

Main Undercarriage Leg

The main undercarriage leg is equipped with a single-sided support of the brake wheel and consists of a telescopic shock absorber, the wheel, a breaker strut, a lifter, a retracted position lock and a mechanical position indicator.

K141/T141 Wheels

The main legs are fitted with K141 / T141 brake wheels equipped with pneumatic expander tube brakes. The wheels have 500 X 150 model 6 half-ball type aircraft tires. The control over the wheel brakes is provided in both cabins by the lever on the control stick connected to the pressure reducing valve and the control pedals connected to the compensation gear. The compressed air, reduced in the valve to a pressure of $8 + 1 \text{ kg/cm}^2$ enters the brake chambers through the compensation gear. The rubber brake chambers expand and press the friction pads against the wheel, creating the necessary braking torque. After depressurization, the brake pads are squeezed off from the rear of the wheel by the return springs.

Undercarriage nose strut

The front leg of the undercarriage consists of the telescopic shock absorber, the wheel, the folding strut, the lifter, the retracted position lock and the mechanical position indicator. The shock absorber consists of the shock absorber tower, the internal set, the mechanism for setting the wheel to the neutral position, the rod with the wheel attachment fitting and the self-excited oscillations dampener. The wheel of the front leg has the ability to turn in both directions at an angle of $50^\circ - 20^\circ$. A mechanism is mounted in tower; this mechanism places the wheel in a neutral position after removing external loads from the wheel.

The front leg has a half-ball type non-braked 44-1, model 5, 400X XI 50 aircraft tire. The deployment and retraction system of the undercarriage and the mechanical position indicators are identical.

Air System

The air system of the aircraft facilitates engine startup, undercarriage deployment and retraction, landing flap control, and the undercarriage wheel brake system. The air system consists of two autonomous systems: the main and emergency systems, both of which are connected by a common charging airline. The compressed air supply of each system is provided by individual air tanks onboard the aircraft:

- main system - LM375Ya-P-50 11 liter tank;
- emergency system - LM375Ya-3-50 3 liter tank.

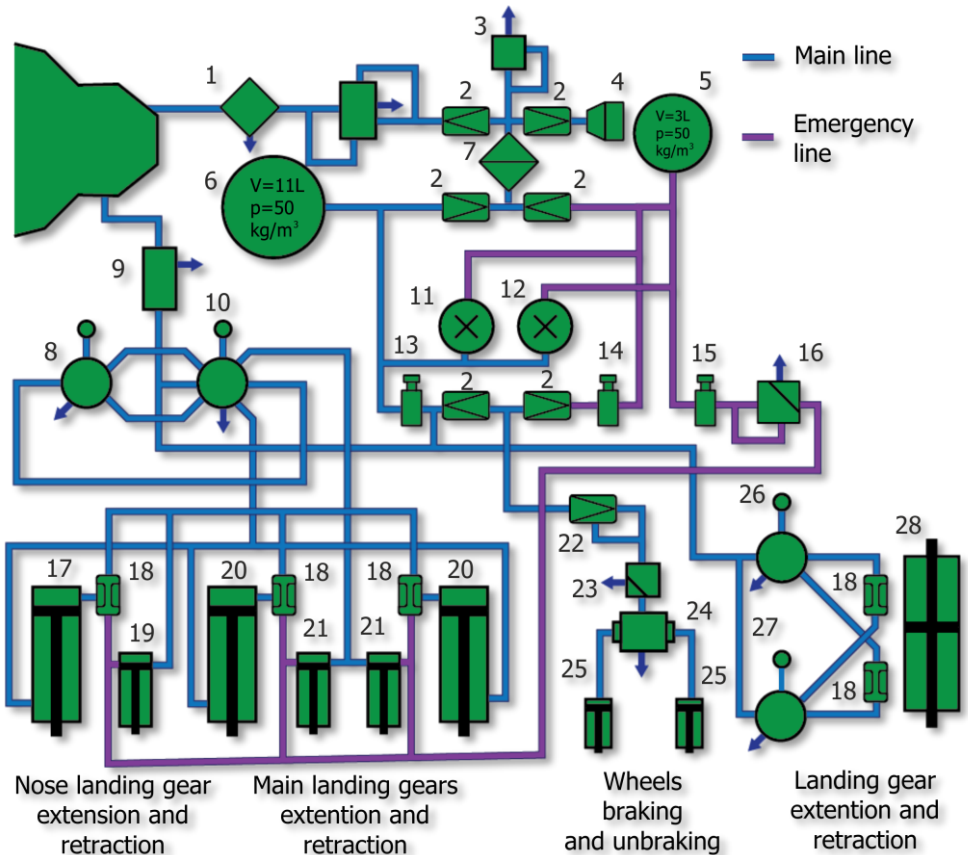


Figure 6. **Schematic diagram of the air system.**

1 - FT decanter; 2 - non-return valves; 3 - pressure reducing valve; 4 - filler valve; 5 - emergency system tank; 6 - main system tank; 7 - 31VF3A filter; 8 - 625300M three-way valve; 9 - EK-48 electro-pneumatic valve; 10 - undercarriage command crane; 11, 12 - 2M-80 manometers; 13 - 992AT valve (network charging); 14, 15 - 992AT-3 emergency undercarriage deployment valves; 16 - 562300 bleed valve; 17 - lift; 18 - emergency valves; 19 - undercarriage front strut lock release cylinder; 20 - undercarriage main strut lift; 21 - lock release cylinders; 22 - PU-7 (U139) pressure reducer valve; 23 - UP53 / 1M valve; 24 - PU-8 (V135) differential; 25 - brake wheels of the undercarriage main struts; 26, 27 - 625300M three-way valves; 28 - landing flap release/retract cylinder.

Cylinder filling is done by means of a 3509S59 common charging valve from the airfield cylinder using dry compressed air, with a dew point no higher than -50°C . The operating air pressure in both systems is 50 kg/cm^2 . While in flight, the tank of the main system is refilled using the AK-50A compressor installed on the engine.

The charging valve is installed on the left side of the fuselage between frames 10 and 11.

The pressure in the main and emergency systems is monitored by the 2M-80 double-barreled manometers mounted on the left panels of the instrument panels in both cabins. The tanks of the main and emergency systems are installed on the right side of the fuselage between frames 10 and 11.

A safety valve protects the air system from overloading by bleeding air through the openings in its housing into the atmosphere at a system pressure of greater than $70 \sim 100\text{ kg/cm}^2$, on which its spring is backed. The wiring of the air system consists of rigid pipelines, braided hoses, and connecting fittings.

Main system

The main air system consists of the LM375YA-11-50 main tank, the pipelines for charging and recharging the system, the 992ATZ system valve installed on the left panel in the first cabin, the 625300M undercarriage valve, the 525502-10 undercarriage command valve, the 625300M flap valve, the EK-48 electropneumatic valve, the U139 (PU-7) reducer valve, the UP53 / 1M brake release valve, the U135 (PU-8) compensation gear, and the 525701-10 flap cylinder equipped with two 524704-30 emergency valves. When the engine start button located on the left-side panel of the instrument dash in both cabins is pressed, the EK-48 electropneumatic valve mounted on frame 0 is activated and air is fed into the air distributor in order to start the engine. When deploying or retracting the undercarriage, compressed air enters the cylinders of the locks and lifters of the undercarriage through the undercarriage valves located in the instrument dashboards of both cabins. Both valves are connected by conduit pipes. The undercarriage valve in the second cabin is a command valve. Setting the valve handle to the neutral position allows for undercarriage deployment and retraction from the first cabin. In the event of an error in undercarriage control from the first cabin, the pilot in the second cabin, in correcting the error, sets the valve handle to the desired position while the undercarriage valve of the first cabin is simultaneously disconnected from the compressed air system. After this, the undercarriage can be deployed or retracted only from the second cabin. When deploying or retracting the flaps, compressed air through the 625300M valve enters the cylinder. Pressure from the valves of the first and second cabin is fed to the two cavities of the flap cylinder via the emergency valves. When applying brake pressure to the wheels, compressed air through the V139 (PU-7) valve (where air pressure is reduced from 50 kg/cm^2 to $8 + 1\text{ kg/cm}^2$ via the UP53 / 1M release valve connected to the control handle in the second cabin), enters the V135 (PU-8) compensation gear. From here it is distributed into the brakes of the right and left wheels of the main undercarriage legs. The pressure relief valve is controlled by the levers installed on the aircraft's control stick in both cabins. The U139 (PU-7) valve is installed on the wall of frame 7 under the floor of the second cabin. The V135 (PU-8) compensation gear, controlled by the foot pedals, allows for separate braking of the wheels. The compensation gear is attached to the wall of frame 5, while the UP 53 / 1M brake release valve is attached to the wall of frame 6.

Emergency system

Air from the emergency system tank is used in case of main system failure. When releasing the undercarriage, compressed air from the emergency system tank enters the lock cylinders and into the undercarriage lifts through the emergency valves. At the same time, compressed air approaches the pressure reduction valve, ensuring that the undercarriage wheels are braked using air from the emergency system. The 562300 pressure relief valve eliminates the back pressure phenomenon in the undercarriage lifts during their operation using the main system when the 992ATZ closed emergency valves are leaking. When opening the emergency release valve (at a pressure of greater than 5 kg/cm²), the bleed valve closes the outlet to the atmosphere.

Fuel System

The fuel system serves to hold the necessary fuel stock onboard the aircraft and to power the engine in all its modes of operation on all possible trajectories of the aircraft. B-91/115 GOST 1012-72 aviation gasoline is used to power the M-14P engine onboard the aircraft. Fuel is stored in two tanks with a capacity of 61 + 1 liters. These fuel tanks are located in the right and left wing consoles. The fuselage is also equipped with a storage tank with a capacity of 5,5⁺¹ liters, and this tank allows for engine operation during inverted flight and flight with negative G-loads. Fuel flows from the fuel tanks into the storage tank through the non-return valve block. Two non-return valves prevent the fuel from flowing from one fuel tank to another, and another is used to stop flow of fuel from the supply tank to the fuel tanks when the aircraft is diving.

Fuel from the supply tank flows into the gasoline pump through the non-return valve that facilitates the operation of the filler syringe, the fire cock, and the gasoline filter. After passing through the pump, the fuel under pressure flows into the reserve tank, then into the engine carburetor to two fuel pressure sensors after passing through a fine mesh filter. Each sensor outputs signals to its own UK-1 gauge. The gauges and sensors are included in the three-arrow EMI-ZK electric engine gauge. The UKK-1 gauges are located on the instrument panels in both cabins, while the sensors are mounted on the wall of frame 0.

A filler syringe is used before starting the engine to feed fuel into the engine cylinders and fill the main fuel line. The handle of the syringe is located on the dashboard of the first cabin. When the handle is pulled back, the cavity of the syringe is filled with fuel coming from the main fuel line. The filler syringe also serves for emergency fuel supply when the pump fails.

The fuel delivery for oil dilution is supplied through a solenoid valve mounted on frame 0. The fuel feed to the valve is facilitated by a flexible pipeline connected to the outlet of the gasoline pump. The oil dilution valve switch is located on the dashboard of the first cabin. The reserve tank is connected by a pipeline to the supply tank for bleeding excess fuel and maintaining the set pressure at the front of the carburetor. There are two control valves in the pipeline. There is a drain cock at the lowest point of the fuel line between frames 5 and 6; this serves to drain the fuel sludge.