

*Empowering AtoN  
by AIS Technology!*



**MANDO series**

**Empowering AtoN by AIS Technology -**

AMEC MANDO-301/-303 is an AIS AtoN (Aids to Navigation) equipment that provides accurate and real time information to nearby vessels and shore stations. MANDO-301 is a type 1, and MANDO-303 is a type 3 model.

**Meteorological & Hydrological Supports -**

The MANDO series prevents collisions by transmitting position of a fix or a floating AtoN. It has the ability to transmit meteorological and hydrological data with proper additional sensors installed.

**Range Extension via Chaining -**

MANDO is designed with state-of-the-art technologies to offer users many possibilities with ease of integration. As a first in the class, MANDO-303 supports chaining functions which has been successfully approved by BSH. To extend transmission range, the feature has the ability to chain several units to cover a wider area and it definitely brings flexibilities in implementations.

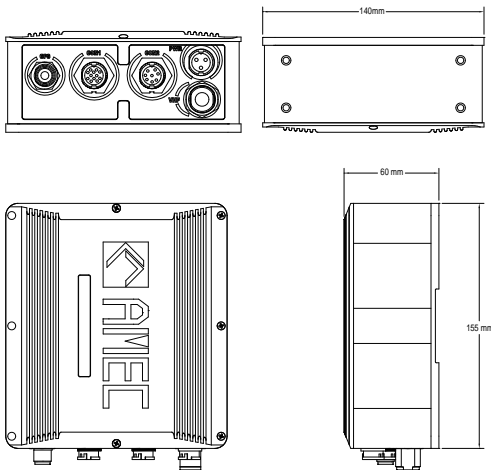
- ▶ Fully compliant with IALA , IEC, and ITU standards
- ▶ Support chaining and RATDMA (MANDO-303 only)
- ▶ Capable to repeat SART, 6, 8 messages (MANDO-303 only)
- ▶ Support remote configuration control (MANDO-303 only)
- ▶ Support synthetic and virtual transmissions
- ▶ Supply with user-friendly window-based configuration tool
- ▶ Support messages 21, 6, 7, 8, 12, 13, 14, 25 (depends on hardware & software configuration)
- ▶ Support meteorological & hydrological message (Message 8)
- ▶ Ultra low power consumption
- ▶ Slim PCB module to integrate with lantern
- ▶ Optional extension I/O boards available
- ▶ Robust housing (IP67)
- ▶ Custom design flexibility upon request
- ▶ BSH/CE/FCC/USCG approved

**KEY FEATURES**

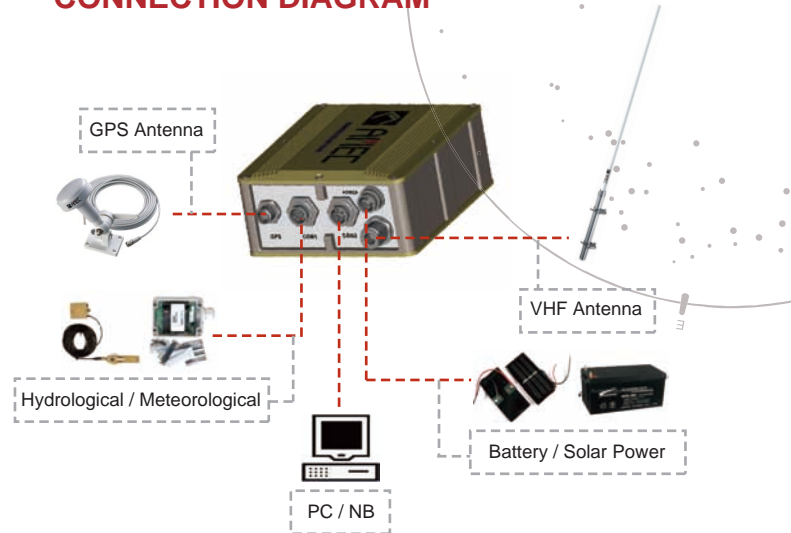
**APPLICATIONS**

- ▶ **Lantern**
- ▶ **Buoy**
- ▶ **Offshore Platform**
- ▶ **Lighthouse**

## DIMENSIONS



## CONNECTION DIAGRAM



## SPECIFICATIONS

### ▶ APPLICABLE STANDARDS

IALA A-126  
IEC 60945  
IEC 61108-1  
IEC 61162-1  
IEC 62320-2  
ITU-R M.1371-3

### ▶ GPS RECEIVER

Receiving Channels	50 channels
Tracking & Navigation Sensitivity	≥ -159 dBm
Reacquisition Sensitivity	≥ -159 dBm
Horizontal Position	< 2.5 m Autonomous < 2.0 m SBAS
Receiver Type	SBAS: WAAS, EGNOS MSAS, GAGAN

### ▶ TRANSMITTER PERFORMANCE

TX Frequency Range	156.025 MHz ~ 162.025 MHz
Frequency Accuracy	±500 Hz
Channel Space	25 KHz
Channel Protection	1 Sec max on air
Modulation	GMSK / FM
Data Rate	9,600 bps
TX Power Control	2 / 5 / 12.5 Watt (programmable)
Carrier Power Error	±1.5 dB (normal)
Nominal Impedance	50Ω

### ▶ RECEIVER PERFORMANCE (MANDO-303 only)

Numbers of Receivers	2
RX Frequency Range	156.025MHz ~ 162.025 MHz
Sensitivity	PER 20% at -107 dBm
Data Rate	9,600 bps
PER	20% at -107 dBm
Co-Channel Rejection	10 dB at 1 KHz offset
Adjacent Channel Rejection	70 dB at 25 KHz
Nominal Impedance	50Ω

### ▶ POWER SUPPLY

Supply voltage	12V DC nominal (at power connector)
Supply voltage range	9.6 ~ 15.6V DC

### ▶ POWER CONSUMPTION @ 12V DC

MANDO-301	FATDMA < 0.288 Ah/day *
MANDO-303	FATDMA < 0.432 Ah/day *
	RATDMA < 1.656 Ah/day *

\*At 12.5W; transmission scheduled every 3 min

### ▶ ENVIRONMENTAL

Operating Temperature	-20°C ~ +55°C
Storage Temperature	-30°C ~ +70°C
Humidity	95% relative humidity at 40°C

### ▶ INPUT / OUTPUT

- 1) One RS-232 port for configuration
- 2) One RS-232 port for communication
- 3) One isolated control output – N.C. relay for alarm indication (default) or other control usages
- 4) One isolated status input channel with 5 mA constant current sink for external device status input (e.g. read light fault, light on/off, etc.)
- 5) Four ADC channels for external sensors
- 6) VHF Connector (M Type)
- 7) GPS Connector (TNC Type)
- 8) More extra I/O interfaces can be supplied via optional extension I/O board

### ▶ SOFTWARE TOOL

AMEC AtoN Configuration      PC configuration utility

Note: Specifications are subject to change without prior notice.



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The AIS Specialists

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Distributor/Dealer