

# | Flow meter modifications

Improved performance for Marine and Land-based installations

## Flow meter modifications

Measuring and documenting the consumption of fuel onboard a vessel is becoming increasingly necessary to improve energy efficiency, optimise operations, reduce emissions, and minimise fuel costs. Furthermore, in maritime applications, compliance with the EU MRV and IMO data collection regulations requires accurate fuel consumption measuring.

The accurate measurement of fuel consumption is also being increasingly required on land-based installations, such as power plants, to improve operational efficiencies and minimise running costs.

Fuel handling systems incorporate numerous flow meters. When improved accuracy is needed, or when existing flow meters become outdated, Auramarine can help you to select the most suitable solution to suit your requirements. We provide flow meters that meet the requirements of ISO 8217 fuels. We also offer engineering preview services as well as design, drawing, documentation and part list services for any new setup and support you throughout the installation phase.

## Retrofit options

### Replacement of volumetric with mass flow meters

In order to replace a volumetric flow meter with a mass flow meter, typically some piping modifications are required as the size of the mass flow meter is usually larger.

In addition, a degree of integration is needed into the fuel handling system for effective operation.

### Upgrade of existing volumetric flow meters

Another possibility is to combine the measured density information with the volumetric information. In certain cases, this can be more cost-effective and the indications are that it is as accurate as mass flow meters under normal operating conditions. It is also suitable for low or high flows. The upgrade also requires certain re-cabling, engineering updates and integration within the fuel handling system to ensure effective operation.

### Separate flow meters for each consumer

Install separate flow meters for each fuel consumer. Auramarine offers expert engineering and design services to support any new setup.



#### Fuel consumption

- vs. payload
- vs. distance travelled
- vs. industry specific parameters

#### Regulations

- CIMO, C2, EEXI, CII

Operational cost awareness

Reporting to bridge/control room

Signal to enable remote reporting to shore

Engine health



# Your needs - your choices

## **From flange to flange**

The new flow meter can be installed within the skid, as a replacement for the previous one, or in an alternative location within the skid. In certain situations, the skid may not be able to accommodate the new flowmeter in the original space, especially if multiple new flow meters are installed. In these cases the additional flow meter(s) will be accommodated in a preferred area outside the skid, e.g. along the consumer specific inlet/outlet line for consumer-specific consumption measurement. The installation is always a safe flange-to-flange installation.

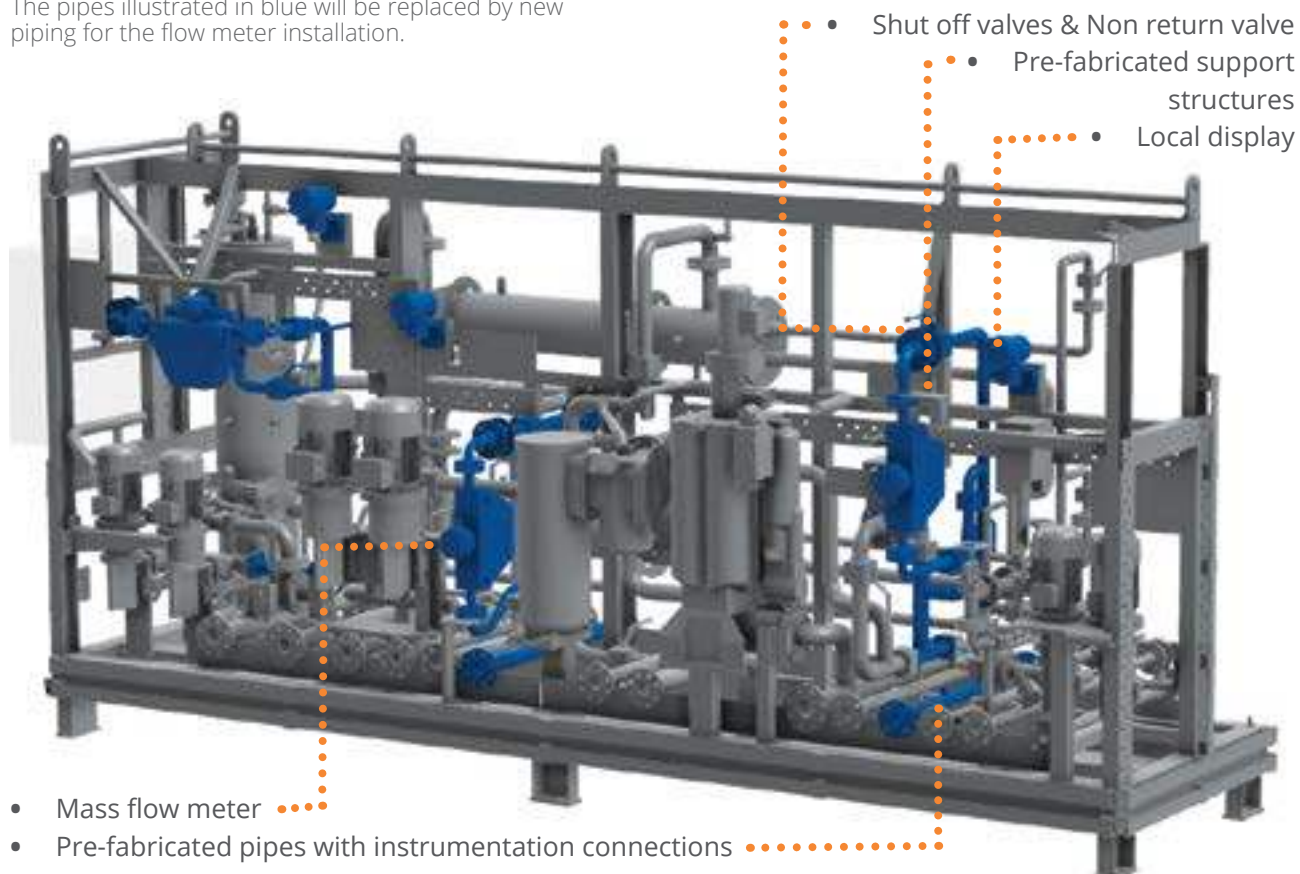
## **Turn-key from design to deployment**

We will provide the initial engineering review, design drawings, the piping and accessories on flange to flange basis. We will need the Auramarine serial number to access all relevant startup information in our database, and naturally we will update all related documentation accordingly. If you choose our turnkey installation, we will prepare everything for a smooth deployment. You can also benefit from our project support and technical advisory services.

It is also important to ensure that documentation is always up-to-date, providing the correct information on future spare parts administration, which will promote and support overall operational efficiencies. On a case-by-case basis, some minor adjustments to electric systems may be necessary, due to requirements from the automation system. These can be carried out as part of our turn-key delivery. However, automation system adjustments are not a standard part of Auramarine's delivery services.

At the time of installation, the specific engine and its fuel supply system must be shut down. Depending on the scope, the flow meter upgrade can be carried out during a longer port stay or at a planned drydocking. The price varies depending on the design, components required and scope of installation. Our strategic and diligent advanced planning, as well as prefabricated pipes and connections are essential for speeding up the installation process and reducing unnecessary downtime.

The pipes illustrated in blue will be replaced by new piping for the flow meter installation.



## Modification examples

### Bunker flowmeter

**Purpose:** Measure bunkering flow. A quick and easy way to enhance bunkering accuracy and documentation.

**Scope:** Mass flowmeter + transmitter + shut-off valve, product documentation.

**Procedure:** Startup information from client, design, package delivery to client.



- Installation
- Turn-key solutions
- Lifecycle services

- General Arrangement
- Electric Diagrams
- PI Diagram

## Volumetric flowmeter

**Purpose:** Provide improved accuracy for fuel measurement.

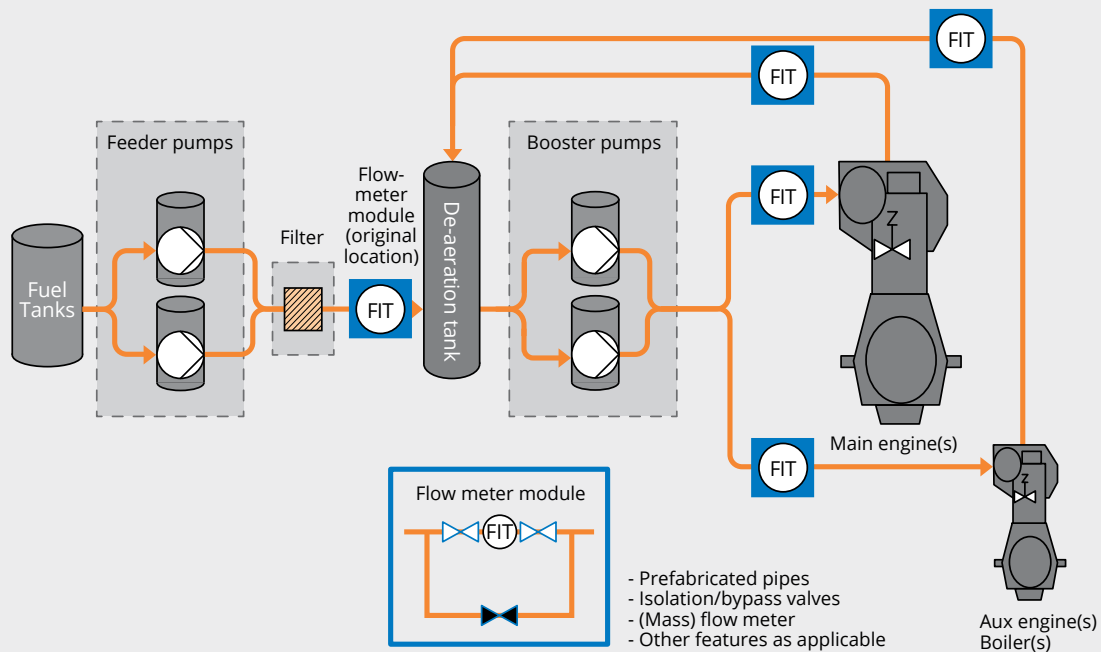
**Scope:** Volumetric flow meter with roller counter and housing with specified dimensions and flow rate. By-pass components as applicable and fulfilling classification requirements for each installation. Design documentation.



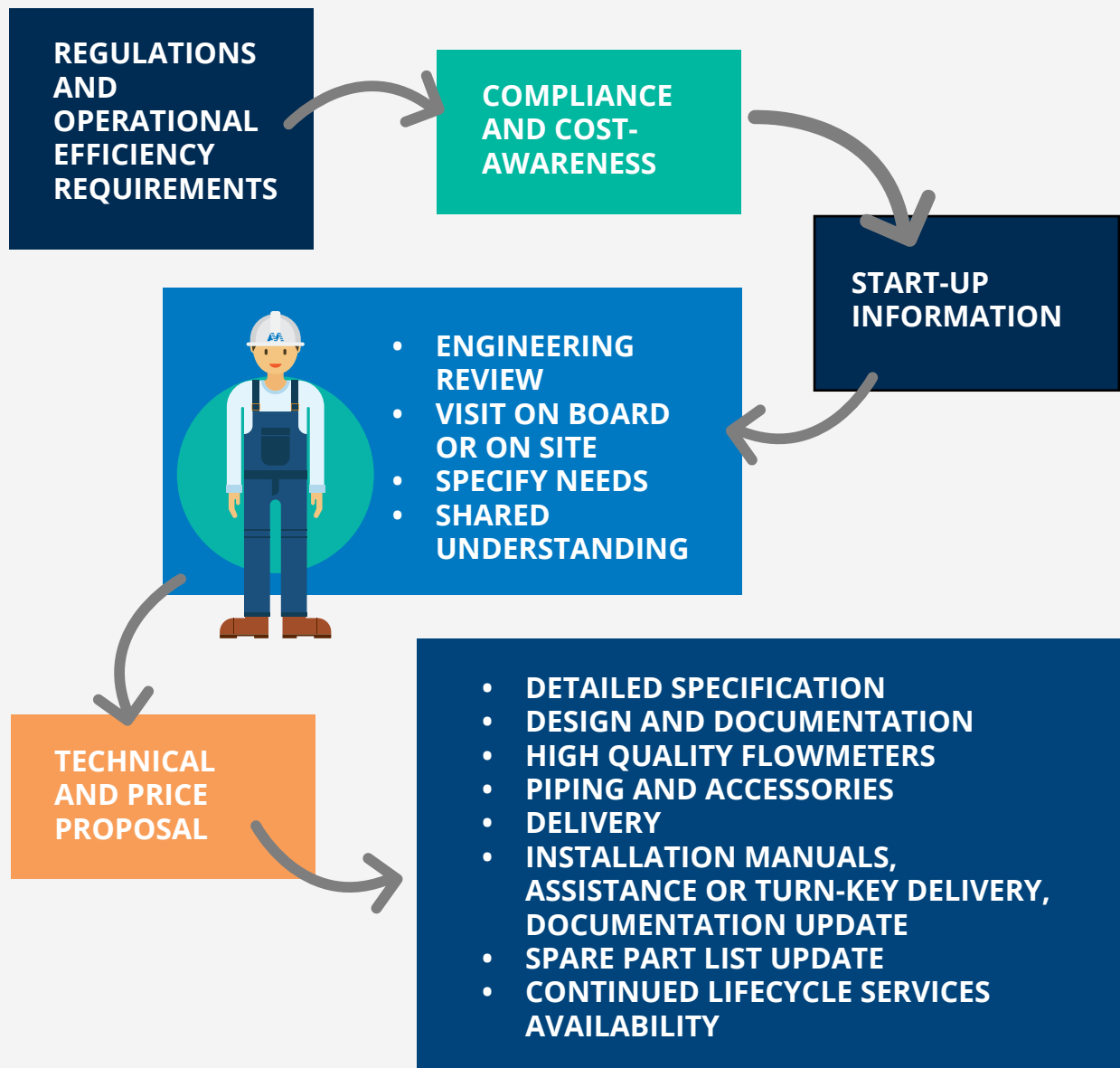
## Mass flowmeters with piping and flanges - simple and safe

**Purpose:** Inside and outside the skid as per the space available. Often it is possible to install the new flow meter within the existing skid frame. Sometimes, however, installation within the frame is not possible. This can be due to dimensions or due to the fact that additional flow meters are introduced in the system, e.g. for consumer specific flow metering from consumer inlet/outlet line. In such cases installation is outside the skid.

**Scope:** Mass flowmeters, set of pipes with flanges (painted), set of mechanical supports, gaskets, bolts and nuts, pipe drawings, packing.



# How to ensure a best result?



“IMO regulations such as the **EEXI** - Efficiency Existing Ship Index, and **CII** - Carbon Intensity Indicator come into force in 2023. The time to be proactive is now.”



# Flowmeter types



## Mass flow meters

Mass flow meter transmitters are built with an advanced architecture and provide a wide variety of I/O and application flexibilities, making them the top choice for compact integral mounting. If bunkers are purchased in metric tonnes, it is easier to measure fuel consumption in terms of mass weight. Most marine fuel mass flow meters use a laterally vibrating, curved tube mass flow meter, which also measures the density of the fluid. This kind of design provides excellent accuracy both for low and high fuel flows, which is especially beneficial when multiple fuels are in use. Mass flow meters also always provide comparable results between fuels.

- Auramarine offers highly accurate mass volume flow and density measurement for applications that require a compact, drainable design
- They are not prone to sticking and also provide density reporting.

## Volumetric flow meters

Most volumetric flow meters are comprised of moving parts (either wheels or screws). The volumetric flow meters provide a local reading, pulse signal, and/or mA (adjustable analogue) signal, and they are exceptionally user friendly. The functionality is easy to monitor, which means any faults can be rapidly detected and simple repairs can, in the majority of cases, be carried out on site.

- Positive displacement principal
- Electronic display of total and resettable volume and actual flow rates
- Adjustable analog (mA) and pulse output signals
- Auramarine offers a range of flow meters for a variety of different needs.

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