

## Case Study

### Best soil samples through the world's most mobile core drilling machine Stuersond goes deep with AGIROSSI and Temposonics

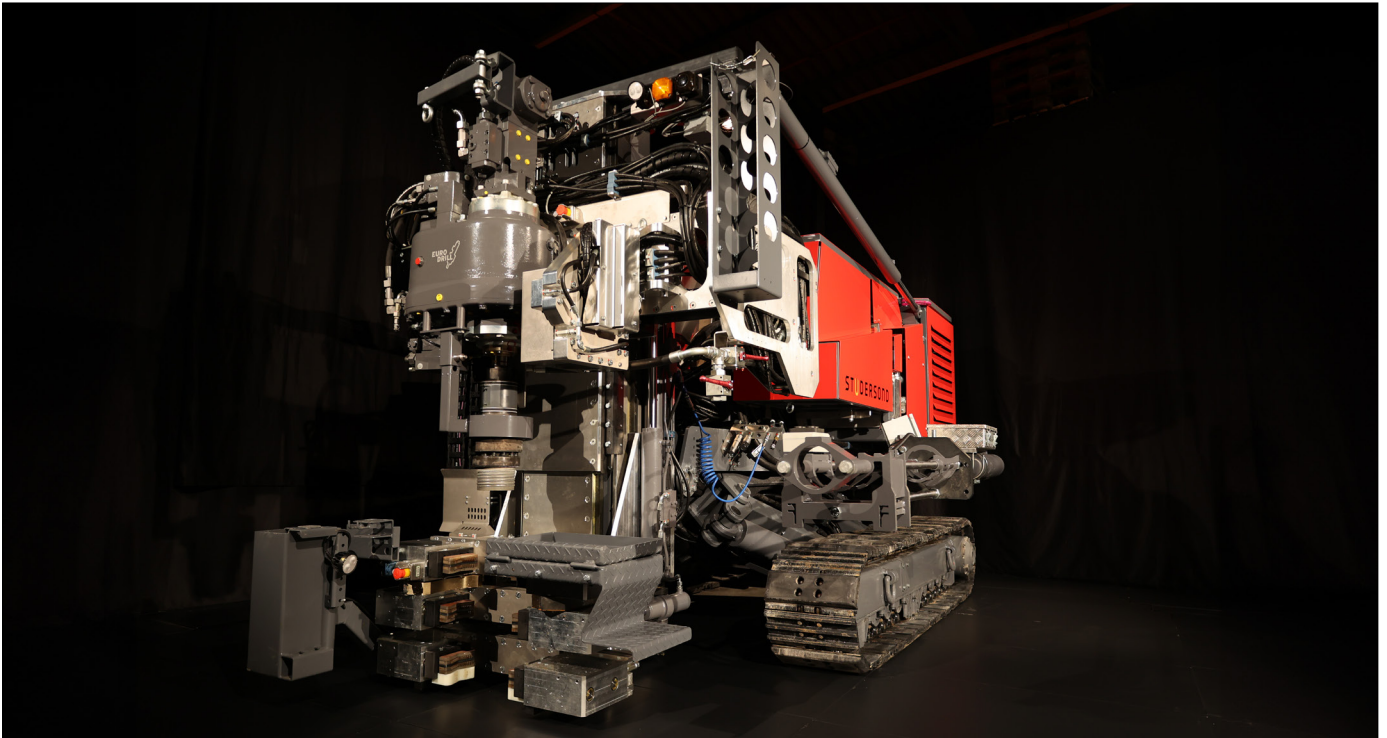


Fig. 1: Studersond TL 18 geo

Soil samples are needed for many different projects. In research, they help to gain new insights into the nature of the subsoil, as well as into times long past. Such samples are also necessary for private or industrial construction companies in order to exclude contamination of the soil to be built on. Conventional core drilling machines are bulky and take up a lot of valuable time during set-up and dismantling. Especially when drilling on slopes, it is often necessary to build a ramp to compensate so that the equipment stands straight. Studersond, a well-known Swiss company with 58 years of experience in soil sampling, knows all kinds of such challenges. Together with its subsidiary Stumatec, Studersond engineers have developed a new "TL18 geo" drilling machine. Great importance was attached to the use of reliable and robust technology, such as cylinders with integrated magnetostrictive position sensors. In the following article, Mr. Daniel Studer, Managing Director of Studersond, and Mr. Rossano Vincenti, Managing Director of AGIROSSI GmbH hydraulic cylinder manufacturer from Waldlaubersheim in Rheinland-Pfalz, Germany,

explain the essential role of the installed hydraulic cylinders with integrated Temposonics® position sensors.

"We know exactly what is needed for earth drilling because we are our own customers," says Mr. Daniel Studer. In 1965, the brothers Arved, René and Eugen Studer carried out the first pile driving tests by hand to finance their studies, thus laying the foundation for the Studersond company. The first success was the development of their device for automatic recording of pile-driving diagrams in the field. Over time, Studersond developed many different machines and patents that revolutionized pile driving. Now, the next giant leap comes with the TL18 geo drilling machine from 2021, designed together with Stumatec. It's a mobile rotary pile core drill. It is only two meters high when retracted, can be transported to the site on a truck, and can be moved extremely agilely due to its nature as a crawler. One of the special features of the TL18 geo is that it can be used not only on rough terrain, but also on slopes up to 35 degrees. With the help

of several hydraulic cylinders from AGIROSSI GmbH with built-in Temposonics® MH sensors, a self-designed chassis enables the extensive maneuverability. “The chassis was developed by ourselves and is therefore unique. Here, it is particularly important for us to have partners at our side whom we can trust and who can support us with their extensive application know-how. In addition, the hydraulic cylinders from AGIROSSI are excellent and, with the built-in Temposonics® displacement measurement systems, the optimum product for our drilling machine. Without these components, we would not have been able to ensure the machine’s superior agility,” Studer explains.

### At 15,000 Newton meter into the depths for samples of the highest quality

Despite its compactness, the TL18 geo is capable of drilling to depths of up to 100 meters. The type of subsoil does not matter. With the help of several AGIROSSI hydraulic cylinders, the machine drills to depths of 15,000 Nm. Combining the cylinders with Temposonics® MH sensors ensures that the machine always applies the optimum force for the particular subsoil. The displacement transducer continuously measures the position of the cylinder stroke so that it can be constantly determined how fast the drill passes through the layers of earth. The precise speed adjustments allows to protect both the machine and the machine components optimally. With a double core barrel, Studer’s machine is able to collect high-quality samples. When drilling in loose rock, the core catcher with retention crown is placed in the initial tube with a carbide crown and then attached to the hydraulic cylinder. This generates the power for the TL18 geo to drill into the ground without any problems. The hydraulic cylinder then detaches from the two tubes and moves fully automatically to the top right. Now the core catcher is manually connected to another hydraulic cylinder, which pulls it out of the ground together with the obtained sample. A device is attached to the side of the TL18 geo, which slowly and carefully pushes the sample out of the core catcher with the help of an AGIROSSI hydraulic cylinder with built-in Temposonics® MH sensor. The MH sensor locates the position of the hydraulic cylinder, ensuring a controlled sample collection process. With this technology, soil samples of incomparable quality can be collected.

The force of AGIROSSI’s hydraulic cylinders exposes all components of the drilling machine to enormous shocks and vibrations. In addition, the environments and conditions in which the TL18 geo operates are usually dirty and dusty. The magnetostrictive displacement sensors used are extremely robust and can withstand even the shocks of core drilling. Due to the complete integration in the cylinder, they are protected from any dust and dirt.

### Control of many complex processes

“The biggest challenge was to combine many known functions in one machine. We have already designed several systems, but each of them has only one specific task. The TL18 geo combines the best of all our systems. That was ultimately the most complex part of the design: getting all these processes under control. To accomplish this, the reliable displacement measurement systems from Temposonics are essential,” says Mr. Studer. The installed MH sensors with CAN-

bus output ensure problem-free motion sequences and monitor the position of the hydraulic cylinders with a sub-millimeter precision. This ensures, among other things, that collisions are avoided in the various functions and processes running simultaneously.

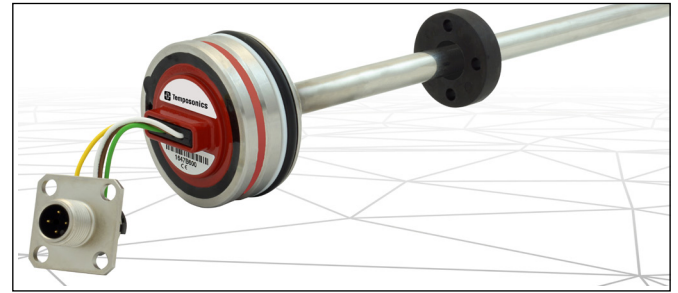


Fig. 2: Temposonics® MH-Series MH sensor

### Trusted partners at your side

When designing such a complex machine, reliable business partners are enormously important. AGIROSSI, as experts in the field of hydraulic cylinders, designed and custom-made them specifically for the TL18 geo. “Mr. Vincenti and his team were involved in the design phase. They always helped us with their know-how and designed the hydraulic cylinders according to our ideas. The years of good cooperation with AGIROSSI have always been free of conflict and at equal footing. It will continue to be like that in the future,” explains Mr. Studer. “The cooperation with Studer has been enormously good for a long time. The requirements vary all the time. So, no project is the same as another and it is interesting to accompany them on these projects. We have been working successfully with Temposonics for many years and appreciate the excellent cooperation with the team. It is extraordinary what they contribute in terms of experience and know-how. When the market demanded so-called smart hydraulic cylinders,



Abb. 3: The TL18 geo manages steep slopes without an auxiliary ramp

we had Temposonics on our side and have been installing the sensors in our hydraulic cylinders ever since,” says Mr. Vincenti about the exceptionally good cooperation. Also in this project, the competent Temposonics team was able to overcome challenges within the application.

### Future projects

A future project is to build a smaller version of the already existing TL18 geo. “The drawings and design are ready. We have already received the cylinders from AGIROSSI with integrated Temposonics® sensors. Now we just have to build the machines,” Mr. Studer tells us. “As mentioned at the beginning, the TL18 geo has been developed from our own needs. The smaller version will be cheaper and more compact, making it accessible to a wider audience.”



Fig. 4: Prototype of from the Studersond Group

### Weblinks

<https://www.temposonics.com/Home>

<https://agirossi.de/en/>

<https://www.studersond.ch/de/>

<https://www.stumatec.com/en/tl18-geo>

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**temposonics.com**

#### UNITED STATES

Temposonics, LLC  
Phone: +1 919 677-0100  
E-Mail: [info.us@temposonics.com](mailto:info.us@temposonics.com)

#### GERMANY

Temposonics GmbH & Co. KG  
Phone: +49 2351 9587-0  
E-Mail: [info.de@temposonics.com](mailto:info.de@temposonics.com)

#### ITALY

Branch Office  
Phone: +39 030 988 3819  
E-Mail: [info.it@temposonics.com](mailto:info.it@temposonics.com)

#### FRANCE

Branch Office  
Phone: +33 614 060 728  
E-Mail: [info.fr@temposonics.com](mailto:info.fr@temposonics.com)

#### UK

Branch Office  
Phone: +44 79 21 83 05 86  
E-Mail: [info.uk@temposonics.com](mailto:info.uk@temposonics.com)

#### SCANDINAVIA

Branch Office  
Phone: +46 70 29 91 281  
E-mail: [info.sca@temposonics.com](mailto:info.sca@temposonics.com)

#### CHINA

Branch Office  
Phone: +86 21 3405 7850  
E-Mail: [info.cn@temposonics.com](mailto:info.cn@temposonics.com)

#### JAPAN

Branch Office  
Phone: +81 3 6416 1063  
E-Mail: [info.jp@temposonics.com](mailto:info.jp@temposonics.com)