SM-F Outdoor Parking Guidance Sensor

Content

Description

SM-F is the answer to a growing need for the real parking management existing in nowadays cities. The underground parking management has been improved for years, now it's time to manage outside.

Traffic Increase needs large parking areas; cities become collapsed and have a real problem of available free spots.

Apart from that, there are special places' increasing, which is important to book and know whether they have been successfully employed as Electric Car spaces, Disabled, Loading and Unloading, etc.

CIRCONTROL has a dual solution for the detection of free parking spaces in Exterior: surface detectors and buried detectors, each one with a clear functionality.

CIRCONTROL The solution is based on the installation of auto switch parking spaces, which communicate with Radio Frequency Intelligent Hubs that through TCP / IP can be integrated into either a wireless network or they can be communicated and integrated with an Ethernet network.

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Technical Features

Battery Powered		
	Power	3,6V with 7.800 mAh
	Lifetime	Up to 5 years *
	Material	Li-SOCi2
RF communications		
	Interface	Proprietary RF protocol
	Frequency	863..870 MHz ISM Band
	Coverage	50m (100m max. **)
Detection		
	Type	3-axis Magnetic auto-compensated
	Height	0..50cm
Environment		
	Temperature	-20 to +60 ºC
	Protection	IP67
Dimensions		
	Dimensions	Ø 254mm, 47mm height
	Weight	980 g
Mechanical Features		
	Material	Reinforced Polyamide
	Resistance	3.500 kg
		** direct line of sight

Battery Lifetime FAT

This battery lifetime study has been done with data provided by the batteries manufacturer and with a restrictive measurement and communications infrastructure.

Test Conditions	Average
Sample Rate	10 seconds
Notification Report Rate	15 minutes
Alive Msg Report Rate	30 minutes
RF upgrade process	3 per year

	Battery Lifetime	
Location Temperature	Average	Minimum
Cold	7,36	6,61
Medium	6,88	6,18
Hot	5,85	5,26

The most restrictive situation warranties at least 5 years of functionality due to the test conditions are harder than the final ones that happen in a parking.

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Data Packet Transmission Information

The sensor transmits the information in data frames called ‘metadata’. Each of this frame contents is generated within the magnetic and environmental measurements acquired by the sensor.

The data frame detailed info (hex):
da0c0210ff0e00b5fe990005fffe0001ff0a00b7fe98ffde22028a0300002b00009b1421821031

This data frame example parsed and translated into Decimal values with sub blocks identification:

DATA BLOCK	DATA VALUE
ADDRESS	* DA0C
FLAGS	210
XRAW	FF0E
YRAW	B5
ZRAW	FE99
XREL	5
YREL	FFFE
ZREL	1
XCAL	FF0A
YCAL	B7
ZCAL	FE98
TEMP	FFDE
BATT	22
MSGS NOT SENT	28A
VERSION	3
SLOPES	0
HUMIDITY	2B
TRACE	0
RSSI	9B
TIME	42025261719

STATUS OF THE SENSOR:
The different status the sensor can has are located in the MS Digit of the Flags Block Dataframe:

STATE VALUE	STATE INFO
0 (-1 in stats.json format)	Communications error
1 (2 in stats.json format)	Uncalibrated Sensor State
2 (0 in stats.json format)	Free Parking Space
3 (1 in stats.json format)	Occupied Parking Space

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Parameters Definition

The table below shows the User parameters of the sensor.

PARAMETER NAME	READ WRITE	REFERED TO	PARAMETER (hex)	DEFAULT VALUE	MAX VALUE	MIN VALUE	DEFINITION
MAIN PERIOD	RW	sm-f	0x05,	2710	65535	1	Period time that the node wake up and take a measurement. Value in seconds.
CALIBRATED PRESCALER	RW	sm-f	0x07,	b4	65535	1	Number of Sample Rates that the node takes to make Report transmissions when the node is calibrated. Calibrated Report Rate (s) = CALIBRATED PRESCALER x MAIN PERIOD
RADIO CHANNEL	RW	both	0x10,	1	255	0	The default radio channel the node uses to communicate with its controller
RADIO FU CHANNEL	RW	both	0x21,	4	255	0	The radio channel used when the node communicates with its concentrator during the Firmware Update process.
SAMPLES TO CALIBRATE	RW	sm-f	0x24,	6	500	1	Number of samples to use in the Calibration Process.
FULL THRESHOLD	RW	sm-f	0x31,	5a	100000	0	The relative level used to determine when the magnetic field is higher enough to notify a Full change of state.
EMPTY THRESHOLD	RW	sm-f	0x32,	50	100000	0	The relative level used to determine when the magnetic field is higher enough to notify an Empty change of state.
FILTER FACTOR	RW	sm-f	0x39,	a	64	0	Value referred to the hardness of a filter applied. 0% - for no filter applied. 100% - for the hardest possible filter.

The table below shows the Expert parameters of the sensor.

PARAMETER NAME	READ WRITE	REFERED TO	PARAMETER (hex)	DEFAULT VALUE	MAX VALUE	MIN VALUE	DEFINITION
DEVICETYPE	R	both	0x00,	n.a	n.a	n.a	The node's model
NODE ADDRESS	R	both	0x02,	n.a	n.a	n.a	Node's Identification Number (hexadecimal)
UNCALIBRATED PRESCALER	RW	sm-f	0x06,	1e	65535	1	Number of Sample Rates that the node takes to make Report transmissions when the node is uncalibrated. Uncalibrated Report Rate (s) = UNCALIBRATED PRESCALER x MAIN_PERIOD
SAMPLES TO CONFIRM CHANGE OF STATE	RW	sm-f	0x09,	1	100	1	The number of samples the node has to use to confirm the FULL state has been reached, before notify a this change of state.
DELTA-TAU DETECTION	RW	sm-f	0x1b,	a	65535	1	Delta detects magnetic changes and limits compensation process. Tau enables permanent status.
REF. CALIB. COEF. - X AXIS	R	sm-f	0x20,	180	6535	1	Coefficient acquired in the Reference Calibration for the X axis.
ENABLE DYNAMIC LIST	RW	sm-f	0x22,	a	65535	1	Enable the sensor to transmit in broadcast or in master/slave mode.
REF. CALIB. COEF. - Y AXIS	R	sm-f	0x23,	a	65535	1	Coefficient acquired in the Reference Calibration for the Y axis.
ENABLE METADATA TX	RW	sm-f	0x25,	1	1	0	Enables sending all metadata info from the node to the concentrator. 0: send metadata, 1:only status
AUTO ADJUST THRESHOLD	RW	sm-f	0x2D,	F			Threshold inside Adjust Mode is applied. Default = 1,5 * <param 0x1B>
INITIAL CAL X	R	sm-f	0x3D,				
INITIAL CAL Y	R	sm-f	0x3E,				
INITIAL CAL Z	R	sm-f	0x3F,				
Tº TRIGGER TO COMPENSATE	RW	sm-f	0x41,	5	100	0	Number of Degrees to trigger compensation. 0: OFF.
FORCE TRACES NOTIFICATIONS	RW		0x43				Enable Trace Notification. 0: not forced, 1: forced to notify
REFERENCE Tº CALIB	R		0x44				Temperature Acquired in Reference Calibration
REF. CALIB. COEF. - Z AXIS	R		0x45				
COMPENSATION LIMIT THRESHOLD	RW		0x46	1	10	1	Absolut limit inside the sensor is allowed to compensate. LIMIT RANGE = ±[PARAM(0X46) x PARAM(0X2d)] (value >= 10 disable de limit)

For a full list of parameters refer to the AP01_460272

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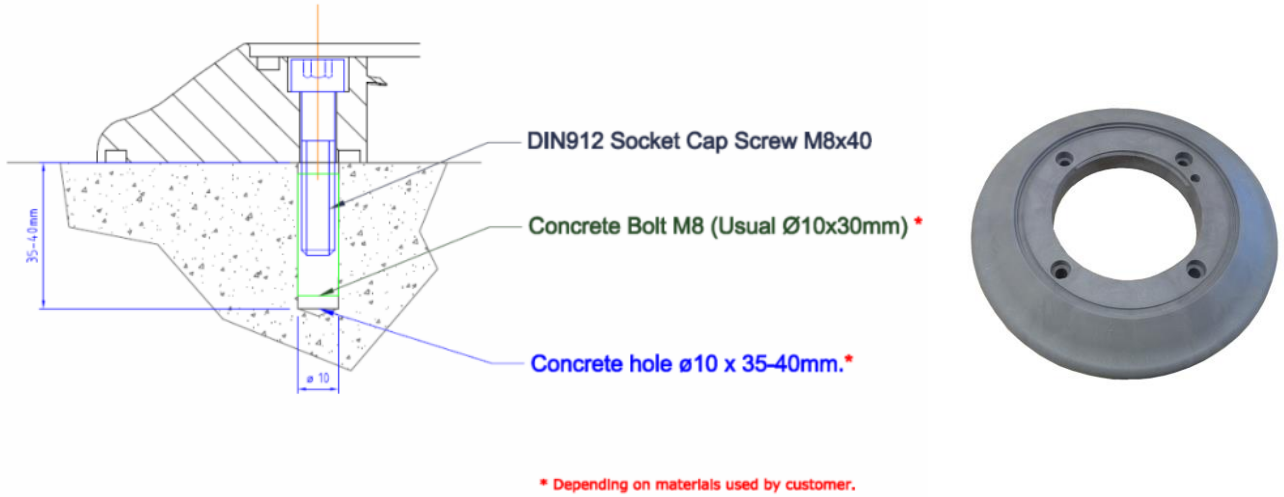
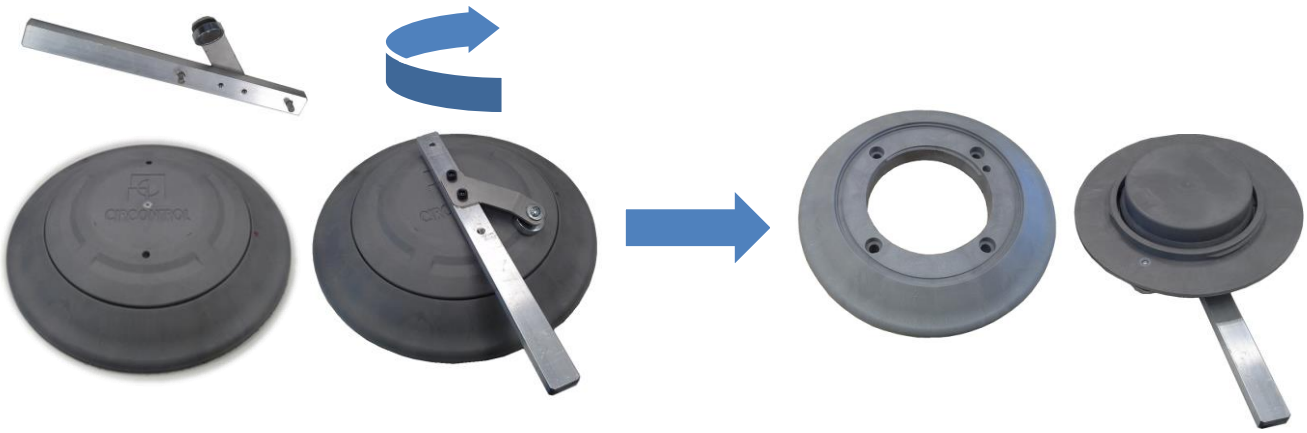
Installation Modes

Mode A. Drilling Holes

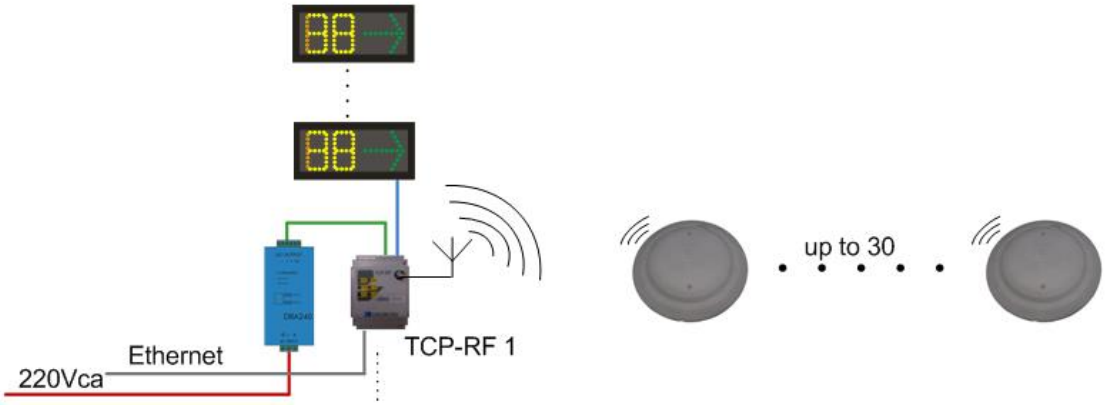


Mode A. Placed with special glue

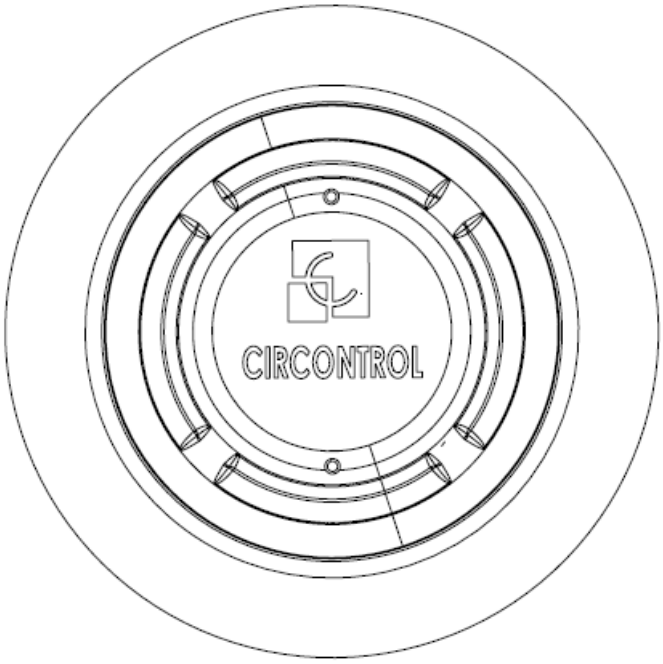
Sensor Lock System

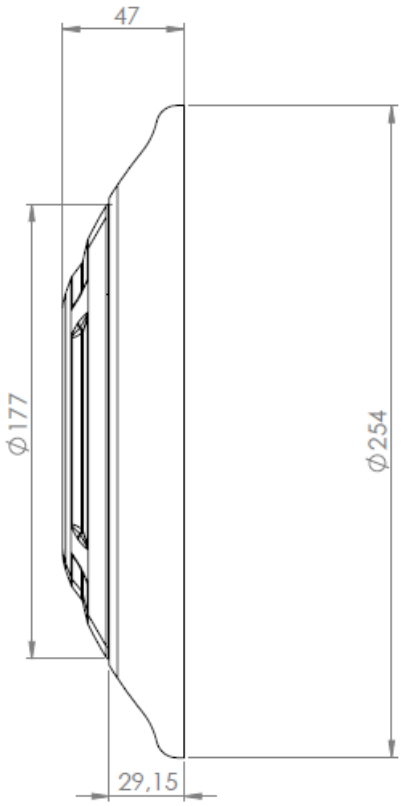


System Installation



Dimensions





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