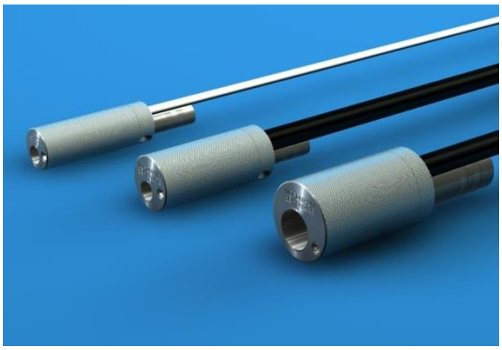
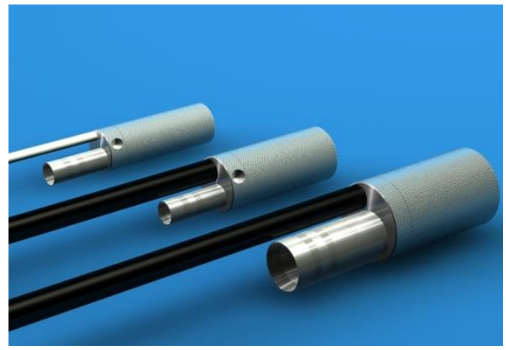
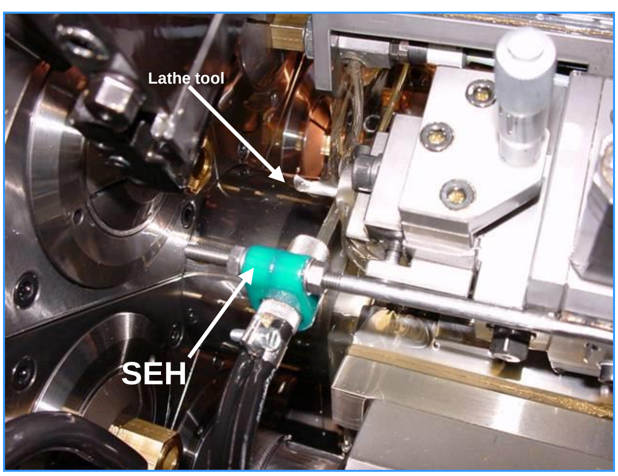
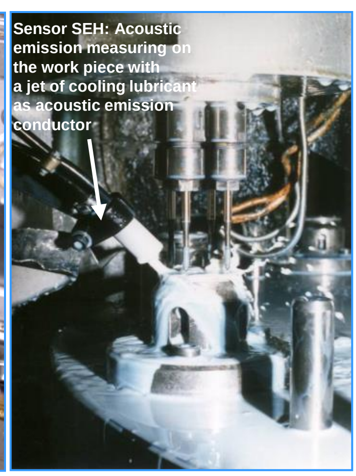
Acoustic Emission Hydrophone SEH









Function:

- Measurement close to the tool or to the workpiece, also on rotating spindles or tools
- Acoustic emission measurement based on a jet of coolant lubricant acting as an acoustic wave conductor

Technical specifications:

Frequency range:	113 (227) kHz - 1MHz
Measuring dynamics:	110dB
Power supply:	via acoustic emission processor SEP (± 15V)
Cable:	coax cable RG174U standard cable length = 5 m

Installation:

The SEH and SEH-Mini models of the acoustic emission hydrophone are delivered with the respective sensor inside a 300 mm long, kink and cut resistant and coolant proof connecting hose. The connector (E) at the hose end is connected to the cooling lubricant supply of the machine.

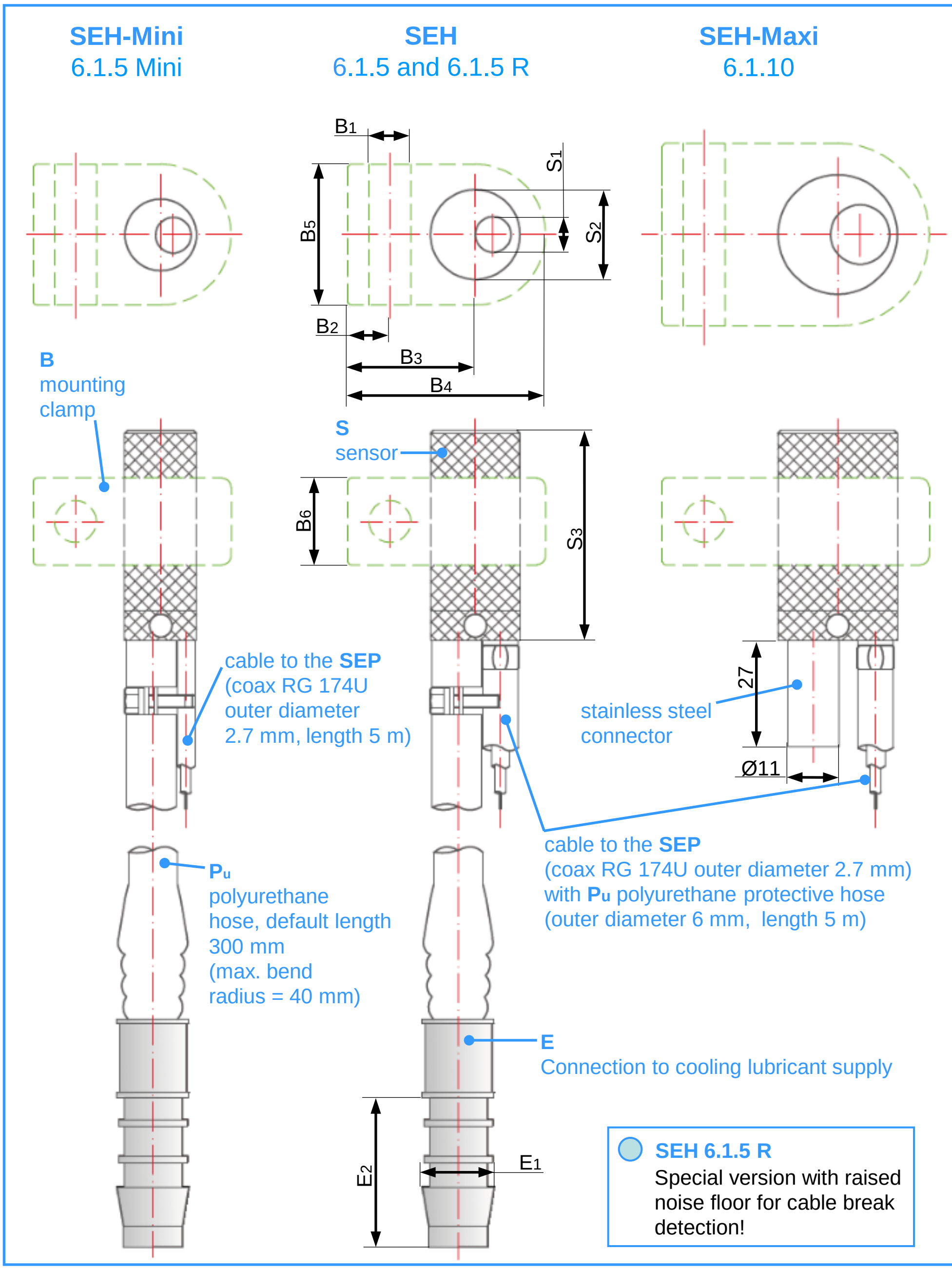
The sensor is normally attached with two polypropylene clamps (B). If there is not enough space for these clamps next to the sensor, it can also be fit into a tube. This tube is then attached to the machine with polypropylene clamps (B).

In order to avoid the interfering transmission of machine noises to the sensor casing, no metallic connections should be used.

When installing the acoustic emission hydrophon, make sure that the liquid measuring jet hits the tool to be monitored or the workpiece being machined, or their carriers, respectively.

The maximum possible length of the measuring jet is determined by the viscosity of the cooling lubricant and the respective flow rate affecting the cohesion of the liquid. The measuring jet must be of continuous cylindrical shape; peripheral roughness due to flow turbulence is allowed. Wide jet distances between tool or workpiece and sensor may be achieved by running the cooling lubricant hose in a straight line in the immediate proximity of the sensor. Usually, the measuring jet should be set to less than 150 mm. (When using a vertical downward jet of cutting oil, which is more viscous than emulsion, it is possible to achieve jets of up to 500 mm.)

Please note: For optimum measuring results, the measuring jet distance between workpiece or tool and sensor should generally be as short as possible.



Models:

SEH — **Mounting clamp** (Stauff LN 314 PP - polypropylene) — **Connection to cooling lubricant**: Polyurethane hose; Hose connection Norma GRS 10-8

Measuring jet	S_1	S_2	S_3	Screw hole	B_1	B_2	B_3	B_4	B_5	B_6	P_u			E_1	E_2
Ø= 5		15	35	Ø= 6.8		7	22	33	23,5	14,5	Length L= 300	Outer Ø= 6.8	Inner Ø= 6	12	10

SEH-Maxi — **Mounting clamp** (Stauff LN 420 PP - polypropylene) — **Connection to cooling lubricant**

via stainless steel connector (outer diameter Ø= 11 mm / length L = 27 mm) The (P_u) polyurethane hose and the hose connection (E) are not included in the scope of supply!

Measuring jet	S_1	S_2	S_3	Screw hole	B_1	B_2	B_3	B_4	B_5	B_6
Ø= 10		20	35	Ø= 6.8		7	26	40	30,5	14,5

SEH-Mini — **Mounting clamp** (Stauff LN 312 PP - polypropylene) — **Connection to cooling lubricant**: Polyurethane hose; Hose connection Norma GRS 10-8

Measuring jet	S_1	S_2	S_3	Srew hole	B_1	B_2	B_3	B_4	B_5	B_6	P_u			E_1	E_2
Ø= 5		12	35	Ø= 6.8		7	22	33	23,5	14,5	Length L= 300	Outer Ø= 6.8	Inner Ø= 6	12	10

All dimensions in [mm]

Oder number:

6 . 1 . 5	SEH
6 . 1 . 5 R	SEH (with raised noise floor for cable break detection)
6 . 1 . 5 Mini	SEH-Mini
6 . 1 . 10	SEH-Maxi

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Flow rate adjustment for measurements on rotating bodies:

The results of measurements on rotating bodies (tool or workpiece) depend on the flow rate of the coolant jet and the peripheral velocity v_U at the location of impact of the cooling lubricant jet (see detail drawing below).

Detail drawing

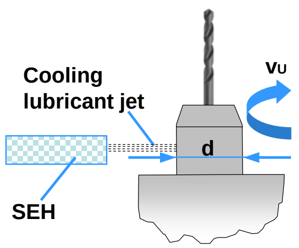


Diagram A shows that it is necessary to maintain a minimum flow rate so that the coupling is not interrupted by the entrained liquid and the rotating air blanket (see solid line).

Lower flow rates dampen the acoustic waves in the point of impact. However, measurements are still possible despite the damping (up to approx. -8 dB) (see dotted lines in Diagram A).

The sensor can be operated at a flow rate of up to 17 l/min (very hard jet). In general, however, the lowest possible flow rate should be selected in order to minimize the impact noise.

The flow rate is adjusted via a regulating cock or a pressure reducing valve. The flow rate is determined using a container of known volume or flow indicators or a manometer. (On the relation of flow rate and pressure see Diagram B.)

Diagram A

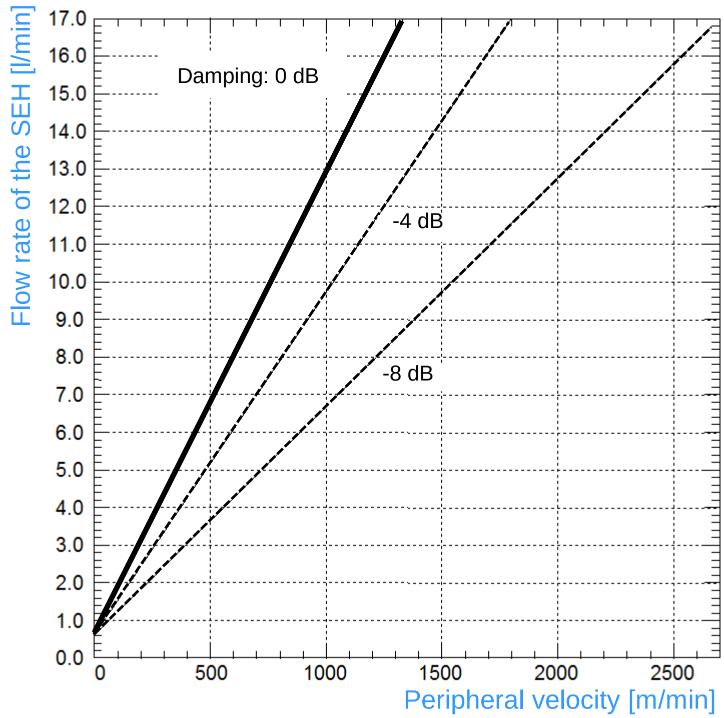
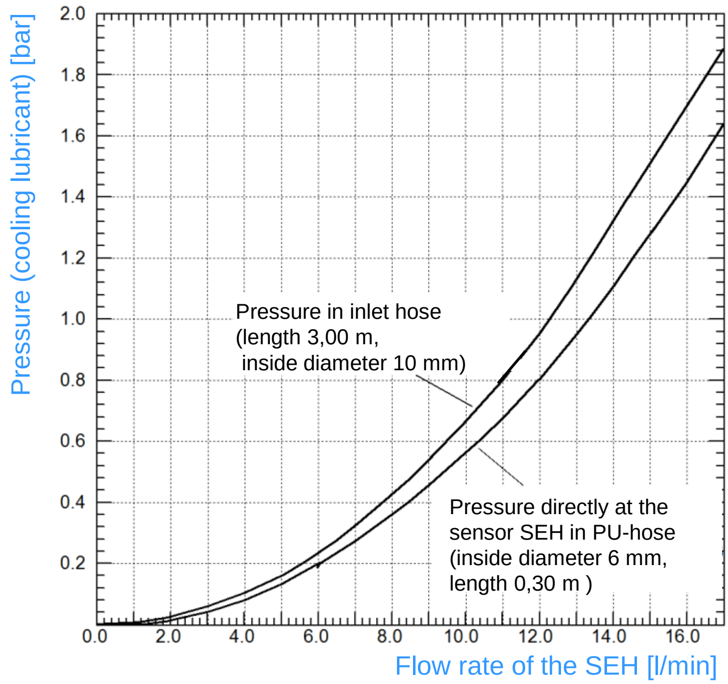


Diagram B



Calculation of the peripheral velocity v_U

$$v_U = \pi \times d \times n$$

v_U: Peripheral velocity [m/min]
π: Circle constant (3.14)
d: Diameter of the rotating workpiece/tool
(measured at the location of impact of the coolant jet) [m]
n: Speed of the tool spindle [1/min]

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