B|BRAUN
SHARING EXPERTISE

MIETHKE

XABO®

ANTIBIOTIC-IMPREGNATED CATHETERS

XTRA PROTECTION AGAINST INFECTION

www.miethke.com

B BRAUN
SHARING EXPERTISE

WE UNDER STAND

The Gravity of the Situation

MIETHKE

TOGETHER FOR A BETTER LIFE **WITH HYDROCEPHALUS**

We have a long and intensive partnership with B. Braun in the field of neurosurgery. We are driven by a common vision: to improve the lives of hydrocephalus patients around the world with innovative solutions.

Our Strong Partner in Neurosurgery:

B BRAUN
SHARING EXPERTISE

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B BRAUN
SHARING EXPERTISE

"Our partnership with B. Braun has always been based on trust, expertise and mutual respect on an equal footing. This was already the case in 1999, when we began our joint journey with B. Braun as an innovative start-up. Today, this partnership also means friendship for us with so many long-standing companions worldwide."

Christoph Miethke, CEO and founder of Christoph Miethke GmbH & Co. KG.

MIETHKE

OUR PARTNERSHIP **WITH B. BRAUN**

What connects us is an intensive and simultaneously a very special partnership with B. Braun.

Together we have been successfully selling MIETHKE products in more than 60 countries worldwide for many years.

Our cooperation is an exciting combination of B. Braun's almost 185 years of expertise as one of the world's leading medical technology companies and our agility as an innovative company and technology leader for gravity-based shunt technology. Above all, however, it is supported by a large number of colleagues, product experts and international contacts with a shared understanding of values.

We listen carefully to the voices of patients and neurosurgeons around the world and constantly question our own status quo. We passionately research, learn, develop and share our knowledge.

TOGETHER FOR A BETTER LIFE **WITH HYDROCEPHALUS**

We share a common vision: to improve the lives of hydrocephalus patients around the world with innovative solutions. What drives us every day is our responsibility for people. With quality, responsibility, scientific and meticulous work, proximity, diversity and mutual respect, we want to meet this responsibility together and worldwide every day.

This is not just a promise but a self-conception of who we are.

Our Strong Partner in Neurosurgery:

B BRAUN
SHARING EXPERTISE

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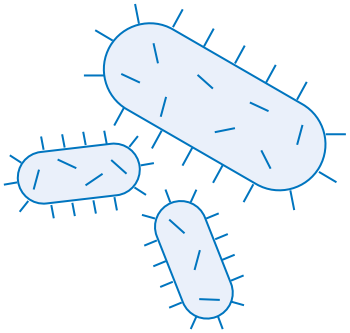
INFECTION AS A SERIOUS SHUNT COMPLICATION

INFECTIONS ARE A SERIOUS COMPLICATION OF SHUNT IMPLANTATION

The implantation of a ventriculoperitoneal shunt is the main treatment option for hydrocephalus patients but complications occur quite often and are burdensome for patients, their relatives as well as the neurosurgeons. Surgery on the brain is perceived as a very demanding procedure by the patient and family members. When such a surgery is followed by severe and potentially life-threatening complications, fears may arise. One of the most common and potentially serious complications of hydrocephalus treatment is an infection of the shunt [1]. This complication affects pediatric as well as adult patients and impairs their quality of life, cognitive function, and shunt survival [2].

Shunt infections mostly require removal of the shunt, antibiotic treatment and reimplantation [2].



» Bacterial shunt infection is one of the most common complications of shunt surgery, affecting 7-15% of hydrocephalus patients [3]. «

CONSEQUENCES OF SHUNT INFECTIONS

Shunt infections can have severe consequences for the patient: They are associated with a higher risk for further complications, such as seizures, psychomotor retardation, and shunt failure, which increase morbidity and mortality [6–9]. The removal of the infected shunt, antibiotic treatment and shunt re-implantation means two additional surgeries, which is an enormous burden both for the patient and the patient's family.

For the neurosurgeon, shunt infections drastically increase the workload and in the worst-case scenario require additional unplanned surgeries.

For the hospital, repeated shunt infections are associated with high economic losses and may affect the hospitals reputation. The costs for one adult patient amount to approximately $50,000 per infection, with even higher costs for pediatric patients [10].

High associated costs

Lower shunt survival

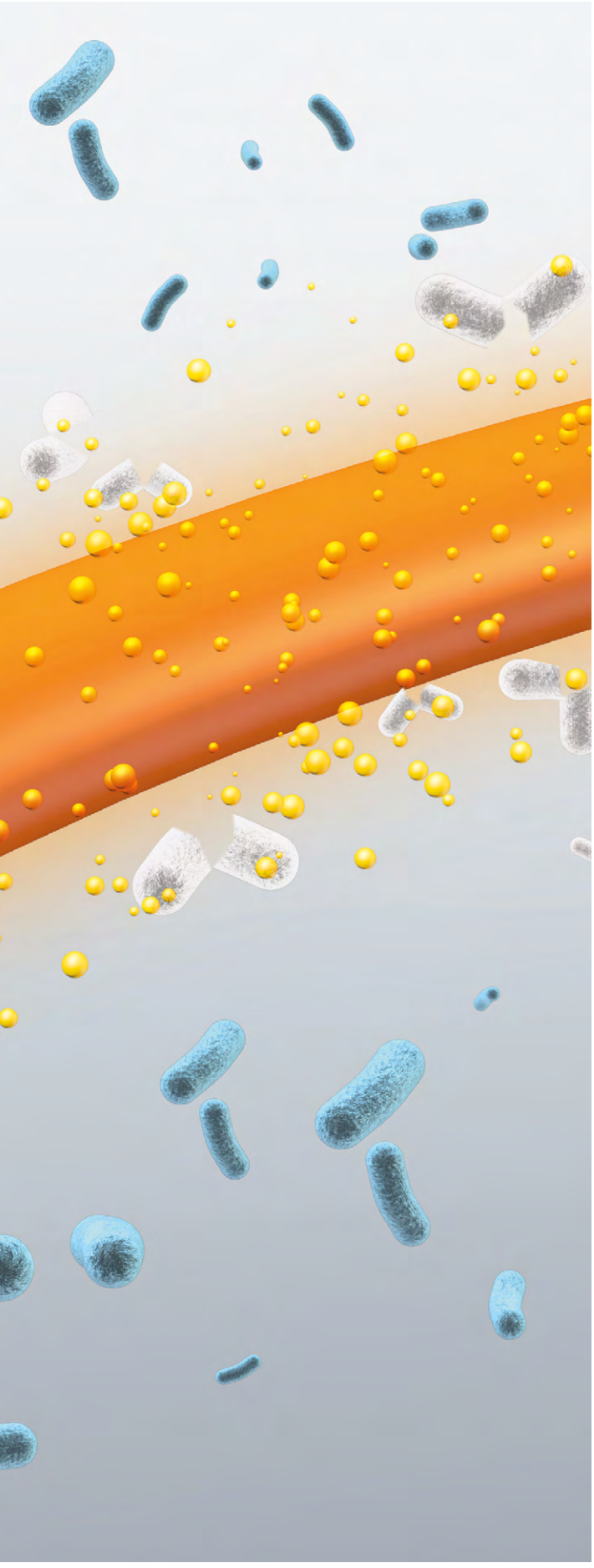
Prolonged treatment

Emotional burden

» *Removal of the infected shunt and re-implantation is an enormous burden for patients and their families and means high economic losses for the hospital [10].* «

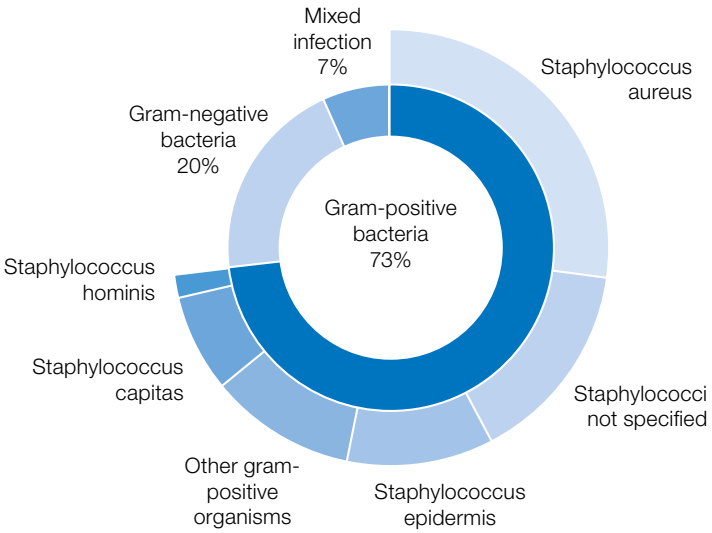
XABO®

XTRA PROTECTION AGAINST INFECTION



CAUSES OF BACTERIAL SHUNT INFECTIONS

Shunt infections are mainly caused by gram-positive bacteria, e.g. Staphylococcus species [4], and often occur within the first month after surgery [5].



» *73% of all bacterial infections are caused by gram-positive pathogens [11].* «

PREVENTION OF SHUNT INFECTIONS

Use of antibiotic-impregnated catheters can prevent two-thirds of shunt infections [11], thus helping to reduce patient burden and improve patient outcome. By avoiding additional hospital stays and surgeries the patient's wellbeing and the acceptance for the treatment can be increased. Moreover, as time-consuming complications are reduced, neurosurgeons can focus on their further work and thus help a greater number of patients. Prevention of infections also has a financial impact as it can save $42,125 and $230,390 per 100 first-time shunt placements in adult and pediatric patients, respectively [10].

Prevention of shunt infection can therefore help to reduce costs for hospitals and the health care system. In addition, follow-up operations can be avoided, thus easing the hospital staff's workload. The time saved and the reduced stress allow neurosurgeons to focus more on the individual patient, thus improving the treatment of hydrocephalus for every patient.

MIETHKE's new antibiotic-impregnated catheter *XABO* uses a balanced ratio of clindamycin hydrochloride and rifampicin to effectively fight gram-positive bacteria [12].

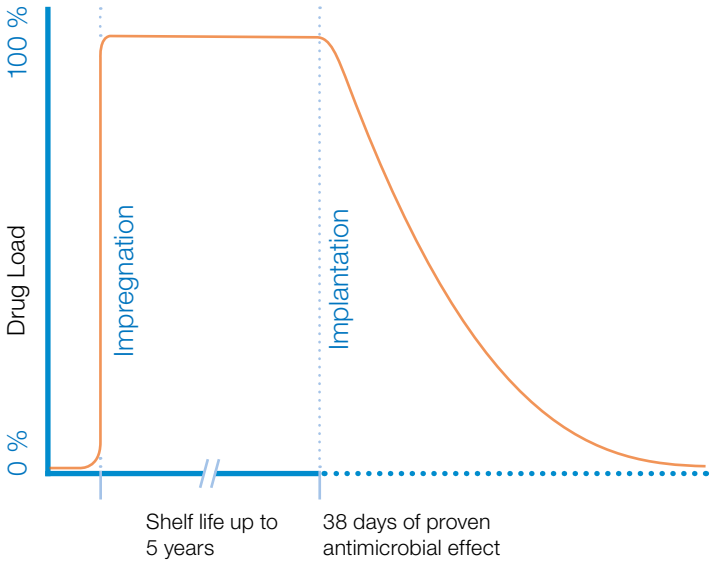
XABO®

LASTING EFFECTS AND CONVENIENT HANDLING

XABO - GENTLE STERILIZATION, OPTIMIZED RELEASE KINETICS

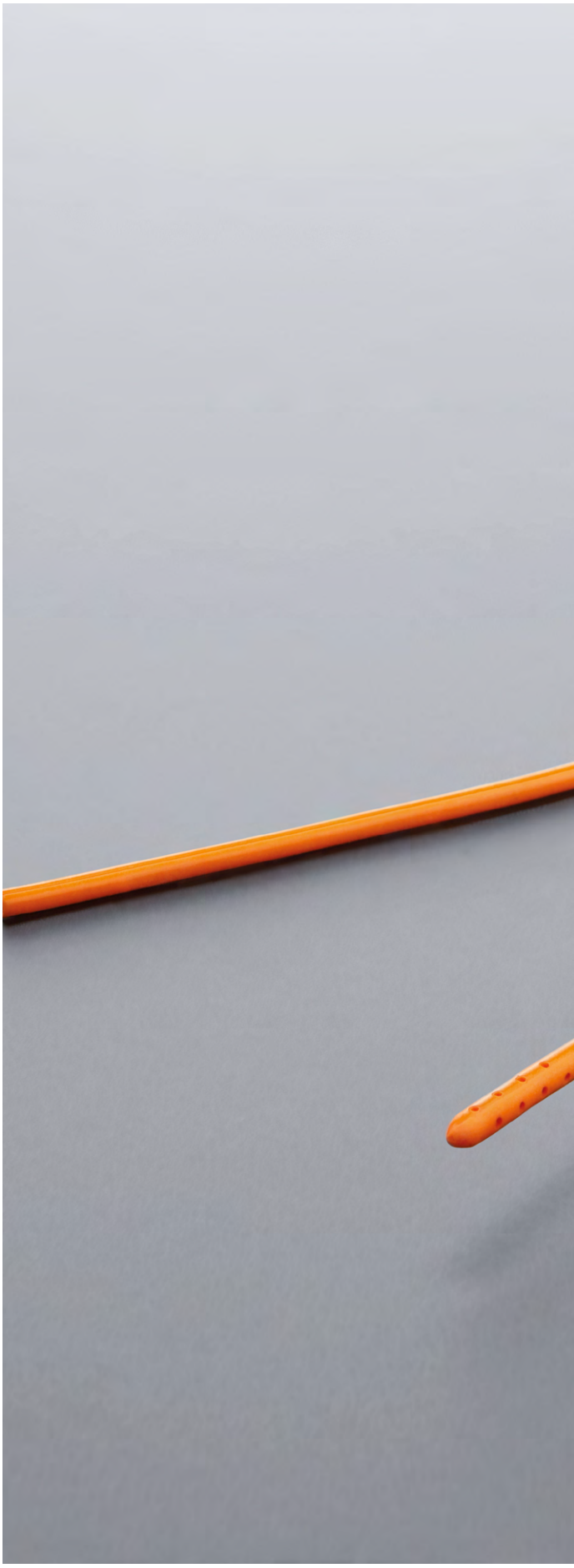
XABO's initial antibiotic loading is retained thanks to the gentle sterilization process. In addition, *XABO* comes wrapped in a specifically designed complete package combination that minimizes degradation products [13], ensuring the antibiotic-impregnated catheter is kept in prime condition for longer. Patients can benefit from *XABO*'s optimized release kinetics: the antibiotics are released continuously over at least 38 days after implantation [14], ensuring that *XABO*'s antimicrobial activity covers the time window when the patient is most susceptible to infection [1,15-17]. The high potency of the clindamycin hydrochloride and rifampicin impregnation allows for the release of low antibiotic doses, which prevents allergic reactions and minimizes the risk of resistance development.

RELATION BETWEEN DRUG LOAD AND TIME



XABO - EASY HANDLING, CONVENIENT STORAGE

XABO is designed to simplify transport and storage: Thanks to the gentle sterilization process and safe packaging it is storable for up to 5 years and withstands temperatures up to 30°C without losing its effectiveness [18].



5

YEARS

» XABO catheters are the only antibiotic-impregnated catheters for hydrocephalus therapy with a shelf life of up to 5 years. This simplifies the clinical routine and the handling for the physician.«

XABO®

HOLISTIC TREATMENT FOR HYDROCEPHALUS

» *XABO offers long-lasting antimicrobial effects, easy handling, convenient storage and perfectly fits all our innovative MIETHKE valves.* «


GAV 2.0 LP
MIETHKE
GAV 2.0
SA 2.0

M.blue®

THE BALANCED WAY OF LIFE. INSPIRED BY YOU.

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 [19].

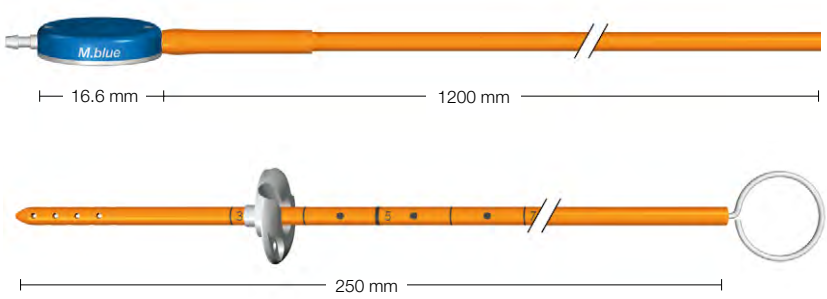
The *M.blue* is our smallest gravitational valve and combines an adjustable gravitational unit with a fixed differential pressure unit in one valve.

This allows for unique uncompromising pressure adaption to optimize the treatment of the patient´s individual needs.

The *M.blue* is the essence of 26 years of experience with hydrocephalus and valve technology and the feedback of numerous physicians and patients worldwide.

+ ONE valve for the unique requirements of a life with hydrocephalus: mobility, growth, changes in the course of disease
+ protected against over-drainage through individually and continuously adjustable opening pressure from 0-40 cmH_2O
+ MR Conditional up to 3 Tesla: no X-ray control after MRI necessary, no additional radiation exposure for the patient
+ Intuitive, safe and comfortable adjustment
+ robust and durable: made of titanium

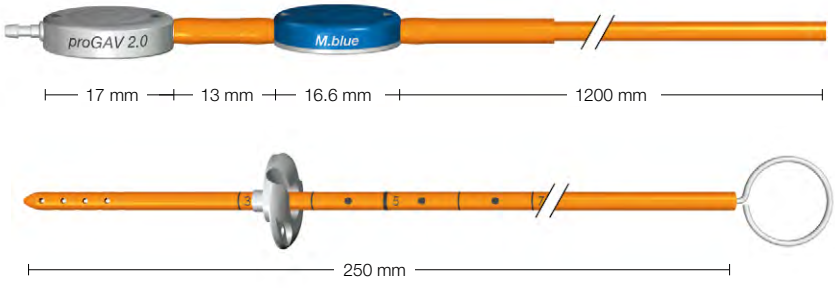
+ *M.blue* valve with *XABO Distal Catheter*
+ *XABO Ventricular Catheter* with introducing stylet and *Pediatric Burrhole Deflector* (13 mm)



M.blue configurations

Art. No.	Differential pressure unit	Gravitational unit **
FX810A	0 cmH_2O	0 - 40 cmH_2O
FX811A	5 cmH_2O	0 - 40 cmH_2O
FX812A	10 cmH_2O	0 - 40 cmH_2O
FX813A	15 cmH_2O	0 - 40 cmH_2O

+ *M.blue plus* valve with *XABO Distal Catheter*
+ *XABO Ventricular Catheter* with introducing stylet and *Pediatric Burrhole Deflector* (13 mm)



Connector: d_o = 1.9 mm
M.blue: h = 4.2 mm
proGAV 2.0: d_o = 4.5 mm
Catheters: d_i = 1.2 mm
d_o = 2.5 mm

** preset to 20 cmH_2O
*** preset to 5 cmH_2O

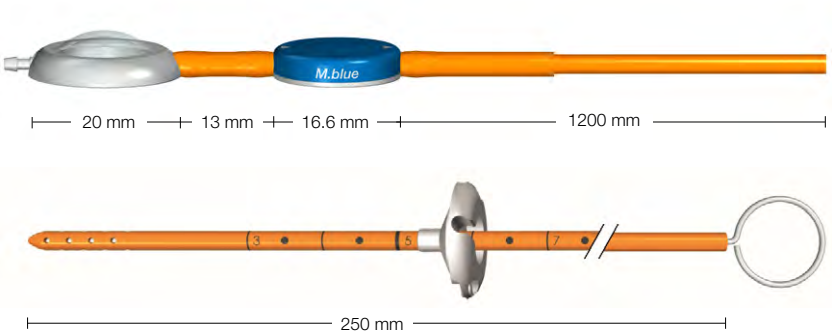
M.blue plus configuration

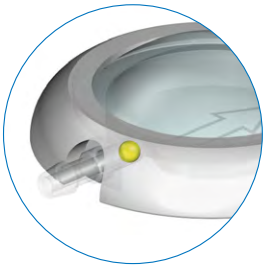
Art. No.	Differential pressure unit ***	Gravitational unit **
FX814A	0 - 20 cmH_2O	0 - 40 cmH_2O

M.blue® / *M.blue plus*® Shunt System XABO®

with CONTROL RESERVOIR

+ *M.blue* valve with integrated *CONTROL RESERVOIR* and *XABO Distal Catheter*
+ *XABO Ventricular Catheter* with introducing stylet and *Burrhole Deflector* (16 mm)





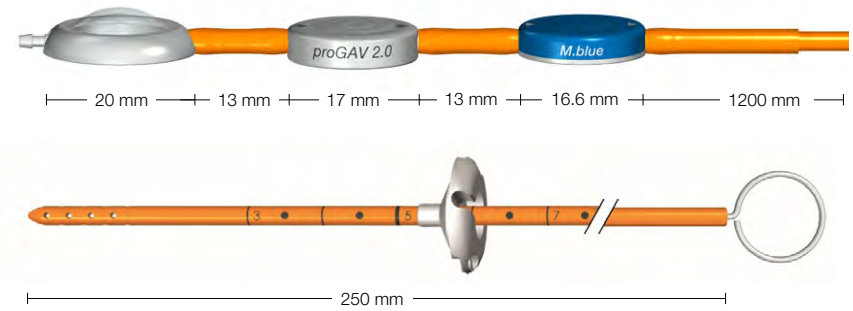
Mechanism to control the flow direction

+ *CONTROL RESERVOIR* allows for checking the patency of both the ventricular catheter and the distal catheter, puncture of the membrane with a pointed syringe needle and shunt function check

M.blue configurations

Art. No.	Differential pressure unit	Gravitational unit **
FX820A	0 cmH_2O	0 - 40 cmH_2O
FX821A	5 cmH_2O	0 - 40 cmH_2O
FX822A	10 cmH_2O	0 - 40 cmH_2O
FX823A	15 cmH_2O	0 - 40 cmH_2O

+ *M.blue plus* valve with integrated *CONTROL RESERVOIR* and *XABO Distal Catheter*
+ *XABO Ventricular Catheter* with introducing stylet and *Burrhole Deflector* (16 mm)



Connector: d_o = 1.9 mm
M.blue: h = 4.2 mm
proGAV 2.0: d_o = 4.5 mm
Catheters: d_i = 1.2 mm
d_o = 2.5 mm

M.blue plus configuration

Art. No.	Differential pressure unit ***	Gravitational unit **
FX824A	0 - 20 cmH2O	0 - 40 cmH2O

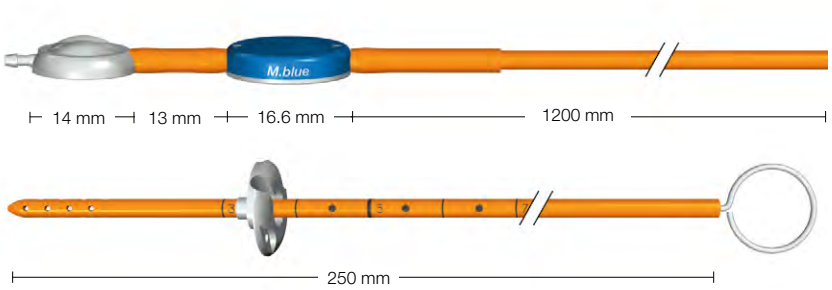
** preset to 20 cmH_2O
*** preset to 5 cmH_2O

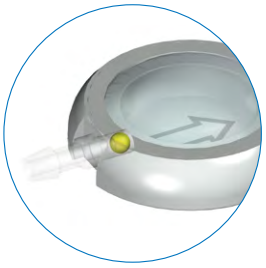
M.blue® / *M.blue plus*® *Shunt System XABO*®

with Pediatric ***CONTROL RESERVOIR***

+ *M.blue* valve with integrated *Pediatric CONTROL RESERVOIR* and *XABO Distal Catheter*

+ *XABO Ventricular Catheter* with introducing stylet and *Pediatric Burrhole Deflector* (13 mm)





Mechanism to control the flow direction

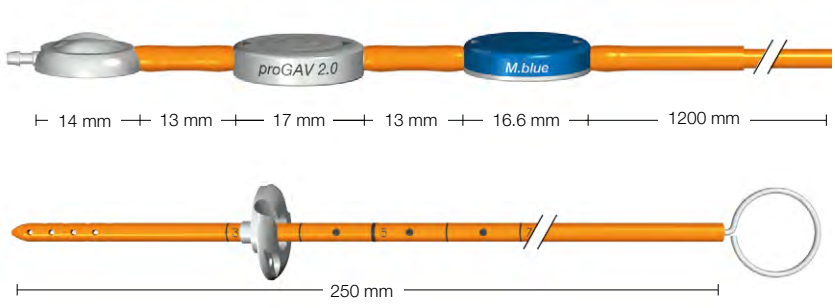
+ *Pediatric CONTROL RESERVOIR* allows for checking the patency of both the ventricular catheter and the distal catheter, puncture of the membrane with a pointed syringe needle and shunt function check

M.blue configurations

Art. No.	Differential pressure unit	Gravitational unit **
FX815A	**0 cmH_2O**	**0 - 40 cmH_2O**
FX816A	**5 cmH_2O**	**0 - 40 cmH_2O**
FX817A	**10 cmH_2O**	**0 - 40 cmH_2O**
FX818A	**15 cmH_2O**	**0 - 40 cmH_2O**

+ *M.blue plus* valve with integrated *Pediatric CONTROL RESERVOIR* and *XABO Distal Catheter*

+ *XABO Ventricular Catheter* with introducing stylet and *Pediatric Burrhole Deflector* (13 mm)



Connector: d_o = 1.9 mm
M.blue: h = 4.2 mm
proGAV 2.0: d_o = 4.5 mm
Catheters: d_i = 1.2 mm
d_o = 2.5 mm

** preset to 20 cmH_2O
*** preset to 5 cmH_2O

M.blue plus configuration

Art. No.	Differential pressure unit ***	Gravitational unit **
FX819A	**0 - 20 cmH_2O**	**0 - 40 cmH_2O**

M.blue® / *M.blue plus*® Shunt System XABO®

with Pediatric SPRUNG RESERVOIR

+ *M.blue* valve
with *XABO Distal Catheter*

+ *Pediatric SPRUNG RESERVOIR*
with *XABO Distal Catheter*

+ *XABO Ventricular Catheter*
with introducing stylet

Mechanism to control the flow direction

+ *Pediatric SPRUNG RESERVOIR*
allows for checking the patency of both the ventricular catheter and the distal catheter, puncture of the membrane with a pointed syringe needle and shunt function check

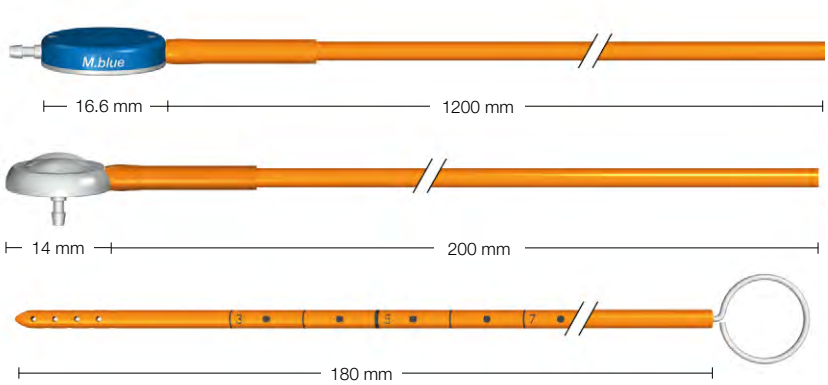
+ *M.blue plus* valve
with *XABO Distal Catheter*

+ *Pediatric SPRUNG RESERVOIR*
with *XABO Distal Catheter*

+ *XABO Ventricular Catheter*
with introducing stylet

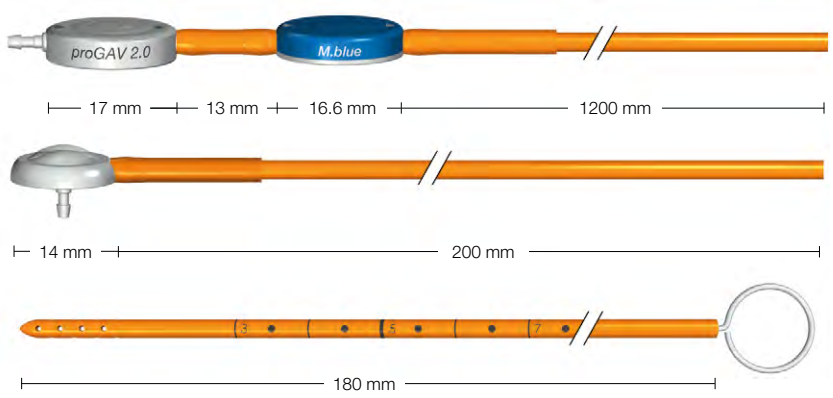
Connector: d_o = 1.9 mm
M.blue: h = 4.2 mm
proGAV 2.0: d_o = 4.5 mm
Catheters: d_i = 1.2 mm
d_o = 2.5 mm

** preset to 20 cmH_2O
*** preset to 5 cmH_2O



M.blue configurations

Art. No.	Differential pressure unit	Gravitational unit **
FX835A	0 cmH_2O	0 - 40 cmH_2O
FX836A	5 cmH_2O	0 - 40 cmH_2O
FX837A	10 cmH_2O	0 - 40 cmH_2O
FX838A	15 cmH_2O	0 - 40 cmH_2O



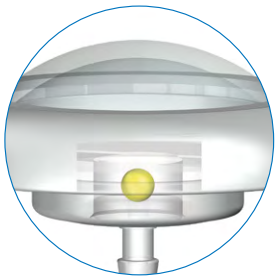
M.blue plus configuration

Art. No.	Differential pressure unit ***	Gravitational unit **
FX839A	0 - 20 cmH2O	0 - 40 cmH2O

M.blue® / *M.blue plus*® *Shunt System XABO*®

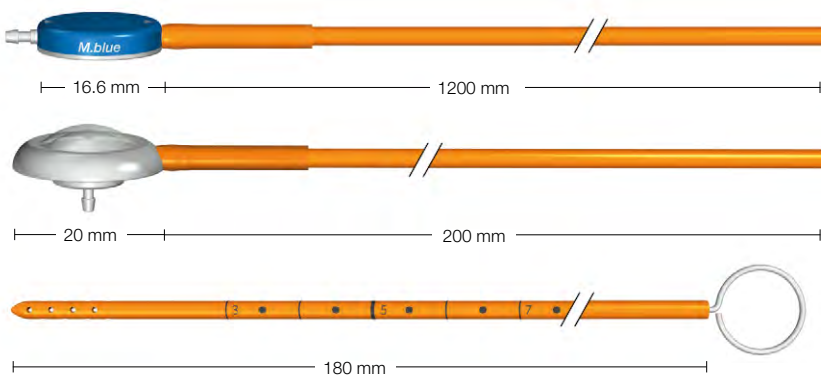
with SPRUNG RESERVOIR

+ *M.blue* valve with *XABO Distal Catheter*
+ *SPRUNG RESERVOIR* with *XABO Distal Catheter*
+ *XABO Ventricular Catheter* with introducing stylet



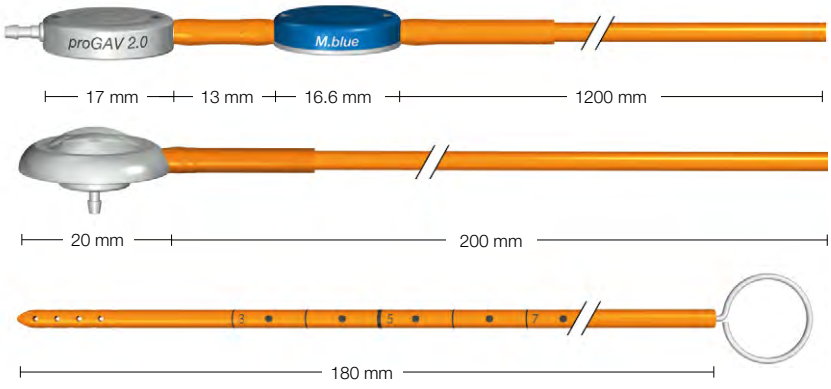
Mechanism to control the flow direction

+ *SPRUNG RESERVOIR* allows for checking the patency of both the ventricular catheter and the distal catheter, puncture of the membrane with a pointed syringe needle and shunt function check
+ *M.blue plus* valve with *XABO Distal Catheter*
+ *SPRUNG RESERVOIR* with *XABO Distal Catheter*
+ *XABO Ventricular Catheter* with introducing stylet



M.blue configurations

Art. No.	Differential pressure unit	Gravitational unit **
FX840A	0 cmH_2O	0 - 40 cmH_2O
FX841A	5 cmH_2O	0 - 40 cmH_2O
FX842A	10 cmH_2O	0 - 40 cmH_2O
FX843A	15 cmH_2O	0 - 40 cmH_2O



M.blue plus configuration

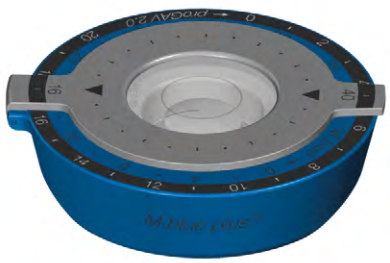
Art. No.	Differential pressure unit ***	Gravitational unit **
FX844A	0 - 20 cmH_2O	0 - 40 cmH_2O

Connector: d_o = 1.9 mm
M.blue: h = 4.2 mm
proGAV 2.0: d_o = 4.5 mm
Catheters: d_i = 1.2 mm
d_o = 2.5 mm

** preset to 20 cmH_2O
*** preset to 5 cmH_2O

M.blue plus® Instruments

+ Soft Touch Instruments
+ *M.blue plus Instruments 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. Nr.	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*

proGAV® 2.0

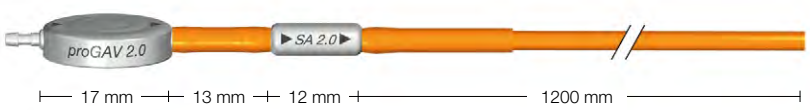
IN TOUCH WITH YOU

The *proGAV 2.0* is a position-dependent hydrocephalus valve. It consists of an adjustable differential pressure unit and a gravitational unit to reduce the risk of overdrainage.

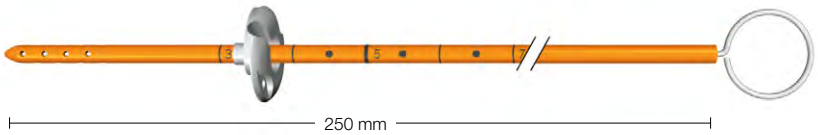
proGAV 2.0 represents the latest development in refining our existing *proGAV* technology to better meet the needs of our customers and their patients.

+ more protection against over-drainage complications due to position-dependent function and infinitely variable pressure setting from 0-20 cmH_2O
+ MR Conditional up to 3 Tesla: no X-ray control after MRI necessary, no additional radiation exposure for the patient
+ "Active-Lock" mechanism: protected against unintentional adjustment by means of exposure to magnets found in daily life
+ "Soft Touch" instruments with enhanced magnetic force: intuitive, safe and comfortable adjustment

+ *proGAV 2.0* valve
  with *XABO Distal Catheter*



+ *XABO Ventricular Catheter*
  with introducing stylet and
  Pediatric Burrhole Deflector (13 mm)



Standard configurations

Art. No.	Differential pressure unit **	Gravitational unit
FY420A	0 - 20 cmH_2O	20 cmH_2O
FY421A	0 - 20 cmH_2O	25 cmH_2O

Alternative configurations

Art. No.	Differential pressure unit **	Gravitational unit
FY418A	0 - 20 cmH_2O	10 cmH_2O
FY419A	0 - 20 cmH_2O	15 cmH_2O
FY422A	0 - 20 cmH_2O	30 cmH_2O
FY423A	0 - 20 cmH_2O	35 cmH_2O

Connector: d_o = 1.9 mm
proGAV 2.0: h = 4.5 mm
SA 2.0: d_o = 4.2 mm
Catheters: d_i = 1.2 mm
d_o = 2.5 mm

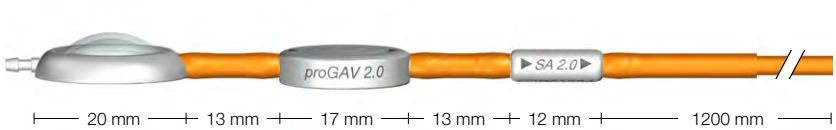
** preset to 5 cmH_2O

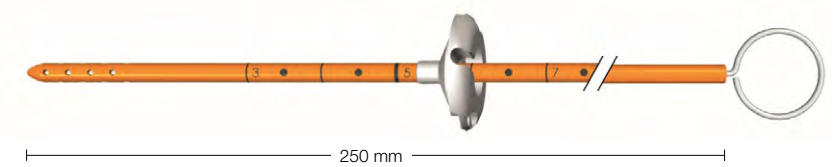
proGAV® 2.0 Shunt System XABO®

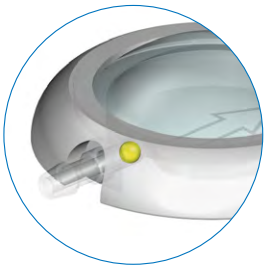
with CONTROL RESERVOIR

+ *proGAV 2.0* valve with integrated *CONTROL RESERVOIR* and *XABO Distal Catheter*

+ *XABO Ventricular Catheter* with introducing stylet and *Burrhole Deflector* (16 mm)







Mechanism to control the flow direction

+ *CONTROL RESERVOIR* allows for checking the patency of both the ventricular catheter and the distal catheter, puncture of the membrane with a pointed syringe needle and shunt function check

Standard configurations

Art. No.	Differential pressure unit **	Gravitational unit
FX602A	0 - 20 cmH_2O	20 cmH_2O
FX603A	0 - 20 cmH_2O	25 cmH_2O

Alternative configurations

Art. No.	Differential pressure unit **	Gravitational unit
FX600A	0 - 20 cmH_2O	10 cmH_2O
FX601A	0 - 20 cmH_2O	15 cmH_2O
FX604A	0 - 20 cmH_2O	30 cmH_2O
FX605A	0 - 20 cmH_2O	35 cmH_2O

Connector: d_o = 1.9 mm
proGAV 2.0: h = 4.5 mm
SA 2.0: d_o = 4.2 mm
Catheters: d_i = 1.2 mm
d_o = 2.5 mm

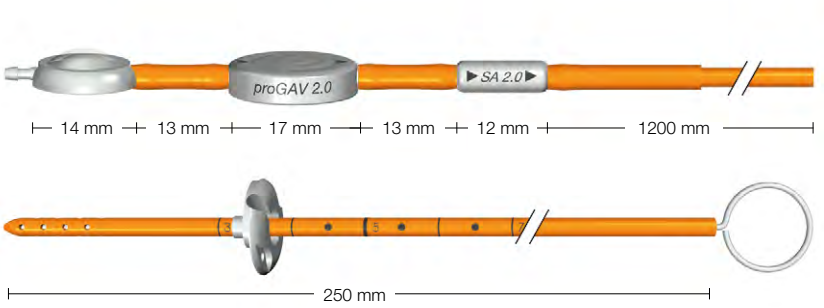
** preset to 5 cmH_2O

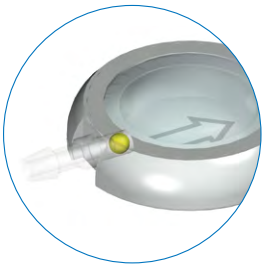
proGAV® 2.0 Shunt System XABO®

with Pediatric CONTROL RESERVOIR

+ *proGAV 2.0* valve with integrated *Pediatric CONTROL RESERVOIR* and *XABO Distal Catheter*

+ *XABO Ventricular Catheter* with introducing stylet and *Pediatric Burrhole Deflector* (13 mm)





Mechanism to control the flow direction

+ *Pediatric CONTROL RESERVOIR* allows for checking the patency of both the ventricular catheter and the distal catheter, puncture of the membrane with a pointed syringe needle and shunt function check

Standard configurations

Art. No.	Differential pressure unit **	Gravitational unit
FX609A	0 - 20 cmH_2O	20 cmH_2O
FX610A	0 - 20 cmH_2O	25 cmH_2O

Alternative configurations

Art. No.	Differential pressure unit **	Gravitational unit
FX607A	0 - 20 cmH_2O	10 cmH_2O
FX608A	0 - 20 cmH_2O	15 cmH_2O
FX611A	0 - 20 cmH_2O	30 cmH_2O
FX612A	0 - 20 cmH_2O	35 cmH_2O

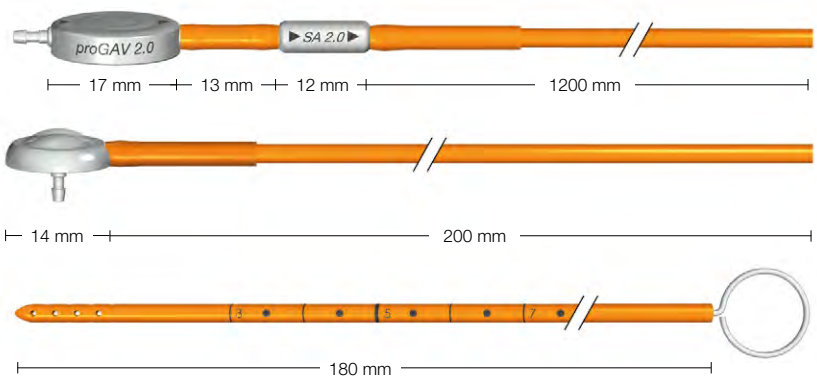
Connector: d_o = 1.9 mm
proGAV 2.0: h = 4.5 mm
SA 2.0: d_o = 4.2 mm
Catheters: d_i = 1.2 mm
d_o = 2.5 mm

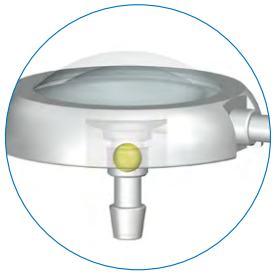
** preset to 5 cmH_2O

proGAV® 2.0 Shunt System XABO®

with Pediatric SPRUNG RESERVOIR

+ *proGAV 2.0* valve
with *XABO Distal Catheter*
+ *Pediatric SPRUNG RESERVOIR*
with *XABO Distal Catheter*
+ *XABO Ventricular Catheter*
with introducing stylet





Mechanism to control the flow direction

+ *Pediatric SPRUNG RESERVOIR*
allows for checking the patency of both the ventricular catheter and the distal catheter, puncture of the membrane with a pointed syringe needle and shunt function check

Standard configurations

Art. No.	Differential pressure unit **	Gravitational unit
FX583A	0 - 20 cmH_2O	20 cmH_2O
FX584A	0 - 20 cmH_2O	25 cmH_2O

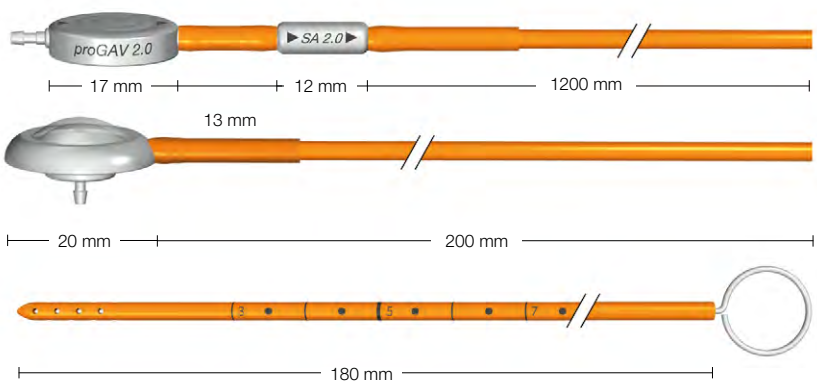
Alternative configurations

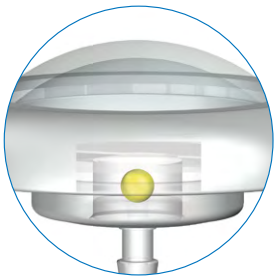
Art. No.	Differential pressure unit **	Gravitational unit
FX581A	0 - 20 cmH_2O	10 cmH_2O
FX582A	0 - 20 cmH_2O	15 cmH_2O
FX585A	0 - 20 cmH_2O	30 cmH_2O
FX586A	0 - 20 cmH_2O	35 cmH_2O

proGAV® 2.0 Shunt System XABO®

with SPRUNG RESERVOIR

+ *proGAV 2.0* valve
with *XABO Distal Catheter*
+ *SPRUNG RESERVOIR*
with *XABO Distal Catheter*
+ *XABO Ventricular Catheter*
with introducing stylet





Mechanism to control the flow direction

+ *SPRUNG RESERVOIR* allows for checking the patency of both the ventricular catheter and the distal catheter, puncture of the membrane with a pointed syringe needle and shunt function check

Standard configurations

Art. No.	Differential pressure unit **	Gravitational unit
FX576A	0 - 20 cmH_2O	20 cmH_2O
FX577A	0 - 20 cmH_2O	25 cmH_2O

Alternative configurations

Art. No.	Differential pressure unit **	Gravitational unit
FX574A	0 - 20 cmH_2O	10 cmH_2O
FX575A	0 - 20 cmH_2O	15 cmH_2O
FX578A	0 - 20 cmH_2O	30 cmH_2O
FX579A	0 - 20 cmH_2O	35 cmH_2O

GAV® 2.0

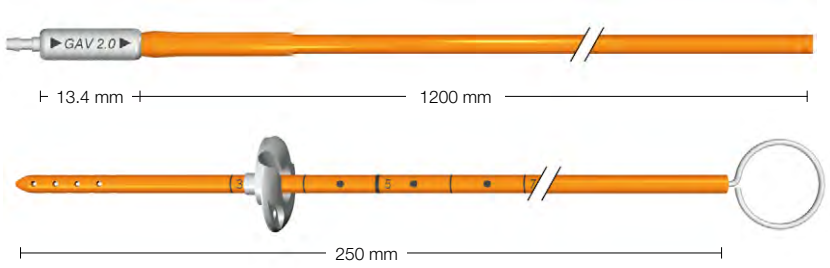
FIXED GRAVITATIONAL VALVE

The *GAV 2.0* is a position-dependent valve and consists of a differential pressure and gravitational unit. The *GAV 2.0* is available im 6 different fixed pressure stages.

The *GAV 2.0* is the consistent further developement of the *GAV* and *paediGAV* with an improved design and flow path and simple pressure level coding.

+ ONE valve for premature and newborn babies, children and adults
+ more protection against overdrainage complications due to position-dependent function
+ three product variants: for ventriculo-peritoneal (*GAV 2.0)* and lumbo-peritoneal drainage (*GAV 2.0 LP*, straight and *GAV 2.0 LP*, U-shaped)
+ MR Conditional up to 3 Tesla
+ simple pressure level coding for clear pressure level detection in imaging
+ robust and durable due to the use of titanium
+ slim, cylindrical and small design for a better flow

+ *GAV 2.0* valve
  with *XABO Distal Catheter*
+ *XABO Ventricular Catheter*
  with introducing stylet and
  Pediatric Burrhole Deflector (13 mm)



GAV 2.0 configurations

Art. No.	lying	upright
FX204A	5 cmH_2O	20 cmH_2O
FX205A	5 cmH_2O	25 cmH_2O
FX206A	5 cmH_2O	30 cmH_2O
FX207A	5 cmH_2O	35 cmH_2O
FX208A	10 cmH_2O	25 cmH_2O
FX209A	10 cmH_2O	30 cmH_2O

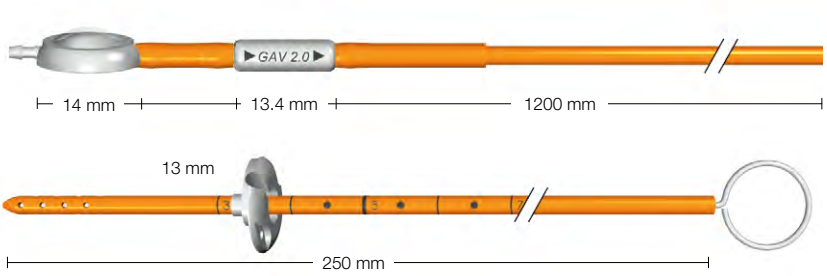
Connector: d_o = 1.9 mm
Valve: h = 4.2 mm
Catheters: d_i = 1.2 mm
d_o = 2.5 mm

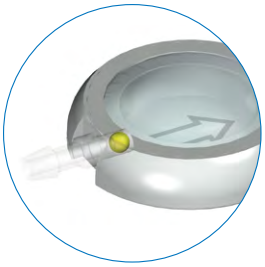
GAV® 2.0 Shunt System XABO®

with Pediatric CONTROL RESERVOIR

+ *GAV 2.0* valve with integrated *Pediatric CONTROL RESERVOIR* and *XABO Distal Catheter*

+ *XABO Ventricular Catheter* with introducing stylet and *Pediatric Burrhole Deflector* (13 mm)





Mechanism to control the flow direction

+ *Pediatric CONTROL RESERVOIR* allows for checking the patency of both the ventricular catheter and the distal catheter, puncture of the membrane with a pointed syringe needle and shunt function check

GAV 2.0 configurations

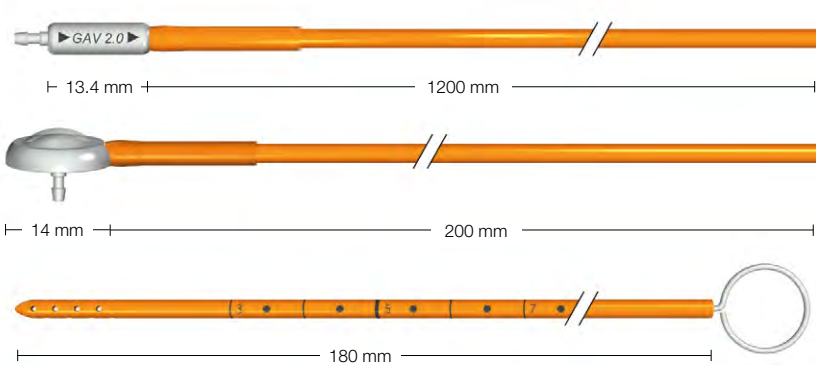
Art. No.	lying	upright
FX152A	5 cmH_2O	20 cmH_2O
FX153A	5 cmH_2O	25 cmH_2O
FX154A	5 cmH_2O	30 cmH_2O
FX155A	5 cmH_2O	35 cmH_2O
FX156A	10 cmH_2O	25 cmH_2O
FX157A	10 cmH_2O	30 cmH_2O

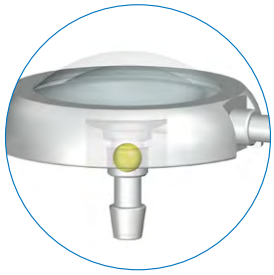
Connector: d_o = 1.9 mm
Valve: d_o = 4.2 mm
Catheters: d_i = 1.2 mm
d_o = 2.5 mm

GAV® 2.0 Shunt System XABO®

with Pediatric SPRUNG RESERVOIR

+ *GAV 2.0* valve
  with *XABO Distal Catheter*
+ *Pediatric SPRUNG RESERVOIR*
  with *XABO Distal Catheter*
+ *XABO Ventricular Catheter*
  with introducing stylet





Mechanism to control the flow direction

+ *Pediatric SPRUNG RESERVOIR*
  allows for checking the patency of both the ventricular catheter and the distal catheter, puncture of the membrane with a pointed syringe needle and shunt function check

GAV 2.0 configurations

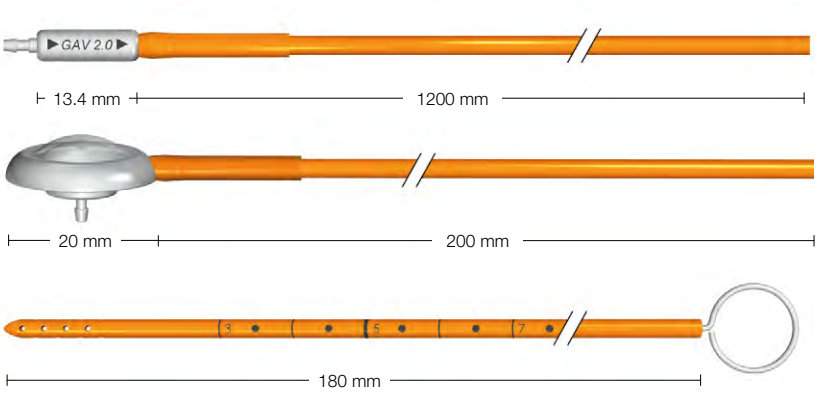
Art. No.	lying	upright
FX276A	5 cmH_2O	20 cmH_2O
FX277A	5 cmH_2O	25 cmH_2O
FX278A	5 cmH_2O	30 cmH_2O
FX279A	5 cmH_2O	35 cmH_2O
FX280A	10 cmH_2O	25 cmH_2O
FX281A	10 cmH_2O	30 cmH_2O

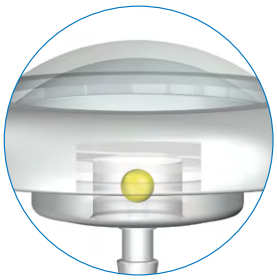
Connector: d_o = 1.9 mm
Valve: d_o = 4.2 mm
Catheters: d_i = 1.2 mm
d_o = 2.5 mm

GAV® 2.0 Shunt System XABO®

with SPRUNG RESERVOIR

+ *GAV 2.0* valve
  with *XABO Distal Catheter*
+ *SPRUNG RESERVOIR*
  with *XABO Distal Catheter*
+ *XABO Ventricular Catheter*
  with introducing stylet





Mechanism to control the flow direction

+ *SPRUNG RESERVOIR* allows for checking the patency of both the ventricular catheter and the distal catheter, puncture of the membrane with a pointed syringe needle and shunt function check

GAV 2.0 configurations

Art. No.	lying	upright
FX270A	**5 cmH_2O**	**20 cmH_2O**
FX271A	**5 cmH_2O**	**25 cmH_2O**
FX272A	**5 cmH_2O**	**30 cmH_2O**
FX273A	**5 cmH_2O**	**35 cmH_2O**
FX274A	**10 cmH_2O**	**25 cmH_2O**
FX275A	**10 cmH_2O**	**30 cmH_2O**

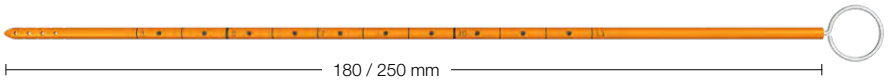
Connector: d_o = 1.9 mm
Valve: d_o = 4.2 mm
Catheters: d_i = 1.2 mm
d_o = 2.5 mm

XABO®
Catheters

+ Impregnated with Clindamycin hydrochloride (0.15 weight %) and Rifampicin (0.054 weight %)
+ Catheters are made of radiopaque silicone
+ Inner diameter 1.2 mm
+ Outer diameter 2.5 mm

XABO Peritoneal Catheter

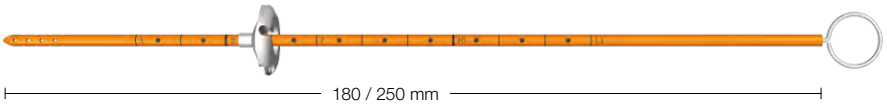
Art. No.	Length
FY010A	600 mm
FY011A	900 mm
FY012A	1200 mm



XABO Ventricular Catheter

Art. No.	Length
FY020A	180 mm
FY021A	250 mm

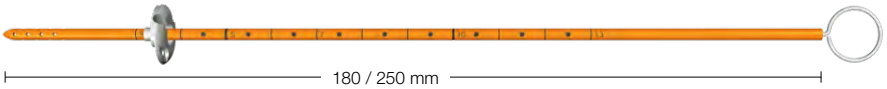
Burrhole Deflector



XABO Ventricular Catheter with Burrhole Deflector

Art. No.	Length	Deflector diameter
FY022A	180 mm	16 mm
FY023A	250 mm	16 mm

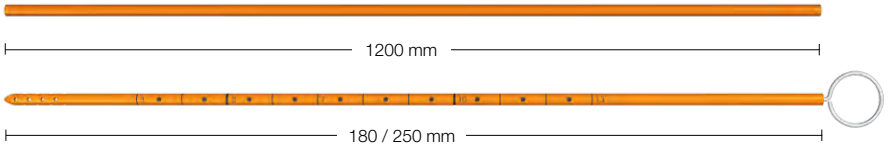
Pediatric Burrhole Deflector



XABO Ventricular Catheter with Pediatric Burrhole Deflector

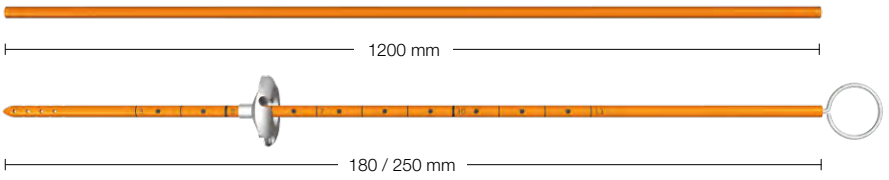
Art. No.	Length	Deflector diameter
FY024A	180 mm	13 mm
FY025A	250 mm	13 mm

+ Set contains one *Ventricular Catheter* and one *Peritoneal Catheter*



XABO Catheter Set

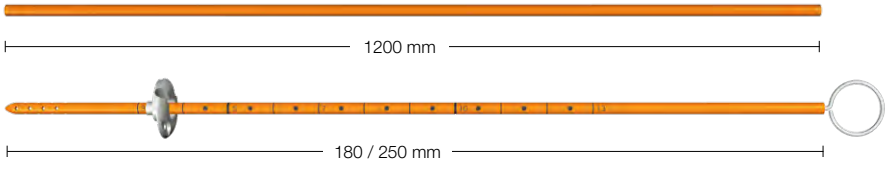
Art. No.	Ventricular Catheter	Peritoneal Catheter
FY040A	180 mm	1200 mm
FY041A	250 mm	1200 mm



Burrhole Deflector

XABO Catheter Set with Burrhole Deflector

Art. No.	Ventricular Catheter	Peritoneal Catheter
FY042A	180 mm	1200 mm
FY043A	250 mm	1200 mm



Pediatric Burrhole Deflector

XABO Catheter Set with Pediatric Burrhole Deflector

Art. No.	Ventricular Catheter	Peritoneal Catheter
FY044A	180 mm	1200 mm
FY045A	250 mm	1200 mm

	M.blue®	*M.blue plus®*	*proGAV® 2.0*	*GAV® 2.0*	*SHUNT-ASSISTANT® 2.0*	*miniNAV ®*	*Shunt Components*
							
Description							
	Adjustable gravitational valve with integrated differential pressure unit	Adjustable differential pressure valve with adjustable gravitational unit	Adjustable differential pressure valve with gravitational unit	Gravitational valve for the treatment of hydrocephalus	Gravitational unit for integration into shunt systems in order to avoid excess drainage	Differential pressure valve, specifically for premature babies and newborns or bedridden or non-mobile patients	
Indication							
NPH	✓	✓	✓	✓	✓		
Pediatric HC	✓	✓	✓	✓	✓	✓	
Adult HC	✓	✓	✓	✓	✓	✓	
Patient							
Bedridden	✓	✓				✓	
Active	✓	✓	✓	✓	✓	*	
Feature							
3-Tesla MR Conditional	✓	✓	✓	✓	✓	✓	
Gravitational unit	✓	✓	✓	✓	✓		
Adjustable	✓	✓	✓				
LP				✓	✓		
XABO®	✓	✓	✓	✓			✓

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