



Micro Detectors

Italian Sensors Technology



Application:
Level check in the underground solid urban waste collection and disposal depots

UK1 - M18 Ultrasonic Sensors

Ultrasonic Sensors

Application note

CAT3EUK1258501

Application note - UK1 - english - Ed.01/2012



MARKET SECTORS

PROBLEM DESCRIPTION

APPLIED SOLUTION

Collection of non-hazardous waste

The collection of solid urban waste is usually organised through the use of bins positioned along the streets of residential areas.

The operators, who travel on lorries equipped for the operation, drive along the streets at regular intervals, collecting the rubbish contained in the bins and taking it to the depots appointed for disposal, where it is separated.

In recent years, there has been a progressive increase in the production of urban waste.

This is why the waste collection and disposal system used up to now has become progressively inefficient and more effective and rational solutions to the problem are required.

A system that rationalises the collection of solid urban waste has been designed, guaranteeing collection only when necessary, preventing accumulation and cutting system management costs. The system, which has already been successfully tested in various countries throughout the world, envisages the use of **underground waste collection depots**.

These consist of a stainless steel tower installed on the road surface. Each tower usually has three parts: a display, an area which houses the compartment for the electronics/automation/remote-control and a hole to introduce the waste.

The waste introduced through the hole is collected in one of the bins below it.

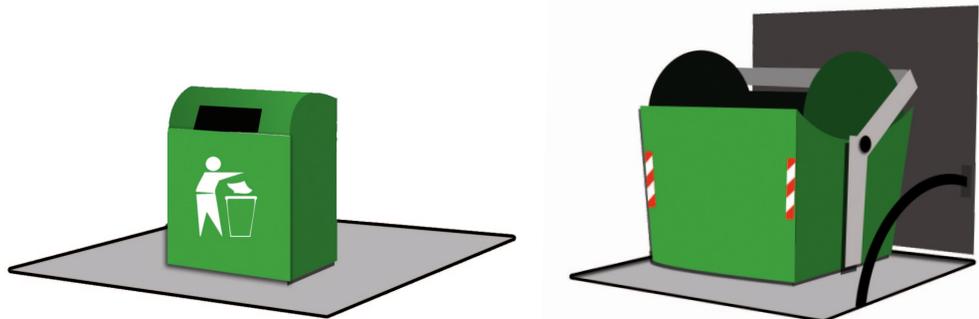
When the rubbish reaches a pre-set level, it is compacted by a press.

When the compacted rubbish reaches a limit volume, an electronic control unit sends a signal to the waste collection and sorting plant, which immediately sends out a lorry.

At the time of collection, the portion of road surface between the two pieces of equipment is lifted by hydraulic arms.

To measure the level of rubbish inside the underground bins, ultrasound is the most appropriate technology.

It is capable of perfectly measuring objects, regardless of the colour, shape or material, unlike photoelectric technology for example. The sensor positioned in the upper part of the underground bin issues an acoustic wave which, after reaching the pile of waste, returns to the sensor, causing the switching of the output if the waste has reached the level selected.



The sensor output is then processed by the electronic control unit connected to it, which calculates the volume of waste deposited inside the bin.

When it reaches 80% of its capacity, the control unit issues a first alarm signal.

A second alarm is issued when the capacity limit is about to be reached.

The excavation required to house the machine usually occupies a volume of about 30 m³ with a length of 3.5 m, a width of 3.5 m and a depth of 2.30 m.

The M18 UK1F cylindrical ultrasonic sensor is characterised by a high capacity of 2.200 mm, which makes it possible to reach the depth required by the system.

The capacity of the Micro Detectors sensor is much higher than that of traditional direct diffusion sensors with an M18 diameter, which reach an average 1,300 mm.

This makes it possible to fit the UK1F sensor in place of the M30 ultrasound sensors frequently used for this specific application.

The solution proposed by M.D. Micro Detectors is economically beneficial, as the price of an M30 diameter sensor is higher than that of an M18 diameter sensor and the reduced size of the UK1F allows its use where space is restricted.

The M18 UK1F cylindrical sensor is **completely resin-coated, and the IP67 level of protection makes it suitable for operation in dusty environments.**

cULus certification also makes the product suitable for the United States market and Atex class 3 certification for gas and dust allows its use in areas where there is a very low risk of explosion.

The **window regulation mode** installed in the sensor enables the selection of the two levels required to send the alarm signals at the waste management plant.

Adjustment is performed using the **teach-in button** which, positioned on the side of the body, is easily accessible by the operator who can easily select the working range.

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