

Belimo Sensors, Gas Monitoring Devices, and Meters





Gas monitoring devices the perfect complement to actuators, valves, sensors, and meters



Belimo is a global leader in developing, producing, and marketing damper actuators, control valves, sensors, meters, and gas monitors for heating, ventilation, and air-conditioning (HVAC) systems. Belimo offers superior reliability, easy installation, and seamless integration with major Building Automation Systems (BAS).



Seamless integration, reliability, and intuitive design

The Belimo range of products results from over four decades of experience, research, and focus on providing value-added technologies to customers throughout the HVAC industry. The unique designs offer easy installation and seamless integration, resulting in reduced costs and optimal system performance.



Seamless

Compatible with major building automation systems, making them suitable for use in any HVAC application.

Reliable

Built from the highest quality materials delivering accurate and dependable readings over the building's entire life cycle. Backed with a 5-year warranty and conform to UL and NEMA requirements.



Intuitive

The compact modular design allows easy installation and commissioning in just a few simple steps to ensure optimal system performance. "Our installers like the innovative design of Belimo's sensor range and have told us that using them reduces their installation time compared to competitive products."

Brian Dutt, President

Controls & Equipment, Moncton, New Brunswick, Canada

Innovation for peace of mind

Sensors from Belimo feature an innovative uniform enclosure, which allows for easy installation and reliability you can count on. The universal enclosure design streamlines the entire product range and complements our existing line of actuators and valves.



Unique snap-on cover

screwless housing design allows for quick installation, easy commissioning, and provides NEMA 4X / IP65 protection.



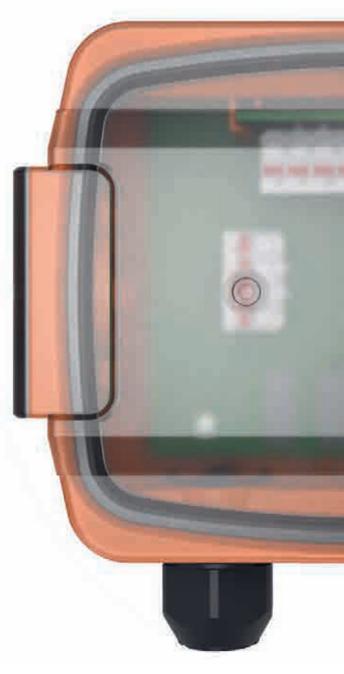
Detachable mounting plate designed to be used as a drill template for easy installation.



NEMA 4X / IP65 and UL compliance

enclosure tested to withstand harsh indoor and outdoor conditions, including exposure to dirt, dust, humidity, condensation, rain, and snow.











Universal design enclosure

increases compatibility and simplifies the selection process.



Modular conduit fitting enables various mounting and cable configurations to meet a variety of applications.



Spring loaded removable terminal block

creates a connection that offers resistance to vibration and maximum pull-out force, saving time during wiring and ensuring contact reliability.



Output protection

provides reverse-polarity protection, which minimizes the risk of damage caused by incorrect wiring.



BACnet and Modbus communication protocols available on selected models.

A comprehensive range of HVAC sensors, monitors, and meters

A complete range of sensors, monitors, and meters offers superior reliability and seamless integration with major Building Automation Systems (BAS). The unique uniform design is easy to install and maintain with various mounting accessories that expedite device setup, saving time, money, and manpower.

Temperature Sensors

Accurate and reliable temperature readings are essential for optimal building comfort and energy efficiency. Outdoor air, duct, and pipe temperature sensors are designed for easy installation and are compatible with all major BAS.



FEATURES

- Up to eight active measurement ranges simplifies field selection and reduces stock storage for maximum flexibility.
- Variety of output signals: passive NTC, RTD, 0...5/10 V and 4...20 mA
- Sintered moisture protection coating on all duct, immersion, and cable sensors protects against condensation, mechanical stress, and vibrations.

PRODUCT SERIES

Duct Single Point Averaging Cable Low Limit Detection Pipe Single Point Cable Strap-on Condensation Outdoor Single Point

Humidity Sensors

Controlling humidity in buildings is critical to occupant comfort and in protecting building infrastructure, production processes, stored goods, and museum artwork. Belimo's range of durable duct, outdoor air, and condensation sensors are manufactured using the highest quality materials to ensure superior reliability, accuracy, and repeatability. Combined temperature and humidity sensors provide a flexible and cost-effective solution.



FEATURES

- Complementary Metal Oxide Semiconductor (CMOS) based polymercapacitance sensor with an accuracy of ±2% relative humidity as standard and long-term drift <±0.25% not affected by high humidity and contaminants.
- Multi-sensor with selectable output measurement values: relative humidity, absolute humidity, enthalpy, and dew point.
- Up to four active temperature measurement ranges simplifies field selection and reduces stock storage, providing flexibility for change requests during commissioning.
- BACnet and Modbus communication protocols provide superior application data access and enable easy commissioning and configuration.

PRODUCT SERIES

Duct Outdoor Air

Air Quality Sensors

Air quality sensors provide occupant comfort and energy efficiency. We offer a wide range of combined multi-sensors for CO₂, humidity, temperature, and VOCs designed to ensure air quality and maximize energy savings over the life cycle of the building.

FEATURES

- Dual channel CO₂ sensor based on NDIR technology. The additional reference channel, allows effective compensation of long term drift, thus providing precise accuracy and long-term stability.
- Sensors are completely maintenance free.
- Integrated temperature, humidity, and VOC sensors are available for building applications that require sensors with multi-functional capabilities.
- Dual channel self-calibration technology allows the Belimo CO₂ sensors to be used for all types of buildings and applications where ABC logic can not be used.
- BACnet communication protocol provides superior application data access and enables easy commissioning and configuration.

PRODUCT SERIES

CO_2

 $\begin{array}{l} \text{CO}_2 + \text{Temperature} \\ \text{CO}_2 + \text{Humidity} + \text{Temperature} \\ \text{CO}_2 + \text{VOC} \\ \text{CO}_2 + \text{VOC} + \text{Temperature} \\ \text{CO}_2 + \text{VOC} + \text{CO}_2/\text{VOC} + \text{Temperature} \end{array}$



Pressure Sensors

Accurate pressure measurement is important for optimal HVAC system performance. Pressure sensors from Belimo are capable of measuring extremely high and low pressures in air and water applications. The sensors offer precise measurement of pressure, differential pressure, and velocity for reliable monitoring. Selectable measuring ranges are available for application flexibility.



FEATURES DIFFERENTIAL AIR PRESSURE SENSOR

- Eight field selectable pressure ranges in one unit.
- Excellent zero-point stability and high accuracy.
- Auto-zero or manual calibration option.
- LCD display optional.
- Modbus communication protocol provides superior application data access and enables easy commissioning and configuration.

DIFFERENTIAL AIR PRESSURE SWITCH

- Field-adjustable switch point.
- Mechanical working life 10⁶+ switching operations.

DIFFERENTIAL WATER PRESSURE SENSOR

- Highly stable resistive sensor element on ceramic substrate.
- Rugged stainless steel housing.

WATER PRESSURE SENSOR

- Resistive sensor element on stainless steel membrane.
- All wetted material is made from stainless steel.

PRODUCT SERIES

Differential Air Pressure Sensor Differential Air Pressure Switch Differential Water Pressure Sensor Water Pressure Sensor

Room Sensors

Belimo room sensors measure temperature, humidity, and CO₂ in a surface mounted streamline design offering high accuracy and fast response. The sensors are maintenance-free and provide long-term reliability for a comfortable room environment. Integrated with Near Field Communication (NFC), Belimo's room sensors allow easy data access, field adjustable, commissioning, and troubleshooting with the use of the Belimo Assistant App and a smartphone.



FEATURES

- Near Field Communication (NFC) allows fast programming, commissioning, and troubleshooting.
- Tool-less housing design allows for quick installation and easy commissioning.
- Spring-loaded removable terminal block saves wiring time and ensures reliable contact.
- Low wall coupling factor provides accurate room temperature measurement that is not affected by wall temperature.
- A discrete manual push button is standard on all passive sensors.
- PC-board cover plate provides additional protection from mechanical damage, dust, and vibration.
- MP-Bus integration offering enhanced communication on select models providing more efficient building management savings on installation, cables, and terminal connections.

PRODUCT SERIES

Temperature Temperature with Setpoint Temperature + Relative Humidity Temperature + Relative Humidity + CO₂

Gas Monitoring Devices

Commercial grade gas monitoring devices are factory calibrated and can measure up to two different gases simultaneously. All monitors offer CAN bus communication allowing daisy-chain installation of up to 32 devices. These monitors can easily be assigned to sites for ventilation zoning on the same network, significantly reducing control wiring and installation. Enhanced communication enables expanded system integration and BMS control with the addition of BACnet MS/TP on select models.



FEATURES

- Universal robust enclosure features an electronic display with an audible and visual alarm.
- Easily configured operation with adjustable alarm relays, indicators, and strobes allow for on-demand ventilation and relay activation.
- Reduce cabling with a daisy-chain network of up to 32 devices.
- Backlit LCD allows for easy access, configuration, calibration, and live gas concentration.
- Simplified field calibration procedure using calibrated gas bottle mixtures or replacing used sensor modules with factory calibrated plug-and-play sensor modules.
- Stand-alone operation and seamless integration into the BMS with BACnet MS/TP and CAN bus networks.
- UL-2075/ULC-588 listed (only on single element CO monitors), UL-61010 listed (all 6000-A & B models)

PRODUCT SERIES

Carbon Monoxide Nitrogen Dioxide Carbon Monoxide + Nitrogen Dioxide Carbon Dioxide Relative Humidity

Flow Meters

Reliable measurement of flow plays an important role in maximizing HVAC system efficiency and conserving energy. Belimo's inline flow meters utilize ultrasonic transit-time technology to provide accurate and repeatable flow measurement in any application. Their compact size and robust design makes them suitable for use with chilled water, hot water, and water/glycol solutions at temperatures ranging from -4...+250°F [-20...+120°C]. The sensors are fabricated from corrosion-resistant materials, ensuring reliable operation and extended product life.

FEATURES

- Multi-point wet calibrated to ensure accuracy and repeatability.
- Patented glycol compensation logic eliminates manual calibration.
- ±2% accuracy of reading and ±0.5% repeatability ensure accurate and precise flow measurement.
- Ultra-compact size with a short inlet length of 5 x nominal pipe diameter and no output-length requirements allow the ultrasonic flow sensor to be installed in tight spaces.
- Low power consumption of 0.5 W saves energy and transformer capacity.

PRODUCT SERIES

Ultrasonic Flow (Volumetric Flow)

Thermal Energy Meters

Accurate measurement for heating and cooling allows building operators to adopt a cost recovery strategy through tenant billing. Designed to EN1434/MID and equipped for IoT-based billing, Belimo's thermal energy meters provide the proper flow and energy measurement. The patented glycol compensation algorithm automatically selects the glycol concentration, ensuring reliable performance and eliminating manual input and inaccuracies. Thermal energy meters are designed for chillers, boilers, commercial/multi-tenant energy metering, and monitoring applications such as commercial units, condominiums, apartments, or central plant systems.



FEATURES

- Multi-point wet calibrated to ensures accuracy and repeatability.
- ±2% accuracy of reading and ±0.5% repeatability for accurate and precise measurement.
- IoT capability allows for remote meter reading and data utilized for billing.
- Power over Ethernet (PoE) utilized for both data and power simplifies installation, reducing the need for additional transformers and wiring.
- Utilize ultrasonic technology with patented automatic glycol compensation algorithm to provide accurate and repeatable flow measurements of water and water/glycol mixtures without drift.
- Thermal heat transfer energy data is transparent allows users to view and document system performance during commissioning and over time.
- Field configuration via the Belimo Assistant App and a smartphone for easy field adjustments.
- Seamless system integration analog feedback and Modbus RTU and Modbus TCP BACnet MSTP and BACnet IP.

PRODUCT SERIES

Thermal Energy Meters (Volumetric Flow and Energy Consumptions)

A seamless approach

The sensor and meter offering stems from the release of the Belimo Energy Valve[™], an innovative solution that features a unique combination of a valve, IoT actuator, sensors and an ultrasonic thermal energy meter.

Belimo Energy Valve[™]

The Belimo Energy Valve is an Internet of Things (IoT) cloud device utilizing advanced analytic technology leveraging captured system data to improve coil and system performance while achieving increased energy savings. Connecting to the Belimo Cloud offers lifetime data storage, setpoint recommendations, and performance reporting, along with an additional two years of warranty. Local data storage and trending capability coupled with BACnet, Modbus, and analog communication provides the ability to monitor energy usage and develop energy savings strategies through the BAS. Belimo Energy Valves are available in sizes ½ to 6 inches.

FEATURES

- The thermal energy data is accurately measured, logged, and identifies areas for optimization when detected.
- Patented Power Control and Delta T Manager logic optimizes the available energy of the coil by maintaining Delta T.
- Glycol monitoring ensures concentration meets design needs while reducing additional pumping, providing optimized heat exchange, and promoting safe operation.
- Dynamic coil performance illustrates the real time operation of the coil while accurately providing transparency of power degradation and other operational issues.
- Simplified commissioning with flow measurement and verification.



Belimo sensors, gas monitoring devices, and meters at a glance

Temperature

Application		Type code	Outp	ut sigi	nal	Measurement range Factory settings		Probe length	Application/comment
			Passive	Active	Switch		Multirange (selectable)		
	Outdoor air	01UT	•			-30+122°F [-35+50°C]			– Outdoor temperature – Wall temperature with
		22UT		•		-30+130°F [-50+50°C]	8		NEMA 4X / IP65 protection
-	Duct immersion	01DT	T			Sensor dependent		2" [50 mm], 4" [100 mm], 6" [150 mm], 8" [200 mm], 12" [300 mm], 18" [450 mm]	 Duct temperature Immersion sensor and thermowell pockets in brass or stainless steel
		22DT		•		0150°F [0160°C]	8	2" [50 mm], 4" [100 mm], 6" [150 mm], 8" [200 mm], 12" [300 mm], 18" [450 mm]	-
	Duct averaging	01MT	•			Sensor dependent		10 ft [3 m], 20 ft [6 m]	Duct averaging temperature sensor for air-handling units or larger ducts with air
U -		22MT				4090°F [-20+80°C]	8	10 ft [3 m], 20 ft [6 m]	stratification
	Strap-on	01ST	•			-30+212°F [-35+100°C]			Pipe strap-on temperature sensors for heating systems, 01ST without housing
		01HT	•			-30+194°F [-35+90°C]			and 01HT, 22HT with housing
		22HT		•		40240°F [0100°C]	8		
\bigcirc	Cable	01CT	•			-30+212°F [-35+100°C]		2" [50 mm]	Cable temperature sensor passive (without housing) and active (with
\bigcup		22CT		•		0150°F [0160°C]*	8	2" [50 mm]	housing)
0:	Low temperature detection	01DTS				1454°F [-10+12°C]		10 ft [3 m], 20 ft [6 m]	Low temperature detection for frost protection in air-handling units available with automatic or manual reset

Humidity

Application	Application		Output signal				Measured values	Measurement range			Application/comment
			Active	Modbus RTU	BACnet MS/TP	Switch		Humidity	Temperature (factory settings)	Multirange (selectable)	
	Outdoor	22UTH	•	•	•		Humidity, Temperature, Enthalpy, Dew Point, Absolute Humidity	0100% rH non- condensing	0200°F [-20+80°C]	4	 Outdoor humidity temperature sensor Wall humidity temperature sensor with NEMA 4X / IP65 protection Option: weather/rain shield protection
-	Duct	22DTH	•	•	•		Humidity, Temperature, Enthalpy, Dew Point, Absolute Humidity	0100% rH non- condensing	0200°F [-20+80°C]	4	Duct humidity temperature sensor
	Condensation	22HH		·		•	Condensation				Condensation sensor Optional: external sensor

Air Quality

Application		Type code	Outp	ut sigr	nal	Measured values	Measurement ra	inge	Options	Application/ comment	
			Active	Modbus RTU	BACnet MS/TP		co	Temperature	Humidity	Display	
	Duct	22DC				CO2	02000 ppm				Duct CO ₂
		22DTC	•			CO ₂ , Temperature	05000 ppm	32122°F [050°C]			Duct CO ₂ , Temp
		22DTM	•	•		CO ₂ , Temperature, Humidity	02000 ppm	32122°F [050°C]	0100% Non condensing		Duct CO ₂ , rH, Temp
		22DCV				CO ₂ , VOC	02000 ppm				Duct CO ₂ , VOC
		22DCM	•			CO ₂ , Temperature, VOC	02000 ppm	32122°F [050°C]	-		Duct CO ₂ , VOC, Temp
		22DCK	•			CO ₂ , Temperature, VOC, CO ₂ /VOC mix	02000 ppm	32122°F [050°C]			Duct CO ₂ , VOC, CO ₂ /VOC, Temp

Pressure

Application		Type code	Outpu	Output signal		Measured values	Media	Measurement range (22ADP factory default settings	shown)	Options		Application/ comment	
		Active Modbus RTU		Switch			Pressure	Multirange (selectable)	Auto-zero	Display			
	Duct	22ADP	•	•		Differential Pressure	Air	01"wc [250 Pa] 010"wc [2500 Pa] 028"wc [7000 Pa]	8	•	•	Differential air pressure sensor	
	Switch	01APS			•	Differential Pressure	Air	0.081.20"wc [20300 Pa] 0.202.00"wc [50500 Pa] 0.804.00"wc [2001000 Pa] 2.0010.00"wc [5002500 Pa]				Duct differential air pressure switch	
P P	Pipe	22WP	•			Pressure	Air, Water	015 psi 050 psi 0100 psi 0200 psi				Pipe water and pressure sensor	
ų inte		22WDP	•			Differential Pressure	Water	015 psi 050 psi 0100 psi				Pipe water differential pressure sensor	

All sensors feature:

Active: 0...5/10 V, 4...20 mA Passive: PT100, PT1000, Ni1000, 10K2, 10K3, NTC20K Supply voltage: DC 15...24 V, AC 24 V UL: cULus listing Protection: NEMA 4X / IP65 (except for 01DTS, 01APS, 22WP, 22WDP; 01APS is ETL listed)

* For active temperature sensors with several measurement ranges, the default range is noted. For additional and allowable operating temperature ranges refer to the data sheet.

For pressure sensors with several measurement ranges, the maximum range is noted, refer to the data sheet for additional ranges.

Room

Application	Type code	Output signal	Manual Override	Measured values	Measureme	nt range				Additional information
		Active	2 7 7		Temperature	Humidity	CO ₂	NFC	No Belimo Logo	
Room	01RT-5B-0			Temperature	32122°F					PT1000 Output & Manua
	01RT-5B00L-0			-	[050°C]					Override
	01RT-5L-0									NTC10k2 Output & Manu Override
	01RT-5L00L-0			-						Overnue
	01RT-5M-0		•	_						NTC10k3 Output & Manu Override
-	01RT-5M00L-0		I II	_						Overnue
	01RT-5Q-0		• •	_						NTC20k Output & Manua Override
	01RT-5Q00L-0								•	Overnue
	P-01RT-5B-0			Temperature						Manual Override
20220	P-01RT-5B00L-0			 with Setpoint 			·			
1	P-01RT-5L-0		• •	-						
-	P-01RT-5L00L-0			-						
	P-01RT-5M-0			-						
1	P-01RT-5M00L-0			-						
	P-01RT-5Q-0			-						
	P-01RT-5Q00L-0			-						
	22RT-59-1			Temperature						Adjustable Temperature
	22RT-5900L-1			-						Range via NFC
	22RTH-59-1			Temperature,		0100%				
- 1	22RTH-5900L-1			 Relative Humidity 		0100%				
	22RTM-59-1	•		CO ₂ , Temperature,		0100%	02000 ppm	•		Adjustable Temperature and CO ₂ Range via NFC
1	22RTM-5900L-1	•		Relative Humidity		0100%	02000 ppm			Adjustable Temperature and CO ₂ Range via NFC
ALC: N	EXT-RT-SS1000		I	Temperature						PT1000 Output & Manua Override
-	EXT-RT-SS10K2		•	-						NTC10k2 Output & Manu Override
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	EXT-RT-SS10K3	•	I	-						NTC10k3 Output & Manu Override
	EXT-RT-SS20K	•	I							NTC20k Output & Manua Override
1. 196	EXT-TN-1066869	•		Light						Light Harvesting and Occupancy Detection
and the second second	EXT-TN-1071511									

Application	Type code Output signal Measuring range Vehicle EXT-OP-6002-250-A •		Commur	lication							
			Active	1 SPDT relay	2 SPDT relay	analog 420 mA 10 V	Carbon Monoxide	Nitrogen Dioxide		CAN bus	BACnet MS/TP
	Vabiala		_	_		_	_		0.050 mm	_	_
-				-		-			0250 ppm	-	-
									_		·
60 60		EXT-OP-6002-250-C					•				
		EXT-OP-6014-A							010 ppm	-	
		EXT-0P-6014-B									
		EXT-OP-6014-C				_					·
		EXT-6002-250-14-A							0250 CO,		
		EXT-6002-250-14-B							— 010 NO ₂		
		EXT-6002-250-14-C							_		

Gas Monitoring Devices - Vehicle Emissions

Additional accessories are available, i.e. communication module, replacement sensors, calibration bottles, and more.

20

Gas Monitoring Devices - Indoor Air Quality

Application		Type code	Outpu	t signal			Measuring rang	je		Commu	unication
			Active	1 SPDT relay	2 SPDT relay	2 analog 420 mA or 210 V	Carbon Dioxide	Relative Humidity	Measuring range	CAN bus	BACnet MS/TP
0	Indoor	EXT-OP-6015-2000-A							02000 ppm		
	Air Quality	EXT-OP-6015-2000-B						·			
	Quanty	EXT-OP-6015-5000-A							05000 ppm		
		EXT-OP-6015-5000-B				_					
0		EXT-OP-6015-10000C				_			010000 ppm		
		EXT-OP-6015-10000B				_					
		EXT-OP-6025-B							0100%		

Additional accessories are available, i.e. communication module, replacement sensors, calibration bottles, and more.

Flow Meters

Application		Type code	Output signal	Measured values	Media	Pipe size	Body press	ure rating		Measurement range
			Analog (0 to 10 VDC)	Flow	Water/glycol (<60%)	Inches [mm]	360 psi	ANSI 125	ANSI 250	Max. GPM
	Pipe	FM050		-		1⁄2" [15]				6.6
		FM075				3⁄4" [20]				12.4
		FM100				1" [25]				21.8
		FM125				1¼" [32]				34.2
		FM150				1½" [40]				47.5
		FM200				2" [50]				91.2
		FM250				2½" [65]				152
		FM250-250				2½" [65]				152
		FM300				3" [80]				215
A		FM300-250	•			3" [80]				215
No.	() () () () () () () () () ()	FM400	•			4" [100]				380
		FM400-250	•		•	4" [100]				380
80. E		FM500	•			5" [125]				594
		FM500-250				5" [125]				594
		FM600				6" [150]				855
		FM600-250				6" [150]				855

NOTE: Vnom accounts for 20% overflow (120% flow is the max output reading at 10V).

Thermal Energy Meters

Application	Type code	Output signal	Measured values	Media	Pipe size	Body pressure rating	Features		Measurement range
		Analog (05 V) (010 V) (210 V)	Flow & Thermal Energy	Water/glycol (<60%)	Inches [mm]	360 psi	Alarm	Display	Max. GPM
Pipe	22PE-5UC	-	-		1⁄2" [15]				6.6
	22PE-5UD				3⁄4" [20]				11.0
The second	22PE-5UE				1" [25]				15.4
1220	22PE-5UF	-			1¼" [32]				26.4
3	22PE-5UG				1½" [40]				44.0
	22PE-5UH				2" [50]				66.0
	22PE-5UHH				2" [50]				100
	22PEM-5UC				1⁄2" [15]				6.6
	22PEM-5UD				3⁄4" [20]				11
The second	22PEM-5UE				1" [25]		•		15.4
	22PEM-5UF				1¼" [32]			•	26.4
Certification EN1434	22PEM-5UG				1½" [40]				44
Approval 2014/32/EU (MID)	22PEM-5UH				2" [50]				66.0

Exceptional service

At Belimo, we continually invest in new technologies that increase customer value by improving occupant comfort, energy efficiency, simplified installation, and maintenance-free operation. Our sales team is available to consult and provide insight and advice on how to achieve the best solution to help increase your system performance. Belimo will continue to focus on providing you with exceptional product availability, fast delivery times, and world-class customer service and technical support. We remain dedicated to continuously improve our standards and are committed to providing you the highest value possible.

Whatever your HVAC application, our global network of support experts are on hand and ready to assist.











Complete product range

USA, Latin America, and the Caribbean: www.belimo.us Canada: www.belimo.ca, Brazil: www.belimo.com.br Belimo Worldwide: www.belimo.com