MODULATION BOX MB-3

Instruction Manual

Vibration isolation technology made in Switzerland

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V 1.02   © The Table Stable Ltd.

Safety Instructions

If you suspect the unit to be in any way unsafe, unplug and prevent any possible accidental usage. Contact your nearest service centre.

Do not use in potentially explosive surroundings.

For Indoor use only.

For connection use only the D-Sub 15 cables (m/f) provided.

Notes on equipment safety

This system has been designed, manufactured and tested in conformity to the following community Directives/Regulations and Standards:

2014/35/EU : Low Voltage Directive (LVD)
Standard : EN61010-1:2010; EN61010-2-030:2010; EN61010-2-033:2012
2014/30/EU: Electromagnetic Compatibility Directive (EMC)
Standard : EN55011:2009/2010; EN61326-1:2013; EN61326-2-1:2013; EN61326-2-2:2013
2011/65/EU+2015/863/EU+2017/2102/EU: RoHS directive.

The operator should read this manual which contains important warnings and information.

Cleaning the outside of the device

Use neutral detergents. Cleaning with solvents will damage the outside surface of the system.
Do not use cleaning materials that contain ammonia.
Do not use isopropyl alcohol to remove dirt from the control panel. It may crack the panel.
Do not use flammable substances or any type of spray to clean the system.

Accessories

2   D-Sub 15 cables m/f 2m
1   Instruction manual

Thank you…

…for your purchase of the **MODULATION BOX MB-3**. This unit has been designed specifically with performance and ease of use in mind. As with all Table Stable products, this device is made to the highest quality standards using precision electronics and mechanical components which should give you many years of trouble free use.

Introduction

The modulation-box allows an excitation signal to be applied to a **TS or AVI** Isolation system so that the system may be used as a shaker in any direction. The modulation is applied to the isolated TS/AVI system so that external vibrations are avoided. Different excitation directions can be selected. There is no separate power supply required.

Features

- Fits for TS **and** AVI systems
- Built in signal generator in a range of 1–100 Hz
- Sine, square, triangle wave can be selected
- External signal Input
- Trigger output
- 5 customised setups can be saved
- All axis can be configured separately
- Input overload Indicator

Front panel

1	Isolation switch on/off (TS systems only)
2	Isolation on Indicator (TS systems only)
3	Overload Indicator
4	Modulation level of internal signal generator / external source selection
5	Menu function selection / Enter

Rear panel
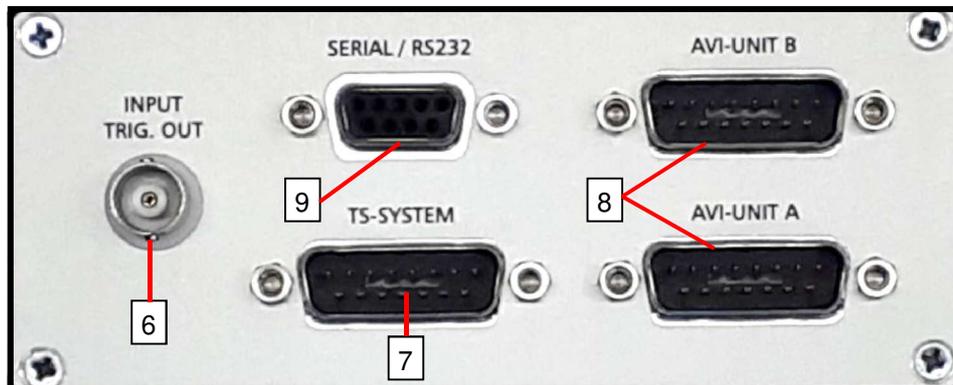
6	External signal input / Internal trigger output
7	Output for TS-systems
8	Output for AVI-systems
9	Serial port (factory use only)

Description

Isolation switch (1)

This switch allows you to switch the active Isolation on or off. **(For TS-systems only)**

Isolation Indicator (2)

This Indicator will light up when the active Isolation is enabled. **(For TS-systems only)**

Overload Indicator (3)

This Indicator will light up when the signal of the Internal/external generator is saturated.

Mod.Level (4)

Adjust to set the level of the **internal signal generator** in a range between MIN. and MAX.
Turning the knob to "EXT." position will switch off the internal signal generator.
In this position an external source can be applied to the BNC socket.

Menu/Select (5)

Turn this knob to navigate within the menu pages. Press to enter into a selected function.

Input/Trigger output (6)

Connect a signal generator to this socket to use an external source.
If the internal signal generator is in use a trigger signal will be available on this socket.

Connecting the box

Connecting the box to a TS system

Connect the socket marked "TS-SYSTEM" (7) to the rear D-Sub 15 socket of the TS isolation system using a D-Sub 15m/f cable provided.

Connecting the box to an AVI system

Connect the sockets marked "AVI-UNIT A" and "AVI-UNIT B" (8) to the upper socket (Diagnostic socket) of the AVI Isolation units using the D-Sub 15m/f cables provided.

Isolation Unit **A** must be on the **left hand side**, unit **B** on the **right hand side** as shown in the picture!

Orientation for AVI-system
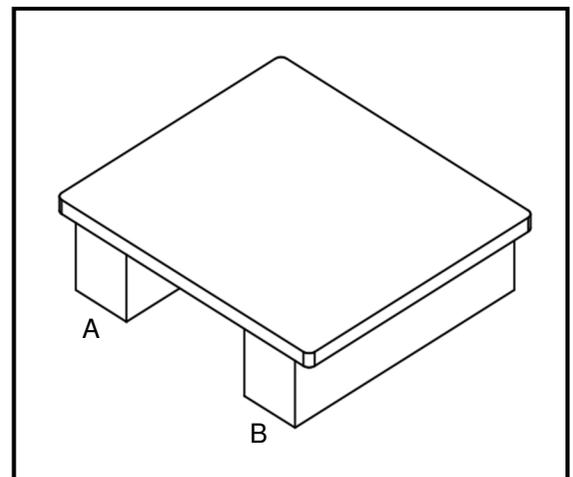
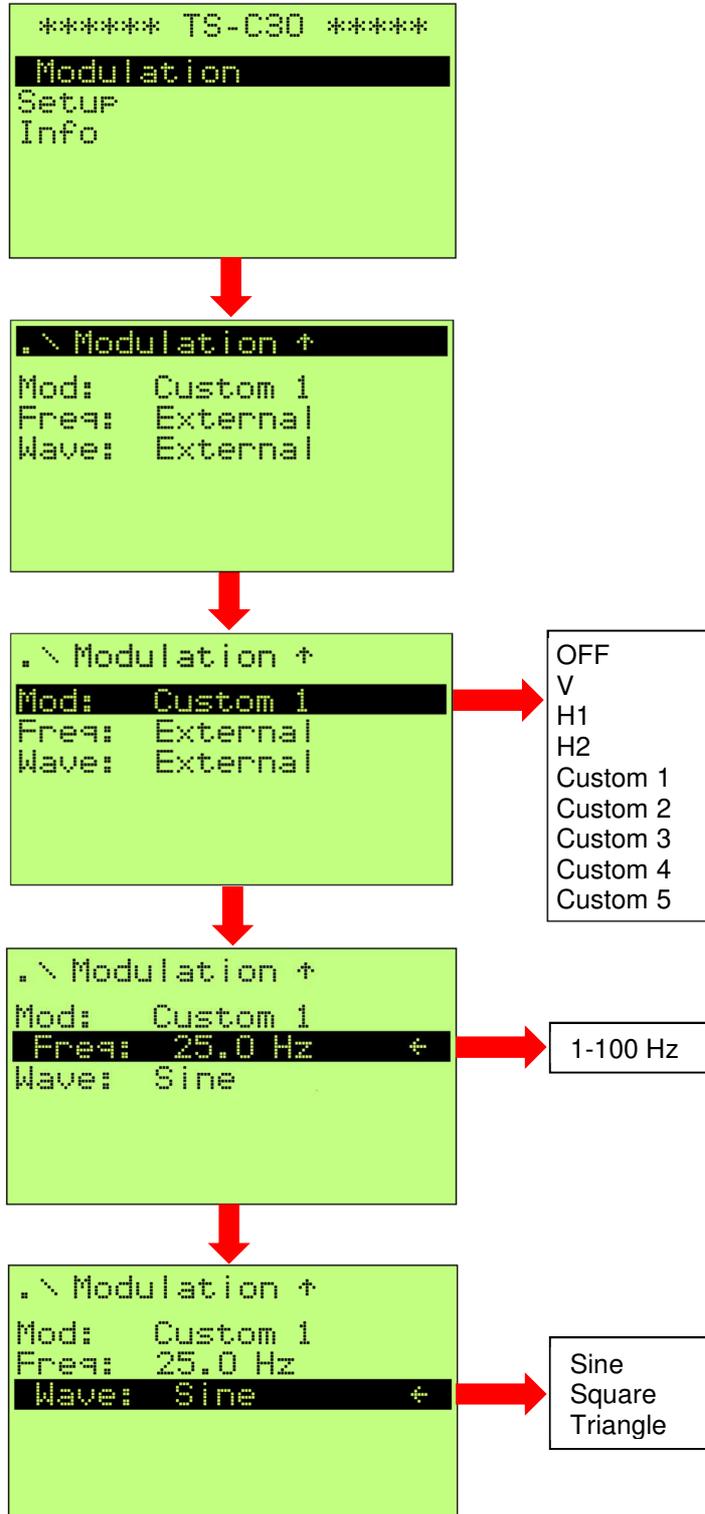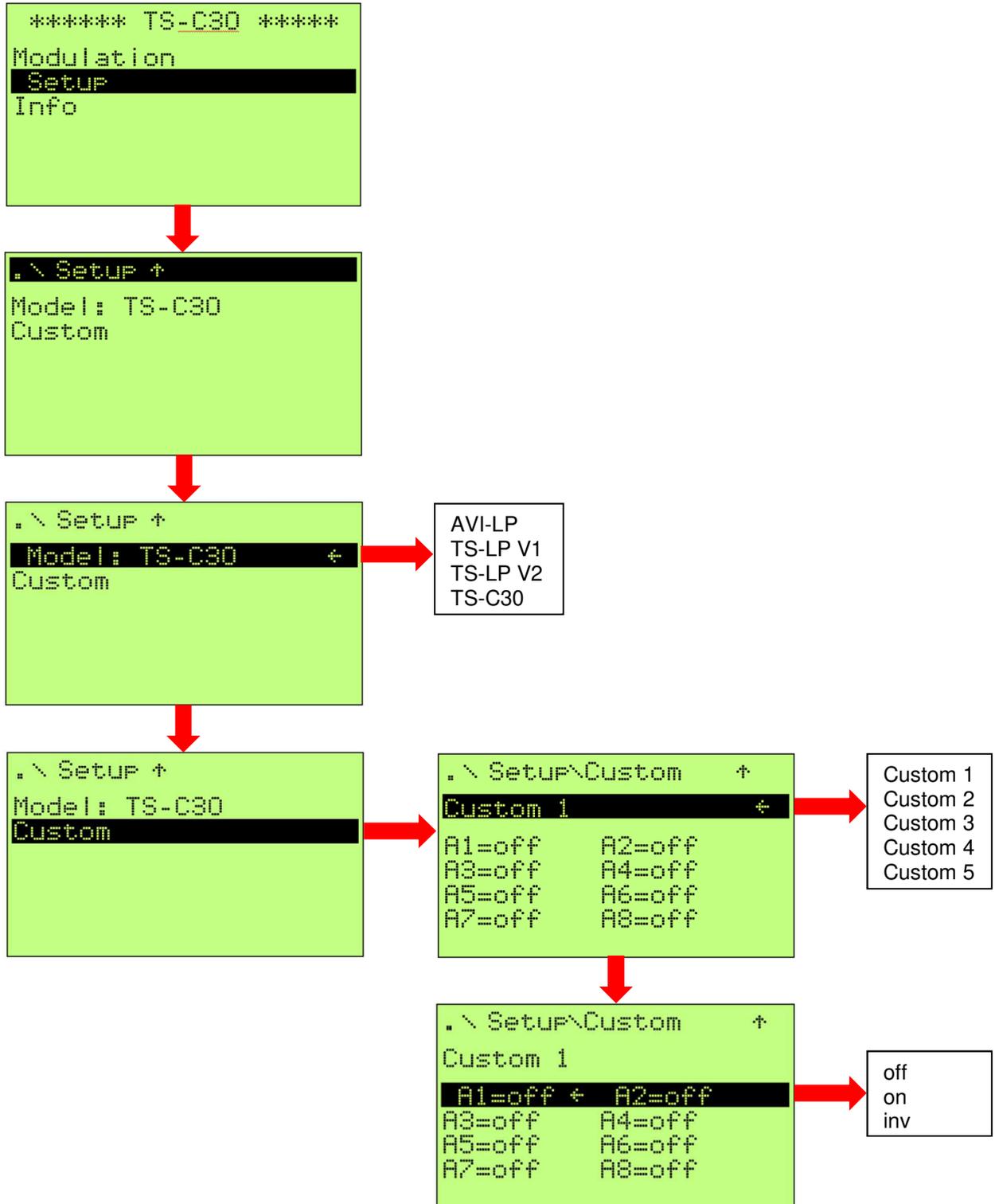## Menu functions overview

Connecting the box to a **running** Isolation system will power up the box and the display will show the main page. Turn the MENU/SELECT knob (5) and push to enter into the *modulation* or *setup* menu. Push enter on top line to return to the previous page. To select a function within a menu push enter and turn the knob.

Modulation menu

```
****** TS-C30 *****
 Modulation
Setup
Info
```

```
.↘ Modulation ↑

Mod:    Custom 1
Freq:   External
Wave:   External
```

```
.↘ Modulation ↑

Mod:    Custom 1
Freq:   External
Wave:   External
```

| OFF |
| V |
| H1 |
| H2 |
| Custom 1 |
| Custom 2 |
| Custom 3 |
| Custom 4 |
| Custom 5 |

To view those functions turn the "MOD.LEVEL" knob clockwise to enable the internal signal generator!

```
.↘ Modulation ↑

Mod:    Custom 1
 Freq:   25.0 Hz      ←
Wave:   Sine
```

| 1-100 Hz |

```
.↘ Modulation ↑

Mod:    Custom 1
Freq:   25.0 Hz
 Wave:   Sine         ←
```

| Sine |
| Square |
| Triangle |

8

Setup menu

```
****** TS-C30 *****
Modulation
 Setup
Info
```

```
.\ Setup ↑

Model: TS-C30
Custom
```

```
.\ Setup ↑

 Model: TS-C30        ←
Custom
```

```
AVI-LP
TS-LP V1
TS-LP V2
TS-C30
```

```
.\ Setup ↑

Model: TS-C30
Custom
```

```
.\ Setup\Custom      ↑

Custom 1             ←

A1=off      A2=off
A3=off      A4=off
A5=off      A6=off
A7=off      A8=off
```

```
Custom 1
Custom 2
Custom 3
Custom 4
Custom 5
```

```
.\ Setup\Custom      ↑

Custom 1

 A1=off ←   A2=off
A3=off      A4=off
A5=off      A6=off
A7=off      A8=off
```

```
off
on
inv
```

Modulation menu

The modulation menu allows you to select different exciting modes.

OFF:	All exciting signals are disabled
V:	Exciting in the vertical direction
H1:	Exciting in the horizontal direction left to right
H2:	Exciting in the horizontal direction front to rear
Custom:	5 individual configurations of mixed signals can be recalled

Internal signal generator

To switch on the signal generator turn the "MOD.LEVEL" knob clockwise to the "MIN" position.
The internal signal generator gives a sine, square or triangle signal in a range of 1-100Hz.
From 1-10Hz in 0.5Hz steps, from 10-100Hz in 1Hz steps.
Push enter on "Freq." and turn the "MENU/SELECT" knob to adjust the frequency.
Push enter on "Wave." and turn the "MENU/SELECT" knob to select the wave form.

Setup menu

Model selection

Push enter on "Model" and turn the "MENU/SELECT" knob to select the Isolation system model.

AVI-LP:	For AVI-LP systems with two units, A and B
TS-LP V1:	For TS systems with an older sensor configuration
TS-LP V2:	For TS systems with a new sensor configuration from serial no.:

TS-150 LP: 1734
TS-140 LP: 822
TS-300 LP: 144

TS-C30:   For TS-C30 Isolation systems

Different models can be saved in a custom setup.

Custom

The "CUSTOM" menu allows you to define different combinations of all 8 axis which can be saved under CUSTOM 1 - CUSTOM 5

Each axis can be switched on, off or inverted.

Operation

Switch on the isolation system and enable the isolation on the front panel/control unit.
Set the isolation switch (1) on the modulation-box to ON. **(TS-system only)**

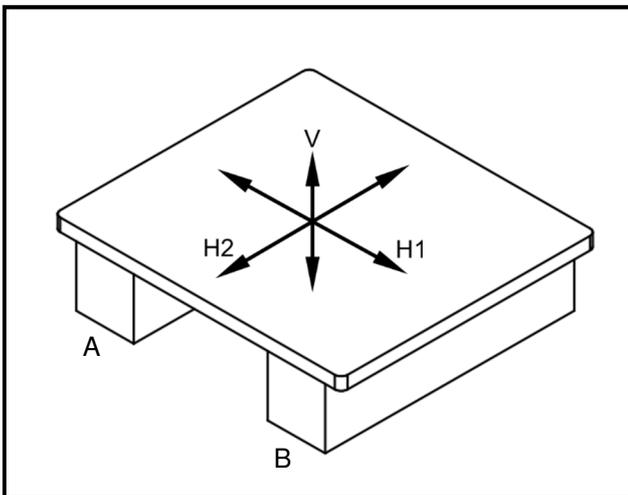Different excitation directions are selectable in the modulation menu. As the frequency of the excitation is scanned, the VELOCITY will remain approximately constant over the range 1-100Hz. Beyond this frequency some resonances are likely to appear, depending on the load. For control purposes an external accelerometer should be used.

AVI-systems

As the frequency of the excitation is scanned the VELOCITY will remain approximately constant over the range 2-80Hz. Beyond this frequency some resonances are likely to appear, depending on the load. For control purposes an external accelerometer should be used. The sensitivity is approximately 10^{-6} m/sec per volt excitation.
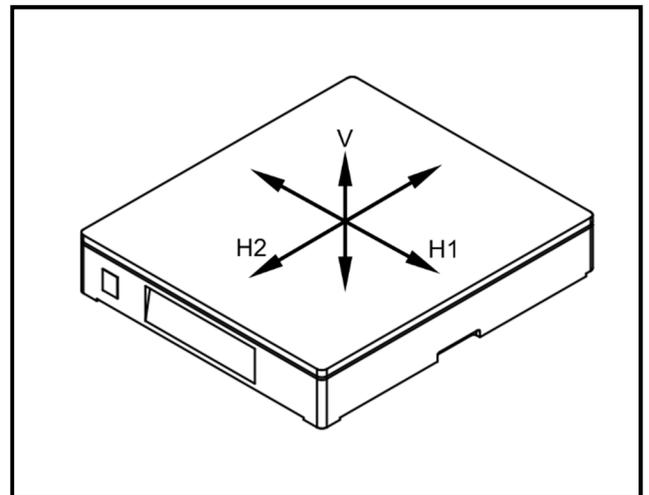
TS-Systems

If the isolation switch (1) is set to OFF, the modulation amplitude will be much larger, particularly around the passive resonance frequency of the TS system (5-20Hz depending on load) and added to any building vibrations that may be present. Use under these conditions is not recommended, but no damage will occur to the TS system. If no signal generator is attached, the switch may be used as a remote control for switching the isolation on and off.
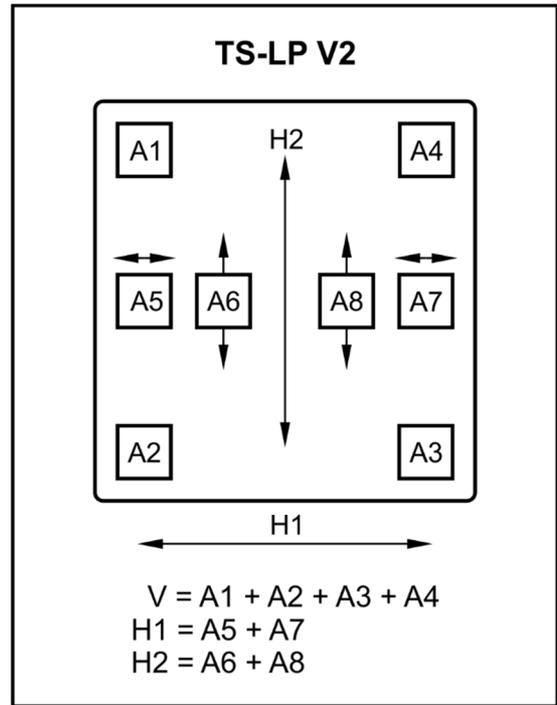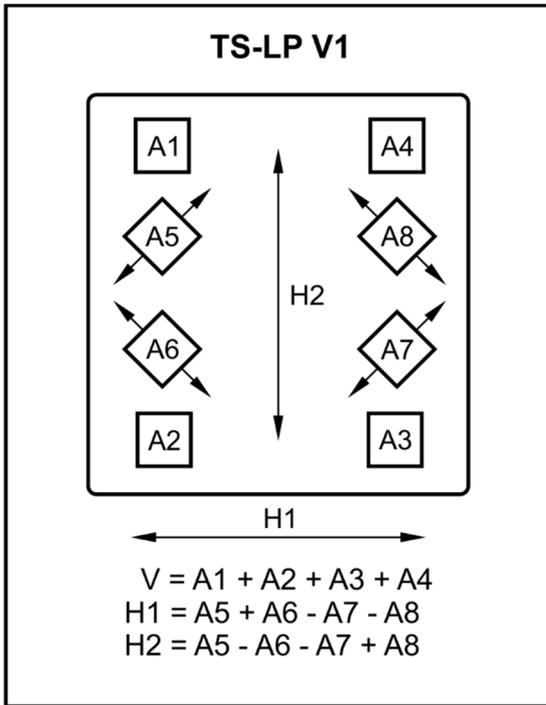
V is vertical, **H1, H2** are horizontal excitations in the directions shown in the pictures below

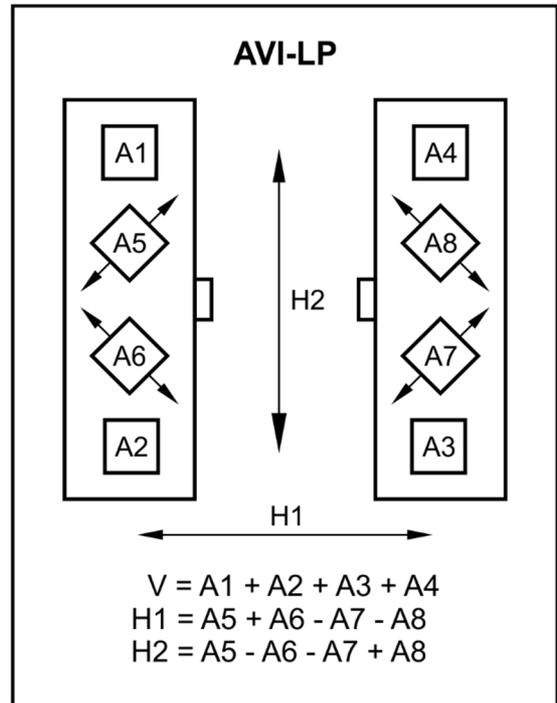AVI-System   TS-System
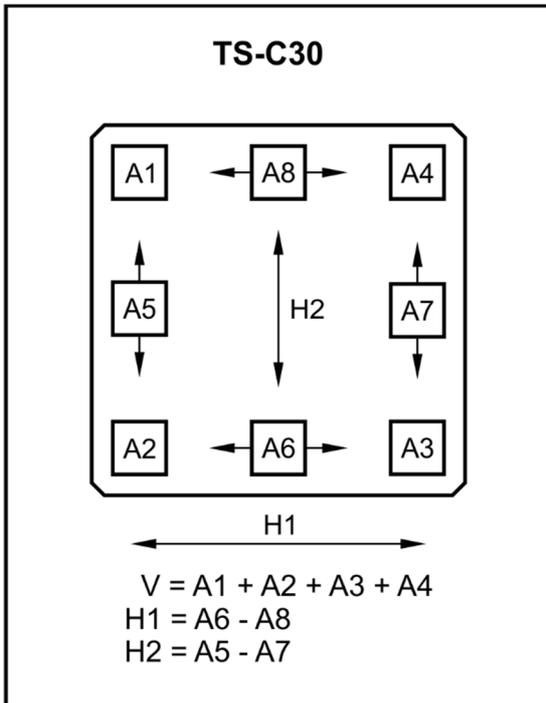
TS-LP V1

A1   A4
A5   A8
A6   A7
A2   A3

H2

H1

$V = A1 + A2 + A3 + A4$
$H1 = A5 + A6 - A7 - A8$
$H2 = A5 - A6 - A7 + A8$

TS-LP V2

H2

A1   A4
A5 A6   A8 A7
A2   A3

H1

$V = A1 + A2 + A3 + A4$
$H1 = A5 + A7$
$H2 = A6 + A8$

TS-LP V2 from serial no.

TS-150 LP: 1734
TS-140 LP: 822
TS-300 LP: 144

TS-C30

A1   A8   A4
A5   H2   A7
A2   A6   A3

H1

$V = A1 + A2 + A3 + A4$
$H1 = A6 - A8$
$H2 = A5 - A7$

AVI-LP

A1   A4
A5   A8
A6   A7
A2   A3

H2

H1

$V = A1 + A2 + A3 + A4$
$H1 = A5 + A6 - A7 - A8$
$H2 = A5 - A6 - A7 + A8$

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Service order

If you suspect that a fault has developed in your device, please fill in the service order form which you can download from our website: www.tablestable.com and send by fax/email to the address below. Our service department will contact you by return. If it proves to be necessary to return the system for repair, you will be issued with an **RMA number** which should then appear on all shipping documents

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Switzerland	**Internet:**	www.tablestable.com

Specifications

Input signal:	Sine, square, triangle wave, max. amplitude 20Vpp
Built in signal generator:	Sine, square, triangle wave, 1-100Hz
Safety Class:	1
Protection class:	IP 20
Dimensions:	170×130×55mm (L×W×H)
Weight:	630g
Temperature range:	5°-40°C / 41°-104°F
Relative humidity:	10-90% (5°-30°C / 41-86°F), 10-60% (30°-40°C / 86°-104°F)
Application:	Indoor
Altitude:	up to 2000m (6500ft)

Technical details of the data, design and illustrations provided in these guidelines are subject to change without notice.