



ModeXion Intelligent MX-100 Manhole Inspection Equipment

Portable 3D Scanning and Modeling System

Smart Manhole Inspection · 3D Modeling · Early Hazard Detection

End blind inspections * Generate precise 3D models with one click * Defect reports



Product Introduction



0-Person Entering the Manhole

Ground-level operation throughout the process, completely avoiding safety risks

5-Minute Deployment

Portable for one person, quick to use

± 1 cm Accuracy

Millimeter-level laser measurement with traceable data

IP64 Protection

Suitable for humid, dusty, corrosive, and complex underground environments

Full-Dimension Data Capture for Manhole Chambers

- Generate centimeter-level 3D point clouds and real-scene
- Automatically identify defects such as damage, deformation, silt buildup, and joint misalignment
- Integrated positioning and attitude sensing, with real-time data transmission and processing, automatically generating digital reports



Core Technical Capabilities

Four Technology Engines for Intelligent Inspection Across All Scenarios



Multi-Source Fusion Sensing: Laser + Vision + Ultrasound

- 360° panoramic 4K imaging with centimeter-level positioning
- Clear data capture even in low-light or wastewater environments (down to 0.13 lux)
- Quantified annotation of cracks, settlement, and silt accumulation, with an error margin of ± 1 cm



AI Automatic Defect Detection: Built-in Lightweight Algorithms

- Automatically detects cracks, damage, misalignment, and blockages
- Three-level alerts (General / Severe / Critical), with PDF reports including coordinates and dimensions
- Supports GIS system integration



Industrial-Grade Protection & Simplified Deployment

- IP64 sealing, stable operation across the full temperature range from -10° C to 50° C
- Single-person operation, one manhole completed in 5 minutes, with 2+ hours of battery life



Cloud Collaboration & Closed-Loop Data Management

- Real-time transmission via 4G / NB-IoT, with dual local and cloud storage
- End-to-end digital workflow: Inspection → Assessment → Work Order Dispatch → Repair → Review

Technical Specifications

Basic Specifications

Weight	0.98 kg
Dimensions	278 mm × 98 mm × 74 mm
Protection Rating	IP64
Material	Aviation-grade aluminum + nylon plastic
Operating Temperature	-10° C ~ +50° C

Power and Consumption

Power Supply	Industrial rechargeable battery
Battery Voltage	7.2V
Battery Capacity	3300 mAh / 95.04 Wh
Typical Power Consumption	15 W

MainBoard

CPU	8 Core ARM
Structure	4× Cortex-A76 + 4× Cortex-A55
System	Linux

Networking and Communication

Wireless Network	2.4 GHz / 5 GHz Wi-Fi
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Data Storage and Post-Processing

Data Storage Format	*.bag (ROS bag format, partially open-source)
Data Processing Method	Post-processing

Storage and Computing Platform

Data Storage	CF express Card (default 128 GB, expandable to 1 TB, read/write >500 MB/s)
System Storage	eMMC 32 GB (<i>system-dedicated</i>)
System Memory	8 GB

Vision Module (Panoramic Video)

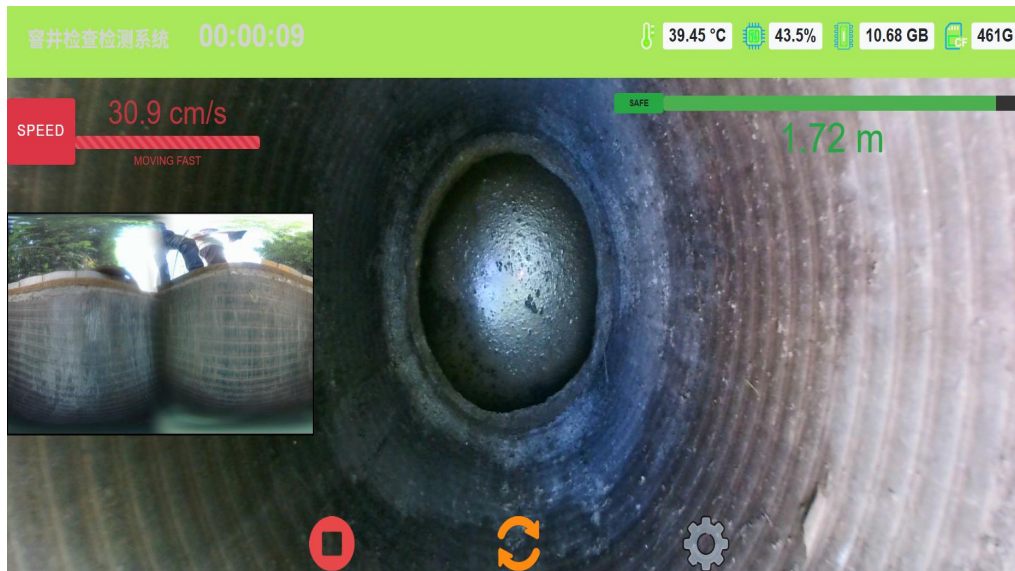
Camera Resolution	Three 8 MP ((optimized for low-light conditions))
Lens Field of View	>180°
Dynamic Range	110 dB+ (Supports Clear HDR + DOL HDR)
Video Output	2K–4K panoramic video stream

Data Collection+ Processing

📷 Real-World Imagery → 🏗️ 3D Model → ☁️ Point Cloud Data → 📄 Report

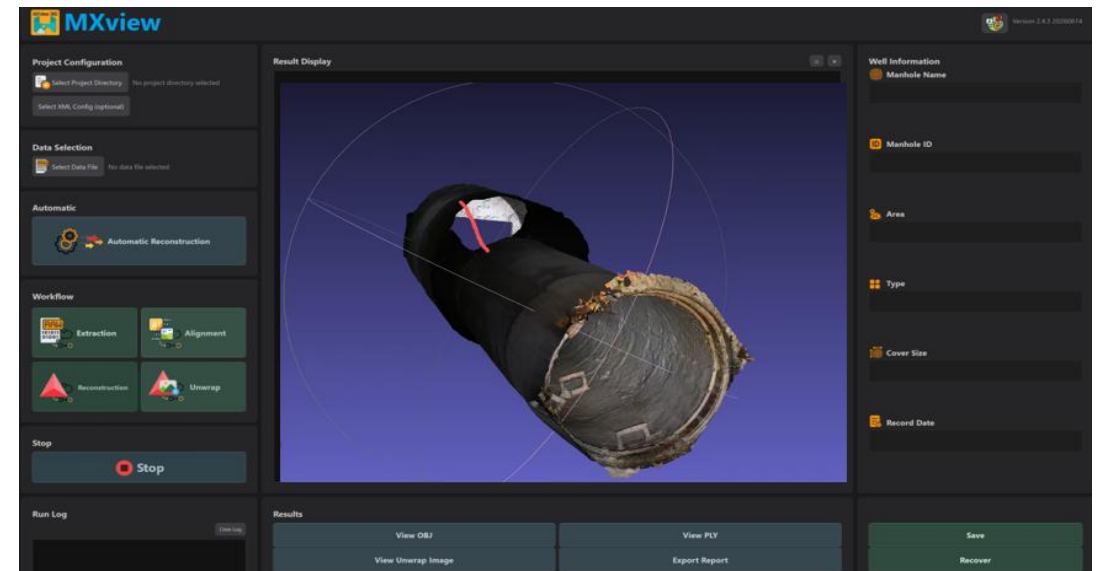
01 Collaboration Software

1. Real-time data visualization, showing information like deployment depth, equipment temperature, and hardware storage status all at once.
2. Comes with a high-definition camera that records views of the bottom and sides of the manhole in real time. The main screen shows the bottom, while split screens show the walls.
3. The interface is clear and easy to understand, simple and efficient to operate, and keeps data safe and stable.



02 Processing Software MXview 360

1. Standardized workflow with one-click handling for the entire process, sequentially tackling data parsing, sparse reconstruction, dense reconstruction, model unfolding, and defect Report.
2. Built-in measurement tools in the software allow measuring post-expo model data and generating data logs.
3. Supports various information like OBJ, PLY, 3D models, unfolded models, and data reports.

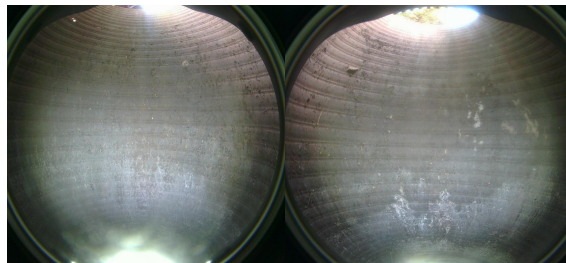


Output Deliverables

📷 Real-World Imagery → 🏗️ 3D Model → ☁️ Point Cloud Data → 📄 Report

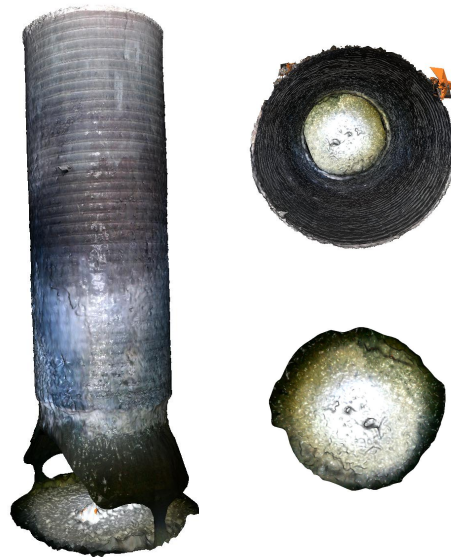
01 HD Real-World Images

Comprehensive raw visuals of shaft walls, pipelines, and base structures for rapid visual inspection



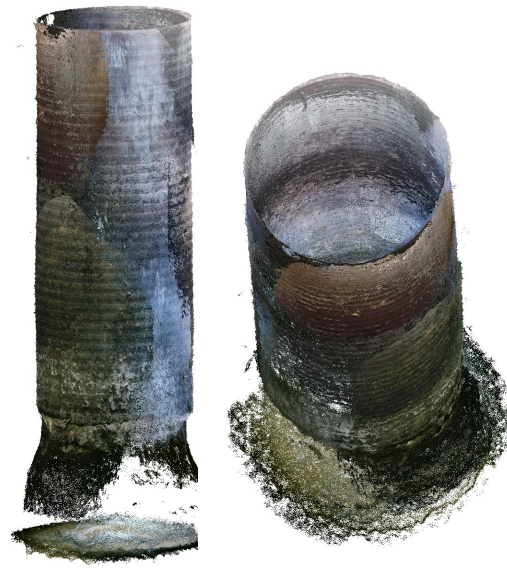
02 Mesh 3D Model

Integrated reconstruction of the manhole structure, fully restoring spatial geometry, pipe-wall curvature, and structural dimensions, with complete 3D visualization of the interior environment



03 Colored Point Cloud

True-color texture with precise measurement of key physical parameters such as pipe diameter and crack width



04 Defect Report

AI identifies damage, leakage, corrosion, and silt buildup, tagging location, type, and severity; compliant with municipal regulatory requirements for direct archiving and support of corrective action and hazard investigation

Manhole Inspection Report

Manhole ID: 30314

Report Date: 2026-07-09

Record Date: 2026-07-08

1. 3D Reality Model

Manhole Name	005	Manhole ID	30314	Area	DongBa
Type	污水井	Cover Size	80CM	Inspector	JieZhao
Inspection Unit					
					

Product Advantages

Six Key Advantages That Outperform Traditional Inspection Methods



Safer Operations

No man-entry required, eliminating the risks of toxic exposure, collapse, and falls



High Efficiency

Single-person deployment in 5 minutes, with per-manhole efficiency far exceeding traditional methods



Accurate and Reliable

Millimeter-grade laser sensing plus high-definition imaging, with ± 1 cm error and full traceability



Cost-Effective

No consumables, low failure rate, and significantly lower long-term cost than large-scale inspection equipment



Scenario Adaptability

Compatible with various inspection wells, without limitations on shaft diameter or depth



Standardized Deliverables

Automatically generated standardized reports for compliant archiving, with no additional manual processing required

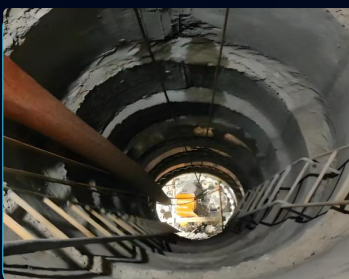
Application Scenarios

Covering Four Major Urban Underground Space Scenario



Municipal Drainage Manholes

Pre-flood-season hazard inspection | Water accumulation volume assessment | Pipe joint leakage detection



Power / Telecommunications Manholes

Manhole cover displacement monitoring | Shaft wall crack detection | Cable corrosion assessment | Gas (hydrogen sulfide/carbon monoxide) warning



Pipeline Network Upgrades in Older Residential Communities

3D documentation of existing manholes | Before-and-after retrofit comparison | Digital archiving



Smart City Pipeline Network Survey

Bulk data collection | Build a 3D digital twin system for underground pipeline networks