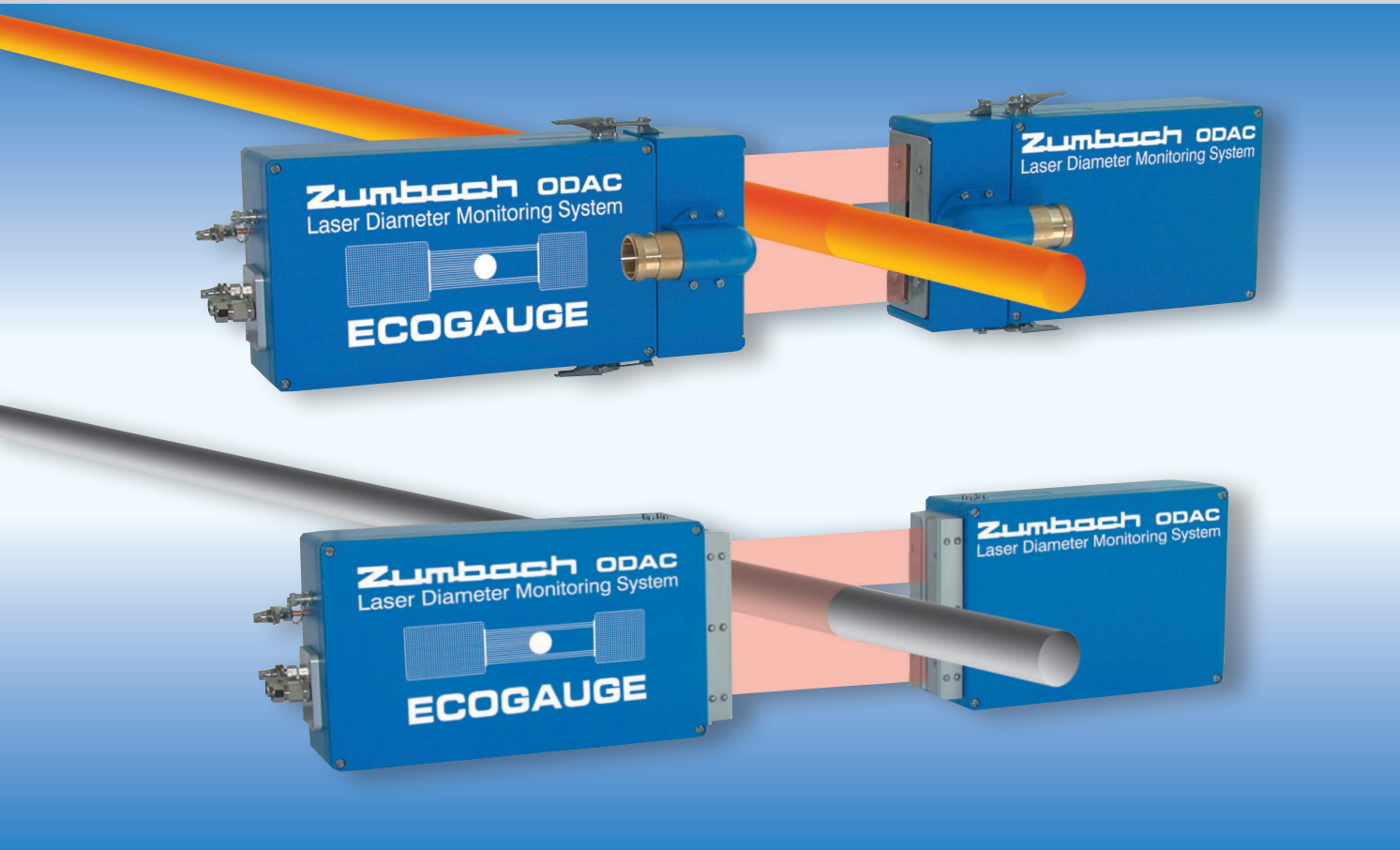


ECOGAUGE



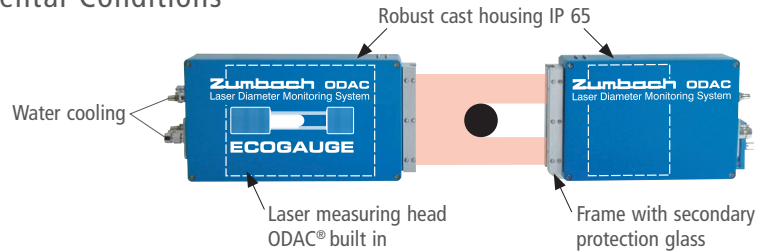
Accurate Low Cost Measurement Solutions
for Harsh Environments

ECOGAUGE SYSTEM EXECUTIONS

The ECOGAUGE family presents an affordable kind of solution for in-line measurement under difficult environmental conditions in processes such as hot rolling, peeling, grinding and other processes. ECOGAUGE systems are comprised of the proven ODAC® laser scanner together with a protection system and an electronic processor unit. Even with vibration or under dusty conditions, the best measuring accuracy is guaranteed thanks to the large measuring field and the high measuring speed. The compact and modular design makes it possible to apply ECOGAUGE as a measurement solution to a wide variety of applications.

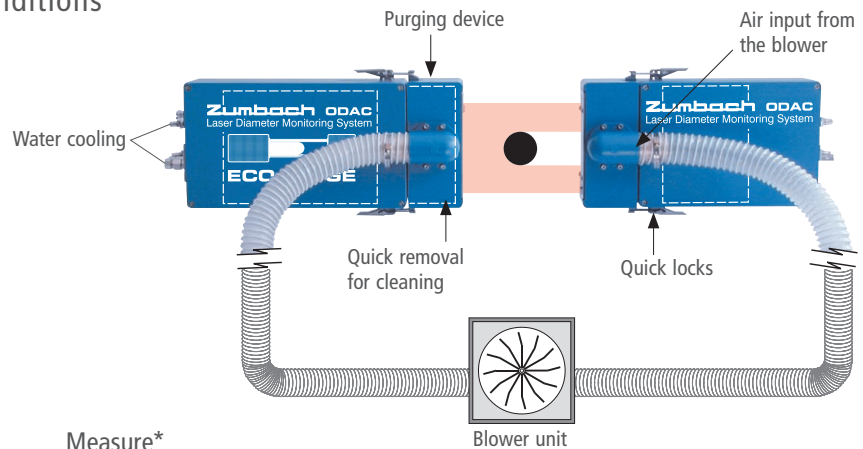
For Medium to Harsh Environmental Conditions

- Oil vapour
- Emulsion
- Peeling/Grinding cuttings
- Dust, general grime



For Harsh Environmental Conditions

- Hot rolling
- Forging
- Continuous casting
- Scale
- Heavy grime



Typical Protection Measures

| Conditions | Measure* |
|---|--|
| - Product temperature = max. 45° C (113° F) | None |
| - Ambient temperature = 45° C (113° F) | |
| - Relatively clean | Water cooling |
| - Product and/or ambient temperature higher than 45° C (113° F) | |
| - Relatively clean | Water cooling and optionally air rinsing with blower |
| - Product temperature higher than 500° C (932° F) | |
| - Temperature higher than 45° C (113° F) | |
| - Medium grime | Water cooling and air rinsing with blower |
| - Product temperature higher than 500° C (932° F) | |
| - Ambient temperature higher than 45° C (113° F) | |
| - Hot rolling environment | |
| - High level of grime | |

* Only typical measures are mentioned. Product dimensions, material, distances etc. have to be known for optimal system composition.

► The temperature inside the protection housing must not rise above 45° C (113° F)!

CHOICE OF PROCESSOR UNITS



Computer Interface Units

For direct communication with a higher level to computer, resp. PLC.

- RS = Serial
- DP = PROFIBUS
- EN = Ethernet TCP/IP



USYS 20

For numerical display with limit alarm and interface.



USYS 2100

For LCD screen display or where a second measuring head will be connected.



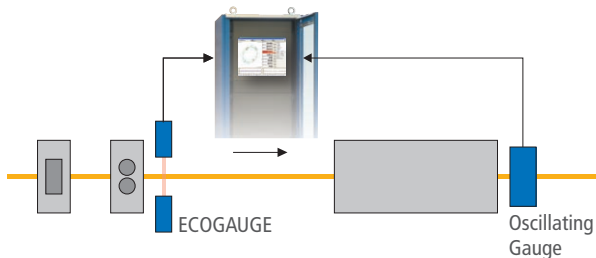
STEELMASTER

For the case where the ECOGAUGE forms part of a MULTIGAUGE system, together with an oscillating or multi-axis system in a rolling mill.

VARIOUS MEASURING SOLUTIONS

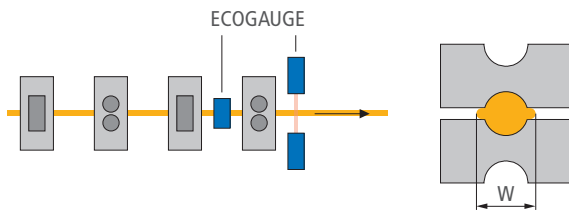
Detection and measurement of under or overflow

When mounted after or between the rolling stands the system instantly recognises, measures and alarms sudden changes in dimension. The orientation of the measuring head depends on the critical dimension that is to be measured. Usually the head is mounted horizontally or vertically. Even very short or sudden changes of dimension e.g. overflow at the end of bars, will be detected.



Measuring position between stands

The ECOGAUGE can be positioned between or after the stands thanks to its compact and robust design. The width (W) or height of the product can therefore be measured continuously. This allows the process to be finely tuned with better speed control. In some circumstances "Loops" can be saved and room savings made.

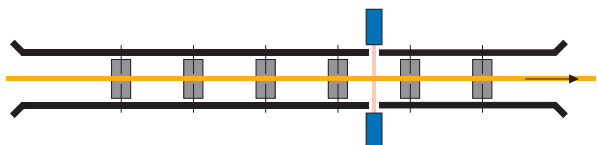


Measurement in the conveyor, sideways transport, exit of rolling mills etc.

The ECOGAUGE can be mounted in many different positions in a rolling mill for bar and pipe.

A few examples are:

- In the conveyor for bar and pipe products
- During sideways transport
- At the exit of the pilger mill
- At the exit of the forging machine
- After the run-out, for final control, sorting etc.



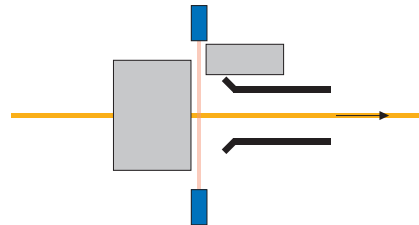
Various, difficult to measure processes and high temperature applications

When the surface is not solid but liquid or flowing and when there are reflections or strands as well as at temperatures up to 2000° C (3632° F), e.g. processes for quartz glass.

For special cases with high levels of grime or high radiant energy large separation distances between the emitter and receiver are available for selection.

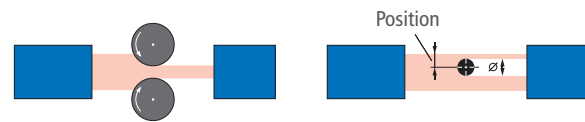
Where access to the product is restricted

Even where machine parts, guides etc. restrict access to the product ECOGAUGE can still be installed. The only condition that has to be fulfilled is that the product is visible over a length of 10 mm (.4 in.). The emitter and receiver can be positioned on tailor-made supports outside the area restricted by the various objects.



For the measurement of gaps or position

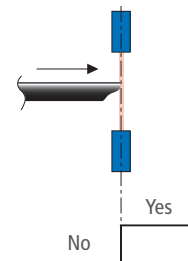
The ECOGAUGE can be applied where a gap or slit instead of a diameter needs to be measured. In addition to diameter information the position of an object within the measuring field can be detected.



Detecting the presence of an object

The measurement signal includes information about the presence of an object in addition to the dimensional and positional data.

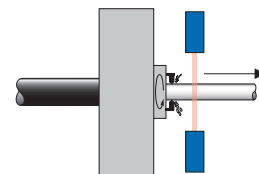
The information can be of general use in the process control or specifically useful for following the progress of material with a further benefit of eliminating the need for other sensors.



For peeling, grinding, polishing etc.

For processes, where large amounts of abrasion, emulsion etc. are present, ECOGAUGE represents an ideal solution.

The air purging assembly is optionally applicable.



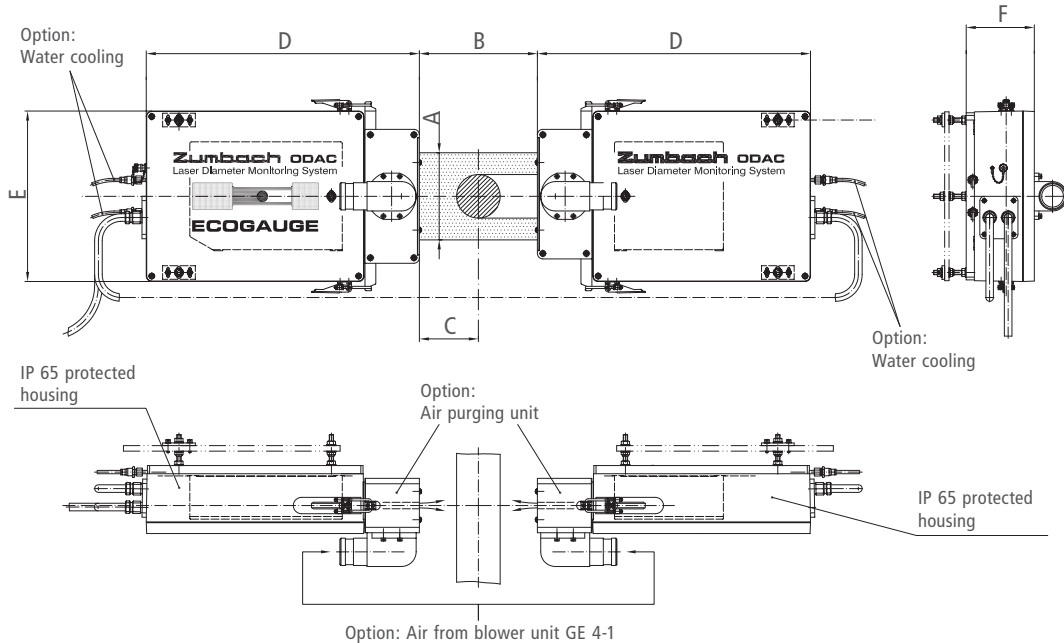
TECHNICAL SPECIFICATIONS

| Measuring Head Model | ODAC® 160 | ODAC® 310 | ODAC® 550 |
|--|--|--|--|
| Measuring field | 160 mm (6.3 in.) | 310 mm (12.2 in.) | 550 mm (21.7 in.) |
| Distance between emitter and measured object | See distance C (below drawing) | | |
| Smallest product diameter | 0.5 mm (.02 in.) | 1 mm (.04 in.) | 1.5 mm (.06 in.) |
| Repeatability * (Averaging time) | +/- 1.0 µm (.00004 in.), 0.1 s +/- 0.5 µm (.00002 in.), 1 s | +/- 4 µm (.00016 in.), 0.1 s +/- 2 µm (.00008 in.), 1 s | +/- 6 µm (.00023 in.), 0.1 s +/- 3 µm (.00012 in.), 1 s |
| Scanning frequency | 1000 scans/s (optional 2000) | | |
| Light source | VLD (Visible Laser Diode) | HeNe laser | |
| Laser class | 2 | | |
| Type of protection | IP 65 | | |
| Power supply | Supplied by the processor (24 VDC) | 115/230 VAC, 50...60 Hz 40 VA | |

* Values within ± 3 Sigma (99.7%)/U₉₅. These data are reached under laboratory conditions. Unstable air layerings in the measuring zone, e.g. by means of ascending heat, may affect these repeatability data.

| Protection System | | |
|---------------------------------------|---|-----------------------------|
| Emitter/receiver housings | Aluminium casting, type of protection IP 65 | Ask for detailed data sheet |
| Temperature inside the housings | Max. 45° C (113° F) | |
| Water cooling (inside the base plate) | Can be connected if necessary | |
| Water | 4-8 bar, max. 10l/min., max. 30° C (86° F) | Ask for detailed data sheet |
| Air rinsing | Optionally fixable with quick locks | |
| Air inlets | Nuzzle, ø 50 mm (1.97 in.) | Ask for detailed data sheet |
| Blower/Filter | Model GE 4-1, 250 W, 200 m³/h | |

| Dimensions | mm | Inches | mm | Inches | mm | Inches | |
|-------------------|----|--------|--------|--------|------|-----------------------------|--------|
| See below drawing | A: | 160 | (6.3) | A: | 310 | (12.2) | |
| | B: | 216 | (8.5) | B: | 632 | (24.9) | |
| | | 466 | (18.4) | | 882 | (34.7) | |
| | | 716 | (28.2) | | 1132 | (44.6) | |
| | C: | B/2 | | C: | B/2 | | |
| | D: | 506 | (20.0) | D: | 729 | (28.7) | |
| | E: | 313 | (12.3) | E: | 600 | (23.6) | |
| | F: | 125 | (4.9) | | F: | 220 | (8.7) |
| | | | | | | Ask for detailed data sheet | |



► For further information, ask for the detailed data sheets.

• Technical specifications are subject to change without notice.



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