

# The new era of energy drilling

Geothermal energy is one of the most efficient forms of sustainable energy. Geomachine's mission is to take geothermal well drilling into a new, more productive time era.

## GM2000

[www.geomachine.fi](http://www.geomachine.fi)



 Geomachine

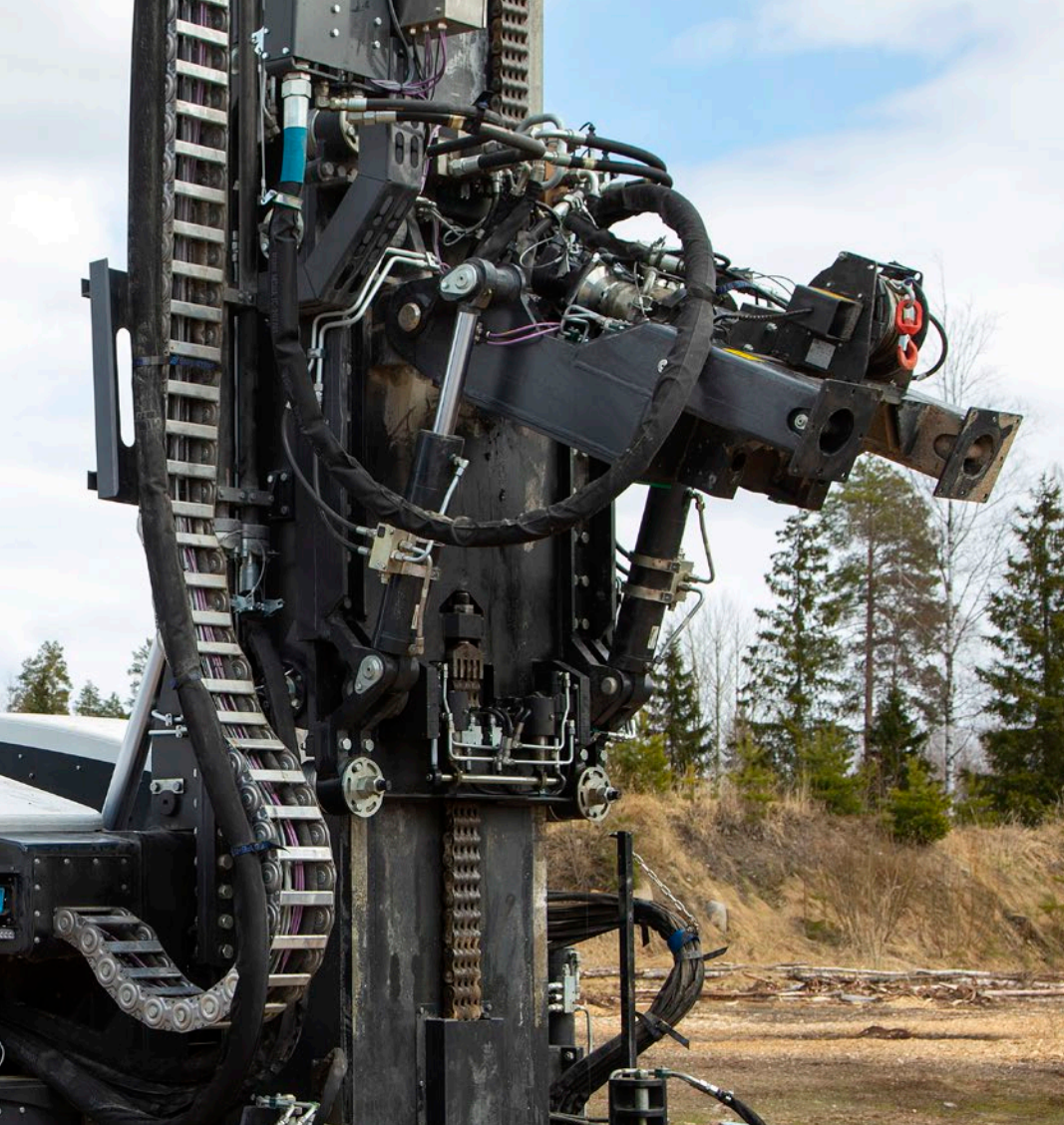
# Heat from the ground, reliably and efficiently

The world needs alternatives to fossil fuels, and the demand for geothermal energy is growing rapidly. The need for heat output in projects is increasing, while the available land area for energy wells remains limited. This all creates a demand for deeper energy wells.

One 1500 – 2000 meter deep energy well replaces 20 – 30 traditional shallow ones. Deeper wells enable the utilization of geothermal energy at larger construction sites and in district heating networks.

Geothermal heat is a global solution available 24/7 for producing sustainable green energy. We are proud at Geomachine to lead the way at the forefront of energy transition by providing solutions for a greener and safer future.





## A high production rate is the key to success

GM2000 is the first DTH drill rig in the world, designed and built to exploit geothermal energy from 2,000 meter deep wells. It is the first of its kind. It is designed to bring more value for the driller by maximizing the speed of the drilling process and, as importantly, by minimizing the down time of the rig.

GM2000 productivity is maximized through

- DTH technology
- 9 m Drill Rods with large inner diameter
- 60 ton lifting capacity
- Fast drill unit movements
- Automated Drill Rod Handling
- Drilling automation and visual control
- Remote control
- State-of-the-art hydraulic system
- Sufficient air supply and onboard water pump
- Easy transport and quick setup with autolevel function

Downtime is minimized through

- GM Weight-on-bit control
- Reliable components
- Preventive digital maintenance program

In addition to machine delivery, Geomachine provides its customers with a comprehensive commissioning and lifetime service, including digital maintenance program and remote support, to keep the operations running.



**MANUAL CONTROL** Overview

0 rpm 20 bar  
0 Nm 0 bar

DEPTH >0<  
259 m

RODS SET  
23

SPEED 0 mm/min  
Feed force 0 bar  
Lifting force 59 bar

CALCULATED WEIGHT 12170 Kg  
MEASURED WEIGHT 12551 kg

WATER PRESSURE 0 bar  
AIR PRESSURE 15 bar

DRILLING FORCE  
RADIO ADJUSTMENT 0

**1600 Kg**

WELDING GEN. "ON" Set weight Set force

Engine  
SETUP  
WORK  
Menu

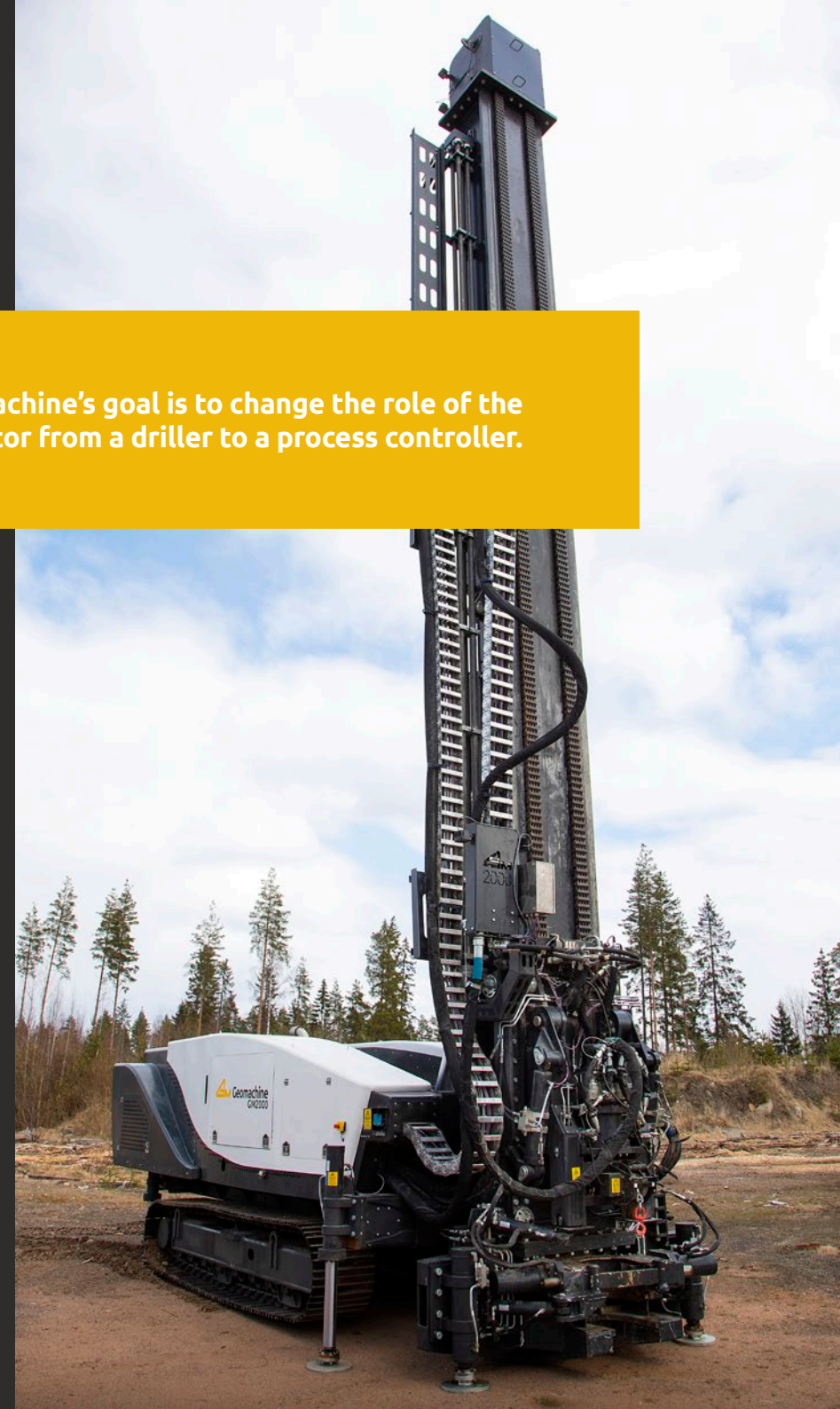
F= 1640 kg

Geomachine's goal is to change the role of the operator from a driller to a process controller.

## From a driller to a process controller

With GM2000 the drilling process is automated. Drilling value monitoring keeps the driller constantly aware of the critical drilling parameters – even when the work takes place several hundred meters below the surface.

GM2000 is operated using a CAN-bus control system. The system enables automated drilling with the GM Weight-on-Bit (WoB) control. The WoB keeps the drill bit pressure against the ground at predefined target level, optimizing the drilling speed and minimizing wear and damage to the bit. All the operations can be controlled and adjusted with a remote control.



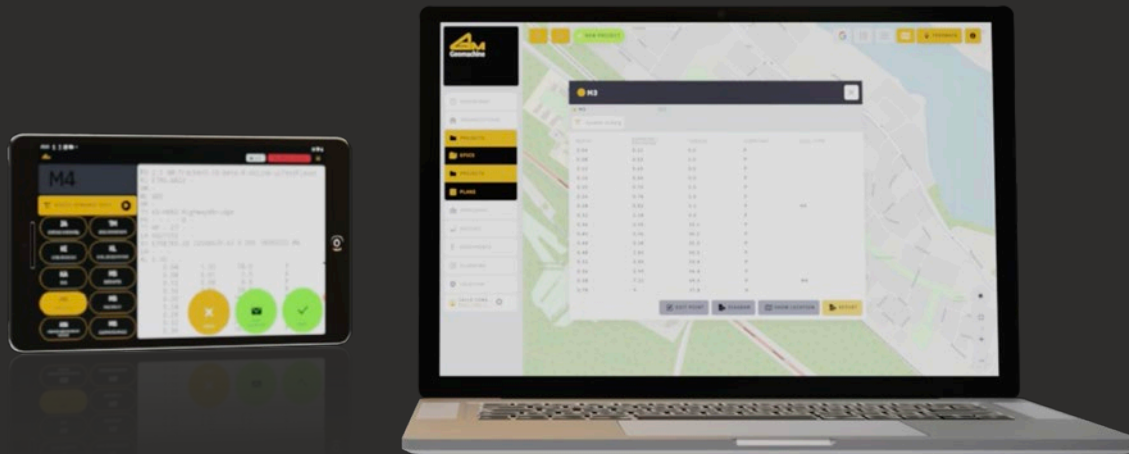
# GM2000 brings the measurement technology used in ground investigations to well drilling

With GMTracker, drilling parameters and rig performance are constantly monitored and data is stored in a cloud service for later analysis. The operator can report their own observations and drilling progress. Information across multiple sites can be analyzed enabling continuous learning and performance improvement.

GMTracker monitoring include e.g.:

- Weight on bit
- Feed and rotation speed
- Feed / lifting force
- Torque
- Air valve position
- Fuel consumption
- Water pump pressure

Note: Air pressure, air volume and compressor fuel consumption can also be logged in case Geomachine air compressor units are being used.



- **Increases productivity**
- **Prevents breakdowns**
- **Reduces parts wear**
- **Brings down operational costs**





## 60 ton lifting capacity

The drill mast is designed to provide the required lifting force to move the heavy drilling equipment rapidly and accurately. The rig penetrates fast, even in hard Scandinavian granite - thanks to DTH drilling technology.

Lifting capacity	60 ton
Feed force	20 ton
Movement speed of the rotary unit	1 m/s
Rotary unit movement range	10.5 m
Mast vertical movement	-0.6 m... +0.4 m
Mast support legs	Hydraulic, 2 pcs with -0.5 m movement
Winch	2 tons


**GM2000 is the first DTH drilling rig designed to drill 2.000-meter-deep geothermal wells.**

## Automated drill rod handling

The tilting rotary head is automated to work together with the feeding table loading and unloading the drill string. Opening and tightening of the rod connections are made easy with a hydraulic clamp and sliding rod holder. All operations are protected by a safety radar system. GM2000 tilting rotary head, together with the automated feeding table makes drilling safe, fast, and easy for the operator.

Rotary head maximum torque	14 kNm
Rotary head maximum RPM	100
Rotary head tilting	90° forward with 30 kNm torque
Opener to release hammer / drill bit	Hydraulic
Safety area radars	2-4 pcs
Maximum diameter of a casing pipe	406 mm
Drill rod length	9 m
DTH Hammer	6-12 inch
Drill rod diameter	89-140mm






GM2000 tilting rotary head together with the automated feeding table makes drilling safe, fast, and easy for the operator.



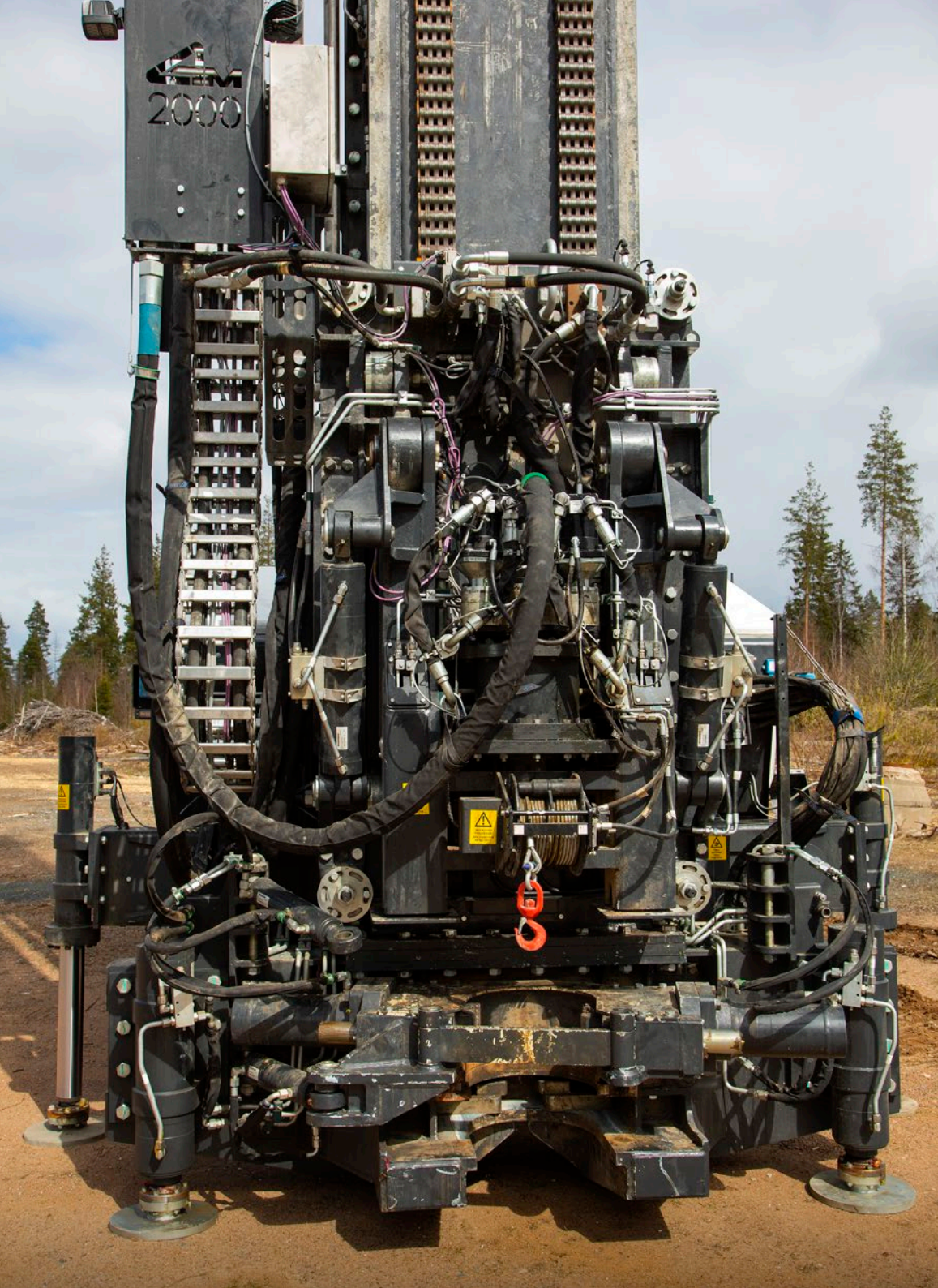
## Easy to transport and fast to ramp up on site

Although GM2000 has the power to drill fast and go deep, it is small in size, easy to transport and fast to prepare for drilling.

GM2000 can also be equipped with an electric powerline.



Engine	Cummins B6.7 Stage V
Power	243 kW
Hydraulic system	Electric controlled, load sensing, 3 + 1 pumps
Oil flow	1200 l/min @ 1700 rpm
Max pressure	350 bar
Max driving speed	2,6 km/h
Hydraulic support legs	4 pcs
Hydraulic generator	Dynaset
Water pump	100 bar
Oiler	Automatic
Motor heater	Webasto
Weight	~42 tons
Length	15,2 m (in transport position)
Height	3,7 m (in transport position)
Width	3 m
Crawler track	600 mm x 3325 mm
Tractive force	225 kN
Ground clearance	350 mm



## GM2000 is part of Geomachine's integrated geothermal product family

**DTH Drilling**

**GM2000**

**Operating system and IoT**

**GMair35**  
(2-3 pcs)

**GMair80**  
Ariel

**Air Compression**

**Geomachine Oy**

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**TAMPEREEN  
KONEPAJAT**

Geomachine is part of the Tampereen Konepajat Oy Group