MARINE DIVISION

67/71 Boulevard du Château
92200 Neuilly-sur-Seine - France

Tel. 33 1 55 24 70 00
Fax. 33 1 55 24 70 45
www.veristar.com

Certificate number: 13362/B0 BV

File number: AP 3547

Product code: 3812H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

TYPE APPROVAL CERTIFICATE

This certificate is issued to

SENMATIC A/S

Søndersø - DENMARK

for the type of product

TEMPERATURE SENSORS / PROBES / TRANSDUCERS

Resistance thermometer: B, BF, BJ, BL, BU, BUF, DMH, GW, NS, PMK, PTE, PTI, S.
Thermocouple: TDMH, DMK, DML, DMV, MK.

Regulations and standards:
BV Rules for the Classification of Steel Ships.

This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements of the Regulations and standards mentioned above.

This certificate is valid until: 18 Mar 2014

At Neuilly, on: 18 Mar 2009

For BUREAU VERITAS,
By order of the Secretary

L.COURREGELONGUE

Approval office

Local office: BV FREDERICIA
Surveyor: V. Simonsen

This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with BUREAU VERITAS. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of BUREAU VERITAS Marine Division. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against BUREAU VERITAS for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

TEMPERATURE SENSORS - Resistance thermometers or thermocouple as listed in table below.

Type	Sensing element	Mechanical connection	Electrical connection	Degree of protection
B	Resistance thermometer	Threaded protective sheath	Connection head	IP 65
BF	Resistance thermometer	Threaded protective sheath	Connection head	IP 65
BL	Resistance thermometer	None or with flange	Connection head	IP 65
BU	Resistance thermometer	Threaded protective sheath	Connection head	IP 65
BUF	Resistance thermometer	Threaded protective sheath	Connection head	IP 65
BJ	Resistance thermometer	Bayonnet socket	Fixed cable	-
DMH	Resistance thermometer	Threaded protective sheath	Connection head	IP 65
TDMH	Thermocouple	Threaded protective sheath	Connection head	IP 54
DMK	Thermocouple	Compression fitting	Fixed cable	-
DML	Thermocouple	Compression fitting	Fixed cable	-
DMV	Thermocouple	Compression fitting	Fixed cable	-
GW	Resistance thermometer	Threaded protective sheath	Fixed cable	-
MK	Thermocouple	Compression fitting	Fixed cable	-
NS	Resistance thermometer	Compression fitting	Fixed cable	-
PMK	Resistance thermometer	Compression fitting	Fixed cable	-
PTE	Resistance thermometer	Without	Fixed cable	-
PTI	Resistance thermometer	Without	Fixed cable	-
S	Resistance thermometer	Threaded protective sheath	Angular connector	-

Notes:

- Terminal box and protective cover to be provided upon installation onboard.
- All sensors are suitable for installation where severe vibration conditions exist (e.g. Diesel engine, air compressor).
- All approved sensors are single element type.

2. DOCUMENTS AND DRAWINGS :

According following documents filed in AP 3547.

Type	Documents
B	Data sheet B
BF	Data sheet BF
BL	Data sheet BL
BU	Data sheet BU_3.1.2.02.V1.99 + Drawings
BUF	Data sheet BUF_3.1.2.04.V1.99 + Drawings
BJ	Data sheet BJ_3.3.6.01.V2.01 + Drawings
DMH	Data sheet DMH_3.2.5.01.V1.99 + Drawings
TDMH	Data sheet TDMH_4.5.3.01.V1.99 + Drawings
DMK	Data sheet DMK_4.5.4.01.V1.99 + Drawings
DML	Data sheet DML_4.5.2.01.V1.99 + Drawings
DMV	Data sheet DMV_4.5.1.01.V1.99 + Drawings
GW	Data sheet GW_3.3.3.01.V1.99 + Drawings
MK	Data sheet MK_4.3.4.01.V1.99 + Drawings
NS	Data sheet NS_3.4.6.01.V3.03 + Drawings
PMK	Data sheet PMK_3.3.7.01.V2.01 + Drawings
PTE	Data sheet PTE
PTI	Data sheet PTI
S	Data sheet S

3. TEST REPORTS :

- DELTA n° KAP250161-2 (DANAK 193119) dated on 21/02/1997.
- DELTA n° K221548-2 (DANAK 195557) dated on 06/06/2001.

4. APPLICATION / LIMITATION :

4.1 - According to BV Rules for the Classification of Steel Ships.

4.2 - Approval also valid for ships to be granted with the notations: **AUT-UMS, AUT-CCS, AUT-PORT and AUT-IMS.**

4.3 - Sensors are not to be installed on exhaust manifolds of high speed and medium speed Diesel Engines.

4.4 - Sensors are not to be installed in saline atmosphere.

4.5 - Sensors are to be installed in thermowell as required by Bureau Veritas Rules.

5. PRODUCTION SURVEY REQUIREMENTS :

5.1 - The above sensors are to be manufactured, examined and tested by **SENMATIC A/S** in accordance with the type described in this certificate and Bureau Veritas Rules for the Classification of Steel Ships.

5.2 - Production sites are to be recognized by Bureau Veritas as per NR320 for HBV products. To this end **SENMATIC A/S** has to make the necessary arrangements for a Society's Surveyor to perform visits and product audits at the production sites.

5.3 - **SENMATIC A/S** has declared to Bureau Veritas that the type of product described in this certificate are manufactured at the following production site:

SENMATIC A/S
Industrivej 8
5471 Søndersø
DENMARK

5.4 - Each equipment is to be supplied with manual(s) for installation, use and maintenance.

6. MARKING OF PRODUCT :

- Maker's name or trade mark.
- Serial number of the units.
- Equipment type number or model identification under which it was type-tested.

7. OTHERS :

7.1 - This approval is given with the understanding that the Society reserves the right to require check tests to be carried out on the above mentioned equipment in Clause I at any time, and that **Senmatic A/S, Sonderso - DENMARK** will accept the responsibility for informing shipbuilders, shipowners or their sub-contractors of the proper methods of use and general maintenance of the Equipment and the conditions of this approval.

7.2 - This certificate supersedes the Type Approval Certificate N° 13362/A1 BV issued on 10/01/2006 by the Society.

***** END OF CERTIFICATE *****

DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. A-10646
This Certificate consists of 3 pages

This is to certify that the

Temperature Sensor

with type designations

B, BF, BJ, BL, DMH, GW, NS, PMK, PTE, S
Resistance Thermometers

DMK, DML, DMV, MK, TDMH
Thermocouples

Manufactured by

Senmatic A/S
SØNDERSØ, Denmark

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards

Application
Location classes:

Temperature	D
Humidity	B
Vibration	B
EMC	N/A
Enclosure	B, BF, BL, DMH, S, TDMH: Class B BJ, DMK, DML, DMV, GW, MK, NS, PMK, PTE: Required protection of cable end terminal box to be provided upon installation on board

Place and date
Høvik, 2008-02-11
for DET NORSKE VERITAS AS

for Odd Magne Nesvåg
Head of Section

Local Office
DNV Fredericia

This Certificate is valid until
2011-12-31

Ståle Sneen
Surveyor

Notice: This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million.In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.

Application/Limitation

The type approval covers only options specified in the relevant documentation listed below.

Thermowells to be used as required by Det Norske Veritas' Rules

Type Approval documentation

Type	Data sheet/Drawing
B	Data sheet Version: V2.4 / Drw: 700-0001-07, 700-0023-06
BF	Data sheet Version: V2.5 / Drw: 700-0003-05
BJ	Data sheet Version: V2.1 / Drw: 700-0029-02
BL	Data sheet Version: V2.3 / Drw: 700-0020-01
DMH	Data sheet Version: V2.1 / Drw: 700-0028-04
DMK	Data sheet Version: V2.1 / Drw: 700-0086-01
DML	Data sheet Version: V2.1 / Drw: 700-0039-01
DMV	Data sheet Version: V2.1 / Drw: 700-0038-01
GW	Data sheet Version: V2.1 / Drw: 700-0033-00
MK	Data sheet Version: V2.1 / Drw: 700-0103-03
NS	Data sheet Version: V2.1 / Drw: 302-745-11, 302-747-10, 302-748-10, 302-749-10, 302-750-10, 302-755
PMK	Data sheet Version: V2.1 / Drw: 700-0035-00, 700-0036-01, 700-0037-03
PTE	Data sheet Version: V2.2 / Drw: 700-0031-02
S	Data sheet Version: V2.3 / Drw: 700-0050-03
TDMH	Data sheet Version: V2.1 / Drw: 700-0048-06

Test Report:	DELTA-KAP250161-2

DNV Fredricia Certificate retention survey report for A-9703, dated 2008-01-04

Certificate retention survey

The scope of the retention/renewal survey is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the survey are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

Retention survey is to be performed at least every second year and at renewal of this certificate.

END OF CERTIFICATE

Type Approval Certificate

Germanischer Lloyd

This is to certify that the undernoted product(s) has/have been tested in accordance with the relevant requirements of the GL Type Approval System.

Certificate No.	**40 566 - 01 HH**
Company	**Senmatic A/S** **Industrivej 8-10** **5471 Søndersø, DENMARK**
Product Description	**Resistance Thermometer**
Type	**B, BL, S**
Environmental Category	**D, EMC1**

Technical Data / Range of Application

Type:	B	BL	S
Sensing element:	Pt100/1000	Pt100	Pt100/1000
Number of conductors:	2, 3 or 4	2, 3 or 4	3 or 4
Number of sensors:	1 or 2	1	1
Tolerance class:	B	B	B
Max. immersion length:	200 mm	200 mm	200 mm
Max. extension length:	140 mm	-	50 mm
Response time z0.5 [s]:	23 (water)	42 (air)	6 (water)
Response time z0.9 [s]:	71 (water)	125 (air)	17 (water)
Temperature range [°C]:	-50/+600	-50/+180	-50/+150
Mechanical connection:	thread	flange	thread
Electrical connection:	B-head	B-head	head
Degree of protection:	IP65	IP65	IP65

Test Standard	**Guidelines for the Performance of Type Approvals, Chapter 2 - Edition 2003**
Documents	**Test Report: DANAK-195557 of Delta dated 2001.06.08** **Test Report: DANAK-193119 of Delta dated 1997.02.21** **Technical Documents: Construction drawings** **Data sheets: Resistance Thermometer - Type B, - Type BL, -Type S**
Remarks	**None**
Valid until	**2012-12-16**

Page **1** of **1**

File No. **I.D.02**

Hamburg, 2007-12-17

Type Approval Symbol GL

Germanischer Lloyd

Jürgen Wittburg

Dariusz Lesniewski

This certificate is issued on the basis of "Guidelines for the Performance of Type Approvals Part 1, Procedure".