Tank Management Systems

Industry | Offshore | Marine
We provide for you

**SURVEYOR™**

Automatic systems for multipurpose all level pressure, temperature monitoring and control

For those with focus on:

- Superior quality and functionality
- Flexibility and integration
- Short delivery times
- Competitive prices
- Cost effective installations
- 24-hours after sales support
- Low service costs

Specifications and details are subject to change and are given herewith for information only.

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Dear Customer

A major benefit of the Ariston technology becoming part of the Scanjet Group in 2012 is that the scope of overall supply for our end users has increased dramatically. With our tank monitoring systems in more than 550 marine and land installations worldwide, the scope of supply now includes tank cleaning machines, electro-pneumatic level gauging systems, vapour emission control systems and high-high level alarms from Scanjet Macron. In addition we are introducing a new and revised intelligent tank cleaning machine monitoring system “WashTrac” – resulting in a one-stop shop for tank cleaning, cargo and ballast monitoring always with your operational and economical demand in mind.

Since Ariston was founded in 1996 we have taken great pride in making advanced, reliable and user friendly tank monitoring systems with our team of skilled engineers being dedicated to strict quality control and providing top class customer care and support at all times.

In fact the true testament of the Ariston technology is the already very extensive list of satisfied customers that have SURVEYOR™ either in operation on board their vessels, or at their terminals and various industrial applications. SURVEYOR™ is designed to meet and exceed all demands on installation and operating costs with quality and workmanship as a prerequisite for ensuring a long lifetime for the system. With built-in expandability, flexible hardware and software, the Surveyor brands allow for fast and easy upgrade dictated by future developments, regulations and conventions.

Please contact Scanjet Group sales team and our global representatives and service centres, we will be pleased to assist you.

President and CEO
Magnus Wallin
Scanjet Group

Company Profile

Ariston Norway AS was founded in 1996. From 1998 to 2004 the company operated under the name Tanksystem Norway AS. In 2012 our Ariston technology became part of the Scanjet Group.

Our focus is on high quality and reliable performance by providing tailor-made system solutions to extended warranty periods and excellent after sales support worldwide.

SURVEYOR™ systems are designed, developed and manufactured in Norway to the highest standards and in full compliance with the governing class and IMO regulations.

SURVEYOR™ systems meet the demand for low cost and time saving installation, with minimum expenses for maintenance during their operational lifetime - for retrofit projects and new buildings alike.

Our achievements include the following satisfied customers that have SURVEYOR™ on board their vessels: Jo Tankers, CMA-CGM, HMM, Odfjell, Anders Utkilens Rederi, Stolt-Nielsen, Navale Francaise, Ctr.F.Ahrenkiel, Leif Hoegh, Tsakos Shipping, C.P.Offen, E.R. Schiffahrts, V.Ships, Indian Coast Guard, to name just a few.

Where the system price, installation cost, delivery time, warranty period and configuration flexibility matter, SURVEYOR™ would be the natural first choice.
The Multipurpose Monitoring & Control System - The Heart Of All SURVEYOR™ Systems.

Being mindful of the need to offer the so desired universal and flexible solution for monitoring of tank levels (cargo, ballast, service), tank and manifold pressures, temperatures, draft, etc. and deliver the information to ship’s automation systems, we developed and launched our advanced Multipurpose Monitoring & Control System.

The System features a tank display unit (TDU) with colour touch screen and configurable software via a Windows based configuration program. Local setup of display functions and measurement units makes the interface user friendly and easy to operate. The unit’s sleek design, size and easy installation contribute to creating more human-friendly and ergonomic environment solutions. Through virtually unlimited expansion possibilities the system can handle an unlimited number of sensors, allowing the addition or removal of monitoring points.

Configuration of a new monitoring point or updating of the existing configuration can be performed on site by connecting the tank control unit (TCU) to a PC. The TCU performs all the processing of the signals from the I/O cards and supplies power to the I/O cards and the display unit. The control unit supports communication protocols to the majority of makers’ automation systems - for example digital I/O, thermocouples, anti-healing systems, mainframe computers, etc. Customized software, friendly interface and expansion possibilities make the Ariston Multipurpose Monitoring and Control System a cost effective and efficient solution.

The SURVEYOR™ systems are based on proven pressure sensor and radar technology, giving accurate information through direct measuring of cargo level, temperature, vapour pressure and cargo density. The pressure sensors and radar gauges have a track record of long time stability and accuracy. The system is recommended for installation in cargo tanks, ballast tanks, fuel oil tanks and for draft measurement. The sophisticated and user friendly on/offline loading calculator is capable of presenting hull stress and stability calculations, allowing printouts of cargo transfer reports, and is an integral part of the system.

The tailor made high quality pressure sensors measure absolute pressure. Sensors are hermetically sealed without any ventilation to the atmosphere. Reference is made through an additional sensor, which reads the atmospheric pressure on a continuous basis. Temperature measurement is integrated in the sensors for correction of the pressure reading accuracy well as a separate temperature monitoring feature. The system is applied on board tankers, dry cargo vessels, offshore vessels, coast guard and land based facilities.
MULTIPURPOSE MONITORING AND CONTROL SYSTEM

Multipurpose monitoring & control system

PC Windows Workstation and Loading Calculator

TDU Touch Screen System Monitor

Handheld Wireless (WLAN) Tank Monitoring and Alarm Unit

IPC 196 Local Indicator

NEW!

Multiple PC Workstation Support

Main and redundancy power (2x24VDC)

Sensor for system atmospheric pressure compensation

Input from the inclinometers for trim and list correction

Multiple TDU Support

RS232

RS485

IPC 140 Local Indicator

With Ex enclosure on deck

To serial line logging printer (memory)

RS232 / RS485 / MODBUS to AMS (third party automation)

Signal to Valve & Pump Control System

Programmable alarm outputs

TCU Control Unit

RS485

To more I/O Cards

I/O Cards

SAFE AREA

HAZARDOUS AREA

System Cabinet

RS485

Non-contact Microwave radar

From On/Off switch

AN-SCCNV AD Conversion Card

Temperature compensated hydrostatic pressure sensor

Water Ingress and Temperature Sensor

Temperature Element Pt 100

Ballast tanks

FO / DO / FW tanks

Draft gauging

4-20 mA or digital

4-20 mA independent 95%-98% Alarm

4-20 mA

Tank Pressure

Line Pressure

Pump Pressure

Sensor with enclosure

NEW!

Main and redundancy power (2x24VDC)

Sensor for system atmospheric pressure compensation

Input from the inclinometers for trim and list correction

Multiple TDU Support

RS232

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From On/Off switch

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Temperature compensated hydrostatic pressure sensor

Water Ingress and Temperature Sensor

Temperature Element Pt 100

Ballast tanks

FO / DO / FW tanks

Draft gauging
**System Electronics Control Unit TCU**

Dimensions: 240 x 125 x 50 (LxWxH) mm.
Mounting on rail DIN 35.
Power supply #1 (DC/DC): 24 VDC (18 to 31 V).
Power supply #2 (insulated): 24 VDC (22.5 to 27 V).
Power consumption: max. 90W.
Power supply redundancy, automatic switch-over included (24 VDC) (battery back-up is optional).
Power supply and communication to I/O modules and multiple TDU and/or local indicators.
Programmable outputs for direct control of valves/pumps.
Communication to 3rd party systems: 1xRS485, 2xRS232, MODBUS.
Dedicated outputs for flash lights and sirens.
Alarm relay output and silence input.

Visual and audible alarms in accordance with IMO Code on Alarms and Indicators 1995*.

**Display Unit TDU**

Touch screen 5.7” colour TFT 400 cd/sqm.
Dimensions: 200 x 150 x 45 (WxHxD) mm.
Panel / console flush mounting.
Cut-out: 150 x 130 (WxH) mm.
Power supply from TCU.
Colour: Blue NCS 3070R90B.
Data presentation on a WinXP PC Workstation:
SURVEYOR™ is one of the most comprehensive and versatile multi-purpose platform for automatic tank monitoring offering possibilities that have previously not been available. Along with the standard presentation on the TDU, the system can be configured to acquire all tank related data from the TCU and will display the same graphics on a dedicated workstation running the SURVEYOR™ for Windows™ software. This software features a user friendly graphical interface for display of tank plan, bar graphs, charts and curves together with advanced functions and individual configuration possibilities.

Loading calculator:
Simulation of loading plan.
Simultaneous indication of results of calculations.
Input and storage of cargo data.
Input and storage of ballast tank data.
Input and storage of service tank data.
Input/output of cargo data in:
- Cubic metres.
- Metric tonnes.
- US barrels.
- Long tonnes.
- Ullage - Sounding - Percentage of tank filling.

Input of cargo temperatures, each tank.
Off-line calculation for cargo planning.
Temperature expansion calculations.
ASTM tables calculation (API) for different ASTM-tables.
Draft survey.
Load and condition report.
Graphic presentation of ship conditions.
Reports - different cargo and presentation reports.
On-line connection to Surveyor level gauging system.

Calculations:
Calculation of intact stability for GM, KG, GZ, FSM.
Display and print out of GZ-curve and relevant areas.
Control of intact stability against actual stability requirements.
VCG and free surface effect of tanks are automatically calculated for different loadings.
Calculation of DW total, displacement, trim, list, draft (dF, dM, dA).
Longitudinal strength calculations.
Damage stability by means of predetermined limiting Min GM or Max KG-curves.

The SURVEYOR™ loading calculator features simultaneous ON- and OFF-line calculations with alarm display in case a current loading condition is different to the pre-planned one(s).
**SURVEYOR™ ANWeb Application For Support Of Multiple Operator Stations**

Along with the standard tank monitoring system data presentation on the TDU, the system can be configured to acquire all data available on the TCU and display this data on a graphical dedicated workstation running the SURVEYOR™ for Windows software, called ANWeb.

The ANWeb is user friendly and available on all Windows XP computers connected to a network running on the Internet Explorer based graphical system. By using this structure, no special software has to be installed on the Workstation and all Windows functionality like WLAN, Network etc. is available without any additional setup.

Up to 10 users can connect to the ANWeb server simultaneously, each with individual user rights for displaying data and changing setups and making adjustments to the system. This gives any user worldwide with access to the ANWeb server the possibility to use the SURVEYOR™ system.

For those requiring data access from any location, an ATEX approved handheld unit is provided able to connect to the ANWeb server using WLAN and having access to all the key data for operating on deck.
SURVEYOR™ Cargo Level Monitoring by non-contact Microwave Radar Or Temperature Compensated Absolute Pressure Sensors

SURVEYOR™ Cargo Level Monitoring

SURVEYOR™ Cargo Level is a complete automatic level gauging and cargo monitoring system for tankers. The system is one of the most comprehensive and accurate systems available for this specific application. Together with advanced signal handling and computer technology, the functions included are follows:
- Level gauging in cargo, slop, ballast, and fuel oil tanks.
- Density measurement in cargo, slop, and fuel oil tanks (only with pressure sensors).
- Vapour (inert gas) pressure in cargo and slop tanks.
- Draft measurement.
- Loading computer for intact stability and stress with load planning.
- Serial line interface for communications with other systems available.
- High level and overfill alarm.

As all parts and functions are based on the same sensor technology, the system is very cost effective and operationally efficient for the users. The modular and compact design makes the SURVEYOR™ Cargo Level an attractive alternative for new building or retrofit installations. Separate ballast gauging systems or complete cargo tank systems are available for installations on board any type of vessel. SURVEYOR™ Cargo Level has been successfully installed on board chemical and oil tankers as well as product and container vessels and is recognized as a cost effective, reliable and user friendly system.

Non-contact Microwave Radar
One of the few marine microwave ullage gauges featuring a power and 4-20 mA signal on a two core cable, thus providing for simple, fast and cost effective installation for both new buildings and retrofit projects. Because of its unique design and technology there is no need for large and tall adapter trunks in order to fit radar to the deck. The system provides for automatic trim and list correction and allows exporting of level either at the flotation centre of the tank, at the sensor location or at the sounding pipe.

Radar Applications:
- Crude Oil Tanks.
- FPSO Tanks.
- Chemical / Products Cargo Tanks.
- LNG Tanks.
- Deck / Slop Tanks.
- Solids Cargo Tanks.
- Ballast, Fuel and Service Tanks.
- Bitumen.

Advantages:
- High accuracy in all kinds of cargo.
- Compact design and easy installation.
- Superior technology allowing fitment close to the tank side also on smaller tanks.
- For Chemical and Oil/Product tank installations a special PTFE flange seal provides a non stick surface that eliminates cargo build-up on the radar antenna.
- Measuring of the solids cargo level that previously could not be done accurately with radar.

Technical details:
Measurement range: up to 35 meters (solids: 70 m).
Accuracy: +/-3 mm, Repeatability: +/-1 mm.
Applications: Any kind of liquid / solids.
Process fitting: Flange from DN50 and up (typical DN80), thread 2.5”.
Product temperature: -200 °C ... +400 °C.
Ambient operating temperature: -40 ... to +85 °C.
Process pressure: -1 ... +16 bar.
Emitting frequency: K / C Band.
Cargo Pressure Sensor with Integrated Temperature Monitoring:

For Cargo Level Monitoring SURVEYOR™ offers an option of using pressure sensor technology giving accurate information through direct measurement of cargo level, temperature, vapour pressure and cargo density.

Our pressure sensors have a track record of long time stability and accuracy. The system is recommended for installation in cargo tanks, ballast tanks, fuel oil tanks and for draft measurement. The sophisticated and user-friendly on/offline loading calculator is capable of presenting hull stress and stability calculations, allowing printouts of cargo transfer reports, and is an integral part of the system.

The highly accurate pressure sensors measure absolute pressure. Sensors are hermetically sealed without any ventilation to the atmosphere. Reference is made through an additional sensor, which reads the atmospheric pressure on a continuous basis. Temperature measurement is integrated in the sensors for correction of the pressure reading, which also provide for a separate temperature monitoring feature.

Advantages of SURVEYOR™ Cargo Level Monitoring:
- Directly measures cargo weight, temperature, density.
- Empty tank detection also at high trim.
- Not affected by liquid movement.
- Not affected by foaming cargoes.
- Not affected by high viscous cargoes.
- Regular maintenance - not required.
- Calibration data stored in the sensor.
- Sensor specially designed for marine applications.
- Maintenance free intelligent absolute pressure.
- Sensors with temperature compensation.

Pressure sensor:
- Temperature range: -54 °C to 120 °C (-65 °F to 250 °F).
- Density range: 0,5 to 2,5 t/m³.
- Accuracy Weight and level: +/- 0,05% of sensor range.
- Temperature: +/- 0,50 °C (+/- 10 °F).
- Over pressure: 5 times FRO
- Burst pressure (<1sec.): 20 times FRO (typical 52 bar).
- Density: +/- 0,15%.
- Tank pressure: +/- 0,10%.
- Sensors material: Inconel 625.
- Pipe material: AISI 316L or better.
- Applications: All types of chemical and hydrocarbons.
- Protection, in tank: IP68.
- Protection, on deck: IP66 (junction box).
- Junction box material: AISI 316.
- Interface to control unit: Serial line.
- Intrinsically safe: II 1 G Ex ia IIC T4.

Compiles with:
IMO: SOLAS 74, IBC, BCH codes.
EC directives 89/336/EEC SOLAS regulation 59, pressure monitoring as an alternative to a secondary relief valve for a tank cargo venting system.
**SURVEYOR™ Independent High Level & Overfill (95%-98%) Alarm System For Cargo Tanks**

Technical data:

**SURVEYOR™ Independent High Level & Overfill Alarm System** is a high quality product based on proven acoustic wave technology for marine applications.

A complete system can be delivered either as a single or dual point system for high level and overfill (high-high) level alarm detection for any kind of liquid, including any hydrocarbons and chemicals. The system is fully compliant with the requirement from IMO resolutions for high level alarms and overflow control and rules from all classification societies. Visual and audible alarms will display on the alarm panel as well as on deck with external alarm lights and sirens. The high level (95%) and overfill (98%) alarms are totally electrically independent from each other. The system sensor test for verification of alarm function is performed on deck and features a built-in function for preventing false alarms.

**Advantages:**
- No moving parts.
- No maintenance.
- No calibration after installation.
- No adverse effects from tank cleaning machines.
- No adverse effects from cargo residue.

**Applications:**
Chemical Tankers, Product Tankers, Oil Tankers, Floating Storage Facilities.

**Level Alarm Switch:**
Switch principle: Acoustic wave.
Ambient temperature: -40 to 85 °C (-40 to 185 °F).
Product temperature: -200 to +450 °C (-328 to 842 °F).
Protection category: Junction box: IP 68, Alarm sensor continuously submerged.
Media: Petroleum products, crude oil, chemicals, acids.
Material: Stainless Steel AISI 316 (L).
Standard flange: DN 50, other flanges on request.
Electrical interface: 4 - 20 mA, fail safe circuit.
Intrinsically safe: I IGD Ex ia IICT5/T6.
SURVEYOR™ Tank & Line Pressure Monitoring

Advantages:
- Compact units and excellent integration possibilities.
- Replaces the need for a second P/V valve at lower cost.
- Redundancy & low power consumption.
- Absolute pressure sensors, no venting, no leaks.
- No maintenance sensors and electronics.
- Cost effective installation.
- Long time stability.
- Easy to expand for monitoring of more points.
- Ready to integrate with Cargo/Ballast.
- Service tank gauging.

Type approved by all major classification societies.

Functions:
- Vapour pressure monitoring.
- Individual High and Low alarms.
- System malfunction alarm.
- Alarm outputs for external alarms.

Application for:
- Chemical tankers.
- Tankers for oil.
- Floating storage facilities.

Pressure Sensor:
Accuracy: +/-0,25% of sensor range
Operating temp: -25 °C to +85 °C (-10 °F to 185 °F)
Process temperature: -25 °C to +85 °C (-10 °F to 185 °F)
Protection, in tank: IP 68
Protection, on deck: IP 68
Media: Sea water, hydrocarbons, chemicals, acids
Material: Hastelloy
Electrical interface: 4-20 mA
Electrical connection: 1 or 2 pair cable (> 0.5 mm²)
Intrinsic safe: Eex ia IIC T4
Overpressure: 3x full range pressure
Burst pressure: >200 bar
Tank pressure: 0-4 bar
Line pressure: 0-40 bar

Application for:
- Chemical tankers.
- Tankers for oil.
- Floating storage facilities.
The SURVEYOR™ Ballast and Service Tank Level Gauging System is designed to meet the highest quality standards for accurate gauging. The system monitors level in ballast and service tanks plus the draft, with accurate compensation for trim & list. Measurements are based on proven hydrostatic absolute pressure sensor technology. Sensors are hermetically sealed with a patented watertight connection between body and the signal cable. This special type of absolute pressure sensor has been designed for long time stability without any need for calibration. The sensor can be installed from the top or side of the tank and are connected to the TCU through I/O cards with integrated zener barriers (ATEX), as required.

Applications:
- Container carriers.
- Passenger vessels.
- Tankers - oil, product, chemicals.
- Dry Cargo Bulk Carriers.
- Floating docks and cranes.
- Offshore vessels and installations.
- Integration with anti-healing systems.

Advantages:
- In-tank parts for permanent submersion.
- No calibration after installation.
- No moving parts.
- No venting of sensors.
- No maintenance.
- Cost effective installation.
- High overpressure resistance.
- High burst pressure resistance.

Basic functions:
Level: When using submerged pressure sensors installed at the bottom of the various tanks, the hydrostatic pressure of the ballast water or oil is the basis for informing the level. The density of the liquid is manually input by the operator whilst the system shows the level in each tank with adjustable high and low level alarms - individually per tank, or per group of tanks.
Trim and list are measured by either inclinometers or draft sensors – these will compensate the tank level readings. Due to the automatic trim and list compensation, the sensors can be installed in the best suitable location without considering the tank’s flotation centre.

Automatic stop of ballast pumps:
A default set point signal from the level function of the gauging system can be used for the automatic stop of the ballast pumps.

Volume: The sounding tables for each tank are a part of the system program which allow presentation of the volume content in each tank. Adjustable high and low volume alarms are included as well as estimation of tank filling rate and finish time.

Weight: Presentation of weight in each tank is achieved by using the parameters for level and volume. Adjustable high and low weight alarms are included.

Additional (Optional) Functions

Temperature: In heavy fuel oil tanks, temperature monitoring in combination with the pressure sensor can be optionally included.

Density: A heavy fuel oil tank will normally not be emptied from one bunkering to the next. Knowledge of the actual oil density will be quite uncertain after some time and hence in order to improve accuracy of the tank gauging, automatic density measurement by installation of a second sensor in the respective HFO tanks is recommended. This density measurement will be important when evaluating the bunker quality and in presenting the correct weight of the tank content.

Draft gauging: A draft gauging installation normally consists of two, three or four sensors with associated flanges and valves. The sensors are installed close to the keel for measurement of the hydrostatic seawater pressure.

Atmospheric pressure reading: Sensors measuring absolute pressure are used. As reference, a sensor reading the atmospheric pressure is included. The absence of sensor venting avoids humidity inside the sensors, unstable readings and the need for repair and periodic maintenance.

Advantages:
- High quality sensor made of Titanium, Inconel or StSt.
- Hermetically sealed with a watertight connection between body and the signal cable.
- No venting, re calibration or maintenance.
- Installation from the top or from the side of the tank.
- Installation at any location in tank, regardless of the tank’s flotation centre.
Technical data, Absolute Pressure Sensor:
Accuracy (level): +/-0.25 % of sensor range (+/- 0.1% option).
Environment temperature: -25 to 70 °C (-10 to 160 °F).
Media temperature: -25 to 80 °C (-10 to 176 °F).
Storage temperature: -25 to 80 °C (-10 to 176 °F).
Protection category: IP68, continuously submersed.
Media: Seawater, petroleum products.
Material: Titanium, Inconel or SS3.
Electrical interface: 4 - 20 mA.
Electrical connection: 1 or 2 pair cables (0.50 - 1.25 mm²).
Overpressure: 3x Range.
Burst pressure: > 200 bar.
Intrinsic safety: II 1 G EEx ia IIC T4.

Features:
- Adjustable alarms for low & high level, empty tank detection.
- Automatic compensation for trim and list.
- Automatic output to loading computer, ballast pumps and valves,
  anti-heeling system or automation system, integration with valve and
  pump control system.
**Functionality:**
Continuous level / weight monitoring in Fuel / DO tanks with calculation of consumption according to user defined periods - per hour / shift / day - with automatic generation of encrypted record for authorized use only.
Continuous fuel consumption of main engine and DG monitoring measured immediately before the high pressure pump.

Automatic calculation of fuel usage for predefined periods - per hour / shift / day with automatic comparison with the data generated through the level monitoring system.

Automatic generation of log book for local print-out of data and/or interfacing with ship’s communication system for remote review of fuel monitoring data in operator’s office.

Continuous comparison between the consumption measured by tank sensors and the flow meters logging into TCU’s memory for a period of time depending on frequency of log generating. Communication and log data export to an on board PC for further transmission to owners office. Detailed logs as per customer specs.

**Advantage:**
- High quality sensor of Titanium, Inconel or StSt.
- Hermetically sealed with a watertight connection between body and the signal cable.
- No venting, re calibration or maintenance.
- Installation from the top or from the side of the tank.
- Installation at any location in tank, regardless of the tank’s floating centre.

- Accuracy level: +/- 0,25% of sensor range. (+/- 0,1% option).
- Environment temperature: - 25 °C to 70 °C (-10 °F to 160 °F).
- Media temperature: - 25 °C to 80 °C (-10 °F to 176 °F).
- Storage temperature: - 25 °C to 80 °C (-10 °F to 176 °F).
- Protection category: IP68, continuously submersed.
- Media: Seawater, petroleum products.
- Material: Titanium, Inconel or StSt.
- Electrical interface: 4-20 mA.
- Electrical connection: 1 or 2 pair cables (0,50-1,25 mm²).
- Overpressure: 3 x Range.
- Burst pressure: >200 bar.
- Intrinsic safety: II 1 G EEx ia IIC T4.

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**A TYPICAL SYSTEM LAYOUT**

- System cabinet with 1/0 modules
- Processor, Inclinometers
- Power supply
- Level transmitter FO/DO tank
- Level transmitter FO/DO tank
- Flow transmitter Main engine
- Flow transmitter D/G Group

Transfer to owner’s office on shore by means of interfacing with ship’s satellite or GSM communications system

..to more FO /DO tanks

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**OPTIONAL**
System Display Unit TDU

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**WEB SERVER**

**AN CORE**

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Intra / Internet
SML - 1000A
Electro Pneumatic Level Gauging System

Macron technology SML-1000 measures the level of water ballast tanks, fuel oil tanks, water ingress and draft by reliable high quality pressure sensors located in easily accessible IP44 system cabinets. Operating principle is based upon the measurement of hydrostatic pressure at the bottom of the tank by modulated air through a bubbling probe. The system can be supplied either with standard DC 4-20 mA signals with two wires to SURVEYOR™, ship automation or cargo monitoring system or as fully digital system with Modbus serial line. The robust sensors are very stable in the long term, highly repeatable and are temperature compensated.

Option items:
- Digital analog unit for analog out.
- Re-scaling card for local displays.

Additional Macron products.
An extensive product range with products such as:
- SMV-3000P/O/OP, Vapour Emission Control Systems (VECS) for measuring oxygen level and gas pressures in pipelines containing hazardous gases.

Level Gauging System Cabinet
- Air supply pressure: 0.7 - 1.0 MPa.
- Flow rate: 0.5 NL/min.
- Working pressure: 0.4-0.5 MPa.
- Individual sensors, flow controllers and purge valves.
- Local display in every digital cabinet.
- Purge valve, Flow controller and Check valve included.

SML - 1000A Internals, Digital version display unit.

Non return valve

Complete alarm systems
Single and dual type level switches
SURVEYOR™ Integrated Valve & Pump Control System For Cargo, Fuel & Ballast / Service Tank

Advanced and user friendly software for integrated monitoring and control of pumps and valves. Our Pump & Valve Control software is set up on marine approved workstations with redundancy features, installed in cargo control room and/or wheelhouse, connected to an uninterrupted power source. For additional redundancy the software can be installed on multiple computers.

The system can interface with a wide range of pumps and valve actuators using Wago I/O modules or PLS connections on a serial line.

Excellent graphics of the vessel tank plan is displayed as well as individual tanks with colour coding of liquids, indication and feedback alarms for pump and valve performance. Continuous communication with SURVEYOR™ tank monitoring system enables the Pump & Valve Control system to also present crucial tank and line data such as level, volume, pressure and temperature.

Functions:
- On/Off, pump indication and control.
- Open/Closed, valve indication and control.
- Progressive opening valve indication and control.
- Sequence function keys (according to customer requirements).
- Time-out/malfunction alarm.
- Display of tank level / volume / load rate / pressure / temperature and pump / line pressures and alarm.

APPLICATION

Control of electric, hydraulic and pneumatic actuators for cargo, fuel, ballast, bilge and service tank systems on all type of vessels.

The system can be used as part of SURVEYOR™ Multipurpose Monitoring and Control System, where tank data is automatically fed directly from the TCU or as a standalone system acquiring tank data from alternative tank monitoring system.

Remarks:
1) PC#1 runs the SURVEYOR™ for Windows presentation software and is also used as redundant PC for PC#2.

2) Ethernet link between PC#1 and PC#2 provides data feed from the 1/0 cards for the valve and pump controls to both PC’s. PC#2 is the main one, PC#1 takes over in case of failure of PC#2.

3) All equipment is type approved.
Surveyor™ Tank Temperature Monitoring

Advantages:
- Compact Units.
- Easy to install.
- Low Power Consumption.
- No Maintenance.
- Cost Effective Installation.
- Long time Stability.
- Easy to integrate with other systems.
- Type Approved by all major classification societies.

Application for:
- Chemical tankers.
- Oil & Product tankers.
- Floating storage facilities.

Functions:
- Temperature Monitoring.
- Individual Low / High Temperature Alarms.
- System Malfunction Alarm Outputs for external alarms.
- Programmable outputs.

The SURVEYOR™ temperature monitoring system can be used as a stand alone system, or in combination with the other subsystems to the Multipurpose Monitoring & Control.
Typically used, in a stand alone configuration it offers excellent data presentation and easy user interface.
As a part of a tank monitoring system, together with level and tank pressure, the system can be supplied in two versions, using different sensors:

Combined pressure and temperature sensor.
Typically used in heated cargo tanks or HFO tanks with temperature of max 130 °C. sensor is in Inconel and offers extreme resistance to corrosion. This sensor is used for simultaneous measurement of weight/level of the liquid in tank and for temperature monitoring, which is also used for compensation of the readings of the hydrostatic pressure. Accuracy of temperature measurement is <0,5 °C.

Temperature sensor in a pocket, for installation from side.
Typically used in stand alone temperature monitoring system configuration.
Sensor elements used are Pt1000 or Pt100 (2-4 wire).
Another application of this sensor is for temperature monitoring in cargo tanks, when radar is used for ullage monitoring. Accuracy of temperature measurement is <0,5 °C.
SURVEYOR™ Water Ingress Detection & Alarm System With Integrated Temperature Monitoring & De-watering

The SURVEYOR™ Water Ingress Detection & Alarm System is designed to detect the presence of water in the cargo holds of bulk carriers. The system is in full compliance with regulations, following the International Association of Classification Societies’ adoption of a unified interpretation of the International Maritime Organization’s (IMO) Performance Standards for Water Level detectors on Bulk and single hold General Cargo Carriers (to be enforced in 2007 onwards). Regulation requires bulkers to be fitted with water ingress detection equipment that will provide audible and visual alarms on the bridge in the event of water levels being detected in cargo holds (at two levels) and other spaces forward of the first collision bulkhead.

The SURVEYOR™ WIAS microwave radar sensor with integrated temperature monitoring (pat. pending).

Principle of operation:
The microwave water ingress detection system is based on the dielectric properties of water molecules. The sensor constantly checks the dielectric constant of the cargo present at the microwave antenna. Reflection is processed based on the medium’s dielectric properties. Water ingress in the cargo hold leads to a substantial change of the reflection coefficient and thus is detected by the microwave sensor. Presence of water will switch the sensor to an alarm state - in both empty and loaded cargo compartment, regardless of the type of cargo carried.

Comparative advantages:
- Easy installation by DN 40, PN 10 flange.
- Maintenance free, easy cleaning and testing.
- No moving parts, no calibration required.
- Self checking system - no need for inspection before loading.
- Sensor operates in the presence of on all types of cargo, without need of a filter system.
- Sensor is sufficiently protected from damage by cargo solids.
- Cost effective to install for retrofit ships.
- Stable operation by self-checking intelligent digital sensor.
- Multipurpose display unit.
- Local readouts, communication to IAS/PC.
- System can include Ballast/Service tanks draft monitoring.
- IP 68, dust and waterproof, IEC 60529.
- Salt water resistant when mounted in ballast tanks.

Complies with:
- SOLAS regulation chapter XII/12 & 13.
- SOLAS II-1/23-3.
- IMO Res. MSC 145 (77).
- IACS Unified Interpretation SC 180.

Installation:
The spirit of the regulation (when referring to detection of water in two levels) is based on the need for redundancy of the water ingress detection before the alarm would sound. By this reason our system relies on two sensors. Two water detection sensors are to be installed in each cargo. One sensor is to be installed at a height of 0.5 m above tank top (hold floor) and another at a height of not less than 15% of the depth of the cargo hold but no more than 2.0 m above the tank top. In any ballast tank forward of the collision bulkhead, one sensor is to be installed at a height not exceeding 10% of the tank capacity. In any dry or void space other than the chain locker, any part of which extends forward of the foremost cargo hold and the volume of which exceeds 0.1% of the ships maximum displacement, one sensor is to be installed at 0.1m above the floor. The sensors are mounted into the hopper plate adaptor/cable protection pipes by a standard flange DN40. For void spaces and the bosun store, the sensor is mounted on a wall mounted bracket supplied by Scanjet Ariston.

Welding for copper plate installation, with sensor’s heavy duty when carrying scrap or other heavy cargo.
Major functions:
- Pre-alarm at 0.5 m.
- Main alarm at no less than 15%, maximum 2 m height.
- Integrated temperature output.
- Self test malfunction alarm/line monitoring.
- Override/interlock function.
- Automatic cancellation of override condition.
- Override indication.
- Power failure alarm.
- Automatic power redundancy switch over.
- Lamp/buzzer test.
- Common alarm.
- Alarm time delay.
- On board function test.
- Configuration of the system from Windows™ program.

Water ingress detection sensor with a temperature element, with a flange. This sensor configuration provides for quick and cost saving installation on a preburnt opening on a hopper plate or a stool plate. The sensor’s antenna is exposed to the cargo, without need of a filter system or other protection. Cleaning of the sensor antenna is not required, as well as there are no consumable (filters) necessary.

Sensor specifications:
- Measuring principle: Microwave.
- Level accuracy detecting water: < 5 cm.
- Accuracy temperature: < + - 10 °C.
- Power supply: 8-24VDC (from zener barrier AN.ZB 485).
- Power consumption: < 0.5 W.
- Data communication: Digital over RS 485.
- Intrinsically safe: EX II1GD T800 C, IP 68 EEx ia IIC T4.
- Sensor material: Housing: AISI S31254 coated.
- Front end material: PEEK.
- Operating temperature: -25 °C / +70 °C.
- Size: l=179 mm, OD - body 48 mm.
- Flange: DN 40, - PN10.
- Cable: Ø=6 mm Blue, 4 x min 0.30 mm².
- Cable length: 5 m included, extra length on request.
- Weight: 2 kg (sensor) + 0.1 kg/m (cable).
- Protection: IP 68 to 30 mWG.
Scanjet tank cleaning
Our business mission continues to focus on direct cooperation with our customers. This approach, together with specialized fabrication in our workshops using the latest production technology, ensures our customers receive an operator friendly and high quality range of products.

Scanjet tank cleaning equipment
- With or without magnetic transmission.
- Fully programmable.
- Minimized cleaning time.
- Cost efficient.
- Machines for separated turning and lifting movements.
- Strainer options.
- WashTrac™ (option).
- Drive units can be removed without exposing tank to atmosphere.
- Grease lubricated drive units.
- Media or oil lubricated.
- Media turbine driven.
- Hydraulic & Pneumatic alternatives (option).
- Marine Protection System - MPS.

Scanjet – The leading product range for marine and offshore applications
Scanjet produces a range of tank cleaning machines to match any marine or industrial demand for an efficient and environmentally friendly installation. Our qualified design team is always ready to assist in optimising technical specifications prior to installation ensuring that our clients will receive a Scanjet tank cleaning machine installation which will consist of the most modern and efficient technology available.

Spare parts and service
Spare parts and service kits are produced in our own factory and available within 24 hours.

Marine Protection System - MPS
- In line with IMO recommendation "MSC.1/CIRC. 1334”.
- Easy to fit, removable after use.
- Self operating.
- No environmental impact, requires no chemicals or steam for operation.
- None lethal.
- Visible.
WashTrac™ Tank Cleaning Monitoring System

The innovative tank cleaning monitoring system WashTrac™ improves the efficiency and control of the tank cleaning procedure. Shorter turn around time in port, increases the profitability. Overview in real time gives the operator full control of the tank cleaning procedure.

With WashTrac™ there will be no downtime and no missed charters.

WashTrac™ Tank Cleaning monitoring system

Each Scanjet Tank Cleaning machine is equipped with a sensor that indicates when the machine is running. The sensor is connected to our Tank Radar gauge on deck. There is no need for extra cabling in order to present the information on the Work Station.

Our Tank Radar gauge processes the sensors’ signals and the status is transferred to the Work Station via the Supply and Communication Unit (SCU).
Operating status presented on workstation
The operators interface will present an overview where the operator can monitor the cleaning procedure.

The following data is presented on the workstation:
- Operating status of tank cleaning machines.
- Start/stop alarm of tank cleaning machines.
- Operation and prewash data logging on printer.
- Overall running time of tank cleaning machines.
- Tank cleaning machines service intervals.

FULFILLS MARPOL 73/78!
(1994, 1995 amendments)
Printed prewash record
MARPOL 73/78 (1994, 1995 amendments) stipulates that prewash has to be performed after cargo discharge. With Washtrac™ printed prewash record, there will be no discussion about the cleaning performance when the port authority makes the prewash procedure inspection. With printed pre-wash reports there is a record of total running time, starts and stops.
The printed report for each tank includes:
- Name of ship.
- Name of port.
- Tank number.
- Tank capacity.
- Cargo grade.
- Tank cleaning machine.
- Washing program.
- Start time for tank cleaning machine.
- Running time for tank cleaning machine.
- Date of report.

Full control of your system - Washtrac™
- Machines, control system, monitoring and measuring equipment are now integrated in one common complete solution from Scanjet.
- Service made easy, running hours measured.
- Printed service records based on machine type.
Industrial Tank Cleaning Applications
Scanjet is the world’s leading supplier of tank cleaning equipment. Our people carry the most experience in applying tank cleaning equipment across industrial applications.

Ranging from microbiologists, engineers and process specialists we have been solving tank cleaning challenges for more than 20 years. During this time we have developed a leading product range that caters for tanks of all shapes and sizes in both sanitary and non-sanitary industries. With our proven history in the Marine markets we are now proud to offer the global industrial markets a wealth of knowledge, solid proven products and service that is shaping the future of tank cleaning.

Our team speak many languages and travel globally to support our offices, regional partners and your applications wherever this may be located.

Our Corporate Office, Design and Manufacturing facilities are based in Sweden with local offices situated around the globe. From each office we operate with regional sales partners to give you the fast local support you need.

Through our time spent with our customers we have gained a thorough appreciation of cultures and expectations. Our people have learnt that not every tank cleaning application is simple to solve and that we need to stay with every project until you, as our customer, are satisfied that we have delivered a responsible tank cleaning solution.
We deliver engineering consultancy services for large scale offshore projects and have solutions for clients across the globe. No matter if you need assistance in making a 3D model for your fabrication, complex and advanced piping systems with integrated automation and monitoring needs, valve, pump and heat exchanger systems we can be your reliable project partner.

**Our areas of expertise cover:**
- Piping & mechanical design
- Various instrumentation and system integration
- Process design
- Instructions and specifications of various kind

**Examples of what we can provide are:**
- Perform complete product development in to which we may perform pre-studies, find suppliers and evaluate manufacturing possibilities for you as a client.
- Print or manufacture product models of various sizes. We have the possibility to print directly to 3D constructions in ABS plastic, lathe or water cut a broad range of materials. You may choose to use us as your complete partner and let us do the model, or that your own team/department deliver a complete 3D file to us, and we produce your model only.
- Perform conceptual design of such things as process plants, pumping systems etc.
- Deliver P&ID:s with component lists
- Perform detail design, complete with valve lists, sizing and pressure drops and labeling in accordance with ISA standards.
- Design components and deliver mechanical drawings ready for manufacturing.
- Calculate pressure losses & make dimensioning of fluid systems
- Project support, how to integrate machinery systems and to provide plans for retrofit new components in previously built systems.

**We design the future.**
Our Portable Water Driven Gas Freeing Fans are suitable for use on all sizes and types of vessels.

Each fan is designed as a High Performance, Deep Penetration Unit and being constructed from Stainless Steel and Aluminium it is lightweight and easily moved around the deck.

Quality Control:
The SC F 150W is produced in accordance with 9001 Quality standards and our certificate of conformity and accreditation is available on request.

Typical application for SC F150W:
– Product Tankers
– Crude Oil Carriers
– Offshore
– Bulk Carriers
– FPSO
– OBO carriers

**Tank cleaning / gas freeing hatch as an option.**

All hatches are of hinged type with 3 point locking system and can be made of standard or stainless steel.
Scanjet tank cleaning equipment

Tank cleaning machines are installed and operated in extremely harsh marine conditions. In order to ensure continued safe operation of the Scanjet tank cleaning machines it is advised to follow given service instructions.

A Scanjet Service Kit supplies the operator with the essential parts that prolong the life of your tank cleaning machine and ensures safe, smooth trouble free operation.

Provided Scanjet Service kits are available, the maintenance personnel can anytime perform the recommended service. Recommended service intervals are always indicated in the Scanjet general instructions manuals.

Service Kits are available in stock and easy to order. They are designed to make maintenance easier, and more cost efficient.

For each Scanjet machine model the following Service Kits are available:

- O-ring kit drive unit
- O-ring kit gun unit
- Wear kit gun unit

Each kit contains, beside spare parts, a step-by-step instruction of how to replace the parts.

KEY FEATURES

- Contains parts recommended for service
- Easy to order
- Time saving
- Enables budgeting of spares
- Ensures correct service is carried out
- Step-by-step instruction manual
- “Management by Service Kits”

SERVICE KITS

Service Kits can be installed into the vessels budget and regular service. Normally no other spare parts are required.

It also results in full control over spare parts consumption. A request for other parts than Service Kits may indicate handling failure or lack of maintenance on board.

This is called Management by Service Kits.
WE PARTICIPATE IN FOLLOWING EXHIBITIONS WORLDWIDE

SINGAPORE

CHINA, SHANGHAI

GERMANY, HAMBURG

GREECE, ATHENS

INDIA, MUMBAI

JAPAN, TOKYO

NORWAY, OSLO

RUSSIA, ST. PETERSBURG

TURKEY, ISTANBUL

UAE, DUBAI
Typical areas where scanjet provides expertise, high quality products and solutions:

Crued oil carriers require our larger machines with high capacity for sediment control to meet Marpol regulations.

For bulkcarriers Scanjet provides solutions for the cleaning of holds and water ingress alarm systems.

River tankers and barges are using Scanjet following an increased demand for an environmentally friendly and safe tank cleaning operation with closed hatches.

For chemical and product carriers the Scanjet installation is of utmost importance for the safety and economical performance of the vessel.

For FPSO vessels there are Scanjet installations available meeting all operational requirements.

Offshore supply vessels and platforms are using our lower capacity machines for cleaning of drilling mud and brine tanks.

Scanjet is committed to meet the highest standards of quality and performance. We continuously develop and improve our product range to meet the market demand for optimal technical performance.
For any installation there is an optimized Scanjet product.