

Function check

POSITIVE DISPLACEMENT BLOWER

Process description



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1 Functional test run

1.1 Application range

Rotary piston blowers of series K and F.

1.2 Definition

In the test area the fully assembled machine is tested under conditions, that as far as possible match with the original operating conditions of the future installation site. Preferably the original motor is used. If the original motor cannot be used for the reasons listed below, a suitable test motor is connected.

1.3 Aim of the test

In the functional test the machine is tested for proper functionality during start up and operation. At the same time speed, current and power values of the motor as well as the pressures and temperatures are measured and recorded. Additionally, the conveying system is tested for leaks.

1.4 Measured values

During the functional test run the following operating parameters are recorded:

Parameter	Symbol	Unit
motor speed	n_{Mot}	rpm
speed blower stage	n_{ND}	rpm
rated current motor	I	A
actual motor power	P	kW
suction pressure	p_1	(-)mbar g
discharge pressure	p_2	bar g
suction temperature	t_1	°C
discharge temperature blower	t_2	°C
discharge temperature after-cooler (if existing)	t_3	°C

Functional test run

Test conditions > Test field motor

1.5 Test conditions

Tester	The test is carried out by trained personnel.
Test environment	RKR test facility <ul style="list-style-type: none"> ■ 50 m above NHN (“Normalhöhenull” / “standard elevation zero” as per DHHN92)
Test medium	The functional test run is always performed with air.
Inlet temperature	$t_A = +15$ up to $+35$ °C (ambient temperature)
Inlet pressure	$p_1 \sim 1.0$ bar abs. (atmospheric pressure)
Final pressure	$p_2 =$ according to performance data sheet or customer specification
Lubrication oil	according to operating instructions
Testing devices	<ul style="list-style-type: none"> ■ measuring instruments at the machine ■ control cabinet on the test field
Duration of the test	<p>The test duration amounts to one hour and is divided into two periods:</p> <ul style="list-style-type: none"> ■ period 1 Start-up of the machine until discharge temperature has reached state of inertia: approximately 45 minutes ■ period 2 Continuing of operation for further 15 minutes

1.5.1 Test field motor

Usage of the original drive motor within standard values

The original drive motor can be connected and tested in the functional test without additional expenses, if the performance data of the motor match with values listed below.

drive motor power	P = max. 400 kW
drive motor speed	<ul style="list-style-type: none"> ■ 1000 rpm (50 Hz) ■ 1500 rpm (50 Hz) ■ 3000 rpm (50 Hz)
voltage	U = 400 V (± 10 %)

Usage of the original drive motor beyond standard values

If the performance data of the original motor lie beyond the above mentioned values and should this motor be tested in a functional test run, this is possible. For this purpose, additional equipment has to be used, resulting in significant additional expenditure.

Usage of the test field drive motor

The test field motor will be implemented if the performance data of the original motor do not match with the standard values mentioned above or in case, the motor is not for final assembly provided by the customer and will only be assembled at the final installation site.

1.6 Test sequence

Test sequence for machines with power module

The test sequence with frequency converter or soft starter consists of the following steps:

- 1.** ➤ Set up the machine at the test facility
- 2.** ➤ Connect the discharge nozzle to the outlet channel supplied for the test
- 3.** ➤ Establish the electrical connection between the control cabinet and supply voltage
- 4.** ➤ Optional: Connect the compressed air aftercooler to water or air cooling
- 5.** ➤ Optional: connect pneumatically or electrically controlled regulating elements
- 6.** ➤ Fill with oil (oil quantities as per instruction manual)
- 7.** ➤ Check the direction of rotation of the drive motor in decoupled state
- 8.** ➤ Mount the coupling elements
- 9.** ➤ Start up the machine using frequency converter/soft starter against open discharge-side pipe system of the test facility
- 10.** ➤ After run-up, bring the machine to counterpressure using a slide plate or a valve installed in the discharge-side pipe system of the test facility
- 11.** ➤ Switch off the machine and let it run out in a relieved state (no counterpressure)

Test sequence for machines without power module

The test sequence with star-delta starting consists of the following steps:

1. ▶ Set up the machine at the test facility
2. ▶ Connect the discharge nozzle to the outlet channel supplied for the test
3. ▶ Establish the electrical connection between the drive/auxiliary motors and the control centre.
4. ▶ Optional: Connect the compressed air aftercooler to water or air cooling
5. ▶ Optional: connect pneumatically or electrically controlled regulating elements
6. ▶ Check the direction of rotation of the drive motor in decoupled state and with the V-belt removed
7. ▶ Install the coupling elements and mount the V-belt
8. ▶ Fill with oil (oil quantities as per instruction manual)
9. ▶ Start up the machine using star-delta starting against open discharge-side pipe system of the test facility
10. ▶ After changing the drive motor over from star to delta, bring the machine to counterpressure using a slide plate or a valve installed in the discharge-side pipe system of the test facility
11. ▶ Switch off the machine and let it run out in a relieved state (no counterpressure)

1.7 Documentation

The test results are supported by a manufacturer's inspection certificate as per DIN EN 10204 3.1.