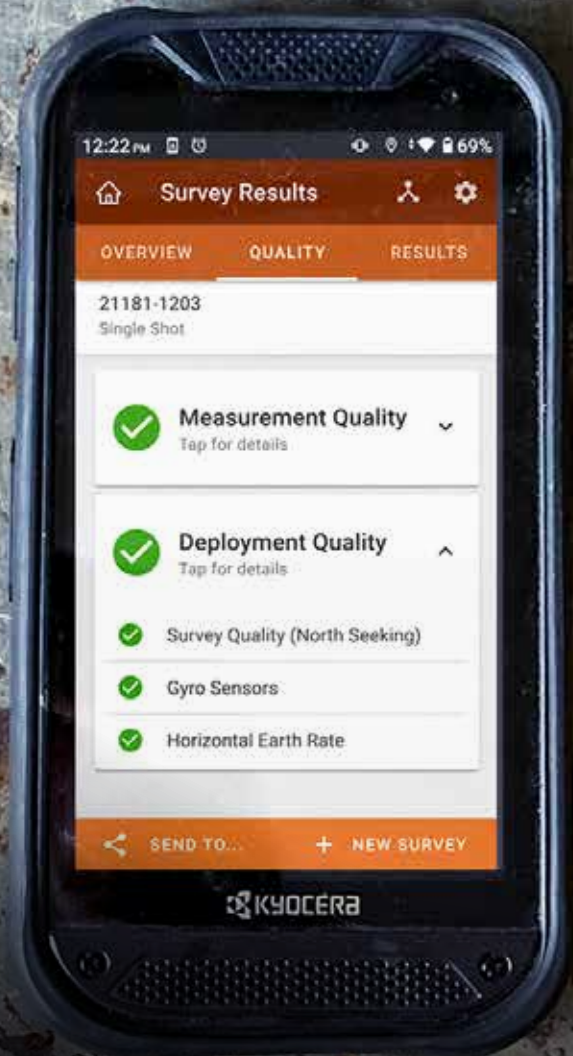


TRUGYRO™

DOWNHOLE SURVEY TOOL



GDS
GEOLOGICAL
DATA SERVICES

BOART LONGYEAR™



TRUGYRO™ DOWNHOLE SURVEY TOOL

Forming the basis of good orebody knowledge through borehole azimuth, dip, and depth.

With best-in-class gyro technology and wireless communication, TruGyro™ provides all attitude high speed measurement capability with no warm-up time.

Deliver the most accurate north seeking measurements in the industry to make informed drilling decisions and provide context to valuable geological data.

Boart Longyear™ geological survey equipment is built to rise to the drilling challenges in the most complex operational environments around the world and meets the highest standards for safety, accuracy, and reliability.

**THE MOST COMPACT AND INTEGRATED
CONTINUOUS NORTH SEEKING
GYRO TOOL IN DRILLING.**

FIVE REASONS TO USE TRUGYRO™ FOR YOUR NEXT SURVEY PROJECT

1

Speed and Accuracy

TruGyro is ready to use right out of the box and produces industry-leading gyrocompass accuracy in as little as 30 seconds. No hold back timers or warm up time.

4

Multi-functional

TruGyro offers the standard north seeking single shot and multi shot surveys along with continuous and orientation survey modes.

2

Survey within Rods and Magnetic Formations

Precise, north-seeking gyrocompass technology finds true north without being impacted by magnetic interference caused by drilling equipment or geology.

3

User Friendly

The easy-to-use, intuitive operator app is loaded on a rugged handheld device with wireless data transfer to both the device and a secure cloud.

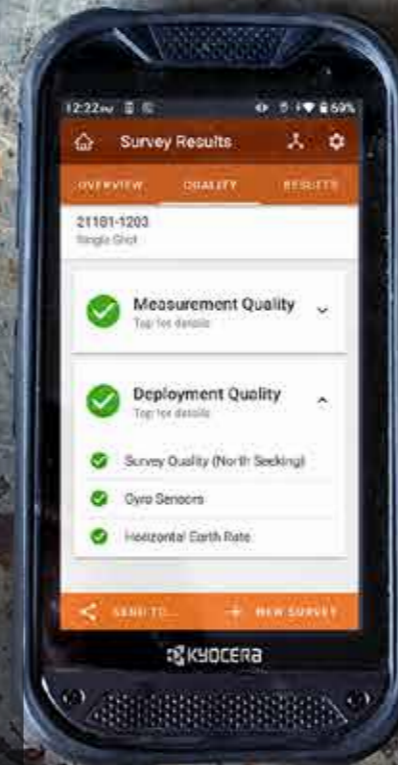
Real-time visual feedback guides users through the end-to-end process minimizing operational errors.

5

Onsite Productivity and Safety Improvement

Designed for seamless integration with both the latest Boart Longyear productivity-improving technologies and traditional tooling.

In underground applications, integration with the Boart Longyear Roller Latch™ Overshot with self locking capabilities provides increased safety for operations.



OPERATOR APP

The operator app features built-in guidance, complete with tooltips and safety messaging to reinforce safe and effective usage guidelines, minimizing uncertainty around a successful survey.

Hassle-free robust wireless connections between devices eliminate cables and the need to disassemble the equipment to initialize tools or download results.



NORTH SEEKING MEASUREMENTS

The TruGyro north seeking measurements can provide a significant time and accuracy advantage compared to its competition.

For example, in 30 seconds*, TruGyro can achieve accuracy which may require two to five minutes using competing gyro products.

Independent north seeking measurements improve survey accuracy, increasing overall confidence in the hole path.



QUALITY SURVEY DATA

The operator app assesses each survey result and raises quality flags that pertain to measurement and deployment.

The quality assurance report is directly available at the drill. All flags are present in the master data files and available in the exported surveys.



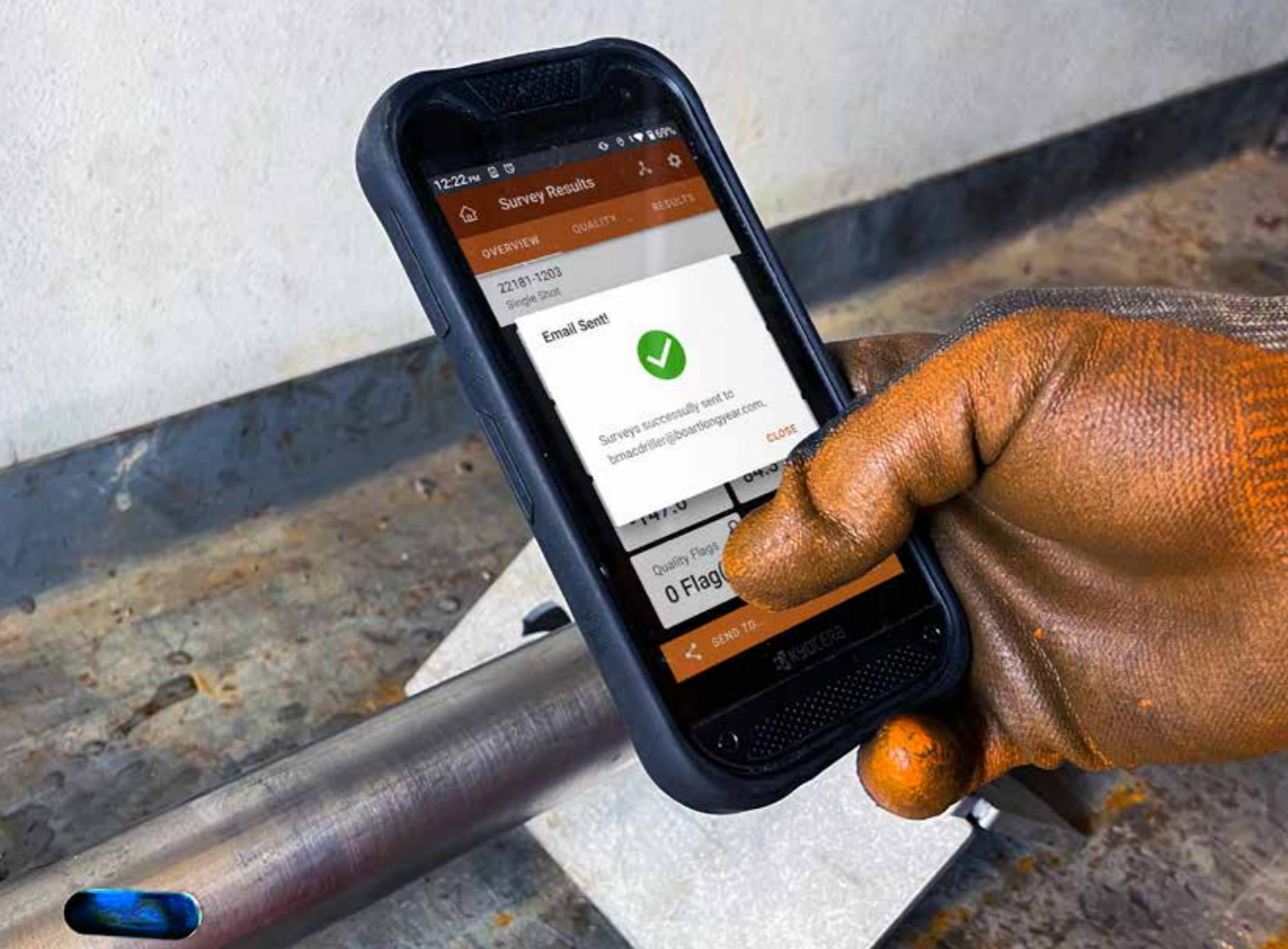
HIGH-SPEED CONTINUOUS SURVEYS

Survey both inclined and horizontal hole paths using Boart Longyear's mature gyro measurement technology which can be operated at high speed within drill rods, resulting in minimal impact to overall wireline time.

When paired with a wireless depth counter, real-time at-a-glance depth and speed feedback is displayed on the operator app, giving users greater confidence that their results meet the high quality they expect.



*Measurement times do not include operational allowances.



CLOUD CONNECTED

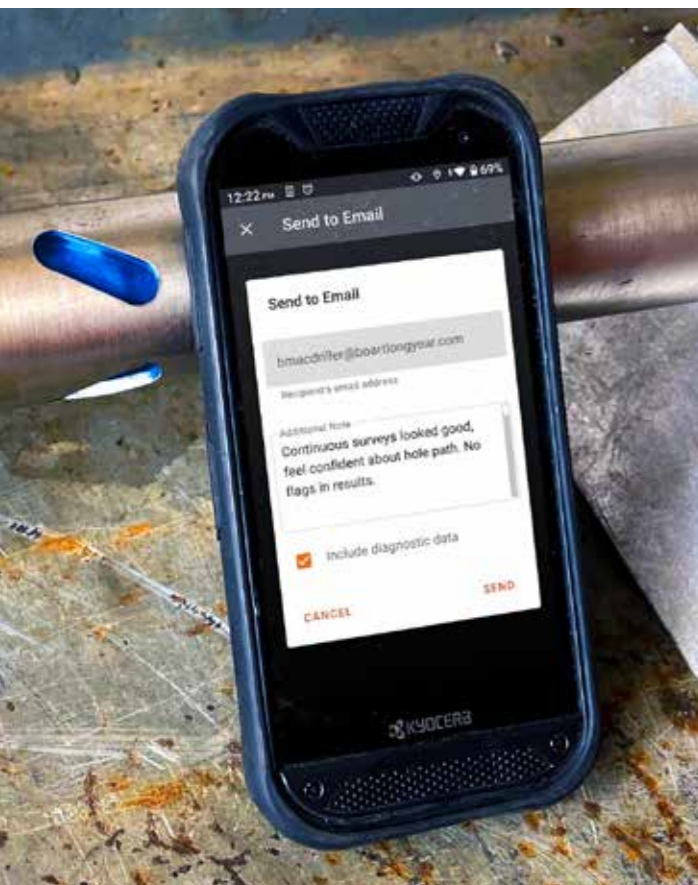
TruGyro™ integrates easily with cloud services and partners, allowing you to visualize the hole path in three dimensions, download survey data and manage surveys.

Deliver accurate, industry-leading surveys that inform drilling decisions and provide valuable context in your efforts to unify geological knowledge.

PROVEN TECHNOLOGY

TruGyro's north seeking gyroscopic technology is the fastest and most accurate currently on the market. Over a decade of research, engineering, and testing have gone into making the gyro tool what it is today.

All sensors in the instrument are solid-state by classification. These sensors are extremely rugged and shock resistant, yet sensitive enough to measure the earth's rotation. Sensor types include angular rate sensors (gyro sensors) and accelerometers. While the gyro sensors are used to perform the gyro-compass measurements to determine azimuth, accelerometers are used to determine inclination (dip), gravity tool-face, temperature, and motion. The combination of the data collected from these sensors provides that which is necessary to calculate the instrument's position and orientation in space for each measurement station.



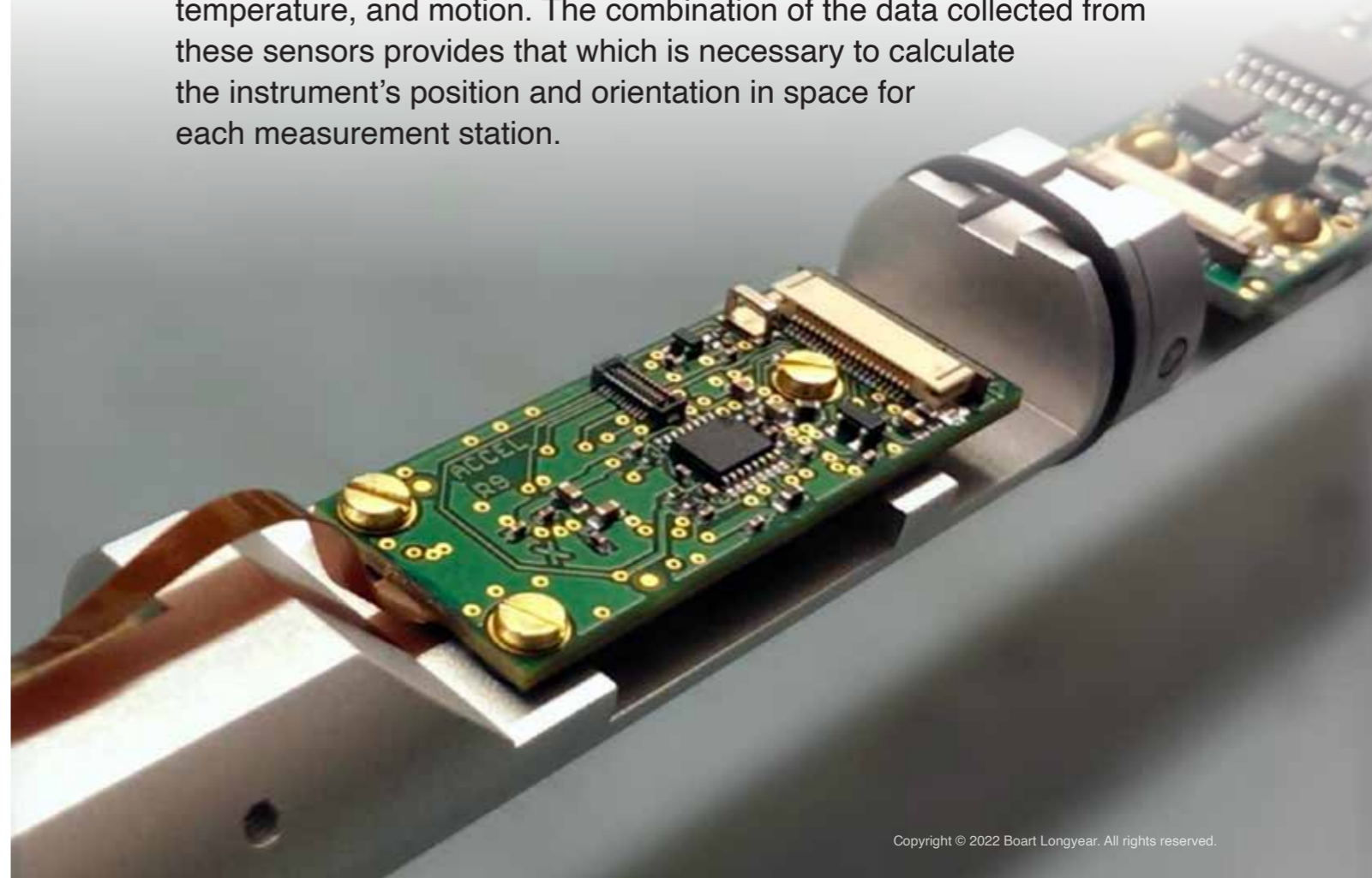
SEND SURVEY DATA YOUR WAY

Configure and customize your survey data to send the information you want, in the format you want it.

Send completed survey records via multiple options: USB drive, email, or connecting to an integrated cloud account.

Completed surveys are listed in a survey queue until they are sent, making it easy to see at-a-glance what data needs to be sent.

A desktop reporting tool is available to further refine your data.



SAFE AND EFFICIENT

Safety and efficiency at the drill site are crucial, and TruGyro is built with that in mind. With precision electronics and integrated running gear, accurate north seeking survey readings can be achieved in as little as 30 seconds. Both Link Latch™ and Roller Latch™ overshot assemblies are supported for best-in-class safety and productivity.

ROBUST CONSTRUCTION WITHOUT SACRIFICING ACCURACY

The TruGyro kit can withstand even the harshest drill site conditions. The innovative instrumentation is fully protected, housed in a high-strength pressure barrel capable of retrieving a core sample with **no additional external housings.**



ONSITE DEVICE MANAGEMENT

The TruGyro system packs neatly into compact kits for easy transport and sharing of equipment between drill sites and rigs. Integrated modular running gear makes surveying in tight underground locations safe and efficient.

Manage tool life with real-time state-of-charge display, allowing for uninterrupted operation.



VALIDATED AND CALIBRATED

Our underlying gyro technology has been validated by comprehensive lab and field testing along with a verified mathematical error model, known as an Instrument Performance Model (IPM). Our IPM model has been accepted by the Industry Steering Committee on Wellbore Survey Accuracy (ISCWSA).

FACT

ISCWSA is a credentialed regulatory body who produces, maintains, and publishes standards for the industry, promoting a collaborative understanding of issues associated borehole surveying.

CALIBRATION CHECK

Each TruGyro kit is regularly certified for calibration by Boart Longyear technicians in using precision measurement equipment.

A Boart Longyear certified calibration stand can be available on request for onsite quality assurance programs.

Contact your local Boart Longyear representative for more information.

TIME TESTED

Over a decade of research, engineering, and testing has gone into making TruGyro the quality product it is today.

TruGyro is the fastest and most accurate north seeking gyroscopic technology in today's market.



THE COMPLETE SURVEY SYSTEM

The TruGyro™ system provides easy onsite device management. The system packs up into compact kits for easy transport and sharing of equipment among rigs.

Gyro Tool Case

- Contains the robust, accurate gyro unit housed within a short, lightweight integrated pressure barrel that is easy to handle.
- A rechargeable control unit that easily attaches to the gyro, forming a secure electromechanical connection. Two units are included with each kit providing enough power for several days of surveying between charges.
- Lightweight inner tube-style wrenches are provided for assembling the gyro tool to control unit—ensuring the correct amount of torque is applied to threaded joints.
- A durable mobile device built for field use includes the ready to use, pre-installed intuitive operator app.
- An all-in-one charging adapter will recharge all TruGyro devices simultaneously—eliminating multiple bulky chargers and saving precious AC wall outlet space.

Depth Counter Case

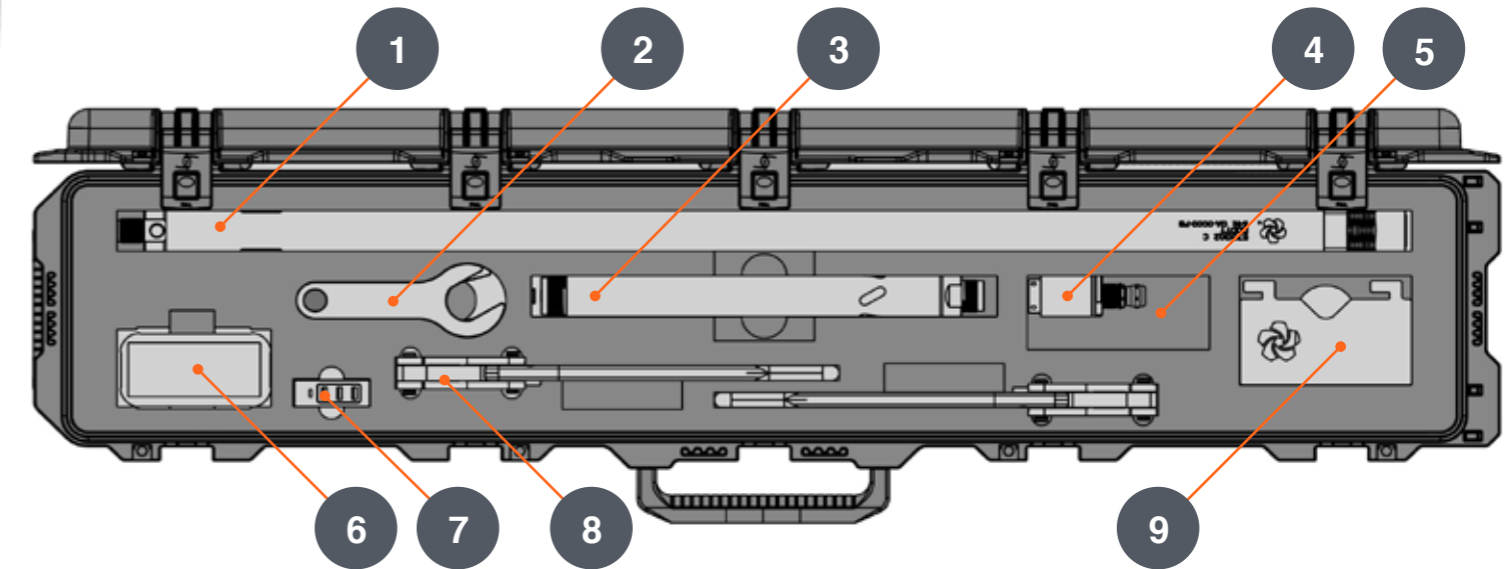
- Robust depth counter is built to withstand even the harshest underground environment while reliably providing accurate depth.
- Includes an innovate magnetic mounting binding to quickly and safely attach to various types of rigs.
- Safety-critical features minimize exposure to rotating components and catch points.

Running Gear Case

- Includes industry-leading Boart Longyear running gear for safe survey deployment.
- Standard Overshot with safety pin.
- Optional Roller Latch™ Overshot.
- Steel centralizers for diamond coring survey applications.
- Bowspring centralizers for near-vertical and RC survey applications.
- NOTE: Orientation running gear kits are available for setting wedges and steering downhole navi-motors.

GYRO TOOL CASE

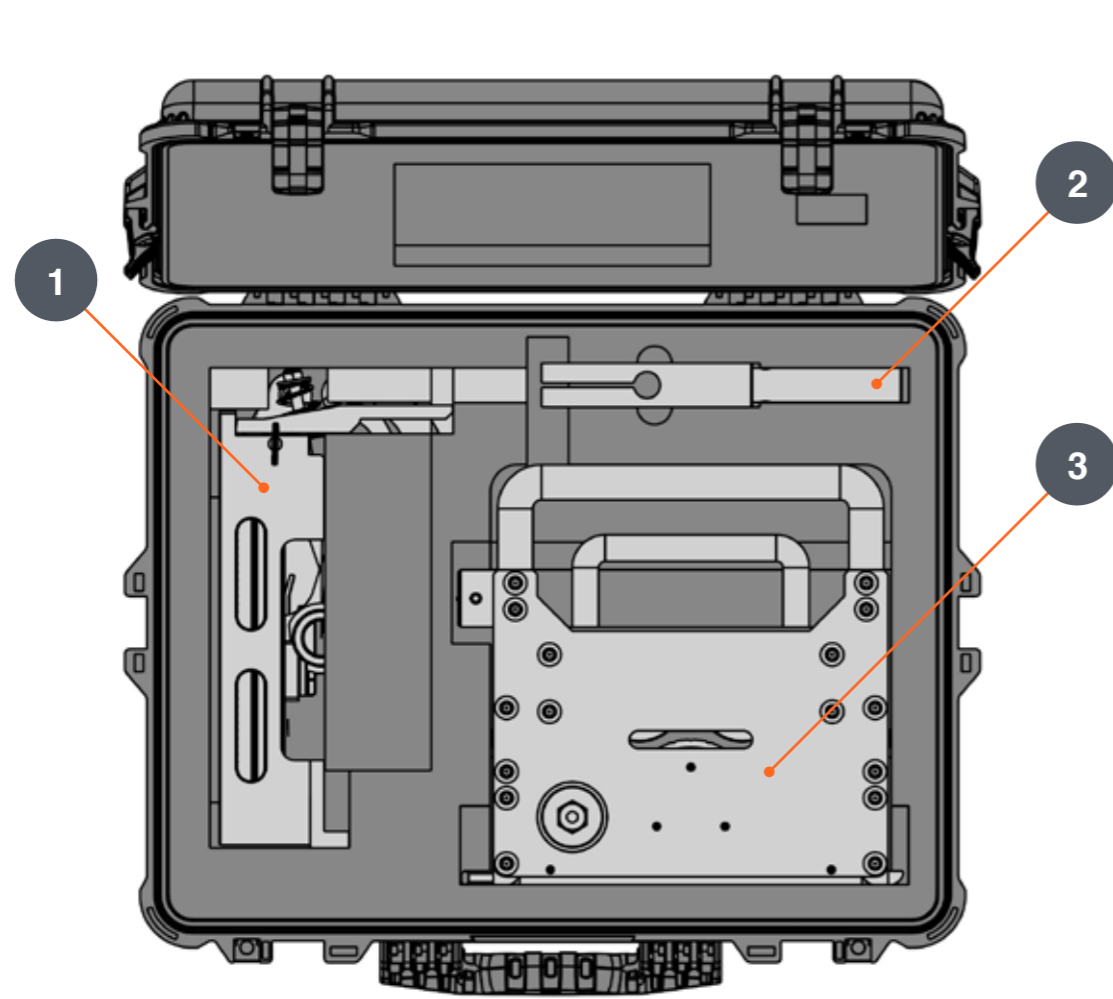
Contains the gyro unit, control unit and handheld device along with relevant cables etc.



1	Gyro Tool
2	Running Gear Wrenches
3	Control Unit(s)
4	Control Unit Charge Cable
5	Accessories pouch: Charging cables, o-ring lubrication grease, reset cable, reset magnet
6	Handheld Device
7	Charger
8	Pressure Barrel Tube Wrenches
9	V-stands

DEPTH COUNTER CASE

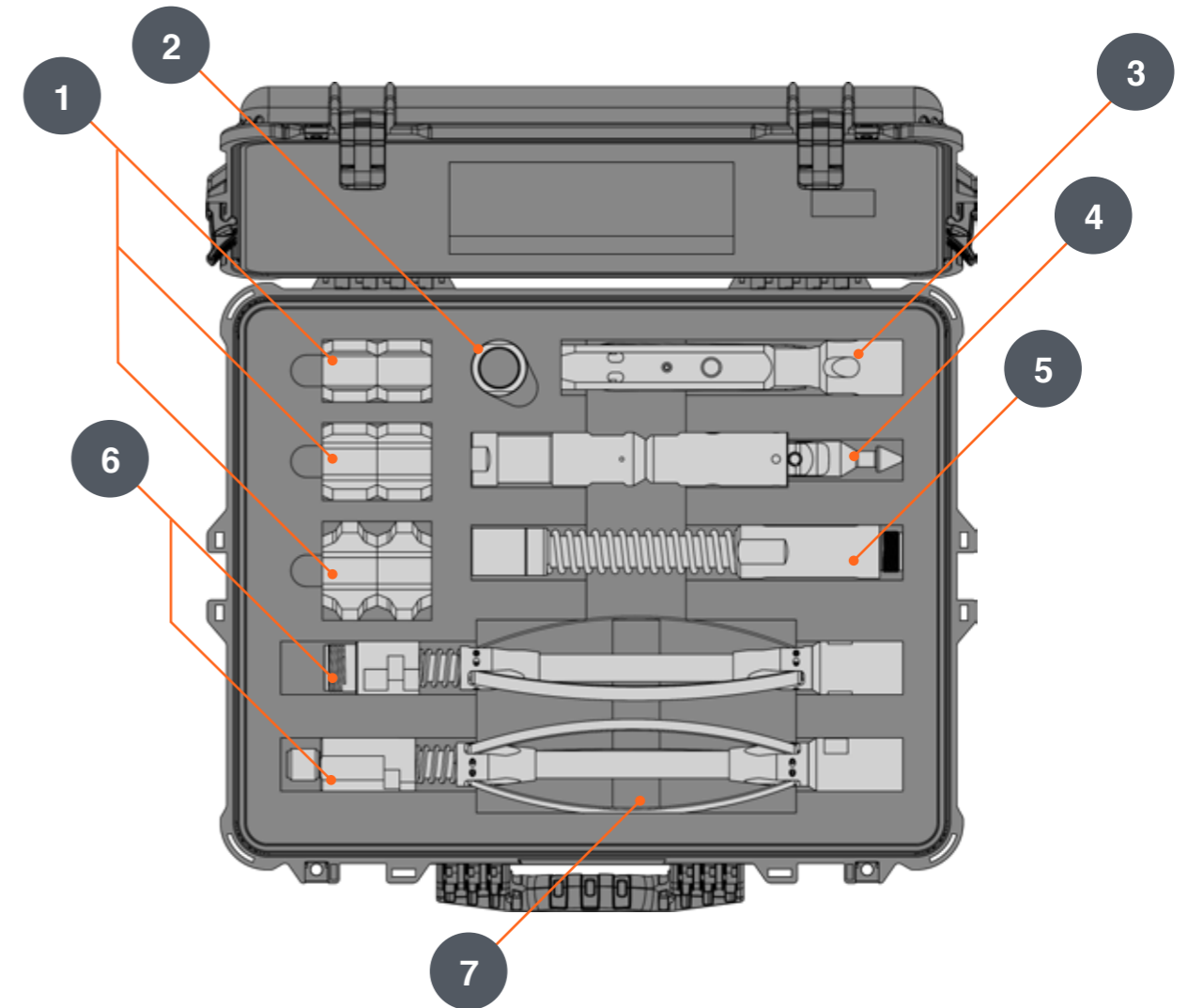
Contains the depth counter with rod clamp or magnetic rig mount attachments.



1	Attachment options: rod clamp (B to P) or magnetic binding (mast mount)
2	Straight arm extension
3	Depth Counter unit

RUNNING GEAR CASE

Contains centralizers, bowspring centralizers, and retrieval and latching ends.



1	Rod Centralizers (<i>Fixed diameters for rod size/inner tube size</i>)
2	Non-latch Landing Adapter
3	Standard Overshot
4	Retrieval Gear
5	Shock Absorber
6	Bowspring Centralizers
7	Spare Bowspring Blades (<i>Beneath bowspring centralizers</i>)

SPECIFICATIONS

DIMENSIONS ¹	
Length	2560mm
Weight	11.5kg
Diameter	42.8mm

¹ Dimensions include standard overshot running gear with shock absorbers. Length without running gear is 1612mm.

ENVIRONMENTAL	
Operational Temperature	-5° to +60° C
Depth	6000psi (3000m fresh water)
Shock	2000g

PERFORMANCE	
North Seeking Azimuth ²	up to +/- 0.1°
Dip ²	up to +/- 0.1°
Survey Types	Continuous, single shot, multi shot, orientation
Data	Share through GDS™ Cloud, Krux Analytics, Email and USB
Continuous Survey Speed	Greater than 50 m/minute

² Results depend on latitude, inclination and measurement time. Does not include running gear.

BATTERY	
Gyro	Two lithium-ion powered control units, 16 hours total run time
Depth Counter	Integrated rechargeable lithium-ion, 24 hours run time



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Learn more about Boart Longyear's products
and services at

www.boartlongyear.com

