



## DRILLING INSTRUMENTATION

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MBI Drilling Products is a proud distributor of Reflex Instrument North America Limited.

REFLEX is the leader in innovative instrumentation and technology for drilling, data collection and analysis within the global minerals industry. REFLEX's technologies are acknowledged for their reliability, ease of use and accuracy. REFLEX customers know more, get information faster and mine smarter.

# REFLEX NORTH FINDER APS



## **Unique GPS based compass producing True North azimuth, GPS position and degree of inclination**

The REFLEX NORTH FINDER APS [Azimuth Pointing System] is not affected by local magnetic interference. It allows Drilling Operators to align drill rigs and survey instruments and more accurately measure drill hole collars. Accurate collar azimuth is vital and can have the greatest impact on the final end-of-hole coordinates. Geologists are able to use the NORTH FINDER APS to pick up previous collars and accurately record starting dip and azimuth coordinates.

The REFLEX NORTH FINDER APS features UTM and latitude/longitude coordinates, sub-metre GPS position accuracy, GPS Integrity Parameter for more accurate azimuth and a long life battery providing more than 6 hours run time.

Collar and directional data from the REFLEX NORTH FINDER APS is transferred via Bluetooth communication to the PDA, and can be downloaded from the PDA to PC [optional].



**UNAFFECTED BY LOCAL  
MAGNETIC ANOMALIES**



### **ACCURATE**

The REFLEX NORTH FINDER APS is accurate to 0.5° of True North Azimuth. Where GPS integrity is excellent, the accuracy can be less than 0.2°. The unit is built with three accelerometers for exceptional tilt accuracy. The REFLEX NORTH FINDER APS reduces the risks and associated costs of human error in recording drill collar measurements.



### **COST SAVING**

When using the REFLEX NORTH FINDER APS, correct drill collar measurements can be obtained easily and accurately. Land based surveys are not required which saves significant costs for the project.



### **EASY TO USE**

The REFLEX NORTH FINDER APS does not require specialized survey teams to achieve accurate results. Field staff are able to competently operate the system, with no specialized training required. It is also easy to set up and can be mounted on a pre-positioned rig, tripod or other object with no overhead obstructions to avoid signal interference.

## REFLEX NORTH FINDER APS SPECIFICATIONS

|                                    |                                                                                                                                                                                                                                                                                                                  |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Azimuth accuracy</i>            | 0.5° nominal<br>< 0.2° with excellent GPS integrity<br>> 1.0° with poor GPS integrity<br>[GPS integrity is automatically calculated by the APS in real time and displayed on the LCD]                                                                                                                            |
| <i>Tilt accuracy</i>               | ± 0.2°                                                                                                                                                                                                                                                                                                           |
| <i>GPS coordinate accuracy</i>     | < 60cm [2 ft] with SBAS correction [WAAS, EGNOS, MSAS]<br>< 2.5m [8 ft] autonomous                                                                                                                                                                                                                               |
| <i>Dimensions</i>                  | 10 cm high x 13 cm wide x 66 cm long [4" x 5" x 26"]                                                                                                                                                                                                                                                             |
| <i>Weight</i>                      | 1.6 kg [3.5 lbs] - no attached options                                                                                                                                                                                                                                                                           |
| <i>Temperature range</i>           | -30° to 60° C [-22° to 140° F]                                                                                                                                                                                                                                                                                   |
| <i>Sealing</i>                     | NEMA 4 [IP 65]                                                                                                                                                                                                                                                                                                   |
| <i>North finder mounting plate</i> | ¼" - 20 tripod threads [2] and 5/8" - 11 tribrach thread                                                                                                                                                                                                                                                         |
| <i>Internal battery</i>            | 12 V DC rechargeable lithium ion [~ 6.5 hrs operation]<br>1.5 hrs max charge time with portable charger                                                                                                                                                                                                          |
| <i>Communications</i>              | Serial output with cable for logging installation or performance data<br>Bluetooth Class 1<br>User selectable National Marine Electronic Association [NMEA] data formats for each mode<br>Laser input port [APS automatically goes into laser offset mode when the laser is triggered]                           |
| <i>Options</i>                     | Rig alignment attachment<br>Tripod<br>Tripod geared head with azimuth, tilt and roll adjustments<br>Hard sided shipping case<br>Laser range finder kit [LTITruPulse laser rangefinder] and mounting bracket<br>1.5 - 4 X optical sighting scope<br>Archer PDA handheld for bluetooth readout and transfer to PC. |

# REFLEX TN14 GYROCOMPASS



## **Pre-load drill hole co-ordinates for fast, accurate and repeatable rig alignment in 15 minutes or less**

The REFLEX TN14 GYROCOMPASS improves productivity dramatically by quickly and accurately aligning drill rigs in surface and underground operations.

The REFLEX TN14 GYROCOMPASS takes approximately 12 minutes to settle, and a drill rig can then be aligned to the correct azimuth and dip within 5 minutes.

The unit is supplied with three batteries for on-site changeover to minimise time.

With a Roll/Pitch range of  $\pm 90^\circ$ , the REFLEX TN14 GYROCOMPASS has the flexibility to improve productivity in all drilling conditions. Without the roll & pitch limitations experienced by some rig alignment systems, azimuth integrity remains high at ALL angled drilling applications.



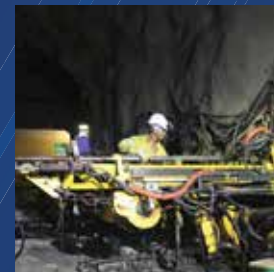
### **WORLDWIDE DATA ACCESS**

Drill hole co-ordinates can be entered directly into the hand held on site or pre-loaded from any location worldwide and sent directly to the rig using REFLEX HUB. Drill hole alignment data is transferred back into REFLEX HUB, so Geologists can effectively manage their drilling program remotely, without leaving their office; no physical file transfers are required. Pre-loading co-ordinates reduces the risks and associated costs of human error caused by entering incorrect co-ordinates or inaccurate survey marking.



### **VISUAL INTERFACE**

The REFLEX TN14 GYROCOMPASS has a large visual interface built into the wireless handheld unit, showing live movement, through clear, simple graphics, to guide alignment and improve operator safety. The visual interface makes it easy to quickly see which direction the rig needs to move to accurately and easily align to the correct dip and azimuth, improving alignment efficiency. The wireless handheld unit means no cables are required, ensuring a safer operating environment.



### **FULLY ADJUSTABLE CLAMPING MECHANISM**

The easy to use clamping mechanism allows for a single person to position the REFLEX TN14 GYROCOMPASS onto the drill rods. A single handed movement lowers the clamp lever to securely fasten the rig aligner to the drill rig. The clamp is fully adjustable and will suit rod sizes from BQ\* to HQ\*.

## REFLEX TN14 GYROCOMPASS SPECIFICATIONS

|                        |                          |
|------------------------|--------------------------|
| <b>Settling Time</b>   |                          |
| Settling time          | Approximately 12 minutes |
| <b>Accuracy</b>        |                          |
| Heading                | +/- 0.2°                 |
| Dip/Pitch              | 0.05°                    |
| <b>Operating Range</b> |                          |
| Operating time         | More than 15 hours       |
| Operating temperature  | -10°C to +60°C           |
| Storage temperature    | -40°C to +85°C           |
| Roll/Pitch range       | +/-90°                   |
| Environment            | 95% humidity             |

\*Q® is a registered trademark of Boart Longyear that refers to its Q® Wireline System. The use of the Q mark herein is not intended to equate the Q mark with a particular hole size but rather to indicate that REFLEX's products and services are designed and intended to be used with Boart Longyear's Q® Wireline System, as well as other Wireline systems available in the industry that are comparable to that of the Q® Wireline System.

# REFLEX EZ-TRAC XTF



## **Instant survey data now sent directly to a secure hub**

The REFLEX EZ-TRAC XTF is a digital downhole survey instrument that has been designed to be multifunctional, easy to operate, highly accurate, robust and reliable.

By operating with the new EZ-COM Blue controller, survey data can now be transferred via mobile networks directly to anywhere in the world, instantly.

The REFLEX EZ-TRAC XTF is easy to operate and minimises the unproductive time required to set up for surveying. It only requires aluminum extension rods to be added to place the instrument away from magnetic interference caused by drilling equipment and it is ready to use. The user friendly EZ-COM Blue makes the survey easy to set up and execute, with results automatically calculated and displayed on the handheld unit, eliminating the risk of human error.



**QUICK AND SIMPLE PROCESSING,  
PROVIDING ACCURATE DATA**



### **MULTIFUNCTIONAL**

By using the new EZ-COM Blue controller the REFLEX EZ-TRAC XTF comes with multi-shot as standard while still being able to perform the quickest single shot surveys the industry has seen. As well as being operated by the dedicated EZ-COM Blue device the EZ-TRAC XTF can also be operated by a rugged RECON pda.



### **HIGHLY ACCURATE**

The REFLEX EZ-TRAC XTF performs surveys in all directions – including vertical – with high accuracy. Orientation of downhole motors and wedges have been streamlined to further simplify the process and reduce costly errors by using the External Tool Force [XTF].



### **ROBUST AND RELIABLE**

The REFLEX EZ-TRAC XTF now has an improved internal shock system built to withstand harsh treatment. The 35 mm integrated pressure barrel is totally sealed against water entry and has a depth rating of 4,000m. The robust and durable design of the REFLEX EZ-TRAC XTF is now CE compliant and ensures a minimum amount of time and cost required for maintenance and repair.

## REFLEX EZ-TRAC SPECIFICATIONS

|                                   |                                                                                                                                                 |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimensions                        | <ul style="list-style-type: none"> <li>Outer diameter 35 mm</li> <li>Length 1,030 mm</li> <li>Weight 4.7 kg</li> </ul>                          |
| Azimuth [direction]               | <ul style="list-style-type: none"> <li>Range 0 to 360°</li> <li>Accuracy <math>\pm 0.35^\circ</math></li> </ul>                                 |
| Dip [inclination]                 | <ul style="list-style-type: none"> <li>Range <math>\pm 90^\circ</math> from horizontal</li> <li>Accuracy <math>\pm 0.25^\circ</math></li> </ul> |
| Gravity roll [rotation/toolface]  | <ul style="list-style-type: none"> <li>Range 0 to 360°</li> <li>Accuracy <math>\pm 0.25^\circ</math></li> </ul>                                 |
| Magnetic roll [rotation/toolface] | <ul style="list-style-type: none"> <li>Range 0 to 360°</li> <li>Accuracy <math>\pm 0.35^\circ</math></li> </ul>                                 |
| Tool magnetic field               | <ul style="list-style-type: none"> <li>Range 0 to 100,000 nT</li> <li>Accuracy <math>\pm 50</math> nT</li> </ul>                                |
| Magnetic dip                      | <ul style="list-style-type: none"> <li>Range <math>\pm 90^\circ</math> from horizontal</li> <li>Accuracy <math>\pm 0.25^\circ</math></li> </ul> |
| Depth rating                      | <ul style="list-style-type: none"> <li>4,000 m vertical in fresh water</li> </ul>                                                               |
| Temperature rating                | <ul style="list-style-type: none"> <li>Full accuracy 0°C to +60°C</li> <li>Operating -30°C to +75°C</li> <li>Storage -45°C to +85°</li> </ul>   |
| Battery                           | <ul style="list-style-type: none"> <li>Non-rechargeable lithium battery pack</li> </ul>                                                         |
| Approximate battery life:         |                                                                                                                                                 |
| Infrequent use                    | <ul style="list-style-type: none"> <li>4 years</li> </ul>                                                                                       |
| Normal use                        | <ul style="list-style-type: none"> <li>2 years</li> </ul>                                                                                       |
| Heavy use                         | <ul style="list-style-type: none"> <li>1 year</li> </ul>                                                                                        |

# REFLEX EZ-A



## **Instant survey data accessible on site**

The REFLEX EZ-A is a digital downhole survey instrument, capable of both single and multi-shot proficiency. With an operating core grade of AQ\* value, the multi-shots 25mm barrel can be used for various slimhole applications in all-angle surveys. With an inbuilt infrared communication link the REFLEX EZ-A is able to transfer vital downhole data quickly and efficiently via a handheld computer, allowing instant, comprehensive analysis.



QUICK AND SIMPLE PROCESSING,  
PROVIDING ACCURATE DATA



## **SINGLE AND MULTI-SHOTS FUNCTION**

With both single and multi shot capabilities, the REFLEX EZ-A has the capacity to survey from one to five single shots and up to 9,000 multi-shots depending on the desired mode. The added gravity roll angle and magnetic tool face functions can be used for the use with orientation wedges, down hole and directional motors. The data captured by the REFLEX EZ-A provides for reliable accurate, all angle surveys within the mining, exploration, and construction industries.



## **ALL ANGLE SURVEYING**

For each shot taken, three magnetic field and three gravity field components are recorded, together with temperature, time and date. Paired with the hand held device this allows comprehensive analysis and presentation of survey data on site. Survey data is displayed in tabular form, as well as in 2D and 3D graphical form. The 3D presentation allows the user to get a realistic view of the perspectives and offers interactive actions such as rotation and zoom.



## **USER FRIENDLY**

REFLEX EZ-A has been designed to be user friendly. The instrument has a built-in interface with editable options managed by a single control switch in addition to a handheld device. An infrared connection eliminates the need for cables. The REFLEX EZ-A is a digital device which immediately presents survey data without any unhealthy chemicals, time-consuming film processing, compass roses or complicated calculations.

## REFLEX EZ-A SPECIFICATIONS

|                         |                                                                                                                                                                                                                                                                                                                               |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Features      | <ul style="list-style-type: none"> <li>• Single and multi-shot modes</li> <li>• Inclinator</li> <li>• Variable time delay: 5 to 32 sec</li> <li>• Self contained, battery powered</li> </ul>                                                                                                                                  |
| Azimuth (direction)     | <ul style="list-style-type: none"> <li>• Range 0 to 360°</li> <li>• Accuracy +/- 0.35°</li> </ul>                                                                                                                                                                                                                             |
| Roll Angle              | <ul style="list-style-type: none"> <li>• Tool face reads to 0.25°</li> <li>• Tool face gravity, in degrees</li> <li>• Tool face magnetic, in degrees</li> </ul>                                                                                                                                                               |
| Magnetism               | <ul style="list-style-type: none"> <li>• Magnetic field strength, in nanoTesla</li> <li>• Magnetic dip, in degrees</li> </ul>                                                                                                                                                                                                 |
| Pressure                | <ul style="list-style-type: none"> <li>• 6,000 psi (41.4 MPa) or 4,000 metre water pressure without pressure</li> <li>• Barrel 20,000 psi (137.9 MPa) or 13,800 metre water pressure with 36/38 mm pressure barrel</li> </ul>                                                                                                 |
| Temperature             | <ul style="list-style-type: none"> <li>• Full accuracy between 0° C to +60° C [+32° F to +140° F]</li> <li>• Operates to +70° C [+158° F] ambient temperature without heat shield</li> <li>• Operates to +177° C [+350° F] ambient temperature with heat shield</li> <li>• Storage -20°C to 85°C [+31°F to +140°F]</li> </ul> |
| Solid State Electronics | <ul style="list-style-type: none"> <li>• Down hole electronic recording</li> <li>• Non-volatile memory and data retention</li> <li>• Thermal modelling for accurate calibration over the entire temperature range</li> </ul>                                                                                                  |
| Dimensions              | <ul style="list-style-type: none"> <li>• Outer diameter 25.0 mm (1.0")</li> <li>• Length 790 mm (31.126")</li> <li>• Weight 1.7 kg (1.2 lbs)</li> </ul>                                                                                                                                                                       |
| Optional Equipment      | <ul style="list-style-type: none"> <li>• 3 extension rods, each 1.5 m long, 36mm O.D.</li> <li>• Landing collar (AQ* - PQ* sizes)</li> <li>• Pin Spear, Swivel or A rod attachment</li> <li>• Bull plug and Mule shoe</li> <li>• Pressure barrels 36 &amp; 38mm</li> </ul>                                                    |
| Handheld Computer       | <ul style="list-style-type: none"> <li>• REFLEX EZ-COM</li> </ul>                                                                                                                                                                                                                                                             |
| PC/Laptop               | <ul style="list-style-type: none"> <li>• Windows</li> <li>• REFLEX SProcess</li> <li>• REFLEX AQS communication software</li> </ul>                                                                                                                                                                                           |

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# REFLEX EZ-SHOT

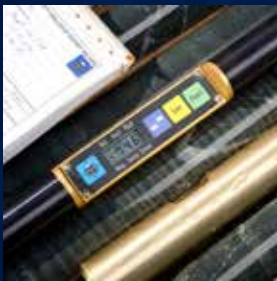
## On site access to survey data

The REFLEX EZ-SHOT is a single shot instrument designed to identify the deviation of boreholes. The REFLEX EZ-SHOT is a totally self contained instrument that is controlled via an integrated keypad membrane and an LCD display.

The REFLEX EZ SHOT fits most standard commercial running gear from BQ\* to PQ\*. Survey kits can be provided in two standard configurations, 36 and 38mm.



FAST OPERATION, IN ALL  
DIRECTIONS



## SEVEN PARAMETERS IN ONE SHOT

The REFLEX EZ-SHOT is a single shot instrument, which quickly provides information about the borehole. The instrument measures seven parameters in one single shot: azimuth, dip, roll angle relative gravity, roll angle relative magnetic north, temperature, magnetic field strength and magnetic dip angle. As soon as the instrument has been retrieved from the borehole, results can be read on the integrated display without an external computer.



## ACCURATE

The REFLEX EZ-SHOT is a high precision magnetic and gravimetric instrument. Three fluxgate magnetometers measure the local geomagnetic field and provide the horizontal component – the azimuth – relative to magnetic north. Three extremely accurate accelerometers provide the vertical component – the dip – and the rotation relative gravity. The REFLEX EZ-SHOT includes a Quality Check function with a predetermined magnetic threshold to highlight survey data that is outside the range of acceptable magnetic interference.



## ROBUST AND RELIABLE

The REFLEX EZ-SHOT has been specifically designed to be robust, reliable and easy to use. The REFLEX EZ-SHOT is totally self-contained, with integrated electronics, control panel and batteries. No cables, battery charging, external computer, regular maintenance, or moving parts to wear and tear in harsh, on site conditions. Low power consumption in combination with a long-life lithium battery pack, allows many years of normal use between battery replacements.

## REFLEX EZ-SHOT SPECIFICATIONS

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimensions              | <ul style="list-style-type: none"> <li>Outer diameter 31.7 mm</li> <li>Length 846 mm</li> <li>Weight 2 kg</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Operating features      | <ul style="list-style-type: none"> <li>Single shot</li> <li>Orientation</li> <li>Azimuth and dip</li> <li>Azimuth quality check</li> <li>Magnetic profile</li> <li>Thermal profile</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                |
| Range and typical error | <ul style="list-style-type: none"> <li>Azimuth <math>0-360^{\circ} \pm 0.5^{\circ}</math></li> <li>Dip <math>\pm 90^{\circ} \pm 0.2^{\circ}</math></li> <li>Roll angle, relative gravity <math>0-360^{\circ} \pm 0.2^{\circ}</math></li> <li>Roll angle, relative magnetic N <math>0-360^{\circ} \pm 0.5^{\circ}</math></li> <li>Temperature <math>-40</math> to <math>+85^{\circ}\text{C} \pm 1</math></li> <li>Magnetic field strength <math>0-100,000</math> nT <math>\pm 50</math> nT</li> <li>Magnetic dip angle <math>\pm 90^{\circ} \pm 0.4^{\circ}</math></li> </ul> |
| Timer                   | <ul style="list-style-type: none"> <li>Survey start delay selectable from 1-1,000 min 1 minute increments</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Temperature rating      | <ul style="list-style-type: none"> <li>Total range <math>-20^{\circ}\text{C}</math> to <math>+85^{\circ}\text{C}</math></li> <li>Highest accuracy achieved between <math>0^{\circ}\text{C}</math> &amp; <math>+60^{\circ}\text{C}</math></li> <li>Shock rating 6,000 g, 0.5 ms, <math>\frac{1}{2}</math> sine</li> <li>Pressure rating 2,250 psi [16 MPa]</li> <li>[36 mm pressure barrel]</li> <li>6,000 psi [41 MPa]</li> <li>[38 mm pressure barrel]</li> </ul>                                                                                                           |
| Battery                 | <ul style="list-style-type: none"> <li>Internal Lithium TCL, 7.2 V, 2.7 Ah 5 year service life (2,500 surveys of 1 hour each)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Electronics             | <ul style="list-style-type: none"> <li>Tri-axial solid state accelerometers</li> <li>Tri-axial solid state fluxgate magnetometers</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Memory                  | <ul style="list-style-type: none"> <li>Memory capacity 50 surveys</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Optional software       | <ul style="list-style-type: none"> <li>REFLEX SProcess</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

Please contact your local REFLEX representative for more information on the range of running gear, survey kits and orientation equipment available from REFLEX.

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# REFLEX GYRO

## **Directional surveying in all environments**

*The REFLEX GYRO is a complete downhole surveying instrument capable of surveying in all environments, magnetic and non-magnetic.*

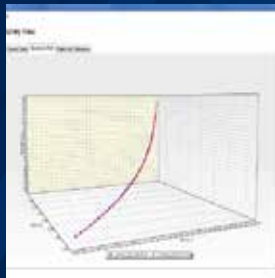
*With proven reliability and accuracy, it utilises a digital surface referenced MEMS-gyro. Survey data, once brought to the surface, can be transferred from the onboard memory to the field PC via a high-speed Bluetooth connection. The full set of data readings can be processed using the advanced REFLEX GMIT5 navigation software, where users can tabulate, plot and export data into various formats for enhanced decision making.*

**PROVEN RELIABILITY IN DELIVERING ACCURATE SURVEY DATA**



### **Designed for operation by Drillers**

The REFLEX GYRO has been designed to be simple to use yet with highly sophisticated technology inside to deliver exceptionally accurate survey results. It can be fully operated by drillers on site for cost effective surveying. As a completely remote and fully time stamped survey tool, it doesn't require a live wireline or additional equipment such as winches for operation.



### **Superior survey data**

Highly accurate survey data is obtained through customised 'Anti-Roll' running gear and centralisers, ensuring the highest quality azimuth data, including in vertical surveying. A large range of data types, including directional data (azimuth and dip), temperature, time and roll are recorded in the onboard memory. Reports can be run through any Windows operating system and are available in xls, dxf, ASCII and ODS formats. The data cannot be altered and can be used for QA/QC and audit purposes.



### **Survey in all environments and directions**

The REFLEX GYRO is not affected by magnetic interference and can be used inside all types of drill rods or in magnetically disturbed ground, eliminating the need to use non magnetic drill pipe configurations. It measures in all directions and is not affected by inclination, and can therefore be used in surface and underground operations and wireline or conventional drill rigs.

## REFLEX GYRO

|                       |                                                |
|-----------------------|------------------------------------------------|
| Dimensions            | O.D. 32mm, L 807mm                             |
| Weight                | 1.1kg                                          |
| Operating temperature | 0°C to +70°C                                   |
| Digital interface     | High speed Bluetooth                           |
| Power source          | High capacity re-chargeable NiMH battery packs |
| Operating time        | <8 hours depending on environmental conditions |
| Dip [Inclination]     | +/- 0.2°                                       |
| Azimuth, gyro**       | +/- 0.5°                                       |
| Roll                  | +/- 0.3°                                       |

## RUGGED FIELD PC

|                  |                                     |
|------------------|-------------------------------------|
| Operating system | Windows 7                           |
| Other features   | Built-in high speed Bluetooth, WLAN |

## OPTIONAL EQUIPMENT

|                |                                    |
|----------------|------------------------------------|
| Other features | Vertical centralisers              |
|                | APS                                |
|                | Conventional running gear          |
|                | Digital depth encoder              |
|                | High temperature version available |

# REFLEX MAXIBOR II

## Optical borehole survey system

The REFLEX MAXIBOR II is an advanced optical instrument for accurate surveying of drill holes and tunnels in magnetically disturbed environments. The REFLEX MAXIBOR II is the ultimate surveying tool for long inclined and horizontal holes.

The REFLEX MAXIBOR II is highly versatile, with an outside diameter of only 44mm, it can be used in a variety of applications; it can be run on rods or wireline, or pumped into the hole and optional centralisers are available for measurement inside large diameter holes.

The REFLEX MAXIBOR II can be set to measure inclination and azimuth every 1.5 or 3m and can be run and results presented in either metres or feet.

An infrared data link ensures reliable and rapid data communications, and Windows based software improves data processing ability in the field.



EASY TO USE, LOW COST TO  
OPERATE



### HIGHLY ACCURATE

The REFLEX MAXIBOR II is a highly accurate surveying tool with solid state silicon accelerometers guaranteeing precision and providing direct inclination and roll information. The tool requires no calibration, manual calculations or instrument drift corrections, minimizing the risk of human error. The REFLEX MAXIBOR II surveys both in and out of the hole for instant QA/QC repeatability check.



### IMPROVE PRODUCTIVITY

The REFLEX MAXIBOR II is designed for simple, straightforward operation, which reduces survey time and costs. Using the Maxibor II, there is no need to pull drill rods before the survey and it is quick to use, a 100m survey can be performed in only 20 minutes [depending on the rig]. Survey results are automatically calculated and are available for immediate presentation on site.



### ROBUST CONSTRUCTION

The REFLEX MAXIBOR II has been designed to withstand harsh on site conditions, delivering reliable operation and minimizing down time. Fully sealed electronics and optics reduce the risk of accidental water entry while robust optics eliminate the need for continual re-calibration. Interchangeable industrial alkaline battery packs provide years of normal use before replacement is required, due to the low power consumption of the unit.

## REFLEX MAXIBORE II SPECIFICATIONS

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimensions                | <ul style="list-style-type: none"> <li>• Tool diameter 44.0 mm</li> <li>• Tool length 1,200 mm</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Optics                    | <ul style="list-style-type: none"> <li>• Optical CMOS image sensor</li> <li>• Light source 6 x high intensity LED</li> <li>• Exposure interval minimum 5s typical 10s</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                           |
| Solid State Electronics   | <ul style="list-style-type: none"> <li>• Downhole electronic recording</li> <li>• Non-volatile memory and data retention</li> <li>• Thermal modelling for accurate calibration</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                  |
| Batteries                 | <ul style="list-style-type: none"> <li>• Interchangeable industrial alkaline battery pack</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Memory                    | <ul style="list-style-type: none"> <li>• Memory capacity over 16 hours at 10 second intervals</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| System Accuracy           | <ul style="list-style-type: none"> <li>• Better than 1:1000 relative to hole length</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Pressure and Shock Rating | <ul style="list-style-type: none"> <li>• 3,500 metre water pressure gives 50% safety margin</li> <li>• Shock survival 6 000g, 0.5 ms 1/2 sine</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Operating Temperature     | <ul style="list-style-type: none"> <li>• -40°C to +65°C [-4°F to +150°F] (with lithium batteries)</li> <li>• -20°C to + 65°C [-4°F to + 150°F] (with alkaline batteries)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                        |
| Standard Equipment        | <ul style="list-style-type: none"> <li>• Camera probe</li> <li>• Reflector tubes</li> <li>• Reflector rings</li> <li>• Reflector tube couplings</li> <li>• Bottom coupling</li> <li>• Camera cap</li> <li>• Sealing ring exchanger device</li> <li>• Reflector ring extractor</li> <li>• TDS Recon Pocket PC</li> <li>• REFLEX Maxibor II Pocket PC Application</li> <li>• REFLEX SProcess software</li> <li>• REFLEX Maxibor II Manual</li> <li>• Spare reflector material</li> <li>• Spare sealing rings</li> <li>• Silicon grease</li> <li>• Transport boxes</li> </ul> |
| Optional Equipment        | <ul style="list-style-type: none"> <li>• Pin spear coupling</li> <li>• Top coupling with blank end</li> <li>• Swivel sub assembly</li> <li>• Landing sub assembly</li> <li>• USB 2.0 Reader/Writer</li> <li>• Stylus pen</li> <li>• Centralisers</li> </ul>                                                                                                                                                                                                                                                                                                                |

# REFLEX ACT III

## Core orientation system delivering exceptional accuracy

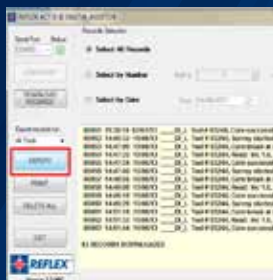
REFLEX ACT III is a digital core orientation system that records the orientation of the core sample and other key data in core drilling operations. It has a patented rapid descent system that reduces time to complete core recovery. It delivers exceptional accuracy, while being easy to use and reliable in harsh field conditions and is the preferred core orientation system for drillers and geologists worldwide. It's high level of data accuracy leads to better understanding of the geological structure, ultimately resulting in enhanced drill program management and geotechnical planning.

COMPATIBLE WITH AUTO  
DRILL SYSTEMS



### RUGGED AND RELIABLE

The REFLEX ACT III is designed to withstand the harshest conditions and treatment in the bottom-of-hole environment. It has a hardened steel outer casing and heat treated threads. Components are shock tolerant and able to withstand up to 20 000G of force. The unit can operate in temperatures of up to 80°C. It has a separate purpose designed hand held controller for communication and state-of-the-art control panel technology which are water resistant. Built with no moving parts and high quality lithium batteries, the REFLEX ACT III needs no maintenance and will operate for approximately 12 months under normal use.



### ACCURATE DIGITAL DATA COLLECTION

The REFLEX ACT III controller displays accelerometer data collected via time stamping technology, including depth values, [when entered at each orientation], inclination, roll, gravity, temperature and all button presses. Unique sequence logic prevents incorrect data and also eliminates operator error, ensuring more accurate data. Data stored on the controller cannot be manipulated and using REFLEX's digital auditor software can be used for QA/QC and audit purposes, as well as operational performance and production analysis.



### IMPROVED OPERATIONAL EFFICIENCY

The REFLEX ACT III is designed to improve productivity on site. It is supplied as a two tool system, while one tool is down the hole, the other is ready for the next run, ensuring no interruption to drilling operations. Core samples are easily matched with orientation data using a spirit level jig, bottom or top orientation can be accurately transferred to any core sample. The controller also indicates if the downhole unit has encountered temperatures above it's safe operating range, displayed on the LCD screen during data retrieval.

## REFLEX ACT III

### CORE SIZES

NQ\*, NQ\*2, NQ\*3, HQ\*, HQ\*3, PQ\*, LTK60, BQ\*, BQ\*TK®, W/L56, W/L66, W/L76, BTW, NTW

### DIMENSIONS

|                |                                |
|----------------|--------------------------------|
| Length         | Between 300 to 400mm           |
| Control unit   |                                |
| Outer diameter | 42mm                           |
| Length         | 300mm                          |
| Weight         | Average weight per kit is 30kg |

### ACCURACY

|          |                         |
|----------|-------------------------|
| Range    | 0 to $\pm 88^\circ$ dip |
| Accuracy | $\pm 1^\circ$           |

### DEPTH RATING

|                      |                 |
|----------------------|-----------------|
| Downhole instrument: |                 |
| Housing pressure     | Up to 10 000psi |

### TEMPERATURE RATING

|                      |                  |
|----------------------|------------------|
| Downhole instrument: |                  |
| Operating            | -30 °C to +80 °C |
| Control unit:        |                  |
| Operating            | -30 °C to +50 °C |

### BATTERY

Non-rechargeable lithium battery pack. Approximate battery life; downhole instrument:

|                                         |                 |
|-----------------------------------------|-----------------|
| Infrequent use                          | Up to 2 years   |
| Normal use                              | Up to 12 months |
| Approximate battery life; control unit: |                 |
| Infrequent use                          | > 2 years       |
| Normal use                              | 2 years         |

\*Q® is a registered trademark of Boart Longyear that refers to its Q® Wireline System. The use of the Q mark herein is not intended to equate the Q mark with a particular hole size but rather to indicate that REFLEX's products and services are designed and intended to be used with Boart Longyear's Q® Wireline System, as well as other wireline systems available in the industry that are comparable to that of the Q® Wireline System.

# REFLEX SMART WEDGE



## **Cut wedge setting time in half at all depths**

The REFLEX SMART WEDGE is the next generation of the original steel wedge bypass system. The unique new anchor system and self-orienting feature are specifically designed to save time and reduce costs.

The new anchor system combines both the wood and mechanical plugs, eliminating one full rod trip from the wedge setting process. This saves up to a full shift from the process, reducing operating costs significantly.

The self-orienting feature is set to the correct tool face on the surface and holds the wedge in the desired tool face all the way down the hole, saving an additional four hours at depth.

REFLEX's SMART WEDGE is the ultimate tool for deep, inclined holes, cutting the time of wedge setting at all depths in half and delivering significant time, productivity and cost savings.

**REFLEX SMART WEDGE IS SELF ORIENTATING,  
SAVING UP TO FOUR HOURS AT DEPTH.**



### **SAVE TIME**

REFLEX's SMART WEDGE reduces the time required to set the wedge bypass system from four hours up to a full shift. An additional four hours is saved through the self orientation feature at depth, significantly reducing operating costs.



### **EASY TO USE**

The REFLEX SMART WEDGE is constructed in 1.5m sections for easy handling and assembly, both on the surface and underground. The lighter wedge and new blunt nose design also make it safer and easier to handle.

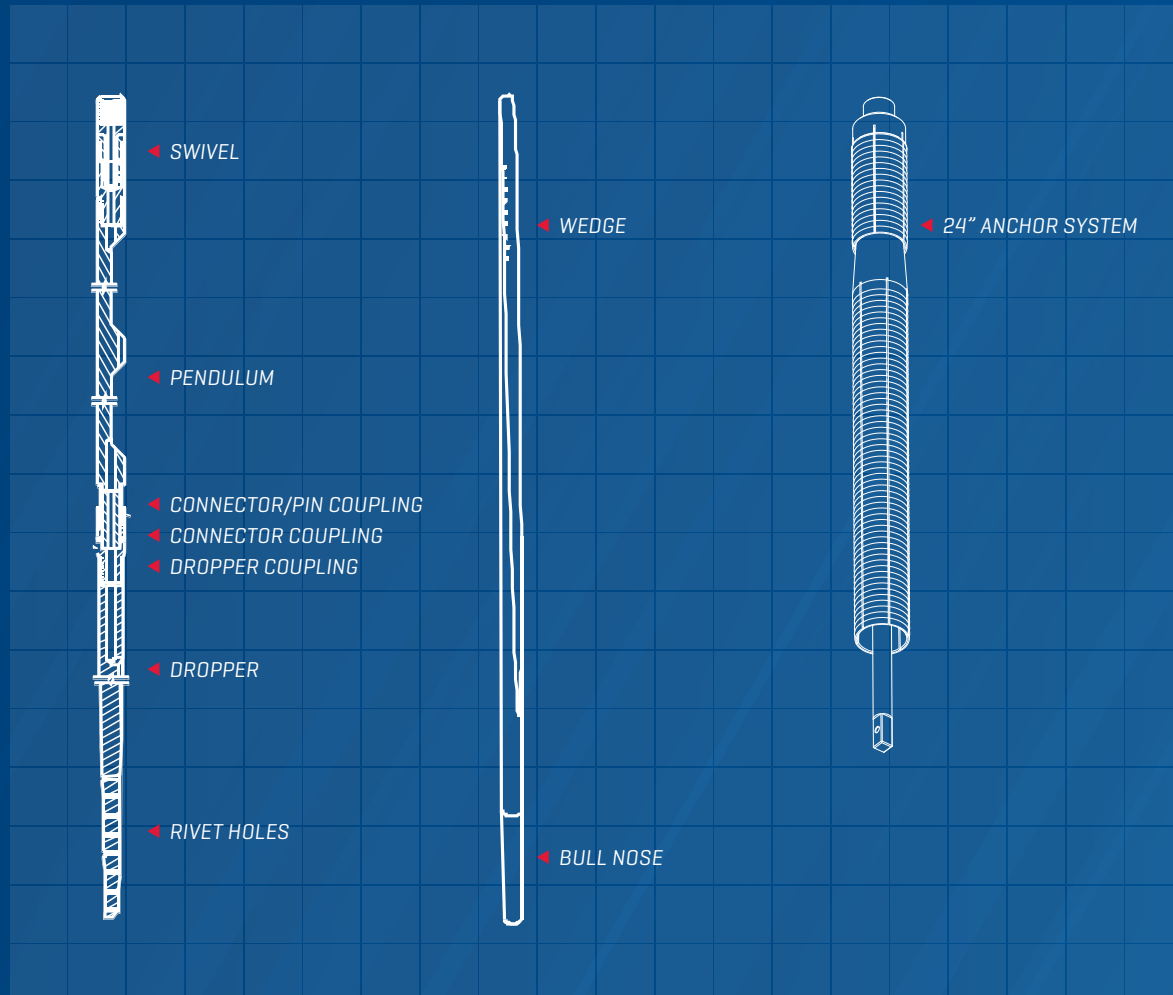


### **ACCURATE**

The REFLEX SMART WEDGE's new gravity orientation system has been proven to hold the tool face within 5 degrees of the selected orientation target. You can be confident the REFLEX SMART WEDGE will not only set accurately, but will also save time.



## HEADING



# REFLEX CONNECT



## **Survey data straight from the rig to the office**

REFLEX CONNECT allows seamless transfer of survey data from the drill rig to a secure, central database for review in near real-time.

It combines the accuracy and performance of REFLEX instrumentation, with the convenience of remote access to data through REFLEX HUB.

Survey and geochemical data is transferred automatically from the digital instrumentation to REFLEX HUB via a mobile device. Geologists can view and approve survey records and then commit them for storage. Data is then available for incorporation with other core geological data sets or exporting directly into mining and GIS software packages.

Survey data can be accessed in REFLEX HUB via a web browser from any location worldwide, in near real-time, with no need to travel to the rig.

RAPID BLUETOOTH  
SURVEY DATA  
TRANSFER INTO  
REFLEX HUB





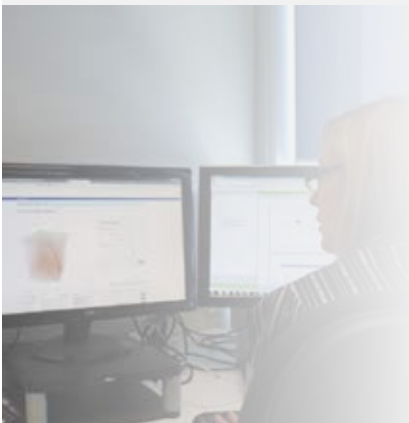
### SEAMLESS DATA TRANSFER

Survey or geochemical data are transferred seamlessly via Bluetooth from the survey tool or XRF to any Android or iOS mobile device, and then transmitted using the REFLEX CONNECT submission form or by attaching to the Daily Drill Report (DDR) to the secure, central REFLEX HUB database. Data can then be exported directly into mining or GIS software packages, in near real-time.



### RAPID ACCESS TO DATA

Once data is transmitted to REFLEX HUB, geologists receive immediate email notification and have instant access to the information for QC review and approval, before submitting records to the database in REFLEX HUB. Decision making on drill hole activity can now be managed interactively and no longer needs to wait for data transfer from site or inefficient manual data entry, delivering greater operational productivity.



### IMPROVED DATA ACCURACY

Manual entry and multiple handling of data are eliminated, improving accuracy and reducing time wasted on processing incorrect data. Survey data is allocated to the correct Drill Hole ID, as controlled by the REFLEX HUB Drillhole management system. Survey records can be reviewed using the QC guidelines to ensure only correct records are imported into the storage databases and issues with surveys can be identified immediately so that data can be re-collected by the drillers where necessary. A single data set is then accessible from any location worldwide.

# REFLEX HUB

## ***Accurate field data, with real time access from any location***

*REFLEX HUB is a complete Software-as-a-Service solution for the collection, storage and reporting of critical operational data.*

*REFLEX HUB incorporates mobile data collection to ensure accurate capture of field data. Data is seamlessly transferred from the drill site to a secure, central database where it can be accessed via a web browser from any location worldwide.*

*It is ideal for applications across the mining cycle, providing efficient drill hole and sample data management; from daily reporting requirements, including shift reports, pre-starts, safety reports, site inspections and employee accreditation, to geochemical logging, analysis and QA reporting.*

*REFLEX HUB provides a single source of truth, accessible globally, improving data quality and control, and minimizing issues with downstream data management. Combined with real time data access, it dramatically improves operational efficiency.*



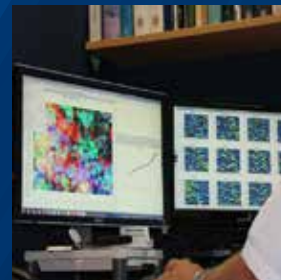
### ***Integrated system***

REFLEX HUB collects and manages data from selected REFLEX downhole survey and core orientation tools, REFLEX TN14 GYROCOMPASS rig aligner and REFLEX XRF, providing the option for greater visibility of all data associated with a single drill hole, or an entire operation, and improving management decision making.



### ***Paperless Solution***

Field data is captured, transmitted and stored electronically in REFLEX HUB's secure database. No paperwork is required, removing associated errors and inefficiencies from the workflow.



### ***Instant data***

Once data is transmitted into REFLEX HUB, it is available instantly to browse, export, report or map, from any internet connection worldwide. Data can be reviewed in real-time and decisions can be made immediately.



## REFLEX HUB DRILLING

Streamlines the collection of daily drilling information, reports are completed and automatically transmitted for approval and storage in the central database.

- Ideal for managing daily shift reports, pre-starts, safety reports, site inspections, maintenance, consumables and equipment use reporting;
- Easy to implement and use, REFLEX HUB operates on iOS and Android mobile platforms. Drillers require only 20 minutes training to competently use the system;
- Improves efficiencies and minimizes client enquiries with in-built data validation on entry ensuring accurate data is provided every time;
- Real time visibility of drilling information and vital statistics including meters drilled, utilization, chargeable activity and consumables. View the entire fleet, or drill down to one rig or driller.



## REFLEX HUB EXPLORATION & PRODUCTION

Ensures accurate logging of drill hole data and surface sample data in the field, pit or underground, with all input activities comprehensively tracked and audited.

- Standardizes data collection and logging, no need to combine data from various sources, types or formats;
- Improves accuracy through data validation on entry, trapping duplications and missing information;
- Automated, industry best practice QA/QC reporting, producing consistent, comprehensive reports in minutes, not weeks;
- Real time visibility of critical geological data, QA reports and drilling information for operations management and planning;
- Supports the requirements of the regulatory frameworks, such as NI-43101, JORC and SAMREC.



## REFLEX HUB MINING SERVICES

Removes paper based collection of activity data for companies providing services to the mining industry to improve efficiencies and deliver an exceptional level of service to the client.

- Ideal for safety audits, employee accreditation testing, environmental assessments, asset management and maintenance reporting;
- Provides real time visibility of all key statistics, multi-customer and multi-site, for operations management and planning;
- Minimizes risks associated with paper based systems, including lost paperwork and processing delays;
- Ensures timely data throughput for compliance to service provision conditions;
- Enhances productivity through quicker, more accurate data collection and transfer.

# REFLEX XRF



## **Real time geochemical information accessible from any location**

The REFLEX XRF combines instant geochemical results from the hand-held XRF with remote access provided through REFLEX HUB's data management solution.

Additionally, the REFLEX CONNECT-XRF application ensures data is transmitted directly from the field to REFLEX HUB to ensure robust and streamlined data availability.

Results from the field are converted to interpretive products within REFLEX HUB, all available in real time for effective, timely decision making.

**SIGNIFICANT WORKFLOW IMPROVEMENT, INSTANT GEOCHEMISTRY AND DATA MANAGEMENT**



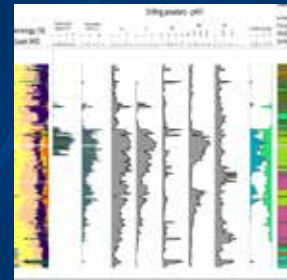
## **REAL TIME INFORMATION AND ANALYSIS**

The REFLEX XRF seamlessly collects and transmits geochemical data to REFLEX HUB, where in-built analytics produce derived outputs that can be used immediately for logging, domaining and classification. Geologists no longer need to wait up to three months for off-site assay results to determine their next move.



## **SIGNIFICANT TIME AND COST SAVINGS**

Simplified workflows and instant geochemical analysis results provide significant time and cost savings. Decisions can be made without delay, based on facts, to better manage drilling programs and save costs. REFLEX CONNECT users seamlessly extract results from the XRF including QA/QC data.



## **REMOTE ACCESS VIA REFLEX HUB**

Geologists can access their aggregated data and monitor the progress of the analytical program from any location globally. REFLEX HUB can be accessed simply through any web browser, whether on site, in the office or travelling. REFLEX HUB ensures all users have access to a "single point of truth".

## REFLEX XRF SPECIFICATIONS

|                                 |                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Weight                          | 1.5kg (without battery)                                                                                                                        |
| Dimensions                      | 260 x 240 x 90 mm                                                                                                                              |
| Excitation source               | 4W Rh, Ag, Au or Ta anode (per application) 40 or 50 keV X-ray tube                                                                            |
| Detector                        | Silicon drift detector                                                                                                                         |
| Environmental temperature range | -10°C to 50°C (14°F to 122°F)                                                                                                                  |
| Analytical range                | Geochem and Soil mode from Mg to U                                                                                                             |
| Processing electronics          | 530MHz CPU with integrated FPU with 128 MB RAM; Proprietary Count Digital Pulse Processor (DPP), <b>high count rate, reduced analysis time</b> |
| Smart electronics               | Accelerometer; Barometer for atmosphere pressure correction of light elements measurements                                                     |
| Power                           | Rechargeable Li-ion batteries; Hot-swap maintains analyser power during battery change                                                         |
| Display                         | 32 bit colour QVGA resolution, Blanview transmissive backlit touchscreen, 57 x 73mm (2.25 x 2.9 in)                                            |
| Data storage                    | 1 GB microSD (stores ~ 75 000 readings)                                                                                                        |
| Data transfer                   | USB, Bluetooth                                                                                                                                 |

## STANDARD ACCESSORIES

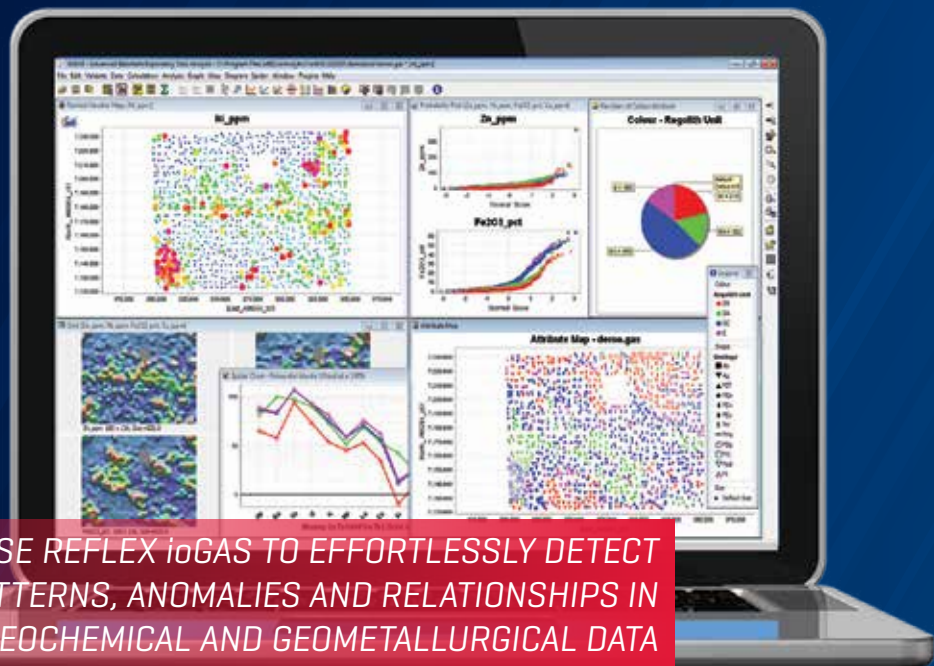
- Waterproof carrying case
- Two Li-ion batteries
- Electronic User Manual and User Interface guide
- Hard copy Quick Start Guide
- Docking station
- Mini USB cable
- 316 Stainless Steel calibration check reference coin
- Ten spare windows
- Integrated wrist strap
- **REFLEX CONNECT XRF Software**

## REFLEX ACCESSORY KIT BOX

- Analyser stand
- Soil foot and pole
- Standard reference materials and kits
- Tough book
- Mortar and pestle



# REFLEX ioGAS: DATA ANALYSIS SOFTWARE

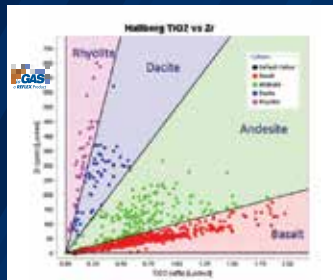


USE REFLEX ioGAS TO EFFORTLESSLY DETECT PATTERNS, ANOMALIES AND RELATIONSHIPS IN YOUR GEOCHEMICAL AND GEOMETALLURGICAL DATA



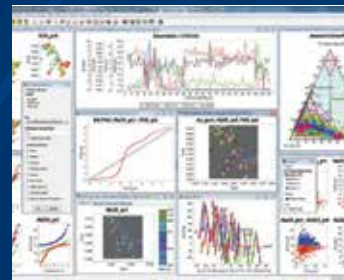
## INBUILT KNOWLEDGE

Knowledge from REFLEX ioGAS experts is captured to deliver optimised workflows and easy-to-use tools that incorporate industry best practice in interpretive techniques.



## STREAMLINE DATA

Import data from a variety of source formats including Excel, Text, CSV, REFLEX HUB, ODBC connection and selected field portable XRF units.



## REAL TIME DATA CAPTURE

Interact with data in real time using the REFLEX ioGAS dynamic graphical environment to get to the right targets and facilitate timely decision making.

## REFLEX ioGAS: DATA ANALYSIS SOFTWARE

### ADVANCED DATA HANDLING

- Streamlined data import (Excel, Text, CSV, REFLEX HUB, ALS Webtrieve, ODBC connection)
- Field portable XRF data import utility
- Data validation tools
- Automatic unit, oxide and molar conversions
- Missing data patterns
- Append new data

### DYNAMIC GRAPHICAL ENVIRONMENT

- Univariate statistics, histograms, probability plots, box plots
- Scatter plots, 3D plots, ternary plots
- Multiple plot generation and vector file output
- Templates for preset lists of diagrams and plot windows
- Store and restore checkpoints

### MULTIVARIATE STATISTICS

- Regression analysis
- Principal components analysis
- Mahalanobis distance analysis
- Cluster analysis
- Discriminant projection analysis

### PETROLOGY

- Comprehensive rock classification diagrams
- Up-to-date alteration indices from international journals
- Display mineral and rock composition nodes
- Point density gridding
- Normalise data to selected geochemical compositions

### MAP AND SPATIAL VISUALISATION

- Subset sample point data using colour, shape and size attributes
- Gridded interpolation maps
- View spatial distribution for more than 20 elements instantaneously
- 3D XYZ plots and stacked line plots for drillhole visualisation
- REFLEX ioGAS-Leapfrog Geo live link
- REFLEX ioGAS-GOCAD live link
- Export to Google Earth, ArcGIS, MapInfo, 3D DXF

### ADVANCED APPLICATIONS

Our team of geochemists have developed unique and effective tools for quickly and accurately identifying mineral exploration targets based on the following geochemical analytical methods:

- Tukey outlier identification
- Data levelling and weighted sums
- Parallel coordinate plots
- Robust multivariate statistical analysis

### MINING GEOMETALLURGY

Use REFLEX ioGAS to measure geometallurgical parameters and incorporate them into resource models to better estimate plant throughput rates, processing costs, ore recovery and improve mine planning.

- Compile rock properties such as specific gravity, multi-element data or phase specific data (e.g. extractable copper, sulphide sulphur, silicate nickel, carbonate, organic carbon) from exploration or grade control samples
- Estimate mineral compositions, hardness, grindability, liberation and acid consumption parameters
- Map deleterious elements
- Model ore deposit geometallurgical domains

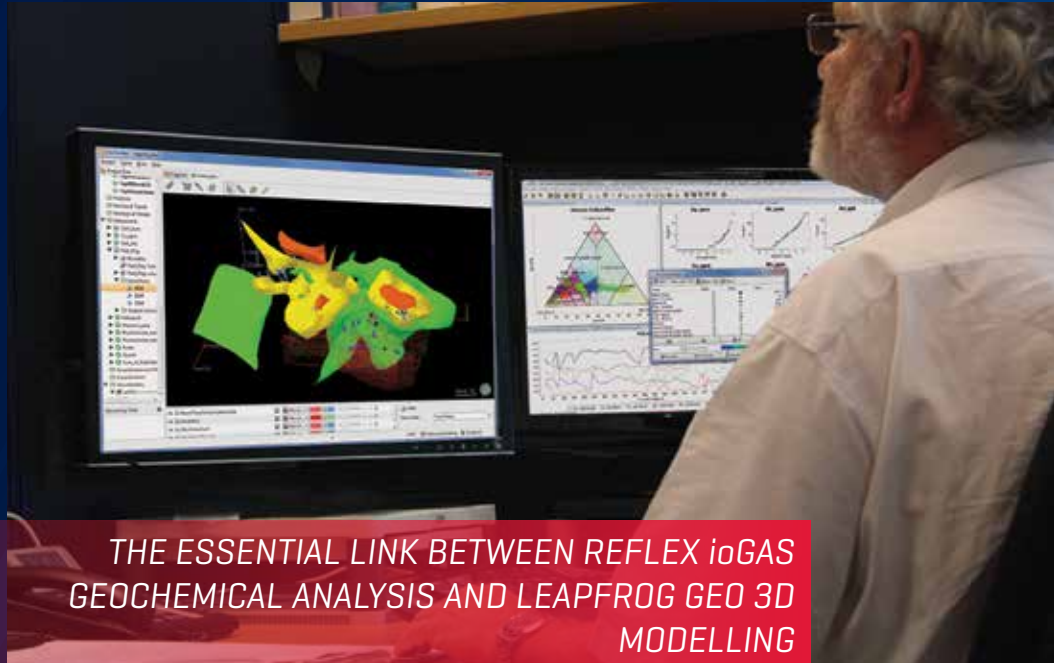
### TRAINING

A range of training options is available including public, online and custom in-house training courses. Get up to speed with our ioGAS Fundamentals course or for the more experienced user, enhance your ioGAS knowledge with our Advanced Techniques course. See our website for course details and upcoming training dates.

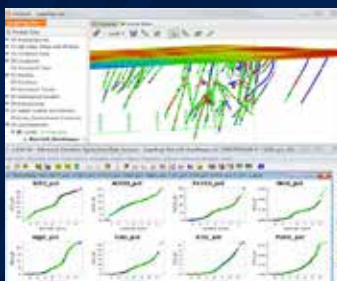
REFLEX Geochemistry can also provide applied geochemistry training (including ioGAS) as part of an exploratory data analysis workflow tailored to client-specific needs. A combination of theory and case study examples from a range of topics such as pathfinder associations, primary and secondary dispersion, partial leaches, surface sampling strategies, QAQC, litho-geochemistry, geometallurgy and target identification can be undertaken and applied to your own datasets.

**TRIAL ioGAS SOFTWARE:** Download a free two-week trial of ioGAS from our website. 32 and 64-bit Windows & Mac versions are available.

# REFLEX ioGAS LEAPFROG GEO LIVE LINK

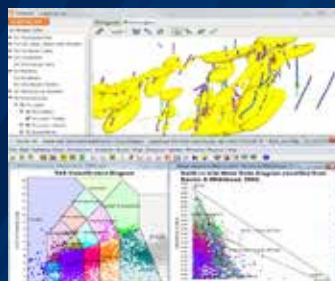


THE ESSENTIAL LINK BETWEEN REFLEX ioGAS  
GEOCHEMICAL ANALYSIS AND LEAPFROG GEO 3D  
MODELLING



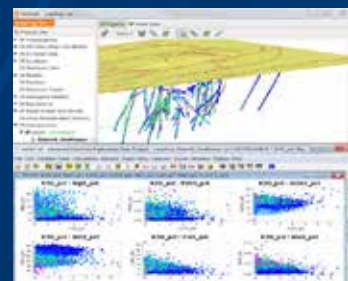
## REAL TIME VISUALISATION

The live link enables 3D drillhole assays or related data from Leapfrog Geo to be linked directly to REFLEX ioGAS allowing the user to do data validation and apply other exploratory data analysis techniques. The attributed results can be viewed instantaneously in Leapfrog Geo and used to generate interpolants to assist in the building of geological models.



## ENHANCED CAPABILITIES

Use REFLEX ioGAS to identify mineral exploration targets, map alteration zones or confirm lithological interpretations using specialised analysis and classification tools. Check geomettallurgical domains for homogeneity to better estimate plant throughput rates, processing costs, ore recovery and improve mine planning.



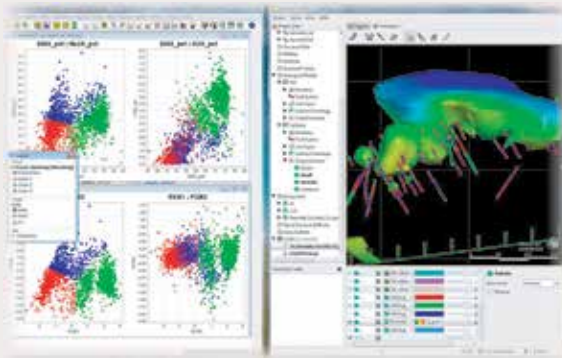
## STREAMLINE DATA

The REFLEX ioGAS – Leapfrog Geo live link simplifies the transfer of data between the two programs allowing all data, including interpreted mineralogy and alteration from ioGAS to be easily integrated into the Leapfrog Geo 3D graphical modelling environment. This streamlines the generation of multiple interpolants testing alternative hypotheses to produce more robust resource models.

## REFLEX ioGAS – LEAPFROG GEO LIVE LINK

### FEATURES

- Attribute, cluster, classify, domain and interrogate your data in ioGAS and view the results along with your other 3D spatial data in Leapfrog Geo instantaneously using the ioGAS Link.
- No importing and exporting required, simple interface.
- Rapidly create 3D interpolants from ioGAS outputs to spatially model, for example, rock type and alteration.
- Improve resource domaining by modelling element associations or mineral species and proportions.
- Preserve ioGAS outputs in the Leapfrog Geo project for later analysis.
- Quickly generate different geochemical or geometallurgical models to test alternative hypotheses.
- De-survey sample data in Leapfrog Geo and explore the located data in ioGAS.
- Attribute samples with spatial domains in Leapfrog Geo and check the domains for homogeneity or identify outliers in ioGAS.



### BENEFITS

- Access exploratory data analysis methods in ioGAS from Leapfrog Geo.
- Test alternative spatial models rapidly to reduce risk while domaining data.
- Improve rock type and alteration models.
- Better understand mineralogical variations and trace element deportment.
- Re-use material classification diagrams in ioGAS for consistent interpretations as new data becomes available.
- Generate more robust models.
- Leverage off existing software knowledge and training.
- Communicate results effectively to colleagues and management.

### HOW DO I GET IT?

The REFLEX ioGAS – Leapfrog Geo live link can only be used with active licences of Leapfrog Geo v1.3 and ioGAS v5.0 or later.

For all link purchasing and licensing enquiries please contact your local Leapfrog Geo sales team at [www.leapfrog3d.com](http://www.leapfrog3d.com)

For more information about the ioGAS software visit [www.reflexnow.com](http://www.reflexnow.com) or contact [iogas@imdexlimited.com](mailto:iogas@imdexlimited.com)

### TRAINING

Training in the use of the REFLEX ioGAS – Leapfrog Geo live link and/or customized training using your own data can be undertaken with both REFLEX Geochemistry and ARANZ Geo staff and is available upon request. See our website for course details and upcoming training dates.

REFLEX Geochemistry can also provide applied geochemistry training (including ioGAS) as part of an exploratory data analysis workflow tailored to client-specific needs. A combination of theory and case study examples from a range of topics such as pathfinder associations, primary and secondary dispersion, partial leaches, surface sampling strategies, QAQC, lithogeochemistry, geometallurgy and target identification can be undertaken and applied to your own datasets.

**TRIAL ioGAS SOFTWARE:** Download a free two-week trial of ioGAS from our website. 32 and 64-bit Windows & Mac versions are available.

# REFLEX GEOCHEMISTRY



ADD VALUE FROM GREENFIELDS TO PRODUCTION  
WITH REFLEX GEOCHEMISTRY



## THE RIGHT TEAM

Our clients gain the benefit of not just one expert but an integrated team of professional geochemists. We provide the right skills for the job at hand and the capacity to complete multiple large projects synchronously with peer review throughout the process. Our professional approach means projects are completed in a timely and efficient manner.



## THE RIGHT SKILLS

Access the knowledge and skills of the largest team of applied geochemists in the world. REFLEX Geochemistry works across the value chain from greenfields exploration, through orebody development to grade and mill output optimisation. The team has expertise in a diverse range of commodities, climates and terrains.



## THE RIGHT TOOLS

REFLEX Geochemistry work closely with data systems business units to develop advanced tools and techniques for data handling and interpretation. This enables our geochemists to focus on turning your data into knowledge, providing you with high-quality results in the most efficient manner.

## TARGETED SOLUTIONS FROM THE GLOBAL LEADERS IN APPLIED GEOCHEMISTRY

### GEOCHEMICAL DATA COMPILATIONS AND APPRAISALS

We can compile attributed geochemical datasets (in any format), merge and level multi-generation data and assess the quality and usefulness of historical company/government datasets, be it on a project or continental scale.

### TARGET GENERATION

Robust target generation requires integration of multiple datasets including assay data, hyperspectral data, regolith mapping, radiometrics and geology. Using industry leading exploratory data handling and analysis techniques, REFLEX Geochemistry will extract the maximum information from your data to aid in target generation, ground selection and drill-site prioritisation.

### TECHNICAL GEOCHEMICAL PROJECT MANAGEMENT

REFLEX Geochemistry can manage your geochemical programs including planning, analysis, data management, QAQC reporting, interpretation, imaging, target identification and costs. Whether you are sending your samples to a lab for assay or you are using a portable XRF unit; whether you are in Africa sampling termite mounds or India sampling village wells, REFLEX Geochemistry has the experience to maximise the effectiveness of your program.

### GEOMETALLURGY

REFLEX Geochemistry can utilise multi-element assay data to identify mineralogical controls related to key metallurgical processing parameters. REFLEX Geochemistry can also assist with phase specific assaying, where extraction of commodity elements is highly dependent on controlling mineral phases.

### QUALITY CONTROL PROGRAM DESIGN AND MONITORING

We can design and monitor QAQC programs to ensure your data are fit-for-purpose for your internal and stock exchange reporting requirements.



### TRAINING

REFLEX Geochemistry can provide applied geochemistry training (including ioGAS) as part of an exploratory data analysis workflow tailored to client-specific needs. A combination of theory and case study examples from a range of topics such as pathfinder associations, primary and secondary dispersion, partial leaches, surface sampling strategies, QAQC, lithogeochemistry, geometallurgy and target identification can be undertaken and applied to your own datasets.

A range of ioGAS training options is also available including public, online and custom in-house training courses. Get up to speed with our ioGAS Fundamentals course or for the more experienced user, enhance your ioGAS knowledge with our Advanced Techniques course. See our website for course details and upcoming training dates.

**TRIAL ioGAS SOFTWARE:** Download a free two-week trial of ioGAS from our website. 32 and 64-bit Windows & Mac versions are available.