



## SINGLE STAGE COMPRESSOR



**DL OG11**

The system has been realized for the study of the operating features of a volumetric alternative single stage compressor, in particular its ranges of application.

The system works together with a supervision software, so that all experiments data can be monitored and reviewed constantly .

The supervision software is a host monitoring software installed in a desktop computer connected with the hardware through a USB 2.0 cable. It gathers the operating data of the system and controls the operation of trainer. It is possible to monitor 12 kinds of parameters at any time, including angle, pressure and flow. Contemporaneously, the software records all the data during the test process. Through the software historical data, graphics can be showed with different modes. Users can study the historical data curve, so as to master the functional characteristics of the compressor.

### TRAINING OBJECTIVES

The system is supplied with appropriate operation and maintenance manuals, including technical documentation of all equipment, and a handbook of the possible experiments such as:

- Determination of the compression ratio
- Efficiency measurement
- Characteristic Q - p at variable rpm
- Load loss
- P-V



## OPERATION OF THE PLANT / TECHNICAL FEATURES

The trainer is complete with measurement instrumentation for monitoring the flow rate, rpm, torque and pressure; it is also prearranged for the measurement of current and voltage and for the installation of electronic transmitters.

Speed adjustment can be obtained by running the inverter, which acts on the A.C. motor.

The system is protected by a safety pressure solenoid valve, when the pressure reaches the highest rated value, the solenoid valve will stop the invert immediately.

### The unit mainly includes:

- Single stage compressor, industrial type, assembled on a steel base,
- A.C. motor,
- Inverter
- Multi-function meter
- Storage tank,
- Control panel and instrumentation.
- It also includes a mushroom valve for delivery regulation and reduction station.

### Specifications

- Dimensions: 1.2 x 1x 1.7m
- Weight: 170 Kg
- Service required:
- Electric power supply 220V - 50Hz Single phase + 1.8KVA

### TECHNICAL DATA

#### Compressor:

- Single-stage, Single-cylinder reciprocating compressor, industrial type
- Air cooled, operation pressure 6 bars,
- Max volume 120 l/min
- Variable rotation speed 0÷1000
- Assembled on a steel base

#### Electric motor:

- AC type, Variable voltage and frequency 0÷3000 rpm, Power 1.1 Kw

#### Instrumentation:

- 1 Flow rate indicator
- 2 Pressure gauge (air delivery),
- 1 Vacuumeter (air intake),
- 1 Torque indicator (electronic load cell),
- 1 Digital inverter (tachometer and voltmeter)
- 1 encoder
- 1 TDC sensor
- 1 Online inside cylinder pressure
- 1 torque/ rpm indicator
- 3 air release solenoid valve
- 3 three-in-one pneumatic components with mushroom button
- 1 safety pressure solenoid valve



## SENSORS

Pressure probe, angular sensor, flow sensor, torque speed sensor and other sensors are applied to acquire faster and more accurate data for the experimental study.

The introduction of the sensor is as follows:

- Pressure probe in the compression chamber is used to measure the instantaneous pressure in the compression chamber. Piston reciprocating motion generates pressure changing, the pressure is transmitted to electric signal by the probe. The value of probe is proportional to instantaneous pressure in the compression chamber. The maximum operating frequency of pressure probe can reach to 2 kHz.
- Angular sensor is an encoder. This is directly connected to the shaft of compressor. No matter whether shaft of compressor rotates at high speed or at low speed, angular sensor sends the relevant angle electric signal. At the same time, it also has the function of zero mark.
- The frequency of top dead center (TDC) is proportional to rotational speed. TDC signal is sent out through high frequency sensor.
- Flow sensor is used to display and transmit the instantaneous flow state.
- Torque speed sensor can gather torque signal and rotation speed signal at the same time, and has local display function.

## SOFTWARE

The system is supplied with an acquisition board for acquiring and gathering data by an 8-channel analog input, at the same time. The maximum sampling rate of the acquisition board reaches to 200ks/S.

### SOFTWARE TECHNICAL FEATURES

The software is designed with multi-window interfaces for a best didactic comprehension. The historical curve, trend curve, flow chart, etc. are separately placed in different interfaces, so as to make data comparison easier. The software is supplied with an application for data recording, to be set in the operation interfaces. Users can record or stop recording data at any time, so to save experimental time and more accurately record data. For the realization of the historical curve, users can freely select by the window, the parameter they must set both X or Y axis, so it can be simple to study the working process of the compressor from multiple perspectives.

If the parameter curve is too close to the window's edge, users can freely adjust the position of the horizontal and the vertical axis to the optimum observation point.

In regards to the speed control, it can be manually entered the operating frequency of the motor for regulating the working frequency of the compressor. When the compressor is running, the status can be monitored by a window that provides real-time data curve.

