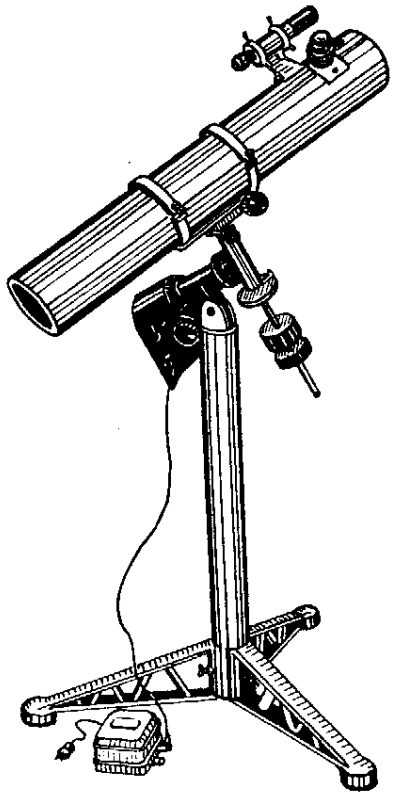
AMATEUR ASTRONOMER
TELESCOPE TAΛ-1M (TAΛ-1MT)



SERVIS MANUAL

3.807.011 PƆ

1997

CONTENTS

The telescope is subject to continuous development and improvement, consequently it may incorporate minor changes in detail from the information contained herein.

1. GENERAL DIRECTIONS

The direct odservations of the Sun through a black light filter are permitted only with the use of a solar diaphragm.

Telescope TAA-1M (TAA-1MT) (hereinafter in the text referred to as "telescope") is designed for visual observation of the celestial objects.

The telescope can operate normally at the ambient temperature from 30°C to minus 30°C.

When buying the telescope, one should pay attention to the package safety ensured by the seal of the manufacturing pliant. After unsealing the case one should check the compliance of the compliance of the standart equipment with the complete set denoted in the list of eclosure. Prior to using the telescope one gets acquainted with its handling and order of operation.

2. SPECIFICATIONS

Diameter of primary mirror	110mm
Focal ratio	f/7.3
Focal length	805mm
Magnification :	
with plossl 25mm eyepiece	32×
with Kelliner15mm eyepiece	54×
with plossll eyepiece and Barlow lens 3×	96×
with Kellner eyepiece and Barlow lens 3×	162×
Angular field of view of the telescope at magnifications:	
32×	1°36'
54×	0°47'
96×	0°25'
162×	0°15'
Resolution	1.3"
Limiting magnitude	12m
Range of slow-motion control on the declination axis	±4°
Rotation of the telescope:	
in right ascention	360°(24h)
in declination	360°
Polar axis altitude adjustment	0° - 70°
Angular field of view of the finderscope	8°
Magnification of the finderscope	6×
Minimum distance of observation	≈65
Voltage of the supplying mains	220/110V±10%
Current frequency	50Hg (60Hg)
Output voltage of the supply unit	12V±10%

Overall dimensions of the telescope:	
leghth	885mm
width	800mm
height in the operating position	1650mm
Mass of the telescope	21kg

3. STANDART EQUIPMENT

Designation	Name	Qty
5.803.067	Telescope	1
5.087.318	Supply unit	1
5.923.547	Eyepiece of f'=25mm	1
6.126.064	Support	3
5.920.019	Telescope of 6° magnification	1
6.452.062	Pier	1*
6.156.041	Tripod	1*
6.063.522	Equatorial mounting	1
6.641.172	Bundled conductors	1
	Accessories and Parts	
5.932.671	Barlow lens	1
5.937.988	Reticle	1
5.923.548	Kellner's eyepiece of f'=15mm	1
5.940.416	Yellow light filter	1
5.940.416-01	Black light filter (solar)	1
-02	Blue light filter	1
-03	Red light filter	1
-04	Green light filter	1
-05	Neutral light filter (grey, lunar)	1
7.006.115	Blind	1
6.152.099	Holder	1
8.632.379	Stoper	1
	Brush	1
8.057.126-01	Cap diaphragm	1
6.890.030-10	Screwdriver	1
8.890.001-01	Napkin	1
6.430.431	Screen (for observation of the Sun)	1

* Telescope can be completed with a metal pier (LXA-1M) or tripod (LXA-1MT)

8.840.369-01	Cover	1

Market Container

4.161.687	Parking case	1

Service Documents

3.807.011РЭ	Service manual	1

4. TELESCOPE DESIGN AND PRINCIPLE OF OPERATION

The telescope consists of four basic units: the telescope tube, equatorial mounting and pier with supports, supply unit.

Tube 1 (Fig. 1) is the basic part of the telescope which embodies the optical pieces: a primary mirror, a diagonal mirror, finderscope 3 fixed in the locating rings 2, eyepieces and Barlow lens which are inserted in the focusing mechanism 4.

The primary mirror (Fig. 3) is mounted in the cell and can be adjusted by means of the screws 1 and 2.

The diagonal mirror. (Fig. 4) is cemented to the cell and fixed in the telescope tube by means of a spider. The inlet hole of the tube is covered with the cap 3 (Fig.8) after operation.

Finderscope 3 (Fig.1) is a telescope wiht 6x magnification and field of view of 8°

The focusing mechanism 4 (Fig. 1) is composed of a rack and pinion. The pinion axle carries the handwheels which help to move the eyepiece tube. The smoothness of the tube movement can be controlled. For this purpose the left handwheel is held by one hand and the right handwheel is rotated clockwise with some effort relative to the left handwheel by the other hand. The chosen position of the tube can be fixed by the denoted method if necessary.

The telescope is completed with six light filters 7 (Fig. 8).

The equatorial mounting (Fig.5) consists of polar axis 2 and declination axis 6 perpendicular to the polar axis.

Fastenend on end of the declinahion axis is a saddle with himged clips 4 in which the telescope tube is mounted, fastened on the order end ofthe axis are counterweghts 8 which can move along the axis by thread for balancing the telescope tube. Screen 1 (Fig.8) and holder 4 for a camera can be fastened on the same axis as well.

The casing of the polar axis is fastened on bracked 10 (Fig.5) providid with a scale of latitudes by whith the polar axis is set to the latitude

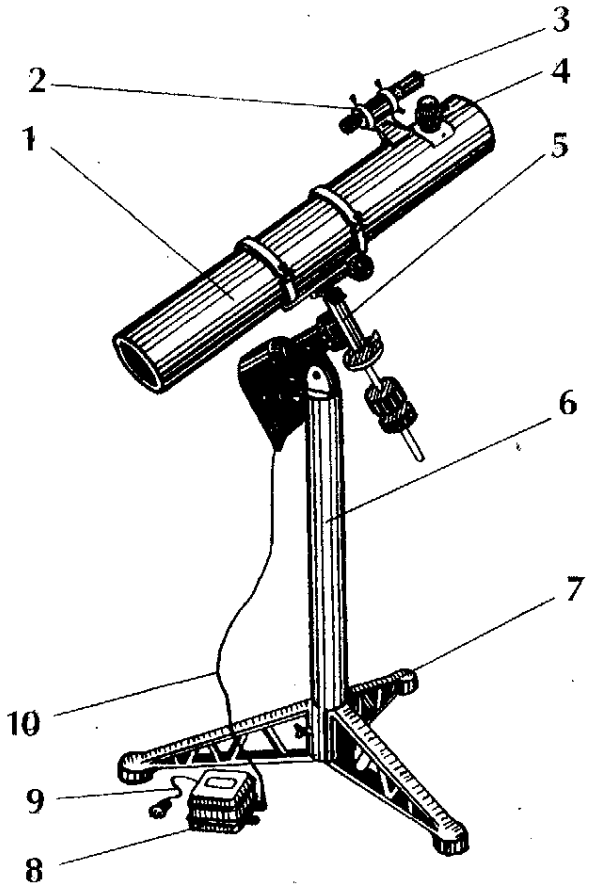


Fig.1. **General view or telescope with metal pier:**

1 - telescope tube; 2 - ring; 3 - finderscope; 4 - focusing mechanism; 5 - equatorial mounting; 6 - pier; 7 - supports; 8 - supply unit; 9 - cord; 10 - bundled conductors

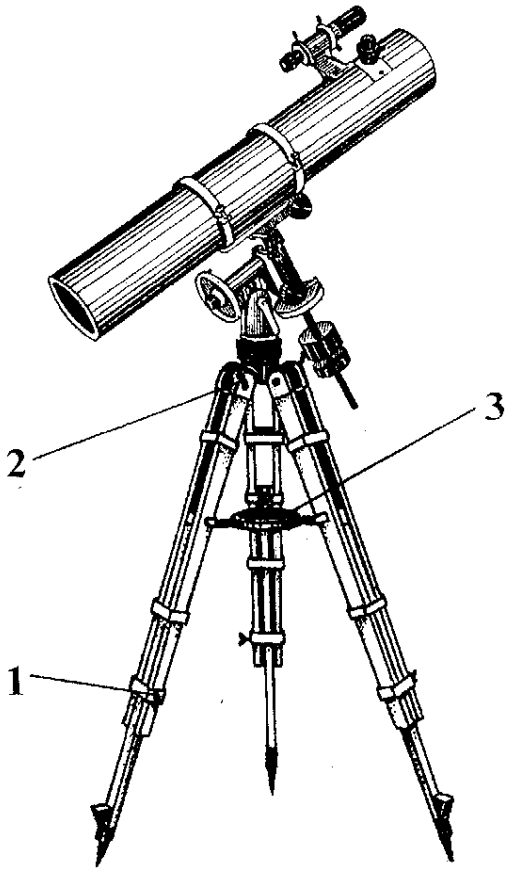


Fig. 2. **General view or telescope with tripod:**

1, 2 - stops; 3 - objects table

of the observer's site.

The southern (lower) end of the polar axis embodies electric watch drive 11, the northen (upper) end embodies the casing of declination axis 6.

Each axis is provided wiht a position circle which shows an hour angle and declination of the objiect visible in the telescope field of view. Position circle 7 on the declination axis which shows the object declination is figured from 0 to 90° wich division value of 2°. Circle 1 positioned on the polar axis (the circle of hour angles) is figured from 0 to 24 hours wiht a division value of 10 min.

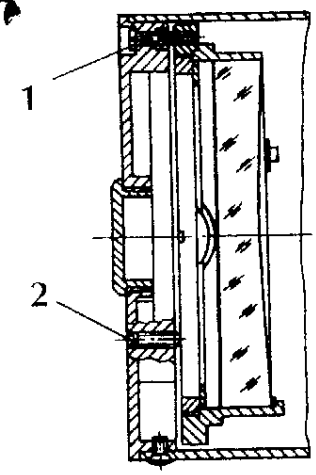


Fig. 3. **Primary mirror:**

1 - set screw; 2 - adjusting screw

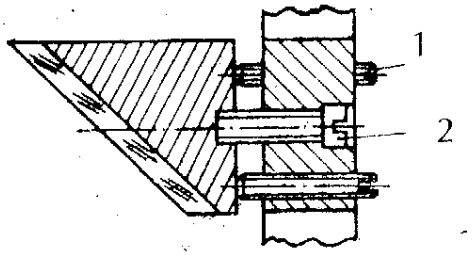


Fig. 4. **Diagonal mirror:**

1 - adjusting screw; 2 - set screw

The declination axis has braking sciew 3 and mechanism 5 of the fine motion which moves the tube in the range of ±4°. By useing this mechanism it is possible to correct the position of the object in the field of view. Theequatorial mounting is connected to pier by thread.

Pier 6 (Fig.1) consists of one tube on wich three legs are fixed.

The tripod (Fig. 2) allows to adjust a height of telescope and to fix each leg of tripod with the help of stops 1 and 2.

Supply unit 8 (a step-doun transformer) is designed for save operation

of the wach drive. All the telescope are secured with the use of a drop of butvar-phenolic adhesiveБФ-4. In order to undo a screw one should use a drop of alcohol.

The reflecting telescope is provided with the Newton optical system (Fig.6). A parallel beam of rays enters the telescope tube, falls on primary mirror 1 with a focal length of 805.85mm and, after reflecting from it in diagonal mirror 2, reflacts at 90° and is viewed with the help of eyepiece 4.

The telescope gives magnifications of 32×, 54×, 96×, 162×.

When mounting the symmetrical eyepiece of f'=25mm, one obtains 32× magnification, Kellner's eyepiece of f'=15mm give 54× magnification; when mounting Barlow lens 3 together with the symmetrical eyepiece one obtains 96× magnification, Barlow lens used together with Kellner's eyepiece gives 162× magnification.

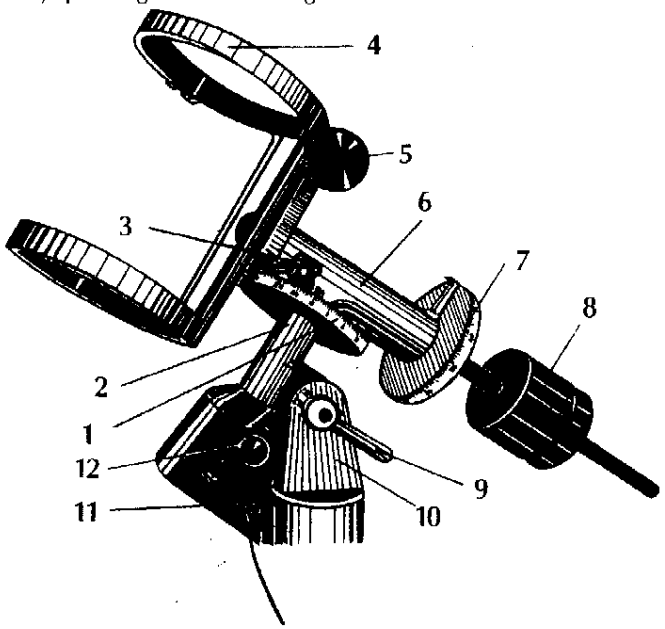


Fig. 5. **Equatorial mounting:**

1 - circle of hour; 2 - polar axis; 3 - screw of axis brake; 4 - folding clips; 5 -hanwheel of slow-motion mechanism; 6 - declination axis; 7 - circle of declination; 8 - counterweights; 9 - handle; 10 - bracket with scale of latitudes; 11 - electric watch drive; 12 - handwheel of polar axis

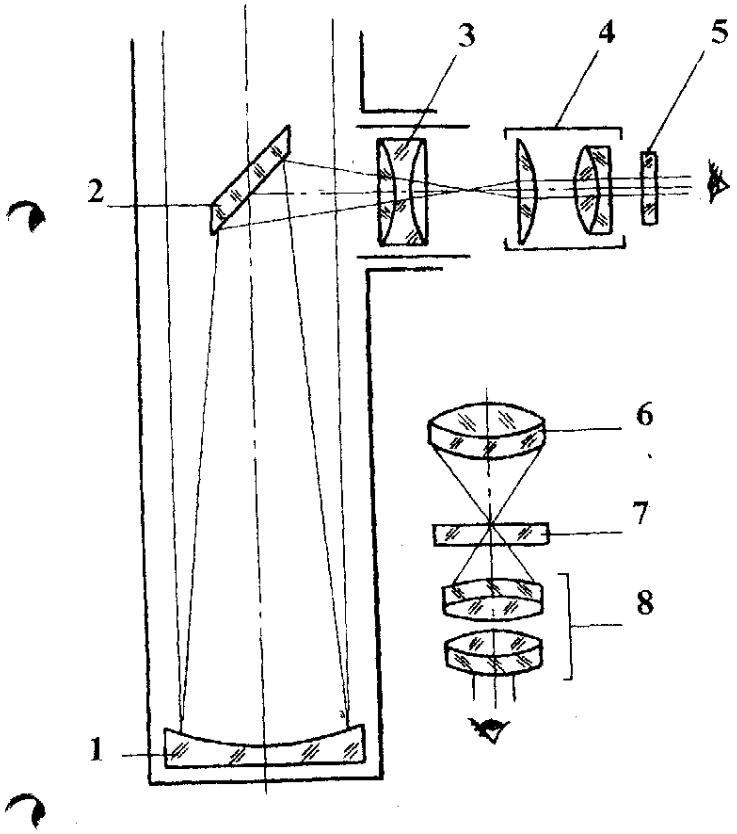


Fig. 6. **Optical train of telescope:**

1 - primery mirror; 2 - diagonal mirror; 3 - Barlow lens; 4 - eyepiece;
5 - light filters; 6 - finderscope objective; 7 - reticle with cross-hairs;
8 - finderscope eyepiece

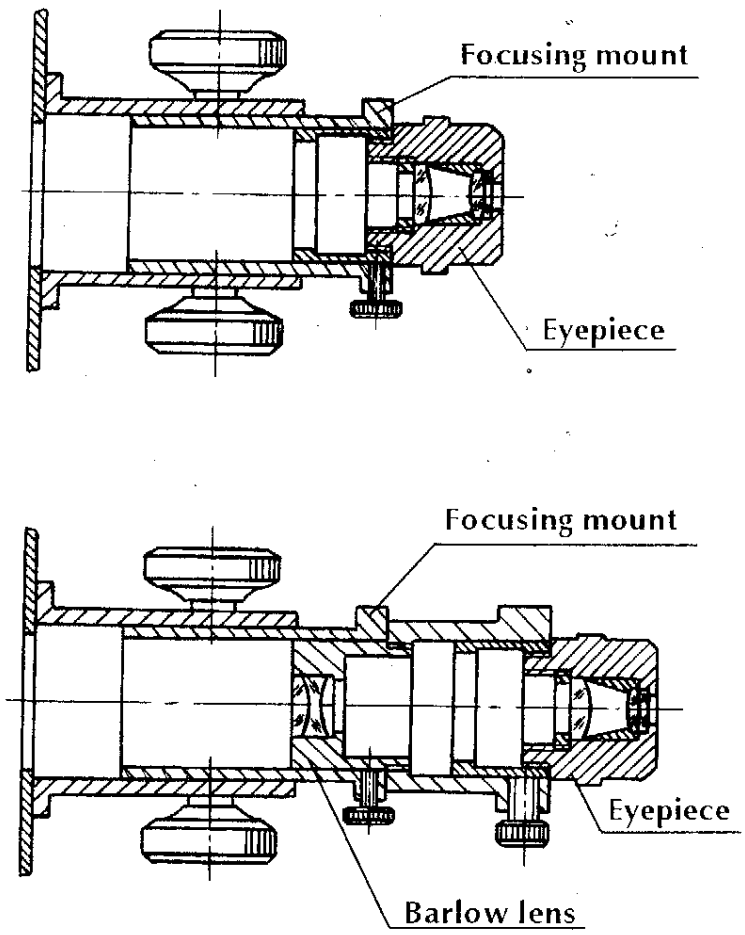
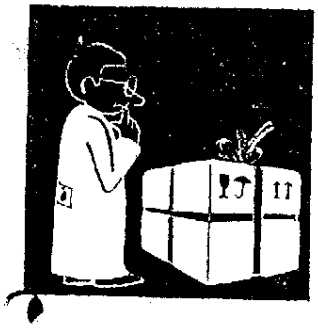


Fig. 7. Diagram of setting Barlow lens



5. PREPARATION FOR OPERATION

5.1. TELESCOPE ASSEMBLING

Before assembling the units and parts schould be cleaned from the slushing compound of the plant.

The telescope is assembled in the following way.

Three supports provided with captive screws are fixed to the lower end of the pier through holes. The equatorial mounting is set on the upper end of the pier. At the same way it is fixed on the tripod.

The polar axis is set by inclining the equatorial mounting by the scale of latitudes to the latitude of the observer's site and fixed with handle 9 (Fig.5).

The telescope tube is mounted on the supports of the saddle and fixed by means of two clips with the help of hinged screws.

The finderscope is mounted on the tube in two rings and fixed with six screws available on the saddle.

In transportation and storage a hole on the eyepiece tube is plugged with a stopper which should be removed and put in the case in preparation for operation.

For obtaining the required magnification of the telescoped the respective eyepiece or the eyepiece with Barlow lens 5 (Fig.8) is inserted in the eyepiece tube.

A toggle switch of the supply unit is to be set in position OFF.

Connect bundled conductors 10 (Fig.1) to the watch drive and to the supply unit throught a socket designated with 12V, connect a plug of cord 9 of the supply unit to the main of 220/110V. Set the toggle switch of the supplyunit in position ON. A light indicator on the watch driver must light.

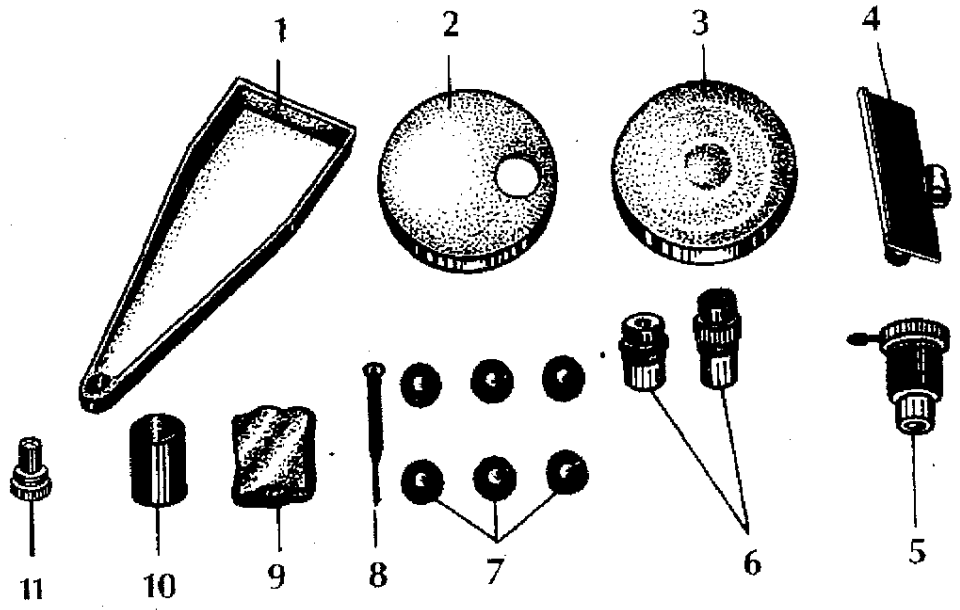


Fig. 8. Tools and accessories:

1 - solar screen; 2 - cap-diaphragm; 3 - cap; 4 - holder for camera; 5 - Barlow lens; 6 - eyepiece; 7 - light filtes; 8 - screwdriver; 9 - napkin; 10 - blind; 11 - reticle

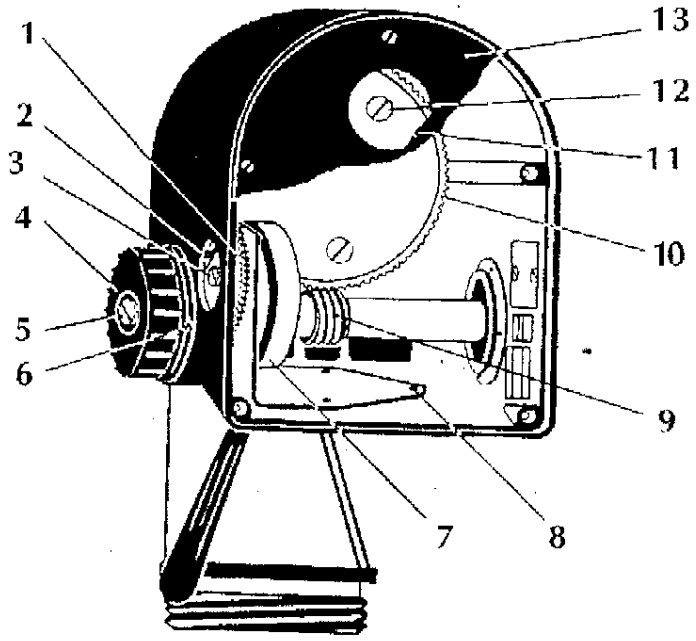


Fig. 9. **Clock drive:**

1 - worm gear wheel; 2 - cap; 3 - screw; 4 - handwheel; 5 - screw; 6 - screw; 7 - motor; 8 - screw; 9 - worm with gear wheel; 10 - worm wheel; 11 - cap; 12 - screw; 13 - cover

5.2. TELESCOPE BALANCING

For smooth motion of the telescope and reliable operation of the micrometer screws it is important to balance its movable parts on the axes of the equatorial mounting.

For this purpose one should set the telescope tube in the horizontal position, unscrew the screw of the brake 3 (Fig. 5) of the declination axis and, holding slightly the tube by hand, ses to it whether it remains in the indifferent equilibrium. If the tube is not in balance, undo the screws of the clips which fix the tube and move the tube along its axis until it will be in balance. After that screws in the screws of the clips.

For balansing the telescope relative to the polar axis it is necessary to set the declination axis in the horizontal position. Then it is necessary to slacken each of three screws 12 after moving cap 11 of the watch drive (Fig.9). Holding the axis by hand, see to it whether the telescope is in balance about the polar axis. If the telescope is not in balance, move counterweight 8 (Fig.5) along the declination axis. After balancing fighten screws 12 of the friction clutch (Fig.9) on the polar axis so that the telescope can not rotate easily.

The adjustment of the friction clutch is considered to be finished if the telescope tube moves due to the minor effort of the hand.

When mounting the various devices on the telescope, for example, the camera, it is required to balance the telescope additionally.

5.3. PRECAUTIONARY MEASURES

The rate of the fuse link mounted in the supply unit must be in compliance wich the rate denoted under the fuse link holder.

Mount the fuse link only after complete disconnection of the supply unit from the main.

Connect the bundled conductors to the wach drive and to the supply unit only when the supply unit is disconnected from the mains.

6. ORDER OF OPERATION

6.1. OPERATION WITH TELESCOPE

Before mounting the telescope it is required to choose the place and prepare a site. It must be even and solid. Mount the telescope on the site and check it for reliable stability.

For pointing to an object the telescope should be rotated about two axis. For rotation of the declination axis it is neccessary to undo braking screw 3 (Fig.5), rotate the telescope and screw in the braking screw.

In backlash is arisen in the worm gear, it is neccessary to disengage motor 7 (Fig.9). For this purpose it is required to take off cap 13, slacken three screws 8, displace motor 7 upwards and fix it with screw 8. Remove handwheels 4 after unscrewing screws 5.After that slacken screws 6 wich fasten worm 9 in the bearings. After pressing the worm to worm wheel 10 fix it wich screws 6.Mount handwheels 4 and secure them wich screws 5. Then slacken screws 8, displace the motor downwards until engagement wich the toothed wheel of the worm takes place and secure them with screws 8. Mount cap 13 on the casing.

Smoothness of rotation of toothed wheel 1 together with the toothed wheel of worm 9 is checked by rotation of the handwheels, jn doing so probable sliding or jamming of the friction clutch of toothed wheel 1 may take place.

For its adjustment it is required to displace cap 2 and fighten or slacken three screws 3. The friction clutch adjustment is considered to be finished if handwheels 4 rotate smoothly.

The telescope is preliminarily pointed relative to the polar axis by rotation of the tube with the help of a friction mechanism by hand.

The celestial sphere and all astronomical objects perform a complete rotation for twenty four hours. As a result the object in the telescope field of view displaces constantly. The rate of its displacement increases of the telescope magnification. Therefore the telescope is provided with electric watch drive 11 (Fig.5) wich rotates uniformly the telescope wich follows the object As a result, in the process of observation the object remains constantly at the centre of the field of view.

In the process of observation it is often required to perform minor

corrections in the diurnal run of the telescope. For this purpose one makes use of handwheels 4 (Fig.9) of the micrometer screw of the polar axis. In observation an observer's hand lies on one of the handwheels and rotates slightly the handwheel clockwise or counter-clockwisw if neccessary. In correction are performend when the drive is continuosly operating.

The telescope has hight magnification and, hence, small fields of view, therefore it os provided with a finderscope.

After mounting the telescope it is neccessary to set parallel of the optical axis of the telescope tube and finderscope.For this purpose one should mount a reticle with cross into the eyepiece f'=25 mm. One should make an adjustment by remoted object.

By operating with the set screws of rings 2 (Fig. 1). of the finderscope one brings the chosen remote object to the centre of the finderscope field of view. This operation is performed once. In the future before observation only a check-up of parallelism of the telescope and finderscope optical axes is needed.

In order to avoid correction of the declination axis during operation of the watch mechanism it is required to set the telescope polar axis in parallel to the celestial axis. In this case the morthern (upper) end of the polar axis faces the celestial pole positioned near Polaris (α Ursae Minoris).For visual observation it is enought to incline the polar axis at an angle equal to the latitude of the observaib\ng site and direct it approximately along the line South-the North. With such coarse setting of the telescope the object will "deviate" step by step in declination (it is lifted or lowered in the field view). This error is corrected at times by means of the micrometer screw of the declination axis.

For photographic operations and in the cases when the telescope can be set stationary, the polar axis of the telescope should be set precisely. For this purpose one observes any bright star in the East, then in the South and makes notice of the direction of the star displacement.

If in observation of the star in the East, it is displaced in the telescope field of view so that in its tracking the upper end of the telescope tube sinks slowly, the north end of the polar axis should be somewhat lifted.

If the upper end of the tube is lifted step by step, the north (upper) end of the polar axis should be lowered.

For precise setting of the axis by azimuth one observes the star near the meridian circle (above the South point) in the same way. If in the star tracking one has to lower slowly the upper end of the telescope tube, the north end of the polar axis should be displaced to the West. If in the process of the star tracking the upper end of the telescope

tube is lifted, the north end of the polar axis should be displaced to the East.

In 20-30 minutes of such observations one can set the polar axis so that the star will remain on the cross-hairs for 10-15 minules without correction in declination.

After precise setting of, the polar axis one can set the declination and hour circles which must help to search the objects invisible with a naked eye or even through the finderscope.

First of all one should set the hour circle which is fixed on the polar axis. After fine setting of the polar.axis set the declination axis horizontally. The horizontal setting should be checked with the aid of a level. After setting of the axis one sets the hour circle so that "0" is found against the index. Fix the circle by means of screws.

For setting the declination circle fixed on the declination axis one should find the declination of two three bright stars in the star catalogue or make use of the declinations of the planets. With thee help of the finderscope one brings the star or the planet to the centre of the field of the telescope at maximum magnification. After that one sets the declination of the required star against the index. The circle is to be fastened with a screw. Then one makes attempt to find the second star by its declination. For this purpose one slackens the screws of the axis brake and adjusts the telescope so that the declination of the star to be sought is set on the declination circle. Fix the declination axis by rotating the telescope tube slowly clockwise around the polar axis, brings the star to the centre of the telescope field of view. After checking of the circle setting one tightens it with a nut.

In order to avoid resetting of tile polar axis and circles one should choose the solid horizontal site. Best of all, it is made of same concrete of 1.5x1.5 m size. The position of three supports of the telescope pier should be marked on this site. The telescope is mounted according to the marks on the concrete site.

6.2. PHOTOGRAPHIC OBSERVATIONS

The telescope complete set includes a holder for a camera. It is used for mounting a miniature cameraon the equatorial mounting. For this purpose the holder is to be mounted on the declimation axis on the side of the counterweight and the camera is fastened to the latter with the help of a screw.

The exposures witch are required for photographing the star fields are tenths of minutes without hindrance of the street lighting. Therefore for this period of time one should see to it that the camera follows the sky precisely in its diurnal rotation. In order for this to happen one

inserts Barlow lens and a powerful eyepiece with a reticle in the eyepiece tube. Near the centre of the field of view of the camera one chooses the bright star to which the telescope is pointed. To keep the star on the reticle cross-hairs is the problem for an observer for the whole period of exposure. As the cross-hairs of the telescope is not illuminated, the image of the guide star should be somewhat defocused in order to cross a light circle of the unsharp image of the star by the cross-hairs and to keep the star in this position for the period of exposure.

One applies minor corrections for a clock-work drive with the help of handwheel 12 (Fig.5) keeping the star on the crosshairs for the whole period of exposure. One corrects the position of the guide star with the micrometer screw of the declination axis if necessary. To obtain the minimum corrections in declination the polar axis should be set as precisely as possible to the celestial pole. One should remember that if the polar axis is set incorrectly, even in the case when the star image is kept on the cross-hairs, the image of the stars at the edges of the field of view appear as dashes.

The holder makes it possible to use a camera with changeable objectives, if their mass is not too heavy.

6.3. TELESCOPE AND ATMOSPHERIC CONDITIONS

At hight magnifications together with the increase of the visible dimensions of the object the disturbances due to atmosphere are increased. They are expressed in great blurring of the images of the distant objects, in scintillation and blurring of of the star images.

The observations in the cold seasons are possible when all telescope parts acquire the ambient temperature. For air circulation inside the telescope tube there is a hole plugged with a stopper in the cell of the primary mirror. In operation the stopper should be unscrewed from the cell.

But in observations out of door the great disturbance of atmosphere may take place at nights, that leads to bad images of the celestial objects.

It is quite possible that at those nights the observations of the fine details of the planets and of the Moon are unsuccessful.

In case of precipitation and stooping of operation the telescope together with supply unit must be covered.

7. MAINTENANCE

For faultless operation the telescope should be kept in cleanness and protected against mechanical damage. The metal surfaces are periodically dusted by using clean soft napkins, then wiped with a napkin impregnated with acidless vaseline, after that with a dry napkin.

The aluminized mirrors require particular care. The accumulated dust is removed only with the use of a soft brush or a cotton wool tampon. Cleaning should be carried out without excessive effort to avoid formation of thin scratches on the mirrors surface which deteriorate the image. If some fat spots are found on the mirrors, never wipe them. In this case the mirrors are washed. The primary mirror (Fig. 3) is taken out of the tube after unscrewing the screws which fix the cell to the tube. Without removing the mirror from the cell, the mirror surface is wetted considerably with pure medical alcohol with the help of a cotton wool tampon. By using the same tampon, one wipes slightly the wet mirror without excessive effort and puts it at once under the stream of pure water. After removing alcohol in this way, one puts the mirror on its edge until it is dried. The drops of water are removed with a blotter by touching them slightly with a blotter corner.

The diagonal mirror is cleaned in the same way. After cleaning the mirrors are put in their places.

The lenses of the eyepieces are wiped with a dry linen napkin. The fat spots are removed with a cotton wool piece impregnated with alcohol.

One should dismantle the optics only in case of necessity. In non-operating position the telescope tube must be constantly covered with a cap and the eyepiece one is to be plugged with a stopper.

8. POSSIBLE DERANGEMENTS AND METHODS OF THEIR ELIMINATION

When manufacturing the telescope at the plant, the optical pieces are carefully set (adjusted) relative to each other. However, in case of transportation or considerable impacts of the telescope the optical parts may be displaced (the adjustment is disturbed). In this case it is required to readjust the telescope. Prior to this operation one should remove the eyepiece from the eyepiece tube and check whether the mirrors are displaced from the given places. For this purpose it is necessary to look through the eyepiece tube from which the eyepi-

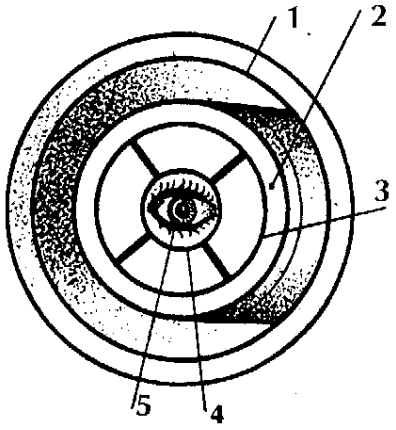


Fig. 10. **Setting concentricly of mirrors:**

1 - finner diameter of focusing mount; 2 - diagonal mirror; 3 - reflection of primery mirror in the diagonal mirror; 4 - reflection of diagonal mirror in the primary one; 5 - observe's eye

ece and the Barlow lens are removed. If the telescope is adjusted, the plane diagonal mirror mast be concentric relative to the brim of the focusing mount. The reflection of the primary mirror in the diagonal one must be concentric as well. The reflection of the diagonal mirror with the in the primary mirror. The image of the diagonal mirror must be positioned precisely in the middle of the primary. The reflection of an observer's eye (Fig. 10) must be seen at the centre of the diagonal mirror reflection.

In adjustment it is required to correct the position of the diagonal mirror or primary one. If the image of the primary mirror in the diagonal one is non concentric, it is neccessary to change the position of the diagonal mirror. For this purpose one unscrews the screw 2 of the cell of the diagonal mirror (Fig. 4) and, operating with one of three screws 1, brings the reflection of the primary mirror in the diagonal one to the centre of the diagonal mirror.

If the position of the primary mirror is disturbed, the reflection of the diagonal mirror with the spider in it is seen not at the centre. In this case one unscrews the screws 2 of the cell of the primary mirror and, by operating with three screws 1 (Fig. 3), sets the primary mirror so that the reflection of the diagonal mirror in it is found at the centre (it becomes concentric). After setting the mirror in the correct position, one fixes the cell in position by means of the screws 2.

The adjustment of the telescope is delicate and is carried out only in case of emergency, when it is clear that tile telescope Is misadjusted and its mirrors and reflections from them are not concentric.

9. RULES OF STORAGE

It is recommended practice to store the telescope in tile case in the hearted premises with relative humidity of maximum 80%, at air temperature from 5 to 40° C.

The impacts and sharp shaking should be avoided.

It is forbidden to store the telescope together with acids, alkalies, materials which liberate moisture or chemically-active gases and vapours.

10. ACCEPTANCE CERTIFICATE

The amateur astronomer telescope, serial No. 0348 is found fit for service

Date of manufacture and slushing 05 - 01

Signatures

Table of close stellar pairs for testing image quality of the telescope

Name of star	Coordinates		Magnitude, m	Visible distance, ang. s.	Constellations
	h, m	ang. degrees, ang. min.			
αPsc	1h59.4m	+02°31′	4.3-5.3	1.9″	Pisces
γCet	2h40.7m	+03°02′	3.4-4.4	2.8″	Cetus
ξOri	5h38.2m	-01°58′	2.0-4.2	2.5″	Orion
αGem	7h31.4m	+32°00′	2.0-2.8	1.8″	Gemini
αHyd	8h44.1m	-06°36′	3.5-6.9	2.9″	Hydra
σ²Uma	9h06.0m	+67°20′	4.9-8.2	2.7″	Ursa Major
38Lyn	9h15.8m	+37°07′	4.9-6.0	2.8″	Lynx
ξUma	11h15.6m	+31°49′	4.4-4.8	2.9″	Ursa Major
ξBoo	14h38.8m	+13°56′	4.6-4.6	1.2″	Bootes
εBoo	14h42.8m	+27°17′	2.7-5.1	3.0″	Bootes
μDra	17h04.3m	+54°32′	5.8-5.8	2.2″	Draco
τOph	18h00.4m	-08°11′	5.4-6.0	2.0″	Ophiucus
70 Oph	18h02.9m	+02°31′	4.0-6.0	2.4″	Ophiucus
ε¹Lyr	18h42.7m	+39°37′	5.1-6.2	2.7″	Lyra
ε²Lyr	18h42.7m	+39°37′	5.1-5.4	2.2″	Lyra
δCyg	19h43.4m	+45°00′	3.0-6.5	2.2″	Cygnus
μCyg	21h41.9m	+28°30′	4.7-6.1	1.8″	Cygnus
ξAqr	22h26.3m	00°17′	4.4-4.6	1.8″	Aquarius