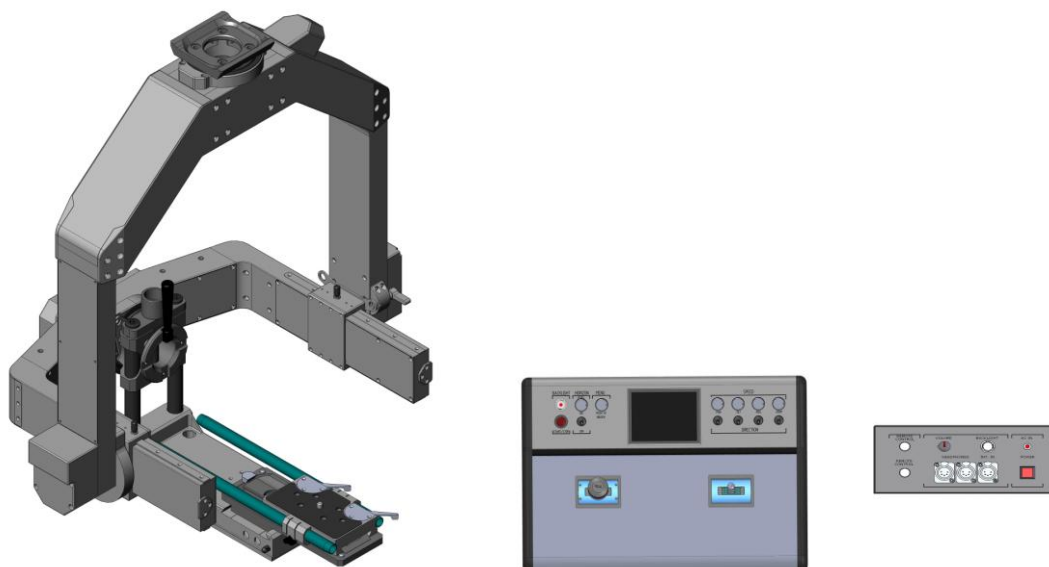




§1. Function

1.1. The gyrostabilized remotely controlled platform, hereinafter the Head, is designed to ensure gyrostabilization and control of angular position of cinema or video cameras in space, lens control and start/stop control for cinema and video cameras, and voice communications for the personnel.

1.2. Resistance of the Head to external climatic factors corresponds to climatic modification YXЛ4 according to GOST 15150-69.

1.3. Ensures reliable operation under the following operating conditions:

1.4. Ambient temperature range, °C

-20 to +45;

1.5. Relative humidity

up to 98% at 25°C.

§2. Configuration and scope of delivery of the Head:

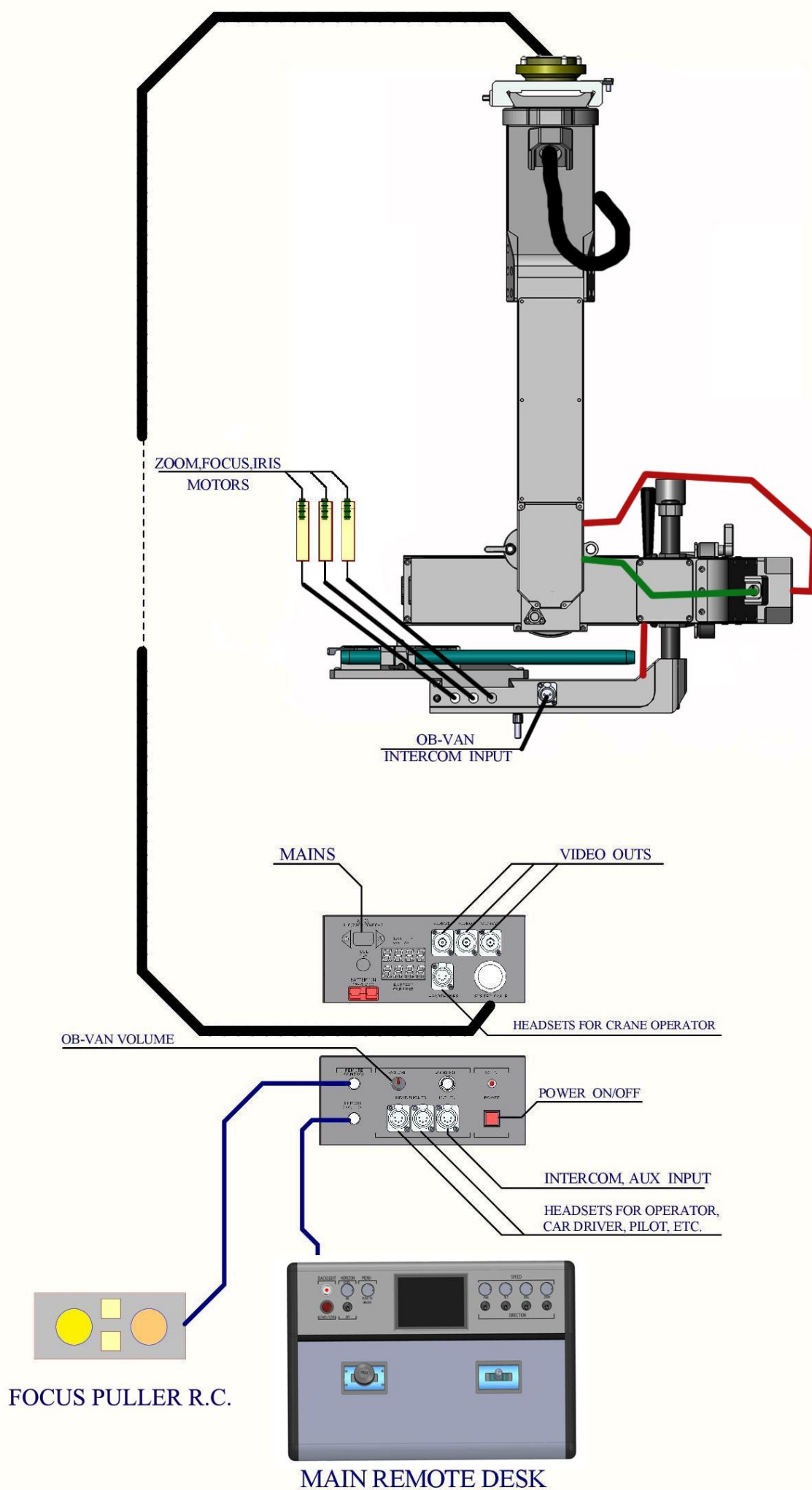
1. Remote head box

1	Remote head	1
2	Lens motor	3
3	Lens motor gear m0.4 (tv iris)	3
4	Lens motor gear m0.6 (Fjinon)	3
5	Lens motor gear m0.5 (Cannon)	3
6	Lens motor gear m0.8 (Cinema)	3
7	Set of mount motor (12 details)	
7.1	Barrel 19 mm	3
7.2	Support tube adapter from 19mm to 15 mm	3
7.3	Bend 19mm x 19mm	3
7.4	Clamp mount for lens motor	3
8	Roll chassis cable	1
9	Tilt chassis cable	1
10	Lens control camera	1
11	Mounting plate with congress screw 1/4"	1
12	Lens support tube	2
13	Safety harness	2

14	Strap	1
15	Set of cables to camera connection	
15.1	Camera intercom cable l=2m NC3MX- NC3MX	1
15.2	Camera intercom cable l=0.5m NC3MX- NC5MX	1
15.3	Camera intercom cable l=0.5m NC3MX- NC7MX	1
15.4	Camera intercom cable l=0.5m NC3MX 3 pole 1/4"audio plug	1
15.5	Camera intercom cable l=0.5m NC3MX- NTP3RC3 pole 3.5 mm audio plug	1
15.6	TV zoom cable 8 pin Percon R01-01P9-8M	1
15.7	TV zoom cable 12 pin Hirose HR 10-10P-12P	2
15.8	TV zoom cable + focus 20 pin	1
15.9	Run Arri 3 pin Fisher S102A052(cable diameter 3.5mm)	1
15.10	Run RED 4 pin Lemo	1
15.11	Run HD cable 12pin Hirose HR 10-10P-12P(cable diameter 3.5mm)	1
15.12	TV focus cable 12 pin	1
15.13	Lens motor cable	3
15.14	BNC-BNC video cables 0.5m	3
15.15	Safety multicore extender with Lemo 30 pin connectors 1.5m	1
16	Head wrench 6mm	1
17	Mitchell mount head wrench	1
18	Balance weight	4
19	Mitchell mount	1

2. Remote control and cable box

1	Power unit	1
2	Main remote control	1
3	Focuspuller remote control	1
4	Remote control cable 1.3m	1
5	Remote control cable 9m	1
6	AC cable	1
7	BNC-BNC video cables 2m	2
8	Lamp with flexible holder	1
9	Headsets	3
10	Headset splitter (NC5)	1
11	Long headset cable with cable reel (20-30m)	1
12	Headset cable 4 m	1
13	Head cable with cable reel 50m	1



§3. Construction of the head.

3.1. The 3-axial gyrostabilized head consists of three chassis connected orthogonally in a gimbal (cardan suspension). The chassis (pan, tilt and roll) are controlled by antibacklash motor drives by means of electronic control unit (ECU). Fibre optic gyroscopes (FOG) installed in each chassis together with the electronic control system provide angular stability of each axis in inertial space. This ensures sufficient stability of the camera axis (acceptable even for focal distances of $F=250-300$ mm) in presence of oscillations or angular vibrations of camera heads mounted on various camera support equipment (cranes, telescopic cranes, dollies, camera shock absorbers, pendant camera systems, helicopter systems, etc.).

The cameraman can use a remote control unit to control pan, tilt and roll angles of a photographic, video or cinema camera remotely. The gyrostabilization system with all axes in function offers superior camera control smoothness over the entire angular velocity range, as well as excellent control dynamics for the platform.

3.2. Lens control servodrives (ZOOM, FOCUS, IRIS) provide remote control of focus, zoom, and iris of the camera lens both from the Head control desk and from the Focus Puller Desk. A set of film and telephoto lens gears is also provided. Automatic adjustment and testing of the lens control system is performed once the servodrives are mounted onto the lens supports and the head is powered-up, which shortens setup time of the entire system and protects the lens against mechanical damage during operation.

3.3. The voice communications system ensures two-way communication in a high noise environment between the head operator, crane operator, dolly grip, OB van, etc. Closed-type headsets with differential microphones provide reliable suppression of external noise.

§4. Setting-up the Head.

4.1. The 3-axial gyrostabilized head, hereinafter the Head, is mounted on a Mitchell Base. The tilt chassis (2) is fixed in mounting position by latch (4), and the roll chassis (3) is fixed by latch (5). Plug the roll cable (6) into connectors (11) and the tilt cable (7) into connectors (12). System cable (multicore) (8) shall be threaded through opening in the pan axle and plugged into multicore cable connector (9). Extra cable length, approximately 250 mm, shall be provided to form cable loop (10). This loop prevents cable from kinking at the outlet of the cable connector. It is strongly recommended to use flexible cross cable 15.15, which features high kink and twist resistance even in case of multiturn rotation of the pan chassis (1).

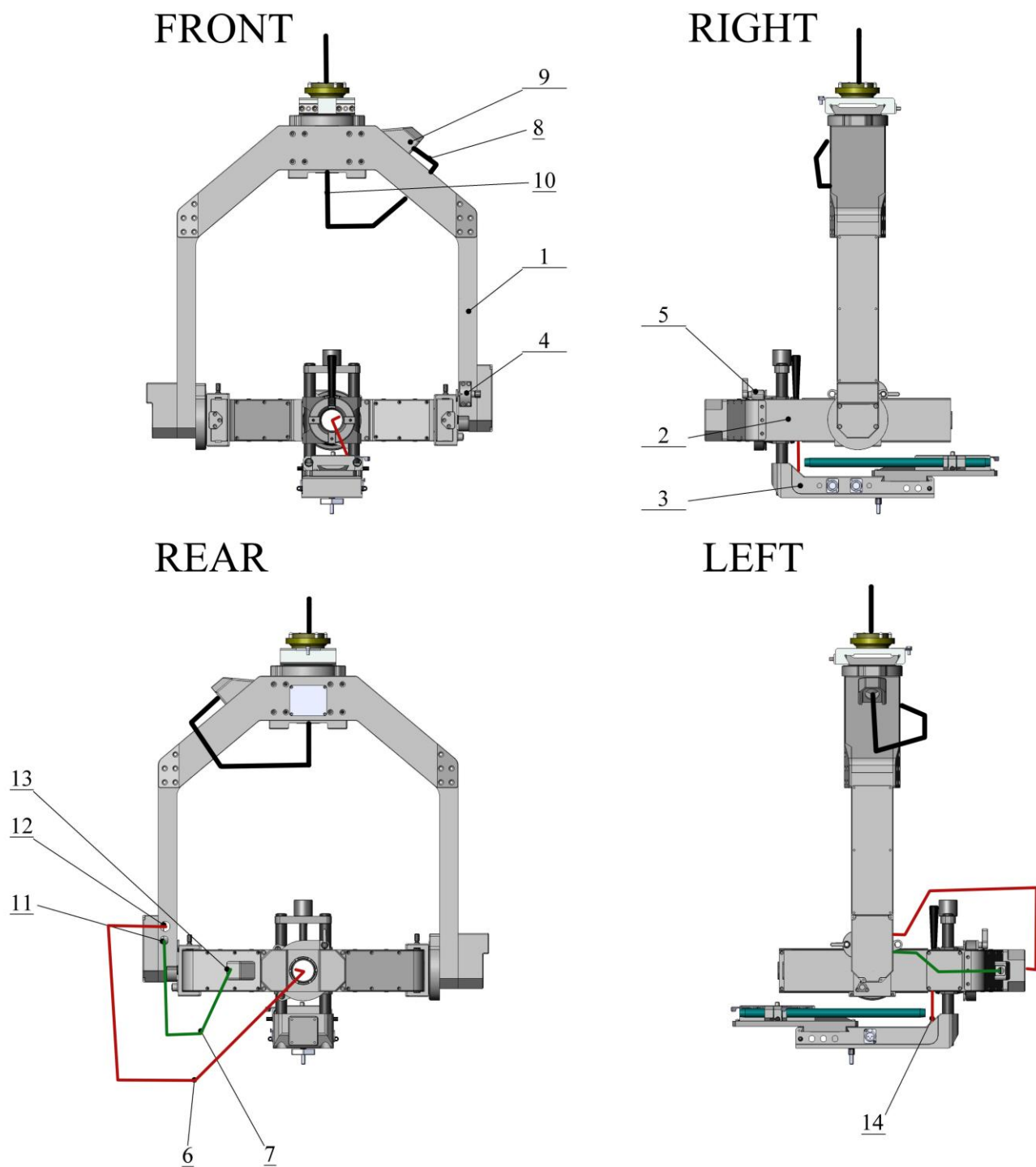


Fig. 1

Before powering-up the Head please make sure that latches of the tilt chassi (4) and roll chassi (5) are in release position.

4.2. Mount the camera on platform (15) (fig. 2)

4.2.1. Put on safety harness and strip the camera to eliminate undesired assembly backlash.

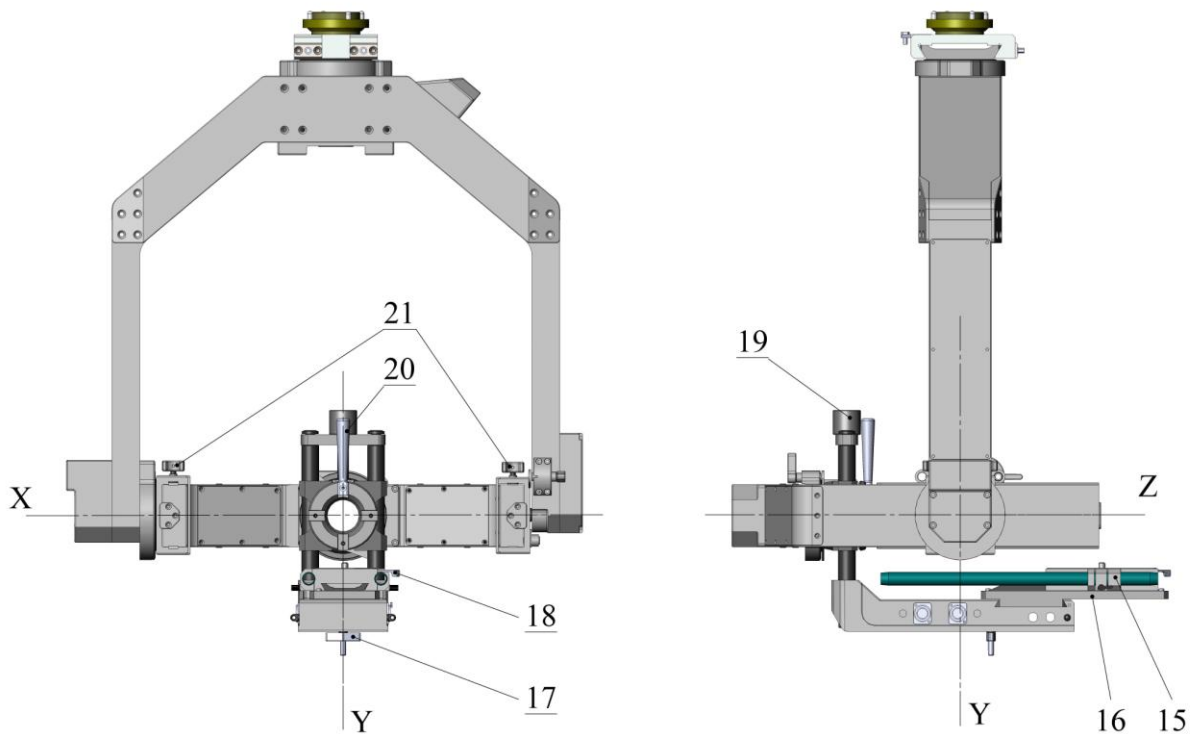


Fig. 2

4.2.1. Connection of video, voice communications and lens actuator cables is shown in fig. 3.

4.3. Balancing the Head.

4.3.1. Loosen platform guide (16) using screw (17) and perform balancing adjustment along the X-axis of the roll chassis. Tighten the screw.

4.3.2. Loosen the roll chassis clamp (20) using screw (19) and perform balancing adjustment along the Y-axis. Tighten the roll chassis clamp.

4.3.3. Loosen tilt chassis clamps (21) and perform balancing adjustment along the Z-axis. Tighten clamps of the tilt chassis.

Accurate tilt and roll balancing allows achieving the best possible space stabilization of the camera axis.

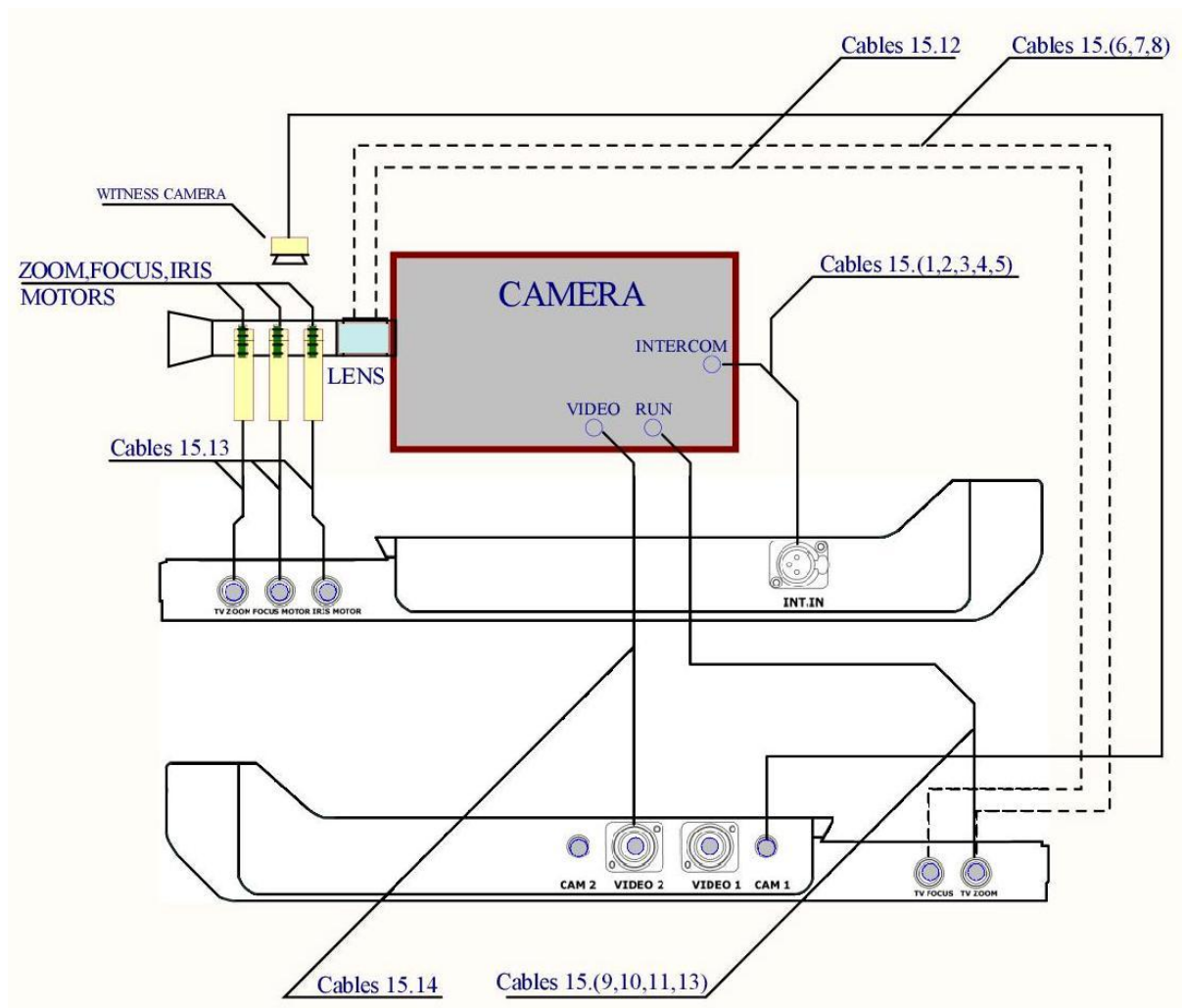
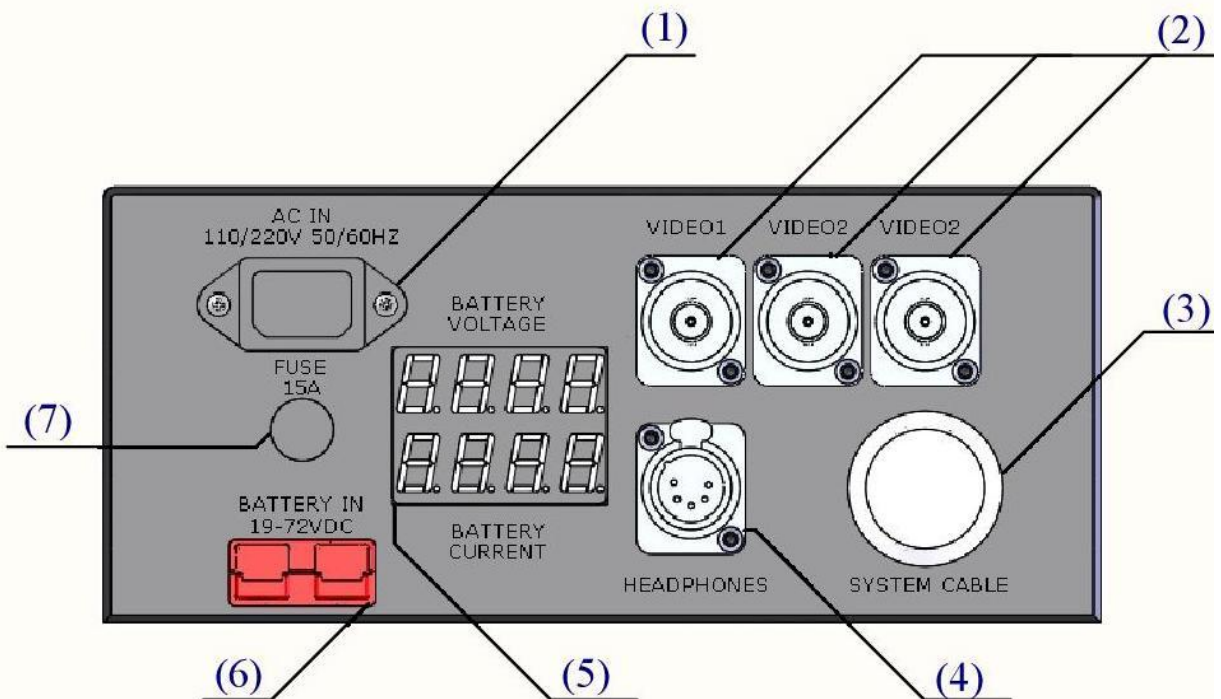
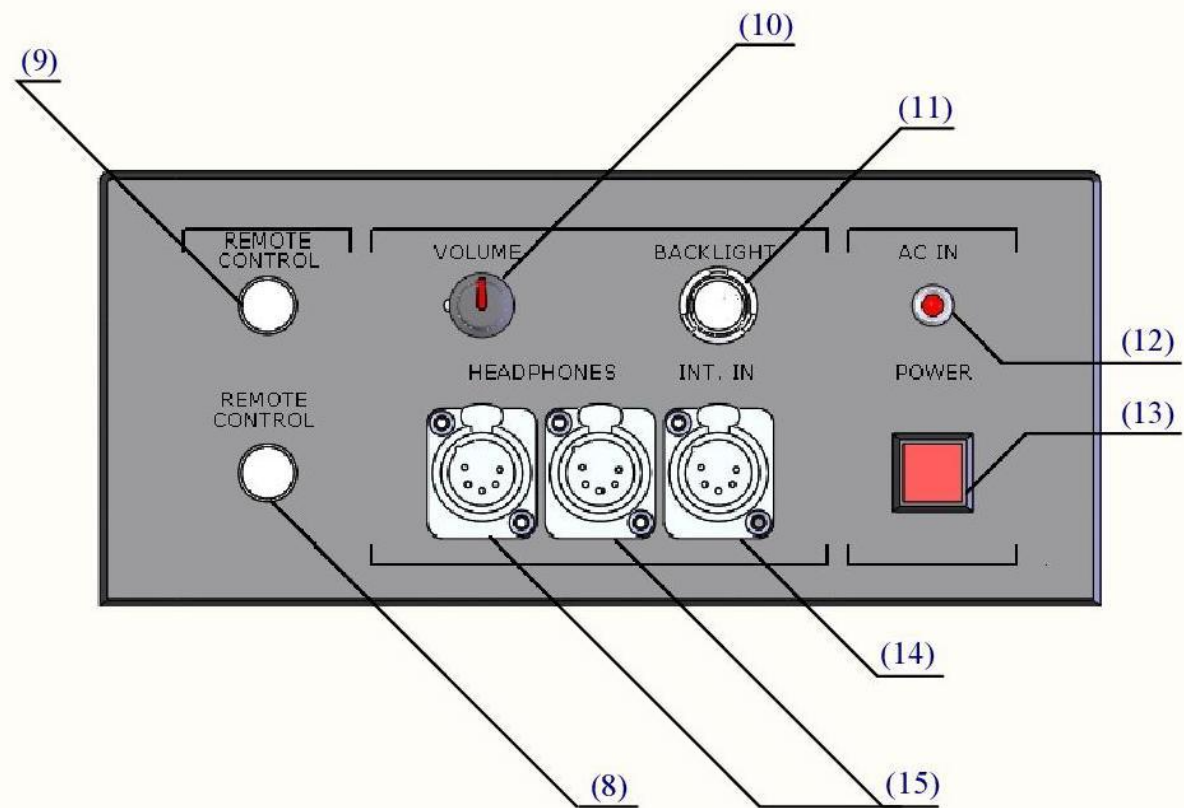


Fig. 3

4.4. Connection of the Power Supply Unit (PSU).

4.4.1. Plug System cable (multicore) into cable connector (3) (SYSTEM CABLE) located on the rear PSU panel.

4.4.2. Plug Remote control cable 1.3m into one of cable connectors (8) or (9) (REMOTE CONTROL) located on the front PSU panel, and into cable connector (8) (MAIN REMOTE DESK) of the Cameraman Control Desk.



4.4.3. When necessary, the other (vacant) cable connector (8) or (9) (REMOTE CONTROL) is used to connect the Focus Puller Desk, using Remote control cable 9m, Radio Control Box or Hand Wheel Control Console.

4.4.4. Mains cable is plugged into socket (1) (MAINS). Power requirements: mains voltage 90~264 VAC, frequency 50/60 Hz. Indicator light (12) (MAIN PRESENT) is provided to indicate the presence of line voltage.

4.4.5. In case of independent power supply (batteries) cable connector (6) (BATTERY IN) shall be used. DC power supply voltage shall range within 19-72 VDC. Alphanumeric indicator (5) displays the battery voltage and current.

4.4.6. Cable connectors (2) (VIDEO OUTS CONNECTOR) serve to connect secondary monitors using cables 15.14.

4.4.7. Cable connector (4) (HEADSETS FOR CRANE OPERATOR CONNECTOR) serves to accept sound cable, to ensure two-way voice communication with crane operator, dolly grip, etc.

4.4.8. Cable connectors (15) (HEADSETS FOR OPERATOR CONNECTOR) serve to accept headset cables at work station of the Head operator.

4.4.9. Cable connector (14) (INTERCOM AUX INPUT CONNECTOR) serves to accept cable for external one-way communication with MTS (mobile television station), producer's desk, etc. Potentiometer (10) (OB-VAN VOLUME) is used to adjust volume of the external signal.

4.4.10. Cable connector (11) (LAMP CONNECTOR) serves to connect auxiliary lighting. The same connector allows reading off total Head hours via the RS-232 interface.

4.4.11. POWER ON/OFF button (13) is used to turn the power of the entire system on and off promptly.

4.5. Cameraman Control Desk.

The Cameraman Control Desk (fig. 1) is designed for remote control of camera angular position in space along pan, tilt and roll axes. It is also used for adjusting camera control parameters, such as sensitivity or control speed (SPEED), fluidity (FLUID), adjusting the Head zero-drifts along all coordinate axes, as well as for eliminating ZOOM lens drift. The Desk allows for reversal of the control signals, as may be required.

The Cameraman Control Desk can also be used to start the camera remotely and to control camera lens parameters, such as FOCUS and ZOOM, with the possibility to reverse ZOOM control.

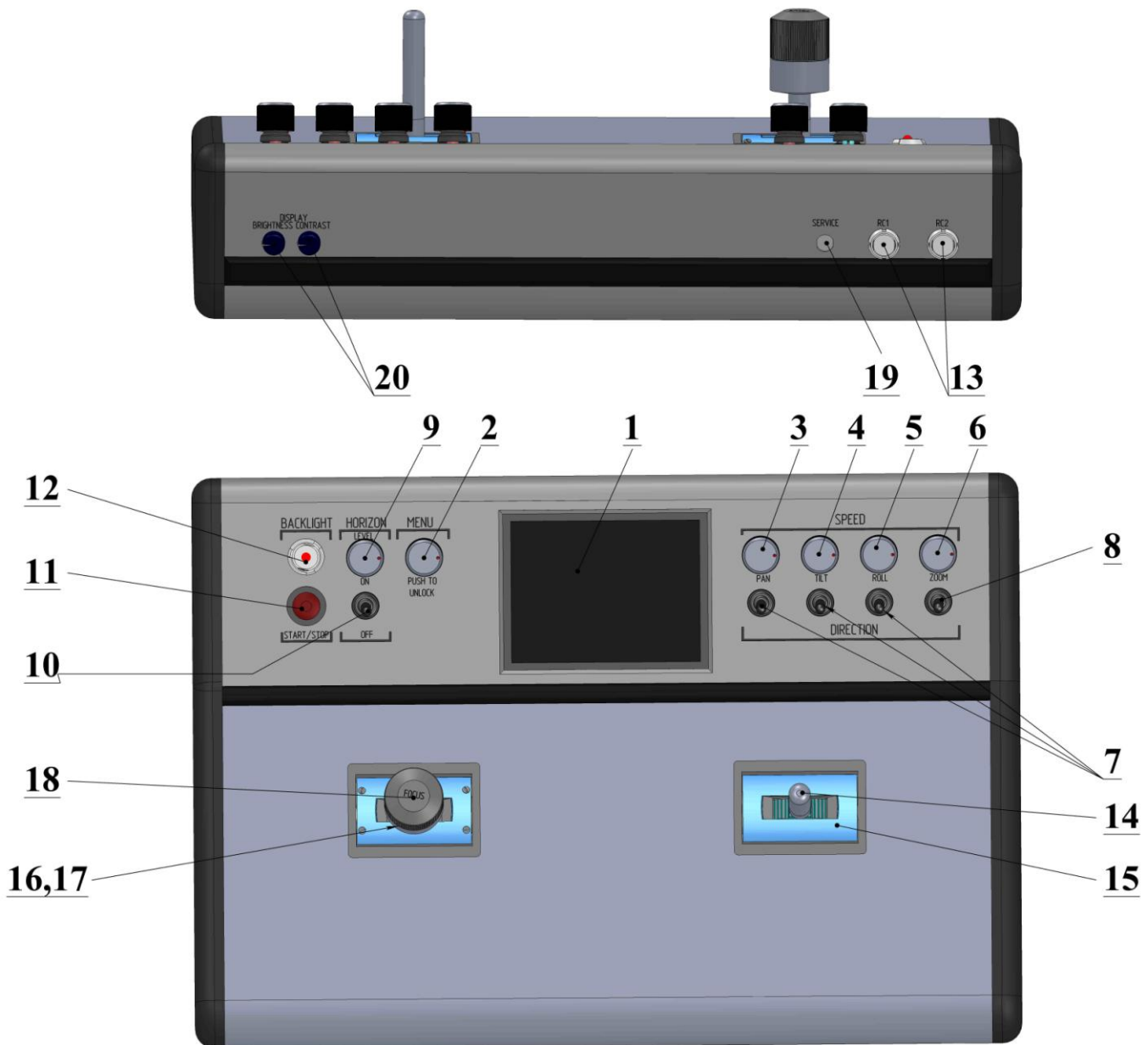


Fig. 1

The Focus Puller Desk can be connected to cable connector (13), to enable remote FOCUS and IRIS control, and remote camera start-up (RUN).

The main display menu of the desk is shown in fig. 2. Use push button potentiometer (2) to move the cursor between the menu items. Activation of the selected item is performed by pushing the potentiometer button.



Fig. 2

Active menu items SPEED, FLUID and PRESET are shown in fig. 3.

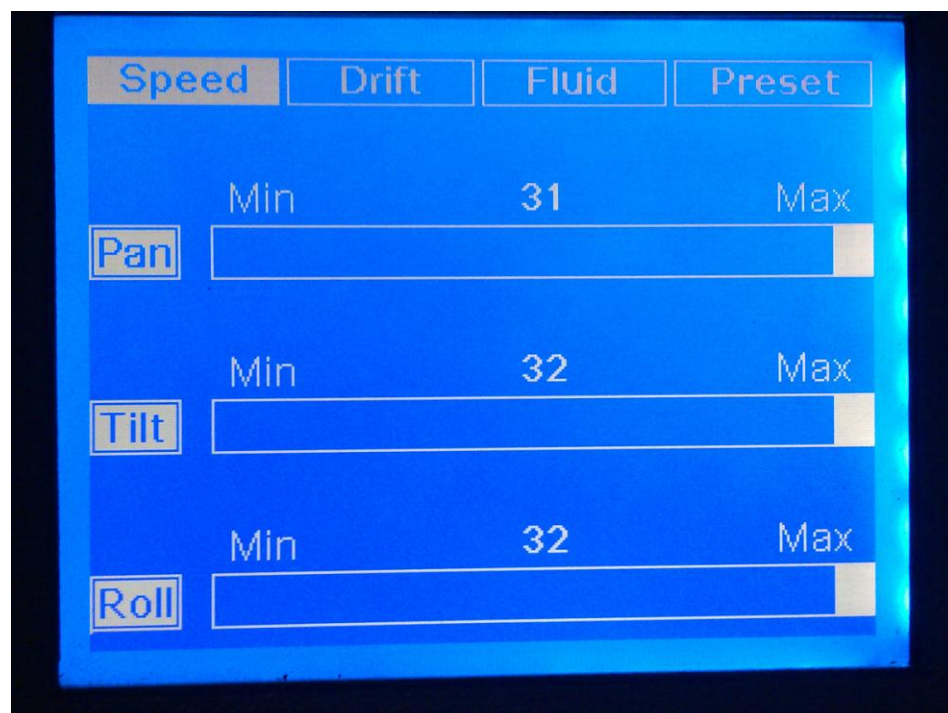


Fig. 3

Potentiometers (3), (4), (5) are used to adjust sensitivity of control (SPEED), fluidity (FLUID), as well as the preset values (PRESET) on the Head control axes (PAN), (TILT) and (ROLL).

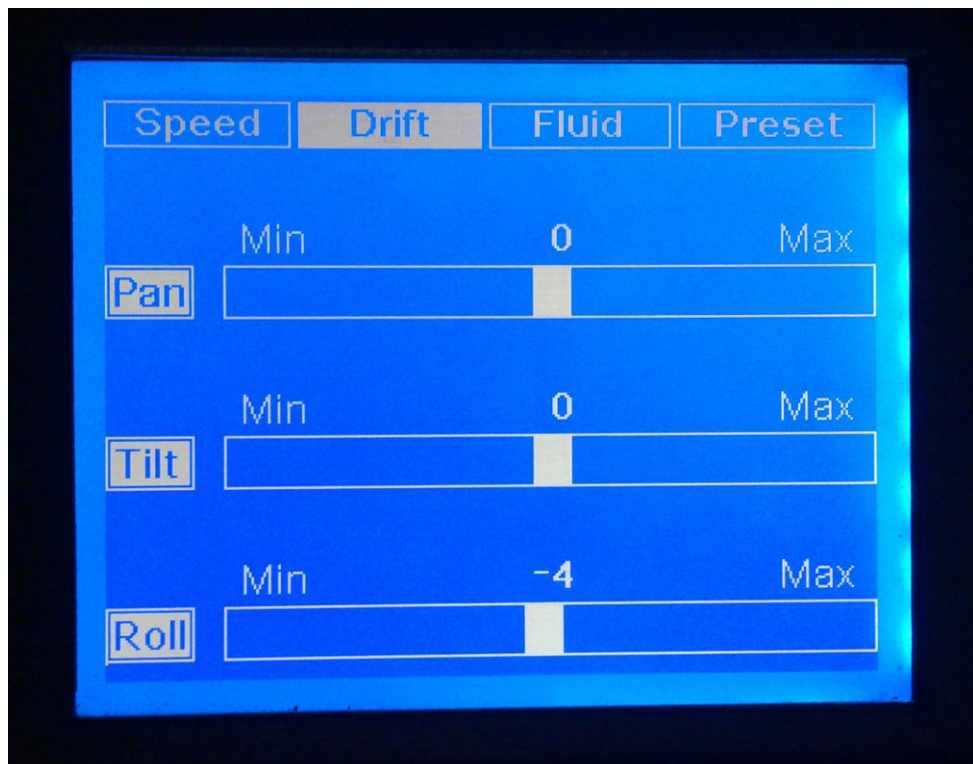


Fig. 4

Active DRIFT menu window is shown in fig. 4. In this mode potentiometers (3), (4), (5) are used to adjust zero drift of the Head axes (PAN), (TILT) and (ROLL).

Switches (7) (DIRECTION) enable independent reversing of (PAN), (TILT) and (ROLL) joysticks. Switch (8) is used to reverse (ZOOM) joystick. Reversal of control is followed by display indication.

If you select ZOOM and FOCUS.IRIS menu options, windows shown in fig. 5 and fig. 6 will be displayed.



Fig. 5

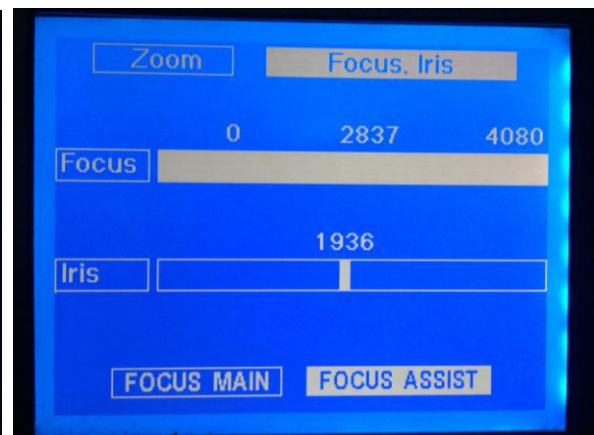


Fig. 6

Potentiometers (3) and (4) are used for range adjustment (RANGE), (MIN) and (MAX) values accordingly. Potentiometer (6) adjusts speed (SPEED) of control (ZOOM). (FUJINON), (CANNON) or (ANGENIEUX) camera lens type is selected by pushing button (6).

In FOCUS,IRIS menu, potentiometers (3) and (4) adjust (MIN) and (MAX) (FOCUS) values. (FOCUS)(IRIS) of the camera lens is adjusted by turning potentiometer (5). In this mode (FOCUS) control can be switched between the main control desk (FOCUS MAIN) and the Focus Puller Desk (FOCUS ASSIST) by pushing potentiometer (6).

LATCH/MOMENTARY menu item enables selection of the camera starting mode (latched / momentary). Switching between the control modes is performed by pushing potentiometer (2) (MENU). The camera is started by button (11). Reversing joystick control for right handed / left handed operation (RIGHT HAND/LEFT HAND) is enabled by the same procedure.

Trimmer potentiometers (20) are used to modify display parameters (brightness and contrast), as required.

Socket (12) is provided for connection of an external illumination lamp.

Switch (10) is used to activate the Head Autohorizon mode (AUTOHORIZON) (fig. 7 and fig. 8).



Fig. 7



Fig. 8

Autohorizon angle is adjusted by potentiometer (9).

Controls for controlling camera platform and camera lens parameters:

- (14) joystick (PAN);
- (15) joystick (TILT);
- (10), (17) joystick (ROLL) and (ZOOM);
- (18) lens control knob (FOCUS).

4.6. Handwheels.

Handwheels (fig. 1.) is designed for remote control of camera angular position in space along pan, tilt and roll axes. It is also used for adjusting camera control parameters, such as sensitivity or control speed (SPEED), damping (DAMPING), and adjusting the Head zero-drifts along all coordinate axes. It is possible to reverse any of the control signals, as may be required.

Handwheels also allows starting the camera remotely and controlling camera lens parameters, such as (IRIS).

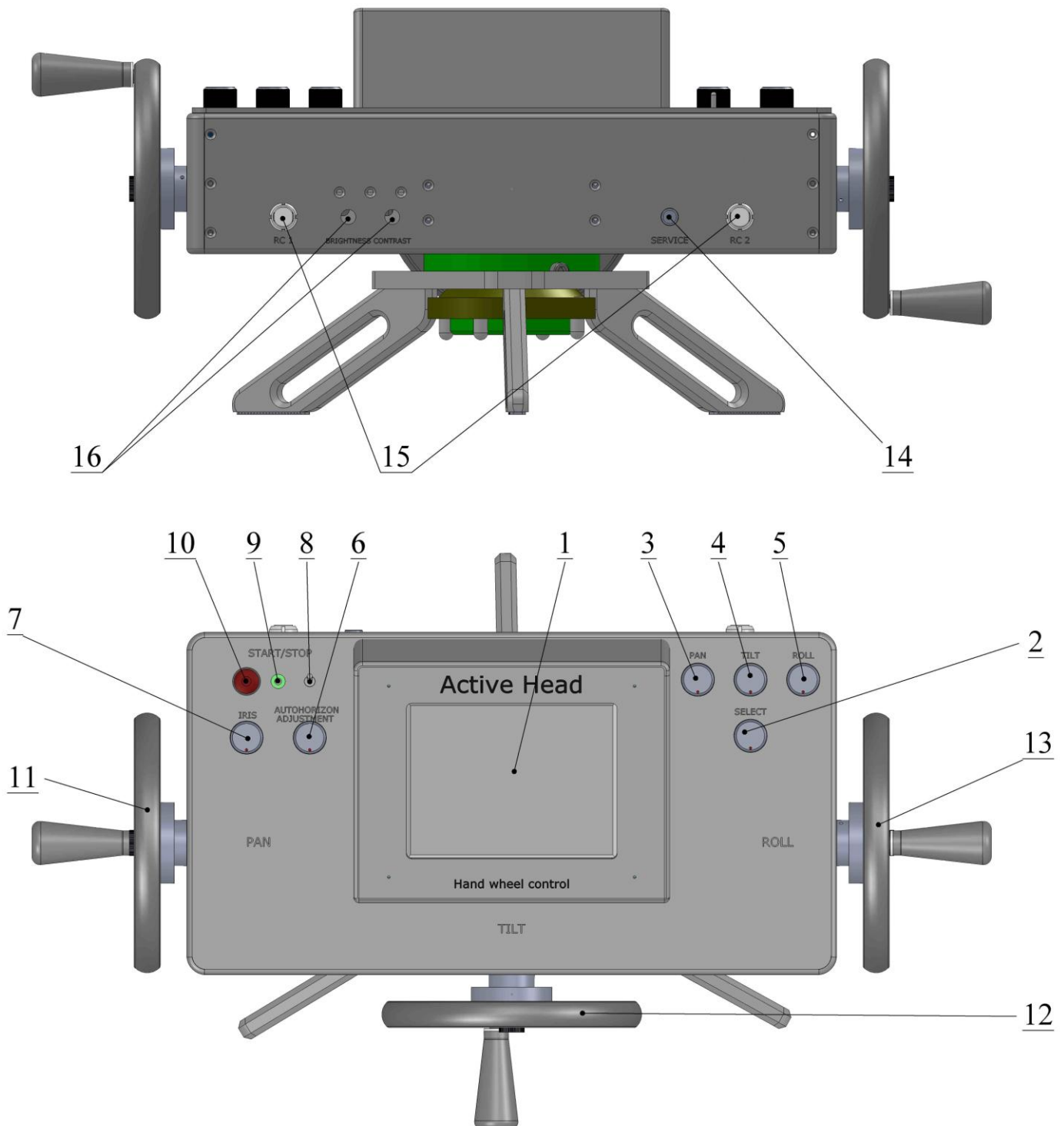


Fig. 1

Cable connector (15) enables connection of the Focus Puller Desk for remote control of FOCUS and IRIS and remote camera start-up (RUN), or connection of remote Focus Puller ZOOM Control.

The main display menu of the desk is shown in fig. 2. Use push button potentiometer (2) to move the cursor between the menu items. Activation of the selected item is performed by pushing the potentiometer button.



Fig. 2

Active SPEED, DAMPING and FLEXIBILITY menu items are shown in fig. 3.

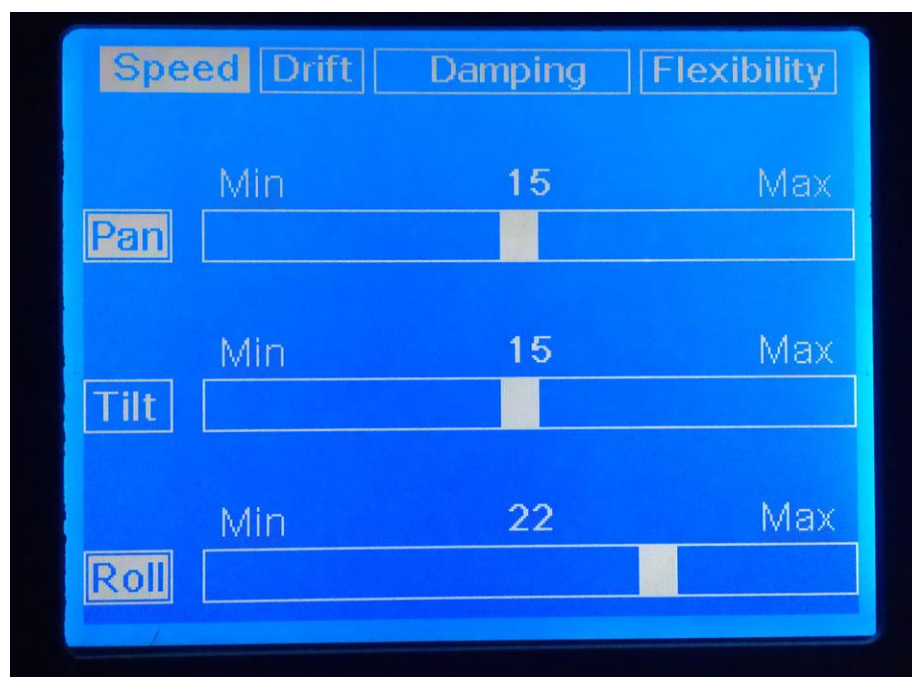


Fig. 3

Potentiometers (3), (4) and (5) are used to adjust sensitivity of control (SPEED), dampening (DAMPING), as well as the preset values (FLEXIBILITY) on the head control axes (PAN), (TILT) and (ROLL).

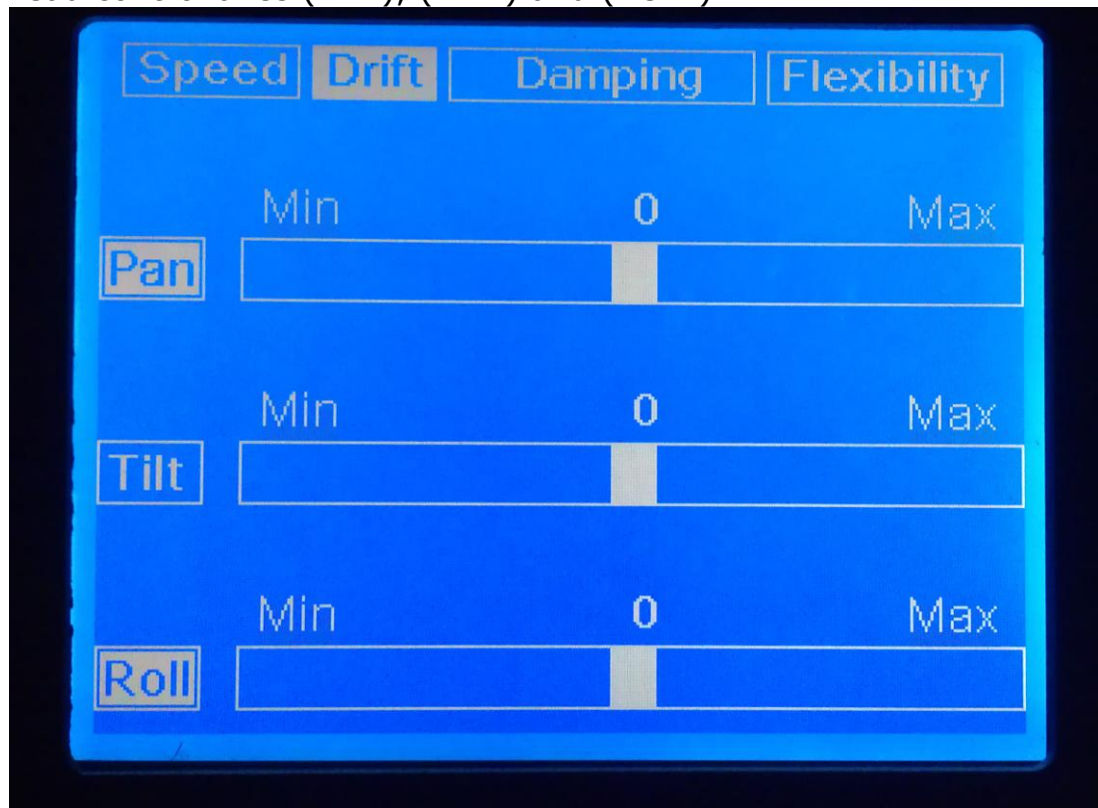


Fig. 4

Active DRIFT menu window is shown in fig. 4. In this mode potentiometers (3), (4), (5) are used to adjust zero drift of the Head axes (PAN), (TILT) and (ROLL).

Push button potentiometers (3), (4), (5) enable independent reversing of control for (PAN), (TILT) and (ROLL) hand wheels. Reversal of Hand wheel control is followed by display indication.

If you select ZOOM and FOCUS.T-STOP menu options, windows shown in fig. 5 and fig. 6 will be displayed.

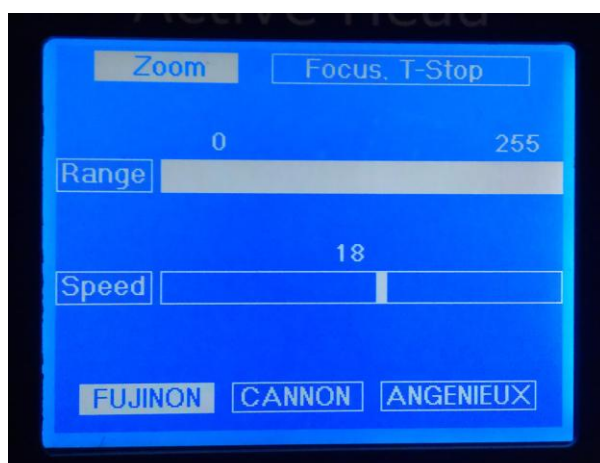


Fig. 5

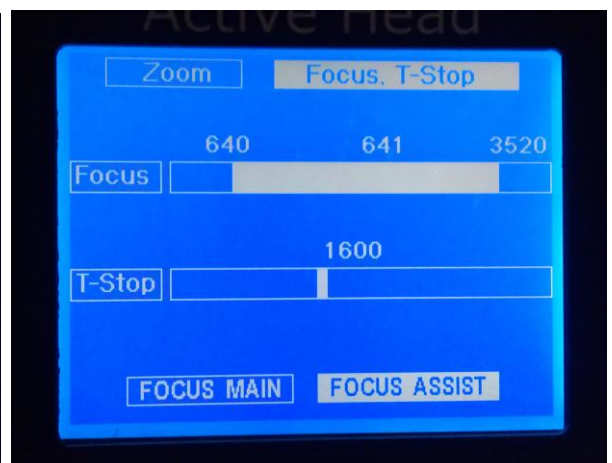


Fig. 6

Potentiometers (3) and (4) are used for range adjustment (RANGE), (MIN) and (MAX) values accordingly. Potentiometer (5) adjusts speed (SPEED) of (ZOOM) control. (FUJINON), (CANNON) or (ANGENIEUX) camera lens type is selected by pushing button (5).

In FOCUS,T-STOP menu, potentiometers (3) and (4) adjust MIN and MAX (FOCUS) values. (FOCUS)(T-STOP) of the camera lens are adjusted by turning potentiometer (5).

LATCH/MOMENTARY Menu item enables selection of the camera starting mode (latched / momentary). Switching between the control modes is performed by pushing potentiometer (2) (MENU). Reversing hand wheel control for right handed/left handed operation (RIGHT HAND/LEFT HAND) is enabled by the same procedure.

The camera is started by button (10) or switch (8).

Trimmer potentiometers (16) are used to modify display parameters (brightness and contrast) as required.

In the Main Menu, the Head autohorizon mode (AUTOHORIZON) (fig. 7 and fig. 8) is activated by pushing button of a push potentiometer (3), (4) or (5).



Fig. 7



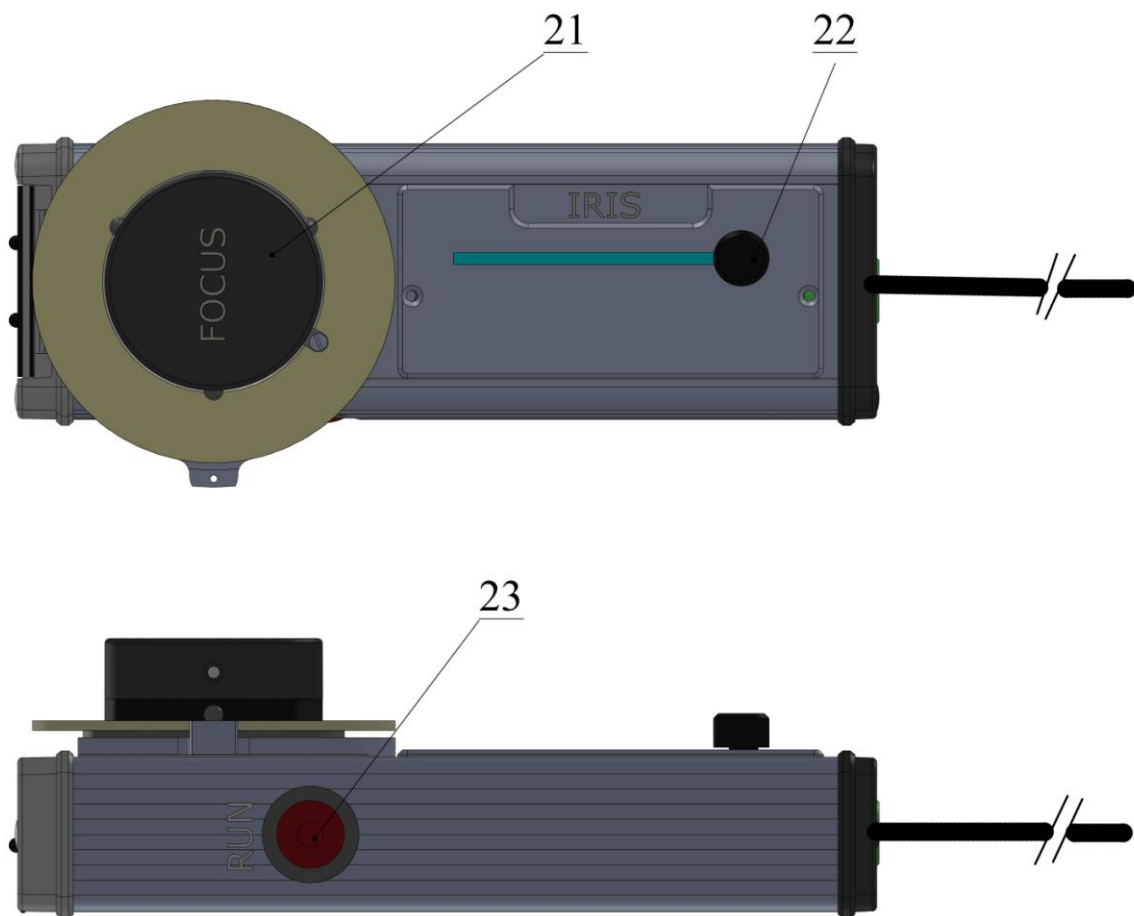
Fig. 8

Autohorizon angle is adjusted by potentiometer (6).

Controls for controlling the Head and camera lens parameters:

- (11) - hand wheel (PAN);
- (12) - hand wheel (TILT);
- (13) - hand wheel (ROLL);
- (7) - lens control knob (IRIS).

4.7. Focuspuller remote control



- (21) - adjustment knob (FOCUS)
- (22) - adjustment potentiometer (IRIS)
- (23) - camera Start/Stop button

4.8. Focus Puller Zoom Control



- (24) - zoom speed adjustment knob (SPEED)
- (25) - zoom direction reverses button (REVERSE)
- (26) - zoom control key

§2. Specifications

2.1. Operating ranges of angular position adjustment, deg

2.1.1. Pan	<u>+/- 1080</u>
2.1.2. Tilt	<u>+60/-135</u>
2.1.3. Roll	<u>+/-40</u>
2.1.3. Focus	<u>3600</u>
2.1.3. Iris	<u>3600</u>
2.1.3. Zoom	<u>3600</u>

2.2. Minimum angular acceleration values, deg/sec²

2.2.1. Pan	<u>150</u>
2.2.2. Tilt	<u>150</u>
2.2.3. Roll	<u>150</u>
2.2.3. Focus	<u>3000</u>
2.2.3. Iris	<u>3000</u>
2.2.3. Zoom	<u>100</u>

2.3. Maximum angular acceleration values, deg/sec²

2.3.1. Pan	<u>875</u>
2.3.2. Tilt	<u>875</u>
2.3.3. Roll	<u>2330</u>

2.4. 360° travel time at 90 tilt, at zero initial speed, sec

2.4.1. Pan	<u>1.7</u>
2.4.2. Tilt	<u>0.4</u>
2.4.3. Roll	<u>0.3</u>

2.5. Stabilization error

2.6.1. Pan (1Hz external mechanical disturbances)	<u>0.1</u>
2.6.2. Tilt (1Hz external mechanical disturbances)	<u>0.02</u>
2.6.3. Roll (1Hz external mechanical disturbances)	<u>0.03</u>
2.5.4. Focus	<u>0.5</u>
2.5.4. Iris	<u>0.5</u>

2.6. Maximum allowable length of the system cable, m 45

2.7. Operation mode continuous

2.8. Power requirements

1. AC power, voltage range (220+20\ -25) V, frequency 50 Hz
2. DC voltage range from +-18V to +-28V

2.9. Power consumption

2.12.1 Average standstill power consumption, max., W	<u>135</u>
2.12.2 Peak power consumption, max.	<u>600</u>

2.10. Weight and overall dimensions

2.10.1 Weight of the head with focus, iris and zoom actuators, excluding camera, max., kg.....	30
2.10.2 Weight of the AC power supply unit	8
2.10.3 Weight of the Cameraman Control Desk, max., kg ..	4
2.10.4 Weight of the Focus Puller Desk, max., kg	0.35
2.10.5 Weight of the system cable, including cable reel, max., kg	25
2.10.6 Weight of the communication cable, including cable reel, max., kg.....	4.3
2.10.7 Weight of the entire system, max., k.....	71.65
2.10.8 Overall packaging dimensions of the head, max., mm 1050x850x300	
2.10.9 Overall packaging dimensions of the power supply unit and control desks, max., mm	650x600x220
2.10.10 Overall packaging dimensions of cables and headsets, max., mm	650x600x670

Active Head Manual