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LATEST PRODUCTS

- **DRS-1**
Doppler radar system
- **UZ-2011**
Universal ballistic breech

MAIN ACTIVITIES

- Research, development and production of the ballistic equipment for testing of the cartridges for hunting, sport or military weapons in accordance with the standards C.I.P., TP-VD, TPF, STANAG, MOPI, MIL etc.
- Testing of small arms and cannons at standard or worsening conditions.
- Testing of the protective materials in accordance with the standards STANAG 2920, AEP-55, NIJ 0101.06.
- Research, development and production of small arms, cannons and ammunition and mounting of the weapons.

CERTIFICATION

- Prototypa-ZM, s.r.o. is a holder of the quality management system certificate EN ISO 9001:2009 and AQAP 2110 (research, development and production in the area of weapons, ammunition and engineering equipment) as well as a holder of NATO codification supplier code 0461G.

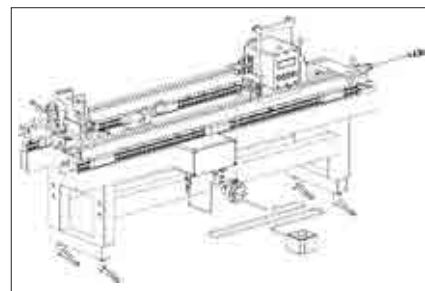
BUSINESS OFFER

- Complete supply of the ballistic test equipment for measurement of velocity, pressure, action time (EPVAT) and accuracy - on key.
- Producing of ballistic equipment for testing of the protection materials (FSP).
- Testing of weapons and ammunition.
- Testing of the protection materials.
- Development and production of the prototypes of weapons.

STZA 10 FIRING REST



3D model of STZA 10



Remote fire control device



TECHNICAL PARAMETERS

Height	380 mm
Length	1330 mm
Width	280 mm
Mass	70 kg



Adapter for pistols and revolvers I



Long guns clamping adaptor (left view)



Adapter for pistols and revolvers II



Long guns clamping adaptor (right view)

STZA 11 RECOIL SYSTEM

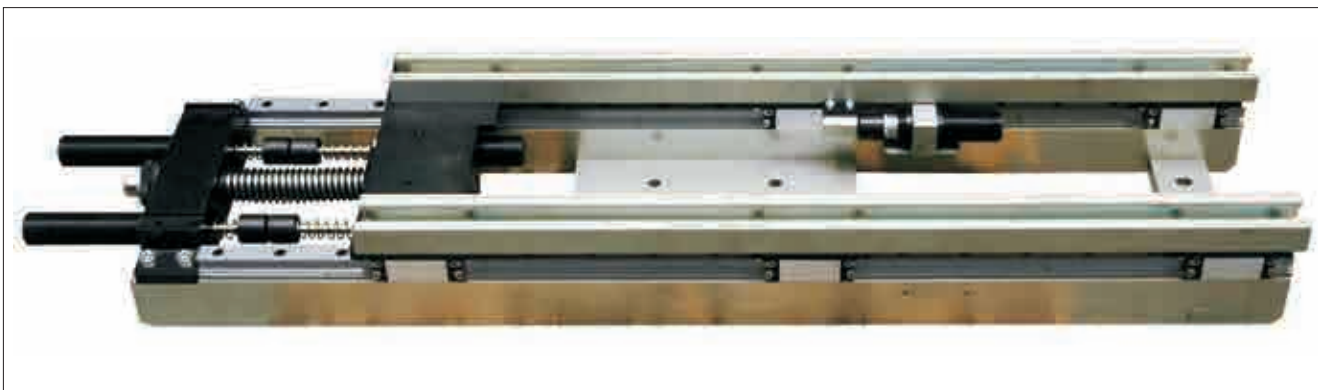


TECHNICAL PARAMETERS

Height	133 mm
Length	1188 mm
Width	280 mm
Mass	70 kg
Max. force of recoil springs	5240 N
Max. Recoil stroke	150 mm
Clamping strip pitch	230 mm
Clamping strip length	900 mm

DESCRIPTION

STZA-11 Recoil system is appointed for working site the job of which is the testing by using of ballistic gauges and cartridges. The STZA-11 Recoil system is appointed for clamping of Ballistic breech BB-20, Universal Ballistic Breech UZ-2010 or UZ-2002 together with the ballistic barrel up to calibre 20 mm. STZA-11 Recoil system allows shoot of ammunition which gives 100 kJ of muzzle energy



STZA 11 Recoil system

STZA 12M1 MOBILE FIRING REST



Remote fire control



Long guns clamping adapter



TECHNICAL PARAMETERS

Height	1000 mm
Length	1270 mm
Width	700 / 960 mm
Mass	350 kg
Caliber range	12,7 mm



Pistols and revolvers clamping adapters

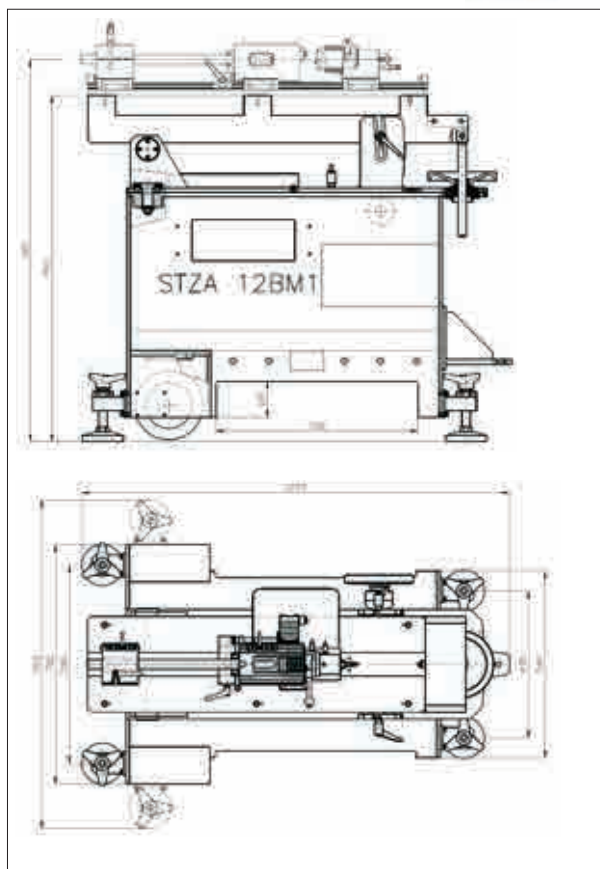


STZA 12M1 with UZ-2002



STZA 12M1 with BB-20

STZA 12BM1 MOBILE FIRING REST



DESCRIPTION

Mobile firing rest STZA 12BM1 is designated for a work places, specialized in ballistic testing of cartridges, within calibers up to the .338 Lapua Mag. Device is designated for the universal ballistic breech UZ-2002 and doesn't contain a recoil system.

TECHNICAL PARAMETERS

Height	1009 mm
Length	1238 mm
Width	700 mm (960 mm optional)
Total mass	320 kg
Towing bar mass	8 kg
Recoiling parts	No recoiling parts
Elevation range	$\pm 5^\circ$
Azimuth range	$\pm 5^\circ$

STZA 12BM1 with mounted Universal Ballistic Breech UZ-2002

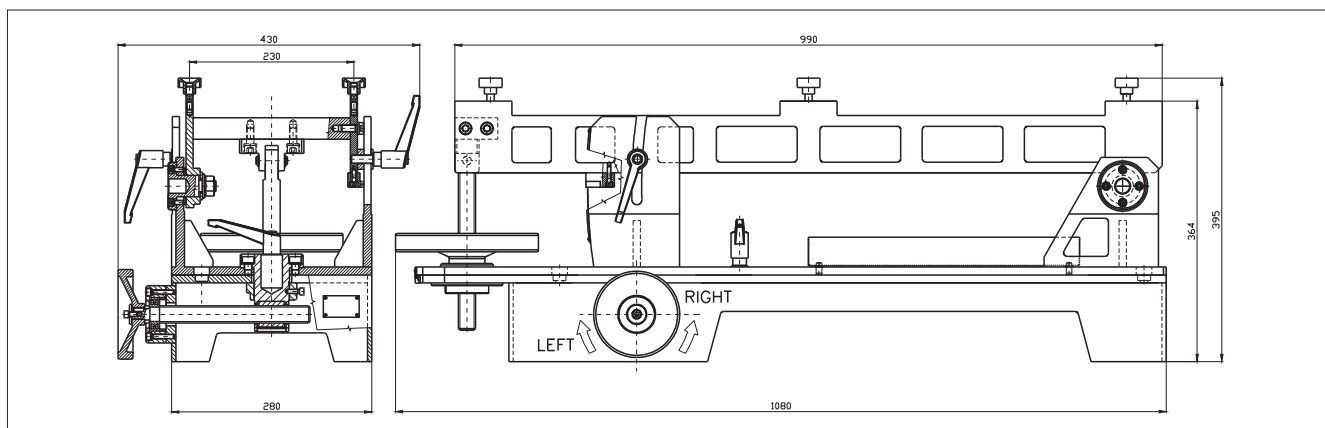
STZA 12B LVL MOBILE FIRING REST

TECHNICAL PARAMETERS

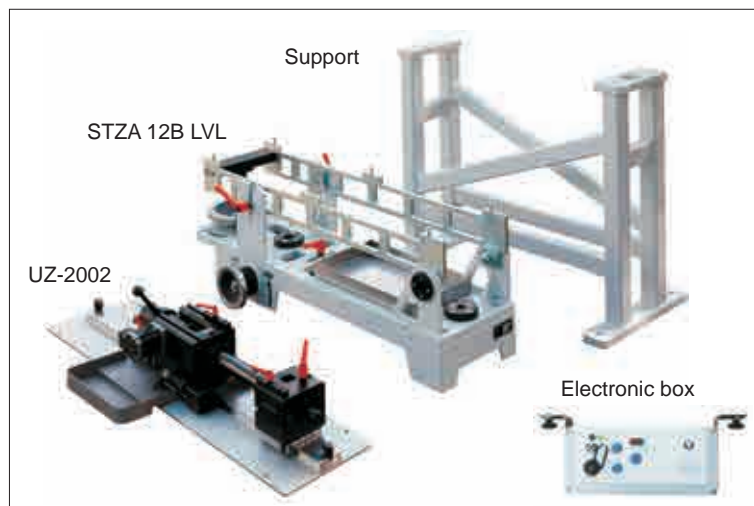
Height	395 mm
Length	1080 mm
Width	430 mm
Mass	71 kg
Mass of support	65 kg
Elevation range	$\pm 5^\circ$
Azimuth range	$\pm 5^\circ$

DESCRIPTION

The modification STZA 12B LVL (Low Version Light) allows testing of cartridges within the calibre up to 375 H&H Mag. in Universal ballistic breech UZ-2002. STZA 12B LVL is light version of firing rest and allow transportation by private car.



Technical drawing of dimensions



Dismantling for transportation



Side view

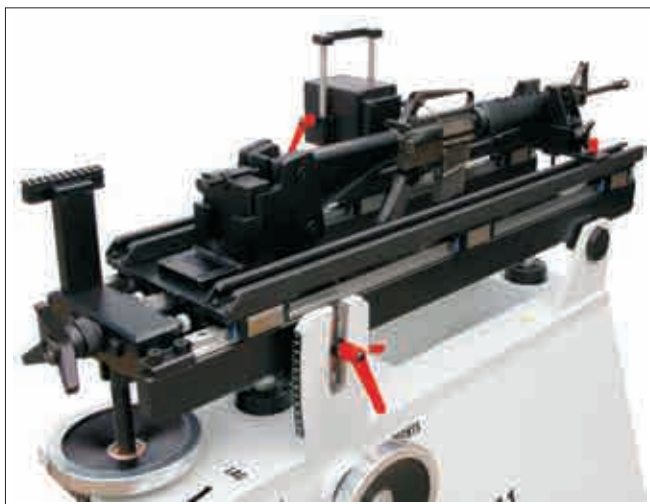
STZA 13M1 MOBILE FIRING REST



Long guns clamping adapter (front view)



Long guns clamping adapter (back view)



TECHNICAL PARAMETERS

Height	1070 mm
Length	1350 mm
Width	970 mm
Total mass	500 kg
Caliber range (up to and including)	12,7 mm



Pistols and revolvers clamping adapters



Remote fire control

STZA 14 FIXED FIRING REST

TECHNICAL PARAMETERS

Height	1035 mm
Length	1200 mm
Width	700 mm
Total mass	330 kg
Caliber range (up to and including)	12,7 mm

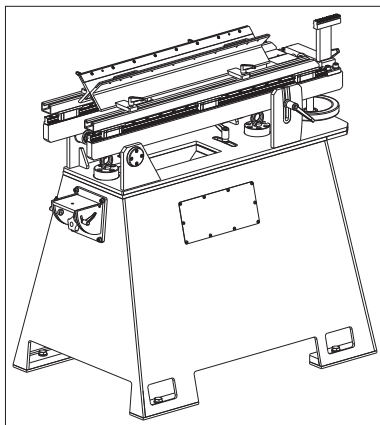
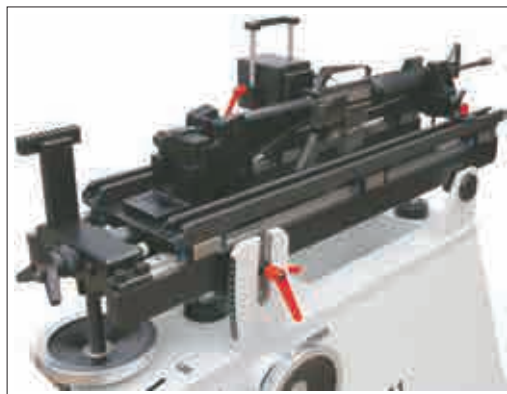


Remote fire control

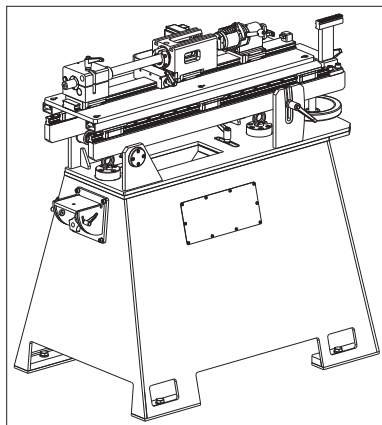
Pistols and revolvers clamping adapters



Long guns clamping adapter (back view)



UZ-67 Adapter (Prizm X)



UZ-2002 Mounting

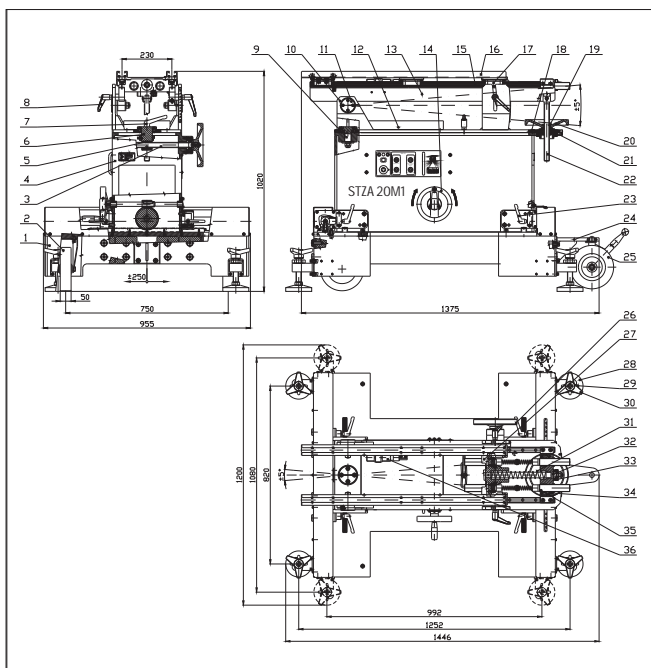


Long guns clamping adapter (front view)

STZA 20M1 MOBILE FIRING REST

TECHNICAL PARAMETERS

Height	1020 mm
Length	1446 mm
Width	950 mm
Mass	905 kg
Caliber range (up to and including)	20 mm
Transversal movement	± 250 mm
Elevation range	$\pm 5^\circ$
Azimuth range	$\pm 5^\circ$



Firing rest



Side view

STZA 25 FIXED FIRING REST

TECHNICAL PARAMETERS

Height	1045 mm
Length	1270 mm
Width	740 mm
Total mass	1300 kg
Caliber range (up to and including)	25 mm



STZA 25 with BB-20 Ballistic breech



Front view

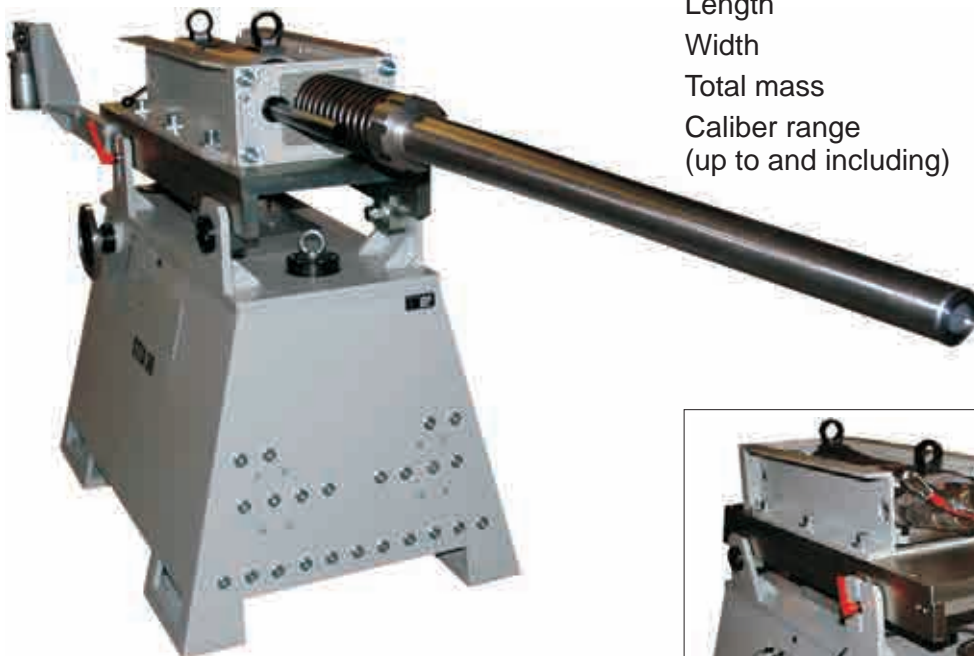


Side view

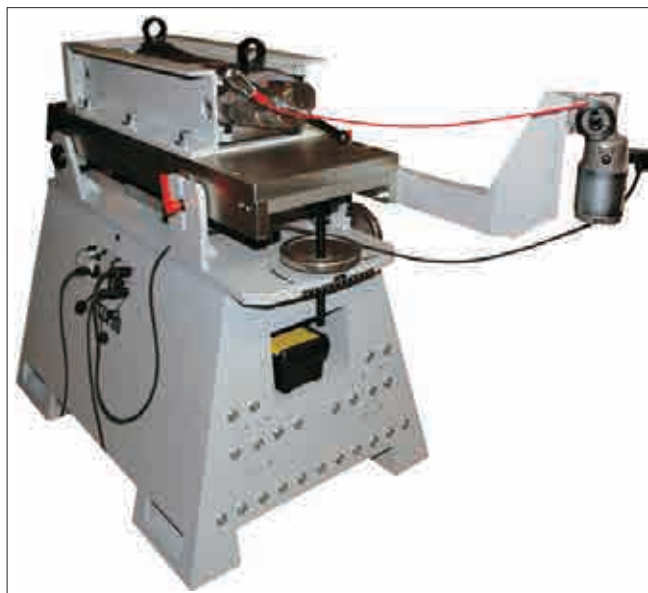
STZA 30 FIXED FIRING REST

TECHNICAL PARAMETERS

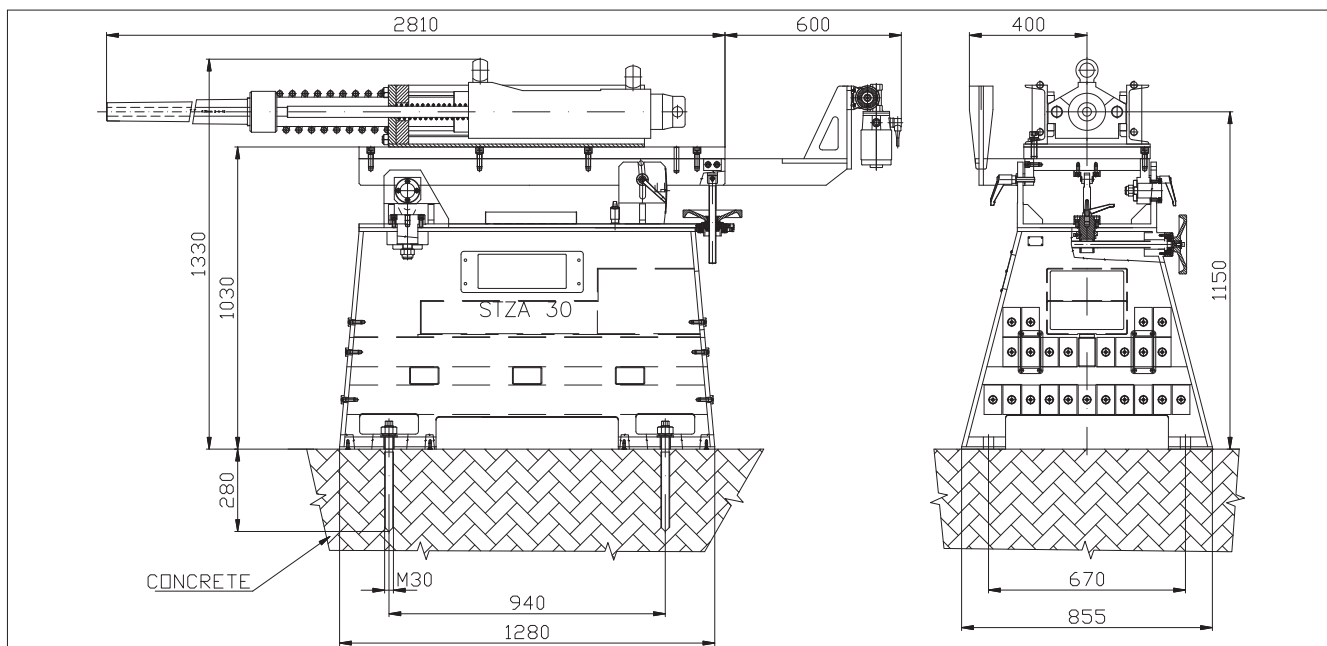
Height	1035 mm
Length	1400 mm
Width	860 mm
Total mass	2050 kg
Caliber range (up to and including)	30 mm



Side view



Back view



LIST OF BALLISTIC TEST BARRELS

A BALLISTIC TEST BARRELS MANUFACTURED ACCORDING TO C.I.P. (for Universal ballistic breech UZ-67 and UZ-2002)

A.1 Shot cartridges

12/63,5	12/70	14/65	16/70	20/70	28/70	410/65
12/65	12/76	16/65	20/65	20/76	410/50,7	410/70
12/67	12/89	16/67	20/67	28/63,5	410/63,5	410/76

A.2 Pistol and revolver cartridges

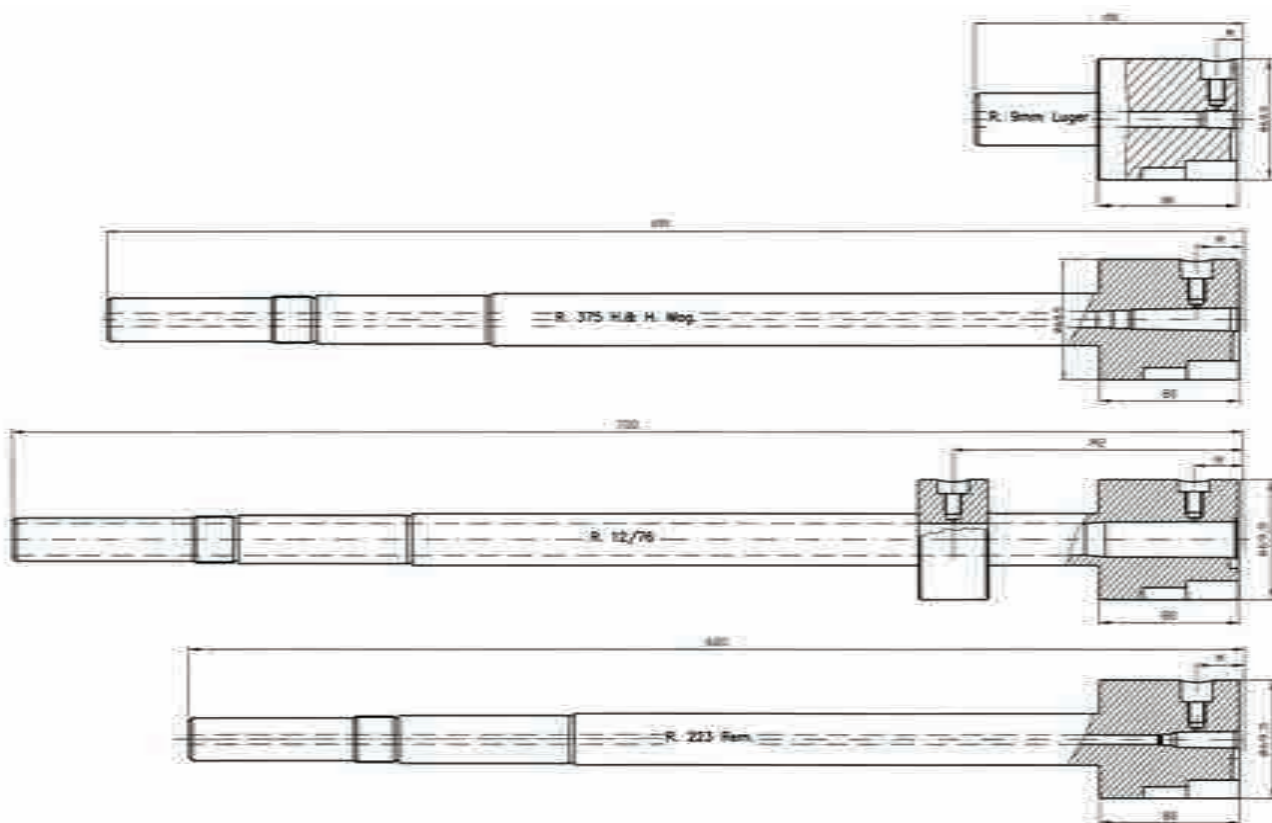
4,6 x 30	9 x 21	10 mm Auto	38 Super Auto	454 Casull
5,45 x 18	9 x 24 Win.	32 S&W	40 S&W	460 S&W Mag.
6,35 Browning	9 mm Makarov	357 Magnum	44 Rem. Mag.	
7,5 FK	9 mm Brown. court	357 SIG	45 Auto	
7,62 x 25 Tokarev	9 mm Luger	38 Special	45 Colt	
7,65 Browning	10 x 22 T	38 Spl. Wad. Cut.	45 GAP	

A.3 Cartridges for industrial use, Cartridges for alarm weapons

5,7/16	6,3/14	6,8/18	6 mm Flobert Blanc	9 mm PA Blanc	22 Long Blanc
6,3/10	6,3/16	9 x 17	315 Blanc	9 mm PA Rubber	
6,3/12	6,8/11	10 x 18	8 mm Blanc	380R Blanc/9 mm R Blanc	

A.4 Rimmless, rimmed, magnum and rimfire cartridges

4 mm Randz. courte	7 mm Win. Short. Mag.	9 x 53 R	30 Carbine
4 mm Randz. long	7 mm 08 Rem.	9,3 x 62	30-06 Spring.
5,6 mm (22) Flobert a balle	7 x 57	9,3 x 64 Brenneke	30-30 Win.
5,6 x 36 R (22 Hornet)	7 x 57 R	9,3 x 72 R	300 AAC Blackout
5,6 x 39	7 x 64	9,3 x 74 R	300 H&H Mag.
5,6 x 50 R Mag.	7 x 65 R	17 Hornet	300 Win. Mag.
5,6 x 52 R	7,5 x 55 Suisse	17 Rem.	300 Win. Short. Mag.
5,7 x 28	7,62 x 39	17 Mach 2	303 British
6 mm ME Flobert short	7,62 x 54 R	22 Long Rifle	308 Win.
6 mm Flobert a balle	8 x 57 R 360	22 Short	338 Lapua Mag.
6,5 Grendel	8 x 57 J	22 Win. Mag. R.F.	358 Norma Mag.
6,5 x 52 R	8 x 57 JS	22 WMR	375 H&H Mag.
6,5 x 54 M.-Sch.	8 x 57 JR	204 Ruger	416 Rigby
6,5 x 57	8 x 57 JRS	22-250 Rem.	45-70 Gout.
6,5 x 57 R	8 x 60 S	222 Rem.	458 Lott
6,5 x 55 SE	8 x 60 RS	223 Rem.	458 Win.
6,5 - 284 Norma	8 x 64 S	270 Win.	50 Browning
7 mm Rem. Mag.	9 mm Flobert a balle	270 Win. Short. Mag.	
6,8 mm Rem. SPC	8 x 68 S	243 Win.	



B BALLISTIC TEST BARRELS MANUFACTURED ACCORDING TO MILITARY STANDARDS

B.1 Barrels for Universal ballistic breech UZ-67 and UZ-2002

5,45 mm Soviet [5,45 x 39,5]	7,62 mm Nosin-Nagat [7,62 x 54 R]
5,56 mm NATO [5,56 x 45 Ball Ss109]	7,62 x 51 Subsonic
5,56 mm NATO [5,56 x 45 Ball M193]	7,65 mm Browning [7,65 x 17]
7,62 mm Tokarev [7,62 x 25]	9 mm Makarov [9 x 18 Soviet]
7,62 mm Soviet Model 1943 [7,62 x 39]	9 mm Parabellum [9 x 19]
7,62 mm NATO [7,62 x 51]	

B.2 Barrels for BB-20 Ballistic breech

12,7 mm Soviet [12,7 x 107]
50 Browning [12,7 x 99]
14,5 Soviet [14,5 x 114]
20 mm Long Solothurn [20 x 138 B]
20 mm US M 39 [20 x 102]
20 mm Hispano-Suiza [20 x 110]
20 mm Oerlickon [20 x 110]
20 mm Hispano-Suiza [20 x 139]
23 mm NR-23 [23 x 115]
23 mm ZU-23 [23 x 152 B]
23 mm GS [23 x 115]

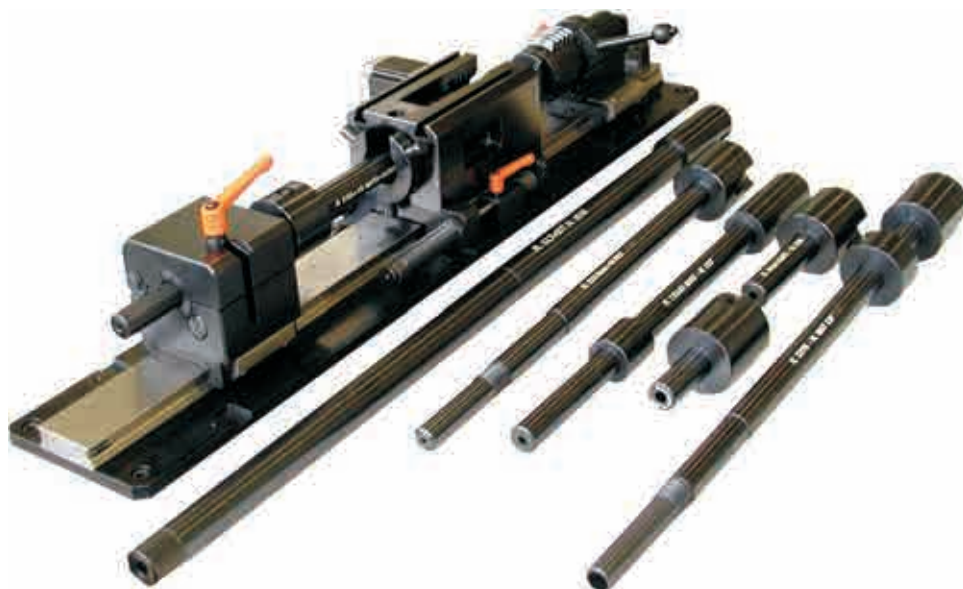
B.3 Barrels for BB-30 Ballistic breech

25 mm Bushmaster I [25 x 137]
30 mm Czech M53 [30 x 220]
30 mm Soviet 2A42 [30 x 165]
30 mm Bushmaster II [30 x 137]
30 mm MK30-Alu [30 x 173]
35 mm Bushmaster III [35 x 228]
20 mm FSP 20/1800
20 mm FSP 20/1300
40 x 46 LV
40 x 53 HV

B.4 Special purpose test barrels

.22 FSP	20 mm FSP
.30 FSP	Ø6.35 Ball
.50 FSP	

UZ-2002 UNIVERSAL BALLISTIC BREECH



DESCRIPTION

It serves for clamping of ballistic barrels for testing of ammunition for rifles, pistols, revolvers and shotguns, and for cartridges with rim fire and for bagged cartridges for expansion apparatus. UZ-2002 is capable of clamping ballistic barrels from various manufacturers.

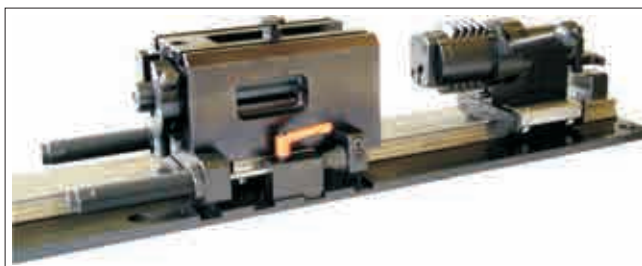
TECHNICAL PARAMETERS

Height	200 mm
Length	960 mm
Width	230 mm
Mass	50 kg
Caliber range (up to and including)	12,7 mm

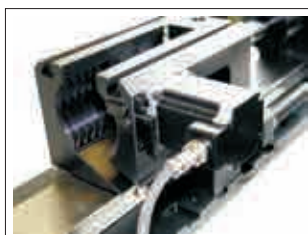
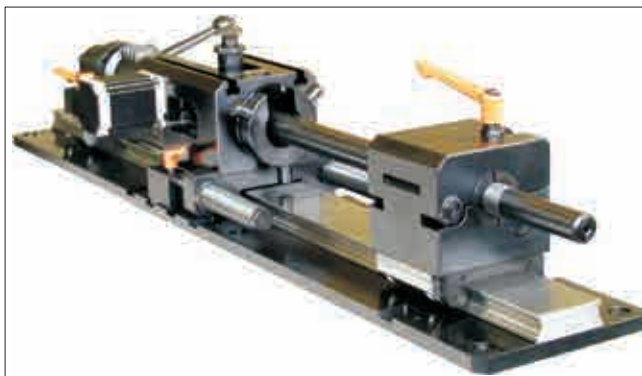
EPVAT measurement



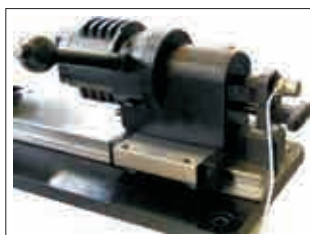
Pistol barrel



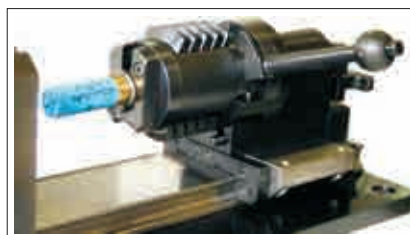
Rifle barrel



Remote and manual fire control



Action time measurement



Breech block for shotguns

AUZ-2002 AUTOMATED UNIVERSAL BALLISTIC BREECH



Back view

TECHNICAL PARAMETERS

Height	600 mm	Caliber range	375 H&H Mag.
Length	1450 mm	Rate of fire	2 - 3 shots/min.
Width	700 mm	Magazine capacity	46 cartridges
Mass	100 kg		

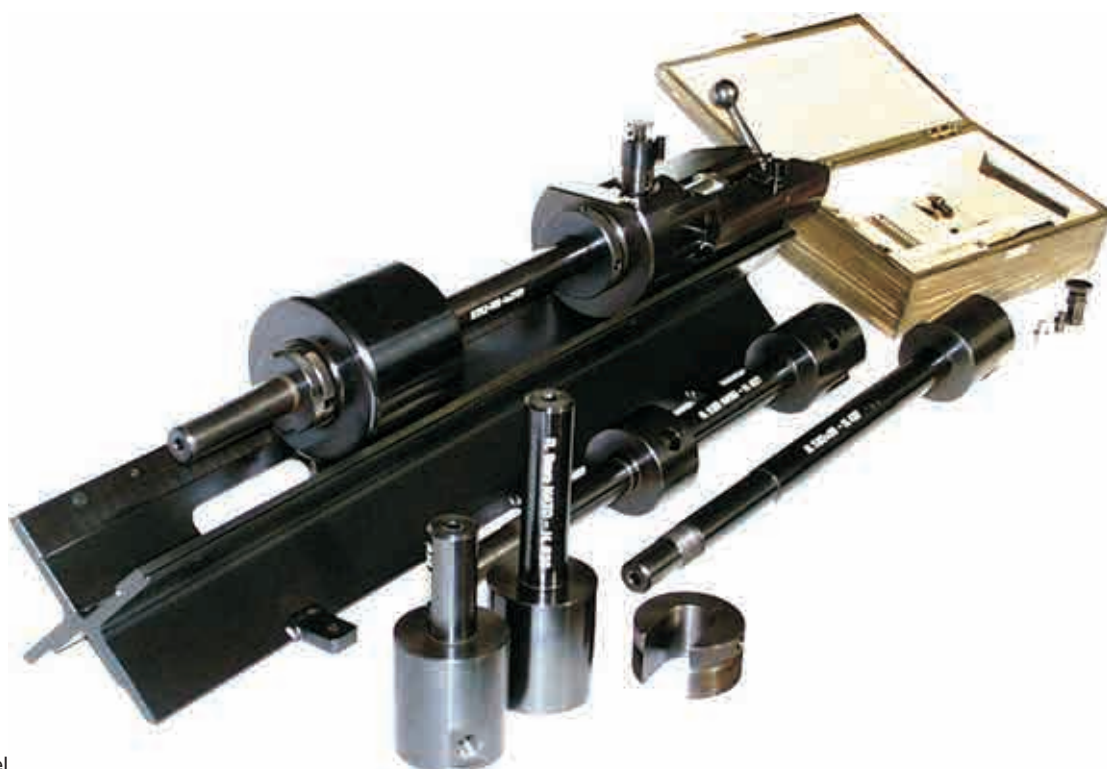


AUZ-2002 Mounted on STZA-13



AUZ-2002 Mounted on STZA-13

UZ-67 UNIVERSAL BALLISTIC BREECH

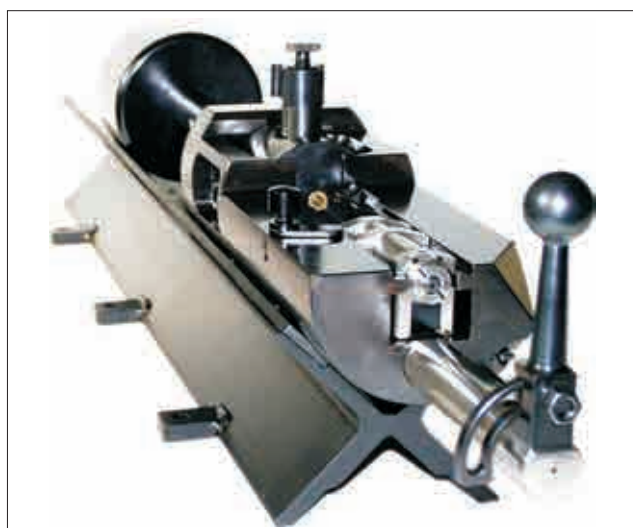


Pressure ballistic barrel
with pressure crusher gauge

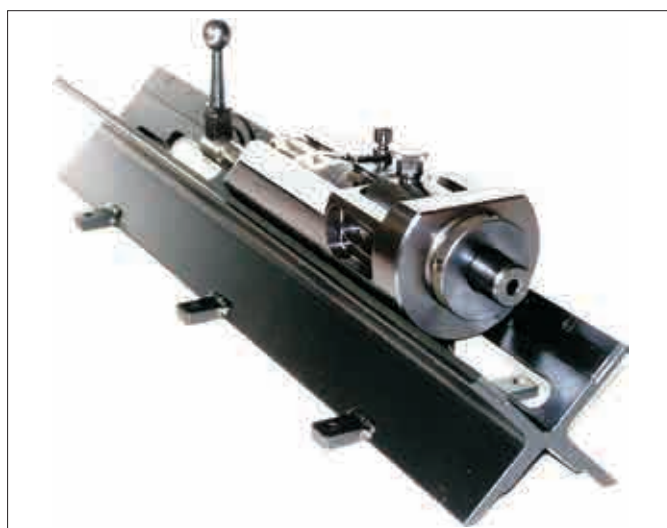


TECHNICAL PARAMETERS

Height	130 mm
Length	350 mm
Width	150 mm
Mass of the front weight	8 kg
Total mass	13 kg



Rifle barrel



Pistol barrel

UZ-2011 UNIVERSAL BALLISTIC BREECH



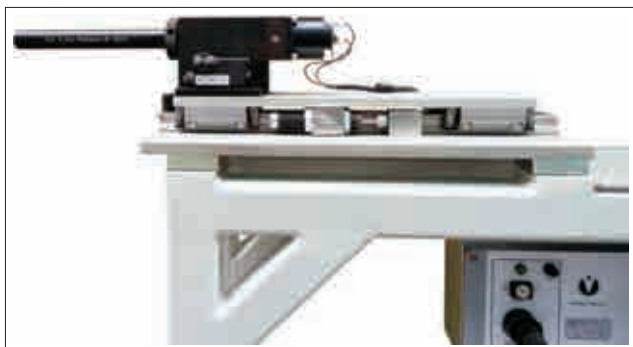
UZ-2011, Recoil system, Electronic remote fire control and Support

TECHNICAL PARAMETERS

Height	170 mm
Length	500 mm
Width	250 mm
Total mass	25 kg
Caliber range (up to and including)	338 Lapua Mag.

- electronic remote fire control - electromagnetic
- optional: Recoil system, Support

UZ-2011 and Recoil system - side view



DESCRIPTION

UZ-2011 Universal ballistic breech works as a single-action manually operated weapon provided with a shift breech block used for testing of protection materials.

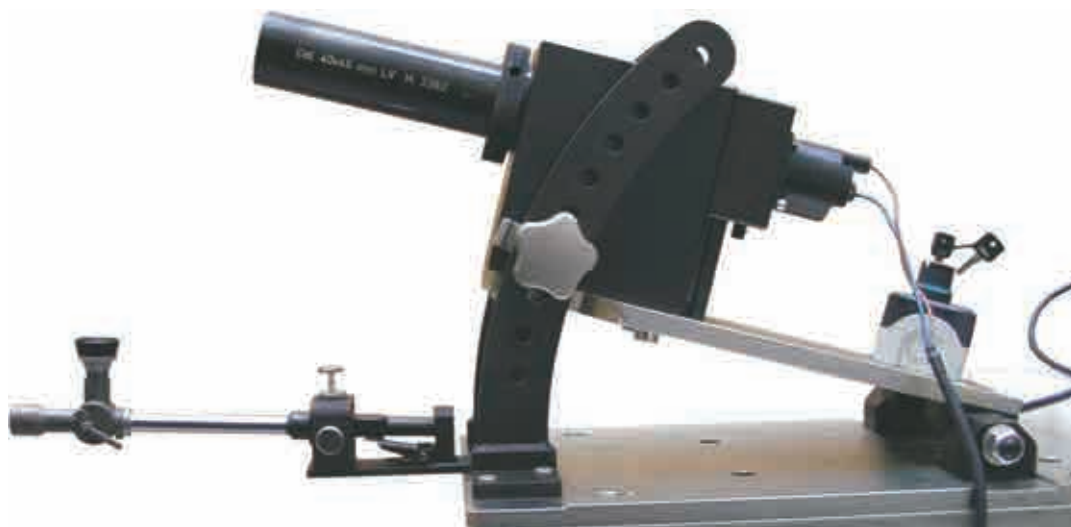


Back side view



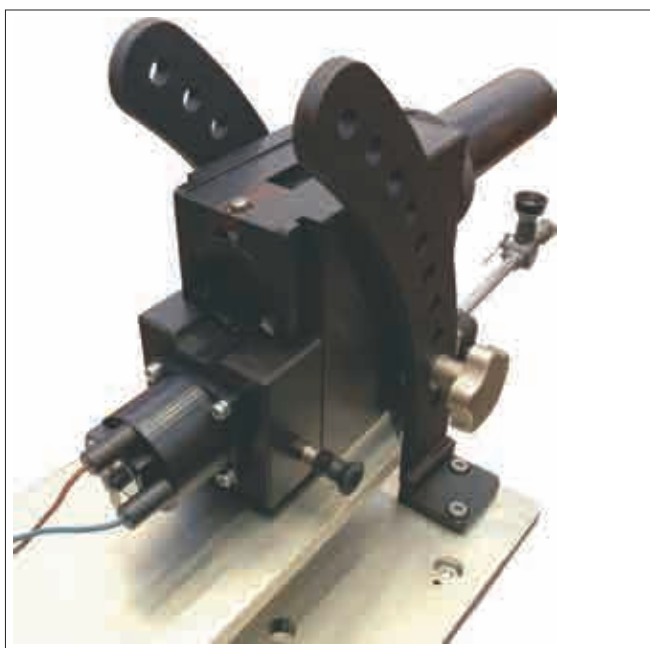
Electronic remote fire control box

UZ-2011/40 UNIVERSAL BALLISTIC BREECH



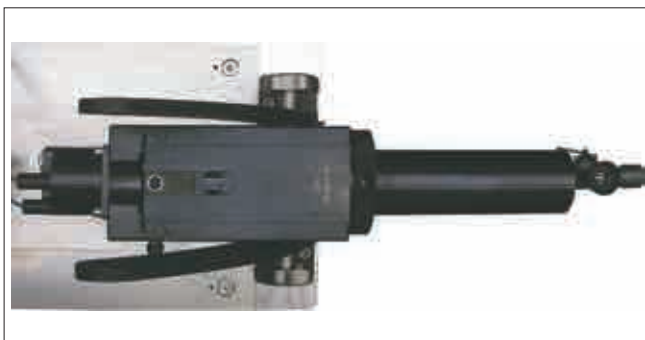
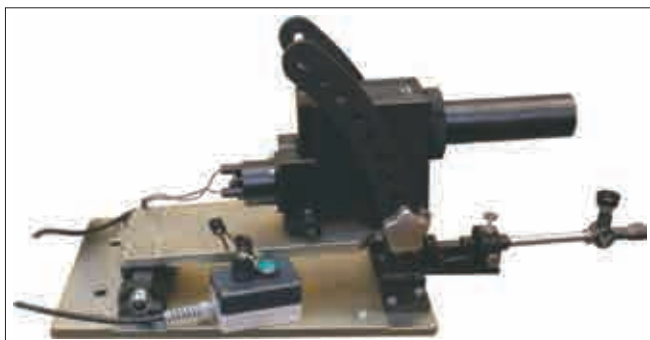
DESCRIPTION

UZ-2011/40 test gun operation is based on a single-action manually operated weapon principle. The test gun UZ-2011/40 is designed for shooting of 40 mm cartridges. The gun can be fitted into Prototypa firing rests STZA. For shooting at longer distances there is the base with elevation mechanism. Triggering is provided through Remote fire control box. Firing (initialization of the cartridge primer) is provided by firing pin including linear hammer accelerated by electromagnet.



TECHNICAL PARAMETERS

Caliber	40 mm
Cartridge	40 x 46 mm LV 40 x 53 mm HV
Length (barrel and elevation mechanism included)	750 mm
Width	280 mm
Height	335 mm
Base dimension	480 x 280 x 15 mm
Total mass	47 kg
Barrel mass	4 kg
Operating temperature rate	-25 °C to +40 °C
Input voltage	230 V / 50-60 Hz
Output voltage (for electromagnet triggering)	DC 18-38 V
Elevation range	0° - 45° (step 5°)





STZA 40 FIXED FIRING REST

DESCRIPTION

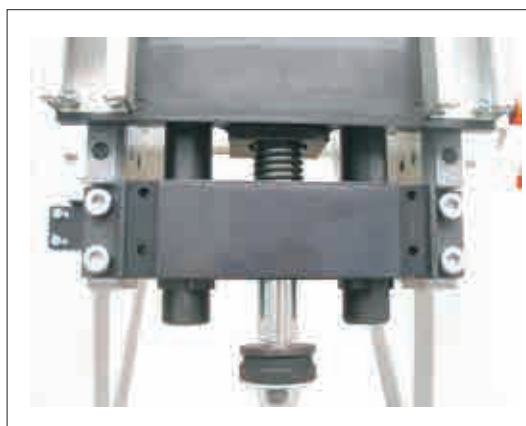
STZA 40 Fixed firing rest (with maximum 45° elevation angle) is determined as a base for tightening of ballistic weapons. High elevation angle offering to fire cartridges at maximum reachable distances. STZA 40 Fixed firing rest is suitable for firing of 40mm grenades of UZ-2011/40 Universal ballistic breech (40x46mm LV and 40x53mm HV).

TECHNICAL PARAMETERS

Height	1075 mm
Length	1290 mm
Width	630 mm
Total Mass	211 kg
Maximum force of recoil spring	276 N
Maximum recoil stroke	75 mm
Clamping strip pitch	230 mm
Clamping strip length	1016 mm
Elevation ranges	from -5° to 45°



Elevation scale

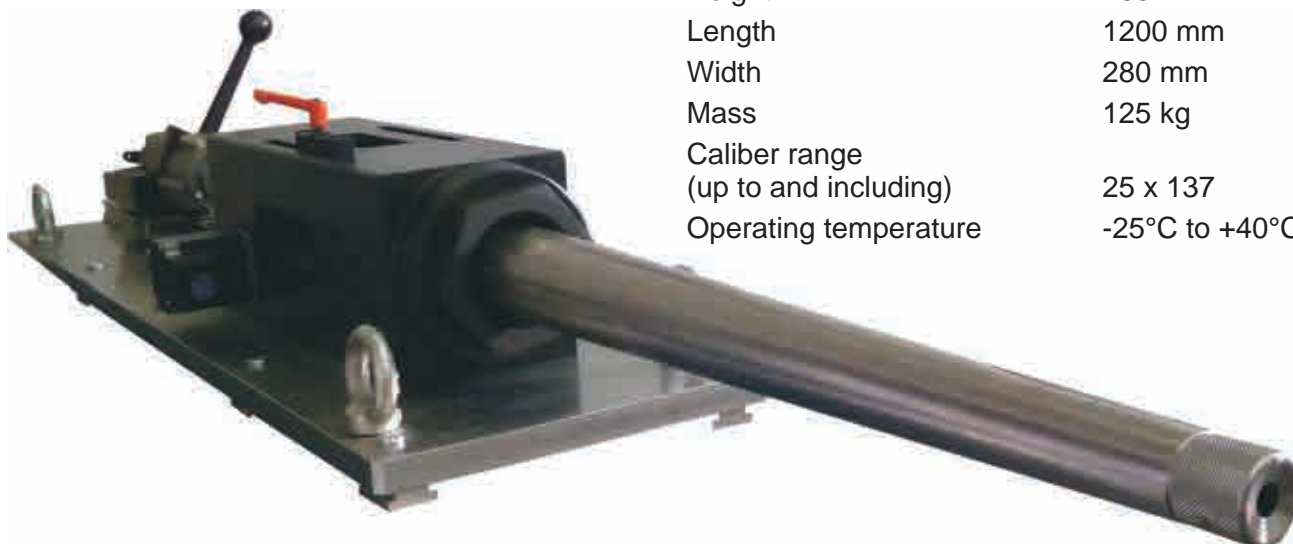


Rear block

UZ-2010 UNIVERSAL BALLISTIC BREECH

TECHNICAL PARAMETERS

Height	165 mm
Length	1200 mm
Width	280 mm
Mass	125 kg
Caliber range (up to and including)	25 x 137
Operating temperature	-25°C to +40°C



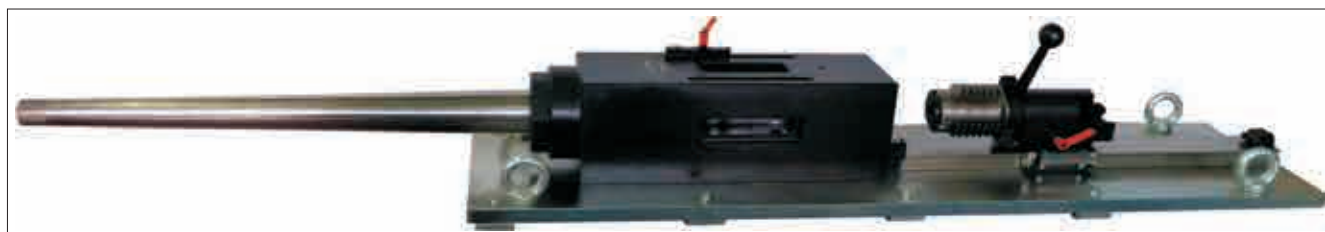
DESCRIPTION

UZ-2010 test gun works as a single-action manually operated weapon provided with a screw breech block. A percussion mechanism cocking takes place in the course of the breech unlocking. After a gunshot (manual or remote operation) a withdrawal and ejection of the cartridge case is done manually.



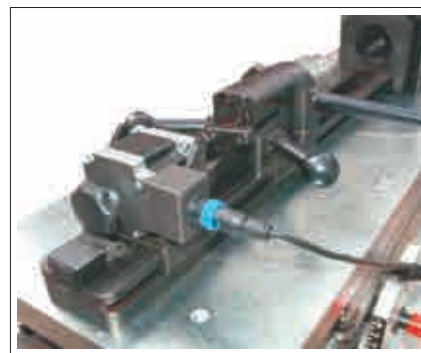
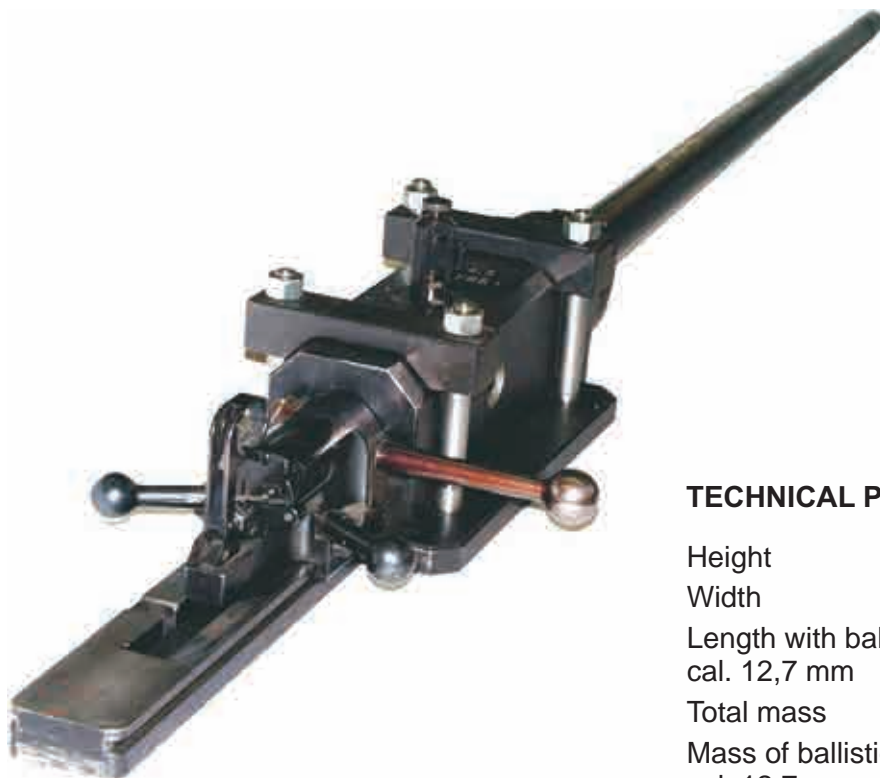
Side view

UZ-2010 fixed on STZA



UZ-2010 with remote fire control

BB-20 BREECH BLOCK



Electrical remote control

TECHNICAL PARAMETERS

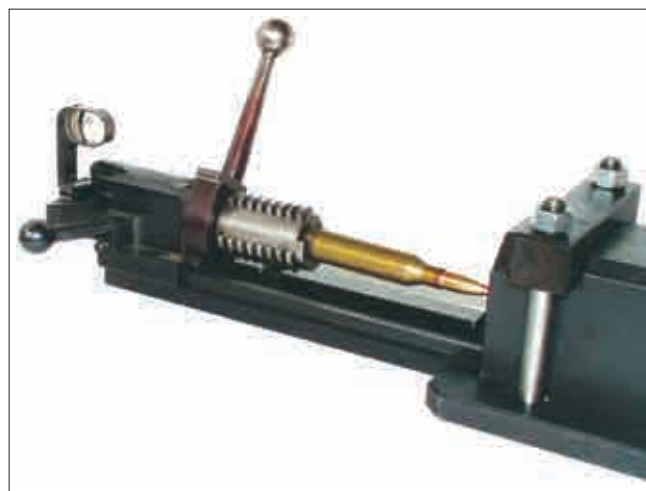
Height	150 mm
Width	110 mm
Length with ballistic barrel cal. 12,7 mm	430 mm
Total mass	50 kg
Mass of ballistic barrel cal. 12,7 mm	12,6 kg

RANGE OF CALIBERS

12,7 x 107 mm	20 mm FSP-20/1300
12,7 x 99 mm	20 mm FSP-20/1800
14,5 x 114 mm	23 mm ZU
20 x 102 mm	23 mm GSh
20x 139 mm	



Top view

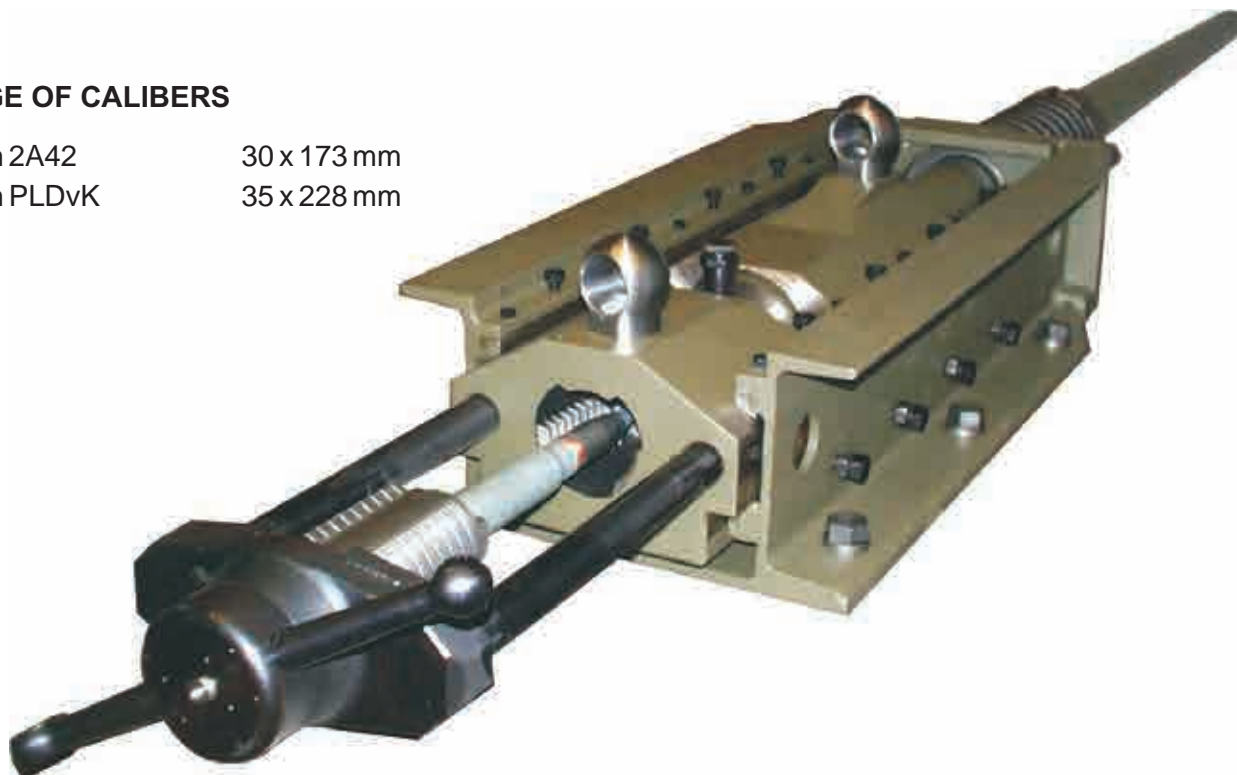


BBB-14,5 x 114 mm Breech Block

BB-30 BALLISTIC BREECH

RANGE OF CALIBERS

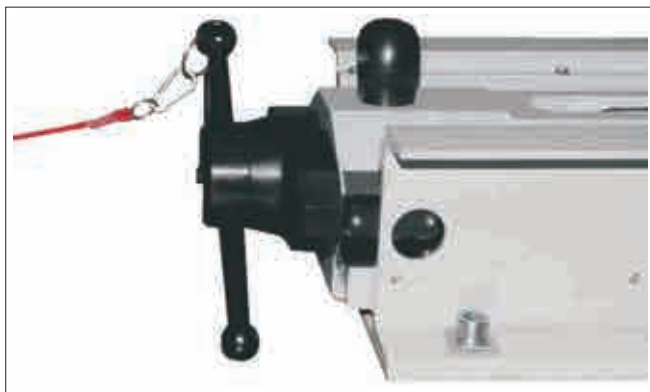
30 mm 2A42	30 x 173 mm
30 mm PLDvK	35 x 228 mm



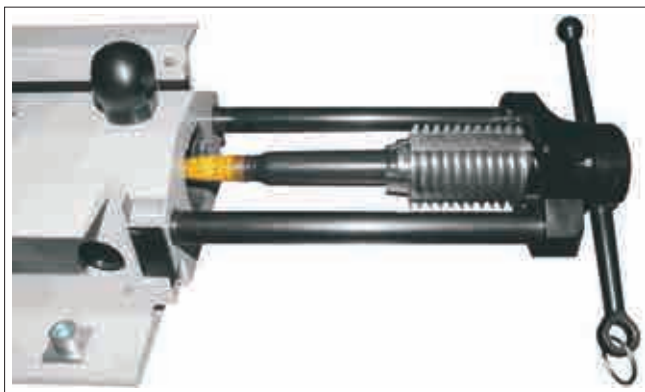
BB-30 with firing rest STZA-30

TECHNICAL PARAMETERS

Height	300 mm
Width	430 mm
Length with ballistic barrel cal. 30 mm 2A42	2700 mm
Total mass	380 kg



Trigger apparatus



Breech block

BREECH BLOCK SYSTEM

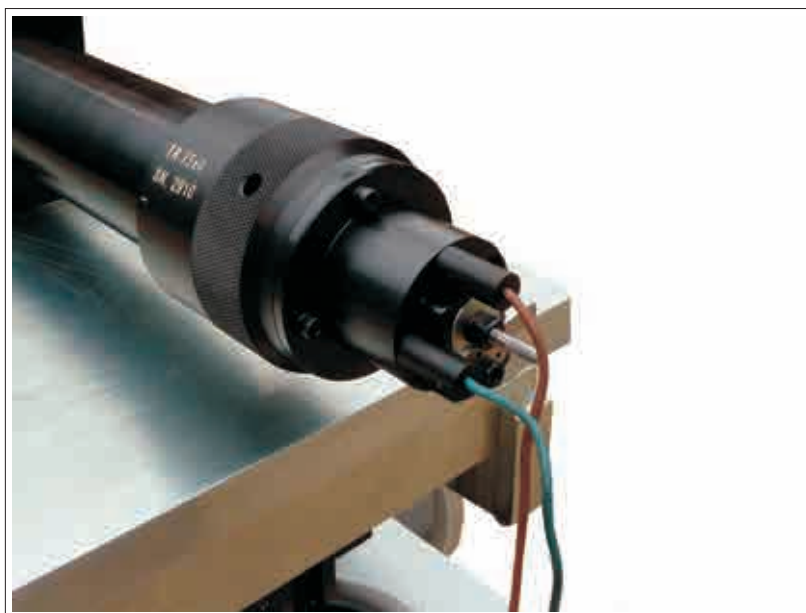
DESCRIPTION

Breech block system assembly with ballistic test barrel serves for shooting of cartridges up to caliber 25mm. Breech block system is designated for clamping on STZA-25 Fixed firing rest. Breech block system works as a single-action manually operated weapon provided with a screw breech block. A percussion mechanism cocking by electro magnet. Withdrawal and ejection of the cartridge case is manual.



TECHNICAL PARAMETERS

Caliber range	from 20 to 25 mm
Breech block thread	TR75x4
Operating temperature range	from -25°C to +40°C
Input voltage of Electronic box	AC 230 V
Length of cable of remote firing box	25 m



TR75 x 4 Breech block system prepared for shot

FSPM TEST BARREL SYSTEM

DESCRIPTION

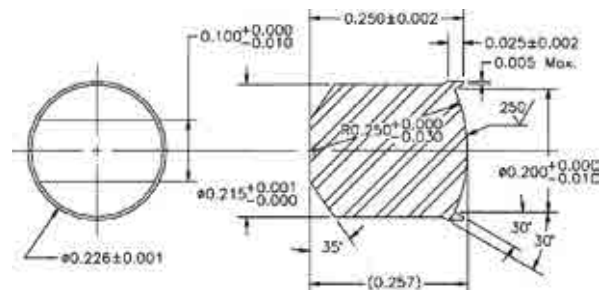
FSPM test barrel system serves for shooting of FSP (Fragment Simulating Projectile) calibers .22FSP, .30FSP and .50FSP. Test barrel system is designated for clamping on STZA-25 Fixed firing rest. System works as a single-action manually operated weapon provided with a screw breech block. A percussion mechanism cocking by electro magnet. Withdrawal and ejection of the cartridge case is manual.



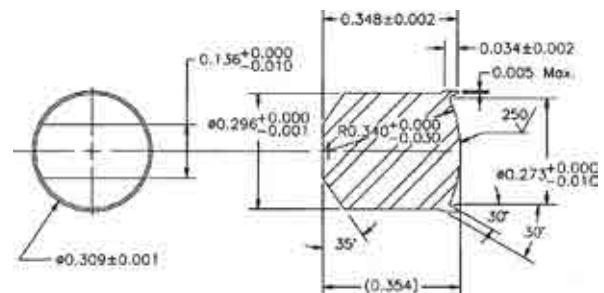
TECHNICAL PARAMETERS

.22 FSP Test Barrel / Chamber 14,5 x 114	1600 mm
Length of barrel	
.30 FSP Test Barrel / Chamber 14,5 x 114	1400 mm
Length of barrel	
.50 FSP Test Barrel / Chamber 14,5 x 114	1800 mm
Length of barrel	

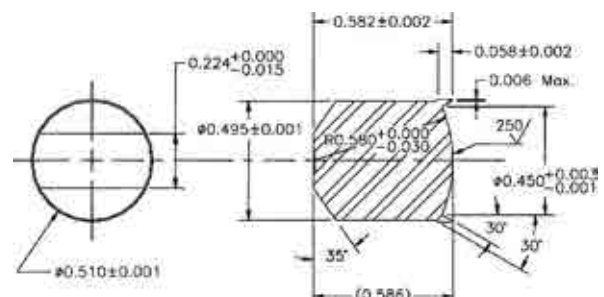
Chamber pressure	max 450 MPa
Breach block thread	TR65 x 4
Operating temperature range	-25°C to +40°C
Input voltage of Electronic box	AC 230 V
Length of cable of remote firing box	25 m



Fragment Simulator Caliber .22



Fragment Simulator Caliber .30

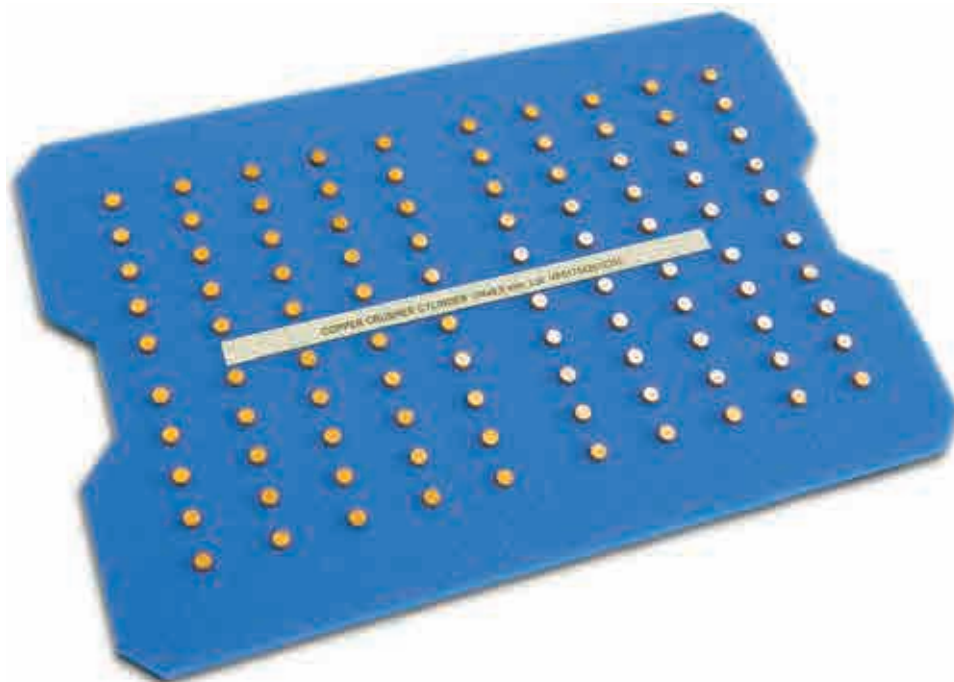


Fragment Simulator Caliber .50



FSPM test barrel system prepared for shot

COPPER CRUSHERS CRUSHER PRESSURE GAUGES



Crusher types

Cylinders	3/4,9
	4/6
	4/6,5
	5/7
	5/8,1
	6/9,8
	8/13



Type Z1 threaded pressure gauges (piston O11,29 mm)

Z1 threaded pressure gauges

Piston diameter	O3,91 mm
	O5,05 mm
	O6,18 mm
	O11,29 mm



Insert pressure gauges

Insert pressure gauges

Gauge volume	4,08 cm ³
	7,80 cm ³
	16,00 cm ³
	35,00 cm ³
	44,00 cm ³

FRAGMENT SIMULATOR CALIBER 20 mm



BB-20 Ballistic breech + breech block FSP-20 + barrel Prototypa FSP-20/1800

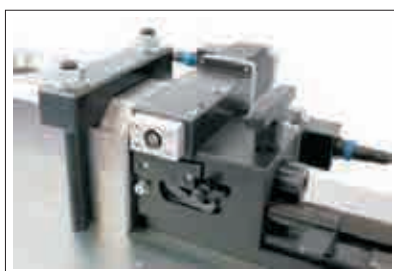
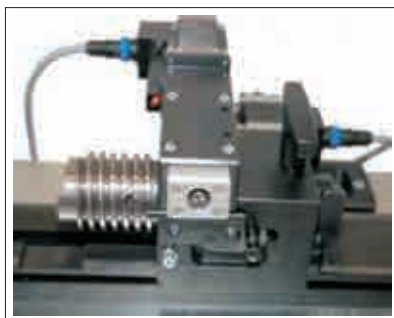


BB-20 Ballistic breech + barrel 20 x 102 mm

TECHNICAL PARAMETERS

Muzzle velocity (barrel 20 x 102 mm)	800 to 1300 m/s
Muzzle velocity (barrel 20 x 139 mm)	800 to 1400 m/s
Muzzle velocity (barrel Prototypa FSP-20/1800)	800 to 1800 m/s
Height	165 mm
Length (barrel including)	2705 mm
Width	240 mm
Total mass	70 kg

Breech block FSP-20 (open)



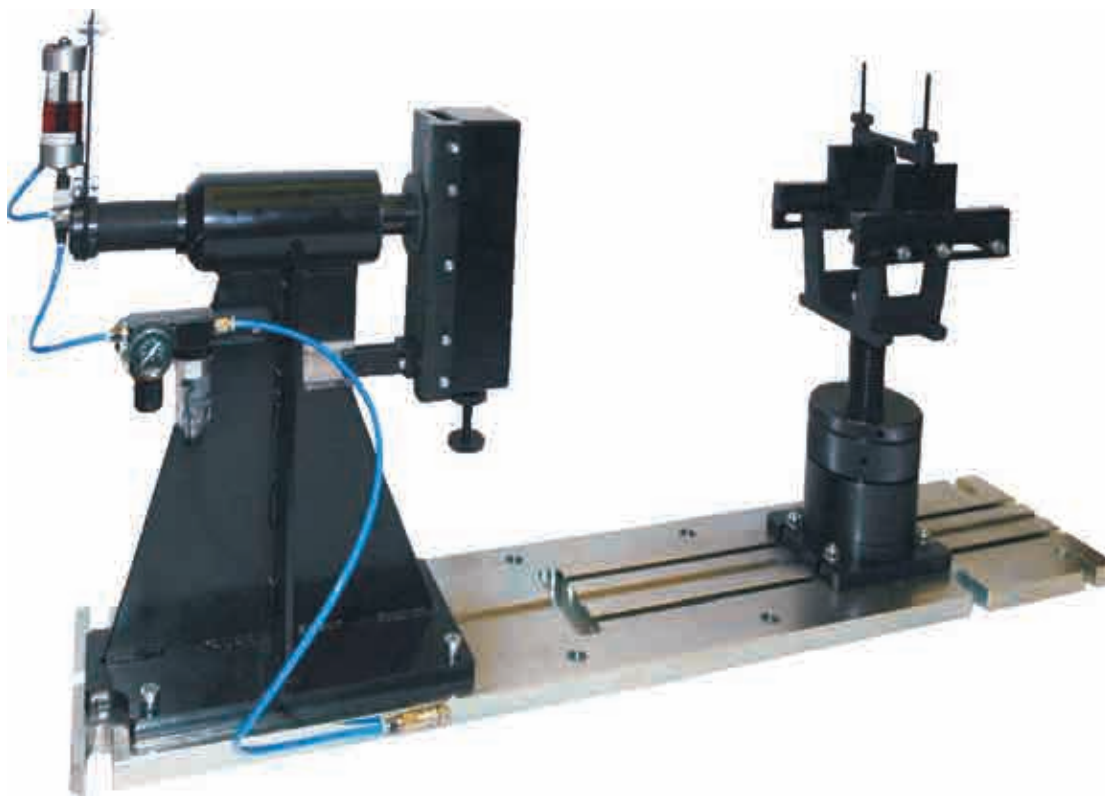
Breech block FSP-20 (locked)

BB-20 Ballistic breech + barrel 20 x 102 mm on STZA-20 Firing rest



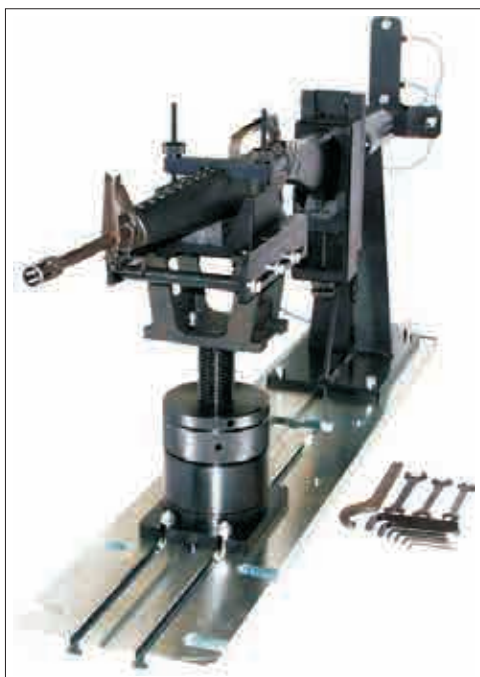
Cartridge 20 x 102 mm - electrical primer
Cartridge 20 x 139 mm - percussion primer

WEAPON MOUNT 1980



DESCRIPTION

The 1980 Weapon mount is capable of carrying out various tests of small arms ammunition and weapons when mounted on a suitable base. Object of the Tests is to ensure consistent proof results are obtained regardless of where or who carries out the proof. The 1980 Weapon mount is complete within itself and requires only a suitable rigid mounting and any such adaptors or fixtures as needed to secure the weapon system proof.



PTU-1 PROGRAMMABLE TRIGGER UNIT



TECHNICAL PARAMETERS

Voltage inputs

Maximal voltage	$\pm 10 \text{ V}$
Treshold	0,1 - 2,0 ·
Minimal pulse width	0,5 - 1000 μs ·
Impedance	10 k Ω

Trigger output

Voltage level	0,1 - 2,7 V ·
Pulse width	0,1 - 10,0 ms ·
Impedance	50 Ω

Acoustic treshold	80 - 130 dB
Time interval range	100 μs - 10 s
Time resolution	125 ns
Battery	2 x 1,5 V, AAA, 1050 mAh
Operation time on battery	80 h

- programmable parameter

DESCRIPTION

- for exact triggering of ballistic measurement and recording instruments (high-speed camera, flash units, radar etc.)
- triggering by acoustic signal or external voltage signal with programmable delay
- real-time calculation of trigger time of photographic equipments based on current velocity
- simple velocity measurement with conjunction of optical light gates
- two voltage inputs with programmable threshold, polarity and minimal trigger pulse width
- trigger output with programmable level, polarity and pulse width
- built-in microphone with programmable threshold
- programmable velocity limits and base of light gates
- simple control using four buttons and built-in LCD display
- battery powered portable equipment
- connector for external power supply

DRILLING AND MARKING JIGS



VRP-B Universal for shotgun cartr.



VRP-K Universal for rifle cartr.



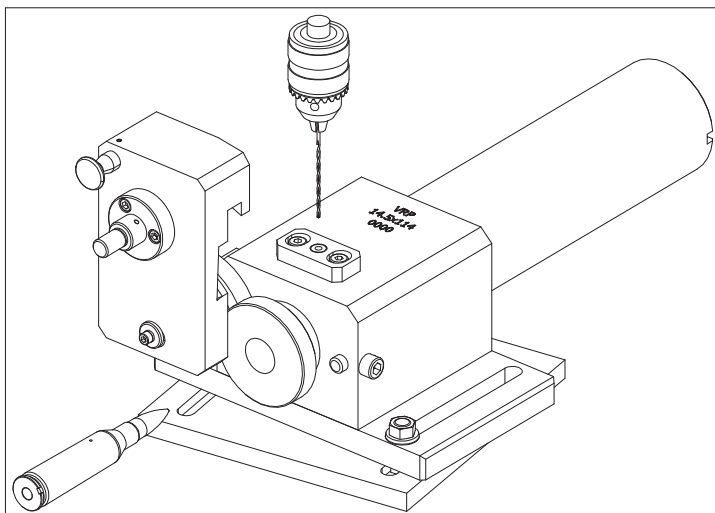
One purpose for cartridge 20 x 102



VPS One purpose for shotgun or rifle cartridges

LIST OF TYPES MANUFACTURED

- | | |
|---------|--|
| VRP-K | Universal for rifle cartridges |
| VRP-B | Universal for shotgun cartridges |
| VPS | One purpose for rifle or shotgun cartridges |
| 12,7 mm | One purpose for cartridge 12,7 x 99 or 12,7 x 108 |
| 14,5 mm | One purpose for cartridge 14,5 x 114 |
| 20 mm | One purpose for cartridge 20 x 102 or 20 x 139 |
| 23 mm | One purpose for cartridge 23 x 115 or 23 x 152 |
| 30 mm | One purpose for cartridge 30 x 165, 30 x 220 or 30 x 173 |



One purpose for cartridge 14,5 x 114



One purpose for cartridge 30 x 173

LS-04 INTELLIGENT LIGHT GATES

TECHNICAL PARAMETERS

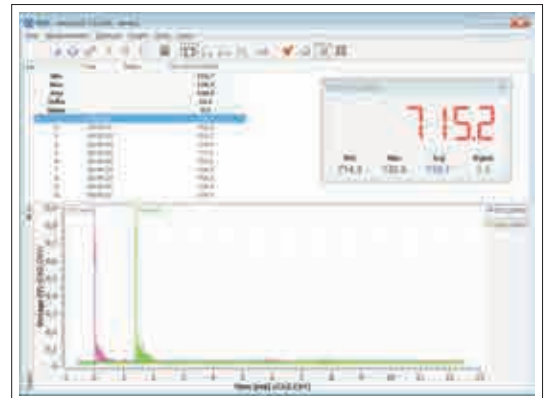
Range of velocity measured	50 to 1500 m·s ⁻¹
Range of rate of fire measured	60 to 3000 min ⁻¹
Range of projectile caliber	4,5 to 20 mm
Area observed	triangular 0,4 m ²
Basis	1 m, 2 m optional
Interface	WLAN, 10/100 Ethernet

DESCRIPTION

- measurement of velocity and rate of fire
- optical scanning of passage of projectile
- integrated evaluation unit equipped with WLAN communication module and Ethernet
- data presentation on standard PC (Desktop, Notebook)
- evaluation software suitable for Windows
- immediate display of velocity and rate of fire values
- presentation of statistically processes values (minimum, maximum, average)
- graphic presentation of time behaviour of values
- optional addition of a mobile wireless terminal with touch sensitive screen



LS-04 Intelligent light gates - Base 2 m



BMS Software



Evaluation on Tablet PC (optional)

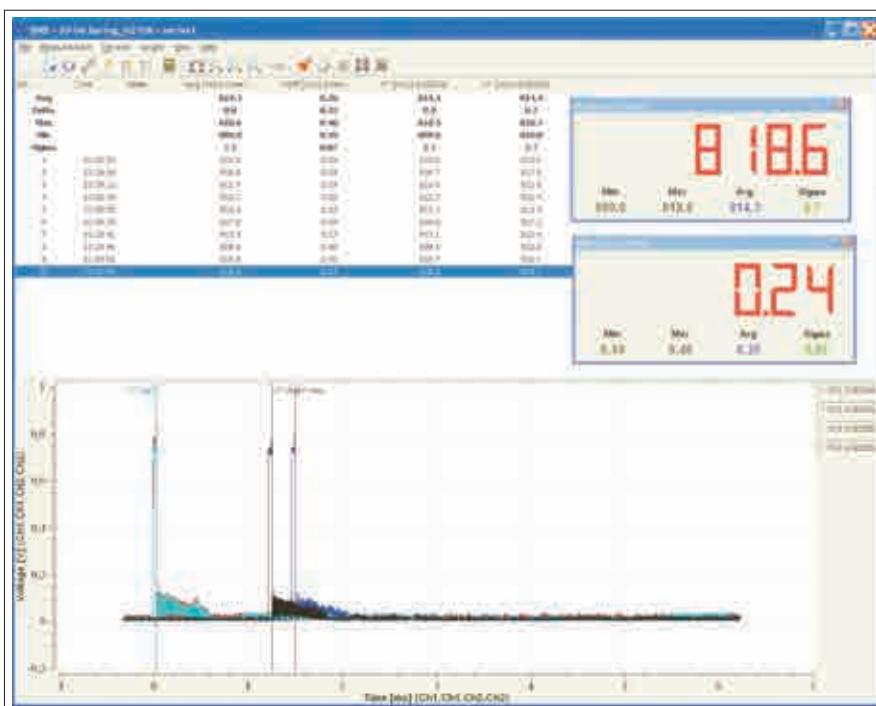
LS-04 DOUBLE INTELLIGENT LIGHT GATES

TECHNICAL PARAMETERS

Range of velocity measured	20 to 2000 m·s ⁻¹
Range of rate of fire measured (theoretically up to 20 000 min ⁻¹)	60 to 3000 min ⁻¹
Range of projectile caliber	4,5 to 20 mm
Area observed	triangular 0,4 m ²
Basis	1 m, 2 m optional
Interface	WLAN, 10/100 Ethernet, RS 232

DESCRIPTION

- measurement of velocity and rate of fire
- optical scanning of passage of projectile
- integrated evaluation unit equipped with WLAN communication module, Ethernet and RS 232 interface
- data presentation on standard PC (Desktop, Notebook)
- evaluation software suitable for Windows and Linux
- immediate display of velocity and rate of fire values
- presentation of statistically processes values (minimum, maximum, average)
- calculation of drop velocity
- graphic presentation of time behaviour of values
- optional addition of a mobile wireless terminal with touch sensitive screen



BMS Software

Evaluation on Tablet PC (optional)

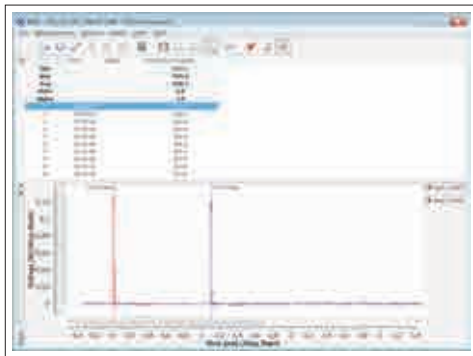


LS-04 Double sensor

LS-06 INTELLIGENT LIGHT GATES

TECHNICAL PARAMETERS

Range of velocity measured	50 to 1500 m·s ⁻¹
Range of rate of fire measured	60 to 3000 min ⁻¹
Range of projectile caliber	4,5 to 20 mm
Area observed	triangular 0,6 m ²
Basis	1 m, 2 m optional
Interface	WLAN, 10/100 Ethernet, RS 232

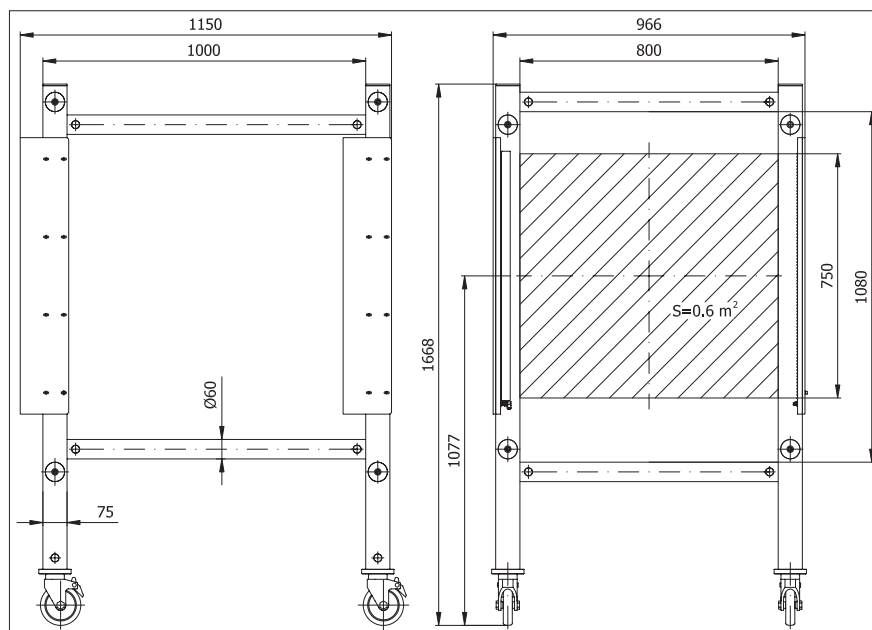


BMS Software



DESCRIPTION

- data presentation on standard PC (Desktop, Notebook)
- evaluation software suitable for Windows
- immediate display of velocity and rate of fire values
- presentation of statistically processes values (minimum, maximum, average)
- calculation drop of velocity (two Light gates required)
- optional addition of a mobile wireless terminal with touch sensitive screen
- measurement of velocity and rate of fire
- optical scanning of passage of projectile
- integrated evaluation unit equipped with WLAN communication module, Ethernet and RS 232 interface
- graphic presentation of time behaviour of values



Dimensional scheme



LS-06 in use

LS-07 INTELLIGENT LIGHT GATES



2 independent frames with set-by-user base



TECHNICAL PARAMETERS

Measuring the projectile velocity

Range	50 to 2000 m·s ⁻¹
Resolution	0,2 m·s ⁻¹
Accuracy	1%

Measuring rate of fire

Range	60 to 3000 rpm
Resolution	1 rpm
Accuracy	1%

Projectile calibre range 4 up to 20 mm
(Maximal projectile calibre tested cartridges was 20 x 102 mm. The device supports measuring the velocity of thrown objects up to size 100 x 100 mm.)

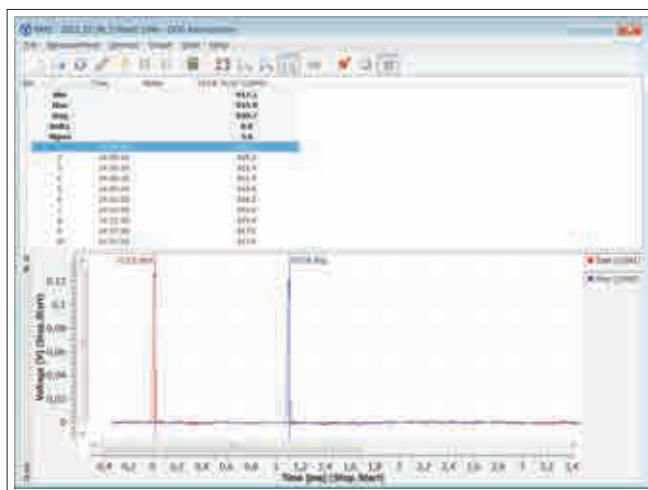
Area observed

LAS Modif.	triangle, b x h: 1000 x 1380 mm
LED Modif.	rectangle 1000 x 1380 mm

Basis	2 m (or optional)
High of axis	1100 to 1700 mm
Range of temperature	+5°C to +50°C
Voltage	230 V / 50 Hz (12 V, 24 V optionally)
Interface	WLAN, RS 232, 10/100 Ethernet



Electronics box with integrated Wi-Fi module



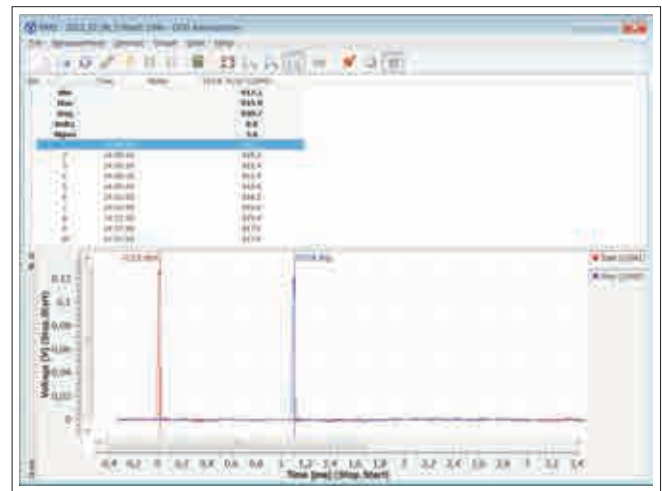
BMS Software

LS-01L INTELLIGENT LIGHT GATES



TECHNICAL PARAMETERS

Range of velocity measured	50 to 2500 m·s ⁻¹
Range of rate of fire measured	60 to 3000 min ⁻¹
Range of projectile caliber	2 to 12 mm
Area observed	150 x 500 mm
Basis	0,5 m
Interface	WLAN, 10/100 Ethernet, USB

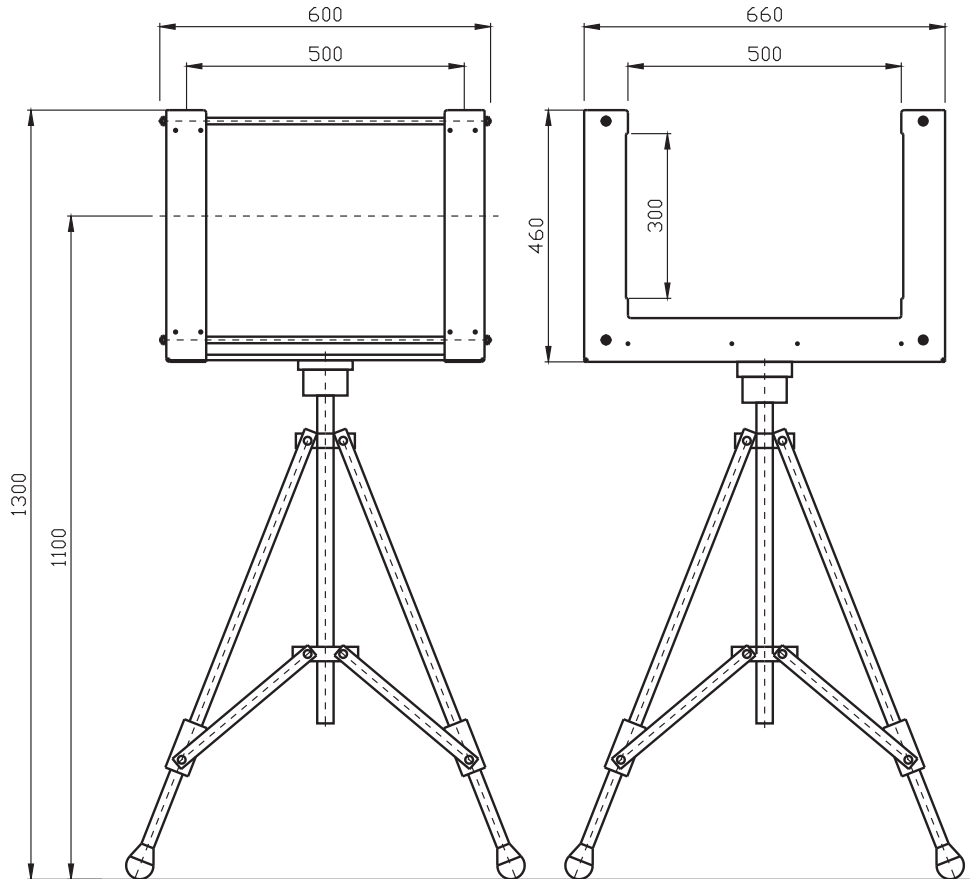


BMS Software

DESCRIPTION

- data presentation on standard PC (Desktop, Notebook)
- evaluation software suitable for Windows
- immediate display of velocity and rate of fire values
- presentation of statistically processes values (minimum, maximum, average)
- calculation drop of velocity (two Light gates required)
- measurement of velocity and rate of fire
- optical scanning of passage of projectile
- integrated evaluation unit equipped with WLAN communication module, Ethernet and USB interface
- graphic presentation of time behaviour of values

LS-02L INTELLIGENT LIGHT GATES

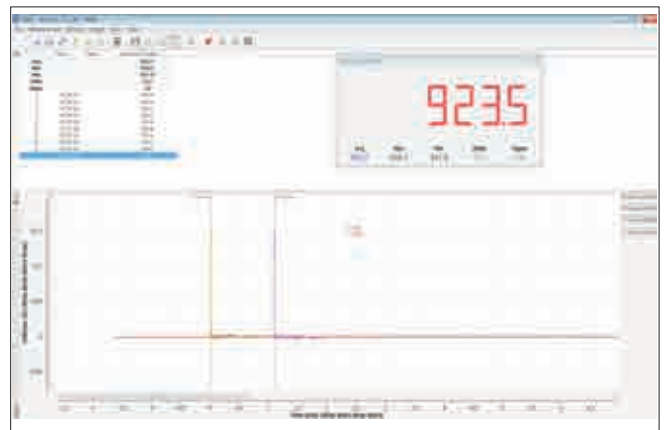


TECHNICAL PARAMETERS

Range of velocity measured	50 to 2500 m·s ⁻¹
Range of rate of fire measured	60 to 3000 min ⁻¹
Range of projectile caliber	2 to 12 mm
Area observed	300 x 500 mm
Basis	0,5 m
Interface	WLAN, 10/100 Ethernet, USB

DESCRIPTION

- data presentation on standard PC (Desktop, Notebook)
- evaluation software suitable for Windows
- immediate display of velocity and rate of fire values
- presentation of statistically processes values (minimum, maximum, average)
- calculation drop of velocity (two Light gates required)
- measurement of velocity and rate of fire
- optical scanning of passage of projectile
- integrated evaluation unit equipped with WLAN communication module, Ethernet and USB interface
- graphic presentation of time behaviour of values



BMS Software

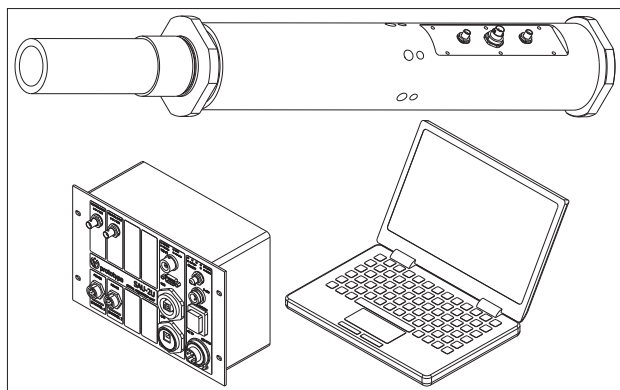
EMG-1 MUZZLE VELOCITY HEAD

TECHNICAL PARAMETERS

Measured velocity range	50 to 2500 m·s ⁻¹
Measured rate of fire range	60 to 10000 rpm
Caliber	2 to 12 mm
Base	0,1 m

DESCRIPTION

- measurement of muzzle velocity and rate of fire
- base on electromagnetic principle
- usable for all types of metal projectiles and fragments
- designed for ballistic barrels
- suitable for connection to signal acquisition units SAU-2/4/8
- evaluation using ballistic measurement software BMS



Main components: EMG-1, signal acquisition unit SAU-2U and BMS software



BMS Software



EMG-1 application

DRS-1 DOPPLER RADAR SYSTEM



Doppler antenna



Triggering unit FD01M



DESCRIPTION

DRS-1 Doppler radar system is an equipment designed for projectile velocity measurement.

TECHNICAL PARAMETERS

Measured parameters:

dependence velocity / distance / time
dependence acceleration / distance / time

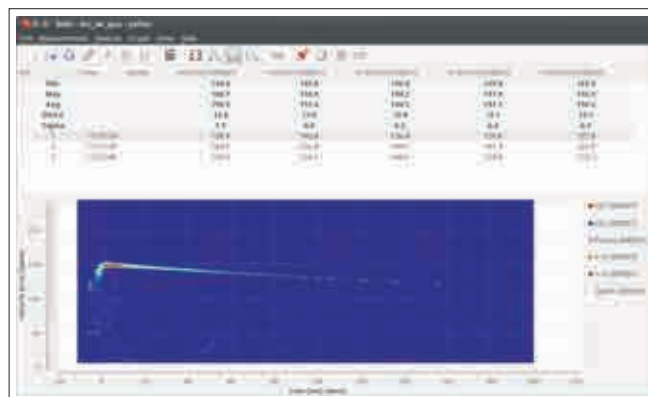
Caliber range 2 to 100 mm
Velocity range 50 to 2000 m·s⁻¹

Measuring distance

(typical measuring distance in outdoor, indoor measuring is usually longer due to reflections from walls.)

cal. 5,56 mm	60 m
cal. 7,62 mm	100 m
cal. 9 mm	150 m
cal. 12,7 mm	200 m

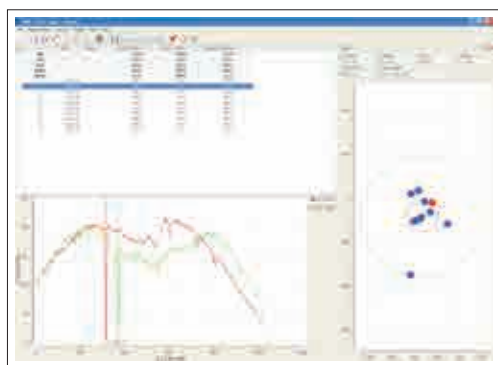
Velocity measurement accuracy	0,2 %
Frequency	24,15 GHz
Transmitter output	100 mW
Beam width	12°
Protection	IP63



BMS Software

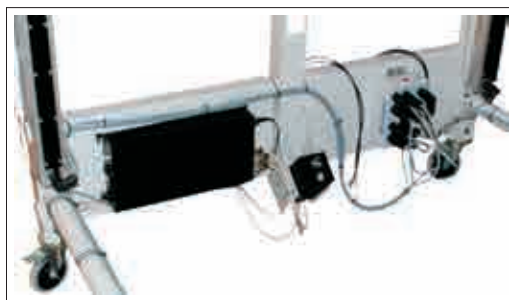
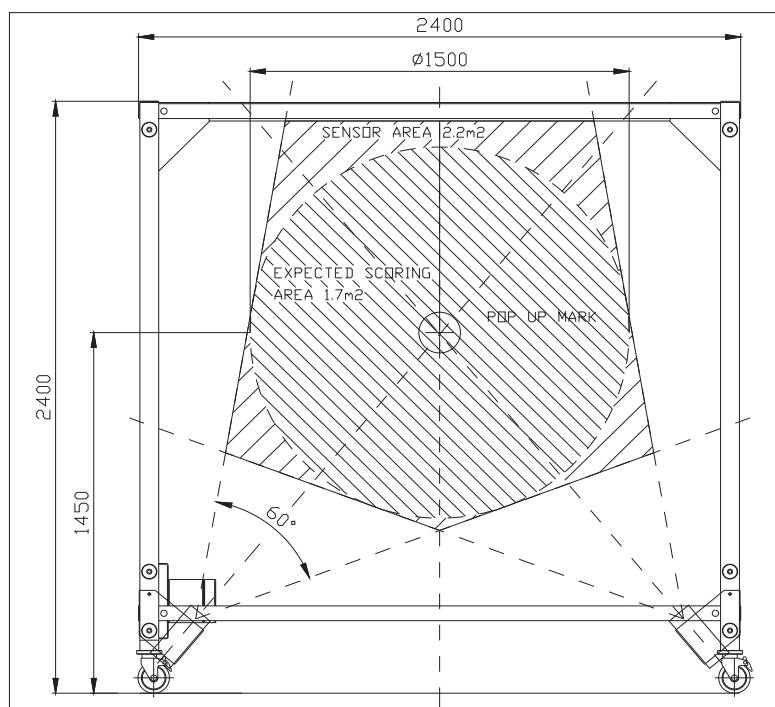
POTSS-2011 OPTICAL TARGET SCORING SYSTEM

BMS Software



TECHNICAL PARAMETERS

Masured parameters	X-Y coordinate, rate of fire, velocity
Caliber range	from 4,5 mm to 40 mm
X-Y coordinate accuracy	1 of measured caliber
Principle of measurement	two position detectors
External size of device	2,4 x 2,4 x 1,5 m
Effective sensor area	2,2 m ²
Working temperature	from -5°C to +40°C
Protection	IP65 (dustproof, weatherproof)
Power supply	230V AC, 50Hz, max 60VA (12VDC or 24V optionally)
Connection	wireless (Wi-Fi) / ethernet



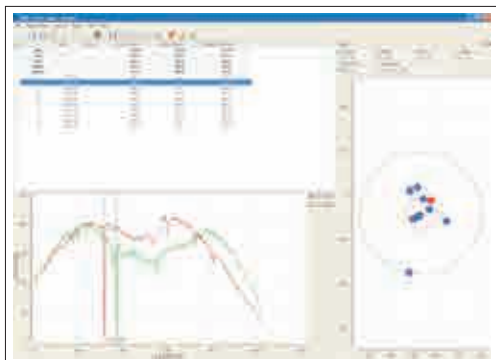
Electronics box



Position detector

POTSS-2012 OPTICAL TARGET SCORING SYSTEM

BMS Software

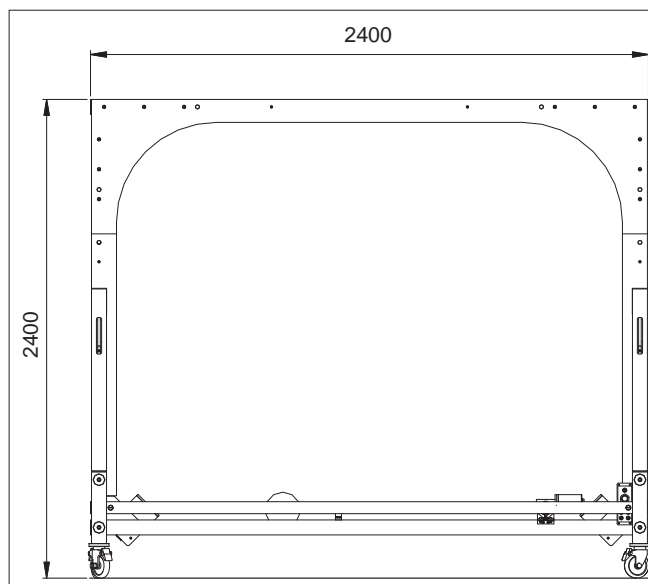


TECHNICAL PARAMETERS

Masured parameters	X-Y coordinate, rate of fire
Caliber range	from 4,5 mm to 40 mm
X-Y coordinate accuracy	1 of measured caliber
Principle of measurement	two position detectors
External size of device	2,4 x 2,4 x 0,9 m (optional)
Effective sensor area	2,5 m ² (optional)
Working temperature	from -5 °C to +40 °C
Protection	IP65 (dustproof, weatherproof)
Power supply	230V AC, 50Hz, max 60VA (12VDC or 24V optionally)
Connection	wireless (Wi-Fi) / ethernet

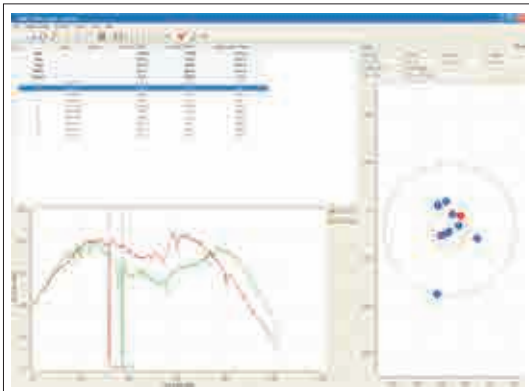


Position detector and electronics box

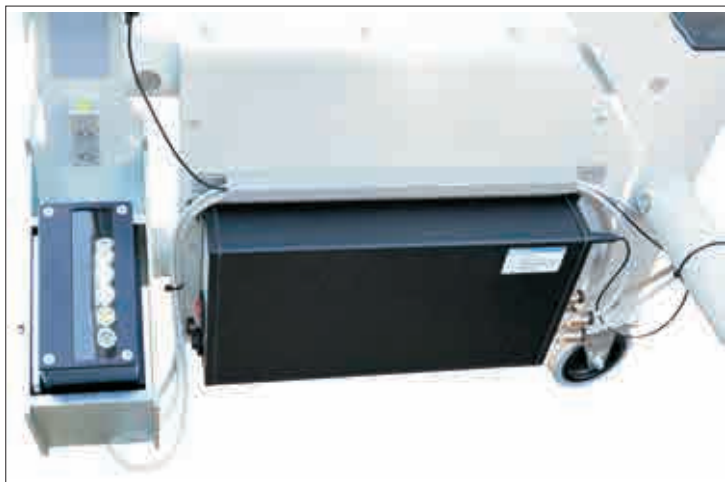


Approximate dimensions

POTSS-2016 OPTICAL TARGET SCORING SYSTEM



BMS Software



Position detector and electronics box



TECHNICAL PARAMETERS

Masured parameters	X-Y coordinate, rate of fire
Caliber range	from 4,5 mm to 40 mm
X-Y coordinate accuracy	± 2 mm for circle of diameter 1,2 m
Principle of measurement	two position detectors
External size of device	2 x 1,3 x 0,7 m (optional)
Effective sensor area	0,65 m ² (optional)
Working temperature	from -5 °C to +40 °C
Protection	IP65 (dustproof, weatherproof)
Power supply	230V AC, 50Hz, max 60VA (12VDC or 24V optionally)
Connection	wireless (Wi-Fi) / ethernet

Aiming Point Projection APP1

TECHNICAL PARAMETERS

APP1

Height	2032 mm
Width	1200 mm
Length	1390 mm
Total mass	105 kg

Paper roll

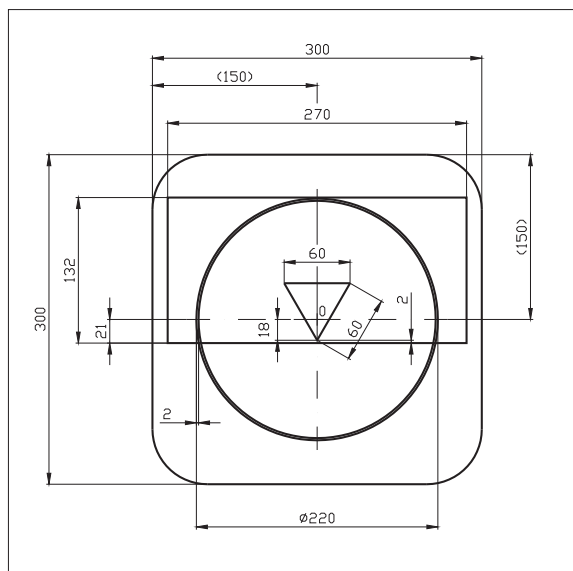
Paper weight	80 g/m ²
Width	610 mm
Length	46 m
Diameter of roll core	50 mm

Projector

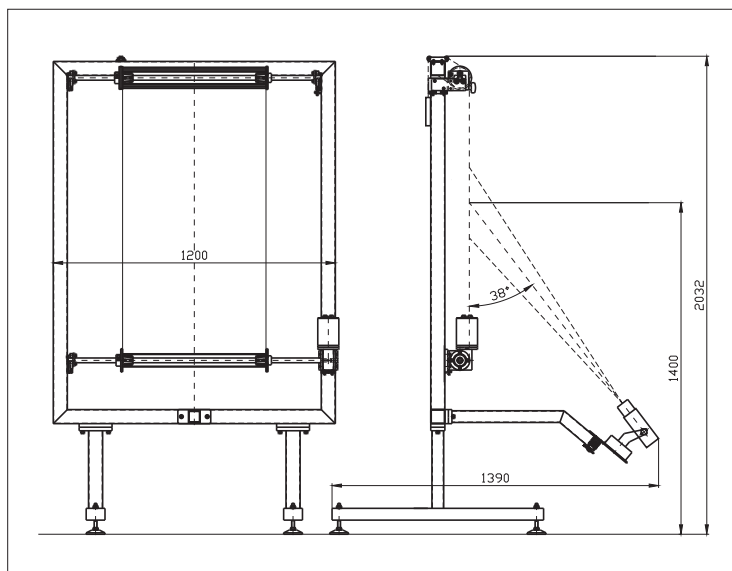
Model	EcoLED 10 W
LED	1x10 W High power LED
Voltage	120 V 60 Hz/230 V 50 Hz
Power	10 W
Dimensions	230 mm x 76 mm
Weight	1.15 kg
Gobo	size Ø 37.5 mm / picture Ø 30 mm

DESCRIPTION

The APP1 Aiming Point Projection is designed for creating of an imaginary aiming point on paper roll. Paper is rolled by the stepping motor after each shot



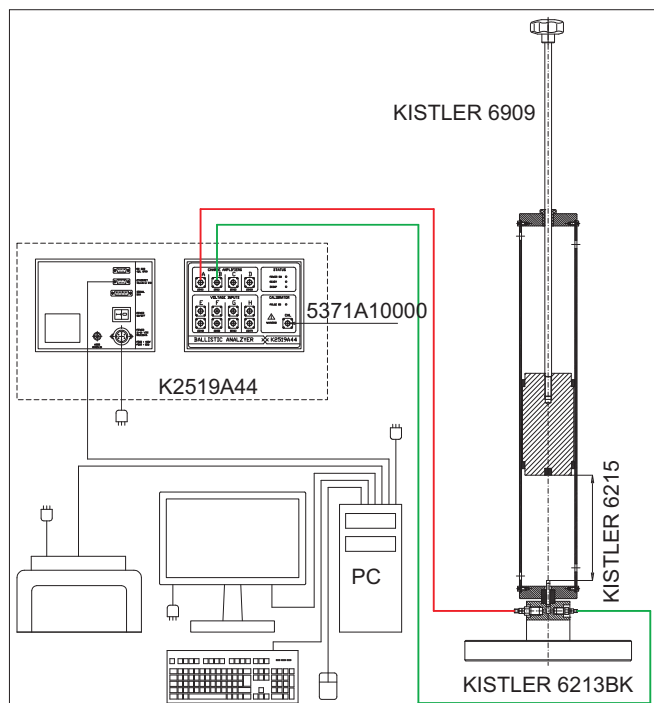
Projected target drawing



APP1 Aiming point projection drawing

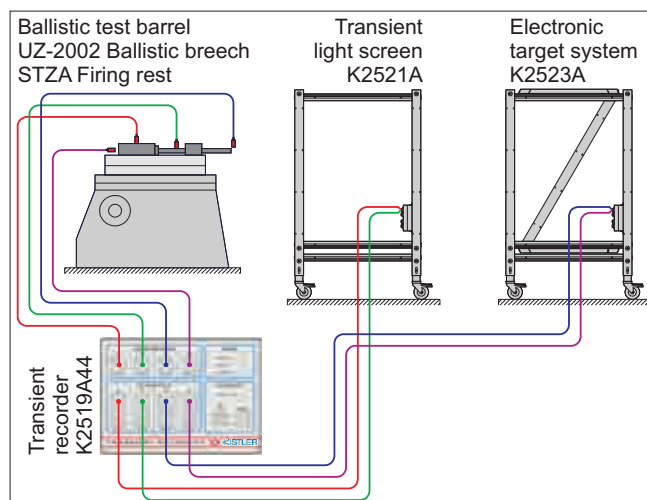
BALLISTIC MEASURING SYSTEM 2013

ASSEMBLY



Pressure sensors calibration system

K2523A Electronic Target System
K2521A Transient Light Screen
KISTLER 6215 Pressure Sensor
KISTLER 6213BK Pressure Sensor

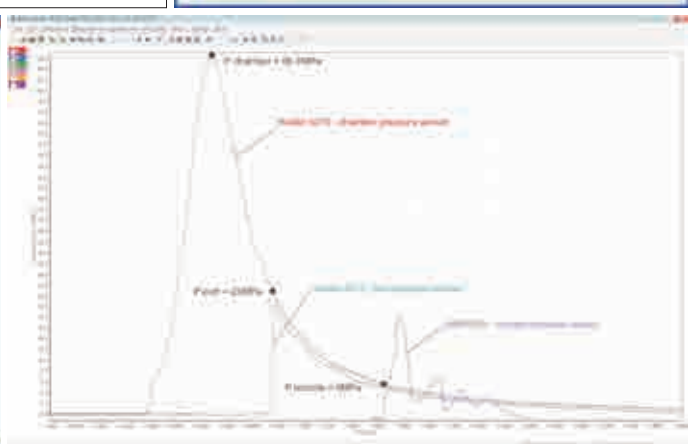
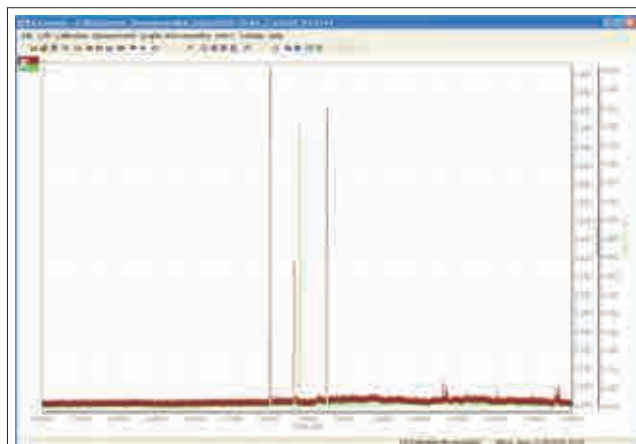
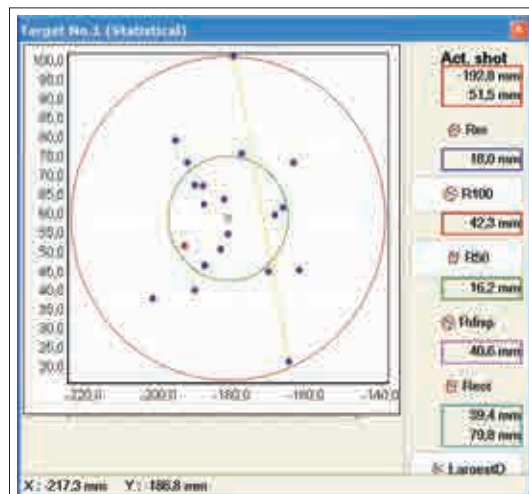


EPVAT & Target system

Electronic target system



Transient light screen



BA Control software

RECOIL 2 MEASURING SYSTEM

DESCRIPTION

- system for measuring motion (distance, velocity) different visible parts of the weapon during function,
- optical method – parts of weapon are not affect by this measuring method,
- using high speed camera,
- it is possible to determine motion and recoil of the weapon in shooter's hands or in special fixture
- software is suitable for measuring absolute, drift and relative motion, for each of them is evaluated a trajectory and velocity in time.

TECHNICAL PARAMETERS

- automatic track of 8 points,
- accuracy up to 0.1 mm, in dependancy on the focal length of the used lense, camera detector and object distance,
- velocity up to 1000 m.s^{-1} – depends on HS camera,
- recommended rate of camera – at least 2500 fps,
- minimal size of the point for measurement is 10 pixel,
- application for Windows 2000 and upper, CPU 2,0 GHz, RAM 2GB.



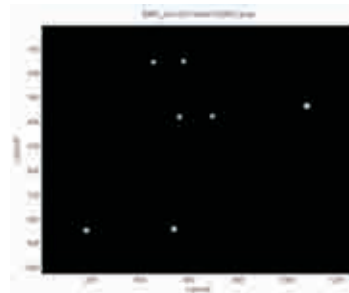
The high speed camera record



The calibration points assignment

NEXT POSSIBILITIES

- compatible with tif, bmp, jpg images format and with AVI noncompressed video format,
- calibration is made in first image by choosing calibration points,
- selecting range from all capture frames,
- there are two points for stabilization of the measurement,
- user can enter required units for evaluation.



The scene segmentation and determination of the points image coordinates

Parameter	Value
Bolt maximum displacement [mm]	65.32
Maximum velocity of backward motion [m/s]	8.30
Maximum velocity of forward motion [m/s]	3.25
The time of backward motion [s]	0.0122
Time of forward motion [s]	0.0605
The overall time of motion[s]	0.0727
Theoretical rate of fire[rounds/min]	824.7

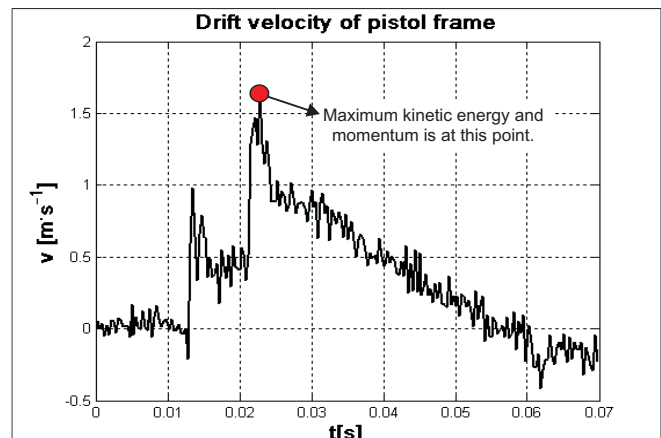
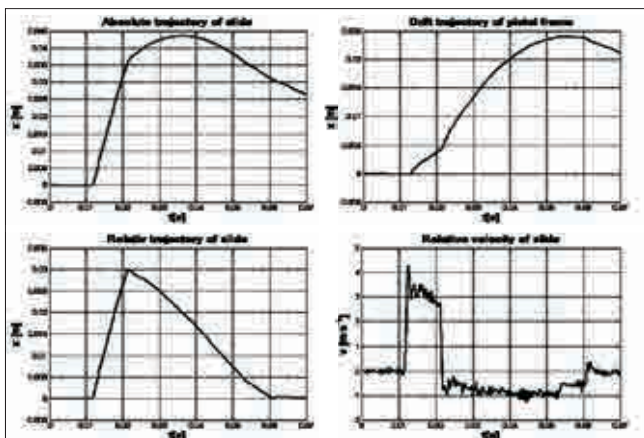
The evaluation of the weapon function significant parameters

MEASURING SYSTEM CONSISTS

- Software for evaluating Motion measurement,
- high speed camera with necessary equipments (lights, flash lamp, tripod, lens etc.) suitable for this measurement and also for other analysis of the ballistics and weapons problem.

ADDITIONAL EQUIPMENT FOR MEASURING

- special stand for measuring recoil of the weapons based on STZA firing rest,
- special trigger unit PTU-1 for camera triggering,
- flash detector.



ROFAM RATE OF FIRE ACOUSTIC METER



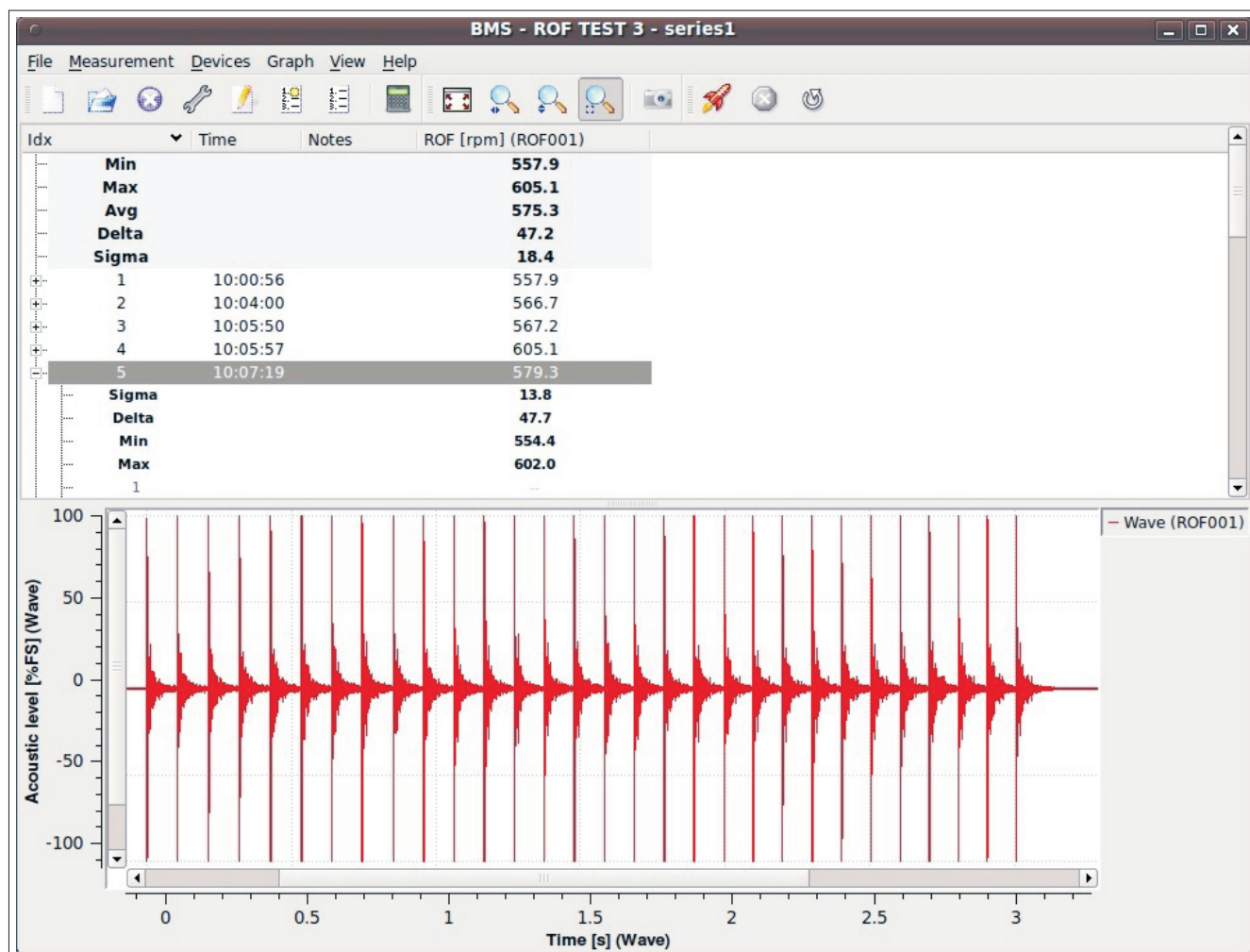
TECHNICAL PARAMETERS

Measuring range	30 to 3000 rpm
Measuring accuracy (depending on acoustic conditions)	better than 0,2%
Maximum record time	30 s
Time resolution	23 i s
A/D converter	
Sampling frequency	44,1 kHz
Vertical resolution	16 bits
Input sensitive setting range	± 20 dB
Input connector type	XLR socket, 3 pins
Output connector	USB
Operating temperature range	-10 °C to +50 °C

Microphone

Connector type	XLR plug, 3 pins
Operating temperature range	-10 °C to +50 °C

BMS Software



TESTING OF TARGET PLATES IN PROTOTYPA BALLISTIC LABORATORY

DESCRIPTION

Our testing ranges are furnish for testing different kinds of bullet proof materials according to many standards.

For testing we are able to use:

- FSP projectile in caliber 5,56 mm, 7,62 mm, 12,7 mm and 20 mm,
- weight of FSP projectile is form 1,1 g to 53,8 g,
- velocity of FSP projectile is from 400 m/s to 1800 m/s,
- 5,56 x 45, 7,62 x 51, 7,62 x 39 API, 7,62 x 54R API, 14,5 x 114 API,
- EFP for testing by 16 g or 20 g copper projectile up to velocity 2 km/s,
- tungsten bullet simulator.

For measuring we use two velocity light gates, high speed camera, remote control of the gun, special adjustable retention system, special ballistic measurement barrels etc.



FSP projectiles



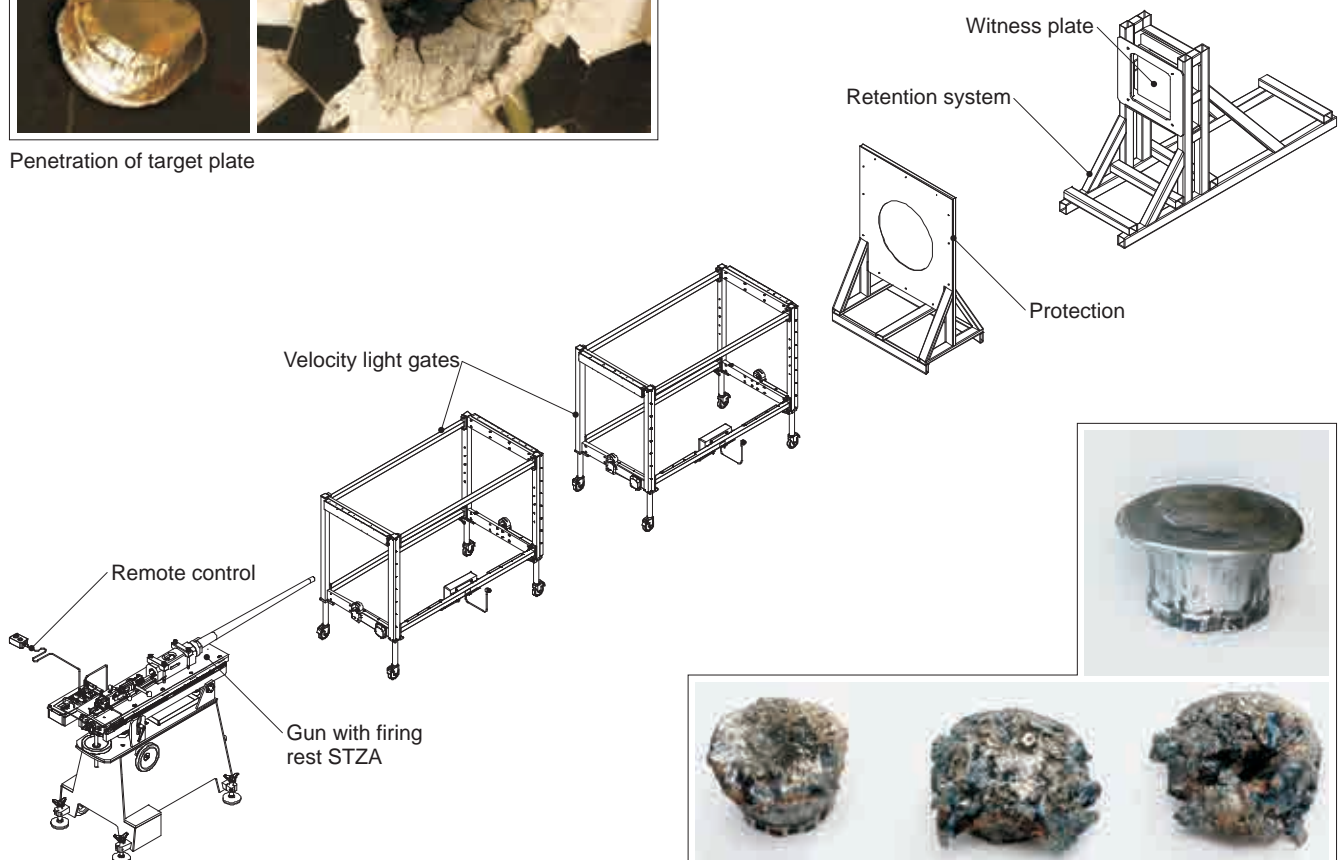
ESP projectiles



Tungsten bullet simulator



Penetration of target plate



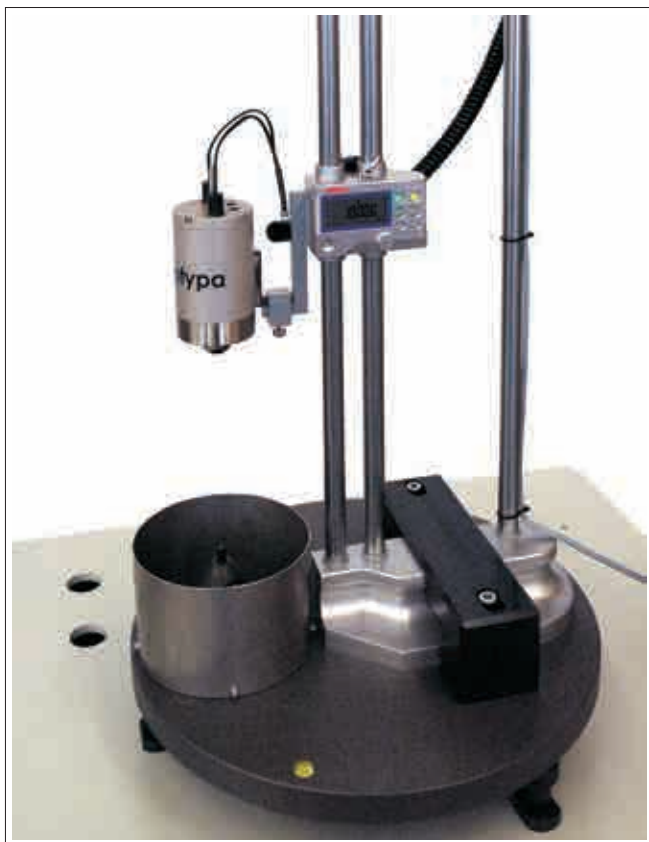
20 mm projectiles after hit plate

PST-1 PRIMER SENSITIVITY TESTER

DESCRIPTION

PST-1 Primer Sensitivity Tester with the measuring stand is a multifunctional device designed for testing small arms ammunition primers within the meaning of Manuals of Proof and Inspection Procedures for NATO ammunition (e.g. AC/225(LG/3-SG/1)D8, AC/225(PaneIII-SP.1)D/170) etc.).

Primers are tested in appropriate cartridge cases (primed cases gained by disassembling of cartridges).



TECHNICAL PARAMETERS

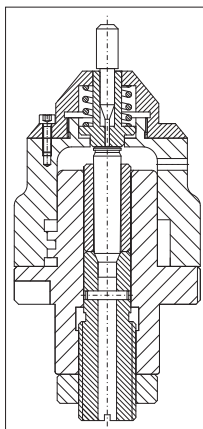
Height	2060 mm
Length	890 mm
Width	760 mm
H range	0 ... 945 mm
Total weight	155 kg
Height measurement accuracy	$\pm 0,07$ mm

Standard fixture heads for calibers

9x19	45 Auto	5,56x45
7,62 x 39	7,62 x 51	7,62 x 54R
12,7 x 99		



Fixture head



Fixture head drawing



BULLET PULLER TESTER

TECHNICAL PARAMETERS

Maximum load	2500 N
Speed range	0.1 - 1200 mm/min
Croshead travel	500 mm
Displacement accuracy	$\pm 0,13$ mm over 300 mm
Maximum power requirement	250 W
Power supply	230 V AC / 110 V AC 60 Hz
Maximum force	2500 N
Accuracy	$\pm 0,1\%$ of full scale
Memory	up to 500 values
Current supply	battery / adapter
Output	RS 232



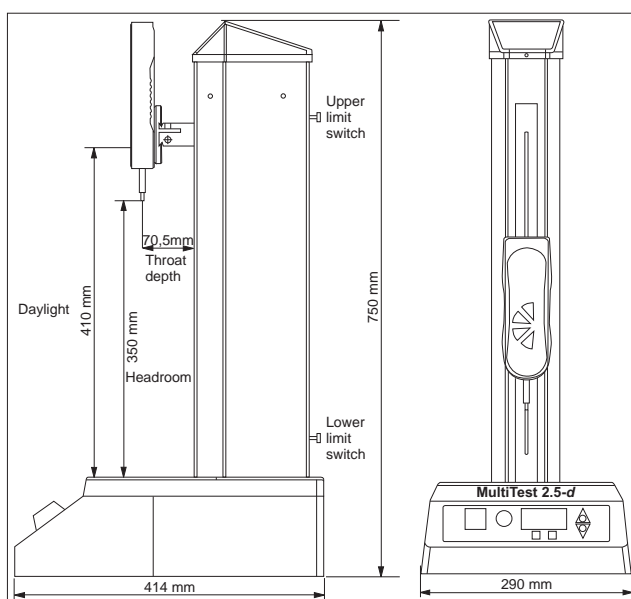
Control panel with digital display



Pulled bullet from the cartridge case



The Advanced Force Gauge (AFG)



Informative drawing - dimensions

MBC-1 MOBILE BULLET CATCHER



Combustion gas exhausting

DESCRIPTION

The MBC-1 Mobile bullet catcher serves to the shot bullet without its damage. The equipment was designed for forensic laboratories.

Features

- variable mounting from 2 up to 4 modules
- mobile undercarriage included
- aluminium light construction with stainless steel parts
- cotton wool padding
- easy instalation and module replacement
- noise suppressor padding
- prepared for connection of combustion gas exhausting



Submachine gun shooting

TECHNICAL PARAMETERS

One module size

Height	590 mm
Length	1500 mm
Width	400 mm

Four modules assembly

Height - undercarriage included	1309 ... 1569 mm
Length	6000 mm
Width	825 mm



Hand gun shooting