Construction Tools PC AB

MDS system manual

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1 Overview

MDS system measures distance between its nodes, which consists of three parts; one MDS-anchor mounted inside a remote control called MC11-OPS and two MDS-tags placed in the front and rear in a moving machine to which distance is measured.

MDS is an acronym for Machine Distance Sensor.

2 Operating description

MDS uses Ultra-Wide Band (UWB) radio technology to measure ToF (Time of Flight), which is then converted to distance.

All MDS are identical in terms of electronic HW and SW, with the exception of anchor and tag setting.

MDS distance data is used for perimeter fencing around dangerous machines as seen in picture below. Safe perimeter used is minimum 2m. If the remote control is within 2m from the machine, the ECU (main computer inside the machine) will stop the machine for operator safety. The ECU is continously receiving distance data from MDS-tag via CAN bus

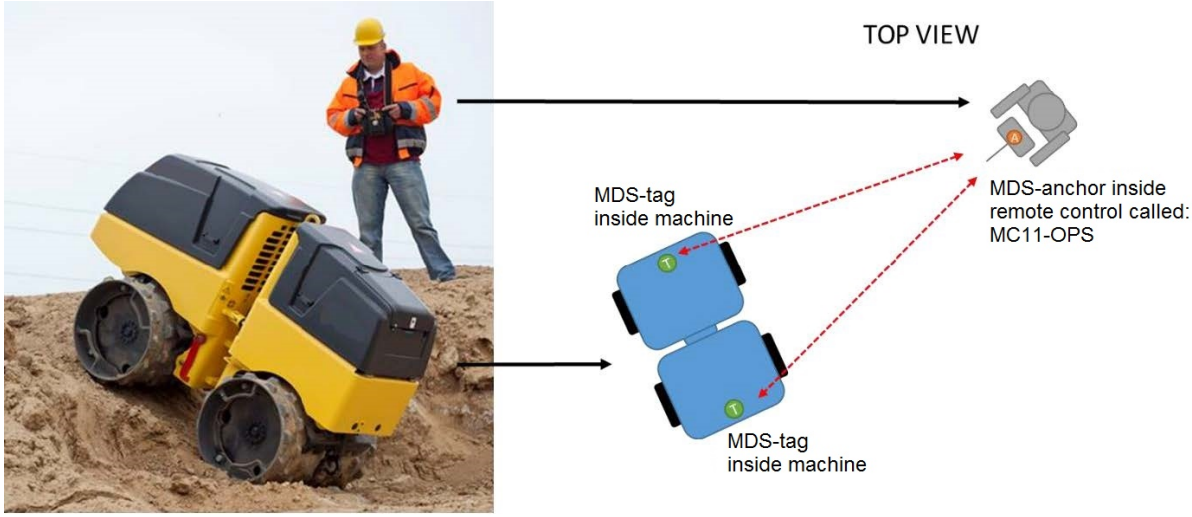

Figure 1: Real life setup.

MDS measures distance at 2Hz with +/-10cm accuracy.

It has a range of 30m line of sight.

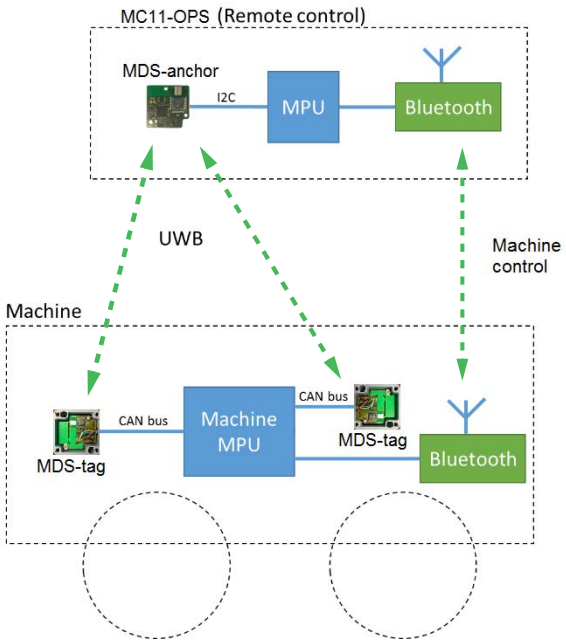

Figure 2: Principle diagram.

Control of machine is transmitted via Bluetooth from remote control of machine. The MDS system is paired at the same time as the Bluetooth is paired.

All processing and validation of distance data from MDS is done by ECU inside the moving machine.

MDS is only a support sensor system, helping the user staying at a safe distance, and should only be used by correctly trained machine operators.

3 MDS modules

The MDS-anchor is mounted inside the remote control called MC11-OPS. The MDS-anchor receive power from the remote control (either battery or control cable).

There are two MDS-tags placed inside casings, using connectors for installation in the machine. These units are called MDS and they are placed in the front and rear of the machine. The operating distance to the machine is minimum 2m.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

NOTE:
Changes or modifications made to this equipment not expressly approved by Construction Tools PC AB may void the FCC authorization to operate this equipment.

NOTE:
This device complies with Part 15 of the FCC Rules and with Industry Canada licence-exempt RSS standard(s).
Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.
L'exploitation est autorisée aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage, et
(2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.