

## Test Stand For Air Turbine Starters

### >TATS4<



The test stand is developed for testing the characteristics of Air Turbine Starters, such as e.g.: pressure, flow, temperature, rotational speed and torque.

It can be adapted for different types of Air Turbine Starters.

- > Electric motors replace fly wheels
- > Electric inertia simulation with energy recuperation. Inertia can be regulated via software
- > Separate air-mixing unit is fitted to regulate pressure, temperature and flow
- > Integrated electromotor for UUT overrunning tests
- > Lubrication oil circuit for UUTs
- > All tests can be realized with one setup

## RANGES OF APPLICATION (EXTRACT) \*

Description	P/N	Description	P/N
STARTER PNEUMATICS	774860A10 774860A11	STARTER PNEUMATICS	1718219 1721429A 1720495 1718218
STARTER PNEUMATICS	775550-7		810970-4 774984-3
STARTER PNEUMATICS	821600-7 821600-8	STARTER PNEUMATICS	763569-6
STARTER PNEUMATICS	811050-4	STARTER PNEUMATICS	784750A6
STARTER PNEUMATICS	1714214A 1715071	STARTER PNEUMATICS	1000358
STARTER PNEUMATICS	1714471C		
STARTER PNEUMATICS	1714470B 1714469B		

\* Further P/Ns can be tested with the test stand.

## MASS SIMULATION MODULE

- > Operation can be autonomous (an already existing flywheel can be used)
- > Integrated hydraulic power unit for supplying UUTs with lubrication oil
- > Electric motors are water-cooled
- > A disc brake is provided for "Stall-Moment-Tests" and as safety equipment
- > In-line setup for mass simulation and overrunning motor. Therefore, no adaption changings are necessary during the test procedure
- > Energy recuperation during inertia simulation
- > Oil-drip tray to collect any leaking lubrication oil during adaption

## MIXING MODULE

- > Operation can be autonomous (an already existing compressed air supply can be used)
- > Precise and quick regulation of pressure and flow via pneumatic control valves developed by TEST-FUCHS
- > Integrated hydraulic power unit for supplying the pneumatic control valves
- > Integrated orifice flow measurement
- > Control valve for hot and cold air

## GENERAL INFORMATION

- > 175kW flow heater for heating air to the required temperature
- > Two compressed air receivers made of steel with 5.000l (1,320.9USgal) each as buffer
- > Operator panel is outside the testing area
- > Sound insulated cabin to protect operators
- > User-friendly design of the software interface
- > All tests can be carried out manually or in a partially or fully automated set-up

## TECHNICAL DATA

<p>&gt; <b>Types of medium:</b></p> <p><u>Cooling fluid:</u> Water + 30% ANTIFROGEN N</p> <p><u>Test medium:</u> MIL-PRF-23699 (e.g.: MOBIL JET OIL II)</p> <p><u>Hydraulic oil:</u> ISO VG46 (e.g.: FUCHS RENOLIN D46 HVI)</p> <p><u>Pneumatics:</u> ISO8573-1 ISO Code 1-4-2</p>	<p><u>Mixing module (incl. switch cabinet):</u></p> <p>Width: 1,350mm (53.1in) Length: 3,100mm (122.0in) Height: 2,400mm (94.5in) Weight: 1,900kg (4,188.8lb)</p> <p><u>Switch cabinet:</u></p> <p>Width: 1,250mm (49.2in) Depth: 700mm (27.6in) Height: 2,450mm (96.5in) Weight: 700kg (1,543.2lb)</p>
<p>&gt; <b>Dimensions and weight:</b></p> <p><u>Air Turbine Starter Module (incl. switch cabinet):</u></p> <p>Width: 1,350mm (53.1in) Length: 3,050mm (120.1in) Height: 2,700mm (106.3in) Weight: 4,000kg (8,818.5lb)</p> <p><u>Converter:</u></p> <p>Width: 3,600mm (141.7in) Depth: 700mm (27.6in) Height: 2,350mm (92.5in) Weight: 1,800kg (3,968.3lb)</p>	<p><u>Network cabinet:</u></p> <p>Width: 650mm (25.6in) Depth: 650mm (25.6in) Height: 2,250mm (88.6in) Weight: 200kg (440.9lb)</p> <p><u>Compressed air receivers</u></p> <p>Width: 2,300mm (90.6in) Length: 3,400mm (133.9in) Height: 5,000mm (196.8in)</p>

## OPTIONS

- > Special UUT trolley for UUT mounting
- > Customization to special customer requirements (infrastructure, UUTs, Software, etc.)

## MEASUREMENTS

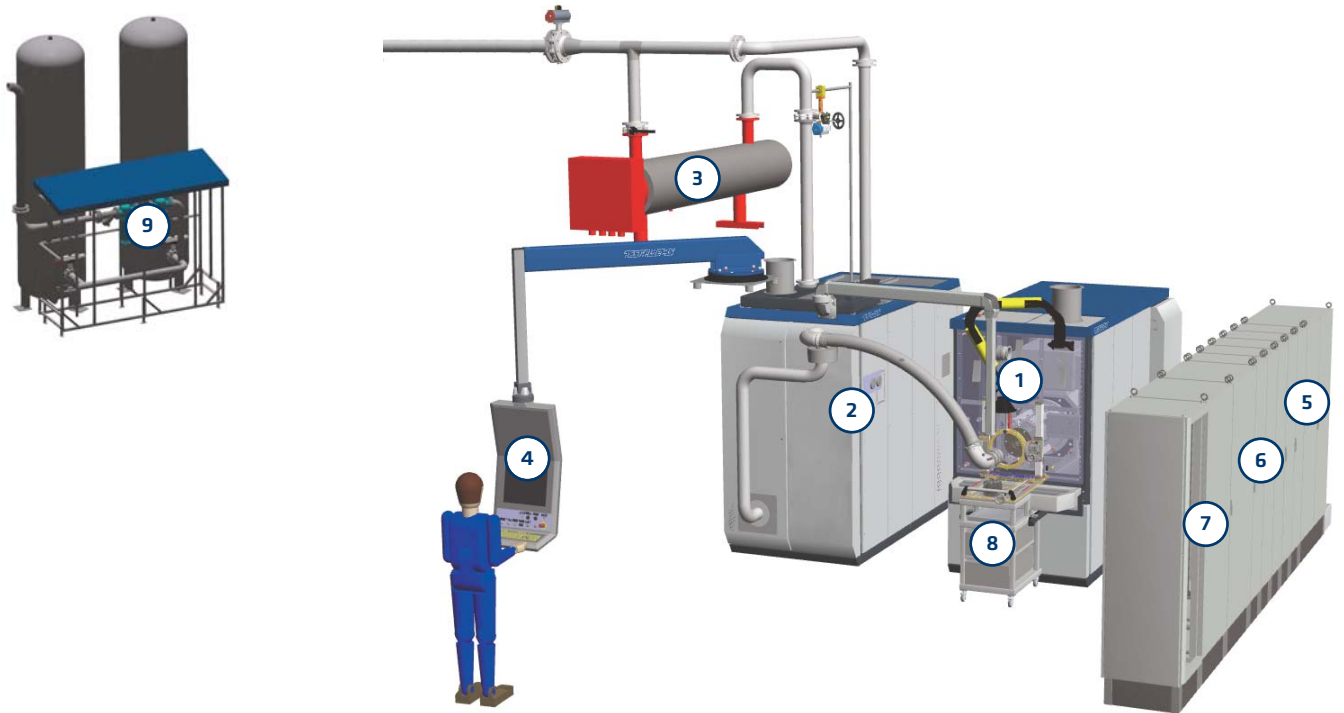
<p>&gt; <b>Flow (2 pcs):</b></p> <p>Range: 0 to 4l/min (0 to 1.1USgpm) Tolerance: <math>\pm 0.5\%</math> of measuring range</p> <p>Range: 0 to 3.2kg/s (0 to 7.1lb/s) Tolerance: <math>\pm 3\%</math> of measuring range</p>	<p>&gt; <b>Torque (1 pc):</b></p> <p>Range: -2,000 to +2,000Nm Tolerance: <math>\pm 0.25\%</math> of measuring range</p>
<p>&gt; <b>Pressure (7 pcs):</b></p> <p>Range: 0 to 164.92mbar (0 to 2.4psi) Tolerance: <math>\pm 0.25\%</math> of full scale</p> <p>Range: 0 to 10bar abs. (0 to 145.0psia) Tolerance: <math>\pm 0.25\%</math> of measuring range</p> <p>Range: 0 to 60bar (0 to 870.2psi) Tolerance: <math>\pm 0.25\%</math> of measuring range</p>	<p>&gt; <b>Vibration (1 pc):</b></p> <p>Range: 0 to 20mm/s Tolerance: <math>\pm 3\%</math> of full scale</p>
<p>&gt; <b>Temperature (10 pcs):</b></p> <p>Range: 0 to 100°C (32 to 212°F) Tolerance: <math>\pm 1^\circ\text{C}</math> (1.8°F)</p> <p>Range: 0 to 300°C (32 to 572°F) Tolerance: <math>\pm 1^\circ\text{C}</math> (1.8°F)</p>	<p>&gt; <b>Voltage - rotational speed sensor (2 pcs):</b></p> <p>Range: 0 to 140VPP Tolerance: <math>\pm 1\text{VPP}</math></p>
<p>&gt; <b>Rotational speed (4 pcs):</b></p> <p>Range: -8,000 to +8,000rpm Tolerance: <math>\pm 0.25\%</math> of full scale</p> <p>Range: -19,000 to +19,000rpm Tolerance: <math>\pm 0.25\%</math> of full scale</p>	<p>&gt; <b>Frequency (2 pcs):</b></p> <p>Range: 0 to 250Hz Tolerance: <math>\pm 1\text{Hz abs.}</math></p>
	<p>&gt; <b>Ambient conditions (3 pcs): (ambient pressure, temperature, humidity)</b></p> <p>Range: 800 to 1,200mbar abs. (11.6 to 17.4psia) Tolerance: <math>\pm 0.5\%</math> of measuring range</p> <p>Range: 0 to 40°C (32 to 104°F) Tolerance: <math>\pm 1^\circ\text{C}</math> (1.8°F)</p> <p>Range: 0 to 100% Tolerance: <math>\pm 2\%</math> abs.</p>

## SUPPLIES (PROVIDED BY THE CUSTOMER)\*

<p>&gt; <b>Electrical supply:</b></p> <p>Mains supply: 3/N/PE AC 50Hz 415V Nominal current: 650A Back-up fuse: 800A gG Performance: 106kVA</p>	<p>&gt; <b>Compressed air 2 backup:</b></p> <p>Pressure: 35bar (507.6psi) Flow: max. 156sm<sup>3</sup>/h Mass-Flow: max. 0.06kg/s Quality: ISO8573-1 ISO Code 1-4-2</p>
<p>&gt; <b>Compressed air 1:</b></p> <p>Pressure: 7 to 10bar (101.5 to 145.0psi) Quality: ISO8573-1 ISO Code 1-4-2</p>	<p>&gt; <b>Exhaust air:</b></p> <p>Pressure: max. 0.5bar (7.3psi) Temperature: max. 300°C (572°F)</p>
<p>&gt; <b>Compressed air 2:</b></p> <p>Pressure: 35bar (507.6psi) Flow: max. 567sm<sup>3</sup>/h Mass-Flow: max. 0.2kg/s Quality: ISO8573-1 ISO Code 1-4-2</p>	<p>&gt; <b>Cooling water:</b></p> <p>Flow: 40l/min (10.6USgal/min) Pressure: 2 to 10bar (29.0 to 145.0psi) Temperature: max. 25°C (77°F)</p>

\* Solutions for different existing compressed air supplies can be offered.

ENTIRE SCOPE OF THE TEST STAND



- |                          |                   |                  |                   |                            |
|--------------------------|-------------------|------------------|-------------------|----------------------------|
| ① Mass simulation module | ③ Heater          | ⑤ Switch cabinet | ⑦ Network cabinet | ⑨ Compressed air receivers |
| ② Mixing module          | ④ Operating-panel | ⑥ Converter      | ⑧ UUT Trolley     |                            |

3D-view of the infrastructure with testing room and operator area

An observation window enables monitoring of the tests

The safety door position is monitored

Customization to the existing infrastructure of the customer is possible

