INTELLIGENT ASPHALT DISTRIBUTOR

Operation Manual

HANGZHOU IKOM CONSTRUCTION MACHINERY CO., LTD

www.ikommachinery.cn

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I. Introduction

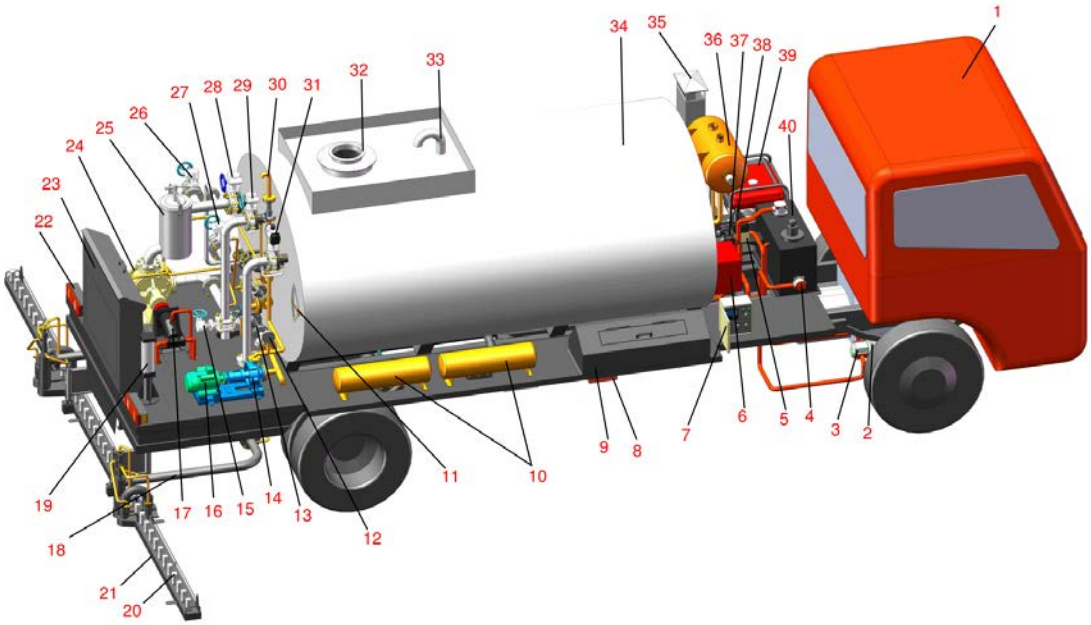

Fig. 1 Intelligent asphalt sprayer model diagram

(Only for reference; all in kind prevail)

No.	Name	Qty.
1	Car chassis	1
2	Power Take Off	1
3	Hydraulic oil pump	1
4	Hydraulic inlet filter	2
5	Hydraulic valve sea	1
6	Burner	1
7	Heat transfer oil control box	1
8	Reducer	1
9	Toolboxes	2
10	High pressure gas cylinders	2
11	Asphalt tank level indicator	1
12	Heat transfer oil pressure gauge	1

No.	Name	Qty.
21	Asphalt spray cylinder	39
22	Rear Tail Light	2
23	Rear control cabinet	1
24	Asphalt pump	1
25	Asphalt filter	1
26	Self-suction valve	1
27	Transfer valve	1
28	Oil outlet control valve	1
29	Small Cycle Return Valve	1
30	Heat transfer oil outlet	1
31	Large Cycle Return Valve	1
32	Asphalt tank inlet	1

13	Heat transfer oil master oil outlet valve	1	33	Asphalt tank air outlet	1
14	Heat transfer oil pump	1	34	Asphalt tan	1
15	Asphalt large cycle outlet valve	1	35	Chimney	1
16	Heat transfer oil motor	1	36	Heat transfer oil expansion tank	1
17	Hydraulic motor	1	37	Hydraulic Reversing Valve	1
18	Asphalt large cycle connection hose	2	38	Hydraulic solenoid proportional valve	1
19	Spray rod lifting cylinder	2	39	Generator set	1
20	Rear spray rod	1	40	Hydraulic oil tank	1

Table 1 Intelligent asphalt sprayer Model Diagram Components Table

1. Equipment purpose

Intelligent asphalt sprayer is a high-tech product developed by IKOM Construction Machinery Co., Ltd. to meet the new asphalt construction technology at home and abroad. It is a special machinery improved for construction and maintenance of asphalt pavement with a reference to similar products at home and abroad combining with many years of construction experiences based on similar products.

2. Basic advantages

- Less manpower: It can be operated by a single person in the cab, and each nozzle can be independently switched on and off; with any combination and a large touch screen;
- Asphalt saved: The truck can work at a static state; the truck has a small and large circulation, so the remaining asphalt in the rear spray pie can be sucked back into the tank after the operation is completed each time, economic and environmental protection;
- Oil saving: The original heating technology is used to increase the efficiency of asphalt heating in the tank, economical and oil saving;
- It can spray high-temperature hot asphalt, SBS modified asphalt, emulsified asphalt, modified emulsified asphalt and other asphalts
- Two sets of front and rear control devices are provided for quantitative spraying.
- The vehicle is equipped with a hand-injection device, which can achieve 360 ° no dead spray
- With three-overlapped asphalt spray pattern, give a good atomization effect with the uniform spraying and high precision
- The truck is equipped with a hand-injection device, which can achieve 360 ° no dead corner spray
- ·The internal of asphalt tank, asphalt filter, asphalt pump, outlet (return) oil tubing and rear spray rod are all equipped with a heat transfer oil heating system;
- ·Imported high-power auto-ignition burner is used, with heating up quickly, to meet the modern modified asphalt spraying temperature ≥175 ° demand;

- Asphalt tank is wrapped with a stainless steel outer layer , using aluminum silicate insulation materials to ensure good insulation properties.
- With an independent generator, the asphalt can be warmed up without starting the chassis of the car, saving diesel, and it can also supply the power to other lighting equipment on the construction site
- Equipped with high-pressure air and diesel flushing device, cleaning is more simple, clean and thorough
- The key parts (hydraulic pump, motor, asphalt pump, heat transfer oil pump, air control valve, automatic control system, sensor, etc.) of the machine adopt imported or domestically-renowned components to ensure the reliability and service life of the whole machine.
- Compared with the past products, the length of the rear suspension is reduced, the height of the post-spray from the ground is increased, and the passing of the whole vehicle under bad road conditions is improved.

3. Description on the Manual

This user manual describes the precautions, main technical performance, basic working principle, use and operation methods and troubleshooting of intelligent asphalt sprayer. **In order to ensure the normal use of the asphalt sprayer and to bring you good economic benefits, please read this manual carefully before using the asphalt sprayer and strictly follow the instructions for use, maintenance and maintenance.** If you have any questions, please call our company's after-sales service department for advice. We will serve you enthusiastically. About the use, maintenance and maintenance of automobile chassis, the original ***Operation Manual*** is attached for this.

II. Precautions

1. Precautions on the use of equipment

① Because the surface temperature of the working devices and pipes of the asphalt sprayer during the working process (including spraying, heating, and filling asphalt and so on) is very high, please **wear work clothes, heat-resistant gloves and protective caps** before work to avoid scald.

② **Only add asphalt that does not exceed 60% of the rated capacity** before **first use** of the asphalt sprayer.

③ Before filling high-temperature hot asphalt (including hot asphalt, SBS modified asphalt and other high-temperature asphalt) to the asphalt tank, **the water in the asphalt tank must be removed completely,** otherwise the cold water will vaporize and expand sharply if in touch with high temperature hot asphalt, causing risk.

④ After using emulsified asphalt and converting it to use high temperature hot asphalt (including hot asphalt, SBS modified asphalt and other high temperature asphalt), **all the emulsified asphalt in the tank and pipeline must be removed completely,** or the moisture in the emulsified asphalt will vaporize and expand sharply if in touch with high temperature hot asphalt, causing risk.

⑤ When converting to the emulsified asphalt after just using the high-temperature hot asphalt (including hot asphalt, SBS modified asphalt and other high-temperature asphalt) or converting to the high-temperature hot asphalt (including hot asphalt, SBS modified asphalt and other high-temperature asphalt) after just using the emulsified asphalt, the remaining asphalt in the asphalt pump, asphalt pipeline, asphalt spray rod, asphalt nozzle and asphalt tank must be removed completely, or water will vaporize and expand sharply if in touch with high temperature hot asphalt, causing risk.

⑥ During the transportation and spraying processes of the asphalt sprayer, **do not stand on the rear working platform** of the truck.

⑦ After filling high-temperature hot asphalt, for your safety, non-operators must **stay away from the asphalt sprayer more than 5 meters.**

⑧ In order to obtain a satisfactory spray quality, the temperature of the asphalt added has the following requirements: **for the common heavy-duty road, the hot asphalt spray temperature is above 160°C; SBS, SBR and other modified hot asphalt spray temperature is above 185°C; SBS, SBR and other improved emulsified asphalt (including emulsified asphalt) is between 65-85°C.**

⑨ In order to ensure the normal use of equipment, **the allowable temperature of the heat transfer oil is ≤ 250 °C.**

⑩ When asphalt tanks are filled with emulsified asphalt, **sediments at the bottom of large storage tanks must not be added to the asphalt sprayer,** otherwise the truck will not work.

⑪ **When the asphalt pump sticks, it must not be forced to start.** It must be heated to make the asphalt melt and loose before it can work.

⑫ When the power take-off is engaged or disengaged (that is, the power takeoff starts to work), **the chassis pressure must be more than 6 kg (greater than or equal to 0.6 MPa) to step down the automobile clutch (it is best to turn off the car**), otherwise the power take-off and the car transmission will be damaged.

⑬ During the transportation of the asphalt sprayer, the power take-off must be disengaged and the master gas valve of the gas source must be closed, **and the burner must not be used while the truck is traveling.**

⑭ The reduction gear is engaged at the high-speed position (that is, the gear ratio is 1:1 without deceleration),

and at the low-speed position. To shift the gear, **this can be done only when the truck is running at the low speed or stops and when the car clutch is stepped down.**

⑮ When all asphalt in the entire truck is sprayed completely, **be sure to clean the asphalt pump, the asphalt pipeline, the asphalt spray rod, and asphalt nozzle.**

⑯ After the spraying work is completed every day, **the remaining asphalt in the tank must be exhausted** to avoid unnecessary problems caused by the solidification of the asphalt.

2. Precautions on the use of chassis

- **Within 2500KM traveling mileages of the new truck, you must go to the special repair station of the car chassis to do "maintenance handling";** otherwise, the manufacturer of the chassis of the vehicle will not provide the three-guarantee service.
- As the national automobile regulations are continuously updated, our company advises customers to apply for motor vehicle licenses **within one month of buying a new truck.**

III. Product parameters and main construction

Upper structure parameters and configuration:			
Tank volume	5000-12000 L	Hydraulic pump	CBQ-F550
Hydraulic motor	XM90	Asphalt pump	QGB450/QGB950
Controller	ZM-IC	Burner	G20 (RIELLO)
Generator	EC6500CX (Honda)	Spray width	6000 mm
Spray accuracy	±1.5%	Spray amount	0.5-3.0 kg/m^2
Thickness of the insulation layer	50 mm	Number of nozzles	35-39

Oil grade and capacity table:		
Oil name	Grade	Capacity
Vehicle fuel	Light diesel	145 L
Engine oil	90# and above gasoline	25 L
Working device hydraulic oil	Anti-wear L-HM68	100 L
Working device heat transfer oil	Great Wall Brand 320#	110 L
Asphalt heating fuel	Light diesel oil	Common chassis tank
Pipe cleaning diesel	Light diesel oil	75 L

Table 2 Product parameters and main configurations table

IV. All system structures and working principle

1. Control system

The electrical control system is divided into two parts: DC circuit (DC24V, chassis power supply) and AC circuit (AC220V, generator set power supply).

DC circuit consists of power take-off, reducer, cooler, hydraulic reversing valve, rear nozzle lift, rear work light control circuit and automatic control system circuit.

The AC circuit consists of a generator, a burner, and a heat transfer oil motor circuit.

See the intelligent electrical schematic diagram (see PXX Figure 1) for details.

2. Hydraulic power and transmission system

Hydraulic power and transmission system consists of power take-off devices, asphalt pumps, hydraulic pumps, hydraulic valves and other hydraulic components. See Figure 2 and Figure 3 for details.

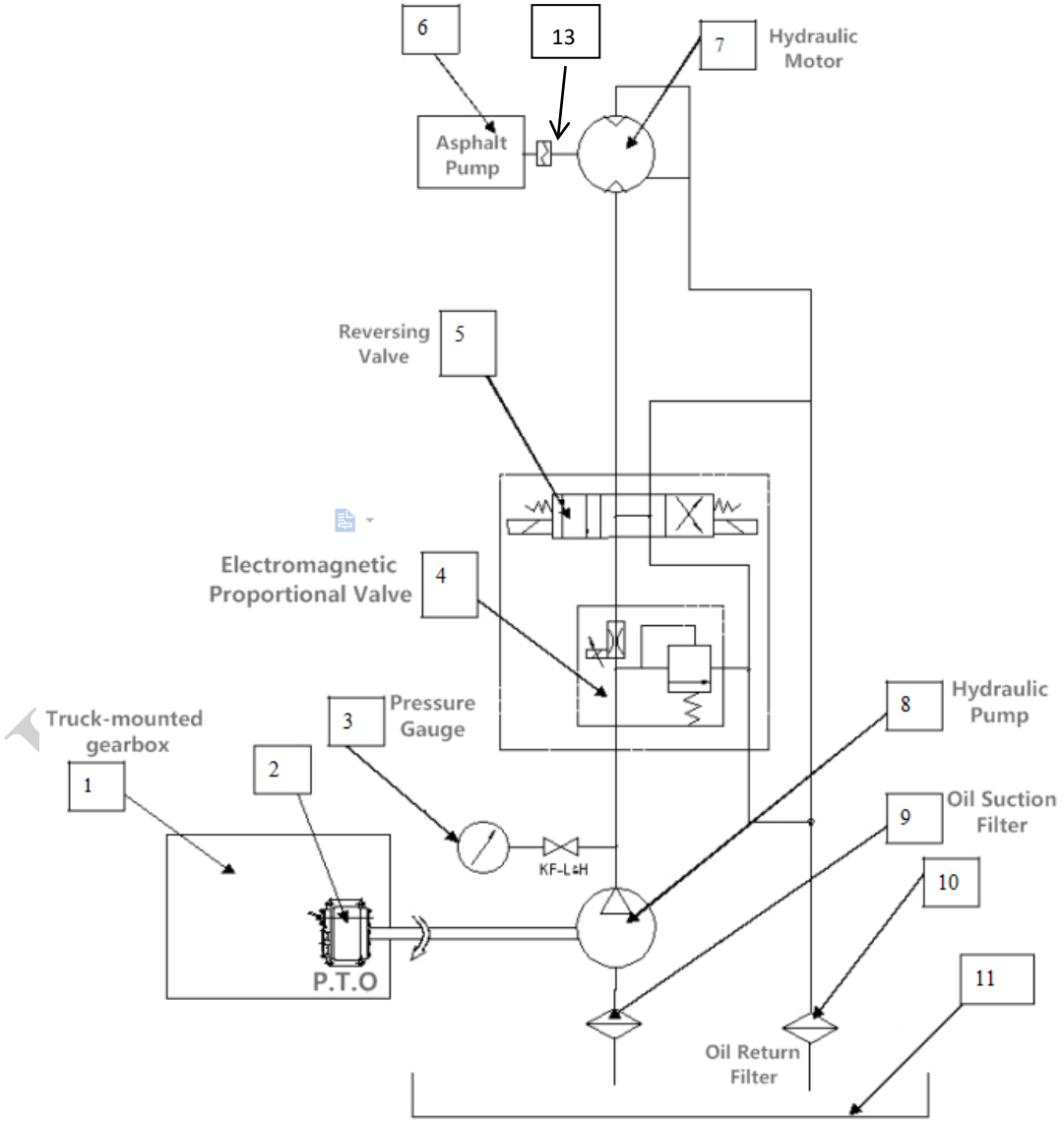

Figure 2 Hydraulic power and transmission system schematic diagram

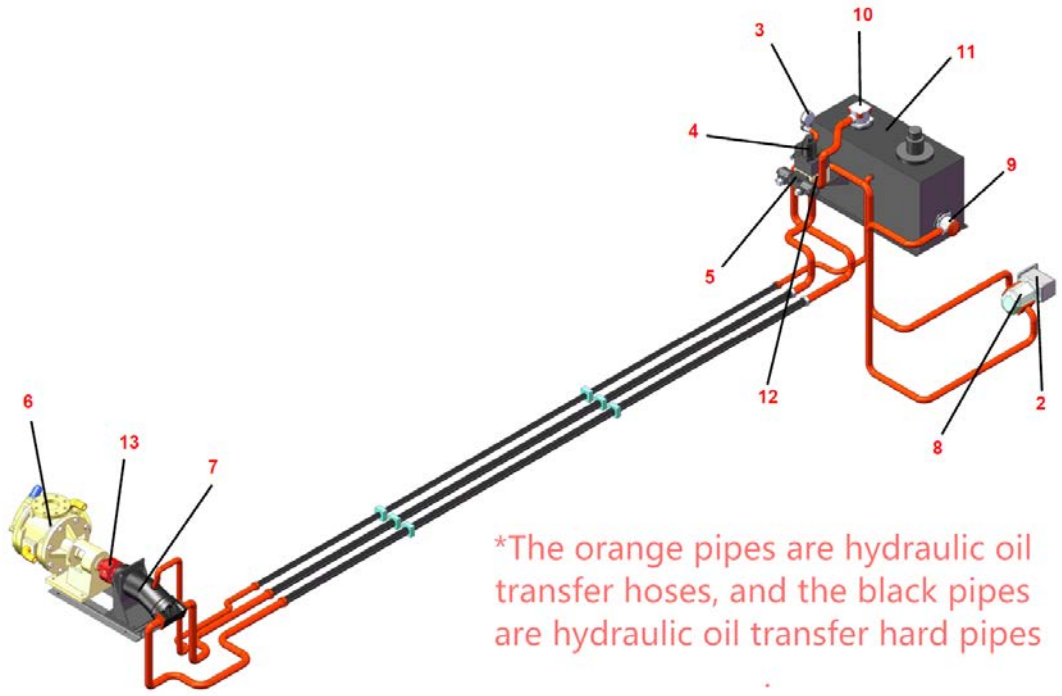

Fig. 3 Hydraulic power and transmission system model diagram

(Only for reference; all in kind prevail)

No.	Name of part	Description
1	Truck-mounted gearbox	\
2	Power Take Off （P.T.O）	\
3	Hydraulic system pressure gauge	System pressure 14MPa
4	Electric proportional valve	\
5	Electromagnetic reversing valve	\
6	Asphalt pump	\
7	Hydraulic motor	Displacement 63ml/R
8	Hydraulic pump	Displacement 40ml/R
9	Oil suction filter	Filtration accuracy 80μm
10	Return oil filter	Filtration accuracy 15μm
11	Hydraulic oil tank	\
12	Hydraulic valve seat	\
13	Couplings	\

Table 3 Hydraulic power and transmission system parts table

The power take-off is a two-axis mechanical gearbox structure. The input gear meshes with the third gear of the intermediate shaft of the automotive gearbox and outputs power from the output shaft. The fork is pushed by the high pressure air to achieve the engaging and disengaging of power takeoff through the meshing gear sleeve.

The sequence of the power transmission between the hydraulic power and the transmission system is as follows: Gearbox (output shaft) → Power Take Off (power received from the gearbox and transmitted to the hydraulic pump) → Hydraulic pump (converts input mechanical energy into kinetic energy of hydraulic oil) → Hydraulic oil → Hydraulic motor (converts input hydraulic oil kinetic energy into mechanical energy of output shaft) → Coupling (elastic connection) → Asphalt pump (converts mechanical energy of input shaft into kinetic energy of asphalt).

3. Asphalt pipe and spraying system

Asphalt pipe and spraying system consist of asphalt pumps, asphalt tanks, asphalt spray rod assemblies, asphalt pipelines, and valves. See Figure 4, Figure 5, and Figure 6 for details.

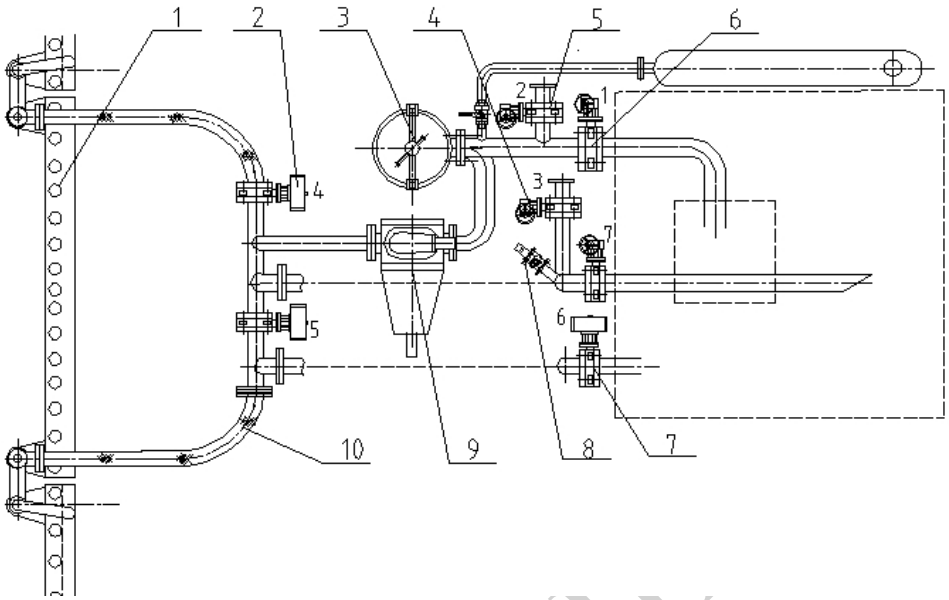

Fig. 4 Schematic diagram of asphalt pipeline and spraying system

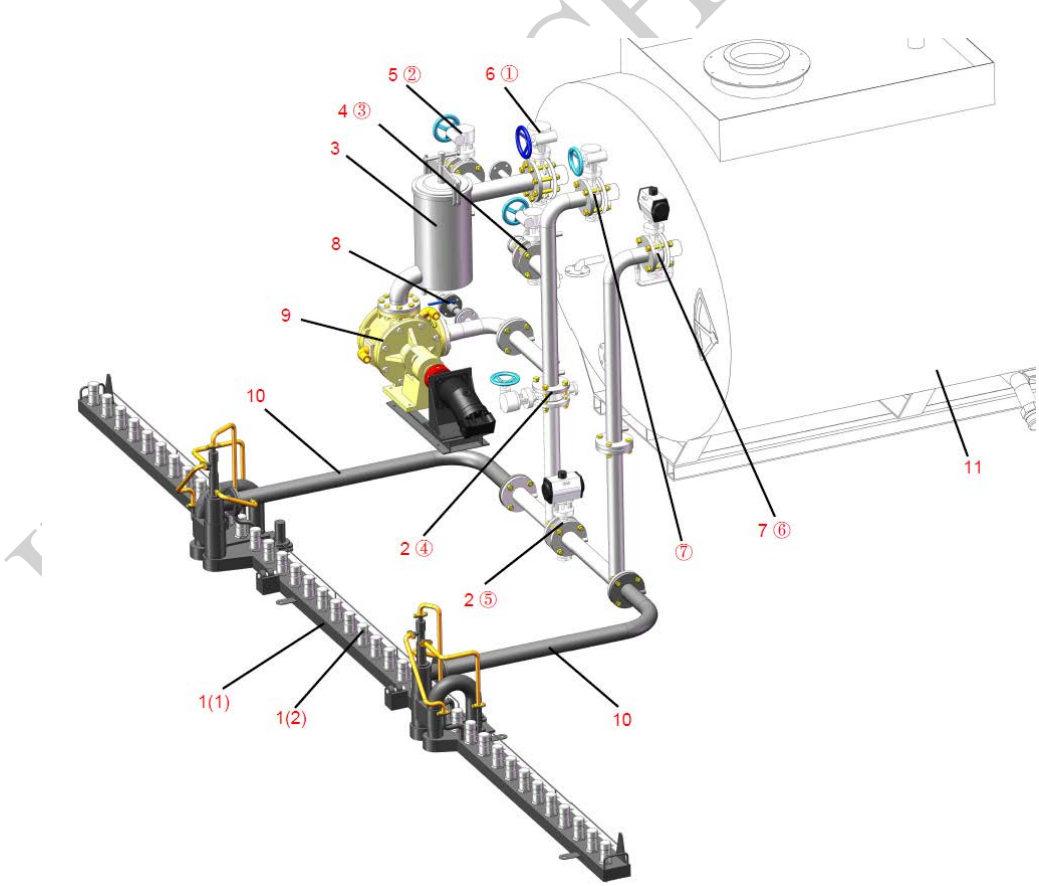

Fig. 5 Asphalt pipeline and spraying system model diagram

(Only for reference; all in kind prevail)

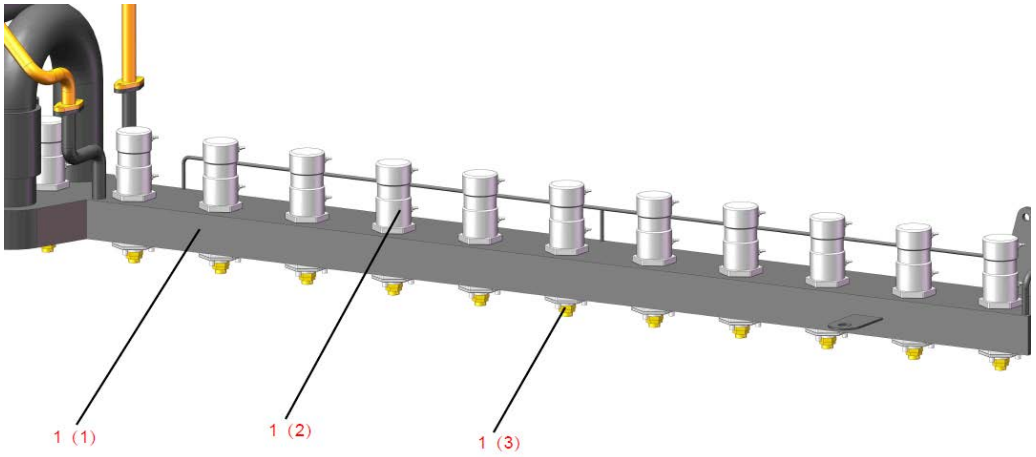

Fig. 6 Asphalt cylinder nozzle assembly model diagram

(Only for reference; all in kind prevail)

No.	Name of part	Qty.	Marks
1（1）	Asphalt spray rod	3	\
1（2）	Small asphalt cylinder	39	\
1（3）	Asphalt nozzle	39	\
2 ④	No. 4 valve - large circulation oil outlet valve	1	Manual control
2 ⑤	No. 5 valve—outlet valve	1	Pneumatic control
3	Asphalt filter	1	\
4 ③	No. 3 valve - transfer valve	1	Manual control
5 ②	No. 2 valve – self-suction valve	1	Manual control
6 ①	No. 1 valve - asphalt tank outlet valve	1	Manual control
7 ⑥	No. 6 valve - large circulation return valve	1	Manual control
⑦	No. 7 valve - small circulation return valve	1	Manual control
8	Hand spray valve	1	Manual control
9	Asphalt pump	1	\
10	Asphalt stainless steel hoses (left, right)	2	\
11	Asphalt tank	1	\

Table 4 Asphalt piping and spraying system parts table

Asphalt can be divided into the following two loops after it is sucked out of the asphalt tank's oil outlet:

I. Asphalt Small Cycle: Asphalt Tank → Asphalt Tank Outlet Valve 6 ① → Asphalt Filter 3 → Asphalt Pump 9 → Asphalt Small Cycle Return Pipe → Asphalt Small Circulation Return Valve ⑦ → Asphalt Tank

II. Large Asphalt Cycle: Asphalt Tank → Asphalt Tank Outlet Valve 6 ① → Asphalt Filter 3 → Asphalt Pump 9 → Asphalt Large Cycle Outlet Valve 2 ④ → Left Asphalt Hoses 10 → Asphalt spray rod 1 (1) → Right Asphalt hose 10 → Asphalt large circulation return pipe → Asphalt large circulation return valve 7 ⑥ → Asphalt tank

4. Asphalt pipeline cleaning system

The pipeline cleaning system is divided into diesel cleaning and high pressure air flushing.

The diesel cleaning part consists of a diesel tank (tube), an oil inlet ball valve, and piping. When diesel is used for cleaning, the asphalt pump rotates at a low speed, and the diesel is discharged through the oil inlet copper ball valve, the asphalt filter, the asphalt pump, and the asphalt nozzle.

The high-pressure air flushing part consists of a gas cartridge, a one-way valve, an air valve, and other components. Check valves prevent asphalt from returning to the air reservoir. When the high-pressure air is used for flushing, close the diesel oil inlet copper ball valve; when the asphalt pump rotates at a low speed, open the main pipeline air valve, wo high-pressure air passes through the valve, the asphalt filter, the asphalt pump, the post-spraying pipeline, and the asphalt nozzle, to discharge the asphalt and diesel in the pipeline. See Figure 7, Figure 8 and Figure 9 for details.

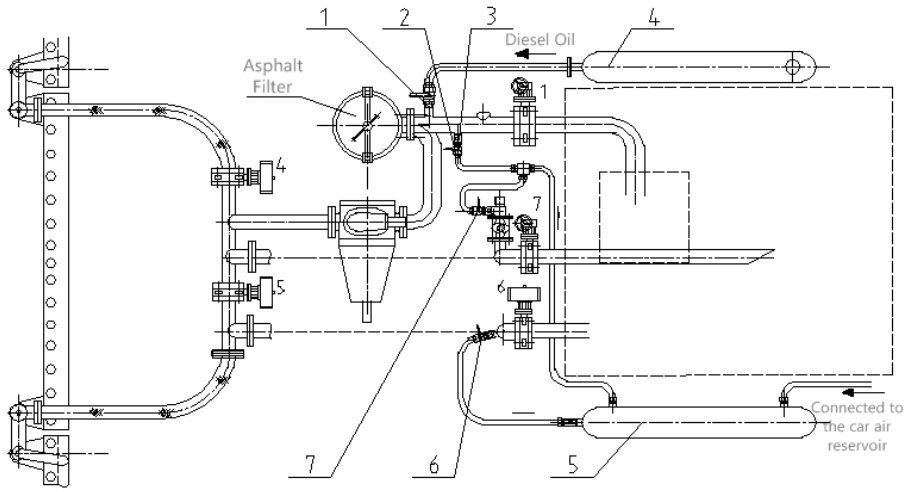

Fig. 7 Schematic diagram of asphalt pipeline cleaning system

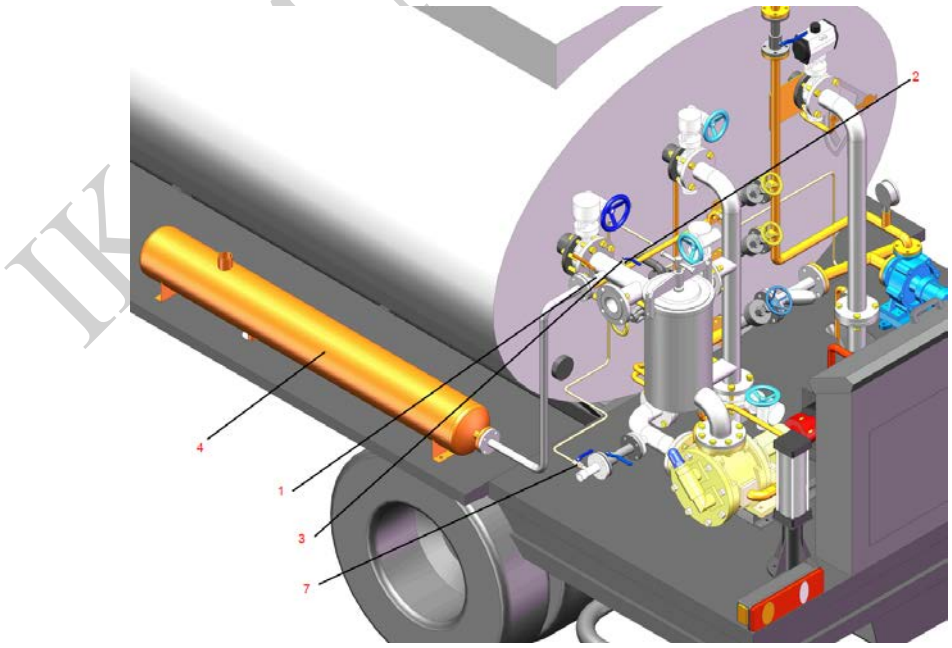

Fig. 8 Left view of the model diagram of the asphalt pipeline cleaning system

(Only for reference; all in kind prevail)

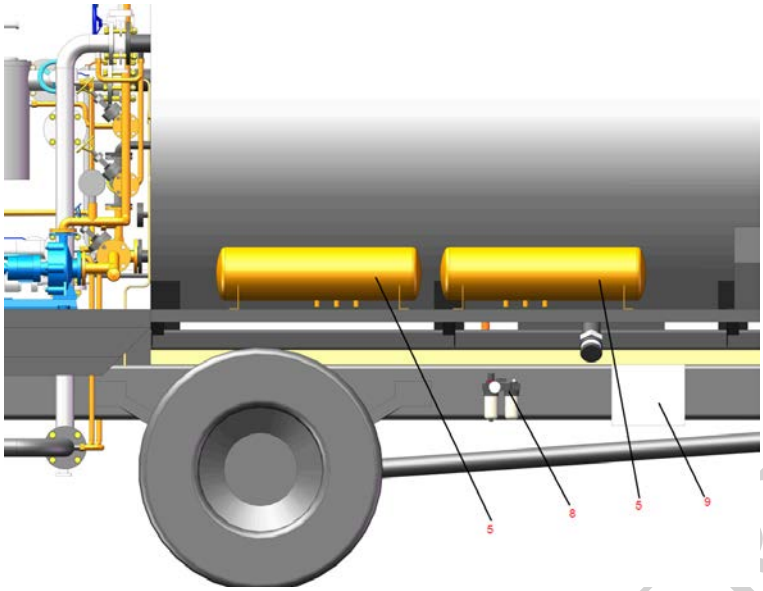

Fig. 9 Right view of the model diagram of the asphalt pipeline cleaning system

(Only for reference; all in kind prevail)

1. Oil inlet copper ball valve 2. Main pipe air valve 3. Air check valve 4. Diesel cleaning fuel tank 5. Air reservoir 6. Return valve air valve 7. Hand nozzle air valve 8. Air source filter 9. Air distribution box

5. Heat transfer oil and heating system

Asphalt heat transfer oil and heating system consists of heat transfer oil circulation heating system and burner heating system.

(1) Burner heating system

The burner heating system consists of a U-shaped combustion chamber, a heat transfer oil heating chamber, a fuel tank (chassis fuel tank), a burner, and a heat transfer oil temperature control box. The diesel fuel is sucked from the chassis fuel tank through the filter to the burner and mixed with air. After atomization, it is injected into the combustion chamber and the exhaust gas is discharged from the chimney. The heat generated by combustion in the combustion chamber heats asphalt in the surrounding tank and the heat transfer oil in the heat transfer oil heating chamber. The flame size and target temperature are controlled by the heat transfer oil temperature control box. See Figure 10 and Figure 11 for details.

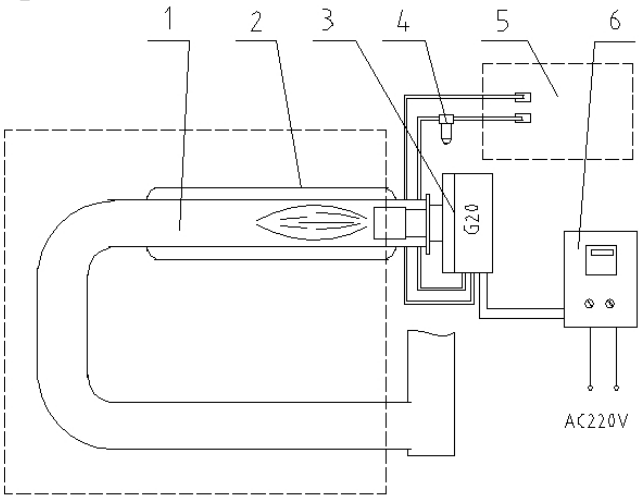

Figure 10 Schematic diagram of burner heating system

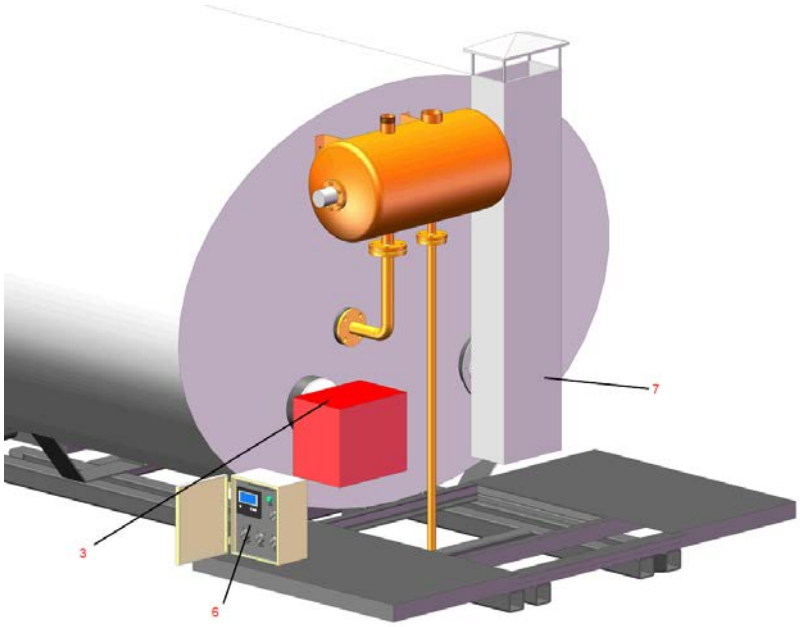

Fig. 11 Burner heating system model diagram

(Only for reference; all in kind prevail)

1. U-type combustion chamber 2. Heat transfer oil heating chamber 3. Burner 4. Diesel filter 5. Chassis fuel tank 6. Heat transfer oil temperature control box 7. Exhaust chimney

(2) Heat transfer oil circulation heating system

The heat transfer oil circulation heating system is composed of a heat transfer oil motor, a heat transfer oil pump, a heat transfer oil expansion tank, and an asphalt heating circulation pipeline. Through the heat conduction oil circulation, not only the asphalt inside the tank can be heated and insulated, but also the asphalt pump, the asphalt filter and the after-spray can be quickly heated, as shown in see Figure 7 and Figure 8.

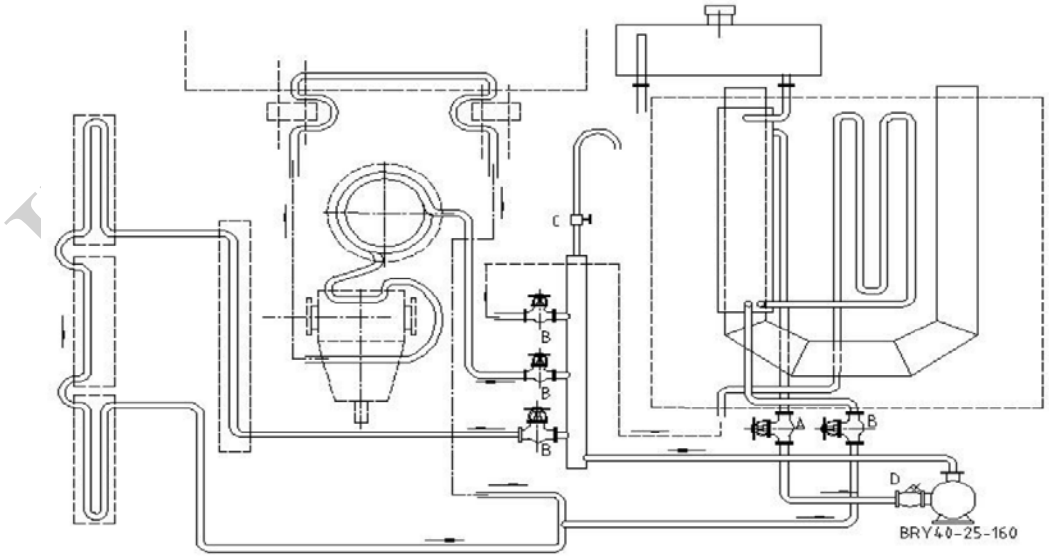

Figure 12 Schematic diagram of heat transfer oil circulation heating system

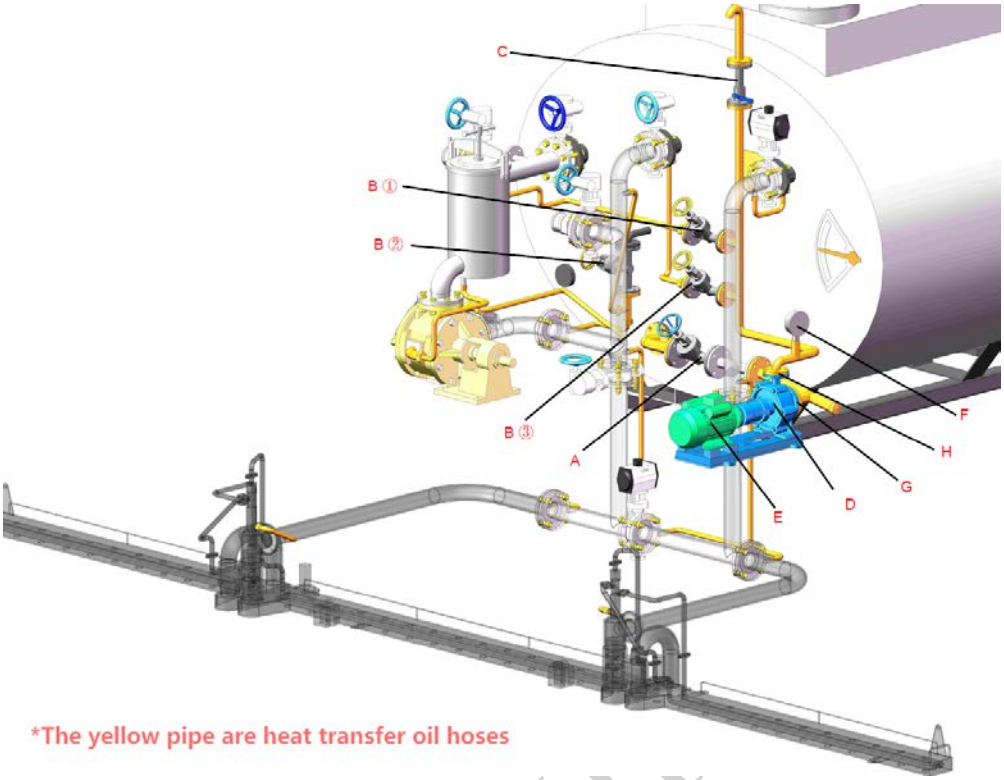

Fig. 13 Heat transfer oil circulation heating system model diagram

(Only for reference; all in kind prevail)

A.1.5" Cut-off valve B.1" Cut-off valve C.0.5" Cut-off valve D. Heat transfer oil pump

E. Heat transfer oil motor F. Heat transfer oil pressure gauge G. Heat transfer oil inlet

F. H. Heat transfer oil outlet

The heat transfer oil can be divided into the following three-way circulation after it is pumped out of the heat transfer oil outlet:

I. Heat transfer oil pump H→1″ shut-off valve B ③→small asphalt circulation return → Heat transfer oil heating chamber → Heat transfer oil pipe inside asphalt tank→1.5″ stop valve A → Heat transfer oil pump G

II. Heat transfer oil pump H→1″ shut-off valve B ①→asphalt filter → asphalt pump → small asphalt circulation return pipe→1″ shut-off valve B ② →heat transfer oil heating chamber (around the combustion chamber)→Heat transfer oil pipe inside asphalt tank→ 1.5″ shutoff valve A → Heat transfer oil pump G

III. Heat Transfer Oil Pump H→1″ Shutoff Valve B ①→Pitch Filter → Asphalt Pump→ Small Asphalt Circulation Return Pip e→ Large Asphalt Circulation Outlet Pipe → Left Asphalt Hose → Left Asphalt Spray Rod → Middle Asphalt Spray Rod → Right Asphalt Spray Rod → Right Asphalt Hose → Large asphalt circulation return pipe → Heat transfer oil heating chamber (around the combustion chamber)→Heat transfer oil pipe inside asphalt tank→1.5″ shutoff valve A → Heat transfer oil pump G

V. Use and operation process

The correct use of asphalt sprayer and compliance with various operating procedures can give full play to the mechanical efficiency and maintain good mechanical performance, thereby increasing productivity and reducing construction costs.

The use and operation of intelligent asphalt sprinklers are mainly carried out according to the following process:

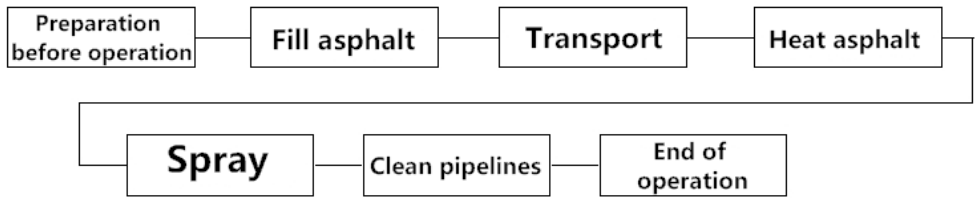

Fig.14 Operation flow chart of asphalt sprayer

1.Preparation before operation

⚠ **Carefully check the following items and add the asphalt to the asphalt tank only when those requirements are met.**

1.Check if the steering, braking, electrical and running gear of the vehicle are working properly and reliably;

2.Check the engine lubricating oil, fuel and cooling water is sufficient and is not leaked;

3.Check whether the generator lubricant and fuel are sufficient;

4.Add appropriate amount of diesel oil (about 60 to 70 liters) to the diesel fuel tank (tube);

5.Place the piping system valves in the closed position (especially the diesel fuel inlet ball valve and the air valve must be closed, otherwise the asphalt backfill into the air reservoir and the diesel tank will cause failure);

6.Check whether the rear spray pipes or portable nozzles and nozzles are unblocked and whether the asphalt pump can be rotated;

7.Before starting the engine, the gearbox and power take-off must be placed in the neutral position;

8.Start the engine, and engage the power take off, and check the hydraulic system is working properly, and check all electrical switches work normally;

9.Check whether the generator set is working properly, and whether the heat transfer oil pump can run normally, and whether the burner can ignite normally.

2.Fill asphalt

Filling asphalt includes the filling by the external equipment and the self-suction filling by the asphalt pump.

Method 1 Filling by the external equipment

After check and confirm the sprayer in the fault-free condition, drive the vehicle under the asphalt filler pipe, and place all the valves in the closed position first, and open the small cap of the filler port on the top of the asphalt tank (P3 in **Figure 1-32**), and put the filler pipe into the tank , and start to fill asphalt, and then close the filler cap after filling is completed.

⚠ **The following requirements shall be met when filling asphalt:**

1.Asphalt can not be added too full, and the asphalt level added can be between 30 and 40 cm from

the filler port, especially for hot asphalt, so as not to overflow;

2.In order to avoid too long heating time, it is very unfavorable to equipment life and work efficiency. The filling asphalt must meet the following temperature requirements: the temperature of ordinary heavy-load hot asphalt pavement is above 160℃; the temperature of SBS and SBR modified hot asphalt is above 185℃; Temperature of the SBS and SBR modified emulsified asphalt is between 65-85℃;

3.When the new car is used for the first time, be sure to clean up the accumulated water in the tank, otherwise it will cause risk, and the filling asphalt must be less than 60% of the volume of the asphalt tank;

4.After using emulsified asphalt and before filling hot asphalt, be sure to discharge the remaining emulsified asphalt in the sprayer completely, otherwise it will cause risk. Conversely, the same steps are available for filling emulsified asphalt after using the hot asphalt;

5.Always check if the vents are unblocked.

Method 2 Self-suction filling by the asphalt pump

Fill asphalt into the asphalt tank through the self-suction by the asphalt pump on the asphalt sprayer.

⚠ **The following requirements are met when filling asphalt:**

1.The connection of the self-suction hose must be tight, and the asphalt filter cover must be tightly closed. No air leakage is allowed.

2.The diesel fuel inlet ball valve and air valve must be closed tightly. Otherwise, they will not work and may even cause danger.

3.The liquid level of the asphalt storage tank must be higher than the center of the asphalt pump and the distance is less than 5 meters;

4.Asphalt pump idle time can not exceed 2 minutes;

Other precautions are same with those described in the method 1.

The operation flow of the Method 2 is as follows:

(1) Preparation

Check whether the entire working system of the vehicle is working properly:

①Check whether the indicators of the vehicle instrument are normal;

②Check whether the oil volume in the fuel tank is sufficient;

③Check whether the hydraulic oil is sufficient;

④Power take-off (P.T.O) switch is at the "OFF" state and the reducer switch is in the "QUICK" state.

Park the asphalt sprinkler on the edge of the asphalt pool and use a hose to connect the asphalt tank outlet with the self-suction port of the asphalt sprinkler.

Fig. 15 Self-suction port diagram

(2) Start the vehicle

Start the engine of the vehicle and check the gas pressure gauge on the car dashboard. When the pressure is ≥ 0.6MPa, turn off the engine of the vehicle and step down the clutch to make the vehicle gear in neutral. Turn the Power Take Off (P.T.O) switch of the front console in the cab to "ON" and start the vehicle engine again, keeping the engine speed at 1000 rpm.

Fig. 16 Power takeoff switch and automotive gas pressure gauge diagram

(3) Open and close the valve

Open the self-suction valve and open the small asphalt circulation return valve, and close the remaining asphalt pipeline valves.

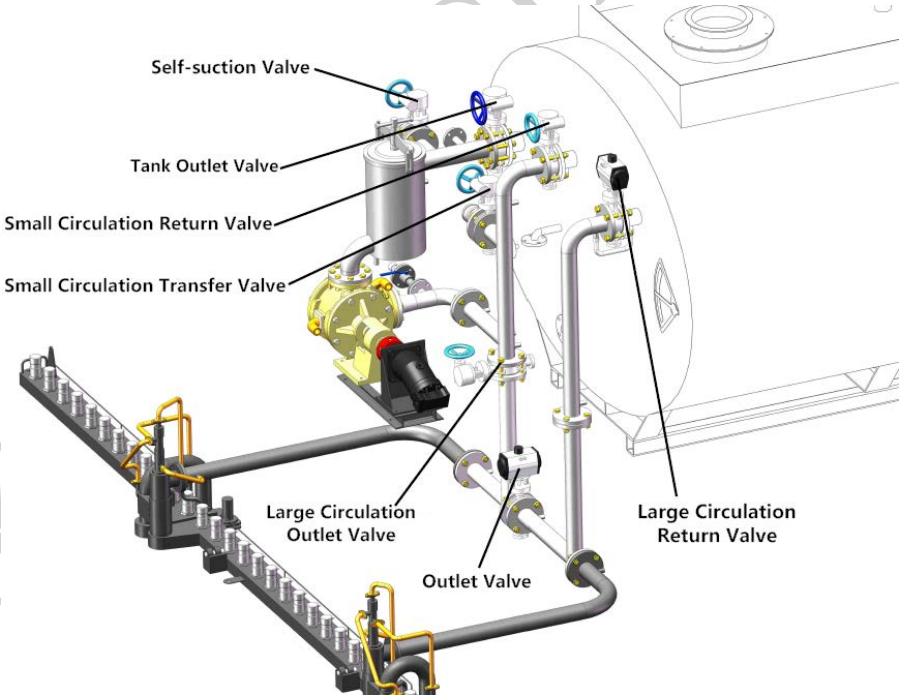

Fig. 17 Asphalt pipeline valve position diagram

(4) Turn on the rear control cabinet power and open the asphalt pump

Turn on the power switch (POWER--“ON”) of the rear control cabinet, and turn the foreground-background selector switch to the (SWITCH--BACKGROUND) and turn on the asphalt pump switch (PUMP--“ON”), and adjust the asphalt pump speed (150rpm) to start the self-suction operation.

Fig. 18 Rear control cabinet control panel diagram

⚠ **During the self-suction operation, observe whether there is asphalt flowing from the small asphalt circulation return port through the manhole; if no asphalt flows from the return port when the asphalt pump is rotating for 2 minutes, close the asphalt pump timely and check the asphalt pipe, the valve and the filter and other components for cogging or air leakage and check whether there is asphalt in the storage tank. As the asphalt pump is working at the high temperature, the internal gap is larger, so the asphalt pump will be seriously worn by a long-term self-suction. Therefore, the company recommends to use method 2 as little as possible.**

3.Transport

When filling asphalt to the target volume in the asphalt sprayer, disengage the car clutch and turn the reducer switch to the “QUICK” state, and drive the vehicle slowly to the construction site at the medium speed.

⚠ Precautions on transportation:

(1)In the process of transportation, **do not stand on the rear working platform;**

(2)During the transportation of the asphalt sprayer, disengage the power takeoff and close the controller of the power takeoff, and close the asphalt pipe inlet and outlet valves and heat transfer inlet and outlet, and stop the heat transfer oil pump; **do not use burner while the vehicle is driving.**

(3)**Close the master switch of the air source of the working system** in the transportation of the sprayer.

(4)As the mass of the truck filling with asphalt is too large, **do not drive or urgently brake the vehicle at high speed as much as possible.**

4.Asphalt heating

After transporting to the construction site, observe the thermometer of the asphalt tank; if the temperature of the asphalt in the asphalt sprayer can not meet the requirements of the spraying operation (for details of the asphalt spraying temperature, refer to the Article 8 of Precaution on P5), the asphalt must be warmed. as follows:

(1)Park the asphalt sprinkler truck on the flat ground, and confirm that the amount of asphalt in the asphalt tank reaches above the warning line, and open the cover of the front chimney of the tank body.

(2)Start the generator, as shown in **Figure 19**

①Turn the engine switch to "ON";

②Open the generator throttle to the maximum;

③Pull the start handle outward until the generator starts;

④Adjust the throttle size so that after the engine runs smoothly, check the voltmeter reading until the voltmeter reading is ≥220V.

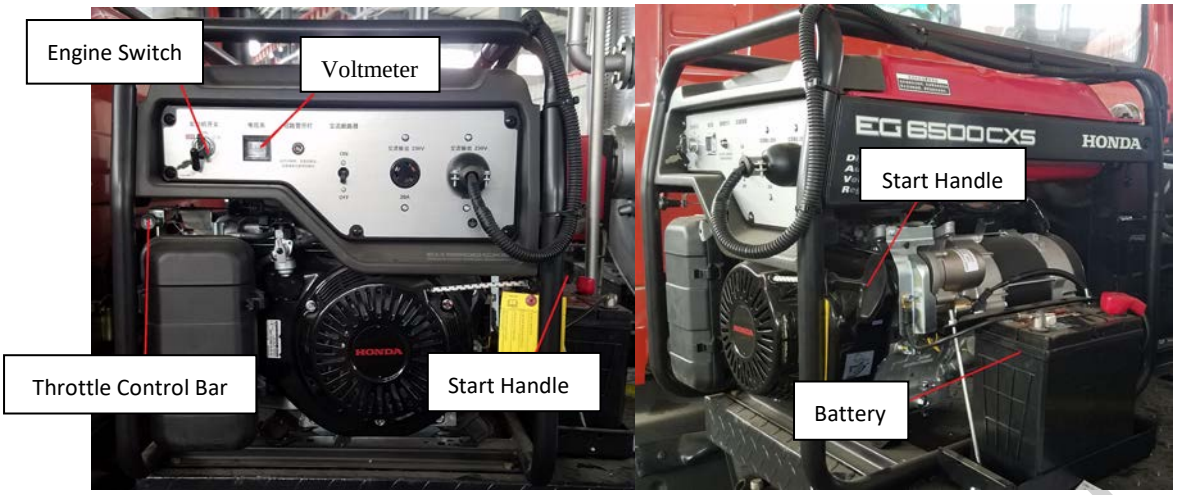

Fig. 19 Generator Set Diagram

(3)Open the master heat transfer oil outlet valve, the heat transfer oil asphalt pipeline oil distribution valve, and close the other valves.

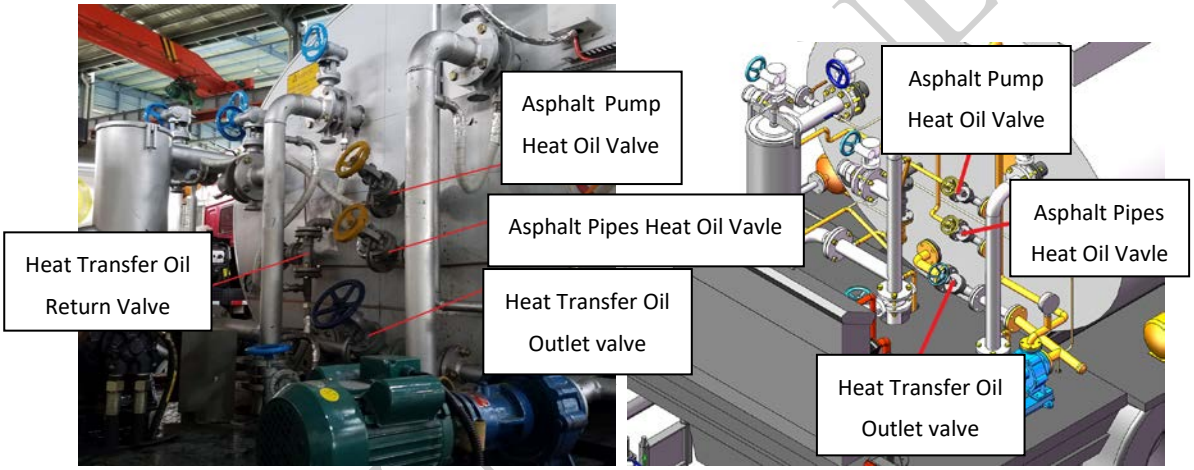

Fig. 20 Heat transfer oil valve diagram

(4)Run the heating system, as shown in **Figure 21**.

①Turn on the power switch, heat transfer oil pump switch, and burner switch;

②At this point, the sound of the burner fan can be heard until the ignition position reaches (observed through the observation port);

③If the burner cannot be ignited, it will stop automatically. Press the button to restart; If it cannot be ignited for many times, check if the oil inlet hose for leakage and check nozzle and the ignition electrode for carbon deposits.

Fig. 21 Heat transfer oil temperature controller diagram

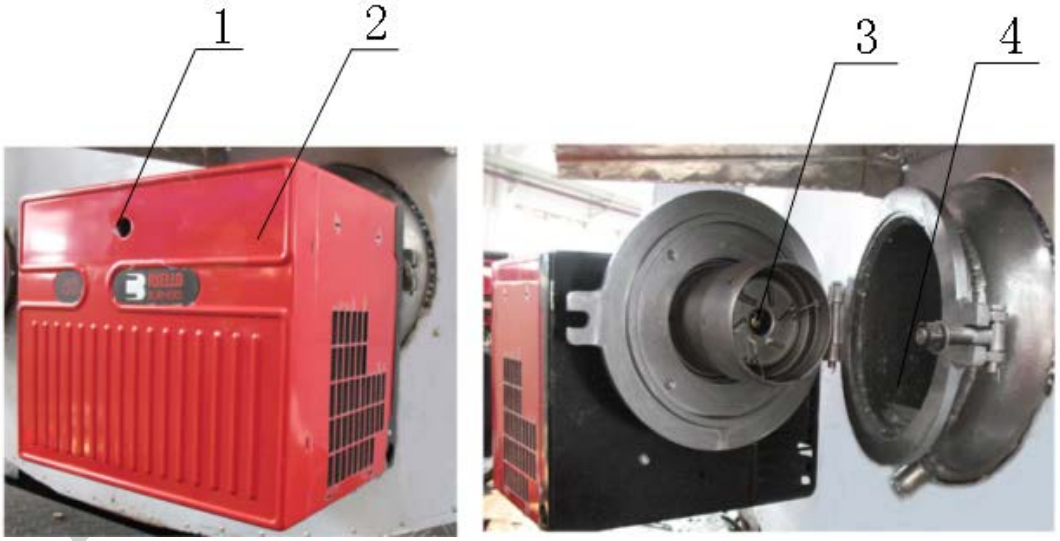

Fig. 22 Burner diagram

1. Burner Recovery Button 2. Burner 3. Burner Nozzle 4. Combustion Chamber

⚠ **The burner operating voltage is 220V. Be careful to prevent electric shock.**

The above method can only be used to heat the asphalt in asphalt tanks. To heat the asphalt pipelines, spray rods and nozzles, it is recommended to open the small circulation of the asphalt pipelines and the large circulation of the heat transfer oil pipeline for cyclic heating to achieve rapid and uniform heating of the asphalt. The purpose of this process is as follows:

(1)Open the heat transfer oil inlet valve, the heat transfer oil outlet valve, and close the other heat transfer oil valves, as shown in Figure 20.

(2)Open the asphalt tank outlet valve, the asphalt small-circulation return valve, and close the other asphalt pipeline valve, as shown in **Figure 17**.

(3)On the rear console, turn the “foreground-background selector switch” on the rear console to “background” and turn the “control valve” switch to “ON” to start the car engine. Engage the power takeoff, and turn on the "asphalt pump" switch and turn the speed adjustment knob to the middle position. The engine speed can be controlled at 1000 rpm, as shown in Figure 18. Make the asphalt from the asphalt tank → asphalt tank outlet valve → asphalt filter → asphalt pump → asphalt small circulation return valve → asphalt tank for small circulation.

Fig. 18 Rear control cabinet control panel diagram

Heat transfer oil temperature setting method:

As shown in Fig. 21, on the panel of the heat transfer oil temperature controller, the “mode key” is set at the factory without adjustment, and the first display PV is the actual temperature. According to the set temperature, press the “UP” or “DOWN”; the value shown by the second display SV is the temperature that needs to be set.

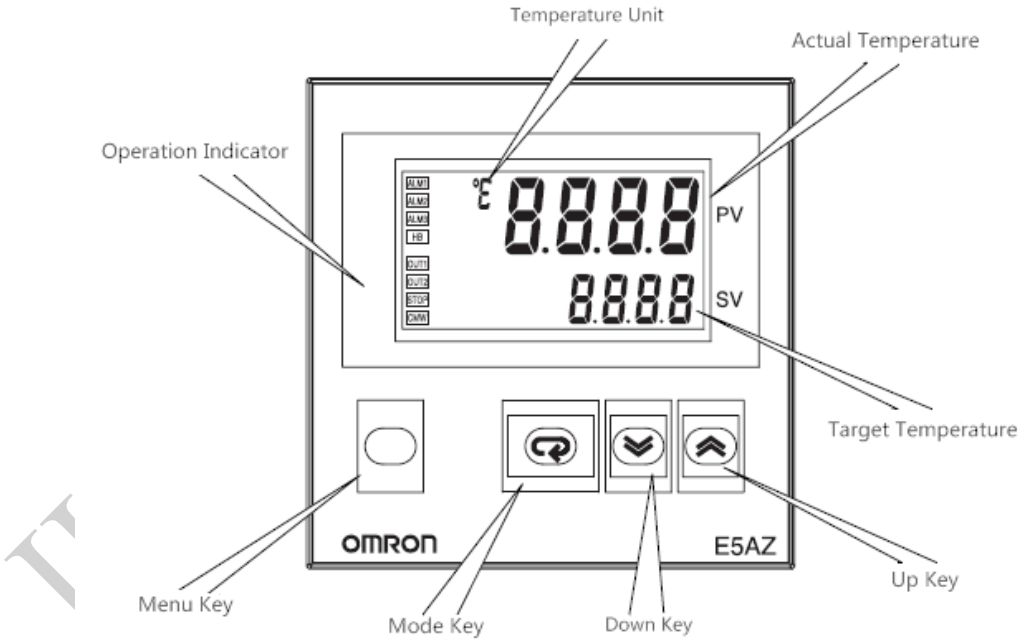

图 23 导热油温度控制器控制面板

Fig. 23 Heat transfer oil temperature controller control panel

⚠The actual temperature of the heat transfer oil is not equal to the actual temperature of the asphalt, and the actual temperature of the asphalt is based on the thermometer of the asphalt tank.

If the asphalt level is low when heating the asphalt, the manhole cover on the top of the asphalt tank needs to be opened to prevent air from expanding rapidly causing risk (the location of the manhole cover is shown in Fig. 1-32);

If found that the heat transfer oil is not pressured or the temperature does not increase continuously when heating the asphalt, discharge the air (that is, open the heat transfer oil exhaust valve, as shown in Figure 13-C).

5.Spray operation (Regular spray and manual spray)

Spray preparation

Before the asphalt sprayer begins to spray asphalt, spray preparation is required to allow the asphalt to circulate within the asphalt pipeline and the asphalt spraying pipeline (spray rod) (that is the large circulation of asphalt). The operation flow is as follows:

(1)Start the engine of the vehicle and open the main valve of gas source, as shown in **Figure 24.**

(2)Open the asphalt tank outlet valve, the asphalt large circulation outlet valve, and the asphalt large circulation return valve, and close the other asphalt pipeline valves.

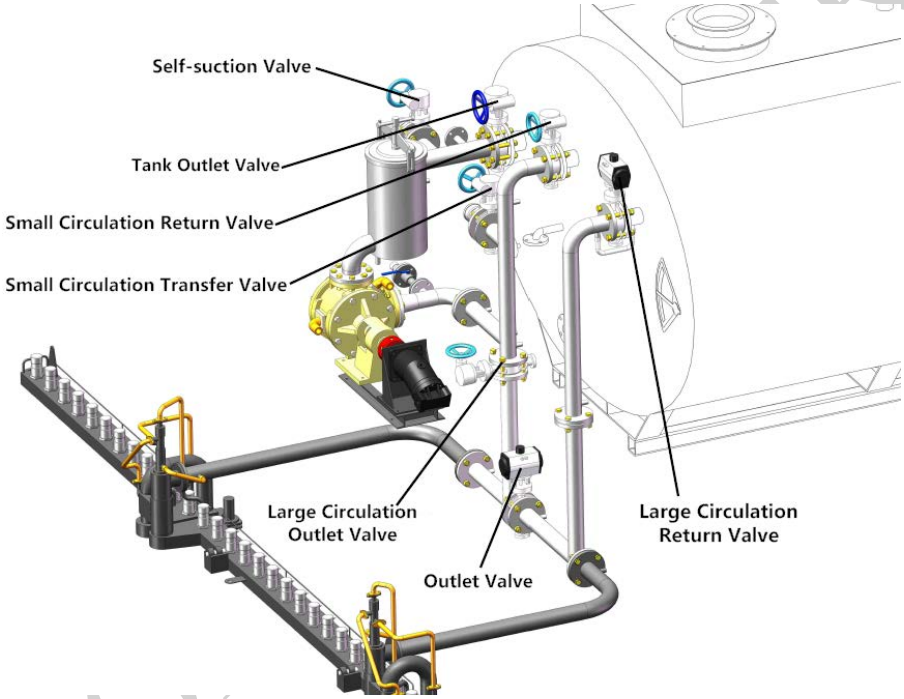

Fig. 17 Asphalt pipeline valve diagram

(3)Turn on the power switch on the rear control panel, as shown in **Figure 18**.

(4)Turn on the asphalt large circulation switch

①Rear console control

Turn the foreground-background selector switch to the “background” →open the asphalt circulation valve (control valve - “spray preparation”) → turn on the asphalt pump switch, as shown in **Figure 18.**

②Front console control

Turn the foreground-background selector switch to the “foreground” → turn on the front console power switch → open the asphalt large circulation valve (VALVE-“ON”) → turn on the asphalt pump switch (Hydraulic Valve--Pump).

Fig. 24 Front console and master air source valve diagram

Asphalt large circulation cycle process: Asphalt Tank → Asphalt Tank Outlet Valve → Asphalt Filter → Asphalt Pump → Asphalt Large Circulation Outlet Valve → Left Asphalt Hose → Rear Spray Rod → Right Asphalt Hose → Asphalt Large Circulation Return Valve → Asphalt tank.

The large cycle of asphalt is about 10 minutes. After the post-spray has been fully warmed up, the large cycle can be stopped.

Spray controlled by the front console

(1)Start the vehicle engine

(2)Control the spray rod lift switch at the rear console to adjust the rear spray rod to about 250-300mm off the ground, and then expand the left and right spray rods to make all spray rods form a straight line.

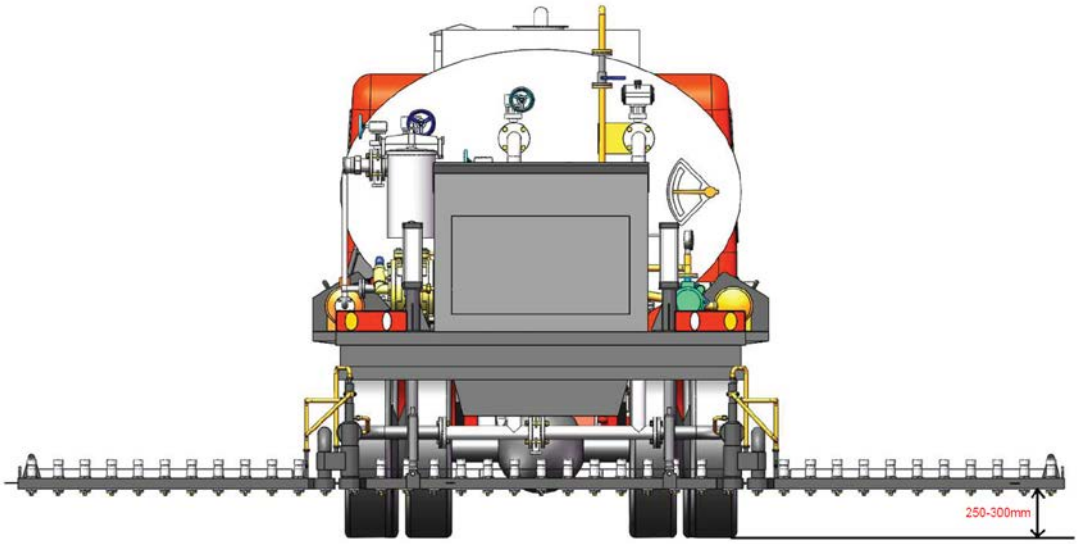

Fig. 25 Schematic diagram of the distance from the rear spray rod to the ground

(3)Turn the foreground-background selector switches to the "foreground"

(4)Turn on the front console power (POWER - "ON")

(5)Turn the reducer switch to the slow gear (TRANSMISSION - "SLOW")

(6)Open the asphalt valve VALVE - "ON", and open the asphalt pump PUMP - "ON"

(7)Turn on the spray switch (WORK--"ON"); that is, the rear spray rod starts to spray asphalt.

Fig. 18 Rear control cabinet control panel diagram

Fig. 24 Front console diagram

(8)Adjust the asphalt spray

①According to different construction requirements, the type of asphalt, the asphalt spraying amount (asphalt pump speed), the spraying width (number of the open nozzle), and the distance to start the spray can be set before spraying (Note: Click on the user menu "USER" and enter the password of the computer system, and press OK key to back to the homepage. Then click “SYSTEM” to enter the internal parameter settings. The internal parameters have been set before shipment. If the customer requires the internal parameters to be reset, please contact the company's after-sales service staff.)

Fig. 26 Front console startup interface

②Click the working parameter setting shortcut key “SCHEME” to enter the working parameter setting interface, and click the setting button shown in Figure 27; according to the construction needs, set the amount of asphalt spray (asphalt pump speed), the asphalt spray width (the number of open nozzles), the asphalt type and the spray starting distance; after setting is complete, click the "Enter Work Monitoring Interface" to enter the work monitoring interface.

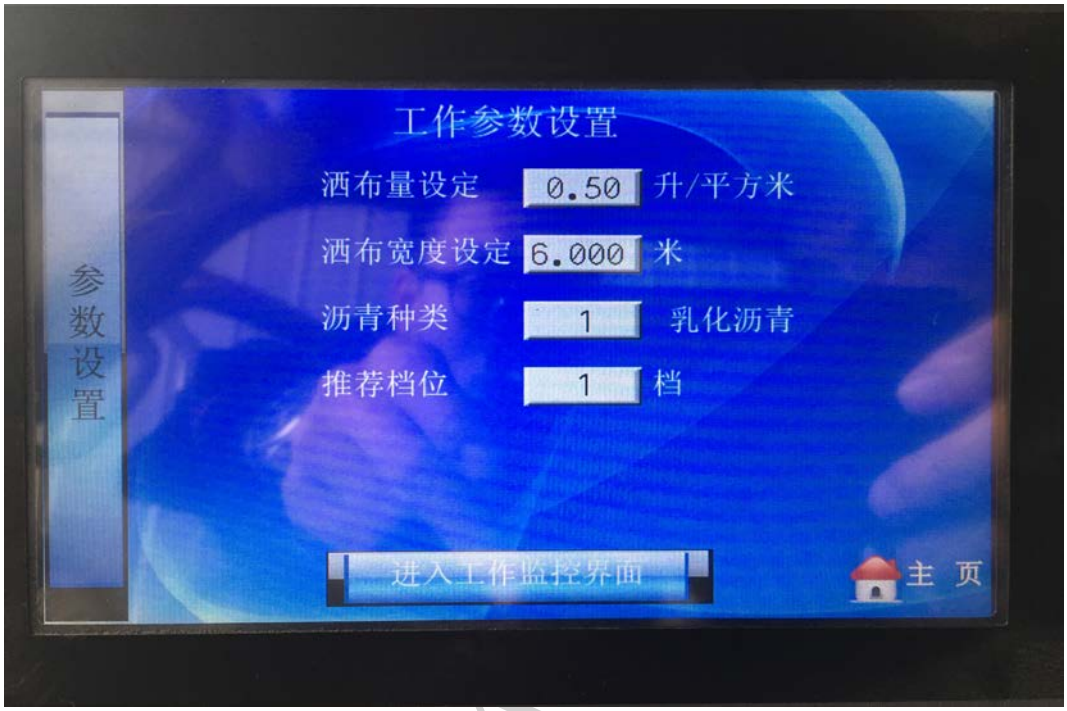

Fig. 27 Front console working parameter setting interface

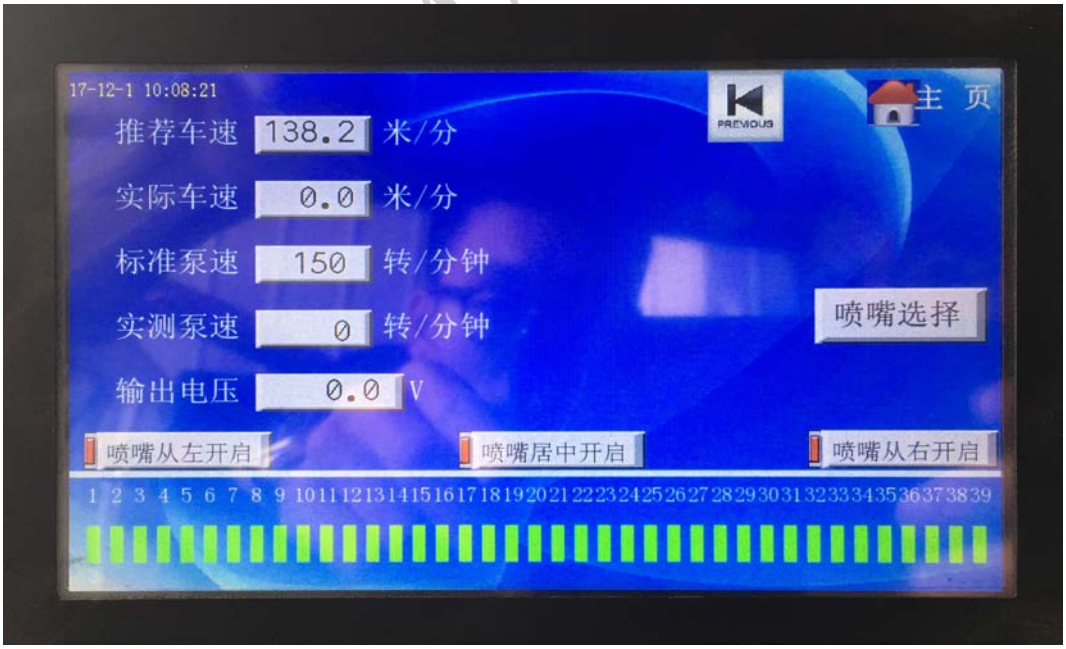

Fig. 28 Front console work monitoring interface

The construction is carried out according to the recommended speed and recommended gears of the front console work monitoring interface (**Figure 28**), to improve the asphalt spraying efficiency and the accuracy.

Background emergency spray

When the spray preparation is completed, control the spray rod lift switch to adjust the spray rod leave the ground about 250 to 300mm, and then expand the left and right spray rods to make all spray rods in the straight line, and then open the asphalt circulation pump and the asphalt pump and turn on the master spray switch (NOZZLE - "ON") to spray; the pump speed button on the rear console panel is used to increase or decrease the asphalt pump seed to meet the spray requirements.

Fig. 18 Rear control cabinet control panel diagram

Manual spray

When the construction needs short distance and small area spraying or when the automatic control system is failed, manual spraying can be used. The manual spraying process is as follows:

(1)Connect the manual spray hose to the manual spray connector (note the use of O-rings when connecting);

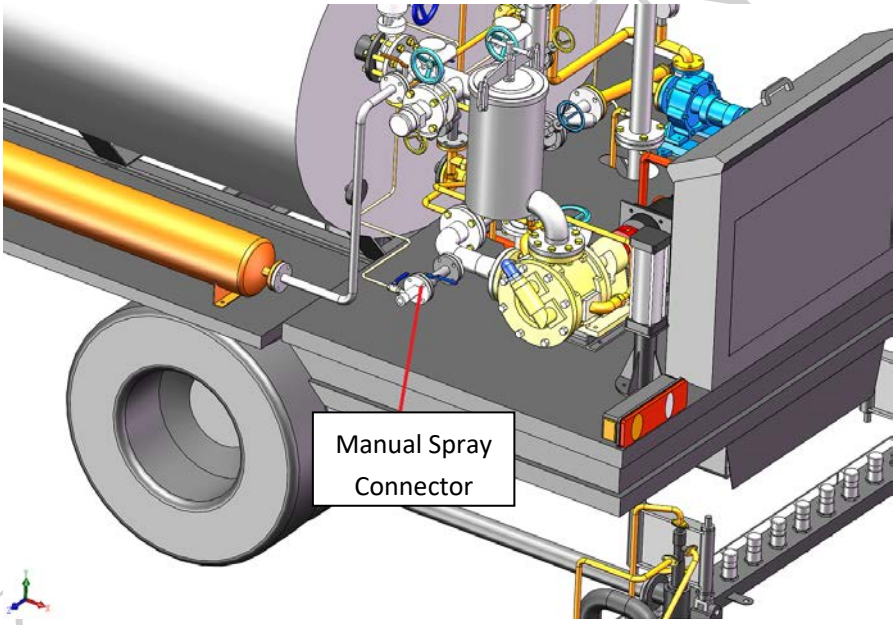

Fig. 29 Manual spray connector diagram

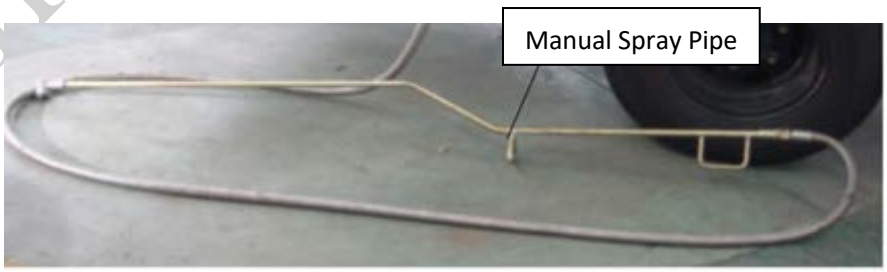

Fig. 30 Manual spray pipe

(2)Open the asphalt tank outlet valve, and open the asphalt small circulation return valve (valve opening is about 45 °), as shown in **Figure 17**;

(3)Turn on the power switch (POWER--“ON”) of the rear control cabinet, and turn the foreground-background selector switches to the background (SWITCH--“BACKGROUND”), and turn the asphalt circulation valve to the self-suction cycle, and turn on the asphalt pump switch (PUMP - "ON"), as shown in **Figure 18;**

(4)Make the asphalt pump operate at low speed, and open the hand-operated manual valve to spray by hand, and control the opening of the asphalt small circulation return valve to control the spray atomization effect.

⚠ **For manual spray, the asphalt pump speed should not be too large; the asphalt small circulation return valve must open 45 °.**

Asphalt spraying amount, engine speed, gear and asphalt pump speed refer to the following table.

Gear	Engine speed	Asphalt pump seed	Spray amount
Ⅰ (slow)	1200rpm	780rpm	3.0L/m^2
Ⅰ (slow)	1200rpm	650 rpm	2.0-2.5 L/m^2
Ⅱ (slow)	1200rpm	610 rpm	1.5-2.0 L/m^2
Ⅲ (slow)	1200rpm	540 rpm	0.8-1.4 L/m^2
Ⅰ (quick)	1200rpm	550 rpm	0.5 L/m^2

Table 5

The above parameters are only for reference and the actual values are based on actual conditions.

6. Clean pipelines

Asphalt is a kind of substance that will solidify when the temperature drops (including emulsified asphalt with low working temperature). Therefore, when the operation of the asphalt sprayer is completed or needs to be converted to the construction site in the middle, the asphalt pump, the asphalt filter, the asphalt pipeline, the asphalt spray rod and the spray nozzle are cleaned. The removal of the residual asphalt can avoid the trouble caused by the solidification of the asphalt during subsequent operation.

⚠ **The cleaning operation must be carried out as soon as possible after the operation of the asphalt sprinkler vehicle is completed, otherwise the asphalt will not be cleaned after solidification.**

The cleaning process is as follows:

Cleaning of rear spray rod after spray

①Cleaning with high-pressure air

(1)Turn off the front console power switch and all work switches.

(2)Turn the foreground-background selector switch to the background (SWITCH--BACKGROUND), and turn the asphalt circulation valve switch to the Manual Spray, and turn on the asphalt pump switch.

(3)Close the asphalt tank outlet valve, and keep the asphalt pump running at low speed, and open the asphalt small circulation return valve.

(4)Open the high pressure air main pipe air valve, and clean the pipe, and blow the remaining asphalt in the pipe back to the asphalt tank.

(5)Close the asphalt small circulation return valve and the main pipe air valve. Open the nozzle switch (NOZZLE--“ON”) on the rear console control panel. First open 2-3 groups of nozzles for cleaning, and then open the remaining nozzles for cleaning.

(6)Open the high pressure air main line air valve to flush the nozzle.

②Cleaning with diesel

After the air flushing is completed, close the other valves to keep the asphalt pump running at a low speed, and

open the diesel fuel inlet copper ball valve, and turn on the nozzle switch (NOZZLE--“ON”) on the rear console control panel. First open 2-3 groups of nozzle for cleaning, and then open the remaining nozzles for cleaning. This will allow removal of residual asphalt in asphalt pumps, asphalt filters, asphalt spray rods, and nozzles.
It is recommended that the high-pressure air cleaning is performed again after the diesel cleaning is completed, and the cleaning can be more thorough.

Fig. 18 Rear control cabinet control panel diagram

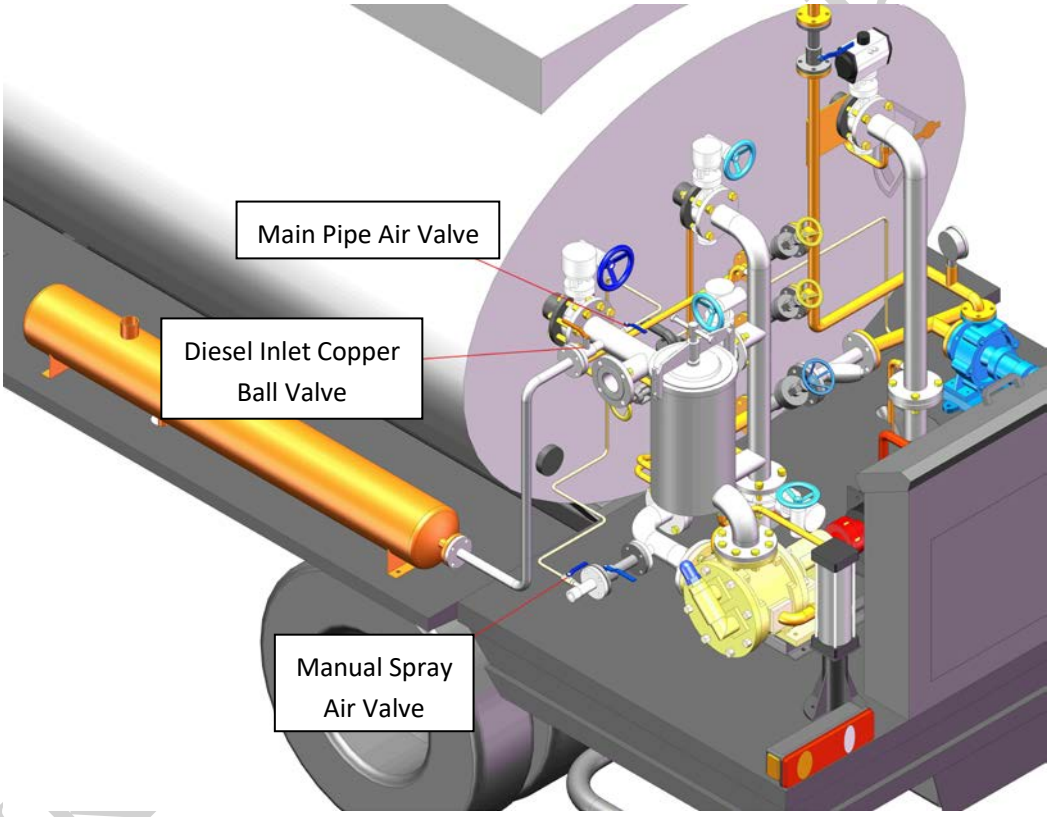

Fig. 31 Asphalt cleaning valve diagram

Cleaning after spray by a manual spray rod

(1) Turn off front console power switch and all work switches;

(2) Rotate the foreground - background selector switches to the background (SWITCH--BACKGROUND), and turn the asphalt circulation valve switch to manual spray, and turn on the asphalt pump switch;

(3) Close the asphalt tank outlet valve, and keep the asphalt pump running at low speed, and open the asphalt small circulation return valve;

(4) Open the high pressure air main pipe air valve, and clean the pipe, and blow the remaining asphalt in the pipe back to the asphalt tank;

(5) Close the main pipeline air valve, and open the diesel fuel inlet ball valve, and keep the asphalt pump running at low speed for 2-3 minutes;

(6) Close the diesel fuel inlet ball valve, and close the asphalt circulation return valve, and open the hand spray air valve, and blow off the asphalt from the manual spray hose, the manual spray rod and nozzle;

(7) After cleaning, close all valves.

7. End of operation

In order to ensure that the next operation of the equipment can be carried out smoothly, the following operations need to be completed after each spraying and cleaning work is completed:

①The remaining asphalt in the tank must be completely cleaned. A large amount of hot asphalt is solidified at the bottom of the tank, and it is difficult to dissolve in the next day. If it is emulsified asphalt, it may cause demulsification and precipitation, and a severe sticky pump phenomenon occurs during the next working day.

②Open the asphalt filter cover, take the filter out and put it in diesel to clean it. Pour about 2 liters of diesel into the filter and put the filter back in place and close the lid. Apply high-temperature grease (7020 kiln bearing grease) to the seal for sealing and open it easily the second time.

③Check that all asphalt valves, diesel valves, and air valves must be closed.

④Close the master gas source valve (on the car's air reservoir) and close the front and rear control console power switch.

⑤Close up the left and right rear spray pipes and lift the rear spray pipe and confirm that hooks are hung firmly.

VI. Maintenance of equipment

1. New vehicle run-in and maintenance

① The new car has a run-in period of 2500km and the operating time of 60h.

② Within 2500KM traveling mileages of the new truck, you must go to the special repair station of the car chassis to do “maintenance handling”;

③ Strict maintenance should be carried out in accordance with the provisions in the Section New Vehicle Run-In of "*Automotive Operation Manual*".

④ The spreader should be driven at a low speed during the period of the new car's run-in; the asphalt thank should be below 60% of the rated load.

⑤ Every day, check the tightening of bolts at various locations and check the joints of asphalt, fuel oil, hydraulic oil, heat transfer oil, high-pressure air, and cooling water pipes for leakage and looseness.

⑥ Check whether the electrical switches and connectors are loose and working normally daily.

2. Technical maintenance and lubrication

During the operation of sprayer, technical maintenance shall be performed timely to ensure the normal operation of the machine and extend the service life of the machine.
In addition to the chassis part of the sprinkler truck must be strictly according to the "automotive manual" for technical maintenance and lubrication at all levels, but also the maintenance and lubrication of the work system shall be made timely.

Powertrain lubrication:

For more than 200 hours per working time, grease should be added to the drive shaft and pump drive (General Purpose Lithium Grease for cars GB/T 5671-1995).

Generator maintenance and lubrication:

① Clean the air filter element for more than 100 hours per working time.

② Regularly check the oil level, and immediately add if below the scale line (gasoline oil SAE10W-30)

③ Regularly remove dirt and asphalt on the surface.

Asphalt pump maintenance and lubrication:

① Regularly check the asphalt pump input shaft journal for oil leakage, and screw the compression nut inwards for 1~2 turns.

② For each working time exceeding 100 hours, add 1 to 2 seal packings. Apply high-temperature grease on the inner surfaces of the journal, the seal packing, and the compression nut during the addition of seal packings.

Burning system maintenance:

① Remove the carbon deposit from the burner nozzle if the working time exceeds 100h.

② Clean the fuel filter if the working time exceeds 300h.

Hydraulic system maintenance:

① Replace the hydraulic oil (Great Wall 68# anti-wear hydraulic oil) for first working time of more than three

months (300h). Replace the hydraulic oil once yearly afterwards. The hydraulic oil can be used again after filtering by 5μm or below filter if not degraded.

② Replace oil suction and return filters for first operation if more than three months (300h) and then replace them yearly afterwards.

③ Check all pipe joints for leakage and replace seals timely.

④ Regularly check the hydraulic oil level and add it immediately if below than the specified level.

Heat transfer oil system maintenance:

① Check each pipe joint for leakage and replace seals timely.

② Add heat transfer oil into the oil expansion tank timely (Great Wall 320#)

VII. Error analysis and troubleshooting

The following table is for reference only. If you cannot correctly determine the fault for troubleshooting, please contact our company's after-sales service department.

No.	Error	Cause	Solution
1	Power takeoff can not be engaged	1. Insufficient air pressure and air leakage from the air pipe 2. Electrical switch damaged 3. Solenoid valve damaged	1. Check the air compressor and pressure regulating valve for failure; replace air pipe 2. Replace the switch 3. Replace the solenoid valve
2	Reducer can not be engaged	1. Insufficient air pressure and air leakage from the air pipe 2. Electrical switch damaged 3. Solenoid valve damaged 4. Small cylinder damaged or connector is disconnected 5. Car clutch is not disengaged completely	1. Check the air compressor and pressure regulating valve for failure; replace air pipe 2. Replace the switch 3. Replace the solenoid valve 4. Replace the small cylinder or install the joint 5. Adjust the car clutch
3	Asphalt pump does not work	1. Hydraulic system failed 2. Solids blocked 3. Asphalt sticking	1. Eliminate the failure of the hydraulic system 2. Remove the asphalt pump and take out the solids 3. Cleaning with diesel oil and waste gas baking
4	The hydraulic motor does not work or the speed is slow	1. The overflow valve is blocked and the pressure is low 2. The reversing valve coil is not powered on or burned 3. High oil temperature, no pressure 4. Hydraulic pump or motor is worn seriously	1. Remove the overflow valve and re-adjust the pressure 2. Check the line or replace the coil 3. Solution according to the method listed in the table below 4. Replace the hydraulic pump or motor
5	Hydraulic oil temperature is high (85℃ or above)	1. Less hydraulic oil 2. Asphalt pump resistance is too large; long-term oil leakage from the overflow valve 3. Oil suction filter clogged	1. Add hydraulic oil 2. Check the asphalt pump and overflow valve 3. Clean filter
6	Burner does not work	1. No power on 2. Filter is too dirty and oil	1. Check the generator and switch in the temperature controller box

		hose is clogged 3. Burner is deposited or clogged 4. Oil pump is worn and oil pressure is too low	2. Clean filter and blow the oil hose with high-pressure air 3. Remove and clean burner 4. Replace the burner oil pump
7	Asphalt pump is working normally without injecting asphalt	1. Asphalt valve location is incorrect 2. Oil suction port clogged with asphalt 3. Asphalt filter clogged 4. Oil outlet pipe clogged with asphalt	1. Adjust the position of valve according to the manual 2. If hot asphalt is used, wait until the asphalt is molten or heated with heat transfer oil 3. Take it out for cleaning
8	The spray pressure is insufficient or intermittent	1. Asphalt filter clogged 2. Air leakage from the filter cover 3. Main pipeline air valve is not closed tightly 4. Asphalt temperature is too low 5. Oil return valve is not closed tightly 6. Asphalt pump is worn seriously 7. Hydraulic system is running unstably 8. Control system failed	1. Remove 2. Seal and close the cover tightly 3. Closed tightly 4. Heat the asphalt to the specified temperature 5. Close the oil return valve tightly 6. Repair or replace the asphalt pump 7. Check the hydraulic system 8. Check and measure the pump speed and voltage
9	Uneven spray of asphalt	1. Spray pressure is insufficient 2. Nozzle clogged with impurities	1. Check and adjust as described above 2. Remove impurities
10	Asphalt can not be sucked	1. The asphalt inlet valve is not closed tightly; the oil return valve is not opened 2. Filter cover leaked 3. Main pipeline air valve is not closed tightly 5. Self-suction pipe joint leaked 6. Asphalt tank is too far or too low	1. Check valve 2. Seal and closed tightly 3. Closed tightly 4. Heat the asphalt to the specified temperature 5. Add the sealing gasket and press it firmly 6. Change the status, otherwise do not self-suck
11	Heat transfer oil overflows	1. Heat transfer oil is too full 2. Water enters into the heat transfer oil system 3. Add the heat transfer oil of	1. Increase the heat transfer oil 2. Heat and dewatering 3. Replace heat transfer oil

		the different grade or the water content is too high	
12	Asphalt pump leaked	Filler at the journal is worn	Tighten the nut appropriately or add the packing

Table 6

VIII. Attached Figure Electrical Schematic Diagram

Fig. 1 Electrical wiring diagram

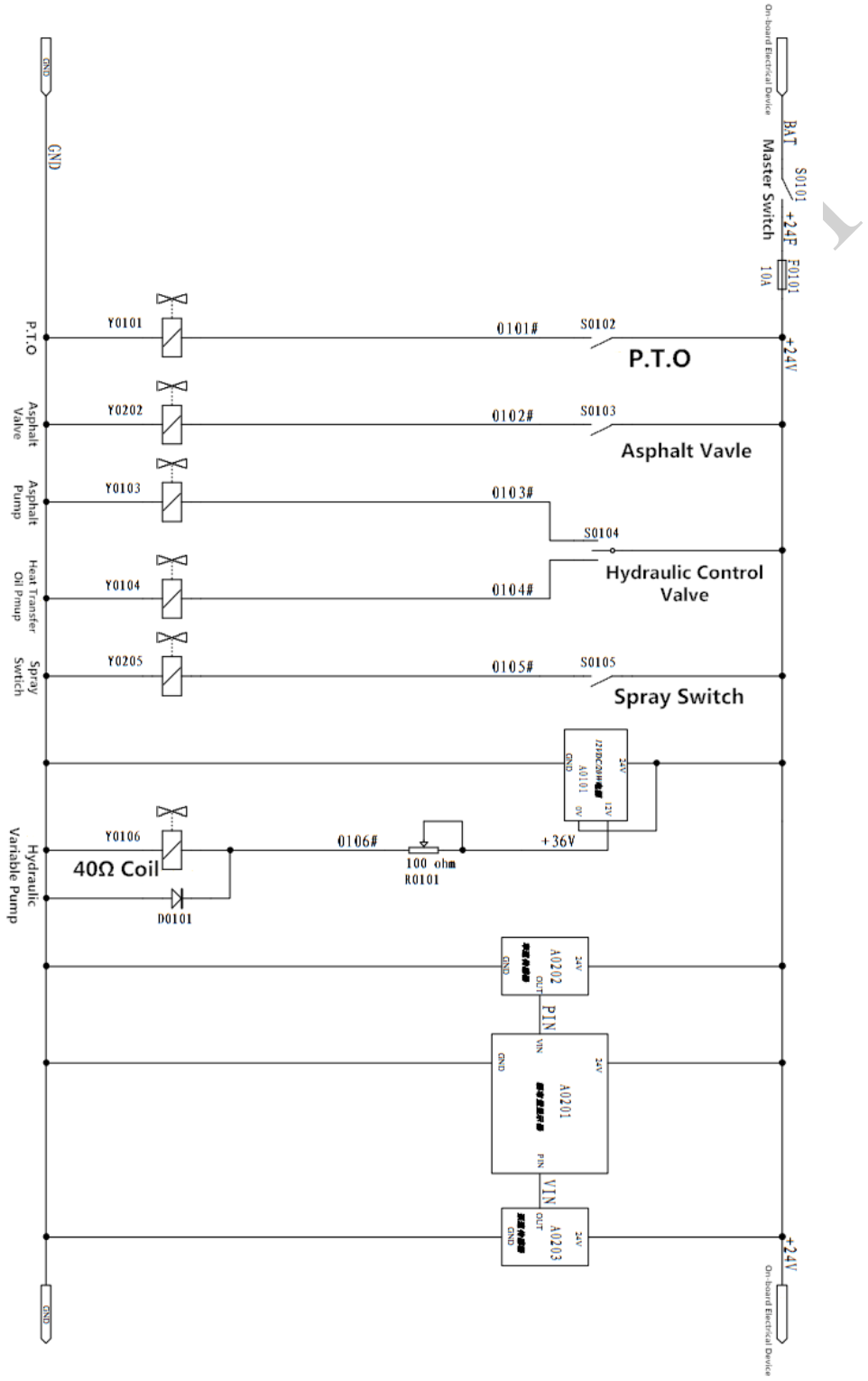

Fig. 2 Controller wiring diagram

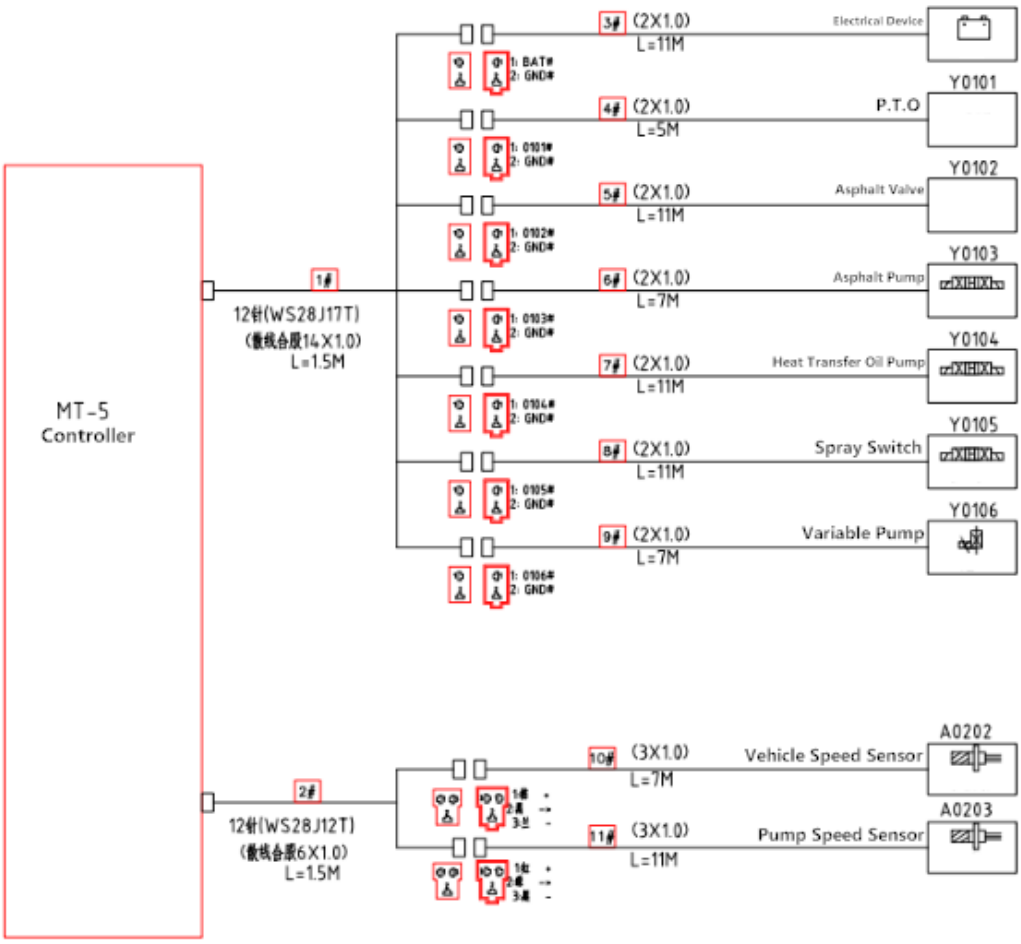

Fig. 3 Background wiring diagram