

TagMaster AB

MarkTag™ HD S1455

Heavy Duty R/O Card

MarkTag S1455 is a 2.45 GHz identification tag that can be read at a distance, also if several tags occupy the reading zone. It is specially designed for tough environments and high temperatures. Typical applications are indoors in heavy industry or outdoors mounted on sea containers, trains, trams, buses trucks and lorries.

Each tag has been permanently programmed with an 8 decimal number from the factory, and this "mark" is unique to all tags in the Confident family.

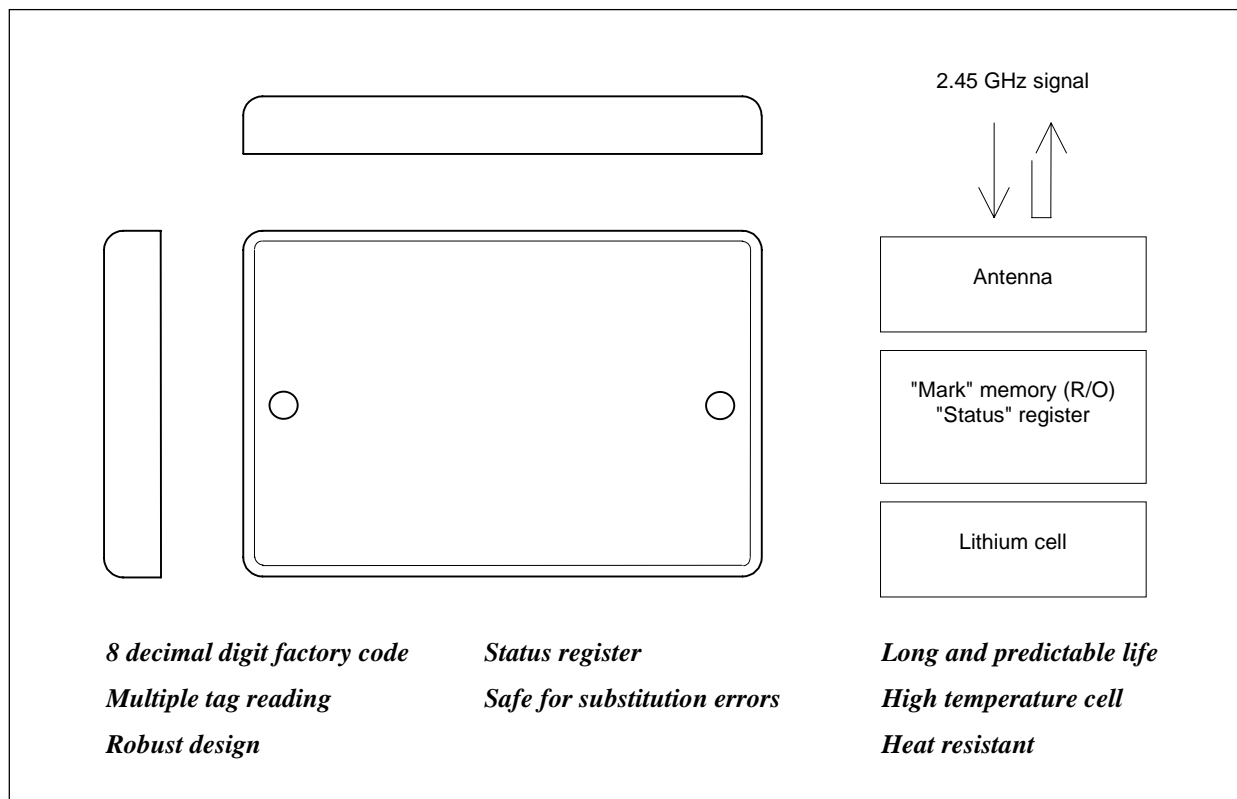
The programmed code comprises a 32 bit checksum for automatic verification of the "mark", thereby effectively eliminating substitution errors even if the tag is far away or when several tags are read in the same zone.

An environmentally harmless lithium cell gives long reading range and a high speed, and the cell life is independent from how often the tag is read.

The cell resists long term operation at elevated temperatures. When the capacity is about to run out, a status bit is set to give automatic warning to the user via the tag reader.

MarkTag S1455 is mounted on any surface with M4 screws or adhesive tape.

The design is vibration resistant, watertight, corrosion free, UV stable and withstands chemicals. The front side can be printed according to user requirements. The rear side label is printed with type code and serial number.



CONFIDENT

Reading range

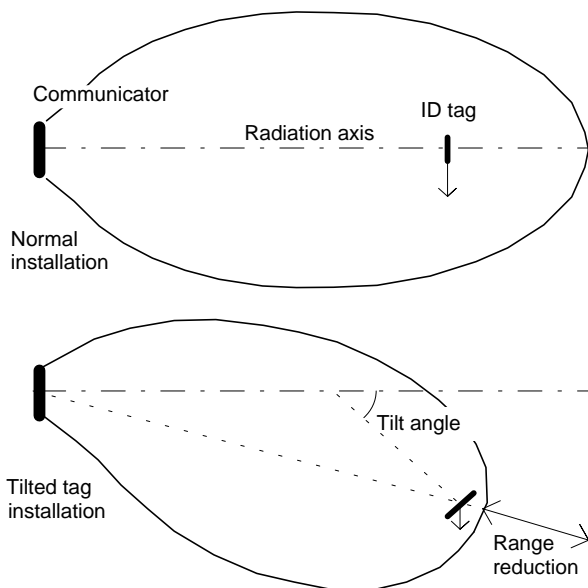
MarkTag S1455 receives and reflects its signals through the front panel and rejects signals in the back direction. The maximum reading range is defined by a number of factors. All resulting in an R parameter for the Confident Tag and Confident Communicator combination in use. Multiply these factors and you get the resulting reading range in meters.

Example according to the tables on respective datasheet's last page: The $R_{1455, \text{high speed}}$ for S1455 is 1.25 and the R_{1500} for the S1500 communicator is 2.7, resulting in a reading range of $1.25 * 2.7 = 3.4$ meters

The tag reads at all distances from the maximum reading distance down to zero. The maximum reading range can be reduced by power and sensitivity setting commands in the communicator.

The lobe is unaffected if the tag is mounted on a metal surface, and non metallic materials in front of the tag usually have little effect on the range.

If the communicator has circular polarisation, like WiseMan S1500 and WatchMan S1501 have, the reading range will be insensitive to rotation around the communicator's radiation axis.

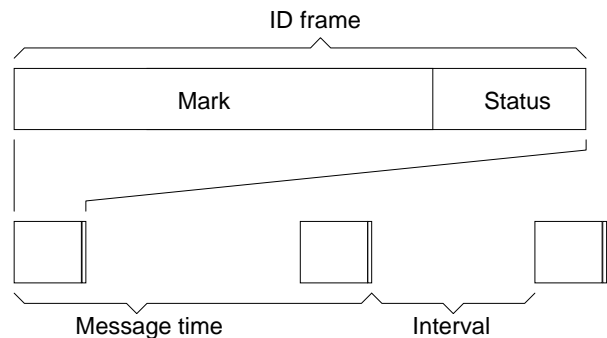


If the tag is very tilted in relation to the radiation axis, the shape of the communication zone will be modified. The range reduction is approximately 30 % if the tag is tilted by 45°.

The figure shows the situation with an ellipsoid lobe communicator, such as WiseMan S1500 or WatchMan S1501.

Communication

The ID tag repeatedly reflects information to any illuminating communicator. This reflection is wide band, i.e. reading works on all channels within the frequency band. If communicators at different channels simultaneously illuminate the tag, it will be safely read by all of these without interference.



Reflections comprise the factory coded "mark" number from the R/O memory, including a 32 bit checksum, and the "status" field. A "mark" + "status" sequence is called an "ID frame".

The ID frame is reflected from the tag with random intervals. An interval plus leading and trailing ID frames is called a "message time".

The maximum message time (T_{mm}), that is the longest time that can ever occur to transfer two complete ID frames with an interval in between, is always less than 150 ms. The average time is however only 80 ms, which means that the tag reflects its ID frame about 12 times every second.

Tag life

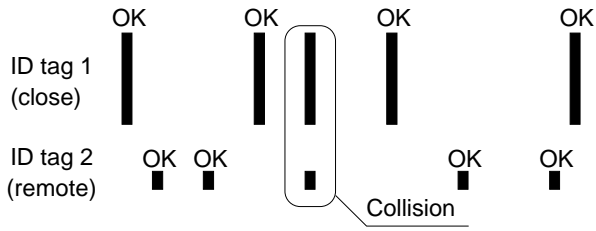
The lithium cell life is typically 10 years. Since the ID tags are always "awake" and reflect their data, the cell life is independent of how often the tags are read. Electromagnetic interference cannot "wake up" the tag and cause unintended discharge.

The lithium cell is specially designed for long term, high temperature operation, such as when the tag is installed in production lines with drying ovens. The cell in itself has a capacity deterioration of about 0,5% per year and if stored at 85°C for 2.000 hours, the capacity loss is only about 10%.

The cell is from a manufacturer that has life recordings spanning up to 15 years for the category of lithium cells used in S1255. The lithium cell has been qualified against the UL safety standards and does not contain corrosive or toxic active materials.

Multiple tag operation

Since S1455 emits its ID frames at random intervals, it is possible to read several tags at the same time as is shown on the picture below:



When collisions occur, a checksum algorithm in the communicator cancels these ID frames.

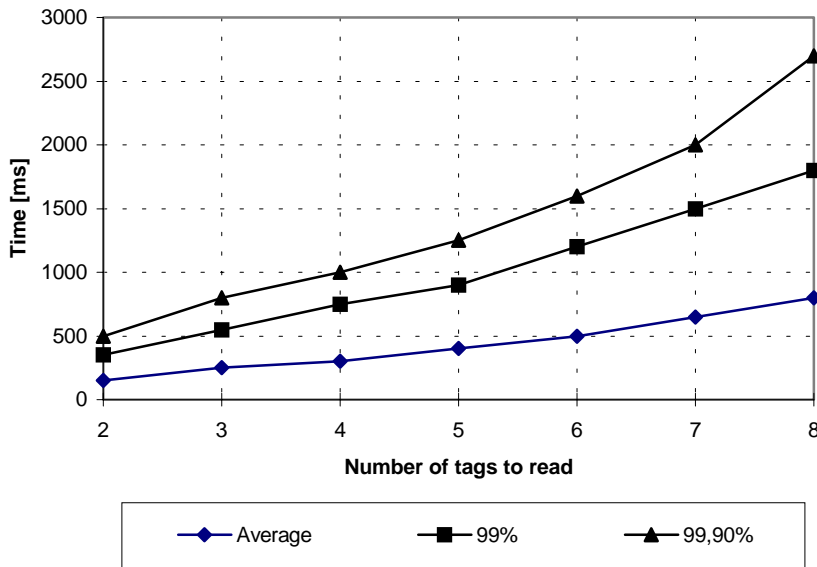
In a worst case situation, e.g. if the tags would all be remote and at the range limit, or subject to strong interference, the likelihood for a substitution error (wrong interpretation) is less than one in $5 \cdot 10^9$ read tags thanks to the 32 bit checksum.

This means that in all practical cases it can never happen that an ID tag is wrongly interpreted.

The time to read all tags in the zone is shown below.

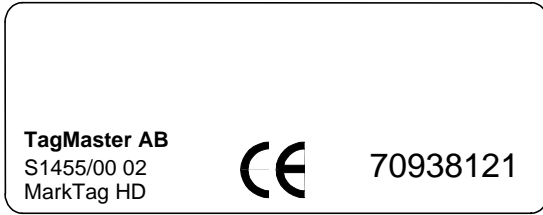
<u>Tags in the zone</u>	Average (ms)	99% (ms)	99,9% (ms)
2 tags	150	350	500
3 tags	250	550	800
4 tags	300	750	1000
5 tags	400	900	1250
6 tags	500	1200	1600
7 tags	650	1500	2000
8 tags	800	1800	2700

Tag reading time



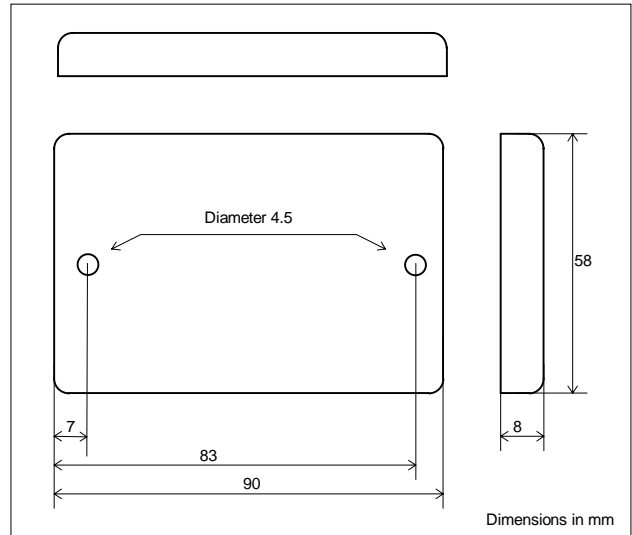
Mechanical data

Product information according to the figure below is printed on the MarkTag rear side label.



For security reasons, there is no relation between the serial number and the 8 digit electronic “mark“. Both are running numbers that never are repeated.

The revision code is for internal use only.



Weight 60 grams

Casing colour Black
Casing material Polymer
Label material, rear Polyester

Communication range data

Reading range parameter: $R_{\text{low speed}}$ -
 $R_{\text{high speed}}$ 1.25 (3.4m with S1500 and S1501, 5.0m with S1503)
Writing range parameter: W -

The interpretation of the R and W parameters are described in the Communicator data sheets S1500, S1501 and S1503.

Environmental data

Cold IEC68-2-1 Ad	- 40 °C	Shock IEC68-2-27 Ea	500 g 1 ms, 3 x 3 dir	Immunity prETS 300 683	Acc. to CE leg.
Heat IEC68-2-2 Bd	+ 85 °C	Bump IEC68-2-29 Eb	40 g 6 ms, 1000x 3 dir	Emission I-ETS 300 440	Acc. to CE leg.
Sealing IEC 529	IP 67	Vibration IEC68-2-6 Fc	10-500Hz, 5g 10 sweeps x 3dir	Chemical Resistance: Oil, grease Petrol	Resistant Resistant
		Solar radiation IEC68-2-5 Sa C	1120 W/sqm 56 days	Trichlorethylene Acid Alkali (bases)	Resistant Resistant Resistant

Options

The ordering code of the product in this datasheet is “MarkTag HD S1455/00”.

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This document

Specifications are subject to change without prior notice.

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