

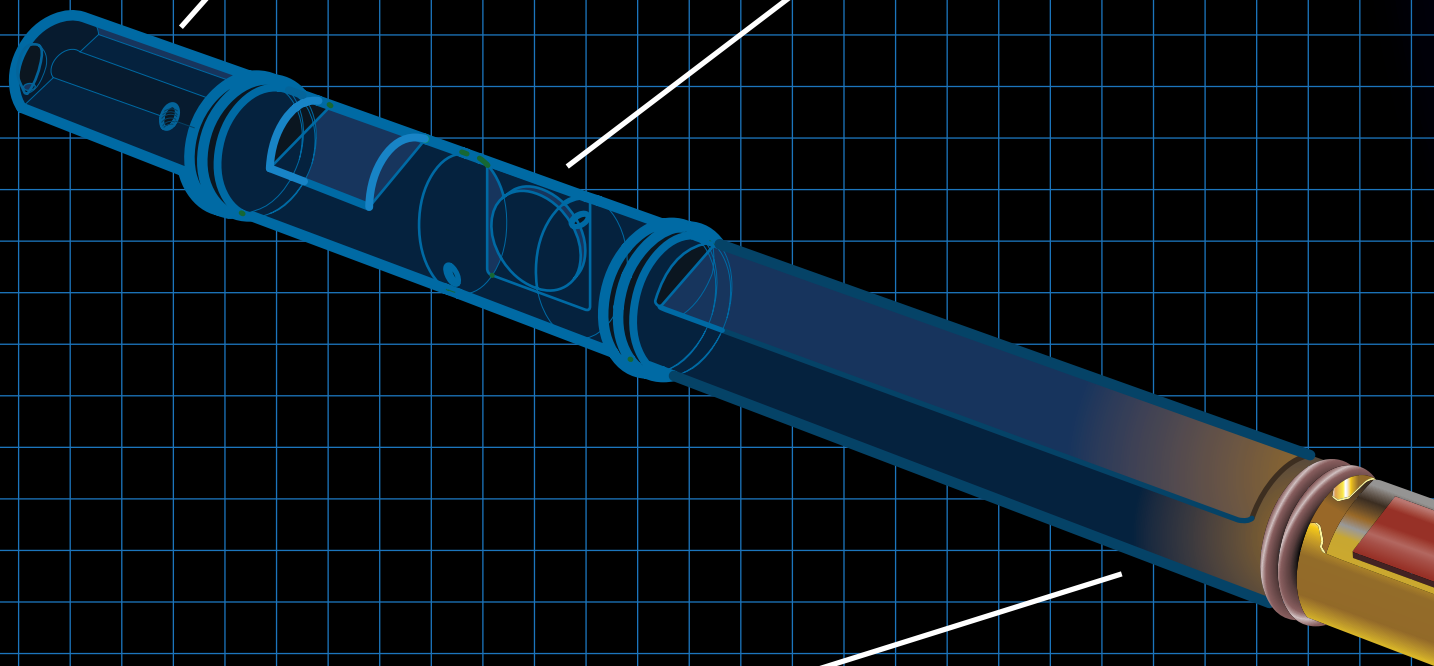
Bench Tree®

Complete Solutions for MWD



**Single-piece aluminum chassis
for enhanced durability**

**Ruggedized accelerometers
produce unrivaled accuracy**

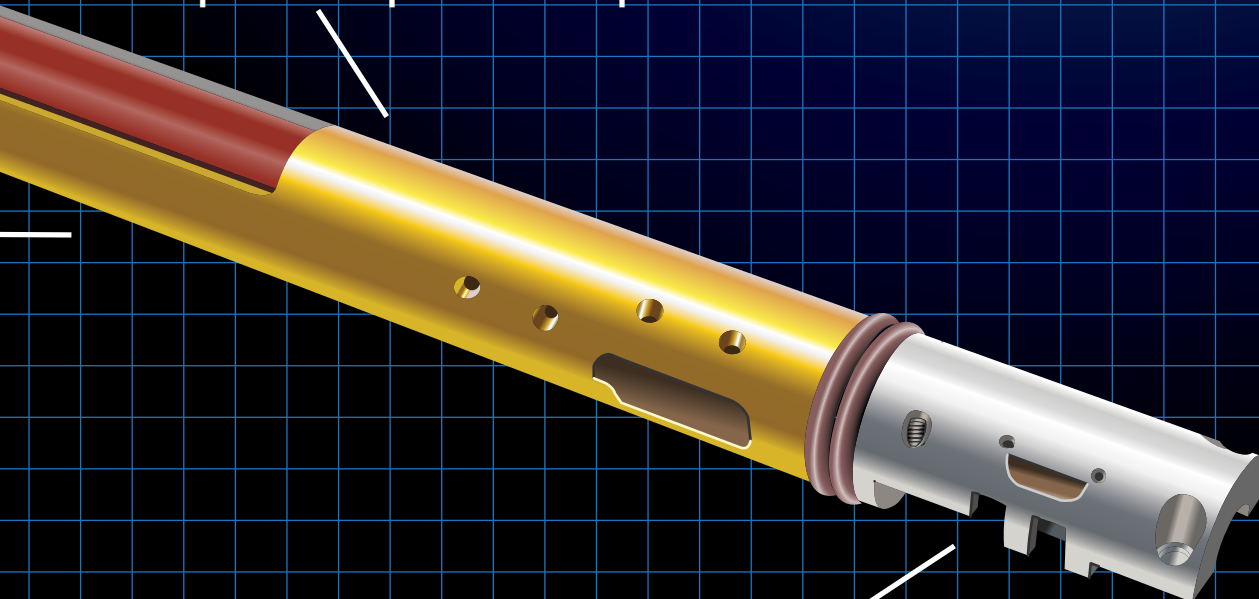


**Industry proven, high-temp
Bench Tree Board Sets**

Bench Tree Orientation Module (BTOM)

Weight:	3.3 lbs (1.5 kg)
Dimensions:	OD – 1.36 in. (34.5 mm) Length – 29.2 in. (741.7 mm)
Connectors:	Top – 21 Pin MDM Bottom – 15 Socket MDM, Non-Mag
Joints:	Industry Standard Pinned Lap Joints with Elastometric Supports
Temp Range:	-40 °C to 150/175 °C
Accuracy:	Dip angle +/- 0.25 degrees Magnetic field +/- 75 nT Gravity +/- 0.0015 gees Azimuth +/- 0.2 degrees
	<i>*Note: Tolerances may differ based on usage.</i>
Power:	1W

Genuine Bench Tree magnetometers
provide unprecedented precision



Fits standard QDT style chassis,
uses standard communication bus
fully compatible with legacy systems

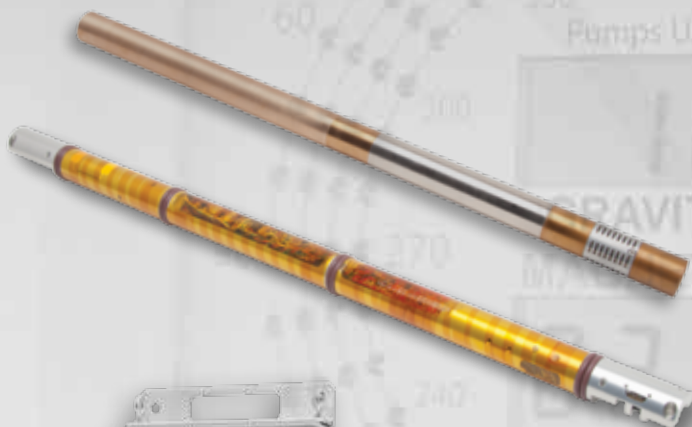
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Complete, Field-Ready MWD Kit Systems



Our Customizable Field-Ready kit provides redundancy and reliability.

Available with:

- 150 °C Directional Kit
- 150 °C Directional and Gamma Kit
- 175 °C Directional Kit
- 175 °C Directional and Gamma Kit

Our modular **Downhole Platform** includes electronics, directional sensors, gamma probes, pulsers and battery packs that are configurable and customizable to meet your specific needs. The probe can be deployed in standard non-magnetic drill collars and is fully retrievable and reinsertable. Each Standard Kit contains two each of the following components:

- Bench Tree Directional Modules
- Battery Assemblies
- Gamma Sensors, 175 °C
- m⁺ Motor Pulser™
- Required Running Gear

Bench Tree **Surface Systems** include our industry-leading data acquisition, decoding and display technologies – advanced receivers, rugged displays, transducers, wireless systems, feature-rich software and web-based services – all designed to seamlessly integrate your devices and data.

Each Standard Kit contains two each of the following components:

- BTR-W™ Receiver System Kits
- RD-G Rig Display
- Bench Tree Wireless Kit
- Pressure Transducers
- Support Cables

Complete MWD Kit Systems Specifications

(Downhole)

General				
Assembly Length	21 ft. minimum to 31 ft. maximum *Actual lengths depend on centralizer configurations			
Outer Diameter (OD)	1 7/8" OD probe Used in standard 3.5" - 9.5" diameter non-magnetic collars			
Assembly Configuration	UBHO (Muleshoe) Sub and Probe (variable configuration)			
Sensors	Directional and Tool Temperature (standard); Gamma, cps (AAPI optional)			
Power Sources	Eight high temp DD lithium battery cells. Over 800 hours of operation from one battery assembly.			
Pulse Telemetry	Positive Mud Pulse			
Programmability	Full programmability at surface. Down Link mode-switching with flow or rotation.			
Retrievable/Reinsertable	Toolstring wireline retrievable & reinsertable in vertical section (excluding UBHO sub)			
Survey Data Configuration	User-configurable data types, ordering, and resolution			
Data Logging	16 MB logging memory, with up to 1000 hours (configuration dependent)			
Environmental				
Operating Temperature	175 °C maximum with 185 °C options			
Mud Pressure	20,000 psi maximum			
Mud Flow Rate	1200 gpm maximum (8 ¼" OD collar) 50 gpm minimum (3 ½" OD collar)			
Pressure Drop Across Tool	Tool configuration dependent			
LCM	LCM - medium nut plug, 40 lbs/bbl max recommended			
Performance				
Survey Transmission Time	50-100 sec. for typical user configurations			
Toolface Updates	~15 sec. intervals (configuration dependent)			
Gravity Toolface	Accuracy ±0.1°			
Magnetic Toolface	Accuracy ±0.1°			
Azimuth*	Accuracy (Configuration Dependent) ± 0.2 (< 150 °C) ± .35 (> 150 °C)			
Inclination	Accuracy ±0.1° (Configuration Dependent)			
Gamma Acquisition	~20,000 cps maximum (AAPI option available)			
Dimensions				
(all modules 1 7/8" OD)	Length		Weight	
Directional Module	79.5"	202 cm	35 lbs.	15.8 kg
m+ Pulser™ Module	35.1"	89 cm	19 lbs.	8.6 kg
m+ Pulser™ Module with Gamma	49.25"	125 cm	30 lbs.	13.6 kg
Battery Packs, ea.	69.5"	176.5 cm	40 lbs.	18.1 kg
Interconnect Module	6" or 13"	15.25 cm or 33.02 cm	8 lbs.	3.6 kg
Fishing Neck/Program Plug	16.5"	42 cm	10 lbs.	4.5 kg

Complete MWD Kit Systems Specifications

(Surface)

PC Software Suite			
Operating System	Microsoft Windows XP/7		
Memory	Minimum 512 MB RAM		
Processor	Minimum Pentium 1.2 GHz. Dual Core recommended		
Disk Space	Minimum 500 MB disk space. 10 GB recommended (for surface data logging)		
Ports	Ethernet port required. Serial port optional (allows WITS output from PC)		
Included Utilities	Real-time Data Display, Configuration Utility, Roll Test, Memory Access		
BTR			
Power	85-264 VAC, 47-63Hz, 140W. UPS recommended		
Dimensions	9.5" x 11.5" x 5", 11 lbs. (BTR-W™) (24.13 cm x 29.1 cm x 12.7 cm, 4.99 kg)		
RD-G			
RD-G Voltage	14 V DC input minimum @ 40mA, ISB recommended		
Dimensions	8" x 13" x 2.5", 11 lbs. (20.3 cm x 33 cm x 6.35 cm, 4.99 kg)		
BTR-Touch™			
Power	85-264 VAC, 50-60 Hz, 180W		
Dimensions	10.25" x 14" x 4", 15 lbs. (26 cm x 35.6 cm 10.2 cm, 6.8 kg)		
Transducer			
Type	4-20 mA, Loop Powered, with 8547 WECO Union, 0 – 5,000 psig standard, 10,000 psig available.		
Cables			
Type	Length		Part Number(s)
Yard Cable	350 ft.	106.68 m	900120, 900121
Wye Cable	3 ft.	.91 m	900140, 900141
Programming Cable	75 ft.	22.86 m	900160
Transducer Cable	100 ft.	30.48 m	900142, 900142-0100
All cables are UL and CSA rated, flame-retardant and low-impedance, with double-insulation and overmold connector backs.			
YCR			
Range	1200 ft. transmission distance (replaces cable between rig display and receiver)		
Power	85-264 V AC input, 47-63 Hz, 5 Watt		

* Denotes Azimuth accuracy for measurements taken with following parameters:
 $45^{\circ} \leq \text{INC} \leq 135^{\circ}$, $-60^{\circ} \leq \text{DIP} \leq 60^{\circ}$

Downhole Solutions

Built-in intelligence with performance
memory and on-board diagnostics

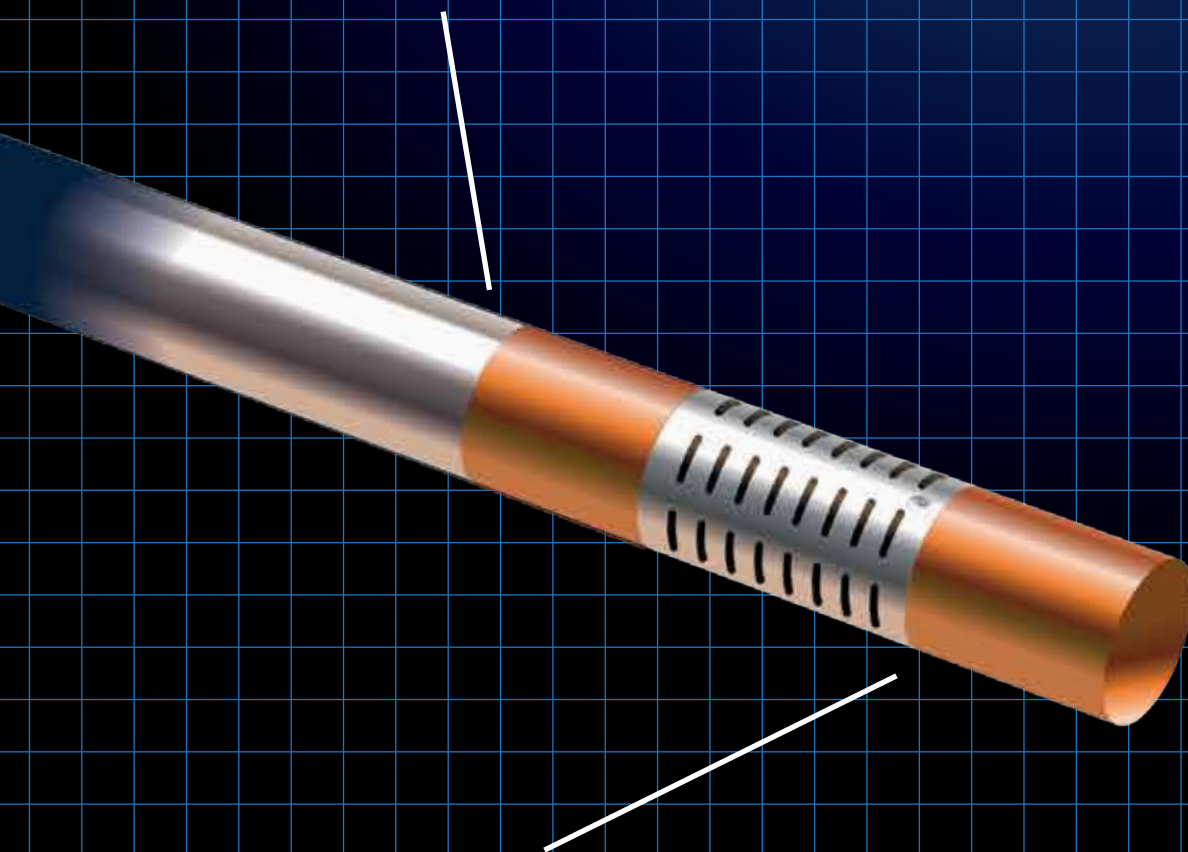
175 °C
20,000psi Performance

Adjustable flow-switch

Bench Tree m⁺ Pulser™ Motorized Pulser Driver (PN: 900370)

- Patented design
- 175 °C Performance
- Piston Compensation, without Bladder or Bellows
- Compact, Rugged Design with 50% Fewer Parts
- Performance Memory and On-Board Diagnostics
- LCM Tolerance
- Auto-Adjusting Pilot Valve Assembly
- Improved Battery Life
- Integrated Gamma Capability
- Reduced Operational Costs
- Adjustable Flow-Switch

**Piston compensation,
eliminating bladder and bellows**

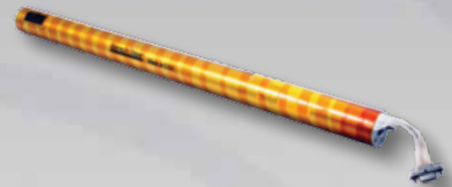


Auto-adjusting pilot valve assembly

Downhole Solutions

Slim OM™

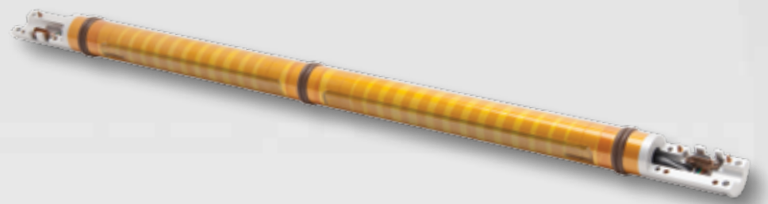
Bench Tree now offers its industry leading performance in a slim, survey quality, one inch diameter OM. Built with genuine Bench Tree magnetometers, Quartz-Flexure accelerometers and at only 16" long, the new Slim OM is available in many custom configurations. Rated to 175 °C.



PN: 900370

BTEM – Bench Tree Electronics Module

Both durable and economical, the Bench Tree Electronics Module integrates the accuracy of Bench Tree's intelligent processors, the field proven efficiency of our power supply and tough strongback chassis in one robust package.



PN: 900300

BTOM – Bench Tree Orientation Module

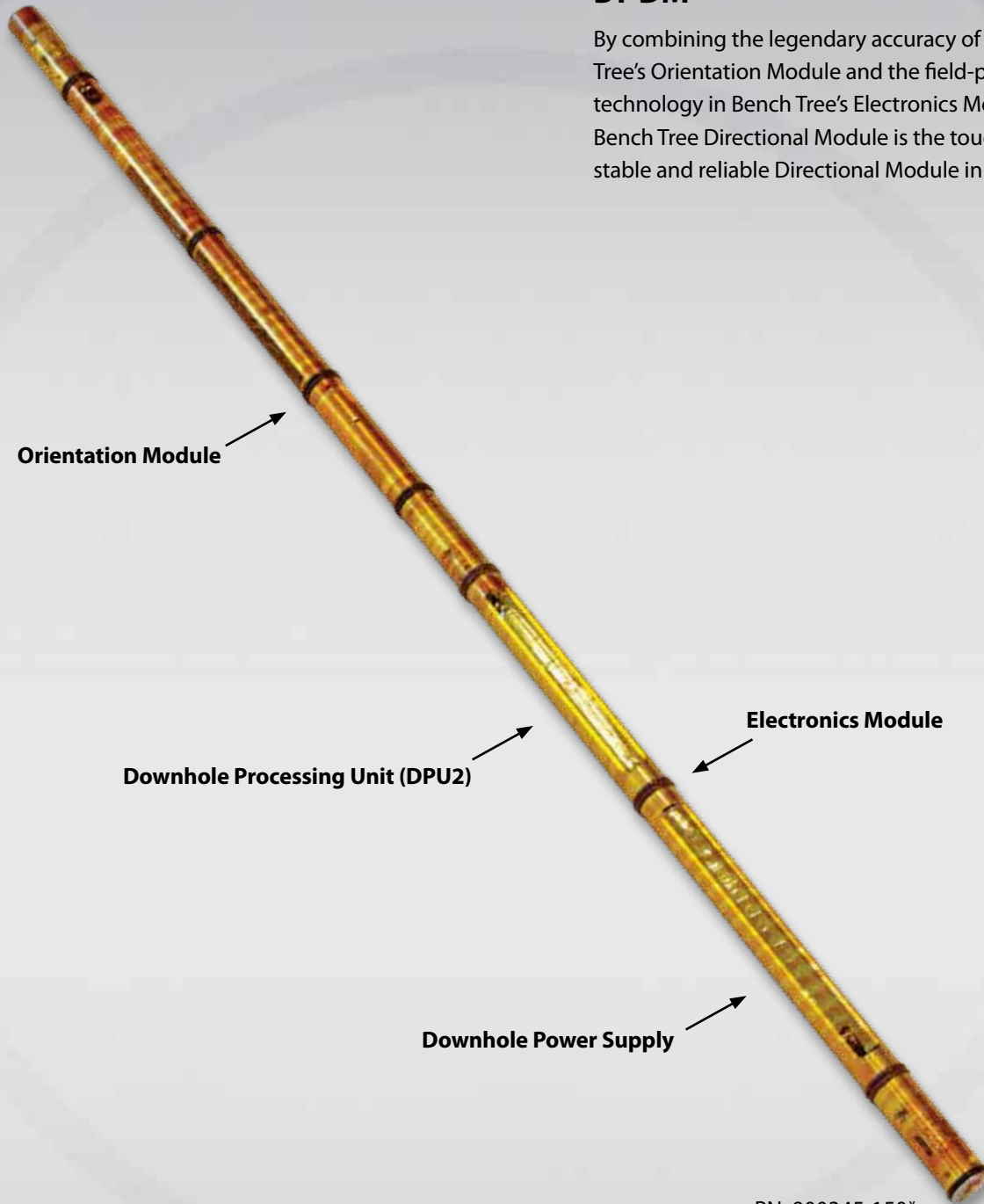
Utilizing genuine Bench Tree magnetometers, sensors and an advanced, proprietary calibration technology, the Bench Tree Orientation Module is the most accurate and stable measuring device for extreme temperatures available in the industry. Available in both 150 °C and 175 °C configurations.



PN: 900340-150
PN: 900340-175

BT-DM™

By combining the legendary accuracy of Bench Tree's Orientation Module and the field-proven smart technology in Bench Tree's Electronics Module, the Bench Tree Directional Module is the toughest, most stable and reliable Directional Module in the Industry.



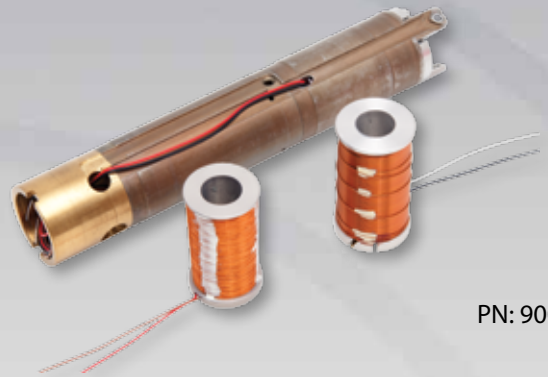
PN: 900345-150*
PN: 900345-175*

* Pressure housing and interconnect hardware included but not shown.

Downhole Solutions

MWD Solenoid

Designed as a convenient drop-in replacement for conventional solenoids, this robust unit provides dependable pulse actuation up to 175 °C. Low power requirements help extend battery life.



PN: 900346

Solenoid Driver

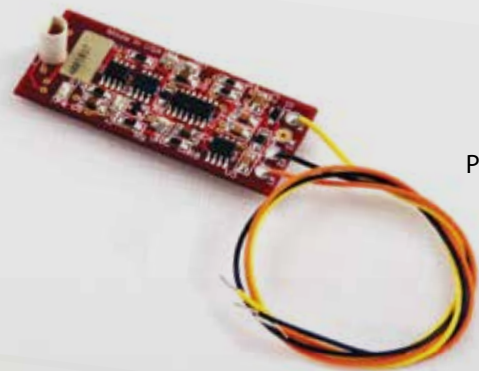
This rugged unit includes a solenoid driver controller, flow switch and capacitor assembly for the reliable operation of solenoid pilot valve systems. The improved chassis offers reliable operation to 175 °C, yet is easy to access and service. Highly efficient Bench Tree circuitry allows operation down to 20V while extending battery life up to 400 hours per battery pack.



PN: 900320

Flow Switch

Our robust flow switch is a reliable drop-in replacement for vibration activated modules where qualification to 175 °C is required. The switch comes preset to standard or custom user-specified levels. Low power consumption and innovative idle circuitry help maximize battery life.



PN: 900314

Transorb

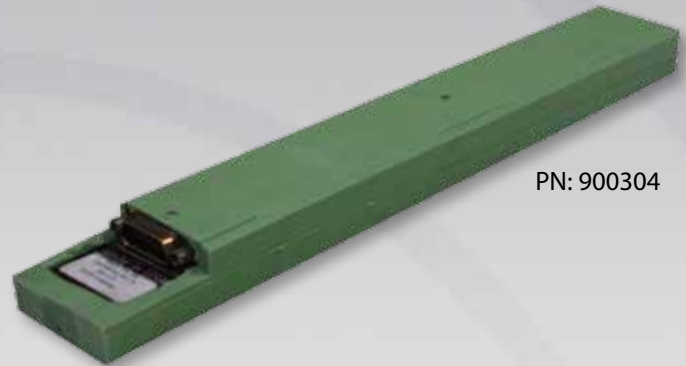
Bench Tree manufactures an array of strong, durable 175 °C transorbs. Designed and built with current spike protection redundancy in mind, our transorbs are fully customizable to meet any need.



PN: 900319

DPS – Downhole Power Supply

Our Downhole Power Supply is a drop-in replacement for conventional power supplies that extends both battery life and operating temperature. Supplying continuous power, even at low voltage levels, the DPS ensures that your processor is functional, down to 7V.



PN: 900304

DPU2 – Downhole Processing Unit – Now with ACE™ Technology

Devised as a compatible, drop-in replacement for traditional downhole processors, the DPU2 already features reduced power consumption, increased processing performance and advanced, built-in system diagnostics. Now with Bench Tree's next generation **ACE™** Feature Package, DPU2 boasts Bench Tree's proprietary *Instantaneous Dynamic Sequencing™*, *MWD Shock View™*, *RInc* Continuous Inclination and Dynamic Surveying abilities.*



PN: 900303

MWD Battery Assembly

Our rugged and reliable battery assembly consists of eight DD Lithium-thionyl Chloride (Li-SOCl₂) cells packaged in a purpose-built barrel designed to withstand the rigors of downhole drilling. Optional features include integrated data loggers that record battery power use, temperature, shock and vibration exposure. The non-magnetic BeCu pressure barrels include high quality interconnect hardware.



PN: 900736
PN: 900736-150
PN: 900737
PN: 900739

*To find out more about ACE™ features or to schedule a demonstration, call us today or visit www.Benchtree.com

Surface Solutions

BTR-Touch™ – Bench Tree Receiver/Display *(Available soon)*

Integrating a 12" class, backlit, sunlight readable Touch display with and powerful Bench Tree pulse receiving/decoding capabilities, the Bench Tree Receiver/Display eliminates the need for a PC. Robust power conditioning and an internal uninterruptible power supply ensure accurate, real-time data for directional drillers and MWD operators in the harshest of environments. Class 1, Div 2 rated.



PN: 900100

RD-G – Remote Display

For nearly a decade, Bench Tree's Remote Display has been the industry standard for reliable, rugged presentation of the information critical to directional drillers and MWD operators. Available with a backlit display, the RD-G provides four tool face history indicators with Inclination, Azimuth, gravity tool face and magnetic tool face.



PN: 900210

BTR-W™ – Bench Tree Receiver

Bench Tree's MWD technology includes an option for wireless PC connectivity. The BTR-W™ provides reliable mud-pulse detection with built-in internet connectivity and allows multiple, simultaneous connections to local PCs. An internal uninterruptible power supply provides conditioned power and its compact footprint makes the BTR-W™ the receiver of choice for MWD operators around the world.



PN: 900090

YCR – Yard Cable Replacement System

If you are looking to eliminate the need for running cables from the rig floor to the safe area, the Bench Tree Yard Cable Replacement Kit is your solution. With a range of 1300 ft. (400 m) the YCR Safe Area Radio provides a direct interface between the BTR-W or BTR-C^ω, and the transducer and RD-G.



PN: 900225

BTR-C^ω™ – Bench Tree Wireless Receiver

High quality hardware in a popular composite enclosure combined with Bench Tree's industry-leading BTR Utilities Software Suite ensures proven and reliable mud-pulse detection. This Bench Tree MWD Receiver has a familiar panel layout and form factor but now offers expanded capabilities such as WiFi connectivity and compatibility with the Bench Tree YCR kit.



PN: 900080-5

Genuine Bench Tree Replacement Parts

4500007.....	16.625" Pulser Housing, BECU
4500008.....	Motor Pulser Ball Screw
4500010.....	Pulser Oil Fill Coupling
4500012.....	Pulser Ball Screw Spanner Wrench
4500024.....	Fixture, Oil Fill Vacuum Cap, m+
4500026.....	Fixture, Piston Set, Oil Fill, m+
4500027.....	Adapter, STD Oil Fill Port to 1/4" MNPT
4500036.....	Port Plug, Oil Fill
4500041.....	Carrier, Wiper Seal, m+
4500043.....	Nut, Oil Fill Positive Press System
4500044.....	Wrench, m+ Actuator Coupling
4500136.....	Housing m+ Oil Fill Hard Coated Id
4500157.....	Screw, Retaining, SHCS
4500191.....	Screen, m+, Xtra Wide Cross Slot
4600160.....	Directional Module Pigtail, 4P/6S Assy
4600161.....	Transorb Aluminum End Piece
4600163.....	Housing, Oil Fill, m+
4600164.....	Housing, Bulkhead, m+
4600166.....	Spring Coupling, m+
4600169.....	Shaft, Servo Pilot, m+
4600171.....	Spacer, Actuator, m+
4600172.....	Piston, Pressure Balance
4600173.....	Guide Housing, Actuator Bluebridge
4600179.....	Screen, Cross Slot, m+
4600180.....	Housing Screen, m+
4600181.....	Disc Buffer, m+
4600194.....	Coupling Servo Tip, m+
4600195.....	Assy, Servo Tip, m+
4600247.....	Scraper for ID/Shaft
4600251.....	Assy, Conn End, m+, Std 10
4600272.....	Assy, Pigtail MWD Snubber
4600293.....	Assy, Servo Tip Motor Pulser SS
4600410.....	Fixture, Oil Level & Pressure Test



Parts & Maintenance

Hand Tools Kit – PN: 900755

includes:

- 1x – 3-Drawer Tool Chest
- 2x – Interconnect Alignment Tool
- 2x – Custom Spanner Wrench
- 6x – 12" Aluminum Tool Stand
- 1x – 8 1/8" Spanner Wrench w/Nipple
- 2x – Large Cleaning Brushes
- 2x – Small Cleaning Brushes
- 1x – 6pc Pin Punch Set, 1/8" to 5/16"
- 2x – Yellow Oil Paint Markers
- 2x – 13pc Ball End Hex Key Sets
- 1x – Utility Knife
- 1x – Breaker Bar, 18 5/8" Handle, 1/2" Drive
- 2x – Hex Bit Socket, 1/2" Drive
- 2x – Adjustable Hook Spanner Wrench 1/8" x 13/32"
- 1x – 8" Diagonal Cut Pliers
- 2x – 6 5/8" Long Nose Pliers
- 1x – 16-26 AWG Wire Stripper/Cutter
- 1x – 1/2" Drive Torque Wrench
- 1x – Brass O-ring Pick
- 1x – 3/4" Tap Gun
- 1x – 25' Measuring Tape
- 1x – 8 oz Machinists Hammer
- 2x – Retaining Ring Pliers
- 2x – Yellow Markers
- 1x – Line Level
- 2x – Aluminum 18" Pipe Wrench
- 1x – 8 pc Combo Screwdriver Set
- 2x – 6 1/2" Slip Joint Pliers
- 1x – 10" Adjustable Wrench
- 1x – 15" Adjustable Wrench
- 1x – File Set
- 1x – Digital Caliper



Parts & Maintenance

MWD Spare Parts Kit – PN: 900758

includes:

- 1x – 36 Compartment Parts Organizer
- 1x – O-ring & Screw Kit
- 8x – BeCu Split Ring Sets
- 4x – Split Shell
- 4x – 1/4" Hex Vent Plugs
- 3x – 2.125" Large Abrasion Rings
- 3x – Wear Cuff
- 3x – Medium Muleshoe Key, 4 3/4" Sleeve
- 3x – Large Muleshoe Key, 6 1/2" Sleeve
- 20x – Large Retainer Rings
- 20x – Medium Retainer Rings
- 10x – Interconnect Spacers
- 2x – 4 1/2" XH Screen Flange
- 2x – 4 1/2" IF Screen Flange
- 2x – 3 1/2" IF Screen Flange
- 1x – Tungsten Carbide Poppet Tip, 1.167"
- 3x – Cross Slot Motor Pulser Screen
- 10x – 3/4"x10 x 1/2" Cup Point, Steel Set Screws
- 10x – 3/4"x10 x 2" Cup Point, Steel Set Screws
- 10x – 3/4"x10 x 1 1/4" Cup Point, Steel Set Screws
- 10x – 3/4"x10 x 1.375" Cup Point, Steel Set Screws
- 10x – 3/4"x10 x 3/4" Cup Point, Steel Set Screws
- 10x – 1/8" x 1/2" Shear Pins
- 10x – 1/8" x 5/8" Shear Pins
- 10x – 1/8" x 3/4" Shear Pins
- 10x – 1/8" x 7/8" Shear Pins
- 10x – 1/8" x 1" Shear Pins
- 2x – CT-6116 Poppet Shaft Orifice
- 2x – CT-6156 1.28" x 2" Carbide Main Orifice
- 2x – CT-6196 1.35" x 2" Carbide Main Orifice
- 2x – CT-6206 1.4" x 2" Carbide Main Orifice
- 2x – CT-6216 1/2" x 2" Carbide Main Orifice
- 2x – CT-6387 1.086" Carbide Poppet Tip
- 2x – CT-6487 1.040" Carbide Poppet Tip
- 2x – CT-6587 1.122" Carbide Poppet Tip
- 2X – 3/8"x 16 x 3/4" Extended Point Steel Set Screws



**m⁺ Pulser™ Standard Parts and
Maintenance Kit – PN: 910201**

includes:

3010217.....O-Ring, Viton, 75 Duro, AS-119
3010240.....O-Ring, Viton, 90 Duro, AS-124
3010243.....O-Ring, Viton, 90 Duro, AS-127
3010222..... O-Ring, 7265D, AS-202
3010224..... O-Ring, 7265D, AS-212
3010291.....PolyPak, Std 12500250 Viton, Sm
7110132.....Screw, SS,100° Flat, 4-40 x 7/16"
7120145.....Screw, SS, SHC, 6-32 x 1/2"
4500036..... Plug, Port, Oil Fill
7130122.....Screw, SS, Set, 8-32 x 1/4"
4600247..... Scraper for ID/Shaft
3010293.....PolyPak, Std 12500875, Viton, Lg
7130158..... Screw, 316 SS, Flat, 8-32 x 3/8"



Cables

Bench Tree's cable solutions are engineered to provide unmatched reliability in harsh environments. All Bench Tree cables feature tough exterior sheathing and ruggedized components like overmolded connections for exceptional abrasion resistance and long life. Whatever you require, Bench Tree's broad selection offers quality and dependability. Complimented by unsurpassed customer satisfaction and rigorous testing, in-stock items can ship for next day delivery. Custom options are available. Contact us for more information.

900034-0050	.....Cable, Power, YCR, RFR 50 ft.
900058	..... Cable, J-Box to Receiver, 10 ft.
900120	..... Yard Cable, 350 ft., 5C
900120-0050	.....Yard Cable, 50 ft., 5C
900121	..... Yard Cable, 350 ft., 8C
900125	.....Yard Cable, 150 ft. Extension, 5C
900140	.....Cable, Y, Rig Floor, RD, 5C
900141	..... Cable, Y, Rig Floor, RD, 8C
900142	..... Cable, Transducer, 19P/6S, 100 ft.
900143	..... Cable, Transducer Crossover, 6P/3P
900145	..... Cable, Transducer Crossover, 3S/6S, 18"
900155	..... Cable, Jumper, 8 ft. with 0° Housings
900158	.....Cable, Flow Sim Power, 3C, 10 ft.
900159	..... Cable, Flow Sim Pressure, 2C, 10 ft.
900161	.....Cable, Programming, 5C, 75 ft.
3100587	..... Serial Gamma Cable, 15P to 9S
4600268	..... Cable, Safe Area Radio, Pigtail, 3C, 8 ft.
4620022	.....Cable, Program, 5C, 75 ft.
4620067	.....Cable, Yard to 6S Transducer



Shop/Test Equipment

Breakout Box

Switch and monitor up to ten standard MWD tool lines with this capable unit. Sturdy construction includes heavy duty shielded cable, stainless steel probes, rugged protective caps and sealed jacks. Covered and temporary switches safeguard against tool damage. Integral cable storage and switch protectors round out the feature set.



PN: 900073

MWD Flow Simulator

The MWD Flow Simulator is designed to verify your MWD string & surface system functionality before deployment. The system provides pump flow on/off states via the 0-5V EFS system line. It also simulates pressure pulses to your MWD surface system via 4-20mA current loop. A power switch, flow state switch, and LED indicators of power, pump/flow state, and pulse line status are integrated. The hardware is of high quality construction including a heavy duty Pelican case, MIL type connectors, and rugged over-molded cables. An MWD tool 5C Programming Cable is available separately.



PN: 900066

Power Supply Test Box

Assess the full range of functionality in Bench Tree's popular DPS unit and other common Power Supplies at nominal and 150% load conditions with this convenient, easy to use unit. A complete User's Manual and Quick Start Guide are included.



PN: 900063

m⁺ Pulser™ Test Box

m⁺ Pulser™ Test Box is an interface system for utilizing the Bench Tree m⁺ Motorized Pulser Driver's advanced diagnostic features and on-board memory. The system includes durable hardware and a custom application that enables detailed evaluation of your m⁺ Motorized Pulser's health.



PN: 4600301

Oil Fill Station

Bench Tree's Oil Fill Station featuring vacuum and gravity fill functions makes refills quick, easy and neat. System tools include clamps, a heavy duty dual-stage vacuum pump, clear/transparent reservoirs and flexible tubing for precise visual metering. The compact unit is housed on a 3'(W) x 2'(D) x 6'(H) heavy duty anodized aluminum cart, with wheels for convenient repositioning. It can be configured to accept a digital low vacuum gauge or standard vacuum dial.



PN: 900067

Gamma Calibrator & Software

The Gamma Calibrator and associated software comprise a system for determining the API sensitivity of MWD gamma probes. The resulting Gamma API Ratio is used to normalize probe plots to API standards. Housed in a rugged stainless steel case for long life, the fully characterized calibrator is correlated to API test pits for precision data archival and reporting. The intuitive, easy to use application comes with a user manual and integrated help menu.



PN: 900072

Handling Gear

3505204.....	Lifting Bail Assembly
3505213.....	Spang Jar, 30" Stroke
3505212.....	.5' Spacer Bar
3505211.....	.5' Weight Bar
3505240.....	1.75" Friction Wrench
3505241.....	1.875" Friction Wrench
1005385.....	Muleshoe Knockout Tool
3505247.....	12" Tool Stands

Pipe Screens

3505216.....	4" IF, 4 ½" XH X 3' Pipe Screen
3505217.....	4 ½" IF, 5" XH X 3' Pipe Screen
3505218.....	4 ½" XH, Perforated Large Top Pipe Screen
3505219.....	4 ½" IF, Perforated Small Top Pipe Screen
3505220.....	2" OD, 3 ½" IF, Slotted
3505221.....	2 ½" OD, 3 ½" IF, Slotted
3505222.....	2 ½" OD, 4 ½" XH, Slotted
3505225.....	3 ½" IF X 3'

Hammer Union

3505245.....	Hammer Union, 2" 1502 15M
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Lifting Bail Assembly
PN: 3505204



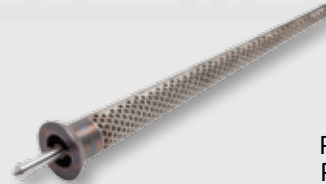
Spang Jar 30" Stroke
PN: 3505213



Spacer Bar 5'
PN: 3505212



Weight Bar 5'
PN: 3505211



Pipe Screens
PN: 3505216
PN: 3505217



Hammer Unions
PN: 3505245

Running Gear

- 900741 4 ¾" Muleshoe Assembly
(With Wear Cuff, Key, Bottom Sleeve,
Retainer Rings & Set Screws)
- 900743 6 ½" Muleshoe Assembly
(Includes Wear Cuff, Key, Bottom Sleeve,
Retainer Rings & Set Screws)
- 3505071 Muleshoe Key, for 4 ¾" Sleeve
- 3505072 Muleshoe Key, for 6 ½" Sleeve
- 900724 Standard Helix Lower End Assembly
- 900708 Spear Point Assembly
- 900704 Centralizer, 13" Fins
- 900705 Centralizer, 5" Fins
- 3505214 Fin Cutter, 4 ½" XH; 17-4 HT
- 3505215 Fin Cutter, 4 ½" IF; 17-4 HT



Muleshoe Sleeve Assembly
PN: 900741



Standard Helix Lower
End Assembly
PN: 900724



Spear Point Assembly
PN: 900708



Centralizer
PN: 900705



Fin Cutter
PN: 3505214
PN: 3505215

Third Party Products

Cirris Cable Testing Products

- 900170 Cirris Cable Test Kit, Down Hole
- 4620001 Cable Tester, Cirris Easy Touch™,
Configured
- 4620002 Cable Test Kit, Cirris Signature 1100H+™,
Standard
- 4620003 Cable Kit, Test, Cirris, Down Hole
- 4620005 Cable Kit, Test, Cirris, Surface
- 4620009 Cable Tester, Cirris Signature 1100H+™,
Configured

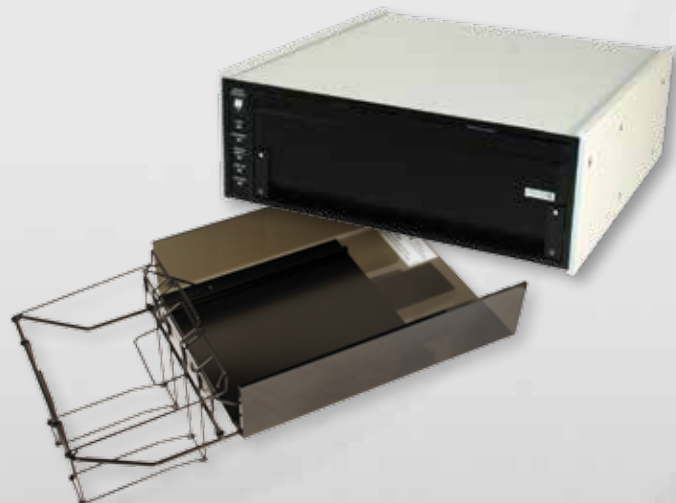
CIRRIS



Printrex

- 960076 Printrex Kit
- PR843 DL/G.....Printrex Printer/Plotter
(Shown with optional basket PR2012-0027)
- PR2012-0038Printrex Input Paper Tray
- PR2316-0001Printrex Paper, Roll
- PR2316-0011Printrex Paper, Fan Fold
- PR2012-0027Printrex Rack Mount Basket

PRINTREX
by TRANSACT



DigiDrill Logging Systems

DigiDrill's Gamma Ray Depth Tracking System can be integrated with Bench Tree surface products for more detailed analysis of strata composition at pinpoint depths along the pipe string. An optional LiveLog service streamlines the secure transfer of MWD data through cell or internet connections.

- LAS file import/export support
- Real-time data logging
- Advanced log filtering capabilities
- WITS compatibility

960073	.....DigiDrill Gamma Depth Tracking
3100580	.....DigiDrill Datalogger Software Key
3100581	.....DigiDrill Data Box
3100582	.....DigiDrill Combo Depth Encoder
3100583	.....DigiDrill Strain Gauge Hookload Sensor
3100584	.....DigiDrill Hookload Transducer 1K PSI
3100585	.....DigiDrill 4-pin Encoder Cable
3100586	.....DigiDrill 5-Pin Encoder Cable



LWD Gamma Module

Bench Tree offers a rugged and highly efficient scintillation type detector assembly that seamlessly integrates with your MWD system to provide real-time gamma ray feedback on the surrounding formation. This facilitates correlation with the API standard for more accurate geosteering by configuring the MWD to transmit supplemental gamma data in rotating mode. The resulting high-resolution data is captured by ACE memory for surface download. Advanced drill collar and environmental correction software is available, as is housing and hardware to package the unit as a discrete MWD probe module. Deployment with the m⁺ Motor Pulser™ Driver allows for measurement closer to the drill bit.



PN: 900072

Technical Support

Bench Tree is proud to offer a comprehensive range of technical support services designed to keep you up and running. We also service many third-party tools. Many repairs can be completed within a week. Expedited service and shipping are available on request.

Repair

Our Certified Technicians have the tools, knowledge and experience to quickly restore your equipment to its original electrical, mechanical and thermal specifications. Once completed, every repair undergoes a thorough inspection, testing and performance evaluation before it ships. This assures you of dependable, accurate operation straight out of the box.

Displays

Bench Tree can diagnose and repair a broad range of Display issues including PCB boards, LCD screens, connectors, communications monitoring, and voltage or current problems. We update Firmware, customize RDs and RD-Gs, and upgrade units from RD to RD-G.

Receivers

Common Receiver faults we can rectify include safety barrier replacement, pump pressure calibration, power supply and output issues, communications monitors, and board repair or replacement (Receiver; QSI; qNIC). We also handle Firmware updates.

Electronics Modules

Bench Tree routinely addresses a wide array of Electronics Module issues including damaged chassis and wiring, processor and power supply problems (including MPU, Triple and other common brands), and Transorb assembly repair or replacement.

Orientation Modules

Bench Tree's Orientation Module services include accelerometer and magnetometer repair and replacement, Analog-Digital converter repair or replacement, and output testing and correction. In addition to our own units, we service GE and Microtesla products as well.



Pulser Driver and Solenoid

Beyond general chassis and wiring repairs, we repair or replace Pulser Driver Boards, Flow Switch Boards, and Capacitor Banks. Solenoid services include pull and hold testing, repairs and upgrades.

m⁺ Motor Pulser™

Routine repairs from maintenance to complete overhaul, including housing and hardware replacement; motor, ballscrew and piston replacement; Flow Switch and Controller Board repair or replacement; and defective wiring or connections. All repairs include an oil fill and pressure test.

Calibration

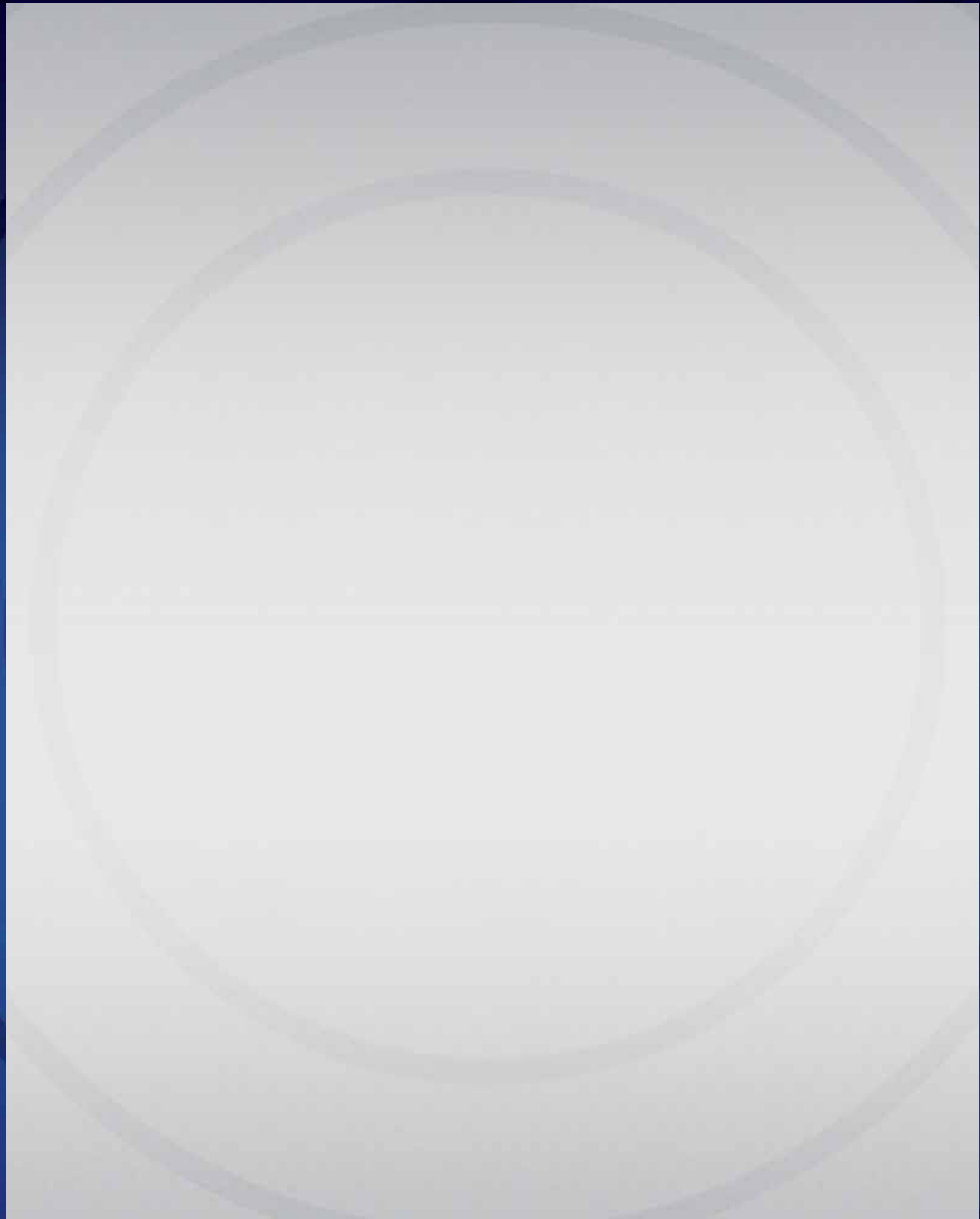
Bench Tree operates a state-of-the-art, multi-station lab designed for the exceptionally precise calibration of directional orientation sensors. The lab is environmentally controlled, isolated from magnetic and seismic forces, and continually monitored for conformance with the earth's true magnetic field. Standard calibrations include 150 °C and 175 °C. Custom temperature ratings are available. Our roll tests consistently produce results 25% tighter than traditional tolerances.

Training

Bench Tree offers comprehensive, hands-on training covering our complete product line, conveniently scheduled at your facility or ours. Contact a sales representative for details and to set up a program that meets your specific needs.

Magnetic Survey

Sensitive directional modules must be thoroughly validated before pressed into downhole service. A magnetically stable environment is essential to the accuracy of these critical field-conducted roll tests. Bench Tree's experienced technicians are available to assess your shop roll area and locate a suitable test area.





Bench Tree has established a world-class quality assurance team under the dedicated direction of an ISO 9001 Certified Internal Auditor. The group has instituted a formal quality management system to guide and evaluate product realization procedures. It includes IPC-A-610 and IPC/WHMA-A-620 certified instructors (CIT) tasked with ensuring that all production, QA, Repair, Technical Service and select engineering personnel maintain IPC-A-610 certification. All soldering staff maintains Level 2 soldering skills.

A key component of the initiative is our product performance review process in which each piece of incoming equipment undergoes rigorous evaluation before any maintenance, upgrade or repair work begins. By tracking real-world performance data, Bench Tree engineers gain the insights needed to continually refine designs for performance you can depend on.



www.benchtree.com

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