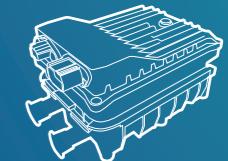


KUS
KUS TECHNOLOGY CORPORATION

THE GLOBAL SUPPLIER OF SENSORS AND
INTEGRATION SOLUTIONS



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Principle of Ultrasonic Wave

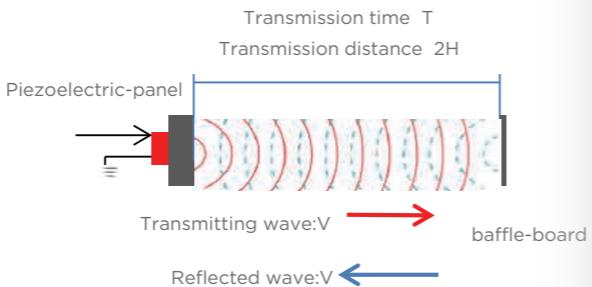
Ultrasonic wave in different medium, different concentration of liquid has different propagation speed; By using ultrasonic wave to travel a fixed distance in the liquid and comparing the difference of the time, the difference value of the concentration of the liquid can be obtained.

Signal: CAN(SAE J1939)

Accuracy: $\pm 2\%$ (25%-36%AdBlue)

$\pm 3\%$ (<25%AdBlue,>36%AdBlue)

Resolution: 0.25%AdBlue



AdBlue Quality Sensor with Valve

- Sensor head with a valve integrated, which can reduce the SCR pipeline connection, lower the leakage risk and also save costs.
- Reduce the installation space of the cooling water valve with simple layout.
- The water valve maintenance is easier and more convenient.



Spiral Shape AdBlue Quality Sensors

AdBlue solution will be frozen at temperature below -11°C . It will affect the operation of the SCR system. Hence, we recommend the spiral shape AdBlue sensor for cold region operation. The spiral design could provide better heating efficiency to thaw frozen AdBlue solution, and allow the SCR system to work normally within specific time after engine cold start. Assembly with AdBlue tank: bayonet, screw fixed; Toothed bayonet installation, head can be equipped with air pipe ventilation (optional).



CHAPTER

AdBlue Quality Sensors

CHAPTER

AdBlue Quality Sensors

L-shape AdBlue Quality Sensors

The L-shape AdBlue Quality Sensors is suitable for large-volume or L-shaped boxes, which can effectively increase the heating area of the AdBlue solution. It can be heated quickly and can thaw AdBlue in a short time, the heating is balanced, so that the vehicle can be used for a long time in cold areas. Stable and normal work. A variety of mounting methods including bayonet, SAE screw pattern with air vent or non-vented respectively.



AdBlue Quality Sensors without Heating Function

In warm area, SCR system does not require heating function, the AdBlue sensors only have the features of level indication and integrated suction/return for AdBlue. CNAAT sensor solution, the connector is integrated with a plastic head, which is a low-cost product among non-heating AdBlue quality sensors. A variety of mounting methods including bayonet with air vent or non-vented respectively.

AdBlue Quality Sensors (Large Bayonet)

The large bayonet structure of the AdBlue sensor is currently a common way to install sensors in AdBlue tanks, and it is also a standard installation method. It has the characteristics of easy disassembly and assembly and strong interchangeability, and is widely used in AdBlue tank assemblies with large capacity and loose structural space.

Non-road AdBlue Quality Sensors

The non-road AdBlue quality sensor uses the principle of electromagnetic induction to detect AdBlue level. It is widely used in SCR systems of well-known trucks at home and abroad. The output signal has high accuracy, stability and continuity. The product structure is simple and reliable. Only the float is a moving part. It is wear-resistant, has a long service life and has good heating effect.

- Multiple functions integrated into one
- Liquid level detection and alarm
- Cooling water circulation heating
- Suction and return of AdBlue solution
- Test AdBlue concentration
- Temperature detection
- AdBlue filtration

CHAPTER

AdBlue Quality Sensors



RD7CT



RDAAT

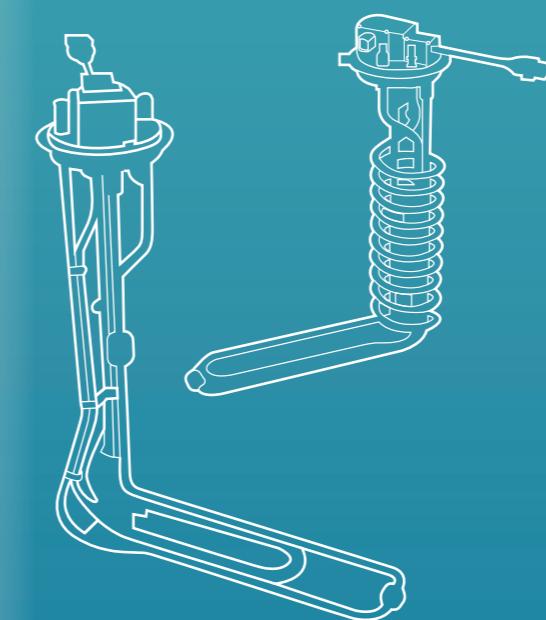


RS9AT

Technical Parameters			
Product number	RD7CT	RDAAT	RS9AT
length range	285-600mm	285-600mm	285-900mm
Length range can be customized according to customer requirements			
Main material	Nylon, rubber, stainless steel		
Installation method	Clamp type, easy to install and remove		
Connector	Amp, delphi, TycoOptional Amp, delphi, Tyco or other brands		
Output information	Resistance signal, voltage signal		
Rated power	125mW		
Accuracy range	10-40mm		
Operating temperature	-40°C-85°C		
Protection level	IP67		

CHAPTER

AdBlue Quality Sensors



PTC+Cooling Water Heating (Euro-7/China-7 Electric Heating Product)

1. AdBlue level measurement
2. AdBlue temperature measurement
3. AdBlue pick up & return
4. AdBlue filtering
5. Heating and thawing AdBlue (PTC electric heating + engine cooling water mixed heating)
6. Detection of AdBlue concentration (ultrasonic detection)

Sensor length: L=300-750 mm (can be matched according to customer tank)

Installation method: E-ring ø125mm, Size bayonet

Electronic Specifications: Voltage: 24-48 V, electric current 16-32A , power 600-1500W

Conventional Water Heating + Cabinet Integrated PTC Heating (Euro-7/China-7 Electric Heating Product)

1. AdBlue storage
2. AdBlue level measurement
3. AdBlue temperature measurement
4. AdBlue pick up & return
5. AdBlue filtering
6. Heating and thawing AdBlue (PTC water and electricity mixed heating)
7. Detection of AdBlue concentration (ultrasonic detection)

Box size: 20L-100L

Installation method: bracket, chassis fixed

Electronic Specifications: Voltage: 24-48 V, electric current 16-32A, power 600-1500W

CHAPTER

AdBlue Tank Assemblies

AdBlue Tank Assemblies

The AdBlue tank is made of engineering plastic PE, which has high product strength and corrosion resistance to alkaline liquid. According to various vehicle mounting requirements, we offer different shape and cubage tanks for options.

- Rich experience in R&D and design of AdBlue tank assembly;
- Perfect AdBlue tank testing capability;
- Fast delivery and sufficient production capacity;
- Meet ISO 22241 standard automatic/manual/limit/filling control requirements.



121.12L 121.12L (32 Gallons) **80L** 80L(21 Gallons)



55L 55L(14.5 Gallons) **45L** 45L(12 Gallons)



35L 35L(9.3 Gallons) **22L** 22L(5.8 Gallons)



20L 20L(5.3 Gallons) **16L** 16L(4.2 Gallons)



12L 12L(3.1 Gallons) **10L** 10L(2.6 Gallons)

We supply 3L-500L AdBlue tanks. Tank size and shape can be customized.

KUS AdBlue tank functions include: AdBlue storage, pressure balance, manual and automatic refilling control, refilling nozzle control.

Sensors are matched with different tanks to serve in various application and severe environments.

Extended Filling Type AdBlue Tank

- Tanks designs for integrating AdBlue supply modules are available upon request.
- Also we can integrate AdBlue pump to meet customers requirements.
- These tanks are widely applied to light duty vehicles, SUVs and pickup trucks.

CHAPTER

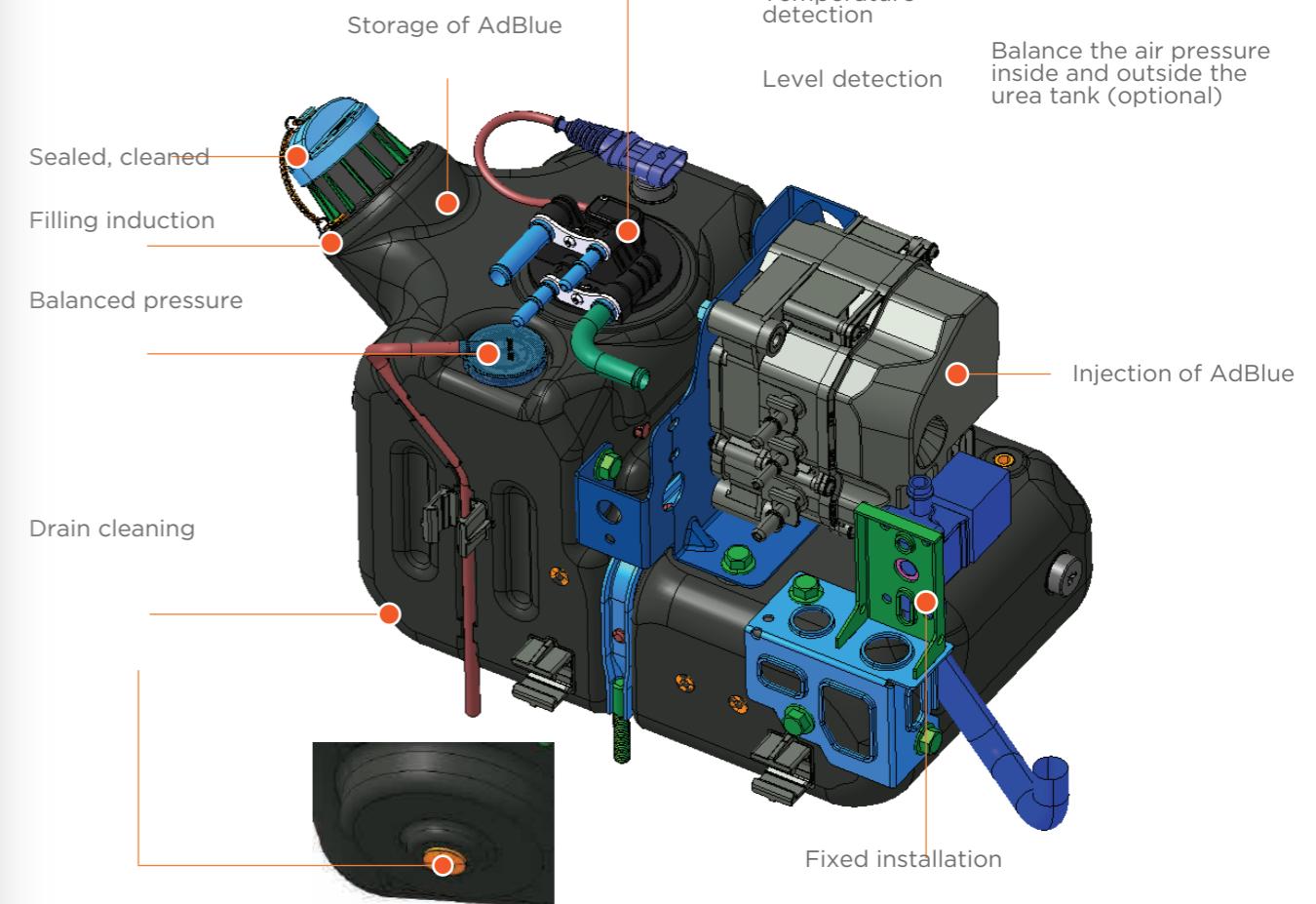
AdBlue Tank Assemblies

Concentration detection

Heating and thawing

Absorption and return of urea solution

Balance the air pressure inside and outside the urea tank (optional)



KUS AdBlue tank can realize the integration of complex and diverse insert design in various molding processes.

AdBlue Tank Parameters

Storage medium	AdBlue	Corrosive, low temperature crystallization
Material	PE	High strength and corrosion resistance
Colour	Black	Prevent algae growth and AdBlue decomposition
Craftsmanship	Blow molding/ Rotational molding	Blow molding production capacity is high; Rotational molding is complex in shape.

CHAPTER

AdBlue Tank Assemblies

AdBlue Tank Assemblies

Integrated Solenoid Valve



Solenoid Valve

With Bracket



Project

MOV: DC24V(<20.4V)/ DC12V(<10.2V)

MOPD: >2.5Bar

Voltage: DC24V/ DC12V

Power: 11.5W(DC12V)/ 13W(DC12V)

Main material: Copper/stainless steel

Flow: 15L/min(<10%), Pressure difference 1Bar

Maximum particle size allowed in the fluid: 200 m

Work pressure: 0-5Bar

Internal and external leakage: <2cc/min air, Test pressure AT 7Bar ±5%

Ambient temperature: -40-85°C

Fluid temperature: -40-90°C

Integrated AdBlue Sensor and Filter



Filter

CHAPTER

AdBlue Tank Assemblies

Filler Cap



Electronically Controlled Nozzle

Extended Filler Neck



Integrated Pump



Inlet Adapter

Vent Valve



Drain Screw



AdBlue Nozzle



Nozzle

KUS is equipped with professional R&D team and manufacturing capabilities. KUS can assist customers to develop AdBlue nozzles for different applications.

Rich nozzle design experience
Efficient production of samples
Comprehensive verification capability
Senior technician
Professional structure and performance optimization capabilities
Professional cost optimization

Various production processes: pipe making, bending, stamping, CNC, welding, brazing, etc.
Fast production and delivery capabilities
Rich nozzle production experience and complete production line

Technical Parameter	
Hole Number	4pcs
Hole Diameter	Φ0.5
Spray Angle	≈33°
Droplet Diameter	SMD (D3.2) <40um

CHAPTER

AdBlue Nozzles



CHAPTER

AdBlue Nozzles



Electronically Controlled Nozzle Specification

Normal voltage: 12V/24V
System pressure: 9Bar
Frequency: 10Hz
Spraying angle: ≈30°
Atomized particle size: SMD(D3.2)<60um
Working temperature: -40°C-120°C
Flow range: 100g/h-6800g/h
The diameter of the urea pipe and the cooling water pipe joint are φ 7.89 and φ949

Annular cooling water channel, uniform cooling

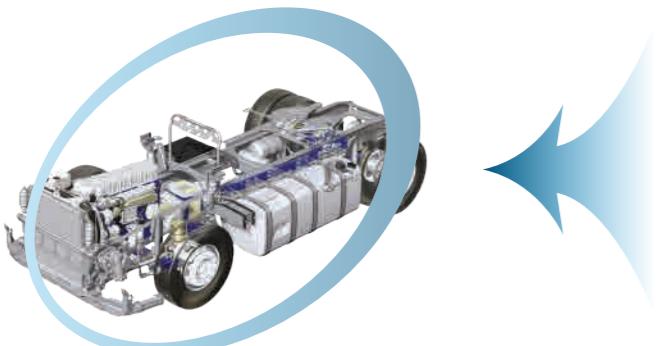
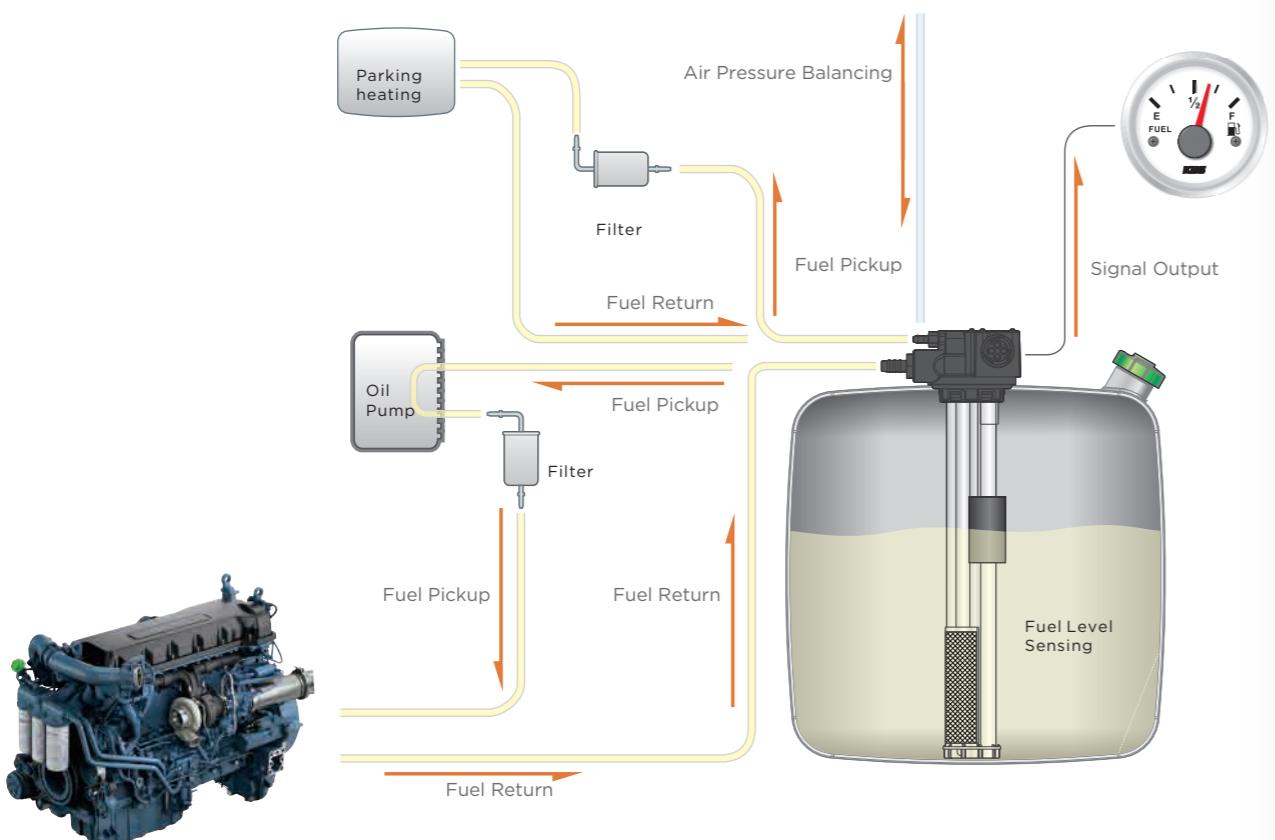
Favorable spraying effect

Parameter	Value	Remarks
Nozzle holes	3	
Nozzle angle	120°	
Conical atomization (α)	30°	AdBlue pressure 900kPa, ambient temperature 21 ±2°C
Radial deviation angle (δ)	--	
Axial deviation angle (γ)	--	
Atomization particle size (D32)	60um	Deionized water, pressure 900kPa

CHAPTER

Fuel System Application

KUS has a variety of oil and water level detection solutions, which can quickly provide customers with customized solutions. KUS also provides various engine speed and pressure sensors, which can work with similar instruments of KUS.



CHAPTER

Liquid Level Sensors



SAFT



KPDL



KAD



SAPK



KPDW-Wired



KPDW-Wireless

Multi-Tube Fuel Sensor

Multi-tube fuel sensors are mainly used in trucks and buses. In addition to measuring oil level, they are equipped with engine inlet/outlet, parking heating system inlet/outlet, and air valves to balance the pressure inside and outside the tank and prevent oil leakage from rolling over.

- Structural selection: aluminum alloy base assembly metal joints/plastic head injection molding integrated molding/piping integrated molding
- Main material: Aluminum alloy ADC12 or PA66+GF30
- Installation: Bayonet twisted for easy assembly.
- Signal output: Resistance, voltage, current or CAN-BUS signal.

Multi-Tube High Precision Capacitive Fuel Sensor – Wireless/Wired

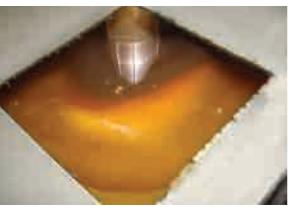
In addition to the characteristics of above mentioned Multi-Tube Fuel Sensor, this series of capacitance sensor functions are:

- it can link to vehicle by wireless or wired;
- high accuracy of 2% and high resolution of $\leq 1\text{mm}$.



Heating Fuel Sensors

KUS fuel heating sensor adopts PTC heating or engine coolant circulation heating, which has high heating efficiency and can automatically control temperature; the combustion efficiency can be effectively improved, and the pollution of exhaust emissions can be reduced at the same time.



High Precision Sensors

The sensors combine Multi-functions, including measuring liquid level, suction/return pipes for engine and vehicle heating system, balancing the pressure of the tank and the atmosphere, temperature alarm, etc.

- Main material: High quality aluminum alloy
- Resolution: 0.1mm
- Accuracy: 2mm
- Measuring principle: AMR, Capacitance
- Signal output: Resistance, Voltage, CAN, SENT, RS-232, RS-485.

The Capacitance Level Sensor (CLS), is used to continuously detect fuel level by measuring the capacitance variations as the level changes, it has the characteristics of high precision, strong stability and long service life.

- Sensor length range is 300mm-1500mm and can be customized.
- Installation: SAE standard 5 holes flange, other installation methods are available.

CHAPTER

Fuel Level Sensors



SPEHH

SAH



KAB

SADR



CLS2

CLS4

CHAPTER

Fuel Level Sensors



TN



PS5D

PS5

S5

S3



Sensors Of Stainless Steel Type

TN series are mainly used for light trucks, construction machines, yachts, etc. Besides measuring the level, an additional suction/return pipe or air ventilation for engine can be customized.

- Main material: Stainless steel
- Installation: SAE standard 5 holes flange or 6 holes flange, bayonet twisted is also available.
- Signal output: Resistance, voltage, current or CAN-BUS signal.

Single-tube Sensor Types

S5 & S3 series are widely used in various fuel, water or chemical tanks. With a simple yet reliable structure, starting from 4 inches, every half inch is a standard length.

- Main material: SS 316 & SS 304
- Installation: SAE standard 5 holes, BSP or NPT thread

PS5 & PS5D sensors are widely used in fuel tanks, water tanks and other liquid tanks. The sensor has the characteristics of light weight and strong vibration resistance.

Fuel Tank Caps

KUS fuel tank caps have the function of balancing the air pressure between the interior and exterior of the tank. The cap can be made out of engineering plastic or metal. The cap can be equipped with a key and lock ventilation and without ventilation based on customer preference.

CHAPTER

Fuel Level Sensors



Methanol Resistant Sensor

The parts and components used in the methanol-resistant sensor are all methanol-resistant, and have the functions of engine liquid absorption, liquid return, liquid level detection, impurity filtration, and anti-static.

The suction and return pipeline adopts an integrally formed elbow structure to reduce leakage.

The fixed parts are made of high-strength materials, which are resistant to compression and vibration.

The main body of the filter is integrally formed, the mesh is evenly distributed, it is not easy to deform under pressure, and it is durable.

Reasonable layout of the filter structure increases the filter area and reduces the pressure loss of the oil suction circuit.

The filter screen and buoy can be disassembled for easy maintenance.

Oil Pump Sensor

The oil pump sensor is a heating sensor with high thawing efficiency, simple product operation and low cost. The sensor adopts "pressure drive" to solve the problem of low-temperature fluidity of diesel oil at start-up, and raises the temperature of the fuel in the fuel tank through the residual heat of oil return.

- Use the pressure of the pump to drive the flow of fuel in the pipeline, eliminating the need to use energy conversion
- "One-button electronic control mode" to adjust the working mode, the operation mode is simple
- There is no need to add different grades of diesel oil at different ambient temperatures, reducing the cost of use

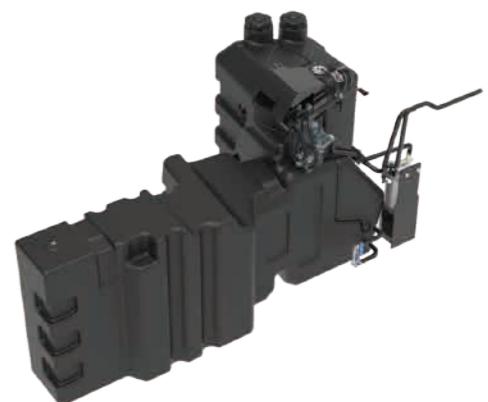


CHAPTER

Fuel Tank Assemblies



90L



260L

Product Advantage

Light weight, integrated shape, seamless connection

Strong plasticity: suitable for special shapes

High safety: excellent impact and strength resistance

Excellent corrosion resistance

Cabinet Parameters		
Storage medium	Diesel oil	Permeability, low temperature waxing
Material	PE	High strength, permeation resistance
Colour	Black	Good UV resistance
Craftsmanship	Blow molding/ Rotational molding	High blow molding capacity; complex rotational molding shapes; can produce boxes larger than 300L
Operating temperature	Ambient temperature: -40°C ~ +85°C, peak temperature: 90°C	

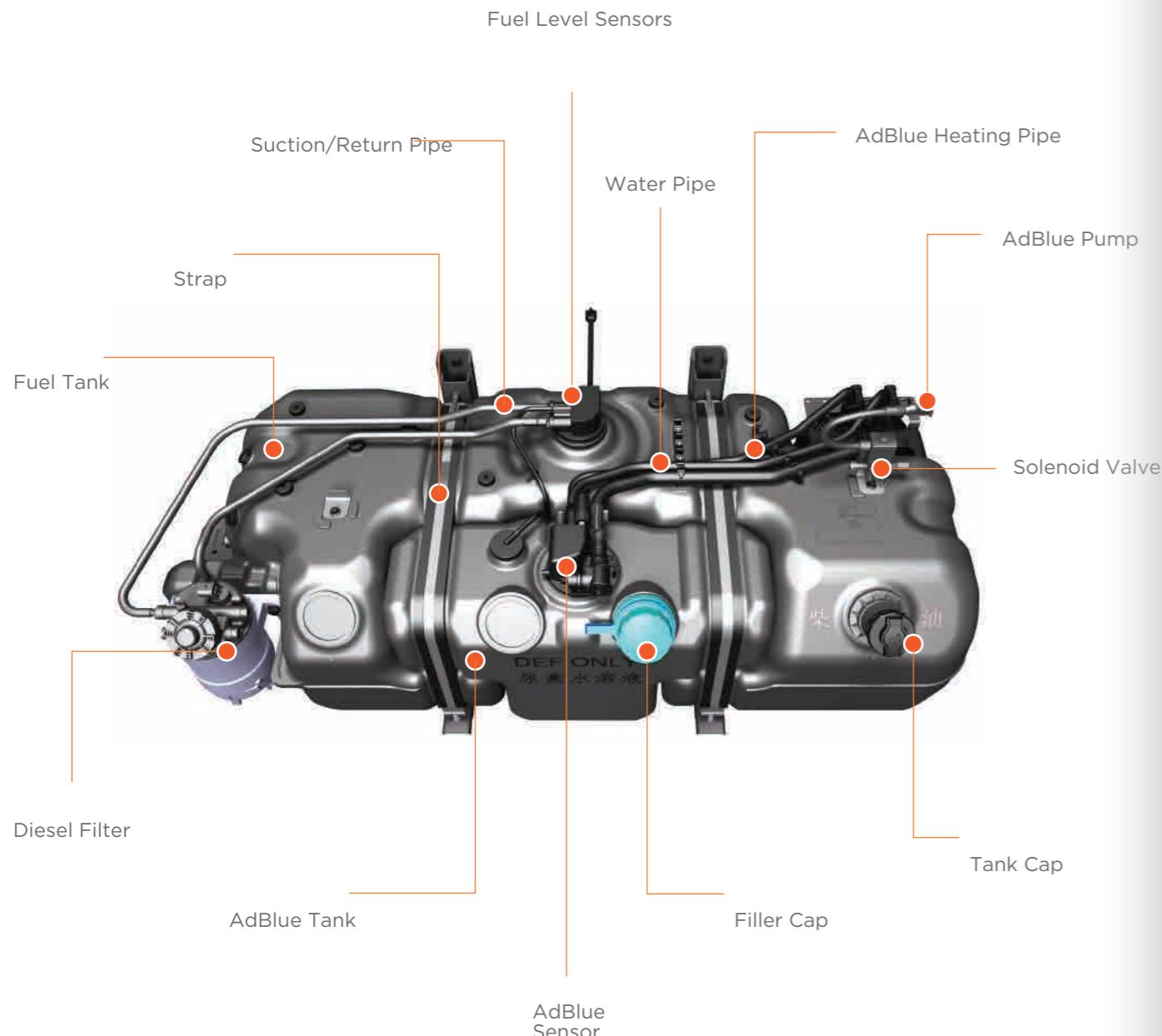
CHAPTER

Tank Integrated Solutions

CHAPTER

Tank Integrated Solutions

With the continuous development of automobile lightweight, integrated cabinets emerge as the times require. Based on highly vertically integrated production and R&D capabilities, KUS provides customers with mature AdBlue tank and fuel tank integration solutions, integrating fuel tanks, fuel sensors, diesel filters, AdBlue tanks, AdBlue sensors, AdBlue pumps and other accessories to meet light Quantified demand, flexible matching of various platform models of customers.



The AdBlue tank is inlaid behind the tank



The AdBlue tank is inlaid on the side of the tank



Product Advantage

Urea tank tank integration lightweight, highly integrated;
Modular assembly, improve vehicle production efficiency;
Body space layout neat and beautiful;
Reduce supplier management costs for customers.

Cabinet Parameters		
Storage medium	AdBlue	Corrosive, low temperature crystallization
Material	PE	High strength and corrosion resistance
Colour	Black	Prevent algae growth and AdBlue decomposition
Craftsmanship	Blow molding/ Rotational molding	Blow molding production capacity is high; Rotational molding is complex in shape.
Size		Size and shape can be customized according to customer needs

CHAPTER

Other Sensors

Temperature and Humidity/

Temperature and Humidity Pressure Sensor

The temperature and humidity sensor detects the humidity and temperature of the air through a digital temperature and humidity chip, and then outputs it through D/A or I2C, which is collected and converted by the MCU into CAN communication output. The temperature and humidity pressure sensor detects the humidity and temperature of the air through a digital temperature and humidity chip, and then outputs it through D/A or I2C; the pressure chip converts the mechanical deformation caused by the input pressure on the pressure sensitive body into a voltage signal output. Finally, the MCU collects humidity, temperature, and pressure physical quantity signals and converts them into CAN communication output.



Hydrogen Leakage Sensor

The hydrogen leakage sensor is a key safety component for monitoring hydrogen leakage in hydrogen fuel cell engines, hydrogen storage tanks and gas supply pipeline systems. Its principle is to detect hydrogen concentration by utilizing the characteristics of hydrogen's thermal conductivity changing with concentration. It has a fast response speed to hydrogen concentration changes and can provide real-time and accurate concentration monitoring results.



Conductivity Sensor

Fuel cell engines have high requirements on the conductivity of coolant. This is because impurities will continue to increase during the circulation process of the coolant, causing its conductivity to continue to increase and the insulation performance of the system to decrease. To ensure safety, a conductivity sensor is required to monitor the conductivity of the coolant, and the conductivity is measured using the resistance measurement method based on the principle of electrolytic conduction.



CHAPTER

Other Sensors

Other Sensors



Current Sensor

The current sensor is a current measuring device based on the principle of magnetic induction. It has the characteristics of high precision, wide range and fast response, and supports battery charge and discharge current detection and motor current detection. It has overcurrent and anti-reverse connection functions and can be used for current monitoring of battery packs and DC/DC converters of pure electric, hydrogen fuel vehicles, hybrid and other new energy vehicles to ensure the safety and stability of the system.



Pressure Sensor (Mechanical)

The pressure sensor mainly measures the pressure of water, oil, gas, refrigerant and other media. It is widely used in engine management systems, new energy vehicle waterway systems, transmission systems and safety systems. The product has high reliability, high measurement accuracy, and adopts strict process control to ensure excellent quality. The interface can be made according to customer needs, and the output signal can be configured according to customer requirements.



Pressure Sensor (Ceramic)

The sensor utilize the piezoelectric effect to measure the medium pressure and convert it into a linear resistance output, and it has the advantages of high reliability and high measurement accuracy. It is widely used in engine systems.

Main Material: Stainless steel
Protection rank: IP67

Temperature Sensor: Temperature sensors are used to measure the temperature of cooling water, pipelines, battery packs, charging equipment, etc. of new energy vehicles. They can also measure the temperature of high-voltage wiring harnesses, engine oil, excavator hydraulic oil, generators, etc. The temperature sensor has fast response time, high measurement accuracy, good stability and high degree of customization. Over-temperature alarm switches can be added according to customer needs.

CHAPTER

Other Sensors



Tacho Sensor: The tacho sensor is used to measure gear rotation speed and transmit this information to the engine control unit (ECU) or the vehicle's electronic control system to ensure that the engine is operating under normal operating conditions. Its shape, material and threaded interface can be made according to customer requirements.

Measuring principle: Holzer, Magnetoelectric



Water Level Switch: The water level switch is used in the water tank or cooling water tank of the generator, engine, mainly to measure the engine cooling water level. The water level switch has a low liquid level alarm function. When the liquid level is lower than the preset position, the alarm is issued and the switch signal is provided to the external device after a delay of 10 seconds; the delay alarm is to prevent the liquid level from shaking and causing false alarm and alarm. Duration 0-25s (factory setting).



CHAPTER

Auto Parts



Expansion Tank

Expansion tank is mainly used for coolant and deionized water storage, regulating system pressure, integrated water tank and water level switch/level sensor in one, can be customized according to the vehicle installation requirements and customer needs of different shapes, different volumes of water tank assembly.



Air Duct: Automotive air ducts are made up of pipes and vents used for heating, air conditioning and ventilation in your vehicle. The air duct can send hot and cold air to the required areas respectively to adjust the temperature inside the car, and control the air in and out, flow direction and speed in the vehicle, improving the air quality and the comfort of the car. The air duct has tight connections and no leakage. It is made of HDPE and PP material, which has high wear resistance and corrosion resistance, and low maintenance costs.

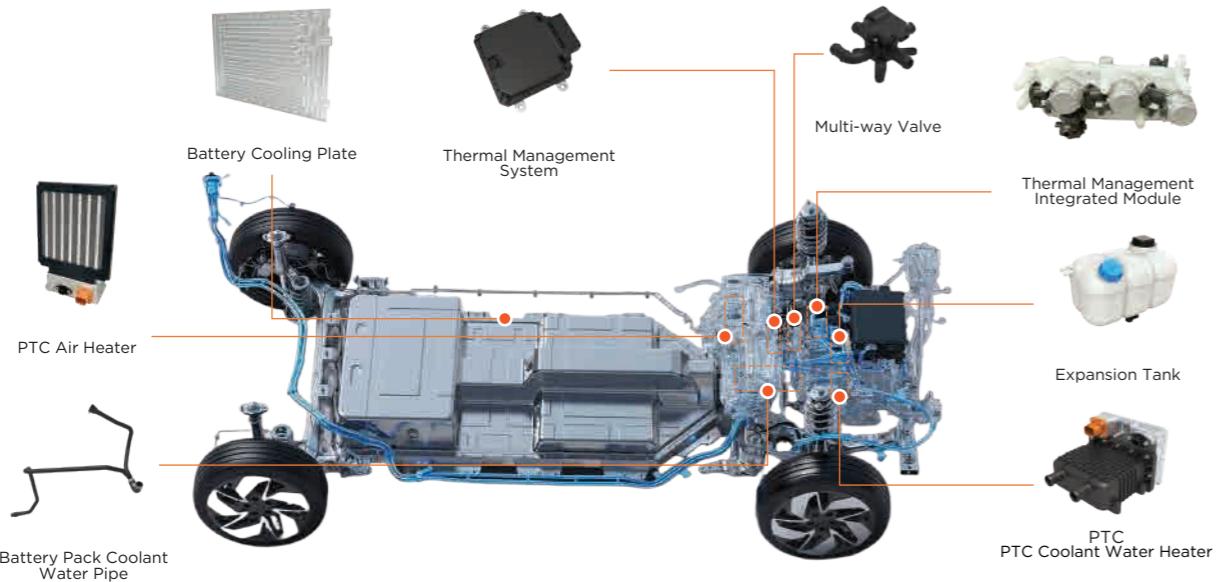


Fender: The primary function of fenders is to protect the tires and braking system from mud or other impurities, making them safer and more efficient. Fenders also help prevent mud, dirt, dust particles and other fluids from being thrown into the air as the tires roll. The part has a curved shape, and is available in a variety of models and sizes.

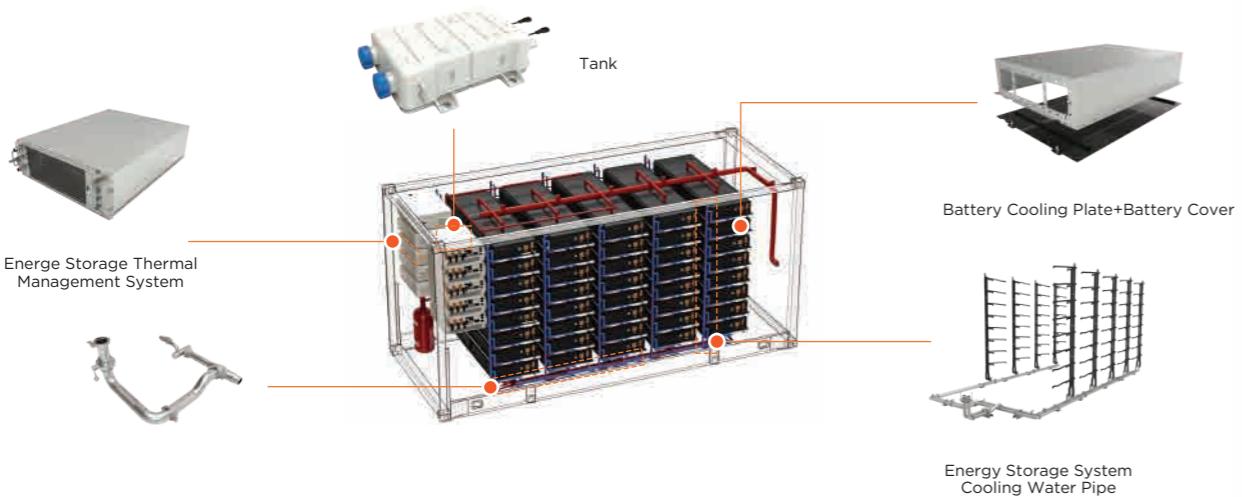
CHAPTER

Thermal Management System Products

The onboard thermal management system is a system that, from the perspective of system integration, coordinates the relationship between heat, engine, and the entire vehicle, and uses comprehensive methods to control and optimize heat transfer. It can automatically adjust the cooling intensity according to driving conditions and environmental conditions to ensure that the cooled object works within the optimal temperature range, thereby optimizing the environmental performance and energy-saving effect of the entire vehicle, while improving the safety and driving comfort of the vehicle operation.



Energy storage thermal management system is a system that converts electrical energy into thermal energy and efficiently stores and manages it. Its core task is to effectively control and manage thermal energy during the energy storage process, ensuring that the battery remains within a reasonable temperature range under various operating conditions.

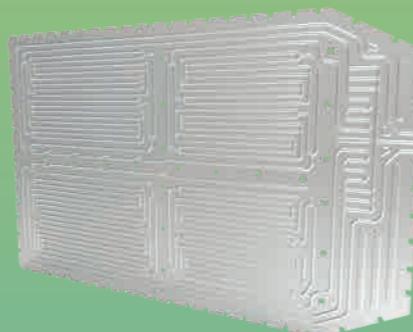


CHAPTER

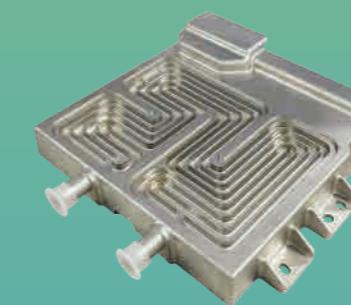
Thermal Management System Products



Energy Storage Liquid Cooling Plate



Power Battery Liquid Cooling Plate



Battery Cooling Plate& Energy Storage Cooling Plate

Cooling Plate is mainly used in battery packs for new energy vehicles and energy storage systems. It uses internal circulating liquid to exchange heat with the power/energy storage battery so that it is always maintained in a suitable operating temperature range, thus extending the battery life and work efficiency.

- Uniform temperature design to improve the battery life
- Provides liquid cooling for direct cooling system solutions
- Low flow resistance design, reduces the energy consumption of the liquid cooling system
- Uniform temperatures and current ensures the temperature stability of battery powered modules under various conditions
- Large footprint reduces the amount of additional connection ports needed and lowers the risk of leakage in the system
- High strength and corrosion resistant materials improve product life, and reduce the wall thickness and weight of products

Domain Control Cooling Plate

Vehicle domain controller will generate excess heat during operation, and as the function integration becomes higher and higher, the power consumption and heat generation will gradually increase, so effective active cooling is required. The domain control Cooler can be used for the cooling of the vehicle domain controller, and the cooling medium is provided through the liquid cooling circuit inside the vehicle to absorb the heat of the vehicle domain controller to ensure the reliable and efficient operation of the system.

PTC Coolant Water Heater

PTC Coolant Water Heater is mainly used in pure electric, hybrid and fuel cell vehicles. Through PTC heating chip, the cooling water is heated to improve the performance of the battery module of electric vehicles, provide warm air for the whole vehicle cab air conditioning of new energy vehicles, and cold start heating for the hydrogen fuel cell module. Its overall structure is composed of radiator (including PTC heating package), main control panel, high voltage connector, low voltage connector and upper shell, etc., which can ensure the safe and stable operation of the vehicle PTC water heater, and the power change will not cause interference to the body system due to the sudden increase and decrease.

Thermal Management System Products



350V 5KW



600V/800V 7KW



600V/800V 10KW-15KW



600V/800V 24KW

- The control and heating body are integrated, and the system takes up little space.
- The power control adopts PWM stepless adjustment, and the system has strong applicability.
- It has built-in voltage, current, and temperature acquisition, overvoltage, overcurrent, and overtemperature protection, and functional safety ASIL-A, making it safer.



Hydrogen fuel cell vehicle



Electric vehicle



Hybrid electric vehicle



Vehicle air conditioning system

CHAPTER

CHAPTER

Thermal Management System Products



High Voltage Integrated Air Heater



High Voltage Split Air Heater

PTC Air Heater

The PTC air heater is a positive temperature coefficient heater which consists of specialized heating discs built from advanced ceramic materials. In fuel cell, electric, and hybrid vehicle air conditioning systems, the PTC air heater replaces a traditional fuel vehicle heater core and is installed in the HVAC assembly. The air heater is powered and controlled by the vehicle. The function of the air heater is to blow warm air through the air ducts to heat the cabin and defrost or defog windows.

Features of high voltage integrated air heater:

- Integrated control and heating body, the system takes up little space;
- The power control adopts PWM stepless adjustment for higher comfort;
- It has built-in voltage, current, and temperature collection, as well as overvoltage, overcurrent, and overtemperature protection, making it safer.

Features of high voltage split air heater:

- The control and heating bodies are separated, making the installation arrangement more flexible;
- The development cycle is short and the manufacturing process is simple;
- PWM control and I/O control are optional.

Thermal Management System Products

Automotive Battery Management System

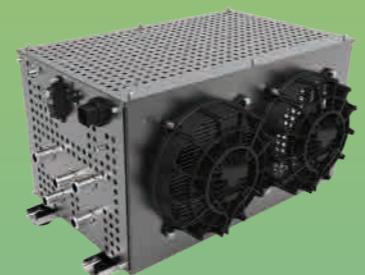
Automotive Battery Management System is one of the important components of the thermal management system of new energy vehicles. It is used to meet the continuous cooling and heating needs of the battery pack, allowing the lithium battery pack to work in a suitable temperature range, extending the battery life and improving battery safety. Automotive Thermal Management System is mainly composed of a compressor, ECU, PTC heater, fan, water pump, condenser, plate heat exchanger, expansion valve, pipeline, etc. It can be customized according to customer needs with different dimensions and cooling/heating power range of 3KW-15KW.



11kW



3kW 5kW



7kW



9kW

Application Scenarios



Construction Machinery



Agricultural Machinery



Commercial Vehicles



Electric Vehicles

Technical Parameters		
Basic Information	Applicable Fields	Construction Machinery, Agricultural Machinery, Truck, Autonomous Charging Vehicle
	Operating Temperature (°C)	-30 ~ +55
Unit Performance Parameters	Rated Cooling Capacity (kW)	3~11kW@(water inlet 40°C&15L/min, ambient temperature 40°C)
	Rated Heating Capacity (kW)	3~15kW@(inlet water -20°C&15L/min)
Electrical Information	Noise Level dB(A)	73~85dB@40°C
	IPProtection Rating	IP55(High-pressure component with IP67 rating)
冷媒系	High voltage range (V)	DC300-900V
Refrigerant System	Low voltage range (V)	9V-32V
	communication method	CAN2.0
	Baud rate (Kbps)	250/500
	Control precision	±1°C
Water System	Refrigerant	R134a
	Compressor type	Horizontal scroll
	Condenser type	Microchannel heat exchanger
	vaporator type	Plate heat exchanger
	fan type	Axial flow fan
	Refrigeration system sealing	Refrigerant leakage < 20g/year
	Coolant	0% Ethylene glycol
	Type of pipe fitting	Quick connector
	Pump head	50LPM@200KPa

CHAPTER

Thermal Management System Products

CHAPTER

Thermal Management System Products

Energy Storage Battery Management System

Energy Storage Battery Management System is mainly used in outdoor energy storage, industrial and commercial energy storage, container energy storage and other scenarios to meet the continuous cooling and heating needs of the battery pack, so that the lithium battery pack can work in a suitable temperature range, extend the battery life and improve battery safety. Energy Storage Thermal Management System is mainly composed of a compressor, ECU, PTC heater, fan, water pump, condenser, plate heat exchanger, expansion valve, pipeline, etc. KUS's current main product series include vertical 5kW, 8kW, and horizontal 5kW.



Horizontal 5kW



Vertical 5kW



Vertical 8kW

Application Scenarios



Outdoor Energy Storage



Industrial And Commercial Energy Storage Cabinet



Container Energy Storage

Technical Parameters		
Application Scenarios	Applicable Fields	Commercial and Industrial Energy Storage Cabinet
	Installation Method	Plug-in frame
	Operating Temperature Range (°C)	-30~+55
Unit Performance Parameters	Nominal Cooling Capacity (kW)	5~8kW@W18/L45
	Electric Heating Capacity (kW)	2
	Noise Level dB(A)	73~75
	Protection Rating	IP55
	Corrosion Resistance Rating	C3
	Equipment Lifespan (years)	10
	Input Voltage Range(V,Hz)	220V±15%, 50/60±3
Electrical Information	Communication Method	RS485.0
	Display Screen	
	Control Accuracy	±1°C
	Refrigerant	R134a
Refrigerant System	Type of compressor	AC frequency conversion
	Type of condenser	Microchannel heat exchanger
	Type of evaporator	Plate heat exchanger
	Type of fan	(Electronically Commutated) centrifugal fan
	Refrigeration system sealing	Refrigerant leak rate < 10g/year
Water System	Chilled water	50% Ethylene glycol
	Pipe diameter	NW22
	Pipe type	Quick connector
	Waterflowrate (L/min)	45@100KPa

Thermal Management Integrated Module

Thermal management integrated module mainly uses the heat exchange between the coolant and the refrigerant through the heat exchanger to adjust the temperature of the motor control, battery pack, and passenger compartment. Thermal Management Integrated Module can achieve multiple working modes and temperature control methods for multiple scenarios, ensuring efficient use of heat and improving energy efficiency during vehicle operation.

CHAPTER

Thermal Management System Products



Multi-way Valve

Multi-way Valve is an intelligent electric proportional control valve that adopts a valve integrated drive controller. According to the stack temperature requirements, the two inlet coolants from different temperature pipelines can be mixed in appropriate proportions through the valve core to actively control the coolant temperature at the valve outlet, thereby controlling the temperature of the fuel cell so that the fuel cell can work within a suitable temperature range. It has the characteristics of fast response speed, intelligent temperature control, and long service life.



Hydrogen Filter

Hydrogen filter is composed of double sleeve joint, filter element, bottom cover, main body and other components, according to the system requirements to select different specifications of the filter element to filter the system particulate matter, to ensure the cleanliness of hydrogen in the system, and reduce the harm of dust and particles to the fuel cell. The products have high filtration efficiency and stable quality, and can be used in the field of fuel cell systems for passenger cars and commercial vehicles.



CHAPTER

Thermal Management System Products



Motor & Battery Pack Coolant Water Pipe: Motor & Battery pack coolant water pipe is used for the thermal management system of hybrid vehicle or electric vehicle, carrying the channel for conveying automotive coolant. Through the flow of coolant on the pipeline, the engine is provided with temperature rise or temperature drop, so that the battery pack can quickly warm up in the cold environment. At the same time, it also takes away the waste heat and provides the circulation function of the cooling system.

Lightweight

Compared with metal pipes and rubber hoses, the weight is reduced

Efficient Production

Straight tube extrusion, thermoplastic molding, quick-fit coupling

Good Performance

Good mechanical properties, chemical resistance and hydrolysis resistance

Cost Advantage

Competitive system tooling costs, as well as raw material costs

Energy Storage System Cooling Water Pipe

The energy storage system cooling water pipe provides a liquid cooling channel for the energy storage system (industrial and commercial energy storage, data center, etc.), transports the cooling liquid through the cooling water pipe and quickly transfers heat to the battery pack and data center server to balance system performance.

Thermal Management System Products



Pipe Connector

Pipe Connectors are parts used to connect pipelines. They have the characteristics of convenient installation, superior performance, and long service life. They can be widely used in automotive fuel systems, SCR systems, power systems, cooling systems, and air-conditioning systems.



Oil Dipstick Pipe

The function of the oil dipstick is to visually measure the oil capacity in the engine oil pan and display the oil level in the form of a scale. The main function of the oil dipstick tube is to provide installation space for the oil dipstick to ensure reliable installation of the oil dipstick.



CHAPTER

Thermal Management System Products



AdBlue/Fuel Filling Pipe

The AdBlue/fuel filling pipe is used for vehicle AdBlue tanks and fuel tanks to transmit fluids (AdBlue or fuel), extend the position of the filling port of the AdBlue tank or fuel tank to a convenient place for filling, and have a ventilation function during filling.



AdBlue Heating Pipe

The AdBlue heating pipe is used for transmission and heating AdBlue in diesel vehicles. It has the characteristics of good process performance, good electric safety performance and strong barrier performance.



Engine Intake/Return Oil Pipe

Engine intake/return oil pipe are used in the automotive fuel system to transfer fuel from the tank to the engine to provide power to the vehicle; Products have good extreme temperature resistance, aging resistance, corrosion resistance, fuel penetration resistance and so on.

CHAPTER

Wiring Harness & Connectors

High Voltage Wiring Harness Assembly

The high-voltage wire harness is a key component for transmitting high-voltage electric energy in new energy vehicles. It connects the power battery, drive motor, vehicle charger (OBC), DC/DC converter, high-voltage distribution box, and electric remote control of the electric vehicle. PTC and other high-voltage components. Can provide high-voltage wire harness assemblies packaged and supplied according to customer customized connector requirements.

Product Features

- Current up to 750A @25°C
- Voltage class up to 1000V
- Wire adaptation range 2.5mm² - 150mm²
- Meet 360°EMI
- IP67 (assembled) - IP2X (unassembled)



Low Voltage Wiring Harness Assembly

Product Features

- Up to 200+ loops
- Waterproof IP67 IP69X
- Oil-proof
- Engine, gearbox piercing parts
- Vibration resistance

Powertrain Wire Harness



Gearbox Cylinder Line

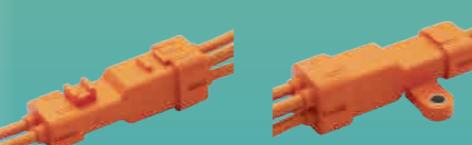
CHAPTER

Wiring Harness & Connectors

High Voltage Connector

The KHVM series metal high-voltage connector is a connector specially designed for high-voltage current transmission and is usually used to evaluate power systems, rail transit and other fields.

- Nominal Current MAX: 60A-500A
- Nominal Voltage MAX: 1000V
- Pos Number: 2
- Cable Size(mm²) : 2.5-95
- Sheilding: Optional
- HVIL: Optional
- IP Class(mated): IP68
- Contact Type: PIN JACK



Product Features

- Nominal Current MAX: KHV-32A-350A,FTP-150A-350A
- Nominal Voltage MAX: 1000V
- Pos Number: KHV-2-3, FTP-1,2,3
- Cable Size(mm²): KHV-2.5-95, FTP-25-70
- Sheilding: Optional
- HVIL: KHV-Optional, FTP-None
- IP Class(mated): IP68/IP6K9K
- Contact Type: KHV- PIN JACK or Flat&Slot, FTP-Screw fasten

High Speed Connector

High-speed connectors can be used to transmit high-speed data, power and signals. Its transmission rate is faster than ordinary connectors, ensuring the stability and reliability of data transmission. KUS provides high-speed connector customization services to meet the different needs of customers.

CHAPTER

Wiring Harness & Connectors



Fakra
Fakra Connectors



Mini Fakra
Mini Fakra Connectors



Mini I/O
Mini I/O Connectors

Product characteristics

Fakra & Mini Fakra

- 50Ω system, up to 6GHz
- Meets SAE/USCAR-17 Rev 5
- CPA/ Non-waterproof/waterproof
- Secondary lock

MinI/O

- Miniaturized only 1/4 RJ45
- The gap between male and female is very small
- High reliability
- Support 10Mbps to 10Gbps data rate

Applications



Industrial Signal Communication

Ethernet Interface

Robot

Self-Driving

CHAPTER

Controller Products



VCU

Vehicle Control Unit (VCU) collects signals from vehicle components such as the accelerator pedal, brake pedal, gear position, and sensors. After judgment and processing, it controls the actions of the controllers of the lower components to achieve normal driving of the car.

- The controller computing power reaches 1800 DMIPS;
- Resource interface type configuration is flexible. Through interface configuration, it covers the vehicle control needs of more than 70% of current pure electric and hybrid models;
- It has network security functions and meets the network information security requirements of the OEM;
- With multi-core architecture, multi-core microcontrollers can realize the integration of TMS, automotive air conditioning and other controller needs;
- Real-time monitoring of sensor status; real-time diagnosis of system faults and other functions;
- Flexible and convenient bottom software and application layer integration method;

model	NVD30	NVS20	NVM10
power supply	12V/24V	12V/24V	12V/24V
Static power consumption	≤1mA	≤1mA	≤1mA
Functional safety level	ASIL B	ASIL B	ASIL D
Protection level	IP67	IP67	IP67
Flash	2M	1.5M	8M/6M
Soft bottom	UDS, Bootloader, NM, information security	UDS, Bootloader	UDS, Bootloader, NM, information security
Communication type	CAN, LIN	CAN	CAN, LIN, Ethernet
Input interface	Digital/analog input, PWM input	Digital/analog input, PWM input	Digital/analog input, PWM input
Output interface	PWM output, high side driver, bottom side driver	PWM output, high side driver, bottom side driver	PWM output, high side driver, bottom side driver

FCU

FCU (Fuel cell control Unit) is the assembly controller of the fuel cell system. It is responsible for controlling the temperature, humidity, hydrogen circulation, power management, etc. of the fuel cell. It is the control of the powertrain of new energy vehicles, effectively managing and coordinating various parameters and controlling execution components.

- Resource interface type configuration is flexible. Through interface configuration, various fuel cell control requirements can be met;
- It has network security functions and meets the network information security requirements of the OEM;
- With multi-core architecture, multi-core microcontroller can realize multi-task parallel operation; real-time monitoring of sensor status; real-time diagnosis of system faults and other functions. The product integrates a six-axis sensor.
- It solves the current problem that the vehicle does not have safety algorithm policy protection when parking, powering on, driving and collision.
- Flexible and convenient bottom software and application layer integration method

CHAPTER

Controller Products



model	NFJ10	NFJ20
power supply	12V/24V	12V/24V
Static power consumption	≤1mA	≤1mA
Functional safety level	ASIL D	ASIL D
Protection level	IP67	IP67
Flash	4M	4M
Soft bottom	UDS, Bootloader, NM, information security	UDS, Bootloader, NM, information security
Communication type	CAN	CAN, LIN, Ethernet
Input interface	Digital/analog input, PWM input	Digital/analog input, PWM input
Output interface	PWM output, high side driver, bottom side driver	PWM output, high side driver, bottom side driver

CHAPTER

Controller Products



ZCU

ZCU (Zone Control Unit) adopts a high-performance multi-core lock-step structure platform and can be configured as a centralized central processing unit or a regional control unit. It plays the role of the vehicle control center and can integrate central gateway, power domain control, body and comfort control, air conditioning and thermal management control, chassis control and other functions as needed.

- The controller computing power reaches 3600 DMIPS;
- It has a multi-core architecture and flexible configuration of resource interface types. Through interface configuration, both central control and regional control can be implemented;
- It has network security functions and meets the network information security requirements of the OEM;
- Central control can realize central gateway, power domain control, body and comfort control, thermal management control, chassis control and other functions
- Area control can realize the function of controlling the front and rear areas and the left and right areas of the vehicle.
- Flexible and convenient bottom software and application layer integration method

model	NDM10	model	NDM10
power supply	12V/24V	Soft bottom	UDS, Bootloader, NM, information security
Static power consumption	≤1mA	Communication type	CAN, LIN, PSI5, Ethernet
Functional safety level	ASIL D	Input interface	Digital/analog input, PWM input
Protection level	IP67	Output interface	PWM output, high side driver, bottom side driver
Flash	16M	other	Six-axis gyroscope

GCU

GCU (Gateway Control Unit) is the central hub of the in-vehicle network. It can help different types of networks in the vehicle to safely and reliably transmit and process data across functional domains (power chassis domain, body control domain, infotainment domain, driving assistance domain, etc.).

- Functions such as digital and analog inputs, high and low side driver outputs have been added to facilitate the expansion and use of the gateway;
- It has network security functions and meets the network information security requirements of the OEM;
- Real-time monitoring of sensor status; real-time diagnosis of system faults and other functions;
- Network management function and specific frame network message wake-up function
- It is more flexible and convenient to use the host computer interface for message configuration, and quickly generate variable interfaces that support MBD development to facilitate secondary development by customers;
- Flexible and convenient bottom software and application layer integration method

CHAPTER

Controller Products



CHAPTER

Controller Products



TMS

Thermal Management System (TMS) has functions such as air conditioning management, heat pump management, battery thermal management, waste heat recovery management, fault diagnosis, predictive thermal management, sensor collection, network communication, etc., and can cover mainstream topologies on the market and control/drive requirements. Through precise control and comprehensive optimization and matching of each circuit, energy efficiency optimization and experience improvement can be brought to customers.

- Resource interface type configuration is flexible. The PWM output interface has output configuration control and fault feedback functions. Through the interface, it can meet different usage requirements;
- It has network security functions and meets the network information security requirements of the OEM;
- Real-time monitoring of sensor status; real-time diagnosis of system faults and other functions;
- Flexible and convenient bottom software and application layer integration method

model	NGM10	model	NGM10
power supply	12V/24V	Soft bottom	UDS, Bootloader, NM, information security
Static power consumption	≤1mA	Communication type	CAN, LIN
Functional safety level	ASIL B	Input interface	Digital/analog input, PWM input
Protection level	IP65	Output interface	PWM output, high side driver, bottom side driver
Flash	1M	other	Hardwire wake-up

model	NTM10	model	NTM10
power supply	12V/24V	Soft bottom	UDS, Bootloader, NM, information security
Static power consumption	≤1mA	Communication type	CAN, LIN
Functional safety level	ASIL B	Input interface	Digital/analog input, PWM input
Protection level	IP67	Output interface	PWM output, high side driver, bottom side driver
Flash	2M	other	Hardwire wake-up

CVM

CVM can monitor the working status of the hydrogen fuel cell in real time. The equipment for detecting and monitoring the working status of the fuel cell can obtain the voltage data and parameters such as the impedance of each cell of the fuel cell in real time.

Product Features

- Directly monitor and estimate the health status of each battery cell through the size and phase of impedance;
- Can detect the total circuit voltage and current;
- Detect the AC impedance of each channel of the fuel cell and comprehensively monitor the fuel cell system;
- Real-time monitoring of sensor status;
- Real-time diagnosis of system failures, etc.

CHAPTER

Controller Products

**CHAPTER**

Gauge Series

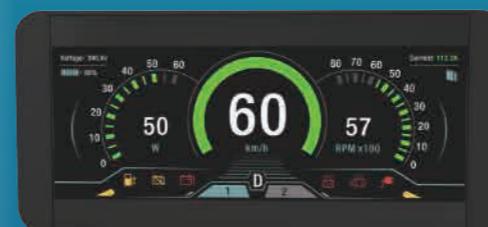
**KMB-70GE**

KMB-70GE Multi-Function Instrument

KMB-70GE is a square multi-function LCD instrument specially developed for pure electric outboard motor applications. The instrument integrates battery power, speed, rotation speed, rudder angle, balance and other functions, is compatible with NMEA2000 and J1939 protocols, and supports multiple style switching.

- Two display styles for option, compatible with single or dual engine
- Simple operation, support Chinese/English language switching
- Compatible with NMEA2000 and J1939 protocols
- Self-defined alarm to ensure safe driving
- Background brightness adjustment: 10%-100%
- Protection level: IP67

model	NCW10	model	NCW10
power supply	12V/24V	Number of voltage measurement channels	234
Static power consumption	≤1mA	Voltage range	-5~+5V, can be collected in 1/2/3/4 pieces
Functional safety level	ASIL B	Number of impedance measurement channels	234
Protection level	IP67	Impedance range	0.01mΩ~20mΩ
Flash	2M	Phase	0~180°
Soft bottom	UDS, Bootloader, NM, information security	Impedance frequency	1Hz~1kHz
Communication type	CAN	other	Total circuit voltage and current measurement, insulation detection, etc.

**KMB-1025GE**

KMB-1025GE Multi-Function Meter

KMB-1025GE is a multifunctional instrument with monitoring function specially developed for pure electric outboard motor applications. The screen can intuitively display parameters such as battery, motor, speed, etc. in digital and graphical form, as well as various alarm icons. The instrument uses a capacitive touch screen of the same size, which is convenient for users to call up video monitoring and set parameters.

- Various styles can be switched arbitrarily
- SOC+FreeRTOS+MCU, high-speed and reliable operation
- OBD firmware upgrade, reduce maintenance cost
- Universal USB interface for SOC firmware upgrade
- Compatible with J1939 and NMEA 2000 protocols
- Cameras can be switched freely, and support FHD, HD, D1 resolution

CHAPTER

Gauge Series

KMG Multifunctional LCD instrument

- Compatible with NMEA2000 and J1939 protocols
- Protection level: IP67
- Fast running speed, low power consumption, high main frequency



KMB Integrated Data Monitor

KMB is an advanced TFT controller with data integration. The TFT instrument panel is compatible with NMEA2000 and J1939 protocols. KMB can display information obtained from the network in real time, including engine output signal, fluid level and speed. KUS can provide customized specifications to meet different customer needs.



Sea Q Series

- Applicable to truck, bus, engineering machinery, generator set, etc fields.
- Bezel material: Stainless steel bezel.
- With reverse polarity connection protection and double layers anti-fog lens.
- Connecting way: 6.3*0.8mm terminal strip, can be connected quickly.
- Light: Red and yellow for your option.
- Display accuracy: <3°
- Protection grade: Surface IP67

