

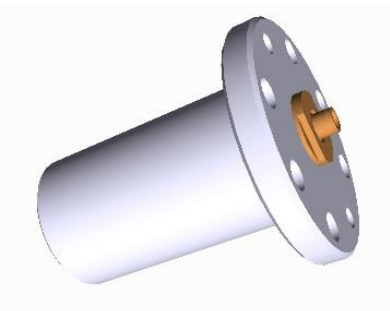
## PT06-3M60 TBM sensor success story



Pondus Instrument AB is a Swedish based company specialized in design & development of pressure measurement devices for demanding applications. Some examples of applications where Pondus are active; heavy-duty pressure sensors made for Tunneling production for subways, trains, motorway etc. Water and Waste Water, Marine market, Sanitary pressure sensors for Food- & Life Science- industry,

This success story started on a customer meeting with Pondus and their distribution partner who visited a big tunnel boring machine producer. The customer complains on very poor reliability and life time on their pressure sensor and their current supplier was not so interested trying to solve their problems.

This meeting was the starting point for a fantastic success and a fruitful cooperation with the TBM customer. The client gave a very clear picture of their need and their expectation for an optimal TBM Pressure Sensor. After several technical meetings the specification was ready. Next step, based on our experience of pressure sensors, was to develop an optimal TBM Pressure Sensor.



### Short list Demand Specification TBM pressure sensor.

- 10 times longer life time than today.
- High sensitivity for Point Pressure detection.
- Water tight IP68 and vibration resistance.
- Different mechanical design to fit different TBM machines.
- Diaphragm must withstand extremely abrasive media.
- Autozero function for maintenance.
- Special models for Slurry Pressure

The challenge was to fulfil all different demands and at the same time the product cost must be kept on a reasonable level. After 10-15 months of product development, field tests and fine tuning of the design, the product was ready and released.

The result after introduction late 2012 has been a tremendous success. Pondus TBM pressure sensor surpassed all demands with big margin. Until today more than 3000 pressure sensors are in use measuring Earth Pressure on TBM's who's boring for new Subways, Rail tunnels, Electrical tunnels, Motorways etc. Currently five different TBM producers has standardized with Pondus TBM pressure sensor PT06-3M60.

Long life time, advanced measurement technology and flexible mechanical design are the main factors for the fantastic success.

In September 2017 Pondus releases generation 2 PT06RS-3Mx60 this sensor follows up generation 1 with following new features.

- Improved point pressure detection
- Four additional different mechanical dimensions can be ordered
- Digital electronic
- Digital output for temperature reading
- Re-ranging of pressure range
- Autozero functions direct on sensor
- Modbus RTU RS485 protocol
- PC configuration for settings of the transmitter.

## Technical background Earth Pressure Balance:

TBM (Tunnel Boring Machine) is heavy duty machine for production of rail tunnels, subways, electrical tunnel. Pressure sensors are mounted in the front of the shield and one in the screw conveyor these are used for tuning the *Earth Pressure balance*.

The principle of Earth Pressure Balance (EPB) is that the excavated soil itself is used to provide continuous support to the tunnel face by balancing earth pressure against the forward pressure of the machine.

A screw conveyor transports the material from the shield to a belt conveyor. The interaction between the screw conveyor's and the TBM's advance rate ensure that soil paste can be controlled precisely. The balance in the excavation chamber is continuously monitored using *Earth Pressure Sensors*. In this way, the TBM operator can control tunneling parameters.

