ES7080 Intelligent Pipeline Detector



I .Brief introduction

Intelligent Utility detector, also known as Utility locator, Path Locator, is a very comprehensive path detection instrument. It has pipeline path detection, cable identification, fault search and other functions. The instrument is composed of transmitter, transmitting current clamp, receiver, receiving flexible current clamp, connecting test line, A-word frame (optional), etc.

Intelligent Utility detector can be used for path detection, pipeline survey and depth measurement of metal pipelines and underground cables under trenchless excavation. The instrument uses a variety of filtering technologies, has anti-interference ability, and can accurately locate and measure the depth. It is suitable for the detection and patrol of various underground metal pipeline, pipeline management and maintenance, municipal planning and construction, power supply and other departments, and is one of the necessary instruments of pipeline maintenance units. This function is realized by the signal transmitter, receiver, signal transmitting clamp and connecting test line. The instrument has the following characteristics:

1. Multiple detection modes: classical positioning mode, wire cruise mode, signal distortion measurement mode;
2. Classic positioning mode: compass, direction and signal amplitude display, visually display the left and right direction of the pipeline。
3. Lead cruise mode: 360 omnidirectional pipeline path indication, continuous display of depth, current, and pipeline relative position. The interface is simple and intuitive, and it can be operated without experience
4. Signal distortion measurement mode: the peak and trough wave form should be displayed at the same time. In the field without distortion, the peak and valley value position should be consistent, and the field shape should be symmetrical relative to the centrol line.

5. Current direction determination (partial frequency), can be calibration current direction, eliminate adjacent line interference, to prevent tracking errors.
6. Full digital high-precision sampling processing: stable and reliable, ultra-high sensitivity, extremely narrow reception frequency band, strong anti-interference ability, can fully inhibit the power frequency and harmonic interference of adjacent running cables and pipelines.
7. Multiple detection frequencies: 11 active detection frequencies and 3 passive detection frequencies.
8. Transmitter a variety of signal output: direct output, caliper coupling, induction method.
9. Transmitter digital amplifier power output, automatic impedance matching, automatic protection.

Cable identification is designed for power cable engineers and cable workers to solve the technical problems of cable identification. It can be used to identify live and blackout cables. The user can accurately identify one of the target cables from multiple cables through the instrument to avoid serious accidents caused by mistaking live cables. For cable identification, 20 cables can be pre-calibrated at the transmitter and then received and identified at the remote end, which greatly saves the time of engineering personnel to and from calibration operation and improves work efficiency. The cable identification is successfully marked with √, and the non-target cable is marked with ×, which can quickly and automatically identify the target cable. The function is realized by the cooperation of signal transmitter, receiver, signal transmitting clamp, connecting test line and flexible caliper**.**

Signal transmitter: used for pipeline path detection and cable identification. The device can add identification signals to the target cable through direct connection output, caliper coupling, induction method, and other methods. There are 11 different pulse signals of 640Hz, 1.28kHz, 2.56kHz, 3.20kHz, 4.09kHz, 8.19kHz, 10.2kHz, 32.7 kHz, 65.6 kHz, 81.9 kHz, and 197 kHz. The maximum signal output power is 15W, and 6 levels are adjustable, adapting to different application environments, making pipeline detection and cable identification more accurate and reliable. Instrument built-in large function rate can be charged with lithium battery, automatic impedance matching, automatic protection. The transmitter adopts the integrated special toolbox design, its box can withstand the pressure of about 200kg, the host 5 inches of the capacity touch LCD display, real-time dynamic display signal output status and battery usage.

Transmitter clamp: suitable for caliper coupling method. The transmitter clamp couples the signal emitted by the transmitter to the target cable, and the jaw size is Φ 125mm. The transmitter clamp is directional, and the transmitted signal flows in from the direction indicated by the arrow on the transmitter clamp.

Receiver: Used for pipeline path detection and cable identification. Built-in multiple shielded 3D antennas, It can effectively identify 13 different pulse coded current signals of 640Hz, 1.28kHz, 2.56kHz, 3.20kHz, 4.09kHz, 8.19kHz, 10.2kHz, 32.7kHz, 65.6kHz, 81.9kHz and 197kHz generated by the transmitter. It can also identify 50Hz and 60Hz power frequency signals and RF signals with center frequencies of 32.7kHz and 81.9kHz. Using 4.3 inch capacitive touch LCD screen, real-time dynamic display 360° omnidirectional pipeline path indication, depth, current and relative position of the pipeline.

]**Flexible current clamp:** Used for cable identification. The current clamp is a Roche coil, which has excellent transient tracking ability, can quickly identify the pulse width frequency signal generated by the transmitter, and is suitable for thick cables or irregularly shaped conductors. The inner diameter of the clamp is about 200mm, which can clamp the cable below Φ 200mm, without disconnecting the measured line, non-contact measurement, safe and fast.

Special note: When the power failure cable is identified: it is strictly prohibited to access the live cable. Live cable identification is only applicable to three-core armored cables. In recognition, the transmitter clamp and the receiver clamp can not be mixed, and the direction of the input signal should be consistent.

Ⅱ.Technical specifications

Receiver specifications

Function	Utility detector(cable position tracking, direction display, depth measurement, current measurement), cable identification, A-frame fault detection (optional function)
Power	8.4V large capacity rechargeable lithium battery
Input mode	Built-in receiving coil, flexible caliper, A-frame (optional function)
Receive frequency	Active detection frequency: 640Hz、1.28kHz、2.56kHz、3.20kHz、4.09kHz、8.19kHz、10.2kHz、32.7kHz、65.6kHz、81.9kHz、197kHz Power frequency passive detection frequency：50Hz、60Hz、250Hz RF passive detection frequency band: the central frequency is divided into:32.7kHz、65.7kHz、81.9kHz、197kHz
Utility detector modes	Wide peak method, narrow peak method, sound valley method
Utility detector display modes	Classic positioning mode, wire cruise mode, signal distortion measurement mode
Utility detection Scope of detection	Direct connection method: generally can reach the cable length of 0~20 kilometers, mainly determined by the grounding resistance, cable resistance and cable buried depth Coupling method: generally can reach the length of the cable 0~10 kilometers, mainly determined by the grounding resistance, cable resistance and cable buried depth Induction method: suitable for cables with buried depth less than 2m
Depth and current	Display the cable depth and current value in real time
measuremen t depth	0-20m
Deep precision	Flat position precision accuracy: Central axis position of the target cable or pipeline: ± 5% (buried depth in 0-3m) -10% (buried depth in 3m-20m)

Positive and wrong prompt	Excluding the interference of adjacent cables, in the measurement of adjacent cables, the measurement of the adjacent cables can be distinguished according to the different signal strength and the measured current phase of the adjacent cables. In the process of tracking the cables, the phase dial and pointer can be observed to distinguish the measured cables and the adjacent cables
Sound instructions	FM tone with signal intensity
Capacity of resisting disturbance	Very narrow receiving frequency band and unique digital processing method can fully suppress the power frequency and harmonic interference of adjacent operating cables and pipelines
Interference distance	When using the coupling method and the induction method, the transmitter will produce interference in close distance. The distance of interference is related to the transmitting power and frequency. The greater the power, the higher the frequency, the stronger the interference.The minimum distance of the receiver free from the transmitter interference often needs to be determined by test: Utility detection: 5m away, 20m away as no interference Cable identification: the coupling method beyond 2~5m can be confirmed as no interference
Cable identification	Identification mode: flexible caliper intelligent identification; Number of calibrable cables: 1~20; Calibration value: the current percentage of the received signal and the transmitted signal between 75% and 135% of the calibration value is one of the conditions for successful identification; Directionality: the transmitter clamp, receiver clamp must be in the same direction as the loading signal, which is one of the conditions for successful identification
Cable identification Range of detection	Direct connection method: can identify the signal with a circuit resistance of 0 Ω ~ 8 kΩ (generally, the length of the cable can reach 0~20 km, mainly determined by the grounding resistance and cable resistance) Coupling method: can identify the signal with circuit resistance of 0 Ω ~ 1 kΩ; (generally the cable length is 0~6 km, mainly determined by the grounding resistance and cable resistance)
Display	4.3 LCD color screen LCD (highlight screen), visible in the sun
Touchscreen	Yes
Size	350mm(length)×155mm(width)×700mm(high)
Weight	Around 2kg

Connection interface	Type-C USB Interface, air socket
Coil inner diameter	φ200mm(A larger caliber can be customized as needed)
Working temperature and humidity	-10℃～40℃；below 80%Rh
Store temperature and humidity	-10℃~50℃；≤95%RH, No knot dew
Withstand voltage	AC2000V/rms(Before the front and rear ends of the shell)
Suitable for safety regulations	IEC61010-1 CAT Ⅲ 600V，IEC61010-031，IEC61326，Pollution grade 2

Transmitter specifications

function	Multiple frequency signal transmission modes
Power	10.8V Large-capacity rechargeable lithium battery
Output method	Direct connection method, caliper coupling method, induction method
Output frequency	640Hz，1.28kHz，2.56kHz，3.20kHz，4.09kHz，8.19kHz，10.2kHz，32.7kHz，65.6kHz，81.9kHz，197kHz
Output mode	Automatic identification, according to different accessories
Output power	15W max，The 9 gear adjustable
Impedance	Automatic real-time impedance matching and protection function
Direct output voltage	150Vpp max
circuit protection	With overload and short-circuit protection S
Display	5-inch LCD Color screen LCD
Touch screen	Yes

Instrument size	320mm(length)×275mm(width)×145mm(high)
Weight	Transmitter about 3.85kg; The transmitter clamp is about 1.18kg
Charger	DC 11.1V 3A
Dimensions of transmitter clamp	Length, width and thickness 297mm×194mm×39mm
Launch clamp inner diameter	φ125mm
Length of transmitter clamp	3m
P-wire	Red test line 3m, black test line 3m
Connection interface	USB interface, DC interface, aviation socket
Resist compression	The transmitter adopts an integrated special tool box type design, and the box body can withstand the pressure of about 200kg
Withstand voltage	AC 3700V/rms(Before the top surface and bottom surface of the instrument box)
Electromagnetic characteristics	IEC61326(EMC)
Suitable for safety regulations	IEC61010-1(CAT Ⅲ 300V、CAT IV 150V、Pollution grade 2)

◆Note: This introduction is for reference only. Please read the instruction manual for detailed parameters.

III.Packing list

transmitter	1set
receiver	1set
toolkit	1pcs
Transmitter current clamp	1set
Receive the flexible current clamp	1set
Direct connection to test clamp	1pcs

Two-headed alligator clip test line	1pcs（black）
Ground needle	1pcs
Receiver charger	1pcs
Transmitter charger	1pcs
Instructions	1set

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