

# scanVdura

new!

# MPA Series

## Hydraulic Pressure Balance

Best pressure measurement  
uncertainty 0,005% rdg

Electronic compensation of errors  
Ranges up to 120 MPa (1200 bar)  
Automatic motor rotation drive

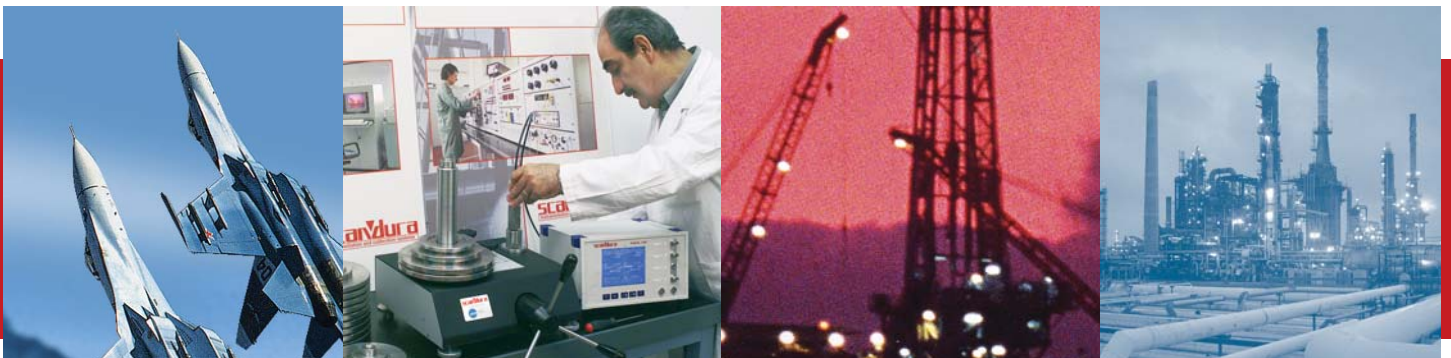
### scanVdura

in co-operation with



FULLY DESIGNED & PRUDUCED  
IN ITALY

MADE IN ITALY



## MPA Blue Line



MPA series connected to PASCAL LAB

## Hydraulic Pressure balance

Uncertainty from 0,005 % rdg to 0,0075 % rdg - Electronic compensation of errors

Masses identification - Automatic motor rotation drive - Ranges up to 120 MPa (1200 bar)

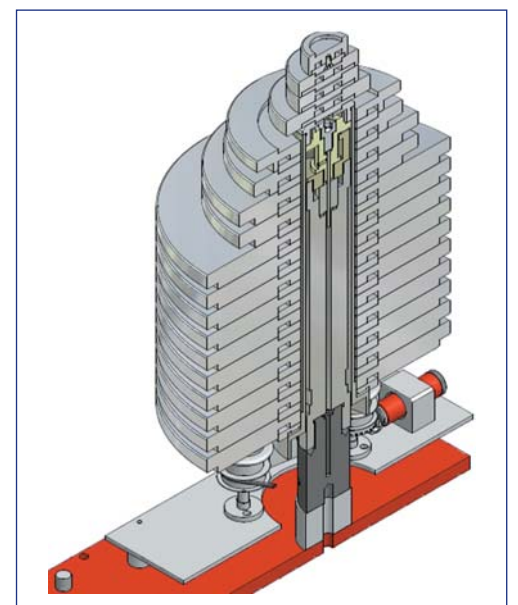
### Uncertainty

Expanded Uncertainty according to UNI CEI ENV 13005 (ISO GUM):  
 $50 \cdot 10^{-6} p \leq U \leq 75 \cdot 10^{-6} p$  (0,005% rdg  $\leq U \leq$  0,0075 % rdg)

### Co-design with the Italian National Research Institute of Metrology

The MPA series is a co-design between SCANDURA & FEM and the I.N.R.I.M (Italian National Research Institute of Metrology) with the objective to develop a series of pressure balances operating in liquid media up to 120 MPa. The common strategy has been laid down in such a way to produce a compact pressure balance easily transportable, but at the same time equipped with all the measuring sensors needed to compensate the errors due to the main influence variables.

Measurement unit section with motor



## Piston-Cylinder Unit

The MPA piston-cylinder series has been designed in tungsten carbide material; the other parts of the unit are made of austenitic stainless steel.

Four piston cylinder units are available.

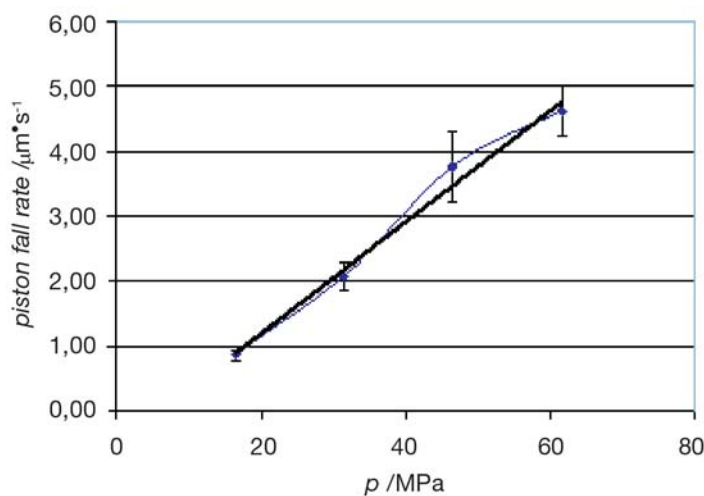
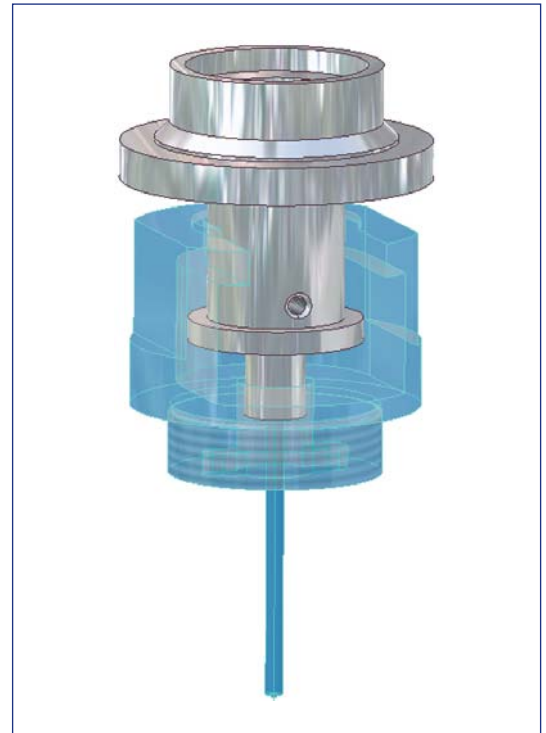
MPA P/C models:

- ✓ from 1,2 to 120 MPa (MPA120)
- ✓ from 0,6 to 60 MPa (MPA60)
- ✓ from 0,36 to 36 MPa (MPA36)
- ✓ from 0,12 to 12 MPa (MPA12)

**All the piston-cylinders are free deformation units.**

The top part of the piston has been integrated into another stainless steel component that supports the masses carrier.

The maximum pressure value for the MPA chassis is equal to 125 MPa (1250 bar).



## Piston Fall Rate

The behavior of piston fall rate as a function of pressure is herewith shown for a 60 MPa full scale unit.

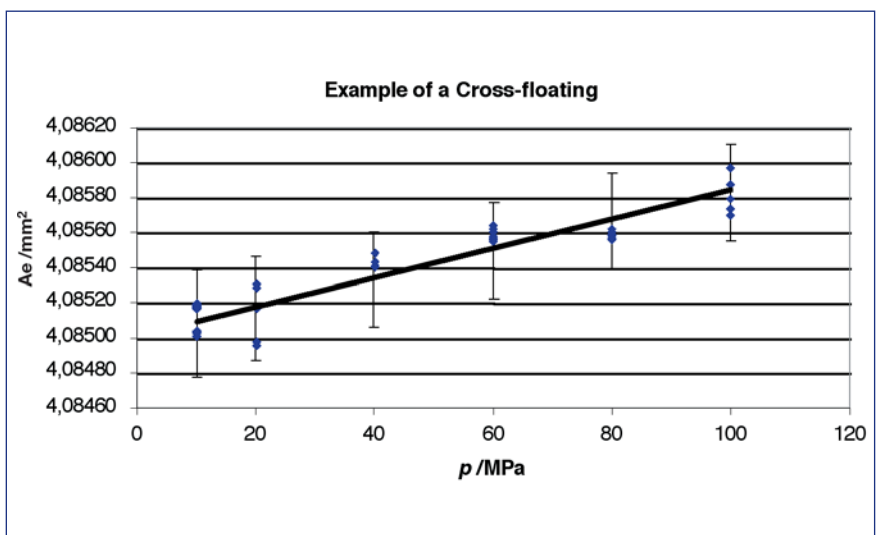
For all the assemblies, the behavior of the piston's fall rate is linear as a function of the pressure.

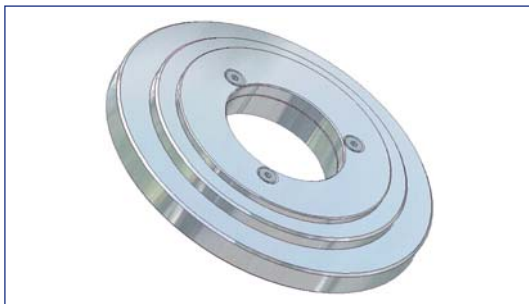
## Effective Area

The behavior of  $A_e = f(p)$ , herewith shown for a 120 MPa full scale unit, points out a good linearity of the effective area as a function of pressure, as expected for a free deformation unit.

The mean value of effective area of the piston-cylinder unit at atmospheric pressure and at reference temperature of 20°C, as well as the pressure distortion coefficient are carried out by Cross-floating with a Reference Pressure Balance.

FEM studies by Cassino University have been made to validate the design of the unit.





## Masses

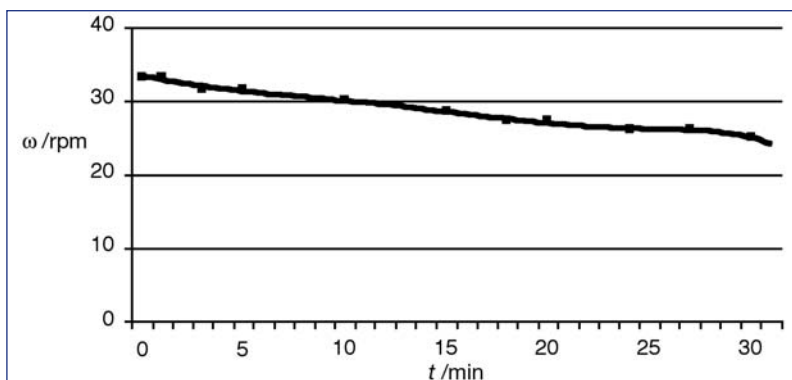
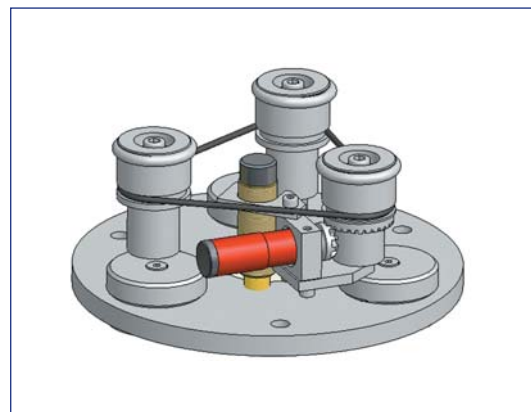
In the central part of each mass a cavity, has been realized, closed by a lid, in where different stainless steel spheres, with different diameters, can be inserted to adjust the mass value. In the BLUE LINE the masses are adjusted with spheres of 1 mm in diameter corresponding to about 10 Pa for the 120 MPa unit. There is the possibility to adapt the masses at nominal value and  $g_L$  values.

## MPA Mass Set

	MPA120		MPA60		MPA36		MPA12
	(1,2 ÷ 120) MPa (12 ÷ 1200) bar		(0,6 ÷ 60) MPa (6 ÷ 600) bar		(0,36 ÷ 36) MPa (3,6 ÷ 360) bar		(0,12 ÷ 12) MPa (1,2 ÷ 120) bar
Qty	Value / MPa (bar)	Qty	Value / MPa (bar)	Qty	Value / MPa (bar)	Qty	Value / MPa (bar)
10	10 (100)	10	5 (50)	10	3 (30)	10	1 (10)
2	5 (50)	2	2,5 (25)	2	1,5 (15)	2	0,5 (5)
1	3 (30)	1	1,5 (15)	1	0,9 (9)	1	0,3 (3)
1	2,5 (25)	1	1,25 (12,5)	1	0,75 (7,5)	1	0,25 (2,5)
1	1 (10)	1	0,5 (5)	1	0,3 (3)	1	0,1 (1)
2	0,5 (5)	2	0,25 (2,5)	2	0,15 (1,5)	2	0,05 (0,5)
1	0,25 (2,5)	1	0,125 (1,25)	1	0,075 (0,75)	1	0,025 (0,25)

## Motor Drive system

The motor drive system is designed in such a way that the application of the rotation to the piston is given only when the piston is in its lowest position. When pressure is increased the piston moves-up to reach its floating position, where the piston is in its free rotation; a proximity sensor detects the piston floating position and automatically switches off the motor. The motor system and the piston-cylinder unit are totally independent and not in mechanical contact between each other during measurements. The rotation is transferred to the piston by friction of three rubber wheels with the masses carrier.



## Rotation Speed

In free rotation, the behavior of the reduction of the rotation speed is also extremely regular as a function of time. For example for a 120 MPa unit tested, after 30 minutes the reduction of rotation speed starting from 33,3 rpm was only 25,0 rpm. This qualitatively represents a proof of the regularity of pressure distribution in the gap of the piston-cylinder.

## Integrated sensors

A barometer for atmospheric pressure measurement, an ambient temperature probe, a relative humidity sensor, a thermo-resistance for the measurement of the piston-cylinder temperature and a proximity sensor that collects information about the floating level of the piston are installed.

## MPA Red Line



## Hydraulic Pressure balance

Uncertainty from 0,008% rdg to 0,01% rdg  
 Industrial applications  
 Easily transportable  
 Ranges up to 120 MPa (1200 bar)

### MPA main features

**Modularity.** MPA available in 2 chassis models: only pressure measurement or measurement and pressure generation.

**Better sensitivity** also due to the low viscosity of the oil (SEBACATE).

**Better performances** due to the lower position of the masses in respect of the P/C unit.

**Interchangeability:** all the MPA chassis models can be used with:

- any piston-cylinder unit;
- same mass set.

**Rangeability** with additional P/C units.

### MPA Piston-Cylinder Unit

The MPA piston-cylinder series has been designed in tungsten carbide material; the other parts of the unit are made of austenitic stainless steel.

Four piston cylinder units are available.

MPA P/C models:

- ✓ from 1,2 to 120 MPa (MPA120)
- ✓ from 0,6 to 60 MPa (MPA60)
- ✓ from 0,36 to 36 MPa (MPA36)
- ✓ from 0,12 to 12 MPa (MPA12)

All the piston-cylinders are free deformation units.

Engineering units available: MPa, bar, PSI, kg/cm<sup>2</sup>

The maximum pressure value for the MPA chassis is equal to 125 MPa (1250 bar).

### MPA Uncertainty

Expanded Uncertainty according to UNI CEI ENV 13005 (ISO GUM):  
 $80 \cdot 10^{-6} p \leq U \leq 100 \cdot 10^{-6} p$  (0,008% rdg  $\leq U \leq 0,01$  % rdg)

### MPA Mass Set

	MPA120		MPA60		MPA36		MPA12
	(1,2 ÷ 120) MPa (12 ÷ 1200) bar		(0,6 ÷ 60) MPa (6 ÷ 600) bar		(0,36 ÷ 36) MPa (3,6 ÷ 360) bar		(0,12 ÷ 12) MPa (1,2 ÷ 120) bar
Qty	Value / MPa (bar)	Qty	Value / MPa (bar)	Qty	Value / MPa (bar)	Qty	Value / MPa (bar)
10	10 (100)	10	5 (50)	10	3 (30)	10	1 (10)
2	5 (50)	2	2,5 (25)	2	1,5 (15)	2	0,5 (5)
1	3 (30)	1	1,5 (15)	1	0,9 (9)	1	0,3 (3)
1	2,5 (25)	1	1,25 (12,5)	1	0,75 (7,5)	1	0,25 (2,5)
1	1 (10)	1	0,5 (5)	1	0,3 (3)	1	0,1 (1)
2	0,5 (5)	2	0,25 (2,5)	2	0,15 (1,5)	2	0,05 (0,5)
1	0,25 (2,5)	1	0,125 (1,25)	1	0,075 (0,75)	1	0,025 (0,25)

Engineering units available: MPa, bar, PSI, kg/cm<sup>2</sup>

# MPA Blue Line

## Standard Supply

- Chassis
- P/C unit
- Mass set
- Automatic motor drive system
- Integrated electronic error compensation card
- Calibration report for masses and area of the P/C unit
- Bottle (500 ml) of di-ethyl-hexyl-sebacate
- Connecting adapters 1/4"+3/8"+1/2" BSP
- O- ring Set code 241080
- 2 Spanners (30-32)
- Spirit level and adjustable levelling feets
- Operating Manual (English)
- Carrying case for chassis ( 1 piece)
- Carrying cases for masses ( 2 pieces)

## Accessories on request

- ✓ Set of adapters 1/4"+3/8"+1/2" NPT
- ✓ Set of adapters M20 x 1,5 + M12 x 1,5

## Additional units on request

- Precision Test Gauges Series 1150
- Precision Test Gauges Series 1250
- Reference Digital Pressure Indicators series PASCAL LAB
- Reference Digital Pressure Gauges series RDI-P

## Ordering Guide

Model & Range

- MPA 12 B** Range from 0,12 - 12 MPa (1,2 - 120 bar)
- MPA 36 B** Range from 0,36 - 36 MPa (3,6 - 360 bar)
- MPA 60 B** Range from 0,6 - 60 MPa (6 - 600 bar)
- MPA 120 B** Range from 1,2 - 120 MPa (12 - 1200 bar)

## Packing

- 1 Carton containing base (approx 47x33x44 cm, 24 kg)
- 2 Cartons containing masses (approx 47x33x44 cm, 24 kg)

## Head Office

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Specifications are subject to change without notice.

# MPA Red Line

## MPA Standard Supply

- Chassis w/ or w/o pressure generation circuit
- P/C unit
- Mass set
- Bottle (500 ml) of di-ethyl-hexyl-sebacate
- Connecting adapters 1/4"+3/8"+1/2" BSP
- O-ring Set code 241080
- 2 Spanners (30-32)
- Spirit level and adjustable leveling feet
- Calibration report traceable to national and international standard
- Certificate of Compliance (English)
- Operating Manual (English)

## Accessories on request

- ✓ Automatic motor drive system
- ✓ Set of adapters 1/4"+3/8"+1/2" NPT
- ✓ Set of adapters M20 x 1,5 + M12 x 1,5
- ✓ P/C temperature sensor (Pt 100 - 4 wires)
- ✓ External temperature digital indicator, res. 0,01°C
- ✓ SIT certificate (EA) - pressure generation method
- ✓ Carrying case for chassis (1 piece)
- ✓ Carrying cases for masses ( 2 pieces)

## Additional units on request

- Precision Test Gauges Series 1150 or 1250
- Reference Digital Pressure Indicators series PASCAL LAB
- Reference Digital Pressure Gauges series RDI-P

## Ordering Guide

Model & Range

- MPA 12 R** Range from 0,12 - 12 MPa (1,2 - 120 bar)
  - MPA 36 R** Range from 0,36 - 36 MPa (3,6 - 360 bar)
  - MPA 60 R** Range from 0,6 - 60 MPa (6 - 600 bar)
  - MPA 120 R** Range from 1,2 - 120 MPa (12 - 1200 bar)
- M** measurement only

## Packing

- 1 Carton containing base (approx 47x33x44 cm, 24 kg)
- 1 Cartons containing masses (approx 35x40x35 cm, 56 kg)

## Subsidiary

**Dott. Ing. SCANDURA Calibration & Instrumentation (India) Pvt. Ltd.,**

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ISO 9001:2000 certificate N. RIN251-AQ-2811 by DNV



Certificate No. C - 0226

## Local distributor