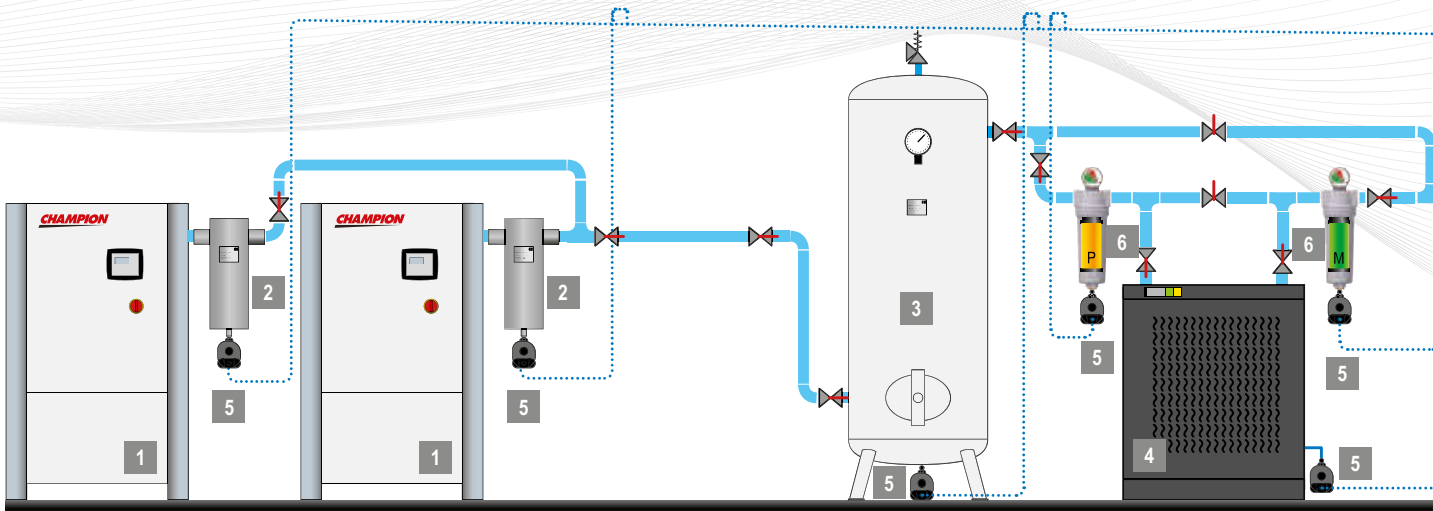


BASIC PRINCIPLES OF MOST TYPICAL COMPRESSED AIR APPLICATION



1. Compressor: The basic working principle of an air compressor is to compress atmospheric air, which is then used as per the requirements. In the process, atmospheric air is drawn in through an intake valve; more and more air is pulled inside a limited space mechanically by means of piston, impeller, or vane. Since the amount of pulled atmospheric air is increased in the receiver or storage tank, volume is reduced and pressure is raised automatically. In simpler terms, free or atmospheric air is compressed after reducing its volume and at the same time, increasing its pressure. Champion can provide many types of compressor to suit your needs.

2. Cyclone condensate separator: Cyclone condensate separators use centrifugal motion to force liquid water out of compressed air. The spinning causes the condensate to join together on the centrifugal separators walls when the condensate gains enough mass it falls to the bottom of the separators bowl where it pools in the sump until it is flushed out of the system by the automatic float drain valve. They are installed following aftercoolers to remove the condensed moisture.

3. Pressure vessel: Pressure vessel plays very important role in compressed air system:

- Damping pulsations caused by reciprocating compressors
- Providing a location for free water and lubricant to settle from the compressed air stream
- Supplying peak demands from stored air without needing to run an extra compressor
- Reducing load/unload or start/stop cycle frequencies to help screw compressors run more efficiently and reduce motor starts
- Slowing system pressure changes to allow better compressor control and more stable system pressures

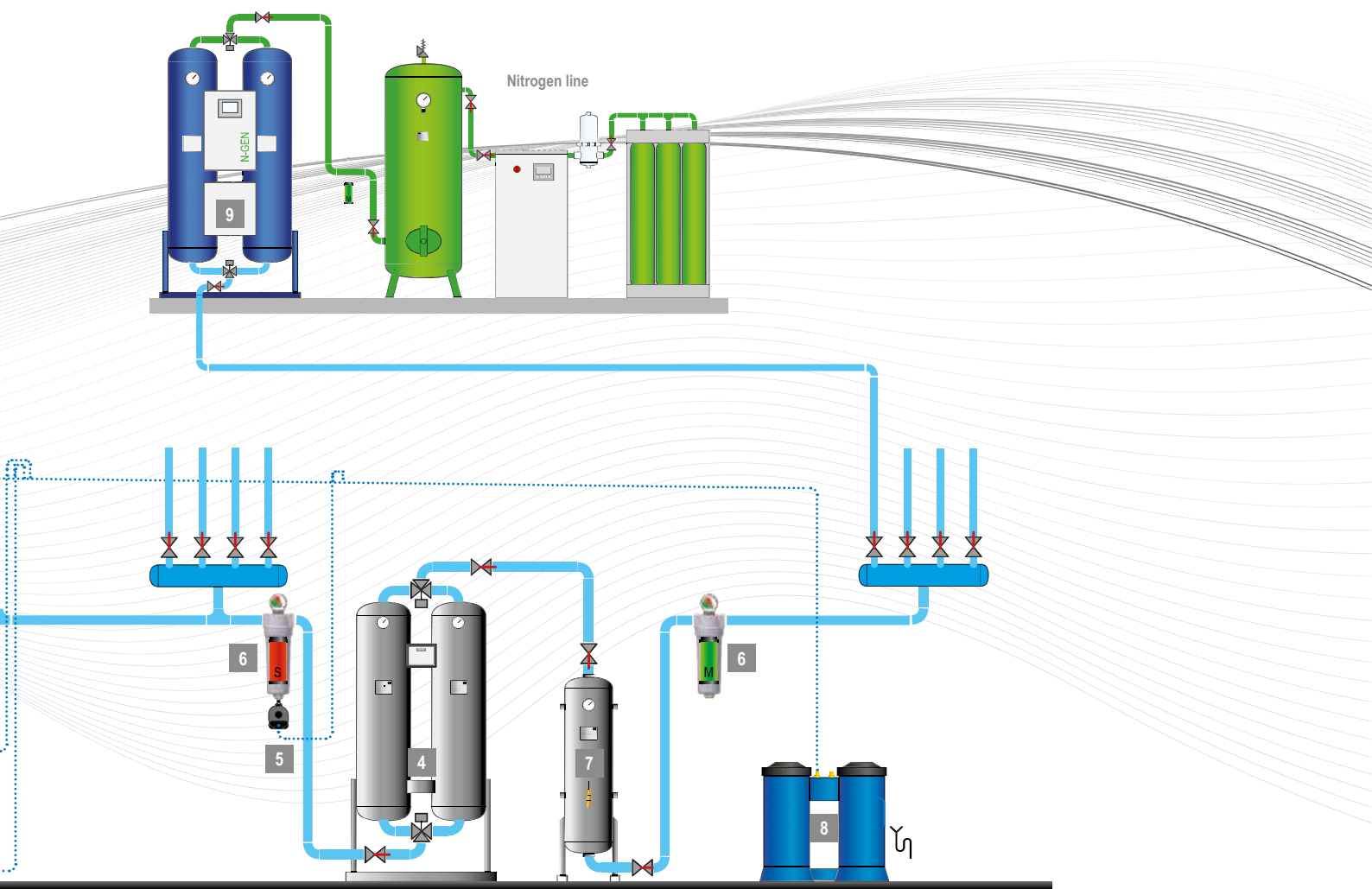
4. Compressed air dryer : Compressed air leaving the compressor aftercooler and moisture separator is normally warmer than the ambient air and fully saturated with moisture. As the air cools the moisture will condense in the compressed air lines. Excessive entrained moisture can result in undesired pipe corrosion and contamination at point of end use.

For this reason some sort of air dryer is normally required.

Some end use applications require very dry air, such as compressed air distribution systems where pipes are exposed to winter conditions. Drying the air to dew points below ambient conditions is necessary to prevent ice buildup.

Common types:

- Refrigerant
- Dessicant
- Membrane



5. Condensate drain: Drains are needed at all separators, filters, dryers and receivers in order to remove the liquid condensate from the compressed air system.

Failed drains can allow slugs of moisture to flow downstream that can overload the air dryer and foul end use equipment.

6. Filter: Compressed air filters are used for high efficient removal of solid particles, water, oil aerosols, hydrocarbons, odour and vapours from compressed air systems.

To meet the required compressed air quality appropriate filter element must be installed into filter housing.

7. Activated carbon tower: Activated carbon tower eliminates hydrocarbon vapours and odours from compressed air. Towers are filled with activated carbon adsorbent that adsorbs contaminants onto the surface of its internal pores. Activated carbon towers are used at applications where content of oil vapours needs to be reduced to minimum.

Activated carbon towers can be incorporated in existing compressed air systems significantly minimising the risks of contamination.

They are able to absorb oil carry-over (both liquid and vapour) to provide the plant with technically oil-free compressed air.

8. Oil/water separator: Local environmental laws and regulations state that condensate drained from compressed air systems cannot be returned to the sewage system due to the content of compressor lubricating oil. Water/oil separators are one of the most effective and economical solution. Multi-stage separation process using oleophilic filters and activated carbon, ensures exceptional performance and trouble free operation.

9. Nitrogen generator: The nitrogen generators extract the available nitrogen in the ambient air from the other gases by applying the Pressure Swing Adsorption (PSA) technology. During the PSA process compressed, cleaned ambient air is led to a molecular sieve bed, which allows the nitrogen to pass through as a product gas, but adsorbs other gases.

End user advice

- Replace inappropriate end use applications with efficient models (vortex nozzles, atomizers)
- Install a flow controller to lower plant pressure and reduce artificial demand caused by higher than required pressures
- Turn off air consuming equipment, using electric solenoids or manual shutoff valves
- Avoid operation of air tools without a load, as this consumes more air than a tool under load
- Replace worn tools, as they often require higher pressure and consume excess compressed air than tools in good shape
- Lubricate air tools as recommended by the manufacturer. Keep air used by all end uses free of condensate in order to maximize tool life and effectiveness
- Where possible and practical, group end use air equipment that has similar air requirements of pressure and air quality