PAN-TILT POSITIONER

TL.0009

USER MANUAL

TL.0009-UM

Revision date 30.08.2024

RUSSIAN FEDERATION
SAINT-PETERSBURG
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User manual contains technical data, provides information on the system's controls, settings, and proper usage.

⚠️ This symbol marks important information for the user.

Any modifications or repairs to the product may only be performed if expressed in this manual. Injuries and physical damages caused by customer's modifying or repairing the product without a prior consultation with TechLaser LLC will not be compensated. If any alterations or modifications are necessary, please contact TechLaser LLC directly

The positioner must be properly connected to the power supply. The positioner may be damaged if it is not properly connected to the power supply.

Do not shake or bump the positioner during transportation, otherwise it may damage the functionality of the positioner.

CONTENTS

For the safety, it is important to follow the instructions in the manual. Manufacturer will not be responsible for any damages caused by user's negligence.

Only users who have read the user manual are allowed to work with the positioner.

1 DESCRIPTION

1.1 General

The Pan Tilt Positioner is a compact module with an installed bracket for placing the payload. Necessary equipment (surveillance cameras, spotlights, antennas, etc.) can be installed on the bracket using mounting bolts. At the customer's request it is possible to produce the positioner without the mounting bracket. (Application A, Picture. A2).

The unit allows remote control of user equipment (payload) installed on the bracket.

The TL.0009 external connection possibilities:

- output for the payload UTP cable on one side of the positioner:
  - o Ethernet to a payload 100 Mbit/s;
  - o o   RS-485 to the payload;
  - o 24V DC power supply;
- one UTP cable from the base to connect the positioner to the upstream Ethernet node;
- one cable from the base to supply power to the positioner and payload.

Picture 1 – Appearance of pan-tilt positioner

The power supply to the payload is shared with the positioner power supply and cannot have a value different from the positioner power supply.

The unit is capable of operating in a wide variety of climates.

1.1.1 Product purpose

The Pan Tilt Positioner TL.0009 is designed to move the equipment mounted on it within specified limits by angle of place and azimuth at specified speeds.

The positioner can be used for mounting optical and thermal imaging surveillance systems, searchlights, communication and location antennas, jamming devices, etc. The

positioner allows for remote control of the equipment mounted on it. The positioner allows remote control of user equipment (payload) mounted on the bracket.

1.1.2 Specifications

Table 1 – Specifications

№	Parameters	Units	
1	Angle of rotation	°	
	– vertical plane (by angle of position)		from +45 to -90
	– the horizontal plane (azimuth)		from 0 to 359,99 (∞)
2	Speed of rotation	°/s	
	– vertical plane (by angle of position)		0.01 to 14,8
	– horizontal plane (azimuth)		0.01 to 40.0
3	Number of position settings (Pelco-D)	piece	64
4	Positioning accuracy	°	± 0,3
5	Maximum axial load	kg	20
6	Maximum torque of the device rotation force	kgf×m	
	– vertical plane (by angle of position)		1,2 ± (10 %)
	– horizontal plane (azimuth)		0,4 ± (10 %)
7	Control interface	-	Ethernet
8	Control protocol	-	Pelco-D and service protocol
9	Interface type for settings	-	WEB
10	Ethernet standard	-	10/100BASE-T
11	Maximum RS-485 communication speed	b/s	115200
12	Number of channels of the fixed part (Ethernet)	piece	1
13	Number of payload channels	piece	
	– Ethernet		1
	– RS-485		1
14	DC mains supply and payload voltage	V	24 ± (10 %)
15	Power consumption,	W	
	– two-axis rotation mode		90
	– preheating mode		150
	– "stop" mode		3
	– "stop" mode with heating on		25
16	Current transmitted to the load, max.	A	13
17	IP	-	IP65
18	Operating temperature	°C	from -40 to 50
19	Length of cables coming out of stationary part, not less	m	0,5*
20	Length of cables coming out of the rotary part, not less	m	0,5*
21	Overall dimensions	mm	167,5×135×219,8
22	Overall dimensions of the package	mm	215×250×215
23	Weight	kg	7
24	Color	-	RAL7013

* – cable length can be changed on customer's request

⚠ The power supply to the payload is shared with the positioner power supply and cannot have a value different from the positioner power supply.

1.2 Positioner equipment

Table 2 – Positioner equipment

№ п/п	Name	Quantity
1	Pan Tilt Positioner TL.0009	1
2	Passport TL.0009-PP	1
3	User Manual TL.0009-UM	1
4	Cardboard box	1

1.3 Design and operation

The positioner is a compact module with an installed bracket for placing the payload. Necessary equipment (surveillance cameras, spotlights, antennas, etc.) can be installed on the bracket using mounting bolts.

Information channels are provided in the positioner:

а) information exchange channel: Ethernet 10/100BASE-T interface type;
б) payload channel: Ethernet 10/100BASE-T
в) payload channel: RS-485

The information exchange channel is designed to control the positioner and payload. Any access to the positioner and its output of the current azimuth position and elevation angle is also accomplished via this channel.

The positioner provides modes:

а) circular rotation mode at a specified speed;
б) positioning mode by azimuth and/or angle of place;
в) "stop (with hold)" mode;
г) self-diagnostic mode.

The circular rotation mode is activated by a command to the positioner interface indicating the selected speed from the available speed grid and the direction of rotation. In this mode, the positioner starts continuous rotation at the specified speed in the specified direction until a command is received to exclude this mode.

The azimuth positioning mode is activated by the receipt of the corresponding command on the positioner interface with the indication of the required angle relative to the origin. After positioning the positioner switches to the hold mode until the command excluding this mode is received.

The self-diagnostic mode is activated when the corresponding command is received. Self-diagnostics is performed up to the functional unit. The self-diagnosis evaluates the supply voltage of the positioner, encoder testing and the possibility of circular rotation.

1.3.1 Labeling and packaging

The labeling of the positioner complies with the requirements of the design documentation.

The information label is glued on the front panel of the positioner case. The labeling contains:

- type, name and designation;
- manufacturer name;
- serial number in the manufacturer's system.

The factory number is applied to a special sticker by printing or laser engraving of the nameplate itself.

The packaging of the positioner is made in such a way as to ensure its protection from unfavorable climatic, mechanical, biological and other factors within the limits specified in Sections 5 and 6.

Package Composition:

- cardboard box.

2 INTENDED USE

2.1 Operational limits

The positioner remains operational at temperatures from - 40°C to 50°C.

Designated service life of the device at observance of storage and operation rules is 15 000 hours.

2.2 Preparing the positioner for use

Check for mechanical damage before starting work.

2.2.1 Safety measures

The user must observe all safety and operating requirements and read the warning notices when operating the positioner. Ignoring the hazard warning notices may result in personal injury and damage to the positioner.

The positioner may only be used for its intended purpose. It is forbidden to disassemble or modify parts of the positioner or to use it for purposes other than those specified in the user manual.

It is not allowed to use the positioner if there is any damage to its parts.

Electrical safety of the positioner is ensured by supplying it with low-voltage direct voltage.

2.2.2 Initial use

When the positioner is turned on for the first time, these operations must be performed:

- connect the ground connection to the power cord terminal coming out of the device enclosure;
- connect the positioner to the power supply and apply power (24V, DC);
  - red wire (red terminal) - to "+24 V" connector;
  - blue wire (black terminal) - to the "General" (GND) connector;
  - colorless wire (yellow terminal) - to ground;
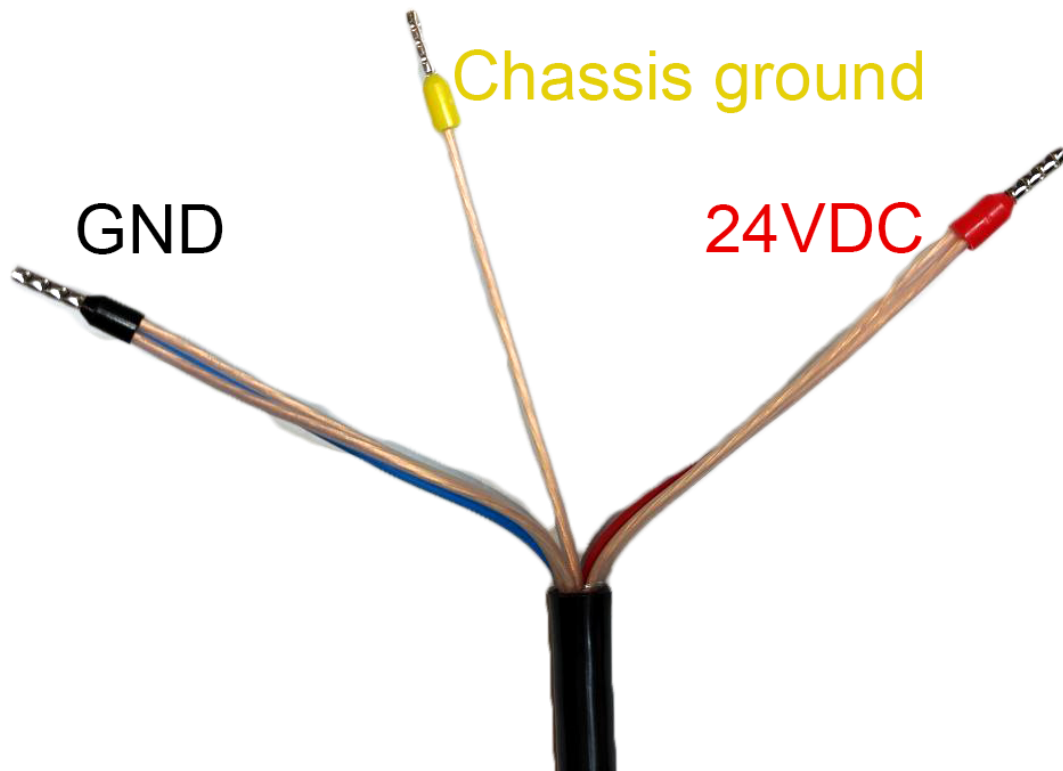
Picture 2 – Power cable appearance

- to setting up the positioner, it is necessary to connect it to an Ethernet network. The web-interface will be available at http://192.168.1.115.

After initial use user can begin setting up the positioner to control it.

2.3 Using the positioner

2.3.1 Web interface

For convenient setting of the positioner, a user interaction interface based on WEB technology is implemented. By means of web pages it is possible to change many settings of the positioner, control and see the current settings and status.

To access the WEB interface it is necessary to enter the IP-address into the address bar of any browser installed on the user's device.

The device WEB page consists of tabs, each of which represents a separate configuration interface (Picture 3).

WEB interface may be modified at the manufacturer's discretion and may not match 100% with the illustrations shown in this manual.

Picture 3 – Web interface home page

The positioner has been successfully started up and is ready for operation.

2.3.1.1 Status

⚠️ CAUTION! Make sure that the payload is securely fastened (or completely missing).

After Initial use of the positioner (see section 2.2.2 Initial use) it is possible (but not obligatory) to carry out the self-diagnostics procedure. In order to do this, it is necessary to press the "Start self-diagnosis" button for each axis.

After pressing button, the positioner will make a rotation by azimuth or angle of place, after which it will return to the initial zero position with a small speed.

When the self-diagnosis is completed and there are no errors in "Status", the word "Self-diagnosis" will change to "Ready". This means that the positioner is ready for operation.

The user can set the values for each of the axes.

Pan Axis:

- Speed: allowable values from 0 to 40 (clockwise movement) and 0 to -40 (counterclockwise movement). The "Set" button is used to start the movement with the set speed;
- Position: allowable values from 0 to 360. To pan the positioner to the desired angle, set the angle value, set the speed (without pressing the "Set" button) and press the "Go" button;

Tilt Axis:

- Speed: allowable values from 0 to 14 (clockwise movement) and 0 to -14 (counterclockwise movement). The "Set" button is used to start movement with the set speed;
- Position: allowable values from 315 to 90 (passing through 0). To tilt the platform to the desired angle, set the angle value, set the speed (without pressing the "Set" button) and press the "Go" button;

Pressing the "Stop" button will stop the rotation of the corresponding axis.

The "Action": shows the current action of the positioner.

The Temperature Control block: user can forcefully switch on the internal heating of the positioner to check its operation.

The Sensor readings: current temperature inside the positioner is displayed.

By pressing the "Reset all settings" button, the positioner can be reset to the default state with the manufacturer's settings.

By clicking on the "Remote restart" button, you can restart the positioner. It will be restarted within a few seconds.
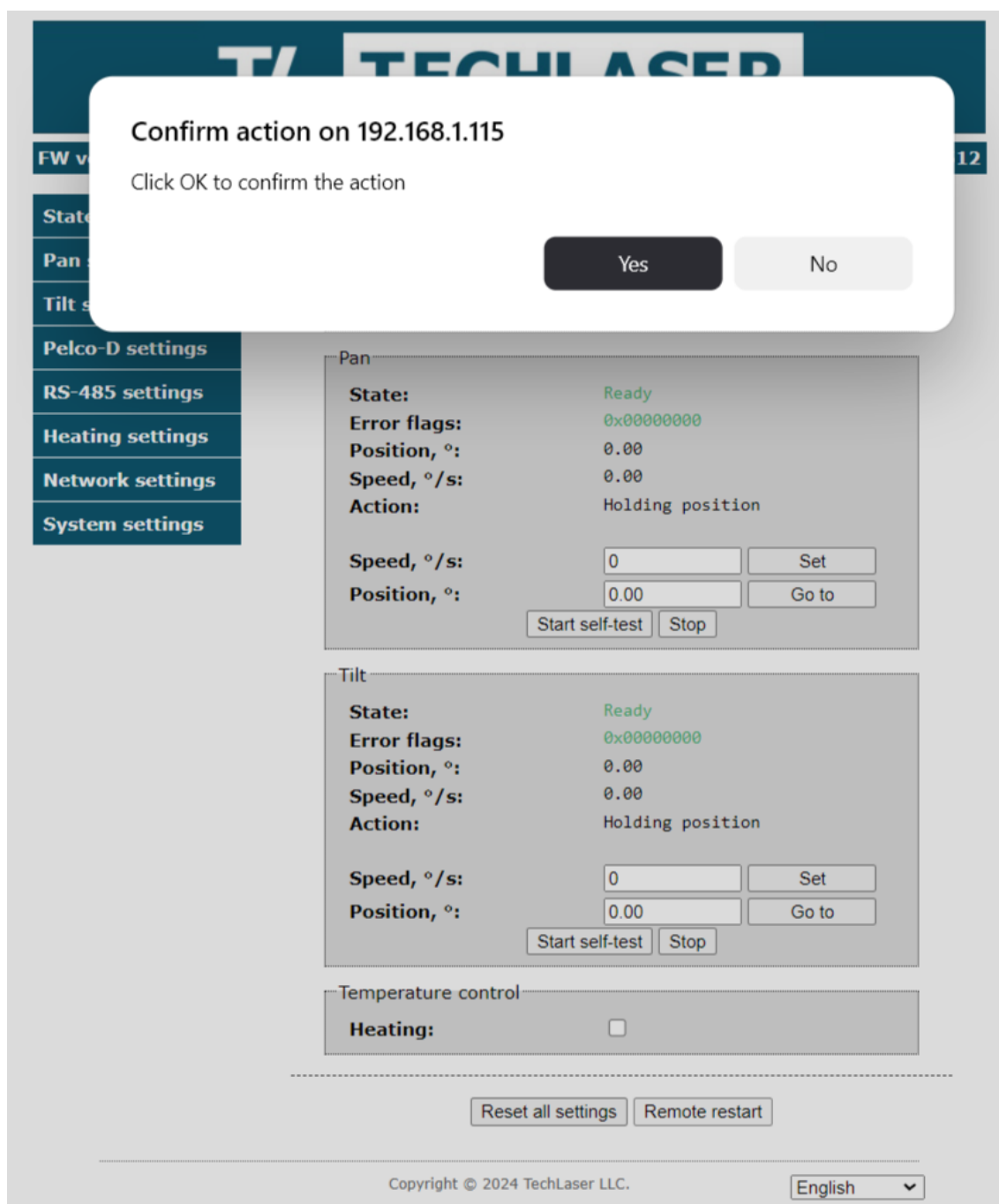
Picture 4 – Status page (remote restart)

2.3.1.2 Pan settings

The Pan Settings page allows you to set the minimum speed, maximum speed, acceleration and deceleration, as well as enable/disable, and set limits for panning (permitted operating area).

The Reset Pan Settings button allows you to reset only the pan settings to default values.

Picture 5 – Pan Settings page

2.3.1.3 Tilt settings

On the Tilt Settings page, you can set the minimum speed, maximum speed, acceleration and deceleration, and set the tilt limits (allowed operating zone).

The Reset Tilt Settings button allows you to reset only the tilt settings to default values.

Picture 6 – Tilt Settings page

2.3.1.4 Pelco-D Settings

On the Pelco-D Settings page, you can set the TCP port and address, and reset the Pelco-D settings to default.

Default values:

- TCP port: 9761
- Address: 1

Picture 7 – Pelco-D Settings page

2.3.1.5 RS-485 Settings (TL.0009 only)

On the RS-485 Settings page, you can set TCP port and speed, and reset RS-485 settings to default.

Default values:

- TCP port: 9762
- Speed: 9600

Picture 8 – RS-485 Settings page

2.3.1.6 <u>Heating settings</u>

The positioner has an internal heating function for operation at low ambient temperatures.

Automatic heating can be turned on and off by checking the appropriate box. It is possible to set the heating off and on temperature and reset the heating settings to default.

Default values:

- Automatic: on.
- Off, °C: 0,0
- On, °C: -10,0

Picture 9 – Heating Settings page

2.3.1.7 Network settings

Picture 10 – Network Settings page

"Network" is used to configure the network addresses of the positioner or to activate the DHCP server. By default, the use of DHCP server is prohibited and the positioner can be easily detected in the local network by a static address (default value 192.168.1.115). In case a DHCP server is engaged but not detected, the positioner will automatically accept the network settings from the "Network" block.

"Control port" is used to configure the port for connecting directly to the positioner, for debugging the machine interface. The communication protocol in this case is identical to the main one.

After making changes to the settings and pressing the "Apply" key, the network interface of the positioner will be automatically restarted with the corresponding message displayed.
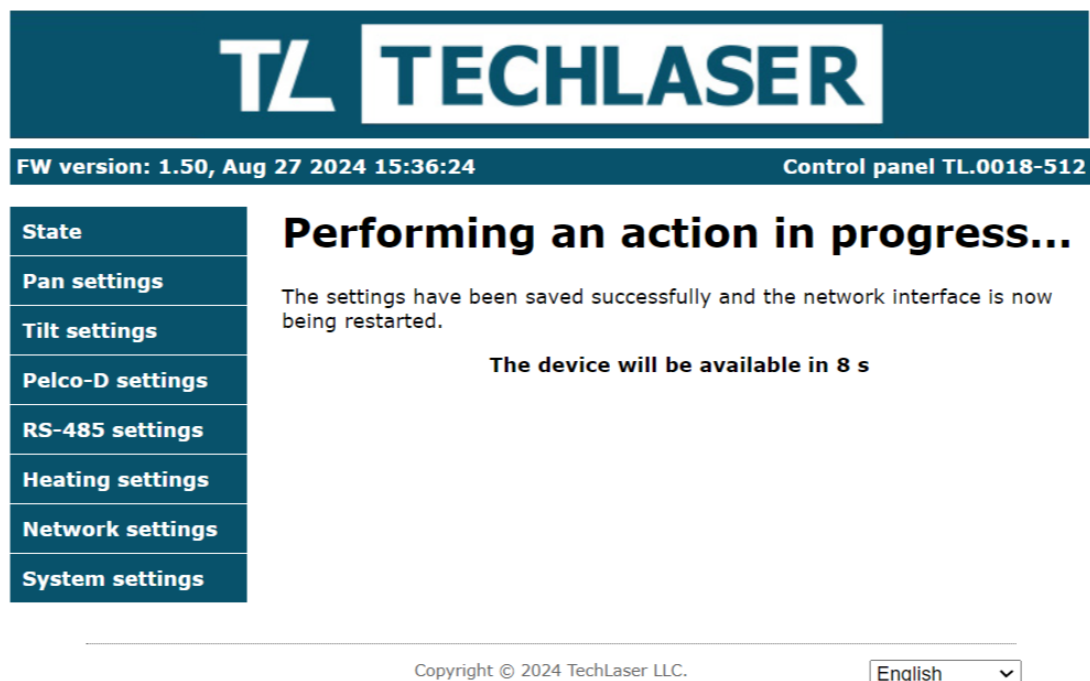
Picture 11 – Page when the network interface is restarted

In case static IP is used in the network settings, a link with IP address will appear on the screen, by clicking on which you can return to the WEB interface.

Multicast

The multicast speed is limited to 10 Mbps on the ethernet plug from which the positioner control is allowed. If you want to use multicast at a speed higher than 10 Mbps, you must uncheck the checkbox (permission) for positioner control from the ethernet plug from which you plan to multicast.

Example: multicast will be broadcast from Ethernet plug 3 at a speed of 100 Mbps. To do this, in the "Network Settings" tab, in the "Allow control from" block, uncheck the box next to Ethernet plug 3 and click the "Apply" button.

2.3.2 Positioner control

The service protocol is used to control the positioner, which provides a full range of control and configuration options.

Pelco-D protocol and a lot of different software, e.g., "Pelco controller 5.6", can be used to control PAN-TILT POSITIONER TL.0009. The position drawing with coordinates in "Pelco D" system is given in Application B.

2.3.3 Service protocol

The main way to configure and control the positioner is through the service protocol.

All the commands look like this: **$x...#** ,

$ — opening symbol,

x — command, … — optional parameters,

— closing symbol.

If an unsupported command is received, the response looks like this - $X#.

Command set

Command	Command Description	Response	Example of a response
$I#	Get firmware type	$Io#	$Io#
$V#	Get the firmware version	$Vxxxx# xxxx –%04x version, this number should be divided by 100 and output in the format %.2f	$V0074# 0x0074 = 116 = version 1.16
$1#	Get the address for the Pelco-D protocol	$1,addr# addr can take a value from 0 to 255.	$1,201#
$1,addr#	Set the address for the Pelco-D protocol		
$2#	Get RS-485 port speed	$2,baud#, baud can take value: 1 — 1200 baud 2 — 2400 baud 3 — 3600 baud 4 — 4800 baud 5 — 9600 baud 6 — 19200 baud 7 — 38400 baud 8 — 115200 baud	$2,5#
$2,baud#	Set the port speed RS-485		
$3#	Get speed for the rotary axis (pan)	$3,min,accDec,max#,	$3,1.00,11.00,40.00#

Command	Command Description	Response	Example of a response
$3,min, accDec, max#	Set speed for the pan axis	min — minimum speed °/s (at which motion is still observed) accDec — acceleration of acceleration/deceleration °/s2 max — maximum speed °/s Values from 0.00 to 50.00 °/s for speed, and from 1.00 to 50.00 °/s2 for acceleration and braking are allowed. The maximum speed can take values from 3.00 to 50.00 °/s.	
$4#	Get speed for the tilt axis (tilt)	$4,min,accDec,max#, min — minimum speed °/s (at which there is still movement) accDec — acceleration of acceleration/deceleration °/s2 max — maximum speed °/s Values from 0.00 to 17.00 °/s for speed, and from 1.00 to 17.00 °/s2 for acceleration are allowed. The maximum speed can take values from 3.00 to 19.00 °/s.	$4,1.00,14.00, 14.00#
$4,min, accDec, max#	Set speed for the tilt axis		
$7#	Get limits for the pan axis(pan)	$7,enable,left,right#, enable — flag for enabling the constraint, takes the value 0 or 1 left — restriction on the left, takes the value from 180.00 to 359.99 (in degrees) right — restriction on the right side, takes value from 0.00 to 180.00 (in degrees).	$7,0,180.00, 90.00#
$7,enable, left,right#	Set limits for the tilt axis		
$8#	Get limits for the tilt axis (tilt)	$8,left,right#, left — left constraint, takes the value from 315.00 to 359.99 (in degrees) right — limit on the right, takes the value from 0.00 to 90.00 (in degrees).	$8,315.00, 90.00#
$8,left, right#	Set tilt axis limits		
$9#	Get heating settings	$9,enable,off,on#, enable — flag of automatic heating algorithm activation, takes value 0 or 1 off — temperature of heating off, takes value from -100.0 to 100.0 on — heating on temperature, takes the value from -100.0 to 100.0. The heating on temperature must be lower than the heating off temperature.	$9,1,-5,-10#
$9,enable, off,on#	Set heating settings		
$a#	Get network settings	$a,dhcp,ip,mask,gateway,dns#,	$a,1,

Command	Command Description	Response	Example of a response
$a,dhcp,ip, mask, gateway, dns#	Set network settings	dhcp — flag of DHCP usage, takes value 0 or 1 ip — ip address in the form 192.168.1.115 mask — subnet mask in the form 255.255.255.0 gateway — gateway in the form 192.168.1.1 dns — main DNS in the form 192.168.1.1	192.168.1.115, 255.255.255.0, 192.168.1.1, 192.168.1.1#
$b#	Get Pelco-D TCP port number	$b,port#, port takes a value from 0 to 65535. The default port is 9761	$b,9761#
$b,port#	Set Pelco-D TCP port number		
$c#	Get RS-485 TCP port number	$c,port# port takes a value from 0 to 65535. The default port is 9762	$c,9762#
$c,port#	Set RS-485 TCP port number		
$d#	Remote reset	$d#	
$e#	Remote reboot	$e#	
$h#	Get heating activity status	$hX#, X can take the values E — on D — off	$hE#
$hE#	Enable heating manually when automatic heating algorithm is disabled	$hE#	$hE#
$hD#	Turn heating off manually when auto-heating algorithm is disabled	$hD#	$hD#
$t#	Get current temperature	$t,temp# temp temperature in degrees Celsius, format "%+.1f"	$t,+26.1#
Pan axis control (lower case letters)			
$m#	Get pan axis status	$m,initState# initState – state can look like: 0 – Not ready (the device switches to it after errors occurrence, which can be obtained by the $n# command) 1 –Self-diagnostic process is in progress (initial state after switching on) 2 – Ready (can accept positioning commands, in other states they are discarded)	$m,0#
$m,1#	Start the self-diagnostic process for the pan axis.		$m,1#
$n#	Get the error flags of the pan axis	$n,faults# faults – error flags in the form of 32-bit hexadecimal number	$n,00000000#
$o#	Get the current position of the pan axis	$o,curPos# curPos – position ° from 0.00 to 359.99	$o,0.00#

Command	Command Description	Response	Example of a response
$p#	Get the current speed of the pan axis	$p,curSpeed# curSpeed – speed in °/s, if the value is greater than zero, the movement is forward (clockwise), and if it is less than zero, it is backward (counterclockwise).	$p,0.00#
$q#	Get the status of the pan axis occupancy (current action)	$q,busyStatus# busyStatus – status can look like: 0 - Hold position 1 - Acceleration 2 - Braking 3 - Uniform movement	$q,0#
$s#	Get the last accepted task for the pan axis.	$s,lastTask# lastTask – command can look like: 0 - No commands received yet 1 - Start self-diagnostics 2 - Stop 4 - Speed setting 5 - Move to position	$s,0#
$u#	Stop for the pan axis	$u#	$u#
$w#	Get the target speed of the pan axis	$w,targetSpeed# targetSpeed – target speed in °/s. If the value is greater than zero, the movement is forward (clockwise), and if it is less than zero, it is backward (counterclockwise). May differ from the current speed obtained by the $p# command. If the speed modulus is less than the minimum speed, a stop is performed (similar to the $u# command)	$w,0.00#
$w, targetSpeed#	Set the speed of the pan axis (start motion)		
$x#	Get the target position and the target speed limit of the pan axis.	$x,targetPos,maxSpeed# targetPos – target position in ° from 0.00 to 359.99, may be different from the current position received by $o# maxSpeed – maximum speed at transition in °/s without direction (always positive number), optional parameter, if not specified, the maximum speed is taken from the axis speed settings.	$x,0.00,40.00#
$x, targetPos, maxSpeed #	Moving to a position at the set speed for a pan axis		
Tilt axis control (lower capital letters)			
$M#	Get tilt axis status	$M,initState# initState – state can look like: 0 - Not ready (the device switches to it after errors occurrence, which can be received by $N# command) 1 - Self-diagnostic process is in progress (initial state after switching on) 2 - Ready (can accept positioning commands, in other states they are discarded)	$M,0#
$M,1#	Start the tilt axis self-diagnostic process		$M,1#

Command	Command Description	Response	Example of a response
$N#	Get tilt axis error flags	$N,faults# faults – error flags in the form of 32-bit hexadecimal number	$N,00000000#
$O#	Get the current position of the tilt axis	$O,curPos# curPos – position in ° from 0.00 to 359.99	$O,0.00#
$P#	Get the current speed of the tilt axis	$P,curSpeed# curSpeed – speed in °/s. If the value is greater than zero, the movement is forward (clockwise), and if it is less than zero, it is backward (counterclockwise). $Q,busyStatus#	$P,0.00#
$Q#	Get tilt axis busy status (current action)	$Q,busyStatus# busyStatus – status can lool like: 0 - Holding position 1 - Acceleration 2 - Braking 3 - Uniform movement	$Q,0#
$S#	Get the last accepted tilt axis task.	$S,lastTask# lastTask – command can look like: 0 - No commands received yet 1 - Start self-diagnostics 2 - Stop 4 - Speed setting 5 - Move to position	$S,0#
$U#	Stop for the tilt axis	$U#	$U#
$W#	Get the target speed of the tilt axis	$W,targetSpeed# targetSpeed – target speed in °/s. If the speed value is greater than zero, the movement is forward (clockwise), and if the speed less than zero, it is backward (counterclockwise). May differ from the current speed obtained by the $P# command. If the speed modulus is less than the minimum speed, a stop is performed (similar to the $U# command)	$W,0.00#
$W,targetSpeed#	Set tilt axis speed (start movement)		
$X#	Get the target position and the limit speed of the pan axis transition	$X,targetPos,maxSpeed# targetPos – target position in ° from 0.00 to 359.99, may be different from the current position received by $O# maxSpeed – maximum speed at transition in °/s without direction (always positive number), optional parameter, if not specified, the maximum speed is taken from the axis speed settings.	$X,0.00,14.00#
$X, targetPos, maxSpeed #	Move to a position with the target speed for the pan axis		

2.3.4 Reset to factory settings

Each interface has a factory reset mechanism.

It is also possible to perform a factory reset using a magnet. To do this, you need to:

- place the magnet on the nameplate area for 2-10 seconds;
- remove the magnet for 2-10 sec;
- place the magnet again for 2-10 sec.

3 MAINTENANCE

3.1 Maintenance under storage conditions

No special maintenance is required under storage conditions.

3.2 Maintenance during operation

Do not subject the positioner to strong mechanical stress during operation.

Heavily soiled parts of the positioner should be wiped with a soft cotton cloth. Soak the cloth in ethyl alcohol and wipe the positioner and then wipe it dry. Do not use any solvents to clean the positioner. Technical inspection should be carried out in accordance with the points outlined in the table below.

Table 3 – Procedure of technical inspection for a positioner

What is being tested and the methodology of testing.	Technical requirements
Conduct an external inspection of the positioner's constituent parts in order to detect deformations of elements, corrosion, violation of coatings.	Damage to surfaces and deformation are not permitted.
Checking the integrity and aging of the insulation of the positioner harnesses	Damage to the insulation is not allowed.
Check the function of the positioner's power supply indication when power is applied.	Lack of indication is not permitted.

4 ROUTINE MAINTENANCE

The list of possible malfunctions of the positioner and methods of their elimination are given in the Table below.

Table 4 – The list of possible malfunctions of the positioner

Malfunction	Probable cause of malfunction	Malfunction repair
No current consumption	Damage to the power cable	Restore the power cable/use a new one
Cannot connect to the web interface	Invalid IP address	Enter the correct IP address, or reset to factory settings
No Ethernet connection	Ethernet cable damage	Replace the Ethernet cable with a new one

5 STORAGE

Short-term storage period is 12 (twelve) months. Short-term storage is possible at ambient temperature from - 40°C to 50°C, humidity up to 95%, atmospheric pressure from 84 to 106.7 kPa (from 630 mm to 800 mm Hg), as well as when the product is protected from atmospheric precipitation.

During long-term storage the positioner should be kept in following conditions:

- in heated storages or warehouses at temperatures from 5 to 40ºC;
- in unheated storages or warehouses at temperatures from - 10ºC to 30ºC.

The packed positioner can be stored in storages or warehouses for 3 years.

The packed positioner can be stored in an unheated storages or warehouses for 1 year.

Mandatory preservation of the positioner is required for longer storage periods.

Long-term storage of the positioner shall be carried out in the manufacturer's packaging in closed rooms under the following conditions:

- storage temperature 5°C to 40°C;
- storage humidity 80%;
- ventilation;
- absence of acid and alkali vapors;
- no direct exposure to atmospheric precipitation.

If the warranty storage period has been exceeded the customer must inspect all parts of the product before use.

If the positioner has been transported or stored in low temperature conditions the customer must keep it in normal temperature conditions for at least 3 hours before use.

6 TRANSPORTATION

The product shall be transported under conditions not exceeding the specified limit values:

- ambient temperature from - 40ºC to 50ºC.

It is allowed to transport the product by all types of transport in a packing box under condition of protection from direct impact of atmospheric precipitation and dust, without limitation of speed and distance.

The product may be transported by airplane only in a sealed compartment. In unsealed aircraft compartments transportation is allowed up to the altitude of 5000m.

During transportation of the product, it is necessary to be guided by warning inscriptions on packing containers.

Placement and fastening of the product in vehicles should ensure its stable position and prevent movement during transportation.

During transportation, the transport container with the packed product must be protected from direct exposure to atmospheric precipitation.

7 UTILIZATION

Out-of-service positioner cannot be disposed of as household waste. The positioner that is not fit for use must be sent to a company that is licensed to collect, transport, treat, process, decontaminate and store waste classified in the group "Computer, electronic, optical equipment that has lost its consumer properties".
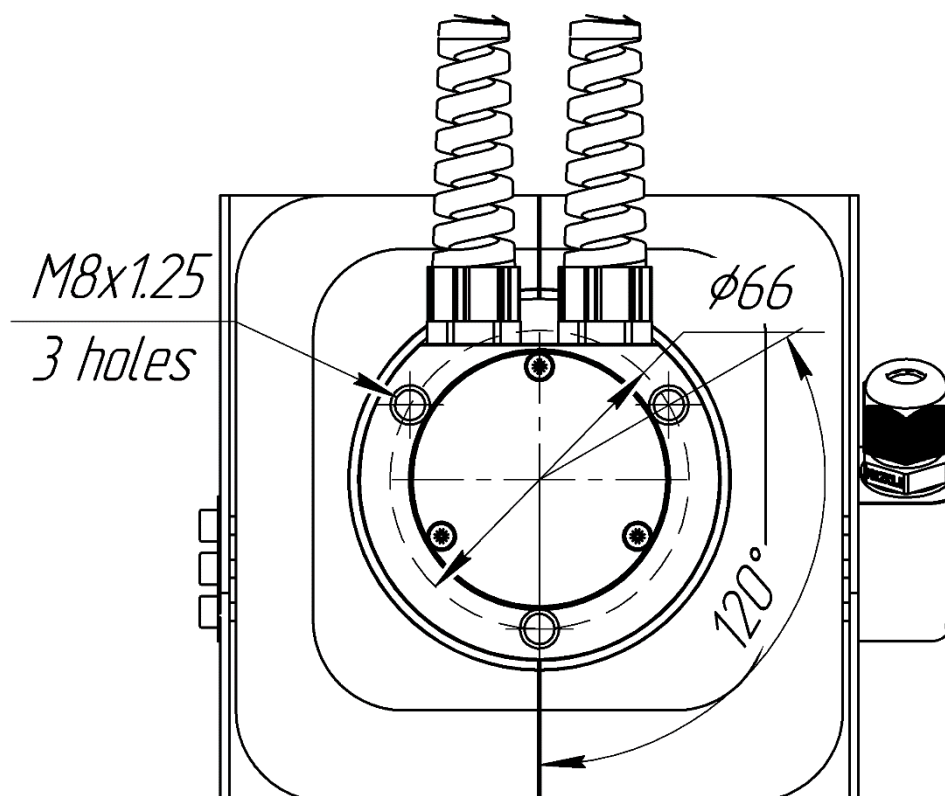
8 APPLICATION A. OVERALL DIMENSIONS AND MOUNTING DIMENSIONS
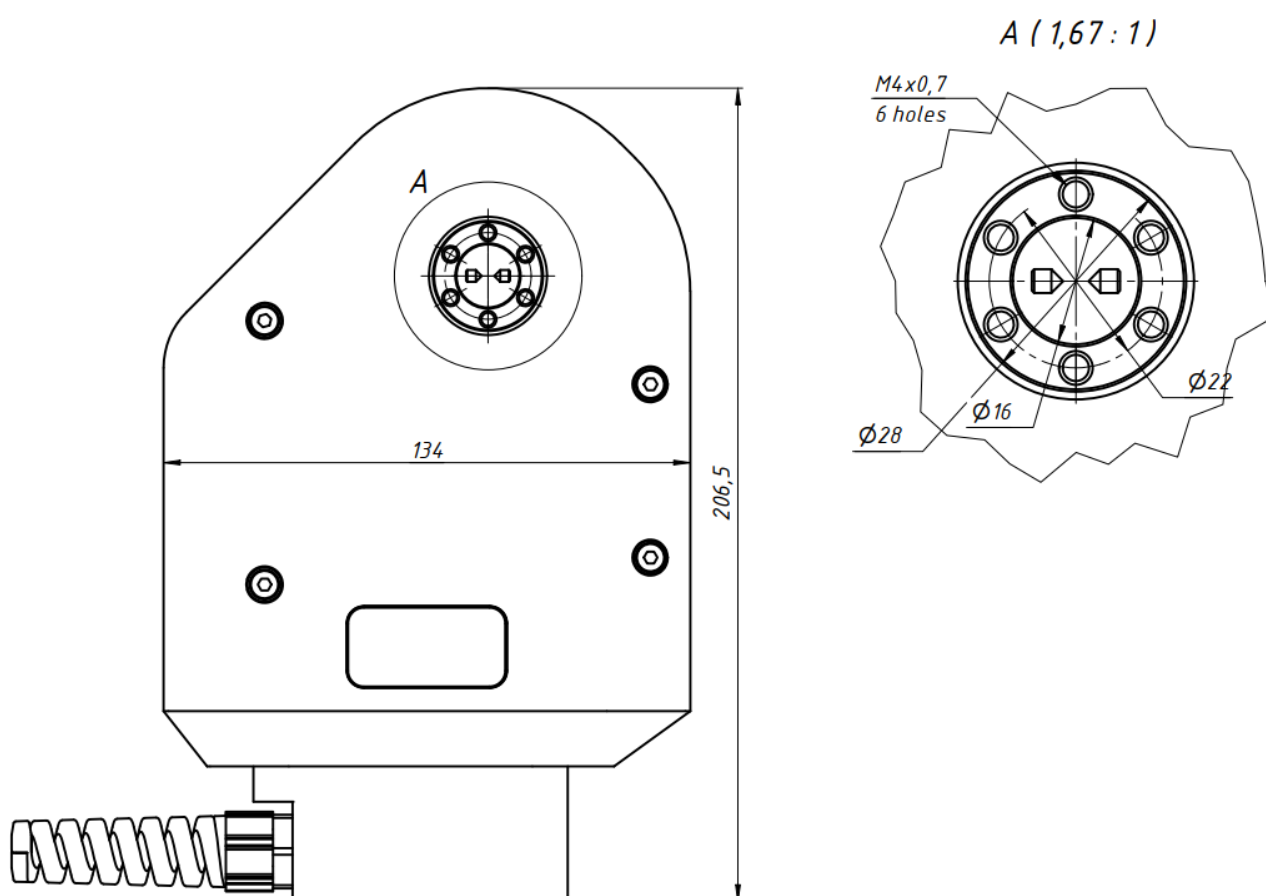
8.1 Overall dimensions
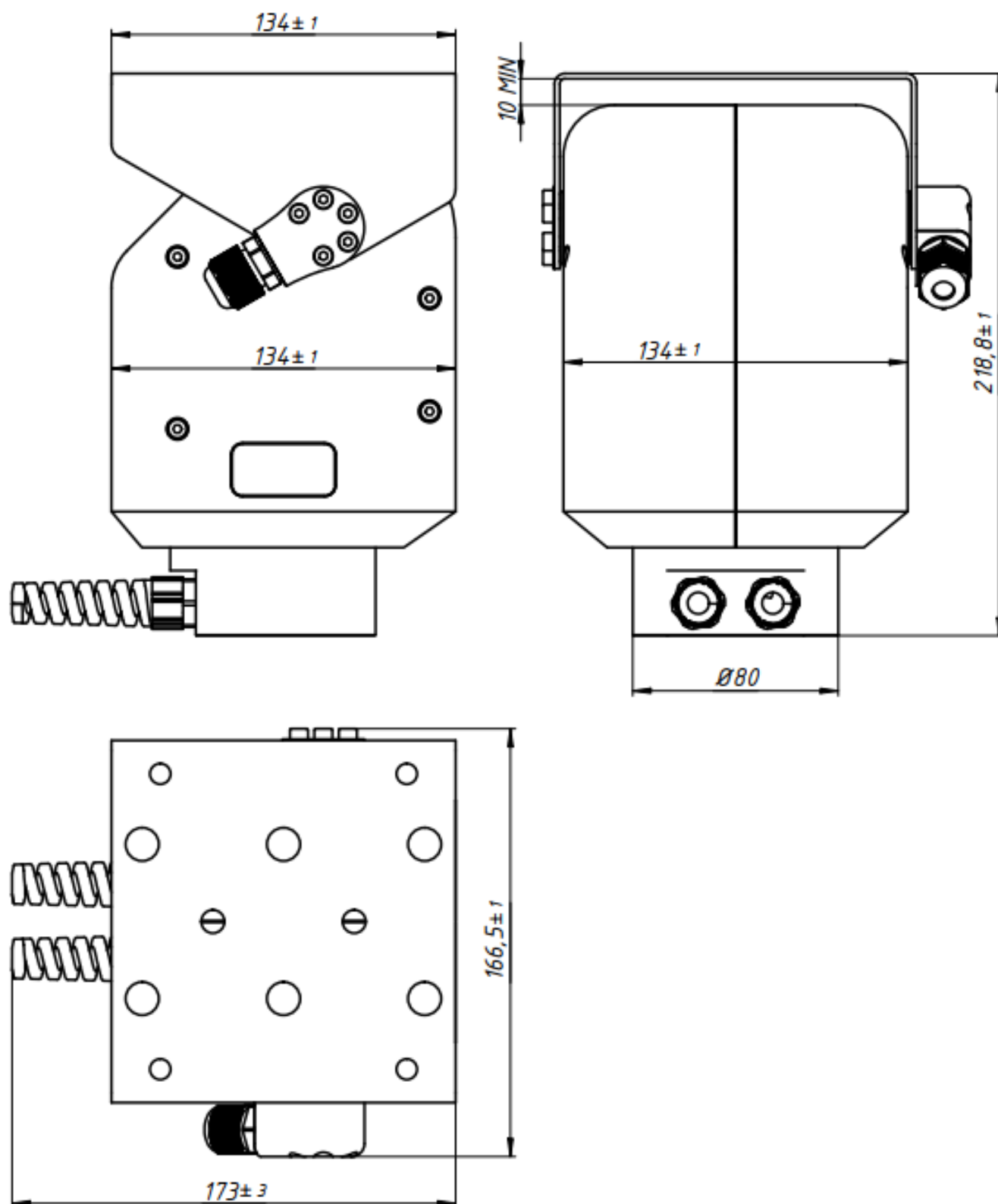
Picture A1 – Overall dimensions of the positioner
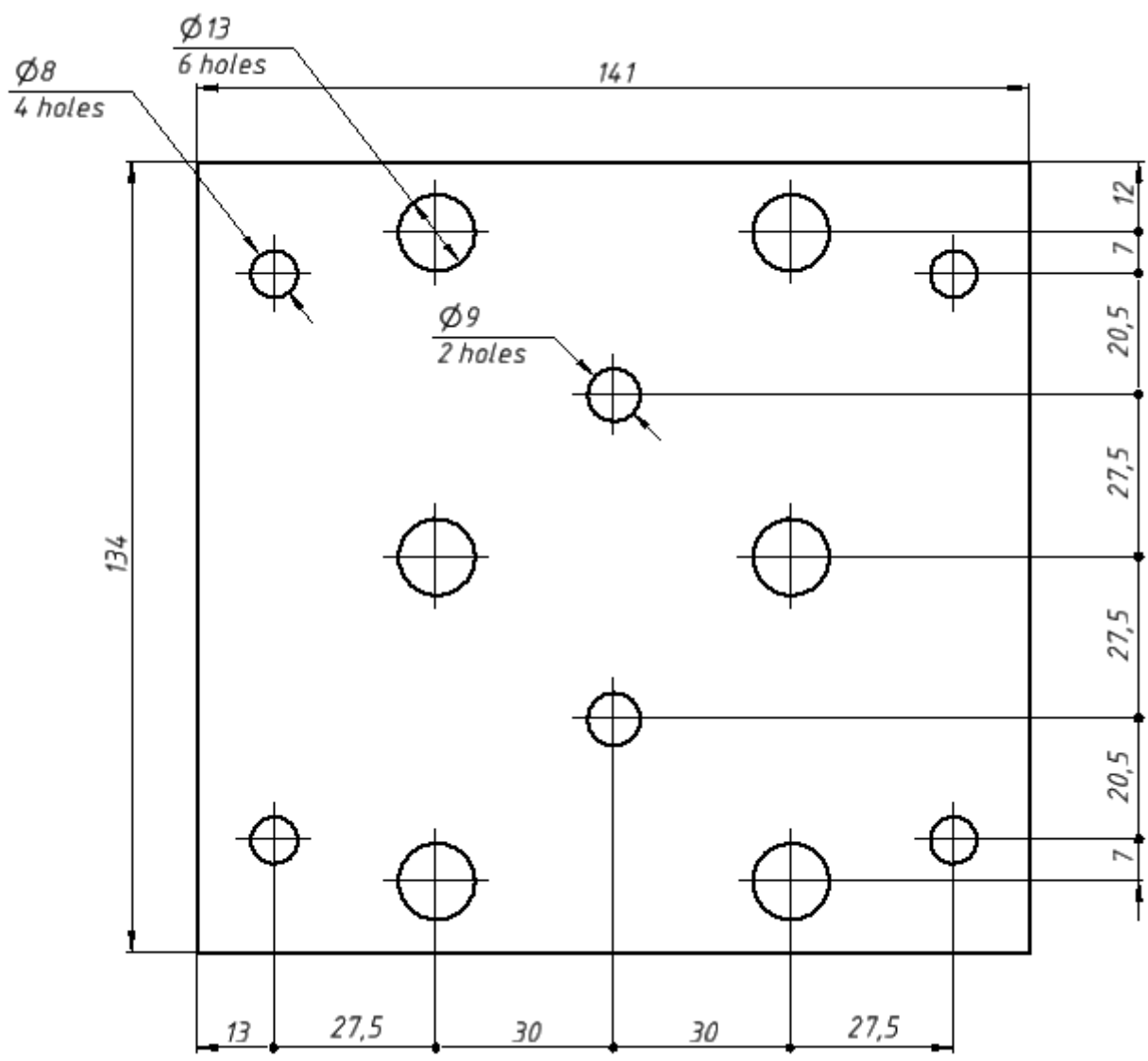
8.2 Mounting dimensions

Picture A2 – Bottom mounting dimensions

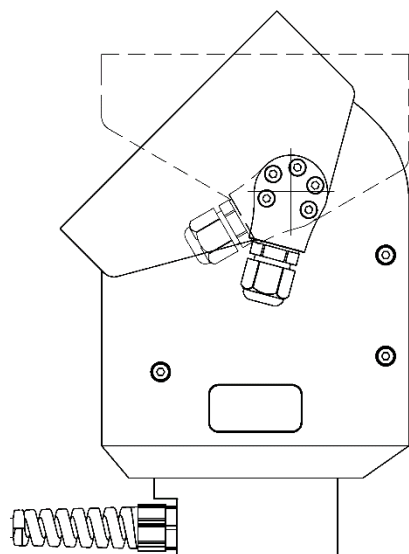*Picture A3 – Mounting dimensions when using it without payload bracket*
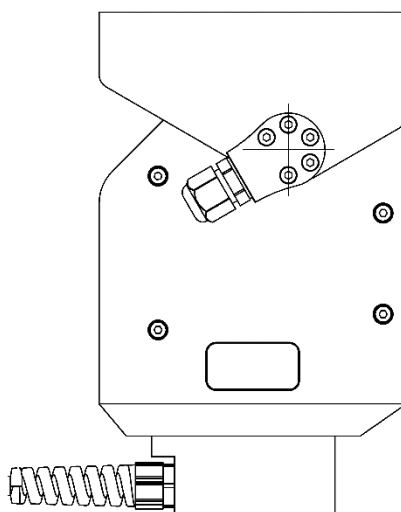
Payload bracket mounting dimensions

Picture A3 – Payload bracket mounting dimensions

End position 1:
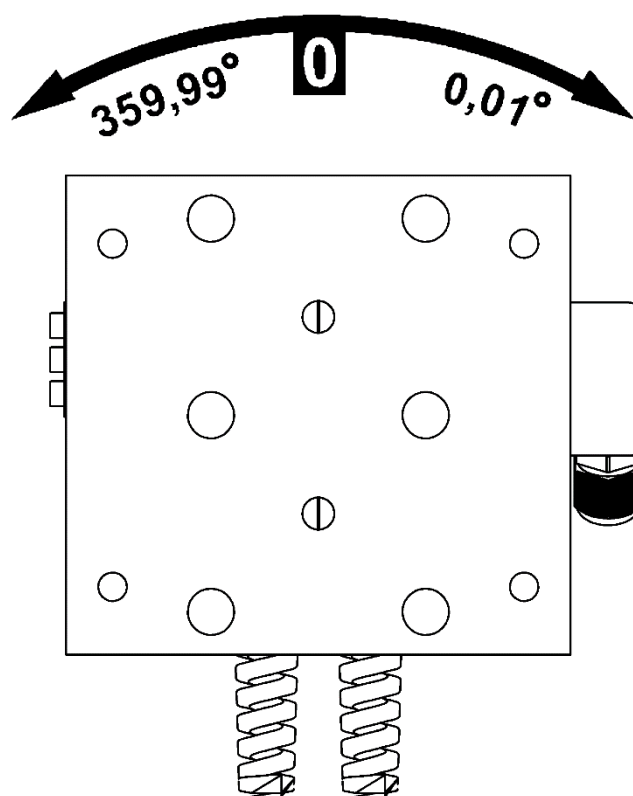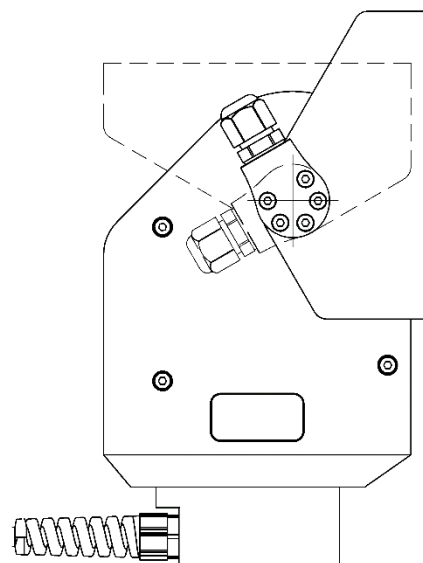Tilt axis position 315°

"Zero" position:
Tilt axis position 0°

End position 2:
Tilt axis position 90°

359,99° 0 0,01°

Picture B1 – Positional Drawing (Coordinates are in Pelco D system)

Pan Tilt Positioner TL.0009

X1 Cord End Terminal (red)

Circuit	Cont.
+ PWR 24VDC	1

(1 pair)

X2 Cord End Terminal (black)

Circuit	Cont.
– Питание ПН (GND)	1

(1 pair)

X3 RJ–45

Circuit	Cont.
TX+	1
TX–	2
RX+	3
RX–	6

Left cable gland

Right cable gland

Ethernet switch

Control Unit

IP address 192.168.1.115

Stationary part

Rotary part

UTP (10 pairs)

Right cable gland

X4 RJ–45

Cont.	Circuit
1	TX+
2	TX–
3	RX+
6	RX–

X5 Cord End Terminal (red)

Cont.	Circuit
1	+ Питание ПН

X6 Cord End Terminal (black)

Cont.	Circuit
1	– Питание ПН (GND)

X7 Cord End Terminal (marking)

Cont.	Circuit
1	TX+ (RS–485)
2	TX– (RS–485)

Picture C1 – Connection diagram