mSense submittal

Job_____   Designer_____   Contact_____

mSense is a room comfort sensor that measures the three fundamental indoor environmental parameters that influence the wellbeing and thermal conditions of occupants: operative temperature, relative humidity (dew-point) and air quality (VOCs).
mSense communicates via serial bus RS485 on Modbus (or BACnet[3]) protocol.

Model	mSense room comfort sensor (Op Temp / RH / Air Quality)
Ordering code	MSENTHQW
Features	Operative Temperature (can be set native in °F or °C)
	Dew-point Temperature (can be set native in °F or °C)
	Monitor Indoor Air Quality (provide an indication of the IAQ via an equivalent CO_2 or TVOC output)
	Serial Connection (Modbus or BACnet[3])
	Works with the Messana mControl platform and connect with both mZone and mBox
	O-in™ Mount Technology for quick and easy installation
	Paintable exterior ring surface to match background wall color [6]
	Address settable by dip-switch or NFC (Near-Field Communication)

Size and weight [1]

Size

W (OD)   2 ³/₈" (60 mm)
W (ID)   1 ³/₄" (45 mm)
D   3 ¹/₂" (90 mm)
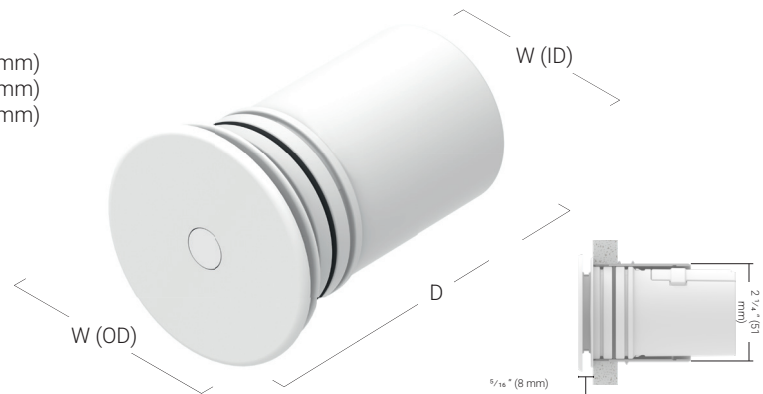
Weight 2 ounces (57 grams)

Wall protrusion ⁵/₁₆ inches (8 mm)

Color and finish

Arctic white paintable plastic [6]

Environmental requirements

Operating ambient temperature	32° to 120 °F (0° to 50 °C)
Relative humidity	0% to 100% (water vapor)
Operating altitude	up to 10,000 feet (3,000 m)

Technical specifications [1]

Sensors [2]

Operative Temperature

On board sensor	Sensirion STS30
Typical accuracy	±0.166 °F (±0.3 °C)
Operative temperature range [4]	-40 to +257 °F (-40 to +125 °C)

Dry Bulb Air Temperature (DB) and Relative Humidity (RH)

On board sensor	Sensirion SHT35
DB temperature accuracy	
68°F to 140°F (20°C to 60°C)	±0.18 °F (±0.1 °C)
32°F to 68°F (0°C to 20°C)	±0.36 °F (±0.2 °C)
DB temperature sensor long term drift	<0.054 °F/yr (0.03 °C/yr)
DB temperature operating temperature range [4]	-40 to +257 °F (-40 to +125 °C)
RH accuracy	±1.5%
RH sensor long term drift	<0.25%/yr
RH operating range [4]	0 - 100% RH

Dew-point temperature

Dew-point temp. is evaluated from RH and DB temp.	Magnus formula
Dew-point accuracy	
74°F @40% RH (23°C @40% RH)	±1.35 °F (±0.75 °C)
74°F @50% RH (23°C @50% RH)	±1.2 °F (±0.67 °C)
74°F @60% RH (23°C @60% RH)	±1.1 °F (±0.61 °C)

Digital gas sensor for monitoring indoor air quality

On board sensor	AMS CCS811
eCO2 range	400 ppm to 32,768 ppm [5]
TVOC range	0 ppb to 32,768 ppb [5]
Volatile Organic Compounds (VOC) detected	Alcohols, Aldehydes, Ketones, Organic Acids, Amines, Aliphatic and Aromatic Hydrocarbons
Early-Life Use (Burn-In)	48 h
Conditioning Period (Run-In) after Burn-in following a long idle period	20 min
Automatic Baseline Correction minimum time for correction	24 h
Sample rate (default)	60 sec
Temperature operating range [4]	-40 °F to +185 °F (-40 °C to +85 °C)
RH operating range [4]	10 to 95% RH

Communication

Interface Standard	2-wire RS-485
Communication protocols	Modbus or BACnet [3]

Input power

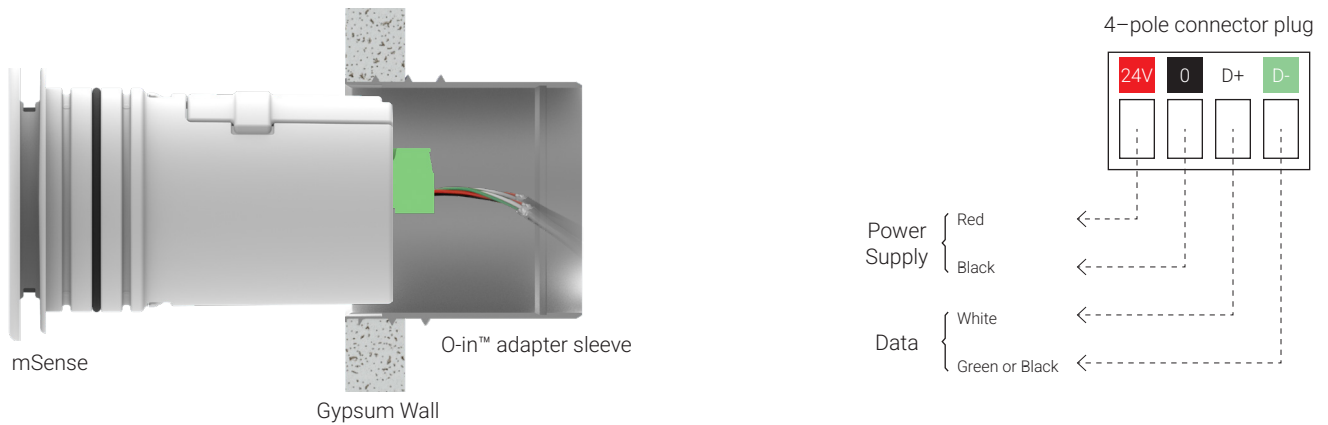|	
24 VAC/DC (±15%)	0.6 VA / 0.4 W

Notes

1. Size, weights and technical characteristics may vary without prior notice.
2. mSense features 3 embedded sensors: (1) Operative Temperature; (2) Dry Bulb Temperature and Relative Humidity; (3) gas sensor for Indoor Air Quality.
3. Modbus or BACnet protocols can be selected via dip-switch (#9). BACnet will be available in future release.
4. Related to the on-board sensor, not to the mSense device itself. Refer to "Environmental requirements" section.
5. Limited to a max value of 2,100 ppm for eCO_2 and 1,187 ppb for TVOC on the Messana control platform.
6. Detach the external ring from the sensor body before painting to void sensor contamination with chemicals.
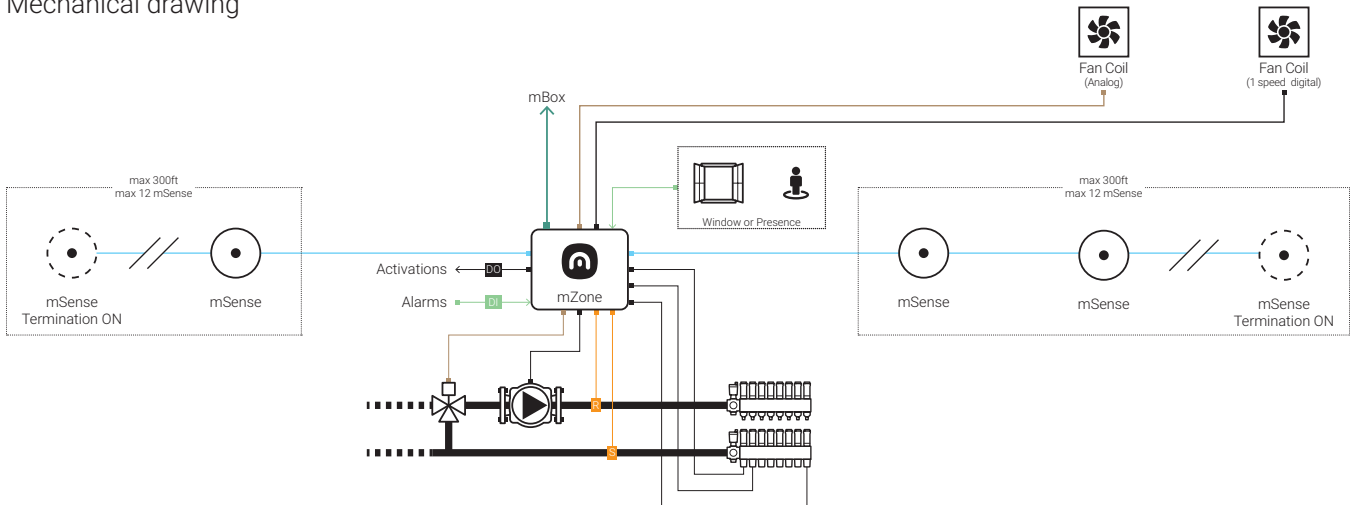
Installation and wiring

mSense

Gypsum Wall

O-in™ adapter sleeve

4−pole connector plug

24V	0	D+	D-

Power Supply
{ Red
{ Black

Data
{ White
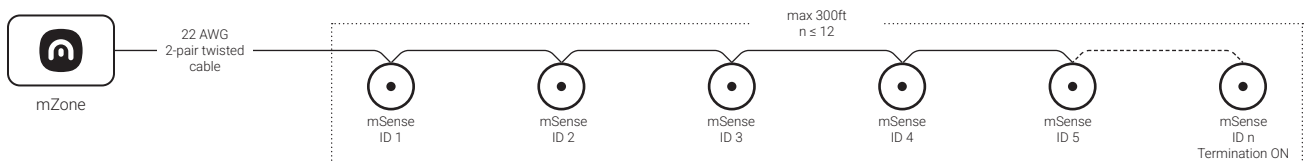{ Green or Black

Sample application drawing

Below is a sample application drawing for this product. This application may include other Messana products that are required for installation. More sample applications can be found at radiantcooling.com.

Mechanical drawing

Fan Coil (Analog)

Fan Coil (1 speed digital)

mBox

Window or Presence

max 300ft
max 12 mSense

mSense
Termination ON

mSense

Activations

Alarms

mZone

max 300ft
max 12 mSense

mSense

mSense

mSense
Termination ON

Electrical drawing

The last sensor on the bus must be terminated by setting the dip-switch ID#9 to ON.

mZone

22 AWG
2-pair twisted cable

max 300ft
n ≤ 12

mSense ID 1

mSense ID 2

mSense ID 3

mSense ID 4

mSense ID 5

mSense ID n
Termination ON

The mZone module can also be installed in the middle of the bus with two different terminated branches.

max 300ft
m < n

mSense ID m
Termination ON

mSense ID 2

mSense ID 1

mZone

max 300ft
n ≤ 12

mSense ID m+1

mSense ID m+2

mSense ID n
Termination ON