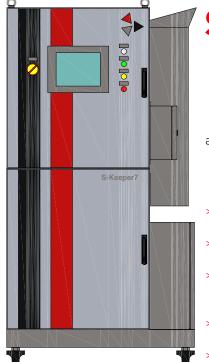


# S-Keeper 7<sup>TM</sup> MARINE APPROVED CEMS





ARE YOU A SHIPOWNER OPERATING IN EMISSIONS CONTROL AREAS "ECAs"? IS INCREASING SHIP EFFICIENCY YOUR TARGET? ARE FUEL SAVINGS STILL AN ISSUE? THIS IS YOUR LIFERAFT.



**S-K7**<sup>™</sup> is a modular analysis system suitable for on-board continuous emissions monitoring as per:

- MARPOL Annex VI Reg. 13 & 14
- MEPC Circ. 471, 177(58), 184(59)
- IEC 60092-504

and certified as per: • RINA Rules, Pt C, Ch 3, Sec 6

- LLOYD Register Test Spec 1
- DNV Standard for Certification 2.4



- > S-K7™ is fully tailored to the Shipowner's requests with particular focus on CaPex & OpEx balance.
- > S-K7<sup>TM</sup> is integrated with a modern PEM Propulsion Efficiency Monitor, thus encompassing metered Fuel Consumption, Fuel Oil Viscosity, Thrust and Torque measuring Systems.
- > Thanks to the specific engineering of this modular system, the S-K7<sup>TM</sup> installation is able to withstand the toughest marine environment.
- > On-board maintenance is easy even for an unskilled operator, while the SPMP Spare Parts Management Program ensures the traceability of every single component and its availability on the ship's course.

## TECHNICAL DATA

### S-K7™ OVERVIEW OF AVAILABLE FEATURES

- According to MARPOL Annex VI Reg.13 & MEPC 177(58), 184(59)
  - > calculation of NOx g/kWh vs Tier I, Tier II, Tier III limits
  - > monthly NOx compliance test report
- According to MARPOL Annex VI Reg.14 & MEPC 177(58), 184(59)
  - > calculation SO2/CO2 ratio
  - > calculation of Fuel Oil Sulphur content (% wt/wt) vs Reg.14 limits
- According to MEPC 177(58), 184(59) HC total Hydrocarbons load (ppm or g/kWh) is measured
- Reports according to ISO 14001 of totalized mass NOx / SOx / CO2 emissions (kg/tonne)
- Reports according to MEPC Circ. 471 of CO2 Emission Index (gCO2 / tonne n.m.)

- Combustion Efficiency monitoring by CO2/(CO2+CO) ratio
- Types EASY-N, LITE-N, LITE designed for LNG powered units
- 02 (%) & Particulate (mg/m3 or g/kWh) analysis as additional options
- Multiple stack management

### S-K7™ MAIN SUPPLY

- Qty#1 Integrated Cabinet
- Qty#1 Sample probe & tube
- Qty#1 Sample line
- Qty#1 Bottles set (according to analyzed components)

### S-K7TM ANALYTICAL OPTIONS

- Qty#1 Oxygen Analyser
- Qty#1 Particulate Analyzer



### S-K7™ TECHNICAL SPECIFICATIONS

### ANALYZED COMPONENTS MEASURING METHOD

- N0x, S02, C0, C02: NDIR (N0 with N02 to N0 converter)
- > HC: H-FID heated flame ionization detector

### **AUXILIARY INPUTS**

Engine speed and Torque, Air inlet flow, Fuel flow, Ambient temperature, Pressure & Humidity sensors as per "NOX Technical Code 2008", Ship GPS Global Positioning System

### SOFTWARE

- > Windows®-based Emissions Reporting software
- > Easy self-explaining graphical interface with Process Flow Diagram and real-time parameters
- > Multilevel Password Protection and Data Encryption to ensure safest tamperproof procedure I/O

### CONNECTIONS

1 x Ethernet RJ45, 1 x RS-485, 1 x SPDT contact

### S-K7™ SAMPLING SYSTEM

### SAMPLE CONDITIONING SYSTEM

According to "NOX Technical Code 2008" with system condition monitoring and maintenance indicators

### SAMPLE PROBE TECHNICAL SPECIFICATIONS

- > Operative Conditions: max. 200 kPa abs, 180°C
- > Filter element: Bonded Silicon Carbide (CSi)
- > Wetted parts: SS316Ti, CSi, Viton®
- > Flanged Process Connection: DN 65 PN 6 DIN 2573
- > Housing: SS304, IP43 rating

### SAMPLE LINE TECHNICAL SPECIFICATIONS

- > Operative Temperature 190°C/Max 210°C/Peak 250°C
- > Maximum Operating Pressure 2.8 barg@200°C
- > Wetted parts PTFE material
- > External diameter 43 mm
- > End Caps diameters 48 mm
- > Minimum Allowable Bending Radius 200 mm
- > External insulation Fiberglass

### S-K7TM OXYGEN ANALYSER (OPTION)

### MEASUREMENT METHOD

> Zirconium oxide

### **M**EASUREMENT RANGE

 $> 0 \div 25 \% (dry)$ 

### Installation

> Integrated in main cabinet

### S-K7™ PARTICULATE ANALYSER (OPTION)

### **M**EASUREMENT METHOD

> Inductive Electrification

### MEASURED PARTICLE SIZE

> 0.3 µm or higher

### MEASUREMENT RANGE

> Lowest value 0.1 mg/m³

### INSTALLATION

> In-Situ, flanged to stack

### S-K7TM AMBIENT CONDITIONS LIMITS

### MAIN INTEGRATED CABINET

> Ambient Temperature +5 / +55°C; 95% RH Max

### SAMPLE PROBE

> Ambient Temperature +5 / +55°C; 95% RH Max

### PARTICULATE ANALYSER (OPTION)

> Ambient Temperature +5 / +55°C; 95% RH Max

### S-K7™ UTILITIES CONSUMPTION

### Power supply

230 VAC @50/60 Hz

### MAXIMUM POWER CONSUMPTION (FULL MODEL)

4.8 KVA Max

### CALIBRATION GAS BOTTLE / EACH PARAMETER

1 bottle 110 L @ 20°C / 1 operative year approx

### DEMI WATER (ONLY LITE-S, LITE, FULL MODELS)

1 canister of 5 Liters / 3 operative months approx

### S-K7™ DIMENSIONS & WEIGHT

### MAIN INTEGRATED CABINET

1050 x 1990 x 800 mm (WxHxD), 550 kg

### SAMPLE PROBE

Housing 251 x 297 x 168 mm (WxHxD), 9 kg, Length TBD

### SAMPLE LINE

Length TBD, 0.9 Kg/m

### CALIBRATION BOTTLE

360 (H) x 90 mm (DN), 1.1 kg

### OXYGEN ANALYSER (OPTIONAL)

Integrated in main cabinet

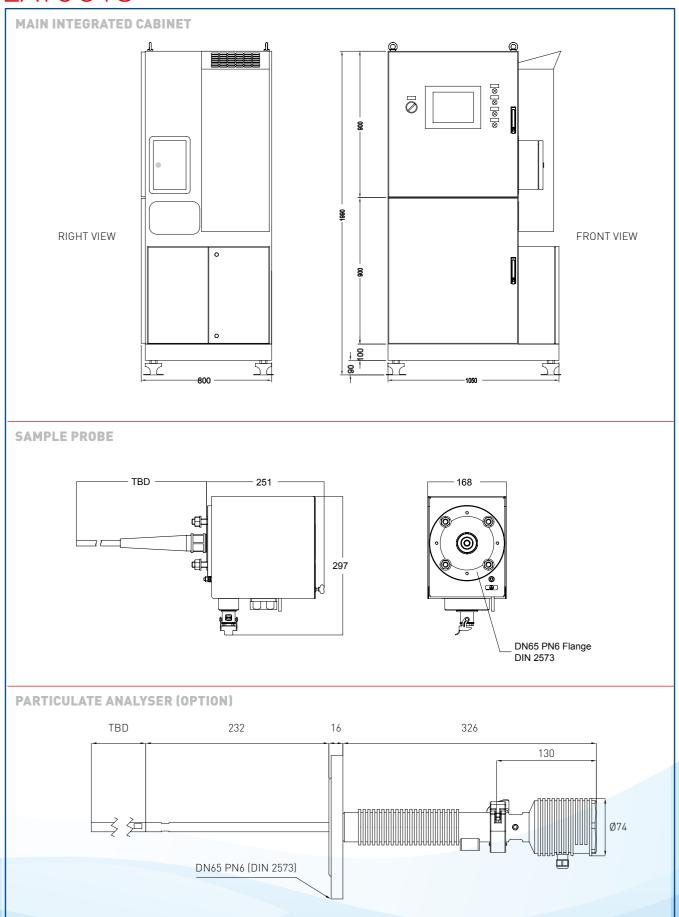
### PARTICULATE ANALYSER (OPTIONAL)

Flanged housing 342 (L) x 74 mm (DN), 1.7 kg, Insertion length TBD

### S-K7TM SELECTION TABLE

Туре	MARPOL ANNEX VI		MEPC	Analyzed Components					TIER	MEPC	ISO	Analytical
	REG.13	REG.14	177 (58) 184 (59)	NOx	C02	S02	CO	нс	I/II/III Limits	Circ. 471	14001	Options
EASY-N	1	X	1	1	X	X	X	X	<b>✓</b>	1	1	02, Particulate
EASY-S	X	1	1	X	1	1	X	X	X	1	1	02, Particulate
EASY	1	1	1	1	1	1	X	X	1	1	1	02, Particulate
LITE-N	1	X	1	1	1	X	1	X	1	1	1	02, Particulate
LITE-S	X	1	✓	X	1	1	1	1	X	1	1	02, Particulate
LITE	1	X	1	1	1	X	1	<b>√</b>	1	1	1	02, Particulate
FULL	1	1	1	1	1	1	1	1	1	1	1	02, Particulate

# LAYOUTS





# S-K7™ companions

SLASHING EMISSIONS, REDUCING FUEL CONSUMPTION, MINIMIZING MAINTENANCE... IN OTHER WORDS, SUSTAINABLE SHIP EFFICIENCY. HOW? HERE'S OUR ANSWER.

### **POSITIVE DISPLACEMENT METERS**

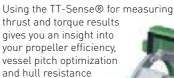


### **VISCOSITY IN LINE ANALYSERS**

The patented ViscoSense® system is used for continuous in-line measurement and control of fuel oil viscosity & temperature for diesel engines on ships



### **SHAFT POWER TORQUE & THRUST METER**





### **PEM PROPULSION EFFICIENCY MONITOR**

The PEM4 is the first maritime solution for measuring propeller thrust, engine power and fuel consumption simultaneously



### **OIL DISCHARGE MONITORING EQUIPMENT**

For the continuous on-line monitoring of discharge water during de-ballasting operations, the Oilcon® Mark 6 is a proven solution known worldwide



### PRESSURE TRANSMITTERS



The FCX AII V5 family with both aluminum and SS316 housings is simply the-state-of-the-art in pressure sensing for heavy-duty service





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