PAJUNK®

Plexus NanoLine
The product line for single shot and continuous plexus anaesthesia
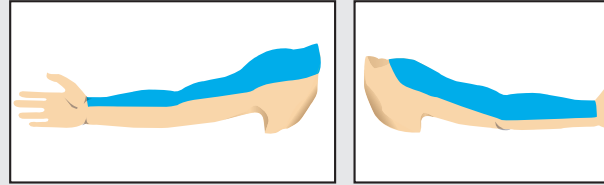
Plexus

Efficient and effective
Peripheral nerve blocks

Regional anaesthesia has become an integral part of daily surgical practice. Aside of the single shot techniques for the peripheral blocks during operational interventions, the continuous techniques additionally help to alleviate post-operative pain, to improve the operative result and to enhance patient comfort.
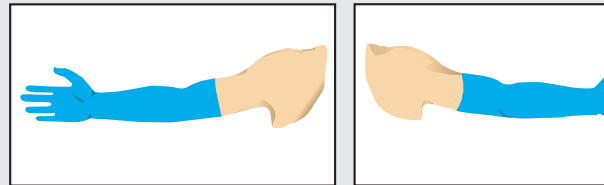
By providing a comprehensive programme for single shot and for continuous plexus anaesthesia, PAJUNK® supports the following applications with its catheter puncture kits:

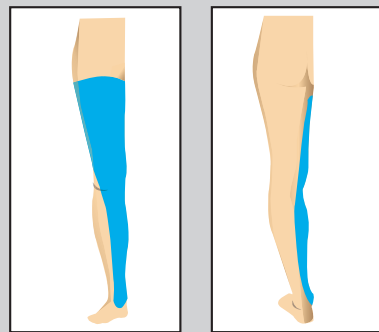## Peripheral blocks

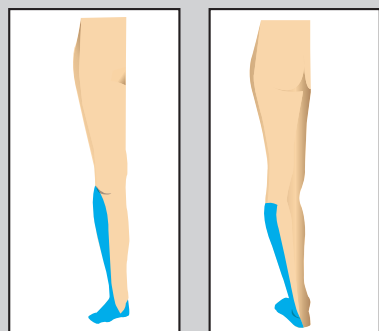### ➡ Upper extremities (brachial plexus)
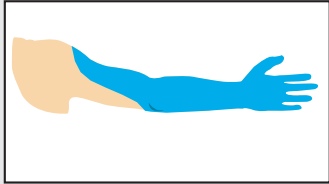

Interscalene brachial plexus block
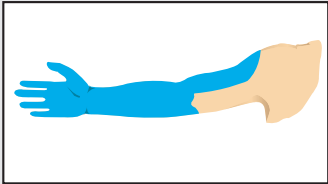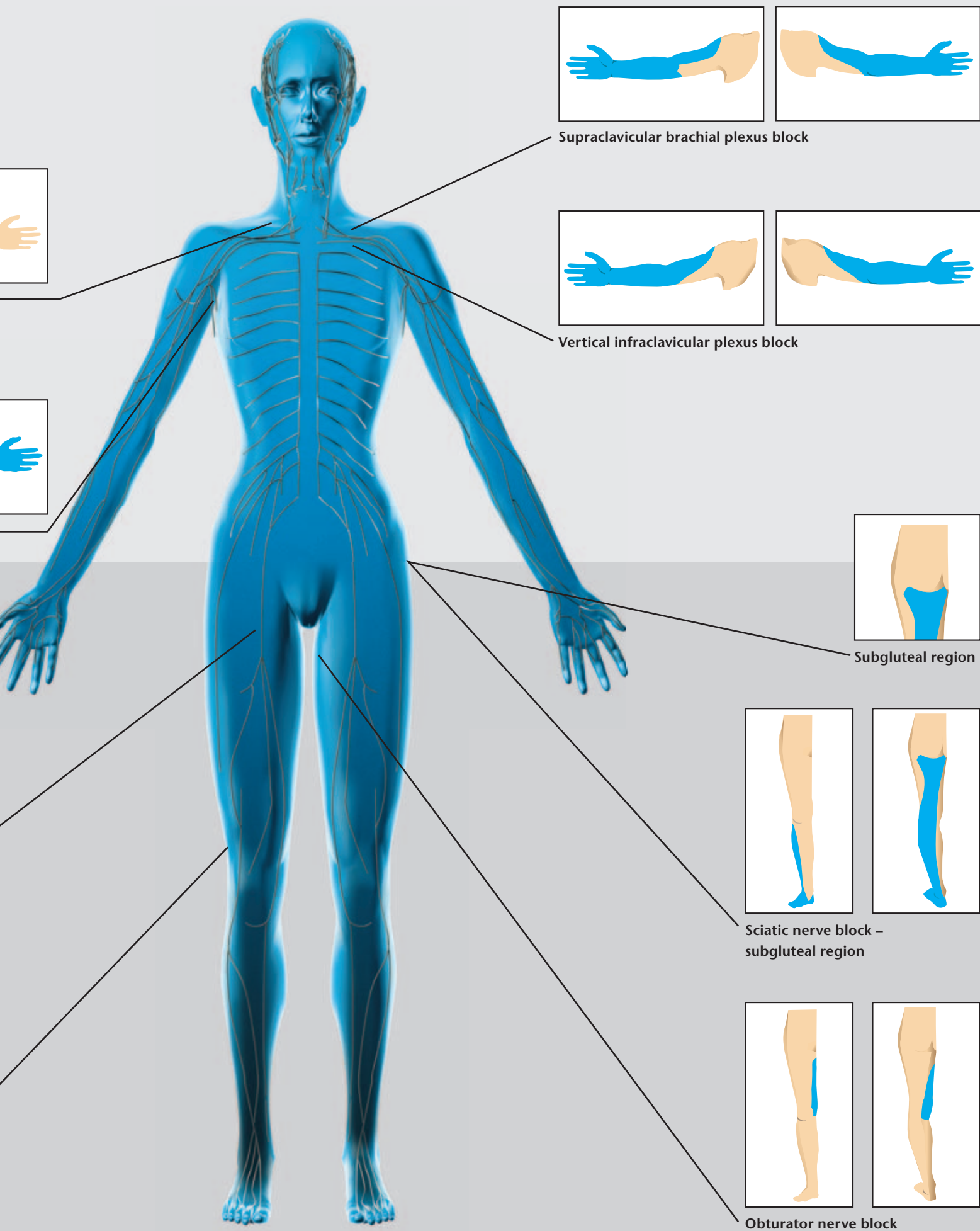

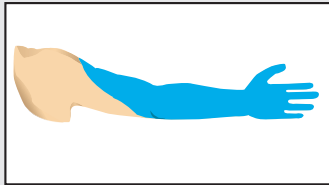**Axillary brachial plexus block**

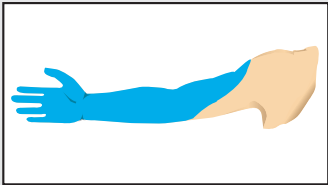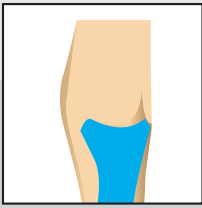### ➡ Lower extremities (lumbosacral plexus)

Femoral nerve block

Sciatic nerve block
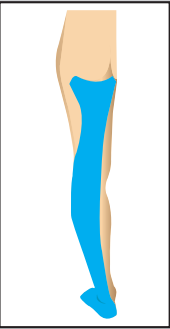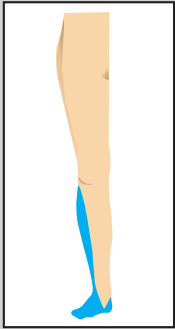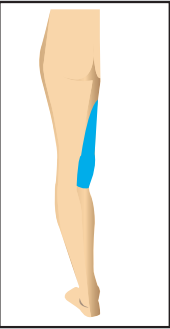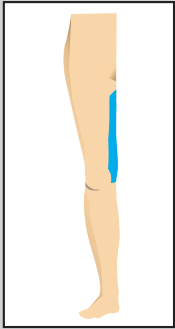
Supraclavicular brachial plexus block

Vertical infraclavicular plexus block

Subgluteal region

Sciatic nerve block – subgluteal region

Obturator nerve block

NanoLine
A quantum leap in cannula coating

NanoLine is an absolute world novelty in the field of cannula coating. With this revolutionary thin-layer technology, the insulating layer can be reduced to a minimum without any detrimental loss in functionality. Well-known anaesthetists rather confirm, that the puncture and the nerve stimulation can be provably conducted correspondingly finer and more subtle and precise with this polymer coating, which may recognized by its slightly golden sheen. The material of the NanoLine coating has undergone years of testing, and its compatibility has been proven in the context of bio-compatibility and -sensitivity tests.

Depth graduation

Unique – the coating of the inner lumen
Based on the NanoLine thin-layer technology, cannulae for the first time can not only be coated on the outside, but also on the inner lumen.

➡ This coating will level out and compensate any unevenness in the inner lumen, and it ensures for a better flow of the anaesthetic.

Reduced puncturing force – perfect gliding qualities
Thanks to the minimal thickness of the layer, the outer diameter is not changed, as is the case with conventional methods. An excellent smoothness of the surface is thereby achieved at the same time with the NanoLine coating.

➡ NanoLine cannulae can be correspondingly utilised with less puncturing force being applied, they glide through the tissue gently.

Depth graduation included
All NanoLine cannulae have been provided with a circumferential centimetre depth graduation for better localization.

➡ The depth of the puncture will therefore always remain under control.
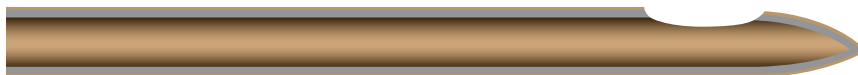
The longitudinal section through a NanoLine cannula shows the inner coating.

NanoLine coating

Electrically conductive puncturing tip

Perfect insulation qualities – extremely precise stimulation

The exceedingly thin polymer layer warrants a 100-per-cent insulation. The active contact point for nerve stimulation at the tip of the cannula remains uncoated.

The stimulation is therefore performed exclusively via the electrically conductive puncturing-tip, and it generates a highly precise electric field.

The puncturing tip is alternatively available in a facet version or as a SPROTTE® cannula with a flush transition to the coating.
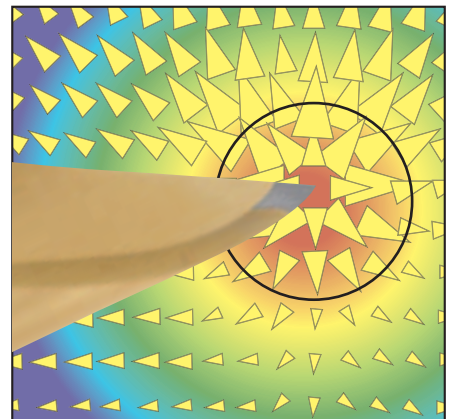
Highly precise, electrically conductive field.

UniPlex cannulae
For single shot peripheral nerve block anaesthesia

The UniPlex cannulae were developed by PAJUNK® especially for single shot application, to be used in peripheral nerve block anaesthesia. They are alternatively available in the following versions:

UniPlex NanoLine cannula with SPROTTE® tip
The closed tip of the UPS cannula assists the anaesthetist in the atraumatically precise localization of the nerve.

NanoLine coating

Depth graduation

Uncoated tip
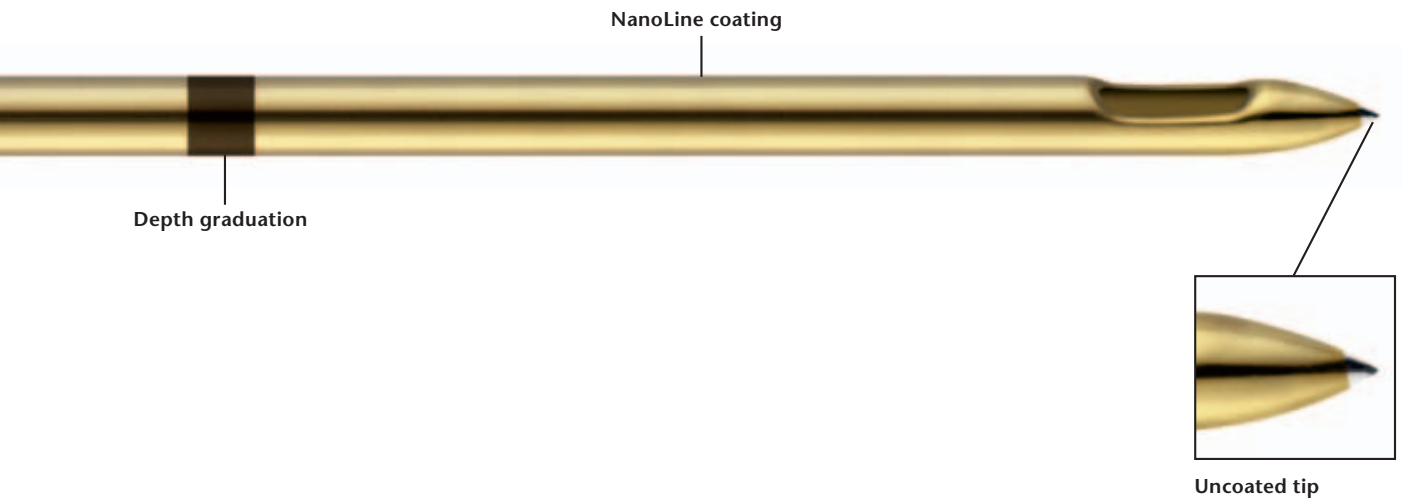
UniPlex NanoLine cannula with facet tip
This special facet tip reduces the risk of injury to a minimum, in comparison with conventionally sharp cannulae.

NanoLine coating

Depth graduation

Uncoated tip
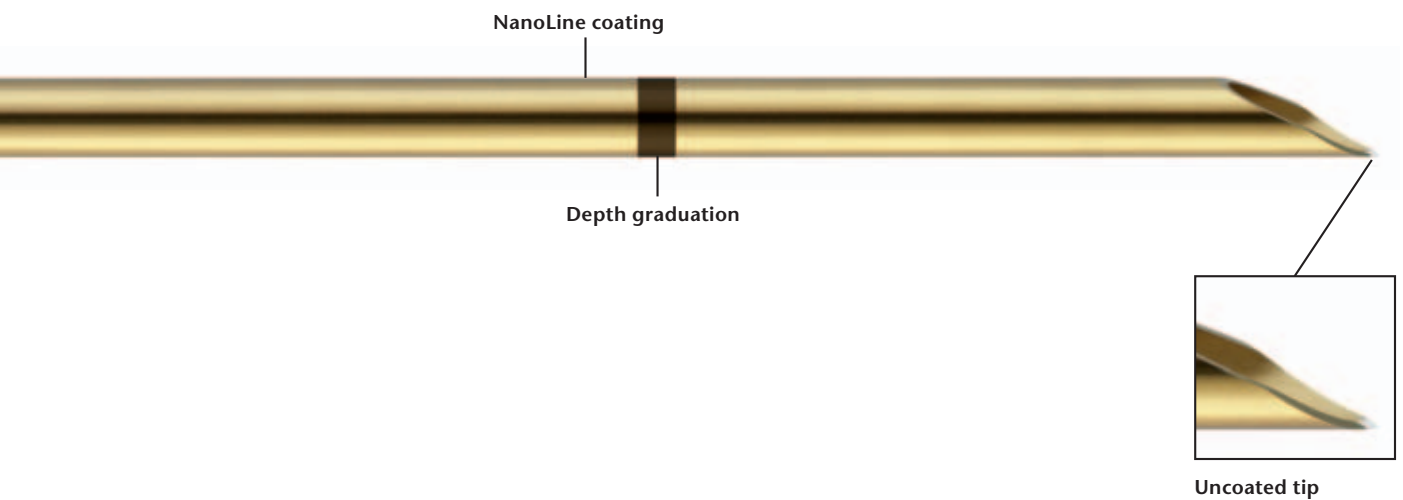
All UniPlex NanoLine cannulae have been provided with an **injecting tube and a connector cable.** The adaptable injecting tube permits simultaneous aspiration and injection. It can be removed by the anaesthetist at any time, if it gets in the way during work.

In addition to the puncture kits, PAJUNK® offers various **nerve stimulators for the localization of the nerve plexus.**

The **MultiStim SENSOR** supports the patient friendly, percutaneous localization and identification of nerves with the aid of a **stimulation handle and the PEG electrode** (Percutaneous Electronic Guidance) – a substantial distinctive feature, as opposed to conventional stimulation equipment.

The **MultiStim SWITCH** is the **only nerve stimulator which also can stimulate catheters.** The anaesthetist can select either the cannula or the catheter for stimulation by means of a switch-over function, simply by pressing a button. With the new function indicating the patient resistance, the intraneural, intravascular and intrathecal placement of the catheter can be recognized and corrected immediately.

Continuous techniques
Kit variants for post-operative pain relief

The continuous peripheral nerve block techniques are becoming increasingly important in regional anaesthesia. Alone the fact that the local anaesthetic is hereby injected as close as possible to the nerve undoubtedly contributes to their ranking among the most effective techniques applied in regional anaesthesia and in pain therapy. Because this permits the impediments of the patient to be reduced to a minimum, and the propagation of the peripheral regional block can be predicted very well.

Complicated and extensive operations can also be conducted with the help of regional anaesthesia, thanks to the continuous techniques – an important step in anaesthesia towards more safety for the patient. The post-operative application of the continuous techniques for the alleviation or elimination of pain is valued greatly in physiotherapeutic treatment. Here, painless mobilisation training can begin directly after the operation.

PAJUNK® has developed a comprehensive set of instruments for the continuous techniques:

PlexoLong kit according to Meier

**Individual kit**

PlexoLong Sono

Depending on the puncture kit, PAJUNK® offers up to three different cannula types:
· SPROTTE®-SPECIAL cannula
· Tuohy cannula
· Cannula with facet tip

While the facet tip cannula is exclusively placed parallel to the nerve, the SPROTTE®-SPECIAL cannula and the Tuohy cannula are suitable for those cases, where it is necessary to introduce the catheter at an angle to the nerve.

SPROTTE®-SPECIAL cannula

Nerve
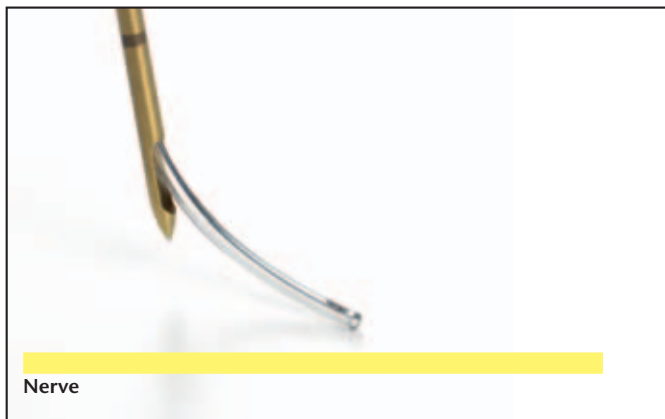
For an absolutely safe application, PAJUNK® recommends the use of the **SPROTTE®-SPECIAL cannula.** Because it has been provided with an especially rounded and polished lateral eye.

➡ The shearing off of the catheter can be excluded.

➡ Together with the atraumatic tip, the lateral eye ensures for an optimal egress and for the precisely guided placement of the catheter.

Tuohy cannula

Nerve

The Tuohy cannula offers the anaesthetist the approved tip used in epidural anaesthesia.

➡ As a coated PlexoLong NanoLine cannula, it is particularly suitable for psoas-compartment blocks.

Cannula with facet tip
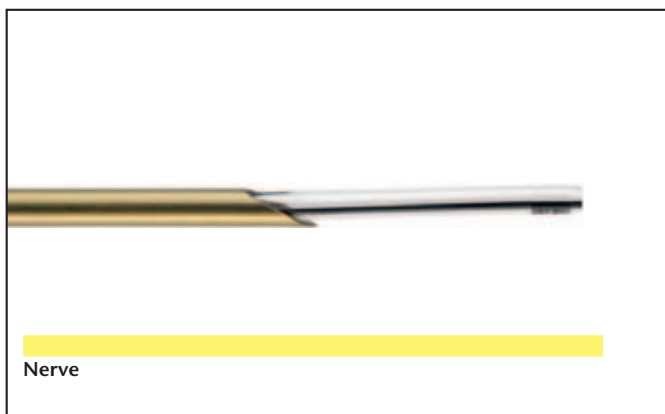
Nerve

The coated **cannula with facet tip** is used in those cases, where it can be positioned parallel to the nerve.

➡ It should always be ensured, that the position of the catheter opening is directed towards the nerve.

PlexoLong NanoLine according to Meier
The direct injection by way of the catheter

The PlexoLong kit was developed in collaboration with Dr. Meier especially for the peripheral techniques in regional anaesthesia and pain therapy. Because with the PlexoLong NanoLine kit according to Meier, PAJUNK® has, as the first and the only manufacturer, initiated a system, by which the catheter is introduced in sterile condition directly from a container through the cannula, and the anaesthetic

is injected through the catheter. A permanent cannula is not required here. This technique is protected by patent and it stands out from all the other conventional methods in continuous plexus anaesthesia due to the extreme simplicity of its handling. It reflects the decades of competence of PAJUNK® in the development and production of catheters and cannulae.

The kit consists of:
· PlexoLong NanoLine cannula – optionally with SPROTTE®-SPECIAL cannula, Tuohy cannula, or cannula with facet tip
· Catheter with steel stylet, contained in the catheter container
· FixoLong system
· Colour-coded adapter
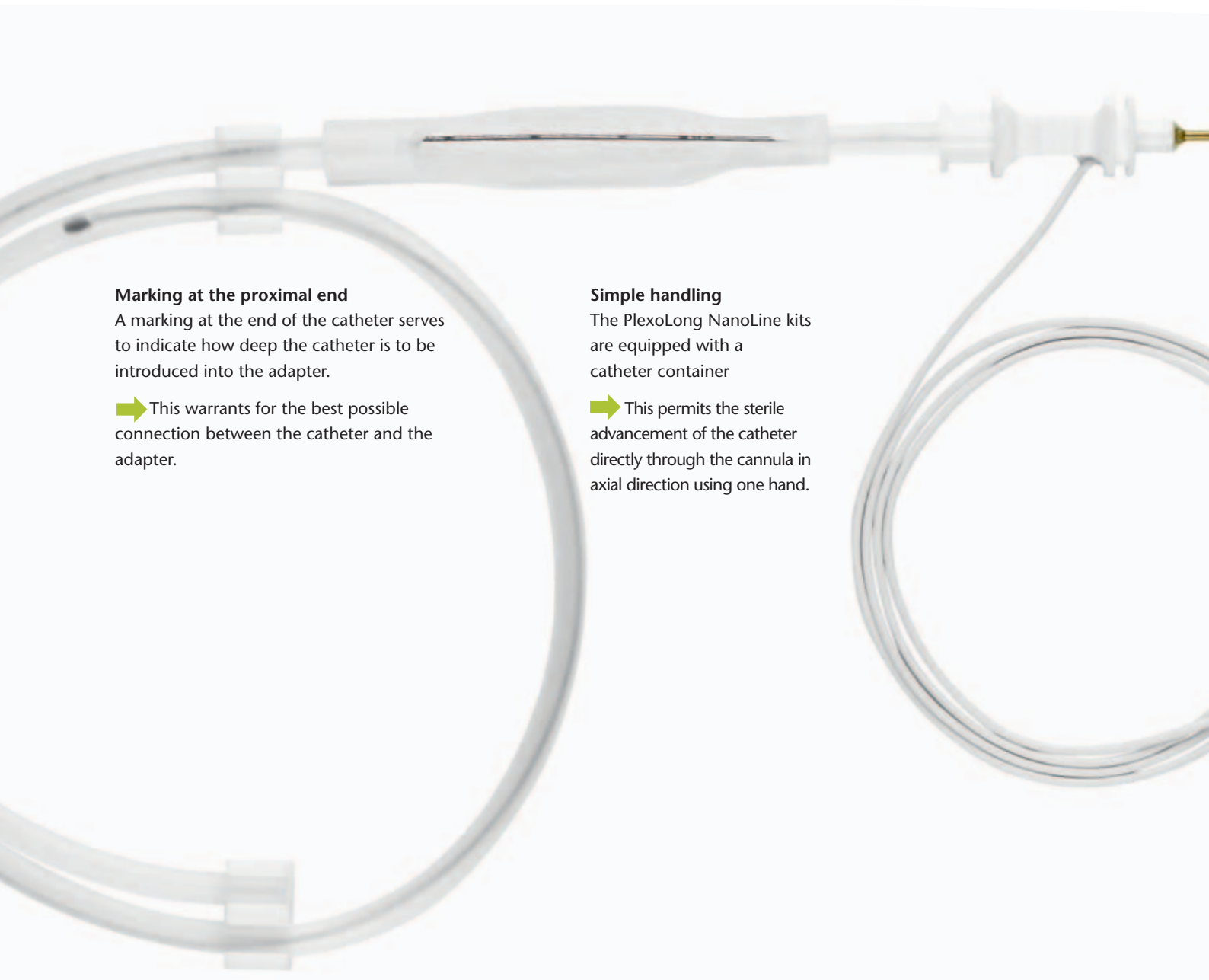
Marking at the proximal end
A marking at the end of the catheter serves to indicate how deep the catheter is to be introduced into the adapter.

➡ This warrants for the best possible connection between the catheter and the adapter.

Simple handling
The PlexoLong NanoLine kits are equipped with a catheter container

➡ This permits the sterile advancement of the catheter directly through the cannula in axial direction using one hand.

Catheter container

Ascending depth graduation

The catheter with a length of 50 cm has been provided with an ascending depth graduation up to a length of 30 cm in intervals of 5 cm.

➡ Its position can therefore be determined exactly at any time.
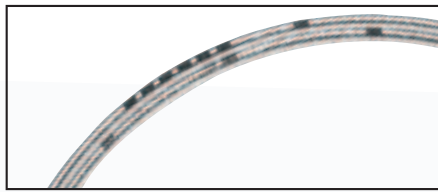
Steel stylet

The catheter of the PlexoLong kit has been provided with a steel stylet, which is locked in place in the introductory aid at its end, and is removed together with the container after the application of the catheter.
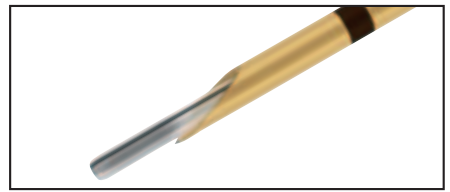
➡ This gives the catheter maximum stability.

Catheter with central orifice

The centre of the radiopaque catheter is open.

➡ This ensures the free flow of the anaesthetic – particularly in connection with the post-operative injection pump.
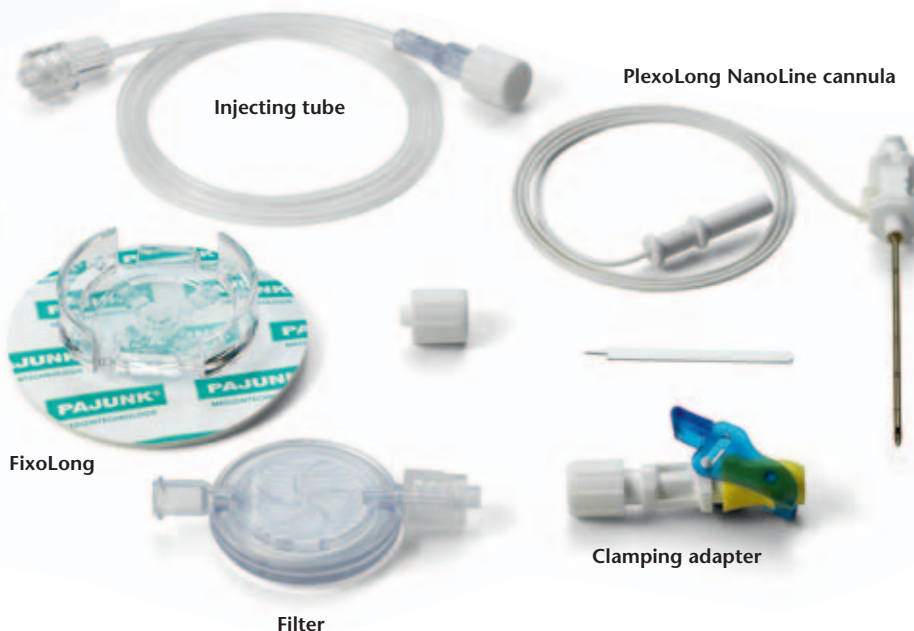
Lateral electric connection

The cannula has been provided with a lateral electric connection, which is equipped with a spring-loaded socket.

➡ This warrants the proper electrical connection at all times.

PlexoLong catheter

Injecting tube

PlexoLong NanoLine cannula

FixoLong

Clamping adapter

Filter

PlexoLong Sono
The kink- and crease-proof catheter with a stainless

The construction of the catheter is decisive for the smooth performance of continuous peripheral nerve blocks. Because the unobstructed flow of the anaesthetic or of the analgesic can only be guaranteed, if the catheter can resist being squeezed off when the patient is in an unfavourable position. Having this in mind, PAJUNK® has developed the PlexoLong Sono catheter. It has been equipped with an **integrated stainless steel helical coil,** and it is particularly **suitable for long-term treatment in pain therapy and plexus anaesthesia.**

Graduation and radiographic contrast strips
The PlexoLong Sono catheter is graduated along the first 30 cm, and it has also been provided with radiographic contrast strips.

➡ This permits the perfect identification of the catheter, as well as its precise, on-target placement.
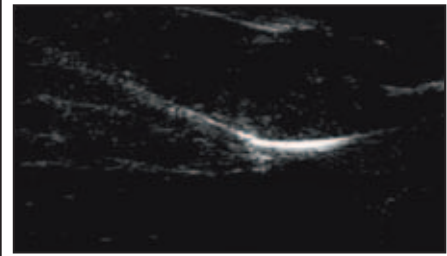
Catheter container and integrated stainless steel helical coil
Only PAJUNK® delivers the catheter in a container. The integrated stainless steel helical coil is also unique.

➡ This eliminates the memory effect usually caused by rolling the catheter up in the packing.

Catheter material
The catheter material consists of transparent polyamide.

➡ The characteristic features of the material are its very high tearing resistance/ tensile strength, as well as excellent tissue compatibility. If the catheter is misplaced, then the inflow of blood may be immediately detected and the corresponding measures can be taken.

steel helical coil

Great inner lumen and integrated stainless steel helical coil
The PlexoLong Sono catheter has a particularly large inner lumen. The integrated stainless steel helical coil makes it absolutely crease- and kink-proof.

➡ The PlexoLong Sono catheter therewith fulfils the prerequisites for a safe connection to the injection pump, in conjunction with an absolutely unhindered flow of the anaesthetic – also and particularly over a longer period of time.
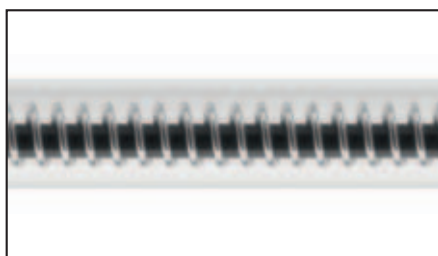
Soft, flexible catheter tip
The steel stylet ends 1 cm before reaching the catheter tip, which leaves the tip soft and flexible.

➡ This helps in avoiding inadvertent injuries of vessels, while providing for maximum flexibility during the introduction and placement of the catheter.

Injecting tube

PlexoLong NanoLine cannula

FixoLong

PlexoLong Sono catheter

Clamping adapter

Filter
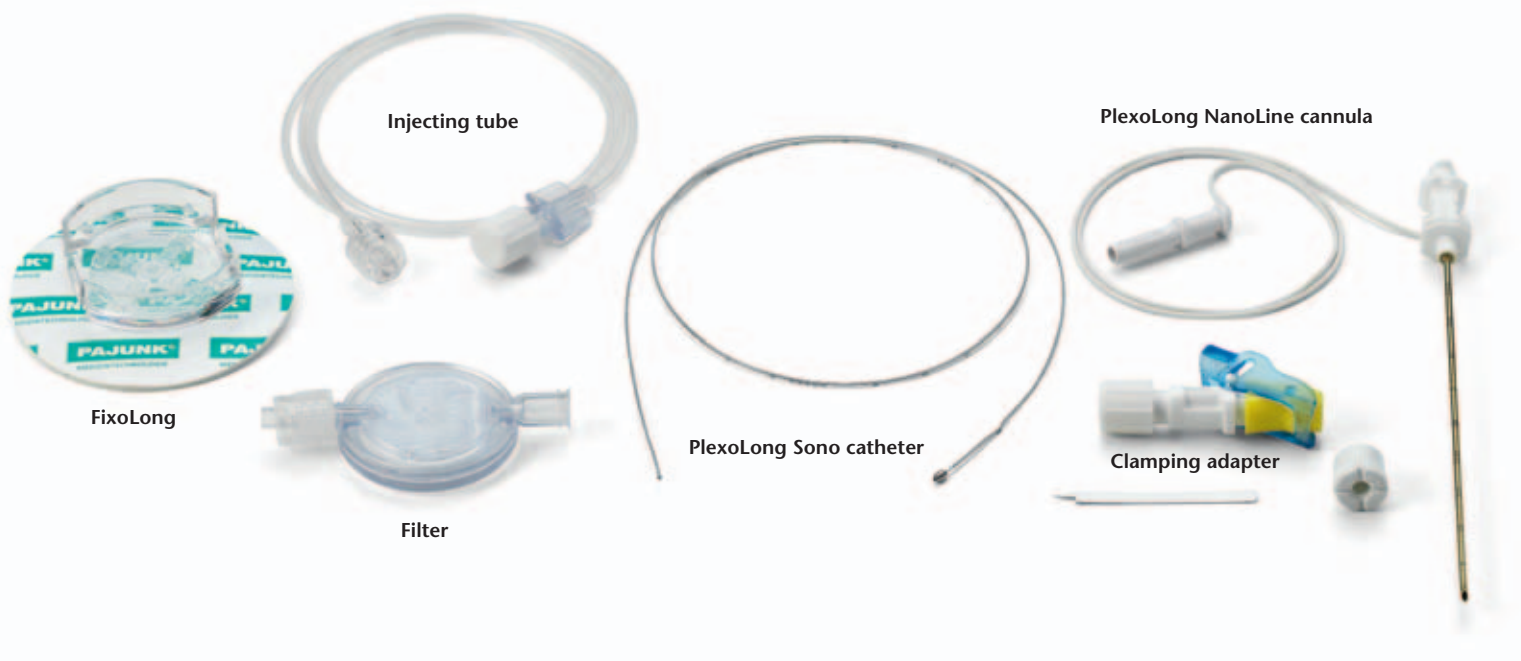
StimuLong Sono
The stimulatable catheter

The StimuLong Sono catheter – a joint development of PAJUNK® and Dr. Kick – is unique due to its stimulatable tip, the electrically conductive steel stylet, and also because of the integrated metal helical coil. First, the nerve in question is identified using a PlexoLong- or UPK cannula. Then the StimuLong catheter is advanced forward under nerve stimula-tion, with continuous adaptation of the intensity of the stimulation current. In comparison with conventional cannulae, we have total electrical insulation, since the inner lumen is completely coated. The stimulation will begin exactly when the tip of the catheter emerges from the cannula. Conclusions regarding the proximate nervous structures may be drawn directly from the stimulation response, and the catheter can be positioned with the corresponding precision. The distance to the nerve can be derived from the mini-mum current intensity required for stimulation. A secondary positioning check of the catheter tip can also be performed in case of an intermittent post-operative pain therapy.

Stimulatable catheter
The catheter has been provided with end-to-end electrical conductivity.

➡ This establishes the electrical connec-tion between the clamping adapter and the stimulatable catheter tip.

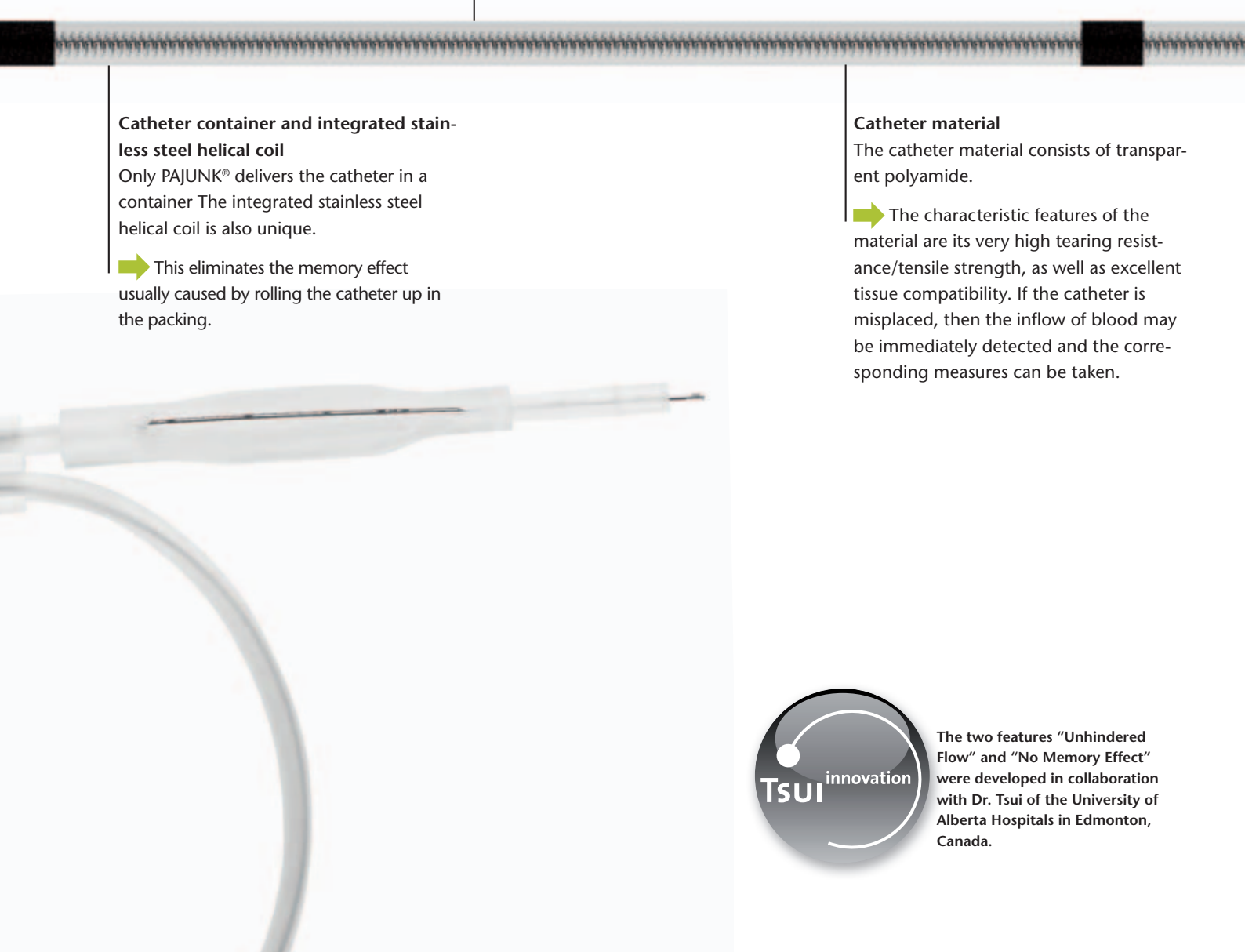**Catheter container and integrated stain-less steel helical coil**
Only PAJUNK® delivers the catheter in a container The integrated stainless steel helical coil is also unique.

➡ This eliminates the memory effect usually caused by rolling the catheter up in the packing.

Catheter material
The catheter material consists of transpar-ent polyamide.

➡ The characteristic features of the material are its very high tearing resist-ance/tensile strength, as well as excellent tissue compatibility. If the catheter is misplaced, then the inflow of blood may be immediately detected and the corre-sponding measures can be taken.

Tsui innovation

The two features "Unhindered Flow" and "No Memory Effect" were developed in collaboration with Dr. Tsui of the University of Alberta Hospitals in Edmonton, Canada.

Integrated stainless steel helical coil
The catheter is absolutely crease- and buckle-proof, thanks to the integrated stainless steel helical coil.

➡ This ensures the unhindered flow of the anaesthetic, also and particularly over a longer period of time.
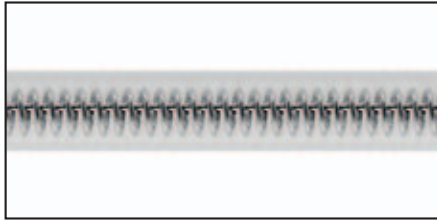
**Graduation and radiographic contrast strip**
The catheter has been provided with an ascending depth graduation up to a length of 30 cm in intervals of 5 cm, and it has also been equipped with radiographic contrast strips.

➡ This permits perfect localization. The metal helical coil furthermore guarantees for 100-per-cent ultrasonic visibility – an important prerequisite for optimal catheter placement.

Stimulatable tip
The atraumatically rounded tip of the StimuLong Sono catheter is gold-plated.

➡ This provides for maximum conductivity and excellent stimulatability.
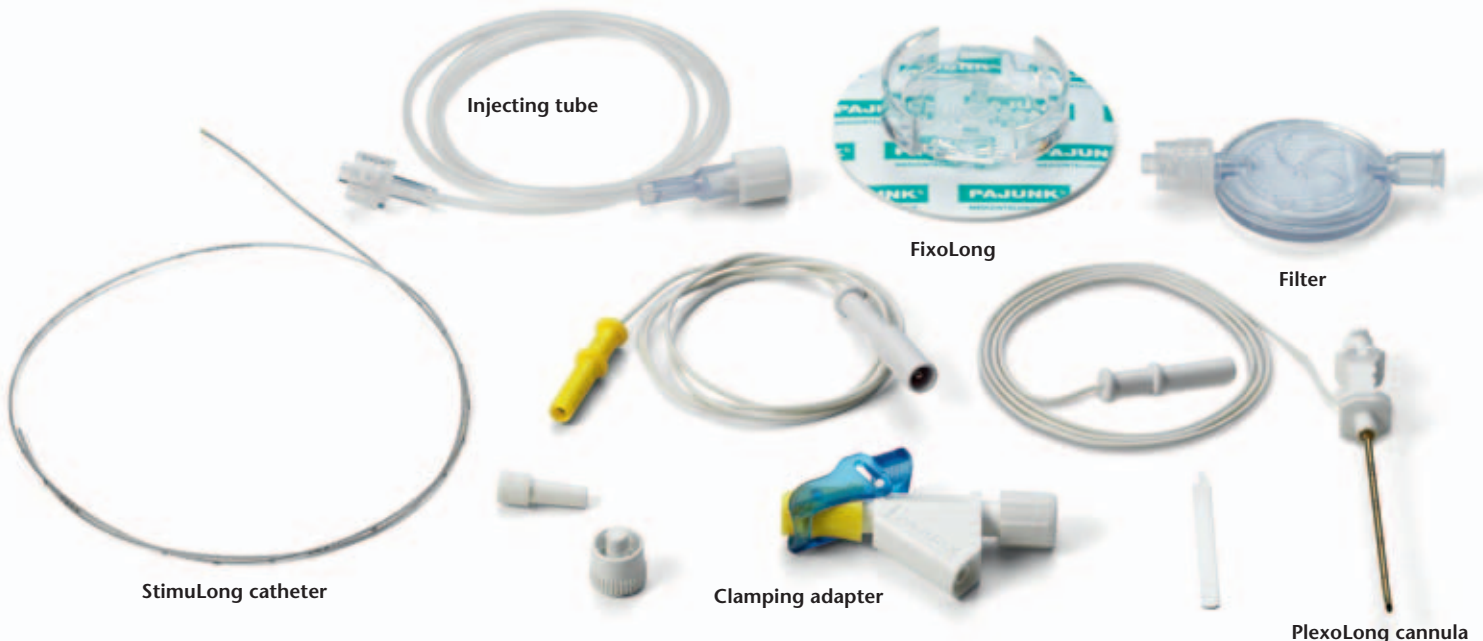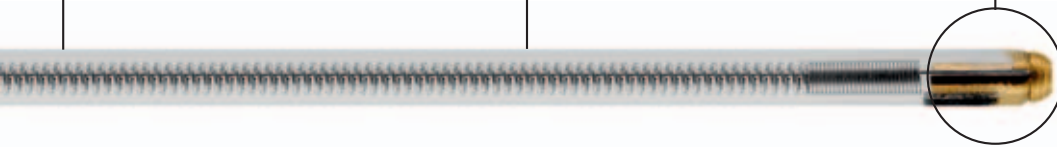
Injecting tube

FixoLong

Filter

StimuLong catheter
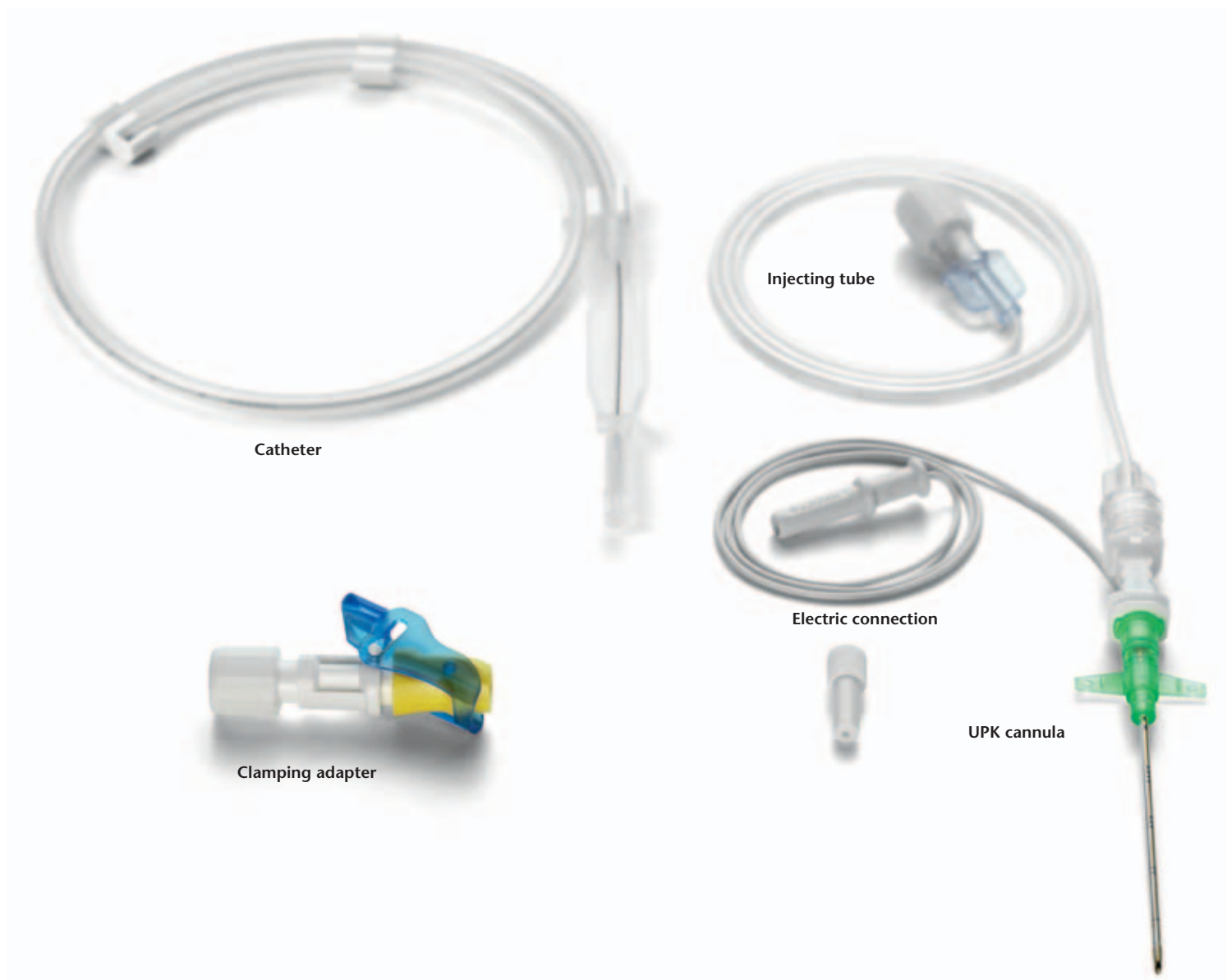
Clamping adapter

PlexoLong cannula

MultiSet NanoLine
The classic technique

The UniPlex cannulae UPK and UPKS of the MultiSet NanoLine kit permit the perineural placement of a permanent cannula. This permanent cannula displays extremely good gliding properties, since it tapers off to the front, and together with the extremely thin NanoLine coating, it creates a fluent and flush transition between the cannula and the permanent cannula. It is very flexible, and at the same time very sturdy – providing the best prerequisites for simple and safe handling. In this tech-

nique, operative anaesthesia is performed using a flexible plexus catheter. The UniPlex cannulae themselves have the same diameter as the catheter, making leakages virtually impossible.

The MultiSet NanoLine technique permits the performance of the puncture using particularly thin cannulae. The UniPlex cannulae are available in various sizes, and with two different tips: SPROTTE® (UPKS) and facet tip (UPK).

Injecting tube

Catheter

Electric connection

Clamping adapter

UPK cannula

Clamping adapter and securing system
The accessories for successful plexus anaesthesia
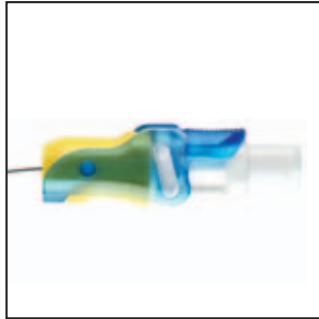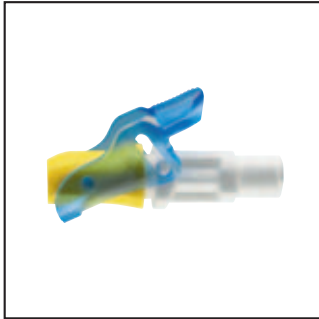
Colour-coded clamping adapter

The connection between the PAJUNK® clamping adapter and the catheter has been provided with a special safeguard.
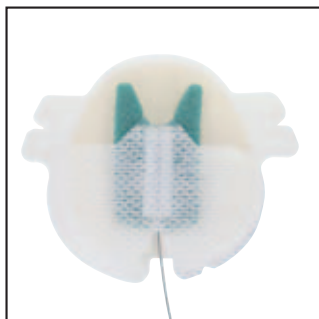
➡ This helps to prevent over-tensioning and warrants a totally unobstructed flow of the anaesthetic.

FixoLong system

The catheter and the filter are secured in the vicinity of the catheter emergence using FixoLong.

➡ This provides the patient with maximum freedom of movement during all continuous applications.
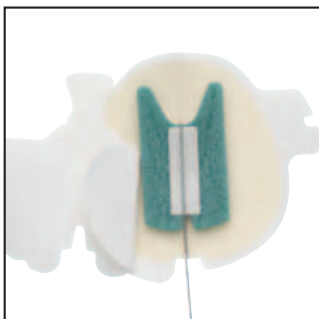
FixoCath

FixoCath is a combination of wound dressing and fixation, and it is attached directly at the exit point of the catheter.

➡ Creasing or buckling of the catheter can be excluded in the greatest extent possible. And here the patient will simultaneously also attain maximum freedom of movement.

Plexus anaesthesia in one bundle:
A comprehensive overview:

UniPlex NanoLine cannulae

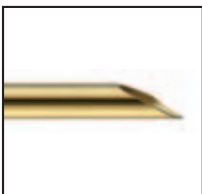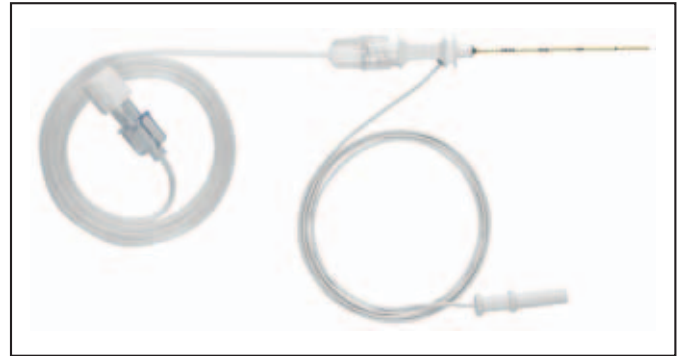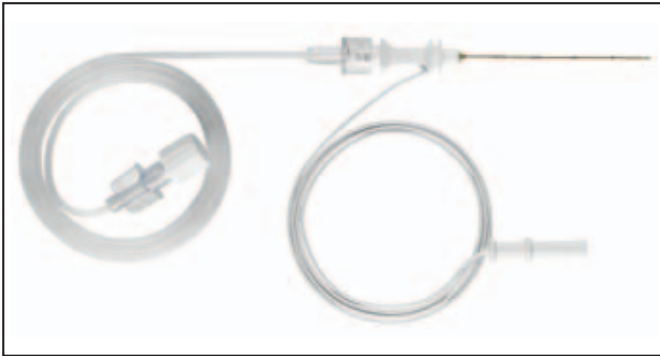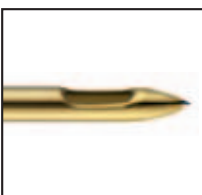| Product	Size	Length (mm)	Inch	Item no.	PU
UniPlex NanoLine with facet tip					
UP 3/25	24 G	25	1	001156-75	10
UP 3/35	25 G	35	1 $3/8$	001156-80	10
UP 3/40	22 G	40	1 $5/8$	001156-70	10
UP 3/50	25 G	50	2	001156-81	10
UP 3/50	22 G	50	2	001156-74	10
UP 3/80	25 G	80	3 $1/4$	001156-86	10
UP 3/80	22 G	80	3 $1/4$	001156-71	10
UP 3/100	22 G	100	4	001156-84	10
UP 3/100	21 G	100	4	001156-77	10
UP 3/120	22 G	120	4 $3/4$	001156-82	10
UP 3/120	20 G	120	4 $3/4$	001156-72	10
UP 3/150	20 G	150	6	001156-76	10
UniPlex NanoLine SPROTTE®					
UPS 3/40	24 G	40	1 $3/8$	001156-30G	10
UPS 3/50	25 G	50	2	001156-29G	10
UPS 3/50	22 G	50	2	001156-31G	10
UPS 3/70	22 G	70	2 $3/4$	001156-31H	10
UPS 3/90	22 G	90	3 $1/2$	001156-31J	10
UPS 3/150	22 G	150	6	001156-28L	10

PlexoLong NanoLine according to Meier
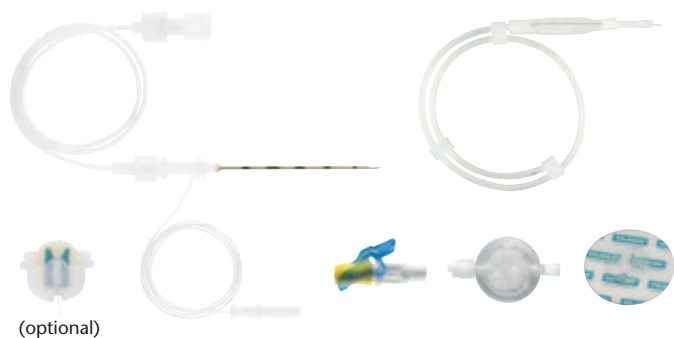
All PlexoLong NanoLine kits are supplied with the following equipment:

· PlexoLong NanoLine cannula, LuerLock and electrical connector cable
· Adaptable injecting tube
· PlexoLong Catheter 20 G x 50 cm with central opening and steel stylet
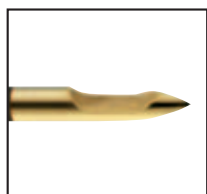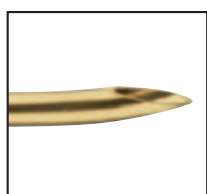· Clamping adapter (yellow)
· Filter 0.2 μm
· FixoLong
· FixoCath (optional)

(optional)

Product	Size	Catheter	Item no.	with FixoCath	PU
Facet tip					
	19 G x 30 mm	20 G x 50 cm	541156-31A		10
	19 G x 50 mm	20 G x 50 cm	531156-31A		10
	19 G x 100 mm	20 G x 50 cm	521156-31A	521256-31A	10
	19 G x 150 mm	20 G x 50 cm	511156-31A	511256-31A	10
SPROTTE®-SPEZIAL tip					
	21 G x 30 mm	25 G x 50 cm	541156-31B		10
	19 G x 60 mm	20 G x 50 cm	531156-31B	531256-31B	10
	19 G x 120 mm	20 G x 50 cm	521156-31B	521256-31B	10
	19 G x 150 mm	20 G x 50 cm	511156-31B		10
Tuohy tip					
	21 G x 30 mm	25 G x 50 cm	541156-31C		10
	18 G x 50 mm	20 G x 50 cm	531156-31C		10
	18 G x 100 mm	20 G x 90 cm	521156-34C		10
	18 G x 100 mm	20 G x 50 cm	521156-31C		10
	18 G x 150 mm	20 G x 50 cm	511156-31C		10

Product	Item no.
PlexoLong NanoLine kit	531156-831A

1 PlexoLong NanoLine cannula 19 G x 50 mm with facet
  tip, LuerLock and electrical connector cable
1 adaptable injecting tube
1 PlexoLong catheter 20 G x 50 cm with central opening
and steel stylet
1 Clamping adapter (yellow)
1 filter 0.2 µm
1 FixoLong
1 injection cannula 25 G x 42 mm
1 injection cannula 18 G x 50 mm
1 syringe 5 ml LuerLock
1 syringe 20 ml LuerLock
3 sponge sticks
1 skin marker
5 gauze compresses 8-fold, 5 x 5 cm
1 transparent fenestrated drape, 75 x 60 cm
1 wrapping cloth 90 x 110 cm

Product	Item no.
StimuLong Sono NanoLine kit	531157-832A

1 PlexoLong NanoLine cannula UP 19 G x 50 mm with
  facet tip, LuerLock and electrical connector cable
1 adaptable injecting tube
1 StimuLong Sono catheter 20 G x 50 cm with electrically
conductive stylet, integrated metal helical coil and central
opening
1 StimuLong clamping adapter (yellow)
1 adapter cable
1 filter 0.2 µm
1 FixoLong
1 injection cannula 25 G x 42 mm
1 injection cannula 18 G x 50 mm
1 syringe 5 ml LuerLock
1 syringe 20 ml LuerLock
3 sponge sticks
1 skin marker
5 white gauze compresses 8-fold, 5 x 5 cm
1 transparent fenestrated drape 75 x 60 cm
1 wrapping cloth 90 x 110 cm
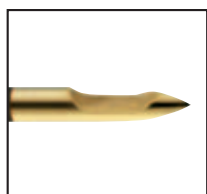
PlexoLong Sono NanoLine

With the exception of the catheter, all PlexoLong Sono NanoLine kits come with the same equipment as the PlexoLong NanoLine kits:

· PlexoLong NanoLine cannula, LuerLock and electrical connector cable
· Adaptable injecting tube
· PlexoLong Sono catheter 20 G with central opening and steel stylet
· Clamping adapter (yellow)
· Filter
· FixoLong

Product	Size	Catheter	Item no.	PU
Facet tip	19 G x 50 mm	20 G x 50 cm	531157-31A	10
	19 G x 100 mm	20 G x 50 cm	521157-31A	10
	19 G x 150 mm	20 G x 50 cm	511157-31A	10
SPROTTE®-SPEZIAL tip	19 G x 60 mm	20 G x 50 cm	531157-31B	10
	19 G x 120 mm	20 G x 50 cm	521157-31B	10
Tuohy tip	18 G x 50 mm	20 G x 50 cm	531157-31C	10
	18 G x 100 mm	20 G X 50 cm	521157-31C	10
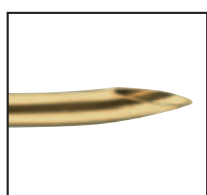
StimuLong Sono NanoLine
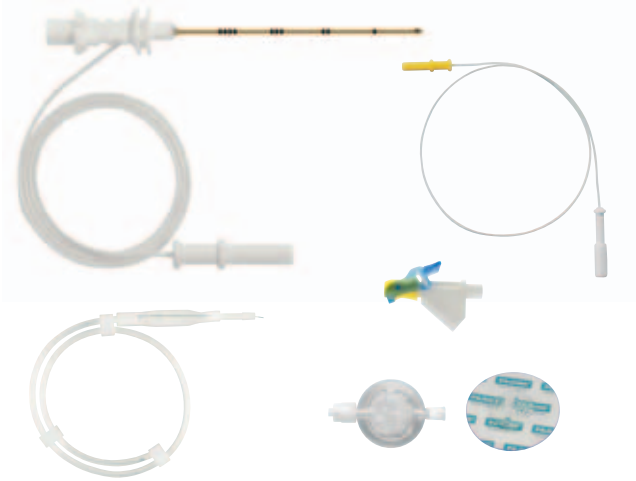
StimuLong Sono NanoLine kits are available with different cannulae. The kits contain the following components:
· PlexoLong NanoLine cannula with electrical connector cable and adaptable injecting tube
· StimuLong Sono catheter 20 G x 50 cm with electrically conductive stylet, integrated metal helical coil and central opening
· StimuLong clamping adapter (yellow) with integrated stimulation connection
· Filter
· FixoLong
· Electrical connector cable

Product	Size	Permanent cannula	Item no.	PU
UPK tip NanoLine according to Kick with indwelling cannula protruding 5 mm				
	21 G	18 G x 75 mm	221157-30E	10
	21 G	18 G x 51 mm	231157-30E	10
PlexoLong NanoLine with facet tip				
	19 G x 50 mm		531157-32A	10
	19 G x 100 mm		521157-32A	10
	19 G x 150 mm		511157-32A	10
PlexoLong NanoLine with SPROTTE®-SPECIAL tip				
	19 G x 60 mm		531157-32B	10
	19 G x 120 mm		521157-32B	10
PlexoLong NanoLine with Tuohy tip				
	18 G x 50 mm		531157-32C	10
	18 G x 100 mm		521157-32C	10

MultiSet NanoLine
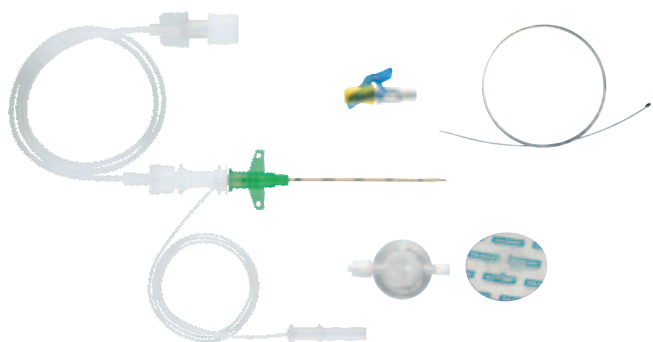
The MultiSet NanoLine kits of PAJUNK® are supplied with:
· Stimulation cannula
· Permanent cannula
· Plexus catheter 20 G x 50 cm with closed tip and steel stylet
· Clamping adapter (yellow)

Product	Size	Permanent cannula	Item no.	0.2 μm flat filter	FixoLong	PU
UPK with facet tip						
	21 G	18 G x 51 mm	201156-30E			10
	21 G	18 G x 51 mm	201156-31E	•	•	10
	21 G	18 G x 75 mm	211156-30E			10
	21 G	18 G x 75 mm	211156-31E	•	•	10
UPKS mit SPROTTE®-SPEZIAL tip						
	21 G	18 G x 51 mm	301156-30E			10

Product	Size	Opening	Item no.	PU
Plexus catheter without steel stylet, radiopaque, catheter adapter (yellow), introductory aid				
	20 G x 50 mm	distal geschlossen	121151-37C	10
Plexus catheter with steel stylet, radiopaque, catheter adapter (yellow), introductory aid				
	19 G x 50 mm	distal geschlossen	0001151-37	10
	20 G x 50 mm	distal geschlossen	001151-37B	10

Product	Item no.	PU
FixoCath	001151-37Z	10

Nerve stimulator: MultiStim SENSOR

MultiStim SENSOR

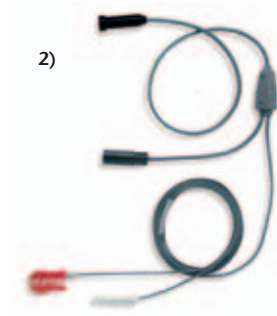| MultiStim SENSOR	Item no.
incl. equipment case and patient cable for the connection of stimulation cannulae	1151-94-30
incl. equipment case, PEG- cable for the connection of stimulation cannulae and monopolar handle	1151-94-32

Nerve stimulator: MultiStim SWITCH

MultiStim SWITCH

MultiStim SWITCH	Item no.
incl. equipment case and SWITCH-cable for the connection of cannula and StimuLong catheter	1151-94-40
SWITCH-cable for the connection of stimulation cannulae and stimulatable catheter	1151-94-07

Accessories for MultiStim SENSOR and MultiStim SWITCH

1)

2)

3)

Accessories	
1) Patient cable for the connection of stimulation cannulae	1151-94-13
2) PEG-cable for the connection of stimulation cannulae and monopolar handle	1151-94-14
3) PEG-electrode – percutaneous, monopolar stimulation handle, autoclavable	1151-94-17
extension cable for the connection of stimulation cannulae, autoclavable*)	01151-861F
Disposable extension cable for the connection of stimulation cannulae, sterile*)	01151-861Q

*) To be used for SWITCH and SENSOR