

HDD LOCATING SYSTEMS

Sense

IT MAKES SENSE

Russian Multi-Frequency
Locating Systems
for Horizontal-Directional Drilling

New Vision





We create Russian multi-frequency location systems for horizontal directional drilling

— Russia, Ulyanovsk —



A. Tareev

SENSE – one of the world leaders on location systems market for horizontal directional drilling. The company produces both azimuth and wireless systems. The SENSE Development Center is located in Russia, in Ulyanovsk.

SENSE company was founded in 1993 by Alexey Tareev and specialized in the development of touchpads for foreign computer manufacturers equipment, including for Logitech.

SENSE is the holder of several patents, registered in Russia, China, India and USA.

After 1996, according to foreign policy reasons, SENSE management began searching for new niches for development. After market analysis, choice was made in favor of developing locating systems for horizontal directional drilling.

Among the reasons is the lack of high-tech Russian-made equipment and lack of service centers in Russia for foreign systems with growing demand for domestic market.

Thirty years we bring to the industry professionalism through innovation, training, accompaniment and support.

Single Frequency Locating System SNS 1t New Vision

Wireless locating systems for horizontal directional drilling are essentially a compass for the operator of a drilling or puncturing rig. Locating systems allow position and angle tracking tilt of the drill in all directions underground. Precisely according to the the locating system data, the locator guy directs the drilling machine operator. The receiver of the location system for HDD uses electromagnetic field created by the sonde antenna to determine the position of the drill head in space. Information from the receiver via radio channel it is sent to a backup device at the drilling rig operator.

Telemetry
 Station (TS)

Hardware and software complex is intended for duplicating information from receiver to displays devices under control Android operating system version 4.4 and higher

Receiver
 SNS 1t NV



Minisonde SNS MSt2

MSt2 Sonde adapter

Wrist repeater
 (option)

When laying communications using a trenchless method, a puncture rig can work from a well or narrow pit, where there is no possibility to place a full-fledged repeater of the locating system. This compact device intended for acceptance by the Installation Operator telemetry when it is in cramped conditions.

SNS 1t New Vision

1. 1 frequency — 12kHz (SNS1t protocol);
2. 1 operating screen;
3. Sleep and non sleep sonde modes;
4. Roll position correction;
5. Depth up to 9,99 m;
6. Internal battery (up to 50 hours) — lifetime warranty;
7. Angle accuracy — 0,1%;
8. 12 roll positions.

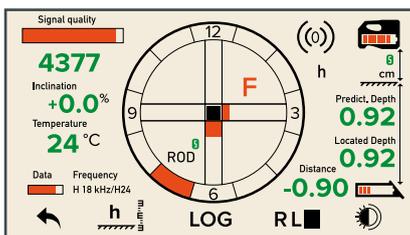
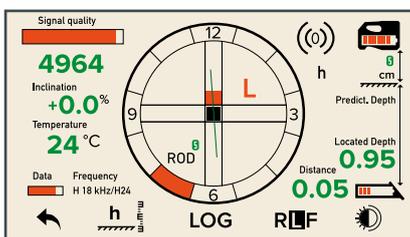
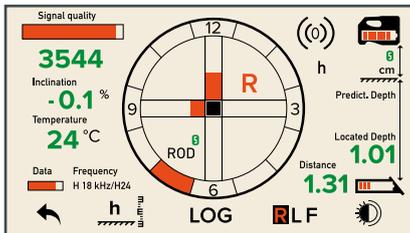
Multi-Frequency Locating Systems SNS 2t / 7t / 8t New Vision



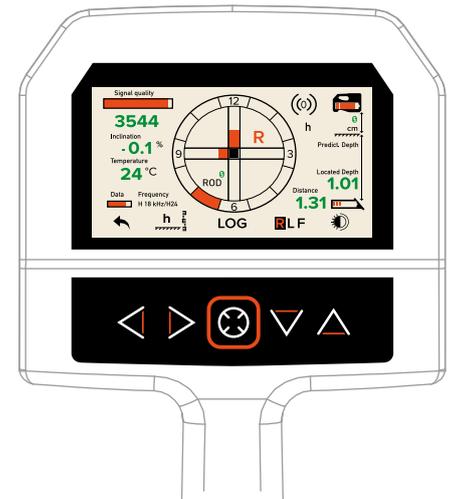
Data sheet

1. 2 (12, 30 kHz) or 7 (2, 8, 12, 18, 24, 30, 41 kHz) frequencies;
2. Internal power supply (up to 50 hours) – lifetime warranty;
3. Oled display;
4. Energy safe mode;
5. Locating screen ClockFace view: Cross ⊕/Ball and depth/distance;
6. Noise test with predicted depth according to the type of sonde;
7. Programming the sonde modes: frequency/power mode/sleep mode ⊕;
8. Permanent real-time displaying all locating information ⊕;
9. Visual and sound sonde heating indication;
10. Predicted depth to drill on-target in auto mode ⊕;
11. Ultrasonic sensor for correction altitude position;
12. Roll position correction;
13. One-step calibration with memory;
14. Calibration test;
15. Depth correction by two heights;
16. 4 telemetry channels, up to 450 meters;
17. Wireless telemetry antenna up to 2 km* (option);
18. DataLog;
19. User password and password on date;
20. Diagnostics;
21. Active and passive trace seek (for SNS 8t);
22. 3+ power modes;
23. Up to 45 meters depth;
24. 24 roll positions;
25. Angke accuracy 0.1%;
26. Distance accuracy: 0 – 5%;
27. One-step programming of frequencies/power modes/sleep mode ⊕;
28. Switching to any frequency during the drilling;
29. Programmed Modes underground switching;
30. Self-diagnostics and diagnostics of battery and sonde housing;
31. All types of batteries, up to 20V.

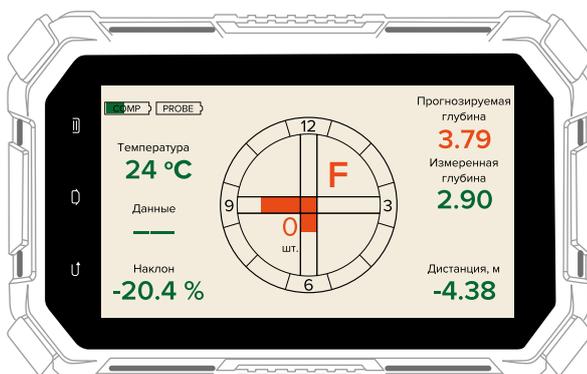
Advantage of SNS Receiver Location Screen is Constant Displaying of All Needed Information



- Quality of sonde signal;
- Power of sonde signal;
- Sonde angle;
- Sonde temperature;
- Sonde power;
- Sonde frequency.
- No. of telemetry channel;
- Receiver battery level;
- Distance to surface;
- Predicted depth (in the vicinity of the front point);
- Current depth;
- Horizontal distance to the sonde;
- Sonde battery level.
- Back to menu;
- Correction distance to surface;
- Record the shot (datalog);
- Switching locating points;
- Day/night mode.



Main Information From the Receiver Transfers to the Repeater, Including Directions to Location Points



- Sonde angle;
- Sonde battery level;
- Sonde temperature;
- Repeater power;
- Telemetry status;
- Predicted depth (in the vicinity of the front point);
- Current depth;
- Horizontal distance to the sonde.

SNS t-series Sondes



##	Name	Dimensions	Power Level	Depth, m
1	SNS st/100	Ø 43, L 550 mm	6x18650, up to 25V	100 m
2	SNS st/A	Ø 32, L 480 mm	2C, up to 10V	70 m
3	SNS st/EA	Ø 32, L 580 mm	4C, up to 10V	70 m
4	SNS st/C	Ø 32, L 480 mm	cable, up to 24V	50 m
5	SNS st	Ø 32, L 380 mm	2C, up to 10V	45 m
6	SNS st/E	Ø 32, L 480 mm	4C, up to 10V	45 m
7	SNS MKt1	Ø 15, L 222 mm	AAA, up to 5V	10 m
8	SNS MKt2	Ø 22, L 205 mm	AA, up to 5V	10 m
9	SNS MKt3	Ø 25,4, L 205 mm	AA, up to 5V	10 m
10	SNS MSt2	Ø 22, L 205 mm	AA, up to 5V	10 m
11	SNS Pt	Ø 15, L 205 mm	AAA, up to 5V	30 m
12	SNS MKt DW	Ø 19, L 270 mm	AA, до 5V	10 m

Adapters for Sondes for DitchWitch (DW) and TractoTechnik (TT) Sonde housings.

Sense Lithium Battery



ER261020M – high capacity battery

Lithium Battery
 3.6V, 2C Type
 Nominal capacity 13000mAh
 Max. constant current 1800mA



ER26500M* – increased range by 25%

Lithium Battery
 3.6V, C Type
 Nominal capacity 6500mAh
 Max. constant current 1500mA

**only for SNS Sonde (!)*

Telemetry Options

Repeater SNS Monitor

The repeater is designed for duplication information from the location system receiver. Telemetry range up to 500 meters in a straight line visibility. Also transmits telemetry data via Wi-Fi to any Android device and installed SNS Vision App.



Relay – increase your range

Additional outside wireless antenna that increases telemetry between Receiver and Repeater. Each Relay increases distance of transferring signal by 500 meters. Relay also helps to keep telemetry when there is no direct vision between Receiver and Repeater.



Telemetry Station (TS)

Hardware and software complex is intended for duplicating information from receiver to displays devices under control Android operating system version 4.4 and higher.



SNS Vision App

The SNS Vision App is installed to any device running by OS Android. It allows you to create project and maintaining drilling records, with receiving telemetry from the System Receiver using a Telemetry station or SNS Repeater. SNS Vision App in fully compatible with DrillSite software.



Telemetry:

1. Sonde temperature;
2. Angle (% , \angle°);
3. Locating line, clockface position, locating points, # of shot;
4. Visual and sound sonde heating indication;
5. Predicted depth (only at front (F) point);
6. Permanent real-time displaying all needed locating information @;
7. Current depth;
8. Horizontal distance Receiver Sonde.



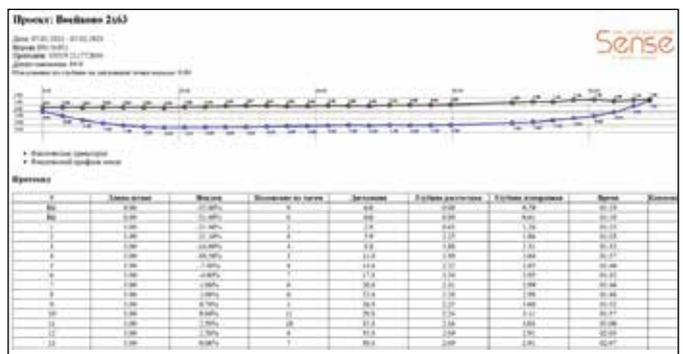
Graphic editor:

- Surface profile;
- Project trajectory;
- Obstacles;
- Actual drilling trajectory;
- Actual surface profile;
- Double window view.



Main Menu:

- Import and creating of drilling project. Real-time project managing @;
- Operations with project;
- Project export;
- Drilling reports;
- Possibility to add comments;
- GPS coordinates with connection to Google Maps.



Azimuthal Cable Navigating System SNS 100

This system was built to control HDD process with big depth and length.

Working principle is based on measuring of gravity and magnetic field of the Earth using special sensors in the probe. All data goes by cable to the Interface module of the system for decoding. From module data goes to PC where it is calculating to define depth, probe position, angle etc.

Final information is assembling to convenient table and goes to Control Panel of drill master.



Data sheet

- Transmitter azimuth range with accuracy better than $0,1^\circ$;
- Horizontal inclination angle measurement – $0,1^\circ$;
- Drilling instrument position measurement – $0,1^\circ$;
- Transmitter power supply measurement – $0,5\text{ V}$;
- Transmitter temperature measurement – $0,5\text{ }^\circ\text{C}$;
- Refreshing data speed – 800 ms ;
- Clarification of the transmitter position with current frame;
- AC Power supply $220\text{V-}50\text{Hz}$ or DC – 12B ;
- Working temperature range from -20 to $+50\text{ }^\circ\text{C}$;

The calculation of the location of the drilling instrument under the ground determines relatively constant magnetic field produced by the current frame, or a permanent magnet.

Non-magnetic drilling instrument is required.

HDD Inclinometer

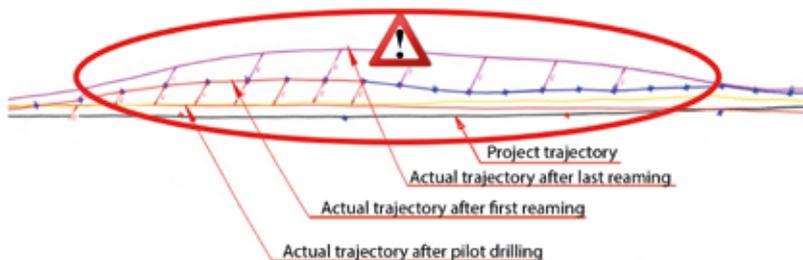
Inclinometer SNS A100 is intended to control zenith angles of borehole bottom during reaming process in horizontal directional drilling constructing by fixing angles of rods line according of horizon using special algorithm. In general User sees angles, trajectory of borehole bottom after reaming and changes in that trajectory after multiple reamings.

Feature of the Inclinometer SNS A100 is its autonomous work up 4 days in record mode and simple way of installing between drilling rods in flow sub in 30-50 meters after reamer to let it lie down on the borehole bottom. This positioning allows fix angles of the trajectory. Time of each reamer stage increases on only several minutes needed for install/uninstall flow sub and for Inclinometer angle calibration.



Creating actual profile in Inclinometer's software

Designed data		Data from Inclinometer					
Distance from start point, m	Zenith angle of drill path, degree	Date	Time	Angle, deg	Rot, deg	Temp., °C	Distance from start point, m
300	180	01.08.2020	10:10:58	182.14	279	21	300
301	180	01.08.2020	10:11:12	182.56	185	21	301
302	180	01.08.2020	10:11:42	185.61	175	21	302
303	180	01.08.2020	10:12:38	185.78	245	20	303
304	180	01.08.2020	10:13:47	187.23	265	20	304
305	180	01.08.2020	10:14:52	190.02	90	20	305
306	180	01.08.2020	10:15:33	190.12	65	20	306
307	180	01.08.2020	10:17:03	192.33	78	20	307
308	180	01.08.2020	10:18:18	192.47	118	20	308
309	180	01.08.2020	10:19:44	191.12	54	20	309
310	180	01.08.2020	10:20:25	190.49	201	20	310
311	180	01.08.2020	10:21:16	189.2	220	20	311
312	180	01.08.2020	10:22:08	187.28	237	20.5	312
313	180	01.08.2020	10:22:56	185.43	302	21	313



Underwater Module



The SNS underwater module is a unique development of the SENSE company, which is an additional equipment of the SNS 2t / 7t NV locating system.

The underwater module is a cable remote 3D antenna designed to determine the location of the drilling tool when drilling wells using the HDD method under the seabed.

The shape of the underwater module is made in the form of a weight, has a waterproof body and handle for moving. It can sink to the bottom under its own weight, or easily move in the water with the help of diver. Has seats for attaching a submersible device.

Data sheet

- channel depth up to 50m;
- equipped with a level indicator;
- operating time – continuously via cable.

Underwater Module Kit

- underwater module – 1 pc.;
- cable – 50 m;
- case – 1 pc.



2745480, 2679468, 2723927, 119240, 2698373, 173105, 2771433
2020612130, 2018615278
US 11,048,009 B2, IN202127003479, CN112771242



702318, 735373

EAЭС: RU Д-РУ.АЖ49.В.13178/20

EAЭС: RU Д-РУ.НВ27.В.15123/20



2019.05-SENSE-SNS8t-EU
2019.05-SENSE-WifiRBox-EU
2019.05-SENSE-Underwater Antenna-EU
2019.05-SENSE-SNSst/E-EU
2019.05-SENSE-SNSst/C-EU
2019.05-SENSE-SNS MKt2-EU
2019.05-SENSE-SNS7t-EU
2019.05-SENSE-SNS 4M-EU
2019.05-SENSE-SNS2t-EU
2019.05-SENSE-SNS1t-EU
2019.05-SENSE-SNS100,SNS PROn-EU
2019.05-SENSE-SNS MKt1-EU
2019.05-SENSE-SNSst/A-EU

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