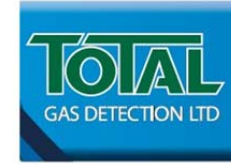


# Mudlogging Equipment Comparison Chart



iBall Instruments Enhanced Bloodhound System iBallInst.com	MSI MLogger (Green Box) With MControl (Hot Wire Like Equipment) TerraSLS.com	MSI MLogger 2.6.23 (RedBox) With MControl (Hot Wire Like Equipment) mudlogsys.com	SRI and Like FID Equipment srigc.com	Fluid Inclusion Technologies (FIT) DQ1000™ Mass Spectrometer fittulsa.com	Total Gas Detection LTD Chromatograph and FTIR Systems totalgas.ca
HISTORY	HISTORY	HISTORY	HISTORY	HISTORY	HISTORY
<p>iBall has been privately owned and operated by Inventor and Engineer Carl Bright since 2006, iBall does not have any overhead corporation interference and can quickly modify the system or services as a whole for customers with new and innovative solutions and a robust 24-7 technical support system available utilizing geologist engineers.</p>	<p>Purchased by Andy Kelly and Brandon Giddings back from MSI in 2016. Two units are sent per order. Technical support will return calls if messages are left. Technically the same equipment as the Red Box with additional sensors added.</p>	<p>Owned by 3 different companies in the last 5 years. Currently owned by Australian Laboratory Services (ALS). Two units are sent per order. Does not have 24-7 customer support</p>	<p>Originally founded as Schambeck SFD GmbH in 1991, SRI Instruments Europe GmbH was expanded in 2008 to carry other like items. Does not have dedicated technical support and utilizes antique techniques. Columns are fragile and do not travel well. Not designed as a dedicated piece of logging equipment and very expensive to maintain.</p>	<p>FIT was originally owned by Mike Sterner of Crown GeoChemistry which split from Warran and Christian logging company in 2005. Incredibly fragile and prone to very expensive breakdowns when in operation, FIT instrumentation has faced criticism since the output can only be read by "FIT engineers". Close to bankruptcy, FIT was sold to Schlumberger in 2015. No reasonable technical support.</p>	<p>Originally owned by the Canadian company by the same name, it started out as a chromatograph system and recently upgraded to a FTIR system which is supplied by BLOCK of Mass. Software is still in heavy flux. High CO2 and water vapor cause large errors in output. Since the developments of the iBall FTIR system, Total Gas and BLOCK was purchased by ALS in 2015. No reasonable technical support.</p>

<b>EQUIPMENT POWER</b>		<b>EQUIPMENT POWER</b>	<b>EQUIPMENT POWER</b>	<b>EQUIPMENT POWER</b>	<b>EQUIPMENT POWER</b>
Universal Power Supply 85 to 240 VAC 47-70 Hz operation	110 60 Hz VAC power only	110 60 Hz VAC power only	110 60 Hz VAC power only but can be configured at factory for 240 VAC	85-264 47-63Hz VAC power	Rig power only. Has no or very limited battery operation and needs to reboot after power failure.
Uses Isolated Universal Power Supply system.	Does not use isolated power system	Does not use isolated power system	Does not use isolated power system	Does not use isolated power system	Does not use isolated power system
Has internal battery backup system built in for 2 hour operation.	Does not have internal battery backup – Unit immediately shuts down on power loss - Must use separate customer supplied external UPS designed for wide swings	Does not have internal battery backup – Unit immediately shuts down on power loss - Must use separate customer supplied external UPS designed for wide swings.	Does not have internal battery backup – Unit immediately shuts down on power loss - Must use separate customer supplied external UPS designed for wide swings.	Does not have internal battery backup – Unit immediately shuts down on power loss - Must use separate customer supplied external UPS designed for wide swings.	Does not have internal battery backup – Unit immediately shuts down on power loss - Must use separate customer supplied external UPS designed for wide swings.
As a backup, Bloodhound can operate on 12VDC automotive power	110VAC 60 Hz only.	110VAC 60 Hz only.	AC power only	AC power only	AC power only
Can Drive any 12VDC load up to 10 amps	No DC output	No DC output	No DC output	No DC output	No DC output
Can run and monitor DC Cavitator extractor load	Cannot monitor any extractors	Cannot monitor any extractors	Cannot monitor any extractors	Cannot monitor any extractors	Cannot monitor any extractors
Has Extractor Overload Protection	Cannot power any extractor	Cannot power any extractor	Cannot power any extractor	Cannot power any extractor	Cannot power any extractor
Dedicated internal embedded processor and battery backup handles power fluctuations flawlessly without downtime.	Power fluctuations cause the Red Hat Linux PC104 computer to take up to 15 minutes to reboot and become operational losing critical information	Power fluctuations cause the Red Hat Linux PC104 computer to take up to 15 minutes to reboot and become operational losing critical information	Power fluctuations cause the instrument to reset and lose cycles	Power fluctuations cause the instrument to reset and lose data - not recommended, may lose internal vacuum	Power fluctuations cause the instrument to reset and lose data - not recommended, may lose internal vacuum
AC volts and frequency is a monitored item	No AC monitoring	No AC monitoring	No AC monitoring	No AC monitoring	No AC monitoring

Electrically isolated WITS interface	No electrical isolation from Rig power or communications system	No electrical isolation from Rig power or communications system	No electrical isolation from Rig power or communications system	No electrical isolation from Rig power or communications system	No electrical isolation from Rig power or communications system
Electrically isolated secondary geograph input	Secondary geograph input but not electrically isolated	Secondary geograph input but not electrically isolated	No gelolograph input	No gelolograph input	No gelolograph input
Local and remote AC power loss alarm	Unit immediately shuts down on power loss.	Unit immediately shuts down on power loss.	Unit immediately shuts down on power loss.	Unit immediately shuts down on power loss.	Unit immediately shuts down on power loss.
System designed for overload, spike, sag, and static electricity. Designed to comply with NEBS level 3 testing.	Simple internal 24VAC open frame power supply with standard PC computer power supply running internal PC104 computer.	Simple internal 24VAC open frame power supply with standard PC computer power supply running internal PC104 computer.	Simple internal switching power supply	Unknown	Simple internal switching power supply
<b>TEMPERATURE</b>	<b>TEMPERATURE</b>	<b>TEMPERATURE</b>	<b>TEMPERATURE</b>	<b>TEMPERATURE</b>	<b>TEMPERATURE</b>
Monitors Internal Case Temperature and can detect when trailer heaters have been left on and unattended.	Does not monitor any internal temperatures	Does not monitor any internal temperatures	Has temperature settings for CG column, but does not remotely monitor any internal temperatures	Does not monitor or regulate temperatures	Must regulate internal temperature or wild output fluctuations will and do occur.
Monitors HRM Detector Block. Regulates internal case temperature for extreme environments and is remotely monitored.	Has to have a heated temperature controlled Detector Block or gas units will drift. No temperature regulation of CG column.	Has to have a heated temperature controlled Detector Block or gas units will drift. No temperature regulation of CG column.	Column and injection port are heated to high temperatures but is not remotely monitored or controlled.	Unknown	Internal temperature must be maintained to a specific bandwidth for proper operation or unit will fail to operate.
Has temperature controlled chromatograph column for precise separation control over extreme environmental temperature changes.	Case temperature changes can drastically change the CG separation timings.	Case temperature changes can drastically change the CG separation timings.	Extreme case temperature changes can change the separation timings. Not recommended in extreme temperature environments	Not published and not recommended in extreme temperature environments	Not published and not recommended in extreme temperature environments

Has electronically controlled filtered cooling fans for positive case pressure to keep dust and debris out of case	One cooling fan on all the time. No filtering. Dust is easily sucked into machine causing damage	One cooling fan on all the time. No filtering. Dust is easily sucked into machine causing damage	One cooling fan on all the time. No filtering. Dust is easily sucked into machine causing damage	One cooling fan on all the time. No filtering. Dust is easily sucked into machine causing damage	Unit utilizes aluminum case for heat sink.
Settable temperature alarms for low and high temperature range alarms	No temperature alarms	No temperature alarms	No temperature alarms	No temperature alarms	No temperature alarms
<b>CHROMATOGRAPH</b>	<b>CHROMATOGRAPH</b>	<b>CHROMATOGRAPH</b>	<b>CHROMATOGRAPH</b>	<b>CHROMATOGRAPH</b>	<b>CHROMATOGRAPH</b>
High temperature AZVO™ packing material lasts at least twice as long as conventional Silica Hexane Columns and is not effected by water or other contaminants.	Chromatograph column must be changed at least every 5 months if not sooner.	Chromatograph column must be changed at least every 5 months if not sooner.	Can have complex multi column design which requires Maintenance.	Does not have column. Must have readings from output interpreted by expert	FTIR relies on complicated software and firmware interaction 100% of the time. Can have wild fluctuations due to temperature or inlet or exhaust partial blockages.
No Hassle fixed pressure medical grade brushless 20,000 hour pump that is easy to service by end user.	Physical variable pressure regulator needed to be adjusted by on site user to adjust column timing since column is not temperature controlled.	Physical variable pressure regulator needed to be adjusted by on site user to adjust column timing since column is not temperature controlled.	Must use external Hydrogen, Helium, Nitrogen or other like high pressure tanks that must be monitored and maintained and is sometimes hazardous.	Does not have column. Must have readings from output interpreted by expert	Internal pumps are brushless but does not monitor flow rates.
Separation timing is handled through electronic temperature control of the column. Temperature can be monitored and controlled remotely.	Physical variable pressure regulator needed to adjust column timing and adjusted on site.	Physical variable pressure regulator needed to adjust column timing and adjusted on site.	Separation timing must be controlled by external computer or through front panel. Must use temperature program and is not user friendly.	Does not have column. Has adjustable 90 to 360 second cycle time. Must have readings from output interpreted by expert	Does not have column. Internal interferometer must be kept contaminant free or the unit will immediately fail and will not inform the user.

Automatically adjustable injection timing allows for larger injections with low gas units and smaller injections for large gas units and protects against any system saturation. Timing can be set from 3 to 15 minutes.	Column can be saturated with gas on high gas units and little or no separations on low gas units. CG sensor can be damaged with too much gas injected causing failure of CG column	Column can be saturated with gas on high gas units and little or no separations on low gas units. CG sensor can be damaged with too much gas injected causing failure of CG column.	Injection timing must be set up with external computer or on front panel and can be adjusted for 3 to 6 minutes.	Does not have column. Has adjustable 90 to 360 second cycle time. Must have readings from output interpreted by expert	Calibration is done with nitrogen gas or with a hard vacuum in the sample chamber. Neither of which is available on site. If calibration drifts, it must be replaced by a service tech.
Automatic injection timing allows for separations on as low as 5 gas units and no saturation at 10,000 gas units.	User training is needed for correct Injection timing and must be manually adjusted for best separation results. Sometimes on a per injection basis	User training is needed for correct Injection timing and must be manually adjusted for best separation results. Sometimes on a per injection basis	A new program has to be loaded to change cycle time and adjustments to CG parameters..	Does not have column. Has adjustable 90 to 360 second cycle time. Must have readings from output interpreted by expert	High heavy gasses will cause the unit to askew outputs and have inaccurate C1-C2 gasses.
Bloodhound automatically adjusts injection timing for best possible Chromatograph results.	Detector damage WILL result in too long of an injection timing on high gas units	Detector damage WILL result in too long of an injection timing on high gas units	Saturation can occur on FID if too much injection is programmed into system.	Does not have column. Has adjustable 90 to 360 second cycle time. Must have readings from output interpreted by expert	Adjustments to the calibration must be done in a laboratory.
Chromatograph pressure is a monitored item and can be seen remotely. Alarms on pump failure.	Chromatograph column pressure is unknown and not monitored.	Chromatograph column pressure is unknown and not monitored.	Pressures are set manually and not monitored remotely. Losses in carrier gas caused instrument to malfunction.	Must have readings from output interpreted by expert.	Pressures and flow rates are not monitored.
Condensed water is allowed to travel through column and does not cause problems.	Condensed water is collected in front filter trap. If allowed in column, it may plug up.	Condensed water is collected in front filter trap. If allowed in column, it may plug up.	Water generally does not cause problems if not too much. If too much water is injected, system may fail.	Do not inject water into machine or damage will occur.	Condensate that is introduced into the system will cause the system to immediately fail and it will have to be replaced with a different unit.

Column is easily serviced or changed with no tools or training needed.	Tools and training needed to change column	Tools and training needed to change column	Unit must have a major tear down for <u>any</u> service or maintenance; including servicing the column. Usually by trained personnel.	Does not have column. Has adjustable 90 to 360 second cycle time. Must have readings from output interpreted by expert	Does not have column and must be serviced at the manufacturer.
Remote column temperature control allows for separation and timing changes remotely	No remote access to chromatograph variables or monitoring.	No remote access to chromatograph variables or monitoring.	No remote access to chromatograph variables or monitoring.	Does not have column. Must have readings from output interpreted by expert	Does not have any remote ability to change regulation temperatures.
Master Injection timing, Column temperature, and cycle time are all adjustable locally and remotely.	No remote access to chromatograph variables.	No remote access to chromatograph variables.	No remote access to chromatograph variables.	No remote access to operational variables.	No remote access to operational variables.
3 to 15 minute elution time	6 to 8 minute elution time	6 to 8 minute elution time	3 to 15 minute elution time	90 - 360 second elution time	5-30 second resolution times if in perfect condition. Longer if accuracy is needed.
5 ft. column	6 ft. column	6 ft. column	Unknown	No column	No column
C1 through NC5 (7 gasses)	C1 through NC4 (5 gasses)	C1 through NC4 (5 gasses)	C1 through C6	C1 through C12, however it is not explained how the heavy liquids are analyzed or injected as gasses for testing.	C1-C4 (as brochure states) However, firmware and software changes may be able to enhance this range.

DETECTORS	DETECTORS	DETECTORS	DETECTORS	DETECTORS	DETECTORS
Total gas units detector is a single infrared detector. Will not saturate or fail on high gas units. No air dilution needed. Simplistic sample and chromatograph gas flow. Lasts over 2 years of solid continuous use. 0 - 10,000 gas units.	Total gas units detector uses a Pelistor (type of hot wire) for the low range and a Thermal Coefficient Detector (TCD) for the high range. The Pelistor can fail as well as the TCD. Sometimes in short order. Usually multiple units are sent to a single customer to overcome this failure.	Total gas units detector uses a Pelistor (type of hot wire) for the low range and a Thermal Coefficient Detector (TCD) for the high range. The Pelistor can fail as well as the TCD. Sometimes in short order. Usually multiple units are sent to a single customer to overcome this failure.	Flame Ionization Detector. Usually best used in laboratory installations. Requires fuel gas that can be hazardous. Some models are fragile and require constant calibration. Not best suited for harsh environments.	Reported as Quadrapole Mass Analyzer. Sensitive to setup and environment. Must have specialist nearby in case system fails.	<b>Single wide band IR detector and gas ignitor IR source running at over 800 deg F. AND IS CURRENTLY AN EXPLOSION HAZZARD.</b>
Gas unit high range and low range automatically switches and adjusts. One infrared sensor for both ranges.	Manual adjustments to the Pelistor and TCD are needed periodically via equipment panel.	Manual adjustments to the Pelistor and TCD are needed periodically via equipment panel.	Manual adjustments to the FID are required on a regular basis to keep the unit in calibration.	Calibration is unknown and is performed only by equipment specialist.	Calibration is unknown and is performed only by equipment specialist.
Due to Infrared design and multisensory patent pending systems, the Bloodhound will easily go 6+ months without a calibration and can be touched up remotely and has self-re-calibration ability.	User must calibrate quite regularly to see if the Pelistor or TCD has failed and to see how much sensitivity they have lost. Sensors can fail without the user knowing.	User must calibrate quite regularly to see if the Pelistor or TCD has failed and to see how much sensitivity they have lost. Sensors can fail without the user knowing.	Sensor failure is usually known instantly but calibration is required very regularly to keep the unit within specifications.	Calibration is unknown and is performed only by equipment specialist.	Calibration is unknown and is performed only by equipment specialist, however it is claimed to go as long as it does not get contaminated or flow changes.
Has integrated oxygen sensor that per patented process that can allow the sensor to self-re-calibrate or remotely by technical support.	Has Oxygen sensor but is allowed to drift on its own without means for customer to easily correct. Oxygen sensor is not normally used in operations unless specifically requested.	No Oxygen sensor	Can detect Oxygen if set up to detect it but it usually is not.	Data sheet shows that it can detect Oxygen but is unknown as to how accurate.	No Oxygen detection.

Has integrated CO2 sensor that can self re-calibrate when needed or easily touched up by customer or remotely by technical support..	Has CO2 sensor but is allowed to drift on its own without means for customer to easily correct. CO2 sensor is not normally used in operations unless specifically requested.	No CO2 sensor	Can detect CO2 if set up to detect it but usually not.	Data sheet shows that it can detect CO2 but is unknown as to how accurate.	Limited CO2 detection. Large amounts of CO2 can drastically effect the output resolution and accuracy.
Has integrated Hydrogen Sulfide sensor that can easily be touched up by customer or remotely by technical support.	Has Hydrogen Sulfide sensor but is allowed to drift on its own without means for customer to easily correct. Hydrogen Sulfide sensor is not normally used in operations unless specifically requested.	No Hydrogen Sulfide sensor	Can detect H2S if set up to detect it but usually not.	Cannot detect Hydrogen Sulfide.	Cannot detect Hydrogen Sulfide
The BloodhoundTCD system for the chromatograph as well as a variable duration injection to protect the detector from any damage.	Chromatograph gas units detector uses a Pelistor (type of hot wire) The Pelistor may fail on high gas units with a large injections	Chromatograph gas units detector uses a Pelistor (type of hot wire) The Pelistor may fail on high gas units with a large injections.	FID can drift over time and will need calibration regularly to keep in within specifications.	Calibration is unknown and is performed only by equipment specialist.	Calibration is unknown and is performed only by equipment specialist.
Chromatograph sensor is fully automatic. No zeroing or manual adjustments necessary.	Must manually adjust chromatograph zero knob to adjust the detector element from time to time. Especially if hit with high gas units.	Must manually adjust chromatograph zero knob to adjust the detector element from time to time. Especially if hit with high gas units.	CG must be calibrated on a regular basis due to drifting of the column or sensor	Calibration is unknown and is performed only by equipment specialist.	Calibration is unknown and is performed only by equipment specialist.
Bloodhound monitors Chromatograph and infrared detectors for failure and notifies system and also remote systems.	If sensor becomes bad sensitivity suffers – many times without user knowledge.	If sensor becomes bad sensitivity suffers - sometimes without user knowledge.	Failure would only alarm locally and not remotely. There is no remote system.	Failures alarms are local and cannot remotely alert.	Failures alarms are local and cannot easily remotely alert.



<b>SAMPLE</b>	<b>SAMPLE</b>	<b>SAMPLE</b>	<b>SAMPLE</b>	<b>SAMPLE</b>	<b>SAMPLE</b>
Brushless medical grade 20,000 hour sample pump is controlled electronically to adjust flow rate.	Sample rate is controlled manually using adjustable acrylic flow block and can only be done locally. It is not remotely monitored	Sample rate is controlled manually using adjustable acrylic flow block and can only be done locally. It is not remotely monitored.	Sample rate is controlled manually and can only be done locally. It is not remotely monitored.	Sample rate is controlled manually and can only be done locally. It is not remotely monitored.	Brushless 10,000 hour pump. It is unable to control flow rate and pressures.
Electronic flow meter warns of occlusions or pump failures.	No electronic flow meter or alarms. Unit has visible bead acrylic block flow meter on front panel.	No electronic flow meter or alarms. Unit has visible bead acrylic block flow meter on front panel.	No electronic flow meter or alarms. Must be set up external to machine.	No electronic flow meter or alarms. Must be set up at machine.	No flow meter.
Electronic monitoring of pumps and will alarm on any failure.	No monitoring and no alarms on pump failure.	No monitoring and no alarms on pump failure.	No monitoring and no alarms on pump failure.	No monitoring on pump failure.	No monitoring on pump failure.
Sample line vacuum monitoring that warns of impending occlusion before it happens.	No monitoring of sample vacuum. No alarms on occlusion or impending occlusion	No monitoring of sample vacuum. No alarms on occlusion or impending occlusion.	No monitoring of sample vacuum. No alarms on occlusion or impending occlusion.	No monitoring of sample vacuum. No alarms on occlusion or impending occlusion.	No monitoring of sample vacuum. No alarms on occlusion or impending occlusion.
Closed loop feedback of sample rate monitors all aspects of sample flow.	No monitoring of sample line.	No monitoring of sample line.	No monitoring of sample line.	No monitoring of sample line.	No monitoring of sample line.
Exhaust Line pressure monitored for blockage and safety	No electronic monitoring of any pressures.	No electronic monitoring of any pressures.	No remote electronic monitoring of any pressures.	No remote electronic monitoring of any pressures.	No remote electronic monitoring of any pressures.
Flow rate electronically monitored remotely.	No flow rates or pressures are electronically monitored	No flow rates or pressures are electronically monitored.	No flow rates or pressures are electronically monitored.	No flow rates or pressures are electronically monitored.	No flow rates or pressures are electronically monitored.
Percent power given to the sample motor is monitored.	No pump power percentages are monitored.	No pump power percentages are monitored.	No flow rates or pressures are electronically monitored.	No flow rates or pressures are electronically monitored.	No flow rates or pressures are electronically monitored.

Unit monitors for incoming liquid water condition. Upon detection, sample pump is shut off and alarm issued. Can be serviced locally by untrained personnel.	No filtering. Water flooding causes damage and must be cleared out. Unit must be removed for service.	No filtering. Water flooding causes damage and must be cleared out. Unit must be removed for service.	Liquid water flooding causes damage and must be cleared out. Unit must be removed for service.	Liquid water flooding causes damage. Unit must be removed for service.	Liquid water flooding causes damage. Unit must be removed for service.
<b>REMOTE ACCESS AND CONTROL</b>	<b>REMOTE ACCESS AND CONTROL</b>	<b>REMOTE ACCESS AND CONTROL</b>	<b>REMOTE ACCESS AND CONTROL</b>	<b>REMOTE ACCESS AND CONTROL</b>	<b>REMOTE ACCESS AND CONTROL</b>
Remote firmware updates on the fly and remotely.	Unit must be removed from service to have the internal software changed.	Unit must be removed from service to have the internal software changed.	Unit must be removed from service to have the internal software changed.	Unit must be removed from service to have the internal software changed.	Unit must be removed from service to have the internal software changed.
Unit is a true standalone device, set and remotely monitor and chart unit.	Unit has to have attached Personal Computer at all times.	Unit has to have attached Personal Computer at all times.	Unit has to have attached Personal Computer at all times.	Unit has to have attached Personal Computer at all times.	Unit has to have attached Personal Computer at all times unless directly connected to WITS interface system.
PC charting software allows for remote charting and logging without any special software.	Site must have a high speed satellite connection or other Ethernet connection and must setup and use Virtual Private Networking (VPN) for a single remote connection.	Site must have a high speed satellite connection or other Ethernet connection and must setup and use Virtual Private Networking (VPN) for a single remote connection.	None reported.	None. Remote users must Remote Desktop to connected PC if the Rig allows it through the fire wall.	None reported.
Bloodhound System has built in 3G modem with WiFi system. Both AT&T and Verizon networks utilized.	Unit has WiFi router built in for external connection.	Unit has WiFi router built in for external connection.	No wireless ability	No wireless ability	Wireless system connects to local rig only.

On Line web based real time viewer allows viewing of true real time data.	Very limited real time viewer	Very limited real time viewer	No real time view system	None. Remote users must Remote Desktop to connected PC if the Rig allows it through the fire wall.	No real time view system except through local WITS system.
All on site WITS information is remotely viewable in real time.	Very limited WITS viewing	Very limited WITS viewing	No real time view system	None. Remote users must Remote Desktop to connected PC if the Rig allows it through the fire wall.	Very limited WITS viewing
Everything the Bloodhound does can be monitored remotely.	Very limited remote monitoring available through VPN.	Very limited remote monitoring available through VPN.	No real time view system	None. Remote users must Remote Desktop to connected PC if the Rig allows it through the fire wall.	No real time view system
Pumps can be shut down remotely	Pumps cannot be shut down without shutting off the entire unit	Pumps cannot be shut down without shutting off the entire unit	Pumps cannot be shut down without shutting off the entire unit	Pump(s) cannot be shut down without shutting off the entire unit	Internal pump cannot be shut down without shutting off the entire unit
Calibration of unit can be adjusted or performed remotely	Calibration must be performed on site.	Calibration must be performed on site.	Calibration must be performed on site.	Calibration must be performed by trained specialist only.	Calibration must be performed by trained specialist only in lab.
Remote diagnostics, adjustments, and troubleshooting of all connections and internal operations.	No remote diagnostics or troubleshooting. Distal persons cannot adjust anything.	No remote diagnostics or troubleshooting. Distal persons cannot adjust anything.	No remote diagnostics or troubleshooting. Distal persons cannot adjust anything.	No remote diagnostics or troubleshooting. Distal persons cannot adjust anything.	No remote diagnostics or troubleshooting. Distal persons cannot adjust anything
Remote alarm of over 20 parameters	Minimal remote alarms	Minimal remote alarms	No remote alarms	No remote alarms	Minimal local alarms
Remotely correct depth	Unable to remotely correct depth	Unable to remotely correct depth	Unable to remotely correct depth	Unable to remotely correct depth	Unable to remotely correct depth

<b>WEB PRESENCE</b>	<b>WEB PRESENCE</b>	<b>WEB PRESENCE</b>	<b>WEB PRESENCE</b>	<b>WEB PRESENCE</b>	<b>WEB PRESENCE</b>
All data is easily transferred back to the iBall Instruments server via, satellite, Built in 3G and WiFi modem, or rig satellite.	None without complex extranet VPN connection and a high speed satellite connection. No internal cellular connection available.	None without complex extranet VPN connection and a high speed satellite connection. No internal cellular connection available.	None	None	None
Stored server data is transformed into charts that are easily viewable using any browser and is Password protected.	Limited browser viewing available.	Limited browser viewing available.	None	None	None
Server system allows for remote control of the Bloodhound through simple commands and a standalone program.	Limited browser viewing available.	Limited browser viewing available.	None	None	None
Server system allows for viewing of all color coded real time data	Limited browser viewing available.	Limited browser viewing available.	None	None	None
Server system is a forth backup of the data being collected	Limited browser viewing available.	Limited browser viewing available.	None	None	None
Visible gas units charting is auto ranging	Limited browser viewing available.	Limited browser viewing available.	None	None	None
O2 trace visible on website	None	None	None	None	None
CO2 trace visible on website	Limited browser viewing available.	Limited browser viewing available.	None	None	None
Rate of penetration on website	Limited browser viewing available.	Limited browser viewing available.	None	None	None

On error, text messages or emails are sent to the defined user and are controlled through the website	None	None	None	None	None
Download automatically generated LAS, XLS, and data base files directly from the website	Limited browser viewing available.	Limited browser viewing available.	None	None	None
Download a history of all alarms	None	None	None	None	None
Password control is handled through website by defined super users in technical support.	Limited browser viewing available.	Limited browser viewing available.	None	None	None
Log file of all who has had access to website available for download by super users.	None	None	None	None	None
On line chart viewing and down load of LAS, XLS, and data base.	Limited browser viewing available.	Limited browser viewing available.	None	None	None

<b>GENERAL</b>	<b>GENERAL</b>	<b>GENERAL</b>	<b>GENERAL</b>	<b>GENERAL</b>	<b>GENERAL</b>
Reported uptime > 99.99	Two units are generally sent per rental because of the failure rate	Two units are generally sent per rental because of the failure rate	Uptime is directly related to user training and care of unit on site.	Unknown. Specialist has to be ready for any failures or maintenance.	Uptime is directly related to user training and care of unit on site. Any failures or partial failures require the changing of the equipment.
Easy maintenance with industrial Velcro mounting and nylon nuts. Simple tubing routing using common hardware. Easily serviced by untrained personnel.	Maintenance remains difficult with a large tubing count and placements.	Maintenance remains difficult with a large tubing count and placements.	Maintenance is done only by trained personnel and can be long and expensive.	Unknown. Specialist has to be ready for any failures or maintenance.	Unknown. Specialist has to be ready for any failures or maintenance.
Almost all repair hardware is available on line or purchased at the local hardware store or can be shipped overnight from iBall Instruments.	Many proprietary items in the case.	Many proprietary items in the case.	Items must be ordered from the manufacturer and maintenance is complicated.	Unknown. Specialist has to be ready for any failures or maintenance.	All items in the case are proprietary items.
Shipping is simplified with foam lined common suitcase.	Hard case is the shipping container.	Hard case is the shipping container.	Shipping must be handled by owners and damage can occur if not packed correctly or column is too fragile.	Machine should not be moved while in operation.	Machine should not be moved while in operation or output will change.
All connections are easily available on the side of the case.	Almost all connections are on the back of the machine	Almost all connections are on the back of the machine	Fittings are specialized and are not readily available.	All connections are hard to get to and are on the back of the machine.	Fittings are specialized and are not readily available.

DB9 serial interface, Ethernet, or USB B connection	Ethernet interface only	Ethernet interface only	USB B connection or serial connection.	Very limited Serial/Ethernet connection.	Limited Serial/Ethernet connection.
External filtered positive pressure inlet keeps dust and dirt out of case at all times.	No filtering on cooling fan.	No filtering on cooling fan.	No filtering on cooling fan.	No filtering on cooling fan.	Uses case has heat sink where needed.
Quad redundant data storage ability. Internal, attached USB drive, connected PC, and remote servers.	Internal and attached PC.	Internal and attached PC.	Attached PC storage only.	Attached PC storage only.	No internal data storage retention. No internal backup of data.
Case can be closed during normal operation for remote solitary deployment.	Case must be open during operation.	Case must be open during operation.	Do not operate equipment alone.	Running the equipment without a user is not recommended.	Running the equipment without a monitor is not recommended.
Remote control, diagnosis, and operation of all parameters	Almost no remote control features or system monitoring except for shutdown - without restart	Almost no remote control features or system monitoring except for shutdown - without restart	No remote control features.	No known remote features.	No known remote features.
Noisy geograph alarm when in proximity of noisy lines	No noisy geograph detection	No noisy geograph detection	No geograph input.	No geograph input.	No geograph input.
Simply change job number to change jobs, even remotely.	On new jobs, customer must clear the computer system of old job possibly losing previous job data.	On new jobs, customer must clear the computer system of old job possibly losing previous job data.	No differentiation between Jobs and data base.	No differentiation between Jobs and data base.	No data base.
Has built in Pason WITS 10 pin RS422 Rignet interface as well as 9 pin serial WITS.	9 pin WITS interface.	9 pin WITS interface.	No WITS interface.	9 pin WITS interface.	WITS interface is done at the equipment through specialized and expensive cabling.

Large back lit graphical LCD allows for immediate user feedback and setup anything at the Bloodhound console.	Must have PC computer connected to set or do anything.	Must have PC computer connected to set or do anything.	Must have PC computer connected to set or do anything.	Must have PC computer connected to set or do anything.	Must be wirelessly connected to local PC.
4GB internal storage.	Some system files must be cleared if too much information is stored on the internal hard drive.	Some system files must be cleared if too much information is stored on the internal hard drive.	No internal storage	No internal storage	No internal storage
Easy operation; 1 knob 3 buttons to learn.	10 knobs 4 flowrators 1 gauge 1 button, 3 water traps, and 1 switch to learn. Easy to misconfigure and if so, cannot be corrected remotely.	9 knobs 4 flowrators 1 gauge 1 button and 1 switch to learn. Easy to misconfigure and if so, cannot be corrected remotely.	Complex software to learn.	User basically watches the unit. No user intervention or setup is suggested.	User basically watches the unit. No user intervention or setup is suggested. No user serviceable parts inside.
1 sample line in and 1 exhaust line out - Different sizes no confusion	6 tubing fittings for inlets and exhausts - all the same size	6 tubing fittings for inlets and exhausts - all the same size	Different specialized fitting and sample inlets. Sample must be pre-treated before injection. (driers pumps etc.)	Different specialized fitting and sample inlets. Sample must be pre-treated before injection. (driers pumps etc.)	Different specialized fitting and sample inlets and exhaust. Sample must be pre-treated before injection. (driers pumps etc.) or failure will happen. Failure to maintain dryer will cause unit to fail.
Can emulate the output of custom hot wire, FID, Redbox, BlueBox, or any other type of gas detector.	Very limited output character adjustments.	Very limited output character adjustments.	Output is an FID.	Unknown output.	Output is based on the users PC software.



Real Time Data viewers are all color coded and placed so they are easily seen from across the room.	Minor color coding of data	Minor color coding of data	Software dictates operation of data and is not easily viewable.	Complex software for the user to be trained on. Not easily viewable.	Complex software for the user to be trained on. Not easily viewable
Automatically interfaces to popular software packages.	Proprietary software only. Can output LAS files.	Proprietary software only. Can output LAS files.	Software does not always output LAS files and must use secondary program.	LAS files are generated.	PC software must generate LAS files.
Weight: 27.8 Pounds - 12.6 Kilograms – 19” Wide, 15.5” Deep, 7” high	Weight: 54.6 Pounds - 24.8 Kilograms	Weight: 54.6 Pounds - 24.8 Kilograms	About 60 pounds.	About 51 pounds.	About 62 pounds.