Weatherproof

Tracer Ammunition Ready

Light Screen

WLS06

Short description and technical data

Basic technical specification

Measuring the velocity of ammunition with a tracer is a very difficult problem to solve because the light emitted by the tracer is very intensive and causes usually malfunction of the optical gates (receivers) due to the overloading of the receiving modules. That is why special fast optical gates were developed in our company, which are suitable for accurate measurement of the speed of not only standard ammunition, but also ammunition with a tracer. Instead of standard infrared transmitters and receivers, our original design based on spectrum analysis completely eliminates interfering signals from tracers and muzzle flashes. Measuring of ammunition with a tracer is just as easy as measuring standard ammunition without a tracer.

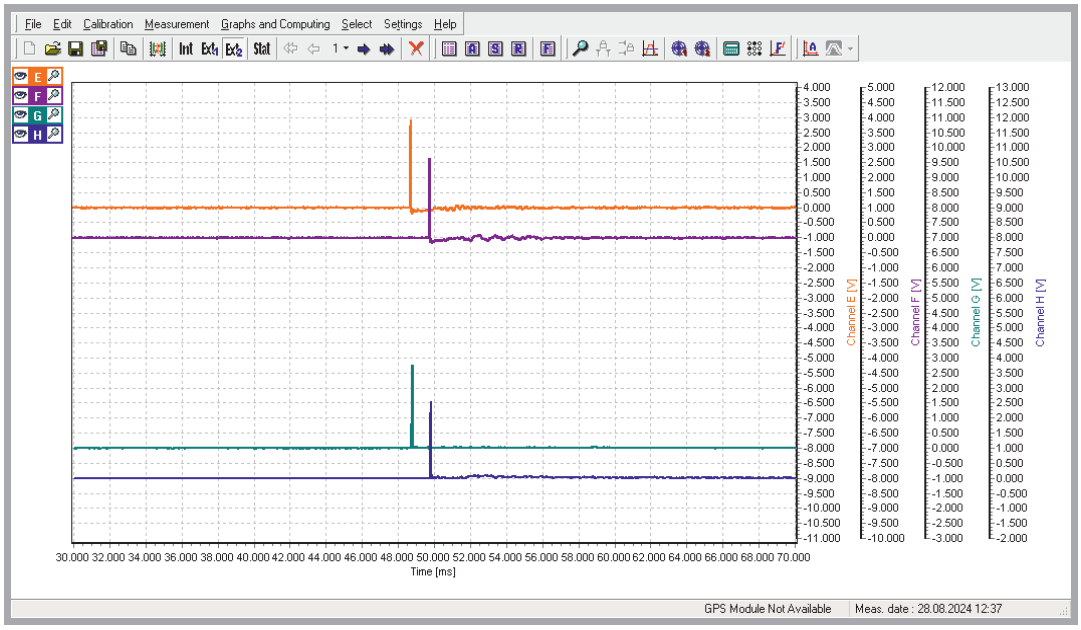
This device has been designed as accessory equipment to Ballistic analyzer BA08M (or previous BA06S etc.) and it can't be usually used separately. On the other side it derives benefit from excellent parameters of BA08M and it integrates with BA08M devices for making very exacting measurement.

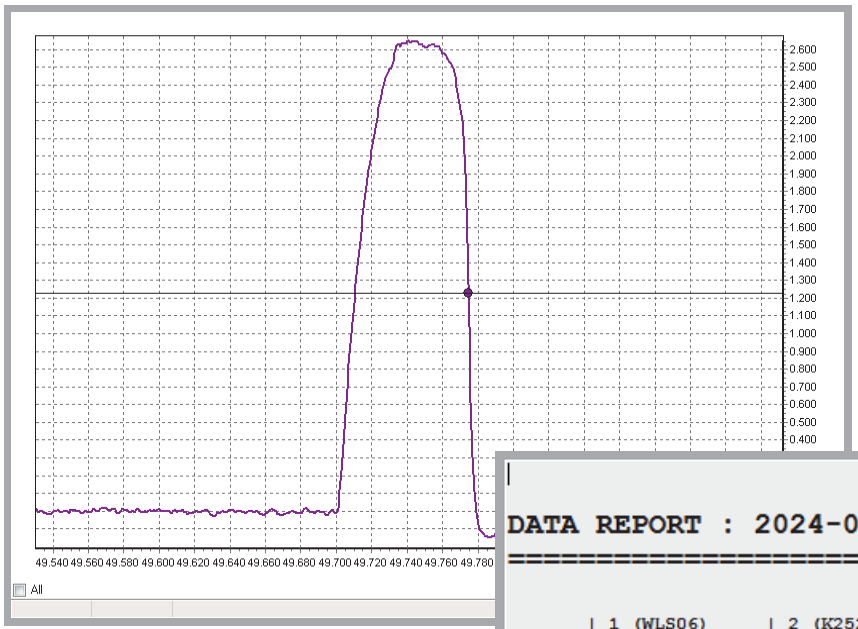
Principle of measurement :	*two high-speed optical gates MOG06*
	- eliminates interfering signals from tracers and muzzle flashes
	- heavy-duty construction in accord with EMC requirements
	- interconnection only by coaxial cables (EMC, low-cost service)
Calibre range :	*min. 4mm to 100mm (with large frame option >155mm)*
Velocity range :	*min. 50 - 2000 m/s*
Velocity inaccuracy :	*<0.2% (200 - 2000 m/s), see Note 1)*
Safe passage area :	*1000 x 1200mm (W x H)*
Active sensor area :	*1000 x 1000mm (W x H)*
Reaction time :	*typ. 4us*
Meas. base for velocity :	*1000mm*
Trigger modes :	*rise / fall edge (= base / nose)*
Shock wave filter :	*selectable BAControl software filter from 0 to 1000us*
Threshold level :	*selectable from -75% to +75% of meas. range*
Output signals :	*BNC AC output START and STOP, 0 to 10V pulse*
Gain range :	*selectable 30x / 10x / 3x*
	30x : calibre <10mm
	10x : calibre 10mm to 50mm
	3x : calibre >50mm
Working temperature :	*-30°C to +40°C (protection from direct sunlight is necessary)*
Protection :	*optical modules IP65*
	electronic box IP63
Air humidity :	*up to 100%, non-condensing*
	(condensation of humidity can cause measurement malfunction,
	but not the instrument damage)
Altitude :	*max. 3000m*
Power :	*electronic box 12...24VDC, WLS max. 40VA (WTS max. 80VA)*
	external power supply 85-264VAC/15VDC (50-60Hz, 50VA, IP50)
Dimensions (approx.) :	*1345 x 1805 x 1075mm (W x H x D)*

Note.1) :
Standard inaccuracy <0.2% is valid for 1MHz Sampling Rate of the Transient Recorder BA08M.
For increasing of accuracy to <0,1% use Sampling Rate 5MHz (velocity 200 ... 1 500 m/s) or 10MHz (velocity 1 500 ... 3 000 m/s).

Software for Ballistic Analyzer BA08M (BA06S)

Output signals and computing of the velocity



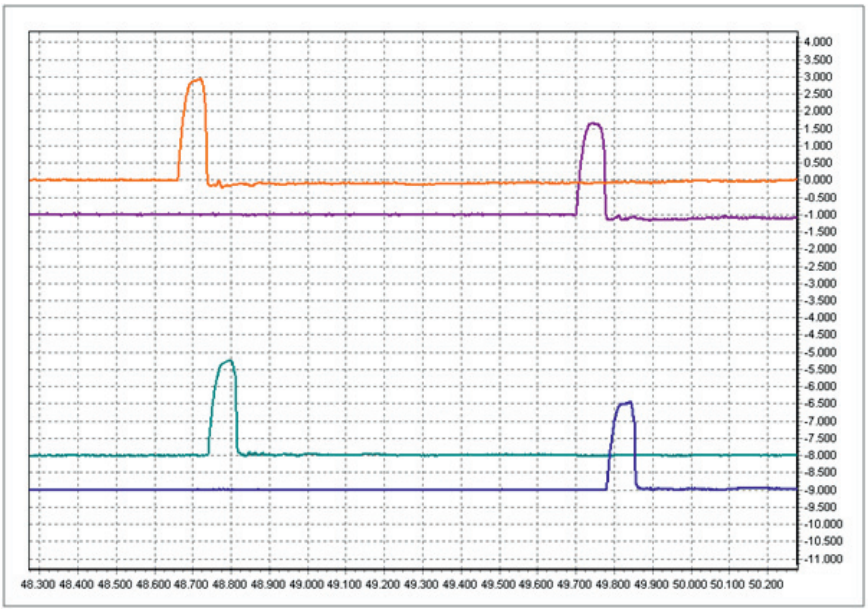


DATA REPORT : 2024-08-28 - 14.5x114

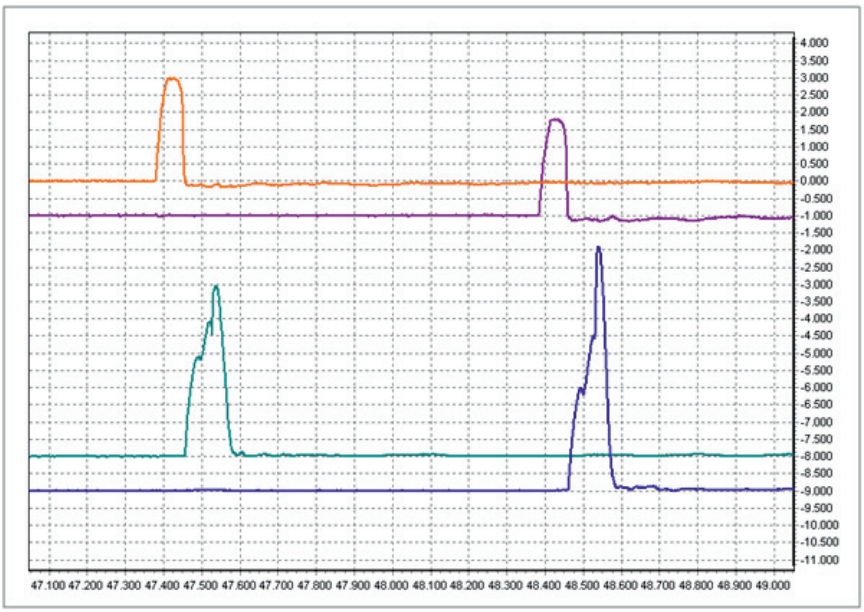
Round	1 (WLS06) Velocity [m/s]	2 (K2521A) Velocity [m/s]	3 (TOF (FD - WLS)) Time [ms]
1	962.0	961.8	48.671
2	962.4	962.3	48.584
3	995.1	999.8	47.394
4	981.4	990.6	47.572
5	994.0	1003.9	46.793
Avg	979.0	983.7	47.803
SD	16.22	20.33	0.8067
Max	995.1	1003.9	48.671
Min	962.0	961.8	46.793
Delta	33.0	42.1	1.878

Real test of the 14.5mm Tracer Ammunition

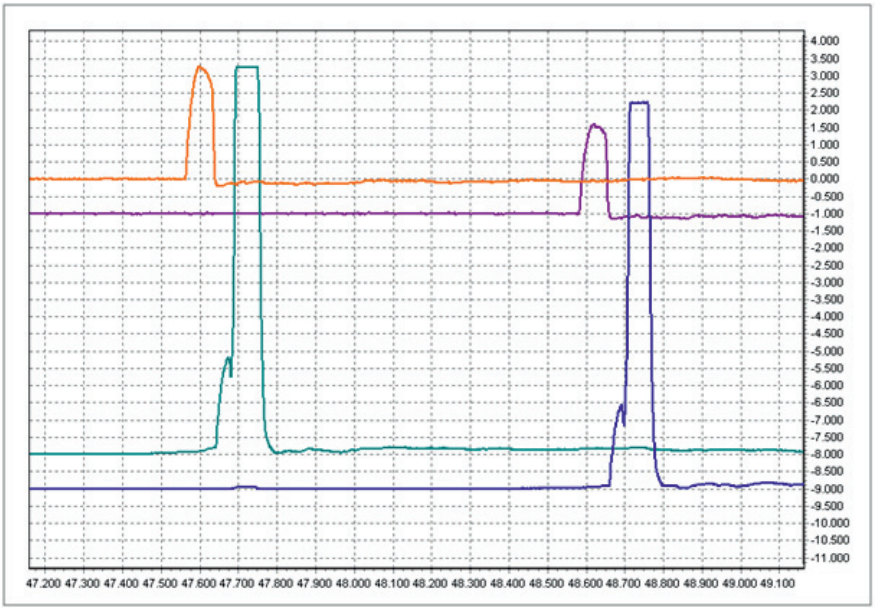
Special double Light Screen was used for the comparative measurement, where the optical modules of the Light Screen WLS06 were mounted together with the standard Light Screen K2521A modules on a common frame. The gain was chosen so that standard ammunition generated approximately the same signal.
The Light Screen was placed at a distance of 50 m from the muzzle of the barrel to ensure sufficient light intensity of the tracer. A BA08ML26 Ballistic Analyzer was used for recording of data, and a FPM01/02-LR Fast Photometer was used to start the measurement, sensing the muzzle flame at a distance of 50m.
The measured curves show excellent suppression of even very intense light from the tracer. Signals from classic gates are distorted or reach limitations (overloading with necessary recovery time), new optical gates show only a certain distortion of the signal only under extreme illumination with a tracer.



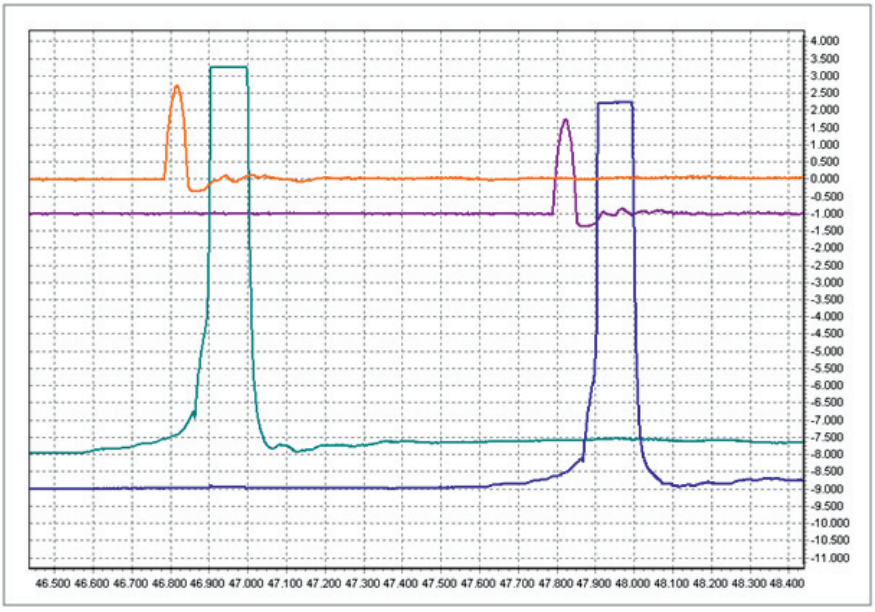
Ammunition : 14.5x114 - API (B-32 armour-piercing incendiary) - no tracer
Upper curves : new WLS06 (yellow = START gate, violet = STOP gate)
Lower curves : standard K2521A (green = START gate, blue = STOP gate)



*Ammunition : 14.5x114 - API-T (BZT armour-piercing incendiary tracer) - **low intensity tracer***
Upper curves : new WLS06 (yellow = START gate, violet = STOP gate)
Lower curves : standard K2521A (green = START gate, blue = STOP gate)



Ammunition : 14.5x114 - API-T (BZT armour-piercing incendiary tracer) - ***high intensity tracer***
Upper curves : new WLS06 (yellow = START gate, violet = STOP gate)
Lower curves : standard K2521A (green = START gate, blue = STOP gate)



Ammunition : 14.5x114 - API-T (BZT armour-piercing incendiary tracer) - ***very high intensity tracer***
Upper curves : new WLS06 (yellow = START gate, violet = STOP gate)
Lower curves : standard K2521A (green = START gate, blue = STOP gate)

Conclusion:

The measured curves show the clear benefit of the new design of the WLS06 gates with active suppression of the unwanted spectrum of interfering signals to ensure accurate measurement of the velocity of problematic ammunition.

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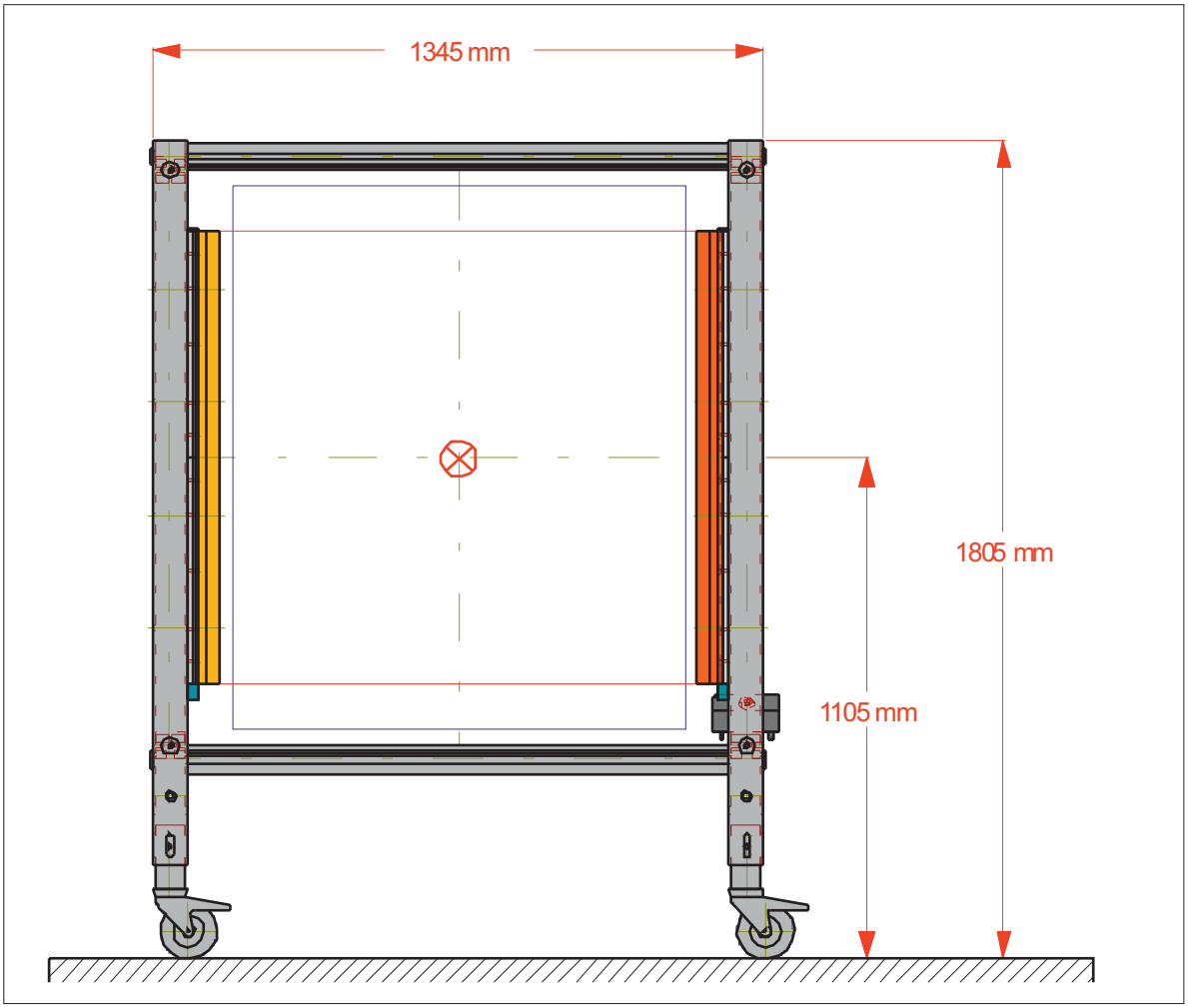

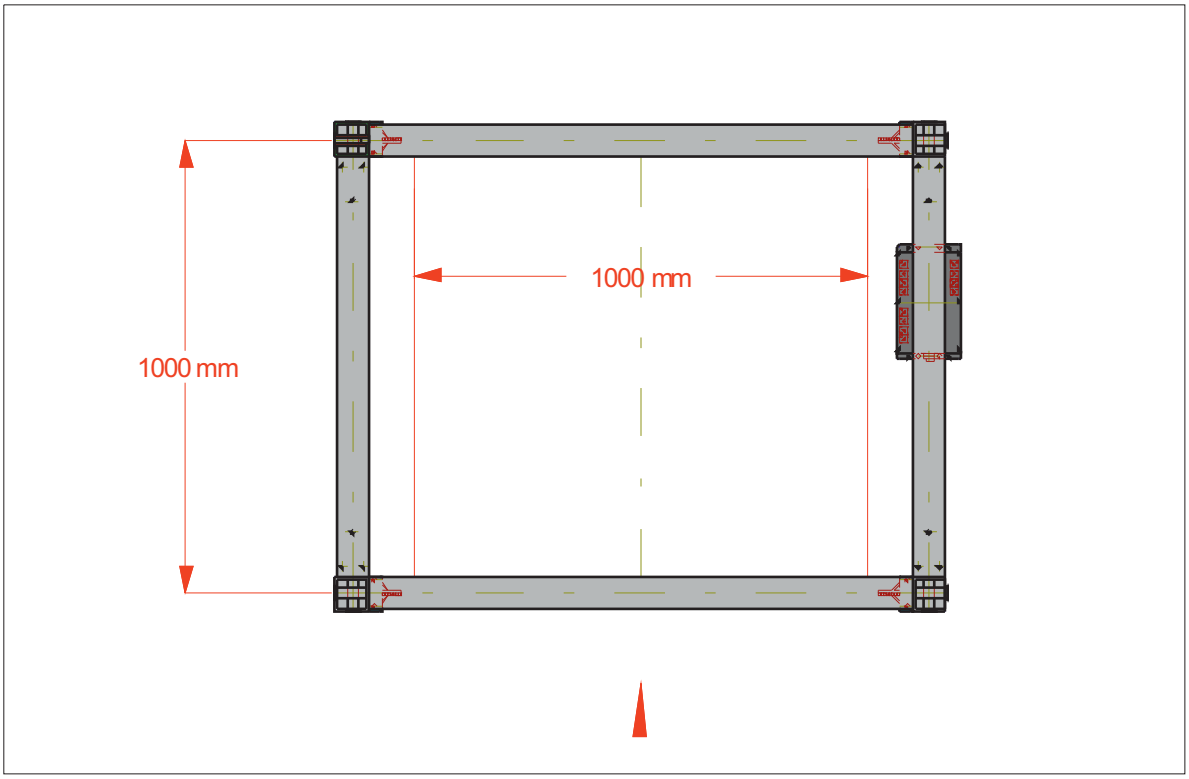

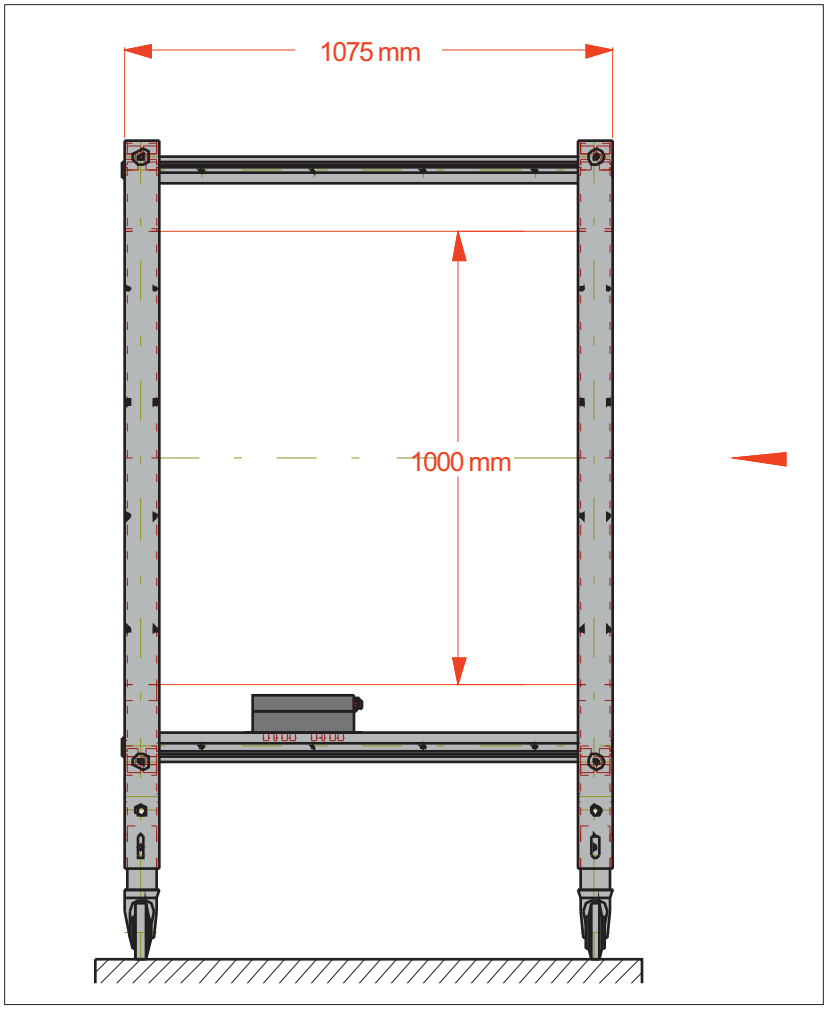
1075 mm
1000 mm