

Minelab Single Transmit Multiple Receive

| | |
|----------------------------|--|
| System | |
| 1. Brand | Minelab |
| 2. Model | Single Transmit Multiple Receive - STMR MkII |
| 3. Technology | Time domain electromagnetic induction (Multi Period Sensing – Bi-Polar) Magnetic Influence Mine resistant |
| 4. Major Components | <ul style="list-style-type: none"> Control Box - new ruggedised MkII electronics and connectors Sensor Head: <p>STMR - Sensor Head (complete with integral carrier, mounting points and Transmit (TX) cable). Width determines number of individual Receive (RX) coils.</p> <ul style="list-style-type: none"> Power and Auxiliary Connectors PC based Display Software Operation and Software Protocol Manuals Threshold based Marking System Trigger controlled by PC application |
| Physical Data | |
| 5. Sensor Head | |
| Type | <ul style="list-style-type: none"> Mono-loop RX Line Replaceable Units (LRUs) are individual RX modules Transmit (TX) coil and cable are incorporated in Sensor Head support structure |
| Dimensions | <ul style="list-style-type: none"> Small head, 2100x400x320mm (outside dimensions) Large head, 3500x400x320mm (outside dimensions) <i>Note: Dimensions above include Carrier structure</i> |
| Weight | <ul style="list-style-type: none"> Approx. 30 kg (2100 unit) Approx. 50 kg (3500 unit) |
| Housing Material | <ul style="list-style-type: none"> Fibreglass and Hollow Core Polypropylene – “Space Frame” |
| Colour | <ul style="list-style-type: none"> US FED STAN 595B 33446 - “Desert TAN 686” |



| | |
|--------------------------------|--|
| 6. Receive (RX) Coils | |
| Type | <ul style="list-style-type: none"> Two Monoloop Coils per RX module (= 2 streams of data per Rx module) Separate RX modules |
| Dimensions | <ul style="list-style-type: none"> 400x280x30mm per RX module (outside dimensions) |
| Max Coils | <ul style="list-style-type: none"> 10 RX modules (=20 individual Rx coils in regards to resolution) <p>(The large 3500mm head is required for the maximum 10 x Rx modules)</p> |
| Weight | <ul style="list-style-type: none"> 1.26 kg per Rx coil (includes two mono-loop windings and a common cable and connector) |
| Material | <ul style="list-style-type: none"> ABS RX Coil Housing with foam inserts |
| Colour | <ul style="list-style-type: none"> Black or white |
| 7. Control Box | |
| Type | <ul style="list-style-type: none"> 6U EDAK Mil Spec Enclosure |
| Dimensions | <ul style="list-style-type: none"> 535x500x350mm (with transport cover in place) 535x435x350mm (in operation) |
| Weight | <ul style="list-style-type: none"> Approx. 25 kg |
| Colour | <ul style="list-style-type: none"> US FED STAN 595B 33446 - "Desert TAN 686" |
| 8. Cable length | <ul style="list-style-type: none"> Max (std) length: 6 m |
| Functional Characteristics | |
| 9. Power | <ul style="list-style-type: none"> 24VDC, 5A (max) |
| 10. Operating Frequency | <ul style="list-style-type: none"> 1.25 kHz +/-3% PRF, 6 pulses per cycle |
| 11. Transmit Power | <ul style="list-style-type: none"> 450V, 15A (peak) |
| 12. Data Link | <ul style="list-style-type: none"> 100 MB/s Ethernet to host PC (or any system capable of TCP/IP communication). |
| 13. Assembly | <ul style="list-style-type: none"> Modular PCB design - Fast, simple field replacement of major components |
| System Protection | |
| | |

| | |
|---|---|
| <p>14. Power Supplies</p> | <ul style="list-style-type: none"> ● Protection against input voltage transients as per ISO7637 ● Will only operate when battery voltage within specified safe limits of approx 20V to 30V. ● Overload of internal voltage rail will initiate shutdown of both power supplies to prevent overheating. ● Overload indicated to user by flashing the 'Power IN' LED on front panel. |
| <p>15. Transmitter</p> | <ul style="list-style-type: none"> ● Protection against intentional and unintentional Power up and Power down occurrences without damage to transmitter ● Over-current triggers immediate TX shutdown. ● Protection against noise induced timing errors |
| <p>16. Recovery</p> | <ul style="list-style-type: none"> ● Protection against intentional and unintentional Power up and Power down occurrences without damage to transmitter |
| <p>17. Wiring Interconnections</p> | <ul style="list-style-type: none"> ● All critical timing wiring connections continually checked for valid connection. Any connection error prevents TX enabling, or initiates immediate TX shutdown. |
| <p>Data Acquisition and Processing</p> | |
| <p>18. Sampling Rate</p> | <ul style="list-style-type: none"> ● 25Hz/50Hz/100Hz/ (software selectable) |
| <p>19. Processor Control</p> | <ul style="list-style-type: none"> ● Controller Card: ECOS operating system, 32-bit Hitachi SH3/7729 ● Sensor and Power Supply: 16-bit Hitachi H8S/2329 |
| <p>20. Data Conditioning</p> | |
| <p>Filtering</p> | <ul style="list-style-type: none"> ● Selectable digital low-pass filters (LPF); <ul style="list-style-type: none"> ○ Fast 10 Hz (up to 15 km/hr); ○ Slow 3 Hz (up to 5 km/hr) |
| | <ul style="list-style-type: none"> ● Similar to F1A4 operating independently for each RX coil. ● Selectable modes: <ul style="list-style-type: none"> ○ Off, |

| | |
|------------------------------|---|
| Ground Balance | <ul style="list-style-type: none"> ○ Fixed (locks in the current settings) ○ Tracking (continually monitors and updates settings) |
| Noise Cancel | <ul style="list-style-type: none"> ● Searches ±3% about the nominal operating frequency for quietest operating point. |
| Drift compensation | <ul style="list-style-type: none"> ● Selectable AC, DC and Pseudo DC modes for drift compensation. |
| 21. Positioning | |
| GPS | <ul style="list-style-type: none"> ● Updates the data with the NMEA time stamp every 1 sec (±0.5ms) ● Latitude and Longitude can be added to data for reference, updated every 1 sec. |
| Road Wheel (accessory) | <ul style="list-style-type: none"> ● System has ability to interface to Quadrature encoder and include data in output stream. ● Processes the quadrature signals so direction can be inferred. ● Distance data is passed inside data packets to host application and can be linked to display. Display scrolls at same rate as road wheel tics. ● <i>Note: Calibration method required</i> |
| 22. Output Format | <ul style="list-style-type: none"> ● Data packets output from the Ethernet connection include the following: <ul style="list-style-type: none"> ● Time stamp (hh:mm:ss) ● Distance (road wheel, ticks) ● Status for each sensor slot ● 3 unprocessed data channels for each Rx coil (G, S, C) ● <i>Note: S & C are ground compensated channels.</i> ● <i>Note: G is a raw data channel.</i> ● Minelab provides a PC application that controls the array, displays real time data, records data and replays collected data. ● The log data is available in XML format. |
| Automatic Target Recognition | |

| | |
|--------------------------------|--|
| 23. Detection | <ul style="list-style-type: none"> • Detection for marking purposes is available. • Signals exceeding a preset threshold (operator adjustable in the application software) will generate a trigger for the marking system via the COM port of the PC running the 'water fall' display. • Channel drift tracking is provided by selectable modes of coupling (AC, pseudo DC, constant DC). |
| Environmental Standards | |
| 24. Humidity | |
| Operating | <ul style="list-style-type: none"> • 10% to 90% RH (MIL-STD-810F-507.4) |
| Storage | <ul style="list-style-type: none"> • 0% to 100% RH (MIL-STD-810F-507.4) |
| 25. Temperature | |
| Operational | <ul style="list-style-type: none"> • -30oC to +60oC (MIL-STD-810F-502.4/501.4 Procedure I & II) |
| Storage | <ul style="list-style-type: none"> • 40oC to +80oC (MIL-STD-810F-501.4/502.4 Procedure I & II) |
| Temperature Change | <ul style="list-style-type: none"> • System will withstand sudden temp change (greater than 10oC per minute) within low and high storage temperatures. (MIL-STD-810F-503.4 Procedure I) |
| 26. Moisture | <ul style="list-style-type: none"> • IP65 (cables exempt when not connected to mating receptacles) (MIL-STD-810F-506.4 Procedure I) |
| 27. UV Resistance | <ul style="list-style-type: none"> • 1 year visually and 5 years mechanically |
| 28. Chemical Resistance | <ul style="list-style-type: none"> • Withstands, without surface damage, short term exposure to: <ul style="list-style-type: none"> • Detergent • Vehicle fuels and lubricants • Note: Slight surface discolouration after short term exposure to fuels is possible. |
| 29. Shock and Vibration | |
| Transport | <ul style="list-style-type: none"> • Aircraft/Ship/Railroad (MIL-STD-810F-514.5 Procedure I) |
| | |

| | |
|--|---|
| Operating | <ul style="list-style-type: none"> ● Ground vehicle (MIL-STD-810F-514.5 Procedure I & III) |
| Detection Capabilities | |
| 30. Max recommended vehicle speed | <ul style="list-style-type: none"> ● Tested at 15 km/hr (currently limited by the fastest filter and maximum sample rate) ● Sampling at 200Hz at 15kph gives a resolution of 2.1samples / cm. ● Significantly faster speeds are possible with a degradation of signal to noise ratio trade-off |
| 31. Sensor Head Height | <ul style="list-style-type: none"> ● 50mm minimum ground clearance ● up to 500mm above surface (if near-surface AT mine threat) |
| 32. Max Detection Depth | |
| Minimum Metal Anti Personal Mine Detonator (NVESD Io Target) | <ul style="list-style-type: none"> ● 220mm (below array) |
| DSTO Anti Tank Mine simulant (metal case) | <ul style="list-style-type: none"> ● 1600 mm (below array) |
| | <ul style="list-style-type: none"> ● <i>Note: There are selectable Rx timings for optimisation of detection depth with respect to varying target characteristics. The same Tx timing is used for all Rx timings</i> |
| 33. Ground | <ul style="list-style-type: none"> ● Suitable for use in all soils with minimal reduction in sensitivity. ● Technology as used in the Minelab F1A4 hand-held detector |
| 34. Cross Track Resolution | <ul style="list-style-type: none"> ● Approx +/- 100 mm |
| Display Software | |
| 35. System | <ul style="list-style-type: none"> ● MS Windows 2000/XP |
| 36. Real Time Display | <ul style="list-style-type: none"> ● "Waterfall" display of all Rx channels with optional marking overlay. ● Data from max 20 Channels is logged for customer processing and displayed. ● 2D or 3D line plots of |

| | |
|-------------------------------|---|
| | nominated Rx channels available. |
| 37. Software Functions | |
| Configure Array | <ul style="list-style-type: none"> At start up, parameters are read from a file on the controller. |
| Control Array | <ul style="list-style-type: none"> Commands are sent via the TCP/IP link to control: <ul style="list-style-type: none"> Data logging Noise cancel Coupling LPF GB mode Sampling rate Rx timings Distance reset Shut down. |
| Real Time Display | <ul style="list-style-type: none"> As in 37 above, linked to distance from road wheel. |
| Log Array Data | <ul style="list-style-type: none"> Time stamp; distance; and {G, S, C, Q} channels |
| Replay logged files | <ul style="list-style-type: none"> Allows application of post processing algorithms |
| System Diagnostics | <ul style="list-style-type: none"> Subsystems are continually verified. Power Supply monitors voltage rails, state, control lines, GPS connectivity and temperature. There is no automatic self test of actual detection operation: a manual test with a metallic object is specified to test coil sequencing and signals. |
| Marking System | <ul style="list-style-type: none"> Manual prompting is from the waterfall display of all the Rx channels. There are facilities available that automatically send a trigger out on the COM port of the host. Marking System hardware not supplied |

Minelab Single Transmit Multiple Receive

<http://mine-detectors.at-communication.com/en/minelab/stmr.html>