Certificate No:
TAD00001KA

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Miscellaneous

with type designation(s)
Sensor, Subsea, 2-1/16"-10K, 2-1/16"-15K, 3-1/16"-15K and 4-1/16"-15K sizes, per Dwg. 200162 Rev. B

Issued to
TTL Subsea, Inc.
Stafford, TX, USA

is found to comply with
DNV-OS-E101 – Drilling facilities, Edition July 2021

Application :

See Page 2.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Issued at **Houston** on **2023-10-25**
This Certificate is valid until **2028-10-24**.
DNV local unit: **Houston Offshore Services**

Approval Engineer: **M. Kevin Mandeville Jr.**

for **DNV**

Brandon D Caraway
Head of Section

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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

The following codes and standards were used as a reference:

API Specification 6A, *Specification for Wellhead and Tree Equipment*, 21st Ed.
API Specification 16D, *Control Systems for Drilling Well Control Equipment and Control Systems for Diverter Equipment*, 3rd Edition

Product description

Pressure and Temperature Sensor for wellbore fluid with a variable length probe integrated into a flanged housing. The following Part Numbers are approved:
200162-HPHTO-X^1-XXX^2-X^3-X^4-X^5-X^6

1: Flange Types Table

Designator	Flange Type
A	2-1/16”-10k
B	2-1/16”-15k
C	3-1/16”-15K
D	4-1/16”-15k

2: Probe Length Table

Designator	Probe Length
040	4.0”
045	4.5”
050	5.0”
055	5.5”
060	6.0”
065	6.5”
070	7.0”
080	8.0”
135	13.5”
240	24.0”

3: Pressure Range Table

Designator	Pressure Range
A	0-10000 psi
B	0-15000 psi

4: Temperature Range Table

Designator	Pressure Range
A	0-150°C

5: Back Shell Connection Table

Designator	Back Shell Connection
A	13MK2 90DEG
B	ODI BH
C	SEACON-MSSL
D	GLOBALTECH/VECTOR

6: Sensor Output Table

Designator	Sensor Output
A	Analog 4-20mA Single Pressure
B	Analog 4-20mA Single Pressure Single Temperature
C	Analog 4-20mA Dual Pressure Dual Temperature
D	Digital RS-485 Single Pressure
E	Digital RS-485 Single Pressure Single Temperature
F	Digital RS-485 Dual Pressure Dual Temperature

Application/Limitation

Design Parameter	Value	(Equivalent)
Maximum Allowable Working Pressure (Part No. 200162-HPHTO-A-XXX-X-X-X-X)	10,000 psi	689.5 bar
Hydrostatic Test Pressure (Part No. 200162-HPHTO-A-XXX-X-X-X-X)	15,000 psi	1,034 bar
Maximum Allowable Working Pressure (All other approved part numbers)	15,000 psi	1,034 bar
Hydrostatic Test Pressure (All other approved part numbers)	22,500 psi	1,551 bar
Temperature Range	Per Table 4. Above	
Medium	Sea Water and Wellbore Fluid	
Supply Voltage	12-40 VDC	
Output Signal	Per Table 6 Above	

Type Approval documentation

Tests carried out

Testing carried out on product with Serial Number 548-2K019-035.

Marking of product

For traceability the following marking is to be carried out on each product:

1. Serial No.
2. Manufacturer's Name or trademark
3. Additional marking at the manufacturer's discretion

Certificate Retention Survey

For retention of the Type Approval Certificate, DNV's surveyor shall perform a survey after two and three-and-a-half years in accordance with DNV's Class Program DNV-CP-0388, 2021 edition.

Other conditions/comments

- DNV Ref. Project No. A1424258

END OF CERTIFICATE