# 1 EU - Type Examination Certificate

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU

3 Certificate Number: ExVeritas 21ATEX0860X Issue: 2

4 Equipment: Thickness Gauge CYGNUS 1 EX

5 Manufacturer: Cygnus Instruments Ltd.

6 Address: 30 Prince of Wales Road

Dorchester, Dorset, DT1 1PW UK

7 This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

8 ExVeritas, Notified Body number 2804 in accordance with Article 17 of the Council Directive 2014/34/EU of 26 February 2014, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to design and construction of equipment and protective systems for use in potentially explosive atmospheres given in Annex II to the Directive

9 Compliance with the applicable Essential Health and Safety Requirements has been assured by compliance with the following Standards and section 16 of this certificate:

EN IEC 60079-0: 2018 EN 60079-11:2012

10 If the sign “X” is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EU-Type Examination Certificate relates only to the design, construction, examination and tests of the specified equipment or protective system in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment shall include the following:

Ex I M1 Ex ia I Ma $T_{amb}$ = 0°C to +50°C

Ex II 1G Ex ia IIC T4 Ga $T_{amb}$ = 0°C to +50°C

DANAK
PROD Reg.No. 7044
Member of EA MLA

On behalf of ExVeritas

ExVeritas OFFICIAL SIGNATORY

Peter Lauritzen
Managing Director

## Schedule

13 Description of Equipment or Protective System

Cygnus CYGNUS 1 EX is a battery powered hand-held thickness gauge. The system operation is based on multiple echo sounding technology, where an ultrasonic probe is used.

The Cygnus CYGNUS 1 EX comprises a plastic enclosure where the encapsulated electronic module, keypad and battery pack are installed.

This system includes two main boards, both are encapsulated. Encapsulation protruding conductive parts are the connector for the main battery pack, backup battery, keypad, Serial Interface connector (used only on safe areas) and Ultrasonic Probe connector.

CYGNUS 1 EX probes have the following part numbers Cygnus S2C, S3C, S5A, T2C, T5B, T5A and T7A.

Rating:

- 2x Lithium battery 4.2 Vpeak in series, resulting in a 8.4 Vpeak battery pack, current limited by a fuse to 750 mA
- Connections for devices in safe area:
    - Charger (PN 060-xxxx) – Um = 8.4 V
    - Comms Interface PN 060-1002 – Um = 250 V
- Probe output:
  Uo = 45.15 V, Io = 28 mA, Po = 312 mW, Co = 10 nF, Lo = 10 µH

14 Descriptive Documents

14.1 Associated Report and Certificate History:

| Report Number | Cert Issue Date | Issue | Comment |
|---|---|---|---|
| R2407/A/1 | 23-06-2021 | 0 | Initial issue of the Prime Certificate |
| R3681/A/1 | 14-12-2021 | 1 | Probe T7A added. |
| R4340/A/1 | 05-07-2023 | 2 | • Inclusion of the new battery Molicel ICP103450DA.<br>• Marking of probes ports output limiting parameters: Uo = 45.15 V, Io = 28 mA, Po = 312 mW, Co = 10 nF, Lo = 10 µH.<br>• Schedule Drawings minor updates. |

14.2 Compliance Drawings:

| Title: | Drawing No.: | Rev. Level: | Date: |
|---|---|---|---|
| Scheme for Intrinsic Safety - Gauge Body Cygnus 1 Ex | M5-IS-13-01 | 1 | 30/04/2021 |
| Scheme for Intrinsic Safety - Battery Pack Cygnus 1 Ex | M5-IS-13-02 | 2 | 30/04/2021 |
| Scheme for Intrinsic Safety - Electronics Module Cygnus 1 Ex | M5-IS-13-03 | 1 | 30/04/2021 |
| Scheme for Intrinsic Safety - S-Probe Transducer Cygnus 1 Ex | M5-IS-13-04 | 1 | 30/04/2021 |
| Scheme for Intrinsic Safety - T-Probe Transducer Cygnus 1 Ex | M5-IS-13-05 | 1 | 30/04/2021 |
| Scheme for Intrinsic Safety - Comms Interface Cygnus 1 Ex | M5-IS-13-06 | 1 | 30/04/2021 |
| Scheme for Intrinsic Safety - S-Probes and Leads Cygnus 1 Ex | M5-IS-13-07 | 1 | 30/04/2021 |

## Schedule

| Title: | Drawing No.: | Rev. Level: | Date: |
|---|---|---|---|
| Scheme for Intrinsic Safety - Txx Remote Probes Cygnus 1 Ex | M5-IS-13-08 | 1 | 30/04/2021 |
| Scheme for Intrinsic Safety - RA Remote Probes Cygnus 1 Ex | M5-IS-13-09 | 1 | 30/04/2021 |
| Scheme for Intrinsic Safety - Marking Cygnus 1 Ex (*) | M5-IS-13-10 | 3 | 16/05/2023 |
| Scheme for Intrinsic Safety - CYG059 PCBs Cygnus 1 Ex | M5-IS-13-11 | 1 | 06/05/2021 |
| Scheme for Intrinsic Safety - Materials Register Cygnus 1 Ex | M5-IS-13-12 | 1 | 06/05/2021 |
| Scheme for Intrinsic Safety - Hand Strap Cygnus 1 Ex | M5-IS-13-13 | 1 | 06/05/2021 |
| Scheme for Intrinsic Safety - Battery Charger Cygnus 1 Ex | M5-IS-13-14 | 1 | 06/05/2021 |
| Bill Of Materials CYG059-01 - Control Board (*) | CYG059-01_b5b | 5b | 15/04/2021 |
| Gerber Files CYG059-01 - Control Board | CYG059-01_g5a | 5a | 03/02/2021 |
| Schematic Diagram CYG059-01 - Control Board | CYG059-01_s5a | 5a | 18/12/2020 |
| Bill Of Materials CYG059-02 - Ultrasound Board (*) | CYG059-02_b5b | 5b | 09/07/2021 |
| Gerber Files CYG059-02 - Ultrasound Board | CYG059-02_g5a | 5a | 03/02/2021 |
| Schematic Diagram CYG059-02 - Ultrasound Board | CYG059-02_s5b | 5b | 28/01/2021 |
| Bill Of Materials CYG059-03 - Connection Board | CYG059-03_b2a | 2a | 05/06/2020 |
| Gerber Files CYG059-03 - Connection Board | CYG059-03_g2a | 2a | 04/06/2020 |
| Schematic Diagram CYG059-03 - Connection Board | CYG059-03_s2a | 2a | 01/05/2020 |
| Bill Of Materials CYG059-04 - Keypad | CYG059-04_b3a | 3a | 20/11/2019 |
| Gerber Files CYG059-04 - Keypad | CYG059-04_g3a | 3a | 20/11/2019 |
| Schematic Diagram CYG059-04 - Keypad | CYG059-04_s3a | 3a | 18/11/2019 |
| Bill Of Materials CYG059-08 - Comms Interface | CYG059-08_b6a | 6a | 01/03/2021 |
| Gerber Files CYG059-08 - Comms Interface | CYG059-08_g6a | 6a | 02/03/2021 |
| Schematic Diagram CYG059-08 - Comms Interface | CYG059-08_s6a | 6a | 01/03/2021 |
| Bill Of Materials CYG059-09 - Battery | CYG059-09_b4a | 4a | 20/05/2020 |
| Gerber Files CYG059-09 - Battery | CYG059-09_g4b | 4a | 02/03/2021 |
| Schematic Diagram CYG059-09 - Battery | CYG059-09_s4a | 4a | 20/05/2020 |
| Bill Of Materials CYG059-13 - Probe Ex Clamp | CYG059-13_b2a | 2a | 29/05/2020 |
| Gerber Files CYG059-13 - Probe Ex Clamp | CYG059-13_g2a | 2a | 05/06/2020 |
| Schematic Diagram CYG059-13 - Probe Ex Clamp | CYG059-13_s2a | 2a | 20/05/2020 |
| M5-EX Segregation Statement (Issue 1)(Signed).pdf | - | 1 | 19/06/2020 |
| M5-EX Ultrasonic Energy Statement (Issue 1)(signed).pdf | - | 1 | 19/06/2020 |
| Instructions declaration form.pdf | - | - | 01/03/2021 |
| Maximum Ultrasonic Probe Output Power Statement.pdf | - | - | 01/06/2012 |
| Scheme for Intrinsic Safety - Gauge Body Cygnus 1 Ex | M5-IS-13-01 | 1 | 30/04/2021 |

## Schedule

| Title: | Drawing No.: | Rev. Level: | Date: |
|---|---|---|---|
| Scheme for Intrinsic Safety - Battery Pack Cygnus 1 Ex | M5-IS-13-02 | 1 | 30/04/2021 |
| Scheme for Intrinsic Safety - Electrionics Module Cygnus 1 Ex | M5-IS-13-03 | 1 | 30/04/2021 |
| Scheme for Intrinsic Safety - S-Probe Transducer Cygnus 1 Ex | M5-IS-13-04 | 1 | 30/04/2021 |
| Scheme for Intrinsic Safety - T-Probe Transducer Cygnus 1 Ex | M5-IS-13-05 | 1 | 30/04/2021 |
| Scheme for Intrinsic Safety - Comms Interface Cygnus 1 Ex | M5-IS-13-06 | 1 | 30/04/2021 |
| Scheme for Intrinsic Safety - S-Probes and Leads Cygnus 1 Ex | M5-IS-13-07 | 1 | 30/04/2021 |
| Scheme for Intrinsic Safety - Txx Remote Probes Cygnus 1 Ex | M5-IS-13-08 | 1 | 30/04/2021 |
| Scheme for Intrinsic Safety - RA Remote Probes Cygnus 1 Ex | M5-IS-13-09 | 1 | 30/04/2021 |
| Scheme for Intrinsic Safety - Marking Cygnus 1 Ex | M5-IS-13-10 | 1 | 30/04/2021 |
| Scheme for Intrinsic Safety - CYG059 PCBs Cygnus 1 Ex | M5-IS-13-11 | 1 | 06/05/2021 |
| Scheme for Intrinsic Safety - Materials Register Cygnus 1 Ex | M5-IS-13-12 | 1 | 06/05/2021 |
| Scheme for Intrinsic Safety - Hand Strap Cygnus 1 Ex | M5-IS-13-13 | 1 | 06/05/2021 |
| Scheme for Intrinsic Safety - Battery Charger Cygnus 1 Ex | M5-IS-13-14 | 1 | 06/05/2021 |
| Bill Of Materials CYG059-01 - Control Board | CYG059-01_b5a | 5a | 28/06/2021 |
| Gerber Files CYG059-01 - Control Board | CYG059-01_g5a | 5a | 03/02/2021 |
| Schematic Diagram CYG059-01 - Control Board | CYG059-01_s5a | 5a | 18/12/2020 |
| Bill Of Materials CYG059-02 - Ultrasound Board | CYG059-02_b5a | 5a | 29/01/2021 |
| Gerber Files CYG059-02 - Ultrasound Board | CYG059-02_g5a | 5a | 03/02/2021 |
| Schematic Diagram CYG059-02 - Ultrasound Board | CYG059-02_s5b | 5b | 28/01/2021 |
| Bill Of Materials CYG059-03 - Connection Board | CYG059-03_b2a | 2a | 05/06/2020 |
| Gerber Files CYG059-03 - Connection Board | CYG059-03_g2a | 2a | 04/06/2020 |
| Schematic Diagram CYG059-03 - Connection Board | CYG059-03_s2a | 2a | 01/05/2020 |
| Bill Of Materials CYG059-04 - Keypad | CYG059-04_b3a | 3a | 20/11/2019 |
| Gerber Files CYG059-04 - Keypad | CYG059-04_g3a | 3a | 20/11/2019 |
| Schematic Diagram CYG059-04 - Keypad | CYG059-04_s3a | 3a | 18/11/2019 |
| Bill Of Materials CYG059-08 - Comms Interface | CYG059-08_b6a | 6a | 01/03/2021 |
| Gerber Files CYG059-08 - Comms Interface | CYG059-08_g6a | 6a | 02/03/2021 |
| Schematic Diagram CYG059-08 - Comms Interface | CYG059-08_s6a | 6a | 01/03/2021 |
| Bill Of Materials CYG059-09 - Battery | CYG059-09_b4a | 4a | 20/05/2020 |
| Gerber Files CYG059-09 - Battery | CYG059-09_g4b | 4a | 02/03/2021 |
| Schematic Diagram CYG059-09 - Battery | CYG059-09_s4a | 4a | 20/05/2020 |
| Bill Of Materials CYG059-13 - Probe Ex Clamp | CYG059-13_b2a | 2a | 29/05/2020 |
| Gerber Files CYG059-13 - Probe Ex Clamp | CYG059-13_g2a | 2a | 05/06/2020 |

## Schedule

| Title: | Drawing No.: | Rev. Level: | Date: |
|---|---|---|---|
| Schematic Diagram CYG059-13 - Probe Ex Clamp | CYG059-13_s2a | 2a | 20/05/2020 |
| M5-EX Segregation Statement (Issue 1)(Signed).pdf | - | 1 | 19/06/2020 |
| M5-EX Ultrasonic Energy Statement (Issue 1)(signed).pdf | - | 1 | 19/06/2020 |
| Instructions declaration form.pdf | - | - | 01/03/2021 |
| Maximum Ultrasonic Probe Output Power Statement.pdf | - | - | 01/06/2012 |
| Cygnus 1 Ex Intrinsically Safe Ultrasonic Thickness Gauge Instructions for Safety | M5-C1EX-M-01-E | D | 23/11/2021 |

(*) Document affected as part of this revision.

15 Conditions of Certification

15.1 Special Conditions for Safe Use

- *Charge only in Safe Area. Use only the specified charger.*
- *Only replace or remove the battery in Safe Area.*
- *The Serial RS422 port can only be used in Safe Area and through the accessory Comms Interface part number 060-1002. The use of this port without the Comms Interface accessory invalidates the approval.*

15.2 Conditions for Use (Routine tests)

- N/A

16 Essential Health and Safety Requirements

Essential Health and Safety Requirements are addressed by the standards listed in section 9 and where required the report listed in section 14.1

The manufacturer shall inform the Notified Body of any modifications to the design of the product described by this schedule.