

AMS - Ball Insertion Device

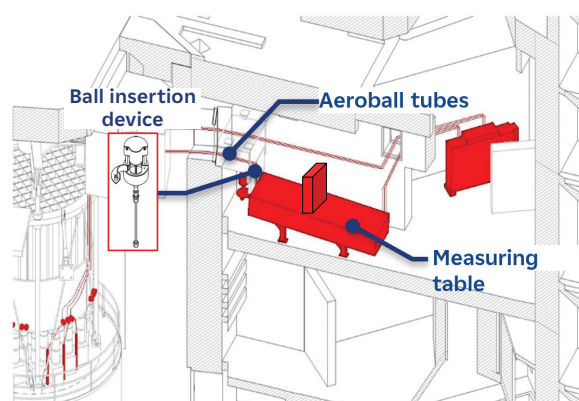
Auxiliary component of Aeroball Measurement System

Ball Insertion Device sets the standard for safe and efficient aeroballs loading into the AMS tables by real-time monitoring.

Challenge

In pressurized water reactors (KONVOI, EPR) the Aeroball Measurement System (AMS) provides crucial information on incore neutron flux distribution and is used for calibration of other key systems such as the Self-Powered Neutron Detector (SPND).

The Aeroball Measurement System (AMS) is an electro-mechanical, computer-controlled system. The AMS primarily operates by inserting aeroballs into the reactor core to perform measurements. Because the aeroballs are used regularly, they must be replaced periodically. Previous methods for exchanging aeroballs relied on vibration-based systems or high-pressure operations, both of which pose risks to operators and are time-consuming.



Solution

The Framatome solution consists of three main components:

> Dedicated control unit

This unit electro-mechanically controls the Ball Insertion Device, ensuring the safe and efficient insertion of a new stack of aeroballs into the AMS.

> Ball Insertion Device

This device enables the precise placement of aeroballs into the AMS table using a motor-driven spindle equipped with a specialized groove and positioned within an integrated funnel. The continuous rotation of the spindle ensures a smooth, uninterrupted flow of aeroballs into the groove, effectively eliminating any risk of clogging during operation. Additionally, a lockable filling lid integrated into the Ball Insertion Device prevents accidental ejection of aeroballs, thereby enhancing operational safety.

> Dedicated Endoscopic Camera

This camera ensures process integrity by providing real-time monitoring and post-operation inspection to confirm that all aeroballs have been successfully inserted into the tube. It is equipped with an integrated LED ring that provides optimal illumination of the device's interior during operation.

Together, these components deliver a reliable, safe, and efficient solution for aeroball insertion and monitoring within the AMS.

Customer benefits

- > Reduction of personnel radiation exposure because the fast operational process eliminates the need for nitrogen
- > Flexibility for preventive and corrective maintenance planning due to pressure-free insertion
- > Time saving through the reduction of number of operational tasks required
- > Easy use of the device due to a mobile design without the constraints of fixed-wall installation

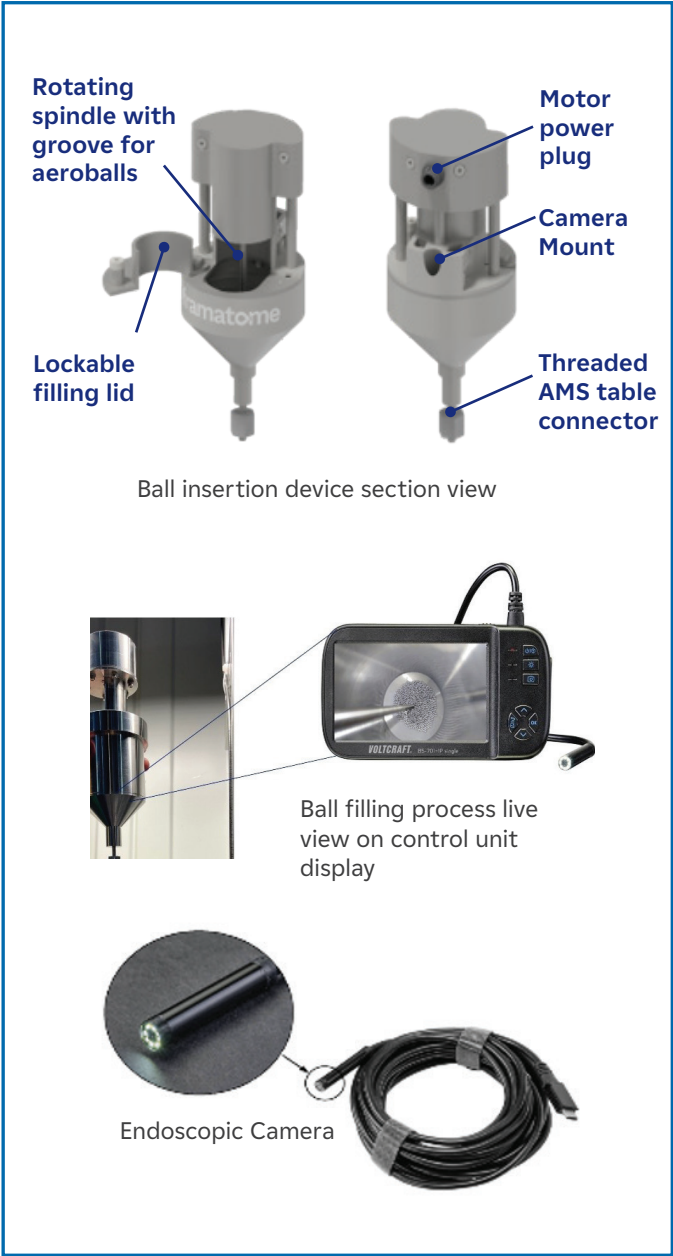
Technical information

Ball Insertion Device	
Length	157,9 mm
Width / Diameter	67,7 mm
Weight (empty)	784 g
Material	Stainless steel
Control Unit	
Dimensions (L x W x H)	200 x 105 x 34mm
Voltage input / output	3 V DC / 12 V DC
Battery type	AA Alkaline 1,5 V
Image resolution	1920 x 1080 p
Endoscopic camera	
Camera head Ø	8mm
Ingress Protection	IP67

Key figures

2.5 hours for preventive maintenance works
(instead of 8 with previous solution).

Less then **800g** per device



Features

- › System battery-based: No need of current circuit
- › Plug-and-play solution: No software installation
- › Ball filling process live view: With dedicated endoscopic camera

Contact: I&C@framatome.com
www.framatome.com

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