Product Manual for High-Temperature Resistant Fire-Fighting Robot Series

Keep lives away from risk





High-Temperature Resistant Fire-Fighting Robot Product Series

Keep lives away from risk

Company Profile

We are a high-tech enterprise dedicated to providing comprehensive techni-cal solutions using speci al robots in key national industries. With disruptive robot products as the core, and ubiquitous network t echnology as the hub, the Company provides advanced security and technical
support for the national emergency safety field.

The Company has been certified as a National High-tech Enterprise, Zhongguancun High-tech Enterprise, Zhongguancun Golden Seed enterprise, has passed ISO9001, ISO14001 and OHSAS18001 certification, and become a member unit of the China Fire Protection Association and Beijing Fire Protection Association.

Adhering to the development philosophy of technological innovation, the Company gives close attention to independent R&D of core technologies and customized services of supporting products, with the objective of creating special robot series products that are leading changes in the emergency safety industries, and contribute to accelerating the modernization and intelligent development of the special robot industry, protecting national property and safeguarding lives.



R&D Team

The R&D team of the Company takes Tsinghua University's innovative scientific research strength as the core, bringing together many top-class doctor and master professionals in the industry, covering the mechanical, electronic, thermal, communication, artificial intelligence and other fields related to intelligent robots. It possesses great independent R&D strength and outstanding technological innovation advantages.

The core R&D team of the Company has undertaken and completed many projects, including the National Natural Science Foundation, National Major Scientific Research Instrument Development Project, National 973, National Major Scientific Instrument and Equipment Development Project, National 863, National Defence Science and Technology Innovation Special Zone Project, Weapon and Equipment Pre-research, Aerospace Pre-research, Beijing Natural Science Foundation and so on. The team won first prize in the Technology Invention Awards of the Ministry of Education in 2003, second prize in the Beijing Science and Technology Awards in 2011, first prize in the Science and Technology Awards of China Analytical Testing Association in 2014, silver prize in the 9th Beijing Invention and Innovation Competition in 2015 and third prize in the Science and Technology Innovation Awards of China Fire Protection Association in 2020.



Honours & Qualifications

For many years, we have attached importance to product innovation, with senior technical personnel being r esponsible for the control from R&D to production. In line with changing market trends, the Company has la unched high-quality products that meet the market demand. Through continuous efforts, we have gaine d recognition from many parties, all of which has motivated to achieve ever higher goals.



CERTIFICATE

- Business Licence
- Trade Mark Licence (several items)
- National High-tech Enterprise
- Zhongguancun High-tech Enterprise
- Member of China Fire Protection Association
- Credit Certificate of Unit Member of Beijing Fire Protection Association
- Member unit directly under Gansu Construction Industry Union
- Innovative product of China International Fire Equipment Technology Exchange Exhibition
- Advanced Equipment of Emergency Technologies certificate
- Beijing New Technology New Product certificate
- Gold Award for Excellent Products in Lanzhou Science and Technology Achievements Expo
- The 10th China Fire Protection Association Science and Technology Innovation Award
- ISO Quality System Certification
- ISO Environmental System Certification
- ISO Occupational Health and Safety Certification
- AAA-level Enterprises Credit Rating Certificate
- AAA-level Quality Service High-integrity Enterprise
- AAA-level Integrity Management Demonstration Unit
- Enterprise Credit Rating Certificate
- Integrity Supplier Enterprise

Patent Certificates



Authorised intellectual property

Invention Patent Certificates	7
Utility Model Patent Certificate	19
Appearance Patent Certificates	6
Computer Software Copyright Certificates	6









Research & Development

Typical threats, such as strong thermal radiation, collapse, explosion and flowing fire, caused by high temperatures at the scene of a fire accident are the main reasons for casualties among rescue firefighters and economic losses. Fire-fighting robots that can replace "heroes in harm’ s way" by entering high-temperature and high-risk fire scenes for rescue operations are necessary to guarantee reducing fire rescue casualties. "Keep lives away from risk" has always been the corporate vision. The Company is determined to replace human firefighters with high-temperature resistant fire-fighting robots, so as to ensure the safety of "heroes in harm’ s way" to the maximum extent.

——Keep lives away from risk

Epoch-making innovative technology

After four years of concentrated R&D, LESENTECH has launched a series of 1000°C high-temperature resistant fire-fighting robot products, which break through the fighting area limit of previous fire-fighting equipment. These can not only work in the normal temperature area around the fire scene, but also enter the dangerous high-temperature area at the core of the fire scene. They have the combat capability of attacking and defending well in a full range. They have four "zero distance" advantages for combat tasks, such as fire reconnaissance, fire-fighting and cooling, and personnel protection in the high-temperature burning area of the fire scene, which expands the combat capability of rescuers and ensures the personal safety of firefighters.

Technological Innovation



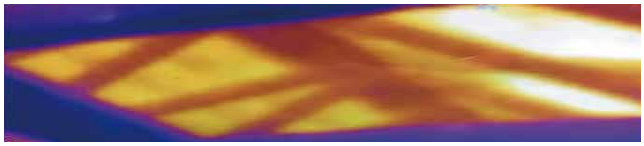
High-Temperature Resistant Protection Technology

A multi-layer variable component heat insulation tile specifically designed for heat transfer suppression in different regions, based on transient heat transfer simulation and a large amount of experimental analysis and optimisation, effectively suppresses external heat radiation, heat conduction and interlayer heat radiation.



High-Temperature Resistant Sports Chassis

High-temperature alloy spring and clearance self-adjusting bogie wheel system, preventing fixed clamp and overload. Low thermal conductivity shafting support technology and passive compliance vibration suppression technology, solving the problem of the working stability of the power train system in environments with extreme temperature difference.



High-Temperature Resistant Vision Detection Technology

Designed with a thermal shock resistant lens component, and a flexible support and sealing system made of inorganic materials, supporting long-term working of the lens under extreme temperature conditions.



High-Temperature Resistant Gas Detection Technology

Designed with an efficient gas phase heat exchanger, temperature measurement and control system, rapidly cooling and detecting high-temperature gases in limited spaces. Large flow and short gas path design, reducing detection delay.



High-Temperature Resistant Communication System

Designed with a high-temperature resistant monopole antenna with a metallic main body, fully optimising the antenna gain by adjusting the structure and matching impedance, thus guaranteeing the direct application of the antenna in high-temperature environments with stable communication.

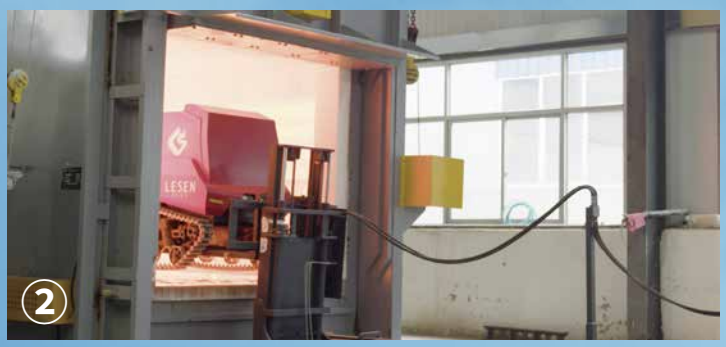


High-Temperature Resistant Water Hose

A strengthened water hose with a compound metal surface, directly withstanding high temperatures.
Interface compatible with GB12514.3-2006 standard, possessing the same level of temperature resistance when connected with the high-temperature resistant robot and high-temperature resistant water hose.

Ultimate High-Temperature Resistance Test





Executive standard: Q/LS RMA2.1-2020、XF892.1-2010

Certification unit: China National Fire-fighting Equipment Quality Supervision Testing Centre

Experiment method: to keep working normally for 30 min in a totally enclosed environment at 1000°C









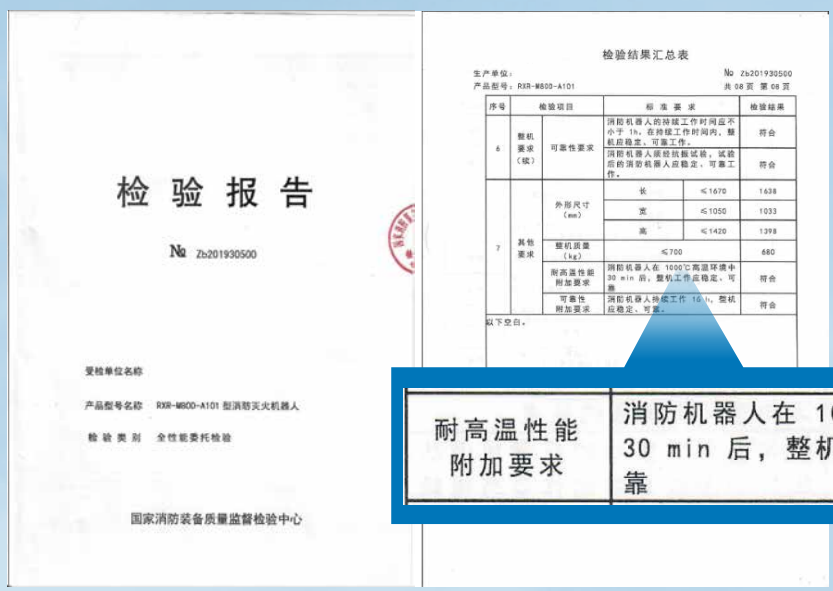


All functions of the robot are normal after the experiment.





Product Test Report


检 验 报 告

№ Zb201930500

受检单位名称

产品型号名称 RXR-M80D-A101 型消防灭火机器人

检 验 类 别 全性能委托检验

国家消防装备质量监督检验中心

检验结果汇总表

生产单位：

产品型号：RXR-M80D-A101

№ Zb201930500

共 08 页 第 08 页

序号	检验项目		标准要求		检验结果
6	整机要求（续）	可靠性要求	消防机器人的持续工作时间应不小于 1h，在持续工作时间内，整机应稳定，可靠工作。		符合
			消防机器人质经抗振试验，试验后的消防机器人应稳定，可靠工作。		符合
7	其他要求	外形尺寸（mm）	长	≤1670	1638
			宽	≤1050	1033
			高	≤1420	1398
		整机质量（kg）	≤700		680
		耐高温性能附加要求	消防机器人在 1000℃高温环境中 30 min 后，整机工作应稳定、可靠		符合
		可靠性附加要求	消防机器人持续工作 1h，整机应稳定、可靠。		符合

以下空白。

耐高温性能附加要求	消防机器人在 1000℃高温环境中 30 min 后，整机工作应稳定、可靠	符合

Several key products of hav e obtained successful produ ct test reports from China N ation-al Fire-fighting Equip ment Quality Supervision T esting Centre, showing that all parameters have reache d national advanced level.


检 验 报 告

№ Zb201930587

受检单位名称

产品型号名称 RXR-M80D-AX2 型耐高温消防机器人

检 验 类 别 全性能委托检验

国家消防装备质量监督检验中心


NDM

国防科技工业 1111 二级计量站

校 准 证 书

CERTIFICATE OF CALIBRATION


CAICT

CNAS

检 验 报 告

产品名称：消防灭火机器人

产品型号：RXR-M80D-AX2（机器人），CDN-A201（履带）

委托单位：北京力升高科技有限公司

生产单位：北京力升高科技有限公司

检验类别：委托检验

中国泰尔实验室


MTT 美信检测

检测报告

Actual Combat Cases

The unique ultimate high-temperature resistance technology of LESENTECH endows its fire-fighting robots with unparalleled real combat advantages. With the high-temperature resistant technology, robots possess four advantages: zero-distance scouting, zero-distance fire extinguishing, zero-distance cooling and zero-distance insisting. Compared with ordinary fire-fighting robots, high-temperature resistant fire-fighting robots can effectively replace firefighters to go deep into the fire scene for tasks. At the same time, multi-type robots can cooperate with each other to achieve cluster operations, with more prominent advantages in actual combat situations.

- To be able to attack, and good at defending

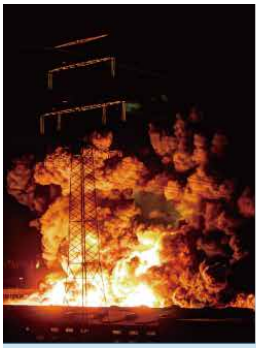
Application Scenarios

- **Risk of collapse:** a large single layer area, long span and big interlayer height, with steel being the main material, combined with a reticulated shell structure and thin shell structure;
- **Difficult evacuation:** intensive equipment and materials, numerous combustibles, and difficult to evacuate personnel;
- **Quick spreading:** large workshop space, numerous combustibles, numerous spreading paths, quick spread of fire and fierce burning.

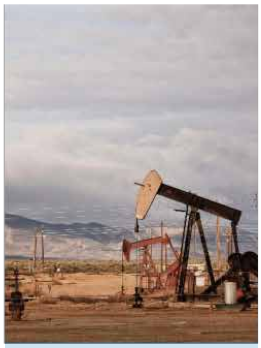
- **Heavy smoke and poison gas:** toxic substances leaking caused by damage from the fire, heavy smoke and poison gas produced, low visibility and risk of asphyxia;
- **Complicated structure:** complicated equipment positioning and function; difficult to detect fire within a short time; not able to grasp data; difficult to constitute a rescue plan;
- **Big explosion risk:** explosion risk at any time; extremely high danger level; risk of causing casualties, building collapse and fuel leakage;
- **Numerous ignition materials:** extremely flammable dangerous chemicals, flammable and explosive gases and liquids; strong volatility; quick burning; quick spread of fire.

- **Relatively enclosed underground space:** difficult to dissipate heat; heat building, quick temperature rise inside with fire source temperature able to climb to 1000°C;
- **Heavy poison gas:** underground space, serious lack of oxygen, insufficient burning of combustibles, producing a large amount of CO;
- **Difficult evacuation:** closed underground space, hot, dark, heavy smoke causing low visibility, difficult personnel evacuation;
- **Difficult to extinguish fire:** lack of paths for extinguishing fire in underground space; firefighters need to enter the underground space against smoke; unable to quickly locate the fire source, making it difficult to extinguish the fire.

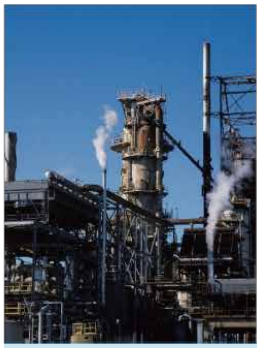
Application Industries



Fire-fighting



Oil



Chemical engineering



National reserve



Electricity

Cases



Suzhou Fire Protection Branch



Suzhou Fire Protection Branch



Suzhou Fire Protection Branch



Beijing Fire Protection Corps



Shanghai Fire Protection Corps



Yanan Wuqi Fire Protection Brigade



Beijing Fire Protection Corps



Daqing Oilfield Fire Protection Branch



Yulin Fire Protection Branch



Beijing Dongcheng District Fire Protection Branch



Beijing Petrochemical fire drill



Suzhou fire rescue detachment



Qingdao Fire Protection Branch



Sinopec South China Safety Trainning Base



A Chemical Engineering Firm in Shanghai



Beijing Dongcheng District subway fire drill



Guangzhou Guilin fire brigade

High-Temperature Resistant Fire-Fighting Robot

RXR-M80D-AX2







Product Introduction

The high-temperature resistant fire-fighting robot adopts many patented technologies for high-temperature protection, endowing it with the ability to work continuously for more than 30 minutes in a high-temperature environment at 1000°C. It can replace firefighters to go deep into dangerous high-temperature fire scenes for long-term fire reconnaissance and fire-fighting, greatly expanding the combat scope and ability of fire rescuers.

Functional Advantages

Image Acquisition Function

Captures scene images for transfer in real time.

Remote Fire Extinguishing for Dangerous Goods

Video dual-frequency transmission, ensuring firefighters can stay away from dangerous explosive environments.

Internet Function (optional)

Strong network communication function, able to access the Internet and transfer data to the command centre, providing a reliable decision basis for rescue decision makers; able to cooperate with UAVs, enabling triad fire-fighting command control.

Heat Source Detection Function

Traces and detects heat sources by infrared imaging.

Environment Detection Function (optional)

Equipped with environmental detection sensors, enabling the detection and analysis of toxic and combustible gases.

Remote Diagnosis Function (optional)

Able to analyse robot faults remotely with the Internet function.

Technical Parameters

Resistance to high temperature	
Maximum working temperature	1000°C
Working time at highest temperature	30min
Mobile platform	
Overall dimensions	1750mm×1100mm×1200mm
Total weight	800kg
Protection grade	IP65
Tractive ability	4.0kN
Maximum speed	1.5m/s
Gradeability	25°
Endurance	4h
Obstacle climbing ability	170mm
Wading depth	400mm
Fire water monitor	
Working flow	80 L/s
Maximum range	85 m
Working pressure	1.0 MPa
Fire extinguishing agent	Dual water/foam medium
Spraying mode	Straight flow/sprinkling
Work range	Slewing angle: -30°～ +30°; pitch angle: -15°～ +75°
Detection function	Water monitor tracking mode dual light imaging; ambient temperature measurement
Operation terminal system	
Dimension weight	430mm×305mm×63mm,6kg
Image display	10 inch LCD screen, three-way image switching
Storage mode	Possessing real-time pass back and storage function
Operation mode	Handheld remote controller; combined rocker and button operation
Wireless communication	Visual range 1000 m

High-Temperature Resistant Fire-Fighting and Scouting Robot

RXR-C1000BD-LSA002







Product Introduction

The high temperature resistant fire-fighting and scouting robot adopts an anti-explosion and high- temperature protection design; it can replace firefighters in going deep into dangerous high-temperature fire scenes for long-term fire reconnaissance and acquire timely first-hand fire scene data and information. It uses a crawler chassis with excellent movement performance and good trafficability. It is widely applied in complex environments with significant hidden fire risk such as oil fields, refineries, chemical factories, thermal power plants etc.

Functional Advantages

Image Acquisition Function

Captures scene images for transfer in real time.

Heat Source Detection Function

Traces and detects heat sources by infrared thermal imaging.

Remote Diagnosis Function (optional)

Able to analyse robot faults remotely with the Internet function.

Internet Function (optional)

Strong network communication function, able to access the Internet and transfer data to the command centre, providing a reliable decision basis for rescue decision makers; able to cooperate with UAVs, realising triad fire-fighting command control.

Technical Parameters

Resistance to high temperature	
Maximum working temperature	1000°C
Working time at highest temperature	1h
Mobile platform	
Overall dimensions	1550mm×990mm×1200mm
Total weight	600kg
Explosion-proof grade	Ex d e ib II B T4 Gb
Protection grade	IP66
Maximum speed	1.5m/s
Gradeability	30°
Endurance	4h
Obstacle climbing ability	220mm
Ground clearance	200mm
Reconnaissance system	
Visible light camera (high temperature)	Resolution 1280×960, colour
Short wave thermal imaging system (high- temperature)	Resolution 640×480, temperature measurement range +500°C ～ +1200°C
Long wave thermal imaging system (room temperature)	Resolution 640×480, temperature measurement range -20°C ～ +500°C
Dangerous gas detection	CO, CH_4, H_2S, H_2 (other gases are optional)
Environment detection	Temperature detection
Operation terminal system	
Dimension weight	430mm×305mm×63mm,6kg
Image display	10 inch LCD screen, three-way image switching
Storage mode	Possessing real-time pass back and storage function
Operation mode	Handheld remote controller; combined rocker and button operation
Wireless communication	Visual range 1000m

High Temperature Resistant Reconnaissance Robot

RXR-C12D

Product Introduction

High temperature resistant reconnaissance robot adopts crawler chassis combined high temperature protection design with excellent movement performance and good trafficability. It can conduct reconnaissance tasks within limited space, and is suitable for various complex environments such as factories, buildings and indoor spaces, as well as rescue and prospecting tasks in hot and dangerous working environments such as chemical industrial environment, toxic gas environment and so on.

High temperature resistant reconnaissance robot can act as pioneer or scout; go deep into hot fire ground instead of fire rescue personnel to comprehensively investigate the fire, and to obtain real-time information such as flame spread, damage degree of on-site structure and vital signs of personnel at the first time. Help the commander to plan the escape route and formulate an effective rescue plan.

Functional advantages

Autonomous functions

Functions such as autonomous early warning and obstacle avoidance, able to realize unmanned risk detection, risk cognition, risk elimination and risk pre-control.

Heat source detection function

Realizing heat source tracking monitoring via infrared thermal imaging.

Voice control function

Equipped with voice control function; supporting hands-off control by firefighters and reducing occupation of fire control resources.

Remote communication function (optional)

Able to access 4G and 5G mobile Internet of Things, transmitting data to the command center and providing basis for rescue decision makers.

Image capture function

Capture images on-site and transmit at real time.

Voice communication function

Equipped with bidirectional voice communication function to timely comprehend the situation of trapped personnel and reduce difficulty of search and rescue.

Logistics

Equipped with robot tool, convenient for transport.

Remote projection function

Equipped with remote projection function to transfer on-site environment information to the command center.

Technical Parameters

High temperature resistance	
Maximum working temperature	350°C
Working time at highest temperature	15min
Mobile platform	
Overall dimension	1500mm ×700mm×350mm (excluding antenna and optional modules)
Total weight	90kg
Degree of protection	IP65
Load bearing capacity	50kg
Maximum speed	1.2m/s
Gradeability	35°
Cruise duration	3h
Obstacle clearing altitude	300mm
Optional functional modules	
Visual reconnaissance	Visible light, thermal infrared imager
Panoramic module	360° image system (optional)
Gas detection	Four-in-one gas detection module; gases are customiz -ed as required (optional))
Operating terminal system	
Dimension and weight	430mm × 305mm × 63mm, 6kg
Image display	10’ LCD, image switching
Storage mode	Possessing real-time pass back and storage function
Remote control manner	Handhold remote controller combined joystick and key button
Wireless communication	Visual range 1000m

High Temperature Resistant Valve-closing and Material-cutting Robot

RXR-Q6D

Product Introduction

High temperature resistant valve-closing and material-cutting robot adopts high temperature protection and crawler chassis design, thus is not afraid of high temperature and can fight in multi-terrain. It is applicable to petrochemical industrial parks, raw material tank farms, production workshops and utility workshops; it can also be used for closing valves of combustion systems, steam turbine sets, high-pressure heaters, quick shut-off devices, etc. in power plants, and is suitable for multiple industries including petrochemical, biomedical, electric power, chemical fertilizer, plastic fiber chemical and so on. Fires in the above-mentioned industrial places are characterized by high heating value, large radiation, rapid spreading and even direct violent explosion; once the combustible material source in pipeline is not cut off, fire can be extremely difficult to control, which greatly reduces the effect of cooling in progress and makes it difficult to further control the fire.

High temperature resistant valve-closing and material-cutting robot can stay long deeply into the emergency operation area to close valves and cut materials, immediately block combustible materials from entering the fire ground, control the spread of flame area, consolidate the rescue effect at the outer edge, and completely control the fire.

Functional advantages

Image capture function

apture images on-site and transmit at real time. Panoramic video capture of the robot, together with liftable pan tilt and real time tracking end effector, it can complete precise operation.

Logistics

Equipped with robot tool, convenient for simple and quick storage and transport.

Good sensitivity

Adopt six axis robot arm system with flexible motion; with adjustable holding power of end effector.

Leakage monitoring

Advanced gas and liquid leakage monitoring technology, visualized presentation, realizing effect valve closing.

Technical Parameters

High temperature resistance	
Max. working temperature	600°C
Working time under max. temperature	30min
Mobile platform	
Overall dimension	2200mm ×1400mm×1600mm
Total weight	1400kg
Degree of protection	IP65
Tractive capability	5.0kN
Max. speed	1.6m/s
Gradeability	30°
Cruise duration	4h
Obstacle clearing altitude	240mm
Fording depth	500mm
Actuating arm	
Degree of freedom	6 axis
Holding power of manipulator	20N ～ 130N
Max. working radius	2.5m
Weight positioning accuracy	±1mm
Max. load	70kg
Disposal mechanism	Valve-closer, working hook
Operating terminal system	
Dimension and weight	430mm × 305mm × 63mm, 6kg
Image display	10’ LCD, three-way image switching
Storage mode	Possessing real-time pass back and storage function
Remote control manner	Handhold remote controller combined joystick and key button
Wireless communication	Visual range 1000m

Explosion-proof Fire-Fighting and Scouting Robot

RXR-MC80BD-B101



Product Introduction

The explosion-proof fire-fighting and scouting robot adopts an anti-explosion design to meet the operating requirements in IIB dangerous explosive environments on the ground. It possesses functions such as obstacle crossing, fire source detection, environment and gas monitoring, fire extinguishing and cooling, etc. The robot uses a working mode of wireless operation by a handheld remote control terminal, greatly expanding the combat scope and ability of firefighters; it can be widely applied in flammable and explosive environments with petroleum, gas, etc., such as chemical factories, dangerous chemical warehouses, cargo ports, and is of great significance to improve the efficiency and reduce the risk of fire rescue, etc.

Functional Advantages

Autonomous Functions

It possesses a series of autonomous functions such as autonomous reconnaissance, autonomous early warning, autonomous fire-fighting, autonomous cooling and autonomous evacuation, which can perform unmanned tasks such as risk control, risk elimination, fire-fighting and cooling.

Automatic Band Off Function

It is equipped with an automatic band off function, so as to evacuate from the scene quickly after rescue.

Logistics and Transportation

It is equipped with a robot trailer that is simple and convenient for storage and transportation.

Voice Communication Function

It is equipped with a two-way voice communication function, helping to quickly understand the situation of trapped people, reducing the difficulty of search and rescue.

Voice Control Function

It is equipped with a voice control function, supporting hands-off control by firefighters, and thus reducing the demands on fire-fighting resources.

Convenient Dragging

It is equipped with a universal ball joint double water inlet pipeline, so as to avoid knotting of water hoses and facilitate dragging.

Technical Parameters

Mobile platform	
Overall dimensions	1800mm×900mm×1300mm
Total weight	700kg
Explosion-proof grade	Exd e ib mb II B T4 Gb
Protection grade	IP65
Tractive ability	4.0kN
Maximum speed	1.5m/s
Gradeability	30°
Endurance	4h
Obstacle climbing ability	220mm
Fire water monitor	
Working flow	80 L/s
Maximum range	85 m
Working pressure	1.2 MPa
Fire extinguishing agent	Dual water/foam medium
Spraying mode	Straight flow/sprinkling
Work range	Slewing angle: -90°～ +90°; pitch angle: -10°～ +75°
Reconnaissance system	
Gas detection	CO_2, CO, O_2, CH_4, H_2S, H_2, SO_2, NO (other gases are optional)
Environment detection	Temperature, sound, etc.
Vision imaging	Visible light imaging: resolution 1920×1080; infrared imaging
Work range	Level angle: continuous 360° rotation; vertical angle: -90°～ +90°
Operation terminal system	
Dimension weight	430mm×305mm×63mm,6kg
Image display	10 inch LCD screen, three-way image switching
Storage mode	Possessing real-time pass back and storage function
Operation mode	Handheld remote controller; combined rocker and button operation
Wireless communication	Visual range 1000 m

Firefighting Robot

RXR-M40D-A/MC80D-A101/MC80D-A102



Product Introduction

Firefighting robot has stable performance, advanced technology and reliable quality; it is easy for assembly and disassembly. Each robot has been calibrated and tested for performance professionally. The robot is powered by DC motor. It adopts engineering crawler chassis, thus is flexible, with ability of pivot turning, good gradeability and off-road capability; it is equipped with firefighting water cannons in different flows with long range, flexible control and easy for deployment. It is suitable for places with big span and space, such as chemical industrial parks, warehouse and so on; and is suitable for multiple industries including petrochemical, biomedical, electric power, transportation and so on.

Functional advantages

Structural advantages

Modularized structural chassis, together with temperature resistant and flame retardant rubber crawler (full metal frame inside), convenient for repair and maintenance.

Environment detection function

Realizing heat source tracking monitoring via infrared thermal imaging; equipped with concentration detection function of 4 hazardous gases.

Integrated remote controller

Equipped with integrated remote control terminal with 10’ highlight display and remote control distance of 500m.

Audible and visual alarm

Equipped with audible and visual alarm to warm surrou nding people during operation.

Image capture

Capture images on-site and transmit at real time.

High flow water cannon

omestic high flow water cannon with large operating range, able to reach a three-dimensional space of 70 ° pitch and 180° level to ensure fire extinguishing effect.

Heat source detection function

Realizing heat source tracking monitoring via infrared thermal imaging.

Voice control function

Equipped with voice control function; supporting hands-off control by firefighters and reducing occupation of fire control resources.

Technical Parameters

Model No.	RXR-M40D-A	RXR-MC80D-A101	RXR-MC80D-A102
Mobile platform			
Overall dimension (mm)	1200×700×1100	1600×800×1200	1600×800×1200
Total weight (kg)	350	450	500
Ingress protection	IP65	IP65	IP65
Tractive capability (kN)	2.6	3	3
Max. speed (m/s)	1.5	1.5	1.5
Gradeability (°)	30	30	35
Cruise duration (h)	2	3	3
Obstacle clearing altitude (mm)	180	200	220
Fording depth (mm)	200	300	400
Firefighting water cannon			
Working flow (L/s)	40	80	
Max. range (m)	65	80	
Working pressure (MPa)	1.2	1.2	
Fire extinguishing agent	Water media	Water media	Water/foam dual media
Spraying manner	Through-flow/flowering		
Operating range (°)	Rotation angle: -90 ～ +90，Pitch angle: 0 ～ 70		
Reconnaissance system			
Visual light camera	-	2-way	3-way
Long waves thermal imager	-	Measurable temperature range -20°C～+500°C	
Hazardous gas detection	-	CO、CH_4、H_4、H_2S	CO、CH_4、H_4、H_2S、H_2、SO_2
Environment detection	-	-	Equipped
Operating terminal system			
Remote control manner	Handhold remote controller combined joystick and key button		
Dimension and weight	200×240×60，1kg	430×305×63, 6kg	
Image display	-	10’ LCD, image switching	
Storage mode	-	Possessing real-time pass back and storage function	
Wireless communication (m)	200	300	500

Intelligent Patrol Robot

LSXJ-C6L-LSC001





Product Introduction

Intelligent patrol robot is cored by intelligent robot technology. It adopts six-wheel six-drive independent suspension chassis and is suitable for multiple complex indoor and outdoor working environments. The system integrates a variety of non-contact detection technologies, multi-sensor integration technologies, pattern recognition technologies and IoT technologies, and has functions of autonomous navigation, static guard, flexible obstacle avoidance, automatic charging, thermal infrared temperature measurement, early disposal, etc. on the basis of dealing with complex terrain. In addition, the product can support a variety of patrol modes simultaneously according to actual use needs, being able to assist or replace manual patrol, give intelligent alarms, view historical data analysis and realize full-automatic intelligent patrol in the task area.

Functional advantages

Driving function

It adopts six-wheel independent driving + independent steering design; can easily pass through complex terrain, with the maximum gradeability of 30° , obstacle surmounting and fording ability of up to 10cm. It has super flexible road adaptability, and can turn around the center of the car body to realize pivot turning.

Autonomous obstacle avoidance function

Autonomous navigation and obstacle avoidance; combined navigation algorithm integrating a variety of sensors including lidar, satellite positioning and inertial navigation combination is adopted to meet the high precision positioning requirement.

Remote control function

Autonomous movement and remote control movement mode for different task requirements; can accomplish tasks automatically or realize remote operating mode by remote control.

Big data service function

Possessing background cloud computing, cloud service, data analysis, historical data distribution inquiry and other big data services; able to realize quick data interchange and processing with security system.

Technical Parameters

Mobile platform	
Overall dimension	720mm×660mm×(1150-1550)mm
Total weight	80kg
Turning radius	Pivot rotation
Bearing capacity	200kg
Obstacle avoidance capability	10cm
Maximum speed	Factory limit 6km/h
Gradeability	30°
Fording depth	10cm
Wind loading rating	Force 8
Chassis structure	Wheel type structure, six-wheel six-drive independent suspension
Functional modules	
Pan tilt structure	Liftable pan tilt
Lidar	C16, 70m level
Thermal imaging camera	384×288 full screen temperature measuring
HD night vision stellar camera	150°wide angle 1080p
Zoom camera	Focal length: 2.7 ～ 8mm
Panoramic camera	360°1080p
LED night vision lamp	2 groups, night lighting
Microphone	Dual-Microphone
Stereophony	One pair
Ultrasonic radar	2m, 70° 10 groups in total
Smoke sensor	Lab sensor product for four harmful gases (optional), requiring customization
Advanced satellite navigation module	GPS+Beidou navigation module
Lithium battery	BMS system, 48v35Ah
Charging pile	High power quick charging
Optional Functions	5G module, body temperature monitoring, disinfection sprayer /fire extinguisher (alternative), highlight anti-riot flash lamp

Wheel Type Anti-explosion Patrol Robot

LSXJ-C4BL-LSC002



Product Introduction

Wheel type anti-explosion patrol robot is professional equipment designed for high risk environment scenarios with anti-explosion requirements, such as petrol, chemical, fuel gas and so on. Robot patrol system substitutes worker to execute daily patrol tasks in dangerous areas with robot by integrating robot technologies, non-contact detection technologies, multi-sensor integration technologies, image recognition technologies, navigation and positioning technologies, as well as wireless communication technologies, etc.

Functional advantages

- Four wheel independent drive, endowing sufficient power;
- Equipped with autonomous positioning and navigation system;
- Adaptive to all kinds of complex road conditions;
- EX d e mb II B T4 Gb explosion proof grade certification;
- Automatic homing and auto-recharging;
- Supporting multiple modes including automatic patrol, remote control function and so on;
- Equipped with all kinds of explosion proof equipment, such as: audible and visual alarm, voice talkback, gas detection, sound pick-up and so on.

Technical Parameters

Mobile platform	
Overall dimension	1385mm×850mm×900mm
Chassis weight	310kg
Degree of protection	IP65
Explosion proof grade	Exd e mb II B T4 Gb
Designed load capacity	100kg
Max. speed	1.0m/s
Max. gradeability	20°
Max. obstacle avoidance	80mm
Battery capacity	48V 80AH
Cruise duration	5h
Functional modules	
Navigation precision	Indoor 2 ～ 5cm, outdoor 5 ～ 10cm
Obstacle avoidance function	Equipped with sensing equipment such as lidar, camera, obstacle avoidance radar and so on; able to realize flexible obstacle avoidance
Auto-recharging	Yes
Patrol mode	Timed patrol, periodic patrol, temporary patrol
Recognition capability	Able to recognize leakage and venting of meters, status lamps and switches
Temperature measuring function	Able to conduct infra temperature measuring and overtemperature warning analysis for boiler, stock tank, pump body, motor and so on
Gas detection	O_2, H_2S, NH_3, CO, LEL, C_6H_6 (other gases optional)
Video back	Feedback visible light and infrared thermal imaging videos of the robot at real time by wireless communication

Demolition and Rescue Robot

RXR-J180D-C





Product Introduction

Demolition and rescue robot is a fire-fighting and rescue robot independently researched and developed. Its compact design and maneuverability make it suitable for many places. With its comp act design, it can pass through general stoeps and enter narrow channels; it is flexible without traili ng cables; it has excellent bearing capacity and good obstacle avoidance. It can stairs or slope up to 30 ° , and is especially suitable for firefighting, emergency rescue, disposal of hazardous chemical s, radioactive sources, demolition and rescue, barrier clearance, anti-terrorism explosive clearing a nd so on, and is the most ideal rescue robot.

Functional advantages

Compact and flexible

Able to enter limited spaces and climb up stairs to reach the work site independently; lightweight and compact, able to work on small bearing capability working platform; convenient for relocation.

Safe and efficient

Remote control, humanized design, safe operation and good visual line; three-arm structure with accurate positioning, flexible operation and big working range.

Multi-functional

Various tooling heads including hydraulic hammer, hydraulic clamp, crab bucket, shear expander and hydraulic drill can be equipped to meet different operation requirements.

Continuous working

Diesel engine driven; in emergency rescue environment, diesel engine is easily available; together with the intelligent power control system, the power can be fully utilized.

Strong power

Compact with strong power; the tool head is strong with great demolition capability, endowing a working efficiency more than four times of engineering machinery with same weight. Able to crush hard objects within narrow spaces.

Technical Parameters

Whole machine	
Overall dimension	2500mm×780mm×1500mm
Total weight	1550kg
Rotational speed	6.5rpm
Crawler width	230mm
Max. working radius	4000mm
Transfer length	2500mm
Min. transfer width	800mm
Driving speed	1.5-3.0 km/h
Gradeability	30°
Max. working height	4500mm
Max. working depth	185mm
Min. transportation height	1500mm
Hydraulic system	
Capacity of the hydraulic system	60L
Type of hydraulic pump	28 load sensitive axial piston pump
System pressure	25MPa
Output flow	45L/min（50max）
Power system	
Brand of diesel engine	Yanmar 3TNV88
Output power	20KW
Diesel tank	80L
Max. torque	110NM
Firefighting water cannon	
Control device	Portable remote controller
Control manner	Wireless transmission distance 200m
Communication mode	Digital wired bidirectional communication based on CAN bus
Video	2-way

Lifting Firefighting Robot





Product Introduction

Lifting firefighting robot can realize lifted firefighting operations at a height up to tens of meter. It possesses functions of wireless remote control, fire ground monitoring, video transmission, 360 panoramic imaging, ultrasonic obstacle avoidance and high-voltage alarm. The whole vehicle is high-temperature resistant, and approach to fire source for fixed-point rescue. Meanwhile, the whole robot can carry out elevated firefighting operation, spraying water at height while driving. The upper structure can rotate, achieving 360 degrees firefighting operation. The robot is compact with flexible motions, especially suitable for firefighting in old neighborhood with traffic congestion, as well as in fire scenarios inaccessible to rescuers such as petrochemical fire, ultra-high voltage substation fire and so on.

Functional advantages

◉ The whole robot has relatively small length, width and height in the industry, and is convenient for transportation;
◉ It adopts Σ-shaped combined arm bracket and zero tail swing design to improve operation efficiency.
◉ It has a turning radius low to 3.15m, thus is flexible and able to work in narrow spaces;
◉ It adopts long endurance. 48V, 400Ah large capacity battery is equipped to provide longer cruising ability;
◉ It adopts advanced two-wheel AC driven walking technology and steering differential control technology to endow strong power and stable motion with gradeability up to 25°;
◉ The combined application of AC pump control and proportional control technology provides users with safer and more stable operation experiences;
◉ It is environmental protective with zero emission, low noise and traceless driving, suitable for indoor and outdoor firefighting operations.

Technical Parameters

Driving status	
Overall dimension	7.18m×2.04m×2.2m
Total weight	7.5t
Max. speed	1.4m/s
Max. gradeability	25°
Min. turning radius	3.15m
Ground clearance	235mm
Wheel base	2100mm
Rated working height	16m
Max. working height	18m
Rotation angle	355°
Control manner	Wired control/wireless control
Power source	Power-operated
Battery capacity	48V/400AH
Walking motor	5.5kw/DC48V
Firefighting water cannon	
Rated working pressure	0.8MPa
Range	46m
Capacity	40L/s
Operating range	Rotation: -180°～ 180°; pitching: -40°～ 70°

Intelligent Comprehensive Command System

Deployment command

Data acquisition



◉Emergency command box

Emergency command box



◉High-temperature resistant fire-fighting and scouting robot



Digital soldier



◉High-temperature resistant fire-fighting robot









With the visual window of the command system, multi-type robots can be remotely operated from the cloud, thus realising cluster and intelligent operation, greatly improving the efficiency of fire rescue.

Ground reconnaissance fire extinguishing

Aerial reconnaissance



◉破拆机器人



◉Explosion-proof fire-fighting and scouting robot



◉UAV

Optional Supporting Product List

Robot delivery car



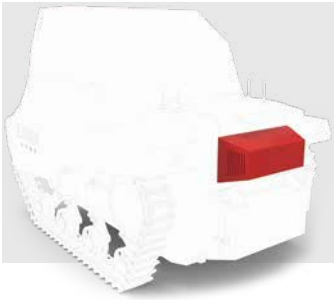
- Matched Robot: 全部机型
- Amount: 1
- Main Description:able to transport 1-2 robots,comply with China VI vehicle emission standards

Robot Trailer



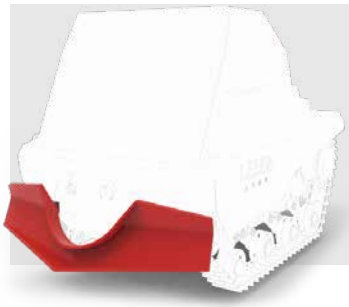
- Matched Robot: 全部机型
- Amount: 1
- Main Description:able to transport 1 robot, maximum speed:80km/h

Gas Detection Unit (4/6 types)



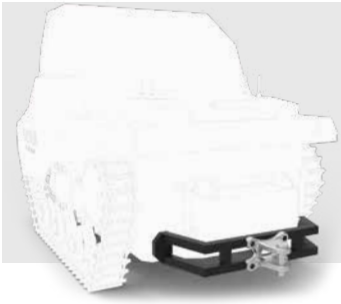
- Matched Robot:AX2
- Amount: 1
- Main Description:explosive gas detection, gas types can be chosen

Obstacle Clearing Unit



- Matched Robot:AX2
- Amount: 1
- Main Description:clear obstacles in the front

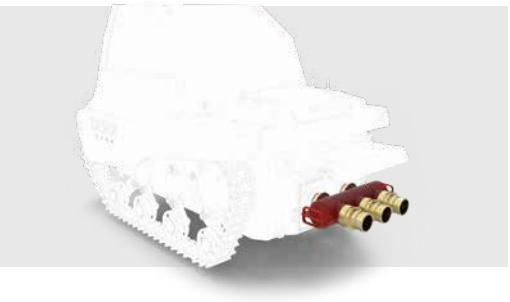
Dragging Unit



- Matched Robot:AX2
- Amount: 1
- Main Description:able to drag portable fire monitor and other rescure resources

Water Hose Expansion Unit

- Matched Robot: AX2
- Amount:1
- Main Description:2 to 3 conversion interface,can expand the range of fire water monitor



Explosion-proof Toolbox

- Matched Robot: 全部机型
- Amount:1
- Main Description:explosion-proof repairment tools



Intelligent Comprehensive Command System

- Matched Robot: 智能化机型
- Amount:1
- Main Description:conduct intelligent commands on multi robots cooperatively at the emergency scene



ESENTECH Fire-fighting Robot Supporting Product List (continued)	
Equipment name	in Description
Sports Enhancing Kit	high performance anti-friction rubber
Communication Enhancing Kit	image transfer communication distance＞1000m (can be customized)
Fire Identification Software Kit	can automatically identify fire area
Voice Control Software Kit	an control the robot by voice
Carefree Service Kit	referring to after-sales service expenses standard
Software Upgrade	price will be showed when function updating

Markets

According to IFR data, the value of the special robots market in China reached USD5750 million in 2019. As one type of special robot, the fire-fighting robot plays an increasingly important role in fire-fighting and emergency rescue, and is increasingly in demand from fire emergency customers.

After years of concentrated research, we have accumulated a number of core technologies in the field of special robots, possesses a number of self-developed fire-fighting robots, and completed the technical layout in related industries.





Distributor Network

We have always attached great importance to the establishment of a distributor net-work and currently has more than 50 distributors in major provinces and cities in China, showing a rapid devel-opment momentum! I n recent years, with the continuous improvement of high-temperature resistant fire-fighting robot series, as well as its product power, the Company has started to extend its reach to the whole world, focusing on a larger market.

Domestic: it has established five regions in China (North China, Central China, East China, South China and Northwest China) with Beijing as its headquarters. It covers the main cities such as Shanghai, Shenzhen, Guangzhou, Wuhan, Nanjing, Chengdu, Lanzhou, Shenyang and Xi 'an.

Overseas: it possesses many cooperative operation branches in Malaysia, Singapore, Egypt, Iran and Pakistan, etc.

Production and Operation Network

We puts R&D first. It possesses a number of epoch-making core technologies. At present, it has two key prod uction bases in Langfang and Shenzhen, and has settled in several high-tech industrial parks in China. It can pr oduce different kinds of fire-fighting robot products, with an annual production capacity of more than 500 unit s. At the same time, LESENTECH has established a complete operation system, which can fully guaran-tee the v arious demands of distributors and customers.

Media Attention

Since their introduction, the high-temperature resistant fire-fighting robot series prod-u cts have attracted great attention from the industry. Media including CCTV, BTV, Anhui TV an d People's Daily Online are competing to report.





















世界机器人大会21件新品首发

十八般“机智”塑造未来生活

本报记者 孙杰 实习记者 鹿杨

有机器人参与的智慧生活是什么样的？通过机器人就能和家里的萌宠视频；餐厅点餐不再需要服务员，机器人能精准下单并送达菜品；一个瘦弱的女孩借助外骨骼设备可轻松负重30公斤以上……正在举行的2021世界机器人大会上，有来自19个企业的21件机器人新品首发亮相，包括多功能环卫机器人、双臂机器人、人工智能垃圾站、防爆轮式巡检机器人等，涉及服务业、工业等多个领域。

多才多艺 熊猫机器人启程迪拜中国馆

“大家好，我是熊猫机器人优悠。”憨萌可爱的熊猫机器人“优悠”在世界机器人大会全球首发亮相。“优悠”身高1.30米，体重63公斤，出生于深圳，是优必选科技以大熊猫的形象为设计原型，在大型仿人服务机器人WalkerX的基础上，为迪拜世博会中国馆专属定制。

“优悠”的脑袋与敦厚可爱的“国宝”大熊猫形态不多一样，体态也极其灵动且富有

型机器人看起来憨态可掬，体型只有一只小猫的大小，它们的头上还长着一只小“眼睛”。别看这些机器人个头小，陪伴宠物的能力却十分强大。机器人内置零食盒，可以给宠物投喂零食，主人滑动手机屏幕还能开启机器人的激光逗宠模式。如果遇到主人出差，还能通过机器人与宠物进行语音或视频“聊天”，并可以指挥机器人为宠物拍摄视频，记录宠物的可爱瞬间。

本次大会上另一台首发机器人是位于擎朗智能展位中的送餐机器人飞鱼。从正面看，它就像一只飞跃而起的小鱼端着三个托盘。这台送餐机器人与现有同类机器人的不同之处在于，它具备厘米级别的定位精度，在50厘米的狭窄过道中也能顺畅通行，为智能送餐提供了优质解决方案。

解决难题 蛇形臂赋能智慧工业

展览现场，一台蓝色的“巨蟒”吸引了不少观众的注意。只见这条由金属锻造的钢铁巨蟒正在灵活地穿越前方障碍。令人惊讶的是，这条巨蟒没有“眼睛”，却总能精准地找到前方障碍中的空隙，随后将整个身体探入其中。

据工作人员介绍，这台蛇形臂机器人是具有“24+1”自由度的连续性机器人，主要应用在狭小空间和恶劣环境领域，通过使用不同工具完成多种复杂作业。如在飞行器翼肋隔舱舱狭小环境内，核电站反应堆冷却管路内进行检修作业，越过视野障碍对军事目标展开侦察作业，在地震现场对被困人员进行搜救等。

“这些工作往往很难由人工完成，一是空间狭小，人难以进入；二是环境复杂、未知，如核辐射、易燃易爆、高低温等高危环境下，蛇形臂机器人可以代替人展开作业。”工作人员说，这台机器人采用了不同于传统离散关节型机器人的工作方式，极大提升了灵活性和适应性，更适合在极端恶劣的环境下正常工作。蛇形臂机器人不仅可以轻松应对核燃料等工业领域的特殊需求，将来还能应用在航空航天、国防安全、石油化工勘查等领域。

1000℃！耐高温“逆行者”首秀

本报讯（记者 孙杰）2021世界机器人大会上，机器人家族的重要成员消防机器人竞相秀绝活儿。北京力升高科科技有限公司首次参加世界机器人大会，此次展出的耐高温消防机器人，可进入1000℃的火场高温核心区域进行灭火降温、火情侦察。

红红的装甲外壳，扎实的履带底盘，耐高温消防机器人重约800公斤，如同一辆小坦克。其携带的消防水炮，可喷射水和泡沫，最大射程达85米。简单来说，它能起到“水龙头”的作用，在耐高温水管的支持下，进入火场中心零距离灭火。

耐高温消防机器人最大特点和亮点是耐高温，在不借助外部辅助降温的情况下，能够在1000℃的环境中稳定工作30分钟以上，这就有效解决了消防力量无法进入火场高温核心区域的痛点。现场大屏幕上，循环播放的极限耐高温实验画面显示：在一个全密闭的1000℃高温环境中，消防机器人可持续工作30分钟，实验后机器人的各项功能均正常。

如何在烈焰升腾中安全“逆行”？工作人员介绍，耐高温消防机器人的技术创新点，在于复合壳体能够有效抑制外部热辐射，热传导及层间热辐射，运动底盘也解决了极限温差环境下传动系统的工作稳定性。

机器人的“眼睛”即耐高温摄像头，也设计了



抗热振镜头组件，支持镜头在极端温度条件下长期工作，光学镜片组带通滤波，可减少高温辐射源对传感器的直接辐射，保证成像质量。此外，机器人还需要与外部保持信号畅通，其无线可保障在高温环境下通行稳定。这些耐高温设计，可让机器人深入火场中心进行图像采集，并实时回传。

正是有了这些“硬核”防护，消防机器人才可以突破以往消防设备的作战区域限制——不仅能在火场外围常温区域作业，还能进入火场核心高温危险区域，具有全范围能攻善守的作战能力。展台工作人员说，机器人可进行火场高温区域的火情侦察、灭火降温，扩展救援人员的作战能力，保障消防战士人身安全，让生命不再冒险。

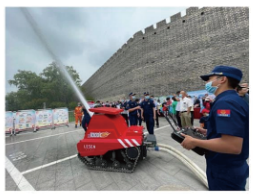
消毒、测温、发传单、问询导览……

人民网 people.cn

人民网北京6月16日电（池梦蓉）根据国务院安委会办公室部署2021年全国“安全生产月”和“安全生产万里行”活动和北京市“感念宣传追高家”工作的总体部署，结合《2021年東城區“安全生产月”活动方案》相关要求，扎实推进安全宣传“五进”工作，牢固树立安全发展理念，普及安全知识，培育安全文化，紧密围绕“落实安全责任，推动安全发展”主题，6月16日，東城區在明城墙遗址公园举办安全宣传咨询日宣教活动。

東城區副區長薛强表示，今年是建黨100周年，東城區作为首善之區要切实发挥實效，推動解決安全生產深層次本質性問題，切實扛起維護安全穩定的政治責任，牢牢守住安全底線，緊緊盯住安全風險，堅決遏制重特大事故，为慶祝建黨100周年創造良好的安全環境。

本次咨询日活動根據場地情況和參與單位職能分成了三大主題區域，分别是主題活動區，安全宣教區，互動體驗區。



東城消防救援支隊現場展示智能消防機器人參與滅火（東城區供圖）

在互動體驗區，設置東城區急十二時辰新媒體互動、安全科普宣教活動、互動技能學習等内容。區應急管理局利用“東東+”品牌效應，通過東城安全宣教代言人“東東”一天中不同時段遇到的安全場景為主線，組成“東城十二時辰”科普展區，將現場安全知識展板與微信平台答題結合進行趣答互動，引導現場觀眾邊學習展板知識，邊參與現場答題，激發群眾參與學習的熱情和動力，還設置了“東東”主題合影區，以設立人形立牌組合形象的方式參與到宣教活動，擴大東城科普品牌的知晓度，提高宣教實效。東城消防救援支隊進行消防車輛展示、消防救援器材演示、破拆工具使用操作演示等活動，並現場展示智能消防機器人參與滅火。

中国机器人网 www.chinarobotnet.com

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全球智能应急装备大赛落幕，力升高科耐高温消防机器人斩获大奖

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9月28日，以“匠心智造·创领应急”为主题的首届全球智能应急装备大赛颁奖仪式在中关村国家自主创新示范区展示中心举行。北京力升高科科技有限公司的千度耐高温消防机器人凭借在机器人侦察越障、灭火救援等决赛科目考核中展现的强悍实力，经国内外应急领域顶级专家、应急装备采购单位、知名投资人从专业维度、市场应用维度、投资维度综合评判后，最终斩获大赛“应急救援机器人”赛道二等奖(一等奖空缺)。

