

GVA monitoring systems for aeration facilities

Aeration systems with high-performance ELASTOX® membrane air diffusers generally ensure durable lifetime together with high operational reliability without maintenance.

Application

The operation of an aeration system depends on the selected engineering technique and process management of the activation stage. Under unfavourable conditions, chemico-physical or biological laws can lead to increased pressure loss at the air diffuser membranes, due to which the economic efficiency of the system is impaired. Based on a normally applied pressure measurement of the compressors area within a measuring range of 0–1.0 bar, the system pressure is monitored, however, pressure losses at the aeration components cannot be detected.

GVA has succeeded in developing aeration installations that are applied on a global scale and have permanently proved their worth in practice.

Differential pressure measurement

Within the area of the activation basin, the pressure loss at the membrane is determined by differential measurement. For this purpose, the system pressure is measured as the reference value, and the differential pressure is determined by using a water-bubble aeration tube. This differential pressure value represents the pressure loss of the aeration components. The pressure loss depends on the air throughput of each aeration component, a well-defined operation adjustment has to be pre-specified.

Test lance

In case of changes to the air admission state or the pressure conditions, it is necessary to check the air diffusers. If no removable reference air diffusers are applied, this can only be accomplished with great personnel efforts, while interrupting plant operation or after emptying the basin. This is the reason why so-called test lances are applied, which can be taken out of the aeration basin by means of a lifting device.

Flow measurement

Optionally, every desired air admission value can be set by the combined use of the measuring device and the test lances based on flow measurement. This is a cogent requirement if there is no other possibility to set a specified air admission value by means of the compressors. Flow measuring can be performed by means of calibrated Nm³/h flow measurement. The air quantity can be adjusted by a valve according to the test lance applied. If there is no flow measurement for the aeration device, measuring can also be used for control operations or determining the total air quantity.

In addition, it is possible to design the measuring head in a relocatable manner in order to be able to perform checks in several places, e.g. in change areas. In case of relocatable head design, control tasks can be performed in a restricted manner only.



GVA measuring installation: differential pressure measurement – test lance – flow

Differential pressure measurement

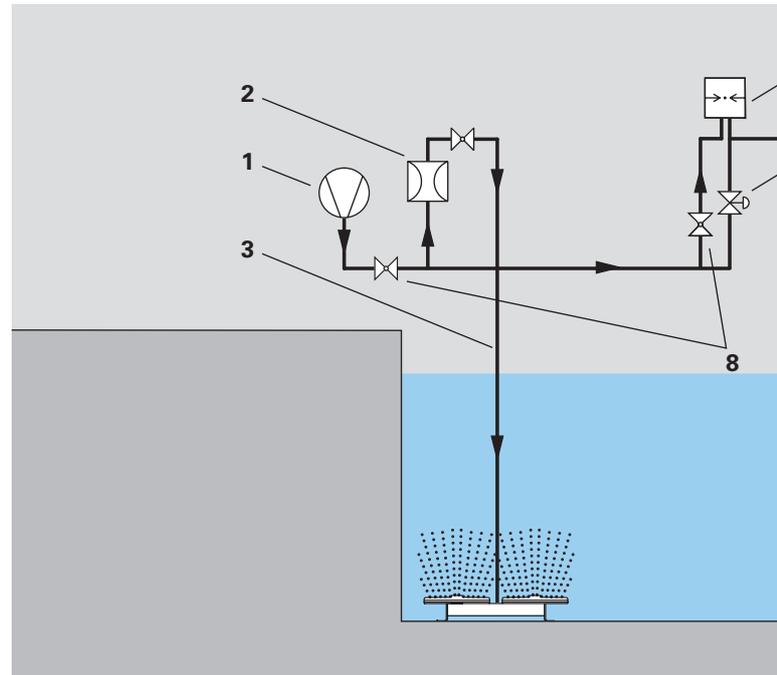
Specifications

Type	PDM235
Measuring range	0–160 mbar
Burst pressure	40 bar
Ambient temperature	-40 to +85 C°
Power supply	11.5 to 45 V DC
Protection degree	IP 65
Output signal	4–20 mA
Measured-value display	LCD

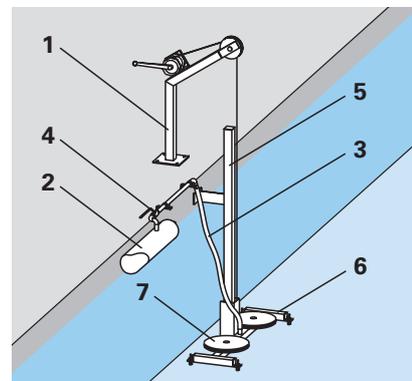
Materials

Differential pressure enclosure	Die-cast
Measuring cell	1.4435
Measuring membrane	1.4404
Measuring cell sealing	FPM-Viton
Standing-type or wall bracket	1.4301
Weather protection roof	GFK
Tube	1.4571
Fixtures	1.4408
Flow measurement	1.4301
Mounting set	1.4571

Flow chart of measuring installation

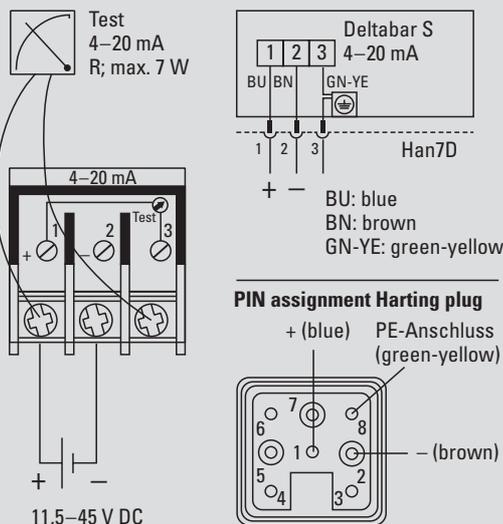


Test lance



- 1 Lifting device with rope winch
- 2 Air feeding tube
- 3 Flexible hose
- 4 Valve
- 5 Guide
- 6 Test grid
- 7 Reference air diffuser

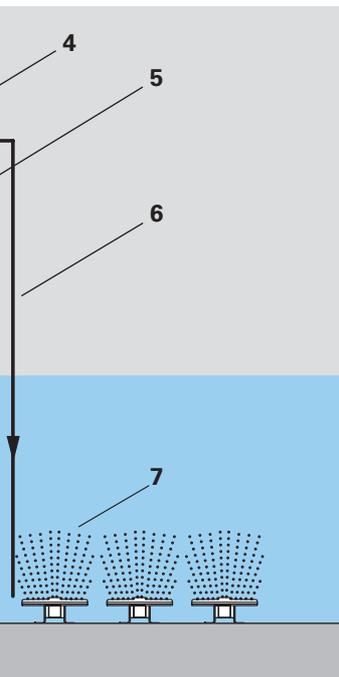
Terminal diagram



Materials of test lance

Connection	1.4301 / 1.4571
Valve	1.4301 / 1.4571
Air feed	reinforced plastic hose
Aeration grid	1.4571
Aeration elements	acc. to aeration installation
Guide	1.4571
Lifting device	1.4301
Rope winch	Alu
Mounting set	1.4571

measurement



- 1 Compressor
- 2 Flow measurement test lance
- 3 Air feed test lance
- 4 Differential pressure transmitter
- 5 Fine adjustment valve with Q measurement
- 6 Water-bubble aeration tube
- 7 Compressed-air aeration
- 8 Globe valve

Flow measurement

Specifications

Power supply	24 V DC
Output	< 5 W
Protection degree	IP 65
Output signal	4–20 mA
Pulse output	Quantity measurement
Measured-value display	LCD (Nm/s or Nm ³ /h)
Interface	V 24 / RS 232
Calibrated measurement:	
■ Nominal range	16
■ Measuring range	0.15–43 Nm ³ /h

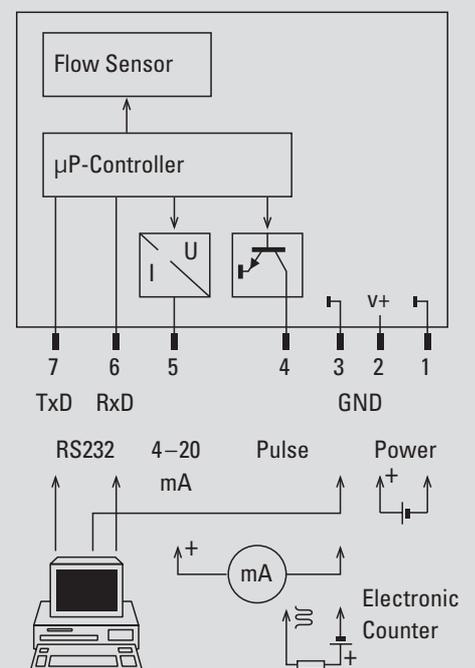
Materials

Calibrated flow measurement	1.4571
Control valve	1.4571
Connecting valve	1.4571
Screwed connection	1.4571

Specifications of test lance

Aeration grid	For holding aeration elements, buoyancy-neutral
Aeration elements	Optionally disk, tube or plate air diffusers
Number of aeration elements	2 pcs (standard) or acc. to customers requests
Guide	Square-shaped tube
Lifting device	Firmly installed with ALU rope winch, 125 kg and VA rope
Air feed	Armoured plastic hose
Connection of tube system	Stainless steel tube with ball valve
Flow measurement	Optionally, for determining air admission

Terminal diagram (optional)



GVA-UPB system – submerged positioning and support system



Mobile purification system for membrane air diffusers



Removable aeration fields which can be taken out of the basin during the operation for maintenance purposes, without having to lower the water level, are economically sensible and can be realized with our GVA-UPB system.

The GVA-UPB system ensures fast and easy maintenance of the aeration grids and fields.

In an easy way of handling from the basin edge, the aeration grid is shifted by a firmly installed guide structure from its fixed position and is released. While lifting and lowering the grid, it slides safely in the guide. By means of an eccentric movement, it is secured on the bottom in a form-fitted way. No additional complicated measures are required for securing it against buoyancy.

Depending on the size of the aeration fields, mobile lifting gears can be used for smaller units. Mobile cranes are required for handling large-size units.

It is recommended, in particular, to fit firmly installed aeration devices with condensate discharge facilities. On the one hand, it is possible to discharge undesired condensate, and on the other, to rinse after the cleaning of the aeration installation with formic acid, so that the residual acid will not detrimentally affect the stainless steel.

The membrane air diffusers are cleaned by atomizing or spraying formic acid with a content of 85 % into the air volume flow. The amount of acid as well as the cleaning cycle depend on the mechanical construction of the aeration installation as well as on the aeration elements to be cleaned. For dosing the acid, injection locations must basically be specified in order to avoid expensive retrofit.

The GVA company places a mobile dosing station at your disposal and, thus, no expensive investment is required. The cleaning works can be carried out by our trained personnel.