KAREM's New Generation of Land-air High-rise Firefighting/Rescue System

An Introduction to KAREM's Products

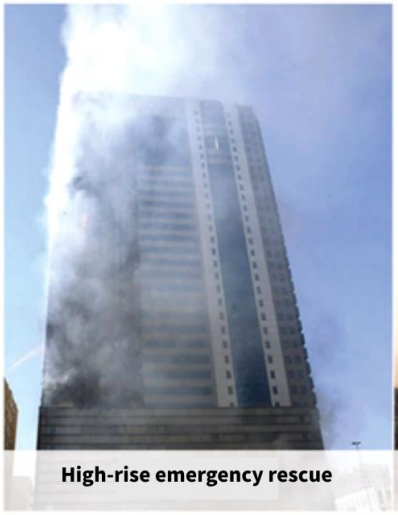
KAREM's new generation of land-air high-rise firefighting and rescue system is powerful fire-fighting equipment. It provides functions such as tethered spraying, ground fire fighting, fire inspection, emergency power supply, and mobile commanding. It greatly enhances the capabilities of fire-fighting UAVs and improves the efficiency of fire fighting and rescue.

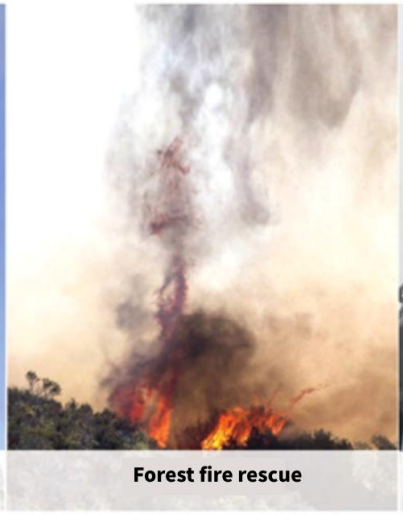
Key Functions

- The integrated tethered system and power generation system allows foe long term fire fighting or rescue. The hang time of the tethered UAV can be up to 72 hours.
- The Integrated air compression foam system provides the peak flow rate of 280L/min and an effective range of over 15 meters.

- Can be equipped with a fire hose to achieve precise and long-term fire extinguishing at an altitude of 170 meters.
- The integrated UAV transportation and lifting platforms can be deployed and put into use for fire-fighting tasks within 3 to 5 minutes.

Application Scenarios


High-rise emergency rescue


Forest fire rescue


Firefighting training/demonstration


Container terminal


Chemical plant

High-rise Firefighting (Super high-rise office buildings/residences)

- **Difficulties:**
  - ✓ The work height of traditional fire truck ladders is limited (usually ≤50 meters).
  - ✓ The internal fire escape is blocked by smoke, preventing personnel from approaching the fire.
- **Solution:**
  - ✓ Have the vehicle-mounted window-breaking UAV carrying a 40mm water hose. It can break the window, locate the fire point, and then quickly extinguish the fire with the help of an infrared thermal imager, avoiding secondary losses caused by blind water spraying.

Fire in Industrial Zone and Special Environments

- **Difficulties**

- ✓ The accumulation of flammable and explosive substances poses extremely high risks.
- ✓ High-temperature radiation prevents conventional equipment from operating continuously.

- **Solution:**
  - ✓ Have fire-fighting UAV entering dangerous areas for fire suppression. The vehicle-mounted system can generate high-temperature resist water mist, under which it can operate at a temperature of 300°C.

Fire in Electrical Power Facilities

- **Difficulties**
  - ✓ Traditional water-based fire extinguishing agents cannot be used for electrical equipment.
  - ✓ High-value equipment such as transformers need precise protection.
- **Solution:**
  - ✓ Use compressed air foam system (CAFS) to insulate from fire extinguishing. The laser positioning system ensures that the fire extinguishing agent precisely covers electrically-live equipment.

Fire in Airport Terminal Buildings

- **Difficulties:**
  - ✓ Aircraft fuel fires need to be suppressed as soon as possible.
  - ✓ Steel-structured buildings are prone to collapse at high temperatures.
- **Solution:**
  - ✓ Perfluorohexanone fire extinguishing agent efficiently extinguishes aviation fuel fires, and vehicle-mounted water cannons switch to the columnar/mist spray mode to protect building structures.

UAV-fire truck live drill

Optional part

Dry powder fire extinguishing tank module

Water hose module

Window breaker module

Aviation laser forest fire extinguishing bomb

Parameters

Fire truck	Dimension (Length*Width*Height)	8800X2500X3950mm
	Maximum weight	19000kg
	Chassis	ZZ5207TXFV471GF5
	Chassis manufacturer	Jinan Truck Company Ltd, SinoTruck
	Driving method	4×2
	Wheelbase	4700mm
	Number of crews allowed in driving cabin	2+4
	Engine model	MC07.34-60 (diesel)
	Engine manufacturer	SinoTruck
	Engine capacity	6870ml
	Engine power	251KW /340Ps

	Engine emission standard	GB3847-2005, GB17691-2018 (Chinese Ⅵ)
	Maximum speed	95km/h
	Pot volume	2m3 (water pot), 0.3 m3 (foam pot)
Lighting lamp	Light source voltage	DC 24V
	Light power (Single)	150W
	Control stick work voltage	≤12 A
	Gimbal work current	≤2 A
	Work height	1200mm
	Light source rotating radius	400mm
	Light source horizontal rotation range	380°
	Light source vertical rotation range	180°
	Light source rotation speed	4 rounds per minute
	Luminous flux	1500LM
	Color temperature	6000K
	Light source category	Cree
	Light source life	100000H
	Control method	Wired, wireless, 485
Power supply	Power capacity	96V/150Ah
	Maximum dynamic current load	160A
Firefighting pump	Flow rate	150~200 L/min
	Rate pressure	0.8MPa
	Power	4.5kW
	Pump depth	3m
Foam pump	Rate flow rate	10L/min
	Work pressure	0.1MPa~1.2MPa
Air compressor	Displacement	850~1200 L/min
	Work pressure	1.0MPa
Firefighting interface	Mixture flow rate	190L/min
	CAF output flow rate	≥1100L/min
	Range	≥20m
Diesel electric power supply generator	Power	150kW
	Capacity	187.5kVA
	Power factor	COSφ=0.8 (lagging)
	Frequency	50Hz

	Maximum output current	270A	
	Output voltage	400/230V	
	Net weight	1800KG	
	Rated battery capacity	60Ah*2	
	Dimension	2450*1000*1600(mm)	
Module	Rated output power	60kW	
	Module type	EVR330-20000C	EVR1000-20000C
	Rated output current	60A	73A
	DC output range	DC 200V~750V	DC 200V~1000V
	Current limiting range	10-112% stepless adjustable	10-110% stepless adjustable
AC input	Rated input voltage	380V AC/480V AC, three-phase	
	Input voltage	320V AC～490V AC (full load); 320V AC～270V AC（linear decreased to half-load）	
	Input current	＜80A	
	Frequency	45Hz～65Hz	
	Power factor	≥0.99	
	Current distortion (THD)	≤5%	
	Input protection	Circuit fuse, lightening-protection circuit	
DC output	Peak-peak noise	≤±0.5%	
	Voltage stabilization precision	≤±0.5%	
	Current stabilization precision	≤±1%	
	Current sharing	≤±5%	
	Efficiency	≥95% (peak)	
Work environment	Temperature	-40℃～55℃ (work); 55℃~75℃ (decreased output)	
	Storage	-40℃～75℃	
	Relative humidity	0～95%	
	Altitude	Lower than 2000m for full load output	
Communication and alarm	Communication interface	CAN	
Firefighting UAV (KRM-1900 PRO)	Symmetry electric motor wheel base	2064mm	
	Dimension	2710mm x 2704mm x944mm (with the arms and propeller blades expanded), 1100mm x 970mm x944mm (with the arms and propeller blades folded)	
	Electric motor KV	70rpm/V	

	Electronic speed controller current	150A (under good radiation condition)
	Propeller blade diameter	48inch
	Maximum takeoff weight	145 kg (sea level)
	Maximum ascending speed	5 m/s
	Maximum descending speed	3m/s
	Maximum horizontal speed	GPS mode: 5m/s; motion mode: 3~10m/s (adjustable, no wind); cruising mode: 3~10m/s (adjustable, no wind); pose mode: 15m/s (no wind)
	Maximum altitude	5000m
	Work radius	12km
	Maximum wind resistance level	Level 6 (work); Level 8 (empty load)
	Maximum flying duration	1.5hours (tethered work 100m); ≥8 hours (tethered, empty load)
	Protection level	IP54
	Hovering accuracy (under good GNSS signal)	Vertical: ±0.5 m; horizontal: ±0.5m (GPS positioning works fine)
	Camera	30x optical zoom; image sensor: 1/2.3inch SONY IMX117 CMOS; 1200 pixel
	Water hose	40mm, 180 meters
	Tethered vehicle-mounted power supply	Rated power: 45kW; output voltage: 60VDC
	Tether flying altitude	≤170m
	Obstacle avoidance	Provided
	Aiming system	Laser aiming
Recon UAV (KRM-R1000)	Symmetry electric motor wheel base	1047mm
	Dimension	1140x1140x531mm (expanded); 514x439x469mm (folded)
	Electric motor KV	180rpm/V
	Electronic speed controller current	80A (under good radiation condition)
	Propeller blade diameter	24inch
	Maximum takeoff weight	15.8kg (sea level)
	Maximum ascending speed	5m/s
	Maximum descending speed	3m/s
	Maximum horizontal speed	GPS mode: 5m/s; cruising mode: 3~20m/s (adjustable, no wind), pose mode: 25m/s (no wind)
	Maximum altitude	5000m
	Maximum wind resistance level	17 m/s
	Maximum flying duration	54minutes (sea level, no load, lithium battery power supply)

	Hovering accuracy (under good GNSS signal)	With RTK enabled: ±10cm (vertical), ±5cm (horizontal) With RTK not enabled: ±0.5m (vertical), ±0.1 m (horizontal)
	Camera	Infrared dual-light camera, thermal imaging sensor, vanadium oxide uncooled infrared focal plane detector, resolution: 640*512
	Window breaker	Remote controlled triggered electromagnetic projectile window breaker
	Window break capability	10mmdual-layer tempered glass
	Obstacle avoidance	Provided
Console	PC	Legend 510S mini, i5-12400, 16G memory, 512G solid disk
	Monitor	Legend 23.8inch, model: M2412ML, resolution: 1920*1080
	Keyboard	K835 84-key mechanic keyboard
	Mouse	Wired mouse
	Router	Huawei 5G CPE Pro router
Camera	Sensor	1/2.7' Progressive Scan CMOS
	Maximum image size	1920×1080 (200W 1080P)
	Frame rate	Main code: 50hz 25fps (1920×1080)
	Lens	4mm
	Shutter	1/3s ～1/100000s
	Day-night switching mode	ICR infrared filter
	Minimum luminance	Colored: 0.01Lux @（F1.2，AGC ON)
	Backlight compensation	Supported, region selection enabled
	Wide dynamic range	120 dB
	Digital noise reduction	3D noise reduction
	Video compressing standard	Main stream: H.265/H.264; sub stream: H. 265/H.264/MJPEG
Video standard	H.265	BaseLine Profile /Main Profile/ High Profile
Interface and function	Video compressing rate	32 Kbps ～8Mbps
	Protocol	TCP/IP, ICMP, HTTP, HTTPS, FTP, DHCP, DNS, DDNS, RTP, RTSP, RTCP, NTP, UPnP, SMTP, IGMP, 802.1X, QoS, IPv6, UDP, Bonjour
	Interface protocol	ONVIF, ISAPI
	Common function	Heart beat, mirroring, password protection, video mask, water mark
	Smart alarming	Motion detection, mask alarming, illegal logon
	Communication interface	One Rj45 10M /100M adaptive Ethernet interface
Other	Work temperature and humidity	-30℃～60℃
	Power supply	DC12V±25%/PoE (802.3af)

Power consumption	6.5W MAX
Protection level	IP67
Operating humidity	20-90 % RH @ 0- 40°C (no condensing)
Noise	Lower than 50dBA @ 1m
Management	Smart RS-232 or USB (optional)
SNMP (optional)	Windows® 2000/2003/XP/Vista/2008/7/8、Linux、Unix, and MAC supported Power supply management through SNMP and Explorer
Current peak ratio	3:1
Harmonic distortion	≦ 3 % THD (linear load); ≦ 6 % THD (non-linear load)
Electric power supply voltage	±1% (battery mode)
Lowest transform voltage	160 VAC / 140 VAC / 120 VAC / 110 VAC ± 5 % (environment temperature lower than 35℃) (Load ratio 100% - 80 % / 80 % - 70 % / 70 - 60 % / 60 % - 0)
Lowest recovery voltage	175 VAC / 155VAC / 135 VAC / 125 VAC ± 5 % (environment temperature lower than 35℃) (Load ratio 100% - 80 % / 80 % - 70 % / 70 - 60 % / 60 % - 0)
Highest transform voltage	300 VAC ± 5 %
Highest recovery voltage	290 VAC ± 5 %
Frequency range	40Hz ~ 70 Hz
Phase	Single-phase, grounded
Electric output	≧ 0.99 @ 220-230VAC (input voltage)
Output voltage	200/208/220/230/240VAC
Overloaded	The environment temperature is lower than 35℃. 105%~110%: UPS will be off in 10 minutes in the battery mode or switched to the bypass mode if the input is proper. 110%-130%: UPS will be off in one minute in the battery mode or switched to the bypass mode if the input is proper. Overloaded >130%: UPS will be off in 3 seconds in the battery mode or switched to the bypass mode if the input is proper.

Vehicle-mounted compressed air foam system

	Wet foam	Strong wet foam	Dry foam
Flow (L/min)	180	280	100
Range (m)	≥15	≥15	≥12

UAV Landing Platform

Specialized transportation platform used to raise, take off, and land through a single operation.

- **Vehicle-mounted tethered power supply**
  - ✓ Rated output power:60kW
  - ✓ Rated output current: 60A
  - ✓ Input voltage: 320VAC～490VAC
  - ✓ Cable length: 200m