

# INS-C



KONGSBERG



Photo: Transocean

## High-end position reference system for demanding operations

This Position Reference System is an INS Centric approach to DP station keeping. Inertial technology combined with the latest multi-antenna, multi-constellation GNSS technology and hydro-acoustic positioning, provides a reliable position reference solution with the highest tolerance for outages of position reference data.

### Sensors teaming up

The integrated solution is based on inertial measurements from an Inertial Measurement Unit (IMU), aided by two redundant positioning technologies. In this system the IMU is a Motion Sensor and Gyro Compass (MGC). The redundant positioning data sources are one or two of KONGSBERG's DPS series ((D)GNSS position reference systems) and optional KONGSBERG's HiPAP series SSBL and LBL acoustic positioning systems. The system will improve stability of the real-time positioning and increase operational uptime in the event of a loss of some, or all, of the position reference sensors.

### Designed for robust performance

INS-C is the central processing unit in the INS Centric Position Reference System. It integrates raw data from up to three different technologies, inertial, GNSS and acoustics, to provide a robust and reliable position solution.

INS-C can use all available GNSS systems. In addition, it uses GNSS corrections, depending on what is available on the connected DPS models. INS-C can also use acoustic ranges and angles (if available) for tightly coupled LBL and/or SSBL aiding of the integrated solution.

### Active decision support

INS-C has an intuitive and easy-to-use graphical user interface developed in close co-operation with experienced DP operators.

### Remote support

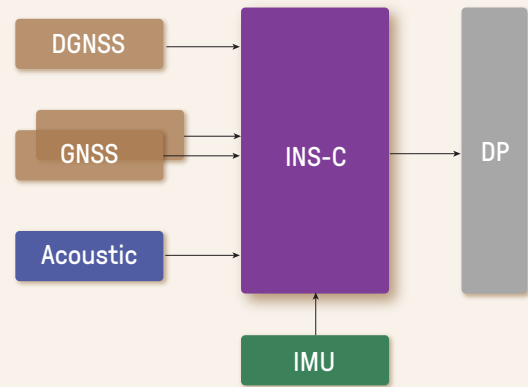
INS-C is ready for K-IMS remote services for operational support and troubleshooting. Cases that previously required a visit from a service engineer, may now be resolved remotely.

## FEATURES

- New position reference system (PRS) concept providing a step change in robustness and reliability for the most challenging installations by utilizing both acoustic and GNSS measurements for highest possible robustness and integrity
- Unique technology for shallow water DP operations, challenging conditions, difficult vessel designs, demanding operations and operations in areas with jamming/spoofing
- Navigation Grade INS (MGC R3/ R4/R5) aided with the latest multi-constellation GNSS technology and hydro-acoustic positioning
- Fully capable to utilize differential correction services
- High-precision lever arm compensation of position and velocity
- Intuitive and easy-to-use HMI tailored to safety critical DP operations
- Scalable solution
- Spoofing detection capabilities
- Automatic data recording with replay functionality
- Remote service and diagnostics by utilizing K-IMS

The INS-C position reference system consists of the following components:

- Multiple GNSS systems (DPS)
- DGNSS receiver
- Hydroacoustic Position Reference system (HiPAP)
- Inertial Measurement unit (MGC)
- INS-C



## Technical specifications

### INS-C

#### Performance specifications

|                           |                                  |
|---------------------------|----------------------------------|
| High precision accuracy   | 10 cm, 95% CEP                   |
| Position accuracy w/DGNSS | < 1m, 95% CEP                    |
| Position accuracy w/SBAS  | < 1m, 95% CEP                    |
| Velocity accuracy         | < 0.01 m/s, 95%                  |
| Roll, pitch accuracy      | 0.005 degrees RMS (MGC R4 or R5) |
| Update frequency rate     | < 20 Hz                          |
| Latency                   | < 1ms                            |

All accuracy specifications are based on real-life tests conducted in the North Sea under various conditions. Operation in other locations under different conditions may produce different results.

#### Interfaces

|              |  |
|--------------|--|
| Serial ports | 8 isolated ports, 6 configurable between RS-232 and RS-422 |
| IMU          | RS-422   |
| Ethernet/LAN | 4  |
| USB          | 3  |

#### Data outputs

|                 |   |
|-----------------|---|
| Message formats | NMEA 0183 v. 3.0, Proprietary   |
| Message types   | DPGGA, DTM, GBS, GGA, GLL, GNS, GRS, GSA, GST, GSV, RMC, VBW, VER, VTG, ZDA, PSXN |

#### Data inputs

|                       |   |
|-----------------------|---|
| DGNSS corrections     | RTCM-SC104 v.2.2, 2.3, 3.0 and 3.1, Seastar XP2/G2/G2+/G4/G4+ |
| RTK corrections       | RTCM-SC104 v. 2.3, 3.0, 3.1 and CMR                           |
| GNSS raw data         | 2 x DPS   |
| Acoustic measurements | HiPAP   |
| IMU                   | MGC   |
| Display control       | DDC   |

#### INS sensor

|               |  |
|---------------|--|
| Supported INS | MGC R3, MGC R4, MGC R5<br>(See dedicated datasheets for technical information) |
|---------------|--|

#### Weights and dimensions

|                 |                           |
|-----------------|---------------------------|
| Processing Unit | 5.4 kg, 89 × 485 × 357 mm |
| HMI Unit        | 3.6 kg, 44 × 481 × 267 mm |

#### Power specifications

|                 |                                     |
|-----------------|-------------------------------------|
| Processing Unit | 100 - 240 V AC, 50/60 Hz, max 75 W  |
| HMI Unit        | 100 - 240 V AC, 50/60 Hz, max 170 W |

#### Environmental specifications

##### Operating temperature range

|                 |                   |
|-----------------|-------------------|
| Processing Unit | -15 to +55 °C (*) |
| HMI Unit        | +5 to +35 °C (**) |

|                  |              |
|------------------|--------------|
| (*) Recommended  | +5 to +40 °C |
| (**) Recommended | +20 °C       |

##### Humidity

|                       |                         |
|-----------------------|-------------------------|
| INS-C Processing Unit | Max 95 % non-condensing |
| HMI Unit              | Max 95 % non-condensing |

##### Mechanical

|           |                              |
|-----------|------------------------------|
| Vibration | IEC 60945/EN 60945, IACS E10 |
|-----------|------------------------------|

##### Electromagnetic compatibility

|                                      |                              |
|--------------------------------------|------------------------------|
| Compliance to EMC, immunity/emission | IEC 60945/EN 60945, IACS E10 |
|--------------------------------------|------------------------------|

##### Product safety

|                                  |                        |
|----------------------------------|------------------------|
| Compliance to LVD, standard used | IEC 61010-1/EN 61010-1 |
|----------------------------------|------------------------|

##### Product standards

|   |  |
|---|--|
| GNSS systems  | IEC 61108-1  |
| Maritime navigation and radio communication equipment and systems | IEC 61162-1, IEC 60945                             |
| IMO regulations   | MSC.112(73), MSC.113(73), MSC.114(73), MSC.115(73) |
| UKOOA compliant   |  |

Specifications subject to change without any further notice.