

HB-Therm[®]

FLOW-5

Flow Meter

Product Catalogue 2021-10



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.

...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

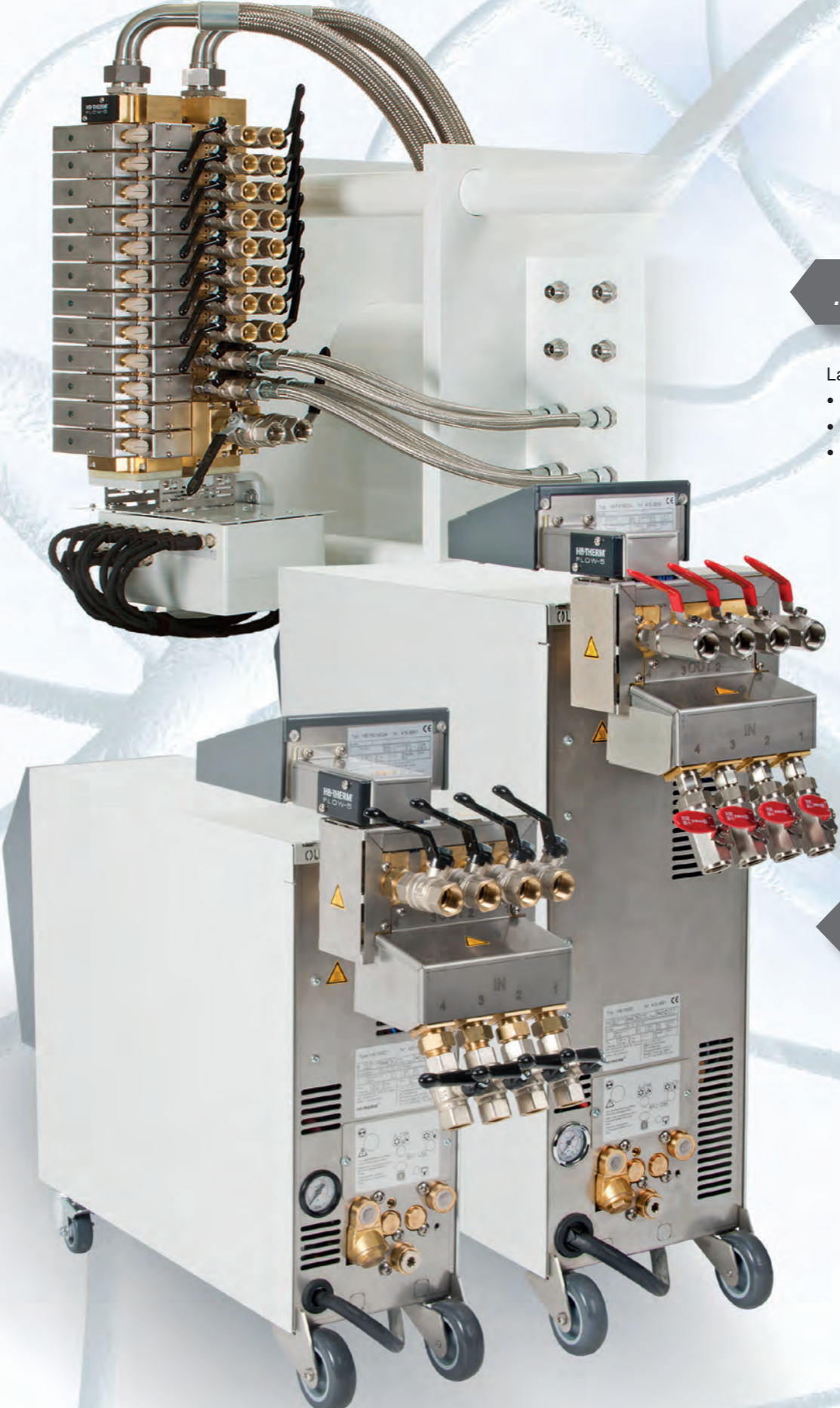
Saves costs and energy

- Fewer temperature control units necessary

...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

Tu 2021-02-23, 14:38		Tu 2021-02-23, 14:38									
HB-THERM		HB-THERM									
B1	B2	B3	B4	B5	B6	B7	B8	A1	A2	A3	
Flow rate		18.1									
Main line		175.0 °C									
Return line		174.2 °C									
Process power		1.0 kW									
Difference return/main line		-0.8 K									
Normal operation											



...precise, powerful and efficient

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

...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 with sensor Pt 1000
		Temperature measuring in the return line of each circuit with sensor 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
	AUX	2 sockets Sub-D 15 pin (1 male and 1 female)
		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	
	Max. number of circuits	4	4	4	
Circuits	Number	4	●	●	●
Connection	Cable HB, 1 m	●	●	●	
Additional equipment	Shut-off valves	ZH	○	○	○

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 ○ Optional

Model: Autonomic assembly

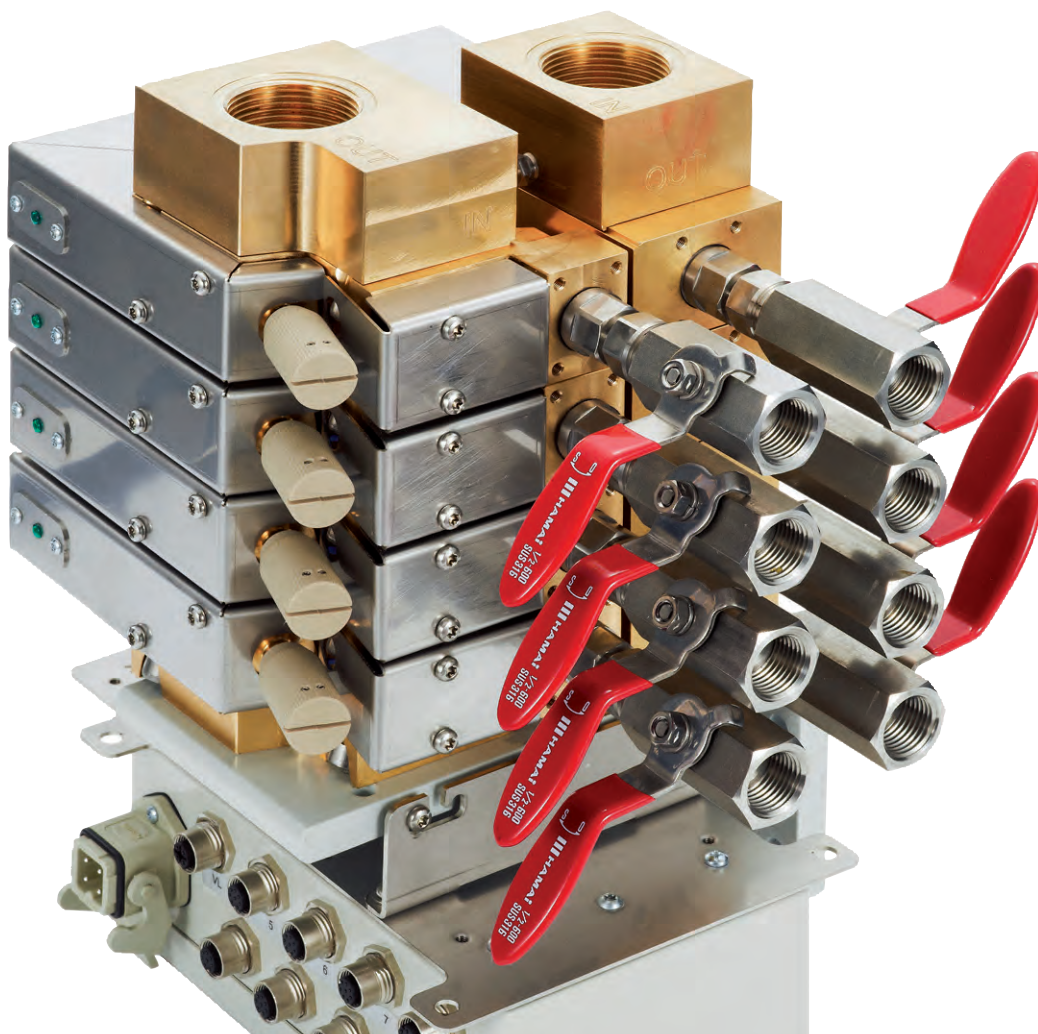
Standard Equipment

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				
	Max. number of circuits	4	8	12	16	4	8	12	16	
Circuits	Number	2				●				
		3	○			○				
		4	○			○				
		5		●			●			
		6		○			○			
		7		○			○			
		8		○			○			
		9			●			●		
		10			○			○		
		11			○			○		
		12			○			○		
		13				●			●	
		14				○			○	
		15				○			○	
		16				○			○	
	Additional equipment	Connection for alarm	ZA	○	○	○	○	○	○	○
		Shut-off valves G ³ / ₄	ZH	○	○	○	○	○	○	○

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

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

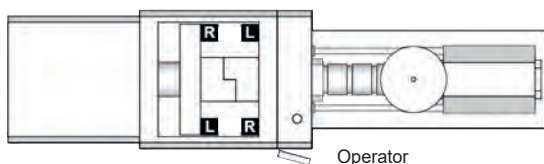
+ 1x Parallel connection set with shut-off valves G³/₄ (O/ID T26243-2)

+ 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		G ¹ / ₂				G ¹ / ₂			
	Parallel connection; Thread		G ³ / ₄				G ³ / ₄			
	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

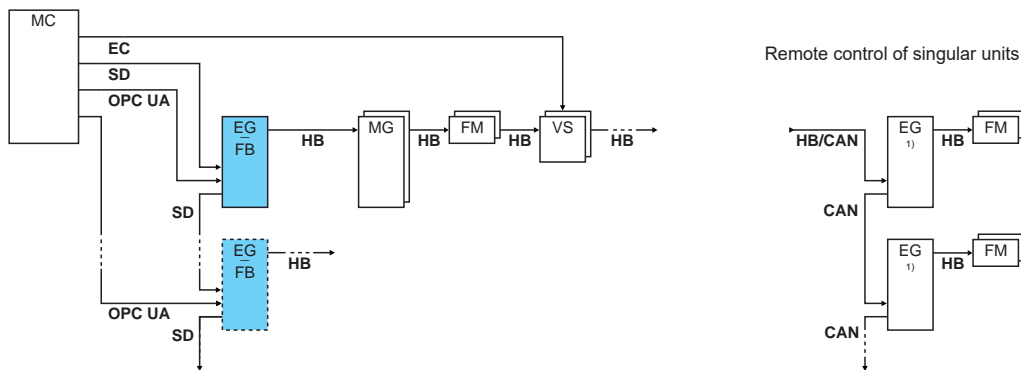
● Standard specification ○ Optional

²⁾ Note for mounting left/right:

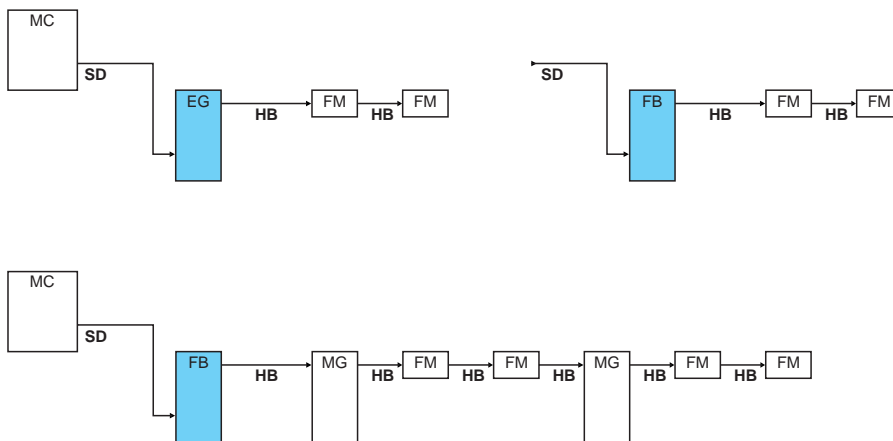


Communication (Fig. 1)

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), 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	
HB ²⁾	Communication interface HB	Order of connection is not relevant
HB/CAN ²⁾	Communication interface HB/CAN	To remotely control singular units
CAN	Communication interface CAN	
EC	External control	Assignment dependent on machine control unit

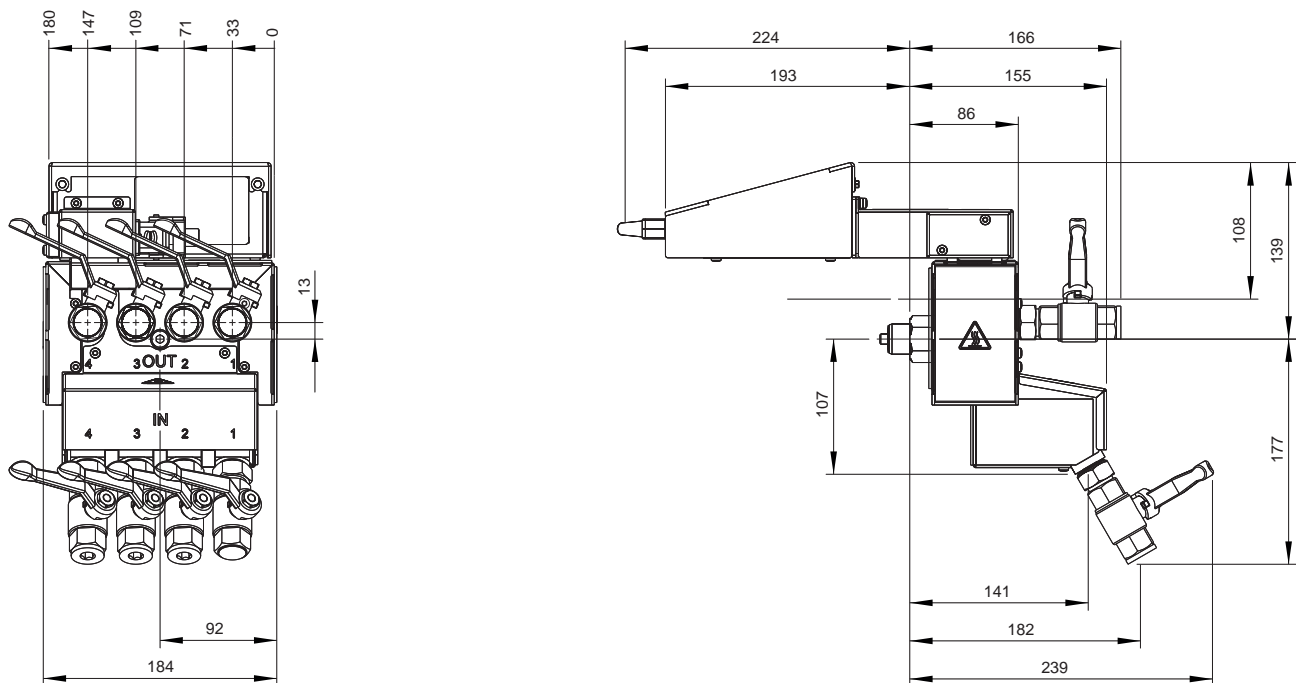
■ Command ¹⁾ Command deactivated ²⁾ max. length cable HB: Total 50 m

General Technical Data

Environment	Temperature range	5–60 °C
	Relative humidity	35–85 % RH (non-condensing)
Colour	Control panel (unit attachment)	RAL 7012 (basalt grey)
Protection class		IP 54
Standards		EN IEC 63000, EN 61010-1, EN 61326-1, EN ISO 13732-1
Certification/Approval		CE (compliance with relevant CE directives)
Temperature measurement	Resolution	0,1 °C
	Tolerance	±0,8 K
Flow rate measurement	Resolution	0,1 L/min
	Tolerance	±(5 % of measured value + 0,1 L/min)

Dimensions (Fig. 2)

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

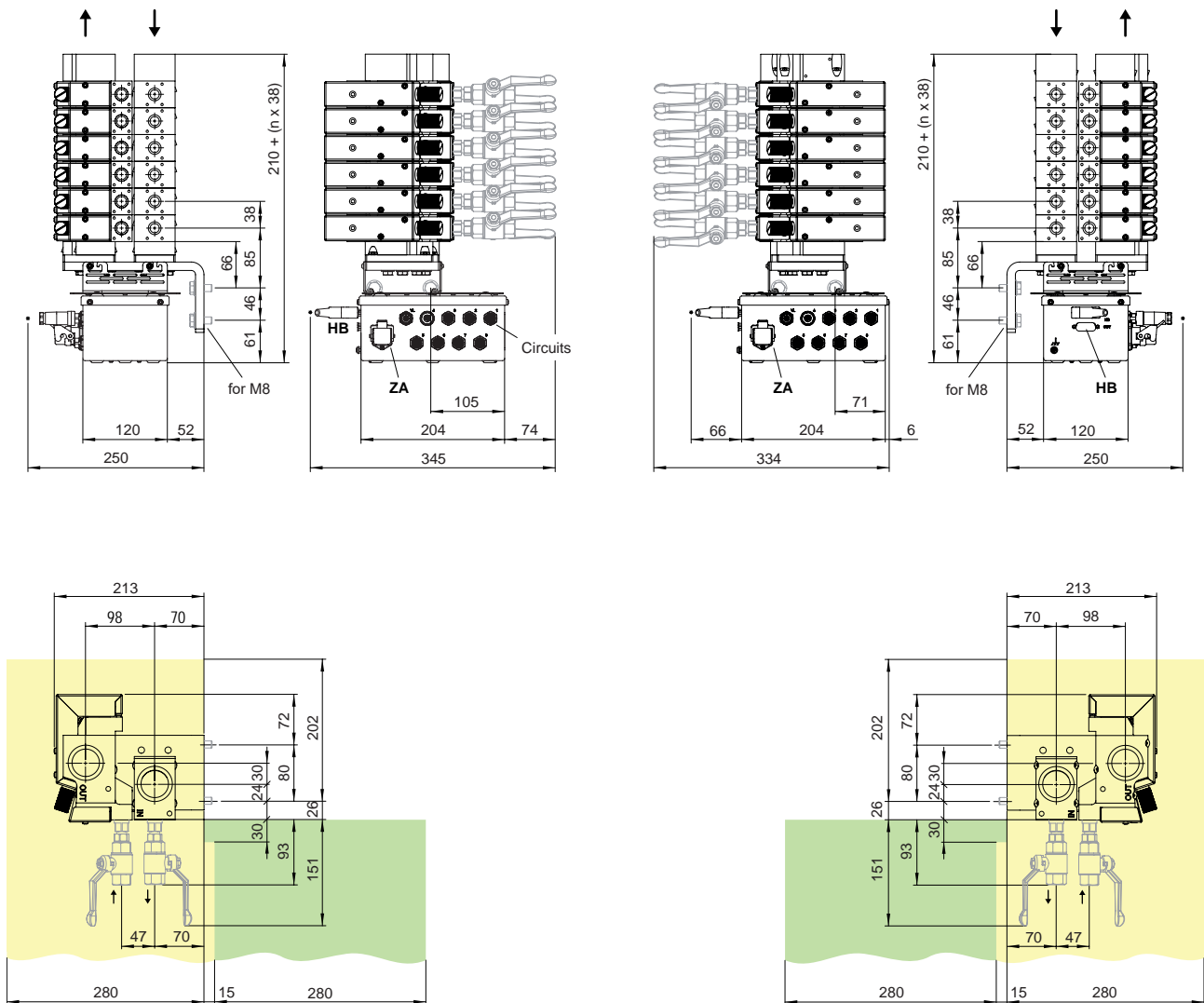


Dimensions (Fig. 3)

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

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

Scale 1:10



n Number of circuits

Required free space

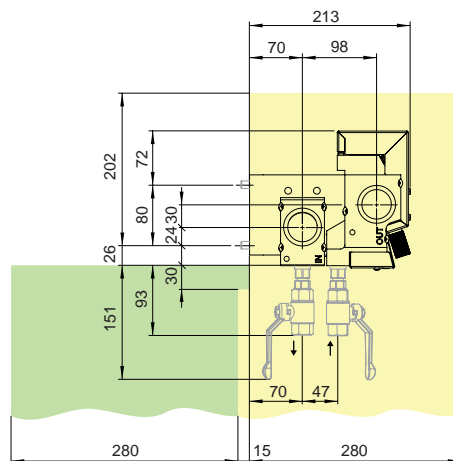
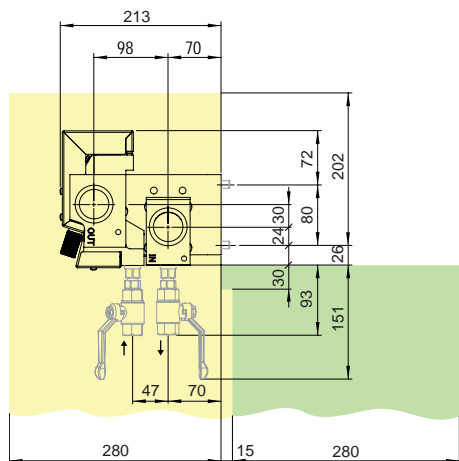
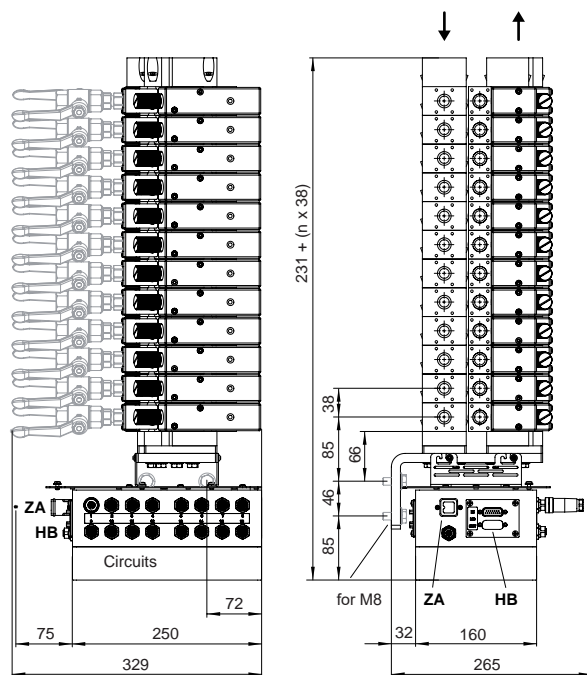
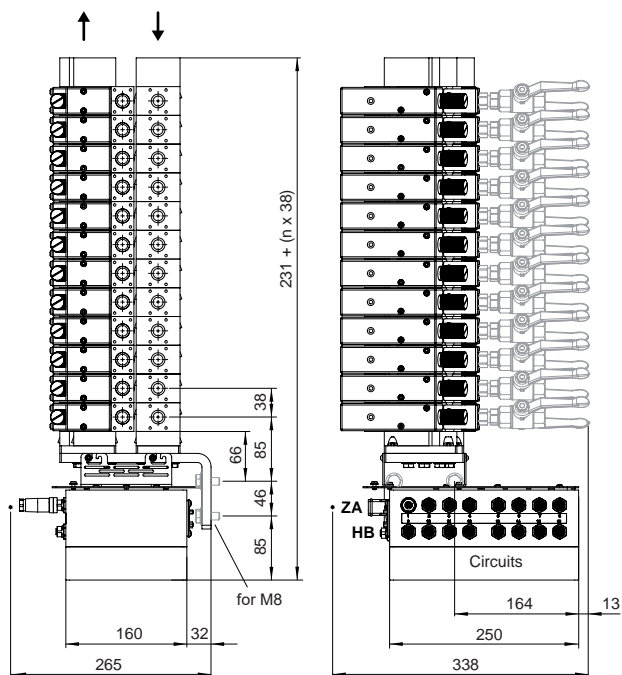
Additionally suggested free space

1) Mounting screws M8 included

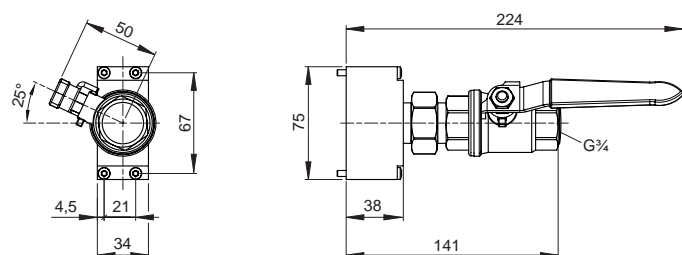
Note: 3D data available

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

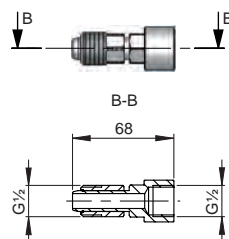
HB-FM160/180R (mounting right, 9–16 circuits)



Parallel connection of two circuits, scale 1:5

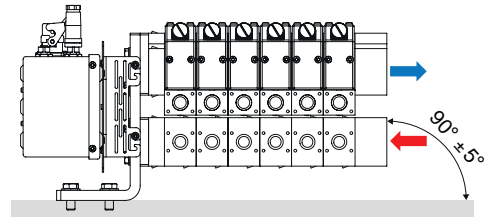
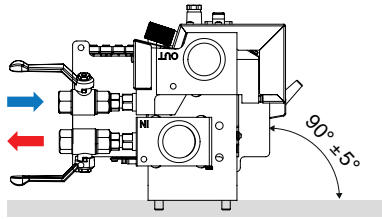


Adjustable screw joint set, scale 1:5

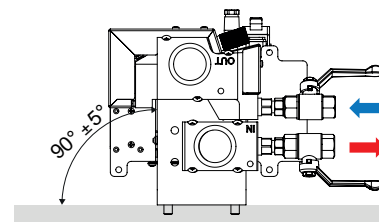
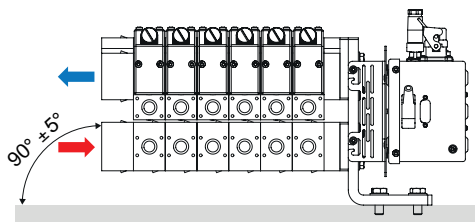


Mounting Position (Fig. 4)

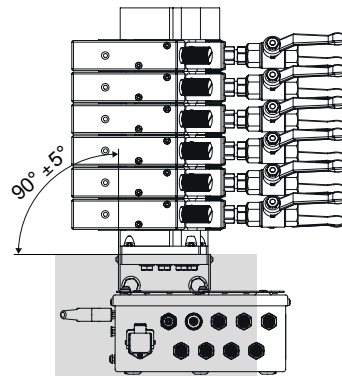
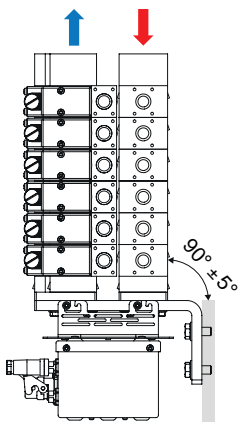
Horizontal (mounting left)



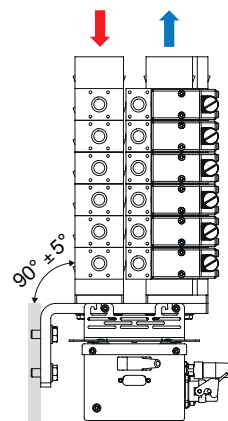
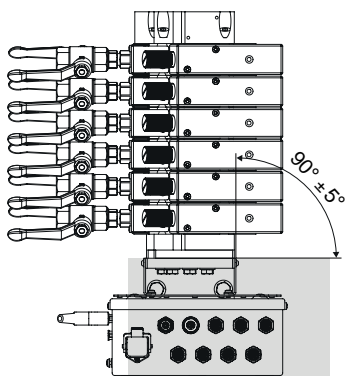
Horizontal (mounting right)



Vertical (mounting left)



Vertical (mounting right)

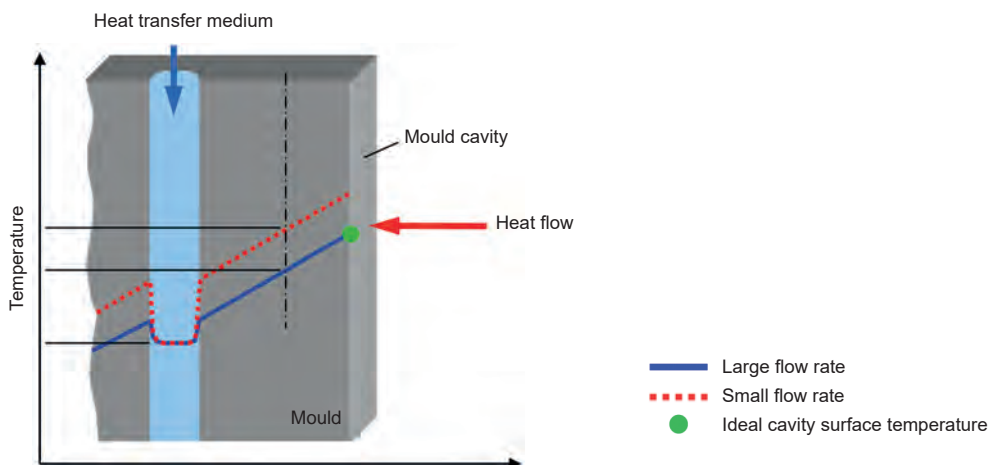


Flow rate measurement

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.

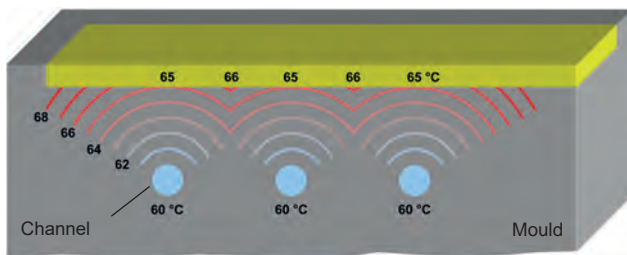
Influence of flow rate in the injection moulding process

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.

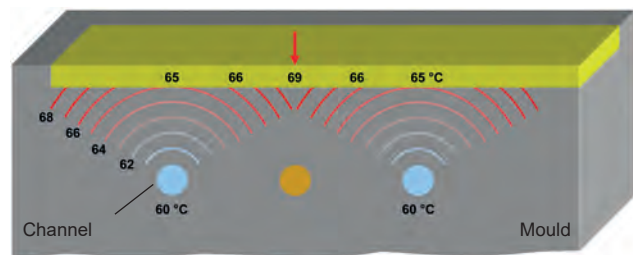


Temperature gradient in the mould for different flow rates

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

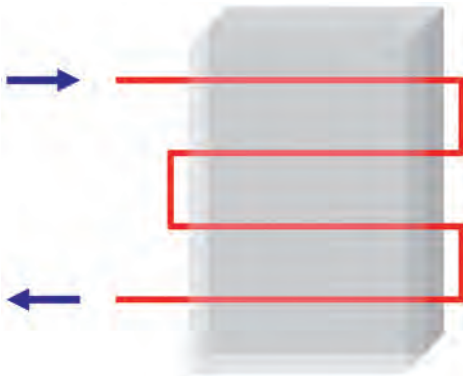


Temperature distribution when the middle channel is blocked

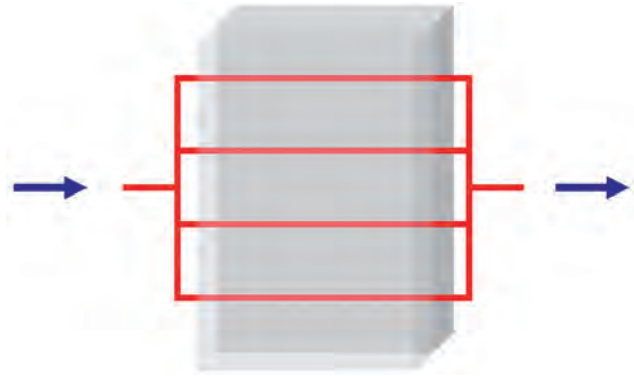
In certain cases, the temperature in the area of influence of a channel can be changed by adjusting the flow consciously. The reduction of the flow results in higher temperatures. With this technique the sensitivity of perturbation increases, what makes the monitoring of the flow of the channels essential.

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 AG
St. Gallen, Switzerland

HB-Therm Distributors in over 60 countries.

Algeria
Argentina
Australia
Austria
Belgium
Bolivia
Bosnia and Herzegovina
Brazil
Chile
China
Colombia
Costa Rica
Croatia
Czech Republic
Denmark
Ecuador

El Salvador
Estonia
Finland
France
Germany
Great Britain
Guatemala
Hong Kong
Hungary
India
Indonesia
Ireland
Israel
Italy
Japan
Korea

Latvia
Liechtenstein
Lithuania
Luxembourg
Malaysia
Mexico
Morocco
Netherlands
New Zealand
North Macedonia
Norway
Paraguay
Peru
Poland
Portugal
Romania

Serbia
Singapore
Slovakia
Slovenia
South Africa
Spain
Sweden
Switzerland
Taiwan
Thailand
Tunisia
Turkey
Uruguay
USA
Venezuela
Vietnam



Contact
details