

# Model WMS2000 Wireless Monitoring Systems

## Description

Model WMS2000 Wireless Monitoring System is developed by BCM SENSOR to wirelessly monitor changes in force or pressure on site. The system consists of three blocks: four sensors, one wireless transceiver (model WTM2000) and one wireless receiver (model WRM2000). In this datasheet, model 1290 force sensor will be used as an example to explain how the system works to wirelessly monitor tightening of four bolts in distance.

In this example the 1290 compression force sensor functions as a washer for the bolt, in order to monitor the tightening status of the bolt. The four sensors are connected to the transceiver with cables, while the transceiver communicates with the receiver at 433MHz radio frequency (RF) which enables communication distance up to 300 meter in an open area.

The receiver, which can be installed in a control room, is integrated with a touch screen, by which the receiver can both store and indicate the tightening status of each of the four bolts monitored by the sensors. With the touch screen one can set both lower threshold (LT) and upper limit (UL) of the measuring range (MR) of each of the sensors. The backlight of the touch screen can be in three colors, respectively to indicate three statuses of the tightening of four bolts – a normal status (i.e.,  $LT \leq MR \leq UL$ ), an unexpected status (i.e.,  $MR < LT$ , or  $MR > UL$ ), and an error status (e.g., low battery, disconnection, or damaged sensor). In case any of the bolts become loosened during the operation (i.e.,  $MR < LT$ ), the receiver will alert the operator in the control room by turning the backlight of the corresponding sensor from green to red and meanwhile having its alarm triggered.

The WMS2000 system is operated as a plug-and-play force/pressure monitoring system without need of any computer. In fact, this system can work with any type of force and pressure sensors of either 4~20mA or millivolt (i.e., output from Wheatstone bridge circuit). In case of the sensor of millivolt output, an SSC (sensor signal conditioner) will be integrated in the cable between the sensor and the transceiver. For applications where more than four sensors are monitored, BCM SENSOR can further develop the WMS2000 system according to the number of sensors. In addition, this system can be turned into a Wireless Measuring System, model WMS3000, by which a specific force or pressure of interest can be measured remotely, for instance, in nuclear power plant or very harsh environment where human cannot access.

## Features

- plug-and-play without need of any computer
- license-free 433MHz RF
- communication distance up to 300 meter in an open area



**WTM2000 wireless transceiver  
with four 1290 sensors**



**WRM2000 wireless receiver**

## Applications

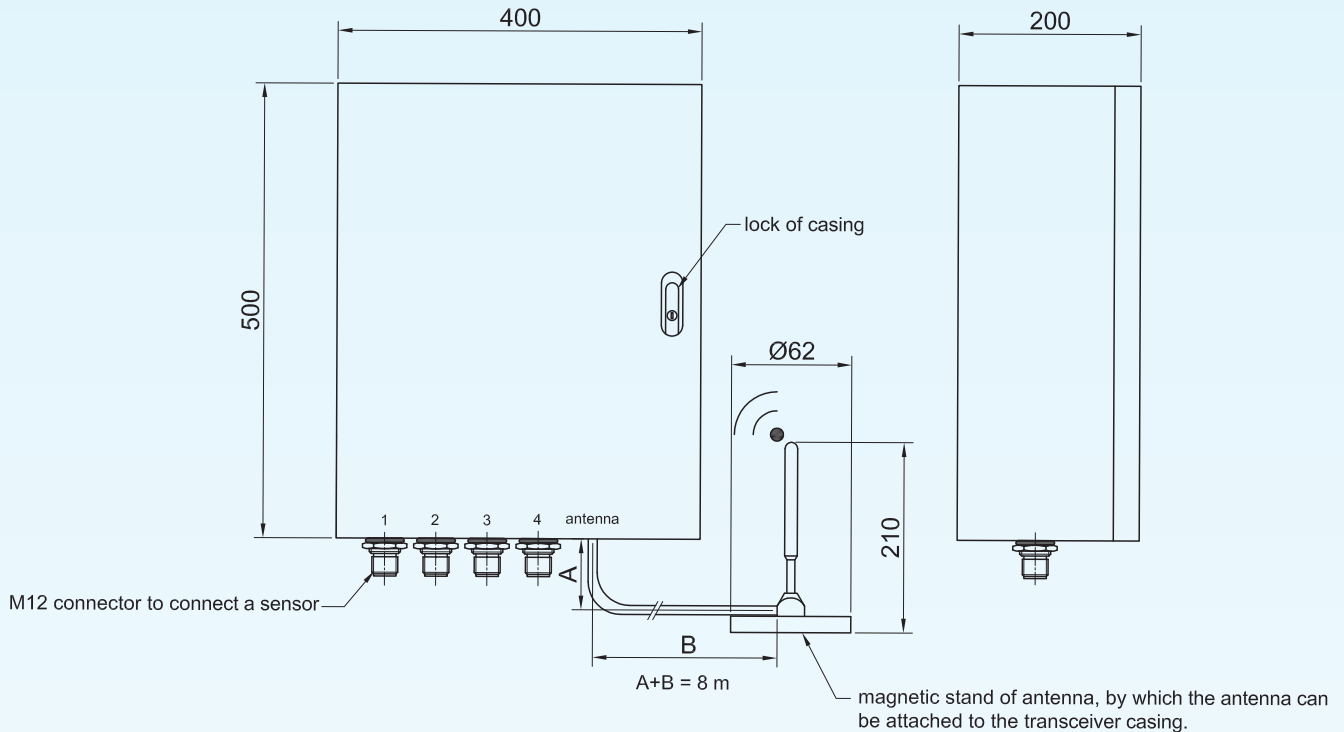
- wireless force monitoring
- wireless pressure monitoring

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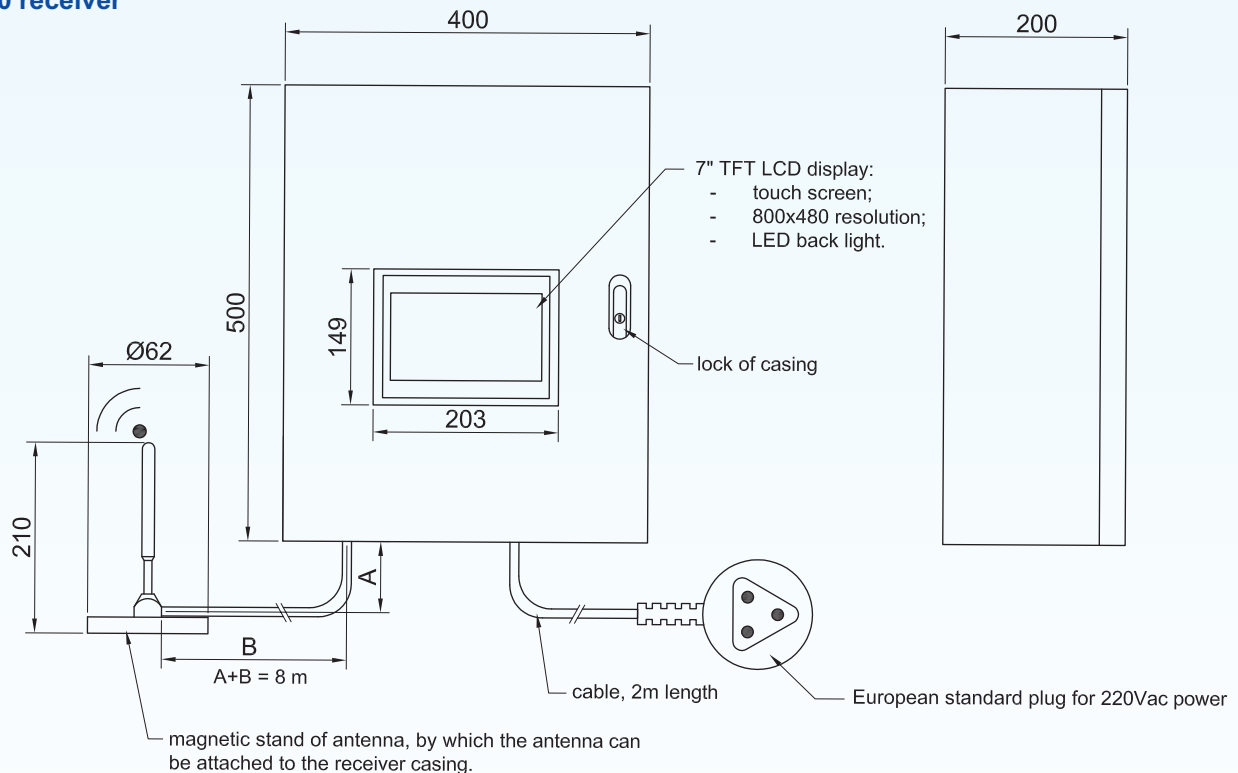
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## Dimensions

### WTM2000 transceiver



### WRM2000 receiver



Note: All dimensions are in mm.

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### Technical Data

Parameters		Units	Specifications	Notes
number of channels			4	1
input signal of transceiver		mA	4~20	2
communication signal			433MHz RF	
communication distance		m	up to 300 through open space	
sampling	measuring data rate		10 data per second, adjustable to fit applications	
	sending data rate		1 time per 10 seconds, adjustable to fit applications	3
accuracy		%fs	determined by accuracy of the sensor	
threshold			Lower and upper thresholds can be set on the receiver.	
supply voltage of transceiver		Vdc	9, ..., 24 via battery	4
battery life			depending on use conditions	5
supply voltage of receiver		Vac	220~230 @50Hz	
operating temperature range		°C	-20 ~ +50	
storage temperature range		°C	-20 ~ +50	
electrical interface	sensor input of transceiver		M12 4-pin connector	
	power supply of receiver		CEE 7/7 power plug, cable length = 2m	6
material of casing			steel with painted surface	
environment protection			IP55	
net weight		kg	~5	

- Notes:
1. More channels are available on request (up to 32 channels).
  2. The input signal of transceiver is the output signal of sensors.
  3. The fastest sending data rate is 1 time per 0.1 second.
  4. Example of battery: rechargeable battery of 12Vdc 20Ah (e.g., part number UP20-12).
  5. Under the conditions of rechargeable battery of 12Vdc 20Ah, 25°C, 5m communication distance without obstacles, and sampling rate as listed above, the battery life is about two years. A lower temperature, a higher sampling rate, or a further communication distance will lead to a shorter battery life.
  6. Other kinds of power plug are available on request.

### Ordering Information

<b>position (pos.) 1: model</b>								
WMS2000								
<b>pos. 2: number of sensor x sensor model (capacity/cable length)</b>								
e.g., 4x1290(1200kN/2m)								
<b>pos. 3: measuring data rate</b>								
10 = 10 data per second								
<b>pos. 4: sending data rate</b>								
0.1 = 1 time per 10 seconds								
<b>pos. 5: accuracy (determined by sensor)</b>								
e.g., 3%fs in case of the 1290 sensors.								
<b>pos. 6: number of transceiver</b>								
1xWTM2000 = 1pc of WTM2000 transceiver								
<b>pos. 7: number of receiver (plug/cable length)</b>								
1xWRM2000(CEE7/7/2m) = 1pc of WTM2000 receiver with CEE 7/7 plower plug of 2-meter cable(#).								
(#) Other plug kind or cable length is available on request.								
<b>pos. 8: environment protection</b>								
IP55								
<b>pos. 9: customized spec's</b>								
“(*)” is necessary only if any customized parameter is required, otherwise it is neglectable.								
<b>pos.1</b>	<b>pos. 2</b>	<b>pos. 3</b>	<b>pos. 4</b>	<b>pos. 5</b>	<b>pos. 6</b>	<b>pos. 7</b>	<b>pos. 8</b>	<b>pos. 9</b>

### Examples of Ordering Code

- standard WMS2000:

WMS2000-4x1290(1200kN/2m)-10-0.1-3%fs-1xWTM2000-1xWRM2000(CEE7/7/2m)-IP55

- customized WMS2000:

WMS2000-4x1290(1200kN/2m)-10-10-3%fs-1xWTM2000-1xWRM2000(NEMA5/15/2m)-IP55-(\*)

(\*): Customized sending data rate = 1 time per 0.1 second;  
Customized power plug = American standard NEMA 5-15.

The listed dimensions, specifications and ordering information are subject to change without prior notice.