Sollant

Shanghai Sollant Energy Saving Technology Co., Ltd.
C 109, No.215, Songri Center, Beihongqiao, Jiading District,
Shanghai, China, 201800

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COMPRESSED AIR APPLICATION SOLUTIONS FOR TEXTILE INDUSTRY

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COMPRESSED AIR APPLICATION SOLUTIONS FOR TEXTILE INDUSTRY

In modern textile manufacturing, compressed air has become a critical power source supporting the entire production process from fiber processing to finished product packaging. As the textile industry advances toward automation and intelligentization, compressed air systems play an increasingly vital role in ensuring production efficiency, enhancing product quality, and reducing operational costs. In this article, Sollant provides a systematic analysis of compressed air's specific applications in the textile industry, its unique quality requirements, compressor selection criteria, and system optimization strategies, offering comprehensive technical references and decision-making support for textile enterprises.

Applications of Compressed Air in the Entire Textile Production Process

The entire textile production process encompasses multiple stages, ranging from fiber processing to finished product packaging, with compressed air playing a critical role in each phase.

1. Fiber Preparation and Pneumatic Transportation.

During the fiber preparation stage, compressed air is primarily used for pneumatic fiber transportation and dust removal.

Pneumatic fiber transportation: A pneumatic system driven by compressed air transports natural fibers such as cotton and linen, or synthetic fibers like polyester and nylon, from storage facilities to production lines, enabling automated and dust-free processing. This method eliminates fiber breakage and contamination potential associated with traditional mechanical transportation, thereby enhancing fiber utilization efficiency and quality.

Dust Removal: Remove cotton lint, dust, and fiber deposits from equipment such as carding machines and combing machines to prevent these contaminants from affecting subsequent spinning quality. Compressed air cleaning significantly reduces equipment downtime, extends maintenance intervals, and enhances production efficiency.

2. Spinning and Deformation Treatment

The spinning process represents a critical application scenario for compressed air, particularly in airflow spinning and air-deformed fiber processing..

Jet spinning: A high-speed compressed air stream spins fibers into yarn, replacing traditional mechanical spindles and increasing production speed by over 30% while reducing energy consumption. After upgrading its jet spinning system, a textile factory achieved a 15% reduction in energy consumption, saving ¥80,000 in annual electricity costs.

Air-deformed filament processing: Compressed air is injected to treat filaments, imparting fluffiness and characteristics similar to those of short fiber yarns. This air deformation technique utilizes nozzle structures to induce curved loops and network structures in the filaments, enabling the production of various textured filaments such as fur-like, yarn-like, bamboo-joint, and snowflake filaments, which are widely applied in the fabrication of simulated natural fiber fabric.

Yarn cleaning and joint treatment: Remove impurities generated during spinning, facilitate yarn joint formation, reduce breakage rates, and enhance production continuity.

3. Jet weaving

The jet loom is the equipment in the textile industry that relies most heavily on compressed air. Its working principle involves using high-pressure airflow to feed the weft yarn into the warp shuttle opening.

Wefting insertion: Compressed air flow carries the weft yarn at high speed through the weaving opening, achieving speeds exceeding 2,000 meters per minute—significantly higher than those of traditional shuttle systems. Stable air pressure (fluctuation ≤ 0.01 MPa) is critical; excessive pressure fluctuations may lead to failure in wefting insertion or yarn breakage.

Pneumatic control: Precise regulation of yarn tension and position is achieved through pressure adjustment, ensuring uniform fabric quality. The pneumatic control system continuously monitors and adjusts weaving parameters in real time, enhancing product pass rate

Weaving machine cleaning: Remove cotton fibers and dust from inside the machine to reduce wear and tear and extend its service life.

4. Dyeing and Post-processing

The dyeing and post-processing stages impose extremely stringent requirements on the cleanliness and stability of compressed air:

Pneumatic dyeing: Compressed air-powered spray guns ensure uniform distribution of dyes, reducing dye waste and color variation in fabrics. The cleanliness of compressed air directly affects dyeing quality; excessive oil content may lead to uneven dyeing or oil stains.

Heat transfer printing: A compressed-air-driven hot press delivers vibrant, long-lasting printed effects, with pressure control accuracy directly determining print quality.

Chemical treatment: Provides pressure support for dyeing vessels and pipelines, ensures stable chemical reactions, and enhances product quality.

Fabric drying: Utilizes compressed air flow to accelerate moisture evaporation from the fabric surface, enhancing drying efficiency and reducing production time.

5. Packaging and Quality Control

During the finished product packaging and quality control stages, compressed air is used for:

Pneumatic packaging system: Automates the sealing, labeling, and packaging of fabrics and yarns, enhancing packaging efficiency and consistency.

Fabric inspection: Defects on the fabric surface are examined using compressed air blowing to assist quality control.

Pre-delivery dust removal: Remove dust and impurities from the surface of finished products to enhance their visual quality.

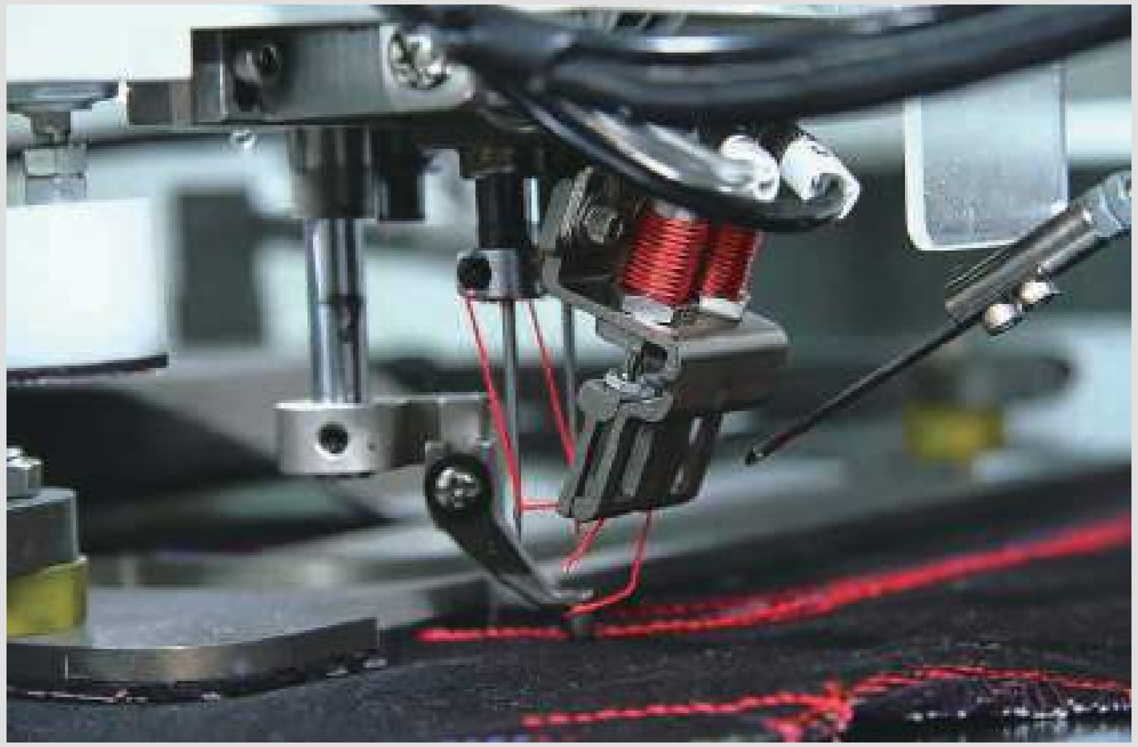
Leak detection: Utilizes pressure testing to identify defects in dyed fabrics or finished garments, thereby improving the product pass rate.

6. Other Auxiliary Applications

Wastewater treatment: Compressed air is utilized to treat wastewater and chemicals generated during the production process, ensuring compliance with environmental standards.

Pneumatic doffing: Controls instantaneous flow requirements when multiple devices operate simultaneously, ensuring stable system performance.

Instrument Control: Controls pneumatic instruments, sensors, and valves to achieve automated production



Special Requirements for Compressed Air in the Textile Industry

The textile industry imposes stringent requirements on compressed air quality, pressure, and flow rate, as these factors directly impact product quality and production efficiency.

1. Quality Requirements: ISO 8573-1 standard

The textile industry has specific requirements for the cleanliness of compressed air, with varying tolerance levels for contaminants across different production processes.

Particles: The textile industry typically requires particle size ≤1 μm, corresponding to ISO 8573-1 Standard for Solid Particles Level 2 (≤10,000 particles/m^3). The dyeing process imposes stricter particle requirements, necessitating compliance with ISO Level 1 (≤1,000 particles/m^3).

Oil : Significant variations across different production processes regarding oil content specifications.

Dyeing/printing process: Must meet ISO Grade 0 (oil-free), with oil content ≤0.01 mg/m^3 to prevent dye contamination.

Jet loom/post-finishing process: Acceptable for ISO Grade 1–2 (oil content ≤ 0.01–0.1 mg/m^3), provided it is achieved using a precision filter..

Spinning process: The oil content may be relaxed to ISO Grade 4 (≤5 mg/m^3), but the impact of oil on yarn must still be controlled.

Water :

Dyeing/printing process: The pressure dew point must be ≤ -40°C (ISO Class 2) to prevent moisture from interfering with dye chemical reactions.

Jet loom/post-finishing process: The pressure dew point must be ≤ -20°C (ISO Class 4) to prevent moisture from causing yarn dampness or equipment corrosion.

2. Pressure requirements: precise matching of process characteristics

Different manufacturing processes in the textile industry require varying pressure levels for compressed air, with stringent tolerance requirements for pressure fluctuations.

•Jet loom: Operating pressure ranges from 0.6–0.8 MPa (6–8 bar), with pressure fluctuations strictly limited to ≤0.01 MPa; otherwise, it may cause yarn breakage and unstable fabric quality. After adopting a high-performance screw air compressor at a textile factory, the yarn breakage rate of jet looms decreased from 2.5% to 0.8%, while the fabric qualification rate improved to 98.5%.

•Spinning equipment: Operating pressure typically ranges from 0.7 to 0.9 MPa (7–9 bar), supporting processes such as ring spinning, cup spinning, and close spinning; stable airflow is critical for yarn quality.

•Dyeing equipment: Operating pressure ranges from 0.4 to 0.7 MPa (4–7 bar); maintaining stable air pressure to prevent uneven dyeing.

•Post-processing equipment: Operating pressure ranges from 0.6 to 0.8 MPa (6–8 bar), supporting processes such as steam polishing and pressing, with guaranteed system reliability.

3. Flow requirement: precise matching of process characteristics

The demand for compressed air flow in the textile industry depends not only on the number of equipment units but also closely relates to equipment type, operating conditions, and system design.

•Per-equipment:

Jet looms: The air consumption per unit ranges approximately from 0.65 to 0.70 Nm^3/min/m width. For a 3-meter-wide loom, the hourly air consumption is about 1.95–2.1 m^3. Through parameter optimization, a textile factory reduced the air consumption per unit from 1.75 m^3/min to 1.43 m^3/min, saving approximately €1,067 annually.

Dyeing equipment: The gas consumption per dyeing machine ranges approximately from 0.5 to 1.5 m^3/min, depending on the dyeing process and fabric type.

Spinning equipment: The air consumption per spinning machine ranges from approximately 0.2 to 0.5 m^3/min, varying depending on spinning speed and yarn type.

•Total Flow Calculation:

Total flow rate = Gas consumption of each equipment × Simultaneous utilization factor (typically 0.8–0.9) + 20% expansion margin.

For example, a textile factory operates 200 jet looms, each consuming 2.0 m^3/min of air; thus the total airflow requirement is: 200 × 2.0 × 0.8 + 200 × 2.0 × 0.2 = 320 + 80 = 400 m^3/min.

•Flow stability: The difference in gas flow rate between units of the same model should be controlled within 3%; deviations beyond this range will be subject to evaluation. Flow fluctuations may lead to unstable air pressure, thereby affecting product quality.

Applicability and Selection Criteria for Air Compressor Types in the Textile Industry

When selecting air compressors for the textile industry, factors such as flow rate, pressure, energy efficiency, and maintenance costs must be comprehensively considered based on specific operational requirements.

1. Main Types of Air Compressors and Their Characteristics

Screw Air Compressor:

- Application scenario: Small and medium-sized textile mills (air flow rate <100 m^3/min) requiring continuous operation.
- Advantages: compact size, low noise level (below 68 dB), long maintenance interval (6000–8000 hours), uniform air intake and flow, absence of pressure pulsation, and smooth operation.
- Limitations: Poor air quality, high oil content, requiring additional post-treatment equipment, and relatively lower capacity compared to centrifuges.
- Energy efficiency: The permanent magnet VSD saves 25%–40% energy compared to conventional models.
- Market Overview: By 2026,80% of air compressor demand in the textile industry will be for jet looms. High-quality screw compressors can reduce yarn breakage rates from 2.5% to 0.8% and increase fabric pass rate to 98.5%.

Centrifugal air compressor

- Application scenarios: Large textile mills (air volume ⩾ 2000 m^3/min) and application requiring ultra-high flow rates.
- Advantages: large airflow, high efficiency (ideal for continuous operation), long service life (over 10 years), compact structure, lightweight design, and oil-free operation.
- Limitations: Surge phenomena may occur during startup and shutdown; not suitable for parallel operation with multiple units; highly sensitive to load fluctuations.
- Energy efficiency: In low-pressure, high-flow applications (e.g., jet loom clusters), the specific power reaches 4.5 kW · h/m^3, 30% lower than that of conventional screw compressors.
- Market Overview: By 2026, the textile industry's demand for air compressors is projected to reach 130,000 units, with 80% of these being used in jet looms..

Oil-free screw air compressor

- Application scenarios: High-cleanliness processes such as dyeing and printing.
- Advantages: 100% oil-free compression process that eliminates oil contamination at the source, prevents dyeing defects, and is ideal for high-end fabric production.
- Limitations: The pressure is typically ⩽0.75 MPa; procurement costs are over 50% higher than those of oil-fired engines, and maintenance expenses are substantial.
- Energy efficiency: 15%-20% more energy-efficient than conventional screw compressors, but requires integration with post-processing equipment.

Magnetic centrifugal air compressor

- Application scenarios: Large textile groups, high-end fabric production, and processes requiring high cleanliness levels.
- Advantages: Energy efficiency reaches 20%-30%; annual maintenance costs are 40%-60% lower than those of screw compressors; low noise (<70 dB(A)); completely eliminates oil contamination; and is suitable for 24/7 continuous operation.
- Limitations: The initial investment is 1.5–2 times that of conventional screw compressors, with ROI period of 2–3 years.
- Energy efficiency: Power remains stable at 4.5 kW · h/m^3, transmission efficiency approaches 100%, and pressure fluctuations can be controlled within ±0.05 bar.
- Market Overview: In 2026, magnetic centrifuges accounted for approximately 12%–15% of the textile industry's market share, and this proportion is projected to exceed 30% by 2030, particularly in high-end fabric applications with green factory initiatives.

TWO-STAGE PM VSD AIR COMPRESSOR SERIES

TWO-STAGE PM VSD AIR COMPRESSOR SERIES

FEATURES

1.Two-stage compression reduces the compression ratio of each stage, reduces internal leakage, improves volumetric efficiency, reduces bearing load, and increases the life of the host.

2. Two-stage PM VSD replaces single-stage compression, and the displacement is increased by nearly 15%, which can achieve an additional 15% energy saving effect.

3. The rotor adopts the latest patented rotor UV profile, which has been refined by more than 20 procedures to ensure accuracy, reliability, and effectiveness of the rotor profile.

4.Two-stage PM VSD air compressor mainframe is more efficient and more energy-saving. It can save up to 40% energy compared with ordinary industrial frequency machines. Calculated at 8000h/unit/year, it can save electricity costs 30,000 USD per year.

ADVANTAGES

1. More Energy Efficient

Two-stage PM VSD rotor is directly driven through the gears, and each stage of the rotor can obtain the best speed. The Air end is always running at the best energy-saving speed. The frequency conversion soft-start reduces the energy consumption of the air compressor during startup. By controlling the pressure between stages, the compressor always works at the best efficiency pointunder different working conditions. Compared with single-stage fixed speed air compressor, in principle, two-stage PM VSD air compressor can save 40% energy.

2.More Stable

There is no mechanical transmission failure, the motor, and the male rotor adopt an integrated shaft structure, and there is no need for coupling and gear transmission, eliminating the hidden danger of coupling and gear failure.

3. More Efficient

PM VSD motor+ no transmission efficiency loss.

PM VSD motor has the advantages of energy-saving and excellent performance.

The one-piece structure can reduce the efficiency loss of coupling and gear.

4. More Comfortable

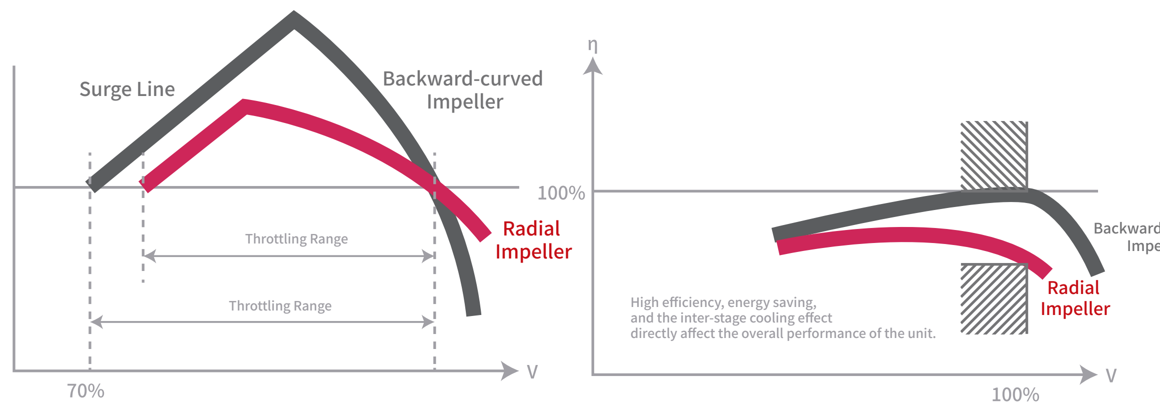
Low noise and low vibration. No motor and bearing noise, no gear noise, no coupling noise.

5. More Compact

The PM VSD motor is small in size, and the integrated structure saves space.

Two-stage Pm Vsd Air Compressor Series compressor

Model	Working pressure	Capacity	Power		Noise	Air outlet pipe diameter	Net weight	Dimensions(mm)		
	bar	m³/min	kW	hp	dB		kg	Length	Width	Height
SLTT-22V	8	2-4.55	22	30	65±3	DN40	732	1610	1050	1380
	10	1.72-3.83	22	30	65±3	DN40	732	1610	1050	1380
	13	1.36-3.04	22	30	65±3	DN40	732	1610	1050	1380
SLTT-30V	8	2.82-6.27	30	40	65±3	DN40	806	1610	1050	1380
	10	2.5-5.66	30	40	65±3	DN40	806	1610	1050	1380
	13	2-4.52	30	40	65±3	DN40	806	1610	1050	1380
SLTT-37V	8	3.47-7.72	37	50	65±3	DN40	821	1610	1050	1380
	10	3.49-7.06	37	50	65±3	DN40	821	1610	1050	1380
	13	2.65-5.9	37	50	65±3	DN40	821	1610	1270	1380
SLTT-45V	8	4.22-9.37	45	60	65±3	DN50	1124	2000	1270	1600
	10	3.76-8.36	45	60	65±3	DN50	1124	2000	1270	1600
	13	3.2-7.13	45	60	65±3	DN50	1124	2000	1300	1600
SLTT-55V	8	6.13-13.61	55	75	65±3	DN50	1643	2050	1300	1710
	10	5.17-11.49	55	75	65±3	DN50	1643	2050	1300	1710
	13	4-8.89	55	75	65±3	DN50	1643	2050	1500	1710
SLTT-75V	8	7.56-16.8	75	100	68±3	DN50	2100	2285	1500	1800
	10	6.3-13.99	75	100	68±3	DN50	2100	2285	1500	1800
	13	5.53-12.3	75	100	68±3	DN50	2100	2285	1685	1800
SLTT-90V	8	9-20.1	90	120	70±3	DN65	2400	2690	1685	1800
	10	8.1-18	90	120	70±3	DN65	2400	2690	1685	1800
	13	7.15-15.9	90	120	70±3	DN65	2400	2690	1685	1800
SLTT-110V	8	11-24.45	110	150	72±3	DN65	3300	2690	1685	1800
	10	9.29-20.65	110	150	72±3	DN65	3300	2690	1685	1800
	13	8-17.8	110	150	72±3	DN65	3300	2690	1685	1800
SLTT-132V	8	12.55-27.9	132	175	74±3	DN65	3500	2720	1700	2060
	10	11.29-25.11	132	175	74±3	DN65	3500	2720	1700	2060
	13	9.46-21.03	132	175	74±3	DN65	3500	2720	1700	2060
SLTT-160V	8	15.12-33.6	160	215	75±3	DN100	4500	3090	1940	2270
	10	13.77-30.6	160	215	75±3	DN100	4500	3090	1940	2270
	13	12.51-27.8	160	215	75±3	DN100	4500	3090	1940	2270
SLTT-185V	8	19.28-38.94	185	250	76±3	DN100	4600	3970	2190	2340
	10	15.71-34.9	185	250	76±3	DN100	4600	3970	2190	2340
	13	14.53-32.3	185	250	76±3	DN100	4600	3970	2190	2340
SLTT-220V	8	21.28-47.3	220	394	78±3	DN100	4850	4200	2240	2340
	10	19.12-42.5	220	294	78±3	DN100	4850	4200	2240	2340
	13	16.83-37.4	220	294	78±3	DN100	4850	4200	2240	2340
SLTT-250V	8	24.16-53.68	250	335	78±3	DN100	6000	4400	2240	2340
	10	21.73-48.3	250	335	78±3	DN100	6000	4400	2240	2340
	13	19.35-43	250	335	78±3	DN100	6000	4400	2240	2340



CENTRIFUGAL TURBO COMPRESSOR

HIGH EFFICIENCY AERODYNAMIC DESIGN

Sollant turbomachinery has a world-class design team with expertise in aerodynamics, rotor dynamics, gear drive theory and structural strength theory for centrifugal compressor and expander industries. Experts with over 20 years of experience in the turbomachinery industry cast a solid foundation for our vision to "build Sollant into a domestic and global turbomachinery manufacturer".

CORE TECHNOLOGY DESIGN

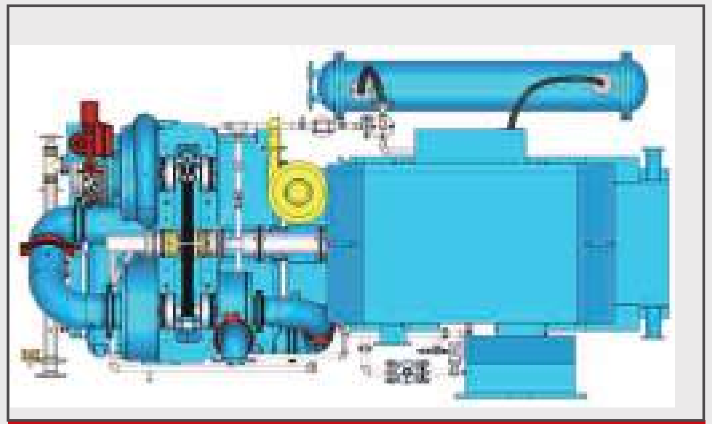
Finite element analysis software is used to simulate the operation of impeller at rated speed to perform stress analysis and deformation calculation. Stress analysis results provide a strong rationale to verify impeller strength to prevent accidents from cracking of impeller in operation. Calculated deformation provides a reference for determining the clearance between impeller and inlet to avoid operation.

ROTOR DYNAMICS DESIGN

Professional software is used for rotor dynamics analysis and bearing design. Power consumption is minimized in bearing operation with reasonable oil film temperature, pressure and thickness. Rotor dynamics analysis based on stiffness and damping of the bearing helps achieve reasonable vibration value and sufficient stability of the rotor and avoids operation near critical rotation speed.

QUALITY CONTROL

Sollant centrifugal compressor has an excellent structural design to provide continuous, stable, oil-free, and high-quality compressed air with minimum maintenance. Its high efficiency can fully meet the needs of various processes and air systems in factories.



Design Capacity

Processing Capability

Detection Capability

Assembly Capacity

Technical Parameters of Centrifugal Compressor

Model	Working pressure barg	Capacity m3/min	Power(KW)	Power(HP)	Dimensions L (mm) W(mm) H(mm)	Weight (kg)
SLT-300C	0.6-9	24-48	132-263	176-350	2750 1550 1820	3800
SLT-600C	0.6-12	45-82	248-450	330-600	3280 1850 2200	6300
SLT-900C	0.6-12	76-122	400-640	530-900	3500 2000 2250	8160
SLT-1200C	0.6-12	118-150	630-800	840-1200	4200 2150 2350	11500
SLT-1500C	0.6-16	118-228	760-1300	1010-1750	4200 2150 2350	12000
SLT-2000C	0.6-16	186-310	980-1600	1320-2150	4600 2200 2500	17200
SLT-3000C	0.6-16	268-438	1380-2250	1840-3000	5300 2300 2970	21500

DRY OIL-FREE SCREW AIR COMPRESSOR

Industry-leading original oil-free air end

1. The air compression chamber is completely separated from the oil chamber. The air compression chamber uses a stainless steel spring-loaded metal ring wear-free sealing system. The oil chamber has a wear-free sealing system with a copper labyrinth seal. The two do not contact ;
2. The compressed air passing through the cooler after thefirst stage of compression has inseparable water vapor. In order to prevent the water vapor from corroding the surface of the compressor's second-stage main machine rotor, the second-stage rotor is made of stainless steel, which is more reliable
3. The industry's first-class super coating (UITRACOAT) is applied to the rotor and compression chamber inner wall of the main machine. It can effectively prevent softening and shedding that are easy to occur with general coatings such as Teflon. It has excellent anti-corrosion and reduces meshing clearance.During the whole life cycle, there is no significant decrease in air volume
4.Filtered lubricating oil is used for cooling in the cabinet compartment of the air end. Efficient cooling, avoiding the scale caused by water cooling, thus improving the reliability of operation.

Smart electronic control system

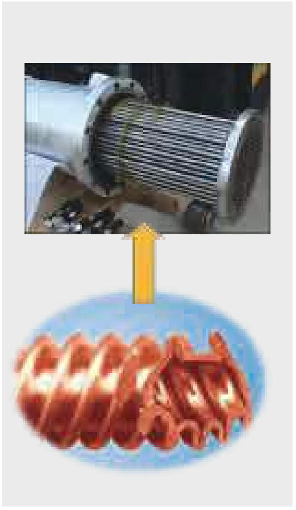
Large-size color LCD touch screen, with a good human-machine communication interface; custom vector inhuman, perfectly matched with the motor; a special program, fully monitoring the parameters of the machine, automatically control the state of the machine, no need for special care; independent air duct design, suitable for each kinds of working condition.

Independent air intake system

Independent air intake to ensure that the intake air temperature is equal to the ambient temperature. Large-capacity air filter is used,which has better filtering effect, lower intake pressure loss, energy saving and high efficiency.Maintenance and
replacement are more convenient

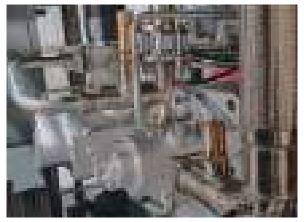
Noise reduction sheet metal design

The multiple noise reduction design iscalculated according to the noise theory. The special flame retardant muffler cotton is attached inside to reduce the noise of the unit and provide a quieter environment for use.



Efficient water cooler

Sollant dry screw air compressor water cooler uses a new type of threaded finned tube shell and tube heat exchanger. Compressed air goes inside the tube, cooling water goes to the shell side, and the tube nest is a new plum blossom copper tube, which is more conventional than water cooling. For the heater, the advantages are as follows
1. Compressed air goes through the tube and the pressurebearing capacity of the outer finned tube is improved ;
2. Cooling water walks on the shell side. Compared with the process selection in the walking pipe, the cooling water passes through multiple sets of baffle parts, the degree of turbulence increases, the probability of the formation of dirt attached to the pipe wall is reduced, the equipment cleaning cycle is extended, and the user's maintenance cost is reduced.
3. The gas travels along the tube and the fins extend axially in the tube. Compared with the outer fins sweeping the wind, the pressure drop generated by the unit windward area is lower than that of the outer fins. It is safe and reliable to use, and the fins are not easy to fall off ;
4. The installation of the heat exchanger is simple and the same as that of the conventional shell and tube heat exchanger ;
5. The side of the tube is made of stainless steel to prevent corrosion and rust of the cooler due to high temperature and high pressure, which affects the life of the compressor and air quality
6. The tube nest can be disassembled independently, which is convenient for users to maintain
7. Compressed air goes to the tube side and water goes to the shell side to reduce the noise generated by compressed air.



Noise reduction venturi

The first and second air ends of the air compressor all adopt the newly developed venturi muffler, and there is also an impedance integrated muffler, which can greatly eliminate the noise emitted by the compressor pipeline.

Reliable hydraulic intake valve

High-efficiency intake valve adopts hydraulic control, the work is more stable and reliable, avoiding the regular replacement of pneumatic components, reducing unnecessary downtime and maintenance costs.

Reasonable margin design

Reserve 30%~50% margin for air filter, cooling system, etc., to ensure that the use requirements are met under different working conditions
As a heavy-duty equipment, 10~15% margin is reserved for the electrical part, and it can continue to operate under individual special working conditions

Dry Oil-Free Variable Speed Screw Air Compressor

Model	Working pressure		Capacity		Power		Noise	Air outlet pipe diameter	Net weight		Dimensions(mm)					
	bar	psig	m^3/min	cfm	kW	hp	dB		Air-cooled	Water-cooled	Air-cooled L*W*H			Water-cooled L*W*H		
SLTOF-45VD	7	102	4.5- 7.8	159- 275	45	60	69±3	DN50	1800	1850	2200	1400	2000	2200	1500	1720
	8	116	4.0- 6.8	141- 240	45	60	69±3	DN50	1800	1850	2200	1400	2000	2200	1500	1720
	10	145	3.7- 6.4	132- 226	45	60	69±3	DN50	1800	1850	2200	1400	2000	2200	1500	1720
SLTOF-55VD	7	102	5.7- 9.8	202- 346	55	75	69±3	DN50	1900	1950	2200	1400	2000	2200	1500	1720
	8	116	5.2- 9.0	182- 318	55	75	69±3	DN50	1900	1950	2200	1400	2000	2200	1500	1720
	10	145	4.4- 7.8	157- 275	55	75	69±3	DN50	1900	1950	2200	1400	2000	2200	1500	1720
SLTOF-75VD	7	102	7.6- 13.0	268- 459	75	100	70±3	DN50	2000	2050	2200	1400	2000	2200	1500	1720
	8	116	7.2- 12.2	253- 431	75	100	70±3	DN50	2000	2050	2200	1400	2000	2200	1500	1720
	10	145	6.6- 11.2	234- 396	75	100	70±3	DN50	2000	2050	2200	1400	2000	2200	1500	1720
SLTOF-90VD	7	102	9.6- 16.0	332- 565	90	120	71±3	DN50	2100	2150	2200	1400	2000	2200	1500	1720
	8	116	8.1- 13.8	286- 487	90	120	71±3	DN50	2100	2150	2200	1400	2000	2200	1500	1720
	10	145	7.6- 13.1	269- 463	90	120	71±3	DN50	2100	2150	2200	1400	2000	2200	1500	1720
SLTOF-110VD	7	102	12.1- 20.6	429- 727	110	150	71±3	DN65	3100	3150	3000	1990	2180	2800	1900	1990
	8	116	11.6- 19.5	408- 689	110	150	71±3	DN65	3100	3150	3000	1990	2180	2800	1900	1990
	10	145	11.1- 18.8	391- 664	110	150	71±3	DN65	3100	3150	3000	1990	2180	2800	1900	1990
SLTOF-132VD	7	102	14.7- 24.8	518- 876	132	175	73±3	DN65	3200	3250	3000	1990	2180	2800	1990	1990
	8	116	13.6- 23.0	480- 812	132	175	73±3	DN65	3200	3250	3000	1990	2180	2800	1990	1990
	10	145	11.5- 19.5	406- 689	132	175	73±3	DN65	3200	3250	3000	1990	2180	2800	1990	1990
SLTOF-160VD	7	102	16.9- 28.5	596- 1006	160	215	73±3	DN65	3300	3400	3000	1990	2180	2800	1900	1990
	8	116	15.6- 26.3	550- 929	160	215	73±3	DN65	3300	3400	3000	1990	2180	2800	1900	1990
	10	145	14.1- 23.8	497- 840	160	215	73±3	DN65	3300	3400	3000	1990	2180	2800	1900	1990
SLTOF-185VD	7	102	19.5- 32.8	687- 1158	185	250	74±3	DN65	3400	4500	3000	1990	2180	2800	1990	1990
	8	116	17.1- 28.9	605- 1021	185	250	74±3	DN65	3400	4500	3000	1990	2180	2800	1990	1990
	10	145	16.3- 27.5	575- 971	185	250	74±3	DN65	3400	4500	3000	1990	2180	2800	1990	1990
SLTOF-200VD	7	102	20.0- 33.6	706.3- 1186.6	200	270	74±3	DN100	5570	5000	4500	2000	2150	3100	2200	2103
	8	116	20.0- 33.6	706.3- 1186.6	200	270	74±3	DN100	5570	5000	4500	2000	2150	3100	2200	2103
	10	145	17.3- 29.2	610.9- 1031.2	200	270	74±3	DN100	5570	5000	4500	2000	2150	3100	2200	2103
SLTOF-250VD	7	102	27.3- 46.0	964- 1624	250	335	74±3	DN100	5800	5200	4500	2000	2150	3100	2200	2103
	8	116	25.3- 42.0	893- 1511	250	335	74±3	DN100	5800	5200	4500	2000	2150	3100	2200	2103
	10	145	22.7- 38.2	803- 1348	250	335	74±3	DN100	5800	5200	4500	2000	2150	3100	2200	2103

Dry Oil-Free Fixed Speed Screw Air Compressor

Model	Working pressure		Capacity		Power		Noise	Air outlet pipe diameter	Net weight		Dimensions(mm)					
	bar	psig	m^3/min	cfm	kW	hp	dB		Air-cooled	Water-cooled	Air-cooled L*W*H			Water-cooled L*W*H		
SLTOF-45FD	7	102	7.8	275.5	45	60	69±3	DN50	1900	1950	2200	1400	2000	2200	1500	1720
	8	116	6.8	240.1	45	60	69±3	DN50	1900	1950	2200	1400	2000	2200	1500	1720
	10	145	6.4	226.2	45	60	69±3	DN50	1900	1950	2200	1400	2000	2200	1500	1720
SLTOF-55FD	7	102	9.8	346.1	55	75	69±3	DN50	2000	2050	2200	1400	2000	2200	1500	1720
	8	116	9.0	317.8	55	75	69±3	DN50	2000	2050	2200	1400	2000	2200	1500	1720
	10	145	7.8	275.5	55	75	69±3	DN50	2000	2050	2200	1400	2000	2200	1500	1720
SLTOF-75FD	7	102	13.0	459.1	75	100	70±3	DN50	2150	2200	2200	1400	2000	2200	1500	1720
	8	116	12.2	430.8	75	100	70±3	DN50	2150	2200	2200	1400	2000	2200	1500	1720
	10	145	11.2	395.5	75	100	70±3	DN50	2150	2200	2200	1400	2000	2200	1500	1720
SLTOF-90FD	7	102	16.0	565.0	90	120	71±3	DN50	2250	2300	2200	1400	2000	2200	1500	1720
	8	116	13.8	487.3	90	120	71±3	DN50	2250	2300	2200	1400	2000	2200	1500	1720
	10	145	13.1	462.6	90	120	71±3	DN50	2250	2300	2200	1400	2000	2200	1500	1720
SLTOF-110FD	7	102	20.6	727.5	110	150	71±3	DN65	3360	3400	3000	1990	2180	2800	1900	1990
	8	116	19.5	688.6	110	150	71±3	DN65	3360	3400	3000	1990	2180	2800	1900	1990
	10	145	18.8	663.9	110	150	71±3	DN65	3400	3400	3000	1990	2180	2800	1900	1990
SLTOF-132FD	7	102	24.8	875.8	132	175	73±3	DN65	3500	3550	3000	1990	2180	2800	1900	1990
	8	116	23.0	812.2	132	175	73±3	DN65	3500	3550	3000	1990	2180	2800	1900	1990
	10	145	19.5	688.6	132	175	73±3	DN65	3500	3550	3000	1990	2180	2800	1900	1990
SLTOF-160FD	7	102	28.5	1006.5	160	215	73±3	DN65	3750	3850	3000	1990	2180	2800	1900	1990
	8	116	26.3	928.8	160	215	73±3	DN65	3750	3850	3000	1990	2180	2800	1900	1990
	10	145	23.8	840.5	160	215	73±3	DN65	3750	3850	3000	1990	2180	2800	1900	1990
SLTOF-185FD	7	102	32.8	1158.3	185	250	74±3	DN65	3860	3960	3000	1990	2180	2800	1900	1990
	8	116	28.9	1020.6	185	250	74±3	DN65	3860	3960	3000	1990	2180	2800	1900	1990
	10	145	27.5	971.2	185	250	74±3	DN65	3860	3960	3000	1990	2180	2800	1900	1990
SLTOF-200FD	7	102	36.8	1299.6	200	270	74±3	DN100	5730	5230	4500	2000	2150	3100	2200	2103
	8	116	34.6	1221.9	200	270	74±3	DN100	5730	5230	4500	2000	2150	3100	2200	2103
	10	145	30.6	1080.6	200	270	74±3	DN100	5730	5230	4500	2000	2150	3100	2200	2103
SLTOF-250FD	7	102	46.0	1624.5	250	335	74±3	DN100	7000	6000	5070	2200	2300	3100	2200	2103
	8	116	42.8	1511.5	250	335	74±3	DN100	7000	6000	5070	2200	2300	3100	2200	2103
	10	145	38.2	1347.7	250	335	74±3	DN100	7000	6000	5070	2200	2300	3100	2200	2103

MAGNETIC LEVITATION AIR COMPRESSOR

MAGNETIC LEVITATION BEARING TECHNOLOGY

It adopts spin ® five-degree-of-freedom active magnetic levitation bearing technology to intelligently control the rotor shaft position and zero friction of rotating parts

Automatic balancing technology is used to acquire signals and correct in real time more than 10,000 times per second to ensure stable suspension of the rotor

Eliminates the lubrication system required for conventional bearings and operates 100% oil-free

Multiple safety protections, equipped with power failure protection system and auxiliary bearings to avoid bearing damage caused by accidental power failure

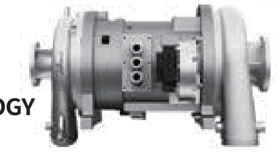
HIGH-FREQUENCY VECTOR FREQUENCY CONVERSION TECHNOLOGY

Focus on high frequency, carrier up to 16kHz, output frequency up to 800Hz, easy to drive high-speed motors

Excellent loss suppression and heat management, high-frequency output without capacitation, suitable for various harsh operating environments

High-performance sensorless vector control technology, good parameter adaptability, high control performance, low output harmonics, and low motor heating

Intelligent self-learning, one-click identification of motor parameters and control parameters, greatly reducing the difficulty and workload of debugging



HIGH-SPEED PERMANENT MAGNET MOTOR TECHNOLOGY

The high-speed permanent magnet motor directly drives the ternary flow impeller, eliminating the speed increase gear structure and improving the transmission efficiency

The rotor is excited by rare earth permanent magnets, and the efficiency of the third-party detection motor exceeds 97%

Unique high-strength carbon fiber binding technology, 115% overspeed test: guarantees the reliability of the rotor permanent magnet at high speed

The electromagnetic characteristics of the motor are matched with the pneumatic characteristics of the impeller and the variable frequency drive characteristics to achieve the optimal efficiency of the whole system

EFFICIENT FLUID MECHANICAL TECHNOLOGY

It adopts high-strength aviation aluminum alloy or titanium alloy ternary flow impeller, integrated milling and forming of five-axis machining center, backward bending design, and a wide range of working conditions

After CAE finite element analysis, the incoming material passes 100% flaw detection and 115% overspeed test after processing

Surface anti-corrosion treatment to ensure safety and reliability during the life cycle

Magnetic Levitation Air Compressor Specification

MODEL	Performance range			Product Specifications:		
	Rated flow rate m^3/min	Pressure bar	flow rate m^3/min	Outlet pipe diameter	Length*width*height mm	Weight (kg)
SLTM110-2	43	1.5-2.5	28-46	DN150	2817*1755*2023	2400
SLTM110-3	34	2.5-3.5	25-38	DN150	2817*1769*2023	2400
SLTM132-2	46	1.5-2.5	22-46	DN150	2817*1755*2023	2500
SLTM132-3	40	2.5-3.5	25-42	DN150	2817*1769*2023	2500
SLTM160-2	62	1.5-2.5	38-65	DN150	2817*1735*2023	2500
SLTM160-2.5	60	2.0-3.0	39-62	DN150	2817*1735*2023	2500
SLTM160-3	56	2.5-3.5	40-60	DN150	2817*1735*2023	2500
SLTM160-3.5	53	3.0-4.0	42-56	DN150	2817*1735*2023	2500
SLTM200-2	77	1.5-2.5	52-82	DN200	2820*1731*2019	3500
SLTM200-2.5	65	2.0-3.0	38-70	DN200	2820*1731*2019	3500
SLTM200-4	47	3.0-4.5	30-50	DN150	2817*1735*2028	2500
SLTM220-2.5	75	2.0-3.0	50-80	DN200	2820*1731*2019	3500
SLTM250-2	105	1.5-2.5	70-110	DN250	3530*1980*2313	5000
SLTM250-3	70	2.5-3.5	45-75	DN200	2820*1731*2019	3500
SLTM315-2.5	100	2.0-3.0	60-110	DN250	3530*1960*2219	5500
SLTM315-3.5	90	3.0-4.0	65-95	DN250	3530*1960*2219	5500
SLTM355-2	110	1.5-2.5	70-120	DN250	3530*1960*2219	5500
SLTM355-3	105	2.5-3.5	75-115	DN250	3530*1960*2219	5500
SLTM400-2	150	1.5-2.5	90-160	DN300	3710*1975*2313	5500
SLTM400-2.5	135	2.0-3.0	80-145	DN300	3710*1975*2313	5500
SLTM600-2	220	1.5-2.5	150-250	DN250	4070*2250*2300	8000
SLTM600-2.5	200	2.0-3.0	130-210	DN250	4070*2250*2300	8000
SLTM800-2.5*	270	2.0-3.0	180-300	DN350	3750*2250*2500	7000

Applicability and Selection Criteria for Air Compressor Types in the Textile Industry

When selecting air compressors for the textile industry, factors such as flow rate, pressure, energy efficiency, and maintenance costs must be comprehensively considered based on specific operational requirements.

2. Design of the Combined Gas Supply System

Given the textile industry's high and fluctuating gas consumption demands, modular gas supply systems have become the preferred solution.

Stepwise gas supply system:

- Design Principle: The high-pressure centrifuge handles the base load, while the low-pressure screw compressor manages peak fluctuations, with real-time adjustment achieved through AI control.
- Pressure matching: For instance, the centrifuge delivers 0.8 MPa pressure to the spinning stage, while the screw compressor provides 0.6–0.7 MPa via a pressure reducing valve for the jet loom, thereby preventing high-pressure waste.
- Case Study: Anhui Zhengli Textile Company implemented a combination of four magnetic centrifuges and screw compressors, achieving annual electricity savings of 1.32 million yuan while maintaining pressure fluctuations within ±0.01 MPa.

Multi-machine Parallel System:

- Design Principle: Multiple air compressors operate in parallel, with load balancing achieved through a master-slave control strategy.
- Advantages: Enhances system reliability and minimizes the impact of individual equipment failures on production.
- Application scenarios: Small and medium-sized textile mills, particularly jet loom workshops requiring high pressure stability.

Variable Speed Control System:

- Design Principle: Automatically adjusts the air compressor speed based on gas demand to achieve "on-demand gas supply".
- Advantages: Significant energy savings (20%-50%) and minimal pressure fluctuations (within ±0.01 MPa).
- Application scenarios: Workshops with significant gas consumption fluctuations, such as spinning and packaging hybrid production lines.

3. Selection Criteria

When selecting air compressors for the textile industry, the following key parameters must be comprehensively considered:

- Pressure: Select based on the equipment's maximum gas demand, with a safety margin of 0.1–0.2 MPa. For example, a jet loom requires 0.7 MPa, while an air compressor can operate at 0.8–0.9 MPa.
- Capacity: After calculating the total actual gas consumption, multiply by coefficient of 1.1–1.2 as the selection basis to ensure the system has sufficient margin for peak demand.
- Energy efficiency rating: By 2026, the textile industry mandates that air compressors achieve an energy efficiency rating of ⩾ IE4, with priority given to Class 1 models, which offer 15–30% higher energy savings than Class 3 models.
- Air Quality: Select appropriate air treatment equipment saccording to process requirements to ensure compressed air remains clean and dry.
- Cooling method: Select air cooling or water cooling based on the local climate conditions. In hot regions or large factories, water cooling is preferred, but water quality and maintenance costs must be considered; in cold regions or small factories, air cooling is suitable, provided the premise has adequate ventilation.
- Total life cycle cost: includes acquisition cost, operating cost (primarily electricity costs), and maintenance cost. It is advised to take the entire life cycle cost into account, rather than focusing solely on the initial investment.

Optimization Strategies for Compressed Air Systems

To enhance energy efficiency and production stability, the textile industry can adopt the following systematic optimization strategies:

1. Equipment Upgrade and Energy Efficiency Improvement

High-efficiency Air Compressor Replacement

- By using permanent magnet vsd screw compressors or magnetic centrifuges, energy savings can reach up to 25%–50%.
- For example, after replacing two traditional screw air compressors with magnetic models at a textile company in Shaoxing, the energy savings reached 21%, saving approximately 320,000 yuan in annual electricity costs.

Waste Heat Recovery System

- Energy efficiency: The heat generated by the compressor is recovered (approximately 94% of electrical energy is converted into heat), to be used for water heating or workshop heating.
- Technical solution: The water-cooled air compressor can be equipped with a plate heat exchanger, achieving a heat recovery efficiency of over 85%; the screw compressor may utilize a high-temperature heat pump to elevate the residual heat from 50–70°C to 85°C for use in spinning oil formulation preparation, reducing steam consumption by 40%.
- Return on Investment: After installing waste heat recovery system, a textile factory saved ¥80,300 in annual coal costs, with ROI period of approximately 1.5 years.

Intelligent control system：

- Control Strategy: Monitor equipment operating parameters and automatically adjusts the air compressor's operating status based on gas demand in real time to achieve "on-demand gas supply".
- Energy-saving Case Study: Hubei Jinghua Textile Group reduced the energy consumption of air compressors by 250,000 yuan per year through its 5G energy management system; a metallurgical plant in Guangdong achieved an overall energy savings rate exceeding 36% via the SaZhenYun system, saving over 1 million yuan in annual electricity costs.
- Key Features: Support remote monitoring, fault alerts, multi-device collaboration, and automatic pressure regulation, maintaining pressure fluctuations within ±0.01 MPa.

2. Pipeline Network Optimization and Leakage Management

Network Design Optimization:

- Layout principle: Prioritize the use of a circular pipeline network design to ensure balanced pressure at all gas consumption points and avoid the need to increase supply pressure due to insufficient pipe diameter.
- Pipe diameter calculation: Determine the appropriate pipe diameter using the formula (d = \sqrt{\frac{4Q}{\pi v}) where Q represents flow rate (Nm^3/min) and v denotes the permissible flow velocity (typically maintained at 6–10 m/s).
- Material selection: The dyeing process requires stainless steel tubes (corrosion-resistant), while the spinning process may utilize galvanized steel tubes. The choice of tubing material directly impacts the system pressure drop and service life.

Leak Management:

- Detection method: Perform regular leak detection using an ultrasonic detector or the soap water.
- Recovery Strategy: Establish a leakage remediation incentive mechanism to encourage employee participation in leakage management.
- Energy-saving Case Study: By sealing leaks, a textile factory saves approximately 100,000 yuan in annual electricity costs, equivalent to an 8% reduction in energy consumption.

3. Optimization of the Air Treatment System

Drying System Upgrade

- Dew point control: The dyeing process employs an adsorption dryer with a dew point temperature ⩽ -40°C; other processes may utilize a freeze dryer with a dew point temperature ⩽ -20°C.
- Energy-saving measures: Implement separate circulation systems for hot and cold fluids to protect electrical components and filtration units, thereby reducing drying energy consumption.

Filter System Optimization

- Multi-stage filtration: Primary filtration (⩾40 μm) removes large particles; secondary filtration (⩾1 μm) removes small particles; tertiary filtration (⩾0.01 μm) removes ultrafine particles and oil mist.
- Filter accuracy: The filters installed on jet looms must comply with ISO 8573-1 Class 1-2 standards to ensure clean air quality.

4. Intelligent and Digital Management

Energy Efficiency Monitoring Platform

- Key performance indicators: unit energy consumption (kW/m^3), system efficiency, air leakage rate, and other critical metrics.
- Data Analysis: Identifies high-energy-consuming processes through big data analysis and provides optimization recommendations.
- Case study: After implementing an AIoT system, a textile company in Zhejiang achieved 22% increase in air compressor efficiency, saving over 1.2 million kWh of electricity annually.

Predictive maintenance

- Technical methods: Predicting equipment failures through vibration analysis, current monitoring, temperature monitoring, and other techniques.
- Case study: After adopting predictive maintenance, a textile factory reduced its failure rate by 60%, cut maintenance costs by 40%, and saved approximately ¥23,000 in annual maintenance expenses.

Production Planning Collaboration

- Control Logic: Dynamically adjust gas supply based on production plans to prevent multiple units from operating inefficiently.
- Energy-saving Case Study: By synchronizing production schedules with air compressor operations, a textile factory saves approximately 120,000 yuan in annual electricity costs.

Case Study Analysis of Compressed Air Applications in the Textile Industry

1. Application of Magnetic Centrifuges in Jet Loom Workshops

Project Background: Anhui Zhengli Textile Technology Co., Ltd. operates 1,600 water-jet looms and 25 elastomer insertion machines, with annual fabric sales of 150 million meters and an annual output value of 500–600 million yuan. The c ompressed air system originally consisted of 9 conventional screw compressors with a total power capacity of 1,060 kW, consuming approximately 8.5 million kWh of electricity annually and incurring electricity costs of about 6.4 million yuan (at a rate of 0.75 yuan/kWh).

Renovation plan: 4 magnetic centrifugal compressors replaced the original 9 screw compressors, reducing the total power to 840 kW and lowering the system specific power from 7.4 kW·h/m³ to 5.8 kW·h/m³—a reduction of 21.6%.、

Outcome
- Power Saving Rate: 20.7%
- Annual electricity cost saving: approximately 1.32 million yuan
- Energy cost ratio: Reduced from 15% of total electricity costs to below 12%
- System stability: Pressure fluctuations are controlled within ±0.01 MPa
- Maintenance cost: Reduced from ¥200,000 to ¥80,000, by 60%
- Air Quality: 100% oil-free, zero oil contamination

Return on Investment: With a total investment of approximately 860,000 yuan, the annual return is about 370,000 yuan, ROI period is approximately 2.3 years.

2. Application of Permanent Magnet VSD Screw Compressors in Spinning Workshops

Project Background: A textile company in Shaoxing operates 300 jet looms, originally equipped with traditional screw air compressors, resulting in annual electricity costs of approximately 3 million yuan and a fabric defect rate of 6%.

Renovation plan: Six permanent magnet vsd screw compressors are installed, reducing the total power from 450 kW to 354 kW and the system specific power from 7.4 kW·h/m³ to 6.5 kW·h/m³, representing a 12.2% reduction.

Outcome
- Power Saving Rate: 25%
- Annual electricity cost savings: approximately 750,000 yuan
- System stability: Pressure fluctuation reduced from ±0.02 MPa to ±0.01 MPa
- Maintenance cost: Reduced from ¥150,000 per year to ¥100,000, a 33% decrease
- Air quality: Oil contamination has been significantly reduced, with the defect rate dropping to 0.8%.

Return on Investment: With a total investment of approximately 700,000 yuan, the annual return is about 750,000 yuan, ROI period is approximately 1 year

3. Application of Waste Heat Recovery Systems in Dyeing and Finishing Processes

Project Background: The air compression station at a textile factory in Xuzhou consumes 816,000 kWh of electricity annually, with significant steam usage during the dyeing process, resulting in annual steam costs of approximately 1.5 million yuan.

Renovation plan: Install a waste heat recovery system at the air compressor station to capture the heat generated by compressors and utilize it for preheating process water in dyeing operations.

Outcome
- Annual electricity cost saving: 285,600 yuan (calculated at 0.8 yuan per kWh)
- Annual steam fee: 57,600 yuan
- Overall Energy Saving Rate: Approximately 35%
- System stability: The temperature control accuracy of dyeing has been improved by 0.5°C
- Environmental benefits: Reduces annual CO⍰ emissions by approximately 230 tons, equivalent to planting 13,000 trees.

Return on Investment: With a total investment of approximately 340,000 yuan, the annual return is about 343,000 yuan, ROI is approximately 1 year

Conclusion

Compressed air has evolved from mere power transmission to encompass multiple applications in process control, quality assurance, and energy management. An efficient compressed air system not only directly impacts production efficiency and product quality but also influences a company's energy costs and environmental responsibilities.

From an application perspective, compressed air plays an irreplaceable role in critical processes such as spinning, jet weaving, dyeing, and finishing. Particularly in air-deformed filament processing, wefting, and dyeing; the quality and stability of compressed air directly determine product quality.

In terms of quality requirements, the textile industry imposes stringent cleanliness classifications on compressed air: dyeing processes must meet ISO Class 0 oil-free standards, while jet looms require pressure fluctuations controlled within ± 0.01 MPa. These specifications far exceed conventional industrial standards, imposing higher demands on both air compressors and post-processing equipment.

In terms of equipment selection, the textile industry has established a clear strategy: small and medium-sized factories predominantly use screw compressors, while large-scale facilities favor centrifugal or magnetic centrifugal compressors; processes requiring high cleanliness, such as dyeing, prioritize oil-free screw compressors or magnetic centrifuges. Permanent magnet technology and intelligent control systems have become mainstream choices for energy efficiency upgrades, achieving 25–40% improvements in system energy efficiency.

From a system optimization perspective, the textile industry is progressively advancing toward intelligent and digital transformation. By implementing waste heat recovery, pipeline network optimization, leakage management, air treatment system upgrades, and smart control systems, it can achieve an overall energy efficiency of 25%–35%, while enhancing system stability and air quality.

In General, compressed air systems in the textile industry will exhibit the following trends:
1.High-efficiency and energy-saving: Permanent magnet vsd and magnetic technologies will become more widespread, with specific power expected to drop below $4.5\ kW \cdot h/m^3$ and energy savings exceeding 40%.
2.Intelligent Enhancement: AIoT technology will be fully integrated into air compression systems, enabling predictive maintenance, intelligent scheduling, and energy efficiency optimization while reducing the need for manual intervention.
3.System integration: Transitioning from standalone equipment to comprehensive solutions, encompassing integrated design and optimization of air compressors, post-processing systems, pipeline networks, and control systems.
4.Green and low-carbon transformation: Waste heat recovery and renewable energy will become standard practices, with comprehensive energy efficiency rising up to over 85%.
5.Standardized Management: Establish comprehensive compressed air management standards and an evaluation system, incorporate energy efficiency metrics into corporate performance assessments, and drive overall improvements in energy efficiency across the industry.

Textile enterprises should select appropriate air compressor types and system configurations based on their scale, process characteristics, and energy efficiency targets. By implementing regular maintenance, leak detection, and energy efficiency monitoring, they can continuously optimize compressed air systems to achieve the objectives of cost reduction, efficiency improvement, and sustainable development.