Autopilots

SEM300

Autopilot

EMRI Autopilots are known for their precision both as Heading Control System as well as a part of a Track Control System.

SEM300 is designed so the navigator can directly change set-point with the panel tiller on the SEM300 Micro control panel.

Next Heading, Next Course or Next Radius can be programmed so it is ready when pressing the Execute Push button.

The programmed setting is stored so the navigator can toggle between displaying the Next Programmed and Actual without loosing the Next Programmed setting.

Course changes can be made with controlled radius of the turn.

Each Mode—Radius, Heading, Course or Remote are controlled by a 4 logically arranged pushbuttons on the panel front.

SEM300 have 3 Performance categories: Economy, Medium and Precise. Economy mode provides a more relaxed, fuel saving track mode, where Precise mode is the mode to select if the ship should follow the track tight.

Loaded, Medium or Light can be selected to optimize the steering in relation to the ship loaded condition.

3 display palettes, Day, Dusk and Night can be selected on panel or by remote input.

Each Autopilot can have up to 4 control panels.
Each control panel has a 6.5 inch TFT display with LED backlight with high luminance. (800 cd/m2).

The TFT display is readable from very large angles.

The display can show rudder order and actual rudder, if feedback signal is available.

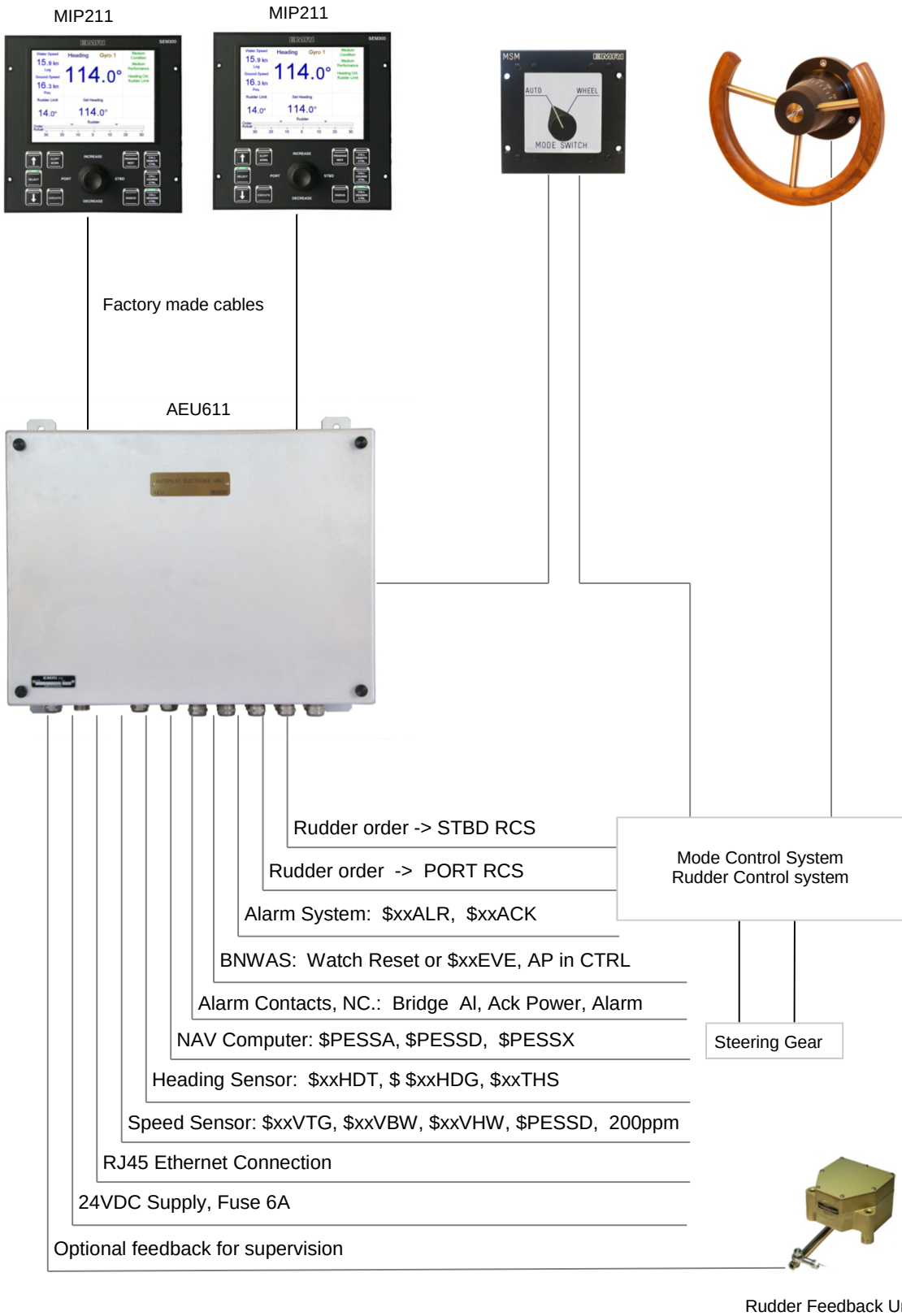
Dimming is done by push buttons or by serial control.

Dimensions 192 x 192 mm. Cut out 181 x 172 mm Panel depth only 65 mm.

Low Power ARM 7 processor. Multiple LED pushbutton indication.

Presentation of information is according to IEC62288.

SEM300 is a cost efficient adaptive autopilot. SEM300 is based on many years of experience in safe autopilot design. Simple basic controller setup is based on known ships data.
SEM300 is a **Heading**, **Course** and **Track** Pilot. Installation and setup of SEM300 is simple.
The autopilot is type approved against MED 96/98/EC.
SEM300 controls single or multiple rudders, Azimuth propellers or waterjets.



Autopilot Integration

SEM300 has interface to external Mode Selection Systems for direct call from the installed work stations (Autopilot Control Panels) and with facility for unconditional call to the Master Workstation only.

Data available on serial interface for displaying “Curved Electronic Bearing Line” on ECDIS and Radars. e.g. useful when programming Next Turns.

Advanced navigation computer interface is provided via NMEA sentences :
$PESSA, $PESSD, $PESSX.

Speed Information 200 pulses per nautical mile or $xxVTG, $xxVBW, $xxVHW, $PESSD from ECDIS.

Alarm interface based on dry contacts or NMEA $xxALR and $xxACK.

BNWAS reset interface based on dry contact or NMEA $xxEVE.

VDR interface via NMEA sentences : $PESSA, $PESSD, $xxALR

Dual gyro input with bumpless change-over of steering reference in case of a gyro failure.
Digital input to make gyro selection follow the gyro change over system setting.

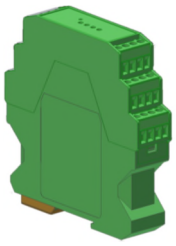
SEM300 is preset from factory, which makes sea trial and setup simple.
The Commissioning and Sea trial are supported by helpful setup wizards and performance data recording on laptop via the built in USB interface in the AEU.

Separate rudder order outputs to give possibilities for improving propulsion and steering efficiency.

The autopilot is type approved against MED 96/98/EC (Annex A.1 Item no: A.1/4.16 & USCG-Module-B No 165.110/EC0098) IEC 60945

Related products

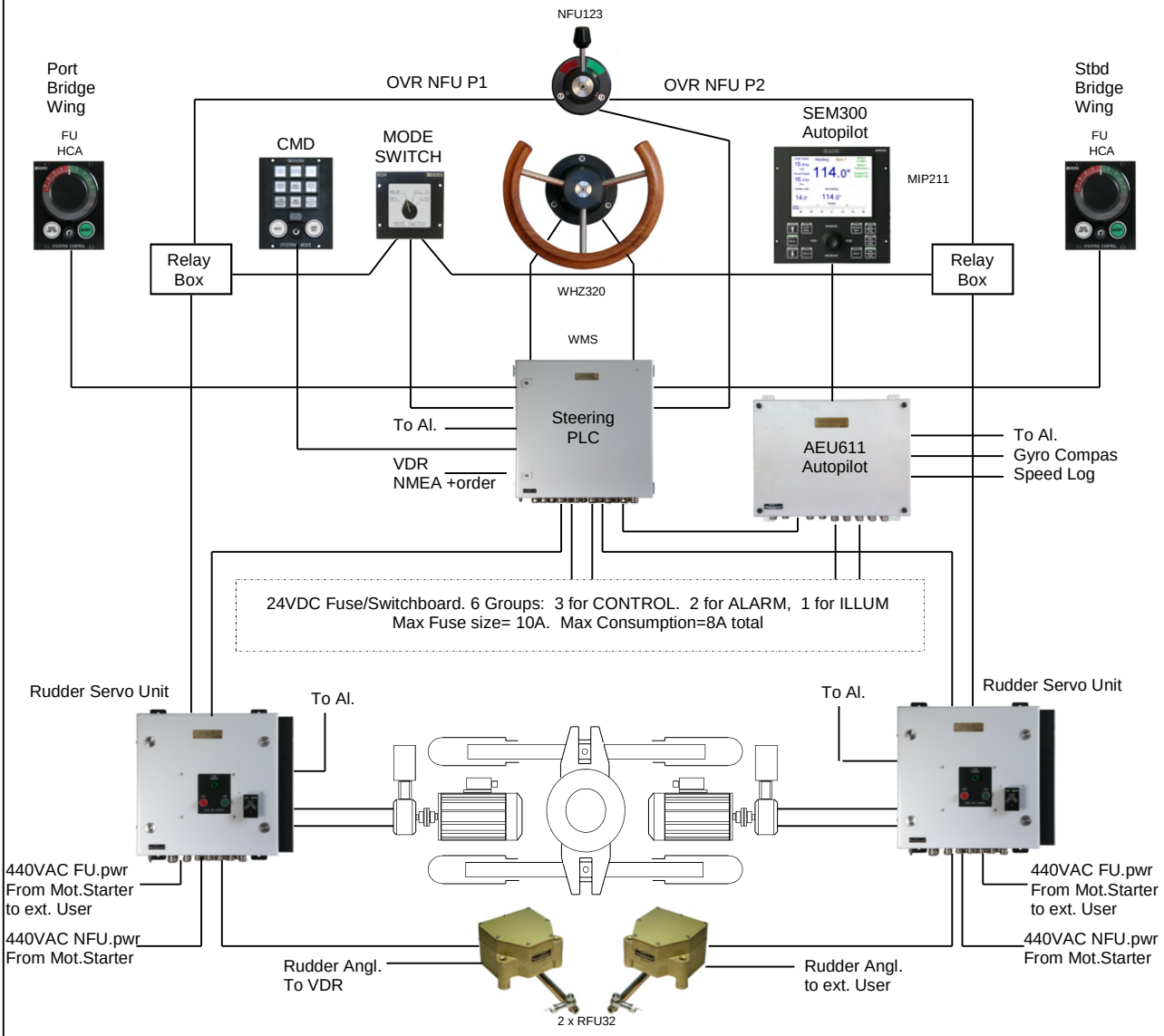
DTU11
When in autopilot mode, the actual rudder position is supposed to be maintained in case autopilot is Not Allive.
This freeze function is in most cases obtained by automatically selecting NFU control.
For steering gears where this is not possible a DTU11 module can be built in to the Autopilot to hold the rudder order.



EMRI DTU11 module is able to hold two independent actual rudder angles (rudders frozen). A separate feedback unit is needed.

RFU33/RFU32
The actual rudder can be shown on the control panel. Actual rudder information can be taken from a rudder feedback unit, RFU33, RFU32 or belt version RFB33 or RFB32. RFU33 and RFB33 are single potentiometer versions. RFU32 and RFB32 are dual potentiometer versions.

System Configuration



SEM300 as part of a steering control system.

The system can be extended with up to 4 Autopilot Control Panels attached to the same AEU611. By adding more panels the console layout can be made so there can be easy access to the Autopilot from 2 chairs or even from the wings. Each steering position can have its own control panel.

Redundancy can be obtained by adding an extra AEU 611 and let this control some of the panels.

Some Class societies require that a vessel is able to finish a turn even if the autopilot fails. This function can be obtained by A hot standby AEU connected to main AEU.

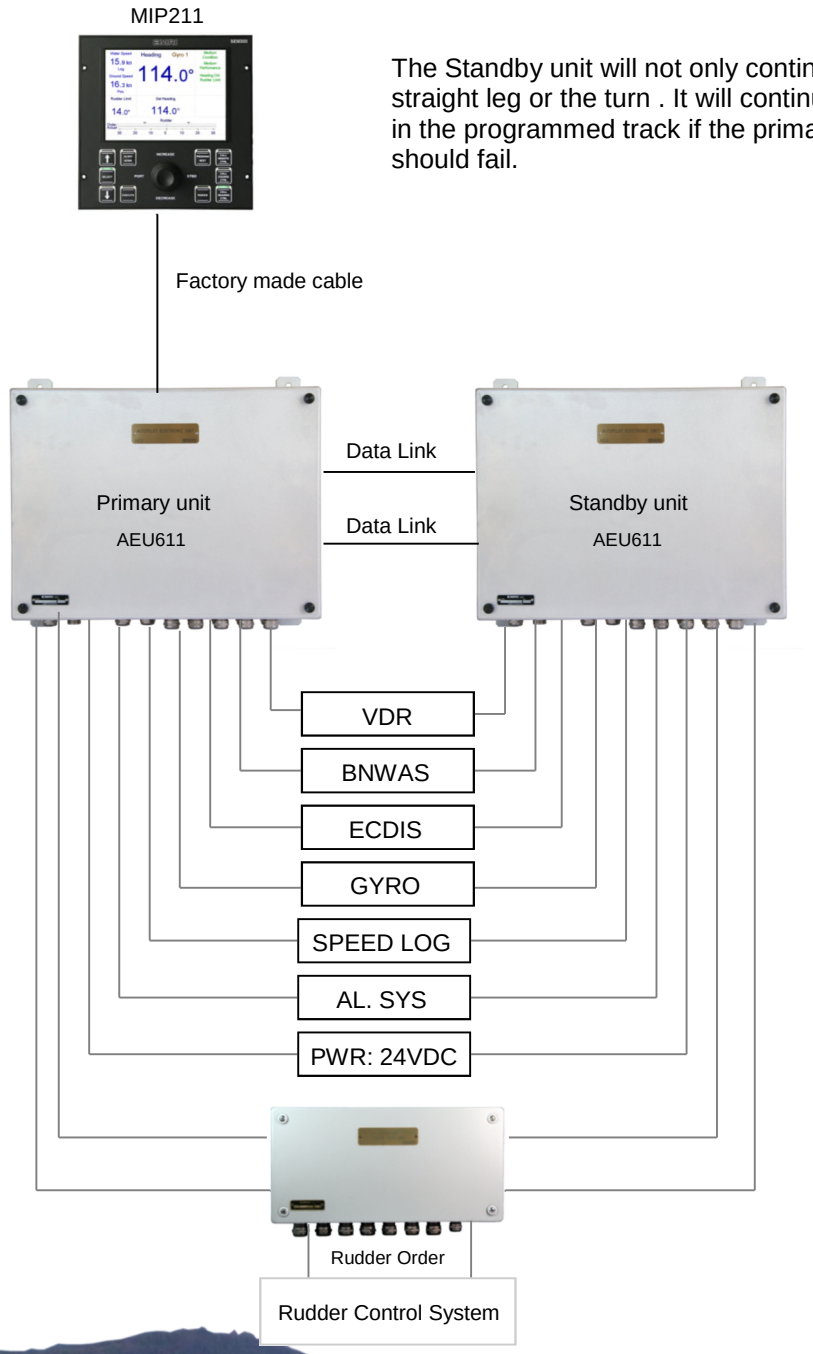
Typical EMRI dual Steering control system with one SEM300 autopilot.

The above Steering control system have 4 modes. NFU, Helm, Call Up and Autopilot.
Call Up means that the Navigator does not have to go to the Mode Switch to send the control to the wings.
When the mode switch is in position Call Up, the navigator can take control in the wings by pressing a push button on the mini wheel unit.
Or the Navigator can select Autopilot control by selecting a mode on the Autopilot control panel.

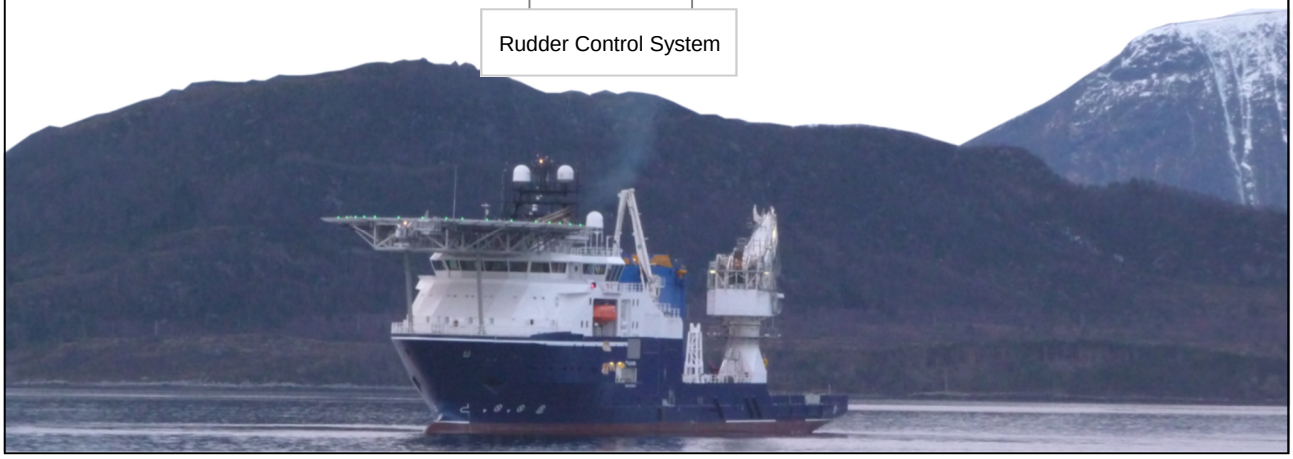
SEM300 fulfilling DNV NAUT AW with a Standby unit.

DNV require for NAUT AW classed vessels, that the Track Control System together with the Autopilot shall be designed so that upon failure of the main processing unit, the safety system will automatically maintain the instant heading, if on a straight course (leg,) or the instant ROT (radius) if in a turn.

Principle drawing:



The Standby unit will not only continue the straight leg or the turn . It will continue steering in the programmed track if the primary unit should fail.



What is New in SEM300

SEM200

SEM300

- SEM300 has a Course control mode. (Drift compensated Heading control)
- SEM300 control panel has a 6.5 inch TFT Ultra bright display with LED backlight (800 cd/m2).
- The display offers a significant improvement to the man machine interface by displaying more and mode relevant information than SEM200 e.g.:
  - Speed information, both Water Speed and Ground Speed.
  - Rudder order.
  - Actual Rudder, if the information is provided.
  - Dual Rudder Order Indication for dual rudder vessels.
  - Rudder Toe angle for dual rudder vessels.
  - Actual Gyro in use when 2 gyros are connected to the autopilot.
  - Clear indication of Rudder Limits
- More flexible bridge design options. 4 control panels can be connected to a single SEM300 system.
- The Navigator can, when Programming Next, set Next Radius or Next Heading, still keeping the actual settings easy available in the background.
  This provides an easy swap between modification of ongoing maneuvers and programming mode.
- SEM300s product life time of course exceeds SEM200.
  SEM200 was released in 1995. SEM300 was released in 2013

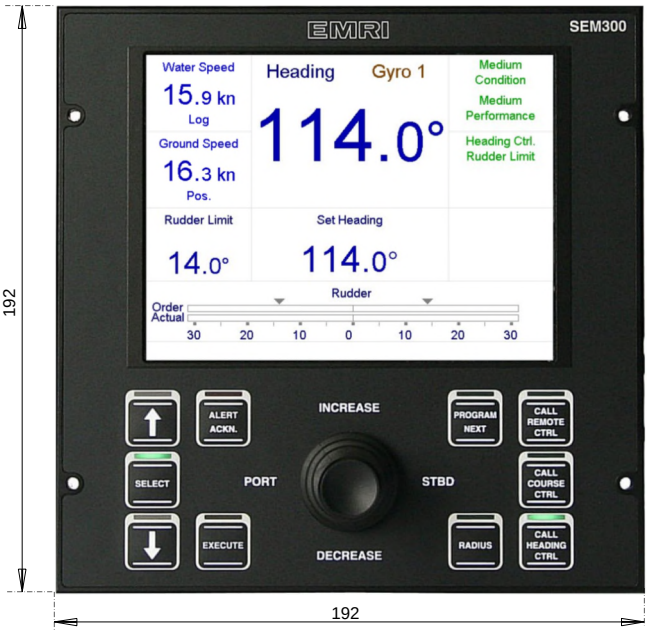
For setup and integration

- Setup and Service via standard pc USB or Ethernet cable using Windows tools.
- Built in USB master and slave port for software load and parameter backup and restore.
- Standard Ethernet Connection.

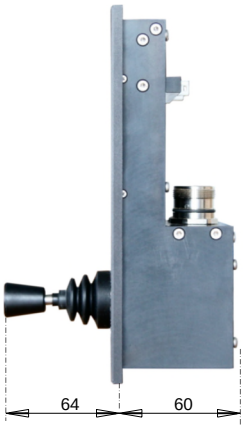
Dual Rudder Display.

SEM300 AUTOPILOT

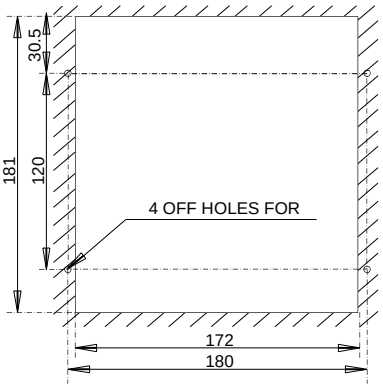
FRONT VIEW:



SIDEVIEW:



PANEL CUT OUT



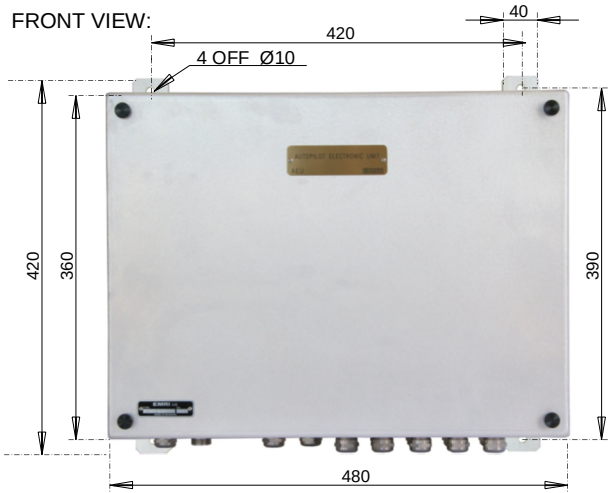
TYPE: MIP211
MICROPILOT CONTROL PANEL
WEIGHT: 1.6 kg

BOTTOM VIEW:

EMC CABLE GLANDS: 13 x M20
FOR CABLE DIAMETER 7-13 mm

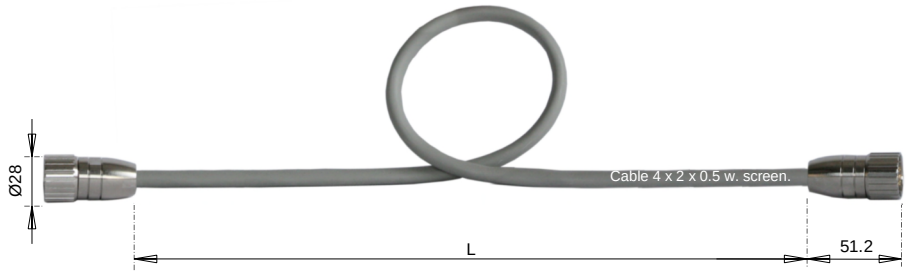
P1, P2: PLUGS FOR MIP PANELS.
(P2 IS OPTIONAL)

FRONT VIEW:



SIDE VIEW:

TYPE AEU611
AUTOPILOT ELECTRONIC UNIT
WEIGHT: 11 kg



Cable: CE2MM-8-xM

x=Cable length L:

L: 3 m. Weight: 0.6 kg
L: 5 m. Weight: 0.9 kg
L: 8 m. Weight: 1.3 kg
L: 10 m. Weight: 1.6 kg

Cable length: Min. bending radius: 50 mm when tied. 100 mm when free.

Measurements in mm