

# HYBRID TANK ESAUL

on base tank T-54, T-55, Type 59, Type 69, Type 79



## ESAUL on base T-55

<b>Specifications</b>	
Weight	36 tons
Crew	4
Length of Body - Gun Fwd	6.2m - 9m
Width	3.27m
Height	2.35m
Base	3.84m
Rut	2.64m
Clearance	0.425m
Maximum Speed	55-80km/h
Fuel Capacity	680 litre
Operational Range	1000km
<b>Obstacle</b>	
Ascent	32°
Wall	0.8m
Trench	2.7m
Ford	1.4m
<b>Engine</b>	Cummins ISLe400-40
Cylinders	L6
Fuel	Diesel
Horsepower	400hp (292kW)
Suspension	Torsion Bar



General of **ISLe400-40 Diesel Engine** for Vehicle

Engine Model	ISLe400-40
Displacement	8.9L
Bore*Stroke	114*145mm
Net Weight	707KG
Engine Size	1129*876*1076m
	m
Cylinders	6
Engine Type	IS

Technical Specification of **ISLe400-40 Diesel Engine** for Vehicle

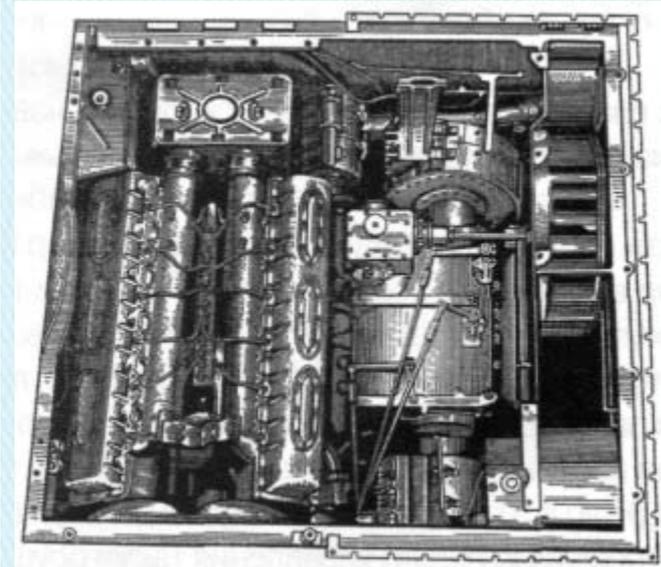
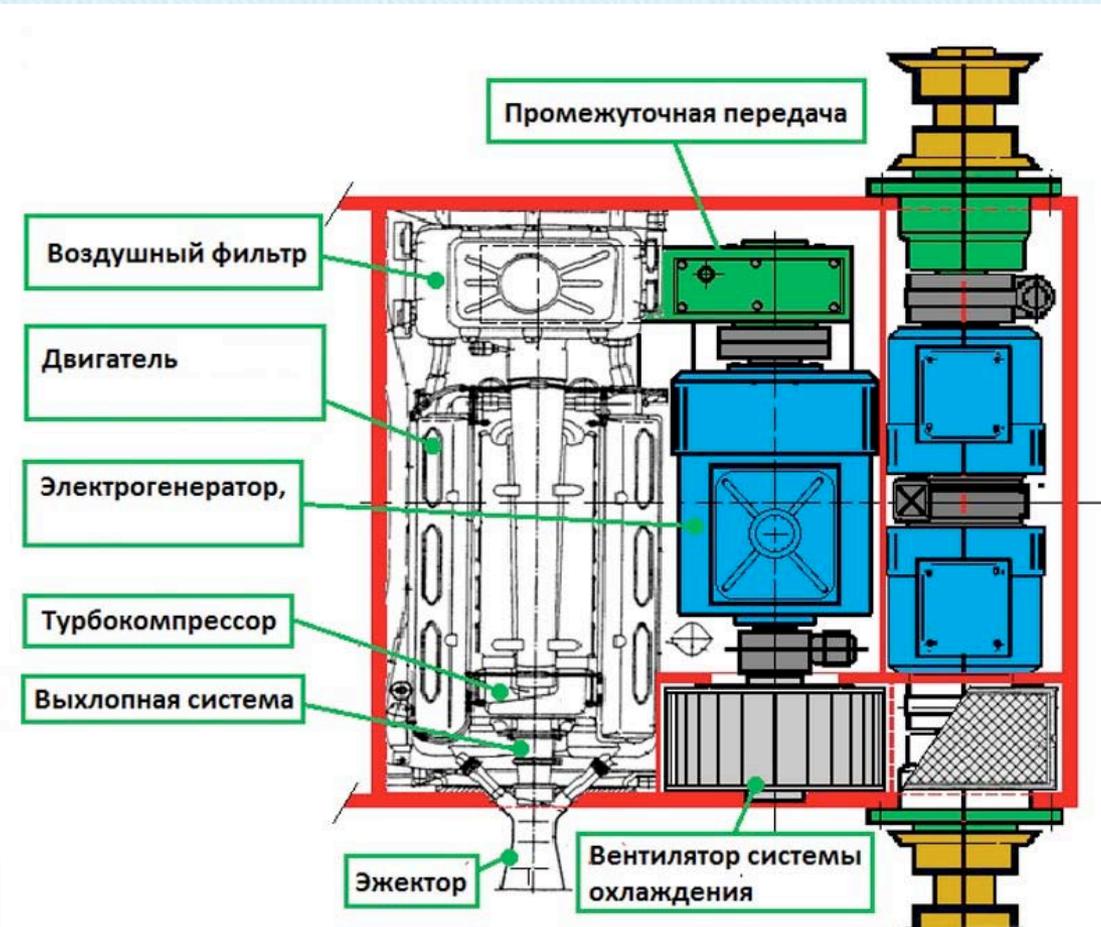
Aspiration	Turbocharged & Intercooled
Full Load Specific Fuel Consumption	195g/kW.h
Rated Power(KW)	294kW
Rated Power(HP)	400HP
Rated Power Speed	2100RPM
Peak Torque	1700N.m
Peak Torque Speed	1500r/min

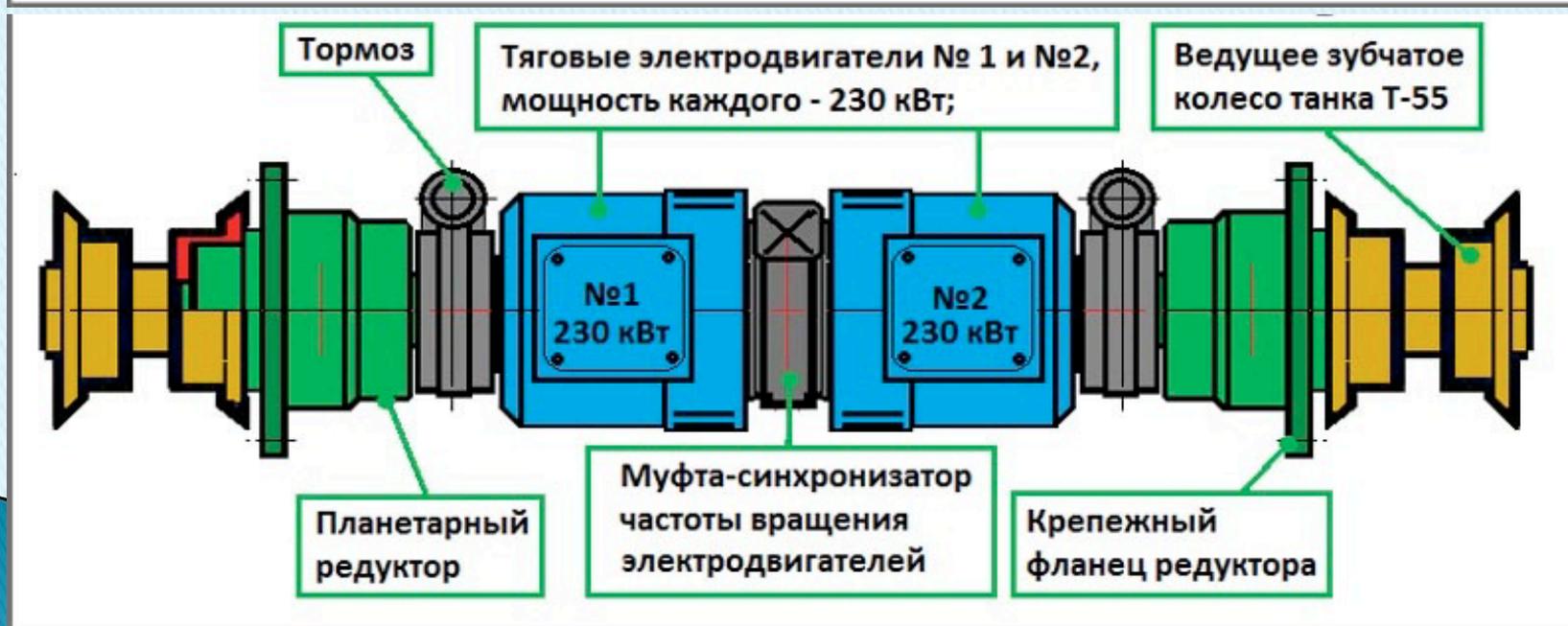
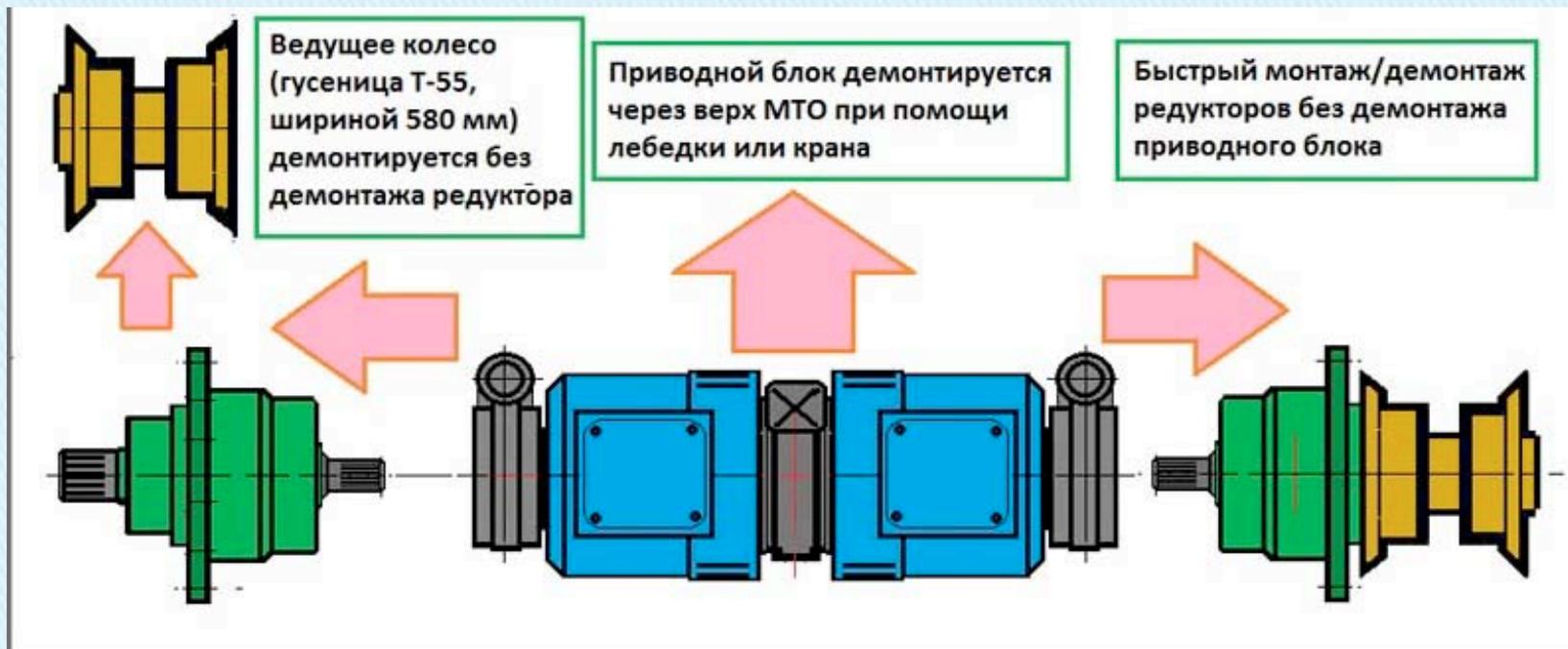
conversions KIT water in fuel for diesel engines CUMMINS FULL SET  
FULL SET!

- COMPLETE WITH DIGITAL PWM and MAF / MAP proofreaders;
- High-end electronics included in the package;
- The union of stainless steel;
- Generator type "dry cell" of the latest generation ;
- Very small dimensions: 240x190x90mm;
- Impressive Square production of hydrogen gas: 2268 cm<sup>2</sup>;
- Large volume production of hydrogen 3.5 liters per minute (15A);
- Suitable for all models of trucks and buses, the engine power to 480hp.
- Weight 8.2 KG



Transmission	Electrical
Alternator (power)	500kW
Electric motor (max. power)	2x 230kW
Max torque	21,000Nm
Special features	576V AC 50Hz
Internal / External power supply	Skid steer Function Pivot neutral steer function





# ELECTRIC MOTOR



High-pressure power system



Alternator



## ECU motion



## CONTROLLERS



speedometer Dash board



Accelerator



Brake Pedal

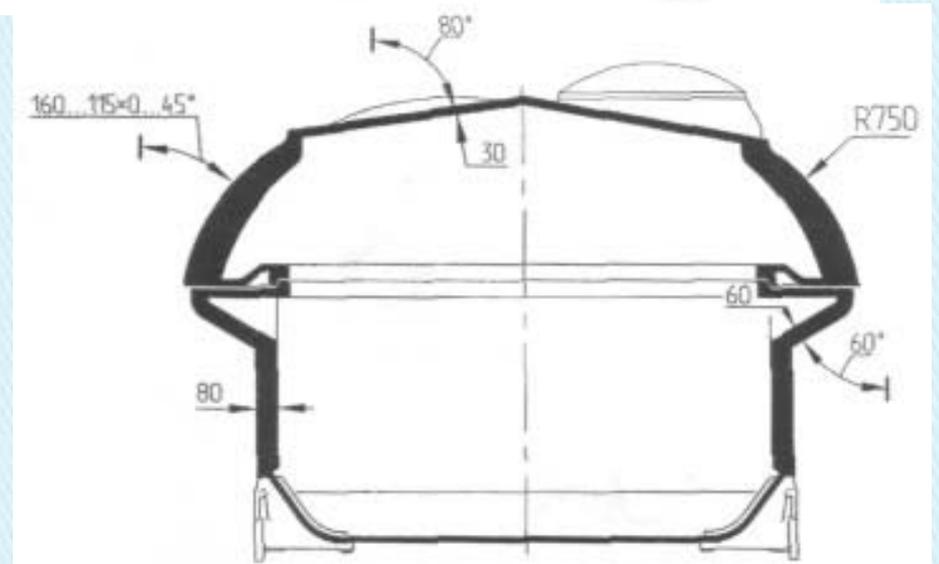
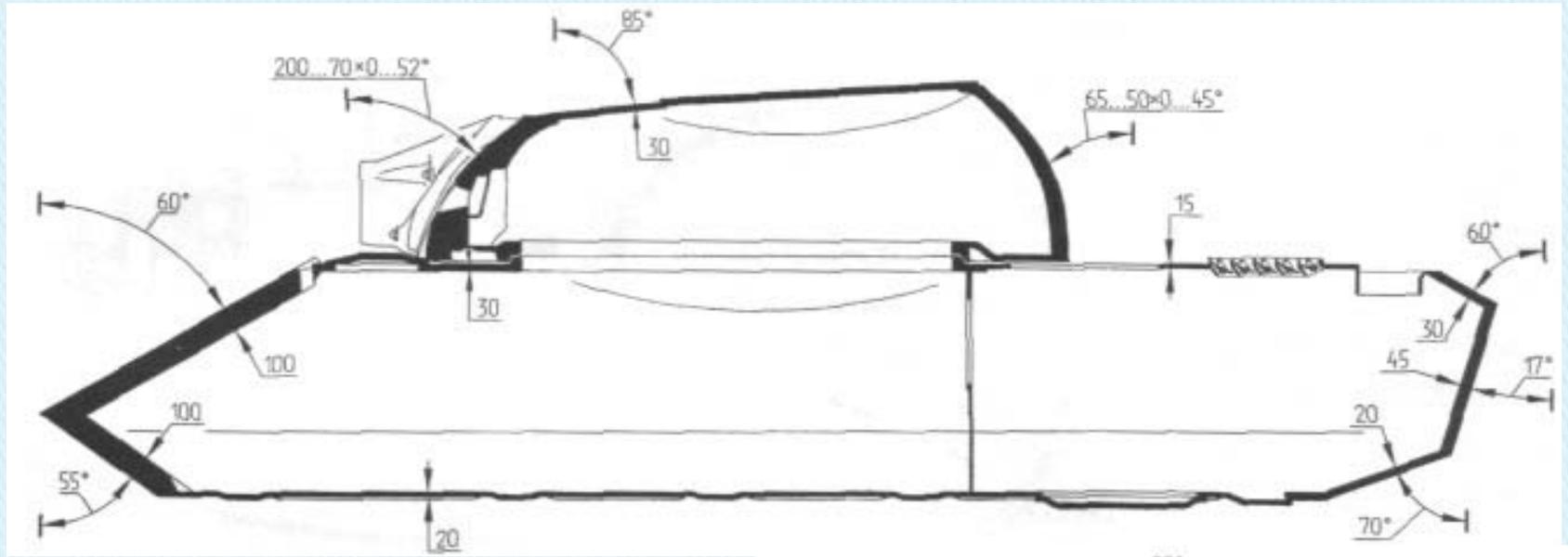


Electric Lever



Auto starter

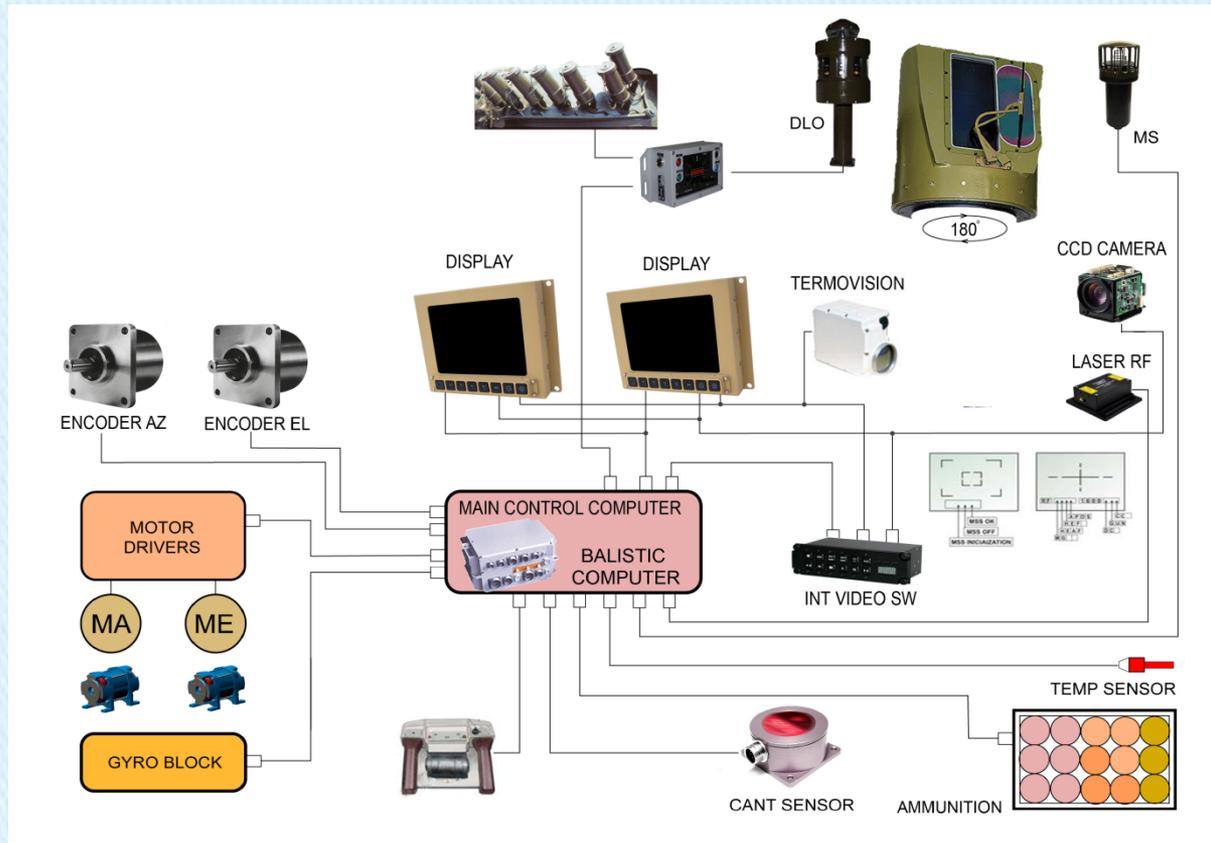




Armouring	
Hull Front top	100mm/60°
Hull Front bottom	100mm/55°
Side Hull top	60mm/60°
Side Hull bottom	80mm/0°
Rear Hull top	30mm/60°
Rear Hull Middle	45mm/17°
Bottom Hull	20mm
Roof Hull	15-30mm
Front Turret	200mm/0°
	70mm/62°
Side Turret	160mm/0°
	115mm/45°
Rear Turret	60mm/0°
	45mm/45°
Roof Turret	30mm

Armament	
Cannon 100mm or 105mm	43 projectives
7.62x54R or 7.62x51mm Coaxial machine gun	2000rds
12.7x108mm or 50BMG anti-aircraft machine gun	300rds
14.5x114mm anti-aircraft machine gun	200rds
or 20x110mm automatic cannon	200rds
or 23x115mm automatic cannon	200rds

# Fire Control System Scheme



## Appendix C—Sight Technical Characteristics

Field-of-view stabilisation	independent, in two axes
Aiming angles of the stabilized line of sight:	
• depression	at least 15 degrees
• elevation	at least 60 degrees
Magnification of the day television channel	1-10 zoomer
Field of view of the day vision channel	30; 10; 5.5 degrees
Field of view of thermal channel:	
wide field of view	9x6.75 degrees
Spectral range of the thermal camera	8-12 micrometres
Range of detection of a TANK-type target:	
• through the television channel	at least 6000 m
• through the thermal channel in the narrow field of view	at least 6000 m
Target ranging limits	200-10000 m
Mean square error of target ranging by the laser range-finder	within 5 m

# PERSONAL RADIO BS & HS



PR-11

## Operational characteristics for BS radio

Net presets	16 -position channel selector
Group address	<ul style="list-style-type: none"> <li>• up to 99 groups</li> <li>• up to 99 addresses</li> </ul>
Data and Voice operation	<ul style="list-style-type: none"> <li>• semi-duplex</li> <li>• voice or data</li> <li>• priority break-in</li> </ul>
Operational autonomy	8 hours
Location	built GPS with automatic position report
Expected range	<ul style="list-style-type: none"> <li>• open terrain: 2.5 km</li> <li>• urban: 500 m</li> <li>• loc: 20 km with PANEL antenna</li> </ul>
Security	<ul style="list-style-type: none"> <li>• remote track function that blocks audio,</li> <li>• reports GPS and battery status</li> <li>• remote KILL function that completely disables radio</li> </ul>
Secure transmission	built-in AES-128, max 16 KEYS stored
Operational regime	<ul style="list-style-type: none"> <li>- Team Leader Radio</li> <li>- Team Member Radio</li> <li>- REPEATER</li> </ul>

## Technical characteristics for BS radio

Frequency range	902-928 MHz
Transmitter power output	100mW/500mW/1W
Modulation	GFSK, BT=0.5
Over the air bit rate	10 / 128 Kbit/s
Receiver sensitivity @ BER=10-3	-110 / -100 dBm
Digital audio	24 Kbit/s CVSDM
Data	RS232: 9.6Kbit/s ..... 115.2 Kbit/s Ethernet: 10 Mb/s / 100Mb/s
Encryption	AES - 128
ECCM	frequency hopping
Power supply	8 - 36 V DC
Dimensions	250 x 180 x 70 mm appr.
Weight	2 kg
Operating regime	-35°C ..... +55°C

## Operational characteristics for HS radio

Net presets	16 -position channel selector
Group address	<ul style="list-style-type: none"> <li>• up to 99 groups</li> <li>• up to 99 addresses</li> </ul>
Data and Voice operation	<ul style="list-style-type: none"> <li>• semi-duplex</li> <li>• voice or data</li> <li>• priority break-in</li> </ul>
Operational autonomy	8 hours
Location	built GPS with automatic position report
Expected range	<ul style="list-style-type: none"> <li>• open terrain: 2.5 km</li> <li>• urban: 500 m</li> <li>• loc: 20 km with PANEL antenna</li> </ul>
Security	<ul style="list-style-type: none"> <li>• remote track function that blocks audio,</li> <li>• reports GPS and battery status</li> <li>• remote KILL function that completely disables radio</li> </ul>
Secure transmission	built-in AES-128, max 16 KEYS stored
Operational regime	<ul style="list-style-type: none"> <li>- Team Leader Radio</li> <li>- Team Member Radio</li> <li>- REPEATER</li> </ul>

## Technical characteristics for HS radio

Frequency range	902-928 MHz
Transmitter power output	100mW/500mW/1W
Modulation	GFSK, BT=0.5
Over the air bit rate	10 / 128 Kbit/s
Receiver sensitivity @ BER=10-3	-110 / -100 dBm
Digital audio	24 Kbit/s CVSDM
Data	RS232: 9.6Kbit/s ..... 115.2 Kbit/s Ethernet: 10 Mb/s / 100Mb/s
Encryption	AES - 128
ECCM	frequency hopping
Power supply	Li-Ion Battery, 7.4V/2500mAh
Dimensions	180 x 85 x 35 mm
Weight	0.5 kg, with battery
Operating regime	-35°C ..... +55°C

# LASER DETECTOR & WARNING SYSTEM



## Laser Detector & Warning System

Laser detector (warning) system consists of two units:

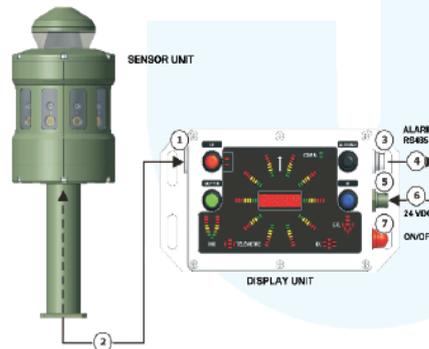
- Detector head and (LD-H),
- Control unit with display (LD-D).

LD is used for laser irradiation indication and warning.

If combat vehicle (ship, artillery post ...) is irradiated with laser beam (rangerfinder, designator/illuminator or laser guided missile) light and sound alarms will be activated.

Command unit display will show intensity, direction, angle and type of irradiation.

After warning, crew can activate countermeasures.



### Direct irradiation detector

Wavelength range	0.4 um to 1.6 um
Number of receivers	10
Azimuth field of view	10x36° = 360°
Elevation field of view	-20° to +60°

### Direct irradiation detector

Wavelength range	0.9 um to 1.6 um
Number of receivers	1
Azimuth field of view	360°
Elevation field of view	-7° to -13°

### Indicator unit - Display

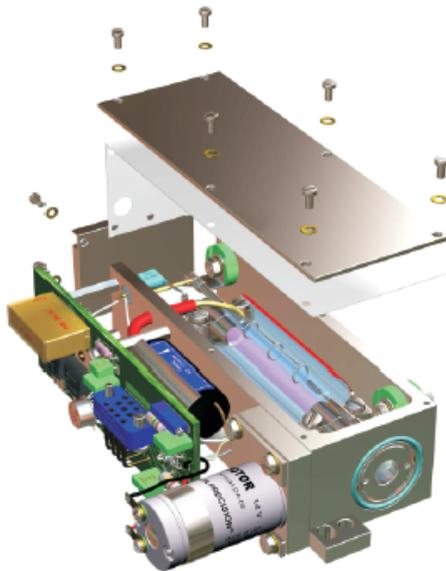
Azimuth angle resolution	10x36° LED
Numerical display resolution	1°
Irradiation source	Laser rangefinder, Laser designator/illuminator, Laser guided missiles

Memory	20 newest readings
Data transfer	RS485, ModBUS, 19 200 bps, 8 bits of data, 1 stop bit, no parity
Digital outputs for activation	Sound alarm, Light alarm, Countermeasures
Operating temperature	-30°C to +63°C
Power supply and consumption	Accumulator 24 VDC/0,6A or 12 Vcc/1,2A, Battery pack (optional)

### Dimensions and weight

Detector head	Ø120mm X 190mm, < 2100g
Display	220mm X 120mm X 70mm, < 1500g
Mounting pole	55mm X 55mm X 150mm, < 900g
Cables	3 pieces, < 1 kg

# LASER RANGEFINDER



Laser rangefinder for tank I

Laser rangefinder subsystem consists of five printed circuit boards and laser transmitter (shown in picture with one PCB).

## Tehnical data

Range	200m + 9995m
Accuracy	± 5m
Pulse repetition rate	0.5 Hz
Maximum number of pulses per minute	12
No. of targets measured	2
Target radial resolution	30m
Laser type	Nd:YAG
Wavelength	1064nm
Temperature range	-25°C to +55°C

# WEATHER STATION



## Measured data specifications:

Wind speed	
Range	0 - 40m/s
Accuracy	±10%, ±0.5m/s for wind speed < 5m/s
Resolution	0.1m/s

Wind direction	
Range	0 - 360°
Accuracy	± 5°
Resolution	1°

Air temperature	
Range	-40°C - +70°C
Accuracy (-10°C - 85°C)	± 2°C
Resolution	0.1°C

Absolute atmospheric pressure	
Range	600 - 1300mBar
Accuracy	±1.5mBar
Resolution	1mBar

Relative air humidity (*optional, model MS-3/D-H only)	
Range	0 - 100%RH
Accuracy(10-90%RH)	±3%RH
Resolution	1%RH

## Device specifications:

Power	18 - 40 VDC
Operating temperature	-30°C - +60°C
Start-up time	< 40s
Data transmission interface	RS 485
Max data cable length	1500 m
Transmission interval	1s or 100ms
Protocol	NMEA(1s); BYT (1s or 100ms)
Connector	Souriau 85107A12-10P50
Height	182 mm
Diameter top	73 mm
Diameter base	50 mm
Weight	505 g

# VEHICLE INTERCOM SYSTEM



## Technical data

Type of transmission	duplex
Interface	RS485
Line rate	64 kb/s
Signals	DTx, DRx, Clock
Output level	± 5V
Input threshold level	± 0.5V
Speech processing	PCM, A-law, G.711, G.712

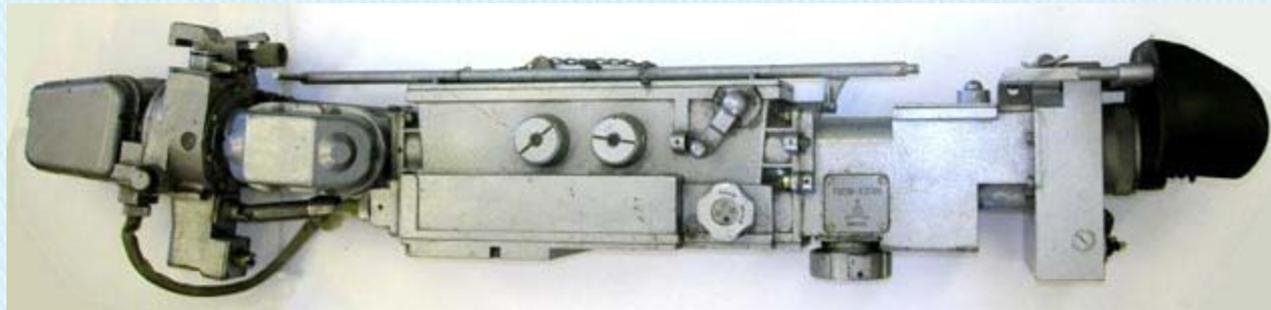
Freq. range	300 – 3000 Hz
Microphone impedance	1600 ohm
Microphone sensitivity	-41 dB, @94dB SPL
Earphone impedance	150 ohm
Audio power	max 50 mW
Distortion	10% @1mW
PTT	0-5 V, TTL
Microphone polarisation	10 VDC

Supply	18-36 V DC
Power consumption Control Unit	3 W
Dimensions Control Unit	250x200x80 mm appr.
Weight Control Unit	2.6 kg
Power consumption Craw Unit	1 W
Dimensions Craw Unit	180x150x70 mm appr.
Weight Craw Unit	1,2 kg
Relative Humidity	do 95% @ +55° C
Operating Temperature Range	-25°C - +55° C

Interface	4 wire with E/M
Impedance	600 ohm
Input level	+2 dB.....-10 dB
Output level	+2 dB.....-10 dB
E/M signalling	0-5 V, TTL

## Reserve sight main gun and coaxial machine gun

mark sight	TSH2B-22
type sight	Telescopic
length of sight, mm	1046
increase in sight, the multiplicity	x3.5 / x7
Field of view, degrees	18/9
weight sight, kg	19.5



## Anti-Aircraft Machine Gun



Technical data	M87N, NSVT-N
Production of the country, the factory	Serbia, Russia, Kazakhstan
Principle of function	Gas-operated
On base	NSVT
Caliber	50BMG (12.7x99mm)
Barrellength	1100mm
Weapons length	1560mm
Weight	24.8kg
Effective range	1500m
Rate of fire	700rds/min
Muzzle velocity	890m/c

Technical data	M87, NSVT
Production of the country, the factory	Serbia, Russia, Kazakhstan
Principle of function	Gas-operated
On base	NSVT
Caliber	12.7x108mm
Barrellength	1100mm
Weapons length	1560mm
Weight	24.8kg
Effective range	1500m
Rate of fire	700rds/min
Muzzle velocity	845m/c

## Anti-aircraft Machine Gun



Technical data	DShKM-N, Type 54N
Production of the country, the factory	Serbia, Russia, Romania, China
Principle of function	Gas-operated
On base	DShK
Caliber	50BMG (12.7x99mm)
Barrellength	1070mm
Weapons length	1625mm
Weight	33.5kg
Effective range	1500m
Rate of fire	600rds/min
Muzzle velocity	890m/c
Technical data	DShKM, Type 54
Production of the country, the factory	Serbia, Russia, Romania, China
Principle of function	Gas-operated
On base	DShK
Caliber	12.7x108mm
Barrellength	1070mm
Weapons length	1625mm
Weight	33.5kg
Effective range	1500m
Rate of fire	600rds/min
Muzzle velocity	845m/c

## Anti-Aircraft Machine Gun



Technical data	KPV, Type 58
Production of the country, the factory	Russia, China
Principle of function	short stroke barrel
On base	KPV
Caliber	14.5x114mm
Barrel length	1346mm
Weapons length	2000mm
Weight	52.3kg
Effective range	2000m
Rate of fire	600rds/min
Muzzle velocity	976m/c

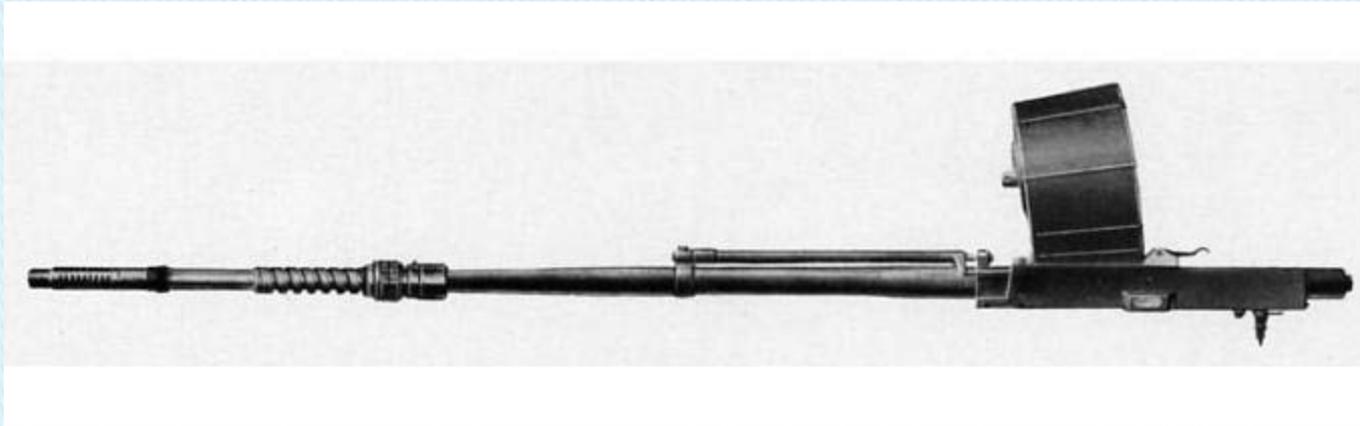
## Anti-aircraft automatic cannon



Technical data	KPV-23
Production of the country, the factory	Serbia
Principle of function	short stroke barrel
On base	KPV
Caliber	23x115mm
Barrel length	1346mm
Weapons length	2000mm
Weight	52.3kg
Effective range	1500m
Rate of fire	600rds/min
Muzzle velocity	680m/c

Technical data	KPV-20
Production of the country, the factory	Serbia
Principle of function	short stroke barrel
On base	KPV
Caliber	20x110mm
Barrel length	1346mm
Weapons length	2000mm
Weight	52.3kg
Effective range	1500m
Rate of fire	600rds/min
Muzzle velocity	835m/c

## Anti-aircraft automatic cannon



Technical data	M55
Production of the country, the factory	Serbia
Principle of function	Gas-operated
On base	HSS-804
Caliber	20x110mm
Barrel length	1740mm
Weapons length	2500mm
Weight	24.85kg
Effective range	1500m
Rate of fire	600-750rds/min
Muzzle velocity	880m/c

## Coaxil Machine Gun



Technical data	UKM-2000C, M86N, PKT-N, MG-TN,
Production of the country, the factory	Polish , Serbia, Bulgaria
Principle of function	Gas-operated
On base	PKT
Calibre	7.62x51mm
Barrellenht	626mm
Weapons lenght	1098mm
Weght	10.7kg
Efective range	1500m
Rate of fire	700-850rds/min
Muzzle velocity	810m/c

Technical data	PKT, M86, MG-T, Type 86
Production of the country, the factory	Russia, Serbia, Bulgaria, China
Principle of function	Gas-operated
On base	PKT
Caliber	7.62x54R
Barrellength	722mm
Weapons length	1098mm
Weight	10.5kg
Effective range	1500m
Rate of fire	600-800rds/min
Muzzle velocity	855m/c

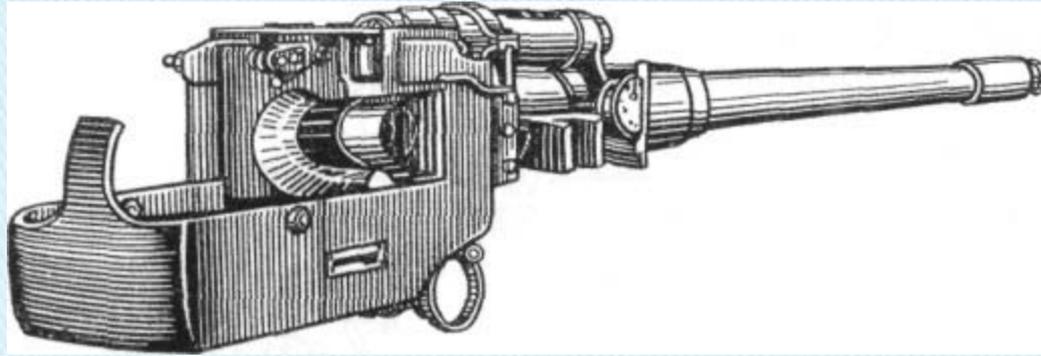
## Coaxil Machine Gun



Technical data	SGMT-N
Production of the country, the factory	Serbia
Principle of function	Gas-operated
On base	SGMT
Caliber	7.62x51mm
Barrellength	722mm
Weapons length	1150mm
Weight	10.5kg
Effective range	1500m
Rate of fire	600-800rds/min
Muzzle velocity	810m/c

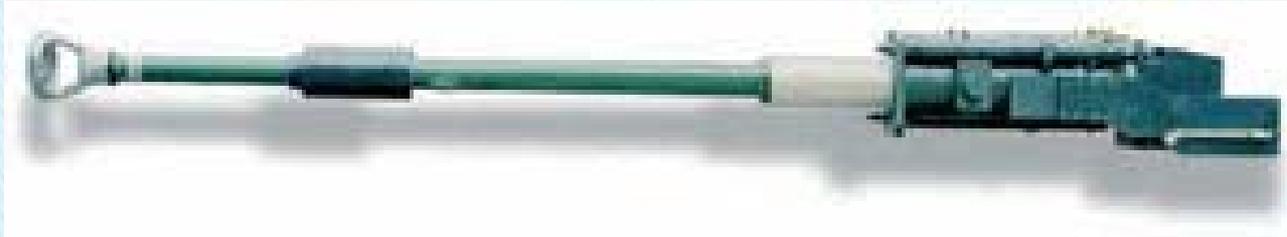
Technical data	SGMT, Type 59T
Production of the country, the factory	Russia, China
Principle of function	Gas-operated
On base	SGMT
Caliber	7.62x54R
Barrellength	722mm
Weapons length	1150mm
Weight	10.5kg
Effective range	1500m
Rate of fire	600-800rds/min
Muzzle velocity	855m/c

## Cannon



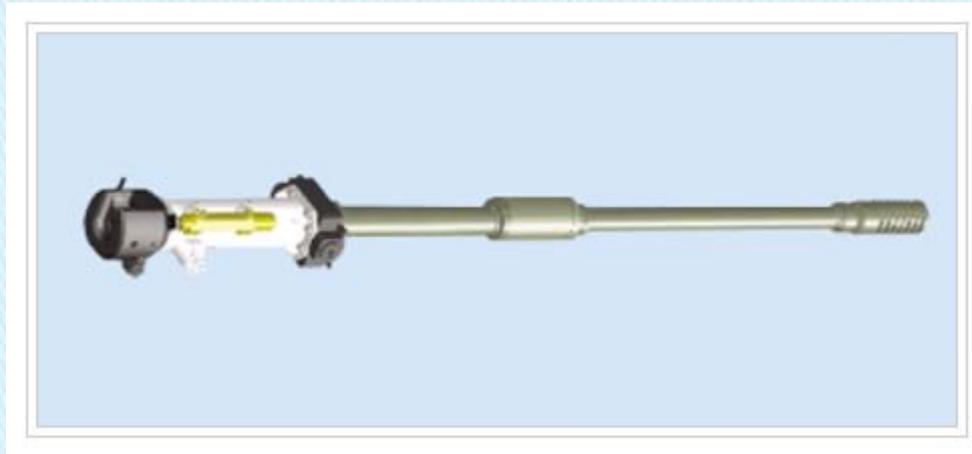
Technical data	D-10TG, D-10T2S, Type 59, Type 69
Production of the country, the factory	Russia, China
On base	D-10
Caliber	100mm
Barrel length	5350mm
the weight of the swinging	2257kg
Weight of sliding parts	1538kg
The length of a normal pullback	550m
The length of the maximum rollback	650mm
Rate of fire	5-6 rds/min

## Cannon



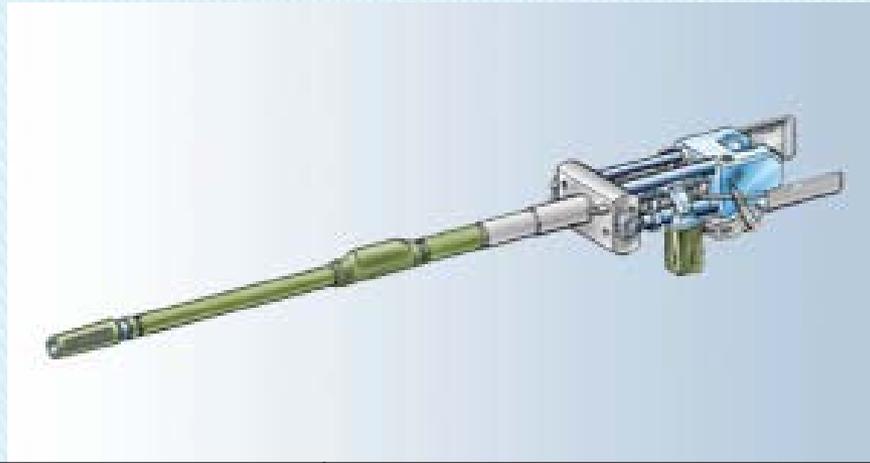
Technical data	105 CV
Production of the country, the factory	Cockerill, Belgium
On base	CV
Caliber	105mm
The length of the maximum rollback	650mm
Weight	1750kg
Length	6095mm
Rate of fire	5-6 rds/min

## Cannon



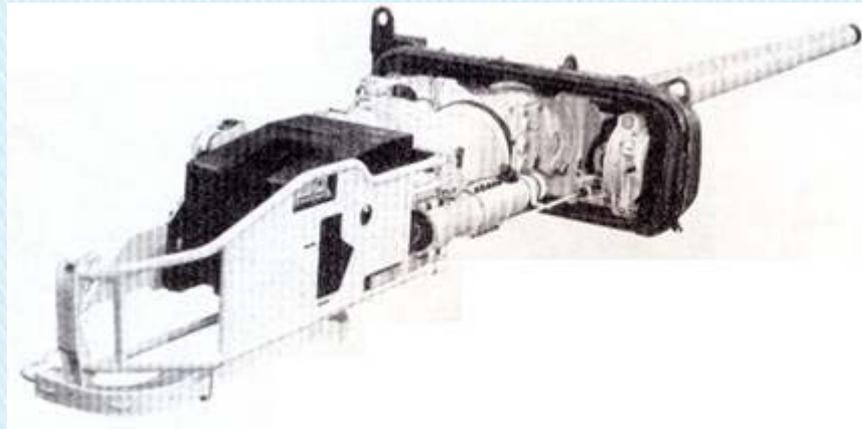
Technical data	105 LW
Production of the country, the factory	IMI Israel
On base	M68
Caliber	105mm
The length of the maximum rollback	650mm
Rate of fire	5-6 rds/min

## Cannon



Technical data	L7, M68, GT-7, Type 81, Type 83, Type 79, MKEM68T
Production of the country, the factory	England, India, USA, Israel, South Africa, China, Turkey
On base	L7
Caliber	105mm
Barrel length	5588mm
the weight of the swinging	1282kg
Weight of sliding parts	1538kg
The length of a normal pullback	300m
The length of the maximum rollback	600mm
Rate of fire	6 rds/min

## Cannon



Technical data	CN-105F1
Production of the country, the factory	France
On base	CN-105F1
Caliber	105mm
Barrel length	5900mm
Weight	2470kg
The length of a normal pullback	385m
The length of the maximum rollback	600mm
Rate of fire	6 rds/min



remote weapon station for AA machine gun or a cannon

## Grid protection for wheeled armored vehicles PЭ

Presented in this anti-tank cumulative PЭ is an adaptation of the protective devices used in tanks BTR-70, BTR-80, T-55 and T-62 during combat operations in Afghanistan. RE protect the sides and stern of the hull and turret of the anti-tank grenade PG-7 and PG-9 with a probability of 0.66.

RE installed on BTR-80 and T-62 have been tested with positive results and have shown high efficiency in the fighting in Chechnya and Georgia. Equipment MCV Khazar set PЭ possible in military terms, using individual spare parts kit. Duration equipment HT Esaul set PЭ was 5.0 h., And the complexity, 12.5 hours.

In order to ensure technological maintenance of the chassis and avoid damaging them to march over rough terrain board made folding screens body in a horizontal plane. The design allows you to firmly fix the PЭ folding in the upper section (stowed) position. Folding of the section in the lower position not fixed rigidly, they move towards the wheels and suspension limited limiters welded at the top of the section.



Installation scheme combined lattice screens (right of the screen in the raised position)

The duration of the installation using the RE staff toolkit was 7 hours., And the complexity of 21 hours. The total duration of the hardware and fasteners for mounting PЭ HT Esaul was 11 hr., And the total complexity of this work was 29 hours.

Installation PЭ resulted in some increase in the dimensions in width (about 300 mm on each board and machine weight 1000 kg).

dynamic protection against tandem shaped-charge projectiles (rockets)  
and piercing projectiles



coated with special paint to reduce visibility in the infrared spectrum  
through a thermal imager

*Russian variant Intermat Low Emissivity Paint*

