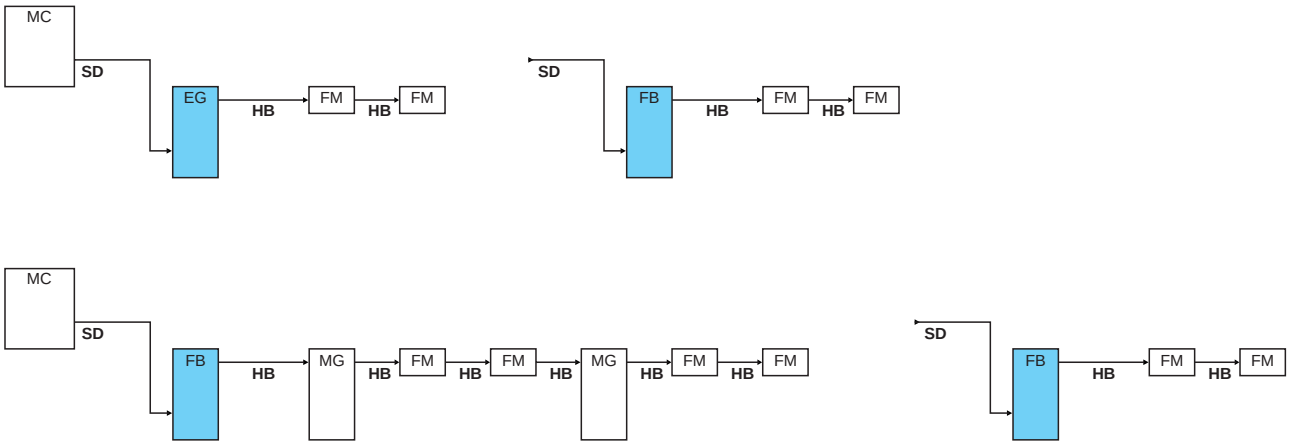
Communication (Fig. 1)

Basic circuit diagram





Examples



Legend	Description	Note
MC	Machine control	max. 1
FB	Control modul Panel-5	max. 1
EG	Temperature control unit Thermo-5, singular unit	max. 16 (per command)
MG	Temperature control unit Thermo-5, modular unit	
FM	Flow meter Flow-5	max. 32 (at 4 circuits each)
VS	Switching unit Vario-5	max. 8
SD	Communication via serial data interface DIGITAL (**ZD**), CAN (**ZC**) or PROFIBUS-DP (**ZP**)	Maximum number of units, operating range and transfer of flow rate values depend on machine control and protocol
OPC UA	Communication OPC UA via Ethernet (**ZO**)	
HB	Communication interface HB	Order of connection is not relevant
HB/CAN	Communication interface HB/CAN	To remotely control singular units
CAN	Communication interface CAN (**ZC**)	
EC	External control	Assignment dependent on machine control unit

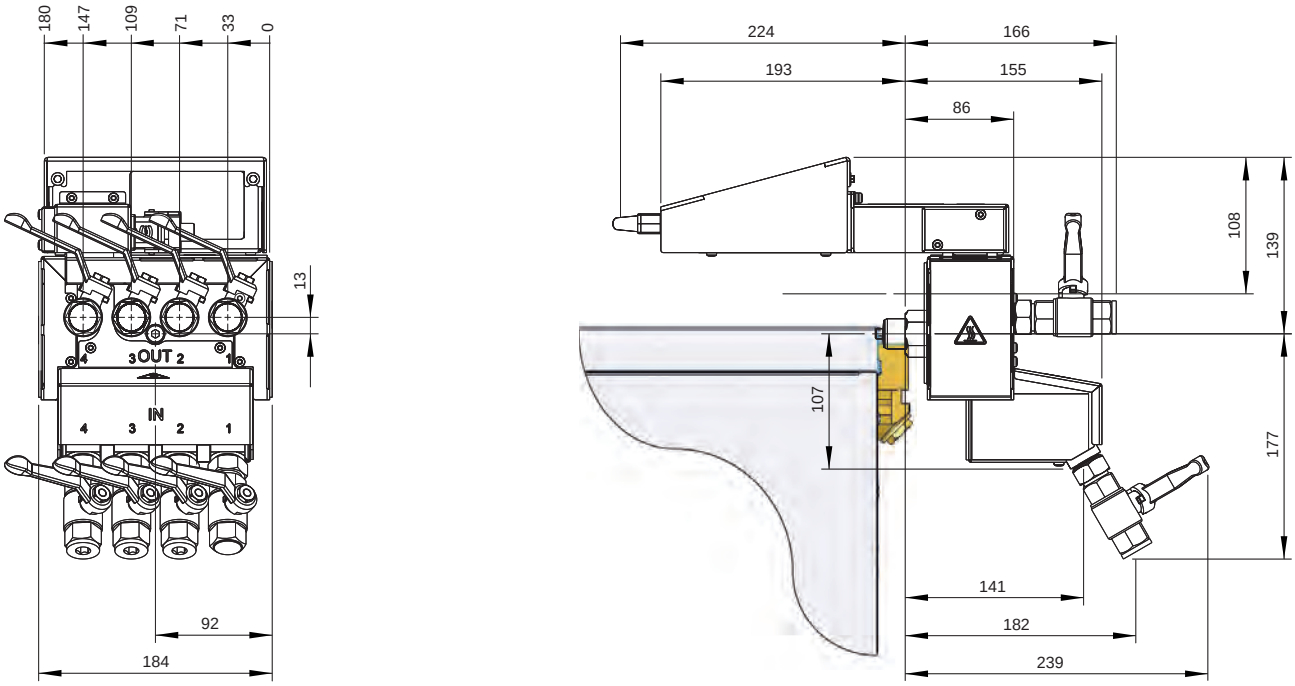
Command [1] Command deactivated

General Technical Data

Environment	Temperature	5–60 °C
	Humidity	35–85 % RH (non-condensing)
Colour	Model: Unit attachment	RAL 7012 (basalt grey)
Protection class		IP 54
Standards		EN ISO 13732-1, EN 61010-1, EN 61326-1
Certification/Approval		CE (compliance with relevant CE directives)
Tolerance	Flow indicator	±5 % of measured value

Dimensioned (Fig. 2)

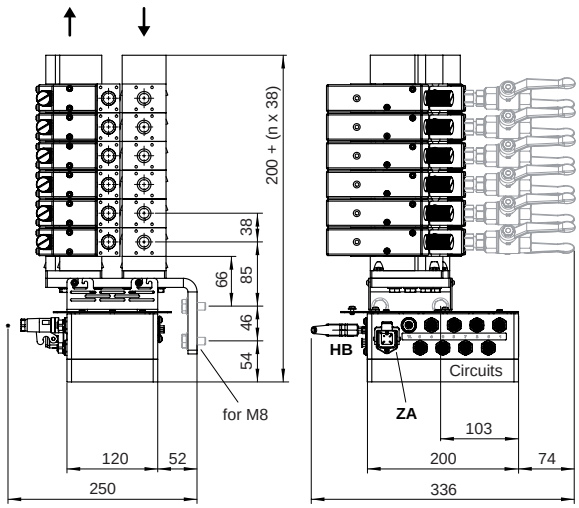
HB-FM160/180/200G, scale 1:6

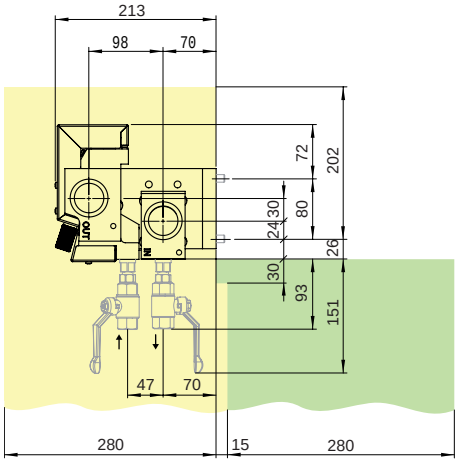


Dimensions (Fig. 3)

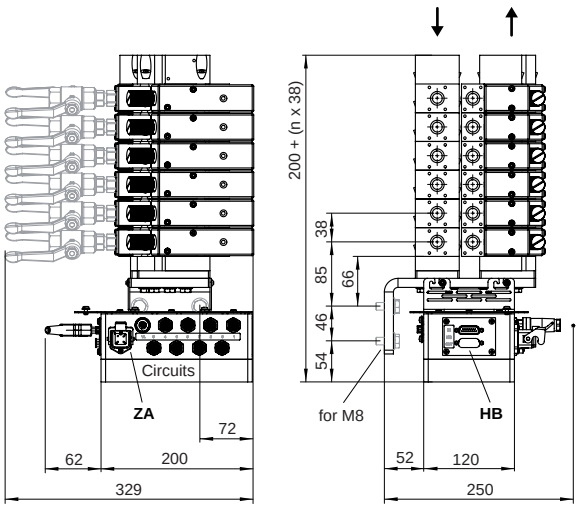
HB-FM160/180L (mounting left, 2–8 circuits)

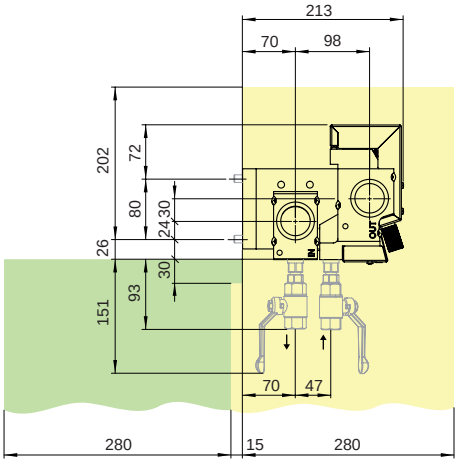
Scale 1:10





HB-FM160/180R (mounting right, 2–8 circuits)





n Number of circuits

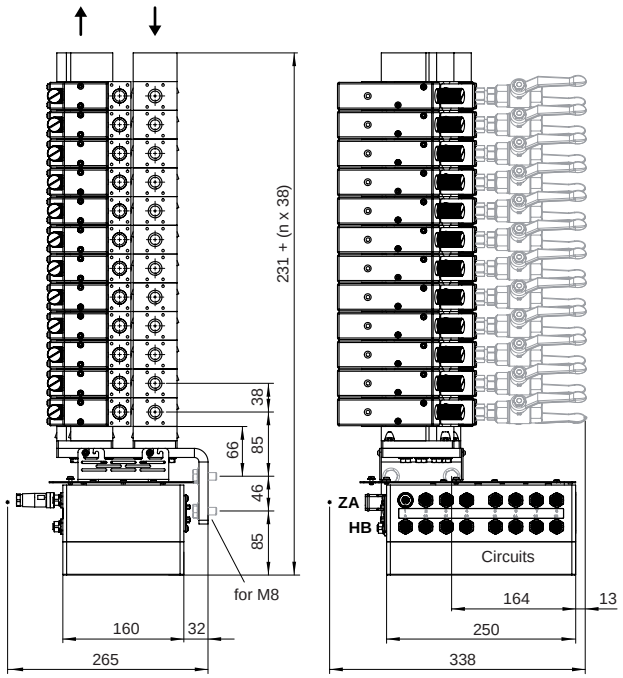
Required free space

Additionally suggested free space

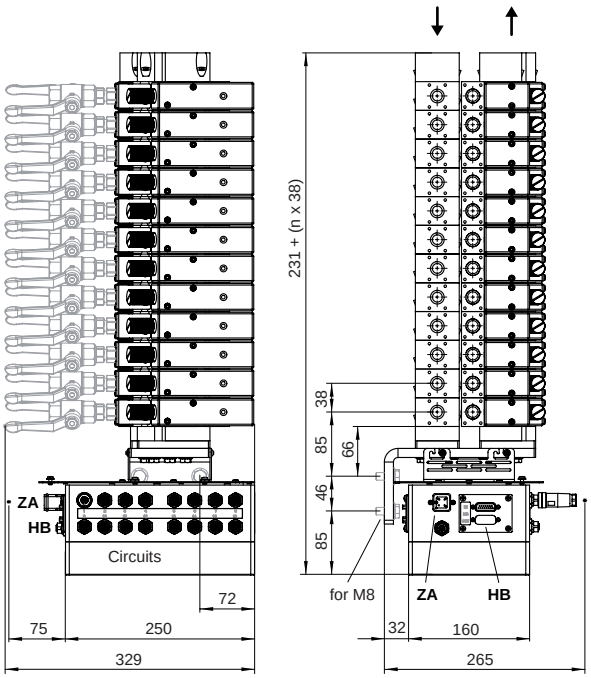
1) Mounting screws M8 included

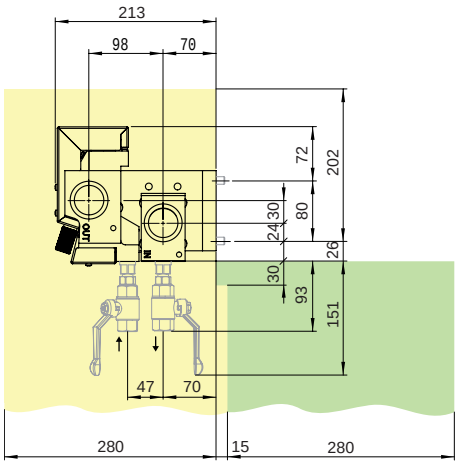
Note: 3D data available

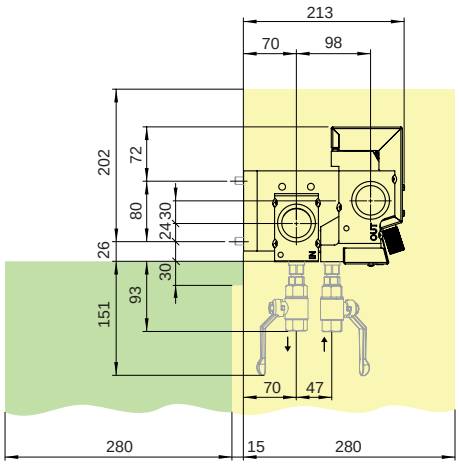
HB-FM160/180L (mounting left, 9–16 circuits)



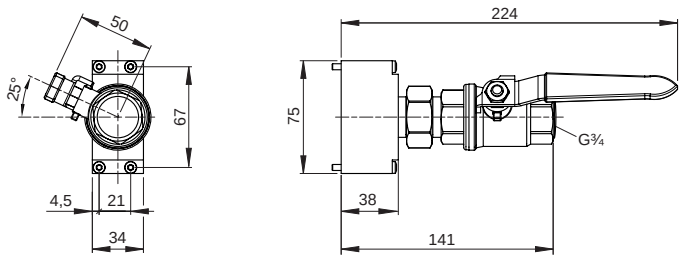
HB-FM160/180R (mounting right, 9–16 circuits)



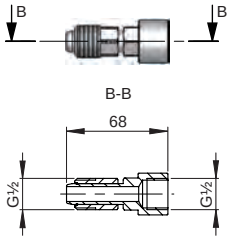




Parallel connection of two circuits, scale 1:5

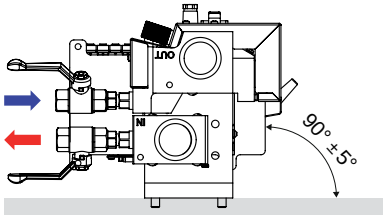


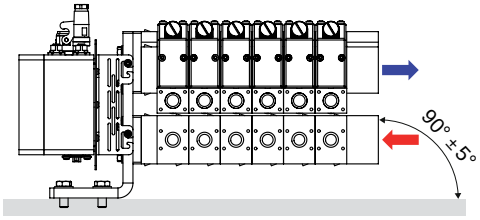
Adjustable screw joint set, scale 1:5



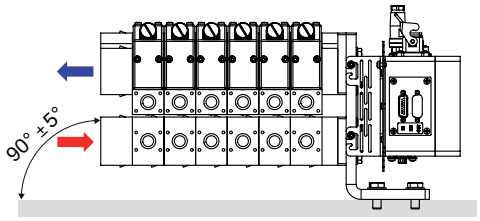
Mounting Position (Fig. 4)

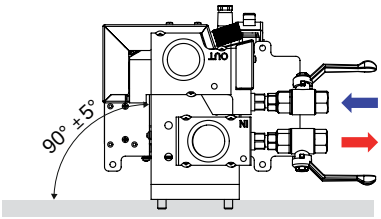
Horizontal (mounting left)



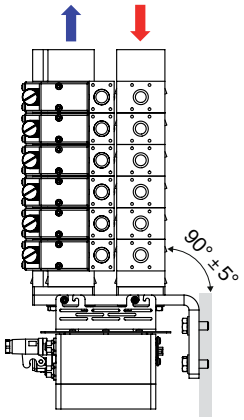


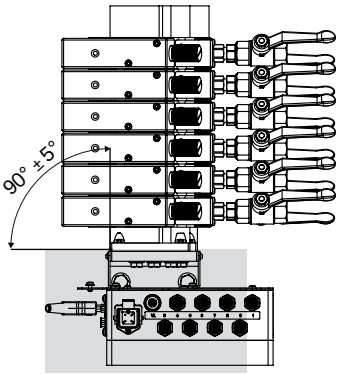
Horizontal (mounting right)



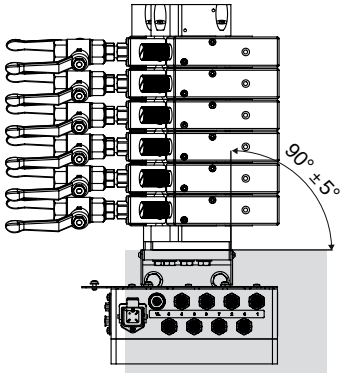


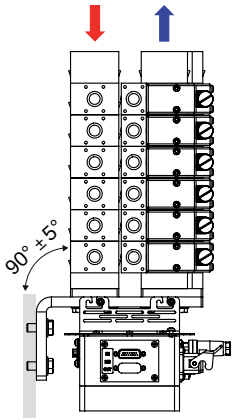
Vertical (mounting left)





Vertical (mounting right)



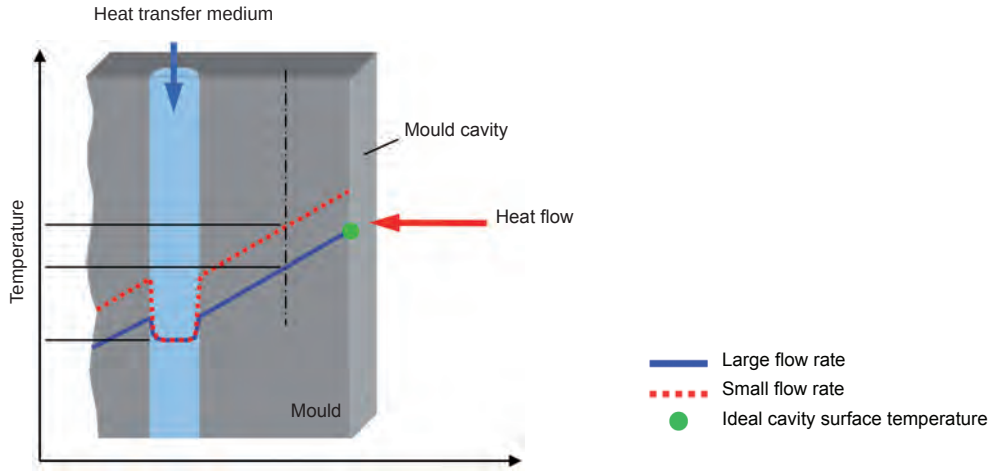


Flow rate measurement

When temperature control circuits are connected in parallel in an injection mould, slight changes in the flow rates of the individual channels can affect the temperature in the mould cavity, which in turn can lead to product quality problems. Reliable measurement and monitoring of the flow rates in all parallel-connected temperature control circuits can enable the benefits of this type of connection to be exploited and ensure consistently high-quality finished parts. Depending on the application it can make sense to mount the flow meters on the temperature control unit or autonomic near the mould.

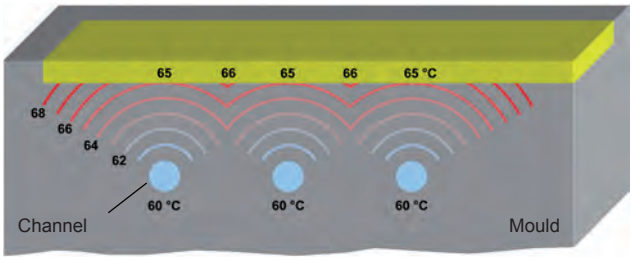
Influence of flow rate in the injection moulding process

Heat transfer at the wall of the cooling channel depends heavily on the flow conditions, which in turn are primarily determined by the flow rate. A change of the temperature difference between the heat transfer medium and the mould therefore has a direct effect on the quality-relevant temperature of the surface of the mould cavity. In the injection moulding process an even temperature distribution at the surface of the mould cavity is particular important for mould temperature control.

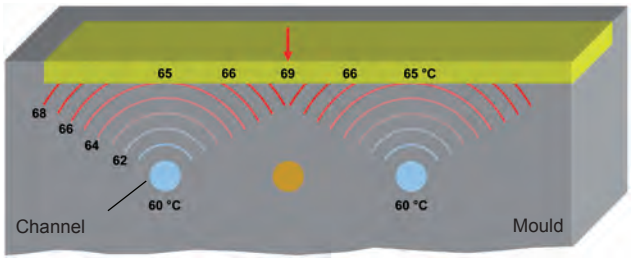


Temperature gradient in the mould for different flow rates

Partly or complete blocked channels of a circuit degrade the temperature distribution massively.
Unfortunately, they cannot be detected by measuring and monitoring the main flow of the temperature control unit only.



Temperature distribution for the same flow rate in all three channels



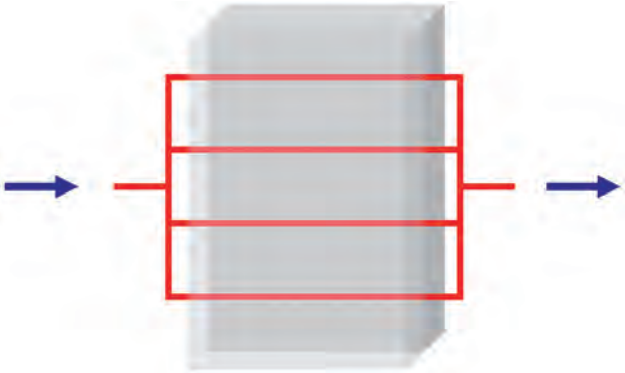
Temperature distribution when the middle channel is blocked

In certain cases, the temperature in the area of influence of a channel can be changed by adjusting the flow consciously. The reduction of the flow results in higher temperatures. With this technique the sensitivity of perturbation increases, what makes the monitoring of the flow of the channels essential.

Serial versus parallel connection

In applications with serially connected temperature circuits, the flow monitoring of the individual temperature control unit is perfectly adequate because the flow in all channels connected is equal. In contrast to serial systems, parallel connected temperature control circuits offer a lower pressure drop with a larger total flow rate, fast-response temperature control and more even temperature distribution as well as a smaller temperature difference between feed and return flow.

Serial connection



Parallel connection

In order to take full advantage of temperature control circuits connected in parallel, it is advisable to measure and monitor the flow rates of the individual circuits.

HB-THERM®

Temperature Control Technology

HB-Therm worldwide.
HB-Therm is one of the leading manufacturers of temperature control units worldwide. Since 1967 HB-Therm AG has been developing and producing innovative temperature control technology to the highest quality standards. With its comprehensive know-how and motivated workforce, the company has succeeded in becoming the technology leader in its sector.

This Swiss family enterprise employs around 150 staff and has established itself as a systems supplier offering seamless customer support from machine design through to a complete after-sales service. Production is exclusively in St. Gallen. Own subsidiaries (Sales & Service) in Germany and France as well as 40 other national agencies are representing HB-Therm around the globe.

The company‘s quality and environmental management system is based on the continual improvement of all activities and processes and is certified to ISO 9001/14001. All its products and services are based on a philosophy of offering „Swiss-made“ quality to customers.

Customer service. Included.
With our sales and marketing network service we can offer comprehensive expert advice and assistance in:

- Optimum temperature control process
- Determination of the specification of the product and advice regarding functionality
- Electrical and hydraulic connections
- Data interfaces
- Heat transfer medium
- Servicing of the equipment

Our experts are always available for support when questions of specialist requirements or applications arise or when putting the equipment into operation, or for the operational training of your staff.

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