Maintenance

Engineering

Question Find the electrical and electronic parts (not mechanical parts) answer the table ? Atlas CopcoCompressed Air Manual (CENTRIFUGAL COMPRESSOR)

Please you can see this image in this link and get info or as you prefer http://www. seminarsonly. com/mech%20&%20auto/frictionless-compressor. php

Parts

Function

Fault or failure

PWM amplifier

It is designed to drive the magnetic resonance imaging systems and other electromagnetic functions

A clogged filter assembly leading to accumulation of dust.

Bearing motor compressor controller (BMCC)

This is the central processor of the compressor that controls the hardware and the software

Loss of the motor power source.

Serial driver

It transforms the signal from the BMCC to control the IGV and the solenoid valves in order to cool the motor and the external extension of the valves

Failure resulting from the aging of the serial driver.

Backplane

It transfers the module of the information between the BMCC and the other components of the compressor.

Leakage of the cooling gases.

High voltage DC-DC motor

It supplies DC voltage of both high and low voltage as required by the system

Power surge and power failure.

IGBT inverter

It converts a DC voltage into an adjustable three-phase AC voltage

Power surge.

Soft start controller

It activates the start-up of the compressor by reducing the starting current and reduces the high in-rush current at startup, Providing advantages to line power systems and reducing thermal stress on the stator.

Power shortage and failure.

Breakage resulting from intense vibrations.

Capacitors

It is used to store energy

High and low energy surges

Rectifier

It converts AC current into DC current

Power short resulting from poor wiring.

Wear out from constant use.

Terminal block

It connects the power supply system

Electrical short

Question 2- from file Compressed_Air_Manual answer the table ?

From manual Compressed_Air_Manualfile (2. 5up to 2. 5. 8)

Name

Function or explain in short answer

Control and

regulation systems

These regulations require constant pressure in the compression system. The compressed air must flow from the center of the compressor for it to be regulated. A number of different compressors are available in the market today and this is dependent on factors such as the compressor type, its acceptable levels of pressure and the variations in air compression

Regulation in general

There are generally two types of regulations systems today which include the continuous flow rate regulations and the load/unload regulations.

Regulation principles for

displacement compressors

The use of relief valves was the original method of regulating compressors in order to have the excess air released into the environment. A servo valve that is controlled by a regulator can be used and this allows for an easier control of the pressure variations in the compressors.

Bypass

This serves the same function as the pressure release. This method is mainly used in the process of compression.

Throttling the inlet

This is a simplified method that is used to reduce the pressure by increasing the pressure ratio existing across the compressor.

Pressure relief with throttled inlet

This method combines the existing maximum regulation range with low consumption of energy. This allows the compressor to work with a vacuum at the inlet and low counter pressure.

Start/stop

The Compressors that are below 5–10 kW are often controlled by completely stopping the electric motor when the pressure reaches an upper limit value and by restarting it when the pressure drops below the lower limit value.

Speed regulation

A combustion engine, gas turbine or frequency controlled electric motor controls the compressor’s speed and, consequently, the flow rate. This is an efficient method that s necessary for maintaining a steady outgoing pressure and lower energy consumption.

Variable discharge port

The flow rate of screw compressors can be regulated by moving the position of the discharge port into the housing, in the rotors’ lengthways direction, towards the inlet. This method is however capable of generating high power consumption.

Suction valve unloading

The piston compressors can be regulated through mechanical forcing of the inlet valves into the open position. This results in air being pumped out and into the cylinder with minimal energy loss that is often lower than 10% of the full-load shaft power.

Load–unload–stop

This is the most common method of regulation that is used for the compressors that have a capacity greater than 5 kW. It combines a large regulation range with low losses.

Regulation principles for

dynamic compressors

This includes principles for both the inlet and the outlet of the compressors.

Inlet regulation

The inlet of the compressor can be regulated by throttling the inlet of the compressor in order to determine the minimum flow and set the range for the compressor. Inlet regulation is also achieved by arranging the vanes as radial blades in the intake causing the drawn-in gas to rotate while the flow is throttled.

Outlet regulation

The outlet of the compressor can be regulated by controlling the flow in the compressor stage’s diffuser. Due to the increased cost and complexity, regulation is maintained at 30%.

Load–unload–stop

Two main modes can be used in this regard including the modulation of the excess flow and the autodial mode which regulates the turndown of the pressure at the inlet.

Speed regulation

Regulation of speed normally results into the same effects as the inlet guide vanes. With a constant pressure, the flow of air can be varied.

Control and monitoring

Controlling compressors requires a regulation system that can be used either for an individual compressor or an entire compressor installation. Regulation systems are becoming more advanced and fast growing development offers a variety of new solutions.

Load-unload stop

When air is required, a signal is sent to a solenoid valve that guides the compressor’s inlet valve to the fully open position. The valve is either fully opened or fully closed. There is no intermediate position in loading and

unloading stops.

Speed regulation

Compressors that have a power source whose speed is controlled electronically provide a great opportunity to keep the compressed air constant within a very tight range of pressure. A frequency converter, which is used to regulate the speed on a given conventional induction motor, is a probable solution to the speed of the system.

Data monitoring

All the compressors are normally equipped with some kind of monitoring equipment in order to protect the compressor and prevent production downtime. The transducer is used to sense the current condition of the installation. Information that is obtained from the transducers is then processed by the monitoring system, which then gives a signal to an actuator.

Temperature measurement

A resistance thermometer is normally used to measure the temperature. It features a metal resistor as a transducer whose resistance increases with as temperature increases. The change in resistance is measured and converted to a signal of between 4 to 20 mA. The most common resistance thermometer is Pt 100.

Pressure measurement

A pressure sensing body is used to measure pressure. The mechanical signal from the body is then converted to an electrical signal 0–5 V. The conversion from a mechanical to an electrical signal can take place in either a resistive system or a capacitative system.

Monitoring

Monitoring equipment is normally adapted to the type of compressor. This involves a range of equipment to suit all types of compressors. A small piston compressor is equipped with a conventional overload cut-out for the motor, while a large screw compressor can feature a number of transducers for overloading either temperature or pressure.

Comprehensive control system

There are a number of factors that make a comprehensive control system more advantageous. These include the division of operating times between machines in order to reduce the risk of unexpected stoppages. The servicing of the compressor is also easier to plan. If something occurs during the operations, standby machines can be connected.

Start sequence selector

This is the most common form of master control system. The selector divides the operating times equally and starts among the connected compressors. The start sequence can be switched on manually or automatically, following a time schedule.

Central control

The central control in association with compressors normally signifies relatively intelligent control systems. The most basic demand is to be able to maintain a predetermined pressure within tight limits and to provide economic operation for the installation. In order to achieve this, the system must be capable of predicting what will happen in the system, while at the same time sensing the load on the compressor. The system senses how quickly the pressure changes in either sense. It is very important for the maintenance of the control efficiency.

Remote monitoring

There may be a need to monitor and control compressor operations from a remote location in various applications. It is usually possible to perform remote starting and stopping. The monitoring system should also have a memory in order to produce a log of what has happened over the last 24 hours. The log is used to plot trend curves, which serve to easily identify values that tend to deviate from the default. The curves can form the basis for continuing operations or planning a system stop.