

## MIoT Data Acquisition

Our MIoT Data Acquisition System seamlessly collects operational signals from a wide range of onboard interfaces. It is compatible with both Hoppe-provided solutions and existing third-party systems, ensuring maximum flexibility and data coverage. The signal list and summary below provide examples of signals and typical use cases from recent projects. Signals that are not listed but are required for a project can, of course, be collected after consultation with Hoppe.

### 1.1 Navigational Data (NMEA-Interfaces)

The signals listed below can typically be collected from nautical equipment via an NMEA interface. The data can be provided through a single-source interface, e.g., from an ECDIS, Voyage Data Recorder, or another multiplexer. Alternatively, signals can be provided via individual lines, or Hoppe can handle the interfacing with existing signal lines using an NMEA expander.

| No. | Signal Name                        | Example Machine Code                  | Hull Performance<br>ISO 19030 | Basic Emission<br>Reporting (MRV, DCS), | Advanced Emission<br>Reporting (CII) | Commercial Reporting<br>& Analysis | Technical Reporting &<br>Analysis | Trim Optimization | Electronic Logbooks | Operational Safety |
|-----|------------------------------------|---------------------------------------|-------------------------------|-----------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|-------------------|---------------------|--------------------|
| 1   | Distance made good                 | v.dog.cnt_tot.nm                      |                               | X                                       | X                                    | X                                  |                                   |                   | X                   |                    |
| 2   | Position Latitude &<br>Longitude   | v.gpslat.act.deg,<br>v.gpslon.act.deg |                               | X                                       | X                                    |                                    |                                   |                   | X                   |                    |
| 3   | Rudder Angle                       | v.rua.act.deg                         |                               |                                         |                                      |                                    | X                                 |                   | X                   |                    |
| 4   | Speed Over Ground                  | v.sog.act.kn                          | X                             |                                         |                                      | X                                  |                                   |                   |                     |                    |
| 5   | Speed Through<br>Water             | v.stw.act.kn                          | X                             |                                         |                                      | X                                  |                                   | X                 |                     |                    |
| 6   | Water Depth                        | v.wd.act.m                            | X                             |                                         |                                      |                                    | X                                 |                   | X                   |                    |
| 7   | Water temperature                  | wea.swt.act.degc                      | X                             |                                         |                                      |                                    |                                   |                   | X                   |                    |
| 8   | Relative Wind Speed<br>& Direction | wea.wsr.act.mps,<br>wea.wdr.act.deg   |                               |                                         |                                      | X                                  |                                   | X                 | X                   |                    |
| 9   | Actual Wind Speed &<br>Direction   | wea.wst.act.mps, wea.w<br>dtv.act.deg |                               |                                         |                                      | X                                  |                                   | X                 | X                   |                    |

## 1.2 External Systems and Interfaces

The list below provides examples of signals that can be integrated from external systems. Typical third-party connections include Alarm and Monitoring Systems (AMS) as well as equipment such as scrubbers, Wind Assisted Propulsion Systems (WAPS), and Power Management Systems. Of course, any signal or system not listed here can also be integrated after consultation with Hoppe.

| No. | Signal Name                                                 | Example Machine Code                                                                                          | Hull Performance<br>ISO 19030 | Basic Emission<br>Reporting (MRV, DCS), | Advanced Emission<br>Reporting (CII) | Commercial Reporting<br>& Analysis | Technical Reporting &<br>Analysis | Trim Optimization | Electronic Logbooks | Operational Safety |
|-----|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|-------------------|---------------------|--------------------|
| 10  | Auxiliary<br>Engine Cylinder<br>Exhaust Gas<br>Temperatures | ae.egtcyl[n].act.dgc                                                                                          |                               |                                         |                                      |                                    | X                                 |                   |                     | X                  |
| 11  | Main Engine Charge<br>Air/ Scavenge Air<br>Temperatures     | me.satcyl[n].act.dgc,<br>me.atiscac.act.dgc,<br>me.atosac.act.dgc,<br>me.wtisac.act.dgc,<br>me.wtisac.act.dgc |                               |                                         |                                      |                                    | X                                 |                   | X                   |                    |
| 12  | Main Engine Charge<br>Air/ Scavenge Air<br>Pressures        | me.sap.act.bar                                                                                                |                               |                                         |                                      |                                    | X                                 |                   | X                   |                    |
| 13  | Main Engine Cooling<br>Water Temperatures<br>and Pressures  | csw.mswt.act.dgc, csw.<br>mswp.act.bar, ...                                                                   |                               |                                         |                                      |                                    | X                                 |                   | X                   | X                  |
| 14  | Main Engine Cylinder<br>Bearing<br>Temperatures             | me.cyl[n].brg.act.dgc                                                                                         |                               |                                         |                                      |                                    | X                                 |                   |                     | X                  |
| 15  | Main Engine Cylinder<br>Exhaust Gas<br>Temperatures         | me.egtcyl[n].act.dgc                                                                                          |                               |                                         |                                      |                                    | X                                 |                   | X                   | X                  |
| 16  | Main Engine Cylinder<br>Oil Consumption                     | me.coms.act.kgph                                                                                              |                               |                                         |                                      |                                    | X                                 |                   | X                   |                    |
| 17  | Main Engine Fuel<br>Rack Position                           | me.frp.act.prc                                                                                                |                               |                                         |                                      |                                    | X                                 |                   |                     |                    |

| No. | Signal Name                                                          | Example Machine Code                                                                                                      | Hull Performance<br>ISO 19030 | Basic Emission<br>Reporting (MRV, DCS), | Advanced Emission<br>Reporting (CII) | Commercial Reporting<br>& Analysis | Technical Reporting &<br>Analysis | Trim Optimization | Electronic Logbooks | Operational Safety |
|-----|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|-------------------|---------------------|--------------------|
| 18  | Main Engine Turbo<br>Charger Speed,<br>Temperatures and<br>Pressures | me.egtitc[n].act.dgc, me.<br>egtotc[n].act.dgc,<br>me.spdtc[n].act.rpm,<br>me.egpitc[n].act.bar, me<br>.egpotc[n].act.bar |                               |                                         |                                      |                                    | X                                 |                   | X                   |                    |
| 19  | Scrubber<br>Consumption e.g.<br>Magnesium<br>Hydroxide, Urea, ...    | egc.mhc.act.tph, egc.urc<br>.act.tph                                                                                      |                               |                                         |                                      |                                    | X                                 |                   | X                   |                    |
| 20  | Fuel Viscosity                                                       | [X].FVS.act.cSt                                                                                                           |                               |                                         |                                      |                                    | X                                 |                   |                     | X                  |

### 1.3 Shaft Power Meter

A shaft power meter can measure the power, torque, and rpm of the propulsion shaft. Either our Hoppe MAIHAK Shaft Power Meter can be installed, or an existing unit can be interfaced with.

| No. | Signal Name                                 | Example Machine Code | Hull Performance<br>ISO 19030 | Basic Emission<br>Reporting (MRV, DCS), | Advanced Emission<br>Reporting (CII) | Commercial Reporting<br>& Analysis | Technical Reporting &<br>Analysis | Trim Optimization | Electronic Logbooks | Operational Safety |
|-----|---------------------------------------------|----------------------|-------------------------------|-----------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|-------------------|---------------------|--------------------|
| 21  | Main Engine Power                           | me.pow.act.kw        |                               |                                         | X                                    |                                    | X                                 | X                 | X                   | X                  |
| 22  | Main Engine<br>Mechanical Energy<br>Counter | me.eng.cnt_tot.gwh   |                               |                                         | X                                    |                                    | X                                 |                   | X                   |                    |
| 23  | Shaft Power                                 | sa.pow.act.kw        |                               |                                         | X                                    |                                    | X                                 | X                 | X                   | X                  |
| 24  | Shaft Mechanical<br>Energy Counter          | sa.eng.cnt_tot.gwh   |                               |                                         | X                                    |                                    | X                                 |                   | X                   |                    |
| 25  | Main Engine Speed                           | me.spd.act.rpm       | X                             |                                         |                                      |                                    | X                                 | X                 | X                   | X                  |
| 26  | Shaft Speed                                 | sa.spd.act.rpm       | X                             |                                         |                                      |                                    | X                                 | X                 | X                   | X                  |
| 27  | Main Engine Torque                          | me.tqu.act.rpm       |                               |                                         |                                      |                                    | X                                 | X                 | X                   | X                  |
| 28  | Shaft Torque                                | sa.tqu.act.rpm       |                               |                                         |                                      |                                    | X                                 | X                 | X                   | X                  |

## 1.4 Fuel Consumption Measurement

A fuel consumption measurement system can be installed to measure and calculate the fuel consumption for each consumer. A whole Hoppe Fuel Consumption Measurement System can be installed, or any existing Flowmeter and System can be interfaced.

| No. | Signal Name                                                                                | Example Machine Code | Hull Performance<br>ISO 19030 | Basic Emission<br>Reporting (MRV, DCS), | Advanced Emission<br>Reporting (CII) | Commercial Reporting<br>& Analysis | Technical Reporting &<br>Analysis | Trim Optimization | Electronic Logbooks | Operational Safety |
|-----|--------------------------------------------------------------------------------------------|----------------------|-------------------------------|-----------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|-------------------|---------------------|--------------------|
| 29  | Auxiliary Boiler Fuel Consumption                                                          | ab.fms.act.tph       |                               | X                                       | X                                    | X                                  |                                   |                   | X                   |                    |
| 30  | Auxiliary Boiler Fuel Counter                                                              | ab.fms.cnt_tot.t     |                               | X                                       | X                                    | X                                  |                                   |                   | X                   |                    |
| 31  | Additional Fuel Consumer Consumption e.g. IGG, GCU, Diesel Power Packs, Incinerators, ...  | [X].fms.cnt_tot.t    |                               | X                                       | X                                    | X                                  |                                   |                   | X                   |                    |
| 32  | Additional Fuel Consumer Fuel Counter e.g. IGG, GCU, Diesel Power Packs, Incinerators, ... | [X].fms.act.tph      |                               | X                                       | X                                    | X                                  |                                   |                   | X                   |                    |
| 33  | Auxiliary Engine Fuel Consumption                                                          | ae.fms.act.tph       |                               | X                                       | X                                    | X                                  |                                   |                   | X                   |                    |
| 34  | Auxiliary Engine Fuel Counter                                                              | ae.fms.cnt_tot.t     |                               | X                                       | X                                    | X                                  |                                   |                   | X                   |                    |
| 35  | Flowmeter Fuel Density                                                                     | fm.den.act.tpm3      |                               |                                         |                                      |                                    | X                                 |                   | X                   | X                  |
| 36  | Flowmeter Fuel Temperature                                                                 | fm.temp.act.dgc      |                               |                                         |                                      |                                    | X                                 |                   | X                   | X                  |

| No. | Signal Name                     | Example Machine Code | Hull Performance<br>ISO 19030 | Basic Emission<br>Reporting (MRV, DCS), | Advanced Emission<br>Reporting (CII) | Commercial Reporting<br>& Analysis | Technical Reporting &<br>Analysis | Trim Optimization | Electronic Logbooks | Operational Safety |
|-----|---------------------------------|----------------------|-------------------------------|-----------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|-------------------|---------------------|--------------------|
| 37  | Flowmeter Fuel<br>Mass Flow     | fm.rate.act.tph      |                               |                                         |                                      |                                    | X                                 |                   | X                   |                    |
| 38  | Flowmeter Counter               | fm.rate.cnt_tot.t    |                               |                                         |                                      |                                    | X                                 |                   | X                   |                    |
| 39  | Main Engine Fuel<br>Consumption | me.fms.act.tph       |                               | X                                       | X                                    | X                                  | X                                 |                   | X                   |                    |
| 40  | Main Engine Fuel<br>Counter     | me.fms.cnt_tot.t     |                               | X                                       | X                                    | X                                  | X                                 |                   | X                   |                    |

## 1.5 Energy Measurement

Energy measurement systems can be installed to monitor electric power production and consumption onboard. Hoppe can provide and install the required equipment, or integrate with existing devices and systems.

| No. | Signal Name                                                                          | Example Machine Code                                                              | Hull Performance<br>ISO 19030 | Basic Emission<br>Reporting (MRV, DCS), | Advanced Emission<br>Reporting (CII) | Commercial Reporting<br>& Analysis | Technical Reporting &<br>Analysis | Trim Optimization | Electronic Logbooks | Operational Safety |
|-----|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------|-----------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|-------------------|---------------------|--------------------|
| 41  | Additional Electric Consumer Power<br>e.g. Cooling Water Pumps, Cargo Equipment, ... | Additional Electric Consumer Power e.g. Cooling Water Pumps, Cargo Equipment, ... |                               |                                         |                                      |                                    |                                   |                   | X                   |                    |
| 42  | Additional Electric Consumer Energy Counter                                          | Additional Electric Consumer Energy Counter                                       |                               |                                         |                                      |                                    |                                   |                   | X                   |                    |
| 43  | Auxiliary Engine Electric Power                                                      | Auxiliary Engine Electric Power                                                   |                               |                                         | X                                    |                                    |                                   |                   | X                   | X                  |
| 44  | Auxiliary Engine Electric Energy Counter                                             | Auxiliary Engine Electric Energy Counter                                          |                               |                                         | X                                    |                                    |                                   |                   | X                   |                    |
| 45  | Air Compressor Hours                                                                 | Air Compressor Hours                                                              |                               |                                         |                                      |                                    | X                                 |                   |                     |                    |
| 46  | Air Compressor Power                                                                 | Air Compressor Power                                                              |                               |                                         |                                      |                                    | X                                 |                   |                     |                    |
| 47  | CII Cargo Cooling Plant Electric Power & Energy Counter                              | CII Cargo Cooling Plant Electric Power & Energy Counter                           |                               |                                         | X                                    |                                    |                                   |                   | X                   |                    |
| 48  | CII Cargo Pumps Electric Power & Energy Counter                                      | CII Cargo Pumps Electric Power & Energy Counter                                   |                               |                                         | X                                    |                                    |                                   |                   | X                   |                    |

| No. | Signal Name                                                       | Example Machine Code                                              | Hull Performance<br>ISO 19030 | Basic Emission<br>Reporting (MRV, DCS), | Advanced Emission<br>Reporting (CII) | Commercial Reporting<br>& Analysis | Technical Reporting &<br>Analysis | Trim Optimization | Electronic Logbooks | Operational Safety |
|-----|-------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------|-----------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|-------------------|---------------------|--------------------|
| 49  | CII Hydraulic Power Packs (FRAMO) Electric Power & Energy Counter | CII Hydraulic Power Packs (FRAMO) Electric Power & Energy Counter |                               |                                         | X                                    |                                    |                                   |                   | X                   |                    |
| 50  | CII Reefer Electric Power & Energy Counter                        | CII Reefer Electric Power & Energy Counter                        |                               |                                         | X                                    |                                    |                                   |                   | X                   |                    |
| 51  | CII Reliquification Plant Electric Power & Energy Counter         | CII Reliquification Plant Electric Power & Energy Counter         |                               |                                         | X                                    |                                    |                                   |                   | X                   |                    |
| 52  | Shore Power                                                       | Shore Power                                                       |                               |                                         | X                                    |                                    |                                   |                   | X                   |                    |
| 53  | Shore Power Energy Counter                                        | Shore Power Energy Counter                                        |                               |                                         | X                                    |                                    |                                   |                   | X                   |                    |
| 54  | Shaft Generator Electric Power                                    | sg.pow.act.kW                                                     |                               |                                         | X                                    |                                    |                                   |                   | X                   | X                  |
| 55  | Shaft Generator Electric Energy Counter                           | sg.eng.cnt_tot.mwh                                                |                               |                                         | X                                    |                                    |                                   |                   | X                   |                    |

## 1.6 Draught Measurement

The below listed signals are typically gathered from a Draught Measurement System. Either a Hoppe Draught Measurement System can be installed or any other system interfaced.

| No. | Signal Name         | Example Machine Code                 | Hull Performance<br>ISO 19030 | Basic Emission<br>Reporting (MRV, DCS), | Advanced Emission<br>Reporting (CII) | Commercial Reporting<br>& Analysis | Technical Reporting &<br>Analysis | Trim Optimization | Electronic Logbooks | Operational Safety |
|-----|---------------------|--------------------------------------|-------------------------------|-----------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|-------------------|---------------------|--------------------|
| 56  | Draughts Fore & Aft | ddm.aftcl.act.m, ddm.fw<br>dcl.act.m | X                             |                                         |                                      | X                                  |                                   | X                 | X                   | X                  |
| 57  | Trim                | ho.tdyn.act.m                        |                               |                                         |                                      |                                    |                                   | X                 |                     | X                  |

## 1.7 Dynamic Draught and Floating Monitoring

This Hoppe system provides highly accurate real-time trim data, enabling optimal performance and fuel efficiency at sea based on live measurements.

| No. | Signal Name  | Example Machine Code | Hull Performance<br>ISO 19030 | Basic Emission<br>Reporting (MRV, DCS), | Advanced Emission<br>Reporting (CII) | Commercial Reporting<br>& Analysis | Technical Reporting &<br>Analysis | Trim Optimization | Electronic Logbooks | Operational Safety |
|-----|--------------|----------------------|-------------------------------|-----------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|-------------------|---------------------|--------------------|
| 58  | Dynamic Trim | ho.tdyn.act.m        |                               |                                         |                                      |                                    |                                   | X                 |                     |                    |

## 1.8 Tank Content Measurement

Typically Tank content and all its related figures are being measured by our Hoppe Tank content Measurement system. Alternatively any other Tank Content System or single sensors can be interfaced.

| No. | Signal Name            | Example Machine Code | Hull Performance<br>ISO 19030 | Basic Emission<br>Reporting (MRV, DCS), | Advanced Emission<br>Reporting (CII) | Commercial Reporting<br>& Analysis | Technical Reporting &<br>Analysis | Trim Optimization | Electronic Logbooks | Operational Safety |
|-----|------------------------|----------------------|-------------------------------|-----------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|-------------------|---------------------|--------------------|
| 59  | Tank Content Mass      | t[n].tm.act.t        |                               |                                         |                                      |                                    | X                                 |                   | X                   |                    |
| 60  | Tank Content<br>Volume | t[n].tv.act.m3       |                               |                                         |                                      |                                    | X                                 |                   |                     |                    |
| 61  | Tank Level             | t[n].tl.act.m        |                               |                                         |                                      |                                    | X                                 |                   |                     |                    |

## 1.9 Electronic Inclinator & HOSIM

Our HOSIM and Electronic Inclinator can measure the motion of the vessel and all its key information.

| No. | Signal Name        | Example Machine Code | Hull Performance<br>ISO 19030 | Basic Emission<br>Reporting (MRV, DCS), | Advanced Emission<br>Reporting (CII) | Commercial Reporting<br>& Analysis | Technical Reporting &<br>Analysis | Trim Optimization | Electronic Logbooks | Operational Safety |
|-----|--------------------|----------------------|-------------------------------|-----------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|-------------------|---------------------|--------------------|
| 62  | Trim by Inclinator | HO.T.act.m           |                               |                                         |                                      |                                    |                                   | X                 |                     |                    |
| 63  | Roll Angle         | ho.roa.act.deg       |                               |                                         |                                      |                                    | X                                 |                   |                     | X                  |
| 64  | Roll Period        | ho.rop.avg.s         |                               |                                         |                                      |                                    | X                                 |                   |                     | X                  |
| 65  | Actual Heel Angle  | roa.aftcl.avg.deg    |                               |                                         |                                      |                                    | X                                 |                   |                     | X                  |

## 2 Appendix:

The table below summarizes the signals described above.

| No. | Signal Name                                                 | Example Machine Code                                                                                        | Hull Performance<br>ISO 19030 | Basic Emission<br>Reporting (MRV, DCS), | Advanced Emission<br>Reporting (CII) | Commercial Reporting<br>& Analysis | Technical Reporting &<br>Analysis | Trim Optimization | Electronic Logbooks | Operational Safety |
|-----|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|-------------------|---------------------|--------------------|
| 1   | Distance made good                                          | v.dog.cnt_tot.nm                                                                                            |                               | X                                       | X                                    | X                                  |                                   |                   | X                   |                    |
| 2   | Position Latitude &<br>Longitude                            | v.gpslat.act.deg,<br>v.gpslon.act.deg                                                                       |                               | X                                       | X                                    |                                    |                                   |                   | X                   |                    |
| 3   | Rudder Angle                                                | v.rua.act.deg                                                                                               |                               |                                         |                                      |                                    | X                                 |                   | X                   |                    |
| 4   | Speed Over Ground                                           | v.sog.act.kn                                                                                                | X                             |                                         |                                      | X                                  |                                   |                   |                     |                    |
| 5   | Speed Through<br>Water                                      | v.stw.act.kn                                                                                                | X                             |                                         |                                      | X                                  |                                   | X                 |                     |                    |
| 6   | Water Depth                                                 | v.wd.act.m                                                                                                  | X                             |                                         |                                      |                                    | X                                 |                   | X                   |                    |
| 7   | Water temperature                                           | wea.swt.act.degc                                                                                            | X                             |                                         |                                      |                                    |                                   |                   | X                   |                    |
| 8   | Relative Wind Speed<br>& Direction                          | wea.wsr.act.mps,<br>wea.wdr.act.deg                                                                         |                               |                                         |                                      | X                                  |                                   | X                 | X                   |                    |
| 9   | Actual Wind Speed &<br>Direction                            | wea.wst.act.mps, wea.w<br>dtv.act.deg                                                                       |                               |                                         |                                      | X                                  |                                   | X                 | X                   |                    |
| 10  | Auxiliary<br>Engine Cylinder<br>Exhaust Gas<br>Temperatures | ae.egtcyl[n].act.dgc                                                                                        |                               |                                         |                                      |                                    | X                                 |                   |                     | X                  |
| 11  | Main Engine Charge<br>Air/ Scavenge Air<br>Temperatures     | me.satcyl[n].act.dgc,<br>me.atisc.act.dgc,<br>me.atosac.act.dgc,<br>me.wtisac.act.dgc,<br>me.wtisac.act.dgc |                               |                                         |                                      |                                    | X                                 |                   | X                   |                    |
| 12  | Main Engine Charge<br>Air/ Scavenge Air<br>Pressures        | me.sap.act.bar                                                                                              |                               |                                         |                                      |                                    | X                                 |                   | X                   |                    |

**Target Signal List**
**Performance & Energy: Signal Scope**
**Issue Date 08.09.2025**

|    |                                                             |                                                                                                         |   |   |   |   |   |   |   |   |
|----|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|
| 13 | Main Engine Cooling Water Temperatures and Pressures        | csw.mswt.act.dgc, csw.mswp.act.bar, ...                                                                 |   |   |   |   | X |   | X | X |
| 14 | Main Engine Cylinder Bearing Temperatures                   | me.cyl[n].brg.act.dgc                                                                                   |   |   |   |   | X |   |   | X |
| 15 | Main Engine Cylinder Exhaust Gas Temperatures               | me.egtcyl[n].act.dgc                                                                                    |   |   |   |   | X |   | X | X |
| 16 | Main Engine Cylinder Oil Consumption                        | me.coms.act.kgph                                                                                        |   |   |   |   | X |   | X |   |
| 17 | Main Engine Fuel Rack Position                              | me.frp.act.prc                                                                                          |   |   |   |   | X |   |   |   |
| 18 | Main Engine Turbo Charger Speed, Temperatures and Pressures | me.egtct[n].act.dgc, me.egtct[n].act.dgc, me.spdct[n].act.rpm, me.egpct[n].act.bar, me.egpct[n].act.bar |   |   |   |   | X |   | X |   |
| 19 | Scrubber Consumption e.g. Magnesium Hydroxide, Urea, ...    | egc.mhc.act.tph, egc.urc.act.tph                                                                        |   |   |   |   | X |   | X |   |
| 20 | Fuel Viscosity                                              | [X].FVS.act.cSt                                                                                         |   |   |   |   | X |   |   | X |
| 21 | Main Engine Power                                           | me.pow.act.kw                                                                                           |   |   | X |   | X | X | X | X |
| 22 | Main Engine Mechanical Energy Counter                       | me.eng.cnt_tot.gwh                                                                                      |   |   | X |   | X |   | X |   |
| 23 | Shaft Power                                                 | sa.pow.act.kw                                                                                           |   |   | X |   | X | X | X | X |
| 24 | Shaft Mechanical Energy Counter                             | sa.eng.cnt_tot.gwh                                                                                      |   |   | X |   | X |   | X |   |
| 25 | Main Engine Speed                                           | me.spd.act.rpm                                                                                          | X |   |   |   | X | X | X | X |
| 26 | Shaft Speed                                                 | sa.spd.act.rpm                                                                                          | X |   |   |   | X | X | X | X |
| 27 | Main Engine Torque                                          | me.tqu.act.rpm                                                                                          |   |   |   |   | X | X | X | X |
| 28 | Shaft Torque                                                | sa.tqu.act.rpm                                                                                          |   |   |   |   | X | X | X | X |
| 29 | Auxiliary Boiler Fuel Consumption                           | ab.fms.act.tph                                                                                          |   | X | X | X |   |   | X |   |

**Target Signal List**
**Performance & Energy: Signal Scope**
**Issue Date 08.09.2025**

|    |                                                                                            |                                                                                   |  |   |   |   |   |  |   |   |
|----|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--|---|---|---|---|--|---|---|
| 30 | Auxiliary Boiler Fuel Counter                                                              | ab.fms.cnt_tot.t                                                                  |  | X | X | X |   |  | X |   |
| 31 | Additional Fuel Consumer Consumption e.g. IGG, GCU, Diesel Power Packs, Incinerators, ...  | [X].fms.cnt_tot.t                                                                 |  | X | X | X |   |  | X |   |
| 32 | Additional Fuel Consumer Fuel Counter e.g. IGG, GCU, Diesel Power Packs, Incinerators, ... | [X].fms.act.tph                                                                   |  | X | X | X |   |  | X |   |
| 33 | Auxiliary Engine Fuel Consumption                                                          | ae.fms.act.tph                                                                    |  | X | X | X |   |  | X |   |
| 34 | Auxiliary Engine Fuel Counter                                                              | ae.fms.cnt_tot.t                                                                  |  | X | X | X |   |  | X |   |
| 35 | Flowmeter Fuel Density                                                                     | fm.den.act.tpm3                                                                   |  |   |   |   | X |  | X | X |
| 36 | Flowmeter Fuel Temperature                                                                 | fm.temp.act.dgc                                                                   |  |   |   |   | X |  | X | X |
| 37 | Flowmeter Fuel Mass Flow                                                                   | fm.rate.act.tph                                                                   |  |   |   |   | X |  | X |   |
| 38 | Flowmeter Counter                                                                          | fm.rate.cnt_tot.t                                                                 |  |   |   |   | X |  | X |   |
| 39 | Main Engine Fuel Consumption                                                               | me.fms.act.tph                                                                    |  | X | X | X | X |  | X |   |
| 40 | Main Engine Fuel Counter                                                                   | me.fms.cnt_tot.t                                                                  |  | X | X | X | X |  | X |   |
| 41 | Additional Electric Consumer Power e.g. Cooling Water Pumps, Cargo Equipment, ...          | Additional Electric Consumer Power e.g. Cooling Water Pumps, Cargo Equipment, ... |  |   |   |   |   |  | X |   |
| 42 | Additional Electric Consumer Energy Counter                                                | Additional Electric Consumer Energy Counter                                       |  |   |   |   |   |  | X |   |

**Target Signal List**
**Performance & Energy: Signal Scope**
**Issue Date 08.09.2025**

|    |                                                                   |                                                                   |  |  |   |  |   |  |   |   |
|----|-------------------------------------------------------------------|-------------------------------------------------------------------|--|--|---|--|---|--|---|---|
| 43 | Auxiliary Engine Electric Power                                   | Auxiliary Engine Electric Power                                   |  |  | X |  |   |  | X | X |
| 44 | Auxiliary Engine Electric Energy Counter                          | Auxiliary Engine Electric Energy Counter                          |  |  | X |  |   |  | X |   |
| 45 | Air Compressor Hours                                              | Air Compressor Hours                                              |  |  |   |  | X |  |   |   |
| 46 | Air Compressor Power                                              | Air Compressor Power                                              |  |  |   |  | X |  |   |   |
| 47 | CII Cargo Cooling Plant Electric Power & Energy Counter           | CII Cargo Cooling Plant Electric Power & Energy Counter           |  |  | X |  |   |  | X |   |
| 48 | CII Cargo Pumps Electric Power & Energy Counter                   | CII Cargo Pumps Electric Power & Energy Counter                   |  |  | X |  |   |  | X |   |
| 49 | CII Hydraulic Power Packs (FRAMO) Electric Power & Energy Counter | CII Hydraulic Power Packs (FRAMO) Electric Power & Energy Counter |  |  | X |  |   |  | X |   |
| 50 | CII Reefer Electric Power & Energy Counter                        | CII Reefer Electric Power & Energy Counter                        |  |  | X |  |   |  | X |   |
| 51 | CII Reliquification Plant Electric Power & Energy Counter         | CII Reliquification Plant Electric Power & Energy Counter         |  |  | X |  |   |  | X |   |
| 52 | Shore Power                                                       | Shore Power                                                       |  |  | X |  |   |  | X |   |
| 53 | Shore Power Energy Counter                                        | Shore Power Energy Counter                                        |  |  | X |  |   |  | X |   |
| 54 | Shaft Generator Electric Power                                    | sg.pow.act.kW                                                     |  |  | X |  |   |  | X | X |
| 55 | Shaft Generator Electric Energy Counter                           | sg.eng.cnt_tot.mwh                                                |  |  | X |  |   |  | X |   |

**Target Signal List**
**Performance & Energy: Signal Scope**
**Issue Date 08.09.2025**

|    |                        |                                      |   |  |  |   |   |   |   |   |
|----|------------------------|--------------------------------------|---|--|--|---|---|---|---|---|
| 56 | Draughts Fore & Aft    | ddm.aftcl.act.m, ddm.fw<br>dcl.act.m | X |  |  | X |   | X | X | X |
| 57 | Trim                   | ho.tdyn.act.m                        |   |  |  |   |   | X |   | X |
| 58 | Dynamic Trim           | ho.tdyn.act.m                        |   |  |  |   |   | X |   |   |
| 59 | Tank Content Mass      | t[n].tm.act.t                        |   |  |  |   | X |   | X |   |
| 60 | Tank Content<br>Volume | t[n].tv.act.m3                       |   |  |  |   | X |   |   |   |
| 61 | Tank Level             | t[n].tl.act.m                        |   |  |  |   | X |   |   |   |
| 62 | Trim by Inclinator     | HO.T.act.m                           |   |  |  |   |   | X |   |   |
| 63 | Roll Angle             | ho.roa.act.deg                       |   |  |  |   | X |   |   | X |
| 64 | Roll Period            | ho.rop.avg.s                         |   |  |  |   | X |   |   | X |
| 65 | Actual Heel Angle      | roa.aftcl.avg.deg                    |   |  |  |   | X |   |   | X |