



WIRELESS MEASUREMENT WHILE DRILLING (GMWD)

CHE GMWD Wireless Measurement While Drilling System is engineered to be used in directional, horizontal, deviated or multi-lateral well applications to determine the well path and its position in three-dimensional space, establish true vertical depth, bottom-hole location, and orientation of directional drilling systems. The measurements of the drill string, BHA and wellbore properties are stable and sufficient to ensure the drilling is occurring according to plan and to identify conditions that could lead to equipment damage or other non-productive time events. Decoding process is automatically done at real-time during drilling operation. Configuration of the tools is simple, easy to assemble and disassemble.



Azimuth and Deviation

- Azimuth: 0 360° ±1° Sampling Resolution: ±0.087°
- Deviation: 0 180° ±0.1° Sampling Resolution: ±0.044°
- Tool Face: 0 360° ±1.5° Sampling Resolution: ±0.087°
- Tool Face Switching Degree: 2 15°
- Gravity Field: ±1%

Geologic Parameter

- Gamma: 0 250 CPS ±1CPS

MWD Temperature

- Temperature: -40°C -- +200°C ±1°C Sampling Resolution: ±0.2°C

Power Supply

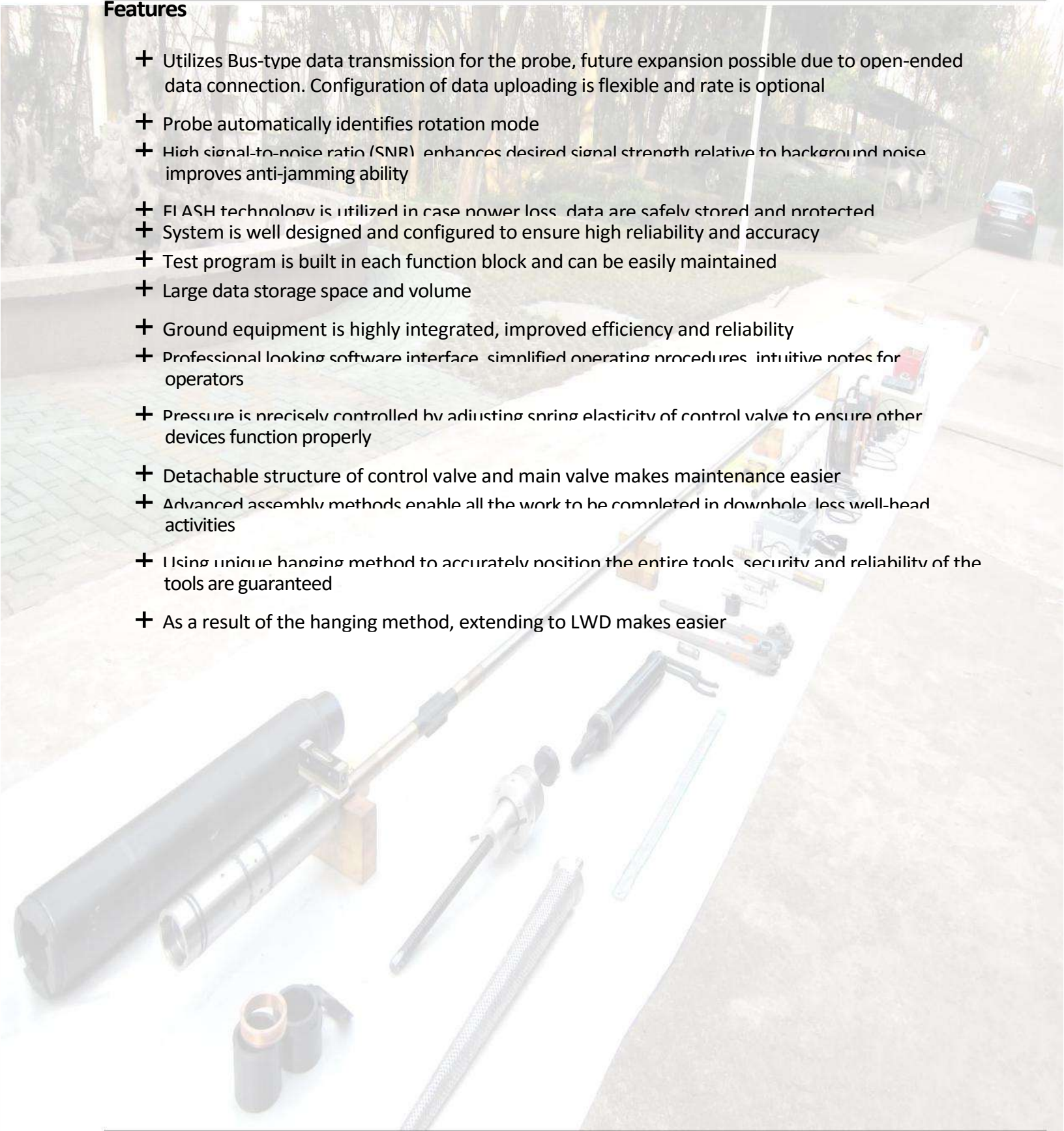
- Voltage: +48VDC
- Working range: +42--60VDC

General Specifications

- Working Temperature: -20°C 125°C
- Length of Centralizer: 495mm
- Vibration: 20g, 10 200Hz
- Connecting Mode: Single Core Connection
- Shock: 1,000g/0.5ms
- Velocity: 70-1,600gal/min
- Max. Pressure: 15,000psi
- Drill Collar: 4 3/4", 6 1/4", 6 3/4", 8", 9 1/2"
- O.D.: Φ45
- MUD Sand Content: ≤2%
- Length of Pulser: 575mm (with Hanging Device: 993mm)
- Mud Type: No request
- Length of Electronics Assembly: 2,185mm
- Mud Viscosity: ≤50lbf/bbl
- Length of Battery Housing: 2,838mm

Features

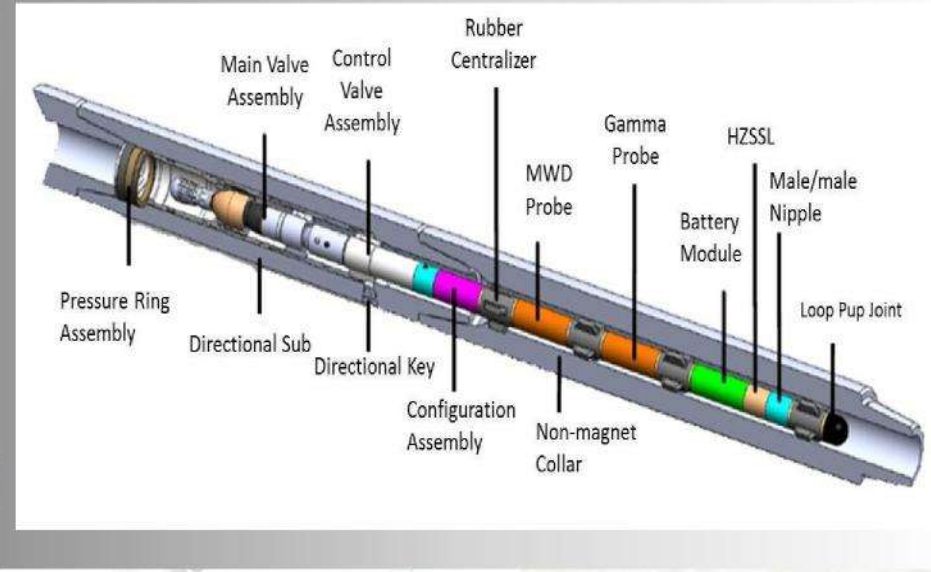
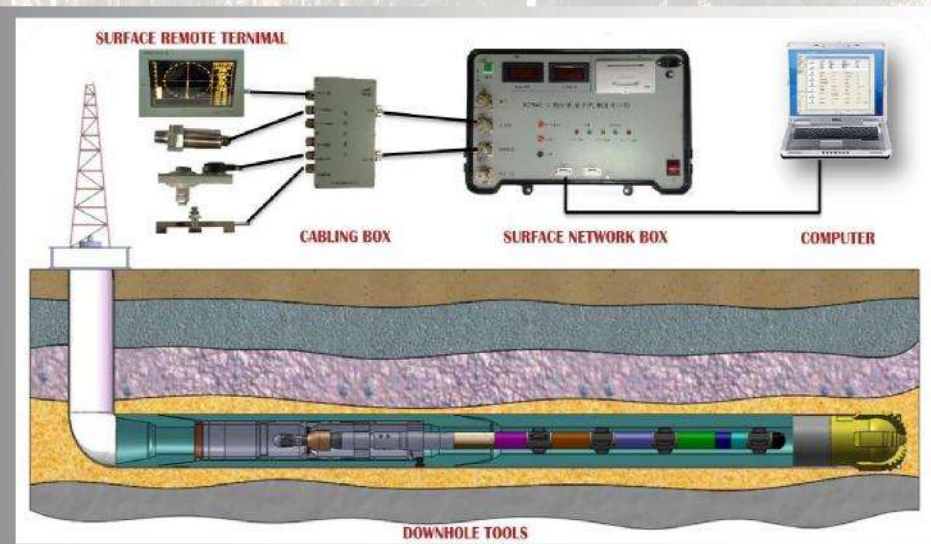
- ✦ Utilizes Bus-type data transmission for the probe, future expansion possible due to open-ended data connection. Configuration of data uploading is flexible and rate is optional
- ✦ Probe automatically identifies rotation mode
- ✦ High signal-to-noise ratio (SNR) enhances desired signal strength relative to background noise improves anti-jamming ability
- ✦ FLASH technology is utilized in case power loss, data are safely stored and protected
- ✦ System is well designed and configured to ensure high reliability and accuracy
- ✦ Test program is built in each function block and can be easily maintained
- ✦ Large data storage space and volume
- ✦ Ground equipment is highly integrated, improved efficiency and reliability
- ✦ Professional looking software interface, simplified operating procedures, intuitive notes for operators
- ✦ Pressure is precisely controlled by adjusting spring elasticity of control valve to ensure other devices function properly
- ✦ Detachable structure of control valve and main valve makes maintenance easier
- ✦ Advanced assembly methods enable all the work to be completed in downhole, less well-head activities
- ✦ Using unique hanging method to accurately position the entire tools, security and reliability of the tools are guaranteed
- ✦ As a result of the hanging method, extending to LWD makes easier



SYSTEM COMPONENTS

GMWD System (With Gamma)

- ❖ Surface
 - Surface Network
 - Surface Remote
 - Compu
 - Pressure Transducer
 - Hook Load
 - Distribution
 - Cabl
- ❖ Downhole
 - Puls
 - Directional
 - Rubber
 - MWD
 - Gamma
 - Battery
 - HZSS
 - Loop Pup
- ❖ Tools and
 - Tool Test
 - Configuration
 - Lifting Tool
 - Directional
 - Filter
 - Pressure Ring
 - Friction Pipe
 - Toolb



MAIN VALVE ASSEMBLY

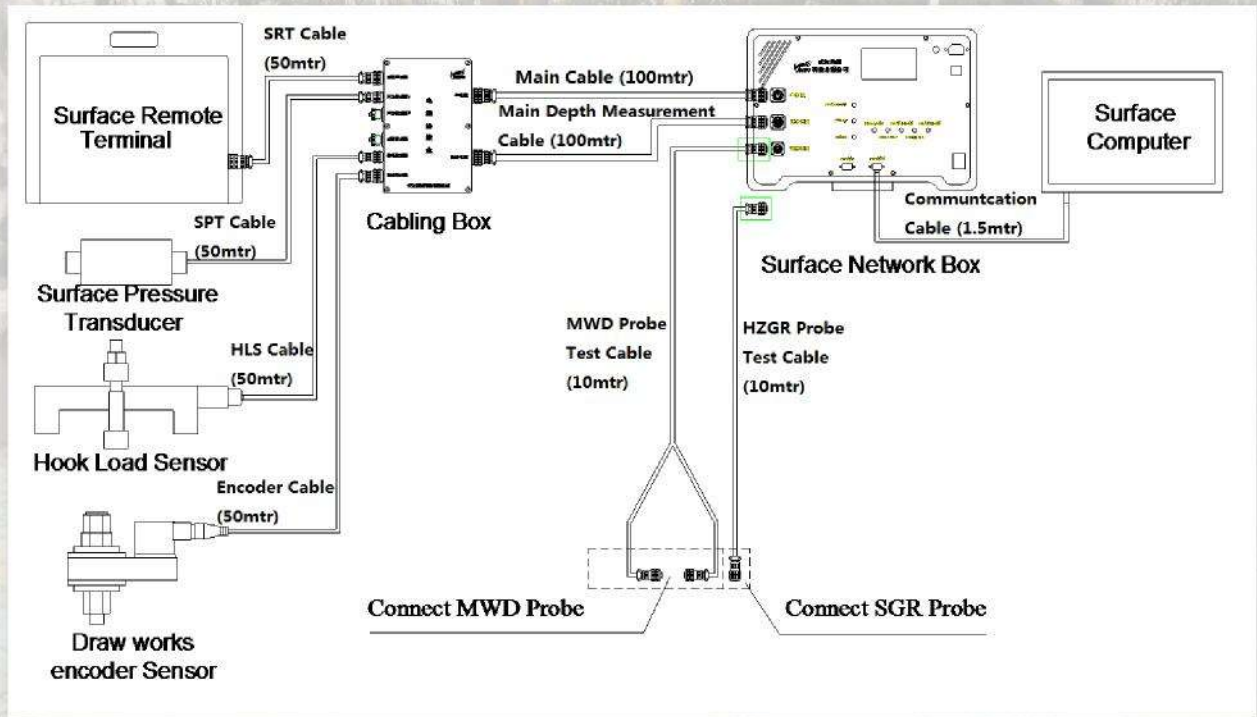


CONTROL VALVE ASSEMBLY

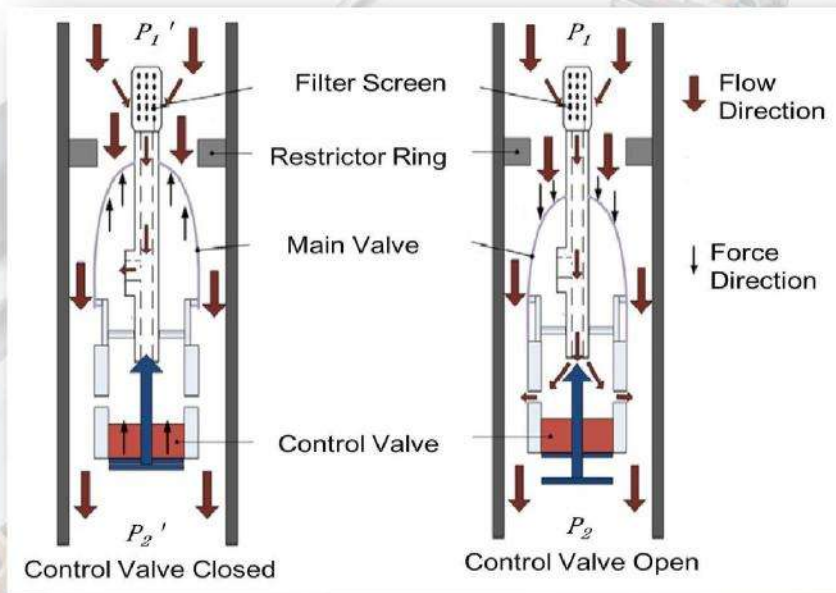


PULSER

Up-hole System Connection Diagram:



Working Principle Of Pulsar



a. Control Valve Open Front-end pressure (P_1) of restrictor ring is higher than back-end pressure (P_2), force direction of

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mushroom head faces down, flow area increases as the mushroom head moves down, at same time, part of fluid flows through filter screen and control valve, it produces a smaller pressure difference before and after the restrictor ring ($P_1 - P_2$).

b. Control Valve Closed

The electromagnet energizes and pushes the control valve upward to close, cavity between the mushroom head and front end of the restrictor ring connects, the force direction of mushroom heads

up, the flow area decreases as mushroom head moves upward, a larger pressure difference ($P_1' - P_2' > P_1 - P_2$) is generated as pressure signal.

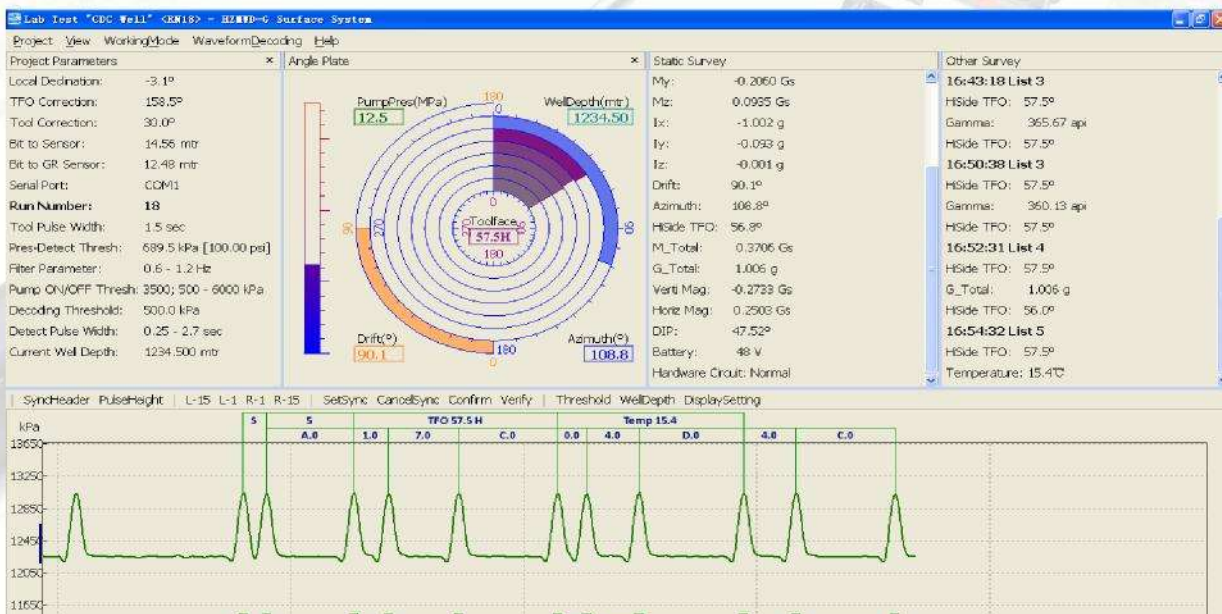
c. Control Valve Reset

When the electromagnet de-energized, mud pressure and control valve springs opens up the control valve. The force direction of mushroom head goes downward, the pulse returns to control valve open

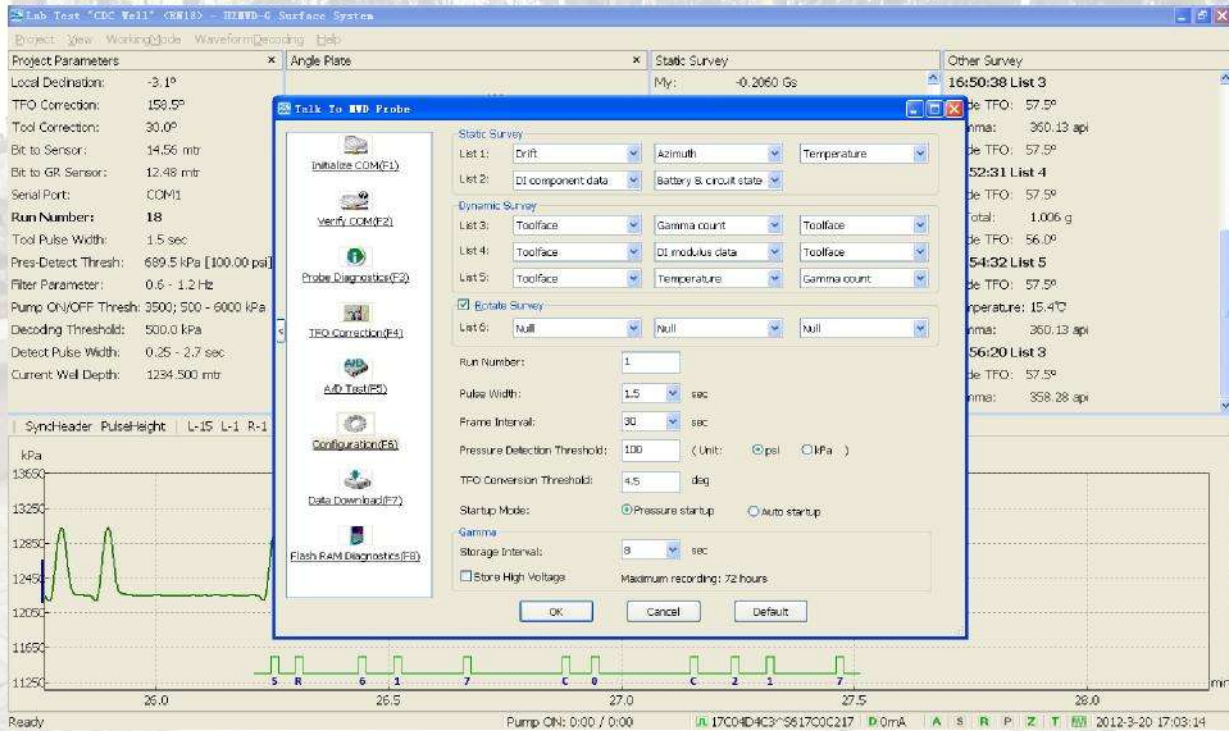
Software

GMWD software is specially programmed for the wireless GMWD system, it is user friendly and Windows based with complete functional capability. MWD probe configuration, mud pulse decoding and processing, sending message to SRT, Survey data download, waveform playback etc. can be done with the GMWD software.

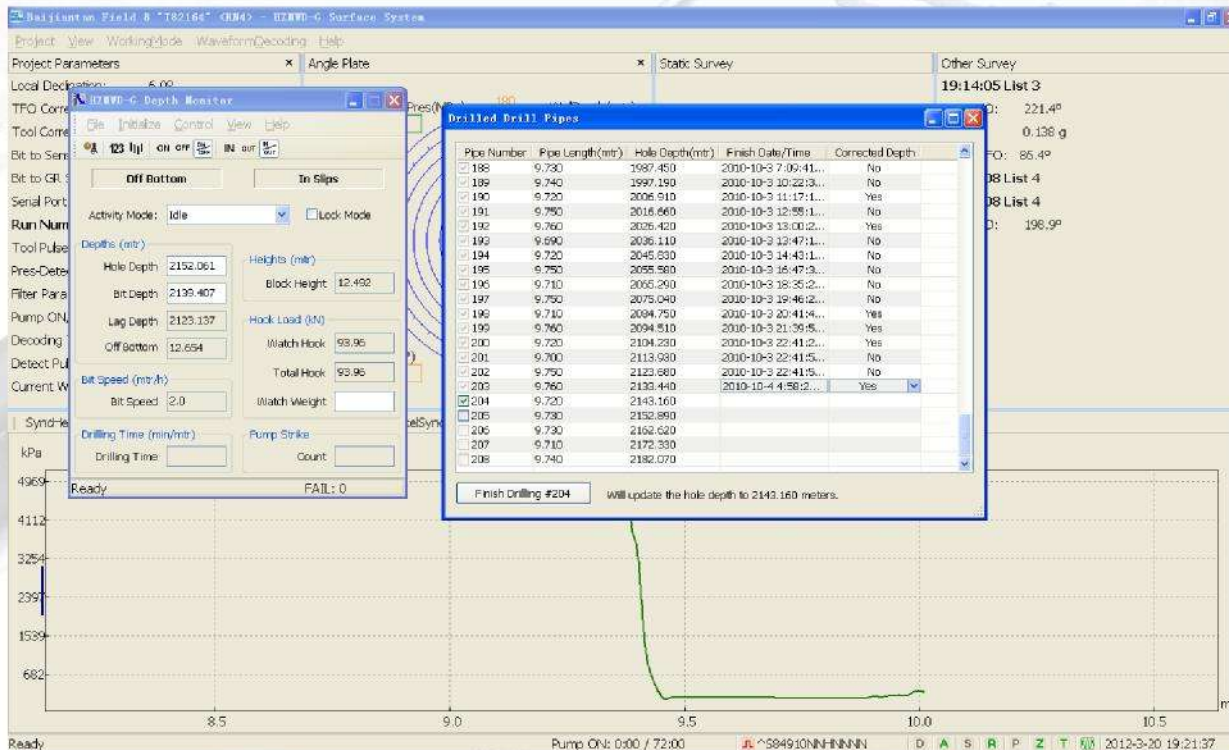
MAIN INTERFACE



CONFIGURATION INTERFACE



DEPTH SYSTEM INTERFACE



DECODING

