



WE UNDERSTAND.

NEUROSURGERY

LUMBOPERITONEAL SHUNTS

GRAVITATIONAL VALVE TECHNOLOGY
FOR LUMBOPERITONEAL SHUNTING

TREATMENT OF HYDROCEPHALUS

NEED FOR IMPROVEMENT

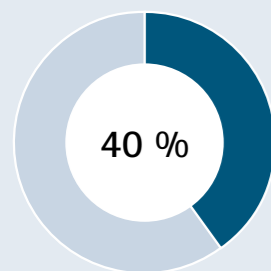
TREATMENT OF HYDROCEPHALUS

Since the 1960s, the main surgical strategy in managing hydrocephalus is the placement of shunts. Ventriculoperitoneal (VP) shunts are still the surgical standard, but lumboperitoneal (LP) shunts are an increasingly important alternative. However, these conventional shunt types have specific high failure rates, each with its own typical causes. Almost every fourth patient is affected by complications (1, 2) with no difference between conventional and programmable valves (3, 4).

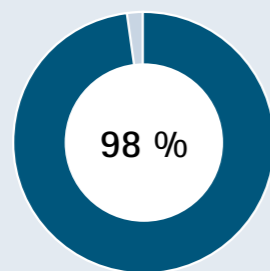
Mechanical failure, such as obstruction and valve malfunction, followed immediately by overdrainage, remain the most common causes of multiple shunt revisions (5). Revisions are burdensome for patients and are accompanied by unavoidable perioperative risks.

We believe that the current treatment options for hydrocephalus are not definitive and improvement is required.

HIGH FAILURE RATES (1)



Proportion of shunts failing within 2 years

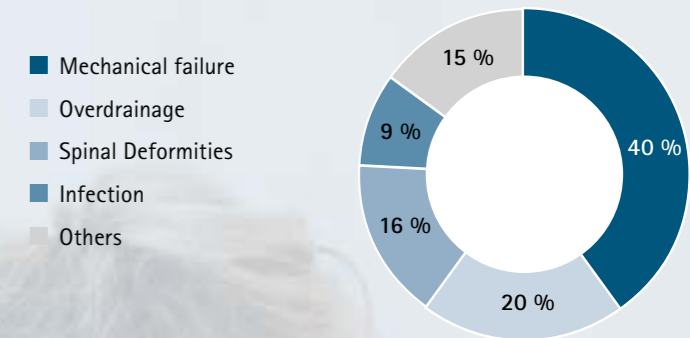


Proportion of shunts failing within 10 years

» High failure rates overshadow the effectiveness of shunts (1)



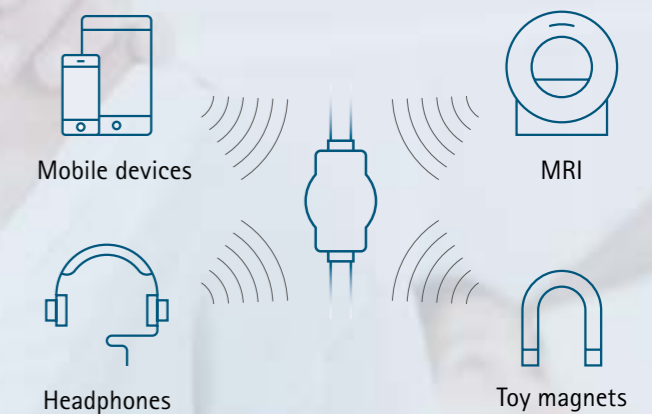
COMPLICATIONS LP-SHUNTING (5)



» About one in four patients experience at least one complication (2)

ACCIDENTAL REPROGRAMMING

As the optimal pressure setting of adjustable valves is of great importance for the patient, the accidental reprogramming of adjustable valves by external magnetic fields, e.g., from smartphones, is a cause of concern and leads to great uncertainty among patients and doctors (6-10).



GRAVITATIONAL VALVES BY MIETHKE

DEVELOPED TO ENSURE SAFETY



BE CONFIDENT!

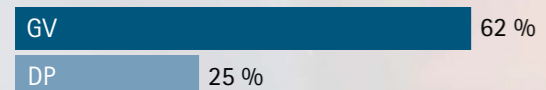
Gravitational shunts provide neurosurgeons with a possibility to address the posture-dependent effects of gravity, with positive clinical outcomes for the patient and a significant reduction of overdrainage events (11-13).

GRAVITATIONAL VALVES (GV) IMPROVE PATIENT OUTCOMES COMPARED TO DIFFERENTIAL PRESSURE VALVES (DP) (14).

Symptom improvement > 2 points on Kiefer-Scale

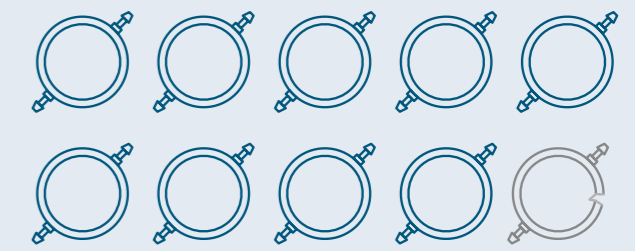


Daily improvement rated good / very good on Black-Scale

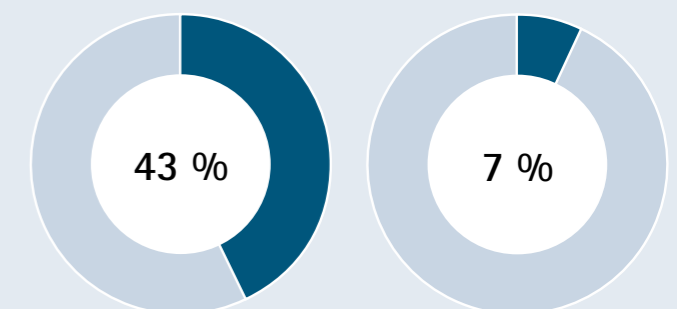


REDUCE COMPLICATIONS! REDUCE REVISIONS!

Clinical studies have shown that MIETHKE gravitational devices reduce the risk of revisions (15-19) and overdrainage complications (8, 13).



» Valve survival rates up to 90 % at 12 months (17).



» Implanting a gravitational valve avoids one additional overdrainage complication in about every third patient (16).

GRAVITATIONAL VALVES BY MIETHKE

DEVELOPED TO ENSURE SAFETY



AVOID MECHANICAL FAILURE!

All MIETHKE valves are manufactured with high precision from titanium. The small valves have aligned flow paths, rigid housing unsusceptible to subcutaneous pressure and high MRI- and biocompatibility.

DON'T LET MAGNETIC FIELDS BOTHER YOU!

The "Active-Lock mechanism" protects programmable MIETHKE valves against reprogramming by magnetic fields of up to 3 Tesla (20).

MIETHKE GRAVITATIONAL VALVES



Made from Titanium for high MRI- and biocompatibility



Protected against reprogramming up to 3 Tesla



Small valves



Rigid housing unsusceptible to subcutaneous pressure



BENEFIT FROM PRIMARY IMPLANTATION (21)!

22%

» higher survival of gravitational valves after primary vs. secondary implantation.

GET IT RIGHT THE FIRST TIME!

Early treatment with the optimal therapy is important for patients with hydrocephalus (21, 22) and can also help to avoid shunt replacements and associated perioperative risks.

OPTIMIZE – DON'T COMPROMISE!

Gravitational shunts allow for the prevention of over-drainage in the standing position without compromising the pressure setting for the supine position. The optimal opening pressure for each patient can be set both for the upright and the supine position – without needing to compromise.



» With gravitational valves the optimal pressure for both supine and upright position can be set.

HYDROCEPHALUS THERAPY

LUMBOPERITONEAL SHUNT AS AN ALTERNATIVE

MIETHKE develops innovative gravitational valves with low opening pressures in supine position and simultaneous high overdrainage protection in upright position, that improve patient outcome compared to conventional differential pressure valves (14, 16). This reflects our philosophy to provide the best possible treatment of hydrocephalus.

VP-shunt placement is the most common treatment, whereas LP-shunts are less commonly used due to initial reports of high rates of complications (23).

Recent international studies provide evidence that LP-shunting is equally as effective as VP-shunting for normal pressure hydrocephalus (NPH) and is associated with comparable complication rates (24-27); without statistically significant difference between the two groups (25, 26, 28). As a matter of fact LP-shunting has become an increasingly popular treatment option (24, 26-31).

Early treatment with the optimal therapy is essential (32). Hydrostatic pressure is created in every patient in an upright position driven by gravity. VP- and LP-shunts are in principle equally at risk of overdrainage in standing position, if no resistance compensation is considered, such as gravitational valves. Thus, avoiding overdrainage is just as important for LP- as it is for VP-shunts (27).

Modern gravitational valve technology from MIETHKE, which has proven its superiority in overdrainage prevention for VP-shunts, can now also be used for LP-shunts using the MIETHKE Valve Board (15, 20).



ADJUSTABLE GRAVITATIONAL VALVES AND ACCESSORIES

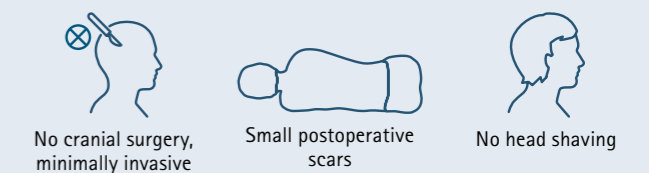
MEETING IMPORTANT REQUIREMENTS OF NEUROSURGEONS AND PATIENTS

- Valve technology for the special requirements of a life with hydrocephalus: mobility, growth, changes in the course of disease
- Superior clinical outcome of gravitational valves: survival rates, improvement in patient symptoms
- Reliable overdrainage protection
- MRI conditional up to 3 Tesla
- Safe from unintentional adjustment by everyday magnets such as smartphones, toys, induction cookers and safety barriers at the airports

MIETHKE VALVE BOARD: FLEXIBILITY AND SAFETY IN APPLICATION

- Various treatment options: *M.blue*, *proGAV 2.0*, *GAV 2.0* and *SHUNTASSISTANT 2.0*
- Different configurations available: with and without *CONTROL RESERVOIR*
- Various placement options: e.g. dorsal, paramedian; ventral, anterolateral; thoracic
- Firm and reliable fixation for axial alignment of gravitational valves
- Integrated kinking protection of catheters
- Intuitive, secure and comfortable instruments

POTENTIAL BENEFITS FROM LP-SHUNTS (29, 33)

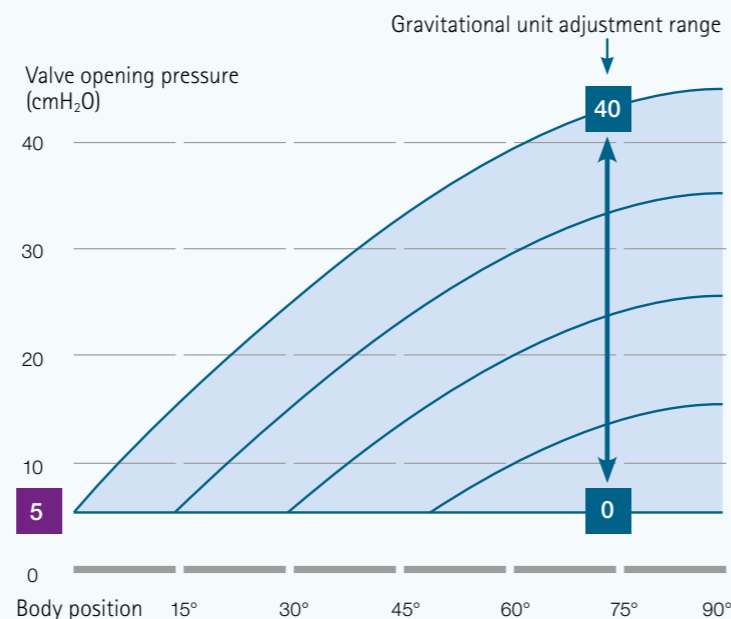


HYDROCEPHALUS THERAPY

FUNCTIONALITY OF GRAVITATIONAL VALVES AND PRESSURE LEVEL RECOMMENDATION

EXAMPLE OF THE ADJUSTABLE GRAVITATIONAL PRESSURE RANGE OF AN *M.blue* LUMBAR WITH A DIFFERENTIAL PRESSURE UNIT OF 5 CMH₂O

MIETHKE GV's are hydrocephalus valves operating in a position-dependent manner. GV's consist of a gravitational unit and a differential pressure unit. The combination of these two units adjusts the opening pressure automatically depending on what position the patient is in, thus countering the risk of possible overdrainage complications, particularly when the patient is in an upright and active position.

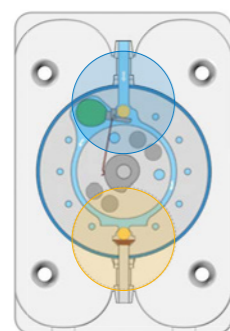
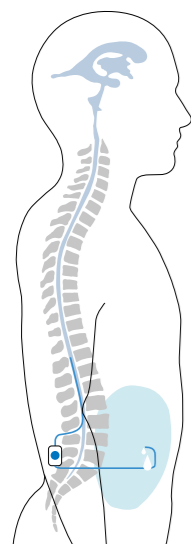


STANDARD PRESSURE LEVELS*

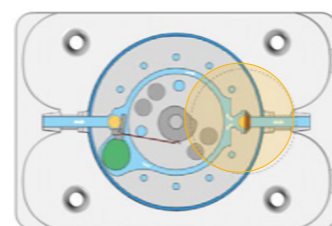
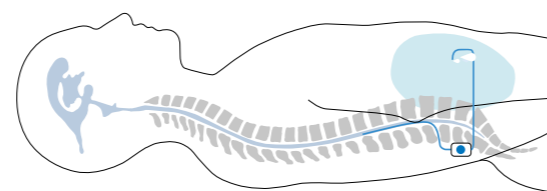
The choice of the appropriate pressure level depends on several factors, including age, degree of activity, size and stature of the patient.

Patient	Selection of pressure levels		Combined opening pressure	
	differential pressure unit	gravitational unit	horizontal position	upright position
Adults	5	25	5	30
Adults < 1.60 m	5	20	5	25
Adults > 1.80 m	5	30	5	35
Adults from 65 years	5	20	5	25
Adults from 65 years < 1.60 m	5	15	5	20
Adults from 65 years > 1.80 m	5	25	5	30

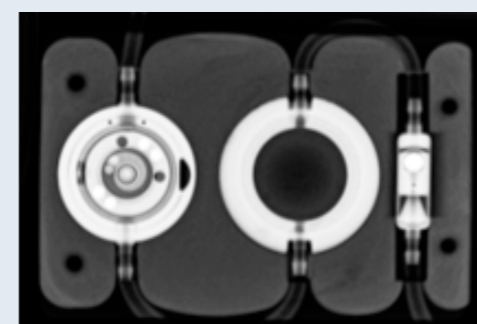
All indicated pressure levels are in cmH₂O.
 * This is a non-binding recommendation for the attending physician. According to his diagnosis, the physician decides each case independently, without instructions and individually. The stated values consider the current scientific knowledge up to 02/2021



Gravitational unit and differential pressure unit work together when the patient is standing



Only the differential pressure unit is active when the patient is supine



X-ray image of Valve Board with *proGAV 2.0* with prechamber, lumbar right (pressure rating of *proGAV 2.0* - 20 cmH₂O pressure rating of *SHUNTASSISTANT 2.0* - 25 cmH₂O)

X-ray recognition and product information can be found in the free MIETHKE App.



Download on the App Store



GET IT ON Google Play

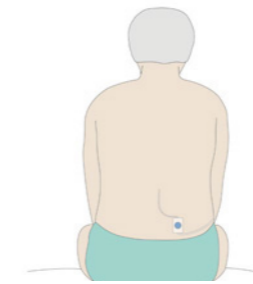
HYDROCEPHALUS THERAPY

VALVE ADJUSTMENT IN LUMBOPERITONEAL SHUNTS

SOFT TOUCH INSTRUMENT FUNCTIONALITY

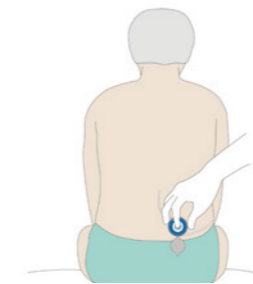
USER-FRIENDLY ADJUSTMENT AND VERIFICATION

Innovative *M.blue plus* instruments allow users to measure, verify and adjust the pressure level on *M.blue*'s adjustable gravitational unit (0-40 cmH₂O) as well as the pressure level on the adjustable differential pressure unit *proGAV 2.0*. The instruments offer simple steps for the physician and make the adjustment process comfortable for patients.



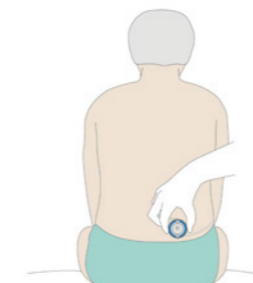
ADJUSTMENT OF MIETHKE LP-SHUNTS

Patient after LP-shunting in a sitting and slightly bent downward position for shunt valve adjustment.



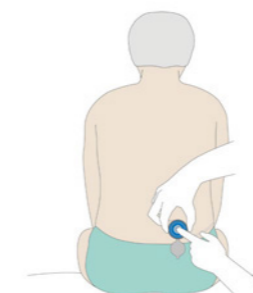
LOCATE

Locate valve by palpating the area with your finger through the open *M.blue plus* compass.



CHECK

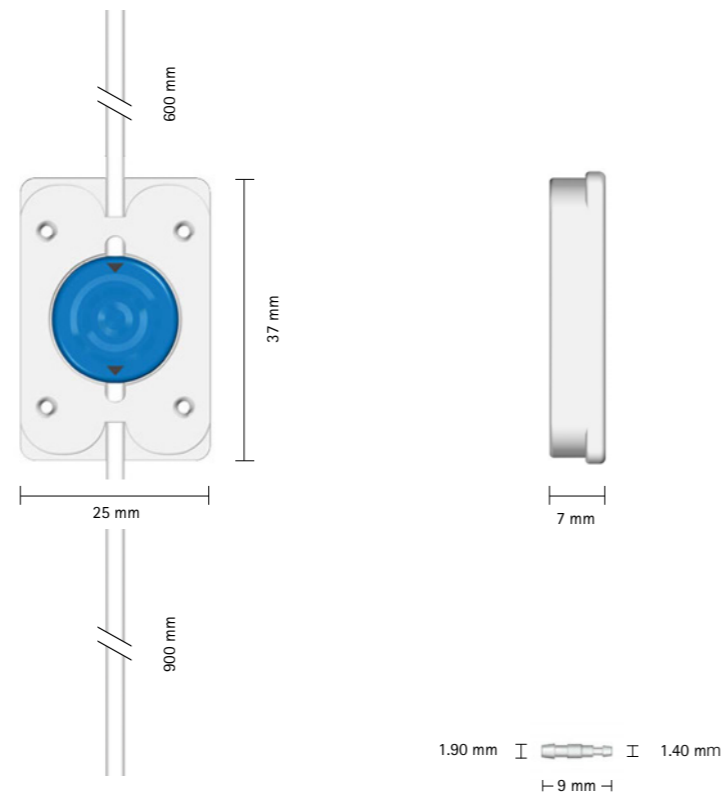
Close *M.blue plus* compass and use the floater to lock location and read current valve opening pressure settings.



ADJUST

With the help of the inserted adjustment ring the valve opening pressure can easily be set to the desired level. After setting the valve opening pressure, it is advisable to double-check the pressure level settings.

- Valve board premounted with:
 - *M.blue* with proximal catheter 600 mm and peritoneal catheter 900 mm
 - Step-down connector

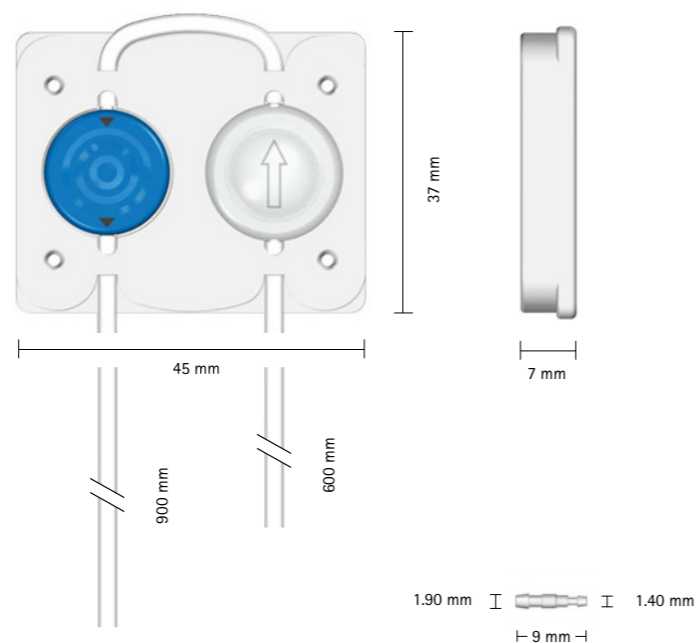


Catheter: $d_i = 1.2 \text{ mm}$, $d_o = 2.5 \text{ mm}$

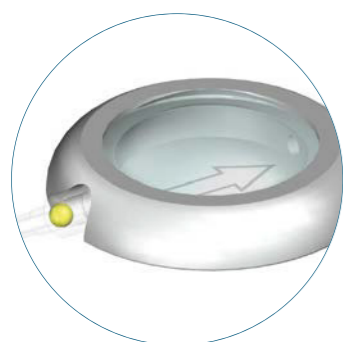
<i>M.blue</i> ®		
Art. No.	Differential pressure unit	Adjustable gravitational unit (preset to 20 cmH ₂ O)
FX850T	0 cmH ₂ O	0 - 40 cmH ₂ O
FX851T	5 cmH ₂ O	0 - 40 cmH ₂ O
FX852T	10 cmH ₂ O	0 - 40 cmH ₂ O
FX853T	15 cmH ₂ O	0 - 40 cmH ₂ O

COMING SOON

- Valve board premounted with:
- *M.blue* with CONTROL RESERVOIR, proximal catheter 600 mm and peritoneal catheter 900 mm
- Step-down connector
- An additional valve in the inlet of the CONTROL RESERVOIR makes it possible to pump cerebrospinal fluid in the direction of drainage only, allowing inspection of both the distal drainage section as well as the lumbar catheter.



Catheter: $d_i = 1.2 \text{ mm}$, $d_o = 2.5 \text{ mm}$

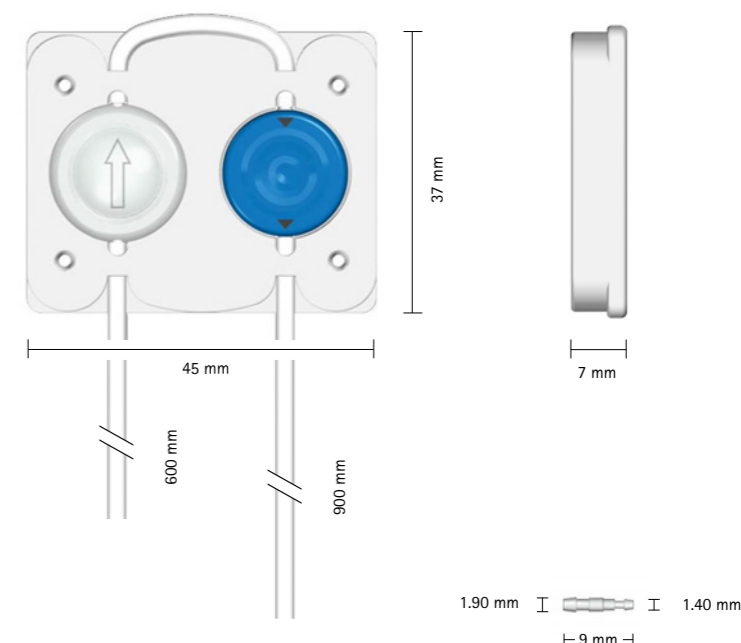


CONTROL RESERVOIR

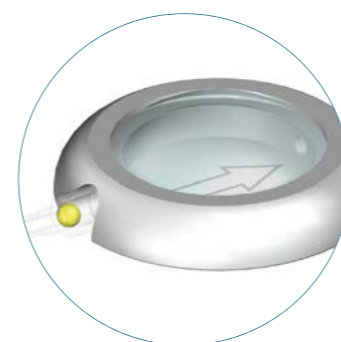
M.blue®		
Art. No.	Differential pressure unit	Adjustable gravitational unit (preset to 20 cmH ₂ O)
FX854T	0 cmH ₂ O	0 - 40 cmH ₂ O
FX855T	5 cmH ₂ O	0 - 40 cmH ₂ O
FX856T	10 cmH ₂ O	0 - 40 cmH ₂ O
FX857T	15 cmH ₂ O	0 - 40 cmH ₂ O

COMING SOON

- Valve board premounted with:
- *M.blue* with CONTROL RESERVOIR, proximal catheter 600 mm and peritoneal catheter 900 mm
- Step-down connector
- An additional valve in the inlet of the CONTROL RESERVOIR makes it possible to pump cerebrospinal fluid in the direction of drainage only, allowing inspection of both the distal drainage section as well as the lumbar catheter.



Catheter: $d_i = 1.2 \text{ mm}$, $d_o = 2.5 \text{ mm}$



CONTROL RESERVOIR

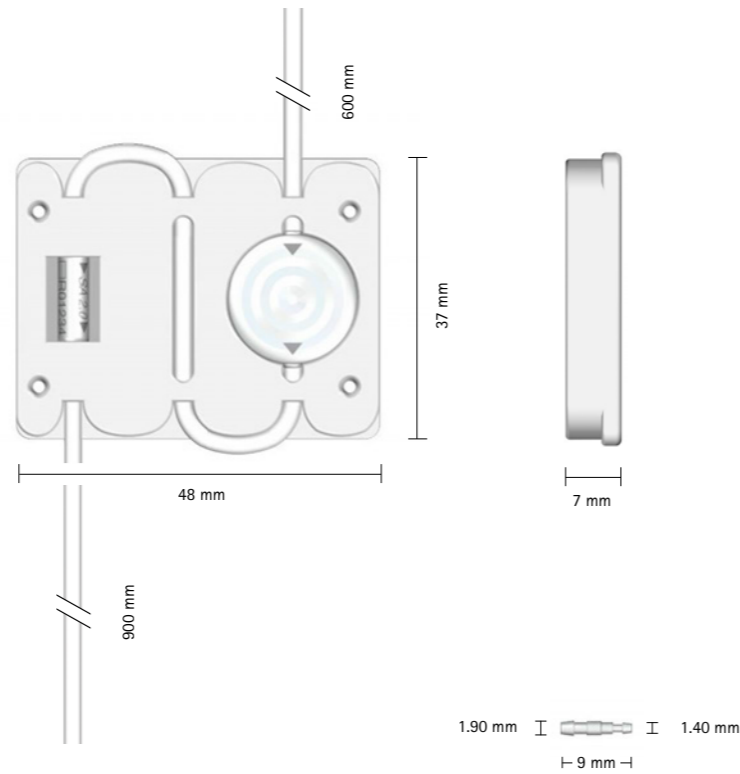
M.blue®		
Art. No.	Differential pressure unit	Adjustable gravitational unit (preset to 20 cmH ₂ O)
FX858T	0 cmH ₂ O	0 - 40 cmH ₂ O
FX859T	5 cmH ₂ O	0 - 40 cmH ₂ O
FX860T	10 cmH ₂ O	0 - 40 cmH ₂ O
FX861T	15 cmH ₂ O	0 - 40 cmH ₂ O

proGAV[®] 2.0

LUMBAR LEFT

- Valve board premounted with:
- *proGAV 2.0* with proximal catheter 600 mm and peritoneal catheter 900 mm
- Step-down connector

Catheter: $d_i = 1.2 \text{ mm}$, $d_o = 2.5 \text{ mm}$



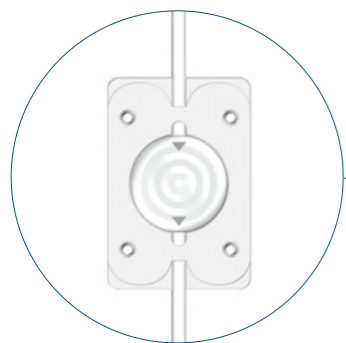
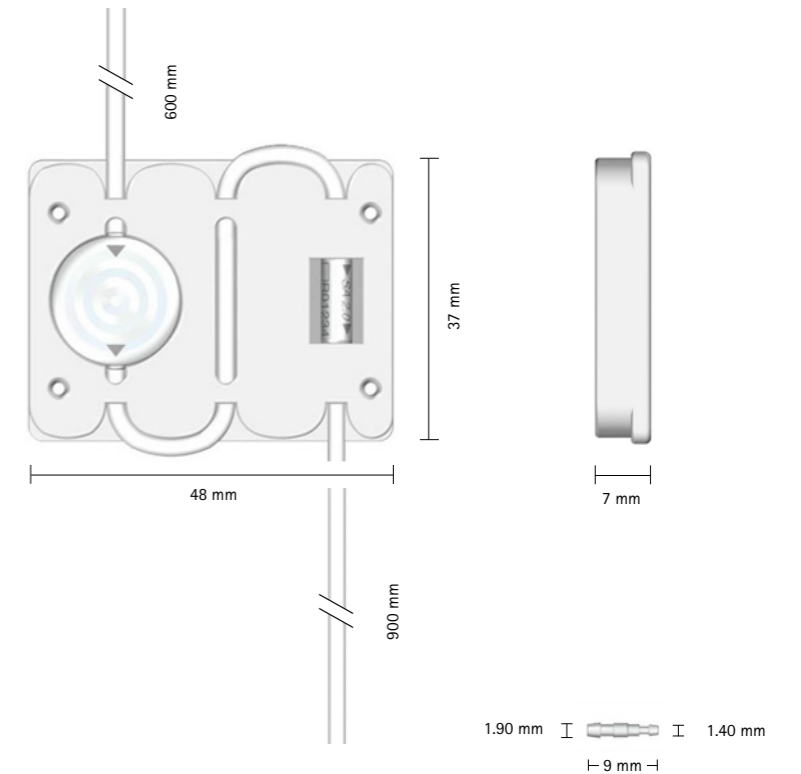
proGAV[®] 2.0

LUMBAR RIGHT



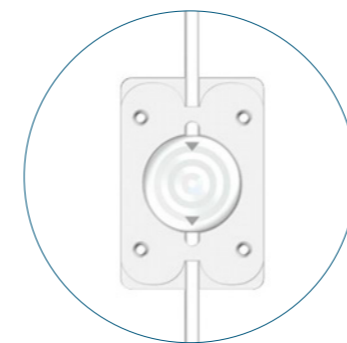
- Valve board premounted with:
- *proGAV 2.0* with proximal catheter 600 mm and peritoneal catheter 900 mm
- Step-down connector

Catheter: $d_i = 1.2 \text{ mm}$, $d_o = 2.5 \text{ mm}$



proGAV[®] 2.0

Art. No.	Graviational unit	Differential pressure unit (preset to 5 cmH ₂ O)
FX700T	-	0 - 20 cmH ₂ O
FX701T	10 cmH ₂ O	0 - 20 cmH ₂ O
FX702T	15 cmH ₂ O	0 - 20 cmH ₂ O
FX703T	20 cmH ₂ O	0 - 20 cmH ₂ O
FX704T	25 cmH ₂ O	0 - 20 cmH ₂ O
FX705T	30 cmH ₂ O	0 - 20 cmH ₂ O
FX706T	35 cmH ₂ O	0 - 20 cmH ₂ O



proGAV[®] 2.0

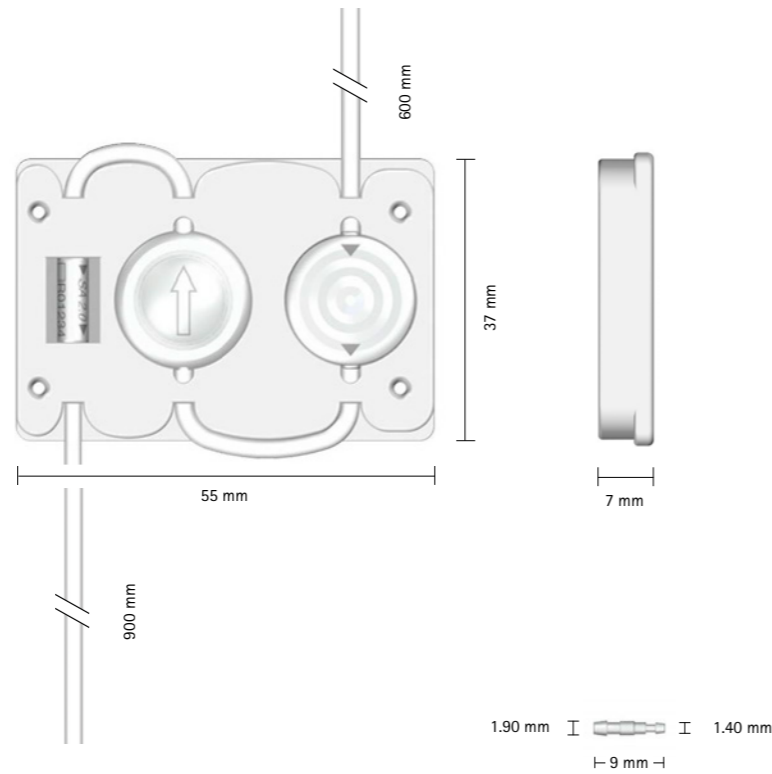
Art. No.	Graviational unit	Differential pressure unit (preset to 5 cmH ₂ O)
FX700T	-	0 - 20 cmH ₂ O
FX707T	10 cmH ₂ O	0 - 20 cmH ₂ O
FX708T	15 cmH ₂ O	0 - 20 cmH ₂ O
FX709T	20 cmH ₂ O	0 - 20 cmH ₂ O
FX710T	25 cmH ₂ O	0 - 20 cmH ₂ O
FX711T	30 cmH ₂ O	0 - 20 cmH ₂ O
FX712T	35 cmH ₂ O	0 - 20 cmH ₂ O

proGAV® 2.0

WITH CONTROL RESERVOIR, LUMBAR LEFT

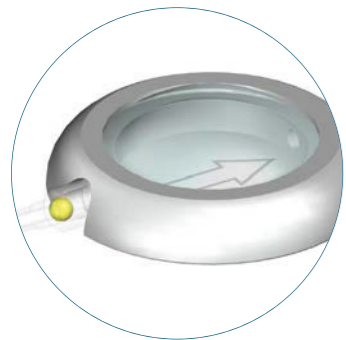
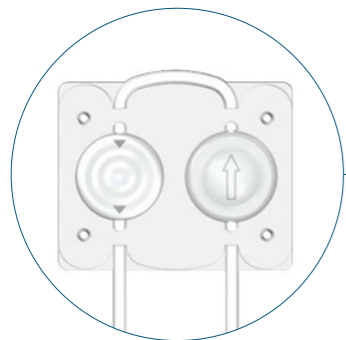
- Valve board premounted with:
- *proGAV 2.0* with CONTROL RESERVOIR, proximal catheter 600 mm and peritoneal catheter 900 mm
- Step-down connector
- An additional valve in the inlet of the CONTROL RESERVOIR makes it possible to pump cerebrospinal fluid in the direction of drainage only, allowing inspection of both the distal drainage section as well as the lumbar catheter.

Catheter: $d_i = 1.2 \text{ mm}$, $d_o = 2.5 \text{ mm}$



proGAV® 2.0

Art. No.	Graviational unit	Differential pressure unit (preset to 5 cmH ₂ O)
FX713T	-	0 - 20 cmH ₂ O
FX714T	10 cmH ₂ O	0 - 20 cmH ₂ O
FX715T	15 cmH ₂ O	0 - 20 cmH ₂ O
FX716T	20 cmH ₂ O	0 - 20 cmH ₂ O
FX717T	25 cmH ₂ O	0 - 20 cmH ₂ O
FX718T	30 cmH ₂ O	0 - 20 cmH ₂ O
FX719T	35 cmH ₂ O	0 - 20 cmH ₂ O



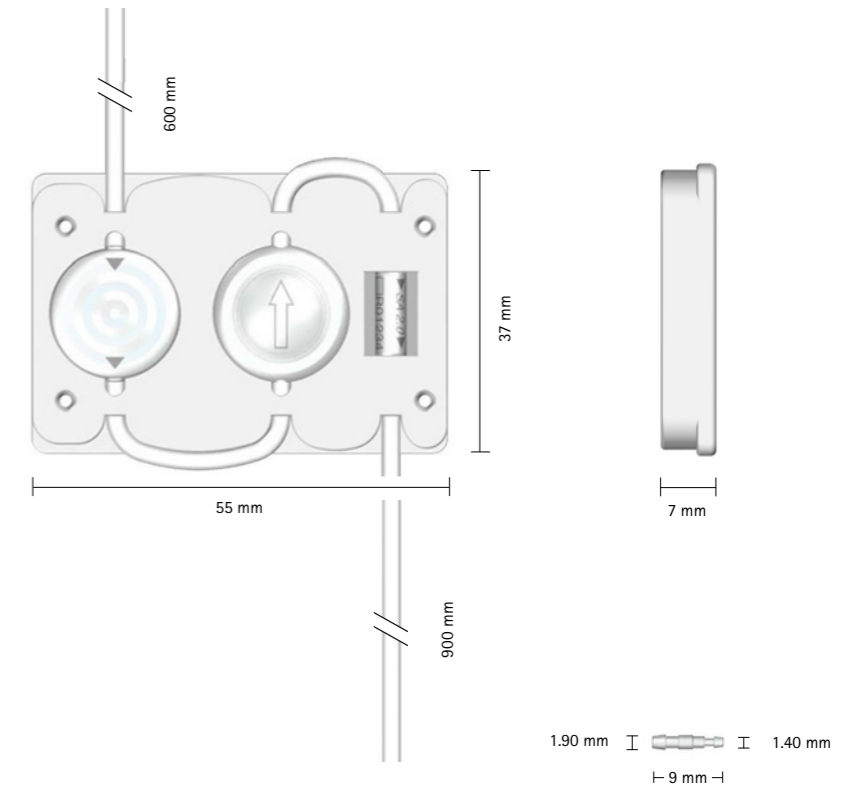
CONTROL RESERVOIR

proGAV® 2.0

WITH CONTROL RESERVOIR, LUMBAR RIGHT

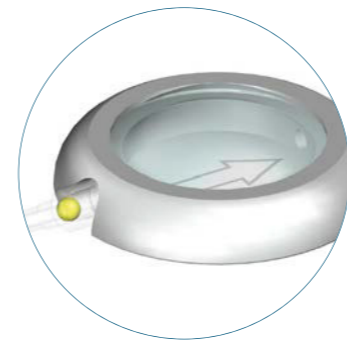
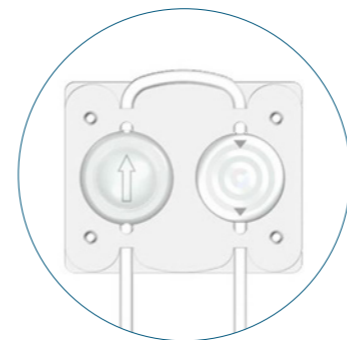
- Valve board premounted with:
- *proGAV 2.0* with CONTROL RESERVOIR, proximal catheter 600 mm and peritoneal catheter 900 mm
- Step-down connector
- An additional valve in the inlet of the CONTROL RESERVOIR makes it possible to pump cerebrospinal fluid in the direction of drainage only, allowing inspection of both the distal drainage section as well as the lumbar catheter.

Catheter: $d_i = 1.2 \text{ mm}$, $d_o = 2.5 \text{ mm}$



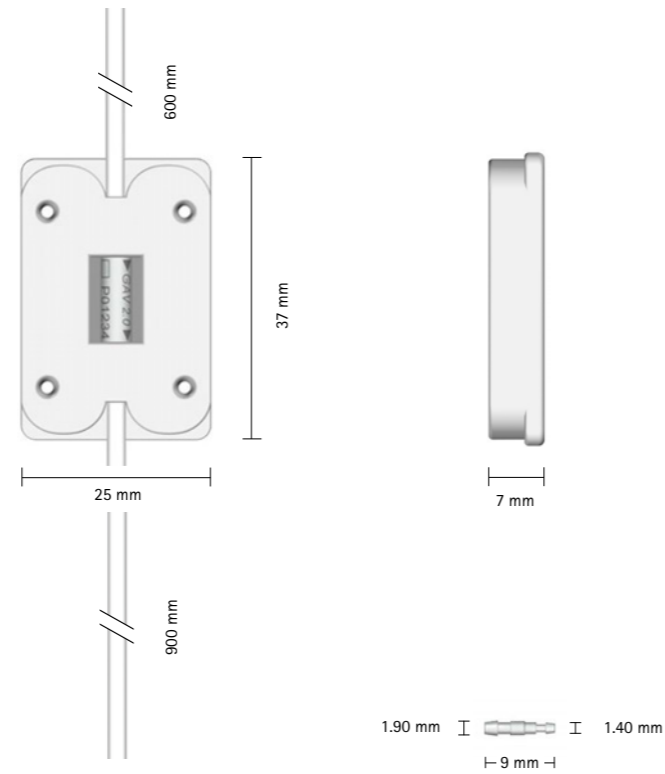
proGAV® 2.0

Art. No.	Graviational unit	Differential pressure unit (preset to 5 cmH ₂ O)
FX720T	-	0 - 20 cmH ₂ O
FX721T	10 cmH ₂ O	0 - 20 cmH ₂ O
FX722T	15 cmH ₂ O	0 - 20 cmH ₂ O
FX723T	20 cmH ₂ O	0 - 20 cmH ₂ O
FX724T	25 cmH ₂ O	0 - 20 cmH ₂ O
FX725T	30 cmH ₂ O	0 - 20 cmH ₂ O
FX726T	35 cmH ₂ O	0 - 20 cmH ₂ O



CONTROL RESERVOIR

- Valve board premounted with:
- **GAV 2.0** with proximal catheter 600 mm and peritoneal catheter 900 mm
- Step-down connector



Catheter: $d_i = 1.2 \text{ mm}$, $d_o = 2.5 \text{ mm}$

GAV[®] 2.0

Art. No.	Lying	Upright
FX182T	5 cmH ₂ O	20 cmH ₂ O
FX183T	5 cmH ₂ O	25 cmH ₂ O
FX184T	5 cmH ₂ O	30 cmH ₂ O
FX185T	5 cmH ₂ O	35 cmH ₂ O
FX186T	10 cmH ₂ O	25 cmH ₂ O
FX187T	10 cmH ₂ O	30 cmH ₂ O

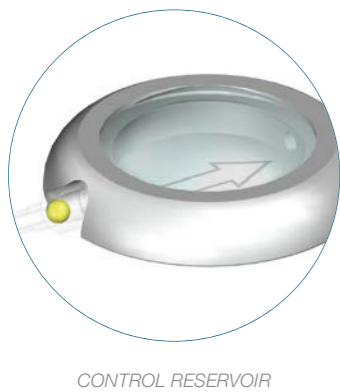
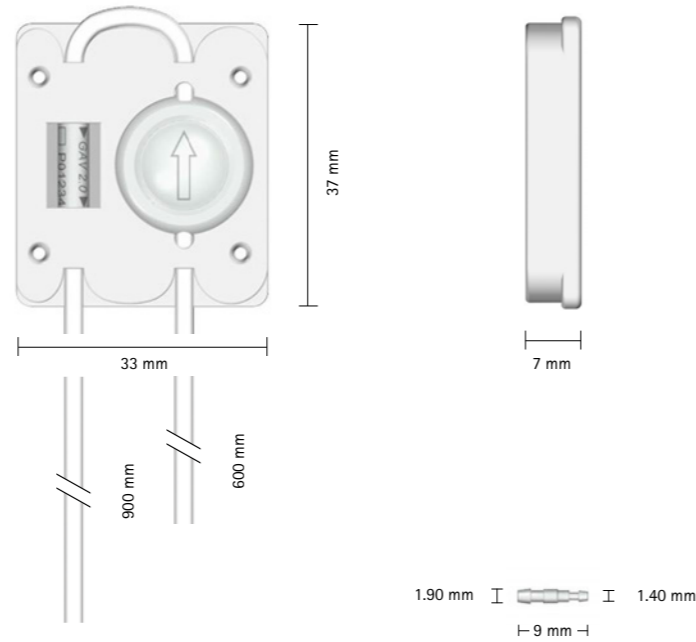
GAV[®] 2.0

WITH CONTROL RESERVOIR, LUMBAR LEFT

COMING SOON

- Valve board premounted with:
- **GAV 2.0** with **CONTROL RESERVOIR**, proximal catheter 600 mm and peritoneal catheter 900 mm
- Step-down connector
- An additional valve in the inlet of the **CONTROL RESERVOIR** makes it possible to pump cerebrospinal fluid in the direction of drainage only, allowing inspection of both the distal drainage section as well as the lumbar catheter.

Catheter: $d_i = 1.2 \text{ mm}$, $d_o = 2.5 \text{ mm}$



GAV[®] 2.0

Art. No.	Lying	Upright
FX188T	5 cmH ₂ O	20 cmH ₂ O
FX189T	5 cmH ₂ O	25 cmH ₂ O
FX190T	5 cmH ₂ O	30 cmH ₂ O
FX191T	5 cmH ₂ O	35 cmH ₂ O
FX192T	10 cmH ₂ O	25 cmH ₂ O
FX193T	10 cmH ₂ O	30 cmH ₂ O

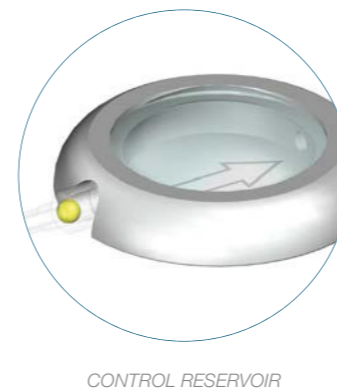
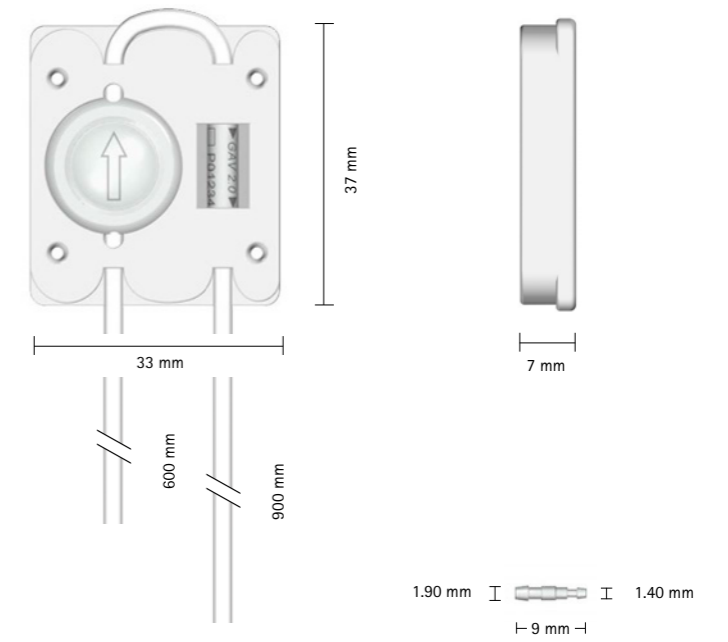
GAV[®] 2.0

WITH CONTROL RESERVOIR, LUMBAR RIGHT

COMING SOON

- Valve board premounted with:
- **GAV 2.0** with **CONTROL RESERVOIR**, proximal catheter 600 mm and peritoneal catheter 900 mm
- Step-down connector
- An additional valve in the inlet of the **CONTROL RESERVOIR** makes it possible to pump cerebrospinal fluid in the direction of drainage only, allowing inspection of both the distal drainage section as well as the lumbar catheter.

Catheter: $d_i = 1.2 \text{ mm}$, $d_o = 2.5 \text{ mm}$



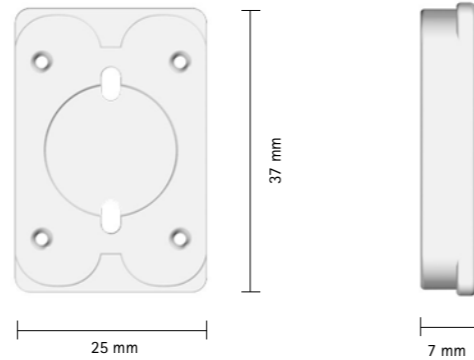
GAV[®] 2.0

Art. No.	Lying	Upright
FX194T	5 cmH ₂ O	20 cmH ₂ O
FX195T	5 cmH ₂ O	25 cmH ₂ O
FX196T	5 cmH ₂ O	30 cmH ₂ O
FX197T	5 cmH ₂ O	35 cmH ₂ O
FX198T	10 cmH ₂ O	25 cmH ₂ O
FX199T	10 cmH ₂ O	30 cmH ₂ O

COMING SOON

VALVE BOARD FOR *M.blue*[®] OR *proGAV*[®] 2.0

- Valve board for *M.blue* or *proGAV* 2.0

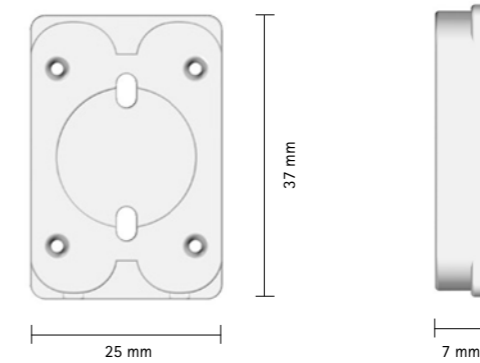


VALVE BOARD

Art. No.	Description
FV087P	Valve board for <i>M.blue</i> [®] or <i>proGAV</i> [®] 2.0

VALVE BOARD FOR CONTROL RESERVOIR

- Valve board for CONTROL RESERVOIR

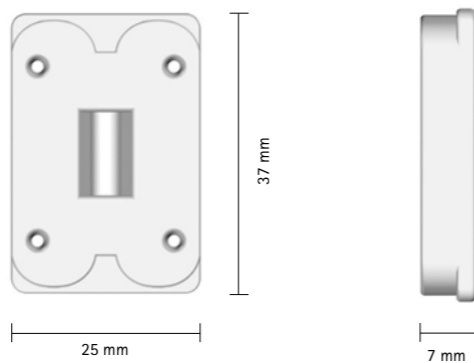


VALVE BOARD

Art. No.	Description
FV089P	Valve board for CONTROL RESERVOIR

VALVE BOARD FOR *SHUNTASSISTANT*[®] 2.0 OR *GAV*[®] 2.0

- Valve board for *SHUNTASSISTANT* 2.0 or *GAV* 2.0



VALVE BOARD

Art. No.	Description
FV088P	Valve board for <i>SHUNTASSISTANT</i> [®] 2.0 or <i>GAV</i> [®] 2.0

GAV[®] 2.0 LP

GAV[®] 2.0 LP, STRAIGHT

- GAV 2.0 LP Valve (straight) with distal catheter (1200 mm)



Valve: $d_o = 4.2$ mm
 Connector: $d_o = 1.4$ mm
 for connection with lumbar catheter
 Connector: $d_o = 1.9$ mm
 Catheter: $d_i = 1.2$ mm, $d_o = 2.5$ mm

GAV[®] 2.0 LP, STRAIGHT

Art. No.	Lying	Upright
FX222T	5 cmH ₂ O	20 cmH ₂ O
FX223T	5 cmH ₂ O	25 cmH ₂ O
FX224T	5 cmH ₂ O	30 cmH ₂ O
FX225T	5 cmH ₂ O	35 cmH ₂ O
FX226T	10 cmH ₂ O	25 cmH ₂ O
FX227T	10 cmH ₂ O	30 cmH ₂ O

GAV[®] 2.0 LP

GAV[®] 2.0 LP, U FORM



- GAV 2.0 LP Valve (U-Form) with distal catheter (1200 mm)



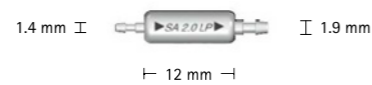
Valve: $d_o = 4.2$ mm
 Connector: $d_o = 1.4$ mm
 for connection with lumbar catheter
 Connector: $d_o = 1.9$ mm
 Catheter: $d_i = 1.2$ mm, $d_o = 2.5$ mm

GAV[®] 2.0 LP, U FORM

Art. No.	Lying	Upright
FX228T	5 cmH ₂ O	20 cmH ₂ O
FX229T	5 cmH ₂ O	25 cmH ₂ O
FX230T	5 cmH ₂ O	30 cmH ₂ O
FX231T	5 cmH ₂ O	35 cmH ₂ O
FX232T	10 cmH ₂ O	25 cmH ₂ O
FX233T	10 cmH ₂ O	30 cmH ₂ O

SHUNTASSISTANT® 2.0 LP, STRAIGHT

▪ Valve LP, straight

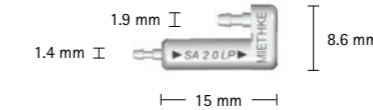


Valve: $d_o = 4.2$ mm
 Connector: $d_o = 1.4$ mm
 for connection with lumbar catheter
 Connector: $d_o = 1.9$ mm
 preferably used with
 Catheter: $d_i = 1.2$ mm, $d_o = 2.5$ mm

Art. No.	Opening pressure
FX106T	10 cmH ₂ O
FX107T	15 cmH ₂ O
FX108T	20 cmH ₂ O
FX109T	25 cmH ₂ O
FX110T	30 cmH ₂ O
FX111T	35 cmH ₂ O

SHUNTASSISTANT® 2.0 LP, U-FORM

▪ Valve LP, U-Form

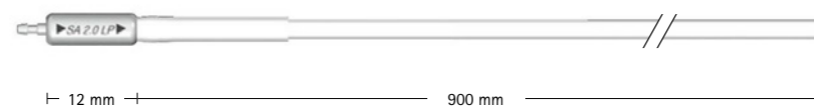


Valve: $d_o = 4.2$ mm
 Connector: $d_o = 1.4$ mm
 for connection with lumbar catheter
 Connector: $d_o = 1.9$ mm
 preferably used with
 Catheter: $d_i = 1.2$ mm, $d_o = 2.5$ mm

Art. No.	Opening pressure
FX112T	10 cmH ₂ O
FX113T	15 cmH ₂ O
FX114T	20 cmH ₂ O
FX115T	25 cmH ₂ O
FX116T	30 cmH ₂ O
FX117T	35 cmH ₂ O

SHUNTASSISTANT® 2.0 LP, STRAIGHT WITH DISTAL CATHETER

▪ Valve LP, straight with distal catheter (900 mm)

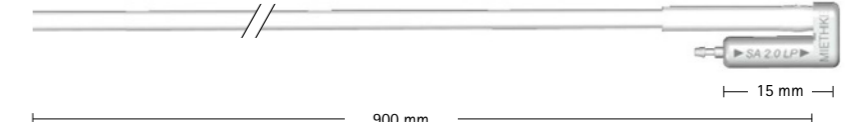


Valve: $d_o = 4.2$ mm
 Connector: $d_o = 1.4$ mm
 for connection with lumbar catheter
 Connector: $d_o = 1.9$ mm
 Catheter: $d_i = 1.2$ mm, $d_o = 2.5$ mm

Art. No.	Opening pressure
FX124T	10 cmH ₂ O
FX125T	15 cmH ₂ O
FX126T	20 cmH ₂ O
FX127T	25 cmH ₂ O
FX128T	30 cmH ₂ O
FX129T	35 cmH ₂ O

SHUNTASSISTANT® 2.0 LP, U-FORM WITH DISTAL CATHETER

▪ Valve LP, U-Form with distal catheter (900 mm)



Valve: $d_o = 4.2$ mm
 Connector: $d_o = 1.4$ mm
 for connection with lumbar catheter
 Connector: $d_o = 1.9$ mm
 Catheter: $d_i = 1.2$ mm, $d_o = 2.5$ mm

Art. No.	Opening pressure
FX130T	10 cmH ₂ O
FX131T	15 cmH ₂ O
FX132T	20 cmH ₂ O
FX133T	25 cmH ₂ O
FX134T	30 cmH ₂ O
FX135T	35 cmH ₂ O

DUALSWITCH® VALVE

DUALSWITCH® VALVE FOR LP DRAINAGE

- Single valve with two connections



Connector: $d_o = 1.4$ mm
for connection with lumbar catheter
Connector: $d_o = 1.9$ mm

Art. No.	Lying	Upright
FV373T	5 cmH ₂ O	30 cmH ₂ O
FV374T	5 cmH ₂ O	40 cmH ₂ O
FV127T	10 cmH ₂ O	30 cmH ₂ O
FV128T	10 cmH ₂ O	40 cmH ₂ O
FV129T	10 cmH ₂ O	50 cmH ₂ O

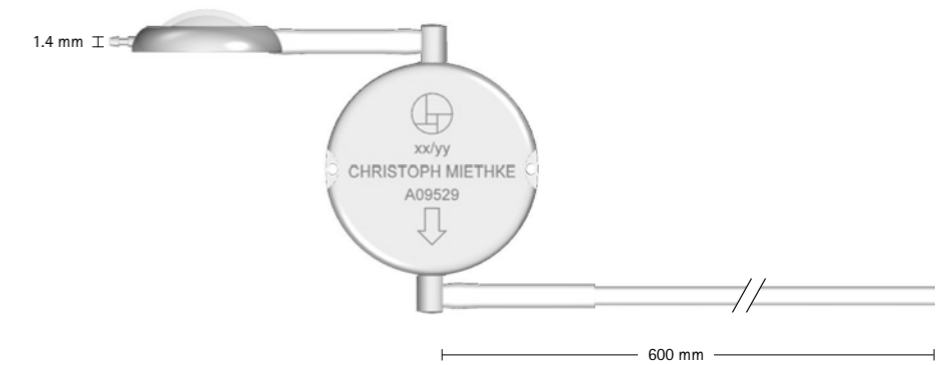
DUALSWITCH® VALVE

DUALSWITCH® SHUNT SYSTEM FOR LP DRAINAGE



- Valve system with one connection
- Valve only, with integrated flushing reservoir and integrated distal catheter

Connector: $d_o = 1.4$ mm
for connection with lumbar catheter
Connector: $d_o = 1.9$ mm
Catheter: $d_i = 1.2$ mm, $d_o = 2.5$ mm



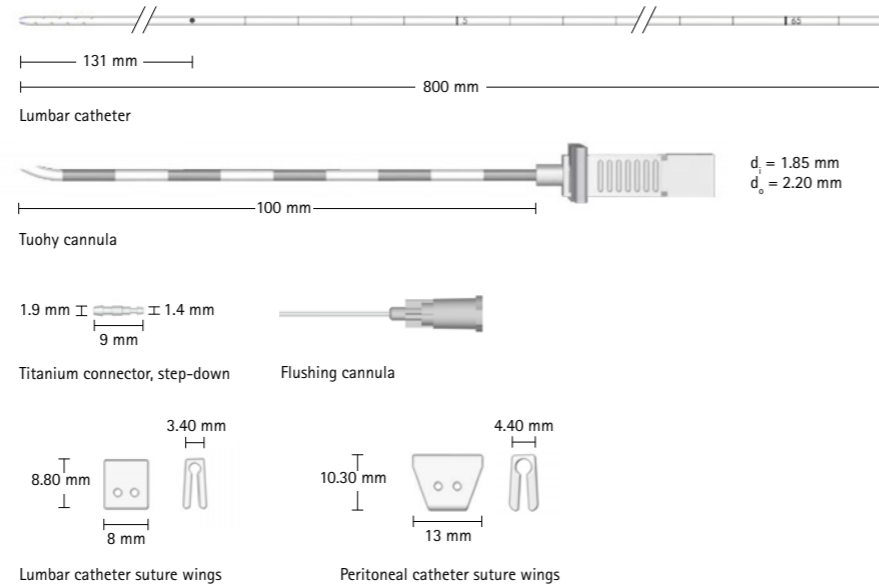
Art. No.	Lying	Upright
FV382T	5 cmH ₂ O	30 cmH ₂ O
FV383T	5 cmH ₂ O	40 cmH ₂ O
FV163T	10 cmH ₂ O	30 cmH ₂ O
FV164T	10 cmH ₂ O	50 cmH ₂ O

LUMBAR CATHETER SET

LUMBAR CATHETER WITH OPEN TIP

- Barium impregnated silicone catheter for X-ray visibility
- Catheter with 16 drainage holes, in four opposite rows
- Length markings on both sides of the catheter
- Length markings aligned to the Tuohy cannula
- Barium impregnated silicone suture wings for X-ray visibility
- Step-down connector for connecting standard catheter to lumbar catheter

Catheter: $d_i = 0.80 \text{ mm}$, $d_o = 1.60 \text{ mm}$
 Connector: $d_o = 1.9 \text{ mm}$ to 1.4 mm



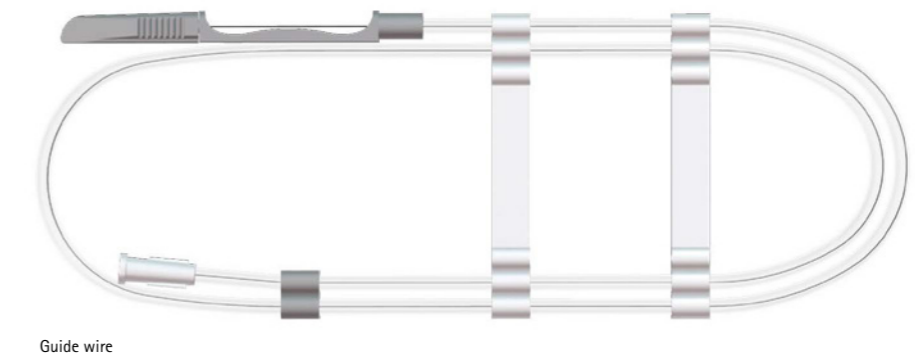
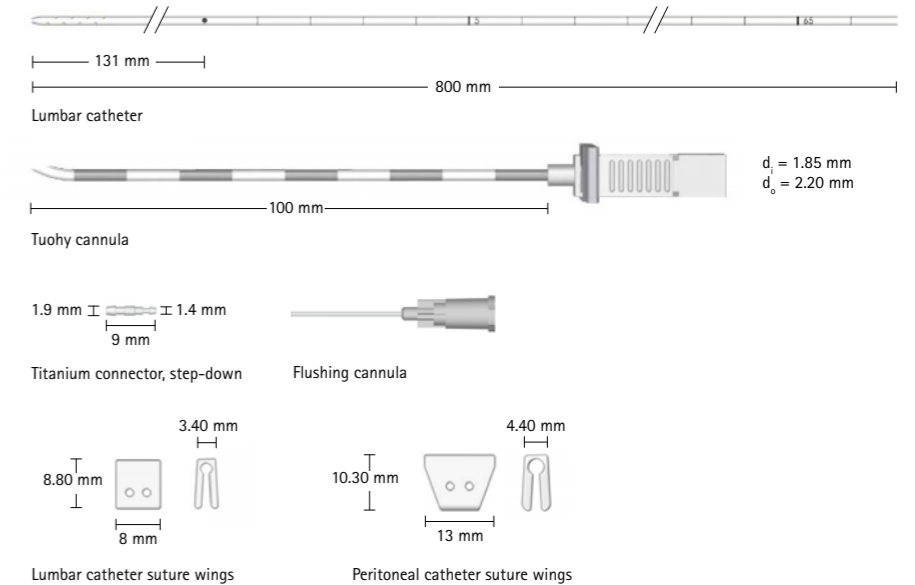
LUMBAR CATHETER SET

LUMBAR CATHETER WITH CLOSED TIP



- Barium impregnated silicone catheter for X-ray visibility
- Catheter with 16 drainage holes, in four opposite rows
- Length markings on both sides of the catheter
- Length markings aligned to the Tuohy cannula
- Barium impregnated silicone suture wings for X-ray visibility
- Step-down connector for connecting standard catheter to lumbar catheter

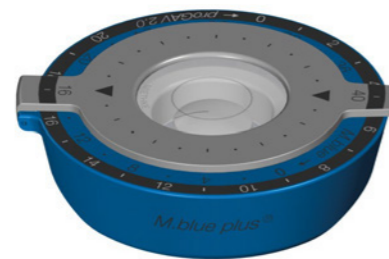
Catheter: $d_i = 0.80 \text{ mm}$, $d_o = 1.60 \text{ mm}$
 Connector: $d_o = 1.9 \text{ mm}$ to 1.4 mm
 Guide wire: $d_o = 0.46 \text{ mm}$



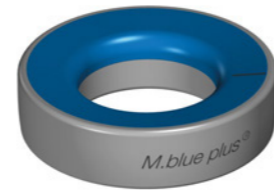
Art. No.	Description
FV083P	Lumbar Catheter Set, open tip, long Tuohy cannula · Lumbar catheter with open tip, 800 mm long · Tuohy cannula 14G, insertion length 100 mm · Lumbar catheter suture wings, peritoneal catheter suture wings · Titanium connector, step-down · Flushing cannula lumbar catheter

Art. No.	Description
FV084P	Lumbar Catheter Set, closed tip, long Tuohy cannula · Lumbar catheter with closed tip, 800 mm long · Tuohy cannula 14G, insertion length 100 mm · Lumbar catheter suture wings, peritoneal catheter suture wings · Titanium connector, step-down · Flushing cannula lumbar catheter · Guide wire

- M.blue plus instrument set
- M.blue plus compass
- M.blue plus adjustment ring
- M.blue plus adjustment assistant



M.blue plus® compass



M.blue plus® adjustment ring

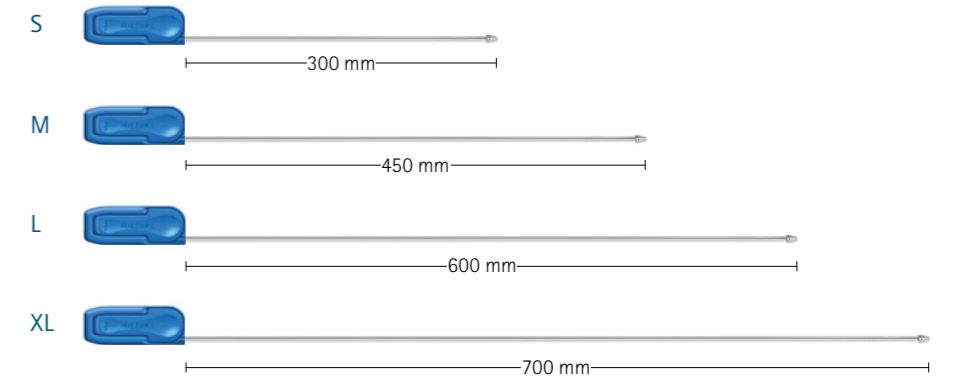


M.blue plus® adjustment assistant

Art. No.	Instruments
FX890T	M.blue plus® instrument set (includes FX891T and FX892T)
FX891T	M.blue plus® compass
FX892T	M.blue plus® adjustment ring
FX893T	M.blue plus® adjustment assistant

4 lengths available in standard or rigid version

- S - 300 mm
- M - 450 mm
- L - 600 mm
- XL - 700 mm



	300 mm	450 mm	600 mm	700 mm
STANDARD VERSION (with ring marking)	FX005SU	FX006SU	FX007SU	FX008SU
RIGID VERSION (no ring marking)	FX001SU	FX002SU	FX003SU	FX004SU

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