TELESCOPE
TAL-125-5APO

SERVICE MANUAL

NPZ®

Contents

Due to continuous development and improvement of telescopes, there can be insignificant changes in their designs, which are not reflected in this publication.

General instructions

Warning!
To avoid eyes injury, do not look at the Sun through an eyepiece or a finder of the telescope!
Children can look through the telescope under the adult's control only.

- The telescope is designed for visual observation and photographing of celestial objects. It requires careful treatment and definite knowledge of astronomy. Only in this case, operation with the telescope will satisfy its owner.
- The telescope can operate in an open air environment within a temperature range of +30 °C to -30 °C.
- When buying a telescope, pay you attention to the integrity of packaging, which is provided with manufacturer's seals. After opening the packaging, check the complete set, indicated in the list of enclosure.
- Read the instructions carefully before mounting and using your telescope.

With suggestions, please contact:
FSUE PA "Novosibirsk Instrument-Making Plant",
630049, Novosibirsk, Dusi Kovalchuk street, 179/2,
Marketing Department, tel/fax: +7 (383) 225-58-96,
+7 (383) 226-17-82,

e-mail: npz@ngs.ru; www.npzoptics.ru.

Moscow Office, tel/fax +7 (495) 482-17-03,
e-mail: nbelousova@rambler.ru.

Saints-Petersburg Office,
tel/fax +7 (812) 324-70-55.

Krasnoyarsk Office,
tel/fax: +7 (3912) 22-74-80, 27-53-20,
e-mail: optica@ktk.ru.

Specifications

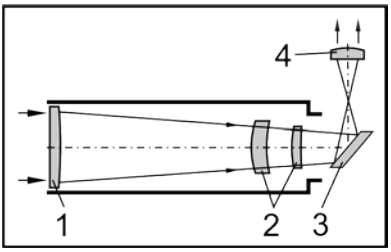
Name	
Objective lens diameter, mm	125
Focal length, mm	940
Aperture ratio	1:7,5
Resolution limit	1"
Limiting stellar magnitude	$12,0^{m}$
Finder:	
visual magnification, x	6
objective lens diameter, mm	30
Focusing device	1,25"; 2"
Tube length, mm	1150
Telescope weight, kg	8,0

Delivery set

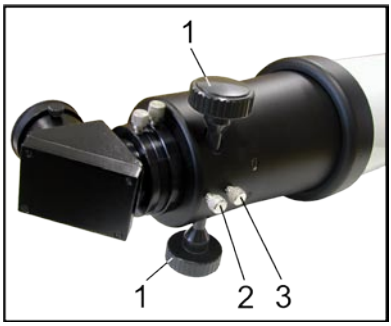
Name	
Telescope	+
Finder 6^{x}×30	+
Service manual	+
Supplementary accessories	
Parallactic mount MT-3S-2D with a counterweight of 3,7 kg	–
Pole finder 6^{x}×23	–
Hand controller	–
Power supply unit	–
Metal tripod	–
Cable (10 m)	–
Pier C75R (1000 mm)	–
Barlow Lens 2^{x}	–
Eyepieces (1,25"):	
f' = 6,3 mm	–
f' = 7,5 mm	–
f' = 12,5 mm	–
f' = 17 mm	–
f' = 20 mm	–
f' = 25 mm	–
f' = 32 mm	–
f' = 40 mm	–
Wide-angle eyepieces (1,25"):	
f' = 10 mm	–
f' = 15 mm	–
f' = 20 mm	–

Name	
Super wide-angle eyepieces:	
f' = 15 mm (1,25")	–
f' = 20 mm (2")	–
f' = 24 mm (2")	–
f' = 25 mm (2")	–
Prism for direct observation	
PP-45° (1,25")	–
Eyepiece-guide 12,5 mm (1,25")	–
Light filters M28,5×0,6:	
black	–
neutral	–
yellow	–
blue	–
red	–
green	–
Light filters M48×0,75:	
black	–
neutral	–
yellow	–
blue	–
red	–
green	–
Car Cable (10 m)	–

Design of telescope



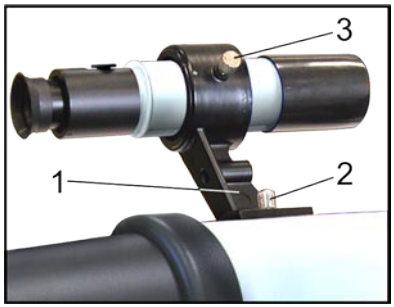
- Optical tube is a telescope itself. All the main optical assemblies are mounted into it: objective lens with corrector, eyepiece assembly with focusing mechanism and optical finder.
- According to the type of optical scheme the telescope refers to the apochromatic refractors. There is used an original optical scheme, not containing special sorts of glass, in the telescope. Parallel beam of light gets into the telescope tube and with the help of objective lens (1) and corrector (2) is projected at the focal plane of an eyepiece (4).
- For observation convenience, the eyepiece assembly is inclined relatively to the telescope axis by 90º with the help of flat diagonal mirror (3).
- There is a finder integrated in the optical tube, and facilitating the search of objects in the sky.
- All surfaces of lenses are coated with multi-layer clearing coverings.



- The eyepiece assembly includes focusing mechanism with eyepiece tube.
- Focusing mechanism of frictional type includes an axis with handwheels (1), with help of which the eyepiece tube shifts.
- Motion smoothness of the eyepiece tube is regulated with the help of a screw (2).
- Screw (3) provides fixation of the eyepiece tube in adjusted position.

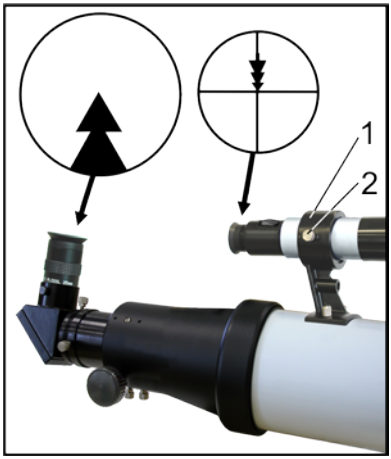
Preparation for observations

Assembling of telescope



- ❑ Mount the bracket of finder (1) onto the telescope tube and fix it with the screws (2). Fix the finder with a screw (3).
- ❑ For the period of observation take off the cover from the blend of telescope tube and from the eyepiece tube.

Adjustment of optical axes



Telescope has high magnifications and consequently – small fields of view. This complicates the search of objects in the sky, that is why the telescope is equipped with an optical finder with a wide field of view. With the help of the finder you can easily find the necessary object in the sky and then observe it in the field of view of the telescope.
For this purpose you should adjust the parallelism of the optical axes of telescope tube and optical finder.

- ❑ Direct the telescope at a distant object, inserting an eyepiece into the eyepiece tube (eyepiece is not included into the set).
- ❑ Set the image of chosen object in the centre of the field of view. Fix this position of the telescope.

- Set the image of chosen object in the crosshairs of finder's reticle by turning it in spherical joint of the bracket (1), and fix this position with the help of the screw (2). In future, it will be enough just to check the coalignment of the optical axes of the telescope and of the finder, prior to observations.

Observations

At high magnifications, along with increase of the visual sizes of the object, the atmosphere become more significant, that appears as distortion and blurring of images of the distant objects, blinking and blurring of the stellar images.
There can be the nights with poor images of celestial bodies because of the atmospheric turbulence. It is possible that at this time you will not be able to observe the details of the planets and the Moon under such conditions.
Observations with the telescope through the window are meaningless as an uneven surface of window glass distorts images.
Cover the telescope when work is finished and to protect it against precipitations.

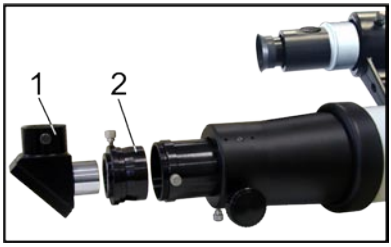
Visual observations

Choose the sky object interest you. Point the telescope tube in the direction of the object. Find an image of the object in the finder's field of view and set the object in the centre of the field of view.

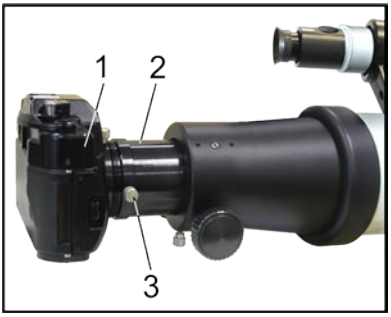
- Insert the eyepiece (not included into the set) into the eyepiece tube. With the help of handwheels of eyepiece assembly, achieve the best sharpness of the image.
  Using various eyepieces, you can get different magnifications.

Photographic observations

Use a miniature reflex camera with an objective's thread M42×0,75 to take pictures of celestial objects.



- ❑ To mount a camera on the telescope, take off deflecting mirror (1) and bushing (2), unscrew the camera objective lens.
- ❑ Screw a reducing bushing 2" in the camera.



- ❑ Insert the camera (1) with a reducing bushing into the eyepiece tube (2) and secure them by the screw (3).
- ❑ High-quality guiding can be performed with the help of off-axis guide or telescope-guide (not included into the delivery set).

Maintenance

In order to keep the telescope in good operating condition it is necessary to check it's technical state and fulfil maintenance.

- ❑ Keep the telescope clean and protect it against physical damage to provide no-failure operation of the telescope.
- ❑ Periodically wipe off the dust from metal surfaces with clean soft napkins, then wipe them by the napkin wet with acid-free Vaseline and dry with napkin.
- ❑ Wipe the objective's and eyepiece's lenses with dry linen napkin. To remove oil spots use a cotton wad wet with alcohol.
- ❑ Conduct the cleaning of the diagonal mirror surface without pressure by cotton wad wet with ether, having removed a dust by a soft lens brush first to avoid thin scratches.
- ❑ In idle position the telescope tube and the eyepiece tube should be permanently closed with lids.

Cleaning of the telescope optical components requires caution and accuracy. Perform it only in case of emergency.

Optics self-cleaning and disassembling of the telescope are permitted ONLY after expiration the warranty period.

Telescope alignment

The necessity in additional alignment of the telescope can appear after optics cleaning or accidental misalignment.

The telescope alignment should be held by specialists, as it requires special skills and qualification.

Storage

- It is necessary to store the telescope in a dry heated place with a temperature range of +5° to +40 °C and relative humidity up to 80%.
- Avoid impacts and sharp shocks of telescope.
- It is prohibited to store acids, alkalis or any chemical materials, emitting moisture or active chemical gases and vapor.

Acceptance certificate

Telescope TAL-125-5APO, serial No. _____,

is fit for operation.

Date of issue _____ 20 ___

Signatures _____

Manufacturer:
Federal State Unitary Enterprise
Production Amalgamation
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Novosibirsk, 630049,
Russia