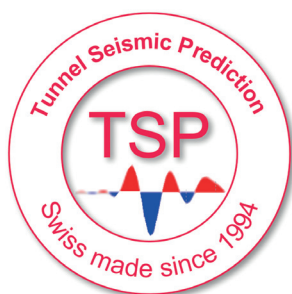
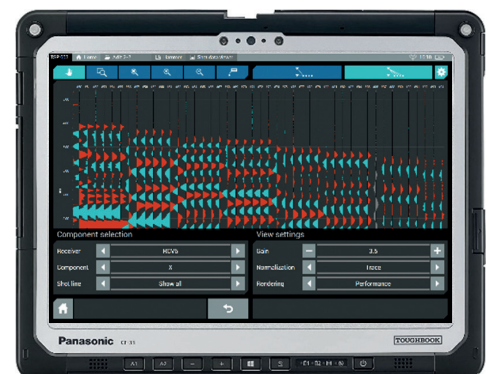




## THE CONTROLLABLE SOURCE FOR ALL DEMANDS IN THE TUNNEL

The Amberg TSP Impact hammer delivers a controlled impact to the ground or a rock surface to generate seismic waves. These waves propagate through the rock mass and are analysed to understand ground properties and to image the structure.

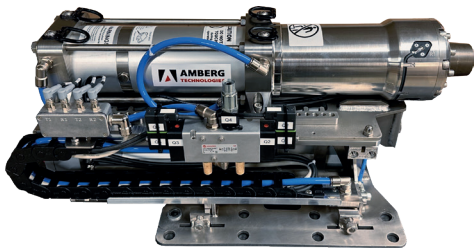
- The pneumatic impact hammer is preferably mounted to a console behind the cutter head of a TBM or to a hydraulic arm of a vehicle.
- It requires the supply of compressed air and electricity.
- After each stroke of a TBM or at regular intervals, it automatically stretches radially against the rock mass, which requires an opening in the shield in the case of a TBM.
- Immediately, striking of 5–10 shots starts and lasts only 2 minutes.
- Amberg TSP Impact includes a trigger mechanism that ultra-accurately synchronises the impact event with the deployed TSP 603 Receiver / Transceiver devices, ensuring precise recording of seismic wave arrival times. This happens through the system's own wireless transmission system.
- The hammer is completely controlled via the Control Unit and wirelessly via a tablet computer running Amberg TSP Ease Acquisition (see right).
- Optionally, the TSP Camera System supports the visual control of the impact hammer, wherever the operator with the tablet is located.



THE SEISMIC IMPACT HAMMER PACKAGE

General Specifications of Seismic Impact Hammer	
Temperature range operat. / storage	0 to +45°C / -10 to +60°C
Protection code operat. / storage	IP 65

Seismic Impact Hammer	
Consisting of two parts	Base (lower) and Hammer (upper)
Dimension	65 x 30 x 27 cm (L x W x H)
Weight	28 kg (base), 28 kg (hammer part)
Required supply	7 bar compr. air, mains 220 V
Impact energy	130 J / strike
Max. Retaining force	4.7 kN
Max. Stroke	30 cm
Works in all positions. Max. 15 strikes / min. / Normally 7 strikes / min.	



Protective Cover of Seismic Impact Hammer	
Material	3 mm steel sheet
Dimension	70 x 31 x 28 cm (L x W x H))
Weight	16.8 kg



Control Cable	
Length	10 m
18-pin cable with two 19-pin round connectors (male / female Amphenol type)	



Control Unit	
Dimension (w / o WiFi antennas)	40 x 20 x 12 cm (L x W x H)
Base material of housing with door	Sheet steel
Weight	6.5 kg
incl. programmable logic controller, DC / DC converter, wireless trigger PCB	
Attachments : 3x push buttons, 1x emergency stop button, 3x LED, 2x WiFi antenna, 1x power supply socket, 1x 19-pin female socket	



External Emergency Stop	
External aluminium housing	60 x 28 x 56 mm
Switch at housing	Red-head switch 2 x 3 contacts
Cable (3 twisted-pair wires)	2 m long w / 8-pin plug (Amphenol type)



Power Supply	
AC In / / DC Out	200-240V 50 / 60Hz // +24V 5A
Cable In	2-pin type F plug (CEE 7 / 4)
Cable Out	3-pin Neutrik plug
Protection code operat. / storage	IP 67 / IP67



Amberg TSP Ease Acquisition Software	
Min. required application	Amberg TSP Ease Acquisition 2.2
Additional feature flag	Impact Hammer