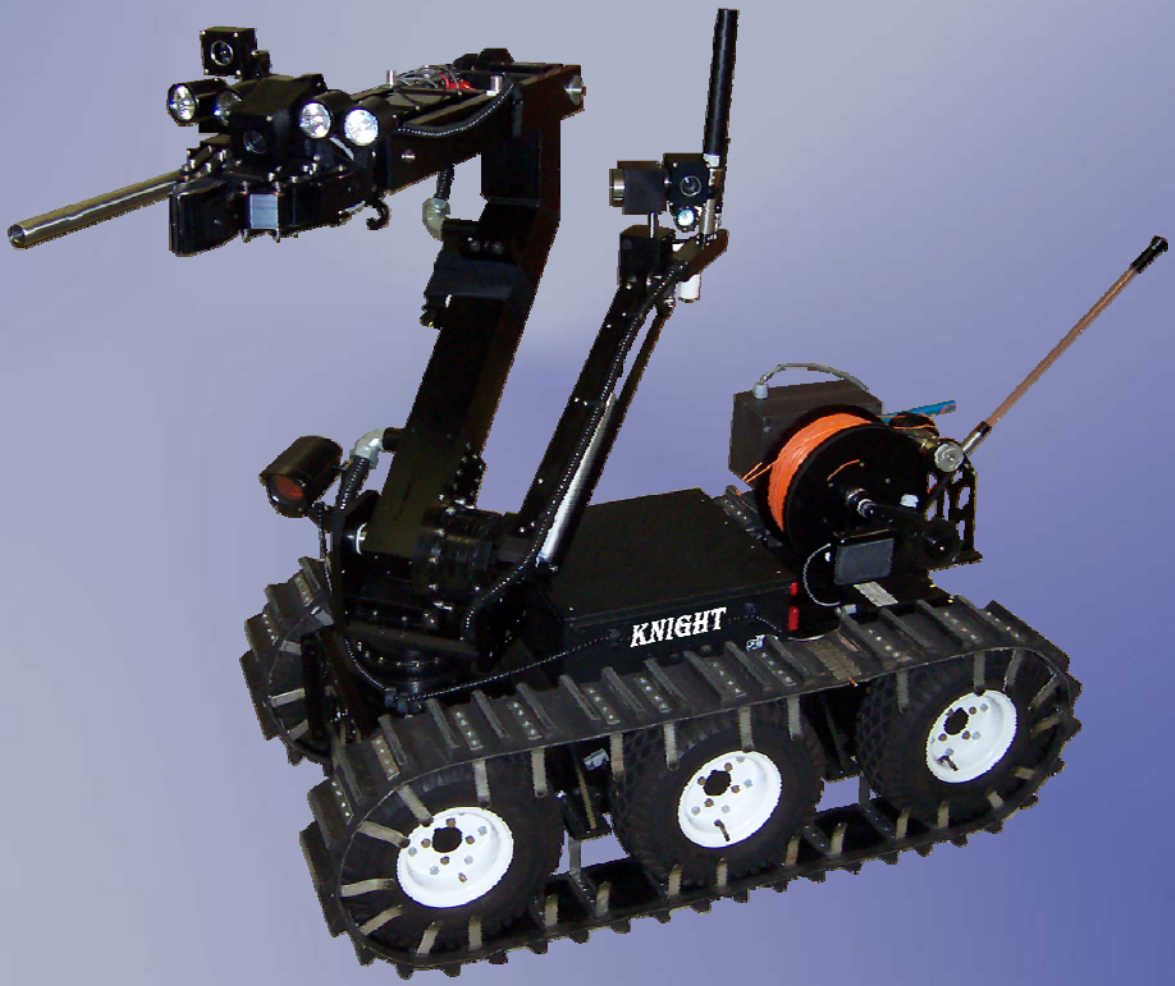
WM ROBOTS, LLC
WOLSTENHOLME MACHINE, Inc.
WOLSTENHOLME AEROMED, Inc.

KNIGHT



ROBOT SPECIFICATIONS

(Section A) DIMENSIONS

(I)	**Height:**	40 inches (1016 mm) with tracks mounted. 38.75 (984 mm) inches without tracks.
(II)	**Width:**	27.75 (705 mm) inches with tracks mounted. 27.5 inches (699 mm) without tracks.
(III)	**Length:**	53.5 inches (1359 mm) with tracks mounted. 50.5 inches (1283 mm) without tracks.
(IV)	**Ground Clearance:**	4.76 inches (121 mm) with tracks mounted. 3.5 inches (89 mm) without tracks.

(Section B) WEIGHT

(I)	**Weight :**	**55**0 lbs (250 kg).

(Section C) MOBILITY

(I)	**Method:**	Six (6) pneumatic wheels with quick release tracks driven by dual 48 VDC motors with automatic brakes and easy access manual override brake release.
(II)	**Slope:**	45 degrees including stairs.
(III)	**Speed:**	0 to 2.5 mph (0 to 4 kmph).
(IV)	**Traverse:**	Openings up to 24 inches (600 mm) and obstacles up to 20 inches (500 mm).
(V)	**Turning:**	Within the length of the vehicle.

(Section D) MANIPULATOR ARM

(I)	**Features:**	Individually variable, joystick-controlled speed for each joint yielding extremely precise manipulation of all joints. Joint controls grouped for natural, coordinated motion. Simultaneous coordinated motion of multiple joints. Single-sided, quick-change accessory mounting system. Arm joints do not drift with weight (no motor backdriving).
(II)	**Torso Rotate:**	-120 degrees to +180 degrees – Backlash=zero.
(III)	**Shoulder:**	215 degrees – Backlash=zero.
(IV)	**Shoulder Length:**	37” (940 mm) from pivot center points.
(V)	**Elbow:**	260 degrees; Backlash=zero.

(VI)	**Elbow Length:**	30.5” (775 mm) from pivot center point to end.
(VII)	**Wrist:**	+/- 100 degrees; Backlash=zero.
(VIII)	**Wrist Length:**	10.25 to [14.75] inches (260 mm to [375 mm]) from pivot center point to end of gripper open and close.
(IX)	**Wrist Extend:**	6 inches (150 mm).
(X)	**Grip Rotate:**	360 degrees continuous; Backlash=zero.
(XI)	**Gripper:**	0 to 12 inches close/open (300 mm).
(XII)	**Grip Force:**	79 lbs (36 kg).
(XIII)	**Lifting Capacity:**	260 lbs (118 kg) at 18 inch (457 mm) extension; 165 lbs* (75kg*) at 48 inches (1220 mm); 60 lbs (27 kg) at full **e**xtension. *Robot counterbalanced with weights to not tip forward
(XIV)	**Vertical Reach:**	103.5 inches (2629 mm) with arm fully extended.
(XV)	**Horizontal Reach:**	76.5 inches (1943 mm) from front of robot platform.
(XVI)	**Arm Speed:**	60 seconds from fully stowed position to fully extended position of 76.5 inches (1943 mm) with coordinated and simultaneous motion control.
(XVII)	**Simulated Linear Motion:**	Coordinated and simultaneous control of shoulder, elbow and wrist yields horizontal linear motion of 55 inches (1400 mm) in 25 seconds. Additional 6 inches (150 mm) is obtained by simultaneously utilizing gripper extend joint.
(XVIII)	**High Intensity Light Kit:**	Optional High Intensity Light Kit attaches to gripper or forearm to provide two banks of 40 Watt lighting for 80 Watts maximum.
(XIX)	**Accessory Mounting System:**	One-sided (right) elbow Dual Accessory Mounting system with one quick change mount and one heavy duty mount.

(Section E) Surveillance Arm

(I)	**Motion:**	Rotates with Turret but raises independently of turret. Raising Arm from fully stowed to maximum forward position takes 15 seconds.
(II)	**Position:**	Furthest forward position places the surveillance camera along the front edge of the robot for a better view around corners without visual obstructions from the robot.
(III)	**Camera Height:**	Stowed position: 38 inches (965 mm); Maximum height position: 60 inches (1525 mm)**.**
(IV)	**Integrated Equipment:**	All video and audio antennas (if RF option is purchased) are permanently integrated into the surveillance arm for rapid deployment.

(Section F) AUDIO VISUAL

(I)	**Surveillance Camera:**	Color camera with auto/manual focus. 300:1 extra low lux color zoom. 360* degrees pan; 360* degrees tilt. Auto/manual focus and iris. 10-watt halogen light attached. Motorized camera extender. Optional auto-switching to near infra red capability. * 360 degree field of view before zoom
(II)	**Gripper Camera:**	Color camera with auto/manual focus. 300:1 extra low light color zoom. Auto/manual focus and iris. Manually adjustable tilt angle. Camera rotates with gripper. Optional auto-switching to near infra red capability.
(III)	**Drive Camera:**	Color fixed focus. Auto iris. Dual 20-watt halogen drive lamps. Optional auto-switching to near infra red capability.
(IV)	**Relocatable Cameras (Optional):**	Option to add multiple cameras. All camera ports can handle fixed focus cameras or cameras with auto/manual focus, iris, and zoom controls. 3 Arm-located for weapons sighting, additional surveillance etc. 1 located in rear of robot for rear view, additional surveillance etc.
(V)	**Video Accessories:**	Optional Near-Infra Red Camera/Light Kit with cameras switching automatically from color to near infra red.
(VI)	**Audio:**	2-way audio system with weatherproof speaker and microphone mounted on the robot chassis.

(Section G) ELECTRICAL

(I)	**Firing Circuits:**	Eight (8) 24 VDC 2-Amp firing circuits with multiple redundant safety features to prevent accidental firing. Operator programmed and computer-controlled firing pulse duration from .1 seconds to 9.9 seconds. Capability of firing 2 devices simultaneously. Dual bank control allows two different firing pulse durations during simultaneous firing. On-screen readout displays “Off”, “Armed”, or “Fired” status. LED indicator lights at robot terminals indicate “Disabled”, “Time Delay”, or “Armed” status for safety. 60 second Time-delay on robot firing circuit for additional operator safety. (Time-delay duration can be modified at factory) Safety Override available on OCU via purposeful operator sequence for Emergency Control of firing circuits. (with hard lock-out).
(II)	**Relay Circuits:**	Eight (8) relay circuits @ 24 VDC and 2 Amps.
(III)	**Robot Power:**	48 VDC – four (4) 12V, 32 Amp-hour sealed lead acid gel cell

battery pack on vehicle with integrated current measurement.

(IV) Battery Charger: 48 VDC charging system – 120/240 VAC, 50/60 Hz Power Supply.

(V) Connections: All connectors are ¼-turn for rapid deployment.

(VI) Modular Assembly: Robot electrical components assemblies are designed for modular removal and replacement to reduce maintenance, shipping costs and minimize downtime.

(Section H) DATA LINKS

(I) Features: Option for RF system and/or Fiber Optic system.
RF option is integrated in robot and OCU.
Both Fiber option and RF option can be simultaneously installed and permanently left on robot.
RF system capable of up to 1 mile (1.6 km) line-of-sight communication. Fiber Optic System has 1200 feet (400 m) of cable with manual/automatic guided cable rewind.
Option for redundant communication capability – system automatically switches to RF if fiber is broken or disconnected during mission.

(II) HazProbe: Dedicated HazProbe Power & Communication port on robot for best integration of HazProbe or future remote controlled accessories.

(IV) Sensors / Detectors: Three sensor ports on the arm for simultaneous use of up to 3 fully-integrated detectors.

(Section I) ENVIRONMENTAL

(I) Features: Sealed weather resistant enclosures built to IP-X5 standards – system Is operable on all surfaces and in all weather.

(II) Snow: Operation continuous in snow depths up to 6 inches (150 mm) and over packed snow banks of 18 inches (450 mm).

(III) Rain / Liquid Decon: Chassis and OCU are weatherproof to IPX5 standards and allow for continuous operation in heavy rain or standard and repeatable decontamination.

(IV) Sand: Robot rated for continuous operation in sand. Sealed wheel bearings, O-rings, and pneumatic tires prevent transmission binding.

(V)	**Temperature Range:**	Robot should be stored and started within a temperature range 0°C to 40°. Once operational, the robot is rated from -20°C to +50°C. Operation in colder climates may be configured by request with use of alternative lubricants, seals, and operational procedures.

(Section J) OPERATOR CONTROL UNIT (OCU)

(I)	**Features:**	Heavy duty, portable, weather resistant case. Compact with integrated optional RF system. Detachable Control Station for direct connection to the robot. Separate Hand Controller for direct connection to the robot for robot navigation. 15 inch (381 mm) LCD monitor with daylight-readable, anti-glare screen. Quad camera display for simultaneous 4-camera viewing. Camera selection switch for quad or full screen camera view Relocatable camera selector for a total of 7 cameras, 3 permanent and 4 relocatable. Intelligent Graphics Display featuring: Automatic Alerts. Scrolling and retained sensor reading. Operator programmable controls of robot options. Real-time video switching for portable video (X-ray) operation – (optional equipment). Indoor/Outdoor color compensation. Camera set-up functions. Sensor feedback – (optional equipment). Video and audio output for event recording.
(II)	**Robot Control:**	Joystick control of robot platform for easy navigation.
(III)	**Manipulator Control:**	Joystick control of all manipulator joints for easily coordinated motion. Individual variable speed control for each joint. Joint grouping for natural control of motions.
(IV)	**Safety Switch:**	Disables all motors except surveillance arm & camera assembly. All other robot functions including firing circuits remain active. Safety setting extends battery life, since motors are de-energized.
(V)	**Fast/Slow Switch:**	Reduces drive speed to 1/5 of maximum when in “Slow” mode. Factory can adjust this factor to other ratios when requested.
(VI)	**OCU Power:**	300 watt-hour, 12 VDC battery. Integrated 120/240 VAC smart charger/power supply. 12 VDC auxiliary power input. Battery life matches robot battery life – 3 to 4 hours for typical mission .
(VII)	**Audio:**	Microphone, speaker and dual volume control.

(Section K) OTHER SALIENT FEATURES

(I) Features:

Built-in on-board diagnostics.
Easy calibration of all joysticks by operator.
Rapid deployment of robot from vehicle – OCU is fully integrated.

(II) Available Accessories:

Mounting Assembly for:

- HazProbe
- Single or Dual Disrupters
- Shotguns
- X-Ray
- Chemical Detectors
- Gas Dispenser
- Power Hawk
- Sage SL6 Grenade Launcher
- Striker
- Street Sweeper

Laser Sights
Weapons Sighting Camera
Shock Tube Initiators
High Intensity Light Assembly
Near Infra Red Light Source/Camera Kit
Drop Charge Reel Assembly
Window Breaker
Electric Hitch Release for trailer
Cordless Circular Saw Assembly
Cordless Reciprocating Saw Assembly
Cordless Drill Assembly
External Battery Pack for OCU

(III) Available Options:

Automatic telemetry switching for X-Ray unit.
Automatic, real-time video switching for X-Ray unit.
Simultaneous X-Ray sensor communication and robot control.
Integrated sensors such as chemical detectors, explosives detectors, or X-Ray.
Full display of sensor information on the graphic display.
Automatic (user controlled) alerts for onboard sensors.
Multiple simultaneous sensors.
Warranty Extensions.
Service Plans.
External Antenna System.
Extended Range Antenna.

(IV) Available Spares:

Spare Battery Pack (with current sensor) and/or Charger.
Replacement batteries for OCU and/or Robot.
Spare Fiber Optic Cable.
Consumables and field spares.

All specifications subject to change without notice.

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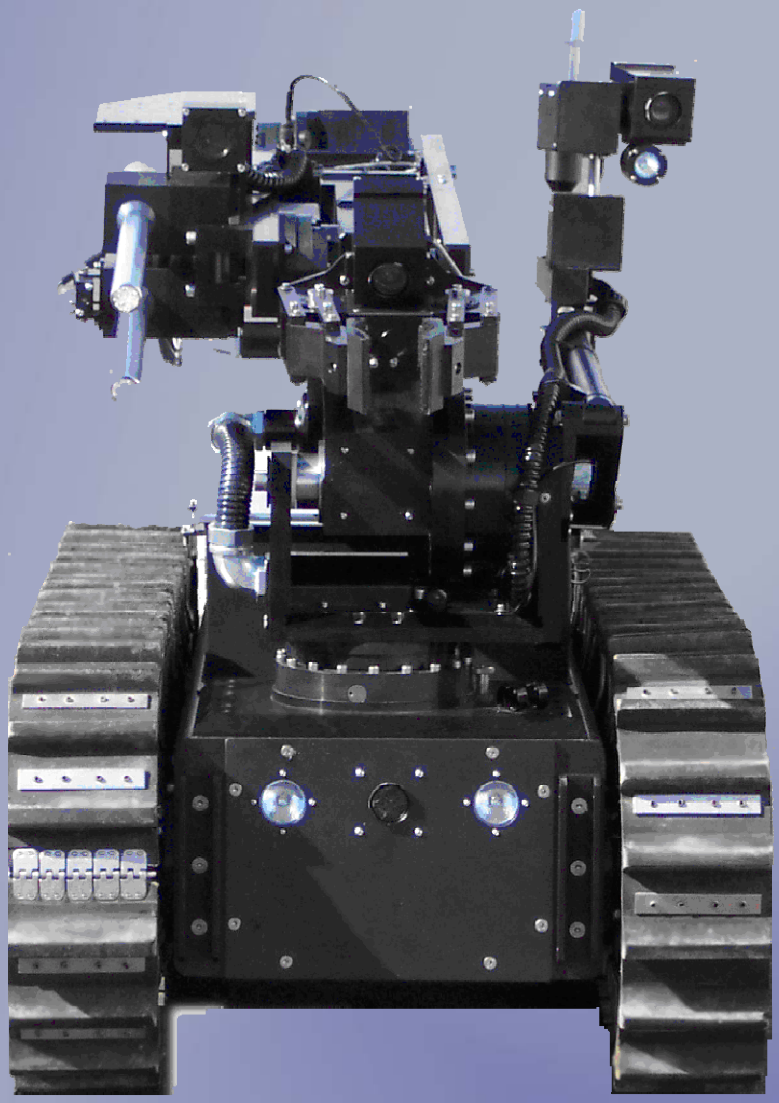

WARRANTY TERMS AND CONDITIONS

WM Robots LLC (WMR) warrants its robot to be free from defects in material and workmanship for a period of one year (12 months) starting from the date of original delivery from WMR. If the product is received within the warranty period and is found by WMR to be defective within the terms of this warranty, WMR will replace or repair any defects in the product at our option and cost.

This warranty does not apply to any failure caused by misuse, accidental damage, abnormal use, neglect, abuse, alteration, improper installation, unauthorized repair or modification, improper testing or causes external to the product such as natural disasters. WMR makes no warranty with respect to expendable or high wear components such as tires, batteries, lamps etc.

In the event that the product needs to be returned to WMR for service, the customer must obtain a Return Materials Authorization (RMA) from WMR in advance, and that number must be clearly indicated on the shipping document.