Sensor Portfolio

Technical Databook

Version 1

Belimo Asia Pacific

Delta Style Room Enclosure

Trade selection by Belimo
Temperature Sensors

Features and Options

- Low profile Delta enclosure
- Optional setpoint and occupant override
- Limited lifetime warranty

Setpoint and Legend
The optional slide pot is a linear slide pot adjustment with a resistive output of 0 to 1K Ohms. The setpoint legend is 5...30ºC.

Override
The optional occupant override is a discreet momentary signal that is configured in parallel with the setpoint output.

Delta style enclosure with setpoint and occupant override

Ordering Information

BE1KR: Room Sensor, 1kΩ Platinum RTD Sensor
BE1KR40L1P: Room Sensor with occupant override and setpoint, 1kΩ Platinum RTD Sensor
BE10K2R: Room Sensor, 10K-2 Thermistor Sensor
BE10K2R40L1P: Room Sensor with occupant override and setpoint, 10K-2 Thermistor Sensor
BE10K3R: Room Sensor, 10K-3[11K] Thermistor Sensor
BE10K3R40L1P: Room Sensor with occupant override and setpoint, 10K-3[11K] Thermistor Sensor
BE20KR: Room Sensor, 20K Thermistor Sensor

Delta style enclosure

Specifications

10K-2 Thermistor sensor specifications
Resistance: 10kΩ @ 25ºC, -55...150ºC range
Standard accuracy: 0.2ºC (±0.36°F) at 0...70ºC
Dissipation constant: 2.7mW/ºC
Stability (drift): Less than ±0.1ºC (0.18ºF) drift over 10 years.

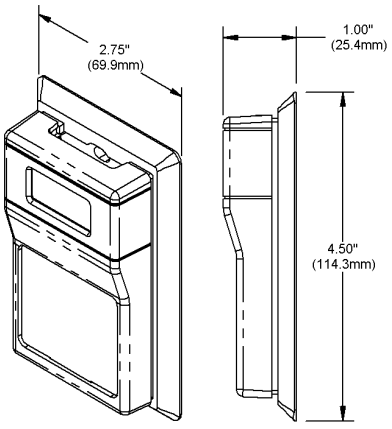
10K-3[11K] Thermistor sensor specifications
Resistance: 5238Ω @ 25ºC, -55...150ºC range
Standard accuracy: 0.2ºC (±0.36°F) at 0...70ºC
Dissipation constant: 2.7mW/ºC
Stability (drift): Less than ±0.1ºC (0.18ºF) drift over 10 years.

20K Thermistor sensor specifications
Resistance: 20kΩ @ 25ºC, -55...50ºC range
Standard accuracy: 0.2ºC (±0.36°F) at 0...70ºC
Dissipation constant: 2.7mW/ºC
Stability (drift): Less than ±0.1ºC (0.18ºF) drift over 10 years.

1K RTD sensor specifications
Resistance: 1kΩ @ 0ºC, -60...150ºC
Tolerance of resistance (accuracy): Standard 0.12% at 0ºC
Tolerance in °C: ±(0.3 + 0.005T); T=Temp in ºC
Self heating (1K RTD only): 0.4ºC/mW at 0ºC
Stability (drift): 0.14ºC with 6,000 continuous hours at 40ºC
Standardisation: DIN 43760-1980, IEC Pub 751-1983, JIS C1604-1989

Environmental operation range:
Temperature: 0...50ºC (32...122ºF)
Humidity: 0...95%RH, non-condensing

Enclosure material: ABS Plastic
Enclosure material rating: UL94, V-0



Delta style enclosure

Features and Options

- Stat 2 style enclosure
- LCD display on the B-Stat 2 style unit
- 4...20mA output 0...50ºC range
- Two year warranty

The T1K Transmitter Room Unit comes in a Delta style or the new BAPI-Stat 2 style enclosure which is similar in size to the Delta style but with a larger LCD display. The units have a 4...20mA output with a 0...50ºC range to match the input of the Belimo controllers.

Stat 2 style room unit

Delta style room unit

Ordering Information

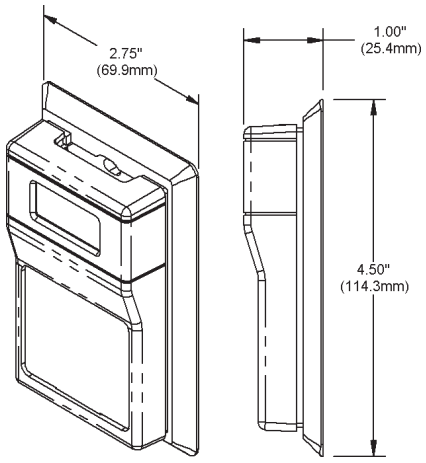
BET1K050CR
T1K Transmitter, 4...20mA output, 0...50ºC range, Delta style unit

BET1K050CBD
T1K Transmitter, 4...20mA output, 0...50ºC range, LCD display, Stat 2 style unit

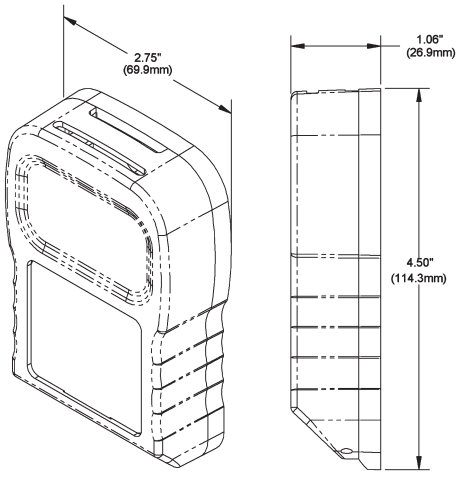
Specifications

Environmental operation range:
Temperature: 0...50ºC (32...122ºF)
Humidity: 0...95%RH, non-condensing
Enclosure material: ABS Plastic
Enclosure material rating: UL 94, V-0

T1K Transmitter specifications
Sensor: 1000Ω Platinum RTD
Supply voltage: DC 7...40V
Maximum loop resistance: 850Ω at DC 24V
Span:
Min. 16.6ºC (30ºF)
Max. 555ºC (1000ºF)
Low temperature:
Min. -90ºC (-130ºF)
Max. 482ºC (900ºF)
Accuracy: ±0.065% of span (8 and16mA outputs)
Linearity: ±0.125% of span
Operational humidity:
0...95%RH, non-condensing
0...100%RH, condensing for short intervals
Output current limits: Less than 1mA and 22.35 ±0.15mA
Power output shift: ±0.009% of span DC 7...40V
Connections: Four 22-gauge etched teflon leads or terminal blocks
Operating temperature:
Transmitter: -20...70ºC
Sensor: -65...105ºC (standard)
-200...600ºC (available)



Delta style enclosure



Stat 2 style enclosure

Delta Style Room Units

Trade selection by Belimo
Temperature and Humidity Sensors

Features and Options

- Low profile Delta style enclosure
- Optional LCD with adjustable toggle rate between temperature and humidity
- ±3%RH accuracy humidity transmitter
- Two year warranty

The Delta style room combo units feature an optional LCD display with a user adjustable toggle rate between humidity and temperature. They are available with a 10K-2 Thermistor, 20K Thermistor or a T10K Transmitter. They have a 3%RH accuracy with a 0...10V output or a 4...20mA output on the transmitter unit. These units save time and money by allowing field replacement of humidity elements without recalibration.

Delta style room units with and without display

Ordering Information

BE10K2H31R: Temp./Humidity Delta style unit, 10K-2 Thermistor, 0...10V humidity output, ±3%RH accuracy
BE10K2H30R: Temp./Humidity Delta style unit, 10K-2 Thermistor, 4...20mA humidity output, ±3%RH accuracy
BE10K2H31RD: Temp./Humidity Delta style unit, 10K-2 Thermistor, 0...10V humidity output, ±3%RH accuracy, LCD display
BE10K2H30RD: Temp./Humidity Delta style unit, 10K-2 Thermistor, 4...20V humidity output, ±3%RH accuracy, LCD display
BE20KH31R: Temp./Humidity Delta style unit, 20K Thermistor, 0...10V humidity output, ±3%RH accuracy
BET10K050CH32R: Temp./Humidity Delta style unit, T10K Transmitter, 0...50°C range, 4...20mA humidity output, ±3%RH accuracy

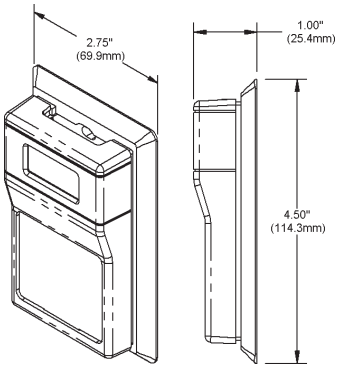
Specifications

10K-2 Thermistor sensor specifications
Resistance: 10kΩ @ 25ºC, -55...150ºC range
Standard accuracy: 0.2ºC (±0.36ºF) at 0...70ºC
Dissipation constant: 2.7mW/ºC
Stability (drift): Less than ±0.1ºC (0.18ºF) drift over 10 years.

20K Thermistor sensor specifications
Resistance: 20kΩ @ 25ºC, -55...150ºC range
Standard accuracy: 0.2ºC (±0.36ºF) at 0...70ºC
Dissipation constant: 2.7mW/°C
Stability (drift): Less than ±0.1°C (0.18°F) drift over 10 years.

T10K Transmitter
Sensor: 10kΩ Thermistor
Supply voltage: DC 8...35V
Maximum loop resistance: 800Ω at DC 24V
Sensed temperature limits: -45...65ºC (-49...149ºF)
Accuracy: ±1.015ºC (0...65ºC)
Linearity: ±0.065ºC (0...65ºC)
Temperature resolution: Span/1024
Operating temperature:
Transmitter: 0...70ºC
Sensor: -65...105ºC (standard)
-40...155ºC (available)
Environmental operation range:
Temperature: 0...50ºC (32...122ºF)
Humidity: 0...95%RH, non-condensing
Enclosure material: ABS plastic
Enclosure material rating: UL94, V-0

Humidity sensor specifications
Output ranges: 4...20mA or 0...10V
Power:
DC 10...5V for 4...20mA output
DC 15...35V for 0...10V output
AC 12...24V for 4...20mA output
AC 15...24V for 0...10V output
Power Consumption:
22mA max. DC (for 4...20mA output)
6mA max. DC (for 0...10V output)
0.53VA max. AC (for 4...20mA output)
0.14VA max. AC (for 0...10V output)
Sensing element: Impedance type humidity sensor
Operating RH range: 0...100%RH (non-condensing)
Operating temperature range:
Room: 0...70ºC (32...158ºF)
Duct and Outside: -23...71ºC (-10...160ºF)
Accuracy range: from 15...95%RH at 25ºC
Response time: 20 seconds for a 63% step
Drift: <2%RH over 5 years



enclosure Delta style

Features and Options

- Mounting tabs for easy installation
- Probe lengths: 4” (100mm), 8” (200mm) and 12” (300mm)
- Series 304 stainless steel probes
- Etched teflon lead wires and double encapsulated sensors
- Medical-Grade foam padding
- Optional B-Box and EU-Box enclosure

J-Box

B-Box

Duct units feature medical-grade closed cell foam to seal the probe insertion hole and to absorb vibration. Mounting tabs allow an easy installation directly to the wall of the duct. All duct units have etched teflon lead wires and double encapsulated sensors to create a watertight package that can perform under real world conditions.
Duct units are available with a 1kΩ Platinum RTD sensor or a 10K-2 Thermistor sensor. They have probe lengths from 4” to 12”. They come with a steel J-Box or a B-Box enclosure, made of UV-resistant polycarbonate with an IP66 rating.

Ordering Information

BE1KD4: 4” Probe, 1kΩ Platinum RTD Sensor, J-Box
BE1KD8: 8” Probe, 1kΩ Platinum RTD Sensor, J-Box
BE1KD12: 12” Probe, 1kΩ Platinum RTD Sensor, J-Box
BE1KD8B: 8” Probe, 1kΩ Platinum RTD Sensor, B-Box
BE10K2D4EU: 4” Probe, 10K-2 Thermistor Sensor, EU-Box
BE10K2D12EU: 12” Probe, 10K-2 Thermistor Sensor, EU-Box
BE10K2D4NB10: 4” Probe, 10K-2 Thermistor Sensor, no box, 10” length lead wires

BE10K2D4: 4” Probe, 10K-2 Thermistor Sensor, J-Box
BE10K2D8: 8” Probe, 10K-2 Thermistor Sensor, J-Box
BE10K2D12: 12” Probe, 10K-2 Thermistor Sensor, J-Box
BE10K2D8B: 8” Probe, 10K-2 Thermistor Sensor, B-Box
BE10K2D8EU: 8” Probe, 10K-2 Thermistor Sensor, EU-Box
BE10K3D8EU: 8” Probe, 10K-3[11K] Thermistor Sensor, EU-Box
BE10K2D8NB10: 8” Probe, 10K-2 Thermistor Sensor, no box, 10” length lead wires

Specifications

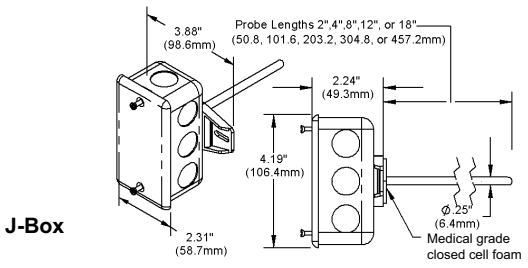
CE

10K-2 Thermistor sensor specifications
Resistance: 10kΩ @ 25ºC, -55...150ºC range
Standard accuracy: 0.2ºC (±0.36ºF) at 0...70ºC
Dissipation constant: 2.7mW/ºC
Stability (drift): Less than ±0.1ºC (0.18ºF) drift over 10 years.

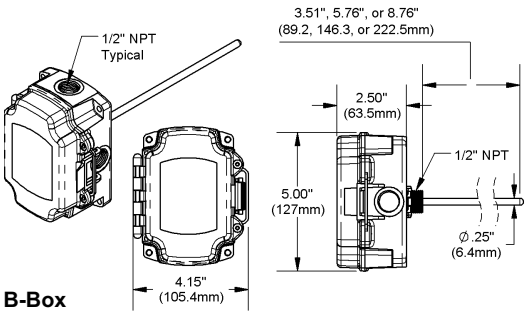
10K-3[11K] Thermistor sensor specifications
Resistance: 5238Ω @ 25ºC, -55...150ºC range
Standard accuracy: 0.2ºC (±0.36ºF) at 0...70ºC
Dissipation constant: 2.7mW/ºC
Stability (drift): Less than ±0.1ºC (0.18ºF) drift over 10 years.

1K RTD sensor specifications
Resistance: 1kΩ @ 0ºC, -60...150ºC
Tolerance of resistance (accuracy): Standard 0.12% at 0ºC
Tolerance in ºC: ±(0.3 + 0.005T); T=Temp in ºC
Self heating (1K RTD only): 0.4ºC/mW at 0ºC
Stability (drift):
0.14ºC with 6,000 continuous hours at 400ºC
Standardisation:
DIN 43760-1980, IEC Pub 751-1983, JIS C1604-1989

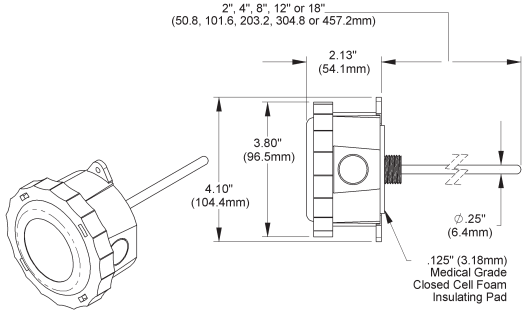
Environmental operation range:
Temperature: -40...100ºC
Humidity: 0...100%RH, non-condensing
Enclosure material and material rating:
B-Box Model: Polycarbonate, UL94, V-0, IP66
EU-Box Model: ABS, UL94, V-0
J-Box Model: Galv. Steel



J-Box



B-Box



EU-Box

Duct Combination Units

Trade selection by Belimo
Temperature and Humidity Sensors

Features and Options

- Humidity alone or temperature/humidity combination
- Watertight B-Box enclosure
- Ruggedised (encapsulated) transmitter with replaceable filter and humidity probe
- ±3%RH accuracy humidity transmitter

Humidity control is an important aspect of any climate control system. Therefore, humidity sensors must be both accurate and dependable. Belimo's humidity sensors are prescreened for accuracy thereby eliminating field calibration even when replacing a sensor or probe. The duct units are also extremely dependable with a watertight B-Box enclosure. The B-Box is made of UV-resistant polycarbonate and carries an IP66 rating.
All duct units feature medical-grade closed cell foam to seal the probe insertion hole and to absorb vibration. Mounting tabs allow an easy installation directly to the wall of the duct. All duct units have etched teflon lead wires, are built to withstand high humidity and condensation and perform under real world conditions.

Combo duct unit in a B-Box

Ordering Information

BE10K2H30DB: 10K-2 Thermistor Temperature Sensor, 4...20mA humidity output, ±3%RH accuracy, B-Box enclosure
BE10K2H31DB: 10K-2 Thermistor Temperature Sensor, 0...10V humidity output, ±3%RH accuracy, B-Box enclosure
BE1KH30DB: 1kΩ Platinum RTD Temperature Sensor, 4...20mA humidity output, ±3%RH accuracy, B-Box enclosure
BEH30DB: 4...20mA humidity output, ±3%RH accuracy, B-Box enclosure
BEH31DB: 0...10V humidity output, ±3%RH accuracy, B-Box enclosure

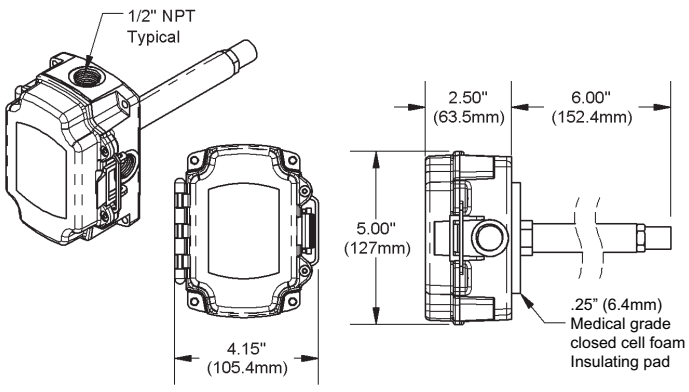
Specifications

10K-2 Thermistor sensor specifications
Resistance: 10kΩ @ 25ºC, -55...150ºC range
Standard accuracy: 0.2ºC (±0.36ºF) at 0...70ºC
Dissipation constant: 2.7mW/ºC
Stability (drift): Less than ±0.1ºC (0.18ºF) drift over 10 years.

Humidity sensor specifications
Output ranges: 4...20mA or 0...10V
Power:
DC 10...5V for 4...20mA output
DC 15...35V for 0...10V output
AC 12...24V for 4...20mA output
AC 15...24V for 0...10V output
Power consumption:
22mA max. DC for 4...20mA output
6mA max. DC for 0...10V output
0.53VA max. AC for 4...20mA output
0.14VA max. AC for 0...10V output
Sensing element: Impedance type humidity sensor
Operating RH range: 0...100%RH (non-condensing)
Operating temperature range:
Room: 0...70ºC (32...158ºF)
Duct and Outside: -23...71ºC (-10...160ºF)
Accuracy range: from 15...95%RH at 25ºC
Response time: 20 seconds for a 63% step
Drift: <2%RH over 5 years

Environmental operation range:
Temperature: -40...100ºC
Humidity: 0...100%RH, non-condensing
B-Box material and material rating:
Polycarbonate, UL94, V-0, IP66

1K RTD sensor specifications
Resistance: 1kΩ @ 0ºC, -60...150ºC
Tolerance of resistance (Accuracy):
Standard 0.12% at 0ºC
Tolerance in ºC: ±(0.3 + 0.005T); T=Temp in ºC
Self heating (1K RTD only): 0.4ºC/mW at 0ºC
Stability (drift):
0.14ºC with 6,000 continuous hours at 400ºC
Standardisation:
DIN 43760-1980, IEC Pub 751-1983, JIS C1604-1989



B-Box

Features and Options

- Mounting tabs for easy installation
- Series 304 stainless steel probes in lengths of 4” (100mm), 8” (200mm) and 12” (300mm)
- Etched teflon lead wires and double encapsulated sensors
- Optional B-Box and EUO-Box enclosure

Immersion Units are available in 2”, 4” and 8” probe lengths. The sensor is potted inside a 1/4” stainless steel probe with thermally conductive epoxy. All Immersion Units have etched teflon lead wires and double encapsulated sensors to create a watertight package that can withstand high humidity and condensation.
Immersion Units are available with a 2”x 4” steel J-Box or a watertight B-Box enclosure. The B-Box is made of UV-resistant polycarbonate and carries an IP66 rating.

J-Box

B-Box

Ordering Information

BE1KI4: 4” Probe, 1kΩ Platinum RTD, J-Box
BE1KI8: 8” Probe, 1kΩ Platinum RTD, J-Box
BE1KI4B: 4” Probe, 1kΩ Platinum RTD, B-Box
BE1KI8B: 8” Probe, 1kΩ Platinum RTD, B-Box
BE10K2I4: 4” Probe, 10K-2 Thermistor, J-Box
BE10K2I8: 8” Probe, 10K-2 Thermistor, J-Box
BE10K2I4EUO: 4” Probe, 10K-2 Thermistor, EUO-Box
BE10K2I4B: 4” Probe, 10K-2 Thermistor, B-Box
BE10K2I8B: 8” Probe, 10K-2 Thermistor, B-Box
BET1K050CI8B: 4” Probe, 1kΩ Platinum RTD Transmitter, 0...50°C Range, 4...20mA output,B-Box enclosure
BET1K0100CI8B: 4” Probe, 1kΩ Platinum RTD Transmitter, 0...100°C Range, 4...20mA output,B-Box enclosure
BE10K2I4EUO: 4” Probe, 10K-3[11K] Thermistor, EUO-Box

Specifications

T1K Transmitter specifications
Sensor: 1kΩ Platinum RTD
Supply voltage: DC 7...40V
Maximum loop resistance: 850Ω at DC 24V
Span: Min. 16.6ºC (30ºF), Max. 555ºC (1000ºF)
Low temperature: Min. -90ºC (-130ºF), Max. 482ºC (900ºF)
Accuracy: ±0.065% of span (8 and 16mA outputs)
Linearity: ±0.125% of span
Operational humidity:
0...95%RH, non-condensing
0...100%RH, condensing for short intervals
Output current limits: Less than 1mA and 22.35 ±0.15mA
Power output shift: ±0.009% of span 7 to DC 40V
Connections: Four 22-gauge etched teflon leads or terminal blocks
Operating temperature:
Transmitter: -20...70ºC
Sensor: -65...105ºC (standard)

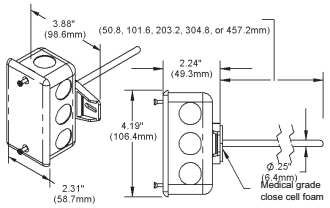
1K RTD sensor specifications
Resistance: 1kΩ @ 0ºC, -60...150ºC
Tolerance of resistance (accuracy): Standard 0.12% at 0ºC
Tolerance in ºC: ±(0.3 + 0.005T); T=Temp in ºC
Self heating (1K RTD only): 0.4°C/mW at 0ºC
Stability (drift): 0.14ºC with 6,000 continuous hours at 400ºC
Standardisation:
DIN 43760-1980, IEC Pub 751-1983, JIS C1604-1989

Environmental operation range:
Temperature: -40...100ºC
Humidity: 0...100%RH, non-condensing
Enclosure material and material rating:
B-Box model: Polycarbonate, UL94, V-0, IP66
J-Box model: Galv. steel
EUO-Box model: Geloy CR7510, UL94F HB

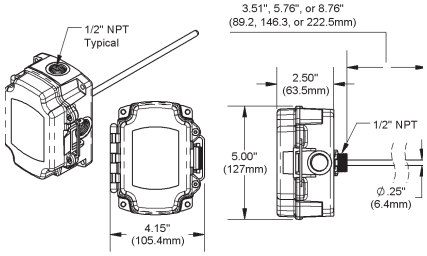
10K-2 Thermistor sensor specifications
Resistance: 10kΩ @ 25ºC, -55...150ºC range
Standard accuracy: 0.2ºC (±0.36ºF) at 0...70ºC
Dissipation constant: 2.7mW/ºC
Stability (drift):
Less than ±0.1ºC (0.18ºF) drift over 10 years.

10K-3[11K] Thermistor sensor specifications
Resistance: 5238Ω @ 25ºC, -55...150ºC range
Standard accuracy: 0.2ºC (±0.36°F) at 0...70ºC
Dissipation constant: 2.7mW/ºC
Stability (drift):
Less than ±0.1ºC (0.18ºF) drift over 10 years.

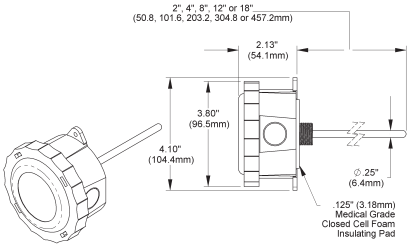
J-Box



B-Box



EUO-Box



Surface Temperature Units

Trade selection by Belimo
Temperature Sensors

Features and Options

- Bendable copper sensing plate
- Double encapsulated sensors
- Etched teflon lead wires
- Limited lifetime warranty

Clamp-on surface temperature sensors are designed to monitor water temperature in retrofit or filled pipe applications. These units simply fit around the outside of a pipe, greatly reducing installation cost.
Each unit has a potted sensing pad that measures the water temperature by sensing the surface temperature of the pipe. Both units have etched teflon lead wires and double encapsulated sensors, and come with a standard J-Box enclosure.
This unit has a bendable copper sensing plate which forms to the curvature of the pipe. An adjustable hose clamp is used to firmly hold the unit in place around the pipe.

Clamp on surface temperature sensor

Ordering Information

BE1KS: Surface sensor, 1kΩ Platinum RTD Temperature Sensor, J-Box enclosure
BE10K2S: Surface sensor, 10K-2 Thermistor Temperature Sensor, J-Box enclosure
BE10K3S: Surface sensor, 10K-3[11K] Thermistor Temperature Sensor, J-Box enclosure

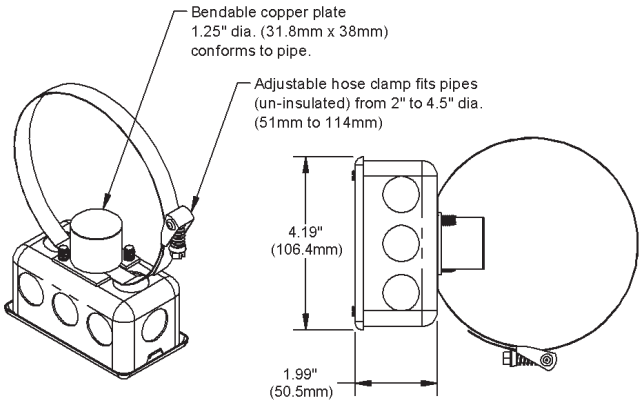
Specifications

1K RTD sensor specifications
Resistance: 1 kΩ @ 0ºC, -60...150ºC
Tolerance of resistance (accuracy):
Standard 0.12% at 0ºC
Tolerance in ºC: ±(0.3 + 0.005T); T=Temp in ºC
Standardisation:
DIN 43760-1980, IEC Pub 751-1983, JIS C1604-1989
Self Heating (1K RTD only): 0.4ºC/mW at 0ºC
Stability (drift):
0.14ºC with 6,000 continuous hours at 400ºC

10K-2 Thermistor sensor specifications
Resistance: 10kΩ @ 25ºC, -55...150ºC range
Standard accuracy:
0.2ºC (±0.36ºF) at 0...70ºC
Dissipation constant: 2.7mW/ºC
Stability (drift):
Less than ±0.1ºC (0.18ºF) drift over 10 years.

10K-3[11K] Thermistor sensor specifications
Resistance: 5238Ω @ 25ºC, -55...150ºC range
Standard accuracy: 0.2ºC (±0.36°F) at 0...70ºC
Dissipation constant: 2.7mW/ºC
Stability (drift): Less than ±0.1ºC (0.18ºF) drift over 10 years.

Enclosure material: Galvanised steel
Environmental operation range:
Humidity: 0...95%RH, non-condensing
Temperature: -65...100ºC



Clamp-on strap unit

Features and Options

- Humidity alone or temperature/humidity combination
- Watertight B-Box enclosure
- Ruggedised (encapsulated) humidity transmitter
- Replaceable filter and humidity probe
- 3%RH accuracy

Humidity control is an important aspect of any climate control system. Therefore, humidity sensors must be both accurate and dependable. Belimo's humidity sensors are prescreened for accuracy thereby eliminating field calibrations even when replacing a sensor or probe. The outside air units are also extremely dependable with a watertight B-Box enclosure. The B-Box is made of UV-resistant polycarbonate and carries an IP66 rating.
All outside air units have etched teflon lead wires and are built to withstand high humidity and condensation and perform under real world conditions. This is especially important in an outside air unit which can be exposed to rain, snow and large temperature swings.

Temperature (top) and combination outdoor air sensors

Ordering Information

BE1K0B: 1kΩ Platinum RTD Temperature Sensor, B-Box enclosure
BE10K2OB: 10K-2 Thermistor Temperature Sensor, B-Box enclosure
BE10K3OB: 10K-3[11K] Thermistor Temperature Sensor, B-Box enclosure
BE10K2H30OB: 10K-2 Thermistor, 4...20mA humidity output, ±3%RH accuracy transmitter, B-Box enclosure
BE10K2H31OB: 10K-2 Thermistor, 0...10V humidity output, ±3%RH accuracy transmitter, B-Box enclosure

Specifications

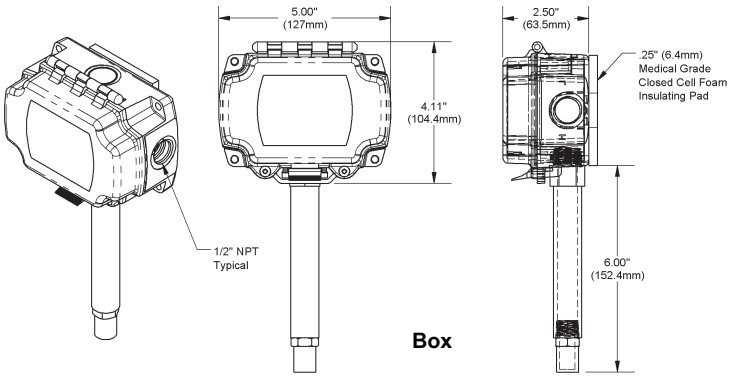
10K-2 Thermistor sensor specifications
Resistance: 10kΩ @ 25ºC, -55...150ºC range
Standard accuracy: 0.2ºC (±0.36ºF) at 0...70ºC
Dissipation constant: 2.7mW/ºC
Stability (drift):
Less than ±0.1ºC (0.18ºF) drift over 10 years.

10K-3[11K] Thermistor sensor specifications
Resistance: 5238Ω @ 25ºC, -55...150ºC range
Standard accuracy: 0.2ºC (±0.36°F) at 0...70ºC
Dissipation constant: 2.7mW/ºC
Stability (drift):
Less than ±0.1ºC (0.18ºF) drift over 10 years.

Humidity sensor specifications
Output ranges: 4...20mA
Power:
DC 10...5V for 4...20mA output
DC 15...35V for 0...10V output
AC 12...24V for 4...20mA output
AC 15...24V for 0...10V output
Power consumption:
22mA max. DC for 4...20mA output
6mA max. DC for 0...10V output
0.53VA max. AC for 4...20mA output
0.14VA max. AC for 0...10V output
Sensing element: Impedance type humidity sensor
Operating RH range: 0...100%RH (non-condensing)
Operating temperature range:
Room: 0...70ºC (32...158ºF)
Duct and Outside: -23 to 71ºC (-10...160ºF)
Accuracy range: from 15...95%RH at 25ºC
Response time: 20 seconds for a 63% step
Drift: <2%RH over 5 years

1K RTD sensor specifications
Resistance: 1kΩ @ 0ºC, -60...150ºC
Tolerance of resistance (accuracy): Standard 0.12% at 0ºC
Tolerance in ºC: ±(0.3 + 0.005T); T=Temp in ºC
Self heating (1K RTD only): 0.4ºC/mW at 0ºC
Stability (drift): 0.14ºC with 6,000 continuous hours at 400ºC
Standardisation:
DIN 43760-1980, IEC Pub 751-1983, JIS C1604-1989

Environmental operation range:
Temperature: -40...100ºC
Humidity: 0...100%RH, non-condensing
Box material and material rating:
Polycarbonate, UL94, V-0, IP66



Box

Room Mount and Duct Mount Units

Trade selection by Belimo
Air Quality Sensors

Features and Options

- Responds to over 30 different contaminants
- Output is recordable and easily imported into standard spreadsheet packages for analysis
- Saves on energy costs through demand-based control of outside air intake
- Increases worker productivity through improved comfort
- Allows early detection of potential air quality problems
- Makes a facility more attractive to potential tenants

Room and duct mount air quality sensors

One of the greatest concerns of today's facility managers is the health and safety of the building's occupants - and indoor air quality is a key factor. Belimo's Air Quality Sensors help to control the air quality of a facility by continuous monitoring. The sensors can be placed in individual rooms and airducts and the data can be directly sent to the building management system. Information from the sensors can also be recorded over time by the building automation system and can easily be imported into standard spreadsheet packages for analysis. This type of "on-line" monitoring offers a number of important benefits including energy savings through demand-based control of outside air intake, improving and optimising the air quality of the facility, identifying potential air quality problems in the early stages and demonstrating to existing and potential tenants your commitment to their satisfaction.
The Air Quality Sensor utilises a unique oxidising element that varies in resistance with respect to the contaminant gases it contacts. The sensor is non-specific to any gas. Instead, the output signal corresponds to the combined concentration of over 30 contaminant gases typically found in indoor environments. This provides a much more accurate representation of the actual air quality than a CO2 sensor which senses only CO2 and not the other contaminants that could be present.
The principle purpose of the Air Quality Sensor is to control the amount of outside air introduced by a ventilation plant and thereby reduce energy consumption by eliminating the introduction of excess outside air into the system during periods of little or no occupancy. Besides the savings from demand-based control of outside air intake, on-line sensing also assures air quality throughout the facility and can help identify potential problem areas (such as contaminants from carpets, equipment, furnishings or chemicals) before they reach a critical stage. The facility manager can also analyse the recorded data from the sensors and adjust building processes for optimum air quality and occupant comfort.

The AQS responds to the following list of contaminants:

COMBUSTIBLES
Iso-Butane
Methane
Ethane
Propane
Ethylene
Hydrogen
Carbon Monoxide
Methyl Ether

OTHER CONTAMINANTS
Tobacco smoke, Alcohol, Formaldehyde and Perfumes

LIQUIDS
Acetone
Methanol
n-Pentane
n-Hexane
Benzene
Meth. Eth. Ketone
Dimethyl Amine
Ethanol
Methyl Acetate

FREONS
Various

OTHER GASES
Hydrogen Sulfide
Carbon Dioxide
Sulfur Dioxide
Chlorine
Ammonia

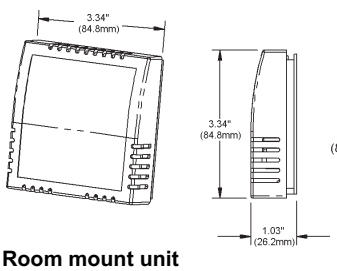
HYDROCARBONS
Vinyl Chloride
Methyl Chloride
Methylene Chloride
Ethylene Oxide
Acryonitrite

Ordering Information

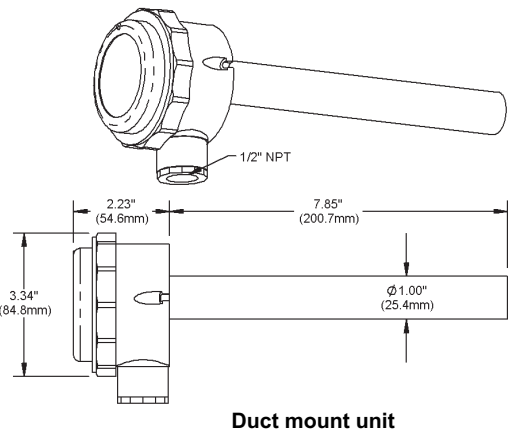
BEAQSR10: Room mount air quality sensor, 0...10V output
BEAQSD10: Duct mount air quality sensor, 0...10V output

Specifications

Signal: DC 0...10V representing 0...100% air pollution
Supply voltage:
AC 24V (+10%, -50%)
DC24 (12V Min., 24V Max)
Power consumption:
2VA with AC power
55mA with DC power
Min. load resistance: 4kΩ
Ambient temp: 32...140ºC
Storage temp: 10...50ºC
Humidity: 5...95%RH (non-condensing)
Housing material: Body - Lexan



Room mount unit



Duct mount unit

Features and Options

- Long life electrochemical sensor
- High accuracy at low concentrations
- Rugged housing mounting tabs for easy installation
- Two year warranty

Belimo's carbon monoxide sensor offers enhanced, long life electro chemical sensing with outstanding accuracy at low concentrations. The sensor has a range of 1-100ppm or 1-300ppm of Carbon Monoxide with a resolution of 1ppm and a linear output of 4...20mA. The unit also features a robust watertight and UV-resistant enclosure with an IP66 rating, with or without LCD display.

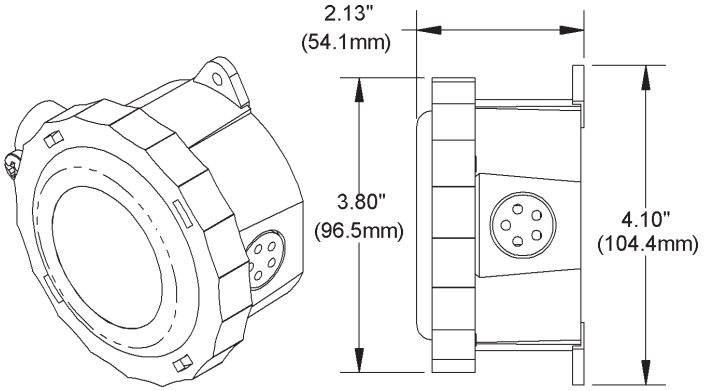
Carbon monoxide sensor

Ordering Information

BE420CO1NDEP:
Carbon monoxide sensor, 4...20mA output, 1...100ppm, no display, UV-resistant and with an IP66 rating enclosure, panel mount.
BE420CO1DEP:
Carbon monoxide sensor, 4...20mA output, 1...100ppm, LCD display, UV-resistant and with an IP66 rating enclosure, panel mount.
BE420CO3DEP:
Carbon monoxide sensor, 4...20mA output, 1...300ppm, LCD display, UV-resistant and with an IP66 rating enclosure, panel mount.

Specifications

Range: 1...100ppm CO or 1...300ppm CO
Voltage requirement: DC 12...27V, non-display
Signal output: 4...20mA, 2-wire, loop powered
Sensor type: Electrochemical cell
Enclosure material: UV-resistant plastic
Resolution: Infinite on 4...20mA loop
Accuracy:
±5 PPM (combination of linearity, temperature, drift and repeatability)
Response time: 90%: Less than 40 seconds @ 25ºC
Environmental operating range:
Temperature: -20...40ºC (non-display)
-10...40ºC (with display)
Humidity: 15...90%RH (constant)
0...98%RH (intermittent)



Sensor life expectancy: More than four years
Load resistance: 500Ω max. DC 24V

* Belimo recommends that you do not lay the wiring for the CO transmitter in the same conduit as the line voltage wiring or as the wiring used for inductive loads such as motors, generators, and coils.

Trade selection by Belimo
Accessories

Features and Options

- Compact and cost effective
- Self-resetting thermal fuse
- Operation and fault LED indicators ruggedised circuitry
- Fixed or adjustable outputs
- Output protected against overload and accidental short circuit

Snaptrack mountable!

With optional snaptrack

Belimo's voltage converter is a cost effective way of converting AC 24V to 5, 12, 15 or DC 24V to use on peripheral devices that require DC voltage. The converter is available with an output of 100mA, and is very compact and designed to fit into a standard 2.75" snaptrack.

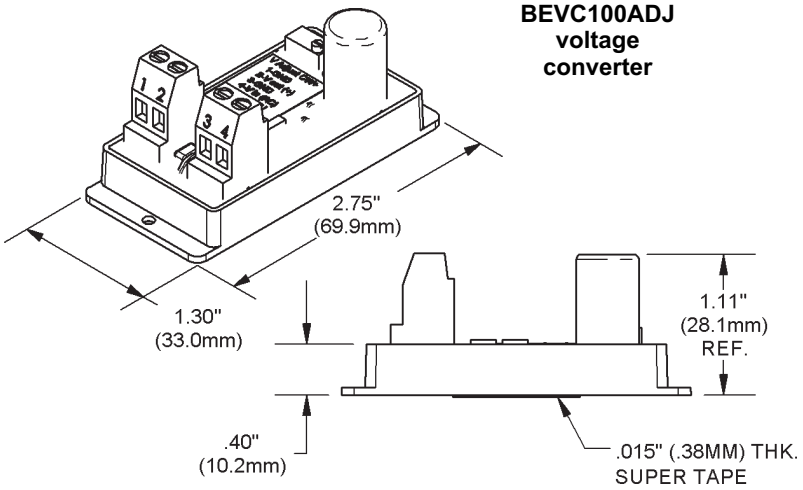
Although most Belimo room units can run on 24 VAC power, converting to DC power eliminates the AC voltage "noise" which can affect the room sensor readings. Belimo's tests show that fluctuating and inaccurate signal levels are possible when the AC power wiring is present in the same cable as the signal lines. To minimize the AC voltage noise, the DC converter must be mounted as close to the controller as physically possible. Do not mount the converter at the sensor end of the wire, as the AC will still couple into the sensor signal.

As a reference, the converter has the capability to power the following BAPI sensors: One X-Combo temperature/humidity combination room unit; two room, duct or outside air humidity sensors.

Ordering Information

BEVC100ADJ: DC 5...24V adjustable at 100mA

Specifications



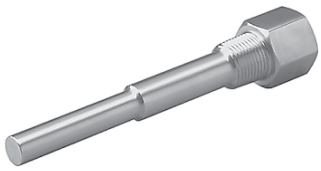
BEVC100ADJ voltage converter

Input voltage: AC 18...30V, DC 24V
Input current max: 240mA (5.8VA)
Environmental operation range: 0...70°C
Wiring: Two pair 16 to 22 AWG
Rectification: Half-Wave rectified
Grounding: AC and DC are common
Min. input voltage:
DC 5V output: AC 18V
12 or DC 15V output: AC 18V
DC 24V output: AC 19V
Mounting:
Standard 2-3/4" snaptrack or
double-sided foam tape (supplied)

Features and Options

- Two lengths: 4” (100mm) and 8” (200mm) (fit standard Immersion Unit lengths)
- Stainless steel 304
- Machined construction
- Other lengths or materials available upon request
- Limited lifetime warranty

Standard Thermowells available from Belimo include 304 stainless steel machined in 4” (100mm) and 8” (200mm) lengths with R1/2” ISO external and 1/2” NPSM. Other lengths and thread diameters are available upon request.
The machined stainless steel wells come with a mirror polish to provide maximum corrosion resistance. A machined stainless steel well is required for high pressure water service.



Machined Thermowell

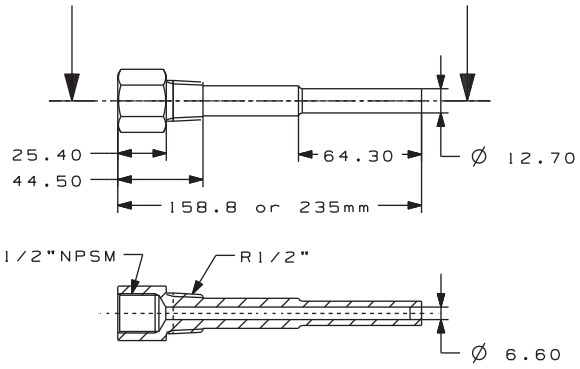
Ordering Information

Type Code	Prescription
Z-MS4	Machined 304 stainless steel --- 4” (100mm)
Z-MS8	Machined 304 stainless steel --- 8” (200mm)

Note: Standard thread size is R½" ISO external, and ½” NPSM internal.

Specifications

Comparing the wake and the resonant frequency



Well failures, in most cases, are not due to the effects of pressure or temperature on the well. The calculation is necessary to provide adequate strength, under given conditions, familiar enough to permit proper choice of wall thickness and material. The values shown in Table 1 are conservative, and intended primarily as a guide. Less familiar and more dangerous are the vibration effects to which wells are subjected. Fluid, flowing by the well, forms a turbulent wake (called the Von Karman Trail) which has a definite frequency, based on the diameter of the well and the velocity of the fluid. It is important that the well has sufficient stiffness so that the wake frequency will never be equal to the resonant (natural) frequency of the well itself. If the resonant frequency of the well coincided with the wake frequency, the well would vibrate to destruction and break off in the piping. Wells are also safe if the resonant frequency is well below the wake frequency or if the fluid velocity is constantly fluctuating through the critical velocity point. Nevertheless, if the installation is not hampered by the use of a sufficiently stiff well, we recommend that you do not exceed the given values in Table 2.

Table 1: Pressure rating versus temperature

Thermowell material	Temperature in degrees Fahrenheit						
	21ºC	93ºC	204ºC	316ºC	427ºC	538ºC	649ºC
	Pressure rating (bar)						
304 S.S.	483	427	386	372	359	310	114

Table 2: Maximum fluid velocity versus insertion length

Thermowell material	Fluid type	Insertion length	
		4” (100mm)	8” (200mm)
		Maximum fluid velocity (m/s)	
304 S.S.	Air/Steam	33	12
	Water	25	-

Asia Pacific Headquarters and Shanghai Office:

Belimo Actuators (Shanghai) Trading Ltd.
479 Chun Dong Road, Building C-2
Xin Zhuang Industry Park
Shanghai 201108, P.R. China
Tel: +86 21 5483 2929
Fax: +86 21 5483 2930
E-mail: info.asiapacific@belimo.ch
E-mail: info.shanghai@belimo.ch

AUSTRALIA

Melbourne Office:
Belimo Actuators Pty. Ltd.
12 Enterprise Court
Mulgrave Business Park
Mulgrave, VIC 3170, Australia
Tel: +61 (0)3 9545 0844
Fax: +61 (0)3 9545 0855
E-mail: info.australia@belimo.ch

Sydney Office:
Belimo Actuators Pty. Ltd.
Suite 2.20, 32 Delhi Road
North Ryde, NSW 2113
Australia
Tel: +61 (0)2 9805 1777
Fax: +61 (0)2 9805 1722
E-mail: info.australia@belimo.ch

GREATER CHINA

Beijing Office:
Belimo Actuators (Shanghai) Trading Ltd.
Beijing Branch Office
Room 605, Hai Chang Edifice
44 Liang Ma Qiao Road
Beijing 100016, P.R. China
Tel: +86 10 6462 1382
Fax: +86 10 6462 1383
E-mail: info.beijing@belimo.ch

Guangzhou Office:
Belimo Actuators (Shanghai) Trading Ltd.
Guangzhou Branch Office
Room 1202, Skyline Plaza
644 Tong Fu East Road, Haizhu Area
Guangzhou 510240, P.R. China
Tel: +86 20 3435 1860
Fax: +86 20 3435 1870
E-mail: info.guangzhou@belimo.ch

Chongqing Office:
Belimo Actuators (Shanghai) Trading Ltd.
Chongqing Branch Office
Room 4, 9th floor, Unit 7, Luoma Jiari Garden
No. 36, QingLong Road, Nan'an District
Chongqing 400060, P.R. China
Tel: +86 23 6275 3155
Fax: +86 23 6280 3380 *519
E-mail: info.chongqing@belimo.ch

Hong Kong Office:
Belimo Actuators Ltd.
Room 207, 2/F, New Commerce Center
19 On Sum Street, Shatin, N.T., Hong Kong
Tel: +852 2687 1716
Fax: +852 2687 1795
E-mail: info.hongkong@belimo.ch

Taiwan Office:
Belimo Actuators Ltd.
7F-2, No. 343, Jhonghe Road, Yonghe City
Taipei County 234, Taiwan
Tel: +886 2 2922 8805
Fax: +886 2 2922 8806
E-mail: info.taiwan@belimo.ch

INDIA

Mumbai Office:
Belimo Actuators India Pvt. Ltd.
204 Jaisingh Business Center, Parsiwada
Sahar Road, Andheri (East)
Mumbai 400099, India
Tel: +91 22 6733 2525 / 6733 2501
Fax: +91 22 2822 2643
E-mail: info.india@belimo.ch

New Delhi Office:
Belimo Actuators India Pvt. Ltd.
A-230, Okhla Phase I
New Delhi 110020, India
Tel: +91 11 2637 1644
Fax: +91 11 2637 1699
E-mail: info.india@belimo.ch

Bangalore Office:
Belimo Actuators India Pvt. Ltd.
60/1, 1st Floor, Coles Road, Frazer Town
Bangalore 560001, India
Tel: +91 80 2558 0421 / 6565 6978
Fax: +91 80 2558 0422
E-mail: info.india@belimo.ch

JAPAN

Belimo Actuators Ltd.
7th Floor, Honjo-Azumabashi DJ Building
4-19-3, Honjo, Sumida-ku
Tokyo 130-0004, Japan
Tel: +81 3 6823 6961
Fax: +81 3 3626 3911
E-mail: info.japan@belimo.ch

MALAYSIA

Belimo Actuators Ltd.
12-1, Jalan PJS 10/2, Subang Indah
46000 Petaling Jaya Selangor, Malaysia
Tel: +603 5631 2188
Fax: +603 5638 2189
E-mail: info.malaysia@belimo.ch

SINGAPORE

Belimo Actuators Ltd.
1 Tannery Road #08-04, One Tannery
Singapore 347719
Tel: +65 6842 1626
Fax: +65 6842 1630
E-mail: info.singapore@belimo.ch

THAILAND

Belimo Actuators Ltd.
90/2 Pensiri Place
Soi Phaholyothin 32, Phaholyothin Road
Chandrakasem, Jatujak
Bangkok 10900, Thailand
Tel: +662 9415582-3
Fax: +662 9415584
E-mail: info.thailand@belimo.ch

Innovation, Quality and Consultancy:
A partnership for motorising HVAC actuators

www.belimo.com

Belimo regional head offices

EU BELIMO Automation AG
Brunnenbachstrasse 1
8340 Hinwil, Switzerland
Tel: +41 43 843 61 11
Fax: +41 43 843 62 68
E-mail: info@belimo.ch

AP BELIMO Actuators (Shanghai) Trading Ltd.
479 Chun Dong Road, Building C-2
Xin Zhuang Industry Park
Shanghai 201108, P.R. China
Tel: +86 21 5483 2929
Fax: +86 21 5483 2930
E-mail: info.asiapacific@belimo.ch

US BELIMO Aircontrol (USA), Inc.
43 Old Ridgebury Road
Danbury, CT 06813-2928, USA
Tel: +800 543-9038 / 203 791-9915
Fax: +800 228-8283 / 203 791-9919

Or contact your nearest Sales Representative

BELIMO®