

Short description

Piezoelectric multi-component pole vault force plate with integrated electronics for the measurement of the 3 orthogonal force components and the corresponding moments.

Stiffened regular pole vault box with high natural frequency. Joint with 4 preloaded 3-comp. sensors on a solid frame.

Integrated electronics with eight 1-channel charge amplifiers with range switching, charge cables and the connector plug.

With the Kistler BioWare type 5691A1 or 2812... or control unit type 5233A2 the force plate can be easily controlled and supplied.

This force plate features:

- Regular pole vault box
- Integrated charge amplifier
- Large measurement range and high natural frequency

This Platform complies to the EU guidelines 89/336/EWG, is CE-conform and fulfills the EMV-Norms

- EN 50081-1
- EN 50082-2

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| Modification 13541 | Date 5.6.2008 | Generating system Word 2003 | European projection | | First project-no 60052 | Date of copy |
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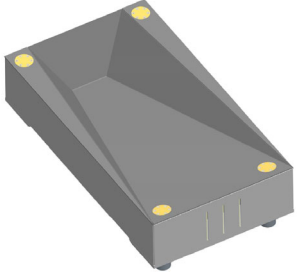



Pole Vault Force Plate with integrated electronics

Specification control sheet

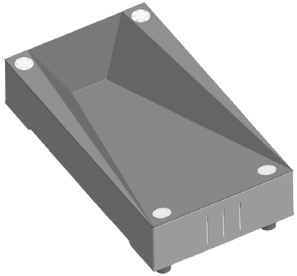


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Measurement chain

Configuration of a typical measuring chain with Kistler DAQ system BioWare®:

| | | | |
|---|---|--|---|
|  |  |  |  |
| Force plate with charge amplifier Type Z20903 | Connection cable Type 1759A... | DAQ system (USB 2.0) Type 5691A1 | Laptop (provided by user) with BioWare® |


Configuration of a typical measuring chain:

| | | | |
|--|---|---|--|
|  |  |  | Ch 1 = F_x 1+2 Ch 5 = F_z 1 Ch 2 = F_x 3+4 Ch 6 = F_z 2 Ch 3 = F_y 1+4 Ch 7 = F_z 3 Ch 4 = F_y 2+3 Ch 8 = F_z 4 |
| Force plate with charge amplifier Type Z20903 | Connection cable Type 1757A... | External Control Unit (8xBNC neg.) Type 5233A2 | DAQ system provided by user (8 analog channels) |

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Specifications

General

| | | | |
|--------------------------------------|-------|--------|--------------|
| • Measuring range | Fx | kN | -2.5 ... 2.5 |
| | Fy | kN | -5 ... 5 |
| | Fz | kN | -10 ... 10 |
| • Overload | Fx,Fy | kN | -10/ 10 |
| | Fz | kN | -10 / 25 |
| • Calibrated range (range 4) | Fx,Fy | kN | 0 ... 2,5 |
| | Fz | kN | 0 ... 10 |
| • Calibrated partial range (range 2) | Fx,Fy | kN | 0 ... 0.25 |
| | Fz | kN | 0 ... 1 |
| • Threshold (range 1) | Fx,Fy | N | 0,125 |
| | Fz | N | 0,250 |
| • Drift | Fx,Fy | mN / s | ≤ 5 |
| | Fz | mN / s | ≤ 10 |

Selectable nominal ranges (FSO / channel)

$F_{xi}, F_{yi} = F_{x_{1+2}}, F_{x_{3+4}}, F_{y_{1+4}}, F_{y_{2+3}}$
 $F_{zi} = F_{z_1}, F_{z_2}, F_{z_3}, F_{z_4}$

| | | | |
|-----------|---------|---|--------|
| • Range 1 | Fxi,Fyi | N | ≈125 |
| | Fzi | N | ≈250 |
| • Range 2 | Fxi,Fyi | N | ≈250 |
| | Fzi | N | ≈500 |
| • Range 3 | Fxi,Fyi | N | ≈1'250 |
| | Fzi | N | ≈2'500 |
| • Range 4 | Fxi,Fyi | N | ≈2'500 |
| | Fzi | N | ≈5'000 |

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Theoretical max. calculated measurement range (FSO)

$$F_x = F_{x1+2} + F_{x3+4}$$

$$F_y = F_{y1+4} + F_{y2+3}$$

$$F_z = F_{z1} + F_{z2} + F_{z3} + F_{z4}$$

| | | | |
|-----------|--------|---|---------|
| • Range 1 | Fx ,Fy | N | ≈250 |
| | Fz | N | ≈1'000 |
| • Range 2 | Fx,Fy | N | ≈500 |
| | Fz | N | ≈2'000 |
| • Range 3 | Fx ,Fy | N | ≈2'500 |
| | Fz | N | ≈10'000 |
| • Range 4 | Fx,Fy | N | ≈5'000 |
| | Fz | N | ≈20'000 |

Sensitivity

- Nominal output signal sensitivity (FSO = 5V)

| | | | |
|--|------------|---------|------------|
| • Range 1 | Fxi,Fyi | mV/N | 40 [37,5] |
| | Fzi | mV/N | 20 [19,0] |
| • Range 2 | Fxi,Fyi | mV/N | 20 [18.75] |
| | Fzi | mV/N | 10 [9,5] |
| • Range 3 | Fxi,FyiN | mV/N | 4 [3,75] |
| | Fzi | mV/N | 2 [1,90] |
| • Range 4 | Fxi,Fyi | mV/N | 2 [1,875] |
| | Fzi | mV/N | 1 [0,950] |
| • Linearity (full range + partial range) | | % FSO | ≤±0,3 |
| • Hysteresis (full range + partial range) | | % FSO | ≤±0,2 |
| • Cross talk | Fx ↔ Fy | % | ≤±1,0 |
| | Fx,y → Fz | % | ≤±2,0 |
| | Fz → Fx,y | % | ≤±2,0 |
| • Natural frequency | x/y - axis | Hz | ≈400 |
| | z - axis | Hz | ≈400 |
| • Operating temperature range | | °C | 0 ... 60 |
| • Weight | m | kg | 120 |
| • Tightening torque of fastening screws M12x25 | | Nm | 90 |
| • Protection class | | EN60529 | IP65 |

* must be calibrated

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Electronics (Charge amplifier)

| | | |
|--|--------------|------------------------------------|
| • Range switching accuracy | % | < ± 0,5 |
| • Range ratio (Range 1 / Range 2 / Range 3 / Range 4) | Fx, Fy Fz | 1 / 2 / 10 / 20 1 / 2 / 10 / 20 |
| • Supply voltage | V DC | 10...30 |
| • Supply current (total, without load) | mA | ca. 45 |
| • Frequency range (-3dB) | kHz | ca. 0...10 |
| • Drift | mN/s | < ± 10 |
| • Output voltage | V | -5 ... 5 |
| • Output current | mA | -2 ... 2 |
| • Output resistance | Ω | 10 |
| • Max. noise at output (0,1 Hz ... 10MHz) | mVpp | < 5 |
| • Control input | V/mA | 5...45 / 0,4...4,4 |

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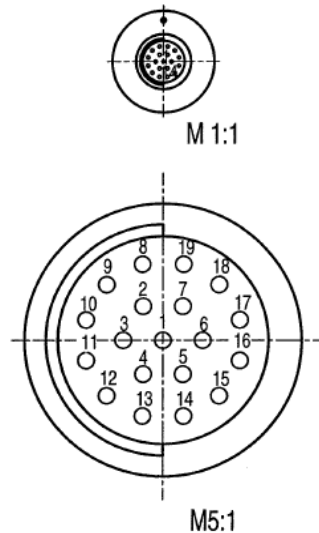
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Connector socket

Connector: 19 pol Fischer - jack **DEE 104A092-130**



- 1 Exct. GND
- 2 Fz4
- 3 Fz3
- 4 Fz2
- 5 Fz1
- 6 Operate
- 7 Control GND
- 8 C. N.
- 9 Fx1+2
- 10 Fx3+4
- 11 Fy1+4
- 12 Fy2+3
- 13 A' (Range z select)
- 14 Signal GND
- 15 N.C.
- 16 A (Range x,y select)
- 17 B (Range x,y select)
- 18 B' (Range z select)
- 19 1Exct. +10 ... 30VDC

Scope of delivery

1 Set shims
 4 Cylinder head bolt M12x25
 1 Hexagonal wrench
 Ring bolt M8 (DIN 580)

7.050.011
 6.120.106
 Type 1391
 6.170.023

Accessory

Connection cable: Platform → Bio-Ware
 DAQ software system BioWare

Type 1759A5, 1759A10, 1759Asp,
 Type 5691A1

Connection cable: Platform → Control Unit
 Remote Control Unit

Type 1757A5, 1757A10, 1757Asp
 Type 5233A2

Mounting frame

Type Z20903-200 (incl.)

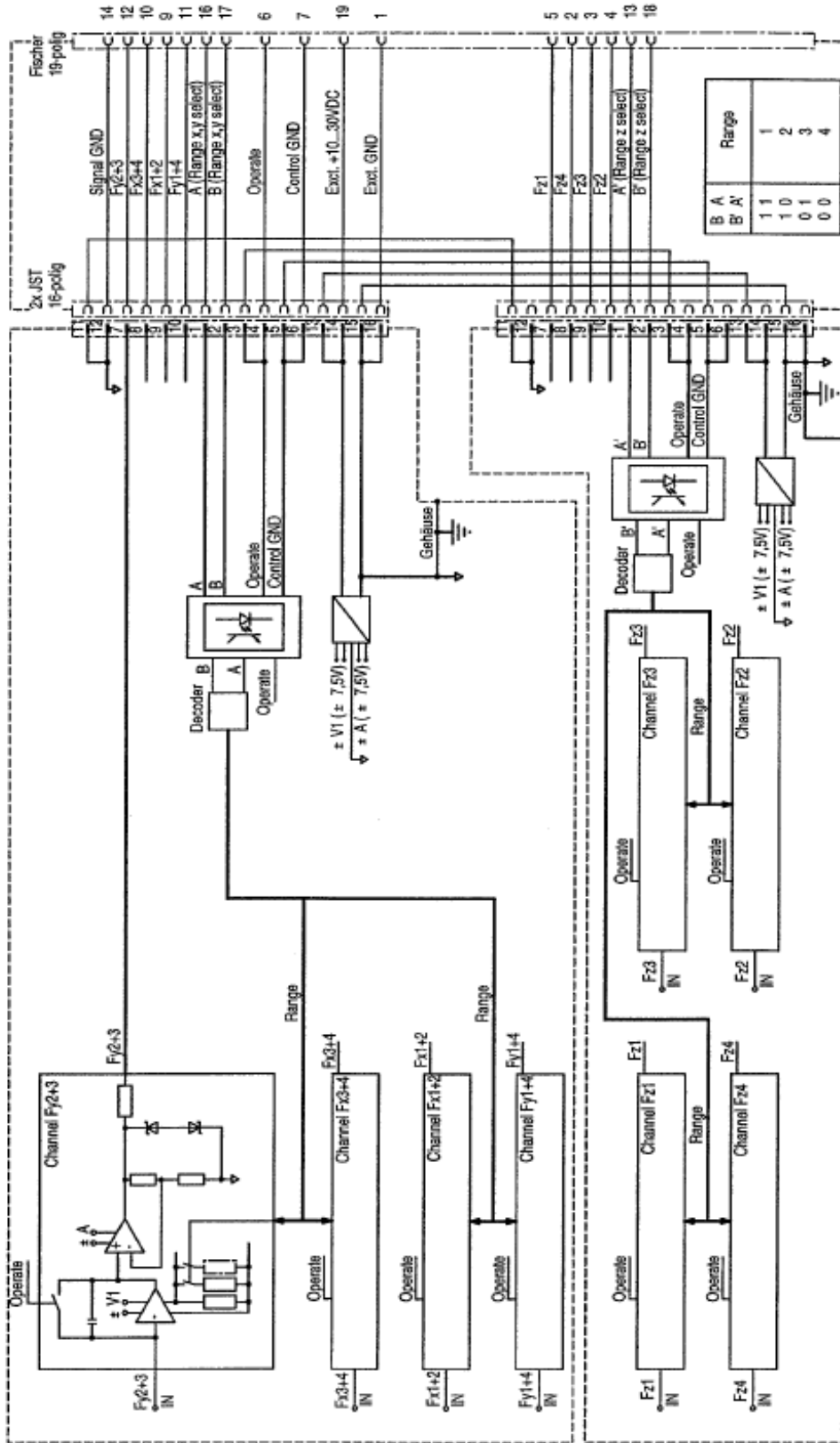
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Block diagram



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