SONGZ

SONGZ AUTOMOBILE AIR CONDITIONING CO., LTD.

Public listed Stock Code：002454

CONTENT

SONGZ

01

Company Profile

Overview

SONGZ AUTOMOBILE AIR CONDITIONING CO.,LTD. herein referred as SONGZ, was founded in 1998. It is a joint-stock company specializing in research, development, manufacturing, service and sales of vehicle air-conditioning systems.

It was successfully listed on the Shenzhen Stock Exchange in 2010. Stock abbreviation: SONGZ, stock code: 002454. This makes SONGZ the first listed company in the Chinese transport vehicle air conditioning industry.

SONGZ devotes itself to automobile air conditioning systems as a premium brand and will become a world-class supplier with state-of-the-art technique and in-house processing in the near future.

SONGZ UPDATE IN 2023 FISCAL YEAR:

653,091,916+	(US$-Sales Revenue in 2023)
2,592,922+	(Passenger Car AC-Output in 2023)
26,323+	(Bus AC-Output in 2023,include 17,598 Sets Electric Bus AC)
6,000+	(Truck Refrigeration Units-Output in 2023)
585+	(Rail Transit AC-Output in 2023)
3,000+	(Headcounts)
17+	(Manufacturing Bases)

Manufacturing Base

With 17 manufacturing base, SONGZ has formed a layout centered on Shanghai, China and based on Finland, Indonesia and China in Anhui, Chongqing, Wuhan, Liuzhou, Chengdu, Beijing, Xiamen, Suzhou and other cities. The total number of employees have been more than 3,000.

SONGZ Finland Lumikko

Founded in 1970, 3464㎡
Headcounts: 27

SONGZ Indonesia

Founded in 2016,6500㎡
Headcounts:35

SONGZ Shanghai (Headquarters)
SONGZ Shanghai (Bus AC)
SONGZ Shanghai (Railway AC)
SONGZ Beijing
SONGZ Suzhou
SONGZ Hefei
SONGZ Wuhan
SONGZ Xiamen
SONGZ Liuzhou
SONGZ Chongqing
SONGZ Chengdu
SONGZ Dalian (Grand Ocean)
SONGZ Foshan (Grand Ocean)
SONGZ Nanchang
SONGZ Nanjing Boshilang

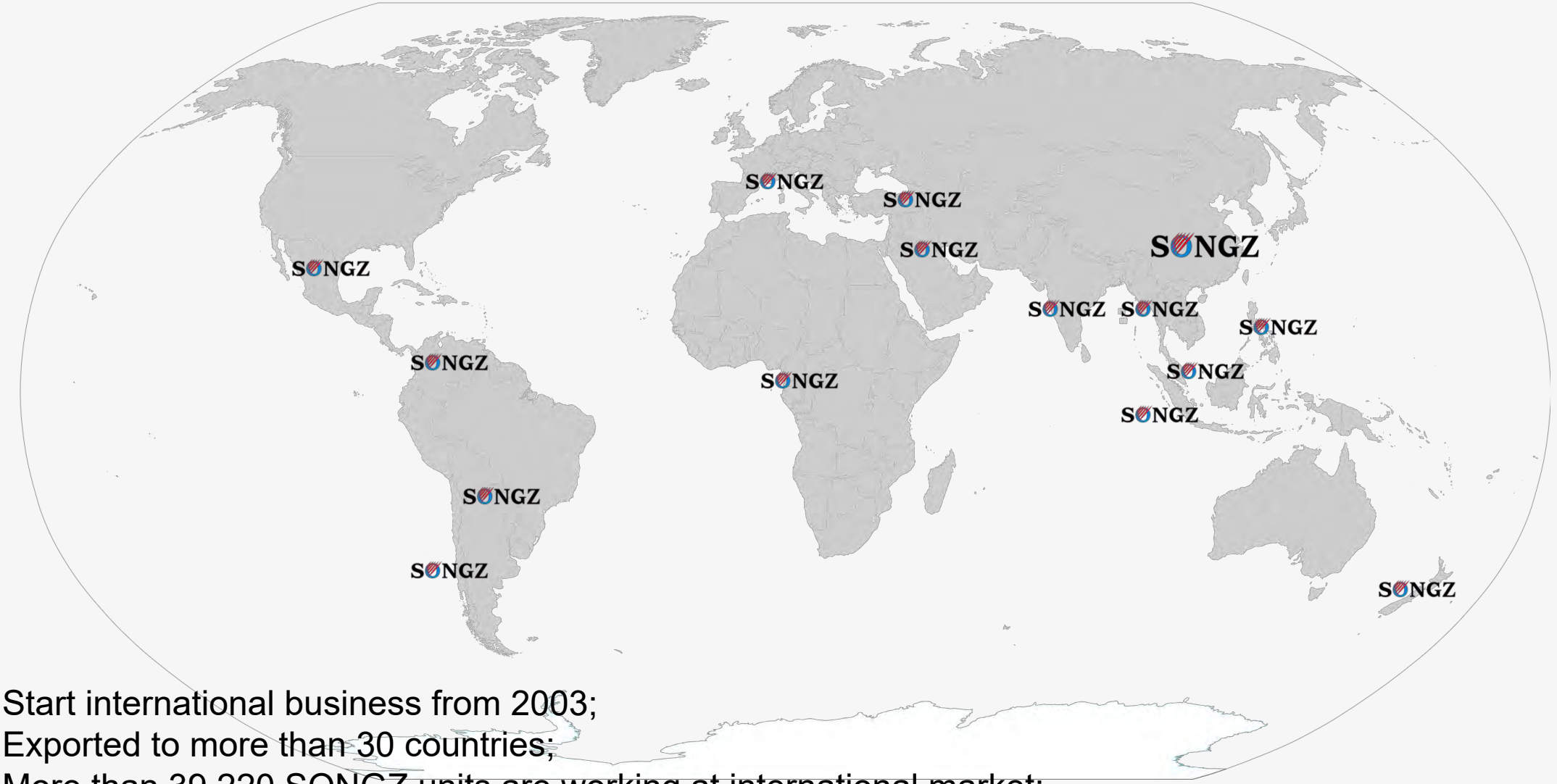
Sales Performance

SONGZ

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Electric Bus AC	3,250	5,302	7,835	9,807	11,356	15,407	26,443	28,499	28,737	32,228	19,487	21,628	21,901	17,598

SONGZ E-Bus AC started in 2008. The market application volume is 194,416 units.
Battery thermal management system market application volume is 36,103 units (Independent) .
More than 39,220 SONGZ units are working at international market. The volume in Europe is more than 3,489 units.

Global Market



Start international business from 2003;
Exported to more than 30 countries;
More than 39,220 SONGZ units are working at international market;
SONGZ is supplying to 30+ bus manufacturers abroad;

Exhibition

2006

Bus Exhibition in Thailand, November

2010

Frankfurt Auto Parts Exhibition in Sao Paulo, Brazil, May

2011

Bus Exhibition in Jakarta, March

Auto Parts Exhibition in Las Vegas, November

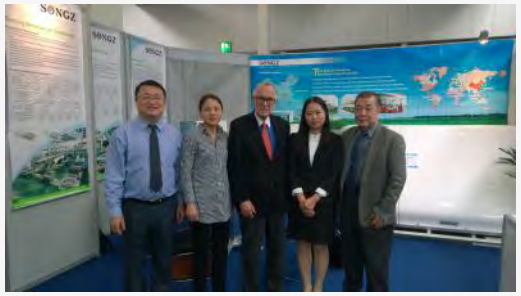
2013

Busworld in Kortrijk, Belgium, October

2014

Busworld in Istanbul, Türkiye, April

IAA in Germany, September



2015

Busworld in Mumbai, India, April

Exhibition

SONGZ

Daoxie Bus Exhibition in Jakarta, March

Busworld in Istanbul, Türkiye, April

IAA in Germany, September

Busworld in Medellin, Colombia, December

2016

2015

Public Transport Exhibition in Sao Paulo, Brazil, September

Busworld in Kortrijk, Belgium, October

2017

Busworld in Kortrijk, Belgium, October

2018

Busworld in Istanbul, Türkiye, April

IAA in Germany, September

Exhibition

SONGZ

Busworld in Brussels, Belgium, October

2019

2020

Busworld in Istanbul, Türkiye, March

IAA in Germany, September

2022

2023

Bus Exhibition in Brazil, October

To be updated

2024

Busworld in Brussels, Belgium, October

R & D

SONGZ test centre was certificated by CNAS as China national lab which covers an area of above 3000 ㎡, the total investment amount of above 30 million USD.

Climatic Wind Tunnel is under the condition of indoor to simulate the vehicle running of the natural environment, including temperature, humidity, solar simulation, flow, etc.

Climatic Wind Tunnel

Bus AC Performance Test Room

Noise Test Room

Railway AC Performance Test Room

CAR AC Performance Test Room

EV Thermal Management Test

Quality Assurance

SONGZ strictly enforces TS16949 and focuses on customer satisfaction, total involvement and quality management. SONGZ now has 527 test tools analyzes test tools according to MSA so as to satisfy the requirements. Besides, SONGZ ensures homogeneity of products through review, optimization and training of suppliers and carries our third-party test of key parts yearly to ensure the air conditioning systems with safe and reliable performance. Three-in-one automatic safety test equipment is adopted so as to satisfy the requirements on product safety. Complete inspection is carried out to ensure product safety and reliability. Key process are analyzed using SPC so as to ensure stability and offer analytical data to quality improvement.

Certificate

Standard: IATF 16949:2016 (1st edition: 2016-10-01)

Certificate Regstr. No.: 01 111 116632/01

IATF Certificate No.: 0491345

Certificate Holder: Songz Automobile Air Conditioning Co., Ltd. No. 4999 (Excluding Workshop 2), Huaning Road, Xinzhuang Industrial Park, Minhang District, 201108 Shanghai, P. R. China

IATF USI: C2X3NM

With remote location(s) according to annex

Scope: Design and Manufacturing of Thermal Management System

Proof has been furnished by means of an audit that the requirements of IATF 16949:2016 are met.

Validity: The certificate is valid from 2023-12-11 until 2026-12-10.

Release date: 2023-12-13

TÜV Rheinland Cert GmbH, Am Grauen Stein, 51105 Köln, Germany - NRW

2-IAQ-QMC 01/03

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www.tuv.com

TÜVRheinland® Precisely Right.

IATF16949:2016

Ministerstvo dopravy České republiky
Ministry of Transport of the Czech Republic
Nábřeží L.Svobody 12, 110 15, Praha 1, Czech Republic

OSVĚDČENÍ o: / COMMUNICATION concerning:

E8

UDĚLENÍ HOMOLOGACE / APPROVAL GRANTED
ROZŠÍŘENÍ HOMOLOGACE / APPROVAL EXTENDED
ODEJMUTÍ HOMOLOGACE / APPROVAL WITHDRAWN
UKONČENÍ VÝROBY / PRODUCTION DEFINITELY DISCONTINUED

typu elektrické / elektronické montážní podskupiny
z hlediska elektromagnetické kompatibility podle Předpisu č. 10.
of a type of electrical / electronic sub-assembly
with regard to electromagnetic compatibility, pursuant to Regulation No. 10.

Homologace č. / Approval No.: 10 R – 05 8360 Rozšíření č. / Extension No.: N/A

1. Značka (obchodní název výrobce) / Make (trade name of manufacturer): SONGZ
2. Typ a obchodní označení / Type and general commercial description: SZG
2.1 Varianty / Variants: SZG-IX-D, SZG-XZ-D, SZGZ-I-D, SZGZ-IF-D, SZGZ-II-D, SZGZ-IIF-D, SZGK-I-D, ZGK-I-D-H, SZGK-IF-D, SZGK-IF-D-H, SZGK-II-D, SZGK-II-D-H, SZGK-IIF-D, SZGK-IIF-D-H, SZGK-III-D, SZGK-III-D-H
3. Způsob znečení typu, je-li uvedeno na vozidle / dílu / samostatném technickém celku / Means of type identification, if marked on the vehicle / component / separate technical unit: Písmeny a číslicemi / By letters and digits
3.1 Umístění označení / Location of that marking: Na rámu vstupu vzduchu / On the Air intake frame
4. Kategorie vozidla / Category of vehicle: – / N/A
5. Název a adresa výrobce / Manufacturer's name and address: Songz Automobile Air Conditioning Co., Ltd. No. 4999, Huaning Road, Xingzhuang Industrial park, Minhang District, Shanghai 201108, P.R. China
6. Pro díly a samostat. technické celky, umístění a způsob připevnění homologační značky EHK / In the case of components and separate technical units, location and method of affixing of the ECE approval mark: Na rámu vstupu vzduchu / On the Air intake frame

European Conformity

IRIS Certification

afaq

CERTIFICATE

awarded to

Shanghai Songz Railway Air Conditioning Co., Ltd.
Area A, Block 2, No.4999, Huaning Road, Xinzhuang District, Shanghai, P.R.C.
201108, Shanghai
China

AFNOR Certification

confirms, as an IRIS Certification™ approved certification body, that the Management System of the above organization has been assessed and found to be in accordance with the

IRIS Certification™ rules:2017
and based on
ISO/TS 22163:2017

for the activities of Design and Development and Manufacturing and Maintenance
for the scope of certification: 14 (Heating, Ventilating and Air Conditioning (HVAC))
FOR THE PRODUCTS OF AIR CONDITIONING FOR RAILWAY INDUSTRY

Certificate valid from: 15/06/2018 Certificate valid until: 29/10/2021*

Current date: 23/07/2018
Certificate-Register-No: 2015/68392.3

* Providing that the subsequent surveillance audits are successful before the validity date of the previous audit.
This certificate is issued on an audit conducted by EAQA/TesCERT (China) Ltd., (CNCA-RF-2002-13 granted by CNCA).
Certification body address: 11 rue Francis de Pressensé, 93571 LA PLAINE SAINT-DENIS CEDEX, France

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IRIS Certificate

ilac-MRA CNAS

China National Accreditation Service for Conformity Assessment

LABORATORY ACCREDITATION CERTIFICATE

(Registration No. CNAS L9057)

SONGZ Automobile Air Conditioning Co., Ltd. Test Center

(Legal Entity: SONGZ Automobile Air Conditioning Co., Ltd.)

No.2059, Zhuanxing Road, Xinzhuang South Industrial Park,
Minhang District, Shanghai, China

is accredited in accordance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence to undertake the service described in the schedule attached to this certificate.

The scope of accreditation is detailed in the attached schedule bearing the same registration number as above. The schedule forms an integral part of this certificate.

Effective Date: 2022-04-22
Expiry Date: 2028-04-21

Signed on behalf of China National Accreditation Service for Conformity Assessment

China National Accreditation Service for Conformity Assessment (CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is a signatory of the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement (ILAC-MRA) and the Asia Pacific Accreditation Cooperation Mutual Recognition Arrangement (APAC MRA).
The validity of the certificate can be checked on CNAS website at http://www.cnas.org.cn/english/findaccreditedbody/index.shtml.

CNAS Lab Accreditation Certificate

SONGZ

02

Introduction of E-Bus AC

E-Bus AC Series

SONGZ

ESA Series

6-7.5m

LMD Series

8-18m

ESD Series

8-18m

Double-decker Series

12m

ESA Series

SONGZ

Suitable for 6-7.5m electric bus

ESA-IB
ESA-IIB

ESA Series

SONGZ

ESA Technical Parameters			
Unit Model		ESA-IB	ESA-IIB
Cooling Capacity		16 kW	19 kW
Heating Capacity		13 kW	15kW
Air Flow Volume (Zero Pressure)	Condenser (Fan Quantity)	5400（3） m3/h	5400（3） m3/h
	Evaporator (Blower Quantity)	3200（4） m3/h	3200（4） m3/h
Roof Unit Dimension(mm)		2700(L)×1600(W) ×240(H)	2700(L)×1600(W) ×240(H)

Application Case

6m

WANXIANG 200 units E-Bus at Shanghai (China)

LMD Series

SONGZ

Suitable for 8-18m electric bus

LMD-III

LMD-IV

LMD-V

LMD-VI

LMD Series

SONGZ

LMD Technical Parameters

Unit Model		LMD-III	LMD-IV	LMD-V	LMD-VI
Cooling Capacity		24 kW	26 kW	32 kW	37 kW
Heating Capacity		18 kW	22 kW	26 kW	28 kW
Air Flow Volume (Zero Pressure)	Condenser (Fan Quantity)	6000（3） m3/h	8000（4） m3/h	8000（4） m3/h	10000（5） m3/h
	Evaporator (Blower Quantity)	3600（4） m3/h	3600（4） m3/h	5400（6） m3/h	6000（6） m3/h
Roof Unit Dimension(mm)		2700(L)×1900(W) ×262(H)	3300(L)×1900(W) ×262(H)	3300(L)×1900(W) ×262(H)	3300(L)×1900(W) ×262(H)

Application Case

8m

KARSAN The first autonom E-Bus at Bursa (Turkey)

Application Case

SONGZ

12m

2200 sets AAB E-Bus at Bangkok (Thailand)

2023

Application Case

SONGZ

12m

E bus at Summit G20

2023 (Bali Indonesia)

G20 Summit cooled by SONGZ Electric Bus AC

Application Case

12m

BOZANKAYA 20 units E-Bus at Izmir (Turkey)

2016

Application Case

December 30, 2015

SONGZ Electric electric air conditioning

Shenzhen bus delivery

Application Case

SONGZ

12m

BYD 100 units E-Bus at Santiago (Chile)

Application Case

SONGZ

12m

CAIO & ELETRA 50 E-Bus

official delivery to São Paulo

(Brazil)

Application Case

12m

VINFAST 365 units E-Bus at Hanoi/HCMC (Vietnam)

Double-Decker E-Bus AC

SONGZ

Suitable for 12m Double-Decker E-Bus

JLE-III

SONGZ Double-Decker Electric Bus Air Conditioner has always been in a leading position in China, providing this air conditioner for BYD, Yutong and Foton all the year round, accounting for more than 80% of the market.

Double-Decker Electric Bus AC

SONGZ

JLE Technical Parameters		
Model:		JLE-IIIB-T
Cooling Capacity	Standard	48 kW
Heating Capacity	Standard	42 kW
Air Flow Volume (Zero Pressure)	Condenser (Fan Quantity)	16000 m3/h (8)
	Evaporator (Blower Quantity)	6000+6000 m3 /h (6+6)
Unit	Dimension	750(L)×2000(W) ×1129(H) +800(L)×1800(W) ×377(H)
	Weight	450 kg

Application Case

SONGZ

12m
ANKAI Double-Decker E-Bus at Beijing (China)

SONGZ has provided more than 500 sets of Double-Decker E-Bus AC to BYD, YUTONG, FOTON, ANKAI etc.

Application Case

SONGZ

European Union

European Union basic info	
Population	445 million
Area	4 million km2
Road mileage	5.3 million km

Country	Diesel engine bus AC		
	8m	12m	18m
Romania	103	15	20
France	14	2	0
Luxembourg	13	2	0
Germany	7	2	0
US	1	1	0
Norway	1	1	0
Greece	1	1	0
Total	**140**	**24**	**20**

Estimated E-Bus AC market share: > 30%

*Based on date of 2023

Country	E-BUS AC	BTMS	Total
UK	0	747	747
Greece	14	0	14
Holland	263	696	959
Finland	179	179	358
Norway	137	78	215
Sweden	169	143	312
Italy	100	91	180
Denmark	76	89	165
Spain	67	119	186
Romania	29	29	58
Germany	122	83	205
Hungary	12	51	63
Portugal	5	5	10
France	13	27	40
Belgium	2	1	3
Luxembourg	0	2	2
Isreal	0	82	82
Total	**1188**	**2422**	**3610**

Application Case

SONGZ

Country	E-BUS AC	BTMS	Total
USA	292	98	390
Total	**292**	**98**	**390**

*Based on date of 2023

Application Case

Latin America basic info	
Population	669 million
Area	19 million km2
Road mileage	3 million km

Country	Diesel engine bus AC	E-BUS AC	BTMS	Total
Brazil	10	674	545	1229
Chile	0	1071	400	1471
Ecuador	542	20	20	582
Mexico	682	0	98	780
Colombia	62	5	308	375
Barbados	0	10	0	10
Belize	0	14	0	14
Total	**1296**	**1794**	**1371**	**4461**

Estimated E-Bus AC market share: > 70%

*Based on date of 2023

Application Case

Country	Diesel engine bus AC	E-BUS AC	BTMS	Total
Thailand	4055	1752	0	5807
Indonesia	1575	50	0	1625
Malaysia	1122	2	0	1124
Philipine	1100	0	0	1100
Vienam	50	365	0	415
Myanmar	1800	0	0	1800
Singapore	100	43	0	143
Laos	0	0	0	0
Cambodia	0	0	0	0
Brunei	0	0	0	0
Dubai	0	2	17	19
Korea	0	429	0	429
Japan	0	250	0	250
Hong Kong	125	42	0	42
Israel	0	1	0	1
Total	**9927**	**2936**	**17**	**12880**

Estimated E-Bus AC market share: > 50%

*Based on date of 2023

Application Case

SONGZ

Country	E-BUS AC	BTMS	Total
Australia	4	17	21
New Zealand	2	2	4
Total	**6**	**19**	**25**

*Based on date of 2023

Application Case

CHINA

CHINA basic info	
Population	1.45 billion
Area	9.6 million km2
Road mileage	5.2 million km

Country	Diesel engine bus AC	E-BUS AC
China	451,671	224,107

Estimated E-Bus AC market share: > 40%

*Based on date of 2023

Application Case

SONGZ

SONGZ Electric bus A/C projects in Overseas Market

●20 Electric Bus (Ecuador)

●100 Electric Bus at Satiago (Chile)

● Bozankaya 20 Electric Bus at Izmir (Turkey)

● Karsn Electric Bus (Turkey)

● CAIO & ELETRA 50 E-Bus official delivery to São Paulo (Brazil)

No. 1 sales quantity in the world

249,478

Market population in the World Market

*Based on date of 2023

Application Case

SONGZ

SONGZ Diesel engine bus A/C projects in Overseas Market

● Ankai (JAC) 3,000 Bus
（Saudi Arabia ）

● SONGZ A/C in Ecuador

● SONGZ A/C in Russia

● Foton 1,000 Bus
（Myanmar ）

492,623

Market population in the World Market

Key OEM customer: BYD, Foton, Higer, Yutong, King Long, Golden Dragon, Daewoo, Ankai, Sunwin, Sunlong, Ya Xing, Zhongtong

*Based on date of 2023

SONGZ

03

Ultra-Low Temperature Heat Pump

The most highest COP heating solution for electric bus

*** Ultra low temperature heat pump not avalble for some models due to structure issues, for details, contact our seles.**

E-Bus heating solutions compare

SONGZ

Heating solutions	Fuel heater	PTC heater	Ordinary Heat Pump	SONGZ Ultra-Low Temperature Heat Pump
Recommend	★	★	★★★	★★★★★
Advantages	Reliable, easy, Heating fast	Heating fast, low cost	Higher COP, low cost	Highest COP, wide usage temperature range
Disadvantages	Unfriendly to environment, highest cost for oil heater and heat exchanger	Highest power consumption, COP lower than 1, will reduce bus range greatly	Not working when temperature lower than -3 degree	cost higher, new technology, can work till -15 degree
COP (Coefficient of performance，W/W)				
2 ℃	Less than 1	0.93	1.9	2.32
-15 ℃	Less than 1	0.93	Not working	1.55

SONGZ Application

SONGZ

Detailed compare for power consumption and output

Ambient temperature	Power consumption (kw)		Heating capacity (kW)		COP (Coefficient of performance W/W)	
(℃)	Ordinary Heat Pump + PTC	SONGZ Ultra-Low Temperature Heat Pump	Ordinary Heat Pump + PTC	SONGZ Ultra-Low Temperature Heat Pump	Ordinary Heat Pump + PTC	SONGZ Ultra-Low Temperature Heat Pump
7	8.5	9.08	22	23.6	2.51	2.49
2	8.4	8.36	17.4	19.4	1.9	2.32
-7	17.2+	11.4	16+	20.2	0.93	1.78
-15	17.2+	10.7	16+	16.6	0.93	1.55

SONGZ Application

More than 2000 sets SONGZ ultra-low temperture heat pump air conditioner at Beijing Public transport company.
Sep, 2018

SONGZ

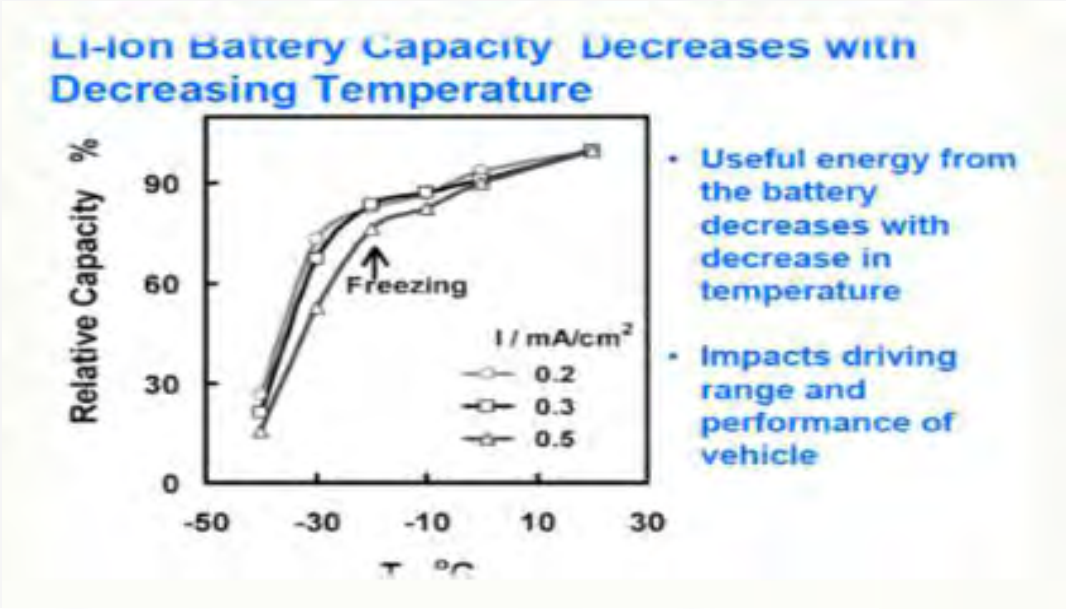
04

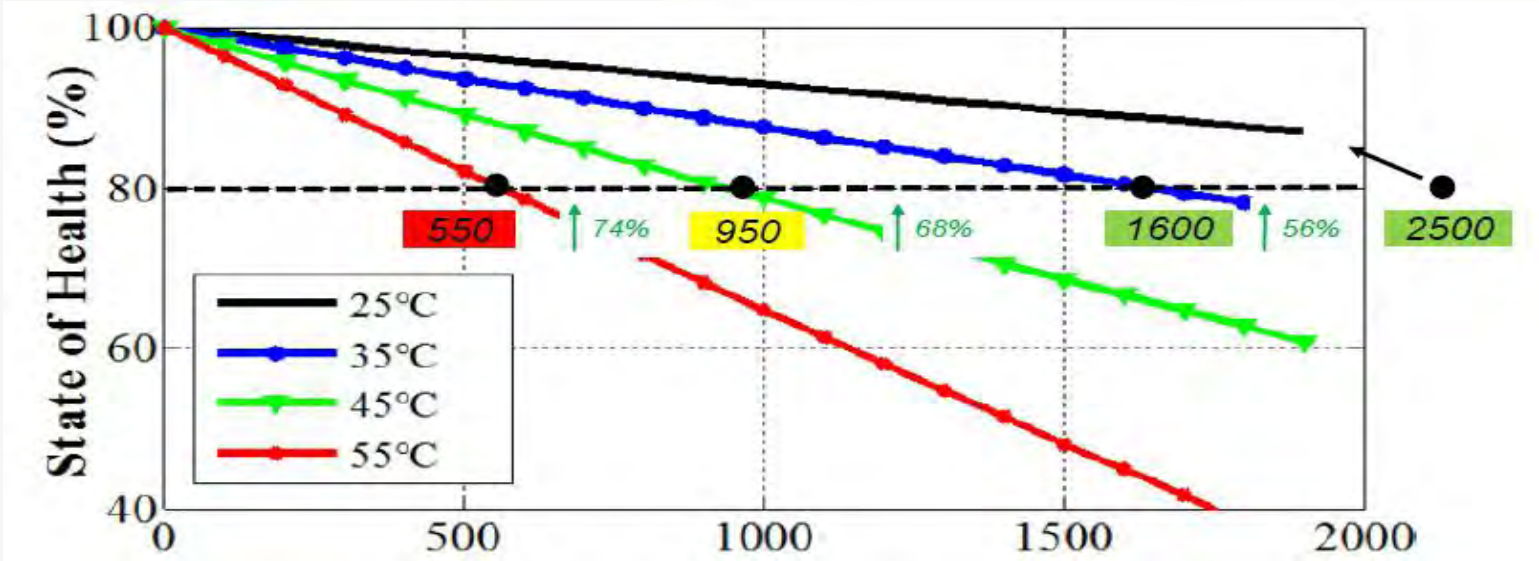
BTMS

SONGZ

Why SONGZ Produce BTMS?

Scientific research found the battery performance and life may work much better at enviroment temperature from 25~35 degrees.





BTMS

SONGZ

Why SONGZ Produce BTMS?

Pain points	Specific appears	Demands	Present situations	Development direction
Range anxiety	Range short （<300km) Charge time long(>3h)	Energy saving, low weight for E bus components	Power consumption of AC is above 25%of E bus. When winter time PTC heating may consume 40~50%	Energy saving, low weight design
Battery Safety	Battery heat high when charging and discharging. Fire may cause huge lose.	Battery Thermo Management required	40 E bus got burned at 2019. Only 25% E bus got BTMS equipped at 2019.	BMTS system
Price performance ratio	E bus cost much higher than normal because of Battery	Battery Thermo Management required	Battery life is not long enough. Replace cost is very high	BMTS system

Then SONGZ Start BTMS production from 2017

SONGZ

SONGZ BTMS solution A

Independent water coolant BTMS

Skirt mounted

Roof mounted

National patent

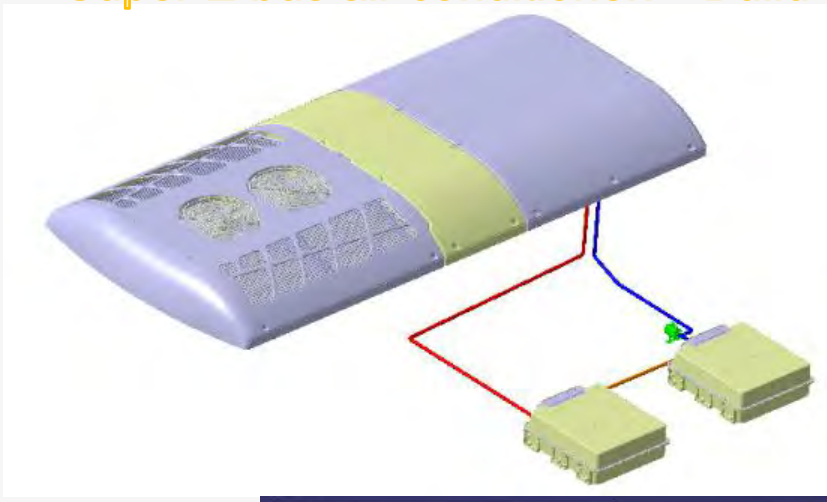
One endependent air conditioner system;
Cooling from air conditioner;
Heating from PTC;
Coolant is water;

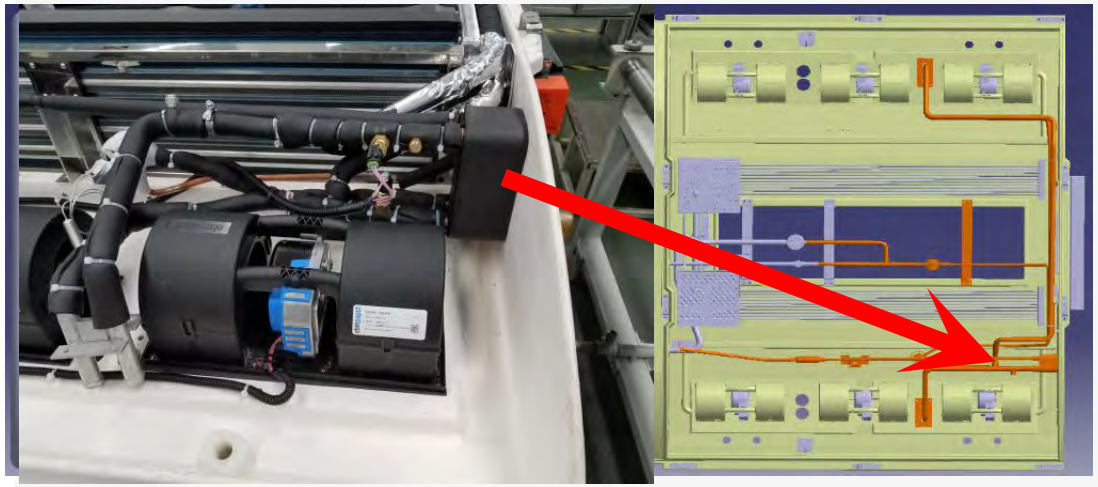
Advantages:
1. high efficiency;
2. Fast response;
3. Widely used;
4. Intelligent control;

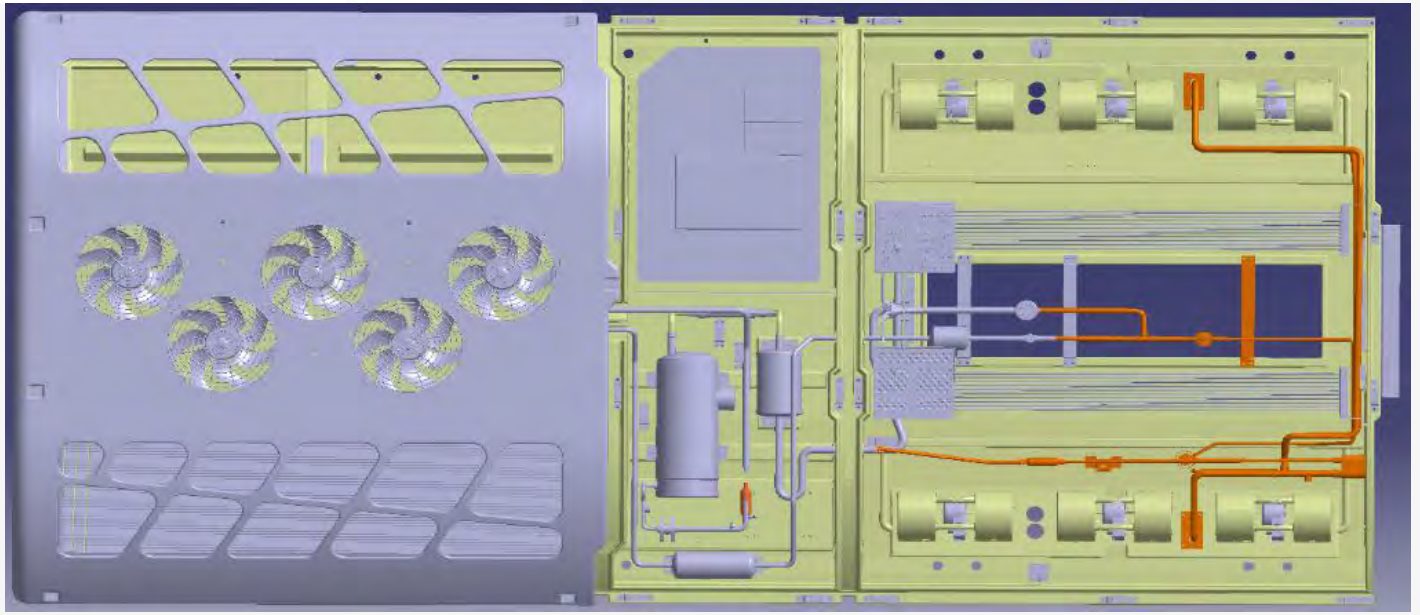
SONGZ

SONGZ BTMS solution B

Super E bus air conditioner: Build-in water coolant BTMS





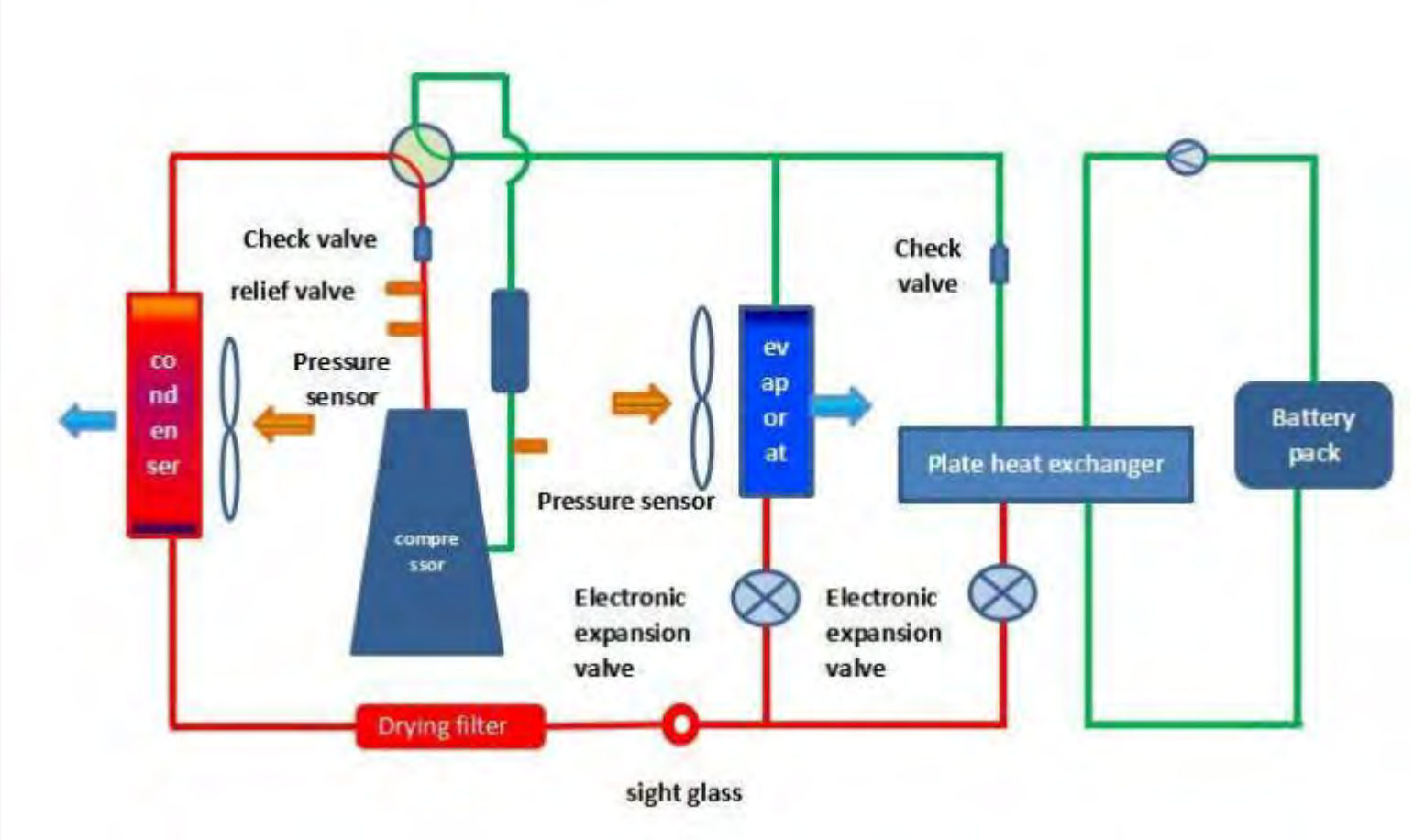


SONGZ

SONGZ BTMS solution B

Super E bus air conditioner: Build-in water coolant BTMS

- **System diagram**




实用新型专利证书

National patent

SONGZ

Independent BTMS & Build-in BTMS comparation:

No.	BTMS type	Advantages	Disadvantages
1	Build-in BTMS	Space saving;	Heating needs additional external PTC heater;
		Lighter weight ;	Cooling depend on AC cooling;
		More economy ;	\
		Easy repair & maintenance;	\
		More friendly to environment, Less material consumption;	\
2	Independent BTMS	Cooling independently;	More space needed;
		Integrated PTC heater can be built-in;	More expensive;
		\	More weight;

05

SONGZ technologies

Integrated Vehicle Thermo Control System

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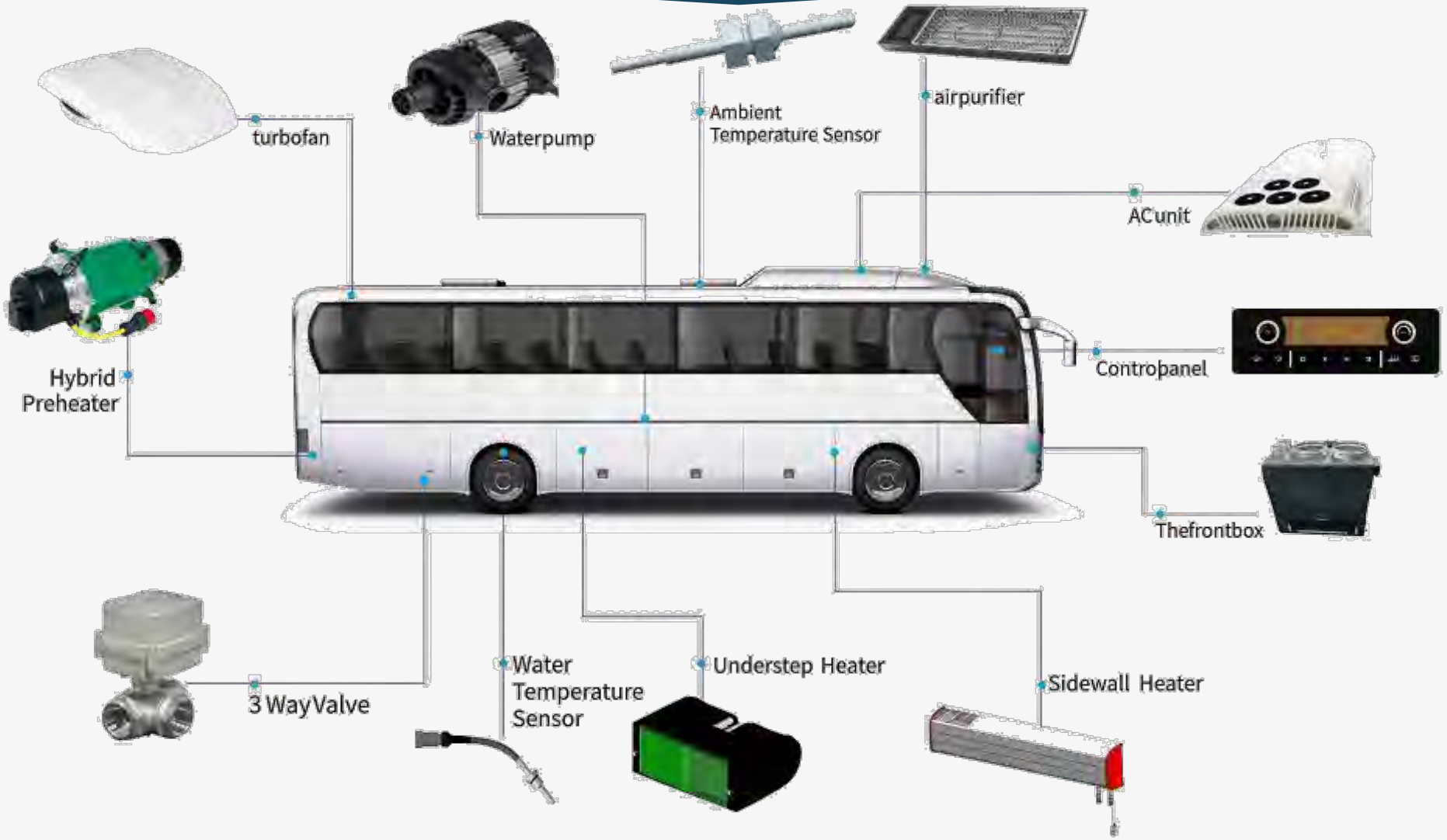
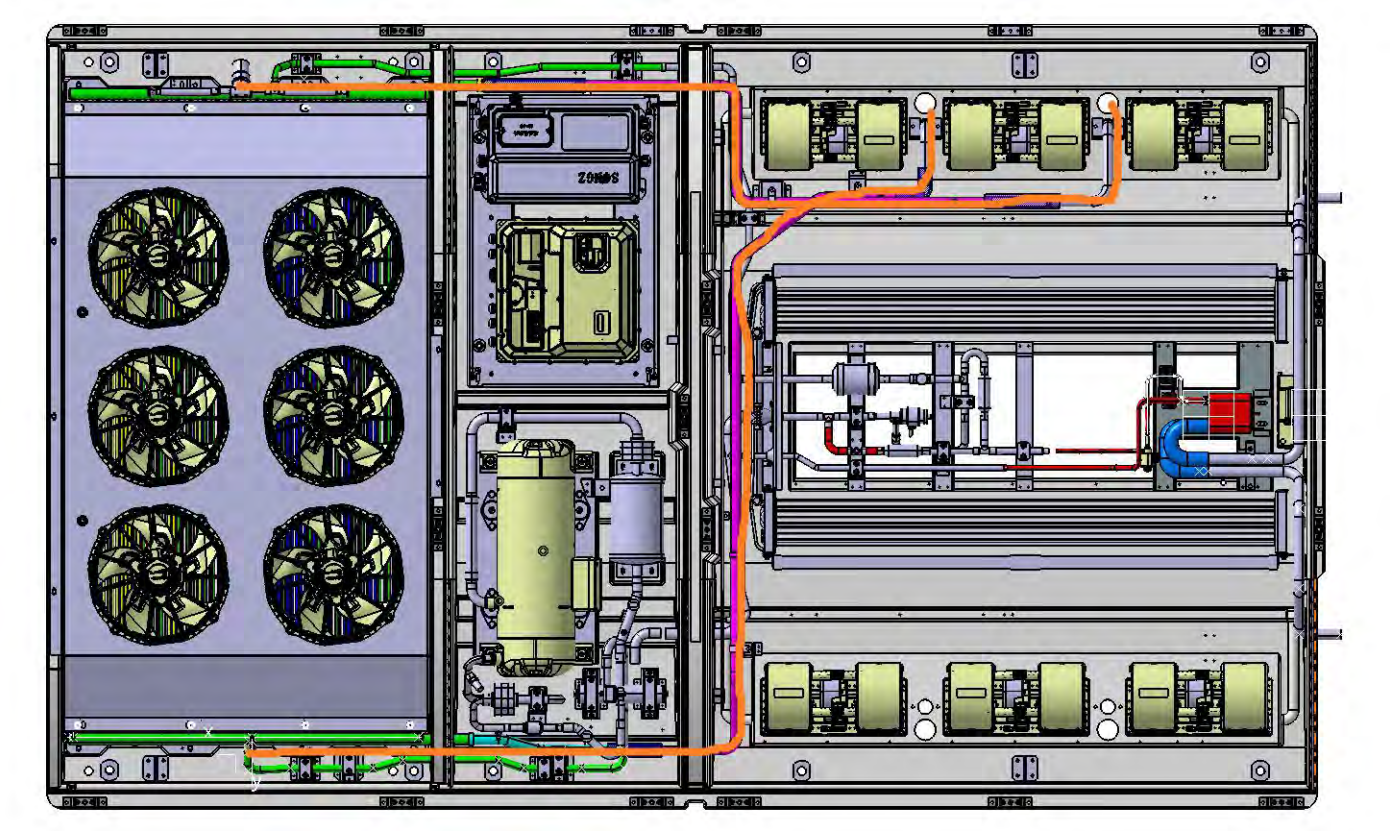


SONGZ self-developed integrated thermo control system is the most advanced and reliable vehicle thermo related components control system.

SONGZ EBTMS

At the end of 2023, SONGZ developed **SONGZ EBTMS (Electric Bus Thermal Management System) Ver 3.0:**

Integrated waste heat recovery system on the base of EBTMS Ver 2.0.

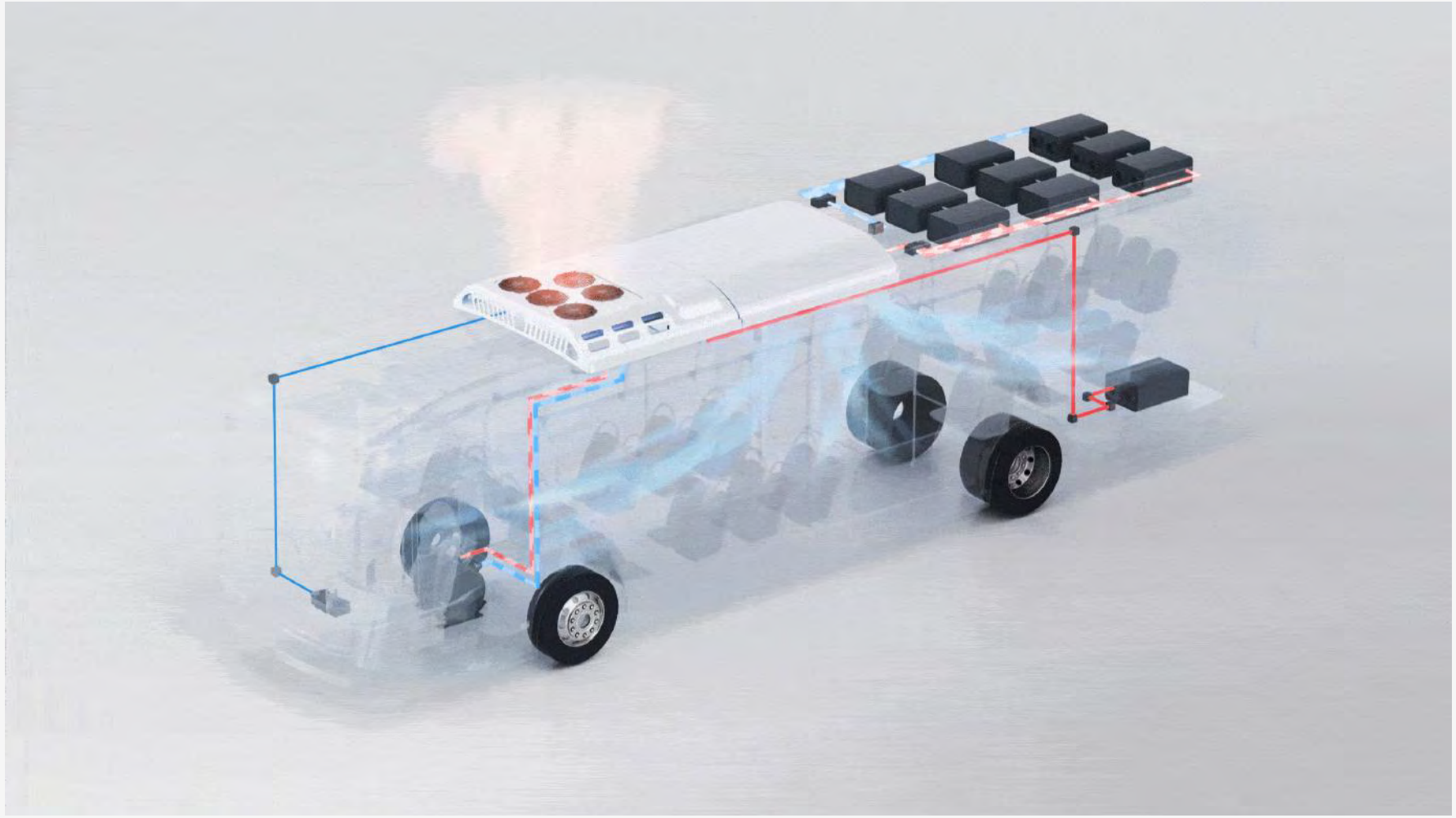


Schematic diagram: The red pipeline in the picture

The waste heat from driven motor electric control can be used to improve the heating efficiency of air conditioning and reduce the energy loss of heating.

SONGZ EBTMS

- SONGZ EBTMS Ver 3.0



●Schematic diagram (summer)

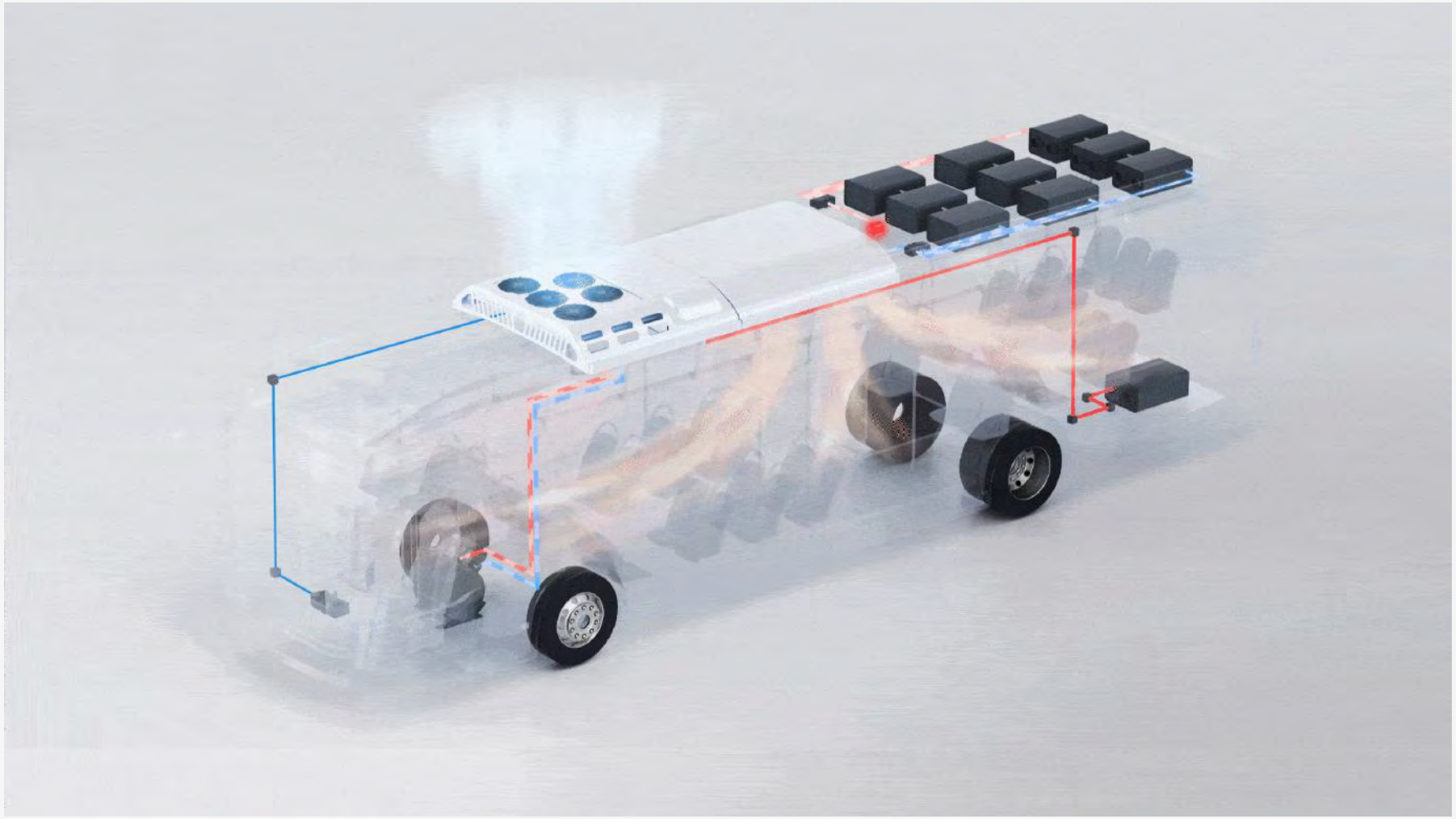
air conditioning cooling,

surplus cooling capacity dynamically allocated to batteries,

using the condenser to exhaust heat from driven motors electric motor control；

SONGZ EBTMS

- SONGZ EBTMS Ver 3.0



●Schematic diagram (winter)

air conditioning heat pump heating,

recovering the heat from the driven motor and electric motor control to improve the efficiency of heat pump heating;

SONGZ EBTMS

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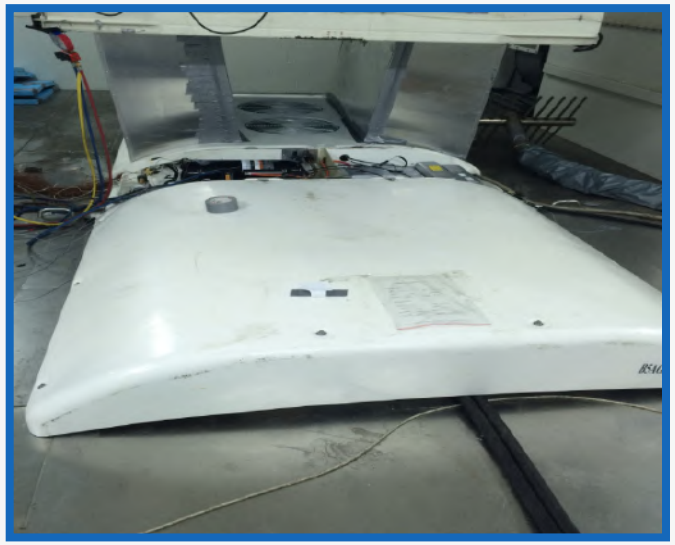
●SONGZ EBTMS Ver 3.0

In **2023**, with an ambient temperature of 5 ℃, When operating SONGZ EBTMS Ver 3.0 designed system:

Air conditioning heating capacity increased 9.5%, COP increased 10.3%

According to the results from bus plant, bus energy consumption reduced 17.8%.



SONGZ EBTMS

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●SONGZ EBTMS Ver 3.0 Energy saving rough compare

Mode	Solutions	Power consumption (Kw)	Output (Kw)	COP	Total Power Consumption (Kw)	Saved power Kwh/h	Saved power Kwh/day (Max)	Increased range in % (Max)
Cooling mode Summer time 30 degree	SONGZ EBTMS Ver 3.0	11.3	22	1.95	11.3	3.4	40.8	**13.6%**
	Ind. E-AC	10.6	24	2.26	14.7	\	\	\
	Ind. BTMS	3.5	8	2.29				
	Ind. Motor Control cooling	0.6	\	0				
Heating mode Winter time -7 degree	SONGZ EBTMS Ver 3.0	10.61	19.36	1.82	10.6	13.6	163.2	**54.4%**
	Ind. E-AC	17.2+	16+	0.93	24.2+	\	\	\
	Ind. BTMS	7+	6	0.93				
	Ind. Motor Control cooling	\	\	\				

***Testing conditions:**

12 meter E-bus, 8Kw BTMS; work 12 hours per day; equipped 300Kwh battery;

SONGZ EBTMS

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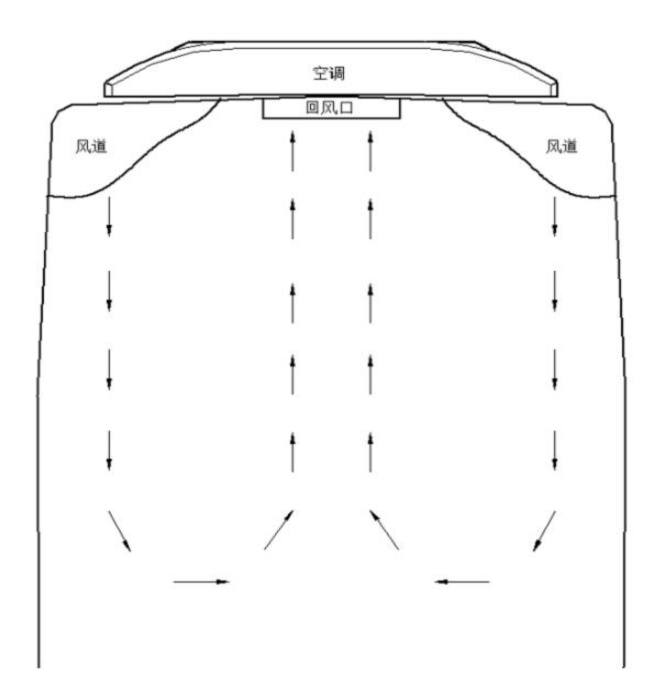
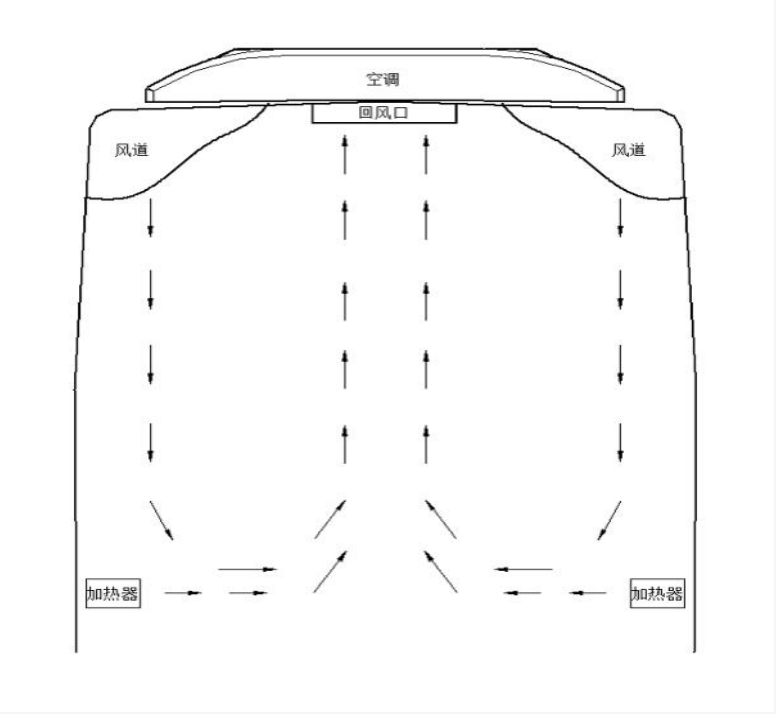
●SONGZ EBTMS & traditional thermal management solution compare;

No.	Bus Thermal solutions	Advantages	Disadvantages
1	SONGZ EBTMS	Space saving;	Heating needs additional external PTC heater;
		Lighter weight;	Cooling depend on AC cooling;
		More economic;	Control system & logic complex;
		Easy repair & maintenance;	
		More friendly to environment, Less material consumption;	
		Platform,modular design;	
		Longer range;	
2	Traditional bus thermal solution	Cooling and heating independently;	More space needed;
		Easy for trouble shooting;	More expensive;
			More weight;
			Less range;

SONGZ solution for bus heating

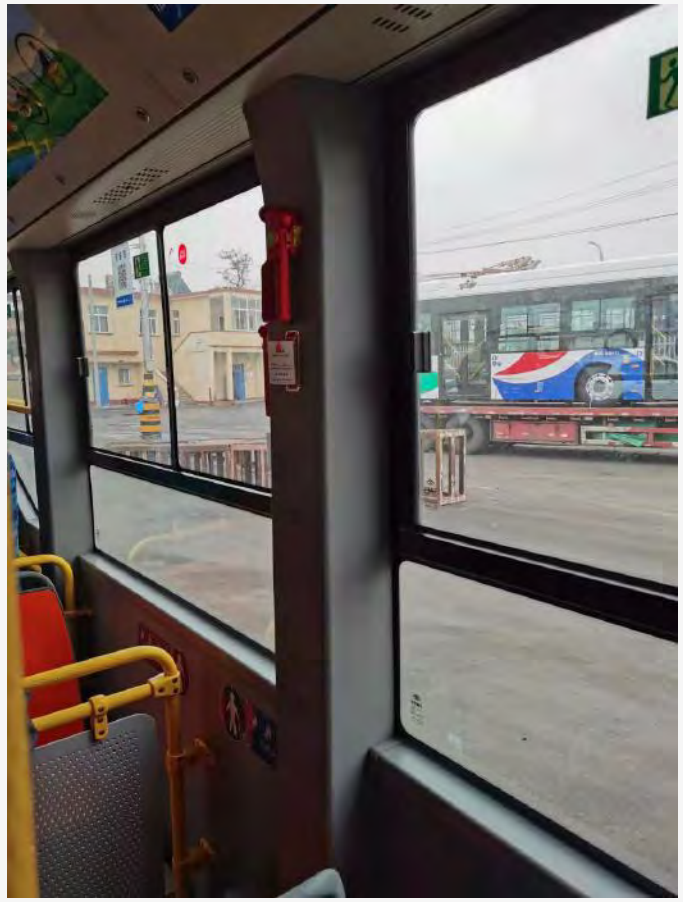


Most of bus use such air route for cooling and heating.
When heating, upper side warm but floor side still cold.



SONGZ Patent air route design which are perfectly resolve heating comfort and efficiency.

SONGZ solution for bus heating



SONGZ patent design, need bus manufacturer to add wind tunnel as picture shows.
SONGZ will control hot wind to floor wind tunnel as picture 3.

SONGZ snow melting design

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The snow melting action

0 minute

5 minutes

After 15 minutes

When Tambient = -15°C, Snow thickness 50 mm the normal heat pump AC cannot operate. SONGZ E-Bus AC with Ultra-Low Temperature Heat Pump, not only operate normally, but also automatic snow removing.

SONGZ

Thanks for your time!

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