

DEPARTURE ANGLE MEASUREMENT SYSTEM

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PLIANT DAMS



PRODUCT DESCRIPTION

Pliant's latest product in offshore is our DAMS (Departure Angle Measurement System). Designed for cable laying vessels, it allows accurate, reliable and responsive measurement of the departure angle of cables.

This document provides details of the DAMS and features three available configurations.

DETAILED FEATURE SPECIFICATIONS

Device Housing

The housing of the DAMS device is RVS316 material, IP66-grade and water-proof. The service access cover is tightly sealed to avoid any water in the cabinet. The windows are fitted with special materials for optimal infrared laser transparency and are sea water-proof and UV-proof.

Window Protector

The DAMS device is equipped with a window protector. The purpose is twofold: avoid sunlight into the laser sensors and prevent the windows getting dirty from sea water.

Power

The basic and standard editions are both equipped with a single durable Power Supply Unit (PSU) for all internal devices. The premium edition is redundant and has two PSU's for powering the internal devices. An additional PSU is installed for cooling and heating power.

Temperature Control

The DAMS device is equipped with one or two active thermoelectric cooling/heating units. The primary goal is to keep the internal components in the correct temperature range. In normal conditions a single unit can provide sufficient cooling or heating. The premium edition features an extra unit for extreme

low or high temperatures. The temperature during normal operation is kept between 10 °C and 30 °C.

Humidity Control

The premium edition features two thermoelectric units, which also allows dehumidifying. It will keep the relative humidity below 50%. By simultaneously heating and cooling, water will condense on the cooling unit. This condensation water is collected in a special water reservoir. The water level in this reservoir is actively monitored. In normal situations dehumidifying is never required.

Water Detection

The DAMS device is water-proof and IP66-rated. Entry of water cannot occur in normal conditions. However, in case water enters the device unexpectedly, the device is equipped with a water level detector sensor. To prevent damage to the electrical

components an alarm will be raised to the service software or vessel control system.

Calibration

After mounting the DAMS to the vessel the system will be calibrated. Pliant has developed a cutting-edge calibration algorithm allowing extremely fast and accurate calibration. This ensures the installation and commissioning can be performed in a short timespan, typical within one day.

For further optimized calibration, the DAMS can incorporate the inclination measurements of the ship to ensure correct calibration with respect to the orientation of the ship.

Optimized Internal Calibration

The standard and premium edition of the DAMS are internally calibrated during assembly, to limit the impact of differences between the laser measurement devices. This increases the accuracy even further.

Multi-vessel Support

The DAMS supports multiple vessel configurations. During calibration a vessel specific configuration is stored. When the DAMS is used for multiple vessels the system has to be calibrated once per vessel and after that it allows easy switching between



The Pliant DAM device fully operational

different vessel configurations.

Alignment Lasers

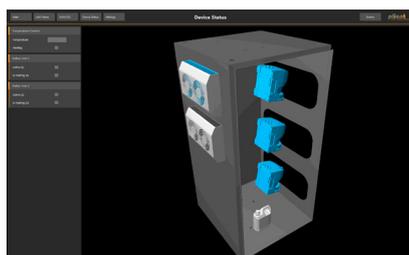
To visually inspect the correct alignment of the DAMS two alignment lasers are mounted in the DAMS. The lasers point at specific fixed (marked) spots on the vessel, to see if the DAMS is still correctly aligned.

Inclino Angle Correction

The DAMS can be optionally equipped with an inclino measurement system to ensure all measurements are with respect to the world coordinate system, if the ship's inclination measurements are not available. The measurement angles can be corrected for the ship's roll and pitch in the DAMS if required.

3D Engine

The DAMS uses an advanced 3D engine which allows high-precious measurements exceeding the conventional measurement. Cables are measured based on shape and are actively tracked in the 3D-space. This ensures a robust, stable and predictable measurement.



Service software: device status screen, blue indicates operational unit

Configurable Filtering

The integrated filtering in the DAMS is optimized for low-latency and is configurable. Depending on the application filters for either lowest latency of smooth signals can be configured.

Bad Weather Mode

The DAMS has an integrated software module for harsh weather conditions, like heavy fog, rain or snow. In this mode multiple measurements are combined to suppress false measurements due to raindrops or snowflakes.

Signal Communication

The default communication method of measurement and status signals is the Bachmann SVI communication protocol. Optionally other communication standards are supported, such as NMEA, CAN or a dedicated Ethernet protocol.

DAMS Software Suite

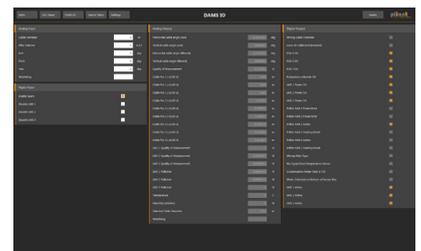
The DAMS can be provided with a software suite, with service and maintenance software. This software shows a live-view of the current measurements in a 3D viewer. All relevant status information from the system is displayed. The software allows configurations and advanced settings to be changed. This software is also used for remote assistance by Pliant if necessary.

Data Logging

The DAMS software suite encompasses data logging software which is able to log all data in a standardized format, such as csv. The accurate time-stamped data is ideally for survey usage and exact matching with other logged data from the cable laying process. The data logging software also stores time-stamped video images from the video camera if provided.

Live-View Vision Camera

The DAMS can be optionally provided with a high-quality color vision camera. This camera can be used as a live-view for the operator on the operator screen. The live-view is available as a standardized IP-stream to be compatible with all kinds of digital display systems. The time-stamped images from the live-stream will be stored by the data logging software for survey purposes.



Service software: I/O status screen with all relevant measurements and status signals

EDITION CONFIGURATIONS

	BASIC	STANDARD	PREMIUM
Dimensions	1200 x 600 x 650 mm	1200 x 600 x 650 mm	1200 x 600 x 650 mm
Weight	±150 kg	±150 kg	±200 kg
IP Class	IP66	IP66	IP66
Laser pointers	None	2x Class 2	2x Class 2
Communication	Bachmann SVI	Bachmann SVI, NMEA	Bachmann SVI, NMEA, CAN, Ethernet
Operating frequency	5 Hz	10 Hz	25 Hz
Internally calibrated	No	Yes	Yes
Vertical accuracy			
Absolute	±2.0°	±1.5°	±0.5°
Relative	±0.5°	±0.5°	±0.2°
Horizontal accuracy			
Absolute	±3.0°	±2.5°	±2.0°
Relative	±1.5°	±1.0°	±0.5°
Measurement range			
Vertical	+0° to +60°	+0° to +60°	+0° to +60°
Horizontal	+/-90° to +90°	+/-90° to +90°	+/-90° to +90°
Number of cables	1	1	2
Cable diameter range	75 to 500 mm	75 to 500 mm	75 to 500 mm
Field of view	130°	130°	130°
LIDAR Sensors	2x Sick LMS	2x Sick LMS	3x Sick LMS
Operating temperature			
External	-5 to +40 °C	-5 to +40 °C	-5 to +50 °C
Internal	+10 to +35 °C	+10 to +35 °C	+10 to +35 °C
Climate control			
Peltier cooling power	1x 245W	1x 245W	2x 245W
LMS heating power	2x 55W	2x 55W	3x 55W
Power supply	Single	Single	Redundant
Power consumption			
Typical	330 W	330 W	480 W
Maximal	750 W	750 W	900 W
Cooling/heating			
Typical	150 W	150 W	150 W
Maximal	275 W	275 W	600 W