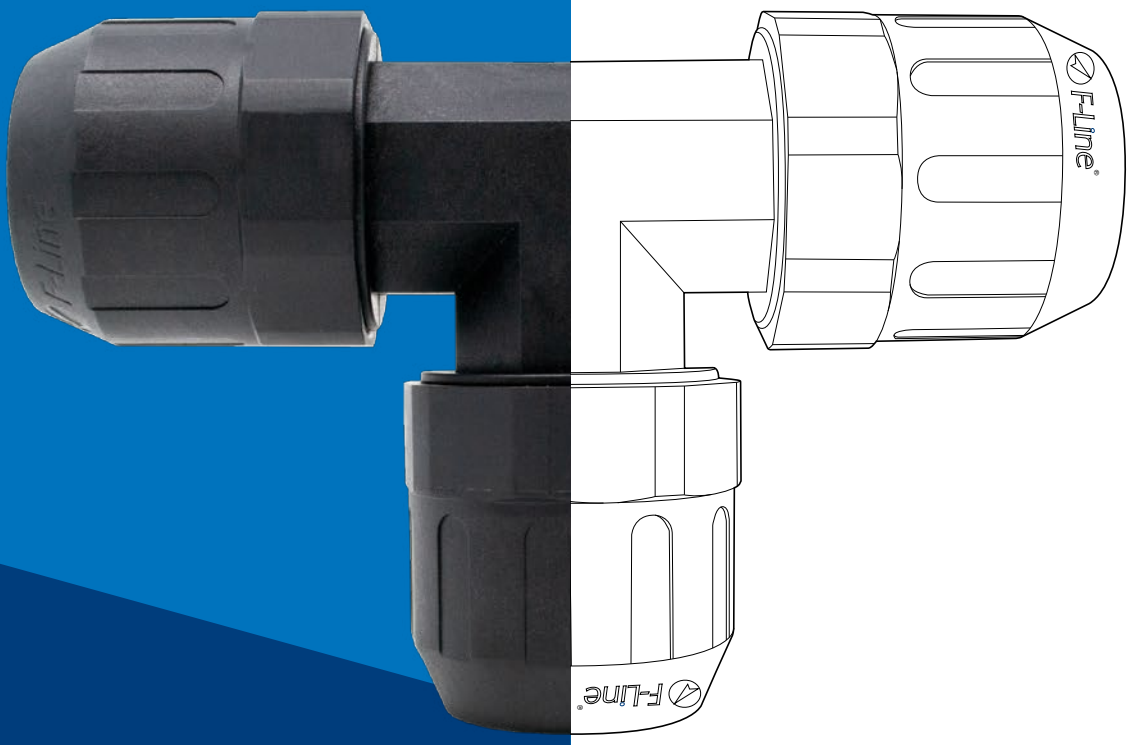
F-Line®.PRO

ASSEMBLY INSTRUCTIONS



TierreGroup®

TECHNICAL SPECIFICATIONS

The F-Line.PRO system has been designed for the realization of networks for compressed air, vacuum, neutral gases and for the construction of industrial plants. Thanks to the very long experience in the industrial field, with focus on pneumatic applications, Tierre Group created a new system, highly technological. F-Line.PRO is a quick assembly system with a perfect pneumatic seal and a remarkable mechanical endurance. The special aluminium alloy of the pipes, coated by hot electrostatic paint, and the high performance reinforced polymer used for the fittings are the best solution for compressed air networks and minimize the risk of corrosion, always granting the best possible quality of the air for a long life of the system and of the connected tools in normal working conditions. Easy to be assembled, thanks to the low weight components (tubes, fittings and accessories), connection without glue or welding needs, reusable, modular, these are only some of the advantages when choosing F-Line.PRO.

TEN-YEAR WARRANTY

Tierre Group S.p.A. guarantees that all F-Line.PRO products are free from defects in material and workmanship, as they are made according to the guidelines of good manufacturing practices, both national and international.
Unless otherwise specified by Tierre Group S.p.A., this Warranty is valid for ten years from the date of shipment of each individual product belonging to the F-Line.PRO range, provided it is used correctly and in accordance with the instructions provided or available on the F-Line.PRO website.

PLANT DESIGN

Here below you will find some tables and technical details to be considered as suggestions for the design of an efficient network. We suggest, when possible, to create networks through a closed ring. This solution will equilibrate the flow and will work as an air storage, keeping a stable air pressure. Moreover, a closed air ring is the best solution in case of maintenance and modifications, avoiding the need of a complete stop of the system. In order to reduce shocks and vibrations, we recommend you to use FPTUC tubes (see page 36) for connecting the network to the air compressor.

COMPRESSOR'S INDICATIVE AIR DELIVERY (AT 7 BAR)

KW	1,5	3	4	5,5	7,5	11	12,5	15	18	22	29	37	45	55
CV	2	4	6	7,5	10	15	17	20	25	30	40	50	60	75
Nl/min	230	400	600	900	1200	1750	2000	2500	3000	3500	4500	5500	7000	8500

PLANT SIZING

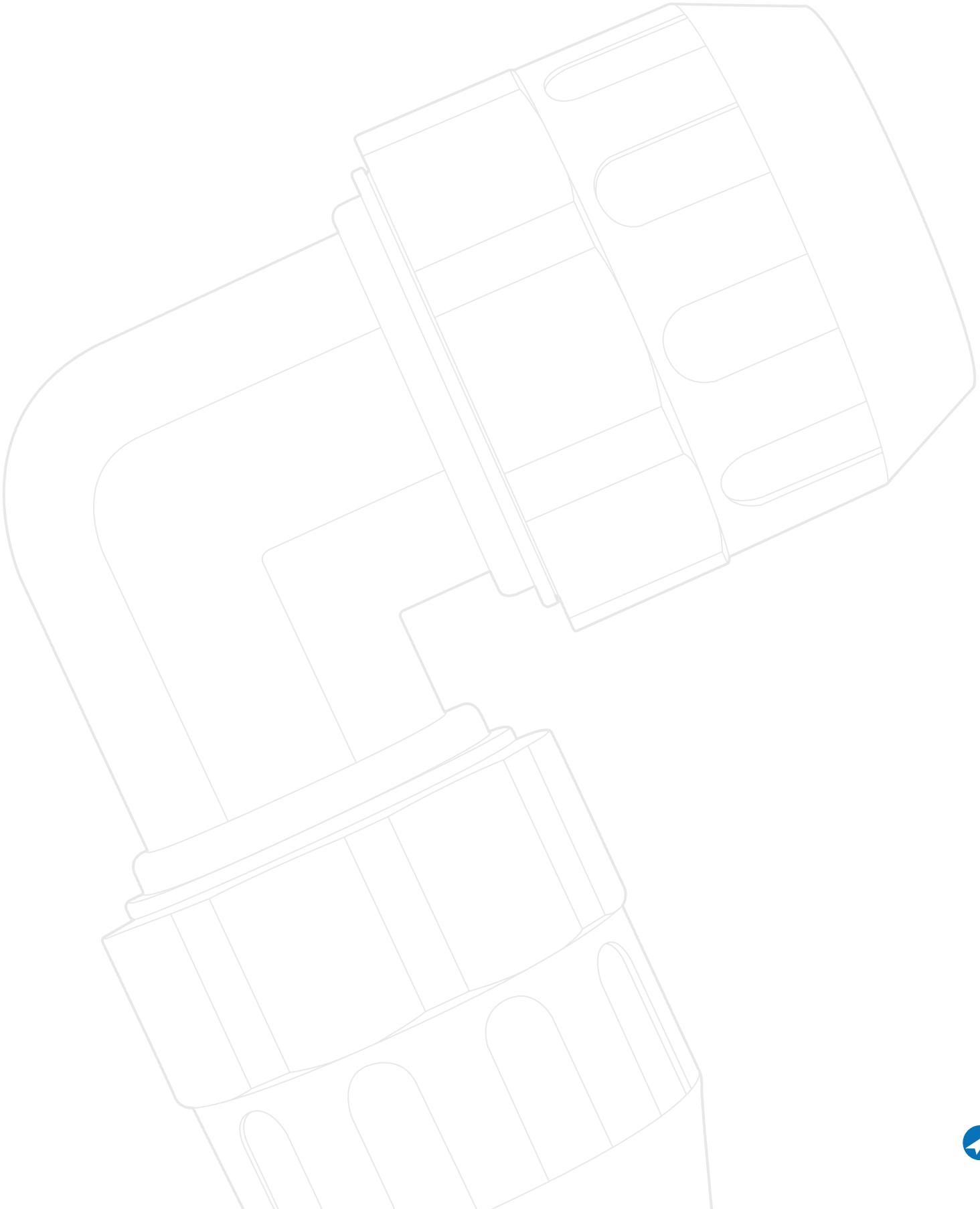
According to the distance from the compressor to the most distant user and to the required flow, this table let you calculate the best F-Line.PRO diameter for your network, taking in consideration that the values refer to a closed ring at a pressure of 8 bar with a maximum pressure loss of 5%.

		METERS										
Nm^{3}/h	Nl/min	25	50	100	150	200	300	400	500	1000	1500	2000
36	600	20	20	20	20	25	25	25	25	40	40	40
54	900	20	20	20	25	25	25	40	40	40	40	40
72	1200	20	25	25	25	40	40	40	40	40	40	63
105	1750	25	25	40	40	40	40	40	40	63	63	63
150	2500	25	40	40	40	40	40	40	63	63	63	63
210	3500	40	40	40	40	40	63	63	63	63	63	63
270	4500	40	40	40	40	63	63	63	63	63	63	
360	6000	40	40	40	63	63	63	63	63			
510	8500	40	40	63	63	63	63	63	63			
720	12000	40	63	63	63	63						
900	15000	63	63	63	63							
1080	18000	63	63	63								
1260	21000	63	63	63								
1560	26000	63	63									
1860	31000	63	63									
1980	33000	63										
2640	44000	63										

FLOW DROPS FITTINGS TABLE

This table is an another useful help in order to get a right plant dimensioning. Each fitting determines a loss of charge and the table indicates the correspondence to pipe meters for every assembled fitting. The equivalent length obained from all fittings will be added to the average length of the installed pipe.

	FITTINGS						
SIZES	FPC FPCA	FPUC	FPUL	FPUT	FPGT	FPBR	FPWLM
20	0,2	0,2	1,2	0,2	-	-	-
25	0,2	0,2	2	0,3	1,8	2	4
40	0,3	0,3	3,6	0,4	3,5	4	-
63	0,4	0,5	5	0,5	-	7	-



THERMAL EXPANSIONS

It's important to check the dimensional changes due to temperature variations in order to avoid that the expansional contraction effects may cause heavy damages to the plant; for that reason it's necessary to sustain and bracket the plant in order to let the pipeline free slide between two fixed points or otherwise to insert a compensator between two fixed points if they are positioned at a distance which may cause sensible contractions/expansions.
For the system F-Line.PRO with aluminum tube this coefficient **"d"** is equal to 0,023 mm/m/°C.

Aluminum thermal expansion factor: 0,023 mm/m/°C

CONTRACTION - EXPANSION OF ALUMINUM TUBE

L (m)	T MIN	T MAX	ΔT	ΔL
10	5°C	45°C	40	9,2 mm
20	5°C	45°C	40	18,4 mm
30	5°C	45°C	40	27,6 mm
50	5°C	45°C	40	46 mm
100	5°C	45°C	40	92 mm

Table of contraction - expansion depending on the length L of a straight stretch and the temperature difference ΔT.

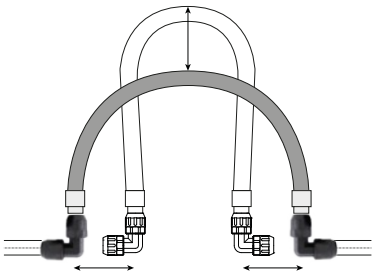
The design and the construction of any plant will consider this phenomenon which is calculated with the following formula:

$$\Delta L = d \times L \times \Delta T$$

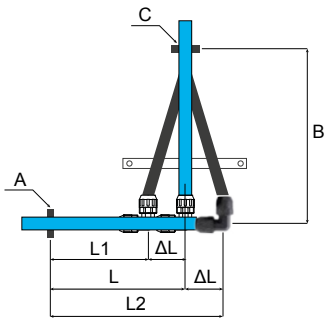
LEGEND:
d= coefficient of lateral expansion
L= length of piping
ΔT= difference of temperature in centigrade
ΔL= difference of length (expansion or contraction)

example: temperature is +10°C; length of piping 20m; working temperature 35°C

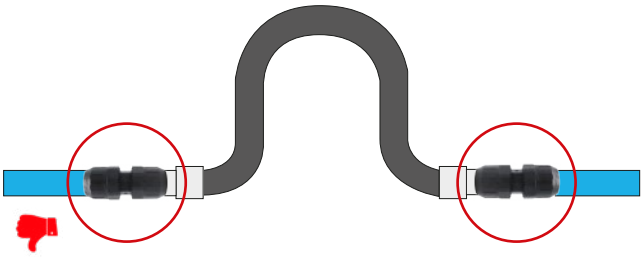
$$\Delta T = 35 - 10 = 25\,°C$$
$$\Delta L = 0{,}023 \times 20 \times 25 = 11{,}5\ mm$$



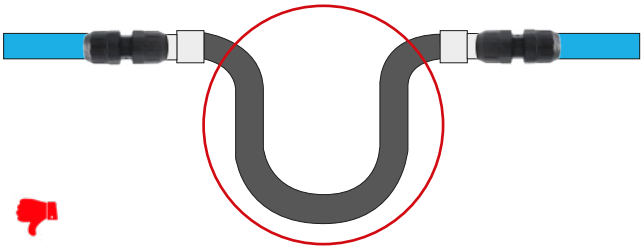
DN	FLEXIBLE TUBE LENGHT
25	1 m / 2 m
40	1,5 m / 3 m
63	1,5 m / 3 m



L: pipeline length at the installation
L1: length with minimum temperature
L2: length with maximum temperature
ΔL: length difference due to ΔT
B: length of the arms of the Lira or of the direction change
A: Sliding bracketing
C: Fixed bracketing



Avoid anchoring the expansion joint to two connections aligned to the same plan.



Always install the expansion joint facing upwards and not downwards in order to avoid a deposit of the condensation.

This is the correct application of the installation of expansion joint. It should be facing up and with two elbows aligned. You need also to insert two clips on the pipe aluminum fasteners close to the installation of an expansion joint.

ASSEMBLY & DISASSEMBLY INSTRUCTIONS FOR Ø16

F-Line.PRO system has been studied and realized in order to obtain an easy, fast and safe installation.

These assembly and disassembly instructions are intended for the installer / maintainer of the F-Line.PRO system. They intend to provide a support tool for correct installation, in order to provide the best possible product performances and avoid accidents during installation and subsequent use of the system.

Any use other than the construction of a compressed air, vacuum and neutral gases networks must be considered improper and, therefore, not allowed. Improper use exempts Tierre Group S.p.a. from any liability for any damage to persons or properties. Failure to comply with the conditions of use and these instructions automatically invalidates any type of warranty.

The installation, repair and maintenance operations must be carried out by suitable and qualified people and must be carried out in full compliance with the reference standards for the safety of people. The installer is responsible for everything concerning the safety of the installed products.

ASSEMBLY INSTRUCTIONS

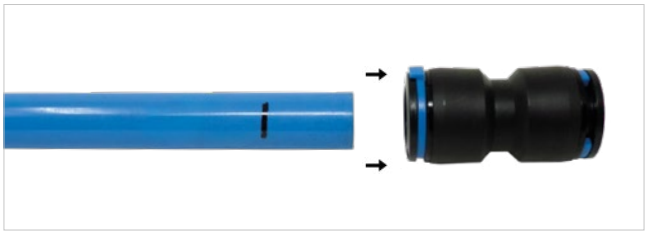
Always use the personal protective equipment required by the regulations. In particular, it is recommended to use protective gloves that allow a firm grip and that are able, at the same time, to prevent any injuries.

It is recommended to provide one or more drainage points for any condensation. The drainage points must be made at the lowest points of the main pipeline by using Tee fittings.

Prepare the tube for assembly. If necessary, cut the pipe using the appropriate FPTT tool. The pipe cut must be perpendicular to its axis (90 ° cut).

Always deburr the pipe, externally and internally, eliminating sharp edges, before making the connection with the fittings. Use the FPUS accessory.

By using a meter make a marking at 20mm distance from the end of the pipe in order to identify the correct and complete insertion point of the pipe into the fitting.



The F-Line.PRO system for 16mm diameter is push-in.
Insert the pipe into the fitting WITHOUT removing the blue locking clip. Ensure that the fitting is supplied with the locking clip already installed before making the connection. If the clip is not installed, install it prior to inserting the pipe. To facilitate insertion, align the pipe with the gasket and then fully insert the pipe.

Verify the correct insertion by checking the marking previously made on the pipe with respect to the insertion of the nut (the sign must be near the end of the nut).

It is recommended to carry out a preventive test of the system or section before starting to use it.

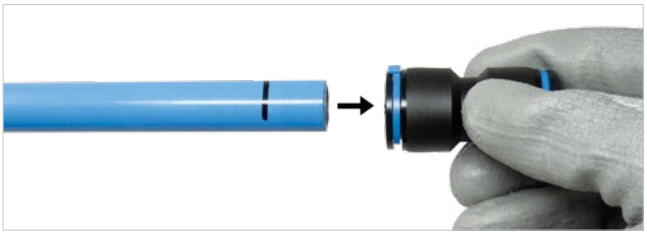
DISASSEMBLY INSTRUCTIONS

It is recommended to check that the system is off and that there is no residual pressure in before carrying out any disconnection.

Never use unsuitable tools that could compromise or damage the fittings (eg multigrip pliers). The use of work gloves is recommended.

Remove the light blue locking clip by pulling it from the tab.

Press the black collet located at the end of the fitting and, while keeping it pressed, pull the pipe out longitudinally without tilting it inside the fitting.



If necessary, the pipe can be reconnected to the fitting, making sure to first reposition the locking clip between the collet and the body of the fitting (see assembly instructions).

-20°C ÷ 80°C

Working pressure:
16 Bar
Negative pressure:
- 0,95 Bar (- 95 kPa)

Compressed air & vacuum
(do not use with water)

Parallel gas BSPP ISO 228
G1/2"

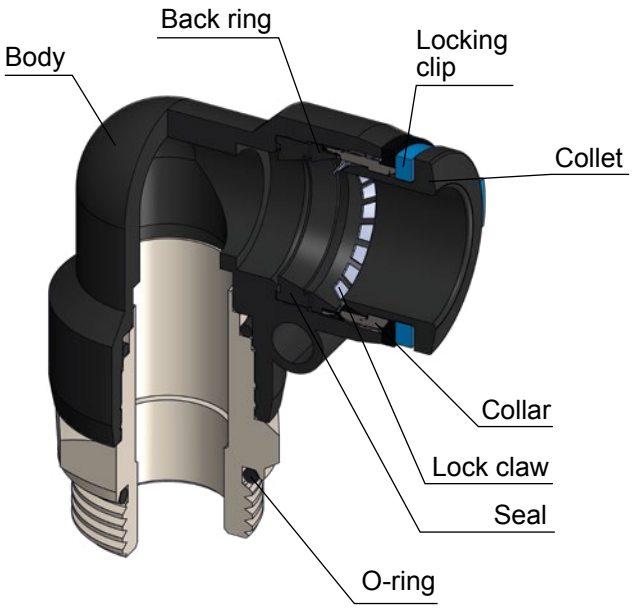
Body: Nickel-plated brass and PBT
Collet: POM
Collar: Black anodised aluminium
Lock claw: Stainless steel AISI 301
Back ring: POM
Seal: NBR
O-ring: NBR
Locking clip: POM (light blu)

SILICONE FREE

REACH COMPLIANT
Products in compliance with EC Regulation 1907/2006

RoHS3
Products in compliance with the directive EU 2015/863

CONSTRUCTION DETAILS



ASSEMBLY & DISASSEMBLY INSTRUCTIONS FOR Ø20, Ø25 & Ø40

F-Line.PRO system has been studied and realized in order to obtain an easy, fast and safe installation.

These assembly and disassembly instructions are intended for the installer / maintainer of the F-Line.PRO system. They intend to provide a support tool for correct installation, in order to provide the best possible product performances and avoid accidents during installation and subsequent use of the system.

Any use other than the construction of a compressed air, vacuum and neutral gases networks must be considered improper and, therefore, not allowed. Improper use exempts Tierre Group S.p.a. from any liability for any damage to persons or properties. Failure to comply with the conditions of use and these instructions automatically invalidates any type of warranty.

The installation, repair and maintenance operations must be carried out by suitable and qualified people and must be carried out in full compliance with the reference standards for the safety of people. The installer is responsible for everything concerning the safety of the installed products.

ASSEMBLY INSTRUCTIONS

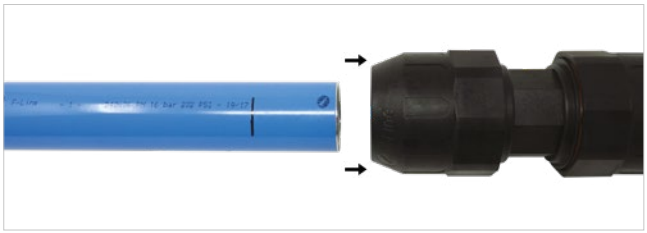
Always use the personal protective equipment required by the regulations. In particular, it is recommended to use protective gloves that allow a firm grip and that are able, at the same time, to prevent any injuries.

It is recommended to provide one or more drainage points for any condensation. The drainage points must be made at the lowest points of the main pipeline by using Tee fittings.

Prepare the tube for assembly. If necessary, cut the pipe using the appropriate FPTT tool. The pipe cut must be perpendicular to its axis (90 ° cut).

Always deburr the pipe, externally and internally, eliminating sharp edges, before making the connection with the fittings. Use the FPUS accessory.

Mark the pipe using the calectometer located on the handle of the appropriate tightening wrench (FPCH) in order to identify the correct and complete insertion point of the pipe into the fitting.



The F-Line.PRO system for diameter 20, 25 and 40 is a push-in system. Insert the pipe into the fitting WITHOUT unscrewing the nut (check that the fitting has been supplied with a completely screwed nut before connection: the screwing witness must not be visible). In order to facilitate insertion, center the tube with respect to the gasket and, subsequently, carry out the complete insertion.

Verify the correct insertion by checking the marking previously made on the pipe with respect to the insertion of the nut (the sign must be near the end of the nut).

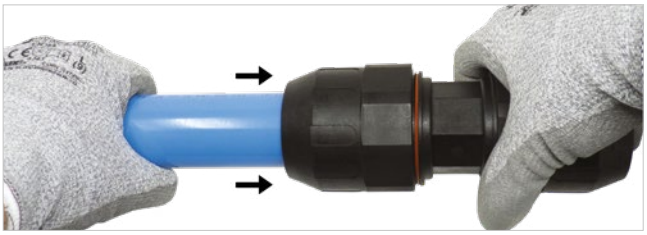
It is recommended to carry out a preventive test of the system or section before starting to use it.

DISASSEMBLY INSTRUCTIONS

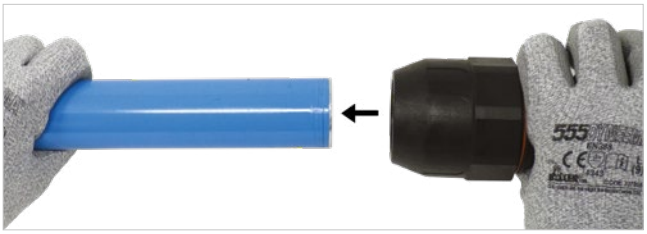
It is recommended to check that the system is off and that there is no residual pressure in before carrying out any disconnection.

Use the dedicated FPCH keys for the unscrewing operations. Never use unsuitable tools that could compromise or damage the fittings (eg multigrip pliers). The use of work gloves is recommended.

Unscrew the nut until the screwing witness is completely visible. Be careful not to insert the tube into the fitting during this step.



Push the tube slightly towards the fitting until the locking ring is disarmed.



Manually remove the tube lengthwise, without tilting the tube inside the fitting.

In case of need, it is possible to re-connect the pipe to the fitting taking care to re-screw the nut in advance until the screwing witness completely disappears.

The F-Line.PRO system has been designed to make maintenance and expansion operations as easy as possible. It is possible to disconnect the pipe from the fitting simply by unscrewing the nut in the event that it is then necessary to reconnect the same pipe in the same position.

In this case, unscrew the nut being careful not to move it from its longitudinal position with respect to the pipe. The same nut can be screwed back with the tube inserted to restore the original situation.

-20°C ÷ +80°C

Max. Working Pressure:
16 Bar
Negative Pressure:
- 0,95 Bar (- 95 kPa)

Compressed air,
non-aggressive gases and
vacuum

- Taper gas BSPT ISO 7
  from R1/2" to R1-1/2"
- Parallel gas BSPP ISO 228
  from G1/4" to G1"

Body: Reinforced PA
Aluminum (CA Version)
Tube Seal: NBR
Back Ring: HP technopolymer
Lock Claw: Stainless steel AISI 301
Lock Claw Support: HP technopolymer
Nut Seal: NBR
Nut: Reinforced PA
Screwing Indicator: Silicone
Tubestop: HP technopolymer
(CA Version)

PED

SILICONE FREE

REACH COMPLIANT — Products in compliance with EC Regulation 1907/2006

RoHS3 — Products in compliance with the directive EU 2015/863

CONSTRUCTION DETAILS

Standard Version

CA Version

ASSEMBLY & DISASSEMBLY INSTRUCTIONS FOR Ø63

F-Line.PRO system has been studied and realized in order to obtain an easy, fast and safe installation.

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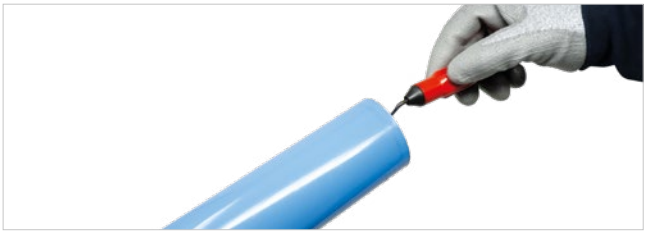
The installation, repair and maintenance operations must be carried out by suitable and qualified people and must be carried out in full compliance with the reference standards for the safety of people. The installer is responsible for everything concerning the safety of the installed products.

ASSEMBLY INSTRUCTIONS

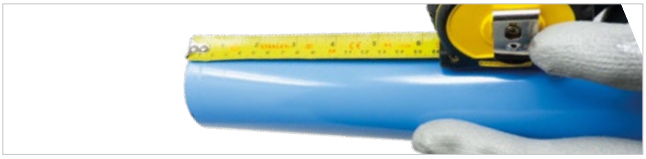
Always use the personal protective equipment required by the regulations. In particular, it is recommended to use protective gloves that allow a firm grip and that are able, at the same time, to prevent any injuries.

It is recommended to provide one or more drainage points for any condensation. The drainage points must be made at the lowest points of the main pipeline by using Tee fittings.

Prepare the tube for assembly. If necessary, cut the pipe using the appropriate FPTT tool. The pipe cut must be perpendicular to its axis (90 ° cut).

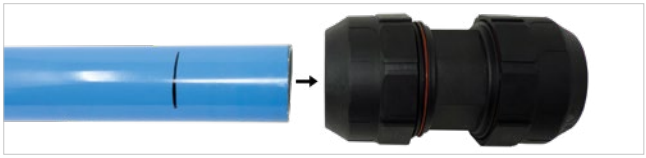


Always deburr the pipe, externally and internally, eliminating sharp edges, before making the connection with the fittings.



By using a meter make a marking at 90mm distance from the end of the pipe in order to identify the correct and complete insertion point of the pipe into the fitting.

Prepare the fitting by unscrewing the locknut, leaving 2–3 turns of thread so that the internal clamp can fully open.



Insert the pipe into the fitting, making sure to align it with the gasket. Then, fully insert the pipe until it reaches the stop inside the fitting.

Manually tighten the fitting's locknut to prevent the pipe from slipping out during the assembly phase with wrenches.

Then, complete the tightening using the appropriate FPCH and FPCCH tools, making sure the locknut covers the orange tightening indicator located on the body of the fitting.

Verify the correct insertion by checking the marking previously made on the pipe with respect to the insertion of the nut (the sign must be near the end of the nut).

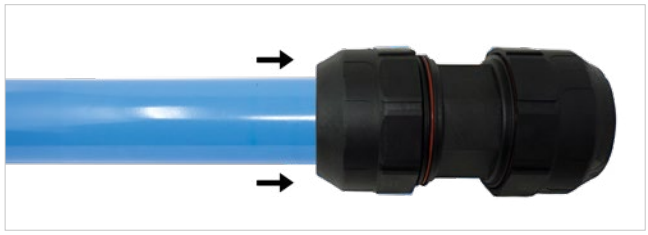
It is recommended to carry out a preventive test of the system or section before starting to use it.

DISASSEMBLY INSTRUCTIONS

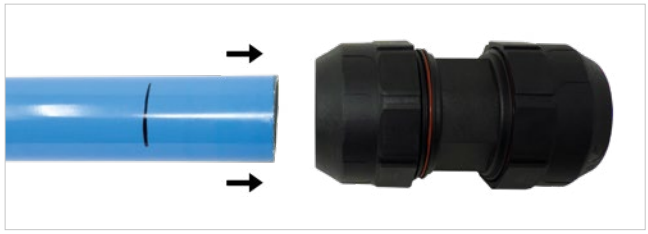
It is recommended to check that the system is off and that there is no residual pressure in before carrying out any disconnection.

Use the dedicated FPCH and FPCCH keys for the unscrewing operations. Never use unsuitable tools that could compromise or damage the fittings (eg multigrip pliers). The use of work gloves is recommended.

Unscrew the nut until the screwing witness is completely visible.



Push the tube slightly towards the fitting until the locking claw is disarmed.



Manually remove the tube lengthwise, without tilting the tube inside the fitting.

If necessary, the pipe can be reconnected to the fitting by repeating the instructions provided on the previous page.

-20°C ÷ +80°C

Max. Working pressure:
16 Bar
Negative pressure:
- 0,95 Bar (- 95 kPa)

Compressed air,
non-aggressive gases and
vacuum

- Taper gas BSPT ISO 7
  R2-1/2"
- Parallel gas BSPP ISO 228
  from G1/2" to G2"

Body: Reinforced PA
Aluminum (CA Version)
Lock Claw: Stainless steel AISI 301
Lock Claw Support: HP technopolymer
O-ring: NBR
Nut: Reinforced PA
Screwing Indicator: Silicone

PED

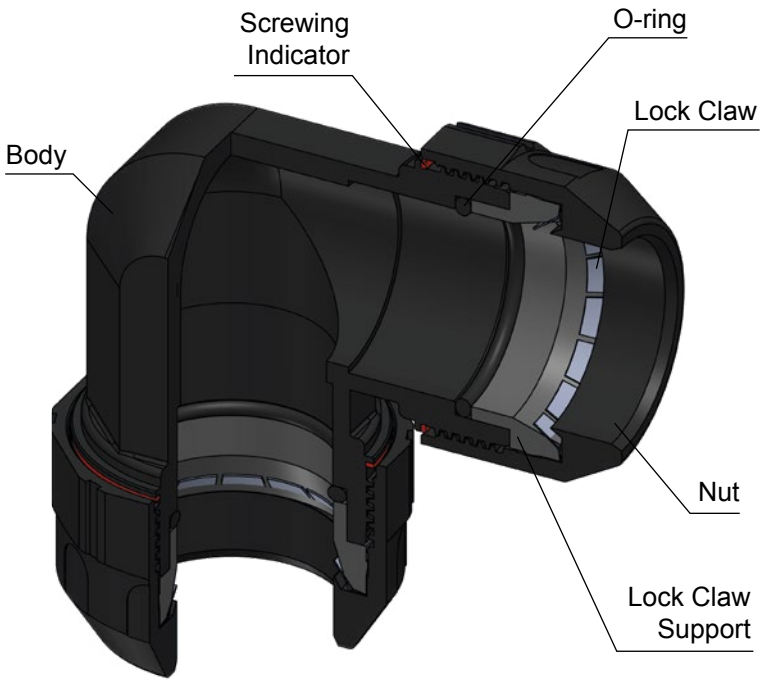
SILICONE FREE

REACH COMPLIANT — Products in compliance with EC Regulation 1907/2006

RoHS3 — Products in compliance with the directive EU 2015/863

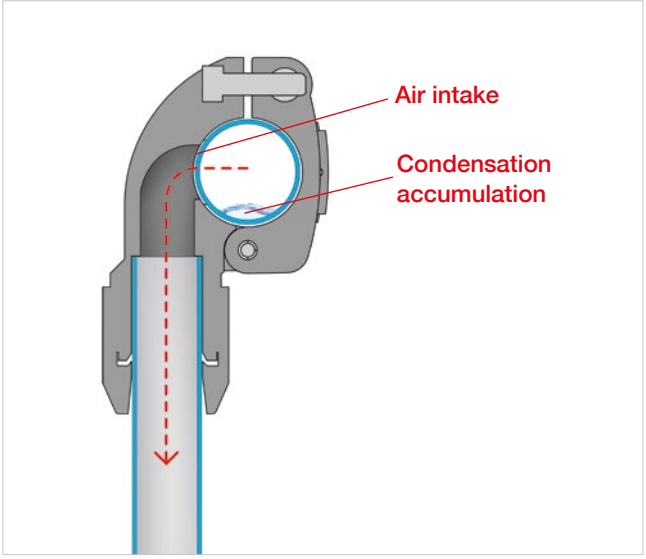
CONSTRUCTION DETAILS

Standard Version



CA Version

ASSEMBLY INSTRUCTION - QUICK BRANCH



F-Line.PRO quick branches allow to get a quick branch from the main conduit without cutting the pipeline and without having the need to prepare the pipes in advance. Moreover, the air intake is positioned above the level at which the condensation accumulation could be inside the tube in order to ensure an excellent air quality.

Place the quick branch in the opposite direction of its final installation position. Use the markers on the body to center it correctly on the tube.

By using the correct side of the centering template, corresponding to the guide on the fitting, position it at the center of the hole and use the drilling tool to make a pre-hole on the pipe.

Once the pipe is pre-drilled and the center of the hole is identified, remove the centering template and use the drilling tool to complete the drilling of the pipe, taking care not to hit the opposite side of the pipe with the tip of the mill tool.

Remove the quick branch and deburr the hole in order to avoid any residue remaining on the edges or on the surface of the pipe.

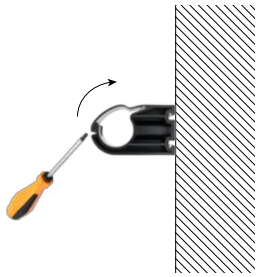
Position the mill vertically, allowing the hook to fall inside the outline of the tip and remove the residual aluminum disk.

Fix the branch so that the internal part will stay correctly in the hole. F-Line.PRO branches have a guided air intake that go inside the tube so that, once they are fixed, it will be impossible for them to move from their position. This system ensure the functioning, always guaranteeing the maximum air flow and eliminating any risk of leakages.

BRACKETING METHOD

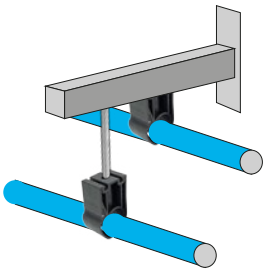
Please, refer to the following indications in order to make a proper bracketing system for your F-Line.PRO network.
We recommend the use of F-Line.PRO wall fasteners (FPST) and the related spacers (FPDST) in order to avoid any possible trouble and in order to keep the system safe.

DN	DISTANCE IN METERS BETWEEN WALL FASTENERS DEPENDING FROM THE MAXIMUM TEMPERATURE DIFFERENCE		
mm	< 20°C	30°C	40°C
20	2,5	2	1,5
25	3	2,5	2
40	4	3,5	3
63	4	3,5	3



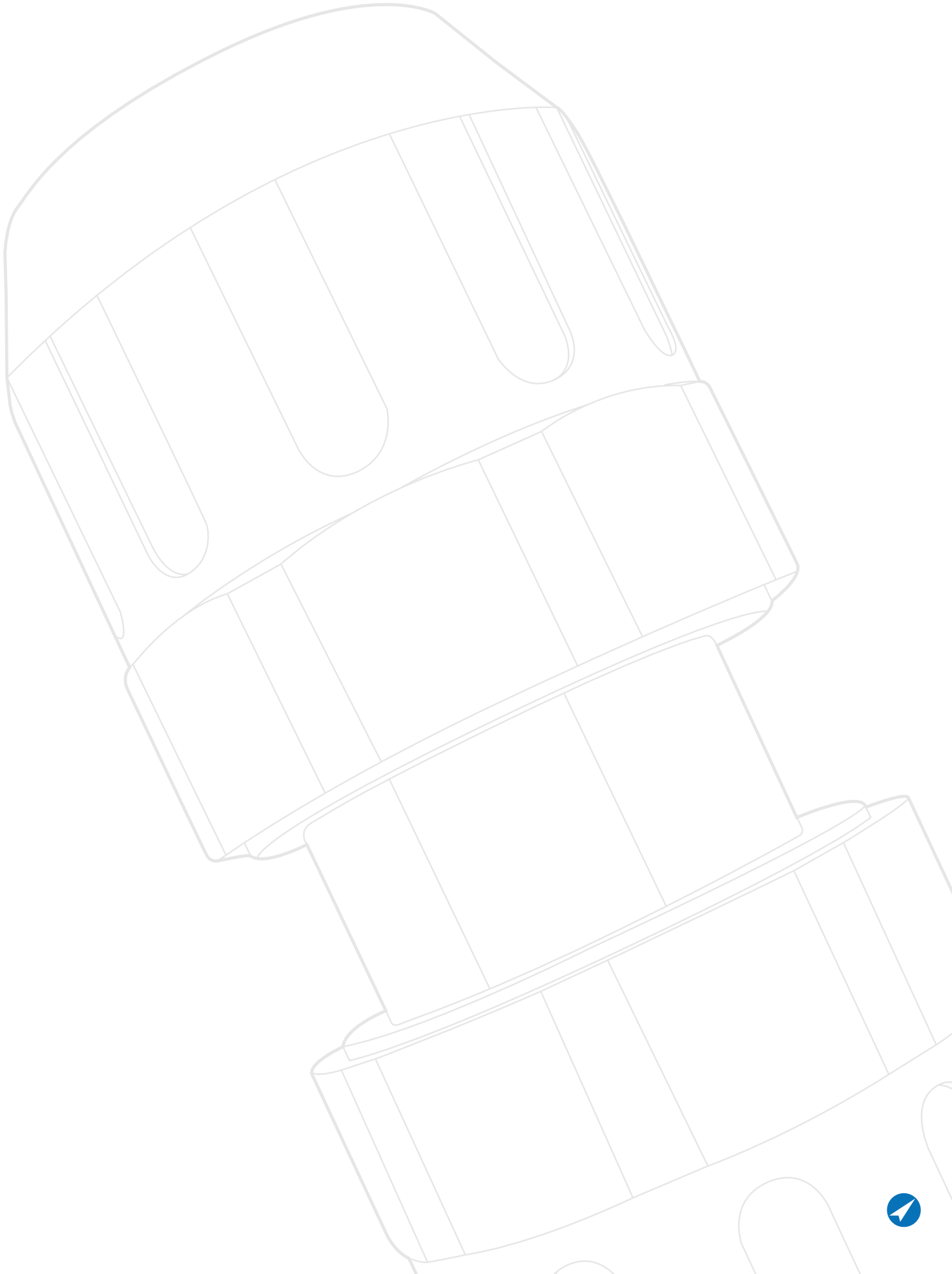
The F-Line.PRO wall fastener can be used both in horizontal or vertical position. Place the FPST at the desired height and open the hook with a screwdriver.

All wall fasteners can be installed using an M8 hexagonal nut to be inserted inside the FPST (by using a threaded bar). It's also possible to use self-tapping screws with a screw-anchor in case of installation on a wall or concrete.



You can secure the wall fastener to any type of clamping system and then insert the tube into the wall fastener and set the hook.

Fasteners can be installed with spacers (FPDST) in order to compensate the distance from the wall.



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