Coda Octopus:MOTION
Precision Attitude & Positioning

/F290R

**GNSS Processing Unit**


**Remote Subsea IMU**


## Benefits

High Accuracy precision device – heading, heave, pitch and roll in subsea deployable IMU Housing

Embeds advanced Heading Lock Stabilization Solution

Subsea IMU Housing which can be deployed underwater (up to 10m water depth)

Designed to achieve maximum performance accuracy under conditions of poor GNSS coverage.

All systems are GPS, GLONASS and BeiDou capable for position and heading seeding

Flexible deployment options for the GNSS Processing Unit and Subsea IMU for a wide range of subsea applications

F280R Series® directly supported in leading Hydrographic Survey Applications

Built in NTRIP Client

Design facilitates Rapid Installation

Pre-calibrated Housing Option available accommodating slow or non-moving deployment platforms.

Easy to Use Web Interface

Expert 24x7 Technical Support

# Accurate, Reliable Motion and Positioning Data measured precisely at your sensor's location

The F280R Series® is designed as a split housing which separates the GNSS Processing Unit from the Remote Subsea IMU. This design facilitates the GNSS Processing Unit to be co-located with the sensor being used such as the multibeam transducer or subsea laser system. Co-locating the GNSS Processing unit with the sensor facilitates greater measurement accuracy of the true subsea motion and attitude compared to capturing this above the waterline on a vessel or at the top of the survey pole. Deployments in harsh environment applications such as marine construction, renewables and heavy machinery integrations allow the Remote Subsea IMU to be mounted on a platform that can often be fully immersed underwater yet where robust and reliable data is still paramount. In these cases, the GNSS Processor can be safely mounted away from this environment to allow safe interfacing with other survey components.

Defined to meet the exacting requirements of the hydrographic survey market, the F280R Series® systems provides the same high precision and performance as the F280 Series®. Designed to be easy to install, and use, this system provides high precision and accurate positioning, heading and motion data including in dynamic offshore conditions. The F280R Series® also includes a built-in NTRIP Client that allows receiving GNSS DGPS quality GNSS Corrections over the internet without need of any PC. F280R Series® must be connected to Ethernet network with Internet access and a separate NTRIP subscription.

All systems are GPS, GLONASS and BeiDou enabled to improve constellation coverage and our advanced heading lock stabilization solution. The system is designed with an easy-to-use web interface which provides configuration, control and processing functionality including iHeave (intelligent heave).

In addition to real-time heave measurement and output, the F290R now directly computes and outputs our long-standing and proven iHeave (intelligent Heave) solution without the need for top-side processing or software. iHeave is a tailored solution specifically for long period ocean.

Swell compensation and is fully integrated with the F290R Precision Attitude and Positioning Systems. In many parts of the world, hydrographic surveys are severely affected by low frequency ocean swells often up to 70 seconds long, resulting in distortions in bathymetric measurements. Conventional techniques for real-time heave measurement can only offer limited accuracy and are insensitive to ocean swells exceeding 10 to 20 seconds. The inbuilt iHeave algorithm analyzes the raw motion data and allows a more accurate determination of the real heave motion experienced by a vessel and enables the output of precise heave values for all ocean swells.

Additionally, for extremely rapid vessel deployments, a Pre-Calibrated Housing accessory is available to significantly reduce the installation and calibration phases of operation allowing the Remote Subsea IMU and GNSS Antenna only to be collocated and the GNSS Processor unit mounted elsewhere in a safer location.

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## Features

- Survey grade GNSS, attitude and heave sensor in one box
- Waterproof housing for Inertial Measurement Unit (IMU) – measures the dynamic motion & position at the SONAR
- High accuracy position, heading, heave, pitch and roll at up to 100 Hz
- Connectivity to multiple sensors simultaneously over Ethernet and Serial
- Built-in NTRIP Client capable of receiving GNSS Corrections over the Internet.
- Multiple lever arms to support precise GNSS positioning for multiple platform locations or sensors
- Rapid Heading initialization (Under 30 secs typically)
- Web based setup and monitoring - ability to store multiple different profiles and recall these instantly - ideal for survey teams with multiple vessels
- Tightly integrated GNSS and inertial components result in increased accuracy and reduced setting times when compared to outputs from separate sensors
- Enhanced performance under conditions of poor GNSS reception
- Compatible with HYPACK, QINSy, CARIS and other navigation packages
- Industry standard formats and interfaces
- iHeave (intelligent Heave) processing available as standard

## Applications

- Hydrographic Survey
- Bridge, dam, harbour inspection
- Dredging
- Offshore renewable energy
- Environmental survey
- Shipping channel survey
- Marine laser scan survey

## Main Components

**GNSS Processing Unit**


**Remote Subsea IMU**


**Cable**

**Antennas**

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# F290R

| | |
|---|---|
| F290R | The F290R is Multi Frequency multi GNSS system with Atlas H10, RTK, DGPS and SBAS GNSS corrections capabilities (1cm positional accuracy). There are other models within F280 Series® of GNSS-Aided INS Systems (Yearly subscription required).<br><br>All systems are GPS, GLONASS, and BeiDou capable for position and heading seeding.<br><br>Models within F280 Series® are field-upgradable. Pre-calibrated housing upgrades can be applied to any model. |

## Dynamic Positioning

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|---|---|
| Positional Accuracy (RMS) | 0.04m with Atlas Global Correction Service<br>0.008m + 1ppm with L1/L2 RTK Correction<br>0.30m with DGPS correction<br>0.30m with SBAS correction<br>1.20m no correction |
| Roll and Pitch (1σ) | 0.02° |
| True Heading (1σ) | 0.04° (2m baseline)<br>0.025° (4m baseline) |
| Heave (1σ) | 5cm or 5% (on-line)<br>3.5cm or 3.5% (iHeave) |
| Velocity (1σ) | 0.014 m/s |

## Physical

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|---|---|
| GNSS Processing Unit Dimensions | 127mm x 155mm x 113mm<br>(5in x 6.1in x 4.4in) |
| Weight | 1.5kg (3.3 lbs) |
| Remote Subsea IMU Dimensions | 165mm x 160mm x 157mm<br>(6.49in x 6.29in x 6.18in) |
| Weight | 5kg (11.02 lbs) |
| Power | 12-36Vdc, 17 Watts<br>(100-240Vac adapter supplied) |
| Antennas | Multi-Frequency, Multi-GNSS, SBAS and Atlas corrections capable |
| Antenna Cables | 15m (49.2ft) standard.<br>100m (328.08ft) optional. |
| Remote Subsea IMU Cable | 15m (49.2ft) standard<br>100m (328.08ft) optional |
| Operating Temperature | -10° to 60° C<br>14° to 140° F |
| Waterproof | Remote Subsea IMU is 10m depth rated.<br>GNSS Processing Unit is IP67 Rated (Maximum depth of 1 meter up to 30 minutes. When Power and Antenna connectors are mated). |
| Vibration | $0.1g^2$/Hz, 5-500 Hz |

## Interfaces

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|---|---|
| Ethernet 100Mbit | Full control and configuration, high speed data output (COMPAC), NTRIP corrections |
| Serial Port 1 | User-configurable for position, heading and attitude strings. Choose from: TSS1, TSSHHRP, EM1000, EM3000, COMPAC, GGA, GSA, GST, GSV, GGK, HDT, PASHR, PRDID, PTCF, RMC, ROT, VTG, UTC, ZDA, PPS and SPD. |
| Serial Port 2 | As Serial Port 1 |
| GNSS Correction Port | Correction input (DGPS) Formats: RTCM 2.1/2.2/2.3/3.0/3.1; CMR, CMR+ |
| Other | 1 PPS on BNC |

## PC System Requirements

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|---|---|
| Web Interface | Compatible with all major browsers. |

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# Pre-calibrated Housing

## F290R POD


## F290R POD with 3D Connect 5G


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Coda Octopus
Sound Underwater Intelligence

Sales Worldwide: +44 131 553 1380 Sales Americas: +1 407 735 2400
More Information: sales@codaoctopus.com salesamericas@codaoctopus.com www.codaoctopus.com
Technical Support Worldwide: +44 131 553 7003 Technical Support Americas: +1 888 340 2632