beamonics
Made to measure

# TDLAS — BM-H-3 BeamStack

## Features

- Cross-duct in-situ gas analyzer
- Absolute gas quantification
- No need for calibration gas
- Analyze trace gases
- IP67 housings
- Not affected by other gases (no cross-interference)
- Low maintenance requirements

## Description

**BM-H-3 BeamStack: High-performance turnkey gas analyzer**

The BM-H-3 BeamStack is a state-of-the-art turnkey solution utilizing Tunable Diode Laser Absorption Spectroscopy (TDLAS) for precise gas analysis.

**Effortless integration:** Engineered for seamless integration, the analyzer is ideal for both industrial environments with PLC systems as well as research laboratories. It facilitates easy export and visualization of raw and processed data for post-processing in third-party tools. Integration onto stacks and pipes is readily available using the Stack-Mount DN50 PN6 flange adapter (see page 4).

**Advanced TDLAS technology:** By leveraging the robust and proven TDLAS technology, the BM-H-3 BeamStack delivers rapid (ms-rate) and highly sensitive (ppb-level) trace gas analysis. This technology is inherently self-referencing and calibration-free, ensuring minimal maintenance.

**Versatile gas analysis:** The analyzer is capable of detecting a wide range of gases commonly found in industrial and laboratory settings, including greenhouse gases such as methane ($CH_4$). Other commonly analyzed gases include $O_2$, $CO_2$, CO, $C_2H_2$, $N_2O$, $NH_3$, HF, $H_2S$, $H_2O$ and HCl.

**Energy efficient design:** The highly energy-efficient design allows the BM-H-3 BeamStack to operate for hours on batteries, making it possible to deploy for mobile analysis applications without external power sources.

**Durability and robustness:** Designed for heavy industrial use, the calibration-free gas analyzer system is exceptionally durable and robust, capable of withstanding harsh environments.

## Examples of gases

| Gas | Analysis precision (ppm)[a)] |
|---|---|
| $O_2$ | 20 |
| HF | 0.01 |
| CO | 0.2 |
| $CO_2$ | 0.5 |
| $CH_4$ | 0.2 |
| $C_2H_2$ | 0.08 |
| $N_2O$ | 0.03 |
| $NH_3$ | 0.2 |
| HCl | 0.07 |
| $H_2S$ | 0.3 |
| $H_2O$ | 0.2 |

[a)] *Under standard test conditions: L = 1 m, t = 1 s, P = 1 atm, T = 300 K, largest of 1% relative and specified precision*



**www.beamonics.se | info@beamonics.se**

Beamonics AB | Tellusgatan 13, 22457 Lund, SWEDEN

# TDLAS — BM-H-3 BeamStack

## Spectroscopy Characteristics

| Parameter | Symbol | Min | Typical | Max |
|---|---|---|---|---|
| Analysis rate | $f_R$ | | 1 Hz | 10 kHz |
| Data sampling noise | | | 0.1 µVrms* | |
| Low-light limit (10 s) | $I_{LL}$ | | 1 nW | |

**1 s sampling time*

## Interfaces

| Interface | Model | Mounted | Quantity |
|---|---|---|---|
| USB | 53398-0471 Communication, Data | Yes | 2 |
| USB | Mini USB, Firmware upgrade | Yes | 2 |
| RS-485/422 | 4 wire Full Duplex - protected | Yes | 1 |
| RS-485/422 | 4 wire Full Duplex - service data | Yes | 1 |
| RS-485 | Half Duplex | Yes | 1 |
| Trig In | 4-30 V | Yes | 2 |
| IO | 0-12 V | Yes | 2 |
| IO Supply | 12 V | Yes | 1 |
| Relay Output | G6K-2F-5DC, NC/NO | Yes | 2 |
| 4-20 mA | Passive / Active | Expansion | 2 |
| Expansion connector | I²C, SPI, GPIO, ADC, Loop Relay, Sync, GND, PWM, UART, Relay, IO, 5 V, 2.5 V, 12 V, PWR_IN, 4-20 mA, 0-10 V | Yes | 3 |
| Sync signals | Daisy chain configuration | Yes | 2 |
| Master clk in / out | 73412-0110 | Yes | 2 |

## Electrical Characteristics

| Parameter | Symbol | Min | Typical | Max |
|---|---|---|---|---|
| Supply voltage | $V_{in}$ | 15 VDC* | 24 VDC | 32 VDC |
| Power consumption | | | 5 W** | |
| TEC driver power | | 0 W | | 3.56 W |
| Comm. link length | | | | 30 m |
| Comm. link speed | | | | 3 Mbit/s |
| Startup-time (ambient) | $t_{su}$ | | 5 s | |

**Degraded noise performance if $V_{in}$ < 15 V / **50 mA laser diode*

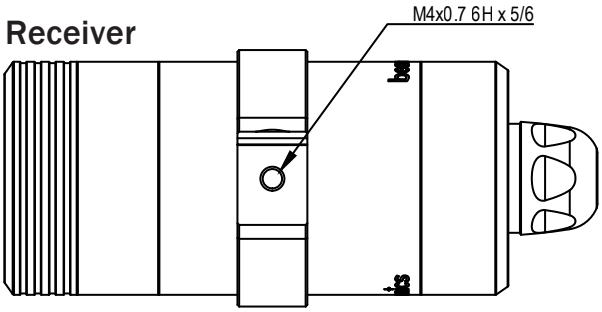
## Other

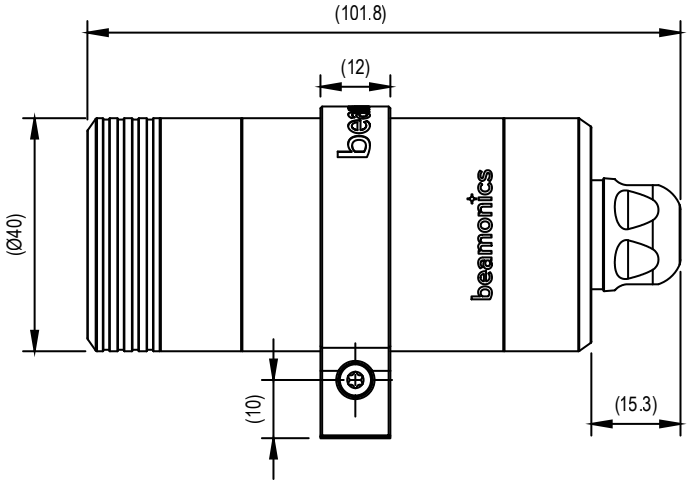
| Parameter | Symbol | Min | Typical | Max |
|---|---|---|---|---|
| Operating temperature | $T_{op}$ | -10 °C | | 55 °C |
| Humidity (non-condensing) | | 40% @ 50 °C / 80% @ 30 °C | | |
| IP classification | | IP67 | | |
| Infrared laser | | Laser Class 1 | | |
| CE-marked EU directives | | 2014/35/EU, 2012/19/EU, 2011/65/EU, EN61000-6-2:2005, EN61000-6-2:2019, EN61000-6-4:2007, EN61000-6-4:2019 | | |

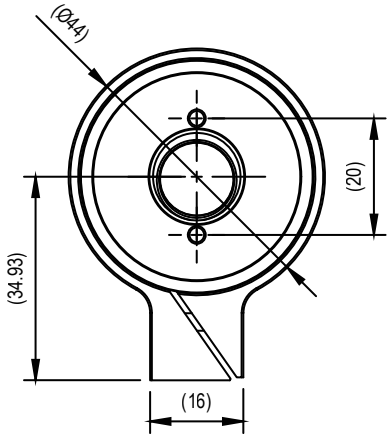
# TDLAS — BM-H-3 BeamStack

## Dimensions

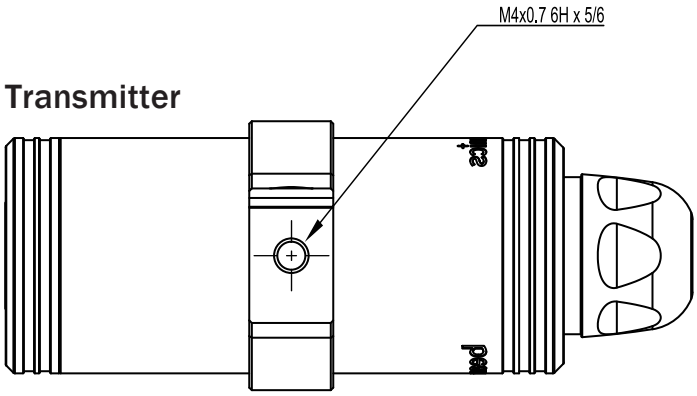
### Receiver

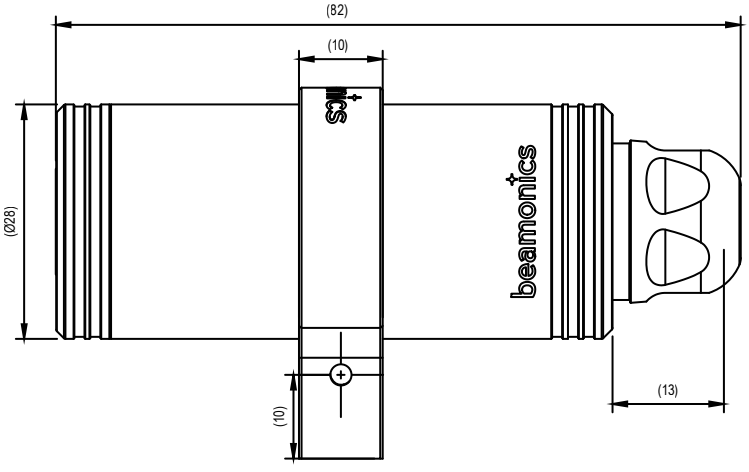


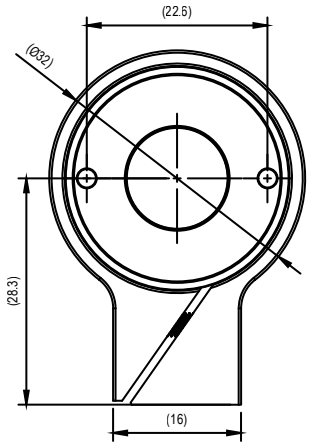




### Transmitter



# TDLAS — BM-H-3 BeamStack

## StackMount - Flange adapter (optional)

### Features

- Mounts to standard DN50 PN6 process flanges
- Easy installation and simple alignment
- Compact and lightweight to simplify installation and service
- Simple and quick disassembly for cleaning if needed
- Integrated protective windows and purge connections
- Wetted surfaces in stainless steel (SS316)
- No need for re-alignment after cleaning / maintenance

### Description

**Beamonics StackMount Flanges**

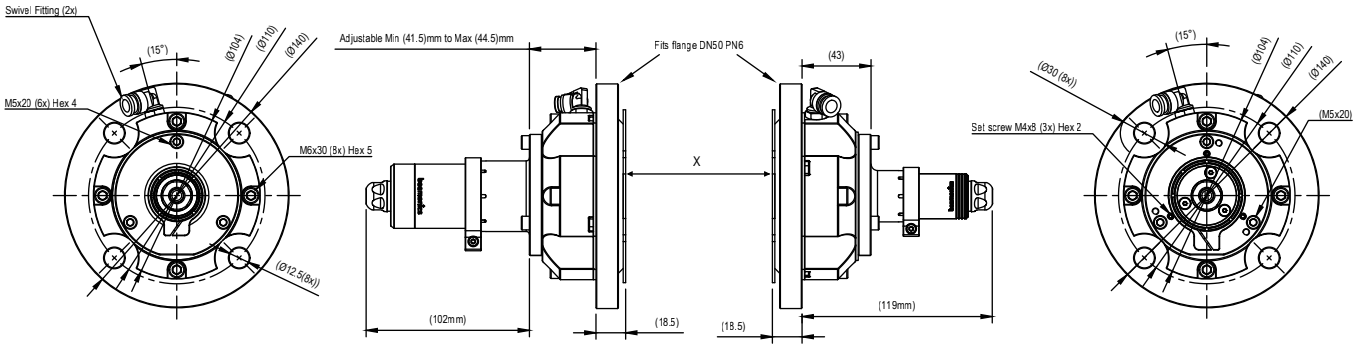
The Beamonics StackMount flanges provide a compact, robust and easy-to-install solution for process gas measurement. Designed for standard DN50 PN6 process flanges, they enable fast installation and simple optical alignment.

The lightweight and compact design simplifies both installation and service, while quick disassembly allows the optical components to be easily removed for cleaning when required. Integrated protective windows and purge connections provide reliable protection in demanding process environments.

All wetted surfaces are made of stainless steel SS316, ensuring excellent durability and corrosion resistance. A key advantage is that no optical re-alignment is required after disassembly, cleaning or maintenance, significantly reducing service time and ensuring consistent measurement performance.

### Specifications

#### Process interface

| | |
|---|---|
| Flange interface | DN50 PN6 |
| Wetted materials | SS316 |
| Optical isolation | Protective windows, 1 per side |
| Purge connection | 6 mm or 8 mm push fit connector, 1 per side |
| Angular adjustment | ±5° |

### Reference Dimensions