SAGE PARTS

PRODUCT SHEET

AIRCRAFT ANTI-COLLISION SYSTEM

ASD - AIRCRAFT SAFE DOCKING RETROFIT KIT

FINALLY, THERE IS ASSURANCE THAT NO AIRCRAFT WILL DEPART WITH UNREPORTED DAMAGE

ASD inside

The **Sage Parts ASD Retrofit Kit** maximizes the safety and efficiency of GSE-aircraft docking procedures.

This state-of-the-art system minimizes the potential of collisions with an accident avoidance technology that assists and prevents the operator from approaching an aircraft too fast.

SPEED CONTROL, STOP, AND RECORD

The **Sage Parts ASD** system creates a virtual "safe docking area", that automatically limits the speed of the vehicle. The system is activated by the operator at predetermined operating zones as they approach the aircraft. Once activated, the system takes over to ensure a safe approach to the aircraft.

The system provides extensive monitoring and reporting with a special "black box" that records all events and incidents.

FEATURES

- SPEED CONTROL PREVENTS THE VEHICLE FROM APPROACHING AIRCRAFT TOO FAST
- 3D SENSING CAMERA DETECTS OBJECTS WITHIN 23 FT (7 M)
- IMPACT SENSING/STOP BUMPER
- SAFETY MODE FLASHING LIGHT ALERT
- SPEED LIMIT WARNING SYSTEM
- ELECTRONIC STOP - WILL STOP THE VEHICLE IF THERE IS SLOW OR NO REACTION FROM THE OPERATOR WHILE IN SAFE-DOCKING MODE
- BUILT-IN BLACK BOX LOGS THAT EVENTS AND INCIDENTS (IMPACT, UNIT HOURS, ENGINE RPM AND GSE VEHICLE SPEED)
- EVENT DATA IS EASILY ACCESSIBLE BY A USER-FRIENDLY GRAPHIC INTERFACE

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OPTIMIZE PRODUCTIVITY, INCREASE SAFETY, PREVENT DAMAGE

HOW ASD WORKS FOR YOU

ASD inside

- Normal ramp operation speed
- No specific limitation in place

SAFETY AREA - OPERATOR ACTIVATION

- Speed limited at 3 mph (5 kph)
- Visual alert to management (flashing beacon)
- Sensitive bumper active

DOCK AREA - ASD ENGAGED

- Approach speed limited to 0.4 mph (0.7 kph)
- Impact monitoring (shock sensor)
- Sensitive bumper active

When the **Sage Parts ASD Retrofit Kit** is activated, a dedicated flashing beacon indicates that the unit is in ASD assisted mode and the vehicle speed is limited to 3 mph (5 kph). The onboard advanced 3D sensing camera detects any obstacle in front of the equipment up to 23 ft (7 m).

Within the safe “dock area” or approaching closer than a few feet (1 m) from the aircraft or any other obstacle, the ASD system automatically limits the speed of the vehicle to less than 0.4 mph (0.7 kph).

A specially designed impact bumper detects when the vehicle touches the aircraft and makes a complete stop. This bumper is specifically designed to not cause any damage to the aircraft.

In the event of a larger impact, an onboard shock sensor alerts the system to shut down the vehicle, and will require a supervisor or manager to reactivate it. This feature is an additional safety precaution to ensure proper inspection of the aircraft.

ASD ON THE DASHBOARD

ASD system can be activated by the operator at predetermined operating zones as they approach the aircraft “safe area”.

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THE 3D ADVANTAGE

STATE-OF-THE-ART PHOTOELECTRIC 3D SENSOR DETECTS IN FRONT OF THE EQUIPMENT UP TO 23 FT (7 M)

The **Sage Parts ASD Retrofit Kit** uses a state-of-the-art photoelectric 3D sensing camera that accurately measures a predetermined distance between the vehicle and targets that are in the field of view. This is the "eye" of the system that continuously monitors the environment for real-time feedback. The 3D camera monitors a wide field of view and is specifically designed to perform in harsh ramp environment conditions.

The 3D camera is equipped with onboard self-diagnostics to ensure it is always functioning properly. In the case of a malfunction or operating in very extreme conditions, the camera will detect and automatically default the vehicle to the safest low speed operation mode.

THE SINGLE SENSOR ADVANTAGE

Sage Parts ASD is based on a single 3D sensing camera rather than multiple sensors or radars, which are more susceptible to interference due to weather and other environmental conditions. The use of a single sensor is a key advantage on the ramp in avoiding the increased potential of technical failure that can happen with radar or laser-based systems.

THE CRITICAL "BLACK BOX"

DATA COLLECTION TO CREATE A HIGHER LEVEL OF ACCOUNTABILITY

Another critical component of the **Sage Parts ASD Retrofit Kit** is the "Incident Black Box", which measures and logs:

- IMPACT
- ENGINE RPM
- VEHICLE SPEED
- OVERSPEED
- DECELERATION
- CAMERA WATCHDOG FEATURE
- AIRCRAFT/OBJECT DETECTED
- BUMPER CONTACT
- ACTUAL ZONE
- ACTUAL MODE
- F·N·R POSITION
- F·N·R STATUS

All data is accessible through a very simple, user friendly graphical interface.

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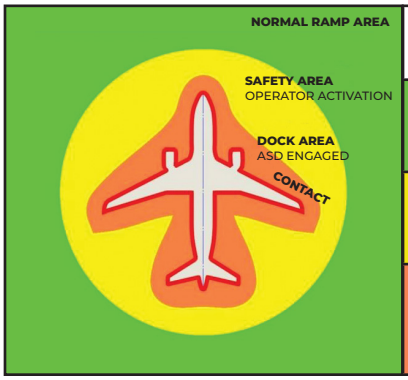
SPECIFICATIONS

AREA MANAGEMENT



AREA	SPEED mph	SPEED kph	SUPERVISION	3D CAMERA	SENSITIVE BUMPER	IMPACT RECORDER
Ramp Area	15.5	25.0	No	Inactive	Inactive	Inactive
Safety Area	3.1	5.0	Yes: Green flashing beacon active. Buzzer active.	Active	Active	Active
Dock Area	0.43	0.7	Yes: Green flashing beacon active. Buzzer active.	Active: Detecting fuselage and limiting speed	Active	Active

SAGE PARTS ASD RETROFIT KIT STANDARD FEATURES

ASD inside

3D CAMERA

One single 3D camera to monitor a wide field area in front of the vehicle, up to a distance of 23 ft (7 m) monitoring every 150 milliseconds.

FRONT BUMPER

Sensitive front bumper to stop the unit when touching the aircraft.

IMPACT AND EVENT RECORDER

A "Black Box" monitors all events above a certain value and stops the unit if the shock could have potentially damaged the aircraft.

EASY TO OPERATE DASHBOARD BOX

- 1 button to activate the ASD
- 1 light to advise if the speed of the unit is correct, or if there are errors.
- 1 buzzer to advise operator when speed is above the authorized limit

sageparts.com / info@sageparts.com

30 HUB DRIVE, MELVILLE, NY 11747 | +1.877.SAGE.877 | +1.631.501.1300 TEL | +1.631.501.1619 FAX