# Sensorlist

## Introduction

In the devicelist we started to list all the devices with their respective interfaces and ports. The sensorlist (tab sensorlist) will break this up even further. It will go from device through I/O to the field that is attached.

Every single I/O that comes in to the system will have its own line here in the sensorlist. This is done to control all the incoming data as accurate as possible. Every I/O gets its own Field-ID which will be kept in the database of NavVision. Once the program knows that a certain I/O belongs to a specific field, you can add possibilities to that field to control the I/O. Just as example, you can add min/max values, alarm values, unit types, offsets, inhibits and much more. You can even use the specific I/O in PLC programs, Whether internal or external.

With the devices already assigned in the devicelist, you can start out filling the columns in the sensorlist. Be aware that you need all the information on the I/O’s upfront. So for I/O’s on Wago you need to know the sort and type of I/O, but also for protocols such as Modbus, Canbus and other types you will need the right details. Without these details it is almost impossible to make a good sensorlist

## Columns

The sensorlist is also divided in to columns. Some columns are free for your own information, but the colored ones are mainly mandatory. Same as in the devicelist you can find the columns in the sensorlist are labeled in the first row. The fields underneath can be filled with free text or have a drop-down menu where you can choose a tag. These tags are mandatory and the sensorlist won’t except tags that are not in the list for these columns.

The following columns are in the sensorlist:

|  |  |  |
| --- | --- | --- |
| **Column** | **Type** | **Description** |
| Import Result | Text | For troubleshooting purposes. See Chapter 12.3 |
| ID | Text | A unique ID for the I-O provided by the shipyard or installation company |
| CableLabel | Text | The cable label as labeled in the real installation. Mostly provided by the installation company |
| GroupLabel | Text | Group labels are for dividing I/O into dedicated groups, like Bilge, Fire, Engines etc. |
| Item | Text | The description of the Data Field. Default item text belonging to the Data Field is preferred. The name of the I/O as you want it to appear in the Alarm List. |
| SensorType | Select  (Text) | SensorType defines which subfield or action of the Data Field is set by this value. By default it’s [Standard]. Standard means it’s not defining a subfield or action, but the value of the Data Field itself. (For more options see Table 11‑2 and Table 11‑3). |
| Connection | Select  (NO,NC) | Connection defines the type of connection for digital in- and outputs. Connection is NO by default. If an in- or output is normally closed it’s NC. |
| Device | Select | Identification of the device where the sensor/control or serial device is connected to. This text should be unique for each FT NavVision® device. The text is case sensitive This comes from the devicelist |
| Location | Text | Identification of the substation where the sensor/control is connected to in the FT NavVision® system. Every substation should have a unique text. The text is case sensitive |
| Interface | Select  (text) | Select the type of interface that the data is coming in. For Wago this is divided in the slice’s type-number. For Modbus, Canbus and other protocols it is Serial (Digital/Analog) in or out. |
| Module | Value  (Index) | Module index where the sensor/control data can be found. For CAN bus it is the parameter group number (PGN), for Modbus it is the Modbus mapping and for WAGO it is the slice number. Module 1 for WAGO is the first slice after the 750-626 module. |
| Pin | Value  (Index) | The I/O index on the module for WAGO and the bit offset in the message for serial protocols. (NOTE: The pin index is 1 based) |
| Type | Select | defines the type of module used to read/control the I/O. This is mainly used for WAGO. It can be between 750-400 and 750-612. For Modbus here goes the function code. |
| Min | Value | Minimum instrument value |
| Max | Value | Maximum instrument value |
| DefaultUnit | Select | The default unit used to present this Data Field. (For options see Table 11‑4) |
| Manufacturer | Optional | Manufacturer |
| Supplier | Optional | Supplier |
| Comment | Optional | Comment |
| Revision | Optional | Revision |
| Field | Select  (FTSelect) | The ID of the Field. References to this ID can be found in the file “fieldlist.txt” that is in the root folder of the FT NavVision® software installation after the first time FT NavVision® has been started. |
| Label | Text | The short description of the Data Field when shown in an instrument. Default label text belonging to the Data Field is preferred. The name of the I/O as you want it to appear in an instrument, a value, a button, etc. |
| Rate | Value  (Hz) | Rate describes the number of samples per second of a sensor/control. This is defined by the protocol. Leave empty. |
| Index | Value  (Index) | Index defines when this Data Field Definition [DFD] is valid. The Index column can only be used in combination with a Data Field Definition [DFD] that has the SensorType set to Index and is in the same message as this DFD. Default is empty. |
| DataType | Select  (Unsigned, Signed, Bool, Enum, Float) | DataType is used to define the type of value on serial protocols. For analogue values it’s Float, Signed or Unsigned. For digital values it’s Bool. For enumerations this is Enum. See Enum column. |
| Enum | Value  (Index) | Enum is the index value where the received value should compare to, to switch the Data Field on. If the value is not equal to the Enum index the Data Field is switched off. |
| Count | Value  (Count) | Count is the number of bits starting from the pin index. For a digital value it’s typically 1 with a pin index between 1 and 16 and for analog values it’s for example for Mod bus typically 16 with pin index 1. |
| Multiplier | Value | Multiplier defines the factor between the sensor/control value and the real value.  For inputs/read:  *value = sensor value \* multiplier + offset*  For outputs/write:  *sensor value = (value – offset) / multiplier* |
| Offset | Value | Offset defines the offset between the sensor/control value and the real value. See Multiplier column. |
| Unit | Select | The Unit in which the sensor/control value is received or send. (See Table 11‑4) |
| GroupLocal | Text | Local language text (see 11.3.29) and: chapter 11.1.14 Software installation and commissioning manual 1.9 |
| ItemLocal | Text | Local language text (see 11.3.29) and: chapter 11.1.14 Software installation and commissioning manual 1.9 |
| LabelLocal | Text | Local language text (see 11.3.29) and: chapter 11.1.14 Software installation and commissioning manual 1.9 |
| Filter | Value  (Seconds) | The filter used in the instruments for this Data Field to eliminate short spikes in measurements. Default is 1 second. Maximum is 10 seconds |
| SetpointMin | Optional | SetpointMin |
| SetpointMax | Optional | SetpointMin |
| SetpointMinDelay | Optional | SetpointMinDelay |
| SetpointMaxDelay | Optional | SetpointMaxDelay |
| SwitchTime | Optional | SwitchTime |
| PulseTime | Optional | PulseTime |
| PersistantRequest | “Y” or “N” | Associated with “Alarm on Request” this field will give an alarm if a valve is opening or closing and doesn’t reach its endpoint. As soon as you acknowledge the alarm, it will show the actual status again in the mimic. |
| ExternalRight | Optional | Read, Write or Read/Write rights |
| Decimals | Optional | Set number of decimals in values. (See also chapter 11.2.2.3 Software installation and commissioning manual 1.9) |
| Log | “Y” or “N” | Defines whether a field will be logged for remote monitoring (see Remote monitoring manual v1.0.2) |
| AlarmSMS | Obsolete | Set if an SMS will be sent at alarm |
| AlarmWAV | Filename | The filename of the sound that will be played over the sound card when this Data Field is in alarm. Default is “alarm.wav”. Files can be found in the “sound” sub folder of the FT NavVision® software installation |
| WarningLow | Value  (in “Unit”) | The threshold for the low alarm. Empty is off |
| WarningHigh | Value  (in “Unit”) | The threshold for the high alarm. Empty is off |
| WarningDelay | Value  (Seconds) | The delay for the low and high alarms |
| WarningGroup | Select | The ID of the alarm group that the low and high alarms are assigned to. References to this ID can be found in the file “fieldlist.txt” |
| WarningAction | Text | The action an operator should take when a low or high alarm occurs. |
| CriticalLow | Value  (in “Unit”) | The threshold for the too low alarm. Empty is off |
| CriticalHigh | Value  (in “Unit”) | The threshold for the too high alarm. Empty is off |
| CriticalDelay | Value  (Seconds) | The delay for the too low and too high alarms |
| CriticalGroup | Select | The ID of the alarm group that the too low and too high alarms are assigned to. References to this ID can be found in the file “fieldlist.txt” |
| CriticalAction | Text | The action an operator should take when a too low or too high alarm occurs. |
| InhibitAll | Value  (“” or “Y”) | Inhibit all alarms for a specific field. This will show in the alarmlist. Empty is off. |
| InhibitLevels | Value  (“” or “Y”) | Inhibit all Level alarms for a specific field. This will show in the alarmlist. Empty is off. |
| InhibitTimeout | Value  (“” or “Y”) | Inhibit all Timeout alarms for a specific field. This will show in the alarmlist. Empty is off. |
| InhibitNotReady | Value  (“” or “Y”) | Inhibit all NotReady alarms for a specific field. This will show in the alarmlist. Empty is off. |
| InhibitDefect | Value  (“” or “Y”) | Inhibit all Defect alarms for a specific field. This will show in the alarmlist. Empty is off. |
| InhibitField1 | Select  (FTSelect) | Field That this I/O should be inhibited or not inhibited to. Se definition “Field”. |
| InhibitType1 | Value  (Higher, Lower) | Inhibits the field depending on if the type is Higher or Lower. |
| InhibitValue1 | Value | Value when to inhibit. ( i.e. Inhibit when RPM is Lower than 500). So choose 500 here. |
| InhibitLogic | Value  (AND, OR) | Logic for second inhibit field. Choose between different possibilities. |
| InhibitField2 | Select  (FTSelect) | Field That this I/O should be inhibited or not inhibited to. Se definition “Field”. |
| InhibitType2 | Value  (Higher, Lower) | Inhibits the field depending on if the type is Higher or Lower. |
| InhibitValue2 | Value | Value when to inhibit. ( i.e. Inhibit when RPM is Lower than 500). So choose 500 here. |
| InhibitBeforeDelay | Value  (seconds) | Delay before inhibit kicks in |
| InhibitAfterDelay | Value  (seconds) | Delay after inhibit stops |
| Weight | Optional | Weight |
| CableLength | Optional | CableLength |
| Connector | Optional | Connector |
| Supply | Optional | Supply |
| Consumption | Optional | Consumption |

Table 11‑1: Sensorlist columns

Sensor types can be used for in- and outputs (read/write). The interpretation of the read values and written values differs a bit, so they are described separately

|  |  |  |
| --- | --- | --- |
| SensorType (Mode: Read) | | |
| Option | Sensor | Description |
| Standard | Value | Sensor value represents the state of the Data Field itself (Default) |
| Set | On | Request to turn on |
| Off | No action |
| Reset | On | Request to turn off |
| Off | No action |
| Pending | On | Processing a request. |
| Off | No action |
| Auto | On | Switched by an automatic control sequence |
| Off | Controlled by an operator |
| Manual | On | Controlled by an operator |
| Off | Switched by an automatic control sequence |
| Low Speed | On | Running at low speed |
| Off | Off, when not in “High Speed”. Otherwise no action |
| High Speed | On | Running at high speed |
| Off | Off, when not in “Low Speed”. Otherwise no action |
| Closed | On | Switched off |
| Off | Processing a request, when not “Open” |
| Open | On | Switched on |
| Off | Processing a request, when not “Closed” |
| Ready | On | Ready for use |
| Off | Not ready for use |
| Remote | On | Remote control. Controlled by AMCS |
| Off | Local control. Not controlled by AMCS |
| Ack | On | Acknowledgement of alarm on the assigned field |
| Off | No action |
| Request | On | Request to turn on |
| Off | Request to turn off |
| Push | On | Request to turn on, when off.  Request to turn off, when on. |
| Off | No action |
| Too Low | On | Value is too low |
| Off | Value is not too low |
| Low | On | Value is low |
| Off | Value is not low |
| High | On | Value is high |
| Off | Value is not high |
| Too High | On | Value is too high |
| Off | Value is not too high |
| Failure | On | Defect |
| Off | Not defect |
| Precision | On | High precision frequency counter in 0.01 Hz accuracy up to 10kHz |
| Off | Low precision frequency counter in 1 Hz accuracy up to 100kHz |
| Counter | Value | The changes in this counter value will be added to the field |
| Sign | On | The value read by “Standard” is negative |
| Off | The value read by “Standard” is positive |
| Index | Value | Value is the index of a serial message. See “Index” description |
| Pulse | On | Field’s value is counted 1 up |
| Off | No action |
| Pulse 1/2 | Value | Used in combination with “Pulse 2/2” to detect movement with two proximity switches. |
| Pulse 2/2 | Value |
| Pulse 1/3 | Value | Used in combination with “Pulse 2/3” and “Pulse 3/3” to detect movement with three proximity switches. |
| Pulse 2/3 | Value |
| Pulse 3/3 | Value |

Table 11‑2: Sensor Type mode Read

|  |  |  |
| --- | --- | --- |
| SensorType (Mode: Write) | | |
| Option | Sensor | Description |
| Standard | Value | Requested state of the Data Field itself (Default) |
| Set | On | Request to turn on |
| Off | No action |
| Reset | On | Request to turn off |
| Off | No action |
| Pending | On | Processing a request. |
| Off | No action |
| Auto | On | Request to turn automatic control sequence on |
| Off | Request to turn automatic control sequence off |
| Low Speed | On | Request to run at low speed |
| Off | Request to turn off, when not in “High Speed”. Otherwise no action |
| High Speed | On | Request to run at high speed |
| Off | Request to turn off, when not in “Low Speed”. Otherwise no action |
| Impulse | On | Request to turn on, when off.  Request to turn off, when on. |
| Off | No action |
| Status | Value | Output value represents the state of the field/ device itself  (No control) |
| Ready | On | Ready for use |
| Off | Not ready for use |
| Remote | On | Remote control. Controlled by AMCS |
| Off | Local control. Not controlled by AMCS |
| Too Low | On | Value is too low |
| Off | Value is not too low |
| Low | On | Value is low |
| Off | Value is not low |
| High | On | Value is high |
| Off | Value is not high |
| Too High | On | Value is too high |
| Off | Value is not too high |
| Failure | On | Defect |
| Off | Not defect |

Table 11‑3: Sensor Type mode Write

|  |  |  |
| --- | --- | --- |
| Unit Type | Select | Description |
| Alarm | Alm | Alarm |
| Ampere Hour | Ah | Ampere hour |
| Angle | ° | Angle |
| Angular Acceleration | °/s^2 | Degrees per square second |
| Angular Speed | °/sec | Degrees per second |
| °/min | Degrees per minute |
| Content | % | Percentage |
| G | Gallon [US] |
| M3 | Cubic meter |
| L | Liter |
| Guk | Gallon [UK] |
| Consumption per Distance | l/nm | Liter per nautical mile |
| l/km | Liter per kilometer |
| G/nm | Gallon [US] per nautical mile |
| l/m | Liter per meter |
| Consumption per Time | G/H | G/H |
| G/M | G/M |
| Guk/M | Guk/M |
| Guk/H | Guk/H |
| l/m | l/m |
| G/S | G/S |
| Guk/S | Guk/S |
| l/h | l/h |
| L/S | L/S |
| Counter | x | Count |
| Course | ° | Course |
| Current | mA | MilliAmpere |
| kA | Kilo Ampere |
| A | Ampere |
| Dampening | D | Dampening |
| DistanceContent | nm/G | nm/G |
| nm/l | nm/l |
| km/l | km/l |
| m/l | m/l |
| Force | Pdl | Poundal |
| Lbf | Lbf |
| N | Newton |
| Kgf | kg |
| ForceLength | Kgm | Kgm |
| Lbf-ft | Lbf-ft |
| kips | Kips |
| Nm | Nm |
| Frequency | Hz | Hertz |
| FuelEconomyGaseous | nm/kg | nm/kg |
| m/g | m/g |
| km/kg | Km/Kg |
| FuelEconomyPower | kWh/l | kWh/L |
| kWh/Guk | kWh/Guk |
| kWh/G | kWh/G |
| Length | km | Km |
| mi | mi |
| cm | cm |
| nm | NM |
| ft | Feet |
| fm | Fathom |
| mm | mm |
| m | M |
| in | Inch |
| Luminance | cd m-2 | cd m-2 |
| Magnetic | ° | Magnetic |
| MassSpeed | g/s | g/s |
| t/s | t/s |
| kg/h | Kg/H |
| Name |  |  |
| Number |  |  |
| okta | Okta |
| Percentage | % | Percentage |
| Position | ° | Degrees |
| Pressure | psi | Psi |
| Pa | Pascal |
| kPa | kPa |
| mbar | mBar |
| hPa | hPa |
| Hg | Hg |
| bar | Bar |
| Resistance | ohm | Ohm |
| mOhm | MilliOhm |
| kOhm | KiloOhm |
| RPM | rpm | RPM |
| RPMAccelaration | rpm/s | RPM/s |
| Speed | km/h | Km/H |
| m/min | M/Min |
| m/s | M/S |
| ft/min | Feet/Min |
| kn | Knots |
| B | Beaufort |
| mph | Miles per hour |
| SpeedAcceleration | g | g-force |
| m/s2 | M/S2 |
| Status | Open | Open |
| On | OnOff |
| Switch | Take Over | Take Over |
| S | Switch Off |
| Alarm Group | Alarm Group |
| General Alarm | General Alarm |
| Alarm Deadman Group | Alarm Deadman Group |
| P | Push |
| S | Switch |
| PS | Popup Switch |
| Temperature | K | Kelvin |
| °C | Celsius |
| °F | °F |
| Time | Mn | Month |
| H | Hour |
| D | Day |
| DTL | Date & Time Left |
| D | Date |
| ms | mSec |
| us | uSec |
| Wk | Week |
| M | Min |
| T | Time |
| DT | Date & Time |
| S | Sec |
| Yr | Year |
| True | ° | True |
| Voltage | mV | MilliVolt |
| kV | KiloVolt |
| V | Volt |
| VoltAmpere | VA | VA |
| kVA | kVA |
| VoltAmpereHour | kVAh | kVAh |
| VAh | VAh |
| MVAh | MVAh |
| Watt | MW | MegaWatt |
| W | Watt |
| kW | kW |
| WattHour | Wh | WattHour |
| MWh | MegaWattHour |
| kWh | kWh |
| Weight | lbs | Lbs |
| kg | kg |
| g | Gram |
| t | Ton |

Table 11‑4: Unit Type