safety in test > safety in flight

TEST FUCHS

Test Stands for OEM and MRO

WWW.TEST-FUCHS.COM

Test Stands for OEM and MRO

HYDRAULICS

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Radar Cooling Liquid Pump Test Rig for EF2000 >RCT1<
Test Stand for Screwjack and Bevel Gear Boxes >TSC1E<
Servicing Trolley for Flaps and Thrust Reversers >SFTR1<
Test Stands for Non-Rotating Components >NR-SERIES<
Test Stands for Rotating Components (Motors and Pumps) >MP-SERIES<
Power Units for Hydraulic Test Stands >PU-SERIES<

FUEL

Test Stand for Main Fuel Pumps and HMU'S >THMU1AF<
Fuel Nozzle Test Stand >FNTS9<
Universal Test Stand for Fuel Controllers and Fuel Pumps >P-PKR2<
Fuel Components Test Stand >FATS2<
Test Stand Assy APU FCU and Fuel Nozzles >PTRV2<
Main Fuel Accessories Test Stand >MFAT1SR<
Test Stand for Fuel Pumps and Components >KKP1000M-407<

PNEUMATICS

Oxygen Regulator Operational Tester >OXR100<
Mobile Test Stand, Oxygen Regulator >MOX12<
Test stand for oxygen components and regulators >OXR3-A<
Universal Test Stand for Pneumatic Components >PP200STA<
Test Stand for Outflow Valves >POVM4NM<
Test Stand for Air Turbine Starters >TATS1AF<
Test Stand for Safety Valves >PSV1000NM<
Test Stand for Safety Valves >BSV1AF<
Test Stand for Safety Valve >PSV1000N<
Test Standfor Pneumatic Valves >PPV3<
Pneumatic Test Stand >SPAN50/15<
Test Bench for Alouette III Rescue Winch >PWP1<
Test Stand for Air Turbine Starters >TATS2EF<

ELECTRICAL

Motor Spindle Test Stand >PMS2<
Test Stand for Power Drive Units >TPDU1E<
Test Stand for Power Drive Units >TPDU4C<
Generator Test Stand >LMP901B<
Test stand for generators, IDGs and CSDs >LMP300<
Generator Test Stand >LMP60-407<
DC-Generators And Starter Generators Test Stand >SPSG15-16C<
Starter Test Stand >DMW50T<
Equipment for Static Test of GCUs and their Modules >PA-RST1<
Backlash-Tester >BLT5FA<
Test Stand for Radial Actuators >PRP5LH-ROT<
Test Stand for Linear Actuators >PRP5LH-LIN<

DIFFERENT

Equipment for Leakage Tests on Actuators >PRP5LH-TLT<
Combined Test System for Aircraft Mounted Accessory Drive (AMAD), Generator Converter Unit (GCU) and Transmission Units >PAM18GT<

Test Stand for Proof Pressure and Cleaning of Aircraft Tubes

>HOEP1500PF<

Developed for static proof pressure testing, cleaning and drying of aircraft tubes.

It can also be adapted for many aircraft tubes.

- Burst testing up to 1500bar
- Nitrogen test up to max. 225bar in the immersion basin
- Inlet and Outlet connection via hydraulic quick release fasteners for 0 to 55bar and 0 to 1500bar
- Mounting and removal of the tubes to be tested on two movable desks

GENERAL INFORMATION

- Computer-controlled via two control panels
- Stainless steel construction
- Continuous separation of oil and water from the cleaning agent

TECHNICAL DATA

Hydraulic parameters:

Hydraulic supply:

Capacity:
approx. 20 litres (5.3USgal)
Pressure: 70bar (1.015.3psi)
Flow: 7l/min (1.9USgpm)

Cooling machine:

Capacity approx. 9.000 Watt

2 Nitrogen supplies:

max. 15bar (217.6psi)
max. 210bar (3.045.8psi)

Electrical parameters (requirements):

3/N/PE AC 50Hz 400V
Nominal current: 65A
Power: 45kVA
Preliminary fuse: 80A

Dimensions and weight:

Length: 11.610mm (457inch)
Width: 4.100mm (161.4inch)
Height: 4.450mm (175.2inch)
Weight: approx. 8.000kg (approx. 17.637lb)

Main circuits:

Test medium:
Klöckner Solvent 100 or nitrogen

Flushing and filtration circuit:
max. 250lpm (66USgpm),
max. 14bar (203psi)
up to the test outlets

MP test circuit:
max. 5lpm (1.3USgpm)
max. 55bar (797.7psi)

HP test circuit:
max. 0.75lpm (0.2USgpm)
max. 1500bar (21.755.7psi)

Medium cleaning:
max. 10lpm (2.6USgpm)
max. 3bar (43.5psi) with active carbon

Main tank:
approx. 700 litres (185USgal)

Auxiliary tank:
approx. 300 litres (79.3USgal)

Nitrogen circuit:
max. 9bar for UUT drying,
max. 225bar for testing in the immersion basin

Nitrogen accumulator:
max. 230bar (3.335.9psi)
max. 50 litres (13.2USgal)

Compressed air circuit:
max. 10bar (145psi)

OPTIONS

Many options are possible for adaption,
e.g. adaption to other aircraft tubes, different control panels etc.

Technical data are subject to change!

Test Equipment For Anti Skid Valves

>TE-ASV1-2<

- Two test stations independent from each other
- Test circuit with two pressure outputs, six measuring inputs and one return line
- Hydraulic supply of the UUTs via quick-clamping adapters
- Servo cylinder
- Nitrogen circuit
- Test set for low pressure long-time tests max. 5bar

TECHNICAL DATA

> Power requirements:

Main power supply:
3/N/PE AC 50Hz 400V
Nominal power: 140kVA
Nominal current: 200A

Lighting:
1/N/PE AC 50Hz 230V

Emergency power supply:
1/N/PE AC 50Hz 230V
Mains protection: 13A

Cooling water:
closed cooling circuit via air-cooled refrigerating machine

Nitrogen supply:
max. 210bar

Compressed air supply:
min. 6bar, max. 12bar

> Dimensions and weight:

Test stand:

Length:	approx. 5,600mm
Width:	approx. 1,600mm
Height:	approx. 2,400mm
Weight:	approx. 2,800kg

Test set for low pressure long-time tests:

Width:	approx. 1,300mm
Depth:	approx. 1,000mm
Height:	approx. 1,400mm
Weight:	approx. 230kg

> Hydraulic circuits:

Hydraulic supplies 1 and 2:
Filling quantity: approx. 200l each

Cooling and low pressure circuits 1 and 2:
70lpm, 14bar

High pressure circuits 1 and 2:
10lpm at 330bar
40lpm at 280bar
60lpm at 210bar

Control pressure circuits 1 and 2:
9.4lpm, 80bar

Output circuit:
1 to 60lpm, max. 315bar

Measuring circuit with flow and differential pressure measurement

Return circuit with flow measurement

Nitrogen fuse test circuit

Scavenge circuit

Servo cylinder - measuring circuit

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.

Technical data are subject to change!

Test Stand for PCU Components

>TPCU1<

To test PCU components for the AIRBUS types A380 und A400M like:

- Pressure
- Temperature
- Flow
- Torque
- Leakage etc.

It can also be adapted to other aircraft types.

- Operation via external table and PC
- Manual, semi- and automatic test runs
- Quick clamp and quick disconnect coupler to connect the UUT and the test stand
- Movable protection cover

GENERAL INFORMATION

- Radial piston pump for pressure tests (Flow 15l/min (3.96USgpm), max. 550bar (7.977psi))
- Intended for external hydraulic supply (Range: 0 to 380bar (0 to 5511.4psi), max. 160l/min (42.3USgpm) (hydraulic supply unit available)

TECHNICAL DATA

> Electrical parameters (requirements):

3/N/PE AC 50Hz 400V
Nominal current: 38A

> Dimensions and weight:

Length:	1.380mm (54.3inch)
Depth:	2.900mm (114.2inch)
Height:	3.000mm (118.1inch)
Weight:	ca. 1.985kg (4.376lb)

> Medium:

Skydrol LD4 or LD5 as test medium

> Measurement range:

Pressure:	0 - 600bar ± 0,25% (0 - 8.702psi ± 0,25%)
Torque:	± 50Nm ± 0,2% (0 - 442.5lbf in ± 0,2%)
Flow:	0 - 2l/min ± 0,5% (0 - 0.53USgpm ± 0,5%)
Temperature:	0 - 100°C ± 1°C (0 - 212°F ± 1°C)
Speed:	± 6.000rpm ± 0,2%

> Operating conditions:

Temperature:	+5 to +40°C (+41 to 104°F)
Humidity:	10 to 85% (non condensing)

OPTIONS

Many options are possible for adaption,
e.g.adaption to other aircraft types,...

Technical data are subject to change!

HYDRAULIC

Hydraulic Test Stand for Flight Control Units (FCU)

>HFCU1<

Universal test stand for Flight Control Units of various aircrafts.

- Measuring data acquisition and data recording of flow, pressure, leakage, force, speed etc.
- Frequency-response test with Frequency-Response-Analyzer
- Bode diagram with marginal check
- User-friendly construction with movable cover
- Computer controlled via operating unit (tilting and rotating)
- Hydraulic quick gripping of hydraulic connections and adapters
- Sound proof to 75dB(A)

TECHNICAL DATA

> Hydraulic circuits:

High pressure circuit:	max. 320bar, max. 150lpm
Low pressure circuit:	max. 10bar
Control pressure circuits:	35bar and 350bar
High pressure test circuit:	max. 600bar, max. 10lpm
Controllable output:	0 - 40bar
Measuring circuit:	0.01 - 100lpm

Scavenge unit with filter

Free connectable pressure transducers

> Supply voltages:

Main supply:	3/N/PE AC 50Hz 400V
Computer supply:	1/N/PE AC 50Hz 230V

> Test medium:

Skydrol

> Dimensions and weight:

WxDxH:	3650mm x 2300mm x 2500mm
Weight:	approx. 4700kg

OPTIONS

Many options are possible for adaption,
e.g. adaption to other aircraft types, to different operating units etc.

Technical data are subject to change!

Test Stand for Aircraft Brakes and Flow Regulators

>PFB6S<

The test stand is developed for testing and purging aircraft brakes and flow regulators (up to max. 350bar/5,000psi).

It is possible to adapt this test stand for other aircraft brakes and flow regulators requiring different parameters.

- The test stand can be operated manually.
- 2 test connectors and 1 free return line are fitted.
- Cooling circuit with a separate pump
- Safety glass doors to protect the user during high-pressure tests.
- Work surface for handling the UUTs.
- UUTs can be placed with a crane.

GENERAL INFORMATION

- Testing pressure can be set manually via pressure regulator
- The mesh size of the filter is 3µm
- Level and thermal shutdown is provided
- Safety valve
- The test stand is made of stainless steel with a black anodized operating front
- Openings for the transport with fork lift are provided

TECHNICAL DATA

Electrical supply (requirements):

Mains connection:	3/N/PE AC 50Hz 400V
Nominal current:	18.6A
Performance:	12.9kVA

Hydraulic parameters:

Medium:	Skydrol, Hyjet
Flow:	max. 20lpm at 20bar (max. 5.3USgpm at 300psi) max. 3lpm at 350bar (max. 0.8USgpm at 5,000psi)
Filtration:	3µm
Main tank:	55l (14.5USgal)

Operating conditions:

Ambient temperature:	5 to 35°C (41 to 95°F)
Storage temperature:	0 to 55°C (32 to 131°F)
Height:	max. 1,000m above MSL (3,280ft)
Rel. humidity:	10 to 95% (non-condensing)

Measurements:

Pressure:		
(2-off)	0 to 10.3bar (0 to 150psi)	Cl. 0.6 (EN 837)
(2-off)	0 to 69bar (0 to 1,000psi)	Cl. 0.6 (EN 837)
(2-off)	0 to 690bar (0 to 10,000psi)	Cl. 0.6 (EN 837)
Flow:		
(1-off)	0 to 23lpm (0 to 6USgpm)	±1% of full scale

Dimensions and weight:

Width:	1,450mm (safety doors closed)	(57.1in)
	2,650mm (safety doors opened)	(104.3in)
Depth:	1,210mm	(47.6in)
Height:	1,870mm	(73.6in)
Weight:	approx. 500kg	(approx. 1,102.3lb)

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: adaption to many different of UUTs, dimensions, etc.

>PFB6S<

Technical data are subject to change!

Aircraft Brakes Test Stand

>PFB3S<

Trolley with mounted UUT

The test stand is developed to test and flush aircraft brakes (up to a max. of 600bar/8700psi).

It is possible to adapt this test stand for other types of aircraft brakes.

Application range:

A319 / A320 / A321
A300 / A310 / A330 / A340 / A380
MD11 / EMBRAER 190
B737 / B747 / B757 / B767 / B777 / B787

- The test stand has 2 independent test stations enabling simultaneous testing of 2 brakes which can belong to different aircraft types.
- 2 lifting protective covers (1 for each test station) are fitted to provide maximum safety for the operators during high pressure testing.
- Trolleys are provided to enable easy installation and positioning of the aircraft brakes during bleeding and testing. They enable the brakes to be easily tilted and rotated.
- The test stand is used for the following tests:
  - Drain test
  - Brake flushing using “HYJET IV-A+”
  - Filling and bleeding of the brake by pressure and vacuum
  - Leakage test
  - Function tests with preset pressure stages

Aircraft Brakes Test Stand

>PFB3S<

GENERAL INFORMATION

- Injector pumps generate vacuum (to fill and bleed by vacuum)
- Control panels (pivotable up to 90°) are fitted to ensure easy operation
- The test stand is operated by means of touch-panels
- UUTs are mounted on the trolley s by means of an expanding mandrel and adapters
- Test runs can be carried out manually, semi-automatically and automatically
- Doors and removable covers enable easy access for maintenance purposes

TECHNICAL DATA

> Electric supply (requirements):

Mains connection:	3/N/PE AC 50Hz 400V
Power:	approx. 12kVA
Nominal current:	max. 17A

> Hydraulic parameter:

Flow:	max. 14l/min (max. 3.7USgpm)
Pressure:	max. 600bar (max. 8700psi)

> Operating conditions:

Ambient temperature:	+5 to +40°C (+41 to +104°F)
Storage temperature:	0 to +60°C (+32 to +140°F)
Altitude:	max. 3000m above SL (max. 9840ft)
Relative humidity:	10 to 90%

> Medium:

HYJET IV-A+ or Skydrol
Tank 240l (63.4USgal)

> Measurement range:

Temperature:	0 to 100°C, ±1°C absolute
(1 off)	(32 to 212°F, ±1.8°F absolute)
Pressure:	0 to 1.6bar, ±0.004bar absolute
(2 off)	(0 to 23psi, ±0.06psi absolute)
Pressure:	0 to 160bar, ±0.4bar absolute
(2 off)	(0 to 2300psi, ±5.8psi absolute)
Pressure:	0 to 600bar, ±1.5bar absolute
(2 off)	(0 to 8700psi, ±21.8psi absolute)

> Dimensions and weight:

Test stand (incl. lifting protective covers)

Length:	approx. 4200mm	(approx. 13.8ft)
Width:	approx. 1500mm	(approx. 4.9ft)
Height:	approx. 3300mm	(approx. 10.8ft)
Weight:	approx. 1700kg	(approx. 3750lb)

Technical data are subject to change!

Flushing Stand
>FLST1MZ<

The flushing stand is developed for cleaning of aircraft components, e.g.: Engine Oil & Fuel Cooler.

It can be adapted for other aircraft components.

- Flushing by means of adjustable medium temperature, change of flushing direction and switchable jets of compressed air
- Pneumatic plate vibrator for intensive cleaning of contamination
- Easy manual operation (parameterizing via Touch Panel)
- Easy UUT mounting on mobile work surface

GENERAL INFORMATION

- Maintenance friendly construction, e.g. by arranging the filters in the test chamber
- Easy accessibility for maintenance tasks by doors and removable covers
- Lifting door with large window for monitoring
- Switchable tank system with 2x 1,000l

TECHNICAL DATA

> Electrical supply (requirements):

Mains connection:	3/N/PE AC 50Hz 400V
Nominal current:	43A
Performance:	30kVA
Prefuse:	63A (mains line)

> Pneumatic supply (requirements):

Pressure:	6 to 10bar

> Flushing circuit:

Hydraulic pressure:	max. 10bar (max. 145.0psi)
Flow:	max. 200l/min (max. 52.8USgpm)

> High pressure circuit:

Hydraulic pressure:	max. 30bar (max. 435.1psi)
Flow:	max. 6l/min (max. 1.6USgpm)

> Purging medium:

EXXSOL D-60

> Operating conditions:

Operating temperature:	5 to 35°C (41 to 95°F)
Storage temperature:	-40 to +70°C (-40 to 158°F)
Height:	up to 1,000m (3,280ft) above MSL
Rel. air humidity:	5 to 95% (non-condensing)

> Measurements:

Pressure:	0 to 16bar (0 to 232.1psi) Cl.1
Pressure:	0 to 16bar (0 to 232.1psi) Cl.0.6
Pressure:	0 to 10bar (0 to 145.0psi) Cl.1
Pressure: (2-off)	0 to 40bar (0 to 580.2psi) Cl.1
Flow:	2 to 200l/min (0.5 to 52.8USgal/min) ±1% o.f.s.
Flow:	0.2 to 10l/min (0.05 to 42.3USgal/min) ±1% o.f.s.
Temperature:	0 to 100°C (32 to 212°F) ±1°C
Temperature:	0 to 60°C (32 to 140°F) ±1°C
Differential pressure:	-10 to +10bar (-145.0 to +145.0psi) ±1% o.f.s.

> Dimensions and weight:

Test equipment:

Length:	3,040mm (119.7in)
Depth:	1,900mm (74.8in)
Height:	3,200mm (125.9in)
Weight:	approx. 3,700kg (8,157.1lb)

Tank system (without medium):

Length:	2,650mm (104.3in)
Depth:	1,300mm (51.2in)
Height:	2,200mm (85.6in)
Weight:	approx. 600kg (1,322.8lb)

OPTIONS

A wide range of options is available to fulfil our customers´requirements.
eg: different test medium, explosion protection of the test chamber, etc.

>FLST1MZ<

Technical data are subject to change!

Universal Hydraulic Test Stand

>GPHTB1<

The test stand is developed to test hydraulic components and assemblies up to 5,000psi of different aircraft types, like:

- Eurofighter
- Tornado

It can be adapted for other aircraft types.

- Two separate hydraulic power units are fitted, they can be interconnected, pressure and flow can be adjusted
- The equipment is of a compact design, easy access is ensured to replace UUTs quickly
- The fitted filters as well as a cooling and heating circuit ensure ideal utilization of the hydraulic test medium
- The control panel and display situated on an adjustable arm enable menu-driven operation of the test stand
- Manual and fully automatic test sequences are provided
- The TEST-FUCHS standard and calibration software is extendable

GENERAL INFORMATION

- The use of quality components ensures a long service life with a low rate of failure
- The test chamber is fitted with safety doors and a drip tray to enable monitoring of the UUT and ensure protection against medium
- The equipment is of an ergonomic and compact design
- Design of the equipment with doors and removable access panels enables easy access for maintenance
- A wide range of accessories e.g. mechanical adaptions, test hoses as well as test cables is available
- Oil pans can be pulled out for easy cleaning
- The electric motor is fitted for rotational speed, the hydraulic motor for torque; both drives can be used as motor or for pumping
- Two hydraulic circuits (from two power units) can be interconnected, thus max. 360lpm, max. 350bar at the combined output can be ensured

TECHNICAL DATA

> Pneumatic supply (requirements):

Compressed air:
Pressure: 6 to 10bar (87 to 145psi)
Flow: max. 1,000Nlpm
Quality: ISO 5873-1 ISO code 1-4-2
Temperature: max. 50°C (max. 122°F)

Cooling water:
Pressure: 2 to 10bar (29 to 145psi)
Flow: max. 250lpm per power unit
Quality: Industrial grade
Temperature: max. 12°C (max. 53.6°F)

> Hydraulic parameters:

Low pressure:
Flow: 230lpm (60.8USgpm)
Pressure: 15bar (217.6psi)

High pressure: (Pressure stage 1)
Flow: 180lpm (47.6USgpm)
Pressure: 350bar (5,076.3psi)

High pressure: (Pressure stage 2)
Flow: 5lpm (1.32USgpm)
Pressure: 420bar (6,091.6psi)

Medium: MIL-H-5606
MIL-H-83282
MIL-H-87257

Nitrogen: max. 200bar (2,900psi)

Static high pressure: 650bar (9,427.5psi)
3lpm (0.8USgpm)
1,000bar (14,503.7psi) static

Vacuum: 0.1 to 1.0 bar (absolute)
(1.45 to 14.5psi)

> Electrical supply (requirements):

Test stand:
3/N/PE AC 50Hz 400V
Nominal current: 100A
Power: 69.2kVA
Back-up fuse: 630Agl

3/N/PE AC 400Hz 200V
Nominal current: 16A

1/N/PE AC 50Hz 230V
Nominal current: 13A
Power: 3kVA
Back-up fuse: 16A

Hydraulic power unit:
3/N/PE AC 50Hz 400V
Nominal current: 272A
Power: 188kVA
Back-up fuse: 315Agl

1/N/PE AC 50Hz 230V
Nominal current: 13A
Power: 3kVA
Back-up fuse: 16A

>GPHTB1<

TECHNICAL DATA

> Dimensions and weight:

Test stand:

Length:	4,800mm (188.9inch)
Width:	1,920mm (75.6inch)
Height:	2,400mm (94.5inch)
Weight:	approx. 5,200kg (11,464lb)

Switch cabinet:

Length:	1,200mm (47.2inch)
Width:	600mm (23.6inch)
Height:	2,100mm (82.7inch)
Weight:	approx. 295kg (650.4lb)

Hydraulic power unit: (Stated values per unit)

Length:	1,200mm (47.2inch)
Width:	3,200mm (126inch)
Height:	2,100mm (82.7inch)
Weight:	approx. 3,100kg (6,834.3lb)

> Operating conditions:

Operating temperature:	+5 to +35°C (+41 to 95°F)
Storage temperature:	0 to +60°C (32 to +140°F)
Altitude:	up to 1,000m (3,280ft) above MSL
Humidity:	0 to 90% non-condensing

> Measurement range:

Voltmeters:	4-off 0 - 36V ± 0.5% range 2-off 0 - 30V ± 0.5% range
Current:	4-off 0 - 6A ± 0.5% range 2-off 0 - 1.8A ± 0.12% range
Flowmeters:	4-off 0 - 180lpm ± 0.5% range (0 - 47.6USgpm ± 0.5% range) 4-off 0 - 80lpm ± 0.5% range (0 - 21.1USgpm ± 0.5% range) 2-off 0 - 20lph ± 0.5% range (0 - 5.3USgpm ± 0.5% range) 1-off 0 - 10lpm ± 0.5% range (0 - 2.6USgpm ± 0.5% range) 1-off 0 - 40lpm ± 0.5% range (0 - 10.6USgpm ± 0.5% range) 1-off 0 - 8lpm ± 0.5% range (0 - 2.1USgpm ± 1% reading)
Temperature: (11-off)	0 - 100°C ± 1% reading (0 - 212°F ± 1% reading)
Pressure:	12-off 0 - 500bar ± 0.5% range (0 - 7,251.9psi ± 0.5% range) 2-off 0 - 10bar ± 0.5% range (0 - 145psi ± 0.5% range) 9-off 0 - 40bar ± 0.5% range (0 - 580.1psi ± 0.5% range) 1-off 0 - 1000bar ± 0.5% range (0 - 14,503.7psi ± 0.5% range) 1-off 0 - 250bar ± 0.5% range (0 - 3,625.9 ± 0.5% range) 1-off 0 - 1.6bar abs. ± 0.5% range (0 - 23.2psi ± 0.5% range) 2-off 0 - 25bar ± 0.5% range (0 - 362.6psi ± 0.5% range) 2-off 0 - 100bar ± 0.5% range (0 - 1,450.4psi ± 0.5% range)
Torque:	1-off -250 to +250Nm ± 0.5% range (-2212.7 to +2212.7lbf in ± 0.5% range) 1-off -50 to 50Nm ± 0.5% range (-442.5 to +442.5lbf in ± 0.5% range)
Rotational speed:	0 - 8,000rpm ± 15rpm 0 - 15,000rpm ± 15rpm

>GPHTB1<

Switch cabinet power electronics

Hydraulic power unit

Switch cabinet power unit

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Oil Flow Test Stand

>FLST2M<

To test aircraft components, e.g. oil nozzle, bearing dampers of engine bearings.

Easy to maintain e.g. due to the doors the amenability to the test stand is most comfortable.

- Flushing by means of adjustable medium temperature
- Big test chamber, test box sidewise
- High grad stainless steel construction
- Easy manual operation (Parameterization via touch panel)
- Lifting door with large window

GENERAL INFORMATION

- Easy mounting of the units under test due to moveable working surface
- Sound proof 70dB(A)

TECHNICAL DATA

Flushing circuit:

Hydraulic pressure:	max. 10bar
Flow:	max. 100lpm
Pump drive:	7.5kW

Measurements:

Pressure:	0-10bar,	± 0,1bar
Flow:	15-100 lpm	± 1% reading value
Temperature:	0-50°C	± 1°C
Weight:	0-1kg	± 10g
	1-35kg	± 1% reading value

Compressed air supply:

min. 5bar, max. 10bar

Main supply:

	3/N/PE AC 50Hz 400V 66A
Power:	45.7kVA

Flushing medium:

Mobil Jet Oil II

Dimensions and weight:

Length:	approx. 3,000mm
Width:	approx. 2,000mm
Height test stand:	approx. 2,000mm
Height lifting door:	approx. 3,200mm
Weight:	approx. 4,000kg

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Oil Nozzles Test Stand

>FLST5LH<

The test stand is developed to test engine and gearbox oil nozzles at various oil temperatures (up to a max. of 150°C (302°F)) at pressures varying from 0 to 10bar (0 to 145.0psi).

It is possible to adapt this test stand for engine oil and gearbox oil nozzles requiring different parameters.

- The measurement accuracy is of the highest standard.
- A measurement tank is provided to measure the exact weight of returned oil.
- The test stand is operated by an easy to use touch screen. The measured data can be indicated in various units.
- Testing is carried out automatically with predefined parameters (temperature, pressure, lead time as well as testing time for weight termination).
- It is possible to set parameters for testing different nozzles via the touch screen.

RANGE OF APPLICATION

Accessory Gearbox (AGB)	Inlet Gearbox (IGB)	Transfer Gearbox (TGB)	IGB Bearing and others

GENERAL INFORMATION

- The test chamber exhaust air is first cleaned by an oil separator and then by an electrostatic oil vapour separator. This obviates the need for external ventilation.
- The spacious test chamber is equipped with an extendible test bed, ventilation and lifting access door.
- The test bed and its drain pan are so arranged as to ensure that any oil leakage is drained into the main tank.
- The test stand is easy to maintain and made from stainless steel. Its doors enable easy access and sound insulation (max. 75dB(A)).
- The insulated pipes are labelled to show flow and medium (hydraulic oil, refrigerant, compressed air, outflow air).

TECHNICAL DATA

> Electrical supply (requirements):

Mains connection:	3/N/PE AC 50Hz 400V
Nominal current:	33A
Power:	22.9kVA
Back-up fuse:	63A

> Pneumatical supply (requirements):

Pressure:	5 to 10bar (72.5 to 145.0psi)
Volume:	max. 100Nl/min (3.5scfm)

> Cooling water supply (requirements):

Pressure:	1 to 6bar (14.5 to 87.0psi)
Volume:	max. 25lpm (max. 6.6USgpm)

> Hydraulial parameters:

Medium:
Mobil Jet Oil II

Supply pump:
max. 50lpm; max. 10bar
(max. 13.2USgpm; max. 145.0psi)

Return pump:
20lpm; 5bar
(5.3USgpm; 72.5psi)

Filter:
25 and 6mic

Main tank:
265l (70USgal)
Effective content: approx. 210l (55USgal)
Stainless steel, thermically insulated
6 heating elements (400V / 3kW)

Measurement tank:
50l (13.2USgal)
To measure the weight of returning medium
max. 75kg (max. 165.3lb)

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TECHNICAL DATA (Continuation)

> Measurement range:

Temperature sensor: (3-off)

Range:	0 to 150°C (32 to 302°F)
Tolerance:	±2°C abs. (±3.6°F abs.)

Pressure sensor: (1-off)

Range:	0 to 10bar (0 to 145.0psi)
Tolerance:	±0.5% of full scale

Flowmeter: (1-off)

Range:	0.4 to 80lpm (0.1 to 21.1USgpm)
Tolerance:	±1% of full scale

Weight: (1-off)

Range:	0 to 75kg (0 to 165.3lb)
Tolerance:	0 to 1kg (0 to 2.2lb)
	±15g abs. (±0.03lb abs.)
	1 to 75kg (2.2 to 165.3lb)
	±1% of full scale

> Dimensions and weight:

Test stand:

Width:	3,000mm	(9.8ft)
Depth:	1,600mm	(5.2ft)
Height:	3,000mm	(9.8ft)
Weight:	1,850kg	(4,080lb)

Test chamber:

Width:	1,900mm	(6.2ft)
Depth:	900mm	(3.0ft)
Height:	900mm	(3.0ft)

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for different engine and gearbox oil nozzles, etc.

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Hydraulic Component Test Bench
>PHKL2-405<

Universal test bench for hydraulic components of various aircraft types such as TORNADO and EUROFIGHTER.

It can also be adapted to other aircraft types

- Three independent testing stations, each one with an individual computer control and one central hydraulic power unit.
- Testing station 1 with horizontal loading mechanism for actuator testing and an external, vertical loading mechanism for chassis testing.
- Testing station 2 with load unit for steering motor and UUT´s with wide flow.
- Testing station 3 with hydraulic quick fixing plate including seven internal, free connectable joints.
- Quick disconnect couplings without oil leakage

UUT CATEGORY

Flight Control Units	gear components	actuators	filter assembly
manifolds	valves	brake components	lockings

GENERAL INFORMATION

- Manual, semi- and fully automatic testing is possible
- Data acquisition and storage of flow, pressure, leakage, force, temperature usw.
- Prepared for integration of EC&MU into the test bench computer system for Eurofighter flight control testing
- A proximity switch testing device is installed into the test bench
- Each testing stationconsists of a moveable control panel, equiped with a monitor

TECHNICAL DATA

> Hydraulic parameter testing station 1 to 3:

2x HP circuit: max. 310bar (4.496psi)
max. 160lpm (42.3USgpm)

1x HP circuit: max. 560bar (8.122psi)
max. 10lpm at 410bar
(2,6USgpm at 5.947psi)

> Hydraulic parameter testing station 1:

LP circuit: max. 10bar (145psi)
max. 40lpm (10.6USgpm)

Measuring: circuit (2x) max. 310bar (4.496psi)
0.2 - 40lpm (0.05 - 10.6USgpm)
10 - 160lpm (2.6 - 42.3USgpm)

2 connecting blocks

Leakage measuring circuit: 0.01 - 2lpm
(0.003 - 0.53USgpm)
0 - 400ccm/min

Horizontal load unit: max. 250kN
(tension/pressure)

Stroke measurement: 2.300mm (7.55ft)

Stroke measurement free of load: 700mm (2.30ft)

Nitrogen circuit:
max. 250bar (3.626psi)

> Hydraulic parameter testing station 2:

LP circuit: max. 10bar (145psi)
max. 220lpm (58.1USgpm)

Measuring: circuit (3x) max. 310bar (4.496psi)
0.2 - 40lpm (0.05 - 10.6USgpm)
10 - 160lpm (2.6 - 42.3USgpm)

Measuring: circuit (1x) max. 550bar (7.977psi)
max. 5lpm (1.3USgpm)

Connecting block

Hand pump test circuit:
max. 1.000bar (14.504psi)

Leakage measuring circuit: 0.01 - 2lpm
(0.003 - 0.53USgpm)
0 - 400ccm/min

Load unit for steering motor:
Angle meas.: 0 - 360°
Torque: 0 - 2000Nm
Rotary actuator: ± 1.500Nm
± 70°

TECHNICAL DATA

> Hydraulic parameter testing station 3:

LP circuit:	max. 10bar (145psi) max. 220lpm (58.1USgpm)
Measuring: circuit (2x)	max. 310bar (4.496psi) 0.2 - 40lpm (0.05 - 10.6USgpm) 10 - 160lpm (2.6 - 42.3USgpm)
Measuring: circuit (1x)	0 - 310bar (4.496psi) 5 - 80lpm (1.3 - 21.1USgpm) 0.05 - 15lpm (0.01 - 3.9USgpm)

Connecting block with 7 joints on the quick fixing plate

Vacuum test circuit:	max. 0.15bar abs. (2.18psi abs.)
Leakage measuring circuit:	0.01 - 2lpm (0.003 - 0.53USgpm) 0 - 400ccm/min
Nitrogen circuit:	max. 250bar (3.626psi)

> Electrical parameter testing station 1 to 3:

DC-supply:	0 - 65V / 0- 10A
Servo valve triggering:	0 - 25mA
Isolation testing:	0 - 500VDC
High voltage testing:	0 - 1.500VAC

Digital multimeter

> Electrical parameter testing station 1:

8-way limit switch analysis

3-way proximity switch analysis

4-way LVDT analysis

> Electrical parameter testing station 2:

2-way limit switch analysis

2-way proximity switch analysis

2-way LVDT analysis

> Electrical parameter testing station 3:

8-way limit switch analysis

2-way LVDT analysis

> Electrical parameters (requirements):

3/N/PE AC 50Hz 400V

Nominal current:	570A
Power:	395kVA
Back-up fuse:	630A

> Dimensions and weight:

Test bench:

Length:	7.700mm (25.3ft)
Width:	6.500mm (21.3ft)
Height:	2.200mm (7.2ft)
Weight:	approx. 9.500kg (20.944lb)

Hydraulic power unit:

Length:	3.300mm (10.8ft)
Width:	2.200mm (7.2ft)
Height:	2.260mm (7.4ft)
Weight:	approx. 7.500kg (16.534lb)

Vertical load unit:

Length:	1.470mm (4.8ft)
Width:	2.100mm (6.9ft)
Height:	2.340mm (7.7ft)
Weight:	approx. 1.720kg (3.792lb)

Vertical load unit

Hose trolley

Hydraulic power unit

Technical data are subject to change!

Universal Hydraulic Test Bench

>UHTB1M<

Supply Unit

Test bench

To test hydraulic components of different aircraft types, like:

- Chinook
- Hercules C130J
- Nimrod MR4
- Sentry
- Tornado
- Typhoon

Can also be adapted for other aircraft types.

- Testing of adjustable flow and pressure with two independent hydraulic circuits
- Static pressure test up to 1000 bar
- Leck oil free quick disconnect couplings
- Supply of the electronics of the aircraft components

APPLICATION

Chinook	Nimrod MR4	Tornado	
Hercules C130J	Sentry	Typhoon	

GENERAL INFORMATION

- Manual, semi- and fully automatic test run
- Swivel-mounted display-and operation unit with 19" TFT-LCD monitor

TECHNICAL DATA

Hydraulic circuits:

Pressure:
max. 415 bar (High pressure circuits)
max. 1000 bar (Static pressure circuit)
max. 20 bar (Return)

Flow:
max. 180 l/min at 300 bar (High pressure circuits)
max. 135 l/min at 350 bar (High pressure circuits)
max. 5 l/min at 415 bar (High pressure circuits)
max. 5 l/min at 650 bar (Static pressure circuit)
min. 0,5 l/min at 0.2 bar (Low Demand Low Pressure Circuit)

Medium:
MIL-H-5606, MIL-H-83282 and MIL-H-87257

Electrical parameters:

Number of DC-supplies: 2
Supply: 0..40 VDC / 0...15 A

Adjustable drive- and load unit:

Speed: max. 15000 rpm
Power: approx. 75 kW (to 7000 rpm)
approx. 12 kW (to 15000 rpm)

Electrical supply (requirements):

Power supply: 3/N/PE AC 50 Hz 415 V
Nominal current: 250 A

Dimensions and weight:

Test bench LxBxH: approx. 2670 x 1500 x 1780 mm
Supply unit LxBxH: approx. 3050 x 2240 x 2000 mm

Weight test bench: approx. 3550 kg
Weight supply unit: approx. 4350 kg

Technical data are subject to change!

Hydraulic Pump Loading System

>HPLS300<

Connector Plate

Operation Rack Console

This equipment is developed for controlled hydraulic loading of the Engine Driven Pump during testing of the Rolls-Royce development engine “BR725” and is designed for use with skydrol.

It is possible to adapt it for other engine types.

- Supply of the Engine Driven Pump (EDP) with hydraulic oil.
- Regulating the flow to simulate pump loading.
- Cooling of the hydraulic oil. Measurement of all relevant EDP pump parameters.
- The supply pressure to the EDP can be regulated.
- The system pressure can be easily switched between 3,000 or 5,000psi from a switch mounted on the 19in Operation Rack Console.

GENERAL INFORMATION

- The operation and control of the system can be performed from the 19in Operation Rack Console or externally from the connector plate fitted on the back of the unit.
- The temperature control is carried out from the test stand.
- 2 fixed and 2 braked swiveling castors with brakes are fitted to provide mobility and manoeuvrability.
- It is provided with openings for transportation with a forklift truck and hoisting points for a crane.
- An external drip tray is provided to catch oil leaks.
- External measurements can be carried out using the connector plate.
- An EX-protection version can be provided.
- Air transport is possible.

TECHNICAL DATA

Electrical parameters:

Mains connection:	3/N/PE AC 50Hz 400V
Nominal current:	25A
Power:	17.3kVA
Back-up fuse:	32A

Hydraulic parameter:

Input pressure:	207bar	(3,000psi)
	or	or
	345bar	(5,000psi)
Flow:	max. 250lpm	(66USgpm)
Main tank:	120l	(31.7USgal)
Filter level:	3µ filter	

Compressed air supply:

Pressure:	4.5 to 10bar	(65.3 to 145psi)
Nominal diameter:	1/4"	

Cooling water supply:

Pressure:	3 to 16bar	(43.5 to 232psi)
Nominal diameter:	1 1/4"	

Medium:

SKYDROL Type IV and V

Control range:

Temperature:	40 to 100°C	(104 to 212°F)
	(manual internal or external set value import)	
Flow:	1 to 250lpm	(2.6 to 66USgpm)
	(manual internal or external flow control)	
Pressure:	0 to 345bar	(0 to 5,000psi)
	(manual internal or external pressure control)	

Measurement range:

Pressure:	0 to 16bar	(0 to 232psi)
	±0.5% o.f.s.	
	0 to 400bar	(0 to 5,800psi)
	±0.5% o.f.s.	
Flow:	1 to 200lpm	(0.5 to 53USgpm)
	±1lpm	(±0.3USgpm)
Temperature:	0 to 100°C	(32 to 212°F)
	±1.5°C	(±2.7°F)

o.f.s. ... of full scale

Dimensions and weight:

Width:	1,970mm	(6.5ft)
Depth:	1,130mm	(3.7ft)
Height:	1,500mm	(4.9ft)
Weight:	995kg	(2,194lb)

Technical data are subject to change!

Engine Driven Hydraulics Pumps Loading System

>HPLS400C<

The loading system is developed for use with the AIRBUS A400M engine (TP400-D6) test stand.

It is possible to adapt this loading system for other aircraft engines.

- The equipment supplies the engine driven pump with hydraulic oil.
- The pump can be loaded by controlling the flow.
- Cooling of hydraulic oil is ensured.
- The return pressure of hydraulic oil is controlled.
- A 2/2 way ball valve is provided to enable low temperature tests to be carried out (down to -40°C).

MISCELLANEOUS

- The system is operated and controlled using an external control unit.
- The temperature is controlled by the engine test stand.
- The test bench has an ergonomic and compact design.
- The test bench can be transported by fork lift truck or by crane.

TECHNICAL DATA

Electrical connected loads:

Power supply:
3/N/PE AC 50Hz 400V
Nominal current: 25A

"Control unit supply":
2/DC/24V
Nominal current: 1.4A

Hydraulical parameters:

Input pressure:	max. 250bar	(3,626psi)
Flow:	max. 250lpm	(66USgpm)
Main reservoir:	60l	(15.9USgal)
Filtration level:	3µ filter	

Compressed air supply:

Pressure:	4.5 to 10bar	(65.3 to 145psi)
Flow:	220lpm	(58USgpm)
Nominal diameter:	3/8"	

Cooling water supply:

Pressure:	3 to 16bar	(43.5 to 232psi)
Flow:	20lpm	(5.3USgpm)
Nominal diameter:	1 1/4"	

Medium:

SKYDROL Type IV and V

Control range:

Temperature:	0 to 100°C (32 to 212°F) (required values can be set manually or from the engine test stand)
Flow:	10 to 250lpm (2.6 to 66USgpm) (required values can be set manually or from the engine test stand)

Measurement range:

Pressure:	0 to 400bar (0 to 5,802psi)	±0.5%
Flow:	10 to 250lpm (2.6 to 66USgpm)	±1%
Temperature:	0 to 100°C (32 to 212°F)	±1.5°C (±2.7°F)

Dimensions and weight:

Test bench:

Width:	1,970mm	(6.5ft)
Depth:	1,130mm	(3.7ft)
Height:	1,280mm	(4.2ft)
Weight:	830kg	(1,830lb)

Control unit:

Width:	250mm	(0.8ft)
Depth:	330mm	(1.1ft)
Height:	125mm	(0.4ft)
Weight:	4.8kg	(10.6lb)

Technical data are subject to change!

Radar Cooling Liquid Pump Test Rig for EF2000

>RCT1<

Computer-controlled testing of
Pressure
Temperature
Flow
Leakage
Current
Voltage
Frequence
Insulation
for Coolant Liquid Reservoir and Liquid Cooling Pump

- Gear pumps deliver pressure-, flow- and temperature-controlled test medium
- UPS for protectionof the computer system in case of power failure
- UUT anc calibration connections in the test chamber
- Possibility of remote maintenance via modem
- Ergonomic design of the control desk
- Test outlets are fitted with self-locking quick-disconnect couplings

TECHNICAL DATA

> Hydraulic parameter:

Pump circuit:	20lpm, max. 12bar
Leckage measuring circuit:	5l and 10ccm, max. 10bar
Flow measuring circuit	max. 30lpm
Return circuit:	max. 28l
Flushing circuit:	15lpm, 0.9bar
Cooling:	Cooling unit max. 4kW

> Measurement range:

Temperature measurement:	0-100°C, Cl. 0.5
Pressure measurement, hydraulic :	0-16bar, Cl. 0.25
Pressure measurement, N2:	0-10bar, Cl. 0.25
Frequency measurement:	0-600Hz, Cl. 0.25
DC current measurement:	0-10ADC, Cl. 0.5 / Cl. 0.75
DC voltage measurement:	0-250VDC, Cl. 0.75
Flow measurement:	0-10ADC, Cl. 0.5 / Cl. 0.75
Leakage test:	0,788-0,88g/ccm Toleranz ±0,3%
Resistance measurement:	0-1.000Ohm Cl. 0.1

> Dimensions and weight:

Width:	3,834mm (151.0in)
Height:	2,400mm (94.5in)
Depth:	1,850mm (72.8in)
Weight:	approx. 2,450kg (5401.3lb)

> Electric supply (requirements):

Mains supply:	2/N/PE AC 50Hz 400V
Connected load:	approx. 18kVA 54A

> Pneumatic supply (requirements):

Compressed air supply:	min. 8bar, max. 16bar
Pressure supply:	min. 20bar, max. 210bar

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Test Stand for Screwjack and Bevel Gear Boxes

>TSC1E<

Developed for testing of EUROFIGHTER Screwjacks and Bevel Gear Boxes to the parameters like force, torque, speed, stroke etc.

- Hydraulic supply with pressure-, quantity- and temperature controllable medium. (MIL-H-5606)
- Emergency power supply to protect the computer system in case of mains failure.
- Automatic control of the complex test runs and display of all necessary measuring parameters (torque, force, speed, pressure, temperature, etc.) on the monitor.

GENERAL INFORMATION

> Ergonomic design

> Recording and processing of the measurements

TECHNICAL DATA

> **Electrical supply:**

Supply voltage for the test stand:

Mains supply:	3/N/PE AC 50Hz 400V
Nominal current:	170A
Nominal power:	118kVA

> **Hydraulical supply:**

Tank:	approx. 28l
Combination of pumps:	$P_{Nom.}$ = 210bar
	$P_{max.}$ = 350bar

> **Main circuits:**

Hydraulic supply for the cooling and high pressure circuit

Test circuit for "Screwjacks"

Test circuit for "Bevel Gear Boxes"

> **Measurement range:**

Angle:

Range:	±360°
Accuracy:	0.1°

Speed:

Range:	0 to 3,000rpm
Accuracy:	±1rpm

Torque:

Range:	±200Nm
Accuracy:	Kl. 0.5

Pressure:

Range:	0 to 400bar
Accuracy:	Kl. 1

Temperature:

Range:	0 to 200°C
Accuracy:	±1°C
	+sensor tolerance

Force:

Range:	±50kN
Accuracy:	Kl. 0.2

Stroke:

Range:	0 to 1,000mm
Accuracy:	±40µm

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.

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Servicing Trolley for Flaps and Thrust Reversers

>SFTR1<

The equipment is developed to provide a controled movement of Flap and Thrust Reverser Actuators during servicing and adjustment in accordance with the ATA chapter 29.

It is used in the civil aviation field for AIRBUS and BOEING aircraft.

It can be adapted for use on other aircraft types.

The equipment is fitted with:

- An Axial Piston pump which enables the maximum flow of 15 l/min to be quickly achieved.
- An Air Cooled Heat Exchanger is used for cooling of the hydraulic oil in the <SFTR1>.
- Temperature is controlled by a cut off thermostat.
- Simple manual regulation of maximum pressure and flow.
- Needle valves for hose pressure relief.
- Oil Level Float Switch to monitor oil level and to indicate a minimum oil level.

GENERAL INFORMATION

> A compact design ensures easy transportation and fixed and steerable castors are provided for manoeuvrability during use.

> Stainless steel framework protects against Skydrol and corrosion.

TECHNICAL DATA

> Current supply:

Power:	approx. 7.5 kW
Voltage:	3/N/PE AC 50 Hz 400 V
Supply cable:	10 m long (33 ft)

> Performance data:

Pressure:	max. 230 bar (3336 psi)
Axial piston pump:	max. 15 l/min at 230 bar (max. 4 USgpm at 3336 psi)
Reservoir capacity:	140 l (37 USgal)

> Medium:

Skydrol 500 B4

> Output hoses:

2-off: each 6 m
(19.7 ft)

> Measurement range:

Pressure:	0 - 400 bar ± 1 % o.f.s.	(0 - 5800 psi)

> Operation conditions:

Ambient temperature	+5 to +35 °C (+41 to +95 °F)
Storage temperature:	0 to +60 °C (+32 to +140 °F)
Humidity:	10 - 95 % rel. humidity
Altitude:	up to 1000 m above SL (up to 3280 ft above SL)
Protection class:	IP55

> Dimensions and weight

Length:	1000 mm	(3.3 ft)
Width:	900 mm	(3.0 ft)
Height:	1210 mm	(4.0 ft)
Weight:	300 kg	(660 lb)

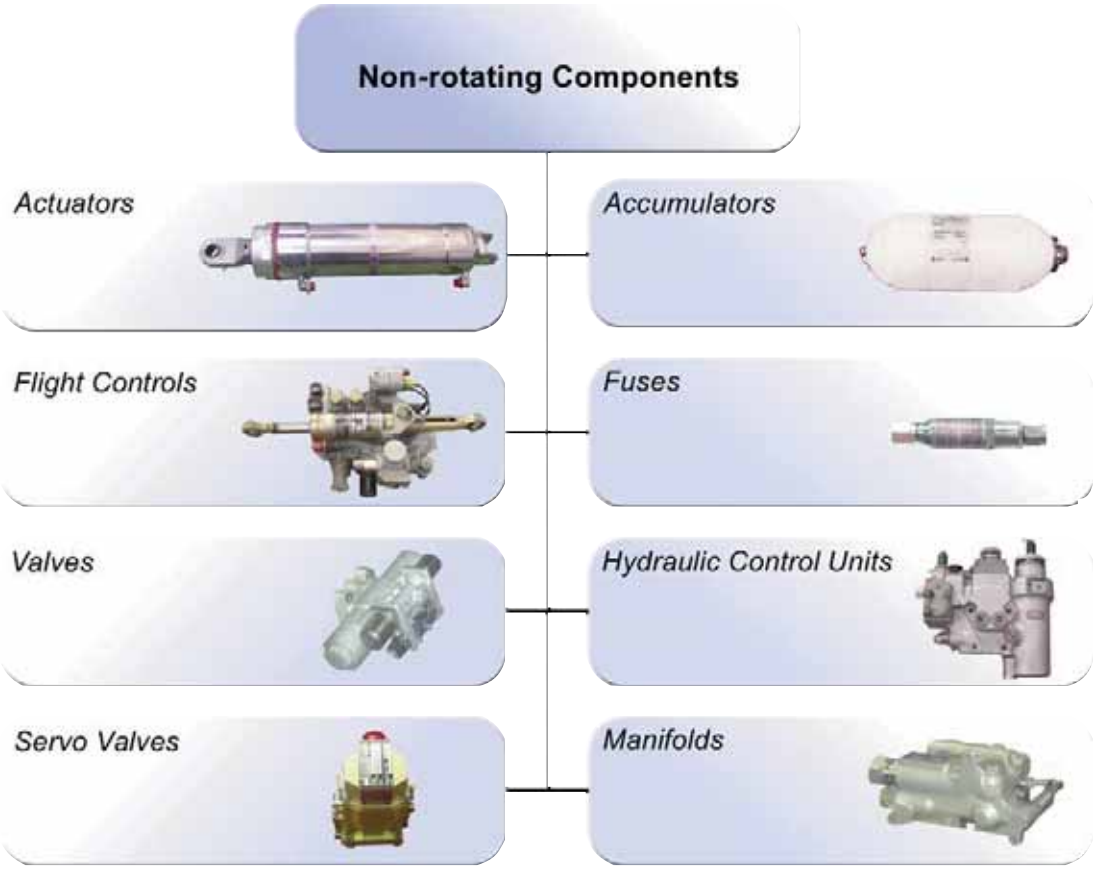
OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for different aircraft types, etc.

Technical data are subject to change!

NR-SERIES

test stands for non-rotating components



Hydraulic Test Stands for Non-Rotating Components

SERIES >/HPM-S/M-NR<

The figure shows a telescopic swivel arm, an operating unit with a second monitor, a drawer cabinet and a universal quick release skewer for pressures up to 650bar

This test bench is developed to test non rotating components such as actuators, flight controls, valves or servo valves for 3000 and 5000psi systems for aircraft types like:
AIRBUS, ANTONOV, BOEING, BOMBARDIER, EMBRAER, FOKKER, LOCKHEED MARTIN, MCDONNELL DOUGLAS, SUKHOI, etc.

> The test bench can be supplied for Skydrol or mineral oil

> Several options grant an assembly of the test bench, which is in accordance with individual requirements

> The modular design of the unit ensures ease of transportation and service

> 5 different types of this unit are available, other designs can be offered on request

> Optional quick release skewer for quick and easy change of adaptions

RANGE OF APPLICATION

The Skydrol version (letter "S") can be used but is not limited to the following aircraft types:

e.g.: Airbus:	**Boeing:**	**Bombardier:**	**Antonov:**
A300	B737	CRJ Series	AN-148
A319	B747		
A320	B757		
A330/A340	B767	**Embraer:**	**Sukhoi:**
A380	B777	ERJ135/145	SSJ-100
A400M	B787	E-Jets	

The mineral oil version (letter "M") can be used but is not limited to the following aircraft types:

Eurofighter	Tornado	F-18	F-16	F-15	F-4	AN-124

3000psi HYDRAULIC TEST BENCH

Suitable for aircraft types equipped with a 3000psi system

Type	Flow HP circuit [US gpm]	Flow HP circuit [l/min]	Flow LP circuit [US gpm]	Flow LP circuit [l/min]
HPM-S/M-NR-20-30	20	76	40	151

5000psi HYDRAULIC TEST BENCH

Suitable for aircraft types equipped with a 3000psi and 5000psi system, e.g.: A380

Type	Flow HP circuit [US gpm]	Flow HP circuit [l/min]	Flow LP circuit [US gpm]	Flow LP circuit [l/min]
HPM-S/M-NR-20-50	20	76	40	151
HPM-S/M-NR-40-50	40	151	62	235
HPM-S/M-NR-60-50	60	227	62	235

TECHNICAL DATA

> Medium

- Letter "S":
  - Skydrol IV, Skydrol V
  - HyJet IV, HyJet V
- Letter "M":
  - Hydraulic oil: MIL-H-5606, MIL-H-83282, MIL-H-87257

> Electrical connected loads (max.)

- 3/N/PE AC 50Hz 400V
  - Nominal current: 32A
  - Power: 22kVA

> Dimensions

- HPM-S/M-NR:
  - Length: 3970mm (13,0ft)
  - Width: 2500mm (8.2ft)
  - Height: 2580mm (8,5ft)

(Dimensions including the swivel arm)

OPTIONS

Various options can be offered to make a tailored solution to the customers´s requirements, e.g.: different control consoles, touch screens, extensions to test servo valves, flight controls etc.

Assemblies and Options

TEST-FUCHS offers a wide range of assemblies and options to achieve an ideal customerisation of the test stand.

These assemblies are divided into universal and component specific modules and options and are described in detail on the following pages.

A complete listing of all assemblies and options can be found at the end of the chapter.

Universal assemblies

COMMON CONFIGURATION

X001 Sound insulation package
Reduces noise emission at full power to less than 80dB(A) at 1m distance.

X002 Customer required color
In accordance with RAL color chart

X003 Non standard labelling
In accordance with customer's requirements (Standard: German/English)

X004 Electric pillar jib crane
Max. 125 kg at 2m extension

X005 Pull out drip trays
Easier access for cleaning

X006 Hydraulic oil
Can be delivered if required

OPERATION

B001 Operating console on swivelling arm
Substitutes standard operating unit (desk)

B002 Operating console on swivelling telescopic arm
Substitutes standard operating unit (desk)

B003 Second monitor
Freely configurable, eg CMM-review

B004 Operating unit console with touch screen
One monitor designed as touch screen

FUNCTION

E001 Servo valve-/Solenoid activation without linear measurement
Activation of solenoids and servo valves.

E002 Connection of cylinder test bench to E001 and E003
The servo valves on the cylinder test bench can be activated and their LVDT-signals can additionally be analysed.

E003 LVDT-analysis for E001
Analysis of signals delivered to E001

E004 Analysis of linear measurement systems other than LVDT
Additional electronics for analysis of all kinds of linear measurements as required

FUNCTION

H001 Freely connectable quadruple test circuit
1 high pressure circuit, 2 measurement circuits, 1 return circuit, all freely selectable. Hoses may stay connected, very timesaving for testing of complicated UUTs

H002 Integration of customer provided pressure source
Max. 10bar (150psi) - pressurized air supplied on site

H003 Nitrogen supply and high pressure circuit
Nitrogen pressure max. 350bar (5000psi) - for checking of accumulator, proof pressure tests etc. - nitrogen supply provided by customer

H004 Intensifier for nitrogen and high pressure air
used to ensure that maximum pressure can be sustained until bottles are empty – nitrogen supply and pressure air supply provided by customer

H005 Nitrogen low pressure circuit
Nitrogen pressure max. 10bar (150psi) - for checking of accumulator, proof pressure tests etc. - nitrogen supply provided by customer

H006 Adjustable proof pressure test circuit
For proof pressure tests at max. 620bar (9000psi)

H007 Flow measurement circuit 2
Two additional flow meters: 1 x max. 250l/min (66Usgal), 1 x max. 16l/min (4Usgal) with automatic switching between the two flow meters for higher accuracy at low flow. Accuracy 0.5% FS with integrated bypass valve for boost pressure regulation - especially recommended for testing of complicated UUTs

H008 Flow measurement circuit 3
Two additional flow meters: 1 x max. 4l/min (1 Usgal), 1 x max. 2l/min (0.5 Usgal) with automatic switching between the two flow meters. Especially for low flow, accuracy 0.5% FS with integrated bypass valve - especially recommended for leakage measurement

H009 Integration of a second Power Unit
Used to increase the output for components requiring high power (the unit is not included in scope of delivery)

H010 Cylinder Test Bench
Separate test bench for static and/or dynamic load tests with integrated power and dimension measurement

H011 Freely connectable manometers
Integrated in test layout by minimess hoses

H012 Low pressure circuit
Output pressure max. 15bar (220psi), used with 8 way test circuit.

H013 Connection for flow measurement cylinder circuit
Useful for precision of servo valves (flow measurement cylinder is not part of delivery) with interconnection for change of direction, max. 230l/min(61 Usgal)

H014 Eight way test circuit
2 high pressure circuits, 4 measurement circuits, 2 return circuits, all freely selectable. No re-connection of the hoses necessary, very timesaving for testing of complicated UUTs

H015 Quick adapter plate
Enables the UUT to be mounted to the adapter plate before attaching to the test stand thus ensuring that the test stand down time is minimised - recommended for highly frequented test stands. Up to 10 in- and outputs (with H014 and H007), freely connectable, in the basic version two in- and outputs - without adaptions of UUTs

H016 Proof pressure test circuit on the quick adapter plate
For proof pressure tests at max. 620bar (9000psi)

Component specific assemblies and options

For efficient and easy test procedure the following extra equipment for the named components is additionally recommended:

ACTUATORS

H009	Integration of a second Power Unit Used to increase the output for components requiring high power (the unit is not included in the scope of delivery)
H010	Cylinder Test Bench Separate test bench for static and/or dynamic load tests with integrated power and dimension measurement
E002	Connection of cylinder test bench to E001 and E003 The servo valves on the cylinder test bench can be activated and their LVDT-signals can additionally be analysed.
E003	LVDT-analysis for E001 Analysis of signals delivered to E001

FLIGHT CONTROLS

H009	Integration of a second Power Unit Used to increase the output for components requiring high power (the unit is not included in scope of delivery)
H010	Cylinder Test Bench Separate test bench for static and/or dynamic load tests with integrated power and dimension measurement
E001	Servo valve-/Solenoid activation without linear measurement Activation of solenoids and servo valves.
E002	Connection of cylinder test bench to E001 and E003 The servo valves on the cylinder test bench can be activated and their LVDT-signals can additionally be analysed.
E003	LVDT-analysis for E001 Analysis of signals delivered to E001
E004	Analysis of linear measurement systems other than LVDT Additional electronics for analysis of all kinds of linear measurements as required

SERVO VALVES

H003	Nitrogen supply and high pressure circuit Nitrogen pressure max. 350bar (5000psi) - for checking of accumulator, proof pressure tests etc. - nitrogen supply provided by customer
H004	Intensifier for nitrogen and high pressure air used to ensure that maximum pressure can be sustained until bottles are empty – nitrogen supply and pressure air supply provided by customer
H005	Nitrogen low pressure circuit Nitrogen pressure max. 10bar (150psi) - for checking of accumulator, proof pressure tests etc. - nitrogen supply provided by customer
H013	Connection for flow measurement cylinder circuit Useful for precision of servo valves (flow measurement cylinder is not part of delivery) with interconnection for change of direction, max. 230l/min(61 Usgal)
E001	Servo valve-/Solenoid activation without linear measurement Activation of solenoids and servo valves.
E004	Analysis of linear measurement systems other than LVDT Additional electronics for analysis of all kinds of linear measurements as required

ACCUMULATORS

H003 Nitrogen supply and high pressure circuit
Nitrogen pressure max. 350bar (5000psi) - for checking of accumulator, proof pressure tests etc. - nitrogen supply provided by customer

H004 Intensifier for nitrogen and high pressure air
used to ensure that maximum pressure can be sustained until bottles are empty – nitrogen supply and pressure air supply provided by customer

H005 Nitrogen low pressure circuit
Nitrogen pressure max. 10bar (150psi) - for checking of accumulator, proof pressure tests etc. - nitrogen supply provided by customer

HYDRAULIC CONTROL UNITS

H003 Nitrogen supply and high pressure circuit
Nitrogen pressure max. 350bar (5000psi) - for checking of accumulator, proof pressure tests etc. - nitrogen supply provided by customer

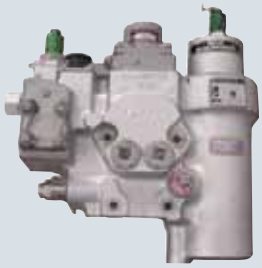
H004 Intensifier for nitrogen and high pressure air
used to ensure that maximum pressure can be sustained until bottles are empty – nitrogen supply and pressure air supply provided by customer

H005 Nitrogen low pressure circuit
Nitrogen pressure max. 10bar (150psi) - for checking of accumulator, proof pressure tests etc. - nitrogen supply provided by customer

H013 Connection for flow measurement cylinder circuit
Useful for precision of servo valves (flow measurement cylinder is not part of delivery) with interconnection for change of direction, max. 230l/min(61 Usgal)

E001 Servo valve-/Solenoid activation without linear measurement
Activation of solenoids and servo valves.

E004 Analysis of linear measurement systems other than LVDT
Additional electronics for analysis of all kinds of linear measurements as required



MANIFOLDS

H003 Nitrogen supply and high pressure circuit
Nitrogen pressure max. 350bar (5000psi) - for checking of accumulator, proof pressure tests etc. - nitrogen supply provided by customer

H004 Intensifier for nitrogen and high pressure air
used to ensure that maximum pressure can be sustained until bottles are empty – nitrogen supply and pressure air supply provided by customer

H005 Nitrogen low pressure circuit
Nitrogen pressure max. 10bar (150psi) - for checking of accumulator, proof pressure tests etc. - nitrogen supply provided by customer

*LVDT = linear variable differential transformer

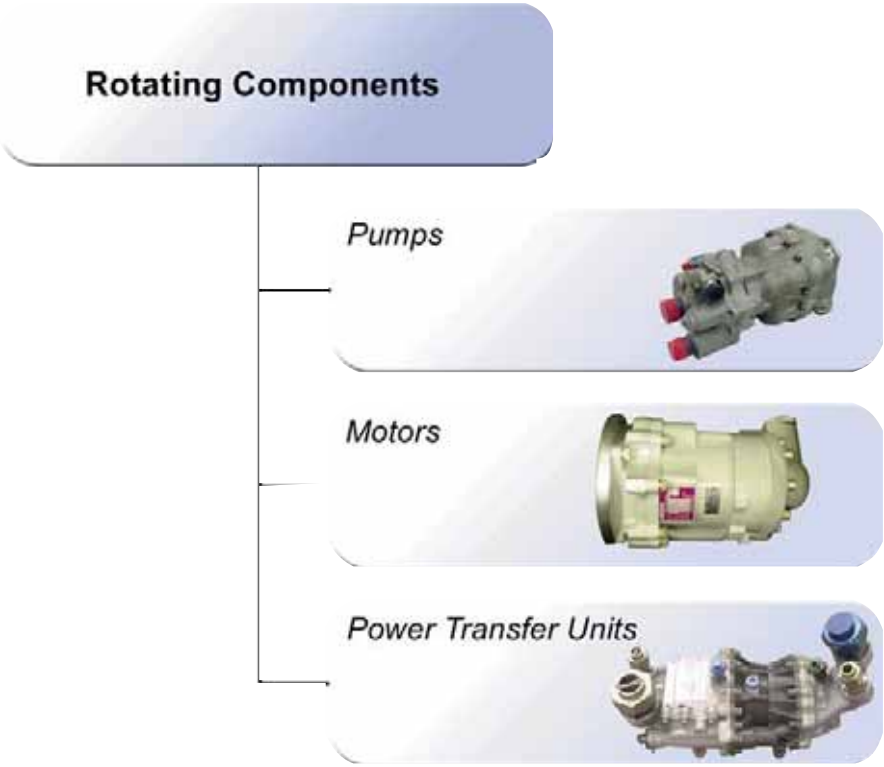
Survey assemblies and options

		Actuators	Flight Controls	Valves	Servo Valves	Accumulators	Fuses	Hydraulic Control Units	Manifolds
H001	Freely connectable quadruple test circuit	✓	✓	✓	✓	✓	✓	✓	✓
H002	Integration of customer provided pressure source	✓	✓	✓	✓	✓	✓	✓	✓
H003	Nitrogen supply and high pressure circuit				✓	✓		✓	✓
H004	Intensifier for nitrogen and high pressure air				✓	✓		✓	✓
H005	Nitrogen low pressure circuit				✓	✓		✓	✓
H006	Adjustable proof pressure test circuit	✓	✓	✓	✓	✓	✓	✓	✓
H007	Flow measurement circuit 2	✓	✓	✓	✓	✓	✓	✓	✓
H008	Flow measurement circuit 3	✓	✓	✓	✓	✓	✓	✓	✓
H009	Integration of a second Power Unit	✓	✓						
H010	Cylinder Test Bench	✓	✓						
H011	Freely connectable manometers	✓	✓	✓	✓	✓	✓	✓	✓
H012	Low pressure circuit	✓	✓	✓	✓	✓	✓	✓	✓
H013	Connection for flow measurement cylinder circuit				✓			✓	
H014	Eight way test circuit	✓	✓	✓	✓	✓	✓	✓	✓
H015	Quick adapter plate	✓	✓	✓	✓	✓	✓	✓	✓
H016	Proof pressure test circuit on quick adapter plate	✓	✓	✓	✓	✓	✓	✓	

		Actuators	Flight Controls	Valves	Servo Valves	Accumulators	Fuses	Hydraulic Control Units	Manifolds
E001	Servo valve-/Solenoid activation without linear measurement		✓		✓			✓	
E002	Connection of cylinder test bench to E001 and E003	✓	✓						
E003	LVDT-analysis for E001	✓	✓						
E004	Analysis of linear measurement systems other than LVDT		✓		✓			✓	

MP-SERIES

Test Stands for Rotating Components
(Motors and Pumps)



Hydraulic Test benches for Motors and Pumps

SERIES >HPM-S/M-MP<

The figure shows a telescopic swivel arm, an operating unit with a second monitor, an integrated printer and pressure gauges

This test bench is developed to test hydraulic pumps, hydraulic motors and Power Transfer Units for 3000 and 5000 psi systems for aircraft types like:

AIRBUS, ANTONOV, BOEING, BOMBARDIER, EMBRAER, FOKKER, LOCKHEED MARTIN, MCDONNELL DOUGLAS, SUKHOI, etc.

> The test bench can be supplied for Skydrol or mineral oil

> Several options grant an assembly of the test bench, which is in accordance with individual requirements

> The modular design of the unit ensures ease of transportation and service

> An optimal sound protection ensures a noise level of max. 80dB(A), within 1m distance (depending on the unit under test)

> One type of this unit is available (standard), other designs can be offered on request

RANGE OF APPLICATION

The Skydrol version (letter "S") can be used but is not limited to the following aircraft types:

e.g.: Airbus:	Boeing:	Bombardier:	Antonov:
A300	B737	CRJ Series	AN-148
A319	B747		
A320	B757		
A330/A340	B767	**Embraer:**	**Sukhoi:**
A380	B777	ERJ135/145	SSJ-100
A400M	B787	E-Jets	

The mineral oil version (letter "M") can be used but is not limited to the following aircraft types:

Eurofighter	Tornado	F-18	F-16	F-15	F-4	AN-124

5000psi HYDRAULIC TEST BENCH

Suitable for aircraft types equipped with a 3000psi and 5000psi system, e.g.: A380

Type	Flow HP circuit [US gpm]	Flow HP circuit [l/min]	Flow LP circuit [US gpm]	Flow LP circuit [l/min]
HPM-S/M-NR-20-50	60	227	62	235

TECHNICAL DATA

> Medium

- Letter "S":
  Skydrol IV, Skydrol V
  HyJet IV, HyJet V
- Letter "M":
  Hydraulic oil: MIL-H-5606
  MIL-H-83282
  MIL-H-87257

> Electrical connected loads (max.)

- 3/N/PE AC 50Hz 400V
  Nominal current: 361A / 400AgL
  Power: 250kVA

> Dimensions

- HPM-S/M-MP-60-50:
  Length: 3450mm (11.3ft)
  Width: 3450mm (11.3ft)
  Height: 2580mm (8.5ft)

(Dimensions including the swivel arm)

> Drive unit to carry out tests of pumps

(132kW, max. 10.000rpm)
further performance category on request
(e.g.: 176kW, 262kW, max. 6000rpm)

> Base version to carry out tests of pumps

> Further versions for additional tests of motors and PTUs

> Later upgrades of the base version can be carried out any time

OPTIONS

Various options can be offered to make a tailored solution to the customer´s requirements, e.g.: different control consoles, touch screens, etc.

Assemblies and Options

To enable the customer to tailor the basic MP-Series to his specific requirements, TEST-FUCHS offers a wide range of modules and options.

These are divided into universal and component specific modules and options and are described in detail on the following pages.

A complete listing of all assemblies and options can be found at the end of the chapter.

Universal assemblies

COMMON CONFIGURATION

X001 Sound insulation package
Reduces noise emission at full power from 90dB(A)
to less than 80dB(A) at 1m distance.

X002 Customer required color
In accordance with RAL color chart

X003 Non standard labelling
In accordance with customer's requirements
(Standard: German/English)

X004 Electric pillar jib crane
Max. 125 kg at 2m extension

X005 Pull out drip trays
Easier access for cleaning

X006 Hydraulic oil
Can be delivered if required

OPERATION

B001 Operating console on swivelling arm
Substitutes standard operating unit (desk)

B002 Operating console on swivelling telescopic arm
Substitutes standard operating unit (desk)

B003 Second monitor
Freely configurable, eg CMM-review

B004 Operating unit console with touch screen
One monitor designed as touch screen

FUNCTION

E001 Integration of customer provided voltage source
200V/400Hz, supplied by customer

E002 Voltage source integrated in test stand
200V/400Hz, supply integrated in test stand

FUNCTION

H001 Motor test circuit
Second high pressure circuit, max. 345bar (5000psi), in case of rotation direction change of the motor no re-connection of the hoses necessary

H002 PTU test circuit
Second low pressure circuit, max. 15bar (220psi), in case of changed rotation direction of the PTU the hoses may stay connected

H003 Case measuring circuit for PTU tests
Second flow measurement, max. 80l/min (21 Usgpm), accuracy 0.5% FS

H004 Adjustable proof pressure test circuit
For proof pressure tests with max. 550bar(8000psi)

H005 Hydraulic accumulator 1
Nitrogen pressurized bladder accumulator 1, volume 2.5l (0.66 Usgal)

H006 Hydraulic accumulator 2
Nitrogen pressurized bladder accumulator 2, volume 2.5l (0.66 Usgal)

H007 Nitrogen connection and accumulator loading circuit
Nitrogen boost pressure variable max. 210bar (3000psi), Nitrogen supply provided by customer

H008 Manometer
Manometers for additional indication, parallel connected to pressure transducers

Component specific assemblies and options

For efficient and simple testing we recommend the purchase of the following components:

PUMPS

H004 Adjustable proof pressure test circuit>
For proof pressure tests with max. 550bar (8000psi)

H005 Hydraulic accumulator 1
Nitrogen pressurized bladder accumulator 1, volume 2.5l (0.66 Usgal)

H007 Nitrogen connection and accumulator loading circuit
Nitrogen boost pressure variable max. 210bar (3000psi), Nitrogen supply provided by customer

E001 Integration of customer provided voltage source
200V/400Hz, supplied by customer

E002 Voltage source integrated in test stand
200V/400Hz, supply integrated in test stand

MOTORS

H001 Motor test circuit
Second high pressure circuit, max. 345bar (5000psi), in case of rotation direction change of the motor no re-connection of the hoses necessary

H004 Adjustable proof pressure test circuit
For proof pressure tests with max. 550bar (8000psi)

PTUs

H001 Motor test circuit
Second high pressure circuit, max. 345bar (5000psi), in case of rotation direction change of the motor no re-connection of the hoses necessary

H002 PTU test circuit
Second low pressure circuit, max. 15bar (220psi), in case of changed rotation direction of the PTU the hoses may stay connected

H003 Case measuring circuit for PTU tests
Second flow measurement, max. 80l/min (21 Usgpm), accuracy 0.5% FS

H004 Adjustable proof pressure test circuit
For proof pressure tests with max. 550bar(8000psi)

H005 Hydraulic accumulator 1
Nitrogen pressurized bladder accumulator 1, volume 2.5l (0.66 Usgal)

H006 Hydraulic accumulator 2
Nitrogen pressurized bladder accumulator 2, volume 2.5l (0.66 Usgal)

H007 Nitrogen connection and accumulator loading circuit
Nitrogen boost pressure variable max. 210bar (3000psi), Nitrogen supply provided by customer

Survey assemblies and options

		Pumps	Motors	Power Transfer Units
H001	Motor test circuit		✓	
H002	PTU test circuit			✓
H003	Case measuring circuit for PTU tests			✓
H004	Adjustable proof pressure test circuit	✓	✓	✓
H005	Hydraulic accumulator 1	✓		✓
H006	Hydraulic accumulator 2			✓
H007	Nitrogen connection and accumulator loading circuit			✓
H008	Manometer			✓

E001	Integration of customer provided voltage source	✓		
E002	Voltage source integrated in test stand	✓		

PU-SERIES

Power Units for Hydraulic Test Stands

Universal Hydraulic Power Unit

SERIES >HPM-S/M-PU<

Sound proof enclosure

This power unit is developed to supply modular designed test benches (3000 and 5000psi systems) used for aircraft types like: AIRBUS, ANTONOV, BOEING, BOMBARDIER, EMBRAER, FOKKER, LOCKHEED MARTIN, MCDONNELL DOUGLAS, SUKHOI, etc.

> The power unit can be supplied for Skydrol or mineral oil

> As an option, a remote control (touch panel operated) can be provided

> Flow and pressure can be controlled at the high pressure outlet

> As an option, a static high pressure outlet with max. 650bar can be provided

> As an option, a pressure controlled low pressure outlet can be provided

> The compact design of the unit ensures ease of transportation and service

> If required, a sound proof enclosure can be provided, emission is max. 75dB(A) at 1m distance

> Five different types of the power unit are available and additional designs can be provided to match other requirements

RANGE OF APPLICATION

The Skydrol version (letter "S") can be used but is not limited to the following aircraft types:

e.g.: Airbus:	Boeing:	Bombardier:	Antonov:
A300	B737	CRJ Series	AN-148
A319	B747		
A320	B757		
A330/A340	B767	**Embraer:**	**Sukhoi:**
A380	B777	ERJ135/145	SSJ-100
A400M	B787	E-Jets	

The mineral oil version (letter "M") can be used but is not limited to the following aircraft types:

Eurofighter	Tornado	F-18	F-16	F-15	F-4	AN-124

3000psi HYDRAULIC TEST BENCH

Suitable for aircraft types equipped with a 3000psi system

Type	Flow HP circuit [US gpm]	Flow HP circuit [l/min]	Flow LP circuit [US gpm]	Flow LP circuit [l/min]	Motor [kW]
HPM-S/M-PU-20-30	20	76	40	151	45
HPM-S/M-PU-40-30	40	151	62	235	75

To supply test rigs of a modular design or as autonomous power unit

5000psi HYDRAULIC TEST BENCH

Suitable for aircraft types equipped with a 3000psi and 5000psi system, e.g.: A380

Type	Flow HP circuit [US gpm]	Flow HP circuit [l/min]	Flow LP circuit [US gpm]	Flow LP circuit [l/min]	Motor [kW]
HPM-S/M-PU-20-50	20	76	40	151	75
HPM-S/M-PU-40-50	40	151	62	235	132
HPM-S/M-PU-60-50	60	227	62	235	160

To supply test rigs of a modular design or as autonomous power unit

TECHNICAL DATA

> Medium

- Letter "S":
  Skydrol IV, Skydrol V
  HyJet IV, HyJet V
- Letter "M":
  Hydraulic oil: MIL-H-5606
  MIL-H-83282
  MIL-H-87257

> Electrical connected loads (max.)

- 3/N/PE AC 50Hz 400V
  Nominal current: 327A / 400AgL
  Power: 226kVA

> Dimensions

- HPM-S/M-PU-40-30
  HPM-S/M-PU-40-50
  HPM-S/M-PU-60-50:
  Length: 3300mm (10.8ft)
  Width: 1210mm (4.0ft)
  Height: 1900mm (6.2ft)
  Height (including sound protection): 2200mm (7.2ft)
- HPM-S/M-PU-20-30
  HPM-S/M-PU-20-50
  Length: 2800mm (9.2ft)
  Width: 1210mm (4.0ft)
  Height: 1900mm (6.2ft)
  Height (including sound protection): 2200mm (7.2ft)

OPTIONS

Various options can be offered to make a tailored solution to the customer´s requirements.

Universal assemblies

COMMON CONFIGURATION

X001 Sound insulation package
Reduces noise emission at full power from 90dB (A) to less than 80dB(A) at 1m distance.

X002 Customer required color
In accordance with RAL color chart

X003 Non standard labelling
In accordance with customer's requirements
(Standard: German/English)

OPERATION

E001 Remote control for Power Unit
Recommended for stand-alone operation
(without MP or NR-test stand)

FUNCTION

H001 Adjustable low pressure circuit
Output pressure up to max. 15bar (220psi)

H002 Adjustable proof pressure test circuit
Output pressure up to max. 620bar (9000psi)

H003 Heater in hydraulic reservoir
For reaching the test temperature required in the CMM

H004 Control pressure pump
Compulsory if no external control pressure pump is available

H005 Pressure controlled “high flow” static circuit
For high flow performance up to 40l/min (10.6US gpm) at 550bar (7,900psi)

Test Stand for Main Fuel Pumps and HMU'S

>THMU1AF<

Automatic test stand for Main Fuel Pumps and HMU's.

- Assembly trolley for an easy and quick assembly of the units under test (UUTs)
- Preliminary set up during automatic test runs possible
- Hydraulic quick clamping of the preliminarily set up UUT-adapter plate
- Manual, semi- and fully automatic test run
- Computer controlled via turnable and moveable operating unit
- Compact construction and ergonomically designed
- Noise level 75 dB(A)
- Modem system for remote maintenance
- Explosion protection via medium temperature-limitation (33 °C), technical ventilation (primary explosion protection) and gas detectors in the test unit

TECHNICAL DATA

> Hydraulic supply unit:

Boost Circuit:	70 000 pph at 50 psi max. 99 psia
Max. pressure of the unit:	2100 psi

> Test medium:

MIL-C-7024 II
(Flashing point 38 °C)

> Drive motors:

HMU:	50 - 8000 rpm 3 kW
Pumps:	0 - 8500 rpm 185 kW

> Mains supply:

3/N/PE AC 50Hz 400V
1/N/PE AC 50Hz 230V

> Compressed air supply:

min. 6 bar
max. 10 bar

> Coolant supply:

min. approx. 600 lpm at 20°C
min. approx. 350 lpm at 15°C

> Dimensions and weight:

Test stand:

Width:	approx. 5250 mm
Depth:	approx. 2500 mm
Height:	approx. 2400 mm
Weight:	6280 kg

Hydraulic supply unit:

Width:	approx. 3700 mm
Depth:	approx. 1870 mm
Height:	approx. 2070 mm
Weight:	2850 kg

Control cabinet:

Width:	approx. 850 mm
Depth:	approx. 700 mm
Height:	approx. 2020 mm
Weight:	250 kg

Switch cabinet:

Width:	approx. 1220	2100 mm
Depth:	approx. 520	620 mm
Height:	approx. 2200	2200 mm
Weight:	350	900 kg

UUT assembly:

HMU

Pump

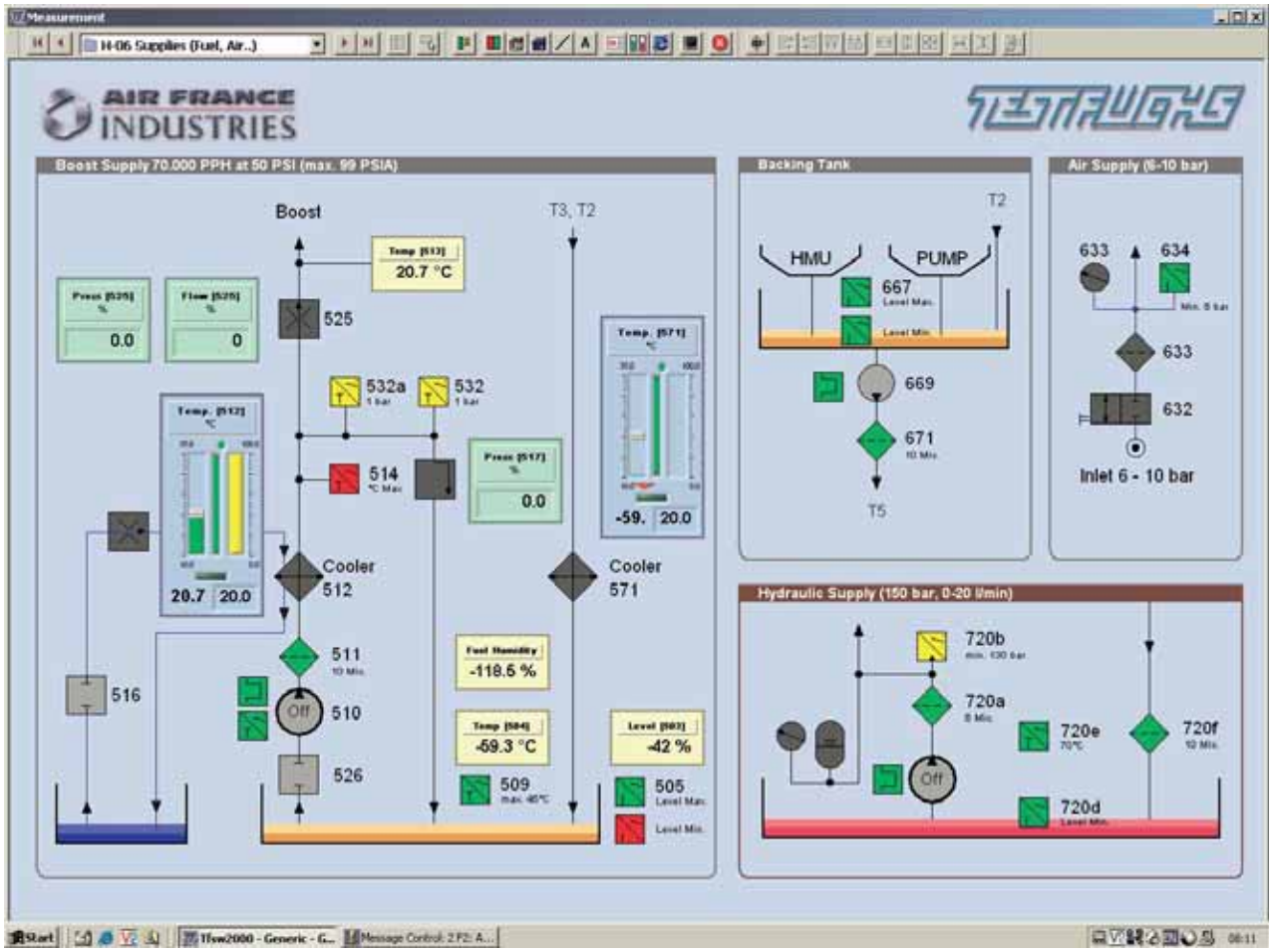


Figure of a program window

Hydraulic supply unit

Control cabinet

Switch cabinets

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for different aircraft types, different touch-screens, etc.

Technical data are subject to change!

Fuel Nozzle Test Stand

>FNTS9<

Designed to test and adjust the characteristic parameters of fuel nozzles like flow stability, flow rates, spray angle, diffusion and leakage.

It is applicable for:

AIRBUS
BOEING

Adaptable for other aircraft types.

- Automatic test operation
- Visual inspection of spray stream by turning range of 360°
- Easy change of UUT via quick clamp device
- Primary explosion protection i.a.w. ATEX-directive 94/9/EG

RANGE OF APPLICATION

CFM56 (Parker)	CFM56 (Woodward FST)	CFM56DAC (Parker)
CF6-80 (Parker)	GE90 (Parker)	GP7200 (Parker)

GENERAL INFORMATION

- Easy accessible test chamber
- UUT for attachment to a universal adapter
- Calibration by software
- Remote maintenance via modem
- Ergonomic and compact design

TECHNICAL DATA

Electrical connected loads:

Main power supply:	3/N/PE AC 50 Hz 400 V Nominal current 16 A
Computer supply:	1/N/PE AC 50 Hz 230 V Nominal current 2.4 A

Hydraulic parameters:

Supply pressure:	max. 110 bar	(1595 psi)
Flow:	max. 20 lpm	(5.3 US gpm)
Main reservoir:	60 l	(15.9 US gal)
Filter level:	3 µ filter	
Nozzle supply temperature:	27 °C	± 1 °C

Compressed air supply:

Pressure:	6 to 10 bar	(87 to 145 psi)
Flow:	500 - 1000 lpm at STP	(18 - 36 scfm)
Nominal width:	12.7 mm	(0.5 in)

Cooling water supply:

Pressure:	min. 3 bar	(min. 44 psi)
Flow:	20 lpm	(5.3 US gpm)
Nominal width:	12.7 mm	(0.5 in)

Medium:

MIL-PRF-7024 Type II

Measurements:

Flow:	0.01 - 20 lpm ± 0.3 % o.r.	(0.003 - 5.3 US gpm)
Pressure:	0 - 160 bar ± 0.25 % o.f.s.	(0 - 2320 psi)
Differential pressure:	0 - 200 mbar diff ± 0.6 mbar diff	(0 - 3 psi diff) (± 0.01 psi)
Temperature:	0 - 40 °C ± 0.5 °C	
Stroke:	5 - 45 mm ± 1 % o.r.	(0.2 - 1.8“)

Dimensions and weight:

Width:	2250 mm	(7.4 ft)
Depth:	1940 mm	(6.4 ft)
Height:	2000 mm	(6.6 ft)
Weight:	1490 kg	(3285 lb)

OPTIONS

Many options are possible for adaption,
e.g. adaption to other aircraft types, to different touch-screens etc.

Technical data are subject to change!

Universal Test Stand for Fuel Controllers and Fuel Pumps

>P-PKR2<

Developed for testing of fuel controllers and fuel pumps for their identification data in fully automatic or in manual mode.

- Three controllable drive units to operate complete fuel controller systems
- Explosion protection by pressurized enclosures, suction systems, separate drive systems and automatic monitoring equipment
- Integrated cold-test thermostats (3 basins in drawers) for temperature sensor simulation
- Freely switchable flow sensors and pressure transducers

TECHNICAL DATA

> Circuits:

Low pressure circuit 1:	max. 10 bar, 60 lpm
Low pressure circuit 2:	max. 8 bar, 260 lpm
High pressure circuit:	max. 145 bar, 60 lpm
2 return circuits (ambient, nozzle flow):	20 - 10000 pph
Return circuit (total):	100 - 15000 pph

> Drive units:

Drive unit 1:	max. 10000 rpm max. 50 kW incl. torque measurement 100 Nm
Drive unit 2:	max. 8000 rpm max. 8 kW
Hydraulic drive unit:	max. 5000 rpm

> Compressed air supply:

LP: 7 bar, HP: 35 bar

> Electrical supply:

Mains supply:	3/N/PE AC 50Hz 400V
Nominal power:	123 kVA
Preliminary protection:	250 A

> Computer system:

Electrical power supply:	1/N/PE AC 50Hz 230V
Nominal current:	approx. 8 A
Preliminary protection:	max. 16 A

> Dimensions and weight:

Width:	4600 mm
Depth:	2400 mm
Height:	2100 mm
Weight:	approx. 6000 kg

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for different fuel controllers and fuel pump types, different touch-screens, etc.

Technical data are subject to change!

Fuel Components Test Stand

>FATS2<

The test stand is developed to test fuel-supply pumps (e.g. fuel booster pumps) and heat exchangers in accordance with ATA Chapter 28

It can be used for various fuel components, heat exchangers and pumps.

- The test stand is fitted with pump and component test stations and a number of fuel circuits and connections enabling easy adaption for the UUTs
- A swivelling reservoir (180°) enables the UUT to be easily mounted without fuel spillage. When the UUT is mounted the reservoir can then be positioned as required
- The control panel is mounted on an adjustable arm enabling the operator to position as required
- The test stand is explosion proofed in accordance with ATEX Directive 94/9/EG
- The original suction lines from the main reservoir enable special tests of fuel booster pumps

APPLICATION RANGE

> **Fuel Booster Pump Units**

Designation	Part Number	Designation	Part Number
Lightweight Fuel Boost Pump	568-1-26713-xxx	Fuel Boost Pump	60-755 Series
Canister Fuel Pump	568-1-28301-xxx	Fuel Boost Pump	60-989 Series
Fuel Pump	568-1-28300-xxx	Pumping Unit ENG Fuel	60-847-3
Fuel Pump	568-1-27202-xxx	Pumping Unit ENG Fuel	60-847-4
Canister Fuel Pump	568-1-27244-xxx		

> **Heat Exchangers**

Designation	Part Number	Designation	Part Number
IDG Oil Cooler	45731-1391	Servo Fuel Heater	160482-6
IDG Oil Cooler	45731-139x	Main Fuel Oil Heat Exchanger	11-841193-x

GENERAL INFORMATION

- The test stand is fitted with forced ventilation, gas warning system, warning and shutdown functions as well as additional secondary and organizational explosion protection measures
- One special test circuit for hot test medium up to a max. temperature of 60°C (140°F) is provided - special security measures to comply with explosion protection are built-in
- Leakage warning switches are fitted in drip trays in the test stand frame. The switches indicate leaking medium during maintenance and in the event of an error
- Drip trays under the test area direct leaking medium (e.g. during UUT disassembly) to a reservoir, from there this medium is pumped back into the main reservoir
- Freely connectable pressure transducers and temperature sensors are fitted
- The sliding protective cover is manufactured from laminated safety glass which protects the operator, enables accessibility, direct view during tests as well as assembly plus disassembly of UUT's by means of an on-site crane

TECHNICAL DATA

> **Electrical supply (requirements):**

- Power supply

Mains connection:	3/N/PE AC 50Hz 400V
Connection:	via terminals
Power:	51.9kVA
Nominal current:	max. 75A
Back-up fuse:	80A gl

- 400Hz supply

Mains connection:	3/N/PE AC 400Hz 200V
Connection:	via terminals
Power:	21.8kVA
Nominal current:	max. 63A
Back-up fuse:	63A gl

TECHNICAL DATA

> Pneumatic supply (requirements):

Pressure:	5 to 10bar (72.5 to 145psi)
Air quality:	ISO 8573-1 ISO Code 1-4-2
Air temperature:	max. 50°C (122°F)

> Cooling water supply (requirements):

Temperature:	max. 20°C (68°F)
Pressure:	max. 10bar (145psi)
Flow:	max. 170l/min (44.9US gpm)
Water quality:	industrial grade

> Hydraulic parameters:

- General

Medium:	MIL PRF 7024
Main reservoir:	approx. 700l (185USgal) stainless steel
Purity grade:	class 18/16/13 (NAS 1638 class 7)
Temperature:	max. 33°C (91.4°F) measurement max. 51°C (123.8°F) in the spec. measurement
Filter:	6µ in the supply and measurement 10µ in the return circuit

- Hydraulic circuits

Low pressure circuit 1:	max. 200l/min (52.8USgpm) max. 16bar (232.1psi)
Measuring circuit 1:	max. 400l/min (105.7USgpm) max. 16bar (232.1psi)
Measuring circuit 2:	max. 200l/min (52.8USgpm) max. 16bar (232.1psi)
Measuring circuit 3:	max. 40l/min (10.6USgpm) max. 250bar (3,625.9psi)
High pressure circuit:	max. 20l/min (5.3USgpm) max. 250bar (3,625.9psi)
Hot measuring circuit:	max. 20l/min (5.3USgpm) max. 16bar (232.1psi)

> Inlet air and exhaust air system (requirements):

Air change (operation):	min. 2,000m³/h
Air change (standstill):	min. 500m³/h
Temperature:	min. 15°C (59°F) max. ambient temperature

> Measurement range:

- Pressure

(1-off)	-1 to +2.5bar (-14.5 to +36.3psi)
(7-off)	0 to 16bar (0 to 232.1psi)
(1-off)	0 to 25bar (0 to 362.6psi)
(4-off)	0 to 250bar (0 to 3625.9psi) ±0.5% measurement range

- Flow

(4-off)	1 to 40l/min (0.3 to 10.6USgpm)
(4-off)	4 to 200l/min (1.1 to 52.8USgpm)
(2-off)	10 to 400l/min (2.6 to 105.7USgpm) ±1% measurement range

- External pressure sensors

(1-off)	0 to 4bar ≙ 4 to 20mADC (0 to 58.0psi)
(2-off)	0 to 6bar ≙ 4 to 20mADC (0 to 87.0psi)
(1-off)	0 to 16bar ≙ 4 to 20mADC (0 to 232.1psi)
(1-off)	0 to 50bar ≙ 4 to 20mADC (0 to 725.2psi)
(1-off)	0 to 250bar ≙ 4 to 20mADC (0 to 3,625.9psi) ±0.4% measurement range

TECHNICAL DATA

- Temperature sensor

(13-off)	0 to 100°C (32 to 212°F)
(1-off)	-40 to +150°C (-40 to +302°F)
	±1°C abs. (±1.8°F abs.)

- Current

(3-off)	0 to 100AAC
	±0.5% of full scale

- Voltmeter

(3-off)	0 to 150VAC
(3-off)	0 to 250VAC
	±0.5% of full scale

- Frequency

(1-off)	0 to 500Hz
	±0.5% of full scale

- Angle (swivel reservoir)

(1-off)	0 to 360°
	±1° abs.

- Level (swivel reservoir)

(1-off)	0 to 250mm (0 to 9.8in)
(1-off)	0 to 600mm (0 to 23.6in)
	±3mm abs. (±0.1in abs.)

- Level (main reservoir)

(3-off)	0 to 650mm (0 to 25.6in)
	±3mm abs. (±0.1in abs.)

- Gas concentration

(5-off)	0 to 100% UEG
	±4% abs.

> **Dimensions and weight:**

- Test stand

Length:	approx. 4,000mm (157.5in)
Width:	approx. 2,200mm (86.6in)
Height:	approx. 2,300mm (90.6in)
Weight:	approx. 4,550kg (10,031lb)
	excl. operating media

- Electrical cabinet

Width:	approx. 1,250mm (49.2in)
Depth:	approx. 700mm (27.6in)
Height:	approx. 2,200mm (86.6in)
Weight:	approx. 380kg (838lb)

> **Operating conditions:**

Ambient temperature:	+5 to +33°C (+41 to 91.4°F)
Storage temperature:	0 to +60°C (-32 to +140°F)
Altitude:	up to 1,000m (3,280ft) above MSL
rel. humidity:	10 to 95% (non-condensing)

installation in non-Ex-zone

OPTIONS

Various options are available to meet our customers' requirements
e.g. adaptions for other aircraft types, etc.

Technical data are subject to change!

Test Stand Assy APU FCU and Fuel Nozzles

>PTRV2<

The test stand is developed to test the TORNADO and EUROFIGHTER APUs, fuel pumps, regulators and injection nozzles.

It is possible to adapt the test stand for various fuel components of other aircraft.

- The equipment tests specific performance data e.g. pressure, flow, temperature, rotational speed, etc.
- The test stand is capable of cooling and heating the test media (up to 165°C).
- The test stand is explosion proofed to ATEX Directive 94/9/EC enabling it to be used in a zone 1 environment.
- To comply with the ATEX directive a fuel vapour warning system and forced ventilation is fitted.

RANGE OF APPLICATION

Tornado units tested	Eurofighter units tested
Fuel Control Units <0289 8092> and <0289 1980> Fuel Pumps <0289 8148> and <0287 8932> Ignition Fuel Nozzles <0289 5464> and <0289 5520> Fuel Recirculation Valve <FRV 200MK3> <755-1-09300-003>	Fuel Control Unit <EFP 18210-1> Primary Fuel Nozzle <EFP 13001-13> Secondary Fuel Nozzle <EFP 13001-14>

GENERAL INFORMATION

- The test stand is operated by means of a movable, rotatable and explosion-proof control console fitted with keyboard and joystick
- An integrated printer generates test reports
- The test stand icounts on an uninterruptible power supply (UPS) to protect it from possible mains fluctuations and power failures
- The nitrogen circuit flushes the test stand prior to start up and prevents an explosive atmosphere
- Two supply circuits (up to 10bar and up to 60bar) are provided for flow and pressure measurement
- The lubricating oil circuit with it´s tank provides automatic lubrication of the drive pinion
- Easy and quick calibration is ensured by the TEST-FUCHS standard software
- The test stand is operated by means of a PC (see illustration page 1)
- The test stand can easily be converted to use a different fuel test medium

TECHNICAL DATA

> Electrical supply (requirements):

Test stand: 3/N/PE AC 50Hz 400V
Nominal current: 100A
Back-up fuse: 125A
Power: 69.3kVA

> Pneumatic supply (requirements):

Minimum 5bar (72.5psi)
Maximum 10bar (145.0psi)
dry and oil-free

> Nitrogen supply (requirements):

Minimum 8bar (116.0psi)
Maximum 10bar (145.0psi)

> Technical ventilation:

Air supply: 800m³/h (28.252ft³/h)

Exhaust air (test stand): 450m³/h (15.892ft³/h)

Exhaust air (test chamber): 450m³/h (15.892ft³/h)

> Operating conditions:

Operating temperature: 0 to +40°C
+32 to +104°F
Storage temperature: -20 to +70°C
-4 to 158°F
Altitude: up to 1000m above MSL
Humidity: 0 to 90% non condensing
Noise emission: max. 85dB at 1m distance

>PTRV2<

TECHNICAL DATA

> Hydraulic and pneumatic parameters:

Fuel circuit:	Test medium:	JP8
	Pressure:	max. 60bar (870psi)
	Flow:	0 to 2500kg/h (0 to 5512lb/h)
Main reservoir:	Capacity:	55l (14.5USgal)
	Pressure:	2.8bar (50.7psi)
Lube oil circuit:	Medium:	MIL-L-23699
	Reservoir:	8l (2.1USgal)
Heating and cooling circuit:	Cooling capacity:	15kW
	Heating capacity:	15kW
Hydraulic power unit:	Medium:	MIL-H-5606-NATO H 515
	Reservoir:	app. 60l (15.9USgal)
	Flow:	0 to 20l/min (0 to 5.3USgpm)
	Pressure:	up to 160bar (up to 2320.6psi)

> Measurement range:

Relative pressure: (16-off altogether)	for example: 0 to 2bar (0 to 29psi) or 0 to 100bar (0 to 1450psi) ±0.25% measurement range
Absolute pressure: (1-off)	0 to 10bar absolute (0 to 145psi) ±0.07% measurement range
Temperature sensor: (8-off)	0 to 200°C (0 to 392°F) ±1K absolute
Flow:	
(2-off)	0 to 80lpm (0 to 21.1USgpm)
(1-off)	0 to 16lpm (0 to 4.2USgpm)
(1-off)	0 to 4lpm (0 to 1.1USgpm)
	±1% of full scale
Rotational speed: (1-off)	0 to 8500rpm ±4rpm absolute
Voltmeter:	
(1-off)	0 to 20V
(1-off)	0 to 40V
	±0.5% of full scale
Current:	
(1-off)	0 to 200mA
(1-off)	0 to 5A
	±0.5% of full scale

> Dimensions and weight:

Test stand:	Length:	3350mm	(11.0ft)
	Width:	2100mm (excl. control console)	(6.9ft)
	Height:	2650mm	(8.7ft)
	Weight:	3020kg	(6658lb)
Control console:	Length:	700mm	(2.3ft)
	Width:	820mm	(2.7ft)
	Height:	2750mm	(9.1ft)
Switch cabinet:	Length:	2450mm	(8.5ft)
	Width:	700mm	(2.3ft)
	Height:	2750mm	(9.1ft)
	Weight:	930kg (incl. control console)	(2050lb)
Hydraulic power unit:	Length:	1200mm	(3.9ft)
	Width:	700mm	(2.3ft)
	Height:	1700mm	(5.6ft)
	Weight:	475kg	(1047lb)
Cooling power unit:	Length:	2200mm	(7.2ft)
	Width:	1300mm	(4.3ft)
	Height:	1200mm	(3.9ft)
	Weight:	385kg	(849lb)
User interface:	Length:	300mm	(1.0ft)
	Width:	250mm	(0.8ft)
	Height:	400mm	(1.3ft)
	Weight:	105kg	(232lb)

>PTRV2<

Example of a test set up

Switch cabinet and control console

>PTRV2<

Technical data are subject to change!

Main Fuel Accessories Test Stand

>MFAT1SR<

Pump Test Station

HMU/FMU Test Station

The test stand is developed for testing different fuel pumps, HMUs (hydromechanical metering units) und FMUs (fuel metering units) according to ATA Chapter 73.

It can also be adapted to other fuel components.

- Explosion protection in accordance with ATEX Directive 94/9/EC
- Two separated, independent test stations (for HMU/FMU and pumps) with individual PLC and computer
- Multi-coupling systems for pressure measurement on the HMU/FMU test station
- Manual, semi-automatic and automatic test runs
- Effective noise protection through sound insulated setup

GENERAL INFORMATION

- Modular setup (different modules supply the test stations with all required media and electric current)
- Ergonomic design
- Operation via control panel on swivel arm (HMU/FMU test station) or control console (pump test station)
- Crane and chain hoist or extractable rescue winch to ease the UUT adaption
- Maintenance friendly through walk-in hydraulic rooms
- Extensive explosion protection concept with venting system, gas warning equipment and overtemperature shutdown 5°C (9°F) below the flashpoint
- Cooling run after overtemperature shutdown for lowering the temperature of the medium
- Test chambers with lockable safety doors; thus, good accessibility for UUT change, good sight during tests and additional protection of the operator through interlock
- Drip pans in the base frame of the test stations to collect leakage during maintenance or in case of failure
- During UUT exchange, any leaking medium is automatically filtered via drip pans and return tanks and is pumped back into the main tank
- The test stand is resistant against the test medium and cleaning detergents (stainless steel and anodized aluminium front panels)
- LAN- connection enables maintenance of the Test-Fuchs test stand software, test procedures, network printer as well as trouble shooting on the device
- Easy and quick calibration via the TEST-FUCHS standard software

Walk-in hydraulic rooms

Multi-coupling systems for pressure measurement

UUT on the pump test stand

>MFAT1SR<

AREA OF APPLICATION

P/N	Description	CMM	Engine
> **Pump test station**			
714900 series	Argo Tech	73-11-13	CFM56-5B/-5C
724400 series	Argo Tech	73-11-14	CFM56-5B/-5C
828300 series	Argo Tech	73-11-15	CFM56-7B
5006834 series	Hamilton Sundstrand	73-11-12	CF6-80C2
5009776 series	Hamilton Sundstrand	73-11-14	CF6-80E1
825501 series	Agro Tech	73-11-04	PW4000
723300 series	Agro Tech	73-11-05	PW4168
838000 series	Agro Tech	73-11-77	GE90-115B
829500 series	Agro Tech	73-11-01	CF34-8
837600 series	Agro Tech	73-11-02	CF34-10
721400 series	Agro Tech	73-12-11	Trent 700
> **HMU/FMU test station**			
1348M79 series	Woodward HMU	73-21-18	CFM56-5B/-5C
1348M79 series	Woodward HMU	73-21-78	CFM56-5B/-5C
8063-884	Woodward FMU	73-21-05	CF34-10
1853M56 series	Honeywell HMU	73-21-79	CFM56-7B
441789	Honeywell HMU	73-21-23	CF6-80C2
441790	Honeywell HMU	73-21-24	CF6-80C2
441860	Honeywell HMU	73-21-28	CF6-80E1
801000 series	Hamilton Sundstrand FMU	73-21-64	PW4000
808800 series 818580 series	Hamilton Sundstrand FMU	73-21-76	PW4168
8061-693	Woodward HMU	73-24-15	GE90-115B
8061-926	Woodward FMU	73-21-04	CF34-8
FMU701MK	Goodrich Engine FMU	73-21-43	Trent 700
FMU702	Aero Engine Controls FMU	73-21-44	Trent 702

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for numerous UUTs, requirement to the test program, dimensioning,...

>MFAT1SR<

TECHNICAL DATA

> Electrical supply (requirements):

Electrical supply of pump test station

Main supply:	3/N/PE AC 50Hz 400V
Nominal current:	400A
Nominal capacity:	277kVA
Pre-fuse:	500A gG

Electrical supply of HMU/FMU test station

Main supply:	3/N/PE AC 50Hz 400V
Nominal current:	470A
Nominal capacity:	326kVA
Pre-fuse:	500A gG

Electrical supply of cooling unit

Main supply:	3/N/PE AC 50Hz 400V
Nominal current:	380A
Nominal capacity:	263kVA
Pre-fuse:	400A gG

> Pneumatic supply (requirements):

Pneumatic supply

Flow:	max. 100l/min (26.4USgal/min)
Pressure:	6 to 10bar (87 to 145psi) dry and oilfree
Quality:	ISO 8573-1242

Venting system of the test stations

Supply air/test room:	approx. 700m³/h (24,700ft³/h)
Connection supply air:	Ø250mm (9.84in)
Exhaust air:	approx. 800m³/h (28,300ft³/h)
Connection exhaust air:	Ø315mm (12.4in)

Venting system fuel supply unit

Supply air/test room:	approx. 700m³/h (24,700ft³/h)
Connection supply air:	Ø250mm (9.84in)
Exhaust air:	approx. 800m³/h (28,300ft³/h)
Connection exhaust air:	Ø315mm (12.4in)

> Hydraulic parameters:

UUT supply

Medium:	MIL-PRF-7024E Type II
Temperature:	max. 33°C (91.4°F) Cooling run max. 60°C (140°F)
Main tank:	approx. 1.400l (370USgal), stainless steel

- Pump test station

Flow, pressure:	max. 30,800kg/h at max. 3.45bar (max. 68,000lb/h at 50psi) at max. 10bar (145psi)
Drive motor:	0 to 8,500U/min, max. 185kW, max. 420Nm (3,720lbfin)

- HMU/FMU test station

Flow, pressure:	max. 27,700kg/h at max. 152bar (max. 61,123lb/h at max. 2,200psi)
Drive motor:	0 to 8,000U/min, max 4.7kW

Hydraulic aggregate

Medium:	FUCHS RENOLIN MR 15 VG 46
Pressure:	150bar (2,180psi)
Flow:	max. 20l/min (5.28USgal/min)
Volume tank:	63l (16.6USgal)

Cold water set

Refrigerant cold water set:	R410A
Refrigerant system cooling:	water + 30% antifrogen N
Cooling capacity:	460kW
Flow:	85m³/h (3,000ft³/h)
Inlet and outlet:	Ø125mm (4.92in)

> Operating conditions:

Operating temperature:	+18°C to +38°C (64.4 to 100°F)
Storage temperature:	0°C to +60°C (32 to 140°F)
Height:	up to 1,000m (3,280ft) over MSL
Rel. air humidity:	10 to 95% (non-condensing)
Altitude:	in a non-explosive area
Permanent noise emission:	max. 79dB(A) in 1m (39.4in) distance

>MFAT1SR<

TECHNICAL DATA (Continuation)

> **Dimensions and weight:**

Pump test station

- Test stand and switch cabinet

Width:	2,070mm (81.5in)
Depth:	4,150mm (163in)
Height:	2,390mm (94.1in)
Weight:	approx. 4,320kg (9,520lb)

- Control console

Width:	1,610mm (63.4in)
Depth:	1,100mm (43.3in)
Height:	1,460mm (57.5in)
Weight:	approx. 210kg (463lb)

HMU/FMU test station

Width:	2,070mm (81.5in)
Depth:	3,620mm (143in)
Height:	3,260mm (128in)
Weight:	approx. 3,880kg (8,550lb)

Fuel Supply Unit

Width:	2,070mm (81.5in)
Depth:	4,550mm (179in)
Height:	2,810mm (111in)
Weight:	approx. 6,900kg (15,200lb)

Cooling unit

Width:	2,190mm (86.2in)
Depth:	4,480mm (176in)
Height:	2,100mm (82.7in)
Weight:	approx. 4,700kg (10,400lb)

Switch cabinet

Width:	1,810mm (71.3in)
Depth:	610mm (24in)
Height:	1,900mm (74.8in)
Weight:	approx. 500kg (1,100lb)

Explosion protection

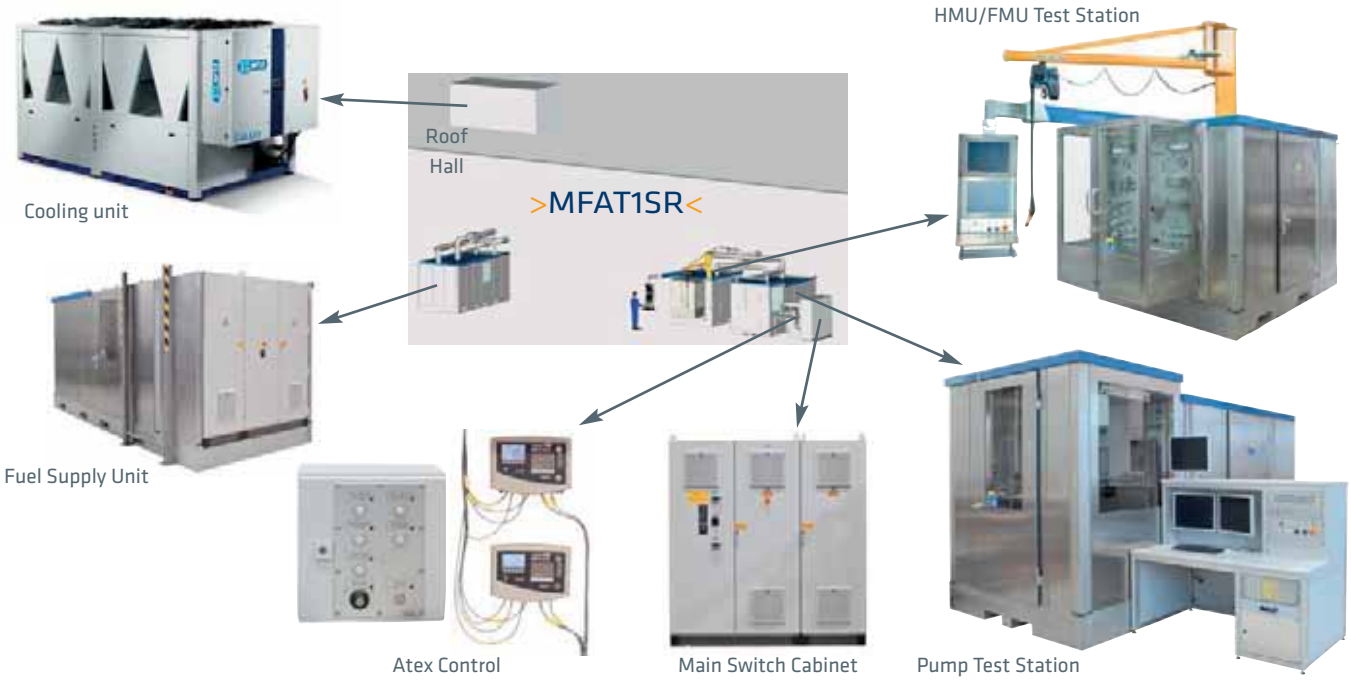
- ATEX- control

Width:	300mm (11.8in)
Depth:	160mm (6.3in)
Height:	300mm (11.8in)
Weight:	approx. 7kg (15.4lb)

- Gas warning equipment

Width:	300mm (11.8in)
Depth:	110mm (4.33in)
Height:	800mm (31.5in)
Weight:	approx. 8kg (17.6lb)

Venting and piping are not listed (above the modules).



>MFAT1SR<

TECHNICAL DATA (Continuation)

> **Measurements:**

Pump test station

- Density

(1-off) 0.7 to 0.9kg/l (5.84 to 7.51lb/USgal)
±0.005kg/l (0.042lb/USgal)

- Pressure:

(2-off) 0 to 10bar (0 to +145psid) not calibrated
(1-off) 0 to 250bar (0 to 3,630psi) not calibrated
(1-off) -6.9 to +6.9bar (-100 to +100psid)
±0.2% of full scale
(2-off) 0 to 10bar (0 to 145psi)
±0.3% of full scale
(2-off) 0 to +27.6bar (0 to 400psid)
±0.2% of full scale
(1-off) 0 to +34.5bar (0 to 500psi)
±0.25% of full scale
(1-off) 0 to +34,5bar (0 to 500psi)
±0.2% of full scale
(2-off) 0 to 145bar (0 to 2,100psi)
±0.3% of full scale
(1-off) 0 to 193bar (0 to 2,800psi)
±0.3% of full scale
(3-off) -0 to 193bar (0 to 2,800psi)
±0.15% of full scale

- Rotational speed

(1-off) 0 to 9,000U/min ±1U/min

- Torque

(2-off) -250 to +250Nm (-2,210 to +2,210lbfin)
±0.25% of full scale

- Flow:

(1-off) 1.7 to 40kg/min (3.75 to 88.2lb/min)
±0.2% of measuring value
(1-off) 2 to 150l/min (0.53 to 39.6USgal/min)
±0.3% of measuring value
(2-off) 5 to 600l/min (1.32 to 159USgal/min)
±0.3% of measuring value

- Temperature

(1-off) 0 to 65°C (32 to 149°F) ±0.5°C (0.9°F)
(1-off) 0 to 70°C (32 to 158°F) ±2°C (3.6°F)
(2-off) 0 to +70°C (32 to 158°F) ±1°C (1.8°F)
(5-off) 0 to +70°C (32 to 158°F) ±0.5°C (0.9°F)

HMU/FMU test station

- Pressure:

(3-off) 0 to 10bar (0 to +145psid) not calibrated
(2-off) 0 to 250bar (0 to 3.630psi) not calibrated
(1-off) -48.3 to +48.3bar (-700 to +700psid)
±0.2% of full scale
(1-off) -48.3 to +48.3bar (-700 to +700psid)
±0.125% of full scale
(1-off) -34.5 to +34.5bar (-500 to +500psid)
±0.2% of full scale
(5-off) -27.6 to +27.6bar (-400 to +400psid)
±0.2% of full scale
(2-off) -27.6 to +27.6bar (-400 to +400psid)
±0.125% of full scale
(1-off) -20.7 to +20.7bar (-300 to +300psid)
±0.2% of full scale
(2-off) -13.8 to +13.8bar (-200 to +200psid)
±0.2% of full scale
(1-off) -6.9 to +6.9bar (-100 to +100psid)
±0.125% of full scale
(2-off) 0 to 13.8bar (0 to 200psi)
±0.25% of full scale
(1-off) 0 to 13.8bar (0 to 200psid)
±0.125% of full scale
(1-off) 0 to +27.6bar (0 to 400psid)
±0.2% of full scale
(1-off) 0 to +34.5bar (0 to 500psi)
±0.3% of full scale
(1-off) 0 to 41.4bar (0 to 600psi)
±0.25% of full scale
(1-off) 0 to 68.9bar (0 to 1,000psid)
±0.2% of full scale
(12-off) 0 to 100bar (0 to 1,450psi)
±0.3% of full scale
(1-off) 0 to 103bar (0 to 1,500psi)
±0.2% of full scale
(3-off) 0 to 145bar (0 to 2,100psi)
±0.3% of full scale
(1-off) 0 to 145bar (0 to 2,100psi)
±0.25% of full scale
(2-off) 0 to 193bar (0 to 2,800psi)
±0.3% of full scale
(3-off) -0 to 193bar (0 to 2,800psi)
±0.15% of full scale

>MFAT1SR<

TECHNICAL DATA (Continuation)

- Density
(1-off) 0.7 to 0.9kg/l (5.84 to 7.51lb/USgal)
±0.005kg/l (0.042lb/USgal)

- Rotational speed
(1-off) -9,000 to +9,000U/min
±1U/min

- Flow:
(1-off) 0.1 to 8l/min (0.026 to 2.11USgal/min)
±0.3% of measuring value
±0.003l/min (0.0008USgal/min)
(3-off) 0.1 to 40l/min (0.026 to 10.6USgal/min)
±0.3% of measuring value
±0.003l/min (0.0008USgal/min)
(1-off) 0.5 to 150l/min (0.13 to 39.6USgal/min)
±0.3% of measuring value
±0.003l/min (0.0008USgal/min)
(1-off) 2 to 150l/min (0.53 to 39.6USgal/min)
±0.3% of measuring value
(2-off) 5 to 600l/min (1.32 to 159USgal/min)
±0.3% of measuring value
(1-off) 4 to 70kg/min (8.82 to 154lb/min)
±0.2% of measuring value
(1-off) 1 to 2,000cm^3/min (0 to 0.07ft^3/min)
±0.2% of measuring value
±2.5cm^3/min (0.001USgal/min)

- Temperature
(4-off) -5 to +70°C (23 to 158°F) ±1°C (1.8°F)
(1-off) 0 to 65°C (32 to 149°F) ±2°C (3.6°F)
(1-off) 0 to 70°C (32 to 158°F) ±2°C (3.6°F)
(10-off) 0 to +70°C (32 to 158°F) ±0.5°C (0.9°F)

- Frequency
(1-off) 2,300 to 3,500Hz ±10PPM

- LVDT A,B
(2-off) -90 to +270° ±0.04°
(2-off) -1 to +1V/V ±0.03% of full scale

- Voltage LVDT
(4-off) 0 to +10V ±0.05% of full scale
(1-off) 0 to 10VRMS ±0.5% of full scale
(2-off) 0 to +10VRMS ±0.1% of full scale

- Voltage Servo
(7-off) -40 to +40VDC ±0.5% of full scale

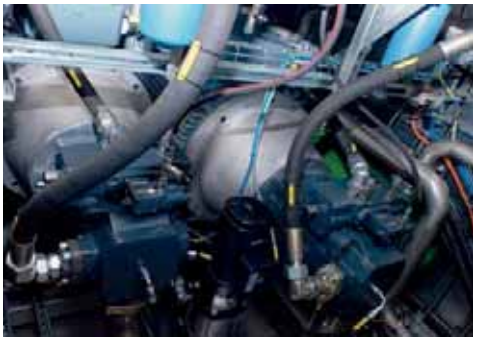
- Voltage Solenoid
(8-off) 0 to 35VDC ±0.3% of full scale

- Current Servo
(6-off) -400 to +400mA ±0.05mA
(6-off) -400 to +400mA ±0.05% of full scale
(1-off) -100 to +100mA ±0.05% of full scale

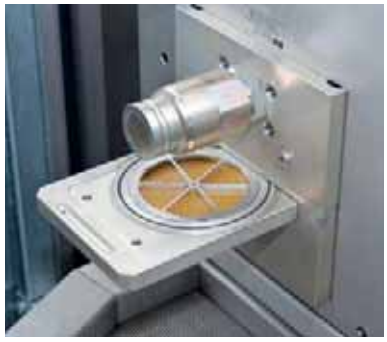
- Resistance
(6-off) 0 to 100Ω ±0.014Ω
(2-off) 0 to 1,000Ω ±0.011Ω
(2 -off) 0 to 3,000Ω not calibrated

Fuel supply unit
- Pressure:
(1-off) 0 to +2.07bar (0 to 30psi)
±0.3% of full scale

- Temperature
(2-off) 0 to 70°C (32 to 158°F)
±1°C (1.8°F)
(3-off) 0 to +70°C (32 to 158°F)
±0.5°C (0.9°F)


Pumps in the fuel supply unit

Rescue winch on the pump test station


Filter drawer on pump test station

>MFAT1SR<

Technical data are subject to change!

Test Stand for Fuel Pumps and Components

>KKP1000M-407<

The test stand is developed for testing of electrically or externally driven fuel pumps and control units, fuel valves with and without actuator, fuel coolers and other fuel components of the TORNADO and EUROFIGHTER TYPHOON aircraft.

It is possible to use this test stand to test other aircraft's fuel system components.

- The test stand tests and records performance data, e.g. pressure, flow and temperature.
- The test stand has three test stations
  - Swivelling tank for immersion pumps
  - Components test module
  - Pump test module
- Self test concept for early detection of malfunction of ARI's (AGE Replaceable Items) and for prevention of consequential damages - Power-On Built-In Test (PBIT) while switching on, Continuous Built-In Test (CBIT) during operation, and Initiated Built-In Tests (IBIT).
- The test stand <KKP1000M-407> is computer controlled.
- Test medium is kerosene (JP-8), however after recalibration MIL-C-7024II or EXXSOL D40 or any other typical fuel can be used.
- Explosion protection in accordance with ATEX Directive 94/9/EC for hazard area.

GENERAL INFORMATION

- TF standard software is fitted which can be easily extended for changes to the test procedures
- Measurement data acquisition and recording of flow, pressure, temperature, etc.
- Wide range of adapters for the different UUTs
- A gas warning unit, control of medium temperature below flash point and technical ventilation are used to prevent any explosive atmosphere in accordance with the ATEX directive
- A modem is fitted to enable trouble shooting and updating of the test stand software/test procedures from Test-Fuchs in Austria
- Easy and quick calibration is carried out by use of the TEST-FUCHS standard software

TECHNICAL DATA

Basic data:

Test medium: JP-8
Main tank: 1400l (369.8USgal)
Swivelling tank: 380l (100.0USgal)

Electric supply (requirements):

Test system:
3/N/PE AC 50Hz 400V
Nominal current: 480A
Back-up fuse: 500A gL
Power: approx. 333kVA

UPS:
1/N/PE AC 50Hz 230V
Nominal current: 13A
Back-up fuse: 13A
Power: approx. 3kVA

Compressed air supply (requirements):

6 to 10bar (87 to 145psi)
dry and oilfree

Nitrogen supply (requirements):

with an independent unit component
max. 200bar (2900psi)

Cold water supply (requirements):

1.6bar, 21.3m^3/h
(23.2psi, 21.3m^3/h)

Technical ventilation:

Supply air: 1000m^3/h (35315ft^3)
Exhaust air: 1100m^3/h (38846ft^3)

Hydraulic and mechanic parameter:

Boost circuit:
max. 1000l/min at 5bar (max. 1849.2gpm at 72.5psi)

HP supply (2 off):
120bar (1740.5psi)
0 to 50l/min (0 to 13.2USgpm)

MP supply:
50bar (725psi)
0 to 120l/min (0 to 31.7USgpm)

Swivelling tank and measurement circuit 1:
750l/min at 10bar (185USgpm at 145psi)

Load and measurement circuit 2:
max. 750l/min, max. 20bar
(max. 198USgpm, max. 290psi)

Load and measurement circuit 3:
max. 160l/min, max. 120bar
(max. 42.3USgpm, max. 1740psi)

Leak measurement circuit:
0.03-11.5cm^3/min, max. 35bar (max. 508 psi)

Hydraulic supply:
0-20l/min, max. 160bar (0-5.3USgpm, max. 2321psi)

Nitrogen supply:
0.3 to 10l/min (0.08 to 2.6USgpm)

Vacuum circuit:
up to 0.033 bar abs. (-0.48psi)

UUT drive:
Power: 30kW
Rotational speed: 12500rpm

TECHNICAL DATA (continuation)

> **Measurement range:**

Volume flow fuel: (9 off)
e.g.
113 to 1150l/min (30 to 304USgpm)
or
0.02 - 2l/min (0.01 - 0.53USgpm)
±0.75% of full scale

Volume flow nitrogen: (1 off)
0.3 to 10Nl/min
±2% range

Mass flow: (1 off)
1.5 - 550g/h
±2% range

Relative pressure: (31 off)
e.g.
0 - 250bar (0 - 3626psi)
or
0 - 0.6bar (0 - 8.7psi)
±0.25% range

Absolute pressure: (1 off)
800 - 1200mbar abs. (11.6 - 17.4psi)
±0.25% range

Temperature: (15 off)
0 - 50°C (32 - 122F)
±0.5K abs.

Water in fuel: (1 off)
0-100ppm
±3ppm abs.

Air humidity: (1 off)
0 - 100% relative humidity
±7% range

DC voltage: (1 off)
- 40 to +40VDC
±0.25% of full scale

Direct current: (1 off each)
0 - 60A
0 - 10A
0 - 2A
± 0.25% of full scale

AC voltage: (3 off each)
0 - 300V
0 - 150V
±0.5% of full scale

Alternating current: (3 off)
0 - 10A
±0.5% of full scale

Frequency: (1 off)
0 - 500Hz
±1% of full scale

Rotational speed: (1 off)
0 - 15000rpm
±15rpm abs.

Torque: (1 off)
-10 to +10Nm
±0.25Nm abs.

Fill level: (2 off)
-330 to 330mm (-1.08 to +1.08ft)
±1mm abs.

Angle swivelling tank: (1 off)
-180° to +180°
±1° abs.

TECHNICAL DATA (continuation)

> **Dimensions and weights:**

Components test module:

Length:	3885mm	(12.7ft)
Width:	3010mm	(9.9ft)
Height:	2400mm	(7.9ft)
Weight:	3500kg	(7700lb)

Hydraulic power unit:

Length:	3880mm	(12.6ft)
Width:	1960mm	(6.4ft)
Height:	2200mm	(7.2ft)
Weight:	4400kg	(9700lb)

Swivelling tank module:

Length:	1130mm	(3.7ft)
Width:	3010mm	(9.9ft)
Height:	2400mm	(7.9ft)
Weight:	1770kg	(3750lb)

Pump test module:

Length:	1130mm	(3.7ft)
Width:	3010mm	(9.9ft)
Height:	2400mm	(7.9ft)
Weight:	1220kg	(2690lb)

Switch cabinet:

Length:	3020mm	(10.0ft)
Width:	510mm	(1.8ft)
Height:	2200mm	(7.2ft)
Weight:	860kg	(1900lb)

Control cabinet:

Length:	610mm	(2.0ft)
Width:	830mm	(2.7ft)
Height:	2210mm	(7.3ft)
Weight:	180kg	(397lb)

Hydraulic Power Unit

Control cabinet

Swivelling Tank

Technical data are subject to change!

Oxygen Regulator Operational Tester

>OXR100<

Developed to perform aircraft oxygen regulator tests for aircraft types F4, F5, C-130 and C-160.

Can be adapted for regulators of other aircraft types.

- The vacuum chamber serves for simulation of altitude to test performance of the oxygen regulator tester under real ambient conditions.
- Freely connectable measurements and supplies permit a multiplicity of different test set ups.
- The pneumatic scheme is shown on the anodized aluminium front panel, this way a quick and well arranged test set up is given.
- Connections are designed as couplings to establish required connections in a fast and safe manner.

RANGE OF APPLICATION

CRU series, MD2 series

MISCELLANEOUS

- Relevant accessories (e.g. test hoses) can be stored in a box, which is installed in the test bench.
- Lifting provisions (accessible after removal of the lower cover), which allow transportation by forklift.
- The vacuum pump is mounted on anti-vibration elements.

TECHNICAL DATA

> Test medium:

Oxygen (MIL-O-27210, type I)
Nitrogen (optional)
Air (optional)

> Electric supply:

Mains supply:	1/N/PE AC 60 Hz 115 V
Nominal current:	11.5 A
Nominal power:	1.32 kVA

> Pneumatic supply:

Pressure:	207 bar (3000 psi)
Flow:	100 Nlpm at 20°C (3.5 scfm at 20°C)
Connection:	AN4 female thread direct connection (hose) to the oxygen bottle can be purchased as accessory

> Dimensios and weight:

Width:	600 mm	(2.0 ft)
Length:	1800 mm	(5.9 ft)
Height:	1050 mm	(3.4 ft)
Weight:	355 kg	(783 lb)

> Measurements:

Pressure:

0 to 207 bar	(0 to 3000 psi)	Cl. 1.6
0 to 138 bar	(0 to 2000 psi)	Cl. 0.25
0 to 41 bar	(0 to 600 psi)	Cl. 0.25
-1 to 0 bar	(-15 to 0 psi)	Cl. 1.6
0 to 4 bar	(0 to 60 psi)	Cl. 1.6
0 to 50 mbar (diff.)	(0 to 20 in H_2O)	Cl. 0.6
0 to 1067 mbar (abs.)	(0 to 800 mm Hg)	Cl. 0.6
0 to 203 mbar (rel.)	(0 to 6 in Hg)	Cl. 0.6
0 to 40 mbar (rel.)	(0 to 16 in H_2O)	Cl. 0.6
0 to 75 mbar (rel.)	(0 to 30 in H_2O)	Cl. 0.6

Flow:

0 to 100 Nlpm at 20°C (0 to 3.5 scfm at 20°C)	Cl. 2
0 to 200 Ncc/min at 20°C (0.0071 scfm at 20°C)	Cl. 2
0 to 40 Ncc/min at 20 °C (0.0014 scfm at 20°C)	Cl. 2

OPTIONS

Many options are possible for adaption,
e.g. adaption to other aircraft types etc.

Technical data are subject to change!

Mobile Test Stand, Oxygen Regulator

>MOX12<

Designed for use with the systems:

- TORNADO
- C-160
- F-4
- P3C ORION

Test procedure in compliance with the requirements of ML 1/2.

- Automatic selftest at test stand startup
- Automatic or manual test run
- Operation via monitor, keyboard and mouse
- Graphic and digital display of measurement data
- Automatic generation of test reports via computer and printer

TECHNICAL DATA

Mains supply:	1/N/PE AC 50Hz 230V	Flow measurement, input:	0...1, 10, 50, 220 lpm	cl. 2.0
Power consumption:	max. 3.7 kVA	Flow regulation, output:	0...1, 25, 220 lpm	cl. 2.0
Protection:	16 A	Mask pressure measurement:	-30...120 mbar	±0.2 mbar
Medium:	Breathing air i.a.w. TL 6830-0004	Altitude control:	-1800...50000 ft	±25ft
Input pressure regulation:	40 bar continuous adjustment		50000...60000 ft	±100ft
		Climbing rate:		
		controlled:	0...4900 ft/min	±50ft/min
		uncontrolled:	approx. 25000 ft/min	

OPTIONS

Many options are possible for adaption,
e.g. adaption to other aircraft types etc.

Technical data are subject to change!

Test stand for oxygen components and regulators

>OXR3-A<

This test stand is developed to test oxygen components and regulators of all current aircraft and characteristics e.g. proof pressure, flow and leak rate.

It is easy to adapt this test stand for any new requirement.

- The vacuum chamber is used to simulate different flight levels. Thus it tests the performance of the UUT's under realistic flight conditions.
- Different test setups can be easily made using the quick connect multi-variable pressure and measuring points.
- The pneumatic diagram is shown on the anodized control panel. This enables a quick and easy to use test set up to be carried out.
- The connections are all quick release so that the required test set up can be easily made.

GENERAL INFORMATION

- All accessories can be stored in the provided drawers
- Measurement results are displayed clearly by means of the pc and the Test-Fuchs standard software
- The equipment is of an ergonomic and compact design
- Doors and access panels enable easy access for maintenance

TECHNICAL DATA

Electrical supply (requirements):

Mains connection:	1/N/PE AC 50Hz 230V
Nominal current:	11A
Back-up fuse:	16A
Nominal power:	2.5kVA

Pneumatical supply (requirements):

Medium:	Nitrogen
Pressure:	approx. 207bar (3000psi)
Flow:	min. 1000lpm (260gpm)

Operating conditions:

Operating temp.:	+5 to +45°C (41 to 113°F)
Altitude:	up to 1000m (3280ft) above SL
Humidity	10% to 95% (non-condensing)

Dimensions and weight:

Length:	2.244mm (7.36ft)
Depth:	1.249mm (4.10ft)
Height:	1.504mm (4.93ft)
Weight:	approx. 550kg (1.213lb)

Measurement range:

Pressure:		
0 to 35bar	(0 to 507psi)	±0.25%m.r.
0 to 240bar	(0 to 3480psi)	±0.25%m.r.
-30 to 130mbar	(-435 to 1885mpsi)	±0.25%m.r.
0 to 2bar	(0 to 29psi)	±0.25%m.r.
0 to 40bar	(0 to 580psi)	±0.25%m.r.
0 to 250bar	(0 to 3626psi)	±0.25%m.r.
0 to 50bar	(0 to 725psi)	±0.25%m.r.
100 to 1200mbar	(1.5 to 17.4psi)	±0.15%m.r.
Differential pressure:		
1.2bar absolute	(17.4psi absolute)	±0.5%m.r.
Temperature:		
0 to 100°C	(32 to 212°F)	±1K
Flow:		
0 to 250mln/min	(0 to 0.008scfm)	±1%o.f.s.
0 to 2400ln/min	(0 to 79scfm)	±1%o.f.s.
0 to 20l/min	(0 to 0.7acfm)	±2%o.f.s.
0 to 210l/min	(0 to 7.4acfm)	±2%o.f.s.

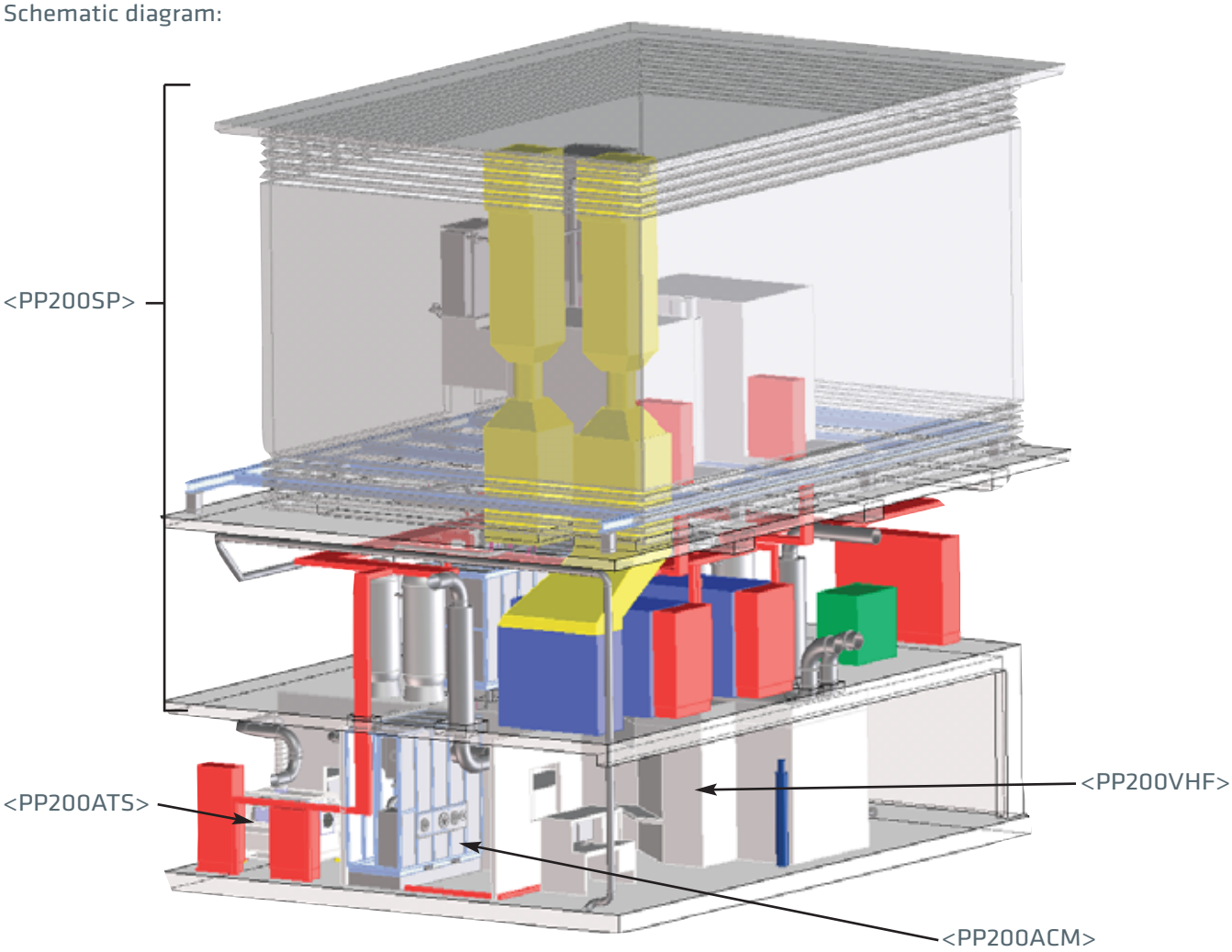
m.r.	measuring range
o.f.s.:	of full scale
ln:	standard liter
min	standard milliliter
scfm	standard cubic feet per minute (21.1°C, 1013mbar)
acfm	actual cubic feet per minute

Technical data are subject to change!

Universal Test Stand for Pneumatic Components

>PP200STA<

Schematic diagram:



This shown construction has been designed and realised for SR Technics

Developed to test aircraft pneumatic components up to these performance data:

Air flow:	max. 3kg/s
Compressed air:	max. 30bar
Temperature:	max. 650°C

- Automatic report generation
- Modular construction with one central pneumatic/hydraulic supply <PP200SP> and three independent test stands
- Fully automatic test runs based on component maintenance manuals (CMMs) test procedures
- 3 self-sufficient test stands:
  - Test stand for Valves and High Flow Components <PP200VHF>
  - Test stand for Air Cycle Machines <PP200ACM>
  - Test stand for Air Turbine Starters <PP200ATS>

PNEUMATIC TEST STAND FOR VALVES AND HIGH FLOW COMPONENTS <PP200VHF>

- Dynamic flow tests under hot air- and cold air conditions to 3.0kg/s, 30bar, max. 650°C
- Quick clamping device for high dynamic flow tests with time-saving adaption of the unit under test (UUT)
- Working area with free switchable supplies and measurements for static and dynamic tests
- Vacuum chamber for cabin pressure components
- Closed test chamber with inspection window
- Port- and case-leakage measurements
- Split vacuum chamber for leakage measurement, Volume: approx. 160 litres / 97 litres
- Vacuum reservoir for leakage measurement, Volume: approx. 25 litres
- High accuracy of pressure- and flow measurements possible due to graduation
- Diving basin (capacity: 840 litres) for leakage tests

Quick clamping device

Working area with free switchable supplies and measurements

Vacuum chamber

Test cell

TECHNICAL DATA

> Input data pneumatic circuits:

3.0kg/s, max. 7bar, cold air
0.67kg/s, max. 30bar, cold air
3.0kg/s, max. 7bar, hot air 700°C
0.67kg/s, max. 30bar, hot air 700°C

> Quick clamping device:

0 - 3kg/s, 0 - 30bar, 20 - 650°C
0 - 0.15kg/s, 0 - 42bar, 20 - 450°C

> High pressure circuit for static test with air or nitrogen:

5 - 350bar

> Vacuum supply:

0.1 - 1bar absolute
Nominal suction capacity: 570m³/h and 11m³/h

> Measurements:

Flow:
0.004 - 25000Nl/min, ± 1% o.m.r.

Pressure:
0 - 400mbar to 0 - 400bar, ± 0.25% o.m.r.
18 free sensors

Temperature:
0 - 100°C to 0 - 1000°C, ± 0.5 - 4°C

> Electrical connections:

Test stand:
3/N/PE AC 50Hz 400V max. 32A

UUT supply:
2 DC 28V
1/N/PE AC 400Hz 115V

> Dimensions:

Length:	7300mm
Width:	3650mm
Height:	2600mm

PNEUMATIC TEST STAND FOR AIR CYCLE MACHINES <PP200ACM>

- Hundred percent inspection of Air Cycle Machines
- Acquisition of pressure, flow, temperatures, leakage, speed, vibration
- Universal controlled heat exchanger to test several ACM-types on one test stand
- Closed test chamber with inspection window
- 2-fold redundant speed measurement with safety monitoring
- Elevating truck for easy adapting of the units under test

TECHNICAL DATA

> Input data pneumatic circuits:

1.32kg/s, max. 7bar, cold air
1.32kg/s, max. 7bar, hot air 700°C

> Supply Air Cycle Machine:

0 - 6bar, 20 - 250°C

> Heat exchanger:

0 - 6bar, max. 250°C
max. 160kW cooling capacity

> Measurements:

Flow:
0 - 1.32kg/s, ± 2% o.m.r., 2 steps

Pressure:
0 - 10bar, ± 0.25% to ± 1% o.m.r.
0 - 100mbar diff, ± 0.25% o.m.r.

Temperature:
-40 - 800°C, ± 0.5°C to ± 4°C

Humidity:
0 - 100% r.H., ± 5% o.m.r.

> Electrical connections:

Test stand:
3/N/PE AC 50Hz 400V max. 32A

UUT supply:
2 DC 28V
1/N/PE AC 400Hz 115V

> Dimensions:

Test frame:

Length:	2745mm
Width:	1200mm
Height:	2940mm

Operating desk:

Length:	1600mm
Width:	1000mm
Height:	1360mm

PNEUMATIC TEST STAND FOR AIR TURBINE STARTERS <PP200ATS>

- To test Air Turbine Starters
- Measured variables: vibration, speed, torque, pressure, flow, temperature, electric resistance, run up period
- Mass simulation unit with 2 flywheel masses (6.78kgm² resp. 22.10kgm²)
- Drive of the UUT via electric motor for overrunning test
- Check of the mechanical centrifugal clutch
- All tests in one clamping can be performed manually, semi- and fully automatic
- Video monitoring of the UUT
- Closed test chamber with inspection window

Test frame

Measuring cabinet

Operating desk

TECHNICAL DATA

> Input data pneumatic circuits:

3.5kg/s, max. 7bar, cold air
2.0kg/s, max. 7bar, hot air 700°C

> Supply Air Turbine Starter:

3.5kg/s, 0 - 6bar, max. 250°C

> Measurements:

Flow:
0 - 3.5kg/s, ± 2% o.m.r.

Speed:
0 - 18000rpm, ± 2rpm

Temperature:
0 - 800°C, ± 2°C

> Mass simulation:

Flywheel mass 1:	6.78kgm², max. 6000rpm
Flywheel mass 2:	22.1kgm², max. 6000rpm

> Electrical connections:

Test stand:
3/N/PE AC 50Hz 400V max. 32A

UUT supply:
2 DC 28V
1/N/PE AC 400Hz 115V

> Dimensions:

Test frame:

Length:	1800mm
Width:	1160mm
Height:	1310mm

Operating desk:

Length:	1600mm
Width:	1000mm
Height:	1360mm

Test chamber:

Length:	3300mm
Width:	2775mm
Height:	3000mm

PNEUMATIC / HYDRAULIC SUPPLY <PP200SP>

- Pneumatic and hydraulic supply of the test stands <PP200VHF>, <PP200ACM> and <PP200ATS>
- Hot air generation:
  - Propane heater: 1300kW
  - Propange heater: 650kW
  - Electric heater: 75kW
  - Heat exchanger
- Compressed-air generation:
  - Compressor max. 30bar
  - Compressor max. 42bar
  - Cooling unit for compressed air
  - 4 x 1000 litres compressed air reservoir
- Hydraulic supply:
  - Hydraulic supply unit max. 150bar
- Mixer for temperature controlled commixture of cold and hot air
- Control via the test stands <PP200VHF>, <PP200ACM> und <PP200ATS>

Propane heater (7bar)

Electric heater

Cooling unit

Compressed air reservoir
Mixer + Hydraulic supply unit

Compressor (42bar)

Compressor (30bar)

TECHNICAL DATA

> **Compressed-air supply for the unit:**

3.5kg/s, 6.6 - 7.2bar, ambient temperature

> **Propane heater:**

650kW, 0.67kg/s, 700°C, 30bar
1300kW, 1.5kg/s, 700°C, 7bar

> **Electric heater:**

75kW, 0.15kg/s, 550°C, 42bar

> **Compressed air compressors:**

0.67kg/s, 30bar, 160kW
0.15kg/s, 42bar, 75kW

> **Hydraulic supply unit:**

25l/min, 150bar

> **Compressed air reservoir:**

42bar, 4 x 1000 litres capacity

> **Cooling unit:**

Air rate 21300m³/h
92kW refigerating capacity
36kW connected load

> **Measurements:**

Temperature:
-20 - 800°C, ± 4°C

Pressure:
0 - 60bar, ± 0.25% o.m.r.

> **Electrical connections:**

Main current:	3/N/PE AC 50Hz 400V, max. 160A
Emergency current:	1/N/PE AC 50Hz 230V, max. 25A
Compressor (30bar):	3/PE AC 50Hz 400V, max. 350A
Compressor (42bar):	3/PE AC 50Hz 400V, max. 200A
Electric heater:	3/PE AC 50Hz 400V, max. 125A
Propane heater (7bar):	3/PE AC 50Hz 400V, max. 50A
Propane heater (30bar):	3/PE AC 50Hz 400V, max. 50A

> **Outputs:**

Supply <PP200VHF>:
3.0kg/s, max. 7bar, cold air
0.67kg/s, max. 30bar, cold air
3.0kg/s, max. 7bar, hot air 700°C
0.67kg/s, max. 30bar, hot air 700°C
0,15kg/s, max. 92bar, hot air 20 - 550°C

Supply <PP200ACM>:
1.32kg/s, max. 7bar, cold air
1.32kg/s, max. 7bar, hot air 700°C

Supply <PP200ATS>:
3.5kg/s, max. 7bar, cold air
2.0kg/s, max. 7bar, hot air 700°C

Technical data are subject to change!

Test Stand for Outflow Valves

>POVM4NM<

Preadapted UUT Example

Accessory and Mounting Trolley

The test stand is developed to test the outflow valves (OFV) for their pneumatic characteristics according to ATA Chapter 21.

It is possible to adapt this test stand to other aircraft types.

- In order to protect the user, tests are carried out in a divisible test chamber with automatic interlock, to be opened or closed via spindle-type lifting gear
- With open cover, the test area is easily accessible. If the cover is closed, an optical inspection of the test procedure is possible due to the observation window and a lamp
- Central, ergonomic operation via a flexible, adjustable panel with swivel arm
- Extensive range of measuring equipment (digital scale, torque key, caliper rule, bar code scanner, inclination sensors, cable measuring box) and additionally installed measuring instruments in the test stand (bonding tester and insulation test device)

GENERAL INFORMATION

- Easy operation and quick calibration via the TEST-FUCHS standard software
- One compressed air supply and one single electrical connection are enough to sufficiently supply the test stand - all UUT supplies are integrated, no additional hydraulic or cooling water connection is necessary
- The valves can be mounted on adapter plates with quick release latches for easy mounting and reduced set-up times (parallel to test operation, the next UUT can already be adapted)
- Drawer storage trolley for proper storage of the test cables and adaption parts, also useable as mounting trolley
- Stable design of the test stand due to welded steel frames
- Transport with fork lift truck (fork lift access points are integrated in the base frame)
- Excellent access for maintenance or calibration tasks through doors and a special arrangement of the system parts inside

OPERATION AREA

Description	P/N	Spec. No.	CMM
Boeing 787 Outflow Valve (OFV)	7000059H01	PVA-7000059H01 Rev. Oct.05	21-38-15 Rev. 9
A380 Outflow Valve	21826-02	PVA-21826-02 Rev. C	21-39-21 Rev. 1
Cabin Outflow Valve Boeing 747	719201-2 719201-3 719201-4 719201-5 719201-6 719201-7 719201-8 719201-9 719201-10 719201-11 719201-12	HS3950 Rev. E	21-31-03 Rev. 26 Gage Code: 73030
Outflow Valve 787-9			

>POVM4NM<

TECHNICAL DATA

> Pneumatic supply (requirements):

Supply pressure:	6 to 8bar (87 to 116psi)
Flow:	at least 200g/s (0.44lb/s)
Air quality:	ISO 8573-1 ISO Code 1-4-2
Supply purity (according to ISO 8573-1):	
Solid state:	Class 1
Oil:	Class 1 (<0.01mg/m^3)
Humidity:	Class 3 (Pressure dew point under -15°C (+5°F))
Wire cross section:	2"

> Electrical supply (requirements):

Mains connection:	3/N/PE AC 50Hz 400V
Performance:	approx. 17kVA
Nominal current:	max. 25A
Control voltage:	24VDC
Preliminary fuse:	32A GL (mains line)

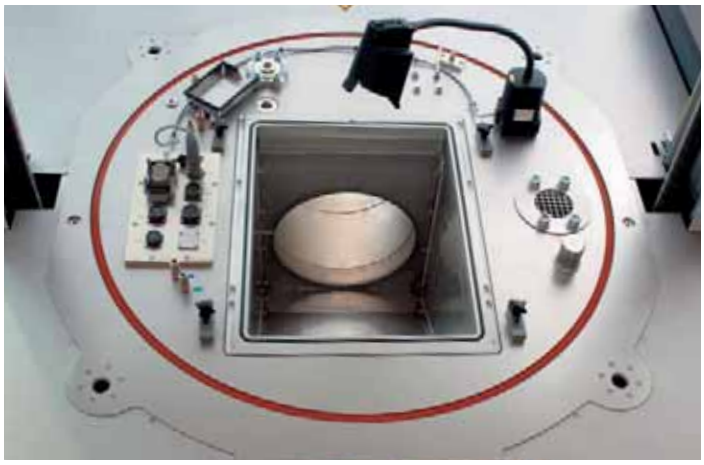
> Operating conditions:

Operating temperature:	15 to 35°C (59 to 95°F)
Storage temperature:	0 to 60°C (32 to 140°F)
Height:	to 1,000m (3,280ft) over MSL
Rel. air humidity:	5 to 95% (non-condensing)
Installation:	in a non-explosive area
Permanent noise emission:	max. 96.2dB(A) in 1m (39.4in) distance

> Dimensions and weight:

Test stand:	
Length:	approx. 3,530mm (140in)
Depth (with exhaust pipe):	approx. 1,820mm (71.7in)
Height (cover closed):	approx. 2,000mm(78.7in)
Height (cover opened):	approx. 2,440mm (96in)
Weight:	approx. 1,750kg (3,860lb)
Switch and measuring cabinet:	
Length:	approx. 1,540mm (60.6in)
Depth:	approx. 720mm (28.3in)
Height:	approx. 2,170mm (85.4in)
Weight:	approx. 425kg (937lb)

Closed and locked Test Chamber



Test Area inside the Test Chamber

>POVM4NM<

TECHNICAL DATA

> **Measurements:**

Pressure:

(1 off)	800 to 1,200mbar (11.6 to 17.4psi) ±1mbar (0.015psi)
(1 off)	0 to 1.2bar (0 to 17.4psi) ±0.1% o.f.s.
(1 off)	0 to 2.5bar (0 to 36.3psi) ±0.1% o.f.s.
(1 off)	0 to 6bar (0 to 87psi) ±0.25% o.m.r.
(1 off)	0 to 10bar (0 to 145psi) ±0.25% o.f.s.

Torque:

(1 off)	0 to 22.6Nm (0 to 200lbfin) ±1Nm (8.85lbfin)
(1 off)	-11.3 to +11.3Nm (-100 to +100lbfin) ±1% o.f.s.

Flow:

(1 off)	0 to 4kg/min (0 to 8.81lb/min) ±2% o.f.s.
(1 off)	0 to 7.3kg/min (0 to 161lb/min) ±3% o.f.s.

Inclination:

(4 off)	0 to 360° ±0.4°

Temperature:

(1 off)	-20 to +80°C (-4 to 176°F) ±1°C (1.8°F)
(3 off)	0 to 40°C (32 to 140°F) ±1°C (1.8°F)

Air humidity:

(1 off)	0 to 100% ±5%

Voltage:

(1 off)	0 to 500V ±0.5% o.f.s.
(1 off)	-60 to +60V ±0.15% o.f.s.
(3 off)	0 to 15V ±0.15% o.f.s.
(1 off)	0 to 5.2V ±0.15% o.f.s.
(1 off)	0 to 10VAC ±0.5% o.m.r.
(1 off)	0 to 125VAC ±0.5% o.m.r.
(1 off)	0 to 250VAC ±0.5% o.m.r.

Current:

(1 off)	0 to 0.005mA ±0.5% o.f.s.
(1 off)	0 to 0.05mA ±0.5% o.f.s.
(1 off)	0 to 0.5mA ±0.5% o.f.s.
(1 off)	0 to 5mA ±0.5% o.f.s.
(1 off)	0 to 5A ±0.25% o.f.s.
(1 off)	0 to 10AAC ±0.5% o.m.r.

Frequency:

(1 off)	0 to 500Hz ±0.1Hz

Flexibly adjustable Operating Panel with Swivel Arm

Additional Measuring Instruments (Scale, Sliding Caliper, Inclination Sensors, Bar Code Sensor)

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for numerous UUTs, requirement to the test program, dimensioning,...

>POVM4NM<

Technical data are subject to change!

Test Stand for Air Turbine Starters

>TATS1AF<

Test unit

Operation panel

Developed for testing of Air Turbine Starters of Airbus and Boeing aircrafts.

- Measuring values: vibration, speed, torque, pressure, flow, temperature, resistance
- Operation panel outside the test chamber
- Video control of the test runs
- Separate pressure and temperature controller for controlled pressure, temperature and quantity
- Two individual connectable masses for mass simulation
- Drive of the units under test via electro motor for Overrunning Test
- Integrated hydraulic unit to supply the control circuits
- All tests can be carried out manual, semi- and fully automatic (e.g.: Acceleration Time Test, Stall Air Flow Test, Overrunning Test)

TECHNICAL DATA

> Electrical supply:

3/N/PE AC 50 Hz 400 V, preliminary fuse 50 A
1/N/PE AC 50 Hz, nominal current 7 A, preliminary fuse 13 A

> Compressed air supply:

4.7 kgps, max. 10 bar, ambient temperature
3.5 kgps, max. 10 bar, 250 °C - 350 °C
7 - 10 bar, control air

> Test unit:

Flywheel mass 1:	6.78 kgm²
	max. 8000 rpm
Flywheel mass 2:	22.1 kgm²
	max. 8000 rpm
Test shaft:	max. 18000 rpm
	(for Overrunning Test)

> Circuits:

Supply of the starter:	4.7 kgps
	max. 6 bar
	max. 250 °C
Hydraulic circuit:	20 lpm
	150 bar

> Measurements:

Vibration:
- Range: 0 - 150 mmps
- Accuracy: ± 7 % o.m.r.

Speed:
- Range: 0-18000 rpm
- Accuracy: ± 2 rpm

Torque:
- Range: -1100 to 1100 Nm
- Accuracy: ± 0.5 % o.m.r.

Pressure:
- Range: 0-10 bar / 800-1200 mbar abs.
- Accuracy: Cl. 0.25

Flow:
- Range: 0.65 - 4.7 kgps
- Accuracy: Cl. 2

Temperature:
- Range: 0-100 / 200 / 300 / 400 °C
- Accuracy: ± 0.5 °C / ± 2 °C

Resistance:
- Range: 0 - 600 Ω
- Accuracy: ± 1 Ω

OPTIONS

Many options are possible for adaption,
e.g.: adaption to other aircraft types, etc.

> **Mix group and hydraulic supply with assembled switch cabinet:**

Inlet lines with cold and hot air are merged via dynamic servo valves and mixed according to the computer setting to the adequate pressure, temperature and quantity

Hydraulic unit to control the servo valves

> **Measuring cabinet:**

Acquisition and evaluation of the measuring values determined in the test unit

Location of the PLC

> **Elevating truck:**

Adjustable for height

For transport and mounting of the units under test

> **Adapter cabinet:**

To store the adaptions

Technical data are subject to change!

Test Stand for Safety Valves

>PSV1000NM<

For testing of cabin safety valves of the aircraft types

AIRBUS,
BOEING and
EMBRAER

for function and leakage during production and maintenance.

- Fully automatic test run with automatic logging.
- Simulation of cabin and ambient pressure by filtered compressed air and integrated water ring vacuum pump with liquid separator.
- Additional test rack for measuring of: weight, insulation, transition resistance, force measurement and stroke
- Simultaneous testing at test stand and test rack is possible.

RANGE OF APPLICATION

Airbus	Boeing	Embraer
A320, A330, A340, A380	B737, B747, B787	ERJ 170/190

GENERAL INFORMATION

- Easy accessible test chamber with hydraulic lock for quick change of UUT
- Universal UUT adaption via mechanical clamping
- Bar code reader for serial production
- Remote maintenance via modem
- Ergonomic, compact design

TECHNICAL DATA

> Vacuum supply:

Vacuum:	max. 33 mbar abs. (0.48 psi)
Nominal suction flow:	500 m^3/h
Nominal width:	80 mm

> Hydraulic supply:

Supply pressure:	max. 150 bar (2175 psi)
Flow:	max. 25 l/min (6.6 US gpm)

The hydraulic supply is utilized for locking of test chamber and operation of flow control valve.

> Pneumatic supply:

Compressed air:	range: 5 to 10 bar (72.52 to 145 psi)
Air volume:	0.5 kps (1.1 lb/sec.)
Nominal width:	50.8 mm

> Electrical connected loads:

3/N/PE AC 50 Hz 400 V
Nominal current 50 A

> Cooling water supply:

Water:	max. 1.5 bar (max. 21.76 psi)
Flow:	max. 16 l/min (4.23 US gpm)
Nominal width:	25.4 mm

> Measurements:

Flow:	0.03 - 491 gps ± 2 % a.f.s.	(0 - 1.08 lb/s)
Differential pressure:	± 100 mbar diff. ± 0.1 % of the range	(± 1.45 psi)
Absolute pressure:	0 - 6 bar ± 0.25 % of the range	(0 - 87 psi)
Temperature: (Test chamber)	0 - 100 °C ± 1 K	(0 - 212 °F)
Absolute pressure: (ambient)	0.8 - 1.2 bar ± 0.25 % of the range	(11.6 - 17.4 psi)

Humidity and temperature measurement (ambient):

	0 - 100 % rH	(± 5 % a.f.s.)
	-20 to + 80 °C	± 1 K
Laser path measurement:	0 - 120 mm	± 0.5 mm abs.

Technical data are subject to change!

Test Stand for Safety Valves

>BSV1AF<

For computer controlled testing of safety-/ outflow valves to their characteristics like test pressure, decrease of pressure, leakage, flow etc. with a max. flow of 100lbpm

> Due to the use of appropriate adaptions it is possible to test many different types of units under test (UUTs); (e.g. at present, valves of the aircraft types Boeing 747 / 737 / 777 / AWACS and C-135 are tested

> Computer controlled via moveable operating panel with main computer, TFT-monitor, keyboard, mouse and printer

> Data recording with disc drive and/or CD-RW drive

GENERAL INFORMATION

- Two TFT-monitors for graphical indication of the measuring data
- Keyboard to operate the test stand with software program <TFSW 2000>
- Printer for test records
- Modem system for remote maintenance
- 6 pcs. air-cooled vacuum pumps to generate the test vacuum
- All necessary adaptions to connect the UUTs are in the test chamber
- Hydraulic clamping of the moveable test chamber
- UUT installation in every angle position
- Quick adaption via V-clamps
- Large inspection window
- UUT-monitoring via WebCam
- All circuits connectable
- All regulators are remote controllable via main computer

TECHNICAL DATA

> Supply:

Supply voltage (Test stand):

Mains supply	3/PEN AC 50Hz 400V
Nominal current	approx. 345A
Power	approx. 240kVA

Supply voltage (Computer system):

Mains supply	1/N/PE AC 50Hz 230V
Nominal current	approx. 7A
Power	approx. 0.8kVA

Compressed-air supply:

Pressure	5 to 10bar
Quantity	65lbpm

Hydraulic supply:

Capacity	approx. 50l

Vacuum chamber supply:

Final pressure	min. 20mbar abs.

> Measuring Equipment:

Differential pressure:	Range up to± 1000mbar
Pressure	Range 0 to 6bar abs.
Flow:	Range 5ml to 46000Nlpm
Voltage	Range 0 to 40VDC
Humidity:	Range 0 to 100rel%
Temperature:	Range -20 to +60°C
Resistance	Range 0 to 2500Ohm

> Vacuum pump:

Speed	1000min^{-1}
Air quantity	1600m3ph each
Drive motor	30kW (total 180kW)

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for different aircraft types, etc.

>BSV1AF<

Technical data are subject to change!

Test Stand for Safety Valve

>PSV1000N<

For testing of safety valves of the aircraft types A319, A320, A321, A330 and A340 for function and leakage

- Each part of the test chamber is protected by a safety valve.
- Simulation of cabin pressure by filtered compressed-air.
- Closing of the test chamber by a hydraulic claping system; clamping pressure monitoring by means of pressure switches.

GENERAL INFORMATION

> The test stand is in compliance with the ergonomic requirements. The suspended operating unit can be moved and rotated horizontally.

TECHNICAL DATA

> **Supply voltage, test stand:**

Mains supply: 3/PE AC 50Hz 400V
Power: max. 18.7kVA
Preliminary fuse: 32A

> **Supply voltage, computer:**

Mains supply: 1/N/PE AC 50Hz 230V
Power: max. 0.8kVA
Preliminary fuse: 16A

> **Supply voltage, lighting:**

Mains supply: 1/N/PE AC 50Hz 230V
Power: max. 3.0kVA
Preliminary fuse: 16A

> **Pneumatic supply:**

Range: 6 to 10bar
Air volume: 2.5kpm

> **Measurements:**

Flow	0.1 to 2.5kpm	Cl. 1.0
	0.1 to 150gpm	Cl. 1.0
Differential pressure	to ± 1000mbar	Cl. 0.15
Absolute pressure	0 to 6bar	Cl. 0.25
Temperature, test chamber	0 to 50°C	± 1K
Absolute pressure, ambient	0.9 to 1bar	Cl. 0.25
Humidity and temperature measurement, ambient		
	0 to 100%rF	Cl. 3.0
	-20 to +60°C	Cl. 0.5

> **Dimensions and weight:**

LxDxH: 3900mm x 1140mm x 1980mm
Weight: 2120 kg

>PSV1000N<

Technical data are subject to change!!

Test Stand for Pneumatic Valves

>PPV3<

The equipment is developed to test different pneumatic engine components for troublefree function.

Testing of:

- Bleed Valves
- Butterfly Valves
- HPT/LPT ACC Valves
- Solenoid Valves
- Differential Pressure Switches
- Pressure Switches
- Oil Tanks

> Modular pneumatic circuitry provides many different interconnections

> Hydraulic fixtures for easy UUT mounting

> Manual and automatic test procedures

> Ergonomically designed test and operation area with rotatable and pivotable operating arm and touch panel

> Evaluation of electrical parameters of the UUTs

GENERAL INFORMATION

- Stainless steel profile frame, aluminium front panels and doors or covers of stainless steel
- Big clamping bed for diverse adaptions for UUT mounting
- Broad sliding doors of laminated safety glass (LSG) and integrated safety door monitoring to protect the user
- Colourless anodized front panels with bilingual labelling (German and English) are permanently resistant against mineral and synthetic oils, fuels and cleaning detergents
- Remote maintenance of the test stand by the Ethernet connection
- Compact setup and easy accessibility for maintenance tasks

TECHNICAL DATA

> Electrical supply (requirements):

Mains supply:	3/N/PE AC 50Hz 400V
Nominal current:	max. 10A
Power:	7kVA
Preliminary fuse:	16A

> Pneumatic supply (requirements):

Compressed air:

Pressure :	6bar	(87.0psi)
Flow :	min. 700lpm	(184.9USgpm)

In-house nitrogen line:

Pressure :	27bar	(391.6psi)
Flow :	min. 700lpm	(184.9USgpm)

Nitrogen bottle:

Pressure:	65bar	(942.7psi)
Flow:	min. 700lpm	(184.9USgpm)

> Operating conditions:

Ambient temperature:	5 to 35°C (41 to 95°F)
Storage temperature:	0 to 60°C (32 to 140°F)
Height:	up to max. 1,000m MSL (3,280ft)
Rel. humidity:	5 to 95% (non-condensing)
Max. noise emission:	<68.0dB(A) in 1m distance

> Dimensions and weight:

Width:	approx. 3,400mm	(133.9in)
Depth:	approx. 2,500mm (incl. swivel arm)	(98.4in)
Height:	approx. 2,550mm	(100.4in)
Weight:	approx. 1,950kg	(4,300.0lb)

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MEASUREMENTS

> Pressure measurements:

Measuring circuit 1:

0 to 1bar	(0 to 14.5psi)
0 to 10bar	(0 to 145.0psi)
0 to 60bar	(0 to 870.2psi)

Measuring circuit 2:

0 to 1bar	(0 to 14.5psi)
0 to 10bar	(0 to 145.0psi)
0 to 60bar	(0 to 870.2psi)

Differential pressure measurement:

0 to 0.2bar	(0 to 2.9psi)

Tolerance: ±0.25% of measuring range

> Flow measurements:

Flow measuring track 1:

0.05 to 2.5Nl/min	(0.013 to 0.7USgpm)
0.7 to 35Nl/min	(0.18 to 9.2USgpm)
5.4 to 270Nl/min	(14.3 to 71.3USgpm)

Flow measuring track 2:

0.2 to 10Nl/min	(0.05 to 2.6USgpm)
2 to 100Nl/min	(0.5 to 26.4USgpm)
14 to 700Nl/min	(3.7 to 184.9USgpm)

Tolerance: ±1% of full scale

> Current measurements:

(2-off) 0 to 1ADC

Tolerance: ±0.5% of measuring range

> Voltage measurements:

(2-off)	0 to 35V
(1-off)	0 to 10Vrms

Tolerance: ±0.5% of measuring range

> Temperature measurements:

(1-off)	-20 to +80°C	(-4 to +176°F)
(2-off)	20 to 90°C	(68 to 194°F)

Tolerance: ±1°C (±1.8°F) absolute

OPTIONS

Various options are available to meet our customers' requirements.
e.g.: Adaption to numerous UUTs, test program command, dimensioning,...

>PPV3<

Pneumatic Test Stand
>SPAN50/15<

Universal test stand for computer-controlled testing and characteristic curve pick-up.

- Dynamic and static leakage measurement
- Flow measurement 2 mNlpm - 75000 Nlpm
- Performance testing up to 600 °C, 1.5 kgps, 50 bar
- Soundproof test chamber
- Boost circuit up to 80 bar for high pressure test
- Stainless steel tubing
- Mixing unit for regulation of pressure and temperature for the UUT
- Vacuum test up to 50 mbar abs.
- External operation for all functions
- Highly dynamic and precise hydraulically operated flow and pressure regulators

TESTS

- Nozzle Flow Test
- Operating Pressure Test
- Internal and External Leakage Test
- Performance Test
- Pressure Drop Test
- Proof Pressure Test
- Regulating Function Test
- Functional Test
- Diaphragm Chamber Test
- Control Limit Test

TECHNICAL DATA

Performance Tests:

LP High Flow Section:	0-1.5 kgps
	0-14 bar
	20-350 °C
HP High Flow Section:	0-1.0 kgps
	0-50 bar
	20-600 °C

Static Tests:

Vacuum Circuit:	0.050-1 bar abs.
	200 lpm
HP Circuit 1, 2, 3:	1-50 bar
LP Circuit 1, 2:	0-10 bar

Flow measurements:

Measuring Circuit 1:	2-2330 Nlpm
	0-50 bar
Measuring Circuit 2:	12-20000 Nlpm
	0-50 bar
Measuring Circuit 3:	2 mNlpm-20 Nlpm
	0-50 bar
HP BOOST Circuit:	0-80 bar
Manual Outlet 1, 2:	0-10 bar
Hydraulic Control Circuit:	150 bar
	25 lpm

Electric supply:

Mains supply:	3/N/PE AC 50 Hz 400 V
Nominal power:	30 kVA
Preliminary fuse:	43 A

Air supply:

50 bar, 1.0 kgps, 20 °C and 50 bar, 1.0 kgps, 600 °C
Compressor supply wattage: 650 kW
Connection output heater: 800 kW (80 m^3ph natural gas)

14 bar, 1.5 kgps, 20 °C and 14 bar, 1.5 kgps, 350 °C
Compressor supply wattage: 800 kW
Connection output heater: 700 kW (70 m^3ph natural gas)

OPTIONS

Many options are possible for adaption,
e.g. adaption for other UUTs, etc.

Technical data are subject to change!

Test Bench for Alouette III Rescue Winch

>PWP1<

The test bench is developed for testing the ALOUETTE III Rescue Winch.

It tests cable load, cable speed, cable linear travel and current consumption.

It is possible to adapt this test bench for other rescue winches as used in other helicopter types.

> Tests:
  - Loading up to 2.4 kN
  - Speed up to 0.6 m/s

> Re-winding of rescue winches

MISCELLANEOUS

- The test bench has an ergonomic and compact design
- Tests are carried out using the PLC touch screen or by remote control
- The test bench can be transported by fork lift truck or by crane

TECHNICAL DATA

Compressor (pneumatic supply for the winch):

Pressure:	max. 8 bar	(116 psi)
Flow:	max. 2.5 m³/min	(88.3 scfm)
Noise level:	max. 71 dB(A)	
Nominal power:	max. 18.2 kW	

Electrical supply:

Mains supply:	3/N/PE AC 50 Hz 400 V
Nominal current:	45 A
Power:	31.2 KVA
Back-up fuse:	63 A

Measurement range:

Loading:	0 - 5 kN	± 10 N
Voltage:	0 - 32 VDC	± 0.5 %
Current:	0 - 5 ADC	± 0.5 %
Flow:	100 - 2000 ln/min (3.5 - 70.6 scfm)	± 2.5 %
Pressure:	0 - 10 bar (0 - 145 psi)	± 0.25 bar (± 3.6 psi)
Stroke:	0 - 30 m (0 - 98.4 ft)	± 0.15 m (± 0.5 ft)
Speed:	0 - 0.6 m/s (0 - 1.97 ft/s)	± 0.003 m/s (± 0.009 ft/s)

Dimensions and weight:

Test bench:

Length:	900 mm	(2.9 ft)
Width:	950 mm	(3.1 ft)
Height:	1900 mm	(6.2 ft)
Weight:	550 kg	(1213 lb)

Switch cabinet:

Length:	500 mm	(1.6 ft)
Width:	1000 mm	(3.3 ft)
Height:	2200 mm	(7.2 ft)
Weight:	260 kg	(573 lb)

Compressor:

Length:	1470 mm	(4.8 ft)
Width:	795 mm	(2.6 ft)
Height:	1070 mm	(3.5 ft)
Weight:	435 kg	(959 lb)

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for different rescue winches and helicopter types, etc.

Technical data are subject to change!

Test Stand for Air Turbine Starters

>TATS2EF<

The test stand is designed to test Air Turbine Starters for the aircraft types Eurofighter "EF2000" and "F18-Hornet". It is developed for tests in combination with the Air Turbine Starter Motor Control Valve.

It is possible to adapt this equipment for other aircraft types

- Tests can be carried out manually, semi-automatic or fully automatic
- An electric motor is used to simulate the starter moment of inertia, and returns generated current into the power system
- Gearbox:
  One shaft with a max. of 70 000 rpm
  One shaft with speeds of 3 000 / 10 000 rpm
  (hydraulically switched)
- Case drain testing is carried out
- All required parameters e.g. pressure, flow, temperature, torque, rpm, vibration, time and resistance are measured, indicated and stored electronically

MISCELLANEOUS

- Two lubricating oil units are provided. One for the UUT and one for the test stand
- The temperature can be regulated during lubrication of the UUT
- A separate air supply is provided
- A separate control console for use outside the test chamber is also supplied
- A modem is fitted to the test stand to allow the software to be maintained directly at the factory
- Calibration is carried out autonomously by the software

TECHNICAL DATA

> Pneumatic parameters:

Compressed air supply for the starter inlet (dynamic):

Pressure	0-7 bar (0-102 psi)
Temperature	ambient - 250°C (482°F)
Flow	max. 1 kg/s (max. 132 ppm)
Connector	4"

Outflow air for the starter outlet:

Pressure	ambient
Temperature	max. 250°C (482°F)
Flow	max. 1 kg/s (max. 132 ppm)
Connector	5"

Leakage test circuit for the housing (static):

Pressure	0-2 bar (0-29 psi)
Temperature	ambient

> Hydraulic parameters (Lubricating oil unit for the UUT):

Hydraulic power unit:
max. 5 bar / max. 4.0 lpm
(max. 73 psi / max. 1.1 USgpm)
Oil temperature: ambient 100°C (212°F)
Capacity reservoir: 30 l (7.9 USgal)

> Hydraulic parameters (Lubricating oil unit for the gearbox):

Hydraulic power unit:
max. 6 bar / max. 20.0 lpm
(max. 87 psi / max. 5.3 USgpm)
Oil temperature: max. 45°C (113°F)
Capacity reservoir: 80 l (21.1 USgal)

> Medium (for the lubricating oil units):

MIL-PRF 23699F Grade STD

> Electrical supply:

3/N/PE AC 50 Hz 400 V (test stand)

Nominal current:	220 A
Power:	140 kVA
Fuse:	250 A

1/N/PE AC 50 Hz 230 V (control panel)

Nominal current:	13 A
Fuse:	16 A

TECHNICAL DATA

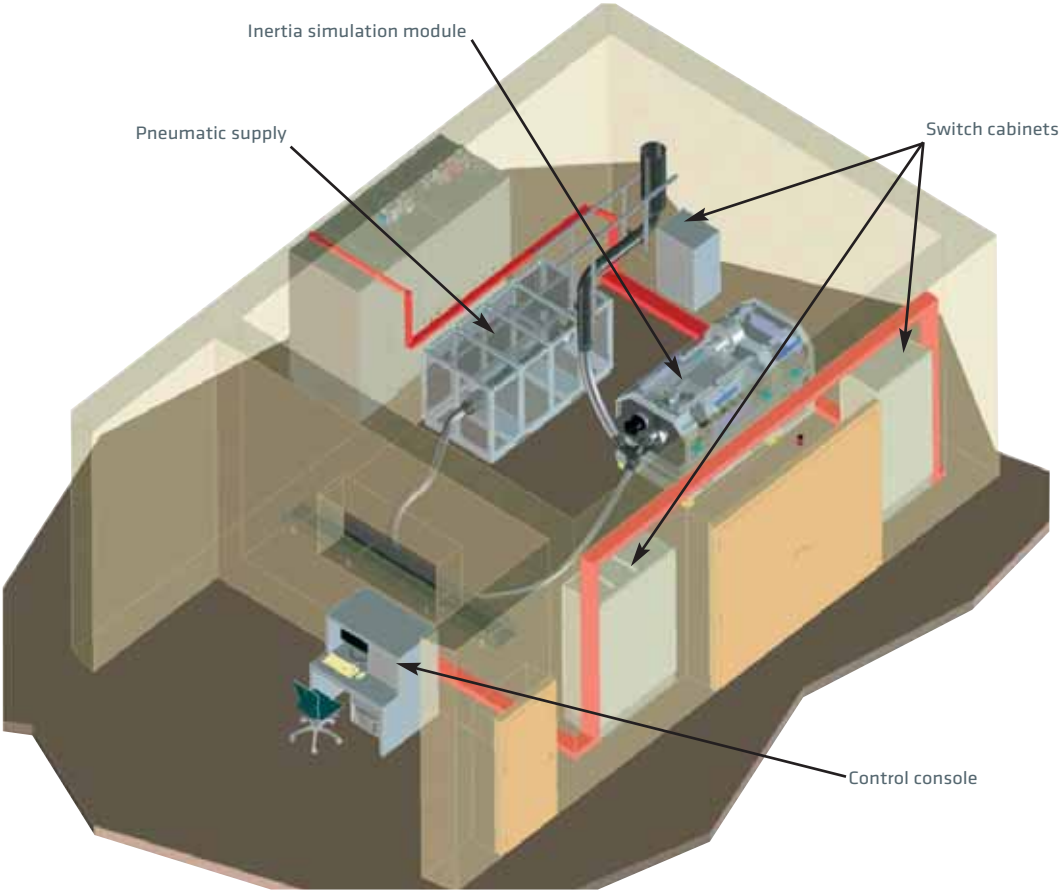
> Measurement range:

Pressure:	0-7 bar (0-102 psi)	Cl. 0.25
	0-2.5 bar (0-36 psi)	Cl. 1
	0-6 bar (0-87 psi)	Cl. 0.25
Differential pressure:	0-200 mbar	Cl. 0.25
Flow:	0-1 kg/s (0-132 ppm)	Cl. 2
Temperature:	0-300°C (572°F)	± 2°C (36°F)
Vibration:	0-5 g	± 7% o.m.r.
Speed:	0-12000 rpm	± 2 rpm
Torque:	0-500 Nm	Cl. 1
Resistance:	0-600 Ohm	± 1 Ohm

> Dimensions:

Inertia simulation module		
Length:	2450 mm	(8.0 ft)
Width:	1150 mm	(3.8 ft)
Height:	1800 mm	(5.9 ft)
Control console		
Length:	1300 mm	(4.3 ft)
Width:	950 mm	(3.1 ft)
Height:	1370 mm	(4.5 ft)
Pneumatic supply		
Length:	2200 mm	(7.2 ft)
Width:	1130 mm	(3.7 ft)
Height:	1250 mm	(4.1 ft)

TYPICAL INSTALLATION OF THE FACILITY



Pneumatic supply

Switch cabinet

Measuring cabinet

OPTIONS

Many options are possible for adaption,
e.g.adaption to other aircraft types, to different touch-screens etc.

Technical data are subject to change!

Motor Spindle Test Stand

>PMS2<

Developed for the testing of components, installed on different aircraft systems, for their identification data, such as force, stroke - end play, current, voltage, time, speed, etc.

> Testing of the following components can be carried out:

41-2-1100, Actuator-ERA and version thereof
94-1-1100, Actuator-ERA and version thereof
43-1-1100, Actuator-APU and version thereof
106-1-1100, Actuator-APU and version thereof
129-1-1100, Pitch Trim Actuator and version thereof
55-1-1100, Flap Actuator and version thereof
265-1-1100, Actuator and version thereof

GENERAL INFORMATION

- The test stand is equipped with measuring and regulation racks, a bridge serving as interface between UUT triggering and UUT, a variable DC supply unit, and a laser printer.
- UUT loading is effected by means of a hydraulically controlled load cylinder.
- Using various mechanical adapters and test cables, different UUTs can be mounted and tested. The test installation is prepared on a thrust bridge. The UUT is mounted between the middle plate clamping fixture and the load cylinder. The middle plate clamping fixture can be fixed in any desired position along the thrust bridge to adjust it to the different types of actuators. The stroke measuring device is mounted on the rear of the thrust bridge.
- The test run can be effected either by execution of an automatic program or by execution of a special test program. The automatic program carries out the test i.a.w. the respective test specification; it records the required measurement values, enters them in a test report and prints the protocol. The measurement values that are out of tolerance are identified (bargraph). On selection of the special test program, the operator can carry out adjustments (depending on the test requirements) on the UUT and repeat a test, as necessary.
- To protect the operating personnel, the test stand is equipped with a protective cover with door contact switch.

TECHNICAL DATA

> Computer system:

INTEL Pentium, Industrial standard (frequency 200MHz)
Graphics, 1280 x 1024 pixels, 256 colors
32MB RAM, 1.5GB harddisk, tape (3.2GB)
Modular, intelligent measuring and control modules
Regulator adjustment: mouse, keyboard or potentiometer
YT, XY-diagram according to the user's layout
Standard graphic user environment
"What you see is what you get" protocol layout
Laser printer for test report sheet printing
Calibration program with error correction
Postprocessing and meas. data export

> Supplies:

Hydraulic supply:	250bar
Mains supply:	3/N/PE AC 50Hz 400V max. 25A

> Dimensions test stand:

LxWxH: 2860 x 1300 x 1980mm

> Measurement range:

DC voltage Motor 1:	0-40VDC	cl. 0.1
DC voltage Motor 2:	0-40VDC	cl. 0.1
DC current Motor 1:	0-80A	cl. 0.25
DC current Motor 2:	0-80A	cl. 0.25
Force:	0-5kN	cl. 0.1
Force:	0-20kN	cl. 0.1
Stroke:	0-1000mm	±0.05mm
Stroke (end play):	0-30mm	±0.01mm
Resistance:	3-2500Ohm	cl. 0.2
Voltage Pot.:	0-10VDC	cl. 0.2
Temperature test chamber:	0-100°C	± 0.5%
	+sensor i.a.w. DIN43760	

Technical data are subject to change!

Test Stand for Power Drive Units

>TPDU1E<

Developed for testing of Power Drive Units for erection stroke, erection force, traction force, velocity as well as current consumption in all phases, voltage and housing temperature.

- Possibility to carry out tests with wet brake drum
- UUT setup on adapter plates outside the test chamber
- Sound-insulation (75dB(A))
- Computer control via sliding rotatable control desk
- Dynamic measurement of voltage and current (scanning rate 10kHz), force, speed and temperature (scanning rate 100Hz)

TECHNICAL DATA

> Electrical supply:

Mains supply:
3/N/PE AC 50Hz 400V 31A

Cumputer supply:
1/N/PE AC 50Hz 230V 16A

> Compressed-air supply:

min. 5bar, max. 10bar
(min. 72.5psi, max. 145.0psi)

> Lifting table:

0 to 200mm (0 to 7.9in)

> Measurements - Power Drive Unit:

Erection stroke:	0 to 50mm (0 to 1.97in)
Erection force:	0 to 20kN (0 to 4,496.2lbf)
Traction force:	±20kN (±4,496.2lbf)
Velocity:	±30m/min (±98.4ft/min)
DC current:	0 to 5ADC
DC voltage:	0 to 40VDC
AC current:	±30AAC
AC voltage:	±250VAC
Housing temperature:	0 to 200°C (32 to 392°F)

> Dimensions and weight:

Width:	3,450mm	(135.8in)
Depth:	1,900mm	(74.8in)
Height:	2,420mm	(95.3in)
Weight:	approx. 2,650kg	(5,842.2lb)

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.

>TPDU1E<

Technical data are subject to change!

Test Stand for Power Drive Units

>TPDU4C<

The test stand is developed to test Cargo Power Drive Units (PDU) and their characteristics e.g. drive speed, power generation or current consumption under load.

It can be adapted for various types of drive units.

- The units under test (UUTs) are mounted on universal aluminium adapter plates outside of the test chamber which are clamped to the test carriage by means of a universal quick release device
- A torque limiter unit is fitted for the torque limiter test in the test chamber
- Active braking is generated by the friction drum until the equipment comes to a standstill
- When testing braking torques the friction drum is driven by a three-phase motor

GENERAL INFORMATION

- The test stand is controlled by a mobile control and measurement unit
- In order to monitor UUT testing a test chamber observation door with polycarbonate glazing is fitted
- The equipment is of an ergonomic and compact design
- Doors and access panels enable easy access for maintenance
- Easy and quick calibration is achieved by use of the TEST-FUCHS standard software

RANGE OF APPLICATION

Designation	Part number	Designation	Part number
3 Inch Self Lift Power Drive Unit	43100-15 43100-15-1 43100-15-2	3 Inch Self-Lift Power Drive Unit	43108-15 43108-15-1 43108-15-2
Power Drive Unit	2955T100-1C	Long Base & Short Base Power Drive Unit	43100-12 43100-13
Power Drive Unit	2955T100-5 2955T100-7 2955T100-9	Spring-Lift Power Drive Unit Assembly	43108-12
Power Drive Unit	2801T100-1	Power Drive Unit	(123100-1) 123100-3
Self Lift Roller Drive	181R42R181 181R42R181-1	Power Drive Unit	80000639-00
Cargo Powered Drive Unit	192AD1R218A 192AD1R218B	Power Drive Unit	80000640-00

TECHNICAL DATA

Electrical supply (requirements):

Main power supply
Mains connection: 3/N/PE AC 50Hz 400V
Nominal current: 20A
Power: 13.9kVA
Back-up fuse: 32A gl

400Hz supply
Mains connection: 3/N/PE AC 400Hz 200V
Nominal current: 10A
Power: 3.5kVA
Back-up fuse: 16A gl

Pneumatic supply (requirements):

Compressed air supply: 5 to 10bar (72.5 to 145psi)
max. 100Nl/min (3.53scfm/min)

Operating conditions:

Operating temperature: +5 to +35°C (+41 to +104°F)
Storage temperature: 0 to +60°C (+32 to +140°F)
Altitude: up to 1,000m (3,280ft) above SL
Noise emission: max. 70dB(A)

TECHNICAL DATA

> Measurement range:

AC current
(3-off) 0 to 10Arms
±1% measurement range

AC voltage
(3-off) 0 to 300Vrms
±1% measurement range

DC current
(1-off) 0 to 1A
±0.5% measurement range

DC voltage
(7-off) 0 to 40V
±0.5% measurement range

Torque
(1-off) -1 to 1Nm (-8.85 to 8.85lbf in)
±0.5% of full scale

Speed
(1-off) 0 to 25mpm (0 to 82ft/min)
±0.5% measurement range
(1-off) 0 to 100rpm
±0.5% measurement range

Force
(1-off) 0 to 20kN (4,500lbf)
±0.5% of full scale
(1-off) -5 to 5kN (-1,124 to 1,124lbf)
±0.5% of full scale

Position measurement
(1-off) 0 to 60mm (0 to 2.36in)
±0.1mm abs.

> Dimensions and weight:

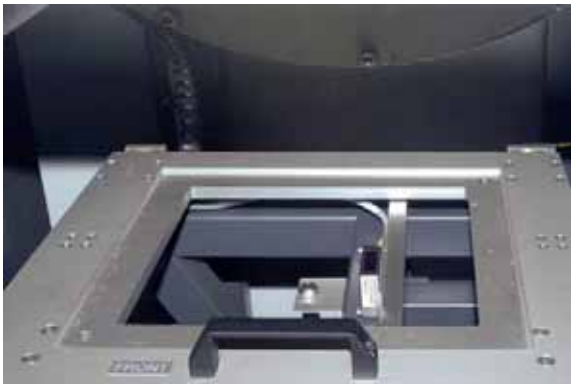
Test stand

Width:	1,300mm	(51.2in)
Depth:	2,000mm	(78.7in)
Height:	2,125mm	(83.7in)
Weight:	~ 1,300kg	(~2,870lb)

Measurement cabinet

Width:	600mm	(23.6in)
Depth:	720mm	(28.3in)
Height:	1,720mm	(67.7in)
Weight:	~ 250kg	(~ 550lb)

Test carriage under the friction drum



Interior of the test stand

OPTIONS

Various options are available to meet our customers' requirements
e.g.: Adaption to other PDU types, touch screen, non-contact temperature measurement, CAN-BUS,...

Technical data are subject to change!

Generator Test Stand

>LMP901B<

Drive unit and hydraulic power unit

Control console

Measurement cabinet

Switch cabinet

Inductive and resistance load decade

The test stand is developed to test all current manufactures' air and oil- cooled AC generators, VSCF, CSD and IDG up to 30,000rpm without the use of a gearbox.

It is possible to adapt and extend this test stand.

- The test stand acquires and records measurement data for voltage, current, frequency, power, rotational speed, vibration, pressure, temperature, flow, PMG, excitation, solenoid, sensor technology (UUT), servo valve, CT, magnetic trim, ...
- In order to fulfil UUT test requirements the following features are provided: Open and closed hydraulic circuits, lubrication ports, scavenge connections and return connections as well as cooling of the UUT
- Tests can be carried out manually or automatically. The test stand is operated by a control console which is located in a separate control room

RANGE OF APPLICATION

> Air- and oil-cooled AC generators, VSCF, CSD and IDG
Power: up to 120kVA
and nominal voltage: 200V to 400V,
nominal frequency: between 370Hz and 2kHz
rotational speed: up to 30,000rpm

Aircraft	Description	CMM	Part number	OEM
A320	IDG	24-11-79	766219 & 740119	Sundstrand
A320	AUX-GEN	24-23-51	5910047 & 5913667	BFGoodrich
A330	IDG	24-11-82	752168-series	Sundstrand
A330/A340	AUX-GEN	24-23-53	BA04105A-series	BFGoodrich
A340 Classic	IDG	24-11-81	752157B-series	Sundstrand
A340-600	IDG	24-11-88	767142B-series	Sundstrand
B757/B767	AUX-GEN	24-22-03	727810A-series	Sundstrand
B757 RR	IDG	24-11-67	727792-series	Sundstrand
CRJ 100/200	IDG	24-21-08	755469B-series	Sundstrand
CRJ100/200	Gen-Assy	24-22-01	720845-series	Sundstrand
CRJ700/ERJ170	IDG	24-21-12	766277-series	Sundstrand
CRJ700/ERJ170	APU-GEN	24-22-13	766288	Sundstrand
A320NG	IDG	24-11-88	772181-series	Sundstrand
A320NG	AC-GEN	24-20-72	BA16501-01	BFGoodrich

GENERAL INFORMATION

> The test stand consists of a drive unit with hydraulic power unit, a control console, switching and measuring cabinets as well as an ohmic and inductive load decade

> The generators' drive (dependent on rotational speed) is ensured by two independent high-performance engines, without using a gearbox

> Quick release latches are fitted to enable easy, quick and secure mounting of UUTs

> The provided heater enables heating of test medium up to a max. of 150°C

> Delta P - measuring and control circuit to simulate contamination of filters in the UUT

> A patch filter is fitted in the lubricating oil circuit of the UUT

> A wide range of accessories e.g. mechanical adapters, test hoses and cables complete this test equipment

>LMP90IB<

TECHNICAL DATA

> Hydraulic supply:

Main reservoir:	Contents appr. 120l (31.7USgal)
Medium:	MOBIL JET OIL II
Flow:	max. 85lpm (22.5USgpm)
Temperature range:	max. 150°C (302°F) (supply line) max. 170°C (338°F) (return)
Pressure:	max. 27bar (391.6psi)
Electrical heater:	28kW
Filter (supply line):	10 micron
Filter (return):	20 micron
Test filter (return):	Paper filter element to evaluate the UUT
Circuit:	open / closed

> Scavenge:

Flow:	appr. 100lpm (26.4USgpm)
Filter:	20 micron

> Sealing air (for drive motors):

Pressure:	0.9 to 1.1bar (13.1 to 16.0psi)

> Oil-mist lubrication (for drive motors):

Pressure:	0.8bar (11.6psi)

> Drive motor 1:

Power:	330kW
Rotational speed:	max. 16,000rpm

> Drive motor 2:

Power:	120kW
Rotational speed:	max. 30,000rpm

> PMG load:

AC load is adjustable in steps (<0.05A at 80V)
DC load is continuously variable up to 50ADC

> AC load:

Voltage:	3 x 200V / 3 x 400V
Frequency:	370Hz to 2kHz (to 30kVA) 370Hz to 1kHz (>30kVA)
Power:	192kW, 192kVAr 50% overload for 10min 100% overload for 10sec

> Cooling UUT - air:

Flow:	approx. 1,000m³/h (35,315ft³/h)

> Closed cooling circuit (for drive motors and frequency converters):

Flow:	approx. 70lpm (18.5USgpm)
Pressure:	3.5bar (50.8psi)
Power:	1.1kW
Antifreeze:	MAINTAIN FRICOFIN G12 PLUS

> Infrastructural requirements:

Electrical supply:

Mains connection:	3/N/PE AC 50Hz 400V
Nominal current:	350A
Power:	240kVA

Computer and maintenance supply are tapped by the mains

Cooling water supply:

Temperature:	min. 6°C (42.8°F), max. 20°C (68°F)
Flow:	100lpm (26.4USgpm)
Pressure:	min. 5bar (72.5psi) max. 10bar (145.0psi)
Cooling capacity:	max. 75kW

Compressed air supply:

Pressure:	min. 6bar (87.0psi) max. 10bar (145.0psi)

Cooling air supply for the load decade:

Flow:	appr. 18,000m³/h (635,664ft³/h)
Temperature:	min. 0°C (32°F), max. 40°C (104°F) non-condensing

>LMP90IB<

MEASUREMENT RANGE

> Temperature sensor (11-off):

Range:	0 to 100°C	(32 to 212°F)
Tolerance:	±1.0°C abs.	(±1.8°F)
	to	
Range:	0 to 200°C	(32 to 392°F)
Tolerance:	±2.0°C abs.	(±3.6°F)

> Pressure sensor (8-off):

Range:	0 to 100mbar	(0 to 1.5psi)
Tolerance:	±0.25% of full scale	
	to	
Range:	0 to 40bar	(0 to 580.2psi)
Tolerance:	±0.25% of full scale	
Range:	0 to 4bar abs.	(0 to 58.0psi abs.)
Tolerance:	±0.25% of full scale	

> Rotational speed (1-off each):

Range:	0 to 16,000rpm
Tolerance:	±10rpm abs.
Range:	0 to 35,000rpm
Tolerance:	±15rpm abs.

> Flowmeter and volume (1-off each):

Range:	0 to 100lpm	(0 to 26.4USgpm)
Tolerance:	±0.45% of full scale	
Range:	0 to 30Nlpm	(0 to 1.1scfm)
Tolerance:	±2% of full scale	
Range:	0 to 50l	(0 to 13.2USgal)
Tolerance:	±0.5% of full scale	

> Direct current voltage (12-off):

Range:	-20 to +20VDC
Tolerance:	±0.25% of full scale
	to
Range:	-600 to +600VDC
Tolerance:	±0.5% of full scale

> Alternating current voltage (26-off):

Range:	0 to 1VAC
Tolerance:	±0.5% of full scale
	to
Range:	0 to 500VAC
Tolerance:	±0.2% of full scale
Range:	0 to 10Vrms
Tolerance:	±0.5% of full scale
Range:	0 to 40Vpp
Tolerance:	±0.5% of full scale

> Direct current (11-off):

Range:	-200 to +200mADC
Tolerance:	±1mADC abs.
	to
Range:	0 to 30ADC
Tolerance:	±0.25% of full scale

> Alternating current (16-off):

Range:	0 to 10AAC
Tolerance:	±0.25% of full scale
	to
Range:	0 to 1,500AAC
Tolerance:	±0.5% of full scale

> Effective power (6-off):

Range:	0 to 50kW
Tolerance:	±0.5% of full scale
	to
Range:	0 to 175kW
Tolerance:	±0.5% of full scale

> Apparent power (6-off):

Range:	0 to 50kVA / phase
Tolerance:	±0.5% of full scale
	to
Range:	0 to 175kVA / phase
Tolerance:	±0.5% of full scale

> Resistance (12-off):

Range:	0 to 200Ohm
Tolerance:	±0.25% of full scale
	to
Range:	0 to 200kOhm
Tolerance:	±0.25% of full scale

> Frequency (4-off):

Range:	200 to 2,000Hz
Tolerance:	±0.1Hz abs.
	to
Range:	200 to 20,000Hz
Tolerance:	±1Hz abs.

> Vibration (3-off each):

Range:	0 to 5ips rms
Tolerance:	±0.0104ips rms +3% of full scale
Range:	0 to 5mils pk-pk
Tolerance:	±0.028mils pk-pk +3% of full scale
Range:	0 to 10g rms
Tolerance:	±0.027g rms +3% of full scale

OPTIONS

A wide range of options is available to fulfil our customer's requirements.
e.g.: Adaption for a variety of UUTs, test program requirements, dimensioning,...

>LMP90IB<

Technical data are subject to change!

Test Stand for Generators, IDGs and CSDs

>LMP300<

Measuring cabinet

Switch cabinet

Inductive and ohmic load decade

System cabinet and motor control

Control console

The test stand is developed to test air- and oil-cooled AC and DC generators, VSCFs, CSDs, IDGs and DC starter as well as DC starter generators of all current manufacturers.

It is possible to adapt and extend this test stand with the help of additional adaptions.

- Acquisition of measured data for voltage, current, frequency, power, speed vibration, pressure, temperature, flow, PMG, excitation, solenoid, sensor technology (UUT), servo valve, CT, magnetic trim etc.
- In order to meet specific UUT requirements the following features are provided: open and closed hydraulic circuits, lubrication ports, scavenge connections and return connections as well as cooling of the UUT
- Tests can be carried out manually or automatically. The test stand is operated by a control console which is located in a separate control room.

RANGE OF APPLICATION

- Air- and oil-cooled AC and DC generators, VSCFs, CSDs and IDGs
  Power: up to 425kVA
  Nominal voltage: 200V or between 360V and 407V
  Nominal frequency: between 370Hz and 2kHz
  Rotational speed: up to 30,000rpm

- Air- and oil-cooled DC starter and DC starter generators

GENERAL INFORMATION

- The test stand consists of a drive unit, one hydraulic power unit, one control console, switch cabinet, system and measuring cabinets (e.g.: for drive unit or motor control), one starter current supply as well as one ohmic and inductive load decade

- A pneumatic shock absorber is fitted to compensate vibrations of drive motor and spur gear

- Quick release adapters are supplied by compressed air and - at the push of a button - enable secure, fast and easy mounting of UUTs on both UUT drives

- Test medium is heated up to a max. of 150°C

- A separate cooling system is fitted to cool test medium, gear box oil, drive motor and UUTs

- The fitted flushing circuit removes entrapped air out of the hydraulic system

- A wide range of accessories completes the test stand e.g. mechanic adaptions, test hoses and cables

TECHNICAL DATA

> UUT drive:

Three-phase motor ventilated (HQLa 280P)

Voltage:	3 AC 380V star 60Hz	
Power:	600kW	
Rotational speed:	0 to 3,150rpm	(max. 4,500rpm)
Torque:	3,180Nm	

sin/cos rotary encoder ERN480
Temperature monitoring
Type of protection IP54R

> Spur gear:

Rotational speed: (approx.)	Input:	0 to 3,150rpm
	Output 1:	0 to 18,000rpm
	Output 2:	0 to 30,000rpm
Transformation: (approx.)	Output 1:	1 : 6
	Output 2:	1 : 10
Gear box oil:	Shell Turbo CC46	
Capacity:	approx. 200l	(approx. 53USgal)
Gear box oil supply:	approx. 145l/min / max. 12bar (approx. 38USgpm / max. 174psi)	
Lubrication:	by means of an electric lubrication oil pump (start procedure) and mechanic lubricating oil pump	

> Load decade:

AC load:

(including automatic load control)

Voltage:	3 x 200V / 3 x 400V switchable
Frequency:	370Hz to 2kHz (up to 50kVA) 370Hz to 1kHz (up to 425kVA)
Power:	0 to 425kVA, performance factor 0.6 ind. to 1 50% overload for 10min 100% overload for 10sec different charge levels/phase up to 12kVA

DC load:

30VDC max. 1,000A

PMG load:

DC load is continuously variable
AC load is adjustable in steps (<0.05A), three-phase

> Measuring data acquisition system:

Quick, decentralized, synchronous measurement and control
Integrated, flexible signal conditioning
Real time measuring system manufactured by Sigmatek
Analog resolution: 18bit
Accuracy of analog measurements: 0.02% of full scale
Data acquisition rate: up to 40kHz / channel
Digital regulators: 5kHz

> Cooling air:

UUT:	Capacity: approx. 1,000m³/h
UUT drive:	Capacity: approx. 4,500m³/h

> Universal voltage regulator (UVR):

Universal regulator instead of the original - GCU for all UUTs
PWN or linear control (switchable)
Servo valve control
Excitation max. 100V / 10A
Integrated safety monitoring of generatros
Integrated current transducer instead of original CT out of the aircraft
Supply via DC current supply or PMG

> Hydraulic supply:

Test medium:	Mobil Jet Oil II	
Capacity:	approx. 140l	(approx. 37USgal)
Flow:	max. 85lpm	(max. 22USgpm)
Temperature (return):	max. 160°C	(max. 320°F)
Electrical heater:	12kW	
Filter (supply line):	10mic	
Filter (return):	20mic	
Test filter (return):	(paper) filter element (to evaluate the UUT)	

> Scavenge connection:

Flow:	approx. 100lpm	(approx. 26gpm)
Filter:	20mic	

> Actuating pressure circuit:

Flow:	approx. 8lpm	(approx. 2gpm)
Pressure:	max. 30bar	(max. 435psi)

> Starter current supply:

Voltage:	0 to 30VDC
Current:	0 to 2,000A

> DC current supply (seperate excitation):

0 to 100VDC, 0 to 15A adjustable

> Infrastructural requirements:

Electrical supply:

Mains connection:	3/N/PE AC 50Hz 400V
Nominal current:	max. 1,200A
Power:	830kVA
Back-up fuse:	1,250A gl

Computer and maintenance supply are tapped by the mains

Pneumatic supply:

Pressure:	6 to 10bar	(87 to 145psi)

Cooling water supply (gear box and hydraulic system):

Temperature:	15°C or 27°C	(59°F or 80.6°F)
Flow:	max. 270l/min	(max. 71.3USgpm)
Pressure:	min. 3bar	(min. 43.5psi)

Cooling air:

Load decade:	Capacity: approx. 35,000m³/h

MEASUREMENT RANGE

> Temperature sensor (20-off):

Range:	0 to +100°C	(+32 to 212°F)
Tolerance:	±1.0°C abs.	(±1.8°F)
	to	
Range:	0 to +200°C	(+32 to 392°F)
Tolerance:	±2.0°C abs.	(±3.6°F)

> Torque (1-off):

Range:	-30 to +30Nm
Tolerance:	±0.25% of full scale

> Flowmeter and volume (1-off each):

Range:	0 to 100lpm	(0 to 26.4USgpm)
Tolerance:	±0.45% of full scale	
Range:	0 to 30Nl/min	(0 to 1.1scfm)
Tolerance:	±2% of full scale	
Range:	0 to 50l	(0 to 13.2USgal)
Tolerance:	±0.5% of full scale	

> Rotational speed (6-off):

Range:	0 to 18,000rpm
Tolerance:	±15rpm abs.
	to
Range:	0 to 30,000rpm
Tolerance:	±15rpm abs.

> Vibration (3-off):

Range:	0 to 10g
Tolerance:	±0.2% of full scale

> Direct current (7-off):

Range:	0 to 100mADC
Tolerance:	±0.25% of full scale
	to
Range:	0 to 2,000ADC
Tolerance:	±0.25% of full scale

> Alternating current (16-off):

Range:	0 to 10AAC
Tolerance:	±0.5% of full scale
	to
Range:	0 to 2,500AAC
Tolerance:	±0.5% of full scale

> Resistance (9-off):

Range:	0 to 200Ohm
Tolerance:	±0.25% of full scale
	to
Range:	0 to 150kOhm
Tolerance:	±0.25% of full scale

> Pressure sensor (6-off):

Range:	0 to 4bar abs.	(0 to 58.0psi abs.)
Tolerance:	±0.25% of full scale	
	to	
Range:	0 to 40bar	(0 to 580.2psi)
Tolerance:	±0.25% of full scale	

> Frequency (4-off):

Range:	200 to 2,000Hz
Tolerance:	±0.01% of full scale
	to
Range:	0 to 3,000Hz
Tolerance:	±0.1Hz abs.

> Direct current voltage (7-off):

Range:	0 to 40VDC
Tolerance:	±0.25% of full scale
	to
Range:	0 to 250VDC
Tolerance:	±0.25% of full scale

> Alternating current voltage (17-off):

Range:	0 to 130VAC
Tolerance:	±0.5% of full scale
	to
Range:	0 to 500VAC
Tolerance:	±0.2% of full scale
Range:	0 to 10Vrms
Tolerance:	±0.2% of full scale
Range:	0 to 30Vpp
Tolerance:	±0.5% of full scale

> Phase shifting (1-off):

Range:	-270 to +90°
Tolerance:	±0.3° abs.

> Real power (9-off):

Range:	0 to 50kW
Tolerance:	±0.5% of full scale
	to
Range:	0 to 375kW
Tolerance:	±0.5% of full scale

> Apparent power (9-off):

Range:	0 to 50kVA
Tolerance:	±0.5% of full scale
	to
Range:	0 to 375kVA
Tolerance:	±0.5% of full scale

OPTIONS

Many options are possible for adaption,
e.g. adaption to other aircraft types

Technical data are subject to change!

Generator Test Stand
>LMP60-407<

The test stand is developed to test oil-cooled AC-generators and IDGs up to 30,000rpm without the use of a gearbox.

It is possible to adapt and extend this test stand.

- The test stand acquires and records measurement data for voltage, current, frequency, power, drive, vibration, pressure, temperature, flow, PMG, excitation, solenoid, sensor technology (UUT), servo valve, CT, magnetic trim, etc.
- In order to fulfil UUT test requirements, the following features are provided: open and closed hydraulic circuits, lubrication ports, scavenge and return connections as well as cooling of the UUT
- Tests can be carried out manually or automatically. The test stand is operated via a control console which is located in a separate control room.

RANGE OF APPLICATION

Aircraft	Description	Test specification	Part number
TORNADO	IDG	FAER 8A6-8LUC1-3	AE8906 902
TORNADO	AC-GEN	FAER 8A6-8LUC1-3	AE2130 802

GENERAL INFORMATION

- The test stand consists of a drive unit with hydraulic power unit, a control console, switch and measurement cabinet as well as an ohmic and inductive load decade
- The generator drive (adjustable rpm) is ensured by a high-performance engine, without using a gearbox
- Heating of test medium up to a max. of 150°C (302°F)
- Delta P - measuring and control circuit to simulate contamination of filters in the UUT
- A wide range of accessories e.g. mechanical adapters, test hoses and cables complete this test equipment

FIGURES

Switch cabinet

Measurement cabinet

Inductive and
ohmic load decade

>LMP60-407<

TECHNICAL DATA

> Hydraulic supply:

Main reservoir:	Content max. 140l (37.0USgal)
Medium:	TURBONYCOIL 699
Flow:	max. 85l/min (22.5USgpm)
Temperature range:	max. 150°C (302°F) (supply line) max. 170°C (338°F) (return)
Pressure:	max. 25bar (362.6psi)
Electrical heater:	28kW
Filter (supply line):	6 micron
Filter (return):	20 micron
Circuit:	open / closed

> Closed cooling water circuit (for drive motors and frequency converters):

Flow:	approx. 70l/min (18.5USgpm)
Pressure:	3.5bar (50.8psi)
Power:	1.1kW
Antifreeze:	MAINTAIN FRICOFIN G12 PLUS (30%)

> Scavenge:

Flow:	approx. 80l/min (21.1USgpm)
Filter:	20 micron

> Infrastructural requirements:

Electrical supply:

Mains connection:	3/N/PE AC 50Hz 400V
Nominal current:	210A
Power:	145kVA

Computer and maintenance supply are tapped by the mains

Cooling water supply:

Temperature:	min. 6°C (42.8°F), max. 20°C (68.0°F)
Flow:	100l/min (26.4USgpm)
Pressure:	min. 2bar (29.0psi) max. 8bar (116.0psi)
Cooling capacity:	max. 35kW

Compressed air supply:

Pressure:	min. 6bar (87.0psi) max. 10bar (145.0psi)

> Drive motor:

Power:	120kW
Rotational speed:	max. 30,000rpm

> Sealing air (for drive motor):

Pressure:	0.9 to 1.1bar (13.1 to 16.0psi)

> Oil-mist lubrication (for drive motors):

Pressure:	0.8bar (11.6psi)

> AC-load:

Voltage:	3 x 200V / 3 x 400V
Frequency:	370Hz to 2kHz (to 30kVA) 370Hz to 1kHz (>30kVA)
Power:	90kW, 66kVAr 50% overload for 10min 100% overload for 10sec

> Dimensions and weight:

Power train:

Width:	approx. 1,550mm	(61.0in)
Length:	approx. 4,600mm	(181.1in) (without crane)
Length:	approx. 5,720mm	(225.2in) (incl. crane)
Height:	approx. 2,320mm	(91.3in) (without crane)
Height:	approx. 3,400mm	(133.9in) (incl. crane)
Weight:	approx. 3,400kg	(7,496lb)

Control console:

Width:	approx. 1,650mm	(65.0in)
Depth:	approx. 900mm	(35.4in)
Height:	approx. 1,350mm	(53.1in)
Weight:	approx. 350kg	(772lb)

Load decade:

Width:	approx. 1,700mm	(66.9in)
Length:	approx. 2,500mm	(98.4in)
Height:	approx. 2,300mm	(90.6in)
Weight:	approx. 1,900kg	(4,189lb)

Switch cabinet:

Width:	approx. 2,500mm	(98.4in)
Depth:	approx. 700mm	(27.6in)
Height:	approx. 2,200mm	(86.6in)
Weight:	approx. 1,100kg	(2,425lb)

>LMP60-407<

MEASUREMENTS

> Pressure (7-off):

Range: 0 to 25bar (0 to 362.6psi)
Tolerance: ±0.25% of full scale
to
Range: 0 to 40bar (0 to 580.2psi)
Tolerance: ±0.25% of full scale

Range: 0 to 4bar abs. (0 to 58.0psi abs.)
Tolerance: ±0.25% of full scale

> Temperature (9-off):

Range: 0 to 100°C (32 to 212°F)
Tolerance: ±1.0°C (±1.8°F)
to
Range: 0 to 200°C (32 to 392°F)
Tolerance: ±2.0°C . (±3.6°F)

> Flow and volume (4-off):

Range: 0 to 100l/min (0 to 26.4USgpm)
Tolerance: ±0.45% of full scale

Range: 0 to 50l (0 to 13.2USgal)
Tolerance: ±0.5% of full scale

> Direct current voltage (9-off):

Range: -20 to +20VDC
Tolerance: ±0.25% of full scale
to
Range: -600 to +600VDC
Tolerance: ±0.5% of full scale

> Alternating current voltage (20-off):

Range: 0 to 1VAC
Tolerance: ±0.5% of full scale
to
Range: 0 to 500VAC
Tolerance: ±0.2% of full scale

Range: 0 to 10Vrms
Tolerance: ±0.5% of full scale

Range: 0 to 40Vpp
Tolerance: ±0.5% of full scale

> Vibration (1-off):

Range: 0 to 30mm/s (1.2in/s)
Tolerance: ±1mm/s (0.039in/s)

> Direct current (9-off):

Range: -200 to +200mADC
Tolerance: ±1mADC abs.
to
Range: 0 to 30ADC
Tolerance: ±0.25% of full scale

> Alternating current (9-off):

Range: 0 to 200AAC
Tolerance: ±0.25% of full scale
to
Range: 0 to 1.500AAC
Tolerance: ±0.5% of full scale

> Effective power (6-off):

Range: 0 to 50kW
Tolerance: ±0.5% of full scale
to
Range: 0 to 175kW
Tolerance: ±0.5% of full scale

> Apparent power (6-off):

Range: 0 to 50kVA / phase
Tolerance: ±0.5% of full scale
to
Range: 0 to 175kVA / phase
Tolerance: ±0.5% of full scale

> Resistance (12-off):

Range: 0 to 200Ohm
Toleranz: ±0.25% of full scale
to
Range: 0 to 200kOhm
Toleranz: ±0.25% of full scale

> Frequency (4-off):

Range: 200 to 2,000Hz
Tolerance: ±0.1Hz
to
Range: 200 to 20,000Hz
Tolerance: ±1Hz

> Rotational speed (1-off):

Range: 0 to 35,000rpm
Tolerance: ±15rpm abs.

OPTIONS

Various options available to meet our customers' requirements
e.g.: adaption for various UUTs, requirement to the test program, dimensioning,..

>LMP60-407<

Technical data are subject to change!

DC-Generators And Starter Generators Test Stand

>SPSG15-16C<

The test stand is developed to test DC generators and starter generators (drive and brakes; power: 15kW) alone or in combination with their voltage regulators.

It is possible to adapt this test stand for other types of starter generators.

- The equipment tests the performance parameters e.g. current, voltage, rotational speed, torque, etc.
- A complete adapter set is available for testing the generators listed on page 2.
- The provision of a crane enables easy mounting of the generators.
- The UUT's and generators unter test can be monitored by the above the test area built in camera.
- The test stand control console is located in a separate room to minimize the operator's noise exposure.

APPLICATION RANGE

The following generators can be tested:

> P/N 23032-048	(Bell 206B II / III)	> P/N 23048-016	(Hawker Beechcraft King Air)
> P/N 23081-018	(Bell 206B II / III)	> P/N 23079-000-1	(Hawker Beechcraft King Air)
		> P/N 23085-001	(Hawker Beechcraft King Air)
> P/N 23046-019	(Bell 212 / 412EP / 412SP)		
		> P/N 23080-005	(Hawker Siddeley HS-125)
> P/N C5116-11	(Boeing 747)	> P/N 23091-002	(Hawker Siddeley HS-125)
> P/N 30086-011	(Embraer-135 / 145 Series)	> P/N 23078-019	(North American T6)

GENERAL INFORMATION

- The equipment is user friendly and ensures ease of transportation and service due to its compact and modular design.
- The Unit Under Test is attached by means of a special designed adapter.
- Vibration testing is integrated in the test stand.
- Adapters are ordered separately for every UUT.
- "No load" mounting fixtures are fitted to the test bed enabling UUT's and generators to be tested according to CMM.
- Storage space is provided under the test bed for all tools and hoses.
- A modem is fitted to enable updating and trouble shooting of the test bench software and test procedures via network.

TECHNICAL DATA

> Electrical supply (requirements):

Test stand:

Mains connection:	3/N/PE AC 50Hz 400V
Nominal current:	max. 140A
Power:	approx. 97kVA
Back-up fuse:	max. 160A

PC:

Mains connection:	1/N/PE AC 50Hz 230V
Nominal current:	max. 13A
Power:	approx. 3kVA
Back-up fuse:	max. 16A

> Operating conditions:

Ambient temperature:	5 to 40°C (41 to 104°F)
Storage temperature:	0 to 60°C (32 to 140°F)
Altitude:	max. 1,000m above MSL (max. 3,280ft)
Humidity:	0 to 95%

> Dimensions and weight:

Control console:

Height:	1,450mm	(4.8ft)
Depth:	1,100mm	(3.6ft)
Length:	1,650mm	(5.4ft)
Weight:	approx. 260kg	(573lb)

Test stand:

Height:	2,100mm	(6.9ft)	(excl. crane)
Depth:	1,750mm	(5.7ft)	
Length:	1,200mm	(3.9ft)	
Weight:	approx. 1,310kg	(2,890lb)	

Switch cabinet, drive unit, load decade:

Height:	3,250mm	(10.7ft)
Depth:	2,500mm	(8.2ft)
Length:	2,400mm	(7.9ft)
Weight:	approx. 580kg	(1,280lb)

MEASUREMENT RANGE

Temperature: (1-off)	0 to 100°C ±1°C abs.	(32 to 212°F) (±1.8°F abs.)
Temperature: (1-off)	0 to 200°C ±1°C abs.	(32 to 392°F) (±1.8°F abs.)
Pressure: (2-off)	0 to 50mbar ±4% meas. r.	(0 to 0.7psi)
Rotational speed: (3-off)	0 to 16.000rpm ±10rpm abs.	
Torque: (1-off)	-100 to 100Nm ±2.5% meas. r.	
Vibration: (1-off)	-0.1 to 0.1mm ±2.5% meas. r.	
Current: (2-off)	0 to 12A ±0.5% meas. r.	
Current: (1-off)	0 to 600A ±0.5% meas. r.	
Current: (2-off)	0 to 2,000A ±0.5% meas. r.	
Voltmeter: (1-off)	0 to 10Vrms ±0.5% meas. r.	
Voltmeter: (1-off)	-10 to +10V ±0.5% meas. r.	
Voltmeter: (6-off)	-40 to +40V ±0.5% meas. r.	
Voltmeter: (2-off)	0 to 30V ±0.5% meas. r.	
Voltmeter: (3-off)	0 to 40V ±0.5% meas. r.	

meas. r. ... measurement range
abs. ... absolute

Control Console

DC current supply and load decade

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for other types of starter generators, etc.

Technical data are subject to change!

Starter Test Stand
>DMW50T<

The test stand is developed for testing 18kW starters, e.g. for the combat tank LEOPARD 2.

The equipment includes data acquisition for voltage, current consumption, speed and torque.

It is possible to adapt this test stand for other starter types.

- Easy recording of measured values is achieved by a fast inbuilt data acquisition recorder.
- The test stand can be operated ergonomically via an integrated central control panel.
- The starter is loaded by an air pressure brake element.
- Vibration isolation is achieved by vibration and noise damping elements attaching the UUT to the test stand.

GENERAL INFORMATION

- A compact modular design ensures easy transportation, installation, operation and servicing.
- The UUT is mounted to the test stand using a special type of mechanical adapter.
- The battery section is ventilated to remove any explosive gas as well as heat and brake dust generated by the brake.
- An inbuilt chain hoist enables the operator to easily load and remove the UUT.

TECHNICAL DATA

Electrical parameters (max.):

Supply:	3/N/PE AC 50Hz 400V
Nominal power:	17.3kVA
Nominal current:	25A

Compressed air supply:

Min. pressure: 6bar (87.02psi)

Rotational speed:

Max. speed of brake: 1,150rpm

Braking torque:

Max. braking torque: 3,500Nm

Operating conditions:

Operational temperature:	5 to 35°C (41 to 95°F)
Storage temperature:	0 to 60°C (32 to 140°F)

Measurement range:

Torque: (at a transformation rate of 1:10)
0 to 300Nm, ±2% o.f.s.

Voltmeter for starter:
0 to 40V, ±0.25% o.f.s.

Voltmeter for solenoid switch:
0 to 40V, ±0.25% o.f.s.

Amperemeter for starter:
0 to 4,000A, ±0.5% o.f.s.

Amperemeter for solenoid switch:
0 to 50A, ±0.5% o.f.s.

Tachometer:
0 to 10,000rpm, ±0.3% o.f.s.

Dimensions and weight:

Length:	1,900mm	(6.2ft)
Depth:	1,200mm	(3.9ft)
Height:	1,850mm	(6.1ft)
Weight:	approx. 2,050kg	(4,520lb)

OPTIONS

A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for other starter types, etc.

Technical data are subject to change!

Equipment for Static Test of GCUs and their Modules

>PA-RST1<

Designed for the weapon system TORNADO to test the GCU (generator control unit) and its subassemblies (PCBs).

- Measuring values: Generator voltage, PMG-voltage, Exciting current, Frequency, Logic level enquiry etc.
- Voltage simulation via two independent 3-phase AC-sources
- Easy trouble shooting via a separate panel with bridget sockets for all unit contacts
- Integrated switch matrix for signal change-over
- Preparation of a test report with all relevant measuring parameters
- Uninterruptible power supply to protect the PC in case of power failure
- Remote maintenance via modem

TECHNICAL DATA

> Supply voltage - test stand:

Mains supply: 3/N/PE AC 50Hz 400V
Nominal power: 2800 VA
Nominal current: 4 A

> Noise level:

70 dB (A)

> Uninterruptible power supply:

Bridging time at full load: approx. 10 min

> Dimensions and weight:

Operation panel:
Width: approx. 2080 mm
Depth: approx. 1000 mm
Height: approx. 1350 mm

Switch cabinet I:
Width: approx. 620 mm
Depth: approx. 820 mm
Height: approx. 2160 mm

Switch cabinet II:
Width: approx. 820 mm
Depth: approx. 460 mm
Height: approx. 2160 mm

Total weight:
approx. 1050 kg

> Measurements:

Voltage	Accuracy:	0.5 % o.f.s.
	Range:	0 - 200 VAC
Voltage	Accuracy:	0.5 % o.f.s.
	Range:	0 - 30 VDC
Voltage	Accuracy:	1.0 % o.f.s.
	Range:	0 - 14 VAC
Voltage	Accuracy:	0.5 % o.f.s.
	Range:	-80 to +80 VDC
Current	Accuracy:	0.5 % o.f.s.
	Range:	0 - 1 ADC
Resistance	Accuracy:	0.5 % o.f.s.
	Range:	0 - 10 kOhm
Frequency	Accuracy:	0.2 % o.f.s.
	Range:	0 - 3 kHz

OPTIONS

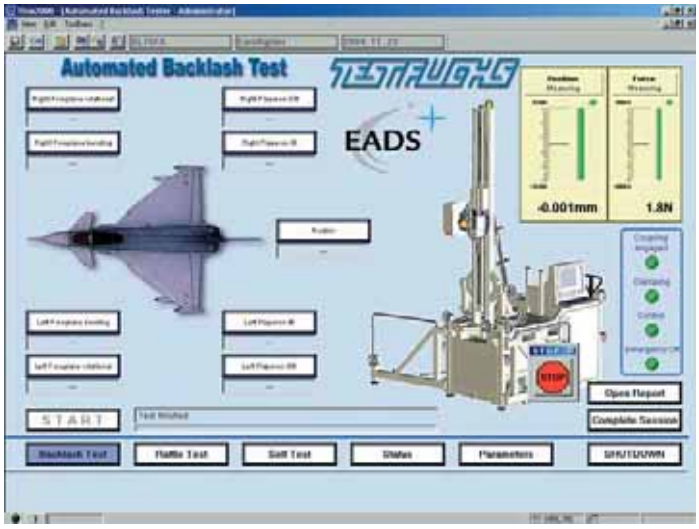
A wide range of options is available to fulfil our customers´ requirements.
e.g.: Adaption for different weapon systems, different measuring values, etc.

Technical data are subject to change!

Backlash-Tester

>BLT5FA<

- Safe and fast evaluation of the backlash and the stiffness of the actuator in the drive unit of control surfaces of the EUROFIGHTER EF2000
- Check of the primary control surfaces Foreplane, Flaperon and Rudder
- Performance of torsional tests and bending tests
- Approved for the use in ex-range (Zone 1) individual testing according to 94/9/EC,
  annex IX
  Ex II 2G T4
  TPS 04 ATEX 1 0001 X
- Mechanical shock (drop test, impact test) and vibration; accredited according to MIL-STD 810F
- EMC accredited according to EFA-specification SPE-J-000-E-1006, edition 2 and EMC-Directive 89/336 EEC
- Connection of the Electronic Control & Monitoring Unit (EC&MU)
- 3-stage safety concept to protect the aircraft
- Chick positioning at the aircraft with integrated lift and transport unit
- Pneumatically actuated membrane elements for clamping the control surfaces



- Operation via TFT-Display and keyboard resp. via remote control at visual control of the test run
- Network capability
- Automatic backlash calculation including report generator and storage of the test report
- Remote maintenance via modem
- Uninterrupptible power supply for PC in case of power failure
- Compensation of control surface weight and clamping weight
- Horizontal and vertical force insertion possible
- Contact-free laser optical stroke measuring system
- Ergonomic, noise reduced construction
- Clamps and accessories stored in aluminium boxes

> Option 400Hz voltage supply with AC/AC-Converter

> Transport Container

TECHNICAL DATA

> Supply voltage tester

Mains supply: 1/N/PE AC 50Hz 230V
Option with AC/AC-Converter: 3-phase, 400Hz, 115/200V
Nominal power: 2600VA
Nominal current: 11A

> Compressed air supply

Range: 7 to max. 1 bar, 7lps

> Noise level

70dBA

> Measurements

Force:	Accuracy 0.1% o.m.r. Range ±5000N
Force safety coupling:	Accuracy 3% o.m.r. Range 0 to 5000N
Force monitoring:	Accuracy 5% o.m.r. Range ±5000N
Torque:	Accuracy 0.1% o.m.r. Range ± 1500Nm
Stroke:	Accuracy 0.1% o.m.r. Range ± 10 mm
o.m.r.	of measuring range

> Dimensions

Operation:	Transport
Length: 2600mm	Length: 3050mm
Width: 3600mm	Width: 1300mm
Height: 3900mm	Height: 2000mm

Mass: 1800kg

> Operation temperature

-10°C to +45°C

> AC/AC Converter

Mains supply:	115/200V, 400Hz, 3-phase
Output voltage:	230VAC, 50Hz
Dimensions:	Length: 700mm Width: 480mm Height: 770mm
Mass:	95kg

> Transport Container

Dimensions:	Length: 4000mm Width: 2200mm Height: 2440mm
Mass:	2550kg

Technical data are subject to change!

Test Stand for Radial Actuators

>PRP5LH-ROT<

<PRP5LH-ROT> has been developed for testing the characteristics of electrically operated rotating actuators.

It can also be adapted for radial actuators with other parameters.

- The rotating actuators are loaded for the higher Nm-range via two torquemotors and for the lower Nm-range via two servomotors.
- The relevant parameters for torque, rotary speed and angle of rotation are calculated by means of torque sensor bars, rpm sensors and angle sensors.
- Safety doors with polycarbonate sheets (Makrolon®) protect the operator and enable optimal access to the test cell.

GENERAL

- Automated test procedures with evaluation of recordings
- Remote controls for UUTs or for the load motors
- Operaton via monitors on a telescope pivot arm
- Maintenance of the TF test stand software, test procedures and trouble shooting on the equipment are possible via network connection
- Integrated main computer

TECHNICAL DATA

Electrical power supply:

- Main supply:	3/N/PE AC 50Hz 400V
- Nominal current:	max. 170A
- Power:	approx. 117.78kVA
- Back-up Fuse:	200A GL
- Connection:	via clamps

Maintenance supply: (tapped from main supply)

- Main supply:	1/N/PE AC 50Hz 230V
- Nominal current:	max. 13A
- Power:	approx. 3kVA
- Back-up Fuse:	16A gl
- Connection:	gripped before main switch

Cooling water supply: (costumer)

- Temperature:	max. 12°C (53.6°F)
- Pressure:	max. 10bar (145psi)
- Flow:	max. 20l/min (5.28USgpm)
- Water quality:	Industrial cooling water

Electrical parameters:

- AC Supply:	3/N/PE AC 400Hz 200V
- DC Supply	
Constant 1:	0 to 40VDC, 0 to 16A
Constant 2:	0 to 40VDC, 0 to 32A

Mechanical parameters:

- High load section:	
Motor 1:	max. ±626Nm, ±400rpm
Motor 2:	max. ±1,280Nm, ±350rpm
- Low load section:	
Motor 3:	max. ±21.3Nm, ±2,000rpm
Motor 4:	max. ±92Nm, ±1,000rpm

Operating conditions:

- Altitude:	max. 1,000m (3,280ft) MSL (main sea level)
- Operating temperature:	+5°C to +35°C (41 bis 95°F)
- Storage temperature:	0°C to +60°C (32 bis 140°F)
- Humidity:	5 to 95% (not condensing)

Dimensions and weight:

- Test stand	
Length:	approx. 3,800mm (149in)
Width:	approx. 1,840mm (72in)
Height:	approx. 2,620mm (104in)
Weight:	approx. 3,500kg (7,720lb)
- AC supply	
Length:	approx. 920mm (36.2in)
Width:	approx. 760mm (30in)
Height:	approx. 1,830mm (72in)
Weight:	approx. 700kg (1,540lb)

>PRP5LH-ROT<

TECHNICAL DATA

> Mechanical measurements

Measurement description	Range	Tolerance	Channel no.
High load section			
Motor 1			
- Torque	-1,200 to +1,200Nm	±0.5% of full scale	000
- Speed	0 to 350rpm	±1rpm absolute	001
- Angle	-720 to 720°	±0.2° absolute	002
Motor 2			
- Torque	-600 to +600Nm	±0.5% of full scale	004
- Speed	0 to 400rpm	±1rpm absolute	003
- Angle	-720 to 720°	±0.2° absolute	005
Low load section			
Motor 3			
- Torque	-92 to +92Nm	±0.5% of full scale	007
- Speed	0 to 1,000rpm	±1rpm absolute	006
- Angle	-720 to 720°	±0.2° absolute	008
Motor 4			
- Torque	-21.3 to +21.3Nm	±0.5% of full scale	010
- Speed	0 to 2,200rpm	±1rpm absolute	009
- Angle	-720 to 720°	±0.2° absolute	011
Temperature			
Temperature	-20 to +100°C (-4 to 212°F)	±3K absolute	012

> Electrical measurements

Measurement description	Range	Tolerance	Channel no.
AC Supply			
Current Phase	0 to 10AAC	±0.25% of range	022 bis 024
Current Phase	0 to 100AAC	±0.25% of range	019 to 021
Current Phase - neutral wire	0 to 150VAC	±0.75% of range	013 to 015
Voltage Phase - Phase	0 to 250VAC	±0.75% of range	016 to 018
Frequency	45 to 400Hz	±0.1% of range	025
Active Power	0 to 6kW	±0.75% of range	051, 053, 055
Apparent Power	0 to 6kVA	±0.75% of range	050, 052, 054

>PRP5LH-ROT<

> Electrical measurements (continuation)

Measurement description	Range	Tolerance	Channel no.
DC Supply - constanter 1			
Current	0 to 16ADC	±0.25% of range	027
Voltage	0 to 40VDC	±0.5% of range	026
DC Supply - constanter 2			
Current	0 to 4.5ADC	±0.5% of range	030
Current	0 to 38ADC	±0.25% of range	029
Voltage	0 to 40VDC	±0.5% of range	028
Additional measurments on UUT			
Resistance			
- Voltage	0 to 5,2V	±0.02% of range	033
- Voltage	0 to 15V	±0.02% of range	032
Tacho			
- Voltage	0 to 40VDC	±0.1% of full scale	034
- Voltage	0 to 3Vrms	±0.3% of full scale	035
- Voltage	0 to 300Vrms	±0.5% of full scale	036
Angle via motor	0 to 360°	±0.2° absolute	044, 046, 047
Angle via motor	0 to 360°	±0.7° absolute	045

Test cell

AC Supply

Test Stand for Linear Actuators

>PRP5LH-LIN<

<PRP5LH-LIN> has been developed for testing the characteristics of electrically operated linear actuators.

It can also be adapted for linear actuators with other parameters.

- The linear actuators are loaded with max. 1.25kN or max. 12.5kN via two hydraulic cylinders.
- The relevant parameters for distance, speed and force are calculated by means of a position measuring system and a force and a load cell.
- Safety doors with polycarbonate sheets (Makrolon®) protect the operator and enable optimal access to the test cell.

GENERAL

- Automated test procedures with evaluation of recordings
- Remote control for UUTs or cylinders
- Operation via monitors on a telescope pivot arm
- Stroke measurement via Linear Variable Differential Transformer (LVDT)
- Maintenance of the TF test stand software, test procedures and trouble shooting on the equipment is possible via network connection
- Integrated main computer

TECHNICAL DATA

Hydraulic medium:

- AeroShell, MIL-H-5606A

Cooling water supply: (costumer)

- Temperature:	max. 12°C (53.6°F)
- Pressure:	max. 10bar (145psi)
- Flow:	max. 20l/min (5.28USgpm)
- Water quality:	Industrial cooling water

Hydraulic Parameters:

- Tank 60l (15.9gal)
- Adjustable axial piston pump 20l/min, 150bar (5.28USgpm, 2,180psi)
- Accumulator 1.4l (0.37gal)
- Plate heat exchanger
- High pressure filter 6µ and return flow filter 10µ, both with electrical and optical contamination indication
- Manometer 200bar (2,900psi), cl. 1.6
- Safety valve 160bar (2,320psi)
- Excess temperature cut-out 70°C (158°F)
- Minimum level switch
- Sight glass

Mechanic Parameters:

- Thrust bridge 1:

Force:	max. ±1.8 or ±15kN
Velocity:	max. ±100mm/s (0.33ft/s)
Stroke:	max. 750mm (29.5in)

Thrust bridge 2:

Force:	max. ±1.8kN
Velocity:	max. ±100mm/s (0.33ft/s)
Stroke:	max. 1,200mm (47.2in)

Main supply:

- Main supply:	3/N/PE AC 50Hz 400V
- Nominal current:	max. 37.5A
- Power:	approx. 26kVA
- Back-up Fuse:	63A gl
- Connection:	via clamps

Maintenance supply: (tapped from main supply)

- Main supply:	1/N/PE AC 50Hz 230V
- Nominal current:	max. 13A
- Power:	approx. 3kVA
- Back-up Fuse:	16A gl
- Connection:	gripped before main switch

Electric parameters:

- AC supply:	3/N/PE 400Hz AC 200V, max. 10A
- DC supply	
Constant 1:	0 to 40VDC, 0 to 16A
Constant 2:	0 to 40VDC, 0 to 32A

Operating conditions:

- Altitude:	max. 1,000m (3,280ft) MSL (main sea level)
- Operating temperature:	+5°C to +35°C (41 bis 95°F)
- Storage temperature:	0°C to +60°C (32 bis 140°F)
- Humidity:	5 to 95% (not condensing)

Dimensions and weight:

- Length:	approx. 5,000mm (197in)
- Width:	approx. 2,200mm (86.6in)
- Height:	approx. 2,700mm (106in)
- Weight:	approx. 2,200kg (4,850lb)

>PRP5LH-LIN<

TECHNICAL DATA

> Mechanical measurements

Measurement description	Range	Tolerance	Channel no.
Thrust bridge 1			
Force	-1.25 to +1.25kN	±0.5% of range	000
Force	-0.1 to 0.1kN	±0.5% of range	000
Force	-12.5 to +12.5kN	±0.5% of range	001
Stroke	0 to 750mm (0 to 29.5in)	±0.0025% of range	007
Thrust bridge 2			
Force	-1.25 to +1.25kN	±0.5% of range	002
Force	-0.1 to 0.1kN	±0.5% of range	002
Stroke	0 to 1200mm (0 to 47.2in)	±0.0025% of final value	008
Clearance			
Stroke	0 to 30mm (0 to 1.18in)	±0.01% of final value	009
Stroke	0 to 100mm (0 to 3.94in)	±0.05% of final value	009
Stroke	0 to 0.8mm (0 to 0.0315in)	±10µm (0.0004in) absolute	-
Temperature			
Temperature	-20 to +100°C (-4 to 212°F)	±3K absolute	012

> Electrical measurements

Measurement description	Range	Tolerance	Channel no.
AC Supply			
Current Phase	0 to 10AAC	±0.25% of range	019 to 021
Current Phase - neutral wire	0 to 150VAC	±0.75% of range	013 to 015
Voltage Phase - Phase	0 to 250VAC	±0.75% of range	016 to 018
Frequency	45 to 400Hz	±0.1% of range	022
DC Supply - constant 1			
Current	0 to 16ADC	±0.25% of range	024
Current	0 to 1.8ADC	±0.5% of range	025
Voltage	0 to 40VDC	±0.5% of range	023
DC Supply - constant 2			
Current	0 to 32ADC	±0.25% of range	027
Voltage	0 to 40VDC	±0.5% of range	026

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TECHNICAL DATA

> Electrical measurements (continuation)

Measurement description	Range	Tolerance	Channel no.
LVDT Measurement Voltage / Frequency			
Excitation			
- Voltage	0 to 29Vrms	±0.1% of final value	034
Measurement 1			
- Voltage	-28 to +28V	±0.1% of range	037
	0 to 28Vrms	±0.1% of final value	038
- Phase displacement	-360 to +360°	±0.5° absolute	035
Measurement 2			
- Voltage	-28 to +28V	±0.1% of range	039
	0 to 28Vrms	±0.1% of final value	040
- Phase displacement	-360 to +360°	±0.5° absolute	036
Additional measurments on UUT			
Voltage	0 to 150Vrms	±0.75% of range	044 and 045
Level recognition			
- Counter	0 to 1,000Hz	±0.1% of range	042 and 043
- Voltage	-20 to +20VDC	±0.5% of range	100 and 104
Resistance			
- Voltage	0 to 15VDC	±0.02% of range	046 and 047
- Resistance	0 to 8,000Ohm	±1% of range	050 and 051
	0 to 1,200Ohm	±1% of range	054
	0 to 13,000Ohm	±1% of range	055

Hydraulic power unit

Test cell

>PRP5LH-LIN<

Technical data are subject to change!

Equipment for Leakage Tests on Actuators

>PRP5LH-TLT<

Developed for testing actuators in a dip tank filled with water.

Can be adapted for actuators with different parameters.

- Lockable flip-top lid with sight glass to protect the operator and to enable monitoring of the UUT
- Operating and supply unit for compressed air, vacuum and nitrogen
- Castors and handles enable easy maneuvring
- Tank or UUT can be evacuated

GENERAL INFORMATION

- Two manometers with different measuring ranges for more precision in the compressed air supply circuit
- Maintenance-free vacuum pump to provide the required vacuum supply
- Filters in supply circuits for cleaning and drainage of the media
- Connection couplings with ball valves for filling and draining of the dip tank
- Easiliy accessible for maintenance

TECHNICAL DATA

Measurements (compressed air):

- Pressure:	range:	0 to 2.5bar abs.
	tolerance:	±0.05bar abs.
- Pressure:	range:	0 to 10bar abs.
	tolerance:	±0.1bar abs.

Measurements (vacuum):

- Pressure:	range:	-1 to 0bar abs.
	tolerance:	±0.01bar abs.

Measurements (nitrogen):

- Pressure:	range:	0 to 4bar abs.
	tolerance:	±0.05bar abs.

Hydraulic parameters:

- Dip tank:	33l
- Tank main dimension:	approx. Ø 390 x 260mm
- Compressed air supply:	0.1 to 7bar abs.
- Vacuum supply:	0.3 to 1bar abs.
- Nitrogen supply:	0.1 to 3bar abs.

Compressed air supply (requirements):

- Pressure:	min. 6bar; max. 10bar
- Flow:	1,000Nl/m

Nitrogen supply (requirements):

- Pressure:	max. 10bar

Measurements and weight:

- Length:	approx. 1,000mm
- Width:	approx. 630mm
- Height:	approx. 1,350mm
- Weight:	approx. 175kg

Operating conditions:

- Altitude of sight:	max. 1,000m sea level
- Operating temperature:	+5°C to +35°C
- Storage temperature:	0°C to +60°C
- Relative humidity: (non-condensing)	5 to 95%

Technical data are subject to change!

Combined Test System for Aircraft Mounted Accessory Drive (AMAD), Generator Converter Unit (GCU) and Transmission Units

>PAM18GT<

This combined test system provides for testing of Aircraft Mounted Accessory Drives, Generator Converter Units, Transmission Units, generators, and regulators. It serves to check identification data, such as pressure, flow, temperature, torque, force, speed, angle of rotation, vibration, voltage, current, frequency, and power.

- In addition to the test stations, the test system (short designation: GEPAL) also contains the hydraulic and lube oil supplies as well as a cooling water aggregate.
- Operation and monitoring of the test system is effected from two control desks, which can be used alternatingly. One control desk is installed in the control room, the other in the test room. Each control desk is equipped with monitor, keyboard and mouse. The control desk located in the test room moreover is equipped with incremental potentiometers (for adjustment tasks).

GENERAL INFORMATION

- The test system is to be operated using keyboard and mouse resp. following the instructions and menus displayed on the monitor. The measurement values are displayed on the monitor digitally and analogically (bargraphs) and are also saved. Error messages are read out in clear text. The test runs can be executed fully automatically, semi-automatically or manually.

- A laser printer provides for the printing of curves showing dynamic processes (X/Y and X/T diagrams). Highly dynamic processes are stored in a dynamic recorder channel and can also be printed.

- Each pressure transducer is equipped with shut off valve and parallel outlet enabling easy calibration as well as the use of the pressure transducer in another circuit (the pressure transducers are freely switchable).

- The test oil and lube oil circuit are separated from each other and integrated in separate cabinets.
  The cooling circuit is mounted in a cabinet beside the transmission unit. The electrical items are all installed inclosed switch cabinets; these cabinets also contain the mains connector.

- Driving and loading unit
  Both the deposit area for the UUT and the large-surface mounting platform are accessible by the swivel crane with precision hoist control.
  The mounting platform is equipped with two connection boxes containing all the electrical and hydraulic connectors., The hydraulic supply connectors are arranged around the mounting platform. Confusion about quick-disconnect couplings or multi-pin connectors is practically impossible as these elements are all clearly labeled i.a.w. a defined identification code.
  The mounting platform is designed to receive the UUT as well as the test stand driving and loading units. Each loading unit can be regulated from minimum to full load by means of a control valve. ATS and PTS drives further can be switched to the functions driving, braking or idle run.
  Due to the fact that the units are equipped with energy recuperation systems the driving power only needs to cover efficiency losses. All the units are equipped with torque measuring systems. Speed values are determined either using suitable transducers or via the AMAD transmission ratio.

- Transmission unit
  The swivel crane serves to transport UUTs and test equipment.
  The UUTs are adapted on an adaption revolver similar to that used on the aircraft. Mounting time is reduced to minimum.
  The variable electric drive unit provides for loading at the input. The input shaft is equipped with torque, speed and rotary angle measuring systems and can be stopped (brake function), if necessary.
  Output loading is provided by a servocylinder and measured by means of a load cell. In addition to the load cell and the torque measuring system, the output is equipped with measuring systems for rotary angle and running time.
  The system enabling the measuring of the operating angle and backlash testing is directly connected to the UUT.

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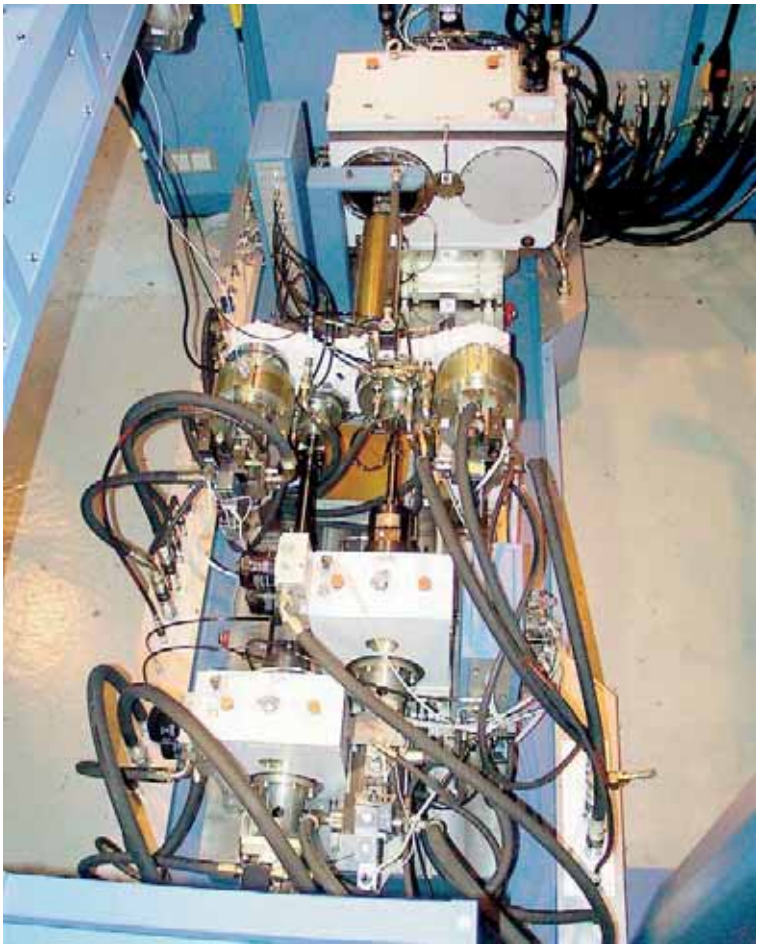

The picture shows the driving and loading unit with AMAD (P/N 42312-26) F/A-18 mounted on it.

The picture shows the transmission unit with LEADING EDGE FLAP RH (P/N 2022636-4-4) F/A-18 mounted on it.

>PAM18GT<

> Hydraulic and lube oil supply

The main tank (hydraulic oil) has a capacity of approx. 500 l; the lube oil tank has a capacity of approx. 100 l. The two tanks are made of stainless steel. The filling level is monitored by three float-type switches. A temperature sensor measures the oil temperature in the tank; an overtemperature switch protects the unit against inadmissibly high temperatures.

> Cooling water aggregate

The two fluids, i.e., cooling medium and fresh water, run in separate tubings. Indication and adjustment of the positions of the various valves and the output temperature are effected on and from resp. the control desk. In the event of malfunction, the respective error message is displayed on the monitor.

TECHNICAL DATA

> **General Information:**

- Cooling water aggregate
  - Temperature: 11 to 30°C (controllable)
- Hydraulic
  - Low pressure: max. 10bar, 220lpm
  - High pressure: max. 315bar, max. 190lpm
  - High pressure: max. 320bar, 16lpm
  - Main tank: approx. 500litres
  - Lube oil tank: approx. 100litres
- Motor (ATS)
  - Speed: max. 14 000rpm
  - Torque: max. 500Nm
- Generator
  - Speed: max. 28 000rpm
  - Torque: max. 200Nm
- Hyd. pump
  - Speed: max. 5 000rpm
  - Torque: max. 200Nm
- Fuel pump
  - Speed: max. 8 000rpm
  - Torque: max. 100Nm
- Pump / motor (PTS)
  - Speed: max. 20 000rpm
  - Torque: max. 500Nm
- Transmission unit
  - Force: max. 100N
  - Force: max. 200kN
  - Stroke: max. 260mm
  - Time: max. 999,9sec
  - Rotation angle: max. 45°
  - Rotation angle: max. 360°
  - Torque: max. 500Nm
  - Speed: max. 500rpm
- Computer system
  - INTEL Pentium, Industrial Standard
  - Windows NT Workstation 4.0

> **Power requirements:**

Electrical mains supply:
3/N/PE AC 50Hz 400V (main supply)
1/N/PE AC 50Hz 230V (emergency power supply)
1/N/PE AC 50Hz 230V (lighting)
Compressed air supply: 6 to 10bar
Fresh water supply: Inlet temperature/ outlet temperature T 50°C flow rate max. 70lpm

OPTIONS

Many options are possible for adaption, e.g. adaption to other aircraft types etc.

>PAM18GT<

Technical data are subject to change!

MRO
Test Equipment

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TEST-FUCHS

Test Stand for Fuel Components
>**FATS2**<

Test Stand for Fuel Pumps and Components
>**KKP5SM**<

Main Fuel Accessories Test Stand
>**MFAT1SR**<

Fuel Leakage Tank
>**FLT1**<

Lube Oil Test Stand
>**TSLU1**<

Test Stand for FMUs and Pumps/Governors
>**TFMU1BA**<

Generator Test Stand
>**LMP90IB**<

Disinfection and Conservation Tool
>**DCT2**<

Waliclean Waste Line CLeaning
>**WLC1**<

Universal Test Stand for
Pneumatic Components
>**PP200STA**<

Test Stand for Radial or Linear Actuators
>**PRP5LH-ROT or PRP5LH-LIN**<

Test Stand for Aircraft Brakes
>**PFB3S**<

Anti Icing and Heating Test Stand
>**AIHTS1**<

Cabin Pressurization Trolley
>**KDP14**<

Test Stand for Pneumatic Valves
>**PPV3**<

Test Stand for Air / Fuel Valves
>**TBAFV2**<

Hydraulic Test Stand for
Flight Control Units
>**HPM-S/M-FC**<

Hydraulic Test Stand for Motors and Pumps
>**HPM-S/M-MP**<

Hydraulic Test Stand
for Non-Rotating Components
>**HPM-S/M-NR**< and >**HPM-S/M-LU**<

Hydraulic Motor Test Stand
>**HMP40-50**<

Test Stand for DC-Gemnerators,
Starter Generators and Generator Control Units
>**SPSG15-16C-GCU**<

Flushing Stand
>**FLST1MZ**<

A320 - A330/340
Test Equipment

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TEST-FUCHS

Hydraulic Test Stand for Motors and Pumps
>**HPM-S/M-MP**<

Hydraulic Pipe Pressure Test Stand
>**SHTB2S**<

Hydraulic Test Trolley
>**HTW220-400**<

Test Stand for Aircraft Brakes
>**PFB3S**<

Test Rig for Rudder Servo Control
>**TR-RSC1**<

Electrical and Hydraulic
Test Equipment Tact 6-8
>**EHPSAT6-8**<

Servicing Trolley for Flaps
and Thrust Reversers
>**SFTR1**<

Mobile Hydraulic Test Stand
Long Range Wide Body for Production Line
>**MHLW1**<

Test Stand for the Hydraulic
and Electric Flap Drive Train
>**TEDC1**<

Reservoir Ventilation Trolley
>**TBW1EX**<

Leakage Tester for
Cargo Compartment
>**LTC1**<

Cabin Pressure Tester
>**KDP4AF**<

Earthing Tester
>**MVP10L-FS**<

Bonding and Loop
Resitance Tester
>**BLRT2**<

Test Equipment for
Anti-Skid System
>**PA-ASG2-4**<

Anti Static Paint Tester
>**IA2**<

Loop Resistance Tester
>**IM2-FS**<

Tools for Ground Tests

Test Stand for Vertical Tail Plane
for SA and TA Production Line
>**EK1-Takt10**<

Vacuum Toilet
Leakage Tester
>**VTLT1**<

Pneumatic Test Set
>**MPTS4**<

Fuel Pressure Test Set
>**FPTE1**<

Stationary Air Conditioner
Production Line
>**BKG4E**<

Aircraft Fuel Sump Drain Equipment
>**ASE300**<

Hydraulic Ground Power Unit
>**HGPU**<

Waliclean Waste Line CLeaning
>**WLC1**<

Nitrogen Filling Equipment
>**SFE300**<

Test Equipment for
RAM-Air Turbines
>**PGRAT1**<

Moveable Turbine Cleaning Equipment
>**MTCE1**<

Fill and Drain Device for
Remote Chiller System
>**RCFD340**<

AIRBUS A350
Test Equipment

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TEST-FUCHS

Vacuum Test Equipment
>STE350HAM-VAC<

Supplemental Cooling System Leakage Test Equipment
>STE350SNZ-SCSL<

Inerting System Test Equipment
>STE350BRO-IS<

Fuel Feed Test Equipment
>STE350BRO-FF<

Fuel Ventilation Test Equipment
>STE350BRO-FV<

Waste Water Test Equipment
>STE350SNZ-WW<

Potable Water Test Equipment
>STE350SNZ-PW<

Impedance Measuring Equipment
>IM2-FS<

Earthing Test Set
>PA-MVP10L-FS<

Bonding and Loop Resistance Tester Kit
>ESNBLRT2KIT<

Modular Door Test Equipment
>MDTE1<

Device-Fill/Drain and Handpump-Topup for Supplemental Cooling System A350
>SCST1-FD< >SCST1-TU<

Valve Actuator Test Equipment
>STE350BRO-VA<

Supplemental Cooling System Rinsing Test Equipment
>STE350HAM-SCSR<

Supplemental Cooling System Leakage Test Equipment
>STE350HAM-SCSL<

Pylon Test Equipment
>STE350SEL-PY<

Universal Pressure Test Equipment
>STE350HAM-UP<

Waliclean Waste Line CLeaning
>WLC1<

Supplemental Cooling System Rinsing Test Equipment
>STE350SNZ-SCSR<

Oxygen System Test Equipment
>STE350HAM-OS<

Wing Test Equipment
>STE350BRE-WI<

Test Stand for Generators, IDGs and CSDs
>LMP 300<

Hydraulic Test Equipment in Bremen
>HTE350BRE<

Hydraulic Test Equipment in Hamburg
>HTE350HAM<

Hydraulic Test Equipment in Saint Nazaire
>HTE350SNZ<

Hydraulic Test Equipment in Stade
>HTE350STD<

Hydraulic Test Equipment in Saint Eloi
>HTE350SEL<

Hydraulic Test Equipment in Broughton
>HTE350BRO<

Hydraulic Test Equipment in Getafe
>HTE350GTF<

AIRBUS A380
Test Equipment

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TEST-FUCHS

Media Supply Module
>**MSM6-380**<

Test Stand for Power Drive Units
>**TPDU1E**<

Generator Test Stand
>**LMP300**<

Test Stand for Outflow Valves
>**POVM4NM**<

Fuel Nozzle Test Stand
>**FNTS9**<

Test Stand for FMUs and Pumps/Governors
>**TFMU1BA**<

Mobile Ground Power Unit
>**HGPU**<

Device for Refilling of Supplemental Cooling System
>**SCSR1**<

RAT-Motor
>**RATMK380**<

Anti Static Paint Tester
>**IA2**<

Impedance Measuring Equipment
>**IM2-FS**<

Disinfection and Conservation Tool
>**DCT2**<

Waliclean Waste Line CLeaning
>**WLC1**<

Hydraulic Test and Pressure Unit
>**HPS380**<

Fill and Drain Device for Supplemental Cooling System
>**SCSFD380**<

Mobile Hydraulic Unit
>**MH-1-350-10-E-PL**<

Pulse Pressure Test Bench
>**DP2A**<

Test Stand for A380 Cargo Door Actuation System
>**TCD1**<

Electric and Hydraulic Test Stand for Vertical Tail Tact 2 and Tact 4
>**EHP380T2/T4**<

Hydraulic Test Stand for Flight Control Units
>**HPM-S/M-FC**<

Hydraulic Test Stand for Motors and Pumps
>**HPM-S/M-MP**<

Hydraulic Test Stand for Non-Rotating Components
>**HPM-S/M-NR**< and >**HPM-S/M-LU**<

Test Stand for Aircraft Brakes
>**PFB3S**<

Test Stand for Proof Pressure Testing and Cleaning of Aircraft Tubes
>**HOEP1500PF**<

Test Stand for PCU Components
>**TPCU1**<

BOEING B777
Test Equipment

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TEST-FUCHS

Test Stand for Safety Valves
>**BSV1AF**<

Test Stand for Air Turbine Starters
>**TATS1AF**<

Test Stand for Outflow Valves
>**POVM2NM**<

Test Stand for Safety Valves
>**PSV1000NM**<

Universal Test Stand for Pneumatic Components
>**PP200STA**<

Hydraulic Ground Power Unit
>**HGPU**<

Waliclean Waste Line CLeaning
>**WLC1**<

Aircraft Fuel Sump Drain Equipment
>**ASE300**<

Bonding and
Loop Resistance Tester
>**BLRT2-LP**<

Nitrogen Filling
Equipment
>**SFE300**<

Servicing Trolley for Flaps
and Thrust-Reverser
>**SFTR1**<

Test Stand for Fuel Metering Units
>**TFMU**<

Fuel Nozzle Test Stand
>**FNTS9**<

Test Stand for Pneumatic Valves
>**PPV2**<

Test Stand for Power Drive Untis
>**TPDU1CAF**<

Generator Test Stand
>**LMP300**<

Test Stand for Aircraft Brakes
>**PFB3S**<

Hydraulic Pipe Pressure Test Stand
>**SHTB2S**<

Hydraulic Test Stand for
Flight Control Units
>**HPM-S/M-FC**<

Hydraulic Test Stand
for Motors and Pumps
>**HPM-S/M-MP**<

Hydraulic Test Stand for Non-Rotating Components
>**HPM-S/M-NR**< and >**HPM-S/M-LU**<

Hydraulic Test Stand for Flight Control Units
>**HFCU3**<

Test Equipment for Anti Skid Valves
>**TE-ASV1-2**<

BOEING B787
Test Equipment

safety in test > safety in flight

OEM

Hydraulic Supply and Flushing System
>**HSFS787**<

Low Pressure and Vacuum Test Trolley
>**LPVTT1**<

GSE

Hydraulic Ground Power Unit
>**HGPU**<

Waliclean Waste Line CLeaning
>**WLC1**<

Bonding and Loop Resistance Tester
>**BLRT2-LP**<

Aircraft Fuel Drain Equipment
>**ASE900**<

Reservoir Ventilation Trolley
>**TBW1**<

MRO

Hydraulic Test Stand for Flight Control Units
>**HPM-S/M-FC**<

Hydraulic Test Stand for Motors and Pumps
>**HPM-S/M-MP**<

Test Stand for Outflow Valves
>**POVM4NM**<

Hydraulic Test Stand for Non-Rotating Components
>**HPM-S/M-NR**< and >**HPM-S/M-LU**<

Generator Test Stand
>**LMP300**<

EUROFIGHTER
Test Equipment

safety in test > safety in flight

TEST-FUCHS

Pneumatic Test Stand
>**PP50FE-407**<

Mobile Air Conditioner
Electric Motor Powered
>**BKG5EM**<

Test Stand for Air Turbine Starters
>**TATS2EF**<

Hydraulic Servicing Trolley
>**HST21**<

Cockpitladder
>**CLEF1**<

Backlash-Tester
>**BLT5F**<

Generator Test Stand
>**LMP150V**<

Test Stand for Actuators
>**PRP2TE**<

No-Volt Tester
>**TE-ATS1EX**<

MIL-BUS Cable Tester
>**PA-MBT10**<

Test Equipment for
Engine Parameters
>**PA-TMG3-5**<

Handoperated Hydraulic Test Rig
>**MH1-280-025-E-3C**<

Low Pressure Test Bench
>**LPT1EF**<

Lube Oil Test Stand
>**LTB5EF**<

Earthing Test Set
>**PA-MVP10S**<

Test Equipment for
Anti Skid System
>**PA-ASG2RV-1**<

Hydraulic Supply Unit
>**HA200-280M2**<

Universal Hydraulic Test Stand
>**GPHTB1**<

Hydraulic Pump Test Rig
>**HPP200EF**<

Pulse Pressure Test Stand
>**DP3A900**<

Hydraulic Component Test Bench
>**PHKL2-405**<

Universal Hydraulic Test Bench
>**UHTB1M**<

Hydraulic Test Trolley
>**HTW200-280NG**<

Mobile Fuel Test Rig
>**MFTR1500**<

Test Stand for APU, FCU
and Fuel Nozzles
>**PTRV2**<

Aircraft Refuelling and Defuelling
System Test Equipment Facility
>**RFS1500**<

Test Stand for Fuel Components
>**KKP1000M-407**<

Radar Cooling Liquid Pump Test Rig
>**RCT1**<

Test Stand for Screwjack and Bevel Gear Boxes
>**TSC1E**<

AIRBUS A400M
Test Equipment

safety in test > safety in flight

STTE

Special Tools

Safety Devices

Devices for Installing and Reinstalling

Lifting Devices

Safety Pins

Covers

SSE

Mobile Air Conditioner
>**BKG8D**<

Oxygen and Nitrogen Trolley
>**ONT1**<

Hydraulic Ground Power Unit
Diesel Motor Driven
>**HST21DSKA**<

Hydraulic Ground Power Unit
Electrically Driven
>**HST21ESKA**<

Test Equipment

Bleeding Tool Set
>**BTS1**<

Impedance Measuring Equipment
for Loop Resistance
>**IM2-FS**<

Weight on Wheel
Condition Simulator
>**WCS1**<

Electrical Module for Cargo Door
and Ramp Operation
>**MCDR1**<

Loop Through Trolleys for
>**MHPA400M**<

Test Equipment

Particle Count Trolleys for
>**MHPA400M**<

Test System for Cargo Hold and
Tunable Vibration Absorber System
>**TS-CH-TVAS1**<

Engine Fire Extinguishing
System Test Tool
>**EFESTT1**<

Earthing Test Set
>**MVP10L-24FS**<

Hydraulic Simulation for Iron Bird
>**GTFB400M**<

Hydraulic Pump Loading System
>**HPLS400**<

Test Equipment

Mobile Hydraulic Test System for Fuselage
>**MHPA400M**<

Electric and Hydraulic Test Stand for
Vertical Tail Tact 5
>**EHP400T5**<

Test System for
Door Ramp Actuation System
>**TS-DRAS1**<

Particle Measuring System
>**PMA400M**<

Cable Test Set
>**KPG4**<

VFG Cooling System
>**VCS400**<