AGR-300

Rev. D

User Manual

V1.2

February 22, 2024

Revision History

Version Number	Date	Notes
V0.1	November 15, 2023	Draft
V1.0	January 26, 2024	Version for Certificate
V1.1	February 8, 2024	Add FCC notice
V1.2	February 22, 2024	Add IC notice in English and French

IMPORTANT NOTICE

This device complies with Part 15 of the FCC rules. 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.

This equipment has been tested and found to comply with the limits for a Class B device (commercial or industrial use), pursuant to Part 15 of 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 communication. 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/her own expense.

NOTE:

- Only peripherals complying with FCC limits may be attached to this equipment. Operation with non-compliant peripherals or peripherals not recommended by Ainstein.
- Modification of this device may void the user's authority to operate the equipment
- Maintain 20cm of separation for the device during operation.

IMPORTANT NOTICE

AVIS IMPORTANT

[English]

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device."

[Français]

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

1. Background and Application

The AGR-300 radar is used to detect the spreading residue of a harvester, and provide the detected data to the harvester via CAN. A harvester then uses this data to determine how the rpm of the residue blower motors needs to be adjusted in order to provide for a more even residue spread.

2. System Specification

Table 2.1 Key AGR-300 Specifications

Product Specifications	Short-Mid Range Radar for Detecting Spreading Residue in Agriculture Application	
Mechanical	Ingress Protection	IP69K
	Operational Temperature	(Ambient) -40 ° ~ +85 °
	Dimension	156 * 124 * 49 mm
	Weight	1 KG/2.2 LBS
Electrical	Power Supply	12 V Unregulated Battery (9 ~ 16 V)
	Connector	DT04-12PA-CE08
Communication Input/Output	CAN	Baud Rate: 500 kb/s
	BroadR-Reach	For engineering purpose only
	USB2.0	For debug purpose only
	Hardware Addressing	2-pin for CAN ID

3. Communication Protocol

3.1 CAN

In the AGR-300 radar, CAN is the primary communication interface between Radar and Combine Harvester with two different communication protocols run on the CAN interface: a) SAE J1939; b) Unified Diagnostic Services (UDS) , on the CAN interface. They are co-existing in the AGR-300 firmware and are used for different tasks.

3.2 BroadR-Reach

In the AGR-300 radar, BroadR-Reach is the one of engineering interfaces (NO production application). A GUI provided by Ainstein AI allows communication via Broad-R. The communication protocol is fully defined by Ainstein.
For details on the communication protocol, refer to the communication protocol documentation.

3.3 USB2.0

In AGR-300 radar, USB2.0 is the debug interface that allows an authorized user to dump data from radar onto a USB stick drive. For details of how to enable USB2.0 interface, please reach out to Ainstein for more information.

4. Mechanical Dimension

The mechanical dimension information can be found in the 2D Mechanical Drawing design file. A screenshot is shown below.
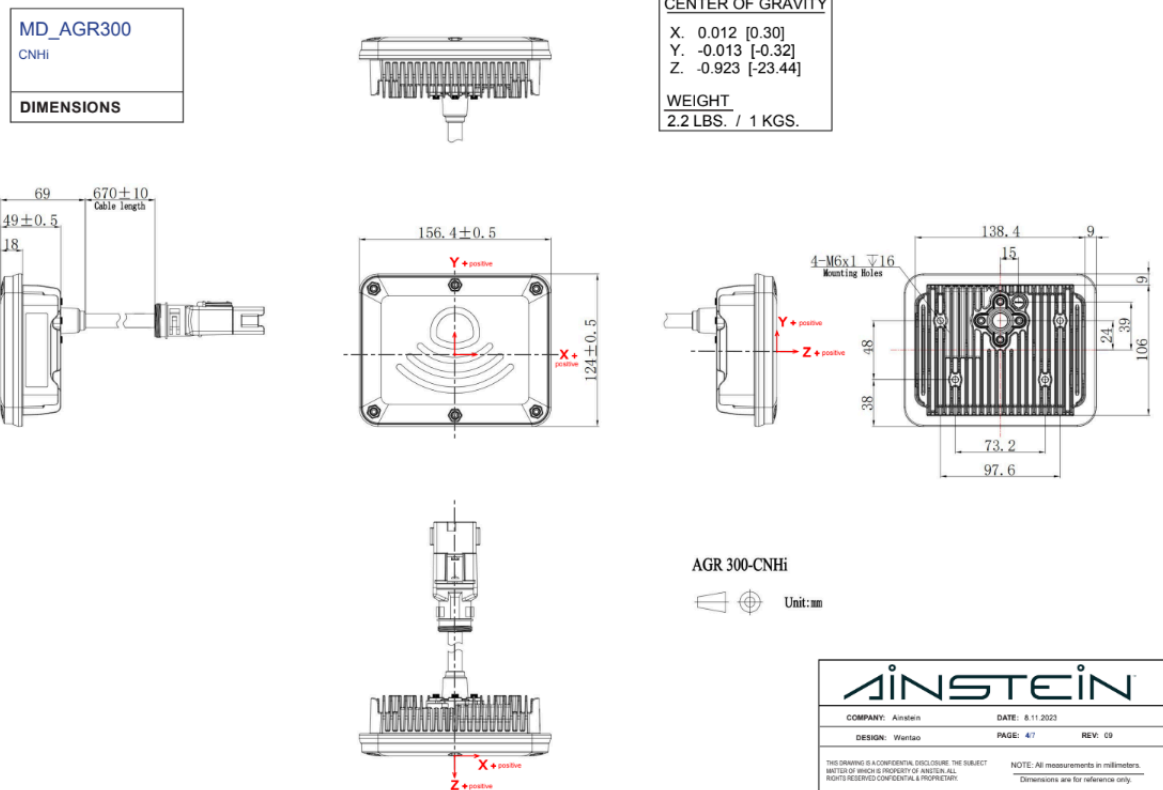
Figure 4.1 AGR-300 mechanical dimensions

5. Installation Instructions

Two AGR-300 radars are installed on a combine harvester, one on each side of the discharge chutes, with the following installation orientation:
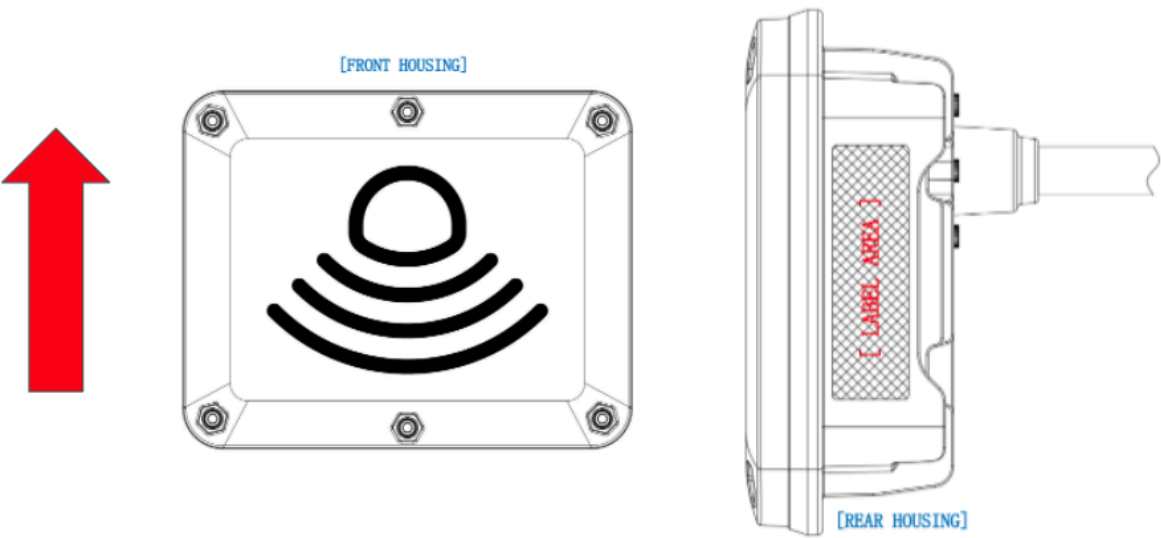
Figure 5.1 AGR-300 installation orientation

The AGR-300 uses a Deutsch connector: DT04-12PA-CE08. The pin definition can be found in the figure below. Users shall use the mating part to make the physical connection between the harvester's harness and the AGR-300.
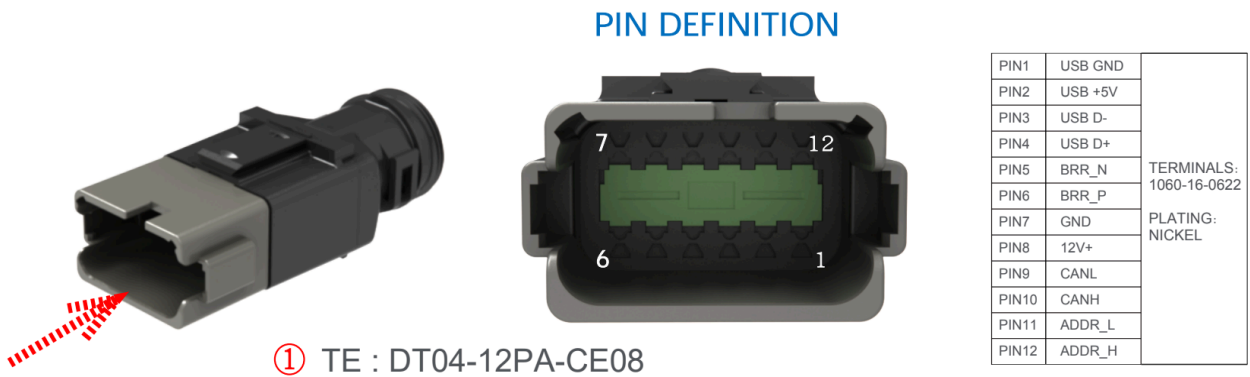
PIN DEFINITION

① TE : DT04-12PA-CE08

PIN1	USB GND	
PIN2	USB +5V	
PIN3	USB D-	
PIN4	USB D+	
PIN5	BRR_N	TERMINALS: 1060-16-0622
PIN6	BRR_P	
PIN7	GND	PLATING: NICKEL
PIN8	12V+	
PIN9	CANL	
PIN10	CANH	
PIN11	ADDR_L	
PIN12	ADDR_H	

Figure 5.2 AGR-300 connector pin assignment