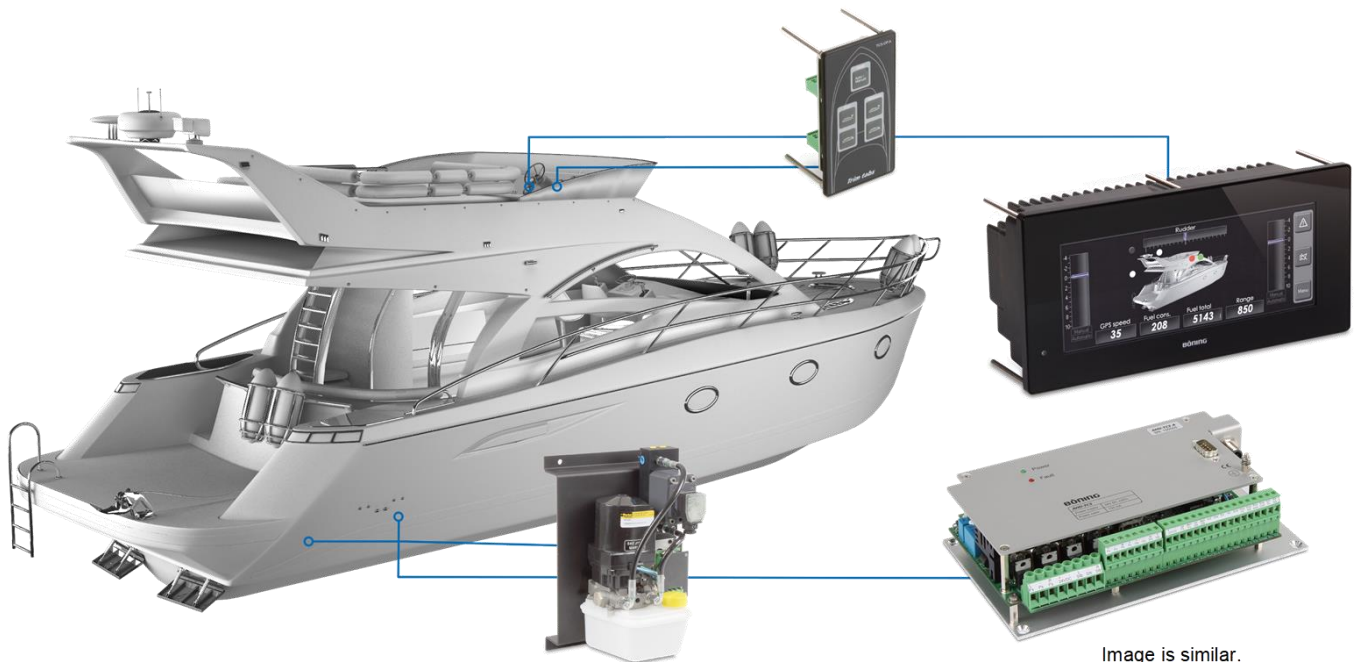


# **AHD-TCS A**

## **Trim Tabs Control System**



- ***Patented electrohydraulic trim tabs control***
- ***Easy to use system for manual and automatic control (3 different automatic modes)***
- ***Calibration and monitoring of the trim tabs position via system electronics***
- ***Works without transducers for the hydraulic cylinders, therefore no electrical wiring on the vessel's exterior***
- ***Integration of the system into the ship alarm system with visualization on color displays***

## **Trim tabs control and monitoring with manual and automatic operation**

The Trim Tabs Control System TCS has been constructed for use on fast yachts whose cruising behavior can be significantly affected by controlling the trim tabs.

As is customary for trim tabs, this too is an electrohydraulic control system. Each trim tab is operated by one or several hydraulic cylinders. The directional valves required for this are electrically controlled.

Transducers are not required for the cylinders. The piston position – and thus, the trim tab position – is calculated with a flow meter and an electronics unit. This eliminates the otherwise necessary electrical wiring on the ship's exterior, which is often prone to error.

Moreover, the electronics provide an analog output (0 – 10 V) for each flap. Round gauges with a corresponding scale, for example, can be connected here.

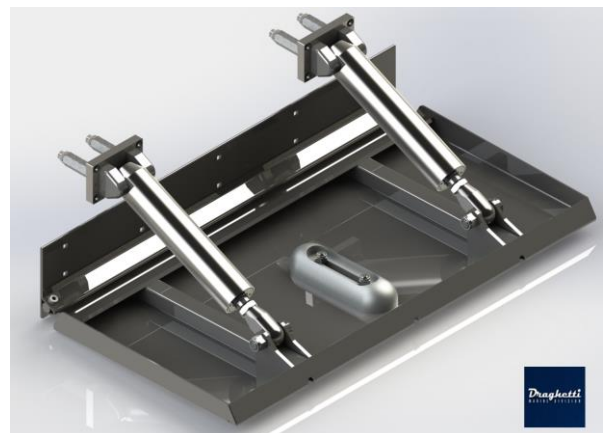
When using a Böning color display and a GPS unit and/or when an inclination sensor is connected, the trim tabs control system can also run in automatic mode, thus providing several automatic modes. In this mode, the trim tabs are automatically moved into an optimal position based on the vessel's cruising speed (trim curve), which was set up by the shipyard during commissioning.

However, any customized assignment of trim tab position and speed can be stored as a trim curve. Of course, manual control is always available; and it overrides the automatic mode.

## **Trim tabs and cylinders from Draghetti (ITA)**

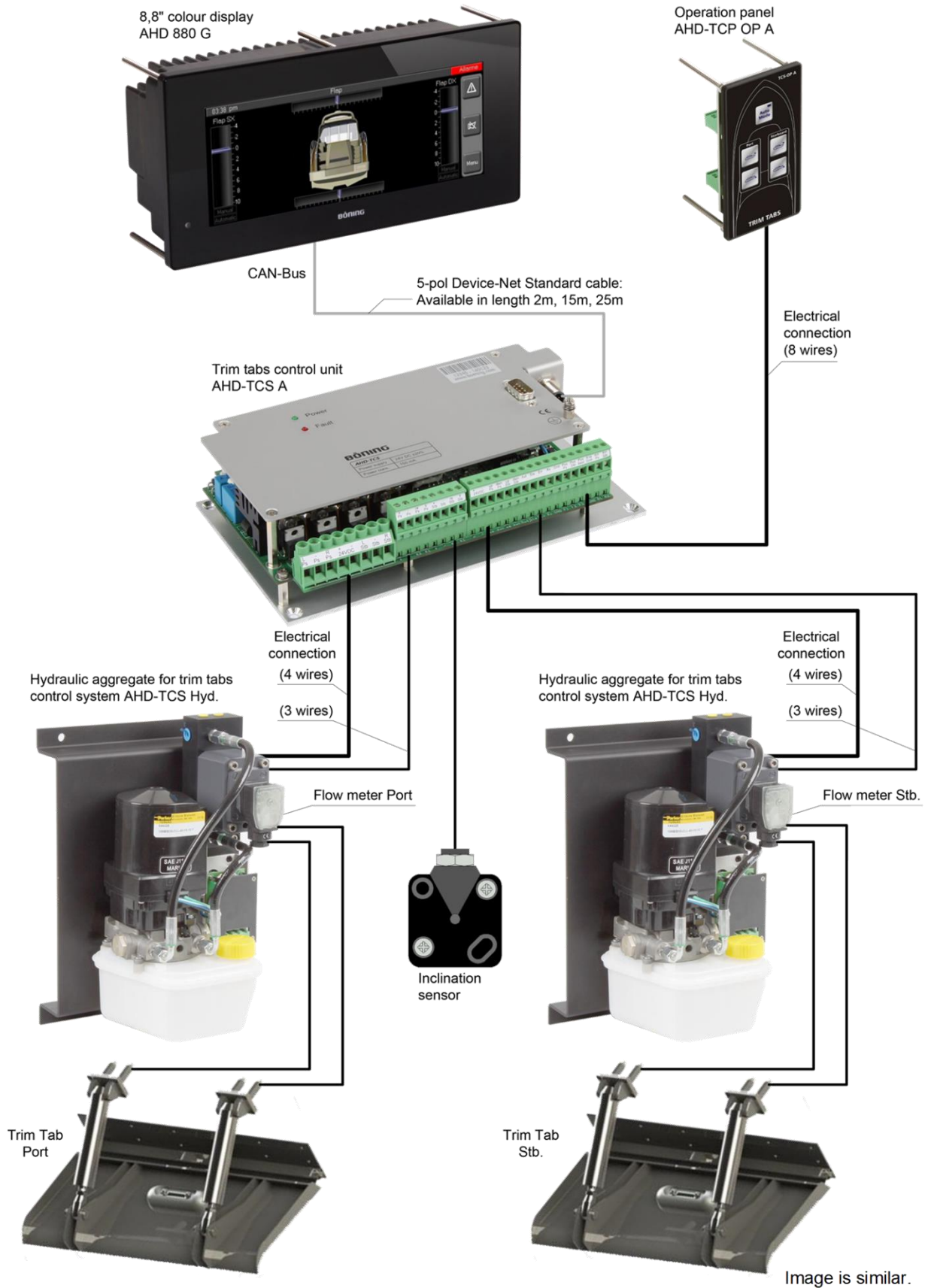
The trim tabs and the cylinders are developed and produced by our partner, the Draghetti Marine Division in Cavezzo/Italy.

With more than 35 years experience in development and production Draghetti is one of the leading companies in the sector of trim tabs technology.



All components of the system have been fine-tuned to ensure its safe and reliable function.

# System Overview



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## **The following auto-modes are available for the AHD-TCS controls:**

### **1. Auto-Mode “Rudder”**

In this mode, the trim tab positions are adjusted depending on the rudder position during curving maneuvers.

Here, the trim tab positions are based on the rudder position; this is specified in a configuration table.

The trim tabs thus support the boat’s curving maneuver with their optimized position.

However, in this mode, there is no trim based on inclination or speed, that is, the two other modes cannot be activated.

### **2. Auto-Mode “Inclination”**

In this mode, the tilt of the boat can be corrected by the position of the trim tabs when cruising straight stretches. Here, the tilt is determined with an inclination sensor, whose signals are analyzed and processed by the electronics unit. By adjusting the trim tabs accordingly, the control automatics ensure that the boat is always in a horizontal position.

Furthermore, depending on the vessel’s load distribution and the fuel levels in the tanks, an appropriate setting of the trim tabs can automatically correct the boat’s list.

This mode includes the functions of the auto-mode “Rudder.”

### **3. Auto-Mode “Speed”**

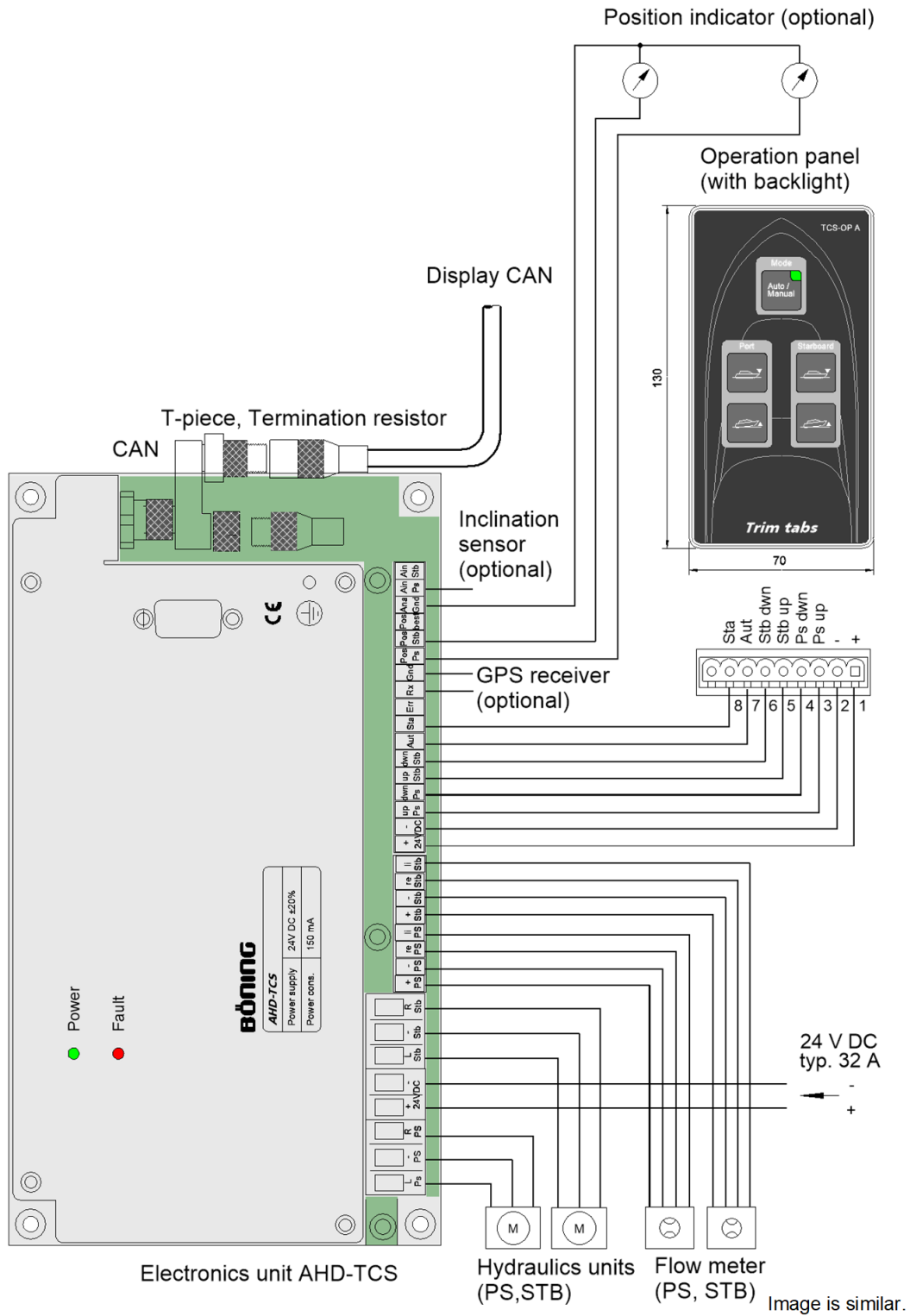
This automatic function is used for optimizing the speed while simultaneously decreasing fuel consumption. When cruising straight stretches, the system attempts to increase the boat’s speed without changing the engine speed by adjusting the trim tabs in cyclical intervals.

A base curve for defining the position to which the trim tabs should be moved at what speed is specified in the configuration. At constant speeds, the electronics attempt to increase the boat’s speed through slight corrections of the trim tab placement. If the optimization of the speed is unsuccessful, the control process is aborted, and the trim tabs are moved to the last known position.

This mode includes the functions of the auto-mode “Rudder.”

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# Connection Scheme



## Technical Data

<b>Hydraulic Aggregate AHD-TCS HYD (1 Unit per trim tab required)</b>	
Power supply	24 V DC via TCS electronics
Current consumption	Typically 16 A
Operating temperature	-25 °C ... 70 °C
Storage temperature	-30 °C ... 85 °C
Weight	11 kg
Protection class	IP 65
Exterior dimensions	269 mm x 176 mm x 135 mm
Hydraulic oil filling level	At least 0.75 l (holding tank)
Inputs	Hydraulic aggregate R, L, -
Outputs	Flow meter re, li, +, -
<b>Electronic Control Unit AHD-TCS A</b>	
Power supply	24 V DC
Current consumption	150 mA
Operating temperature	-25 °C ... 70 °C
Storage temperature	-30 °C ... 85 °C
Weight	0.7 kg
Protection class	IP 10
Exterior dimensions	215 mm x 120 mm x 48 mm
Ports	1 x CAN, 1 x RS232
Inputs	2 Flow meters, 1 inclination sensor, control unit
Outputs	2 Hydraulic aggregates, 2 display instruments
<b>Operating Panel AHD-TCS OP A</b>	
Power supply	24 V DC (+30%/-25%); via TCS electronics
Current consumption	100 mA
Operating temperature	-25°C...~+70°C
Storage temperature	-30°C...~+85°C
Weight	Appr. 0.2 kg
Protection class	IP 66 (frontside), IP 10 (rear)
Exterior dimensions	70 mm x 130 mm x 94 mm
Panel cutout	60 mm x 112.5 mm
Inputs	Power supply
Outputs	Control commands to AHD-TCS A

# Dimensions - Electronic Control Unit AHD-TCS A

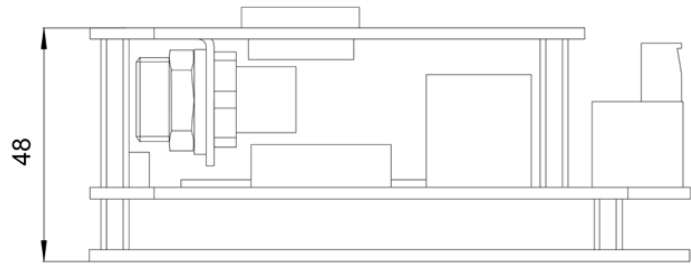
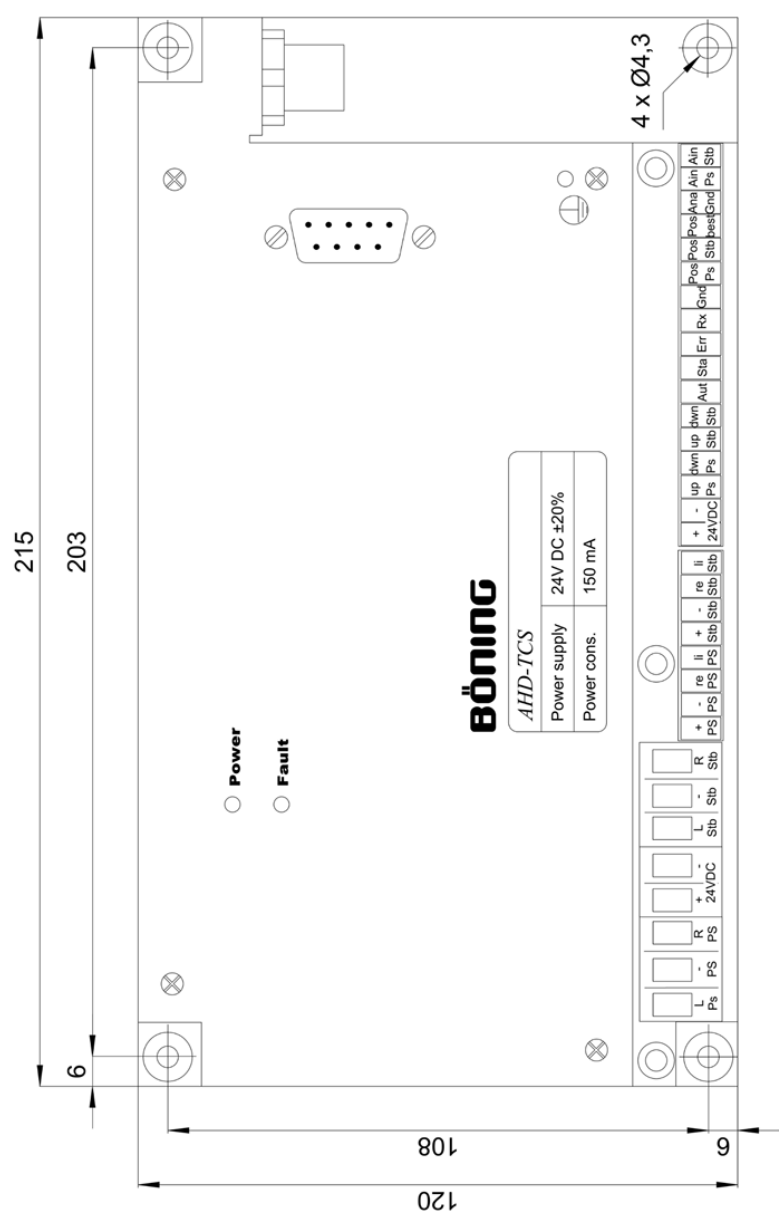


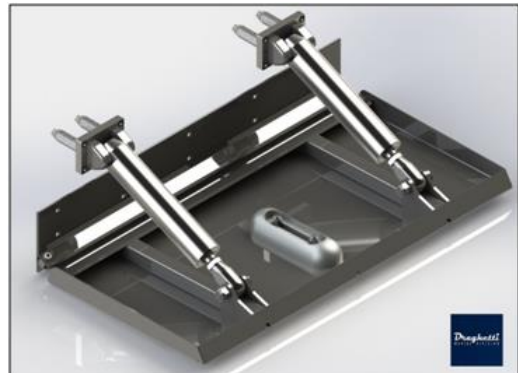
Image is similar.



## Examples of Trim Tabs from DRAGHETTI



Customized trim tab with two cylinders



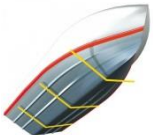

Plane trim tab with two cylinders



Trim tab with S profile and two cylinders



Plane trim tab with one cylinder

Boat Type	Boat length [meters] (feet)		Displacement [tons]	Speed [knots]	Recommended trim tab size [mm x mm]
	from	up to			
 Planing Hull	5 (16.5')	10 (33')	< 17	< 40	300 x 300
	10 (33')	15 (50')	< 35	< 40	500 x 300
	15 (50')	17 (56')	< 35	< 40	750 x 410
	17 (56')	18 (60')	< 35	< 40	800 x 360
	18 (60')	19 (62')	< 55	< 40	800 x 410
	19 (62')	21 (69')	< 55	< 40	900 x 410
	21 (69')	24 (79')	< 130	< 35	1000 x 460
 Displacement Hull	10 (33')	15 (50')	< 15	< 18	500 x 300
	15 (50')	17 (56')	< 37	< 18	800 x 300
	17 (56')	18 (60')	< 37	< 18	900 x 410
	18 (60')	19 (62')	< 55	< 18	1000 x 460
	19 (62')	21 (69')	< 55	< 18	1000 x 460
	21 (69')	24 (79')	< 130	< 18	1000 x 460

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