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# Summing solutions

**Type 5417...**
**5447Asp**
**1684A...**

## For triaxial force sensors and dynamometers

The different summation solutions enable the connection of four triaxial force sensors. In this process, the electrical charges are interconnected to create a standard force dynamometer. The assignement of each sensor connection corresponds to the sensor arrangement used in Kistler's standard force dynamometers.

The outputs of the four force transducers are interconnected using the corresponding summation solution, allowing for the measurement of both the three orthogonal forces $F_x$, $F_y$, $F_z$, and 6-component force/moment measurements ($F_x$, $F_y$, $F_z$, $M_x$, $M_y$, $M_z$). The connection to the charge amplifier is made with a 3-wire cable (for 3-component force measurement) or an 8-wire cable (for the 6-component measurement). The assignment of each sensor and its signals corresponds to the sensor arrangement of Kistler's standard force dynamometer. At the output socket/output connector, there are a maximum of 8 measurement signals, similar to Kistler's standard dynamometers.

**Technical data**

| Summing solution | Type | 5417...<br>Summing box | 5447Asp<br>Summing box | 1684A...<br>Summing cable |
|---|---|---|---|---|
| Operating temperature range | °C | –40 … 80 | –20 … 70 | –20 ... 70 |
| - Box / summing unit<br>- on the sensor | IP | 65 [1]<br>cable-dependent | 67<br>68 | 65<br>60 |
| insulation resistance at 20°C | Ω | ≥$10^{13}$ | | |
| Connection:<br>- Input<br>- Output | - | 4 x Fischer 9-pol neg.<br>Fischer Flange 9-pol neg. | 4x V3 pos.<br>Fischer Flange 9-pin neg. | 4x V3 pos.<br>Fischer Flange 9-pin neg. |
| Summation type:<br>- 8-Channel Dynamometer<br>- 3-Channel Force | - | yes<br>yes | yes<br>no | yes<br>no |
| Cable lengths | m | cable-dependent | 0.1 ... 20 | 0.175 / 0.26 / 0.4 |
| Cable properties | - | cable-dependent | PFA with steel braiding | PFA ø1 mm |
| Summing box - Mass isolated | - | no | yes | no |

[1] IP 63 if sockets are open

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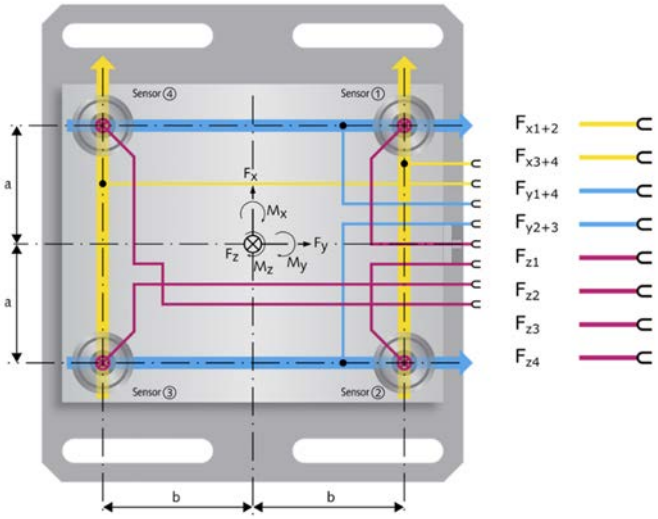
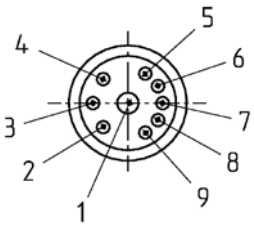



Force summation at dynamometer

| | |
|---|---|
| Mass | 1 |
| $X_{1+2}$ | 2 |
| $X_{3+4}$ | 3 |
| $Y_{1+4}$ | 4 |
| $Y_{2+3}$ | 5 |
| $Z_1$ | 6 |
| $Z_2$ | 7 |
| $Z_3$ | 8 |
| $Z_4$ | 9 |




Output signal

## Cable

| Output Signal | | Cable | Cable Properties | Length [m] min | Length [m] max | Temp. Range | IEC/EN 60529 | | Fischer Connector Dynamometer | Connector Amplifier | IEC/EN 60529 | | Laboratory Amplifier 5015A... | 5018A... | 5080A... | 5165A... | 5167A... | KiDAQ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Chann | 1 | 1 | 1-8 | 1,4 | 4,8 | 52 |
| | | | | | | | | | | | | | IP20 | IP40 | IP40 | IP20 | IP20 | IP20 |
| sum | 3 | 1687BQ01... | TPC black Ø3.6mm | 1 | 20 | -5...70°C | boltable | IP65 | Flange 9-pole pos. | Fischer 9-pole pos. | IP65 | plugged | - | - | ✓ | - | ✓ | - |
| | | 1687BQ02... | PFA, steel braiding | 0.15 | 5 | | | IP67 | Flange 9-pole pos. | | | | - | - | ✓ | - | ✓ | - |
| | | 1687B... | PFA with flexible steel hose | 0.5 | 20 | | | | | | | | - | - | ✓ | - | ✓ | - |
| | | 1689B... | | 0.5 | 20 | | | | Flange 9-pole pos. 90° | | | | - | - | ✓ | - | ✓ | - |
| separate | 8 | 1677AQ01... | TPC black Ø5.6mm | 1 | 20 | -5...70°C | boltable | IP65 | Flange 9-pole pos. | Fischer 9-pole pos. | IP65 | | - | - | ✓ | - | ✓ | - |
| | | 1677AQ02... | TPC, steel braiding | 1 | 20 | | | IP67 | Flange 9-pole pos. | | | | - | - | ✓ | - | ✓ | - |
| | | 1677A... | PFA with flexible steel hose | 0.5 | 20 | | | | | | | | - | - | ✓ | - | ✓ | - |
| | | 1679A... | | 0.5 | 20 | | | | Flange 9-pole pos. 90° | | | | - | - | ✓ | - | ✓ | - |
| | | 1679AQ01... | TPC, steel braiding | 2 | 20 | | | | | | | | - | - | ✓ | - | ✓ | - |

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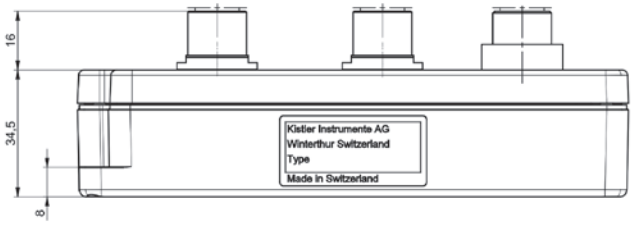
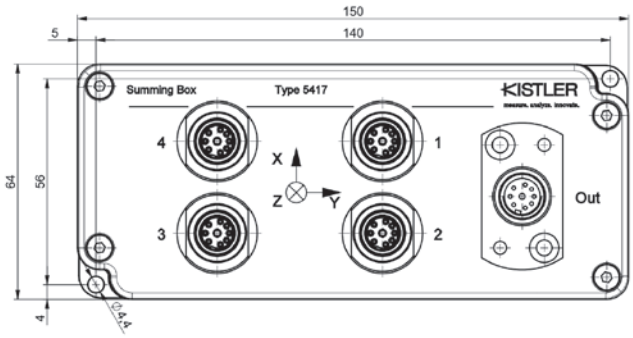
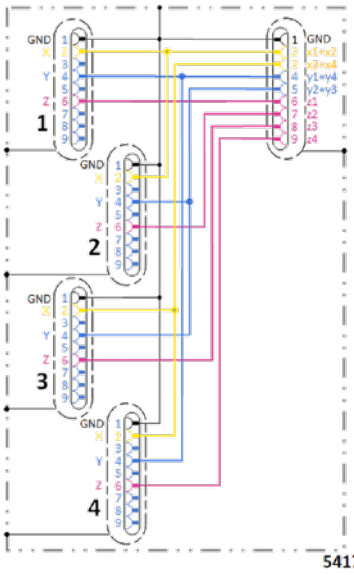
# Summing box 5417 / 5417Q01

## IP 65, single and dynamometer signal summation



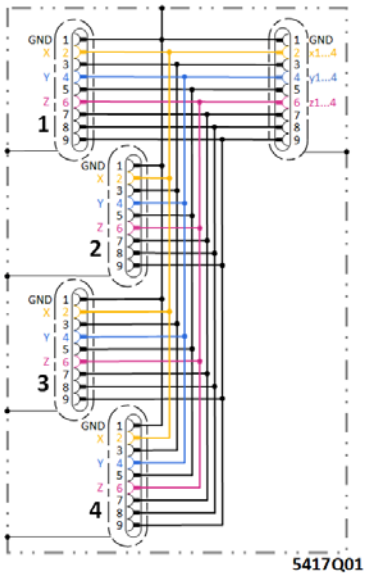




Input:
4 x ($F_{x_i}$, $F_{y_i}$, $F_{z_i}$)

Output:
$F_{x_1 \cdots 4}$, $F_{y_1 \cdots 4}$, $F_{z_1 \cdots 4}$

Circuit diagram




Input:
4 x ($F_{x_i}$, $F_{y_i}$, $F_{z_i}$)

Output:
$F_{x_1 \cdots 4}$, $F_{y_1 \cdots 4}$, $F_{z_1 \cdots 4}$

Circuit diagram

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## Application

The parallel connections are routed as "single wire". To avoid crosstalk, the conditions are as follows:

All channels should be connected to a charge amplifier. If one or two input terminals are not used, the sockets must be closed with a cover.

Standard application:
Summing box with all 4 cables connected.

Special application:
Summing box with covers.

## Cable

| Output Signal | | Cable | Cable Properties | Length [m] min | Length [m] max | Temp. Range | IEC/EN 60529 | | Connector Sensor | Connector Amplifier | IEC/EN 60529 | | Channels | Industrial Amplifier 5030A | 5039A | 5073A... | 5074A... | 5877B... | Laboratory Amplifier 5015A... | 5018A... | 5080A... | 5165A... | 5167A... | DAQ KiDAQ | SumBox 5417 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | 1 | 1 | 1-4 | 1-4 | 1 | 1 | 1 | 1-8 | 1,4 | 4,8 | 4, ... ,52 | 12->8 |
| | | | | | | | | | | | | | | IP65 | IP65 | IP60 | IP67 | IP53 | IP20 | IP40 | IP40 | IP20 | IP20 | IP20 | IP65 |
| separate | 3 | 1698AK... | TPC black Ø3.6mm | 0.5 | 20 | -40...120°C | Plug screwed* | IP 67 | V3 pos. 90° | Fischer 9-pole pos. | IP65 | Plug screwed | | - | - | - | - | - | - | - | ✓ | - | ✓ | - | ✓ |
| | | 1698AB... | TPC black Ø3.6mm | 0.5 | 20 | | | IP68 | V3 pos. 90° | | | | | - | - | - | - | - | - | - | ✓ | - | ✓ | - | ✓ |
| | | 1698AI... | PFA, steel braiding Ø7.5mm | 0.3 | 15 | | | | | | | | | - | - | - | - | - | - | - | ✓ | - | ✓ | - | ✓ |
| | | 1698AC...[1] | PFA, steel braiding Ø7.5mm | 0.3 | 15 | | welded | IP 67 | V3 pos. | | | | | - | - | - | - | - | - | - | ✓ | - | ✓ | - | ✓ |

1) not suitable with 9306A and preloaded load cells 93x7C (structure is not weldable anymore)

*no welding possible

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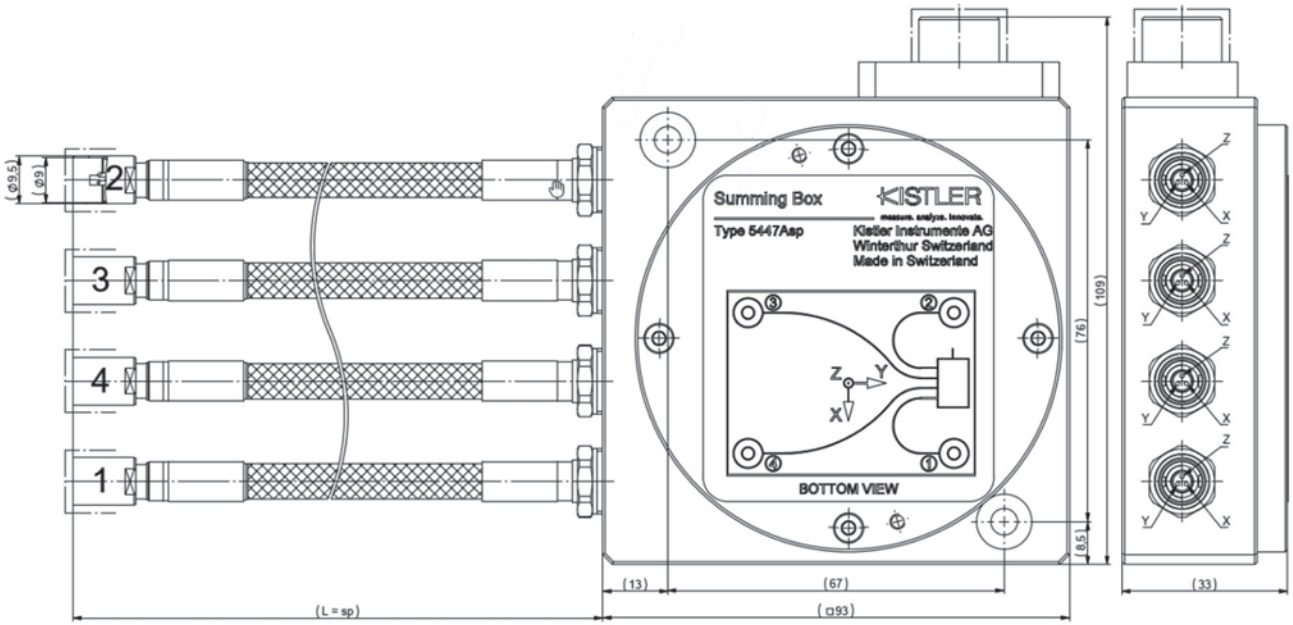
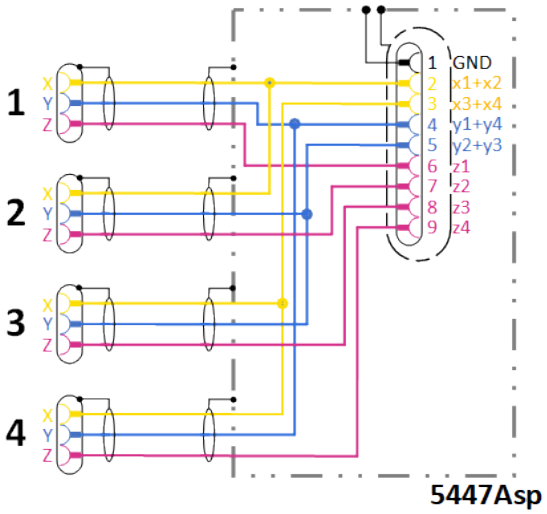
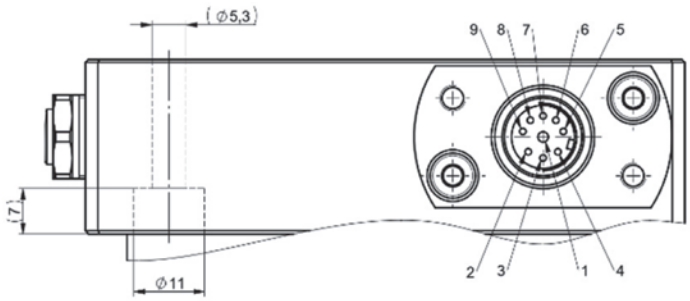
# Summing Box 5447A...

## Dynamometer box including cables for triaxial force sensors




Circuit diagram

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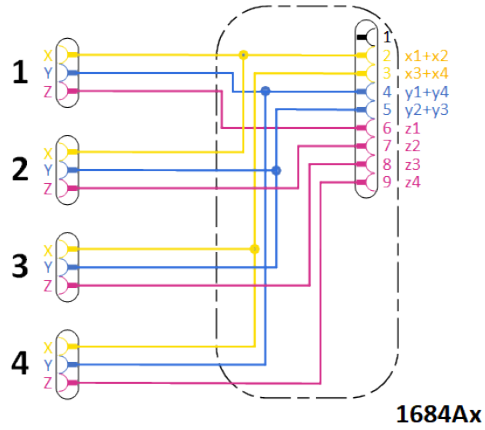
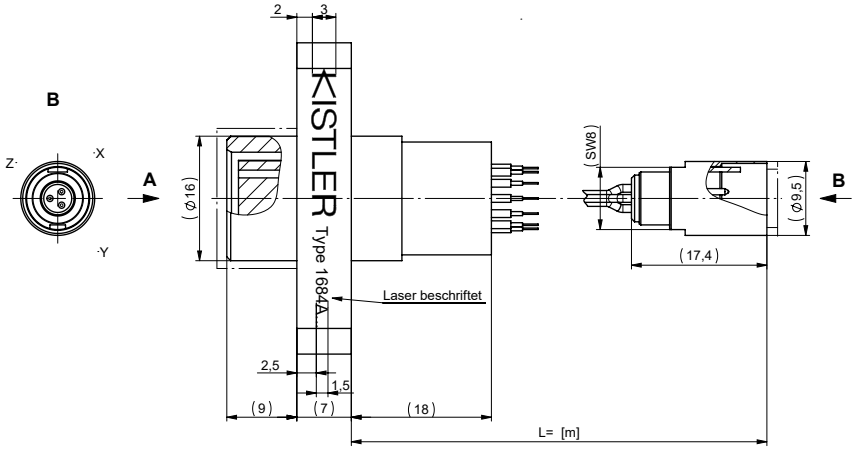
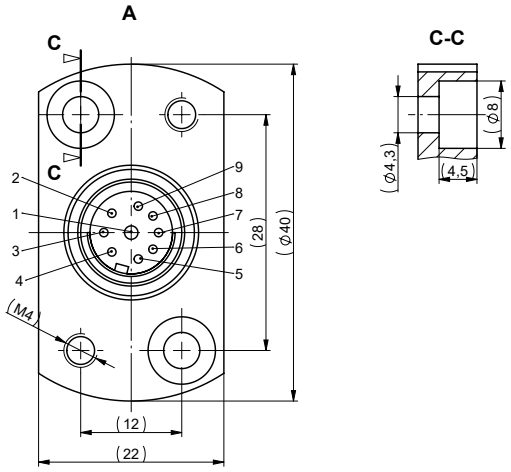
# Summing cable 1684A...

## IP67, Signal summation for triaxial force sensors




Circuit diagram

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