

INSPIRING TRENCHLESS TECHNOLOGIES



PIT  
BURST  
DRILL

GRUNDO MAT

RAM  
CRACK  
BORE

## **NODIG-SYSTEMS – TRENCHLESS AND INNOVATIVE**

Overview of products and methods





## COULD YOU BE PASSIONATE FOR SOMETHING YOU CAN'T SEE? WE ARE

TRACTO-TECHNIK were founded in 1962. In the early 70ties the family business specialised in trenchless installation technologies (Nodig systems) as well as in pipe fabrication and has consequently developed these divisions. The GRUNDOMAT soil displacement hammer have made TT a world market leader.

TT has 500 employees worldwide and exports to more than 70 countries. 5 manufacturing plants, sister companies in Switzerland, Great Britain, France, Australia and the US plus a dense worldwide sales & service partners' network ensure quick support and accessibility of services. TT owns more than 350 patents and have received numerous awards for innovations; among others the TOP 100 and the Axia Award.

### **THE STORY OF THE MOLE**

When entering the trenchless technology market in 1970 the company founder Dipl.-Ing. Paul Schmidt started his search for a symbol with great force of expression. The mole quickly sprang to mind - an animal known as clever, reliable and hard-working.

Sepp Arnemann, a popular cartoonist, designed the trademark. The mole started a triumphal parade around the globe and is very popular to date. It has an excellent reputation and enjoys the business confidence of the customers. 91% of the respondents in this trade are familiar with the mole.





## THE TRENCHLESS MARKET

The „moling technology” is widely-used in the civil engineering branch. Its share compared to open trenching is ever increasing because the underground installation and renewal of supply and disposal pipes bears major technical and economical advantages as excavation and re-instatement work are almost omitted and construction times are short.

These advantages show especially in the production of property service connections and when crossing highly frequented traffic ways.

## PRODUCT VARIETY

to reach the target without trenches:

- GRUNDOMAT – Soil displacement hammers
- GRUNDORAM – Horizontal rammers
- GRUNDOFIT – Fluid-assisted mini drill rigs
- GRUNDODRILL – Fluid-assisted HDD rigs
- GRUNDOBURST – Static pipe bursting systems
- GRUNDOCRACK – Dynamic pipe bursting systems
- GRUNDOBORE – Auger boring units



PROPERTY  
CONNECTION



AIMING  
ACCURACY

# GRUNDOMAT

## The crowning glory of soil displacement hammers

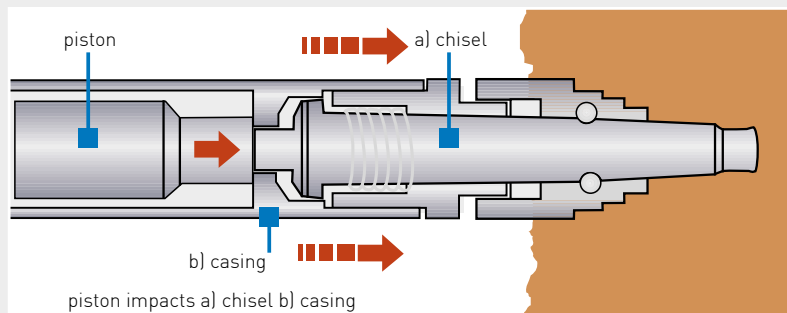
### THE METHOD

The pneumatically driven hammers work according to the soil displacement method. When moving forward the spoil is displaced into the surrounding soil. That way a channel is produced into which socketless short or long pipes up to OD 160 made of plastic (PE, PVC or PE-X) or cables can be pulled in. Depending on the type of soil, lengths up to 25 m can either be pulled in successively or later on. A compressor with 6 - 7 bar operating pressure is required for this. Exact alignment of the machine with the target is necessary for a high aiming accuracy. To achieve this, the decisive factor is the 2-stroke principle.

### THE FUNCTION

With the proven 2-stroke principle the piston initially strikes the multi-cutter cone which advances in order to produce the bore hole and to destroy any possible obstacles. The casing is imposed with the second strike and pulled in with the pipes attached. Peak resistance and casing friction are separated and alternately easier to overcome. This makes the GRUNDOMAT work dead on target even in stony grounds.

### THE 2-STROKE PRINCIPLE: A TRACTO-TECHNIK CONCEPT



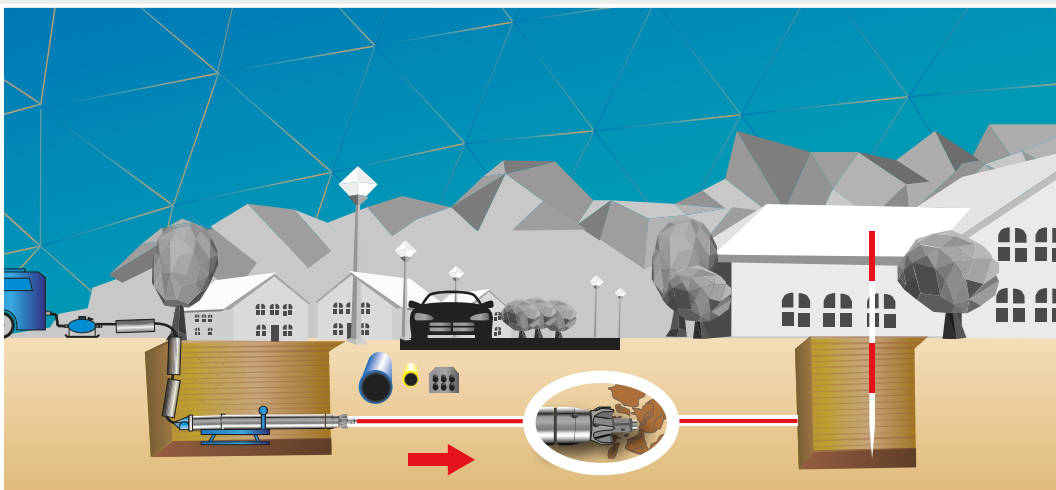
### THE ADVANTAGES

- 2-stroke-principle for high aiming accuracy
- with stepped head or crown head for high penetration power
- 2-gear control stud + reverse gear for optimal adaption to the soil and high application safety
- simple control stud switch over
- premium steel quality - additionally treated - low wear and tear
- partially grooved casing for better grip
- detectable for highly sensitive applications
- well sealed for minimal air consumption
- easy to maintain
- safety pack, e. g steel rope insulator for additional operator safety
- practical accessories
- fast spare parts supply
- training courses





## APPLICATION



To install property service connections for gas, water, sewage, power and broadband (FTTH) the soil displacement hammer can be started directly from the inside of a built-

ding. A head hole in front of the house wall is no longer necessary. This makes the application even more economical and the front garden remains untouched.

### APPLICATION RANGE

Property service connections

Short undercrossings

Piling for foundations or signposts

Installation of short ground heat collectors

Pipe ramming from model 130

Pipe bursting from model 95

### DIMENSIONS depending on model

Bore diameter: 45–180 mm

Length: 875–2,280 mm

Weight: 8–260 kg

Air consumption: 0.35–4.5 m<sup>3</sup>

Pipe Ø: 40–160 mm



POSITIONAL  
ACCURACY



ROBUST  
DESIGN

# GRUNDORAM

TRACTO-TECHNIK's strongest force

## THE METHOD

GRUNDORAM horizontal rammers are driven by compressed air, thus overcoming starting resistance easier after downtimes. Aiming accuracy is ensured because they are penetrating different soil formations instead of displacing obstacles as a whole into the surrounding soil layers. The soil is being picked up by the open steel pipe in the front and after installation water and compressed air can be used to empty the pipe.

## THE FUNCTION

The air driven piston inside the machine body strikes against the ramming head. The kinetic impact energy which is released that way enables maximum advancing of the pipe string due to the optimal force transmission via the cones.

As the constant loads affecting the machine require maximum product quality, the one-piece casing (head and casing are one part) is made out of a solid block which is galvanized. The piston is subject to an elaborate hardening process. A tight sealing minimises air consumption. Thus GRUNDORAM stands for durability and reliability.

## THE ADVANTAGES

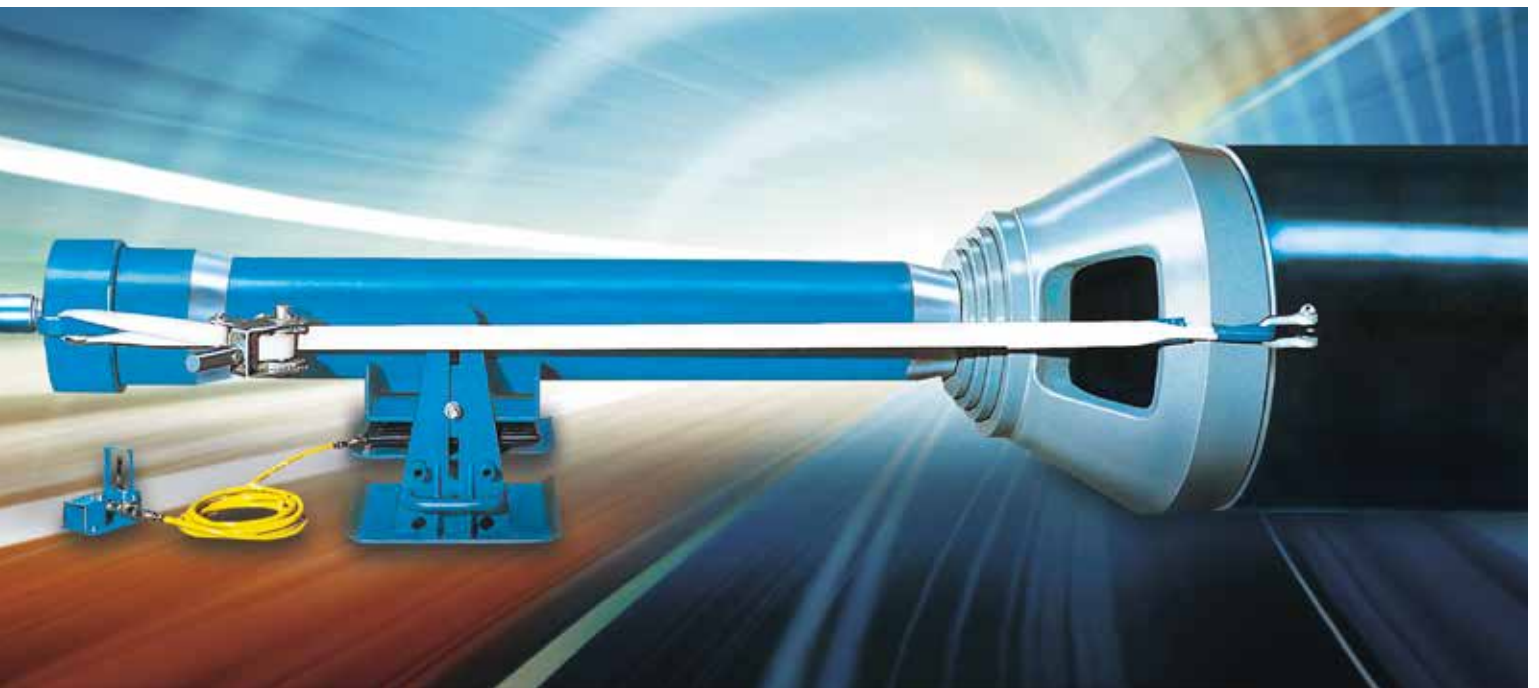
- robust
- resilient
- reliable

## APPLICATION

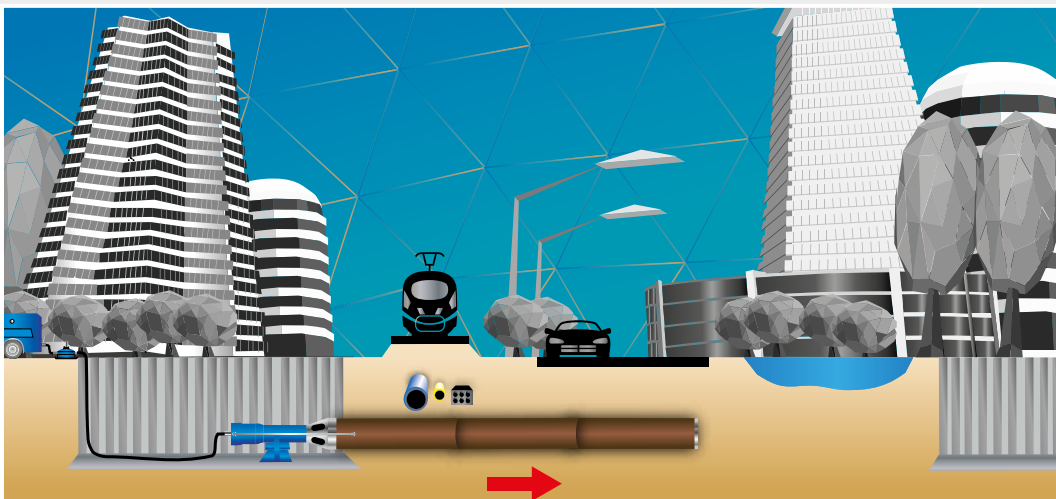
Using the steel pipe ramming method with GRUNDORAM railway tracks, streets, buildings and rivers up to a length of 80m can be undercrossed.

The TT rammers with a thrust performance of up to 40,000 Nm can be used to ram in steel pipes (up to a diameter of 4000 mm) in soil classes 1 – 5 (partly even class 6 – easily soluble rock) without any pressing abutments.

The steel pipe ramming technique is suitable for installing longitudinally or spirally welded pipes, seamless pipes and pipes with insulation protection as product pipes, e. g. in pipeline construction, or as casing pipes for supply and drainage pipe bundles. The rammers are also used horizontally for constructing underpasses, small outlets, pipe roofs for tunnel structures and for supporting HDD bores (HDD Assist). Vertical applications are foundations, sheet piling or well drilling.



## APPLICATION



### APPLICATION RANGE

Pipeline construction, crossings

Installation of steel protection pipes

Pipe roofs, railway underpasses, outlets

Laying of foundations, tree relocation

HDD Assist, ramming of sheet piles

### DIMENSIONS depending on model

Machine diameter: 95–800 mm

Length: 946–4,400 mm

Weight: 59–11,500 kg

Air consumption: 1.2–100 m<sup>3</sup>



EASY  
HANDLING



CONFINED  
SPACES

# GRUNDOPIT

minimally invasiv bores

## THE METHOD

GRUNDOPIT is an easy to handle mini drill rig. Depending on the purpose of the bore, the diameter of the pipe, the type of soil and the level of difficulty you, can choose among a Power, Manhole or Keyhole model.

## THE FUNCTION

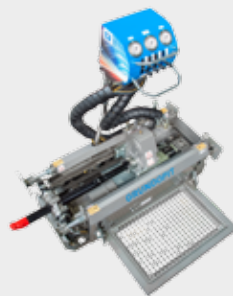
- can also be used with water only as drilling fluid
- can be disassembled in three parts thus applicable from out of the building without core drill, i.e. for FTTB, gas service connections
- with pneumatically driven hammer bore head assembly is safely applicable in alternating soils. If the hammer bore head meets with resistance (larger rock inclusions, solid rock, rubble deposits or brickwork), the hammer effect is activated automatically.
- the complete system with hydraulic power unit and mixing unit MA09 can be placed on a small trailer for safe transportation.
- especially suitable for installing property service connections

## THE ADVANTAGES PIT<sup>6V+S</sup>

- hammer bore head for alternating soils
- steerable bores
- dismountable
- portable
- applicable from out of the building
- quick, clean and economic execution
- excellent performance data
- stable construction
- high stability

## THE ADVANTAGES PIT<sup>K</sup>

- hardly any civil engineering works, gentle construction
- for property service connections from the keyhole into the building
- for installing charging stations for E-mobility
- assembly of the fittings above surface
- for controlled bores up to 25 m



GRUNDOPIT<sup>6V</sup>  
for bores out of a  
construction pit or  
the basement



GRUNDOPIT<sup>S</sup>  
for bores out of a  
manhole

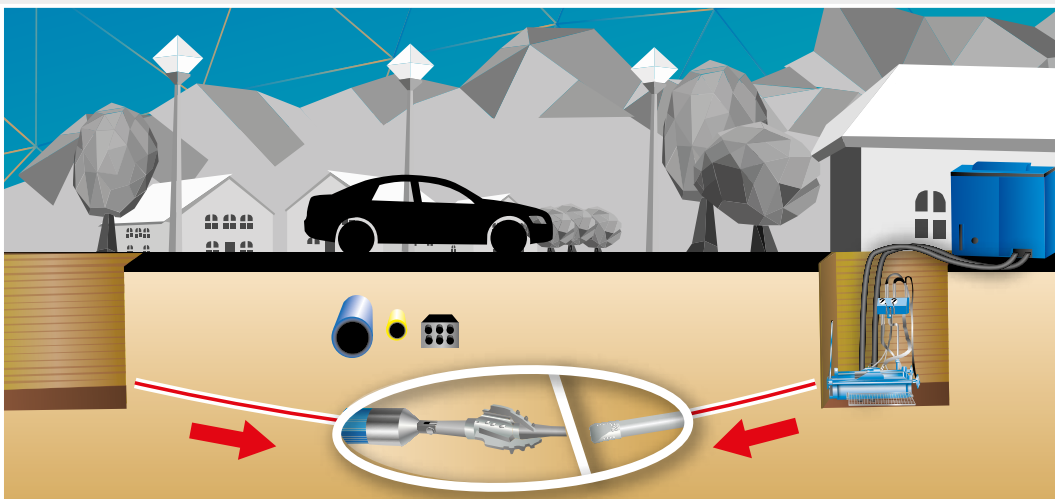


GRUNDOPIT<sup>K</sup>  
for bores out of a  
circular bore hole  
(Keyhole)





## APPLICATION



- for controlled and steerable bores
- for confined spaces with high precision requirements
- property service connections underneath staircases, walls, slopes etc. where the Grundomat cannot be applied
- up to 100 m bore length
- for bores right into the building
- for bores from a keyhole  $\varnothing$  650 mm from manholes  $\geq \varnothing$  1 m (GRUNDOPIT<sup>®</sup>)
- quick, clean and economic execution

### APPLICATION RANGE

Property service connections

Data, supply and drainage lines

Bores right into the building

Bores from a keyhole  $\geq \varnothing$  650 mm

Bores from manholes  $\geq \varnothing$  1 m

### DIMENSIONS depending on model

Length: 430–2,800 mm

Width: 480–930 mm

Height: 450–480 mm

Weight: 250–650 kg

Pipe  $\varnothing$ : 63–200 mm



LOW  
CONSUMPTION



LONG  
LIFE CYCLE

# GRUNDODRILL

intelligent and powerful

## THE METHOD

HDD pipe installation is divided into the following working steps:

- establishing a controlled pilot bore
- upsizing the bore hole to the required diameter
- pulling back the drill rods and simultaneously pulling in the new pipe

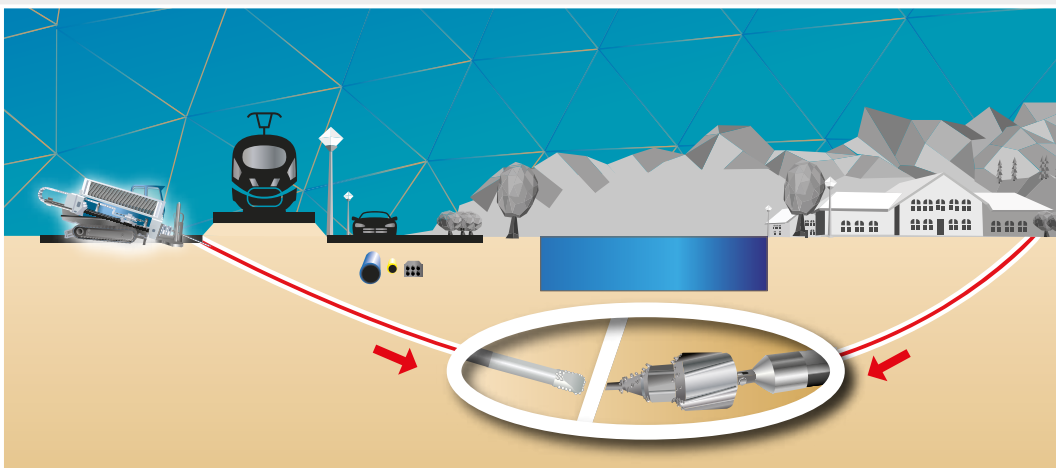
The drilling fluid (water /Bentonite) plays an important part in successful installation. It helps to extract the soil, transports the spoil to the outside and provides a supportive pipe gliding quality.

## THE ADVANTAGES

- flexibly steerable and universally applicable (in all types of soil)
- suitable for bores through rock
- bore data display and log acc. to the latest standards
- tensile load display and log in combination with GRUNDODOLOG tensile load measuring device
- quick diagnosis with telemetric data transfer
- spacious and pivoting cabin with all-around view, comfortable ergonomic seat, multifunctional joystick control, function control via LCD display
- efficient state-of-the art engine technology
- load-sensing hydraulics
- excellent performance data (thrust, pullback, torque)
- high stability due to up-to-date undercarriage
- space-saving design



## APPLICATION



The application range includes several challenging projects such as gas, district heating, supply of drinking water, installing sewage pressure pipelines, cable protection pipes for the supply of broadband internet as well as telecommunication, traffic management

systems, emergency call pillars, low-, medium- and high voltage cables, fibre optic cables, parallel installations, crossings, crossing under waters and other traffic ways, also in rocky soil.

### APPLICATION RANGE

Undercrossings

Parallel bores

Installation of protection pipes

Bores through rock

### DIMENSIONS depending on model

Length: 3,500–7,300 mm

Width: 1,200–2,530 mm

Height: 1,860–2,900 mm

Weight: 2,140–19,000 kg

Max. engine output: 28–224 kW





EASY  
HANDLING



PIPE  
RENEWAL

# GRUNDOBURST

## Pipe renewal at its best

### THE METHOD

For the past 30 years pipe bursting has been a worldwide approved method for the renewal of pressure and gradient pipes.

In process, so the old pipe is replaced by a new pipe of equal or larger diameter. From out of a machine pit lengths of up to 150 m can be achieved in both directions.

The special features are the QuickLock bursting rods which are not screwed together but simply and firmly connected with a click-shut coupling. This makes handling on site much easier. Also slight bends can be driven with these bursting rods.

### THE FUNCTION

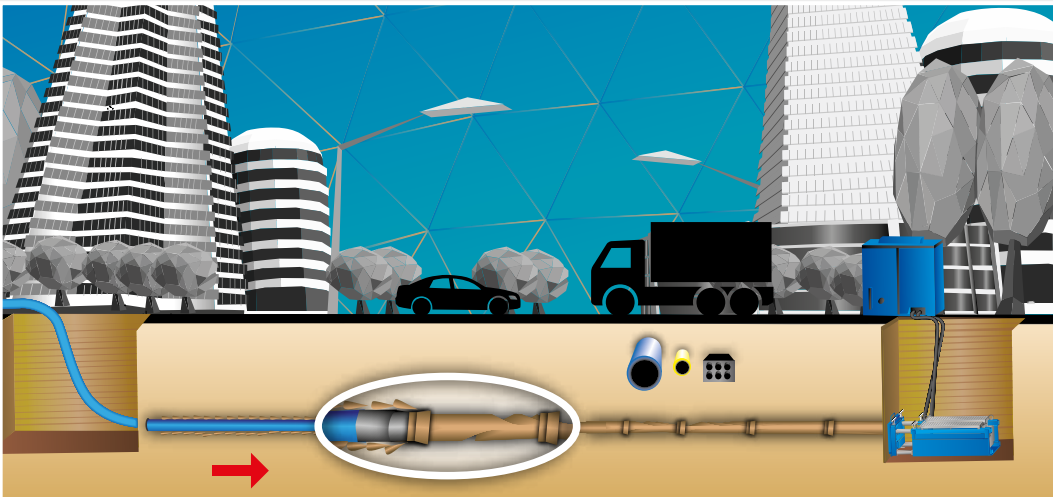
- by means of the powerful and rigid GRUNDOBURST pulling rigs damaged pipes up to Ø 1,200 mm (circular and oval profiles) can be renewed without trenches.
- at first the pulling rig pushes the bursting rods through the old pipe. After the cutting tool and the new pipe have been attached, pipe pulling starts
- the machines provide a pulling force of 40 t to 250 t

### THE ADVANTAGES

- applicable for almost all types of damages and old pipe materials
- bursting and cutting of old pipes made of stoneware, concrete, PVC, PE, cast iron, ductile cast iron, AC, GRP, steel
- new pipes made of PE, PP, stoneware, ductile cast iron, GRP, steel can be pulled in
- a long service life of 80 - 100 years for the new pipe
- diameters up to ND 1200
- replacement lengths up to 300 m.
- upsizing of the old pipe by up to 1 - 2 nominal widths
- simple and safe QuickLock bursting rod connection
- short construction times, short set-up times
- no new bore paths necessary.
- cost saving of 15% to 40% compared to open trenching
- minimal impairment of traffic and environment
- hardly any long-term damages such as soil settlement, ground water interference or road damage
- safe and approved method according to the latest technical standards and regulations



## APPLICATION



- Pipe bursting: new pipe of equal or larger diameter
- Reduction method: reduction of the pipe's cross section during pipe pulling
- TIP method (Tight-in-Pipe): new pipe is installed closely fitting in the old pipe
- Pipe relining: slight reduction of the pipe's cross section

### APPLICATION RANGE

Pipe bursting

Pipe relining

Reduction method

TIP

### DIMENSIONS depending on model

Length: 600–2,950 mm

Width: 490–1,600 mm

Height: 340–1,500 mm

Weight: 200–4,070 kg



PIPE RENEWAL



ROBUST DESIGN



# GRUNDOCRACK

with dynamic energy

## THE METHOD

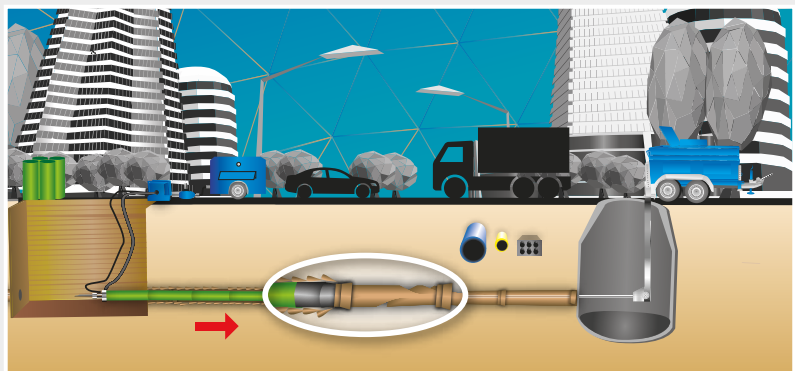
With the dynamic pipe bursting system, old pipes made of stoneware, asbestos cement, grey cast iron, plastic or plain concrete are shattered and simultaneously replaced by new HDPE pipes (long and short pipes) or PVC-U pipes. Intermediate pits are required for strong bends and branches. Inspection chambers can be used as starting and exit pits. Modified pipe rammers are applied for this method.

## THE ADVANTAGES

- environmentally sound
- innovative
- quick
- calculable in advance
- simple, safe and leak-proof
- no incidental costs

## THE FUNCTION

The pipe bursting machine shatters the old pipe while advancing through and radially displaces the fragments into the surrounding soil. The bore hole for the new pipe is extended at the same time. The pulling force of a winch supports the bursting machine and guarantees sure guidance through the given path.



### APPLICATION RANGE

- Impaired old pipe statics
- Misalignment, cracks, missing invert
- Partial collapse

### DIMENSIONS depending on model

- Length: 946–3,645 mm
- Weight: 60–4,800 kg
- Number of strokes: 180–580 min<sup>-1</sup>
- Air consumption: 1.7–50 (m<sup>3</sup>/min)





POSITIONAL  
ACCURACY



# GRUNDOBORE

efficient system solutions

## THE METHOD

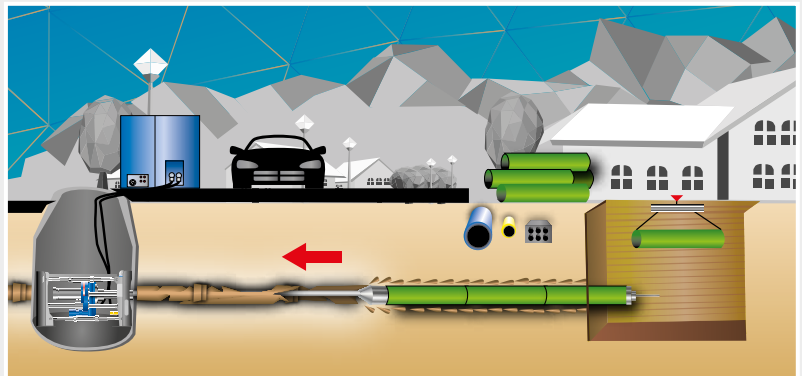
The auger boring method is a safe trenchless technology for the steerable installation of pipes at high positional accuracy as for example required in sewer construction or for pipe installation underneath railway tracks.

## THE FUNCTION

GRUNDOBORE is lowered into the starting pit or starting manhole. An external hydraulic unit supplies GRUNDOBORE with hydraulic operating power.

## THE ADVANTAGES

- 1m-manhole version
- simple installation due to separable system components
- transportation of waste spoil into the target pit
- high positional accuracy
- pressings up to approx. 50 m
- detection system: laser-mirror



GRUNDOBORE<sup>200S</sup> in use

### APPLICATION RANGE

Sewer property connections

Pressings

Free-flow pipelines

### DIMENSIONS depending on model

Length: 960–2,100 mm

Weight: 395–1,095 kg

Max. hydraulic pressure: 250 bar

Pipe Ø: 280–406 mm

# PRODUCT FEATURES

at a glance

## GRUNDOMAT Soil displacement hammers



PROPERTY  
CONNECTION



AIMING  
ACCURACY

16 models  
up to Ø 160 mm, since 1970  
N version with crowned or stepped head



## GRUNDORAM Horizontal rammers



POSITIONAL  
ACCURACY



ROBUST  
DESIGN

For pipe installations  
up to Ø 4,000 mm  
13 models



## GRUNDOPIT Mini fluid-assisted drill rigs

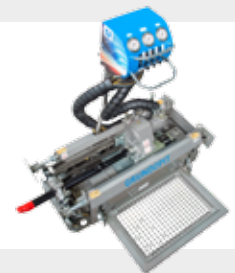


EASY  
HANDLING



CONFINED  
SPACES

4t pullback  
New pipe installations up to Ø 200 mm  
Models: 6V, Manhole, Keyhole



## GRUNDODRILL Fluid-assisted HDD rigs



LOW  
CONSUMPTION



LONG  
LIFE CYCLE

4–28 t thrust and pullback  
New pipe installations up to Ø 710 mm  
Models: 4X, 10XP, 15XP, 15XPT, 18N, 28Nplus and  
rock drilling rig 18ACS





## GRUNDOBURST static pipe bursting systems



EASY  
HANDLING



PIPE  
RENEWAL

for pipe renewal up to  $\varnothing$  1,200 mm  
also for pipe reduction and relining  
Models: 400G , 400S, 800G, 1250G, 1900G and 2500G.



## GRUNDOCRACK dynamic pipe bursting systems



PIPE  
RENEWAL



ROBUST  
DESIGN

for pipe renewal up to  $\varnothing$  1.000 mm  
cable winch pulling support  
Inspection chamber can be used as pit



## GRUNDOBORE Auger boring units



POSITIONAL  
ACCURACY

pilot-steered,  
e.g. for free-flow pipelines, pressings  
Models: 200S and 400







## HOW DO WE EVALUATE OUR SERVICE PERFORMANCE? YOUR GUT FEELING IS TELLING US!

### TAKE ADVANTAGE OF OUR SERVICES

Alongside our products we offer a variety of services.



#### SPARE PARTS

Available for all products on the spot.



#### MAINTENANCE

We offer on-site maintenance and repair almost anywhere.



#### ACCESSORIES

To equip you perfectly, we offer a wide range of accessories and custom-built accessories for our products.



#### TRAINING

We provide a diversified training programme which is attended by more than 3,000 participants annually.



#### **GEOSERVICE**

We examine the soil conditions prior to a bore on your behalf.



#### **SERVICE HOTLINE**

If you have any products and service related questions call us at: +49 2723 808-0



#### **EVENTS**

We host a variety of events: from exhibitions over project weeks to our Hands on Days.



#### **INTERNET**

Visit our website to learn more about the different products and applications.

[www.TRACTO-TECHNIK.com](http://www.TRACTO-TECHNIK.com)



#### **EXPERT INSPECTION**

We conduct the statutory expert inspections on your behalf.



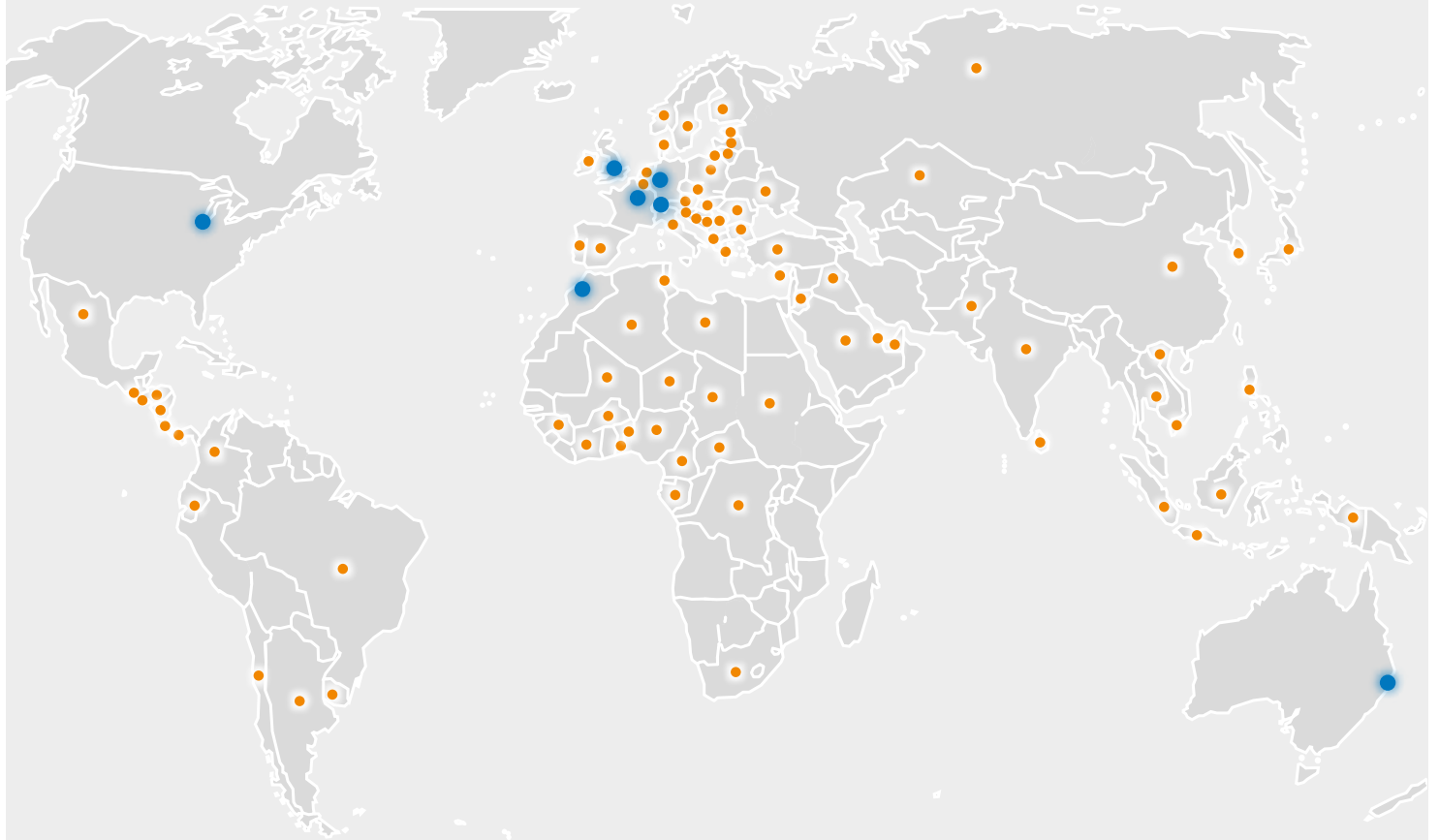
#### **YOUTUBE CHANNEL**

Get inspired by our application videos:

[www.youtube.com/TractoTV](http://www.youtube.com/TractoTV)

# TRACTO-TECHNIK

worldwide



Germany  
**TRACTO-TECHNIK GmbH & Co. KG**  
**TT Headquarters**  
Paul-Schmidt-Straße 2  
57368 Lennestadt  
Tel: +49 2723 808-0 · Fax: -180  
export@tracto-technik.de  
www.TRACTO-TECHNIK.com

Switzerland  
**TRACTO-TECHNIK**  
**Schweiz AG**  
Ratihard 3  
8253 Diessenhofen  
Tel: +41 79 8203897  
info@tracto-technik.ch  
www.TRACTO-TECHNIK.ch

United Kingdom  
**TRACTO-TECHNIK UK Ltd**  
10 Windsor Road  
Bedford MK 42 9SU  
Tel: +44 1234 342566  
Fax: +44 1234 352184  
info@tt-uk.com  
www.TRACTO-TECHNIK.co.uk

France  
**TRACTO-TECHNIK France**  
1/3 Rue de la Prairie  
F-77700 Bailly Romainvilliers  
Tél: +33 1 60 42 49 40  
Fax: +33 1 60 42 49 43  
info@tracto-technik.fr  
www.TRACTO-TECHNIK.fr

Presented by your TT partner:

USA  
**TT TECHNOLOGIES Inc.**  
2020 East New York Street  
Aurora, IL. 60502  
Tel: +1 630 851 8200  
Fax: +1 630 851 8299  
info@tttechnologies.com  
www.TTTECHNOLOGIES.com

Australia  
**TT ASIA PACIFIC Pty Ltd.**  
Unit 2, Devlan Street  
Mansfield, Qld 4122  
Tel: +61 734205455  
Fax: +61 734205855  
info@tt-asiapacific.com  
www.TT-ASIAPACIFIC.com

Morocco  
**TRACTO-TECHNIK Afrique**  
Route de Tamesna 4022  
Poste 2044, 12220 Tamesna  
Tel.: +212 53740 1363/64  
Fax: +212 53740 1365  
info@tracto-technik.ma  
www.TRACTO-TECHNIK.ma

**INSPIRING TRENCHLESS TECHNOLOGIES**

