



# ELECTRO-OPTICAL OBSERVATION SYSTEM "JURA-OPTICUM"





## FUNCTIONAL CAPABILITIES OF THE SYSTEM

The JURA-OPTICUM electronic-optical surveillance system (EOS) allows you to track the movement of aircraft, missiles and UAVs (including high-speed ones) in the airspace, displaying and recording their exact coordinates and visual image.

The extremely high quality of components, record resolution and frame rate, high-power computer and advanced software, as well as attention to every nuance in manufacturing, allow you to observe the smallest details of moving targets at long distances, up to 200 km. The system provides automated recognition and decision-making through elements of artificial intelligence.

The rigid and massive non-welded mechanical design of the support-rotary device has a unique patented bearing assembly and allows the positioning of the high-precision theodolite with extreme accuracy for tracking the movement of targets at significant distances. The "JURA-OPTICUM" system can be placed on various platforms:

- Aerial reconnaissance aircraft
- Mobile platforms on car chassis
- Ships and boats



**The "JURA" system provides: 24/7 with high reliability:**

- Search and detection of targets in television and thermal imaging channels, tracking targets in adverse weather conditions thanks to a carefully selected optical range
- Issuance of coordinates of identified targets to fire control points, targeting of weapon systems to identified targets (aircraft, cruise missiles, rotorcraft, UAVs, armored vehicles, ships, etc.) in real time.
- Reliable tracking of targets with the provision of stealth, due to the fact that the "JURA-OPTICUM" system operates in passive mode.
- Conducting air targets through the area of responsibility in order to exclude the possibility of their dangerous maneuvering;
- Measurements, recording of flight paths and visual images in the air defense system and during tests of aviation, missile or artillery equipment.



## TASKS TO BE SOLVED

- detection of air, surface, ground targets in the visible and infrared ranges of the spectrum;
- taking the identified target for tracking in automatic or semi-automatic modes, targeting weapon systems in the visible and infrared spectrum ranges;
- tracking and high-precision measurements of the target's position in spatial polar and Cartesian coordinates in real time;
- registration of received information on digital media;
- transmission of received information via cable, fiber-optic and radio relay information transmission channels, both in digital and analog form.



## APPEARING OBJECTS

- airplanes, rotorcraft on take-off, landing and during flight;
- land and surface targets in the assigned sector of responsibility;
- cruise missiles at launch and in flight, as well as warheads in the drop zone.





## MOBILITY

The "JURA-OPTICUM" system is designed for mobile application and involves deployment, rebasing and measurements directly from the chassis of a high-terrain vehicle (or tracked chassis), while the theodolite is placed on a special platform mounted on the same vehicle. This option allows you to use the system on unequipped and unprepared terrain.

It is possible to deliver the system to work on pre-prepared special positions, the number and location of which is determined based on the tasks being solved.







## MODES OF WORK

- automatic tracking mode;
- semi-automatic tracking mode;
- manual tracking mode.

The selection of the monitoring mode and transfer of the system from the detection mode to the monitoring mode is carried out by the system operator with the help of control bodies.





## OPPORTUNITIES

The system can form up to six tracking strobes and, accordingly, capture simultaneously up to 6 targets that are in the field of view of the lens relative to one tracked object.

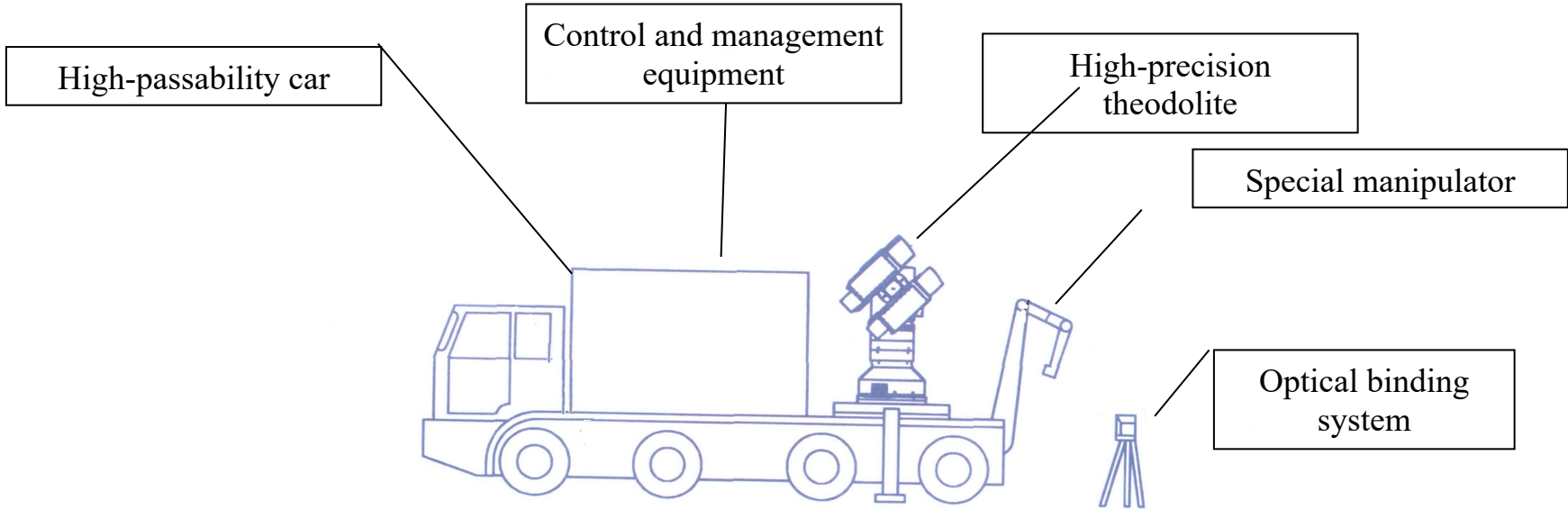
During tracking of the target and performing measurements on the monitor of the operator's console, in addition to the image of the target and tracking strobes, the following is displayed in the lower part of the screen:

- date of measurements;
- current time;
- azimuth and location angle of the target;
- focal length of the lens;
- number of the measuring device (number of the station and channel used);
- range to the target (when using a laser rangefinder).



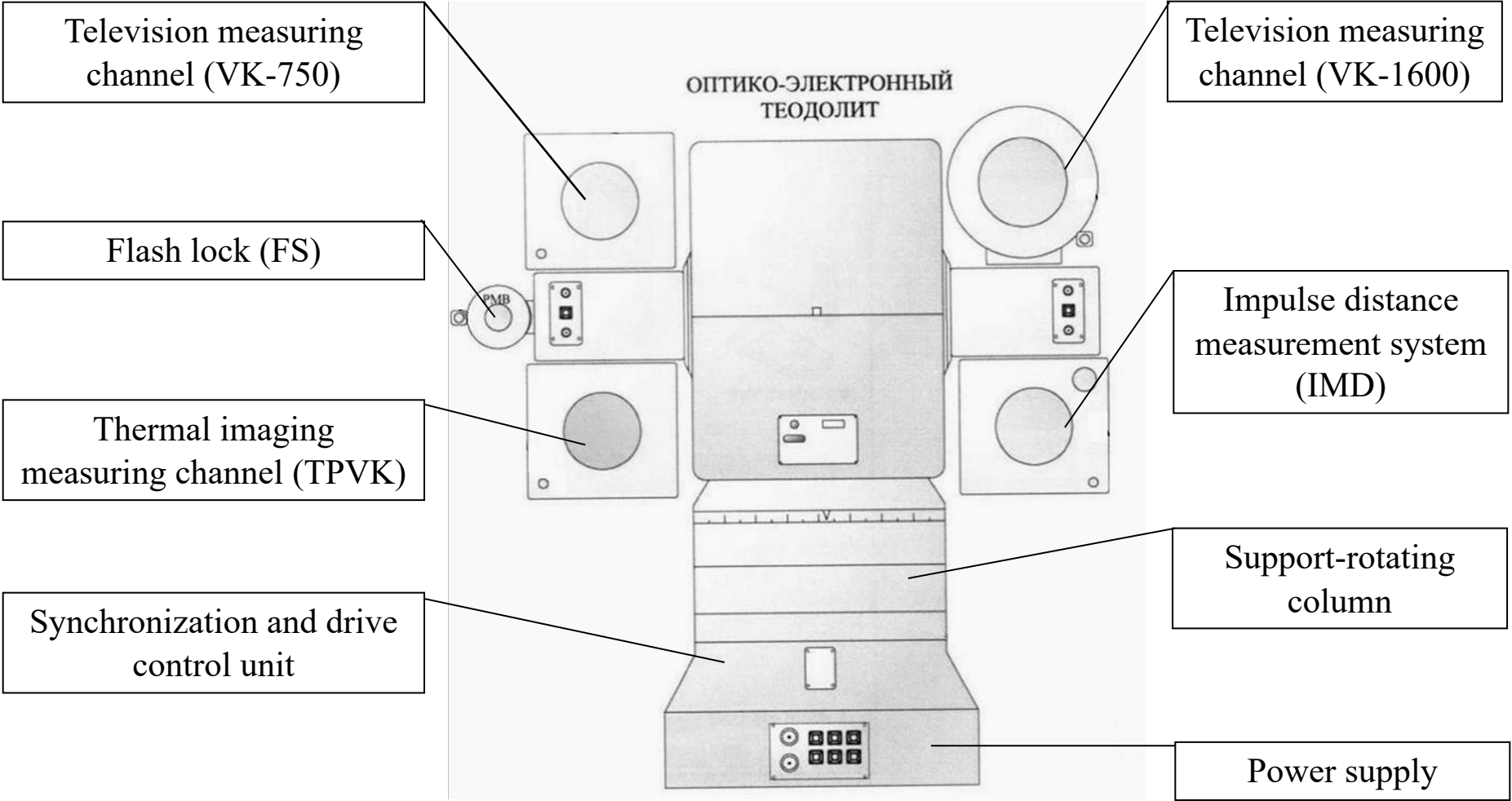


# PLATFORM ON CAR CHASSIS





# POSITION OF THE HIGH PRECISION THEODOLITE





## THE MAIN TECHNICAL CHARACTERISTICS OF THE GROUND COMPLEX

Visibility of targets by the VK-1600 television measuring channel of an air target of the MiG-29 type in the spectrum of 0.6-0.9 microns with an MDA is equal to 30 km	not less than 70 km
Tracking the target with a thermal imaging (MSWK) measuring channel in the spectrum of 3-5 microns with a focus of 500 mm and a matrix of 640×512 elements with an MDV equal to 30 km	up to 200 km and more
Range of measuring ranges by laser rangefinder at a wavelength of 1.57 microns for diffuse purposes	up to 25 km
Standalone relocation	is provided for all types of roads
Time of transfer of the system from the transport position to the state of readiness for measurements	0,5 g
Preparation time for transportation over a long distance	2 g
System preparation time:	
- to the first work	not more than 10 min
- to the next works	not more than 1 min
Uptime	Clock
Total energy consumption (including air conditioning)	10 kW



## MAIN TECHNICAL CHARACTERISTICS

### ➤ Characteristics of measurement objects

- diameter: 40 mm and more;
- length: 500 mm and more;
- speed: from 0 to 3000 m/sec and more.

### Parameters measured in real time:

- angular coordinates;
- range.

### Parameters calculated in real time:

- spatial position;
- speed;
- acceleration.

### The number of simultaneously accompanied targets in sight:

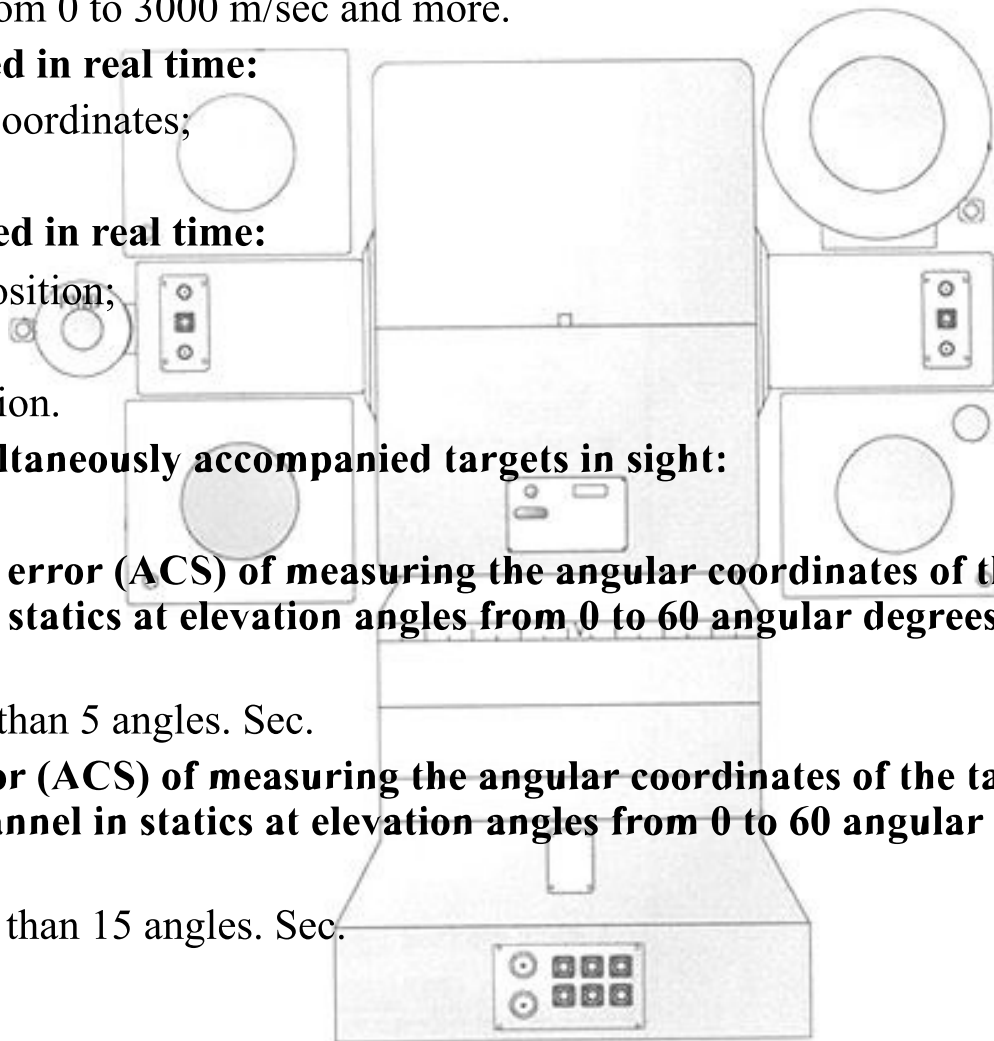
- Up to 6.

### The mean quadratic error (ACS) of measuring the angular coordinates of the target over a television channel in statics at elevation angles from 0 to 60 angular degrees at maximum focal length:

- no more than 5 angles. Sec.

### Mean quadratic error (ACS) of measuring the angular coordinates of the target along the thermal imaging channel in statics at elevation angles from 0 to 60 angular degrees at maximum focal length :

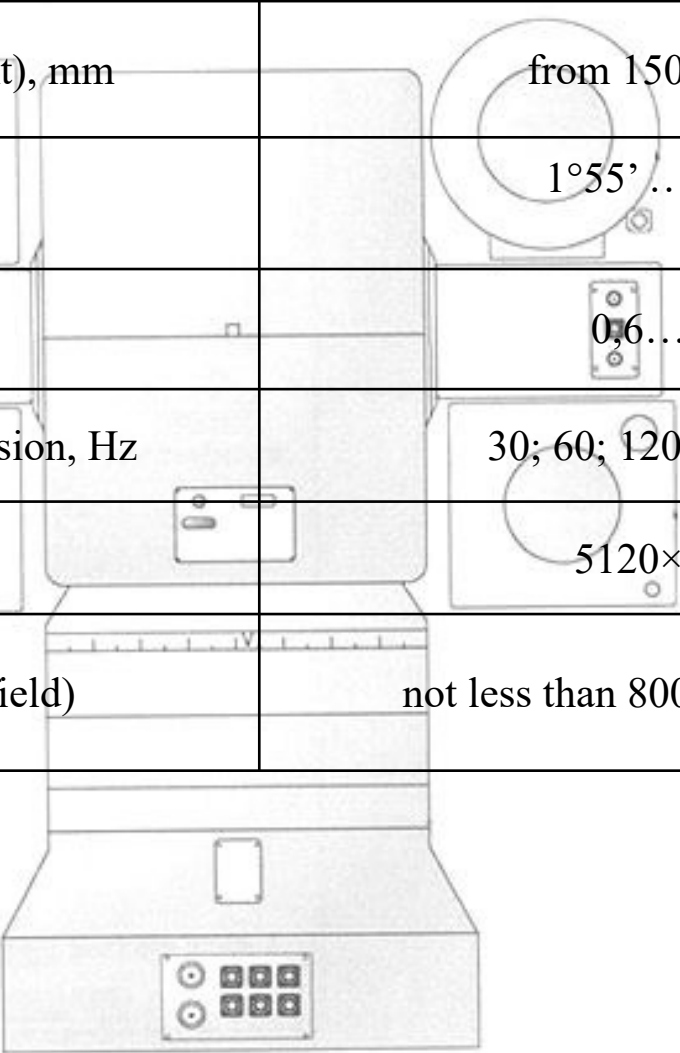
- no more than 15 angles. Sec.





Characteristics of the television high-speed measuring channel (VK-750)

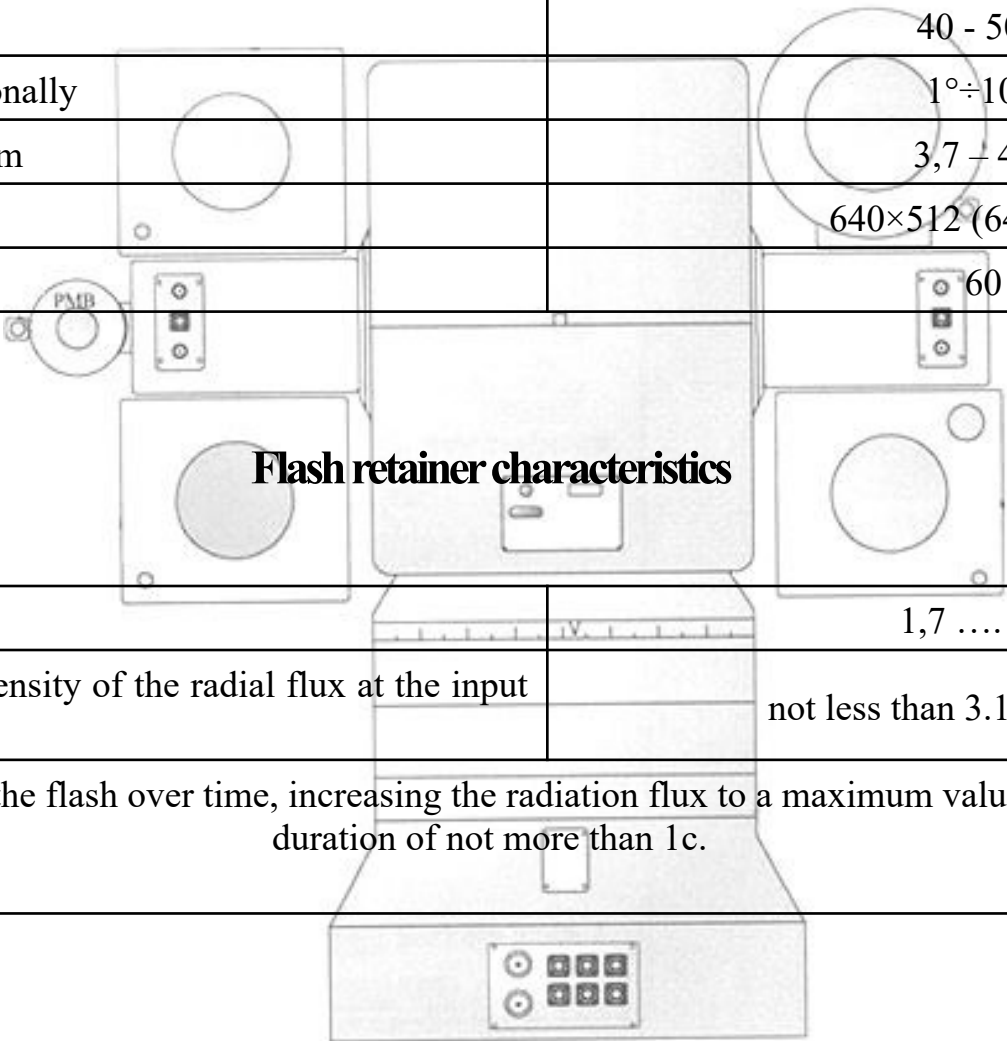
Focal length of the lens (smooth adjustment), mm	from 150 to 750;
Angular field of view diagonally	1°55'...9°34';
Operating spectral range, $\mu\text{m}$	0,6...0,9;
Frame rate depending on the current expansion, Hz	30; 60; 120; 240; 480
The maximum matrix format	5120×5120
Channel extensibility (in the center of the field)	not less than 800 bodies. Lines.





Characteristics of the thermal imaging measuring channel TPWK

Focal length, mm	40 - 500
Angular field of view diagonally	1°÷10°
Operating spectral range, μm	3,7 – 4,8
Matrix format	640×512 (640×480)
Frame rate, Hz	60



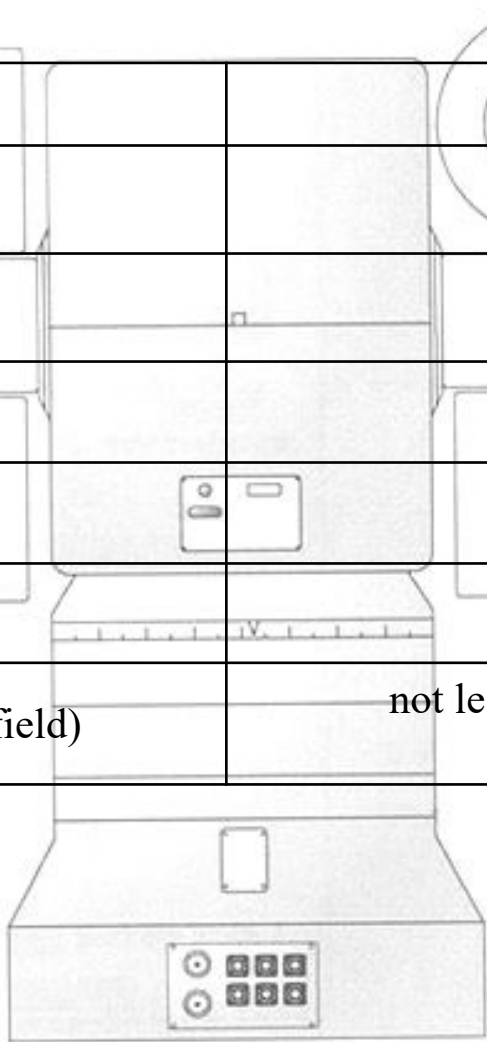
Flash retainer characteristics

Spectral range, μm	1,7 .... 2,8
Integral sensitivity at the density of the radial flux at the input of the optical system	not less than 3.10-9 W/cm2;
The possibility of fixing the flash over time, increasing the radiation flux to a maximum value of 0.6±0.15 ms with a duration of not more than 1c.	



Characteristics of a television measuring channel with a constant focal length  
VK-1000 (VK-1600)

Focal length , mm	1000 (1600)
Focal length measurement accuracy, %	0,5
Кутове поле зору по діагоналі	2°(0°54’)
Operating spectral range, μm	0,6 – 0,9
Matrix format	1280×1024
Frame rate, Hz	30...500
Channel extensibility (in the center of the field)	not less than 800 bodies. Lines.

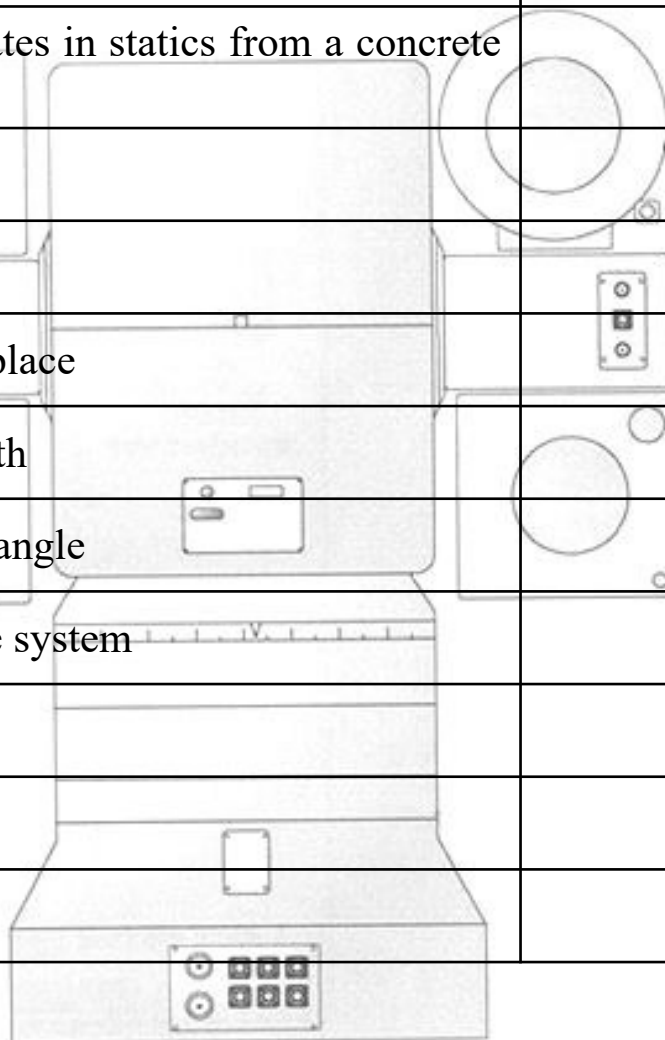






## Characteristics of the support-turning device

Ability to install VK, TPVK, IVD channels	Up to 5 at the same time
UPC measurement of angular coordinates in statics from a concrete foundation	5 кут. сек
Maximum speeds and accelerations	
- angular velocity in azimuth	100 rotate/s
- angular velocity at the corner of the place	100 rotate/c
- angular acceleration along the azimuth	130 rotate/c <sup>2</sup>
- angular acceleration at the elevation angle	130 rotate/c <sup>2</sup>
The range of angular movements of the system	
- by azimuth	> 360
- at the corner of the place	from 5 to 185
Horizoning within	± 30





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