

TSF Series

Stainless Steel Fixed Camera Station

TSL Series

Stainless Steel IR Led illuminator

TSF-AC Series

Air Cooled Stainless Steel Fixed Camera Station

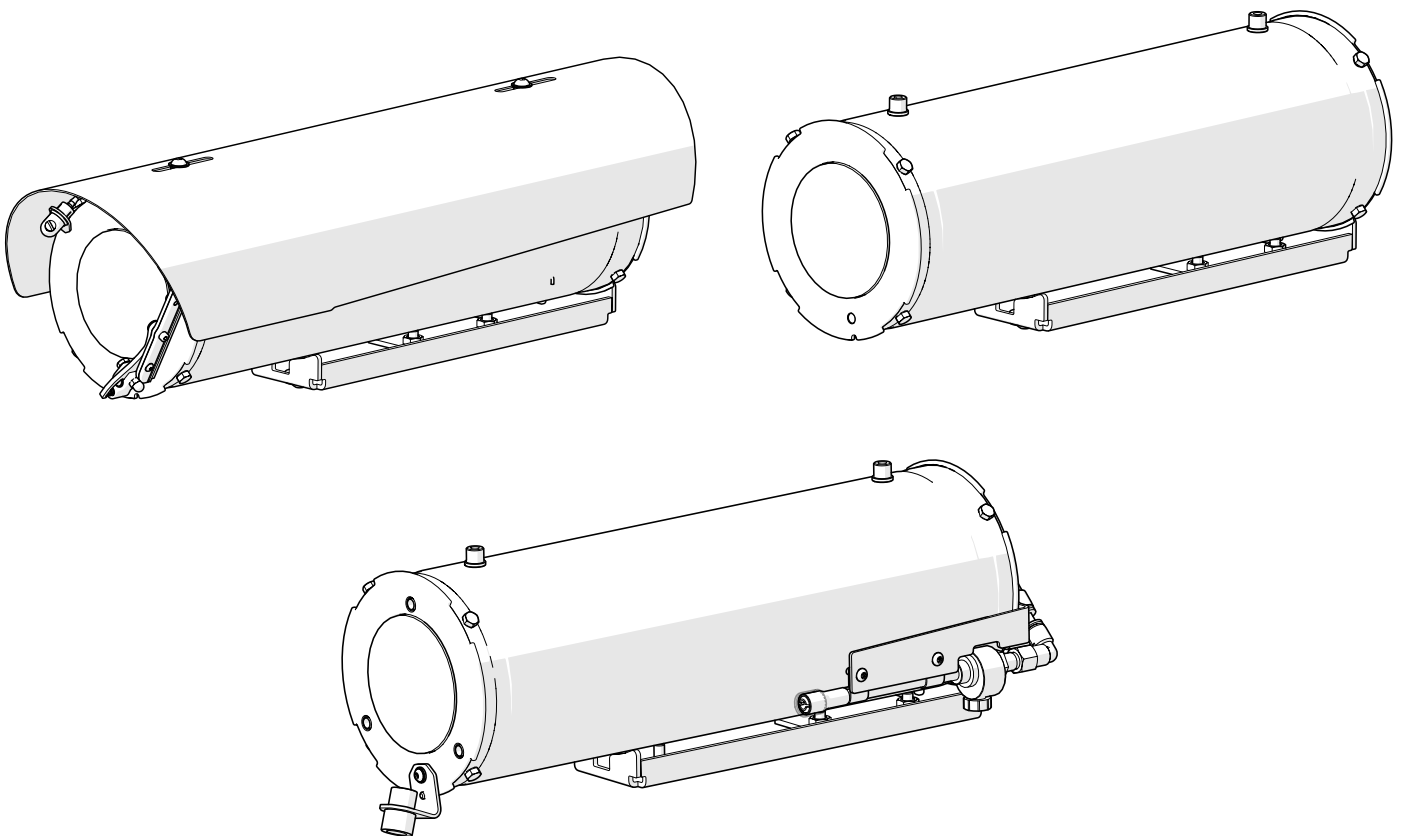


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1- PRELIMINARY INFORMATION

1.1-General information

This manual explains how to use INNO fixed series, which includes:

- TSF fixed camera housing series;
- TSFW fixed camera housing with integrated wiper;
- TSF-IR fixed camera housing for thermal cameras;
- TSF-AC fixed air-cooled camera housing;
- TSL fixed IR LED illuminator.

1.2- Description

INNO TSF Series includes a full range of AISI 316L Stainless Steel fixed camera housings specifically designed for hostile and highly corrosive environments.

The design of the housings ensures the best protection from external agents along with easy installation and maintenance service. INNO TSF fixed camera housings can be equipped with the latest generation day/night and thermal imaging cameras.

INNO TSF-AC camera housing allows to cool down the unit without using a liquid cooling system. Thanks to a Vortex Tube, which converts the air inlet into two air streams (one hot and one cold), it is just needed to connect the camera housing to compressed air to pull down the internal temperature of unit.

INNO TSL series IR LED illuminators are specifically designed for hostile and highly corrosive environments. INNO TSL works on 850nm wavelength and is available with a 15° or 34° beam pattern.

1.3- Symbols



WARNING

It indicates a potentially dangerous situation that, if ignored, could lead to physical or mortal injuries and/or damage to the unit. Read the provided instructions carefully.



ELECTRICAL HAZARD



It indicates a potentially dangerous situation involving electricity risks that could lead to physical or mortal injuries and/or damage to the unit. Read the provided instructions carefully.



OPTICAL RADIATION

It indicates a potentially dangerous situation due to the emission of visible light or infrared that could be harmful for eyes. Read the provided instructions carefully.

1.4- Preliminary remarks

	Prior to installation and operation, read carefully all instructions in this manual and heed all warnings.
	Use the original packaging to transport the unit. Disconnect power supply before moving it. In case of returning the equipment, the original packaging must be used.
	Any change performed on the unit that is not previously approved by the manufacturer will void both the warranty.
	Trying to manually force the wiper will result in damaging the device and will void the warranty.
	When leaving the unit unused for long periods, disconnect supply cables.
	For security reasons, do not install the unit in the proximity of water containers and never push objects or pour liquids into the unit. The unit can be safely used in damp environments or outdoors, as long as the connectors are properly sealed.
	The internal transformer of the unit should never be used to power external devices.
	Before performing any operation, turn off the power. The installation of the unit can be performed only by qualified personnel in accordance with the national legislation and code of practice.

Only for versions with integrated IR LED illuminator:

	The unit emits high intensity IR light. Wear protective eyewear. Avoid direct eye and skin exposure. Please follow safety precautions given in IEC 60825-1 and IEC 62471.
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1.5- Technical data

General & Mechanical

Construction: AISI316L Stainless Steel
 Finishing: Electro-polished

Electrical

Heater: T[°C] ON=12±4°C, T[°C] OFF=20±3°C (thermostatically controlled)
 Supply voltage: 24V~, 120V~, 230V~ (±10%) specified at order
 Power consumption: 40 MAX for TSF Series (camera housing)
 25 MAX for TSF-AC Series (air-cooled camera housing)
 25W MAX for TSL Series (IR LED illuminator)

Certifications

Weatherproof standard: IP66/IP67/IP68/IP69, NEMA 4X
 Vibrations and Shock: EN/IEC 60068-2-6; EN/IEC 60068-2-27; DNV-CG-0339
 EMC: EN 55035; EN/IEC 61000-6-4; EN/IEC 61000-3-2; EN/IEC 61000-3-3;
 EN/IEC 61000-6-2; CISPR-32; CISPR-35; DNV-CG-0339
 LVD: EN/IEC 62368-1
 FCC: FCC part 15B
 RoHS: 2011/65/EU + 2015/863/EU (RoHS 3)
 WEEE: 2012/19/EU

CE compliant

2- UNPACKING AND CONTENTS

2.1- Unpacking

Unpack this equipment and handle it carefully. If the package appears to be damaged, notify the shipper immediately.

Check that all parts listed in "2.2 Contents of the box" are included in the box.

2.2- Contents of the box

For TSF, TSFW and TSF-IR camera stations and TSL IR LED illuminator:



- 1 Camera station/IR LED illuminator unit
- 1 Hard copy "Installation and operation manual"
- 1 Camera fixing kit
- 1 Cable glands kit
- 1 Sunshield mounting kit (only for TSF/TSFW/TSF-IR series)
- 1 Sunshield (only for TSF/TSFW/TSF-IR series)
- 1 Washing nozzle brackets kit (for wiper versions only)

For TSF-AC camera station:

- 1 Camera station/IR LED illuminator unit
- 1 Hard copy "Installation and operation manual"
- 1 Camera fixing kit
- 1 Cable glands kit
- 1 air jet nozzle kit

3- MOUNTING AND FIXING THE UNIT

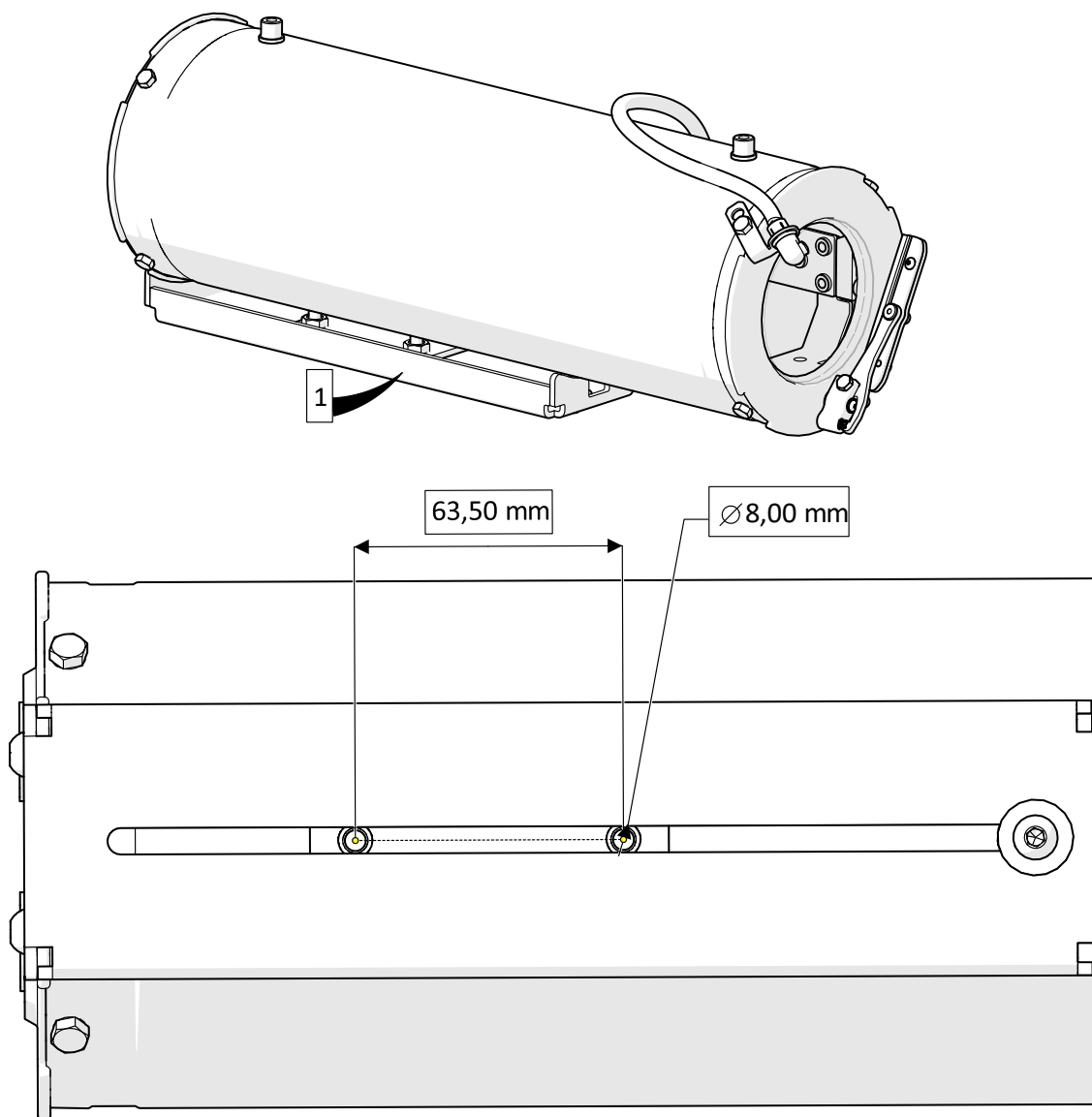
3.1- Assembling and installing the unit remarks

	<p>Proper stainless steel tools should be carefully chosen and used during installation and to fasten the unit to the surfaces, in accordance with the environmental requirements.</p>
	<p>Make sure that the installation surface can support at least four times the weight of the unit in normal operating conditions. Where the equipment may be exposed to excessive external stresses (e.g., vibration, heat, impact), then the equipment must be protected by additional means of protection. Additional protection may be required if the equipment is to be installed in locations where it may be subject to damage.</p>
	<p>Tightening/loosening screws using automatic tools (such as drill drivers) may result in damaged threads.</p>
	<p>Use caution when lifting and assembling the unit. It is recommended that non-slip protective gloves be worn during installation. The unit could bear sharp edges.</p>
	<p>Electrical connections (such as plugs and cords) must be protected from potential hazardous environmental factors (e.g., foot traffic, hitting objects).</p>
	<p>An all-pole mains switch with an opening distance between the contacts at least 3 mm (1/8") in each pole must be incorporated in the electrical installation. The switch must be equipped with protection against the fault current towards the ground (differential) and the overcurrent (magnetothermal). It must be very quickly recognizable and readily accessible. A suitable fuse must also be installed for protection.</p>
	<p>For connection to the main power supply use suitably insulated multipolar cable having minimum 3x1,5 mm². PE wire must be longer than the others.</p>
	<p>Connecting GND/Earth/PE to line or neutral will result in damaging the device and will void the warranty.</p>
	<p>Fasten all the cables inside the housing with cables ties or other fixing means to avoid the electrical contact with surrounding parts in case that terminal blocks screw off. Route all the cables avoiding contact with the wiper shaft and motor.</p>
	<p>Ensure that the unit case is properly earthed, connecting all the earth ground studs.</p>
	<p>Do not connect the unit to a supply circuit unless the installation is completed. Check the proper position of the O-ring seals in their groove.</p>

3.2- TSF, TSF-AC and TSL series mounting pattern

Mounting pattern for TSF and TSF-AC Series camera stations and TSL IR LED illuminator is as shown below, under the external plate (1).

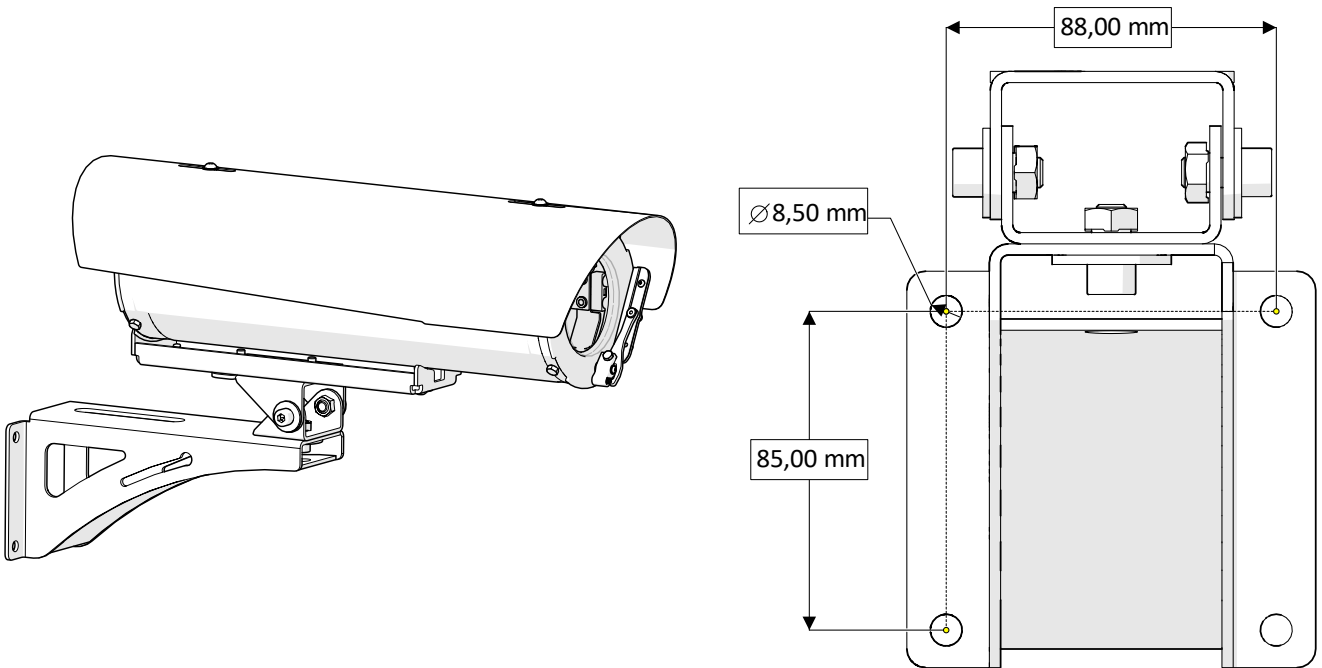
The screws must be tightened with suitable traction load by authorised and qualified operators only, by using a suitable torque wrench tool.



3.3- Wall mounting (using optional SSBK-M bracket)

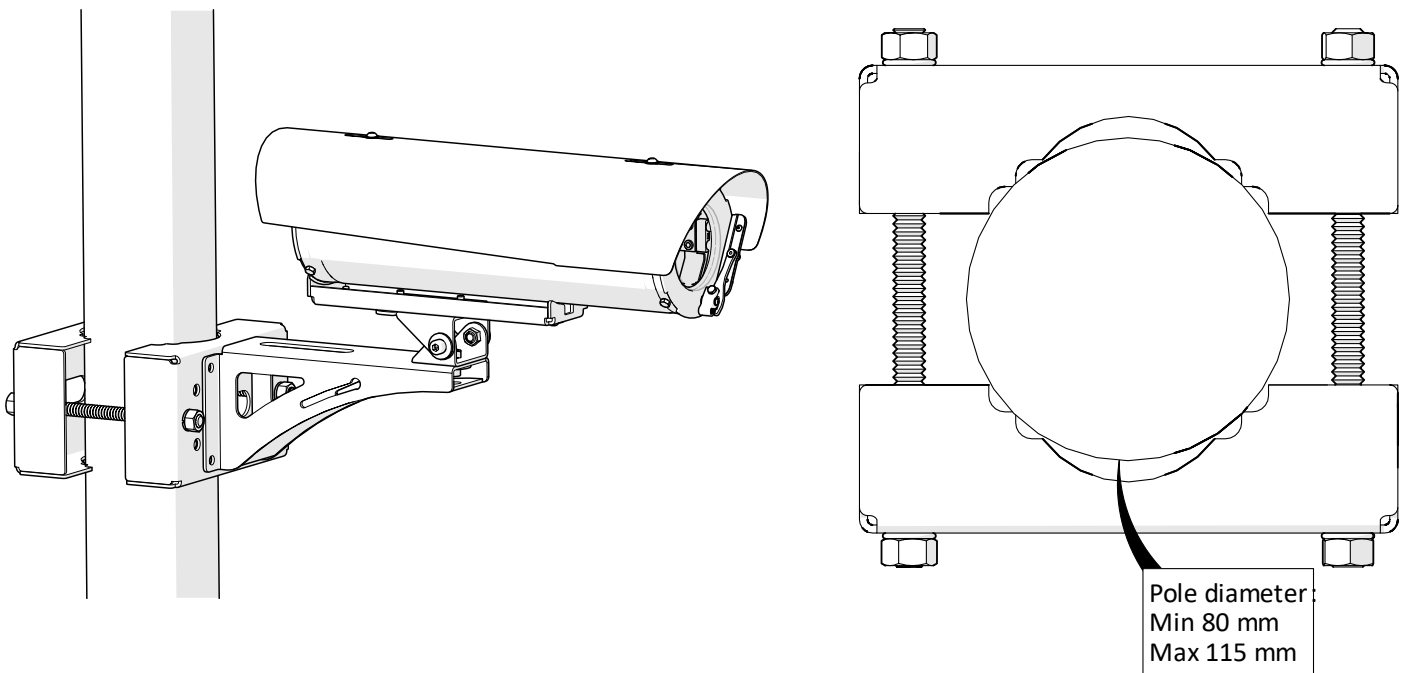
Use SSBK-S to install INNO series to a wall surface. Choose proper fasteners depending to the installation surface.

Refer to the following mounting pattern for the fixing holes.

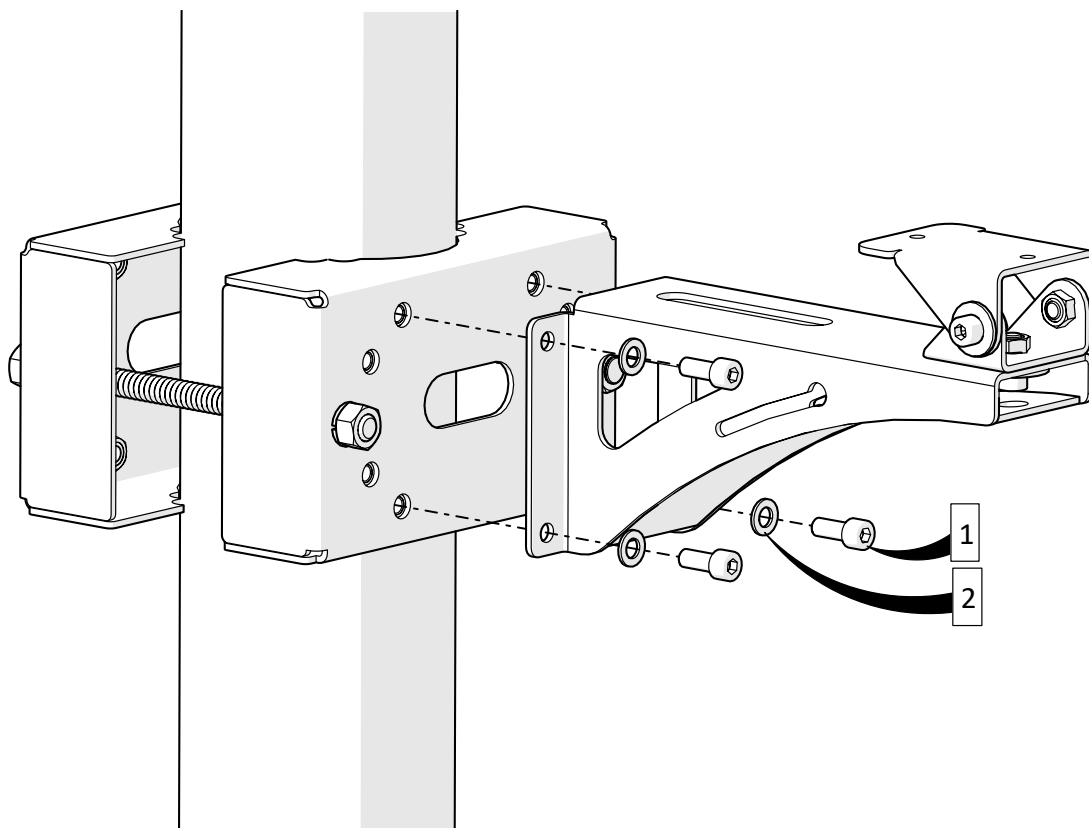


3.4- Pole mounting (using optional SSBK-S bracket and SSPM-S adapter)

Use SSPM-S adapter to install INNO series to a pole. SSPM-S can be installed in poles with diameter ranging from min 80mm to max 115mm.

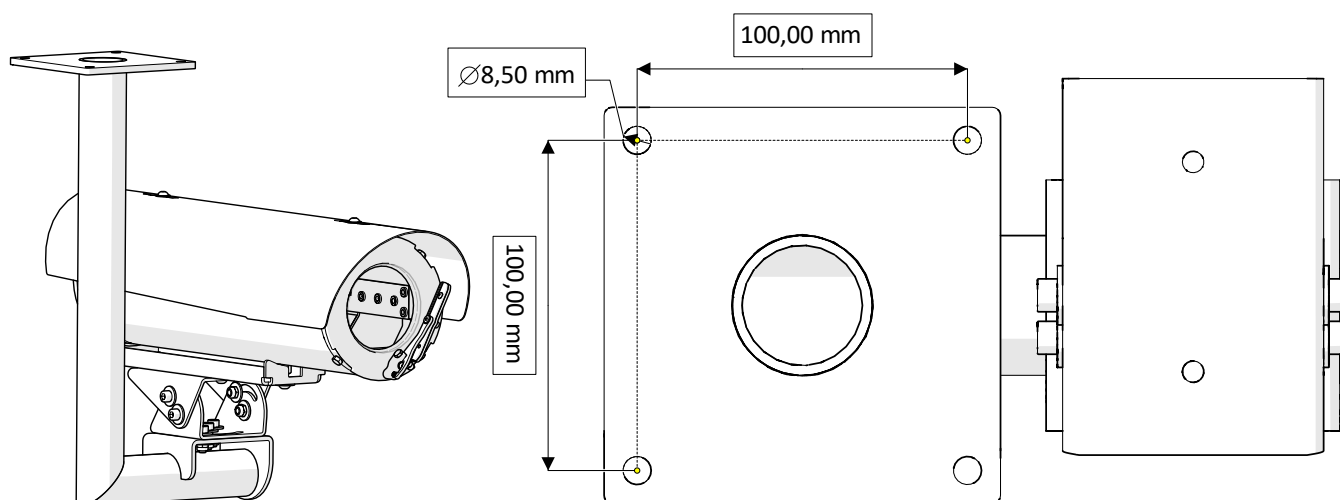


Fix the SSBK-S bracket to the SSPM-S adapter using 4x screws (1) and 4x plane washers (provided with the SSPM-S kit). Check that all the threads are clean. When fixing the screws use thread locking compound (e.g., Loctite) and allow an appropriate rest period.



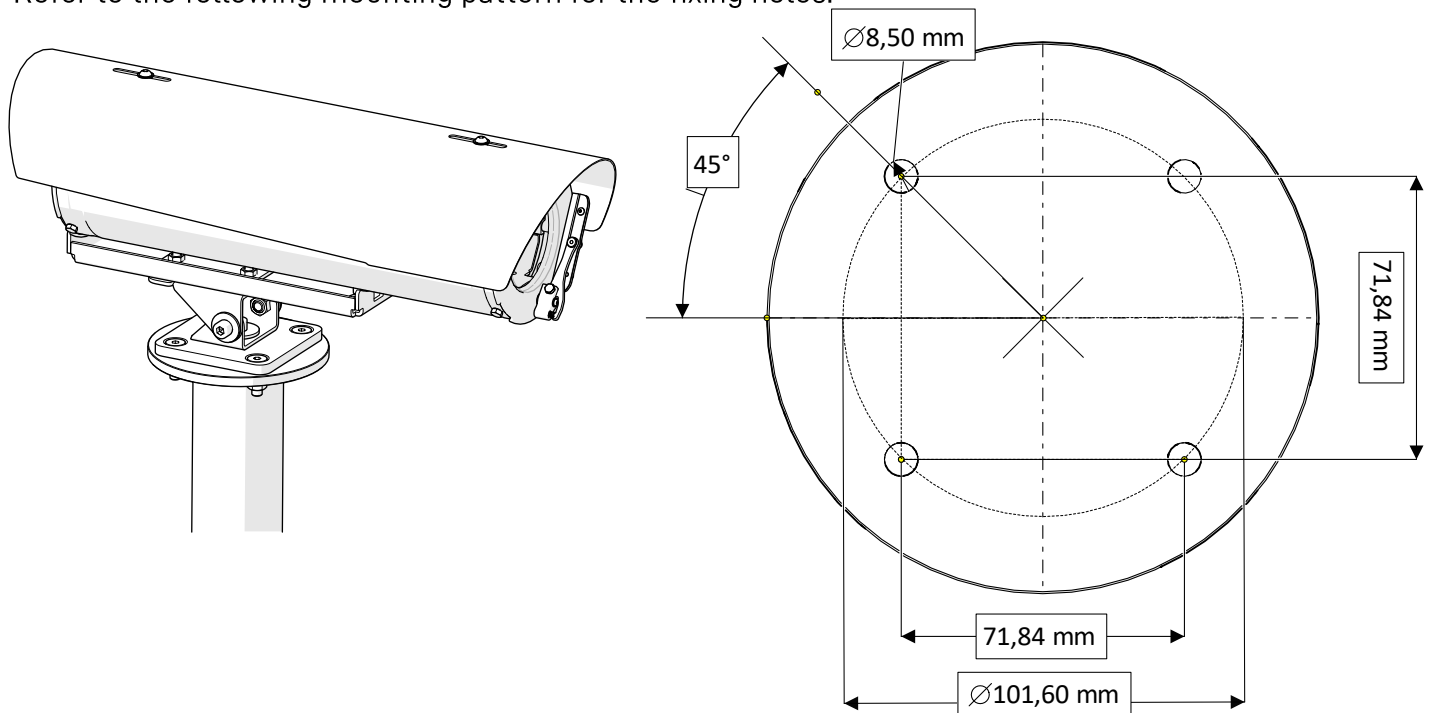
3.5- Ceiling mounting (using optional SSBKCLN-S)

Use SSBKCLN-S mounting plate to install INNO series to a ceiling surface. Refer to the following mounting pattern for the fixing holes.

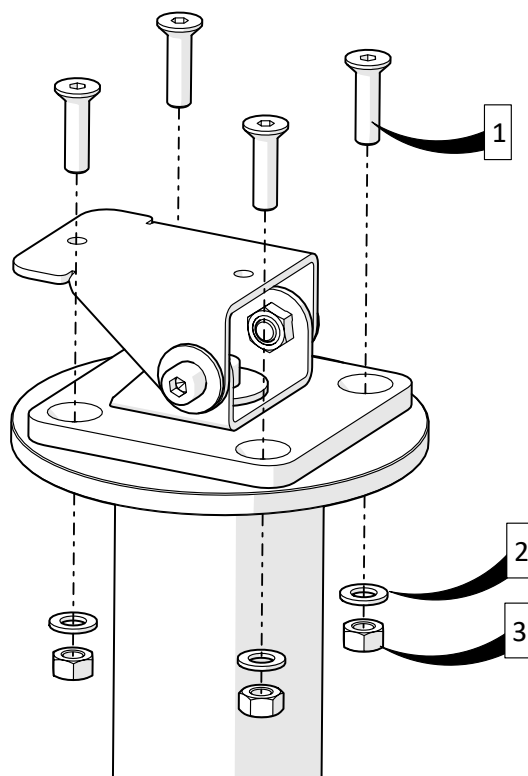



3.6- Pole top mounting (using optional SSPTM-M mounting plates)

Use SSPTM-S mounting plate to install INNO series to a pole top surface.
Refer to the following mounting pattern for the fixing holes.



Fix the mounting plate on the top of the pole using the provided 4x M8 screws (1), 4x M8 plane washers (2) and 4x M8 nuts (3).
Check that all the threads are clean. When fixing the screws use thread locking compound (e.g., Loctite) and allow an appropriate rest period.



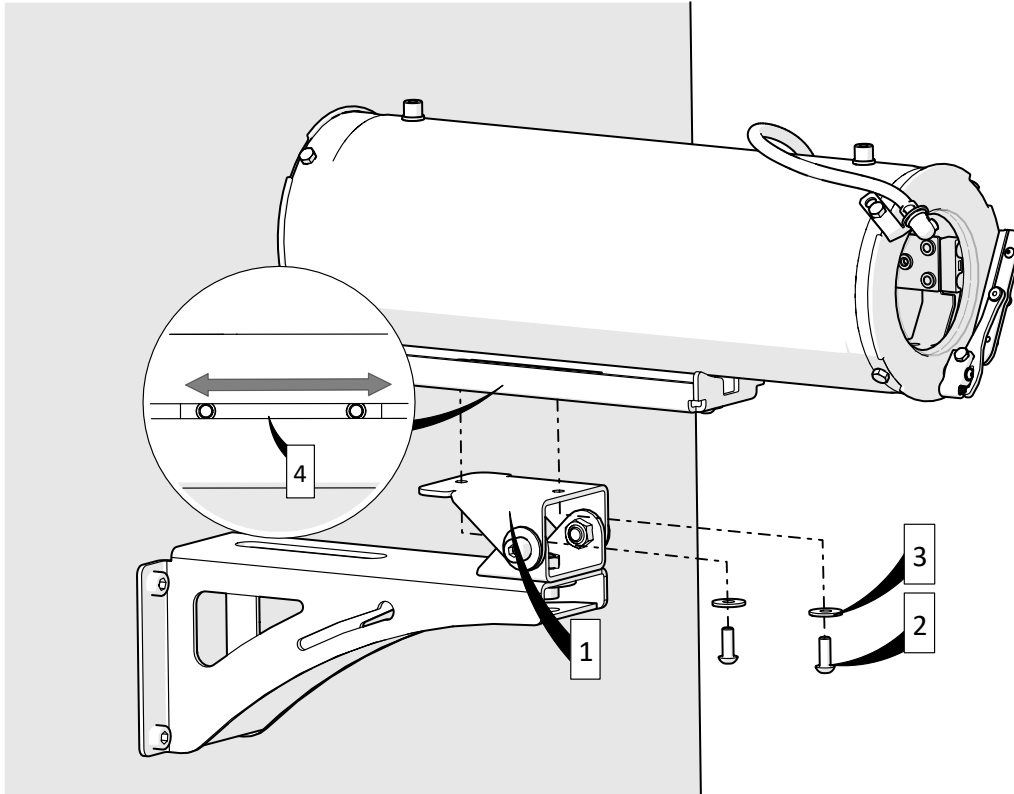
 If through holes are not available on the pole top, choose proper fasteners depending to the installation surface.

3.7- Fixing the unit to optional SSBK-M or SSPTM-M

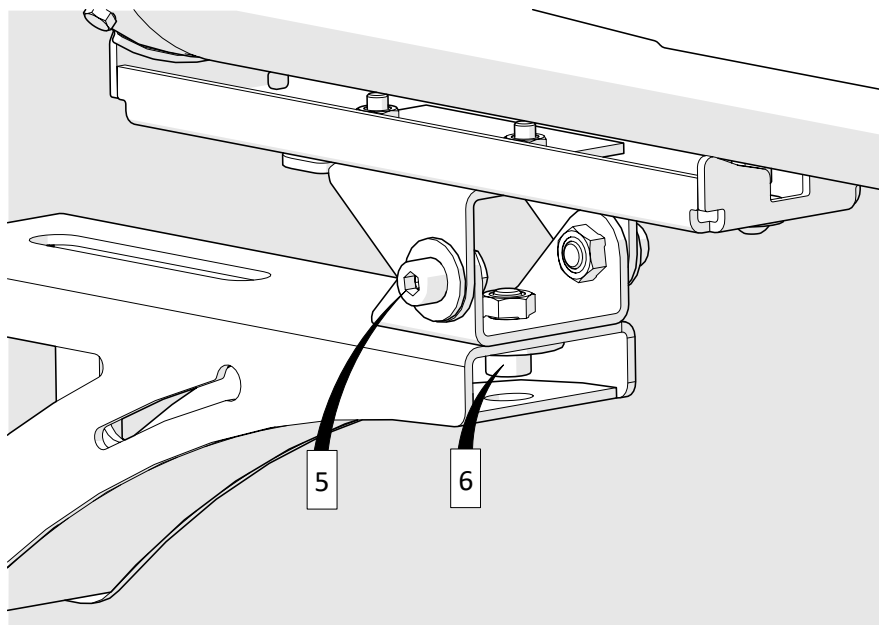
Fix the unit to the swivel joint (1) using the 2x screws (2) and 2x washers (3) provided with the camera station.

To ensure the best stability of the installation, it is recommended reduce the unit overhang from the wall. The plate (4) on the lower rail allows to adjust horizontal position (forth/back) of the housing.

Check that all the threads are clean. When fixing the screws use thread locking compound (e.g., Loctite) and allow an appropriate rest period.





Loosen the screws (5) on both sides to adjust tilt position.
Loosen the screw (6) to adjust pan position.



4- MOUNTING AND FIXING THE UNIT

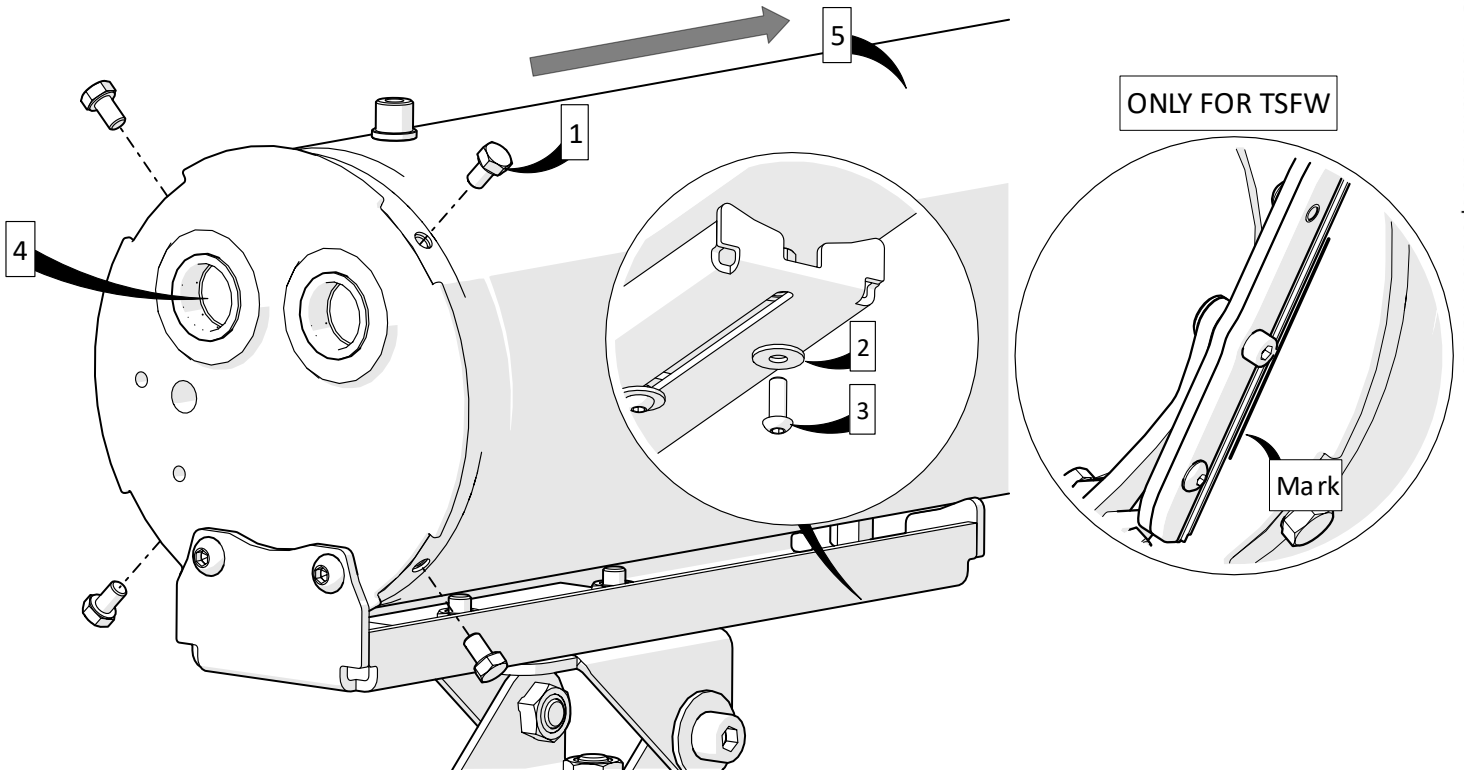
4.1- Perform the electrical connections remarks

	Any action performed on the unit which is not described in this manual may damage it.
	Complete the installation performing the camera connection referring to the manual of the camera.
	Check carefully the supply voltage marked on the label. Incorrect power supply voltage may damage the unit. Do not overload the terminal connection, as it may cause a fire or electrical shock hazard.
	Permanently connected equipment: a readily accessible disconnect device shall be incorporated in the building installation wiring.
	The internal grounding terminal shall be used for the equipment grounding connection. The external terminal is only for a supplementary bonding connection where local codes or authorities permit or require such connection.
	Open only the covers pointed out in this installation manual. Other covers should be open only by the manufacturer.
	Keep the unit tightly closed when operating.
	Disconnect the equipment from the supply circuit and wait at least 5 minutes before opening.
	Do not connect the unit to a supply circuit unless the installation is completed. Check the proper position of the O-ring seals in their groove.

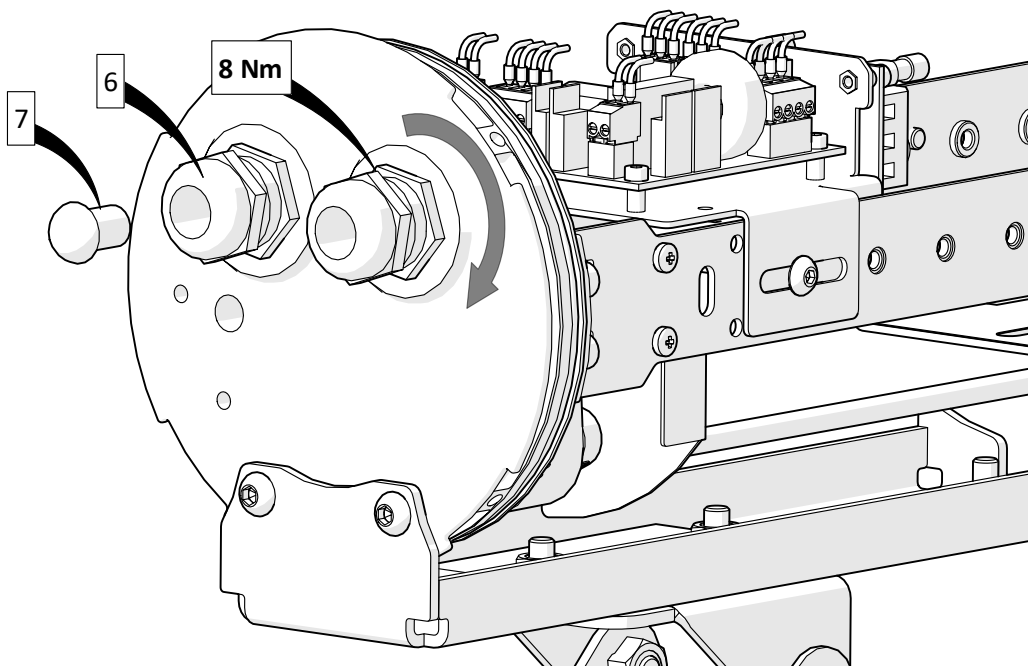
4.2- Installing cable tail to the unit

If the cable tail isn't provided by Tecnovideo, please check the correct cable gland thread dimension. To maintain the IP rating of the unit, use only cables, cable glands, blanking elements, adapters and the like that are suitably rated. Any unused cable entry must be closed with an adequate blank. Eventual plastic caps used to protect cable entries threads should be removed.

Remove the 4x screws (1), the washer (2) and the screw (3). Remove plastic blanks (4).
WARNING: for TSWF units, mark the wiper position with a marker before opening the unit.
 Extract the camera housing body (5) sliding it.

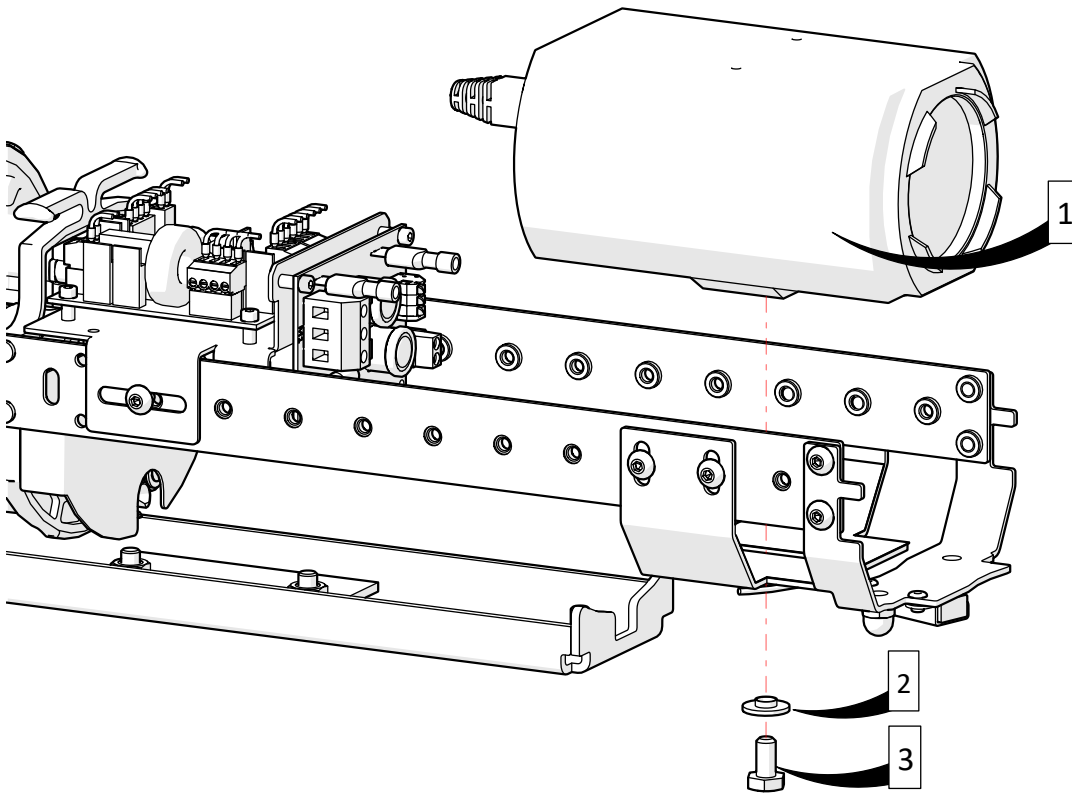


Fix the 2x cable glands (6) provided with the unit kit. Tighten them to 8 Nm.
 Cable glands provided in the kit are suitable for cables with outer diameter ranging from 5 to 10 mm.
 If a cable entry is not used, it can be closed using the plug (7) on the cable gland (6).



4.3- Installing camera (only for customer camera)

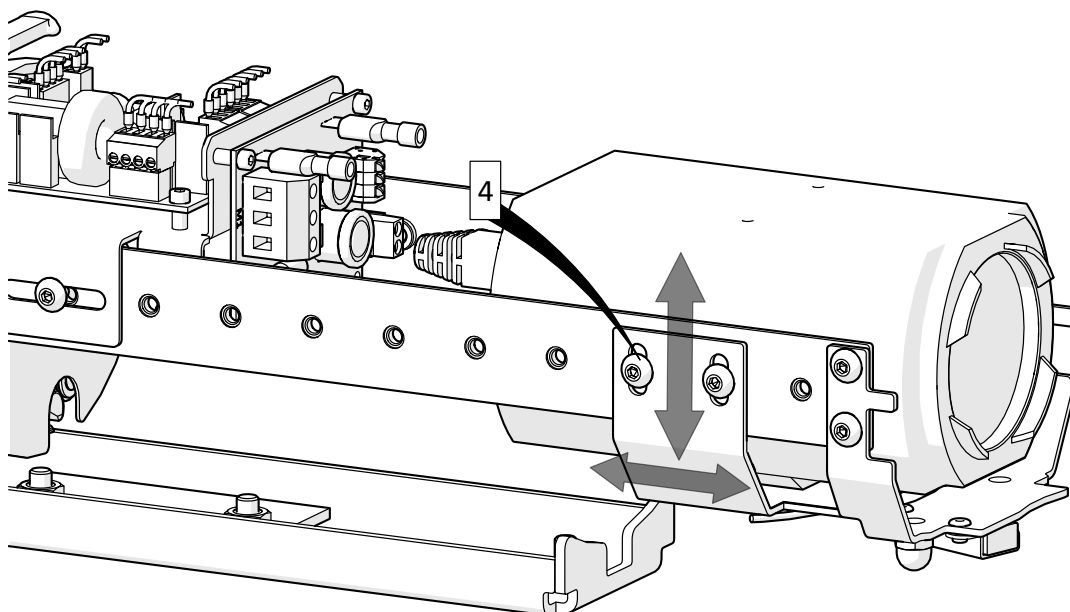
Mount the camera (1) to the internal rail using insulating washer (2) and ¼"-UNC screw (3) supplied with the camera housing. Choose the most adequate ¼"-UNC screw from those supplied. Connect camera video output (Ethernet or coax).



Internal rail can be adjusted vertically, loosening the 4x screws (4) and sliding on the slots of the rail.

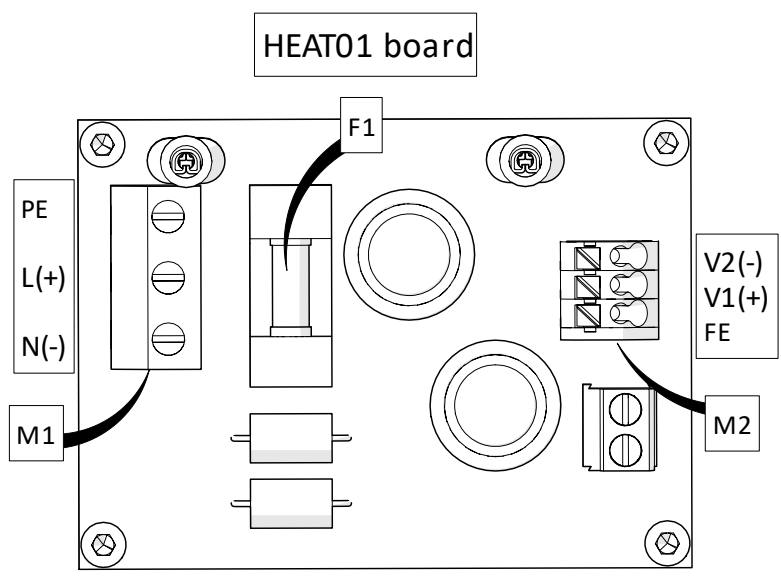
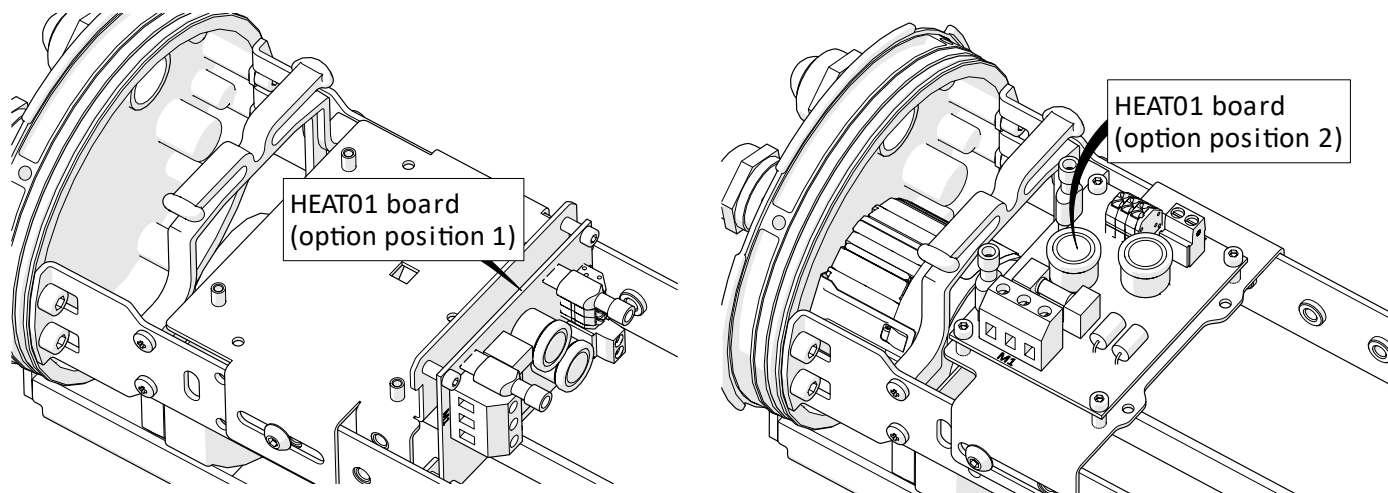
Removing the 4x screws (4) and moving to the next or previous pair of fixings, the internal rail can be adjusted horizontally.

Install the camera as close as possible to the centre of the window, both horizontally and vertically.



4.4- TSF cabling

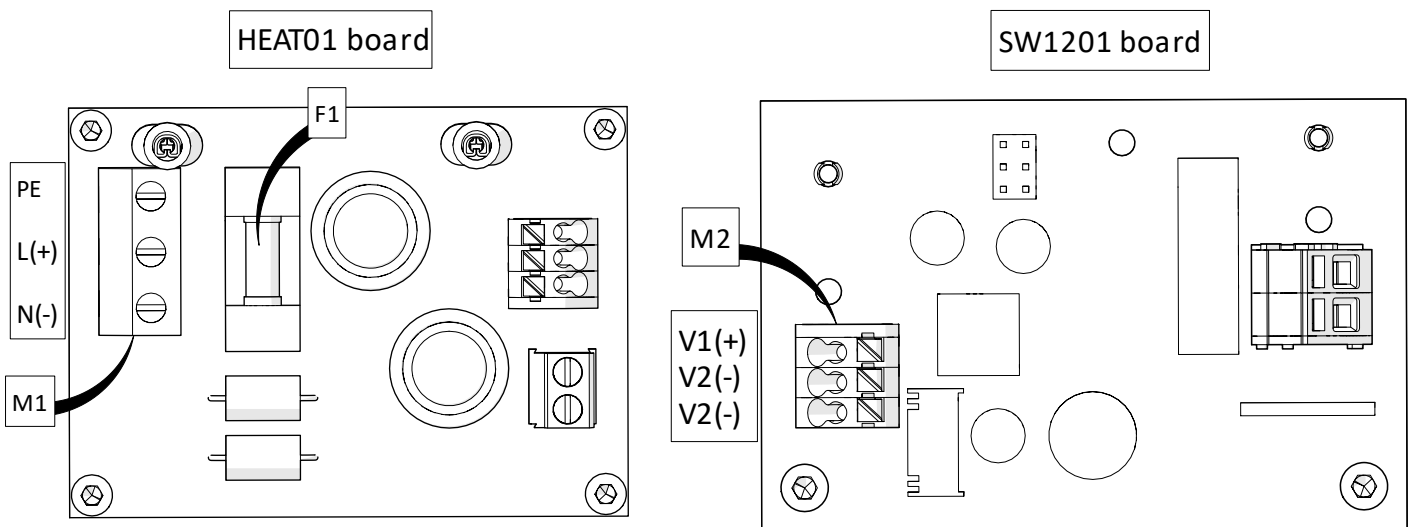
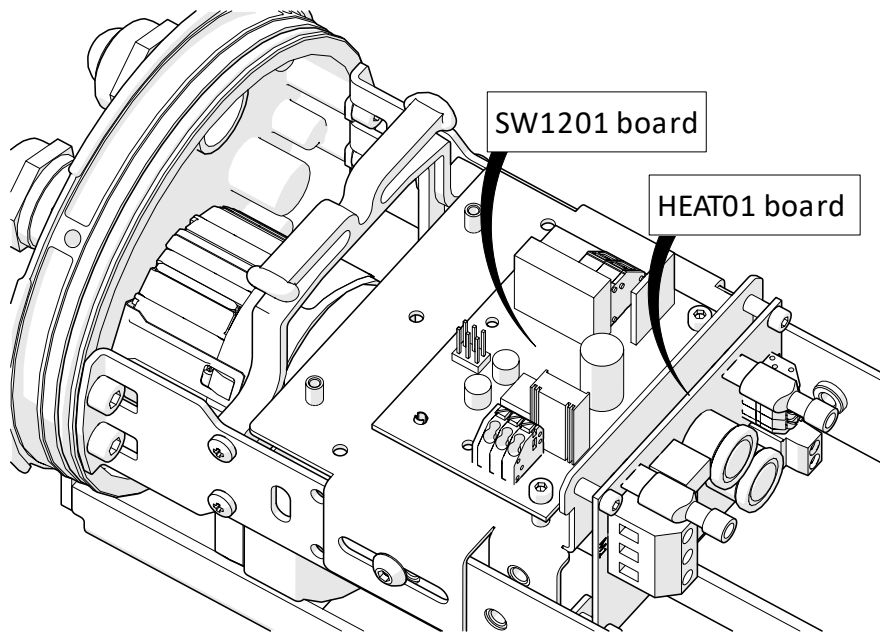
Perform electrical connections on the board, according to the following indications.



ID	Name	Notes
M1	Input supply voltage	Depending on model. Please refer to marking plate supply voltage information.
M2	Camera supply voltage (not for TSL)	Depending on supply voltage powered on M1 terminal.

4.5- TSF cabling with SW1201 power supply

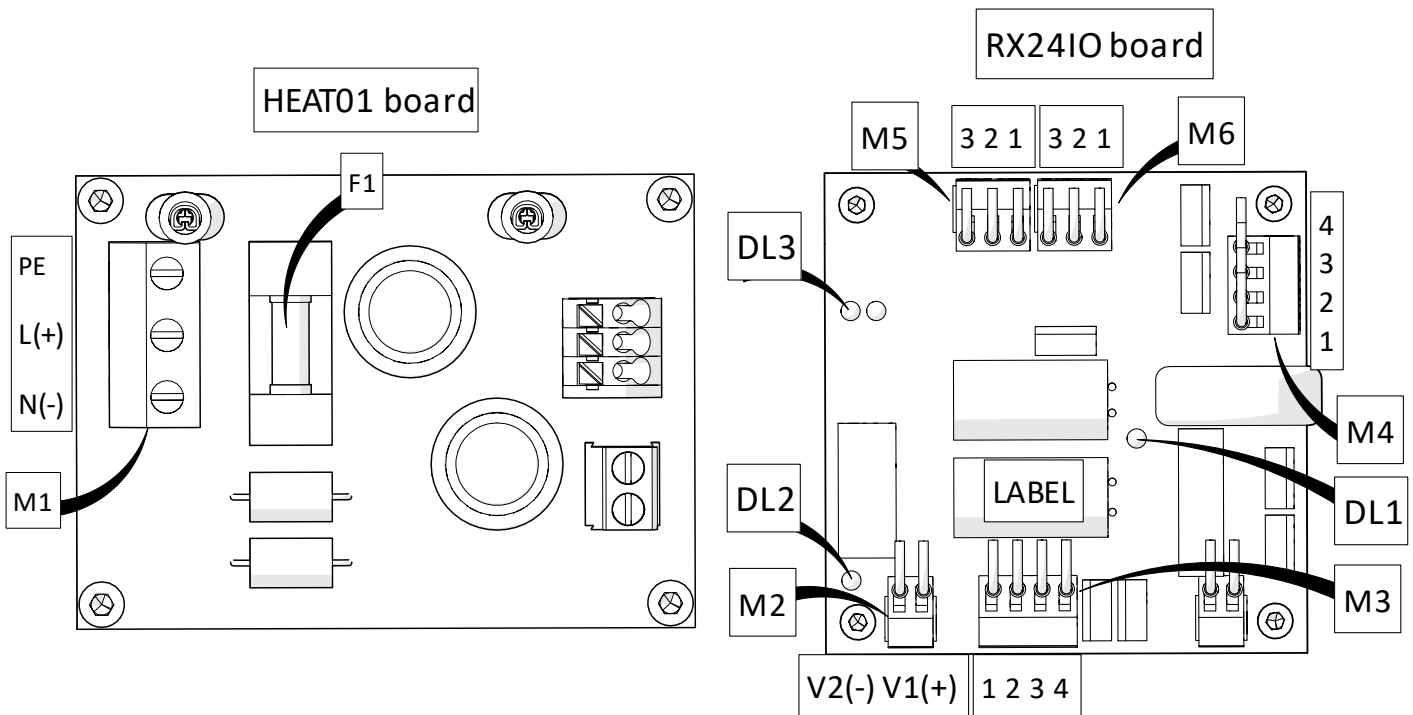
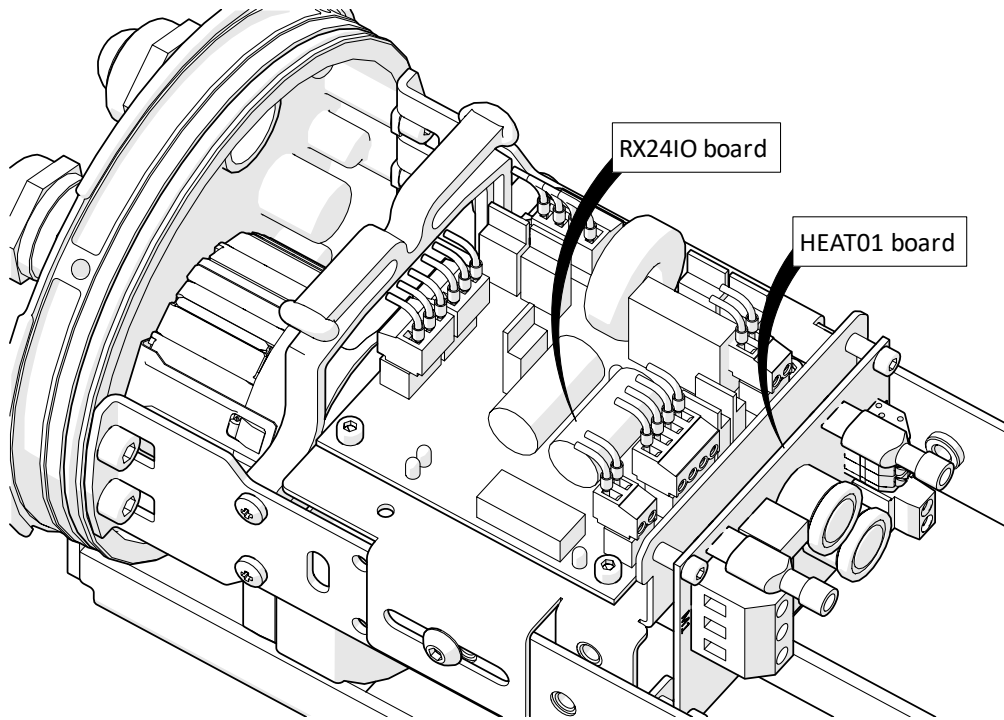
Perform electrical connections on the board, according to the following indications.



ID	Name	Notes
M1	Input supply voltage	Depending on model. Please refer to marking plate supply voltage information.
M2	Camera supply voltage	12V= output. MAX 2A.

4.6- TSWF Cabling

Perform electrical connections on the board, according to the following indications.



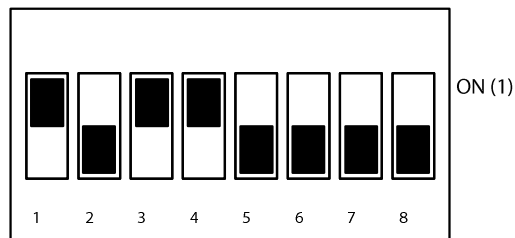
	Name	Notes
M1	Input supply voltage	Depending on model. Please refer to marking plate supply voltage information.
M2	Camera supply voltage	12V= output. MAX 1A.

M3	Auxiliary 24V~/24V== output	1-2 Aux1. Connected by Tecnovideo. 3-4 Aux2. Designed to activate washer systems. 24V== output only for 24V== supply voltage versions (RX24IO/24VDC on board "LABEL"). Pin 3: V1 (~)/V- (=) Pin 4: V2 (~)/V+ (=)	
M4	Auxiliary AC 24V~/24V== output	24V== output only for 24V== supply voltage versions (RX24IO/24VDC on board "LABEL").	
		1-2 Spare Aux3 output. Pin 1: V1 (~)/V- (=) Pin 2: V2 (~)/V+ (=)	3-4 Spare Aux4 output. Pin 3: V1 (~)/V- (=) Pin 4: V2 (~)/V+ (=)
M5	Data Input (RS485)	Pelco D Protocol main bus (half duplex, 2400 baud). Pin 1: A+ TX+ Pin 2: B- TX- Pin 3: RS485 GND	
M6	Input	Closing Input 1 to GND COM (for at least 0,5 seconds) activates Aux1 for 10 seconds (wiper window cleaning). Closing Input 2 to GND COM (for at least 0,5 seconds) activates Aux2 for 5 seconds (waterjet activation). Pin 1: Input 1 Pin 2: Input 2 Pin 3: COM GND input	

Warning: do not connect RS485 GND (M5 pin 3) with COM GND Input (M6 pin 3)

The RX24IO board installed inside the camera housing is equipped with three LEDs.
The DL1 LED (green) is ON when the board is correctly powered.
The DL2 LED (red) blinks when the firmware is working.
The DL3 LED (green) blinks when a command is received from the RS485 bus.

The 8-way DIP switch on the telemetry receiver (DIS1) can be used to set up the unit address (binary). When a switch is on the ON position, the relative digit has value 1, otherwise the value is 0. Switch 1 is referred to the least significant digit (2^0), while switch 8 is referred to the most significant digit (2^7). For example, the address 13 (00001101 in binary) can be set up turning ON the switch 1, 3 and 4 (see figure).



Factory reserved presets:

- Calling preset 87 activates auxiliary output AUX3 (wash wiper cycle). Auto off after 30 seconds.
- Calling preset 88 activates auxiliary output AUX1 (wiper). Auto off after 10 seconds.
- Calling preset 89 activates auxiliary output AUX2 (washer). Auto off after 5 seconds.

The unit has 8 auxiliary functions, as described below:

- Aux1 is used for Wiper activation only (this function will activate the wiper for approx. 10 seconds).
- Aux2 is used for Washer pump activation only (this function will activate the washer pump for approx. 5 seconds).
- Aux3 is used for Wash-Wiper STOPPABLE automatic cycle (this function will activate the wash-wiper cycle approx. 30 seconds). Whenever a command is issued, the cycle will be interrupted.
- Aux4 is used for Wash-Wiper UNSTOPPABLE automatic cycle (this function will activate the wash-wiper cycle approx. 30 seconds). During the Wash-Wiper cycle, any command issued is ignored.
- Aux5 is used for Autofocus refresh (only for external motorized lenses).
- Aux6 is factory reserved.
- Aux7 is factory reserved.
- Aux8 is factory reserved.

The unit has a Special auxiliary functions mode. This mode is useful when neither auxiliary output nor preset above 86 are available.

In this mode, the unit works as described below:

- Preset Call 1 activates wiper (same as auxiliary output AUX1 and Preset Call 88). Auto off after 10 seconds.
- Preset Call 2 activates washer (same as auxiliary output AUX2 and Preset Call 89). Auto off after 5 seconds.
- Preset Call 3 activates the front window cleaning cycle on CR versions with washer systems (same as auxiliary output AUX3).

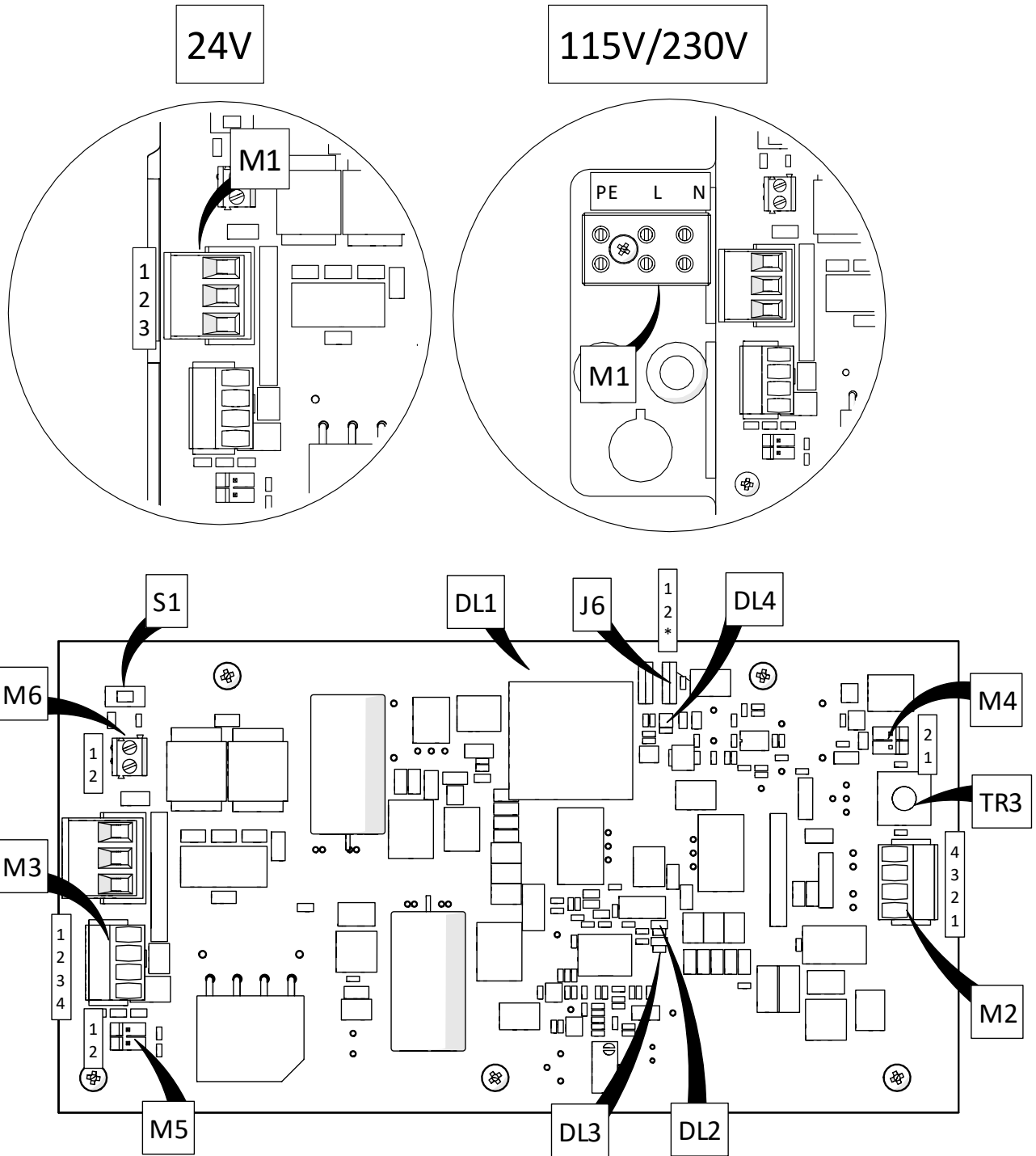
To enter Special auxiliary functions mode, the password is 11163 (Preset Call 1+1+1+6+3; every Preset must be called within 10 seconds from the previous one).

To exit Special auxiliary functions mode, the password is 22251 (Preset Call 2+2+2+5+1; every Preset must be called within 10 seconds from the previous one).

Warning: Preset 1, 2, 3, 4, 5, 6 must be set before they can be called.

4.7- TSL cabling

Perform electrical connections on the board, according to the following indications.



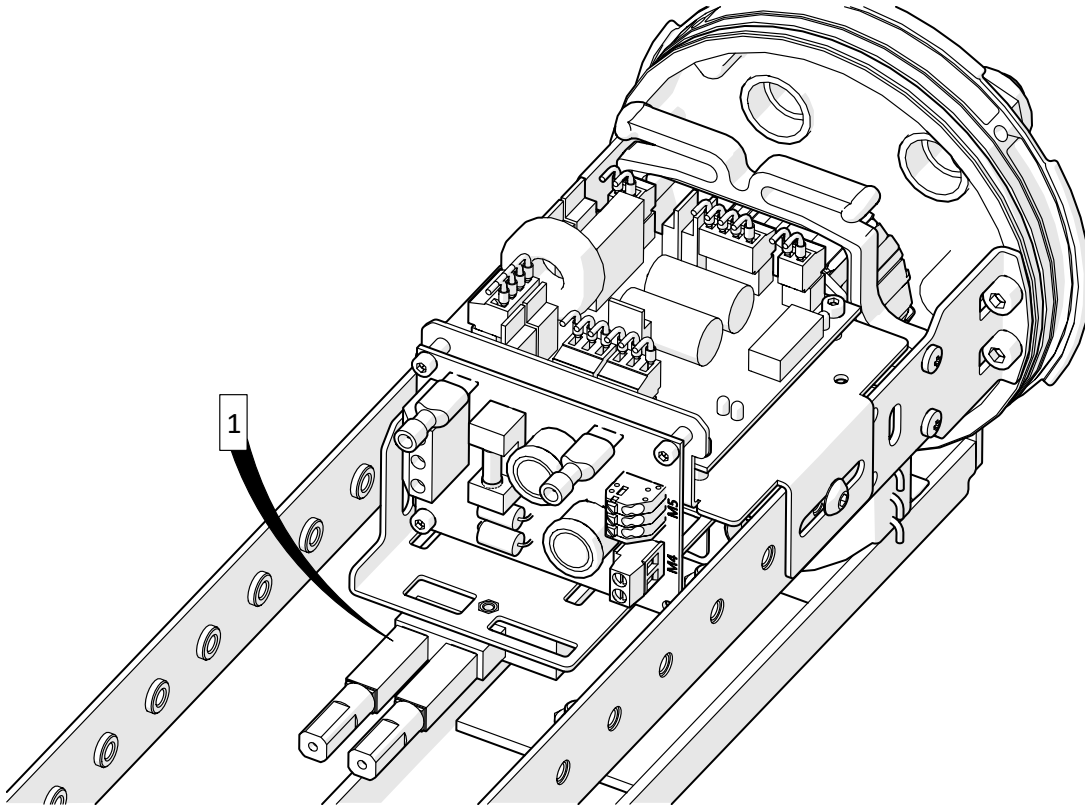
ID	Name	Notes
M1	Input supply voltage	Depending on model. Please refer to marking plate supply voltage information. If 24V: Pin 1: GND Pin 2: V1 (~)/V+ (=) Pin 3: V2 (~)/V- (=)

M2	Light sensor photocell	1-2: Connected by Tecnovideo. 3-4: External light sensor photocell signal. Pin 3: Light sensor photocell C + Pin 4: Light sensor photocell E -	
M3	Day&Night photorelay and strobo	1-2: Output signal to set day/night mode of camera (night=ON, day=OFF). Pin 1: OUT COM photorelay Pin 2: OUT NO photorelay	3-4: Dry contact/Open collector (NPN) input for Strobo mode activation. Pin 3: IN cmd STROBO C+ Pin 4: IN cmd STROBO E-
M5	Auxiliary DC output	12 V=. Max: 0,05 A. Pin 1: V+ (=) Pin 2: V- (=)	
M6	Digital input	Dry contact/Open collector (NPN) input for IR LEDs activation (Example: external camera output). Pin 1: IN cmd START C+ or Dry contact Pin 2: IN cmd START E- or Dry contact	
J6	Instant Activation Selector	Instant or delayed IR LEDs Activation. Connection between 1-2 pins: triggers the hysteresis delayed activation and deactivation (DL4 shows the delayed phase). Connection between 2-3 pins: triggers the instant activation and deactivation (DL4 always OFF).	
S1	Activation Test Button	Manual IR LEDs activation test.	
TR3	Light sensor photocell sensitivity	Adjust the sensitivity of the light sensor photocell. Counterclockwise rotation decreases sensitivity. Clockwise rotation increases it. Setting it to 0 disable the activation from light sensor photocell.	

The IR01 board installed inside the IR LED illuminator is equipped with four LEDs.
 The DL1 LED (green) is ON when the board is correctly powered.
 The DL2 LED (yellow) is ON when the IR LEDs are interrupted (open-led).
 The DL3 LED (red) is ON when the IR LEDs are not activated or when they are in short-circuit.
 The DL4 LED (yellow) is ON when the IR LEDs are in the activation phase during its hysteresis delay-time.

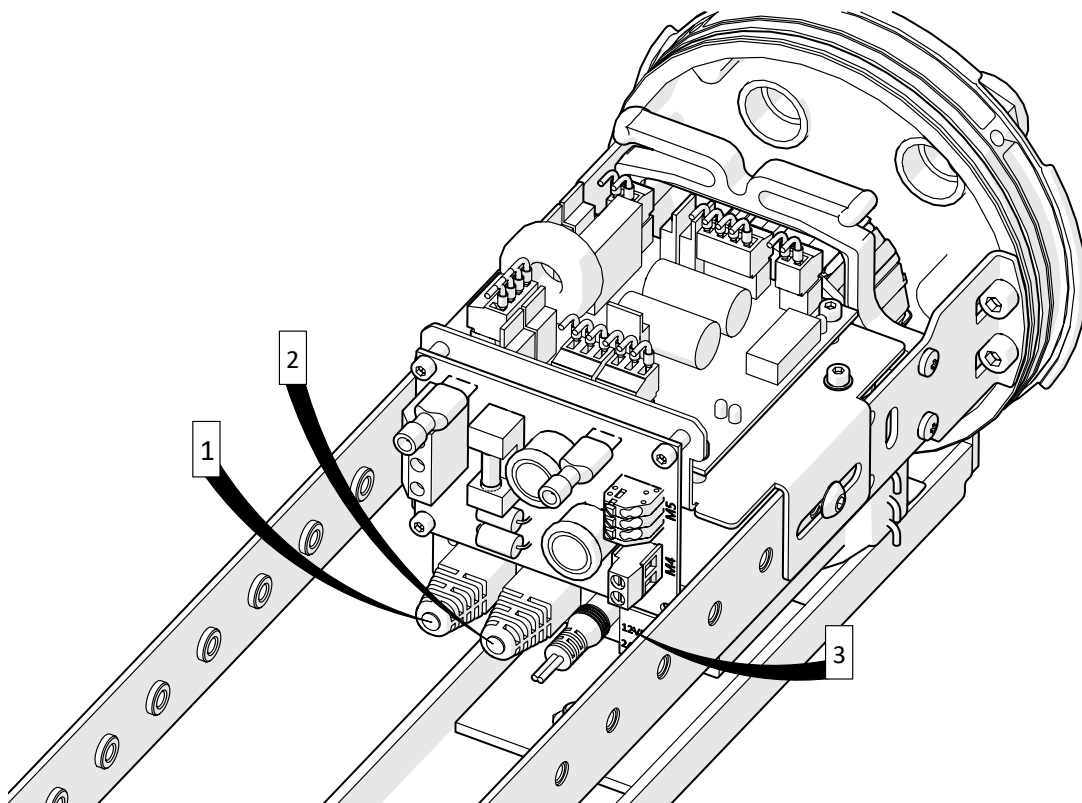
4.8- Optional fibre optic media converter

For camera stations with single-mode (SM) or multi-mode (MM) fibre optic media converter, connect the fibre optic connector (1) to the slot.



4.9- Optional PoE Splitter

For camera stations with PoE (Power over Ethernet) Splitter, connect PoE Ethernet input connector (1) to the splitter and connect data Ethernet output connector (2) and 12V= (3) to the camera.

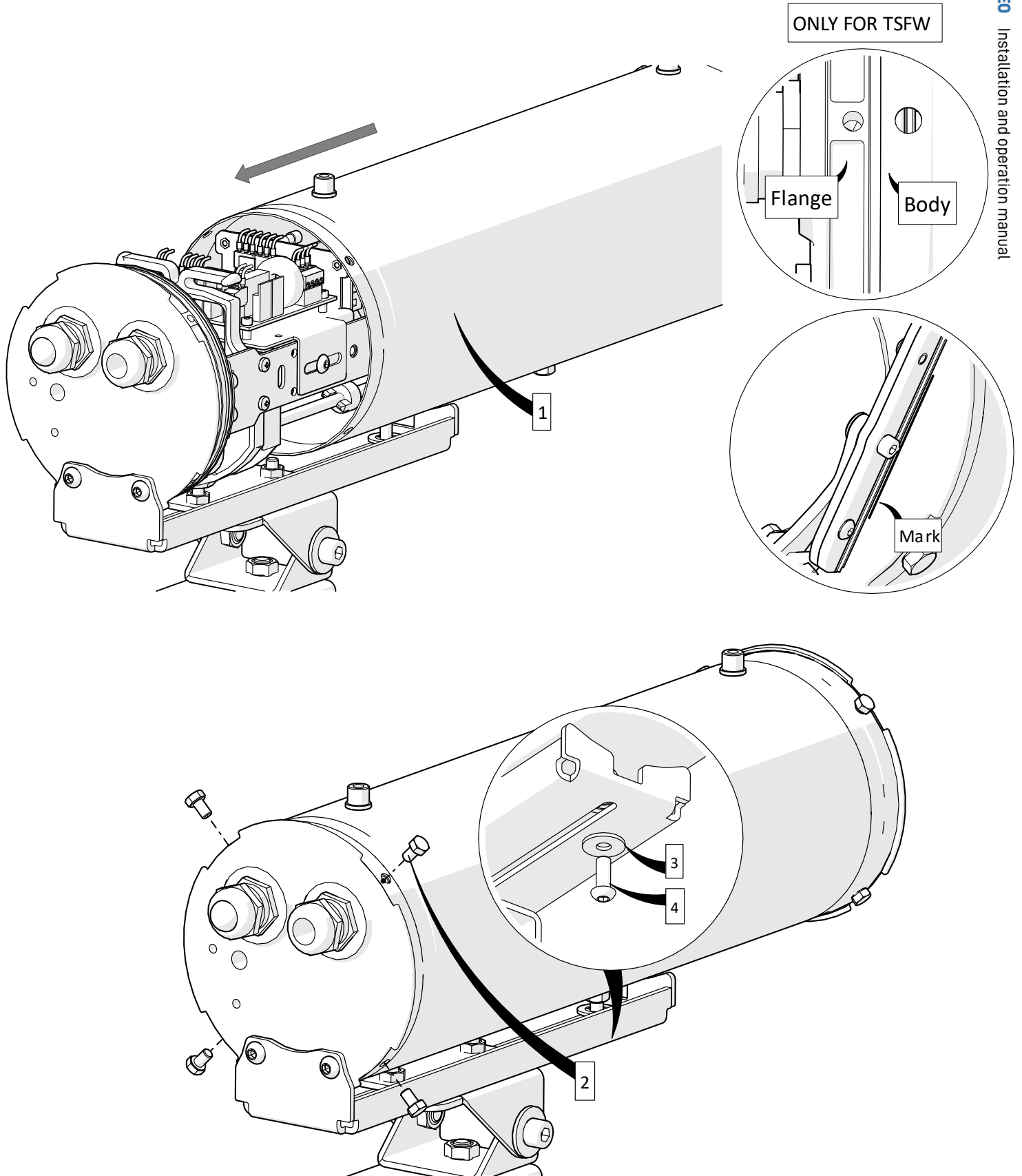


4.10- Closing the unit

Slide the camera housing body (1) to close the unit.

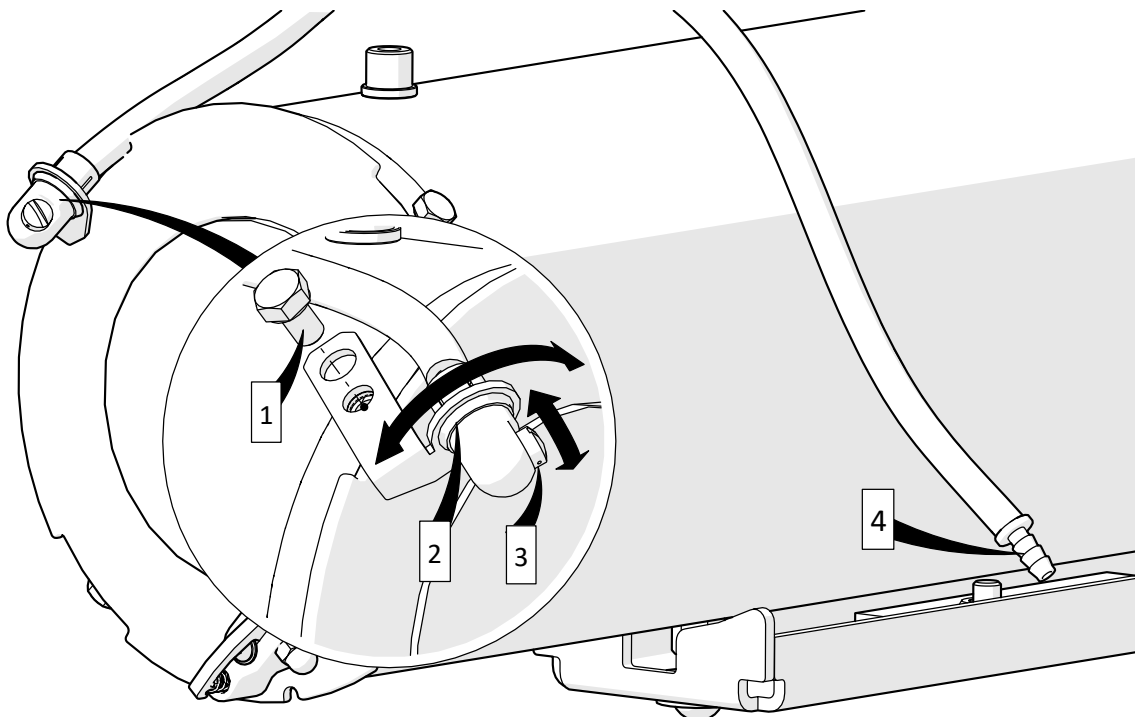
WARNING: for TSWF units, slide the body (1) near the flange as per below image. Before closing the unit, set the wiper in its original previous position.

Fix the body using the 4x screws (2), the washer (3) and the screw (4).



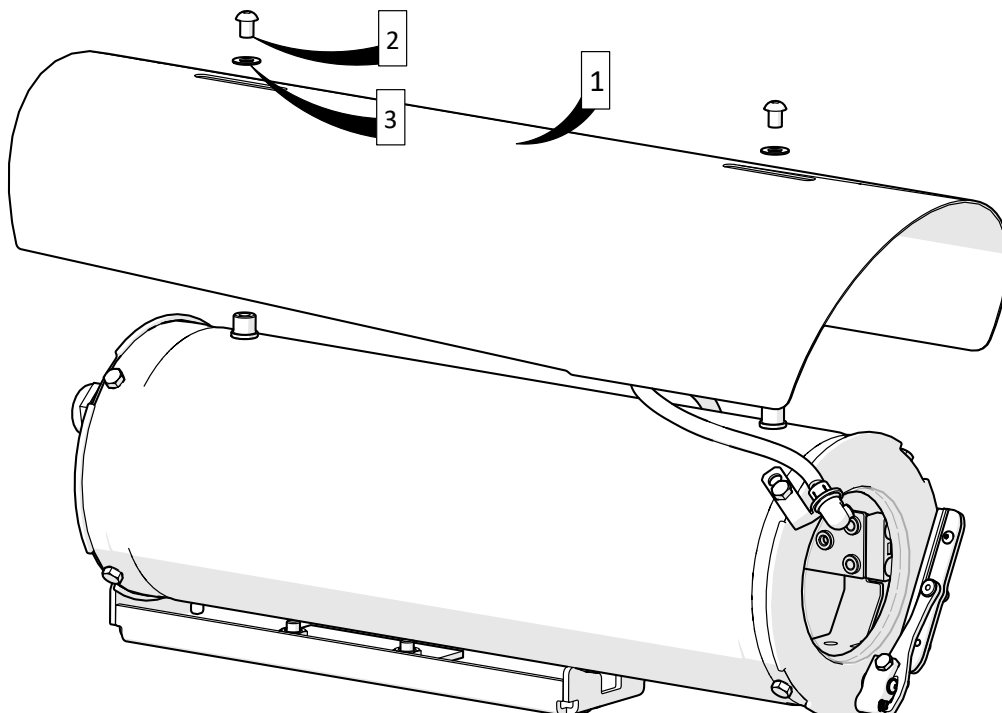
4.11- Water jet nozzle regulation (only for TSW camera housing)

Fix the water jet nozzle to the camera station using the screw (1).
Adjust tilt position of the nozzle (2), use the screwdriver slot on the nozzle (3) to adjust the horizontal position. Connect the washer pump hose to the joint (4).



4.12- Installing the sunshield (only for TSF series)

Fix the sunshield (1) to the camera housing using the provided 2x screws (2) and 2x washers (3).
Horizontal position of the sunshield can be adjusted to limit the effects of sunlight on the camera.



4.13- TSF series fuse replacement

If necessary, replace the fuse shown in "4.4 / 4.5 TSF cabling".

The following fuse value are used for 12V/24V products:

Fuse name	Fuse value
F1	4 A HT 250 V~ 5x20

The following fuse value are used for 120V/230V products:

Fuse name	Fuse value
F1	3,15 A HT 250 V~ 5x20

All the fuses must be ceramic T type (time lag) with a breaking capacity of 1500 A. Different supply voltage can be supplied and may require different fuse values. In such cases, please contact Tecnovideo.

4.14- TSL series fuse replacement


If necessary, replace the fuse illustrated in "4.7 TSL Cabling".

Fuse name	Fuse value
F1	1 A F 250 V~ 5x20

All the fuses must be ceramic F type (fast) with a breaking capacity of 1500 A.

5- TSF-AC CAMERA STATION

5.1- Preliminary remarks

	The internal pressure inside the housing must never exceed 0,5 bar.
	To avoid damaging the units, do not operate above 6 bar when connected to Tecnovideo products.
	Do not operate the Vortex Tube with line temperatures above 43°C.
	Avoid direct contact with compressed air.
	Do not direct compressed air at any person.
	When using compressed air, wear safely glasses with side shields

5.2- General information

A Vortex Tube is a device which, when supplied with filtered compressed air, converts it into two streams: one colder (which goes inside the housing) and one hotter (which goes outside).

The compressed air supply must be filtered (5 micron maximum) to remove water and dirt particles. Failure to use a filter may cause freezing and clogging of the compressed air paths inside the Vortex Tube. Filters should be installed as close as possible to the unit.

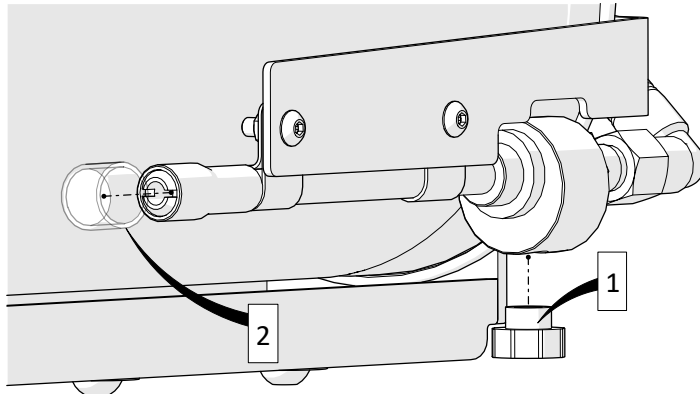
Filter elements must be cleaned/changed on a regular basis. Suggested interval is 6 months, but frequency depends on the conditions of the compressed air supply.

When cold air stream temperature is below 0°C, a compressed air dryer may be necessary to prevent ice formation on the inside of the Vortex Tube.

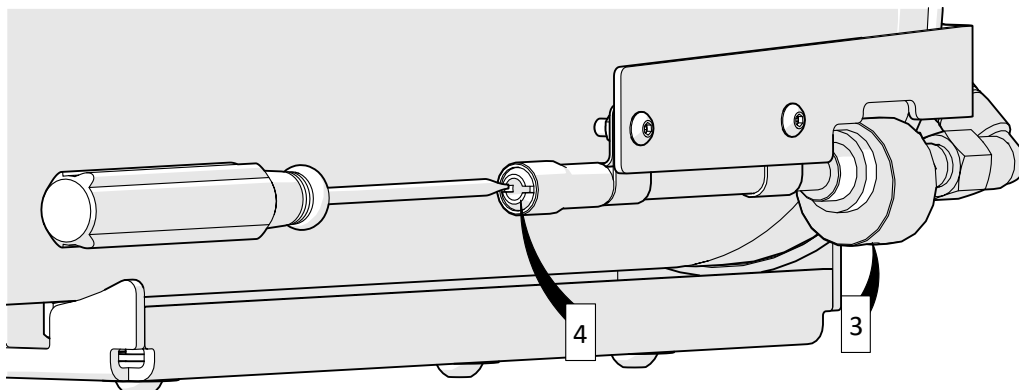
The appropriate compressed air line must be selected to ensure optimal performance.

5.3- Connections

Remove the protective plastic caps (1) and (2).



Connect compressed air supply to the Vortex tube inlet (3) using a 1/8" NPT threaded fitting. Rotating counterclockwise the valve (4) will decrease both the temperature and volume of output cold air, while rotating clockwise the valve will increase temperature cold flow and air volume.

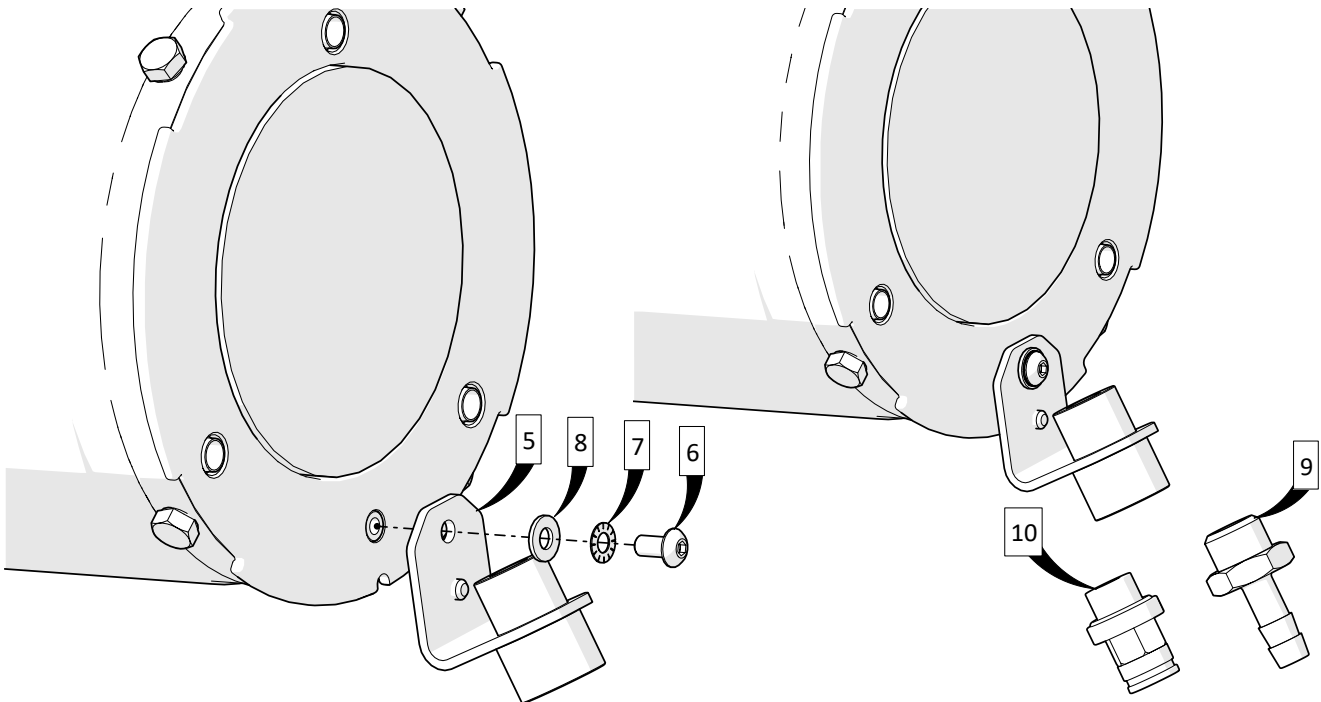


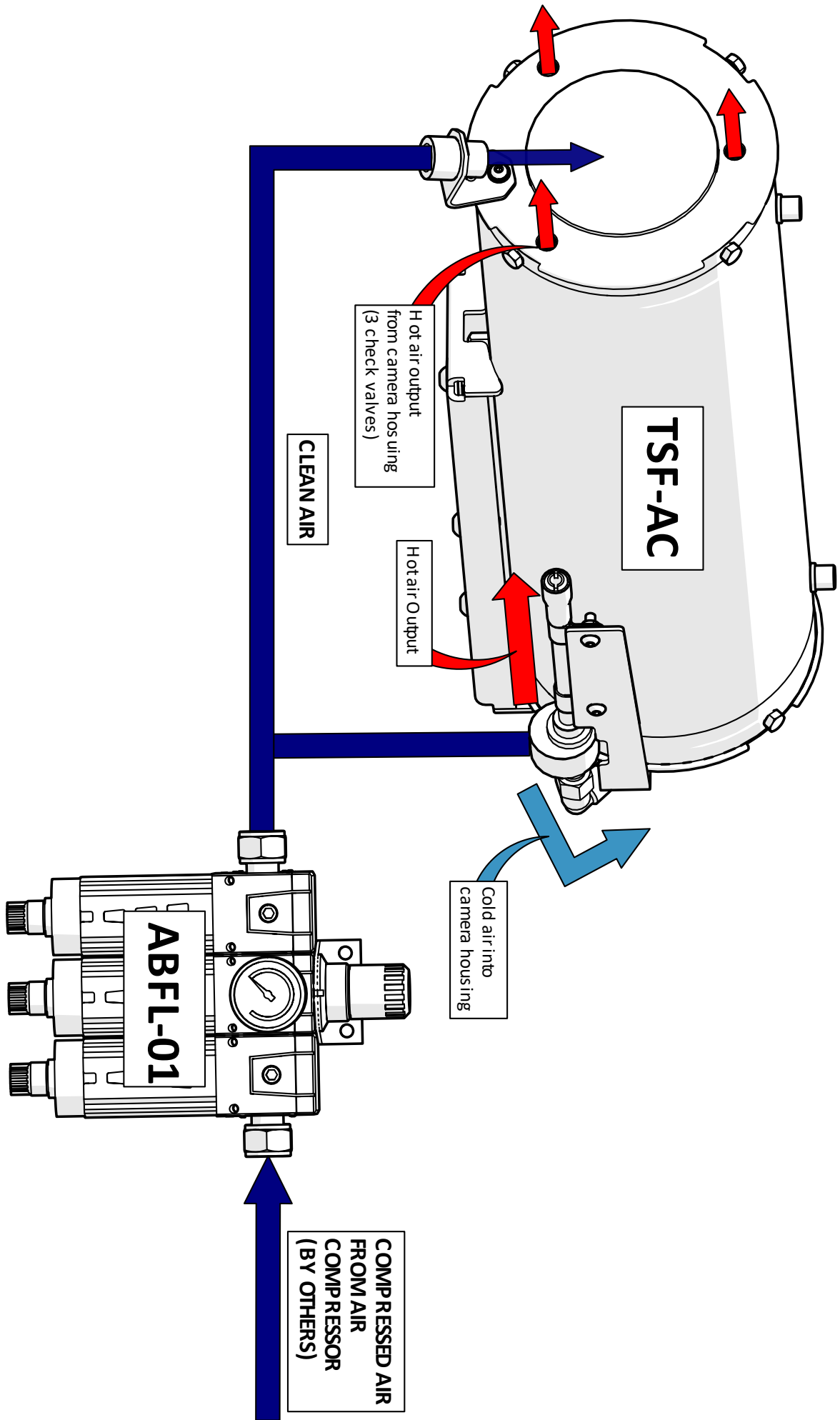
Below table shows approximate temperature drop (and rise) achieved by Vortex Tubes when adjusted to different cold fractions. A cold fraction is the percentage of cold air produced versus total filtered compressed air consumed by any Vortex Tube.

Table baseline: Compressed air temperature: 21 °C

Line pressure [bar]	10% Cold Fraction		50% Cold Fraction		90% Cold Fraction		Air consumption [L/min]
	T Drop [°C]	T Rise [°C]	T Drop [°C]	T Rise [°C]	T Drop [°C]	T Rise [°C]	
1.4	31	4	15	28	9	82	67
2.8	44	5	21	39	14	122	105
4.1	52	6	25	44	16	131	143
5.5	57	7	27	48	17	138	182

Fix the air jet nozzle (5) using the screw (6), the lock washer (7) and the washer (8) provided with the nozzle kit. Choose the suitable 1/4" BSPB threaded fitting, (9) or (10), for your installation and fix it to the air jet nozzle.





6- TROUBLESHOOTING

For TSF, TSFW and TSF-IR camera stations:

Problem	Possible cause	Solution
The unit is powered up but there is no video signal.	Incorrect power cable connections. Protection fuses have been triggered.	Check if the power supply value is correct. Replace any burnt fuse.
The unit is powered up, receives video signals but does not respond to the commands to move.	Incorrect baud rate settings of camera, address protocol. Incorrect serial communication, wiring.	Check the unit and the system serial communication settings and values.
The wiper does not work.	The wiper blade is externally stuck or the wiper mechanism is stuck internally.	Check the wiper blade from outside. Check the wiper mechanism inside to be sure it doesn't hit any element and it's free to move/rotate.
Once the wiper is activated, it won't stop or stops in the wrong position.	The internal wiper motor microswitch is damaged.	Check the wiper motor microswitch with a multimeter, and check that it's working and hitting properly the mechanical arm.
The washer does not work.	The connections for the washer out are worn or the fuse is burnt.	Check the wiring of the washer out signal and the fuse.
There is no video signal and the "VIDEO LOSS" warning appears on the screen.	The video camera installed inside the unit is not connected or is faulty.	Check the video camera.
There is no video signal.	Video cabling issue.	Check the video signal cabling.

For TSF-AC air cooled camera station:

Problem	Possible cause	Solution
Insufficient airflow	Undersized compressed air supply line	Check that compressed air system meets the requirements for the operation of the Vortex Tube.
	Compressed air pressure too low	Check compressed air pressure, increase it if necessary. Do not exceed the maximum operative pressure of Vortex Tube.
	Partial or complete blockage of internal compressed air path due to dirt	Check integrity of compressed air line.
	Compressed air line temperature too high	Check that air temperature line do not exceed the maximum operative temperature of Vortex Tube.

7- EU DECLARATION OF CONFORMITY

We declare under our sole responsibility that the products here specified, to which this declaration refers, are in conformity with the following relevant EU legislation:

2014/30/EU	EMC Directive
2014/35/EU	Low Voltage Directive
2011/65/EU + 2015/863/EU	RoHS Directive
2012/19/EU	WEEE Directive

Reference Standards:

EMC Directive:

EN 55032:2015 + AC:2016 + A11:2020 + A1:2020
EN 55035:2017 + A11:2020
IEC 61000-3-2:2018 + AMD1:2020/EN IEC 61000-3-2:2019 + A1:2021
IEC 61000-3-3:2013 + AMD1:2017 + AMD2:2021/EN 61000-3-3:2013 + A1:2019 + A2:2021
IEC 61000-6-2:2016/EN IEC 61000-6-2:2019
IEC 61000-6-4:2018/EN IEC 61000-6-4:2019
DNV-CG-0339 Edition August 2021
CISPR 32:2015 + AMD1:2019
CISPR 35:2016

Low Voltage Directive:

IEC 62368-1:2018 + IEC 62368-1/COR1:2020
EN IEC 62368-1:2020 + EN IEC 62368-1/A11:2020 + EN IEC 62368-1/AC:2020

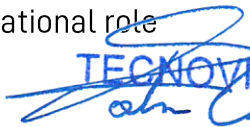
Product code: INNO Series (TSF, TSP)

Product description: Stainless steel weatherproof fixed/PTZ camera station

Location Villaverla Villaverla
Date of issue 30/10/2023 30/10/2023

Name Christian Fabris
Organisational role Managing Director

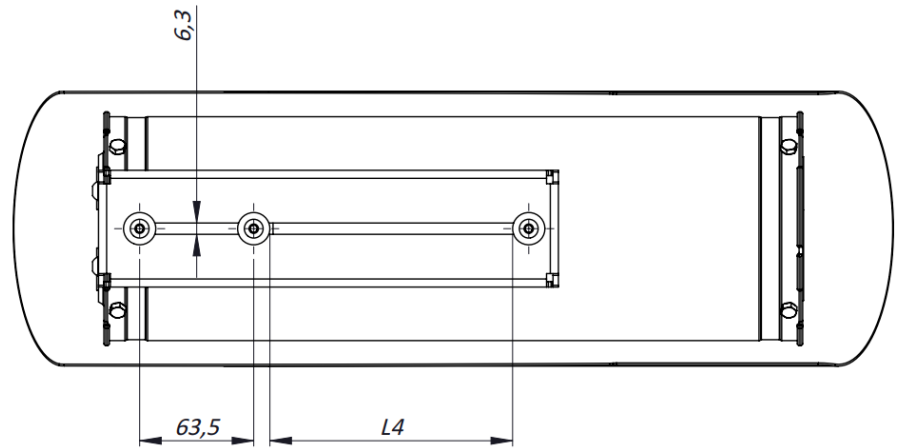
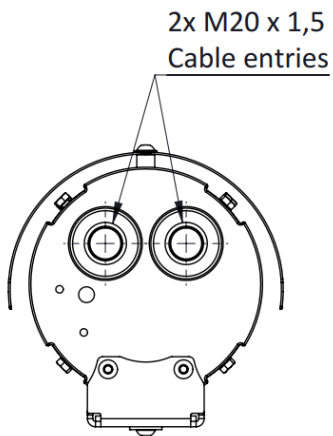
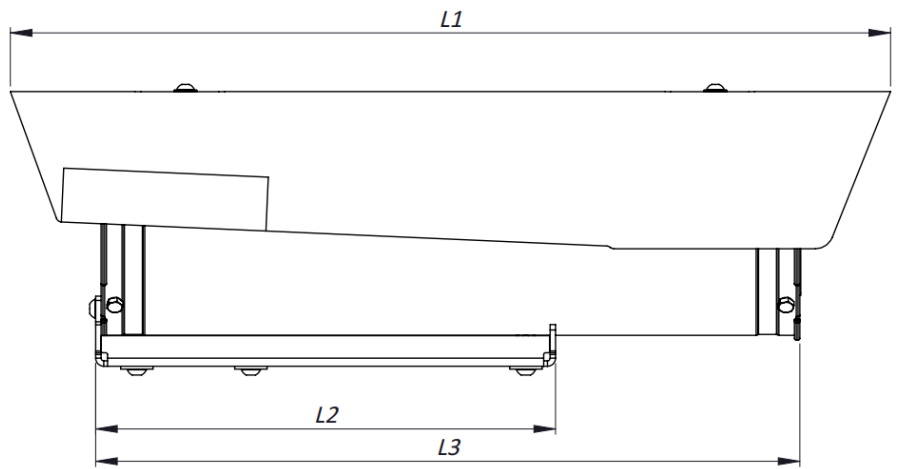
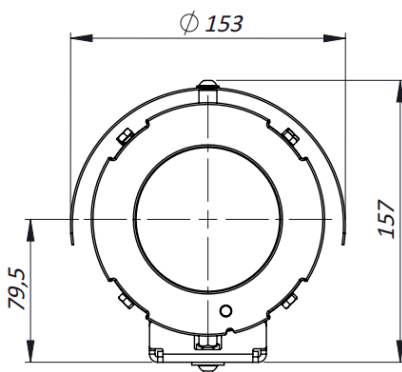
Moreno De Pretto
Certification Manager


TECNOVIDEO S.r.l.


TECNOVIDEO S.r.l.

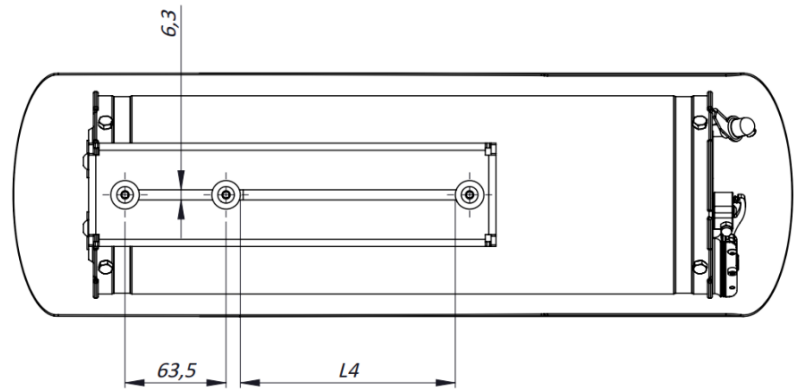
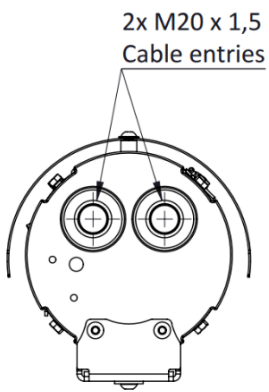
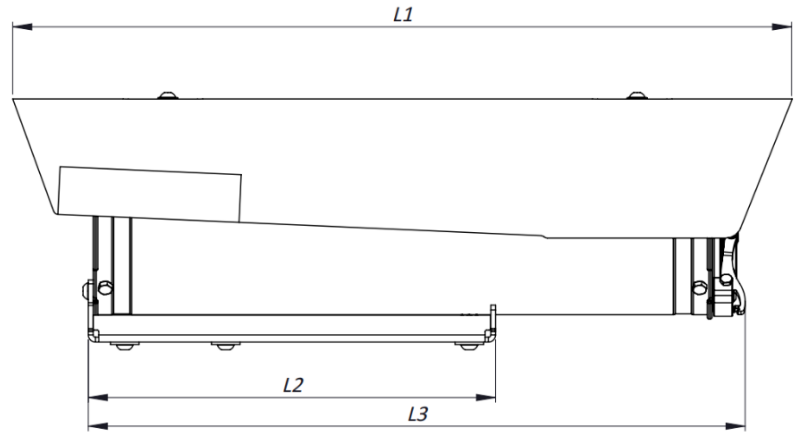
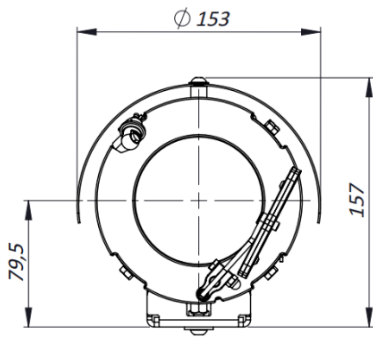
8- DIMENSIONS

8.1- TSF technical drawings



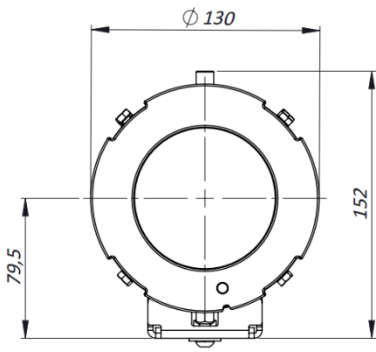
	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)
TSF-M	490	256	392	135
TSF-L	590	356	492	235

8.2- TSWF technical drawings

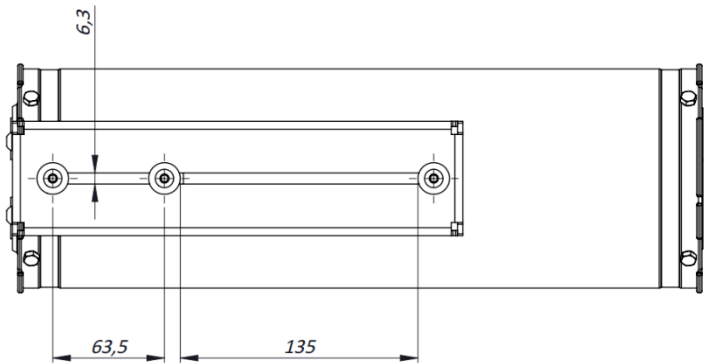
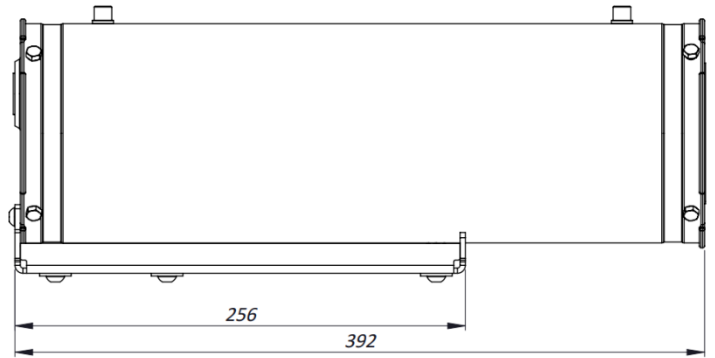
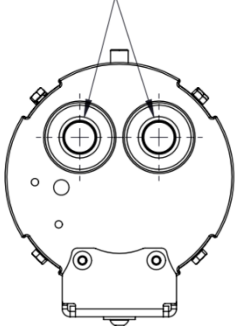


	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)
TSFW-M	490	256	413	135
TSFW-L	590	356	513	235

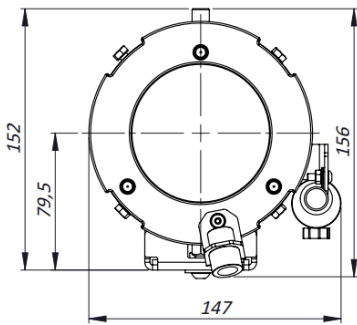
8.3- TSL technical drawings



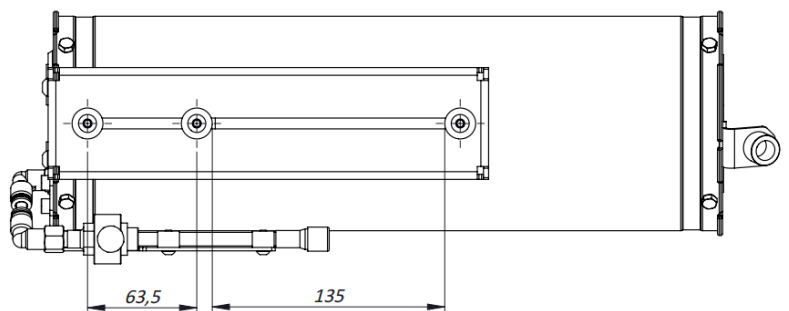
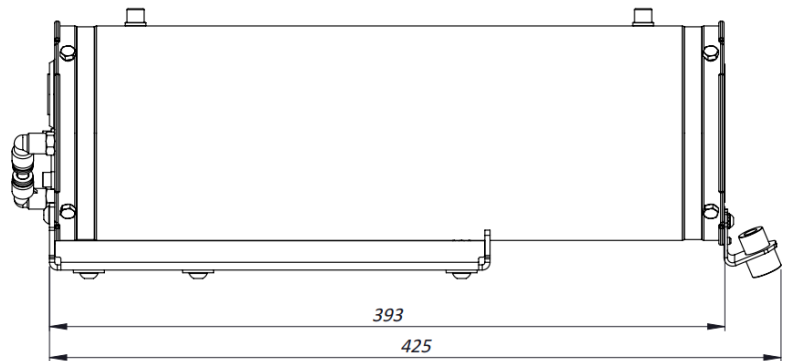
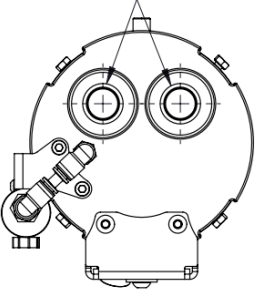
2x M20 x 1,5
Cable entries



8.4- TSF-AC technical drawings



2x M20 x 1,5
Cable entries





Used electrical, electronic, and stainless-steel products should not be mixed with general waste. For proper treatment, recovery, and recycling of old products, please take them to applicable collection points, in accordance with your national legislation and the Directives 2002/95/EC and 2002/96/EC. By disposing of these products correctly, you will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling. For more information about collection and recycling of old products, please contact your local municipality or your waste disposal service. Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.

The manufacturer declines all liability for any consequence resulting from improper installation practices, tampering or improper uses of the product.

The descriptions and illustrations contained in this manual are not binding. The manufacturer reserves the right to make any alterations deemed appropriate for the technical, manufacturing, and commercial improvement of the product, while leaving the essential product features unchanged, at any time and without undertaking to update the present publication.

The manufacturer declines all responsibility for any consequences resulting from improper use of the product or use which is different from that expected and specified in the present documents.



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