



## **Technology Innovation Brand Excellence**

—— Rolling stock ventilation fan



Website

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**Ningbo Longwell Electric Technology CO, LTD**

## Benchmarking Foreign Fans

| LONGWELL Model     | Benchmarking Foreign Fan Models | Benchmarking Foreign Fan Manufacturers | Application Environment           |
|--------------------|---------------------------------|--|-----------------------------------|
| LWBE(RT)320-PT-01  | K3G280-AK54-21                  | EBM                                    | Traction and auxiliary converters |
| LWBE(RT)320-PT-02  | /                               | EBM                                    | Traction and auxiliary converters |
| LWBE(RT)320-PW-03  | GKHR315-CIW.080.5FA             | Rosenberg                              | Air conditioning exhaust unit     |
| LWBE(RT)320-PT-04  | GR31C-ZID.DC.1R(182208)         | ZIEHL-ABEGG                            | Traction and auxiliary converters |
| LWBE(RT)320-PT-05  | K3G280BD14N2                    | EBM                                    | Traction and auxiliary converters |
| LWBE(RT)280-NW-01  | RH25C-61K. BA. CR               | ZIEHL-ABEGG                            | Air conditioning exhaust unit     |
| LWBA(RT)400-NW-01  | 3EST112-648                     | Airscrew                               | Traction and auxiliary converters |
| LWBA(RT)355-PW-01  | 2CS7352-1RG81-OCK1              | SIEMENS                                | Traction and auxiliary converters |
| LWBA(RT)320-NW-06  | /                               | ZIEHL-ABEGG                            | Inverter cooling unit             |
| JLWBA(RT)355-PW-02 | 2CS7352-1RG11-3BH3              | SIEMENS                                | Traction and auxiliary converters |
| LWBA(RT)320-NW-08  | DKH_W315-F_098. 6FA             | Rosenberg                              | Air conditioning exhaust unit     |
| LWBE(RT)280-NW-02  | RLA 51-2528-2D-S-177422         | NICOTRA/Gebhardt                       | Locomotive filter cubicle         |

INNOVATION

BOUTIQUE

SAFETY

SERVICE

SHARING



# R&D CAPABILITIES

## SAFE AND RELIABLE, PRACTICAL AND INNOVATIVE

### HARDWARE DESIGN

- Analog Circuit
- Digital Circuit
- System Circuit

### SOFTWARE DESIGN

- Modular Design
- EN50128 / SIL2
- Object-oriented Development Language

### STRUCTURE DESIGN

- EN15085
- Strength Calculation
- Thermal Design Analysis
- Three-dimensional Simulation

### PROCESS DESIGN

- EMC Design
- Protection Class Design
- Vibration Resistance
- Wiring Process

The practical innovation is preferred, on the condition that the safety and reliability of the product are ensured. Tongye advocates to learn the mature and advanced technology and process from other technological areas, and apply them in the rail transit industry. Nevertheless, the innovation must be advanced, positive and valuable.

The R & D personnel of product development center account for about one third of the total number of Tongye. We have carried out extensive technical cooperation and exchanges with the internationally renowned enterprises, such as Siemens, Knorr, and so on. In addition, some R D personnel are sent abroad to have training and courses for many times, so that their international vision are cultivated.



## INVENTION PATENTS



## UTILITY MODEL PATENTS



## SOFTWARE COPYRIGHTS



# Production Controlling

## SOPHISTICATED TECHNOLOGY, SAFE PRODUCTION

Driven by the "craftsmen spirit", we maintain the "rigorous, focused, persistentmeticulous"attitude, and pay attention to the cultivation of versatile talents.

We also ensure the product consistency in production process through thesophisticated technology, continuous on-site improvement, optimized process,and flexible production.



## Process Control

Six main production processes: wiring assembly, components assembly, modules assembly, final assembly, commissioning aging and finished product inspection

Five special processes controls: crimping, soldering, riveting, spray painting and bonding

Four key processes : commissioning, aging, voltage-withstanding tests and routine tests

# Products And Application



LOCOMOTIVE PRODUCTS



URBAN RAIL PRODUCTS

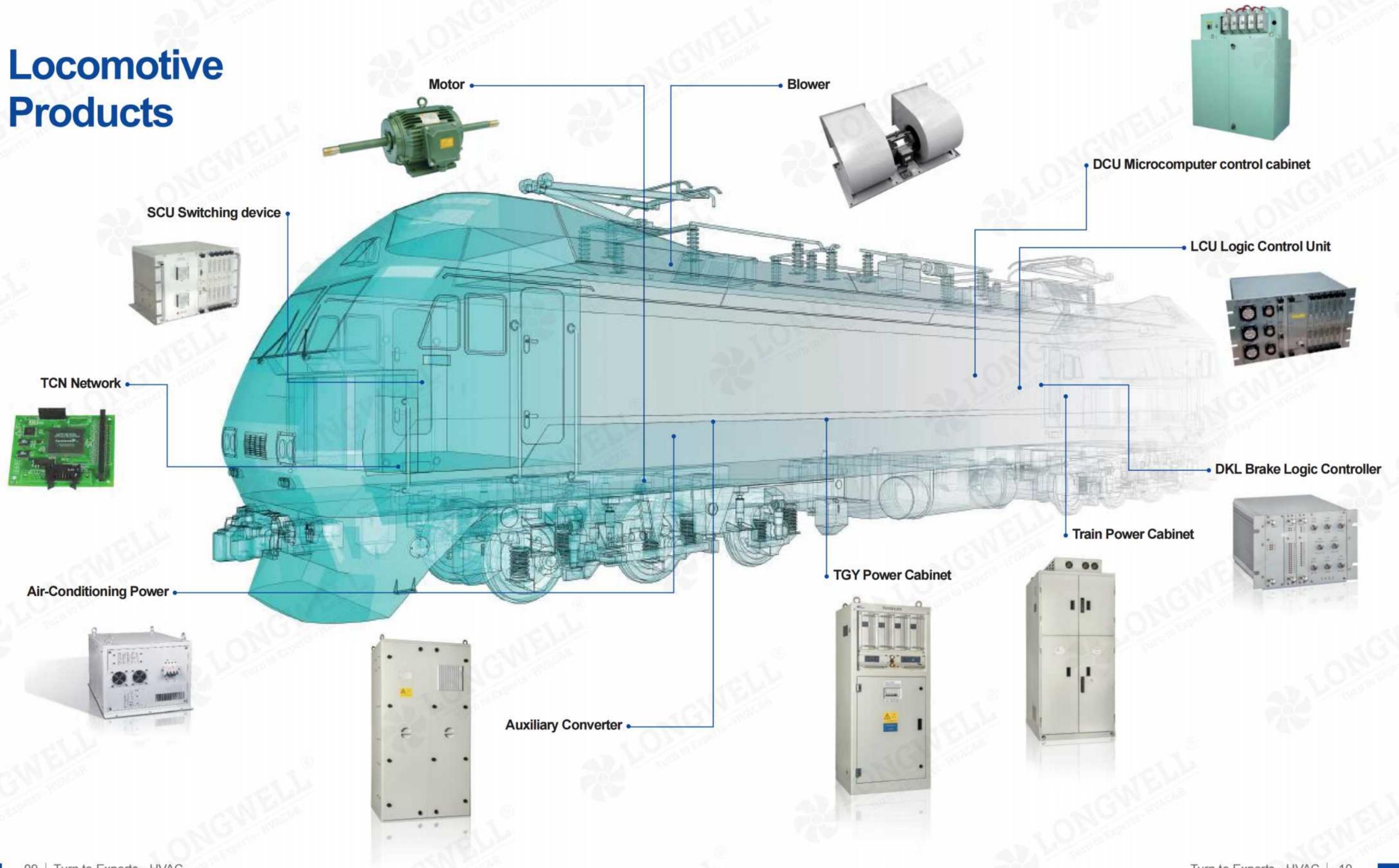


HIGH-SPEED RAIL PRODUCTS

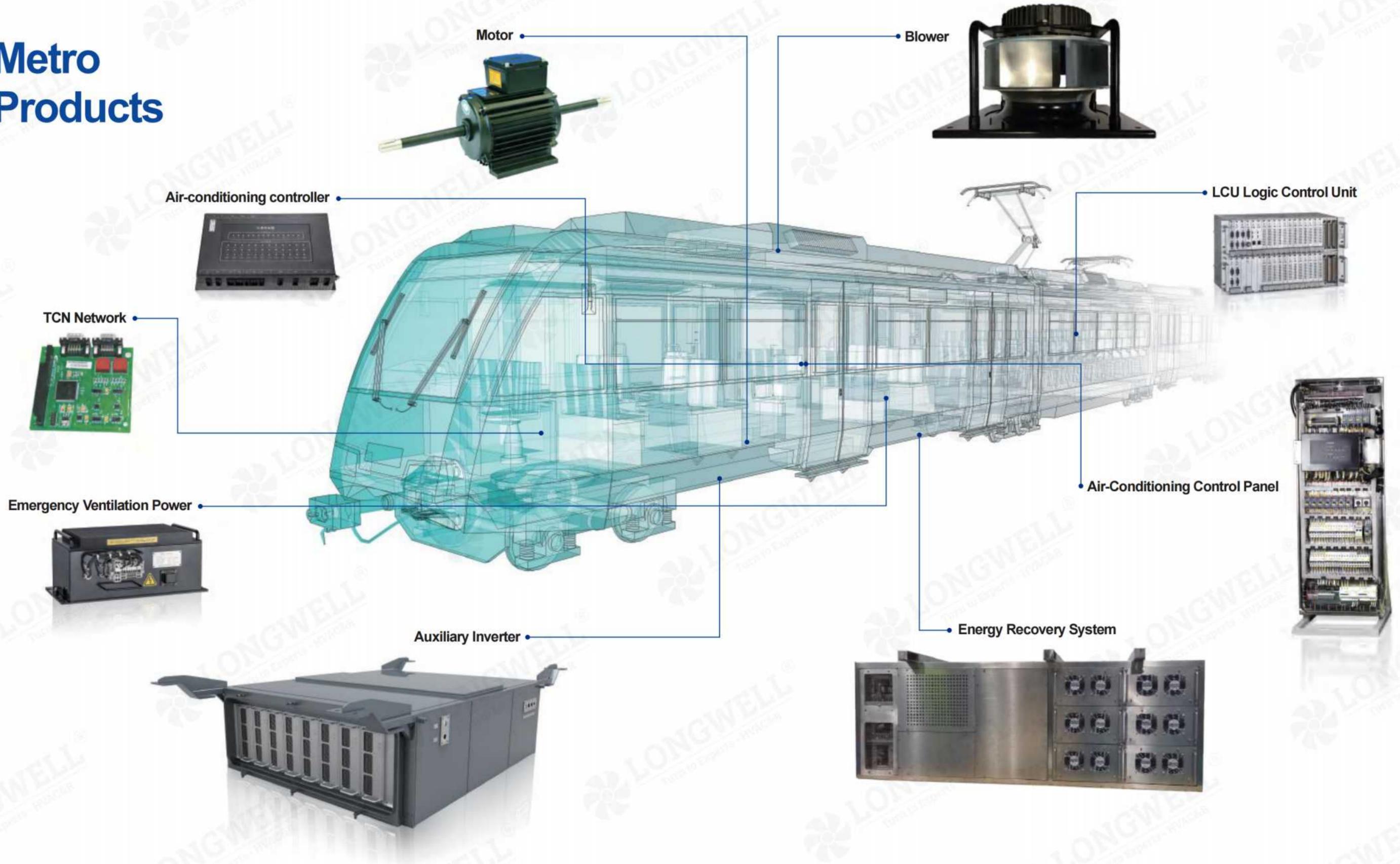


NEW ENERGY PRODUCTS

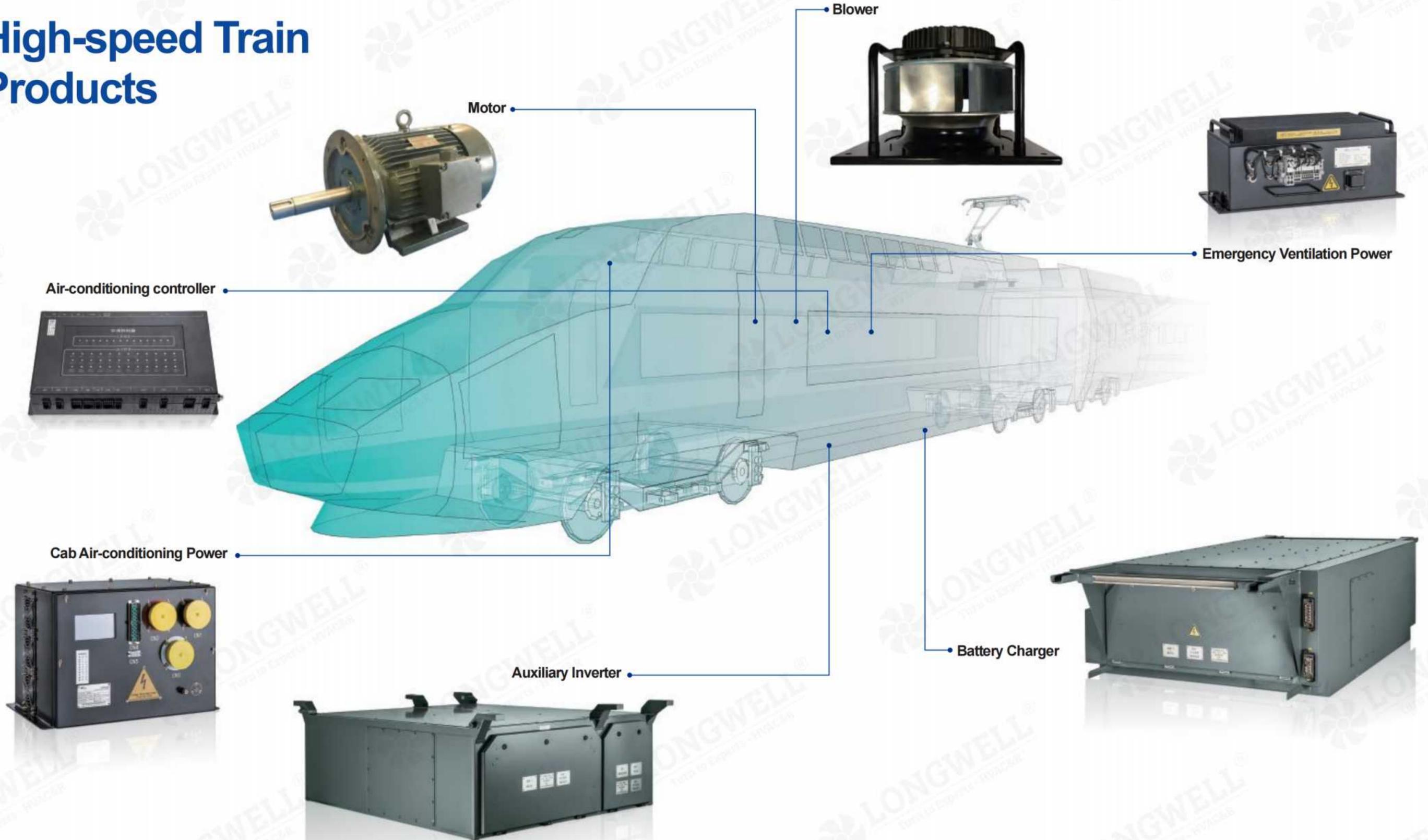
# Locomotive Products



# Metro Products



# High-speed Train Products



# New Energy Products

Super Capacitor Charger



## Application Areas



Tram



Trolleybus



Electric Bus



## Application Areas



Oil Field



Port



Urban Railway



Metro

## Type of fan product



### Axial fan

Mainly used in air conditioning system



### EC fan & blowers

EC motor is used as the driving source suitable for different fan types



### Forward multi-wing centrifugal fan

Mainly used in air conditioning system high static air pressure

### Backward centrifugal fan

Mainly used in auxiliary system and air conditioning system



### Mixed flow fans

mainly used in auxiliary system



## Three-phase asynchronous centrifugal fan



## Three-phase asynchronous axial fan



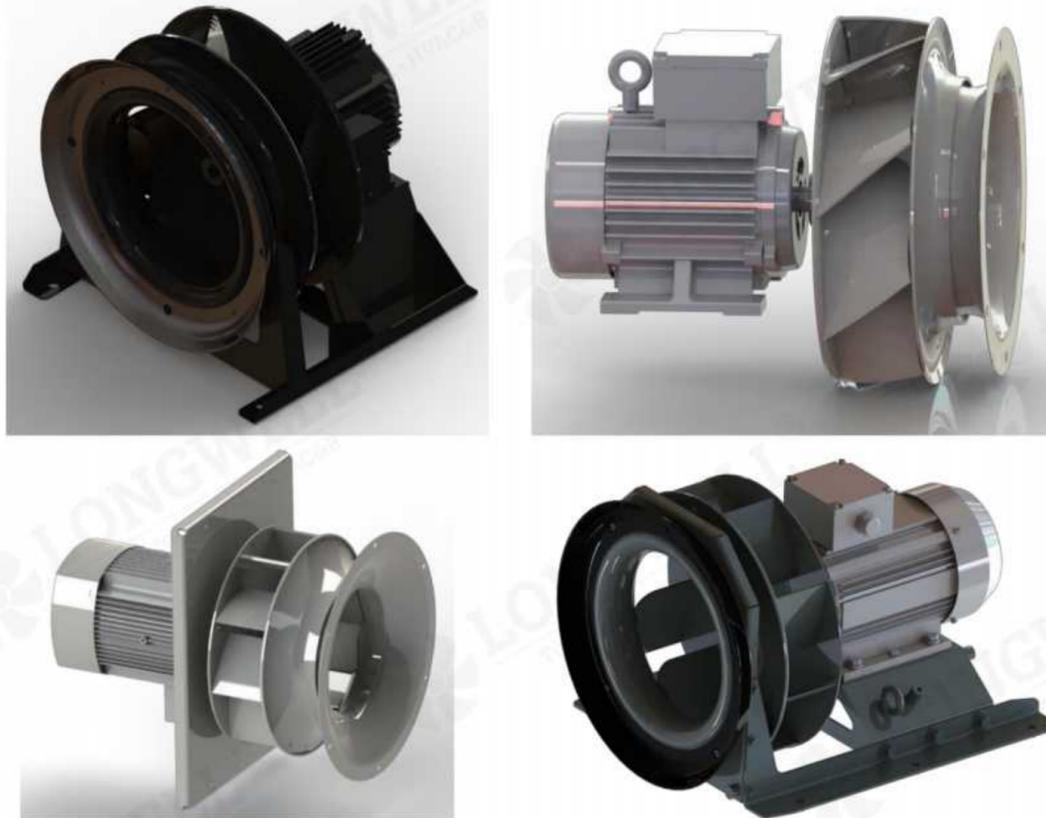
### Single-pole, bipolar and compact external rotor centrifugal fans

|                      |  |
|----------------------|--|
| Power                | 0.12-1.8KW   |
| Air Flow             | 150-8000m <sup>3</sup> /h                          |
| Static air pressure  | 130-800Pa  |
| Noise level          | 61-68dBA   |
| Service life         | 30000-50000h                                       |
| Matching motors type | Internal rotor and external rotor motor            |
| Application          | Air conditioning system,Auxiliary heat dissipation |

### Welding, riveting, die casting and other platform design of the leaf shape

|                     |  |
|---------------------|--|
| Power               | 0.55-3KW   |
| Air Flow            | 5000-14000m <sup>3</sup> /h                        |
| Static air pressure | 60-500Pa   |
| Noise level         | 68-84dBA   |
| Service life        | 30000-50000h                                       |
| Application         | Air conditioning system,Auxiliary heat dissipation |

## Specification of backward curved centrifugal fan



### Welding, riveting, die casting and other platform design of the leaf shape

|                     |                |
|---------------------|----------------|
| Power               | 0.2-8KW        |
| Air Flow            | 1000-15000m³/h |
| Static air pressure | 200-2000Pa     |
| Noise level         | 68-95dBA       |
| Service life        | 30000-50000h   |

## Specification of mixed flow fans



### Specification of mixed flow fans

|                      |                      |
|----------------------|----------------------|
| Power                | 0.75-3KW             |
| Air Flow             | 2400-10000m³/h       |
| Static air pressure  | 200-320Pa            |
| Noise level          | 70-90dBA             |
| Service life         | 30000-50000h         |
| Matching motors type | Internal rotor motor |

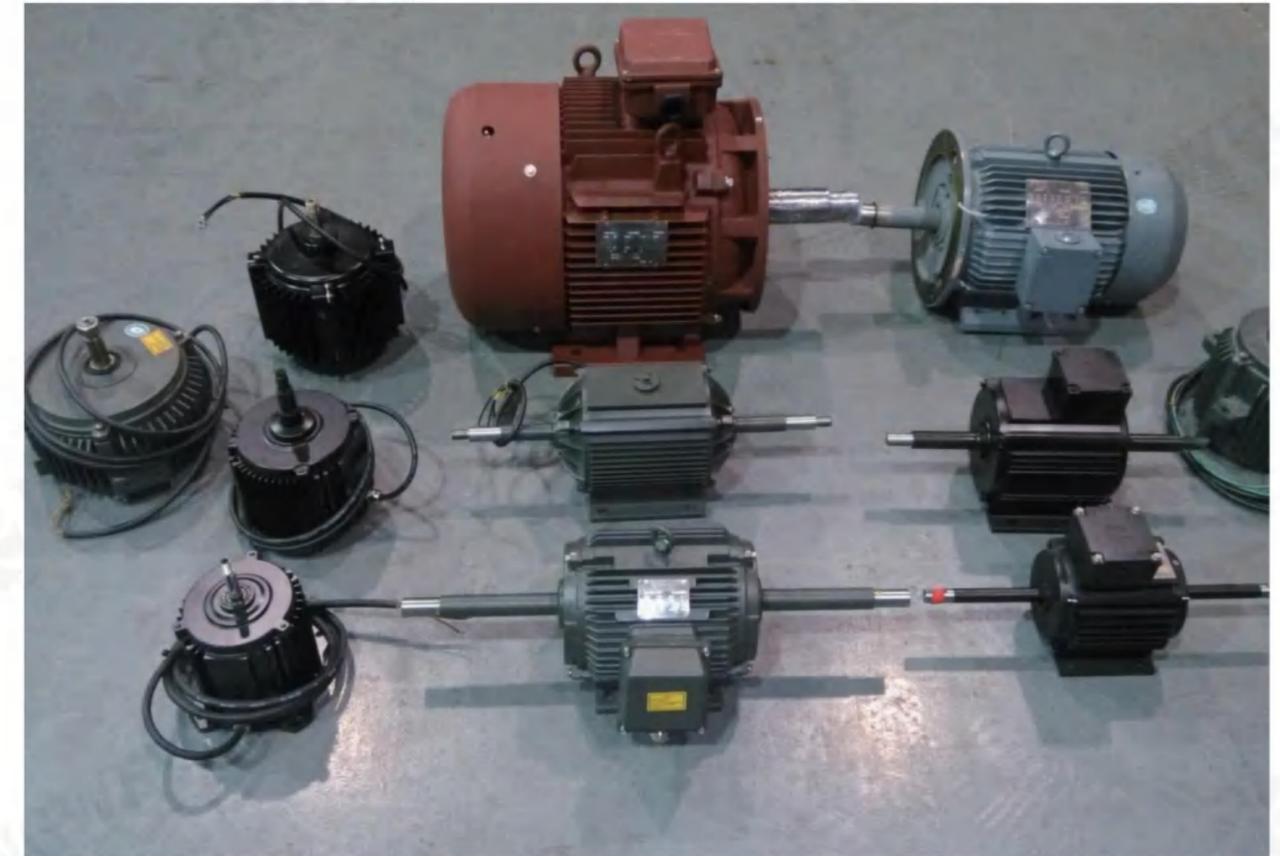
## EC motor fans



### Specification of EC motor fans

|                     |   |
|---------------------|---|
| Power               | 0.55-2KW  |
| Air Flow            | 0-14000m³/h   |
| Static air pressure | 0-1500Pa  |
| Noise level         | 55-84dBA  |
| Impeller type       | forward curve sirocco type,backward curved type,axial flow type |
| Control system      | 0-10V or customization  |
| Voltage type        | AC380-400V,DC110/24/48,etc                                      |
| Application         | Air conditioning system,Auxiliary heat dissipation              |

## Customization for motors



### Customization for Motors

|                         |  |                  |                       |
|-------------------------|--|------------------|-----------------------|
| Types                   | Three-phase or single phase asynchronous motor |                  |                       |
| Housing size            | 63-200   | Motor Power      | 0.12-35KW             |
| Voltage                 | <=690V   | Frequency        | 5-100Hz               |
| Insulation Class        | F/H  | Protection class | IP54/IP55/IP56        |
| Vibration standard      | ISO10816                                       | Motor speed      | Single or multi speed |
| Energy Efficiency Grade | IE2 High efficiency/IE3 Super high efficiency  |                  |                       |
| Installation            | B3/B30/B35/B5/V31/V1/V2                        |                  |                       |

## Application of fan & blowers

Light weight ,small size ,low noise level,High reliability, long life,adapt to vibration, high and low temperature hot and humid alternating special environment



- Train Units Air conditioning system
- Train Units heat--dissipation system
- Auxiliary inverter Cooling system
- Traction Units air compressor cooling system
- Other special custom motors

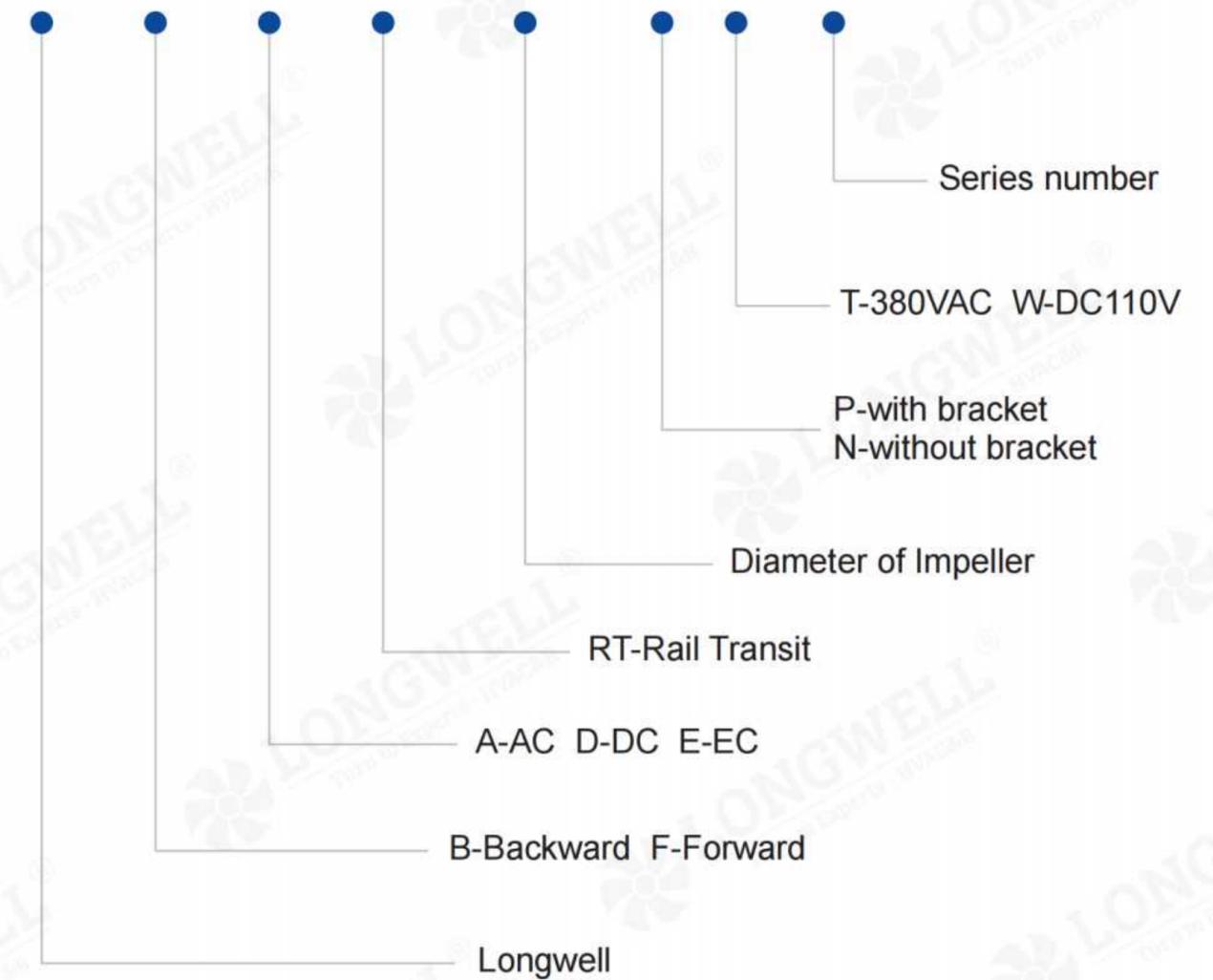
# Rolling Stock Ventilation Fan

Technology Innovation, Brand Excellence



## Type Code

LW B E (RT) 300 - P S - 01



# PM5M01 Type EC Backward centrifugal fan

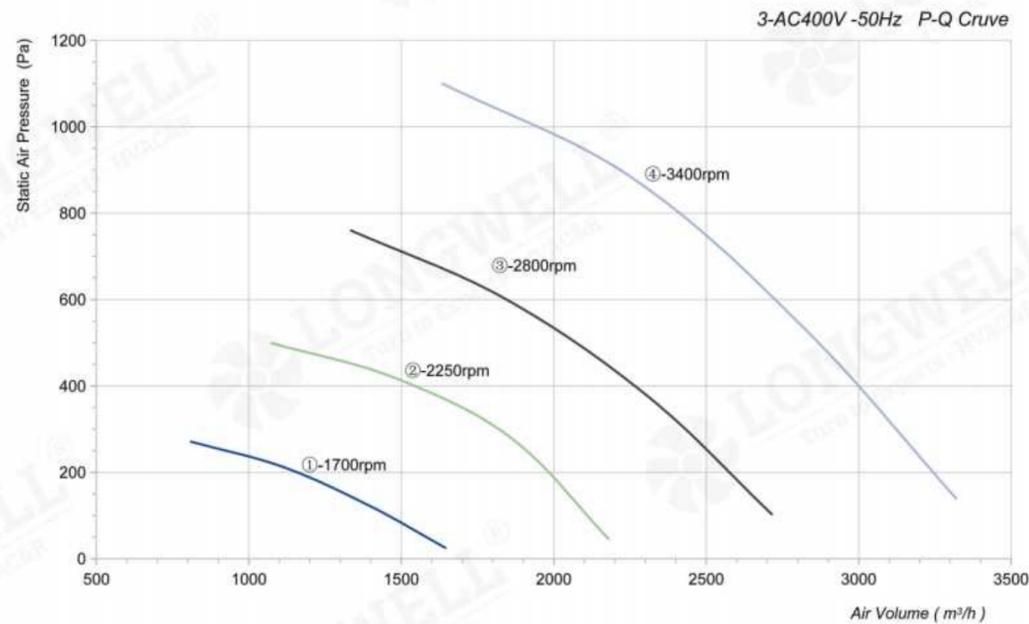
## Product Characteristic

- Train Types: Urban rail transit
- Product Code: PM5M01
- Material: Q345E/5754
- Protection Class: IP54
- Insulation Class: B
- Weight: 14kg (±0.5)
- Application Units: Subway auxiliary inverter

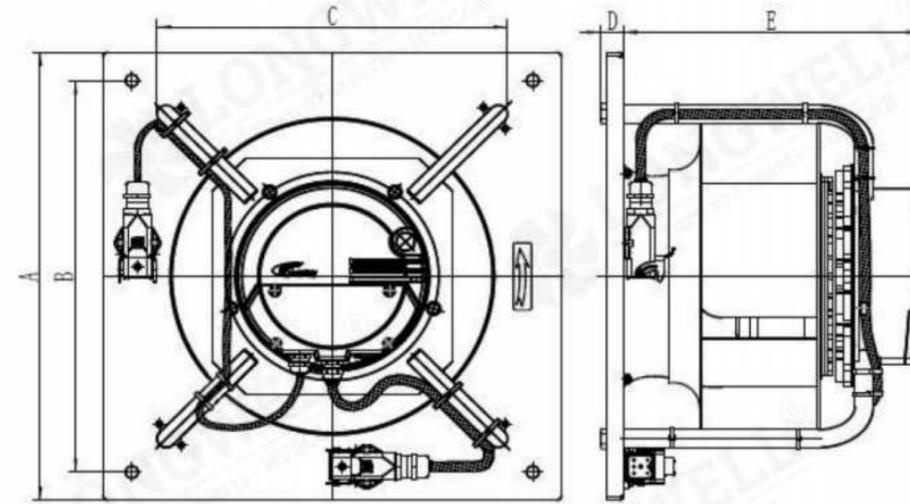


## Technical Specifications

| Model             | Voltage (V) | Frequency (Hz) | Input Power (KW) | Current (A) | Air Flow (m³/h) | Air pressure (Pa) | Speed (RPM) | Noise [dB(A)] |
|-------------------|-------------|----------------|------------------|-------------|-----------------|-------------------|-------------|---------------|
| LWBE(RT)320-PT-01 | AC380-480V  | 50/60          | 1.03             | 1.8         | 3320            | 1100              | 3400        | ≤84           |



## Product Drawing (mm)



|   | Size (mm) | Tolerance (mm) |
|---|-----------|----------------|
| A | 400       | ±2             |
| B | 350       | ±0.5           |
| C | ≤306      | ±1             |
| D | 16        | ±1             |
| E | 261       | ±2             |

# PM5M04 Type EC Backward centrifugal fan

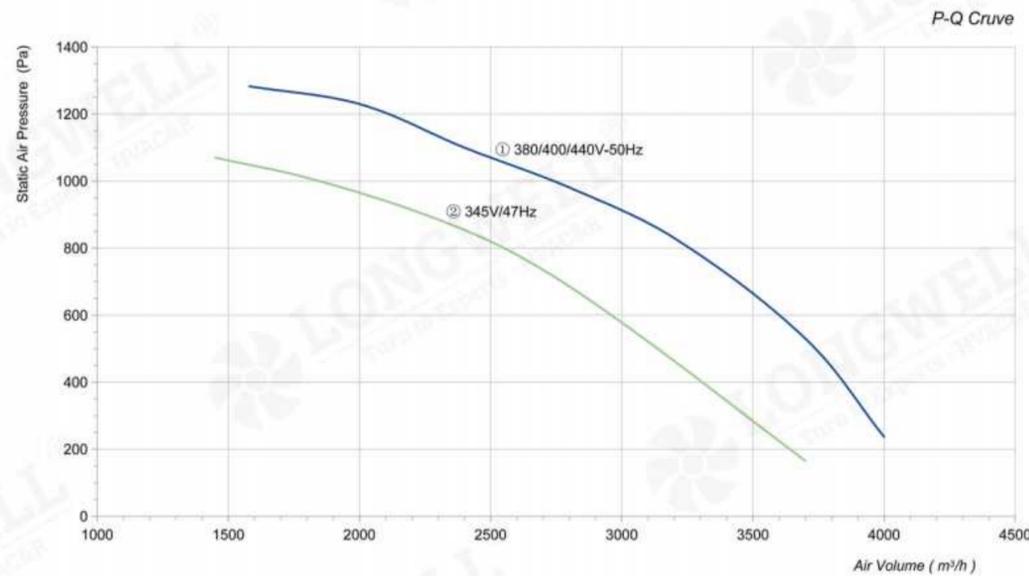
## Product Characteristic

- Train Types: Urban rail transit
- Product Code: PM5M04
- Material: Q345E/5754
- Protection Class: IP55/IP44
- Insulation Class: F
- Weight: 18kg (±0.5)
- Application Units: Subway auxiliary inverter Cooling system

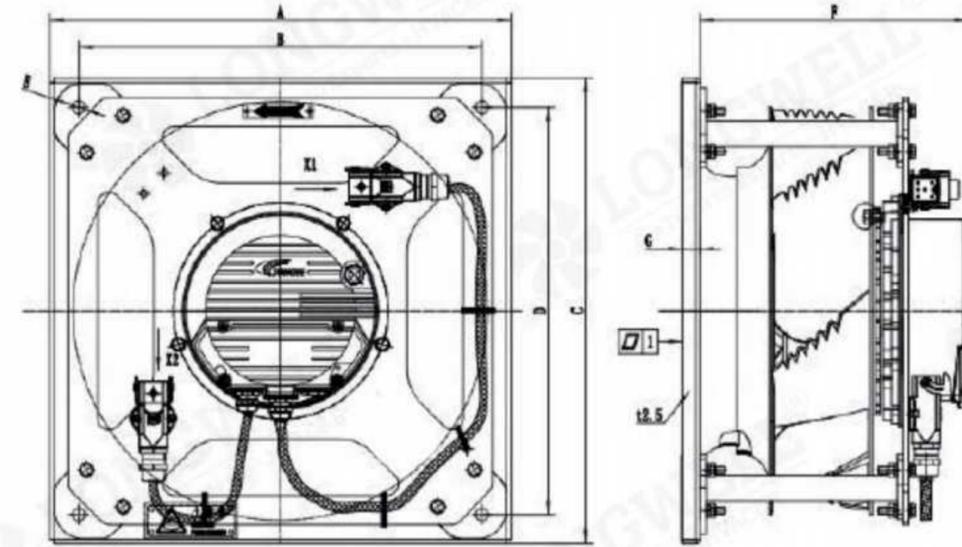


## Technical Specifications

| Model             | Voltage (V) | Frequency (Hz) | Input Power (KW) | Current (A) | Air Flow (m³/h) | Air pressure (Pa) | Speed (RPM) | Noise [dB(A)] |
|-------------------|-------------|----------------|------------------|-------------|-----------------|-------------------|-------------|---------------|
| LWBE(RT)320-PT-02 | AC380-480V  | 50/60          | 1.8              | 2.7         | 2400            | J1000             | 2800        | <79           |



## Product Drawing (mm)



|   | Size (mm) | Tolerance (mm) |
|---|-----------|----------------|
| A | 400       | ±2             |
| B | 350       | ±1             |
| C | 400       | ±2             |
| D | 350       | ±1             |
| E | φ 11      | ±0.5           |
| F | 232.5     | ±4             |
| G | 15        | ±1             |

# Standard high speed train intelligent emissions system

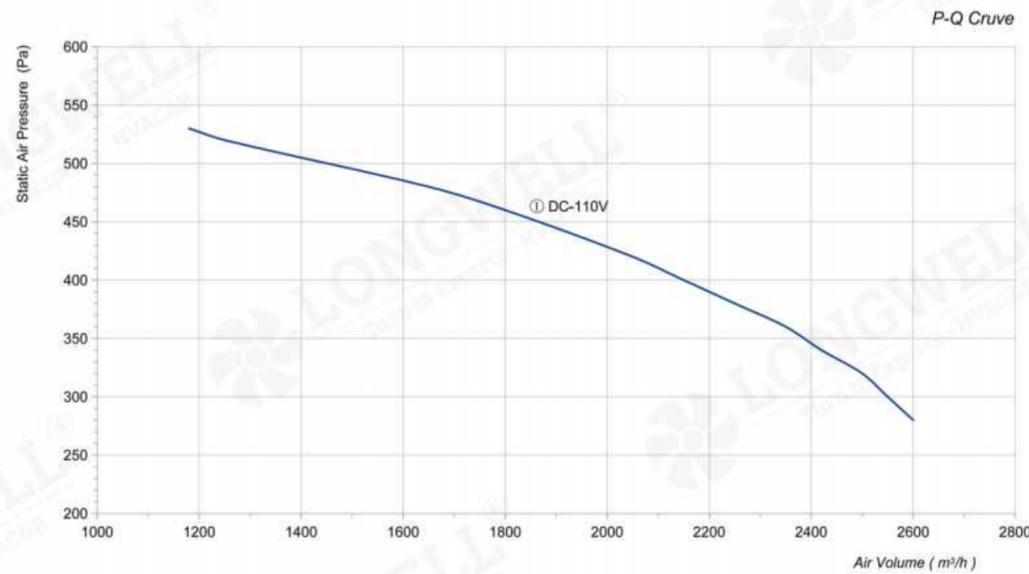
## Product Characteristic

- Train Types: Bullet train
- Product Code: PMSM
- Material: 5754
- Protection Class: IP54
- Insulation Class: F
- Weight: 10kg
- Application Units: Standard High speed train intelligent Emissions system

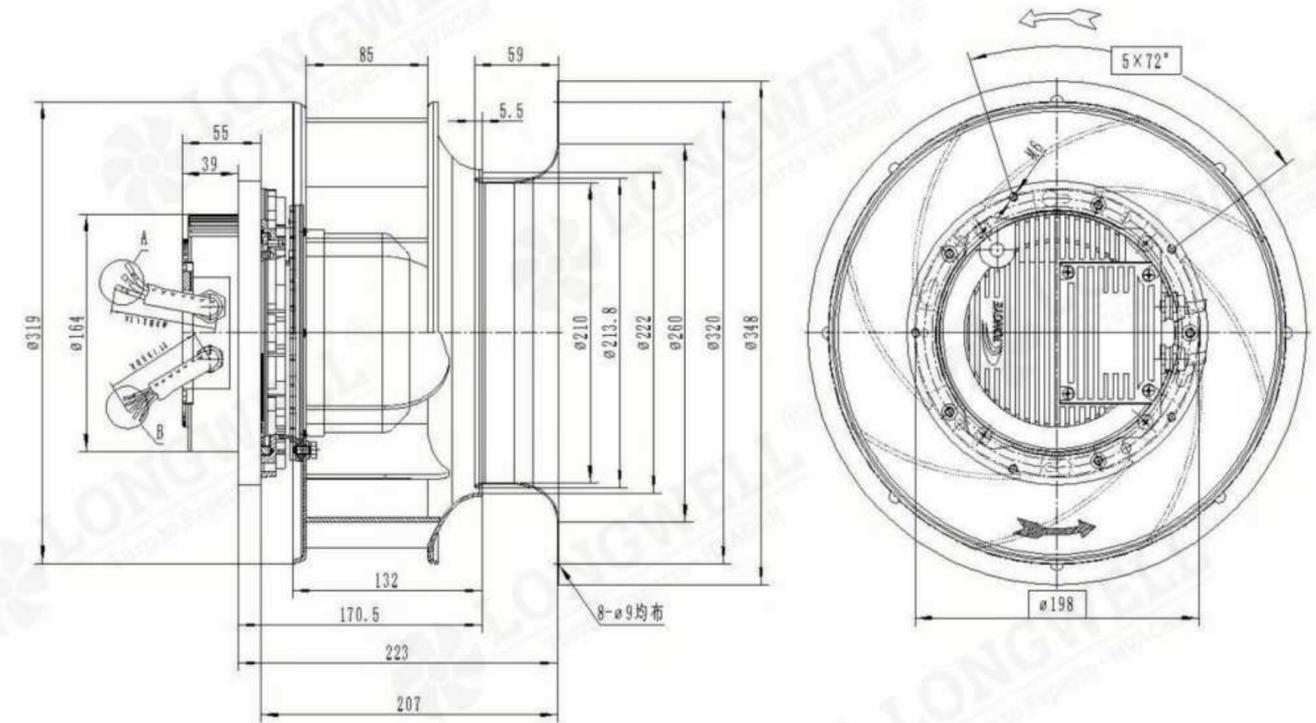


## Technical Specifications

| Model             | Voltage (V) | Frequency (Hz) | Input Power (KW) | Current (A) | Air Flow (m³/h) | Air pressure (Pa) | Speed (RPM) | Noise [dB(A)] |
|-------------------|-------------|----------------|------------------|-------------|-----------------|-------------------|-------------|---------------|
| LWBE(RT)320-PW-03 | DC110V      | /              | 0.9              | 8           | 1800            | J490              | 2300        | < 76          |



## Product Drawing (mm)



# Traction and auxiliary inverter cooling

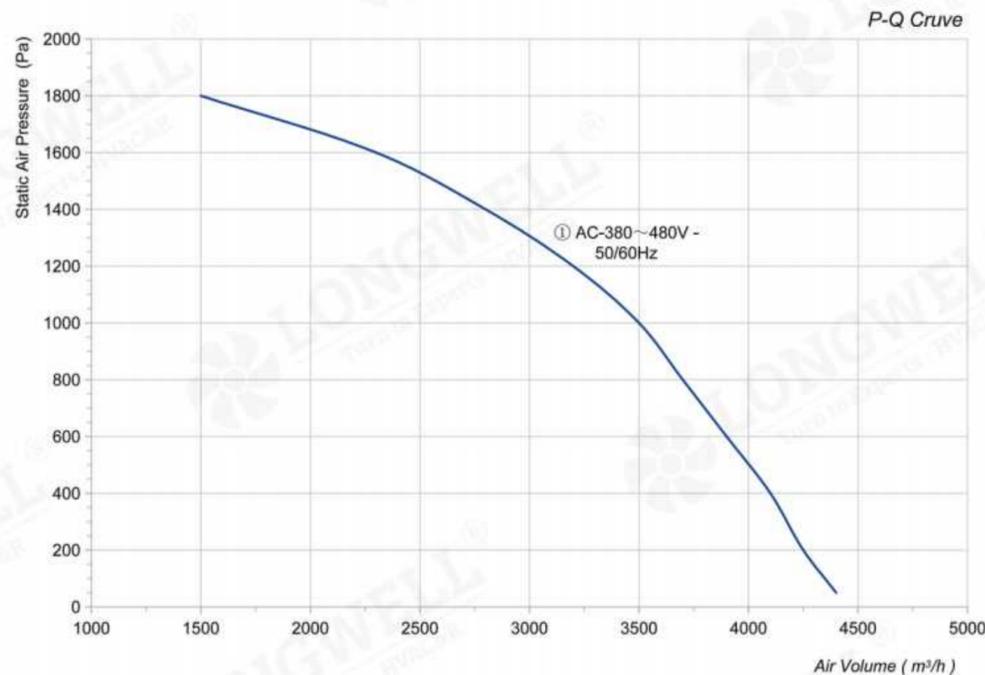
## Product Characteristic

- Train Types: Urban rail transit
- Product Code: PMSM02C
- Material: Q345E/5754
- Protection Class: IP56
- Insulation Class: H
- Weight: 22kg
- Application Units: Urban rail traction and auxiliary inverter

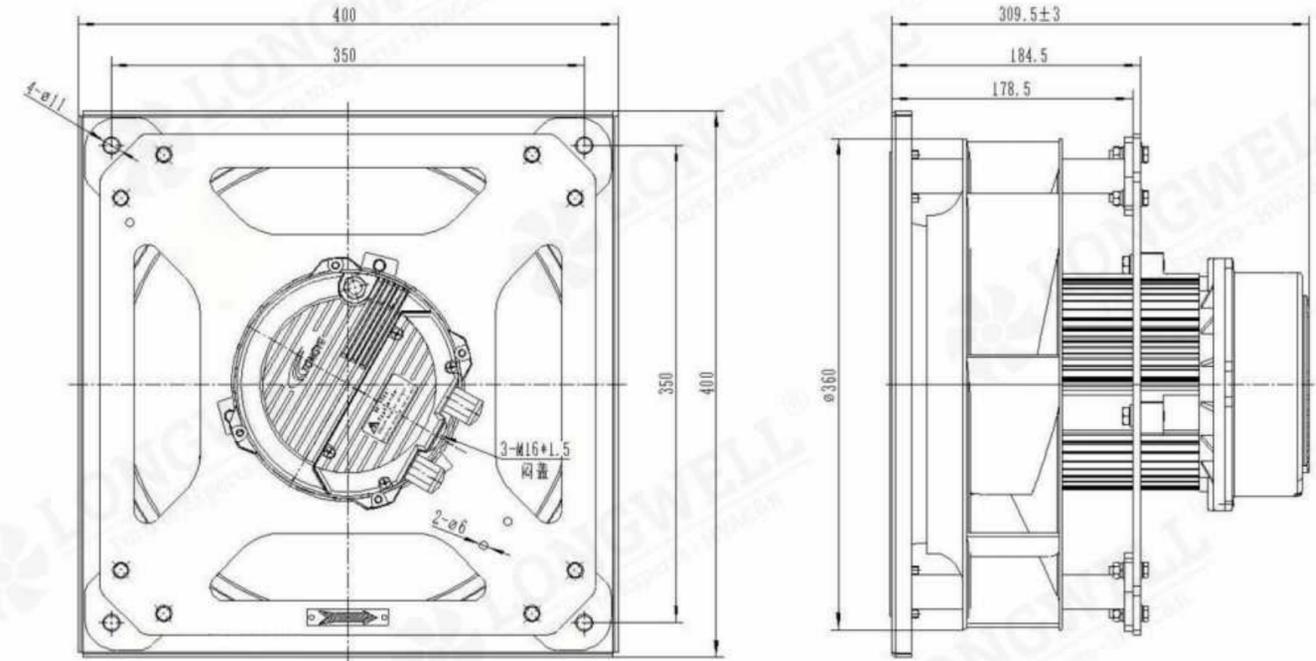


## Technical Specifications

| Model             | Voltage (V) | Frequency (Hz) | Input Power (KW) | Current (A) | Air Flow (m³/h) | Air pressure (Pa) | Speed (RPM) | Noise [dB(A)] |
|-------------------|-------------|----------------|------------------|-------------|-----------------|-------------------|-------------|---------------|
| LWBE(RT)320-PT-04 | AC380-480V  | 50/60          | 2.2              | 3.8         | 2520            | J1500             | 3400        | <80           |



## Product Drawing (mm)





# City High-speed train intelligent Emissions system

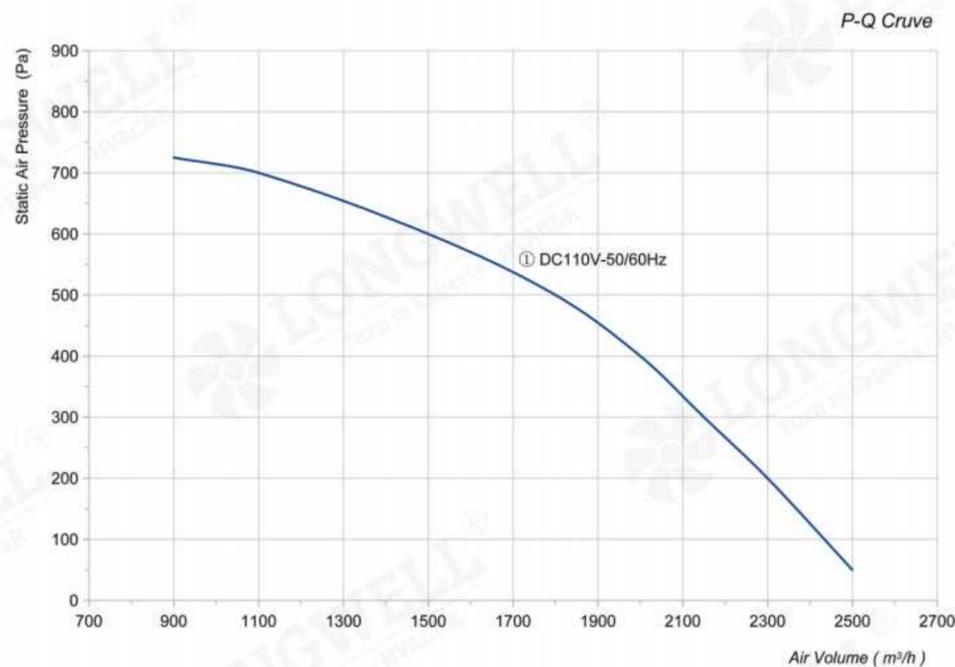
## Product Characteristic

- Train Types: Bullet train
- Product Code: PMSM11B
- Material: 5754
- Protection Class: IP54
- Insulation Class: F
- Weight: 7kg
- Application Units: City High-speed train intelligent Emissions system

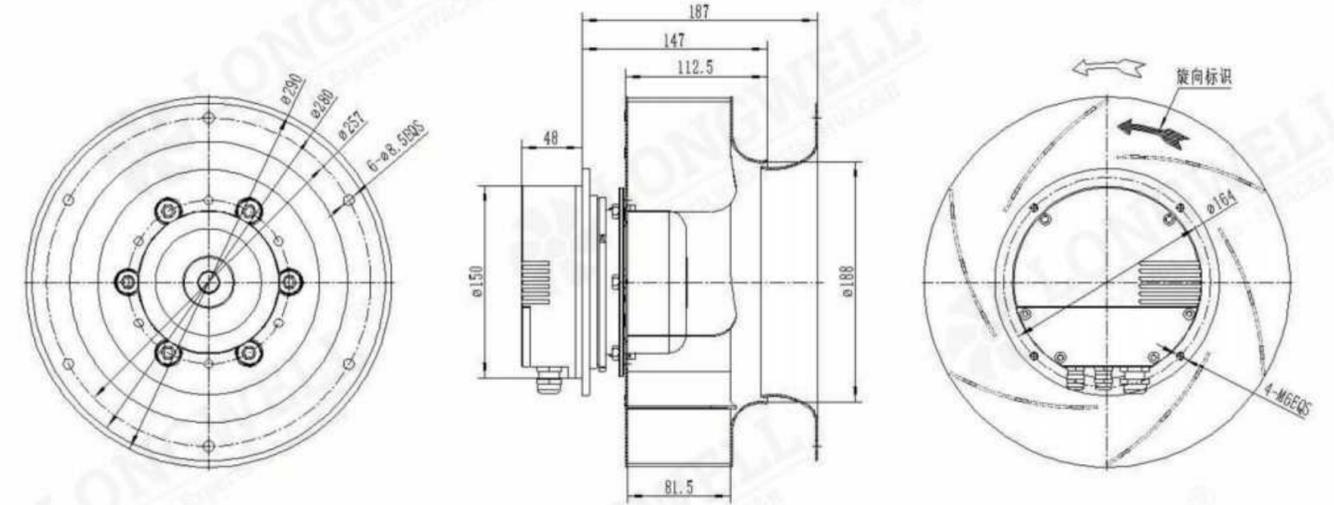


## Technical Specifications

| Model             | Voltage (V) | Frequency (Hz) | Input Power (KW) | Current (A) | Air Flow (m³/h) | Air pressure (Pa) | Speed (RPM) | Noise [dB(A)] |
|-------------------|-------------|----------------|------------------|-------------|-----------------|-------------------|-------------|---------------|
| LWBE(RT)280-NW-01 | DC110V      | 50/60          | 0.5              | 4.5         | 1600            | J500              | 2600        | <66           |



## Product Drawing (mm)



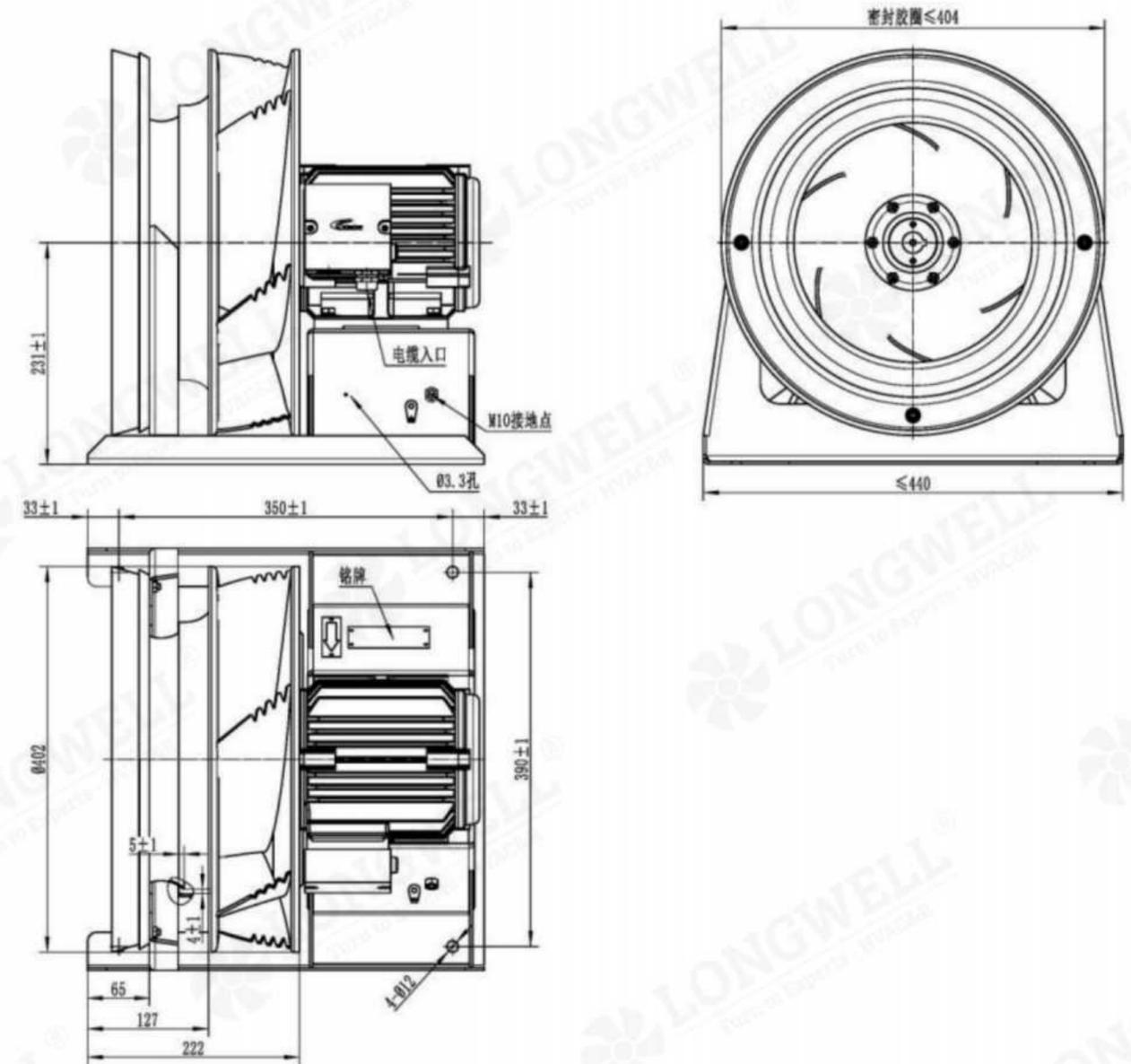
# Backward curved centrifugal Fan

## Product Characteristic

- Train Types: Urban rail transit
- Product Code: /
- Material: Q345/5754
- Protection Class: IP56
- Insulation Class: H
- Weight: 33kg
- Application Units: Urban rail traction and auxiliary inverter

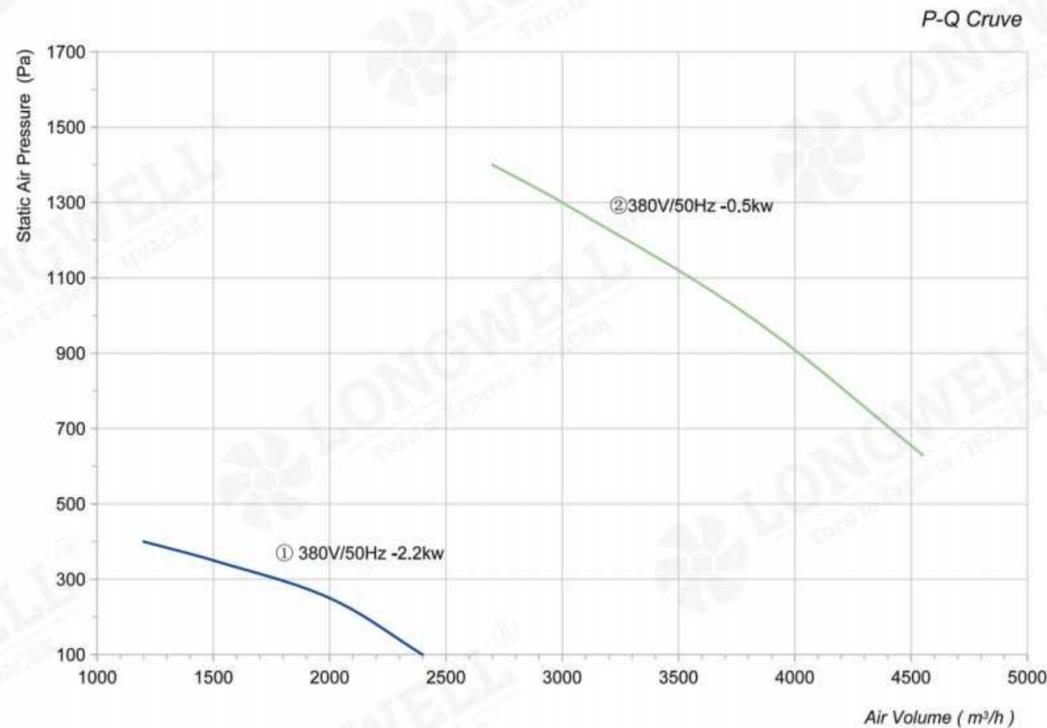


## Product Drawing (mm)



## Technical Specifications

| Model             | Voltage (V) | Frequency (Hz) | Input Power (KW) | Current (A) | Air Flow (m³/h) | Air pressure (Pa) | Speed (RPM) | Noise [dB(A)] |
|-------------------|-------------|----------------|------------------|-------------|-----------------|-------------------|-------------|---------------|
| LWBA(RT)400-NW-01 | 380V        | 50             | 2.2/0.5          | 5/1.3       | 3600/1800       | J1200/300         | 2850/1450   | Lw≤90/78      |



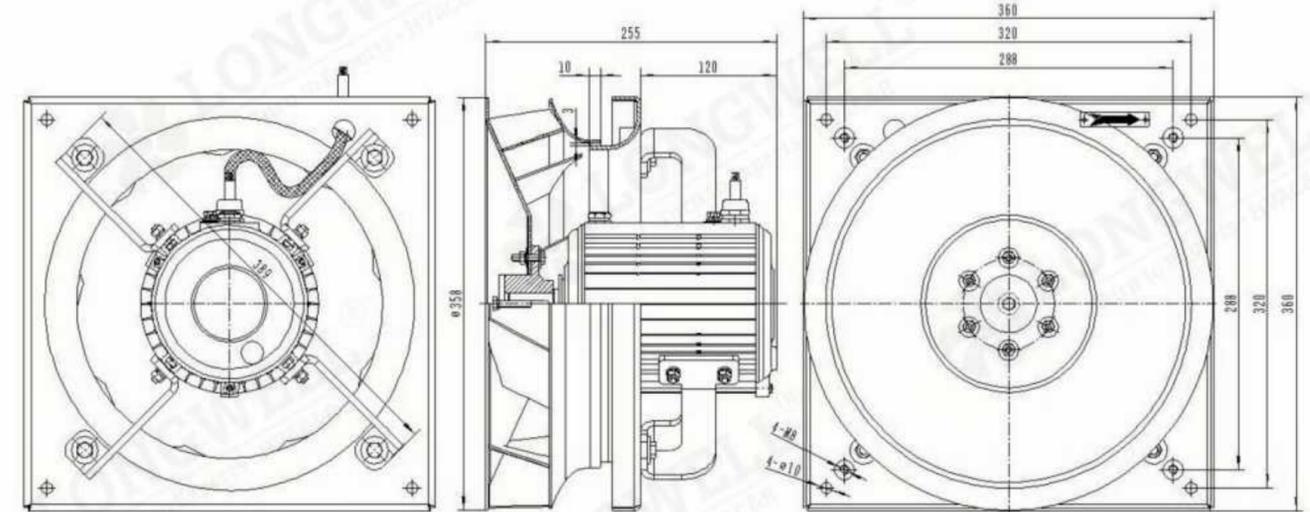
# Backward curved centrifugal Fan

## Product Characteristic

- Train Types: Urban rail transit
- Product Code: /
- Material: Q235B
- Protection Class: IP55
- Insulation Class: F
- Weight: 20kg
- Application Units: Traction Units heat-dissipation fan

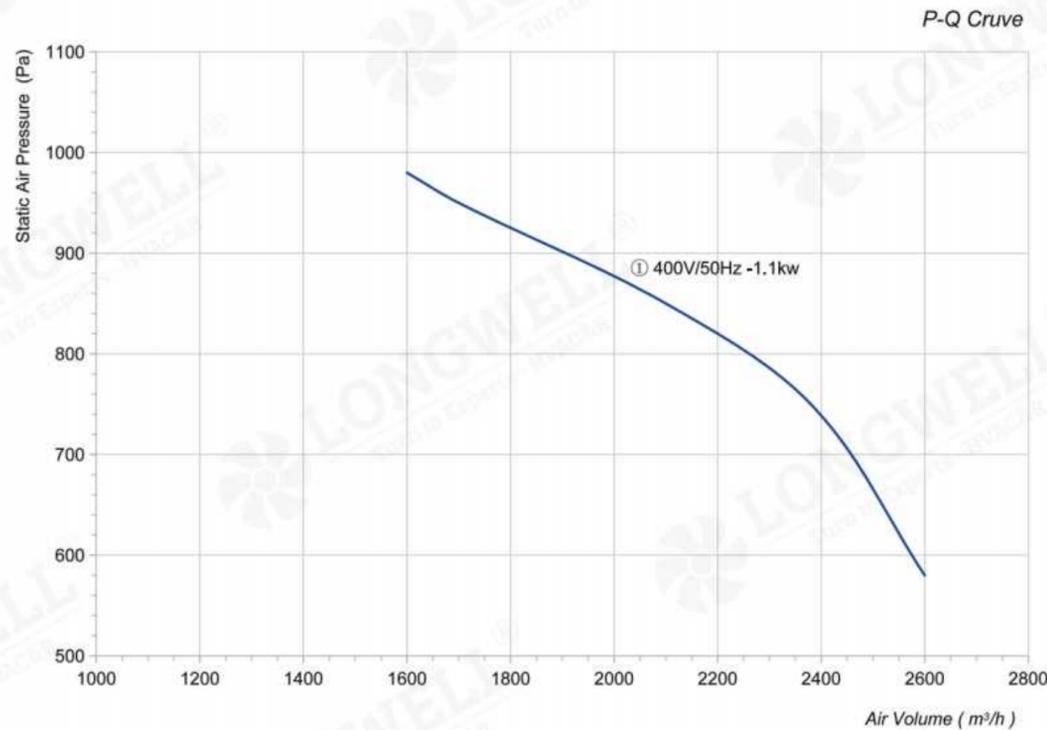


## Product Drawing (mm)



## Technical Specifications

| Model             | Voltage (V) | Frequency (Hz) | Input Power (kW) | Current (A) | Air Flow (m³/h) | Air pressure (Pa) | Speed (RPM) | Noise [dB(A)] |
|-------------------|-------------|----------------|------------------|-------------|-----------------|-------------------|-------------|---------------|
| LWBA(RT)355-PW-01 | 400V        | 50             | 1.1              | 2.4         | 2160            | J765              | 2845        | 78            |



# Backward curved centrifugal Fan

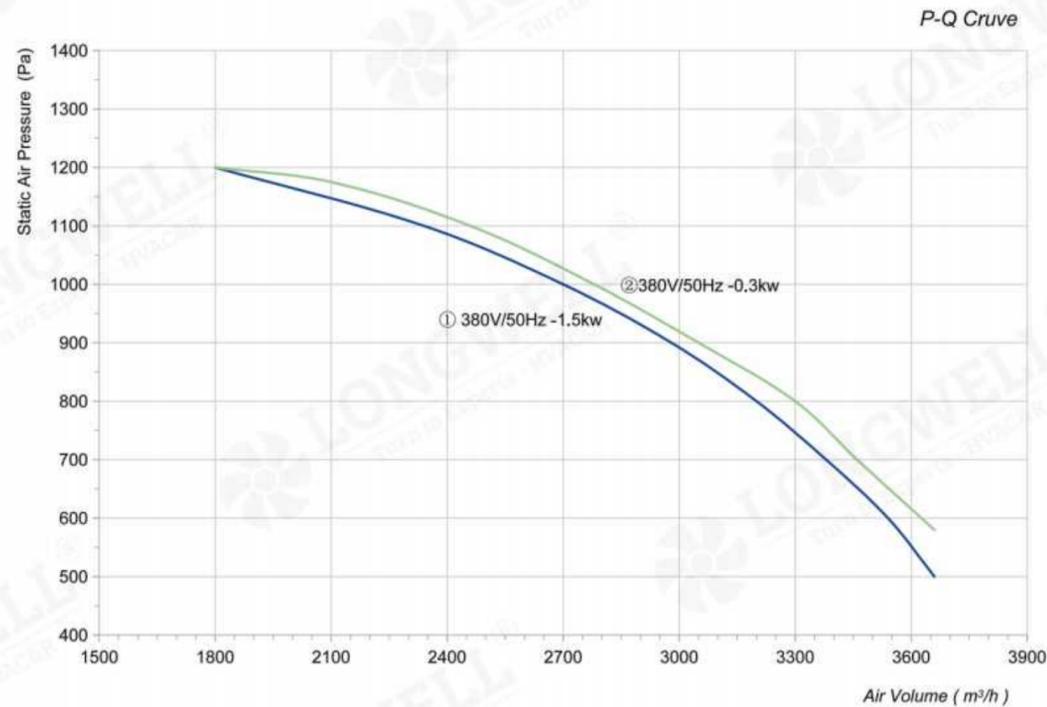
## Product Characteristic

- Train Types: Urban rail transit
- Product Code: /
- Material: 5754
- Protection Class: IP65
- Insulation Class: F
- Weight: 24kg
- Application Units: Traction Units heat-dissipation fan

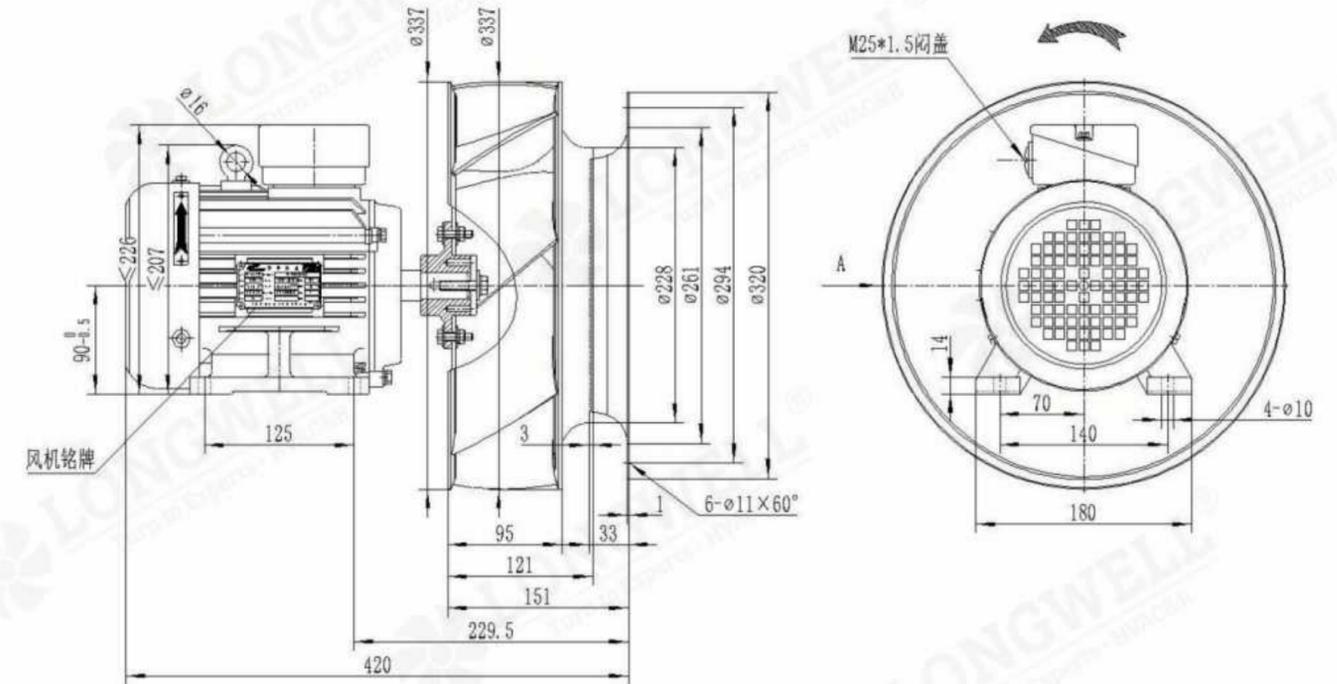


## Technical Specifications

| Model             | Voltage (V) | Frequency (Hz) | Input Power (KW) | Current (A) | Air Flow (m³/h) | Air pressure (Pa) | Speed (RPM) | Noise [dB(A)] |
|-------------------|-------------|----------------|------------------|-------------|-----------------|-------------------|-------------|---------------|
| LWBA(RT)320-NW-06 | 380V        | 50             | 1.5/0.3          | 3.6/0.78    | 2700            | J900              | 2840/1450   | Lws88/73      |



## Product Drawing (mm)



# Backward curved centrifugal Fan

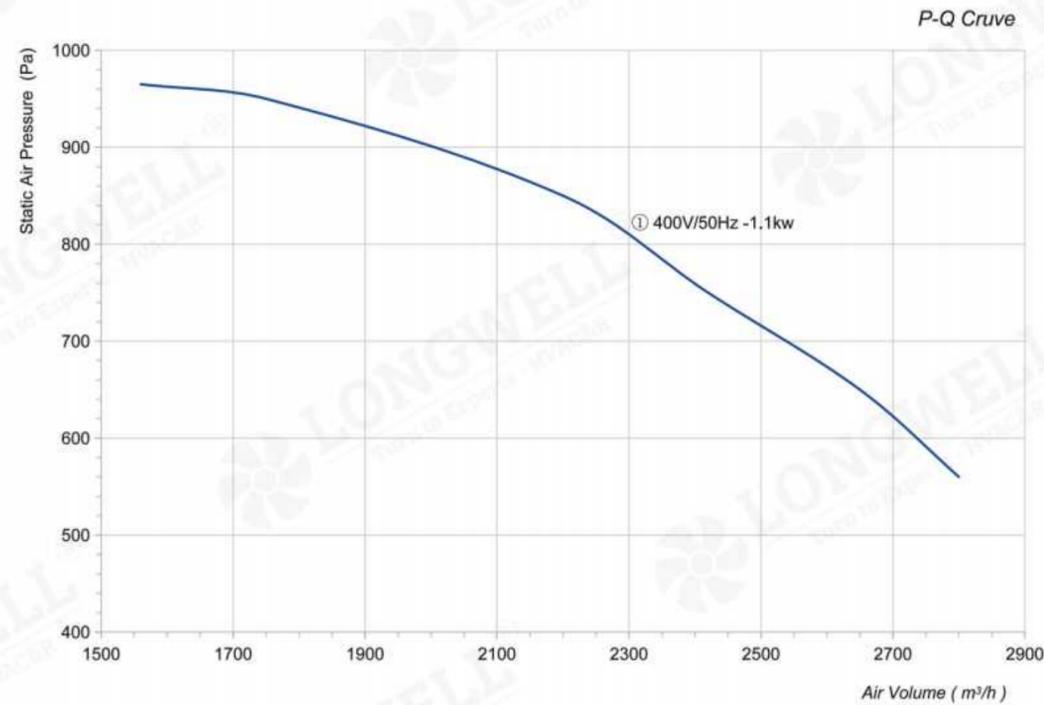
## Product Characteristic

- Train Types: Urban rail transit
- Product Code: /
- Material: Q235B
- Protection Class: IP55
- Insulation Class: F
- Weight: 20kg
- Application Units: Traction Units heat-dissipation fan

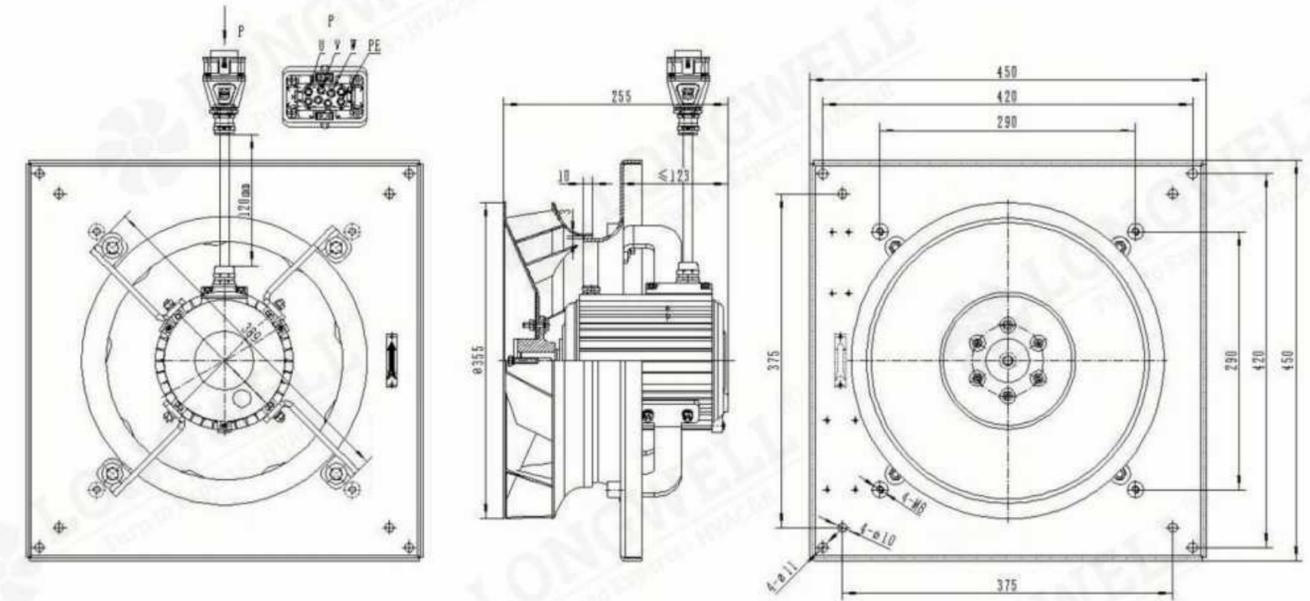


## Technical Specifications

| Model             | Voltage (V) | Frequency (Hz) | Input Power (kW) | Current (A) | Air Flow (m³/h) | Air pressure (Pa) | Speed (RPM) | Noise [dB(A)] |
|-------------------|-------------|----------------|------------------|-------------|-----------------|-------------------|-------------|---------------|
| LWBA(RT)355-PW-02 | 400V        | 50             | 1.1              | 2.4         | 2160            | J765              | 2845        | 78            |



## Product Drawing (mm)



# Backward curved centrifugal Fan

## Product Characteristic

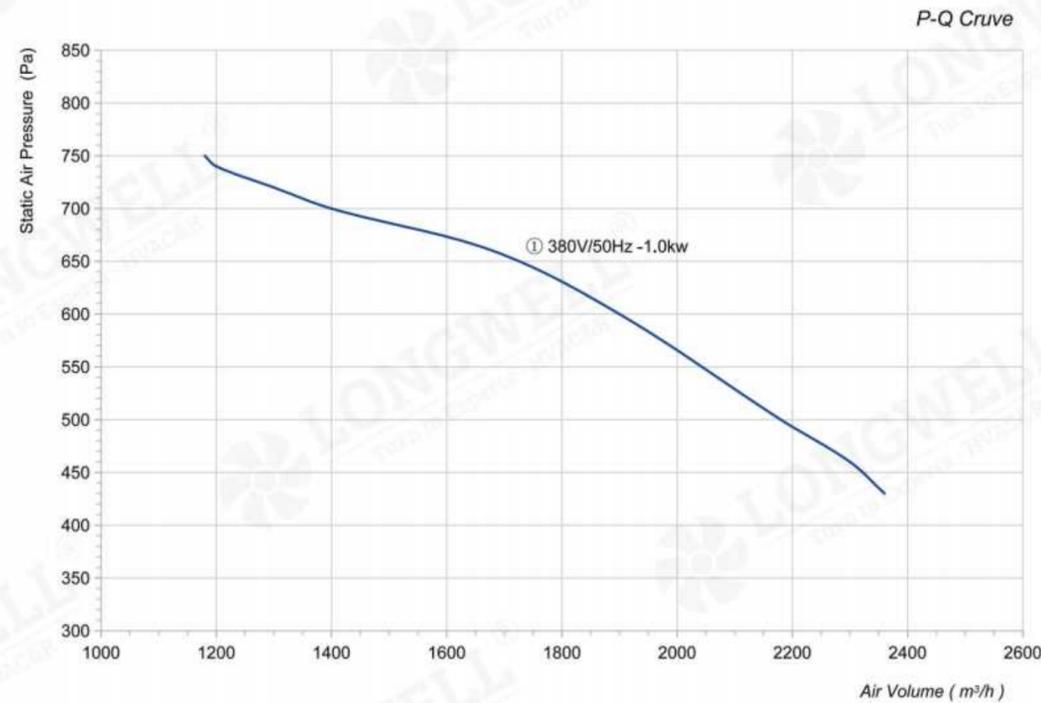
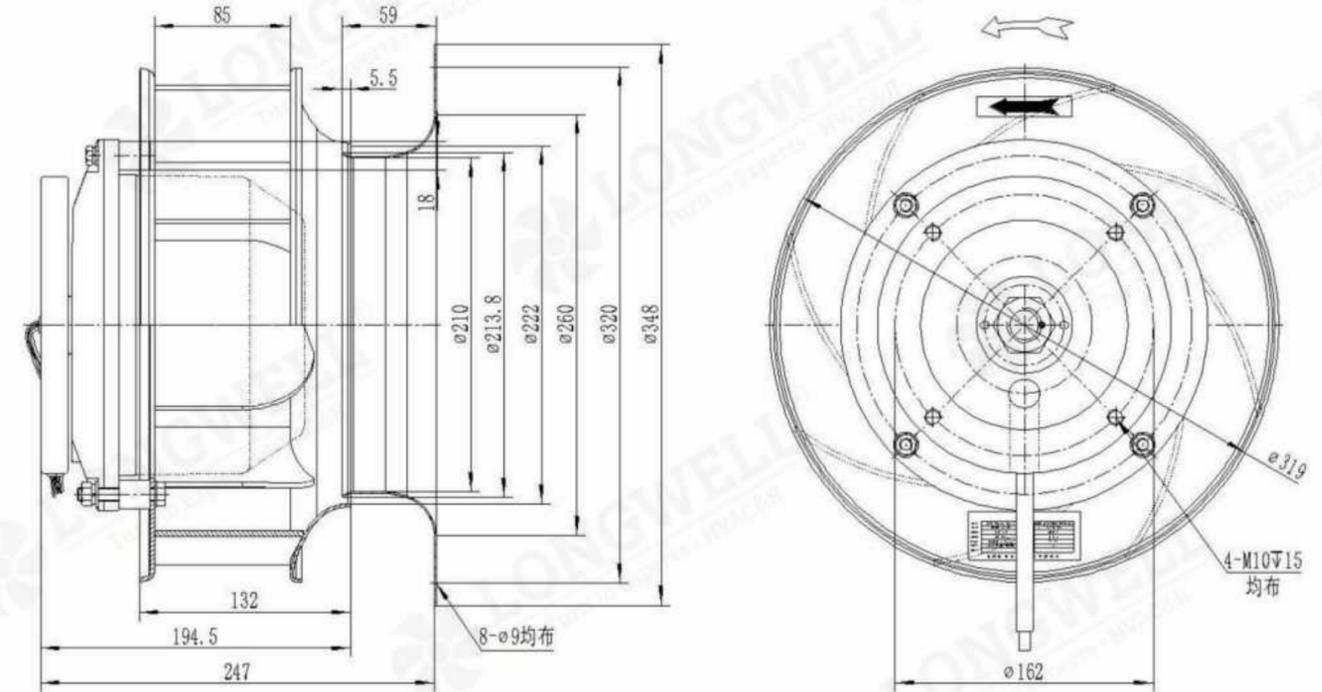
- Train Types: Urban rail transit
- Product Code: /
- Material: 5754
- Protection Class: IP55
- Insulation Class: F
- Weight: 17kg
- Application Units: Traction Units heat-dissipation fan



## Technical Specifications

| Model             | Voltage (V) | Frequency (Hz) | Input Power (kW) | Current (A) | Air Flow (m³/h) | Air pressure (Pa) | Speed (RPM) | Noise [dB(A)] |
|-------------------|-------------|----------------|------------------|-------------|-----------------|-------------------|-------------|---------------|
| LWBA(RT)320-NW-08 | 380V        | 50             | 1                | 1.7         | 1800            | J470              | 2400        | Lw≤81         |

## Product Drawing (mm)



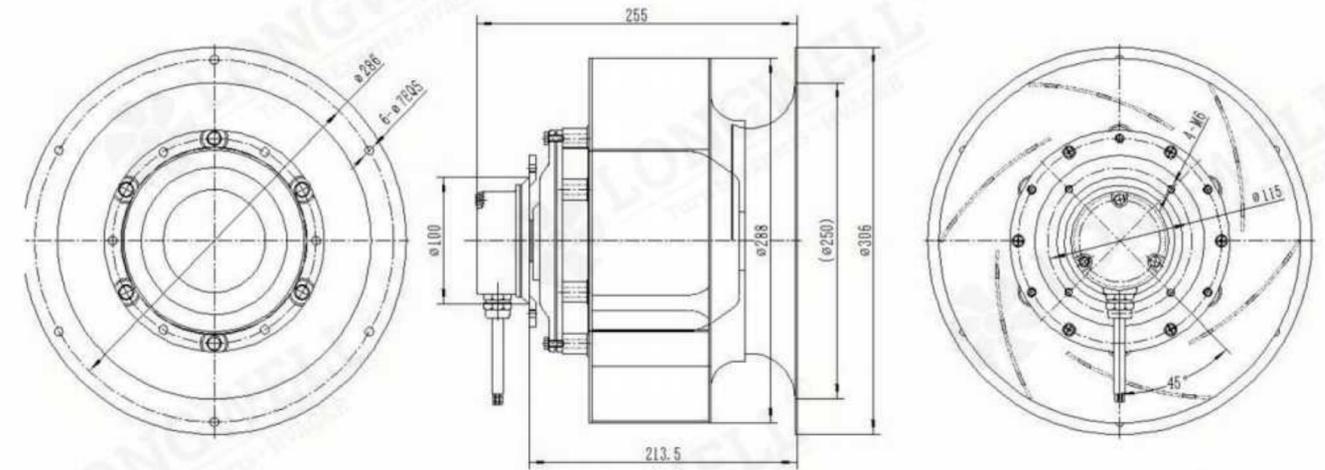
# Backward curved centrifugal Fan

## Product Characteristic

- Train Types: Locomotive
- Product Code: /
- Material: 5754
- Protection Class: IP55
- Insulation Class: F
- Weight: 14kg
- Application Units: Locomotive filter units



## Product Drawing (mm)



## Technical Specifications

| Model             | Voltage (V) | Frequency (Hz) | Input Power (kW) | Current (A) | Air Flow (m³/h) | Air pressure (Pa) | Speed (RPM) | Noise [dB(A)] |
|-------------------|-------------|----------------|------------------|-------------|-----------------|-------------------|-------------|---------------|
| LWBE(RT)280-NW-02 | 460V        | 60             | 1.2              | 1.7         | 2100            | J600              | 3320        | Lw≤88         |

