MIETHKE

B|BRAUN
SHARING EXPERTISE

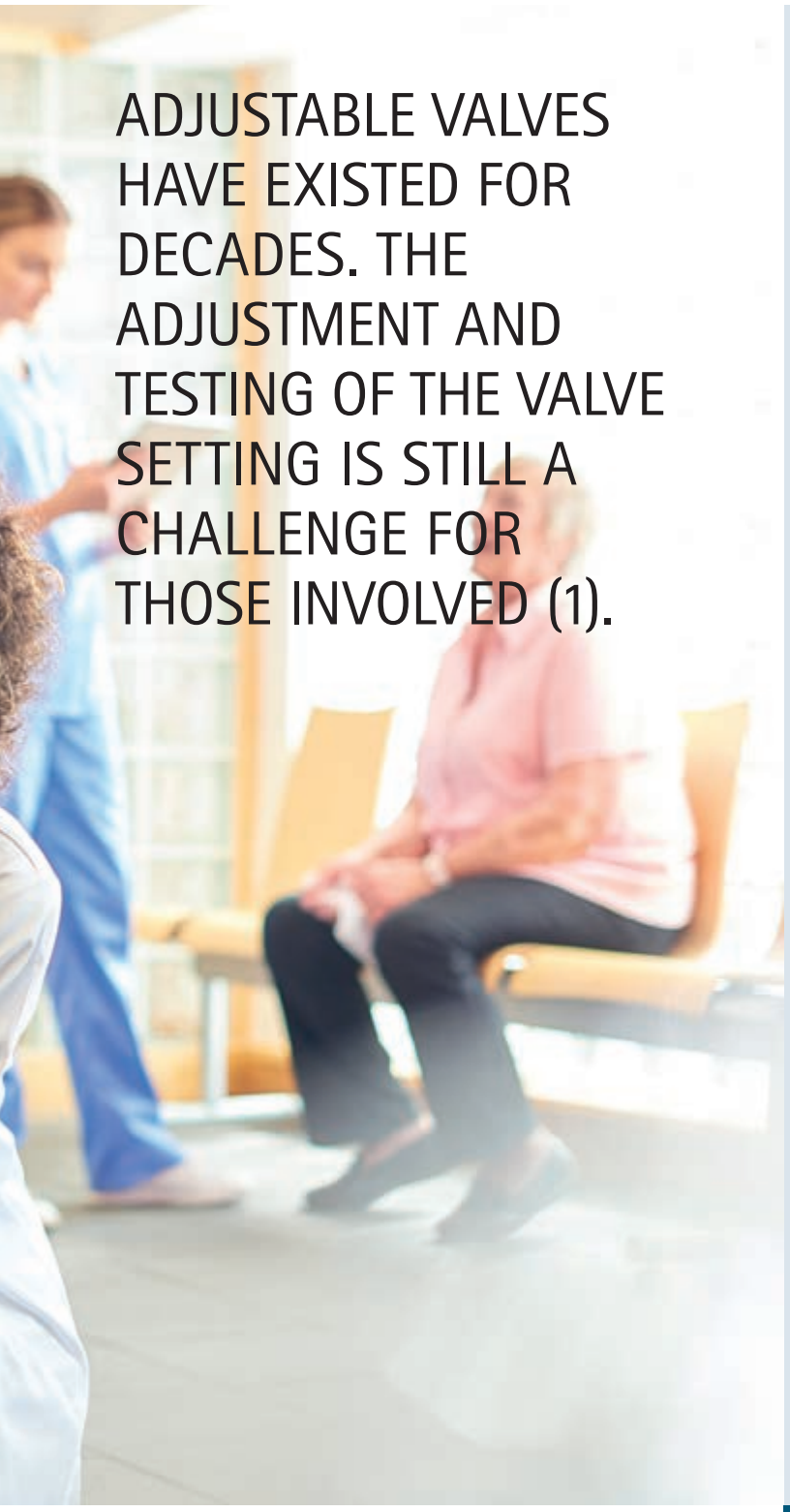
WE UNDERSTAND.

NEUROSURGERY

proGAV® 2.0

IN TOUCH WITH YOU

proGAV® 2.0



ADJUSTABLE VALVES HAVE EXISTED FOR DECADES. THE ADJUSTMENT AND TESTING OF THE VALVE SETTING IS STILL A CHALLENGE FOR THOSE INVOLVED (1).

Valve adjustments are performed postoperatively in 45 % of the cases.
In 19 - 44 % of the cases further pressure adjustments will follow during later treatment (1, 2).

Every valve adjustment is a challenge, both for the patient and the treating hospital staff. Diagnosis and adjustments are often only possible after a radiological examination, which is both time-consuming and costly. In addition to the journey to the clinic, the patient has to wait for treatment, often also accept radiation exposure (1). This makes it all the more important that valve adjustments are user-friendly and convenient.

(1) Bailey NO, Luciano M, Ward MV, Lilienfeld S, Anderson WN, Black P. A Nonradiographic System for Assessing Pressure for the Codman-Hakim Programmable Valve. Neurosurgery. 2010 Sep;67(3 Suppl Operative):ons96-100; discussion ons100-1.

(2) Sprung C, Schlosser HG, Lemcke J, Meier U, Messing-Jünger M, Trost HA, Weber F, Schul C, Rohde V, Ludwig HC, Höpfner J, Sepehrnia A, Mirzayan MJ, Krauss JK. The adjustable proGAV shunt: a prospective safety and reliability multicenter study. Neurosurgery. 2010 Mar;66(3):465-74.

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VALVE AND SOFT TOUCH TOOLS

USER-FRIENDLY ADJUSTMENT & VERIFICATION

With the help of the unique "Soft Touch" instruments, the *proGAV® 2.0* offers a high level of patient comfort with its tactile feedback.

Pressing the valve surface lightly with your finger releases the "Active-Lock" mechanism and simultaneously sends a tactile feedback.

MRI 3 TESLA CONDITIONAL

The "Active-Lock" mechanism of the *proGAV® 2.0* prevents unintended valve adjustments by external magnetic fields up to 3 Tesla (3-5). Strainful follow-up examinations can thus be reduced for the patient.

GRAVITATIONAL TECHNOLOGY

Miethke gravitational valves offer a high protection against overdrainage complications in hydrocephalus therapy (6-8).

(3) Allin DM, Czosnyka ZH, Czosnyka M, Richards HK, Pickard JD. In vitro hydrodynamic properties of the Miethke proGAV hydrocephalus shunt. Cerebrospinal Fluid Res. 2006 Jun;3:9.

(4) Miyake H. Shunt Devices for the Treatment of Adult Hydrocephalus: Recent Progress and Characteristics. Neurol Med Chir (Tokyo). 2016 May 15;56(5):274-83.

(5) Chari A, Czosnyka M, Richards HK, Pickard JD, Czosnyka ZH. Hydrocephalus shunt technology: 20 years of experience from the Cambridge Shunt Evaluation Laboratory. J Neurosurg. 2014 Mar;120(3):697-707.

(6) Lemcke J, Meier U, Müller C, Fritsch MJ, Kehler U, Langer N, Kiefer M, Eymann R, Schuhmann MU, Speil A, Weber F, Remenez V, Rohde V, Ludwig HC, Stengel D. Safety and efficacy of gravitational shunt valves in patients with idiopathic normal pressure hydrocephalus: a pragmatic, randomised, open label, multicentre trial (SVASONA). J Neurol Neurosurg Psychiatry. 2013 Aug;84(8):850-7.

(7) Freimann FB, Vajkoczy P, Sprung C. Patients benefit from low-pressure settings enabled by gravitational valves in normal pressure hydrocephalus. Clin Neurol Neurosurg. 2013 Oct;115(10): 1982-6.

(8) Suchorska B, Kunz M, Schniepp R, Jahn K, Goetz C, Tonn JC, Peraud A. Optimized surgical treatment for normal pressure hydrocephalus: comparison between gravitational and differential pressure valves. Acta Neurochir (Wien). 2015 Apr;157(4):703-9.

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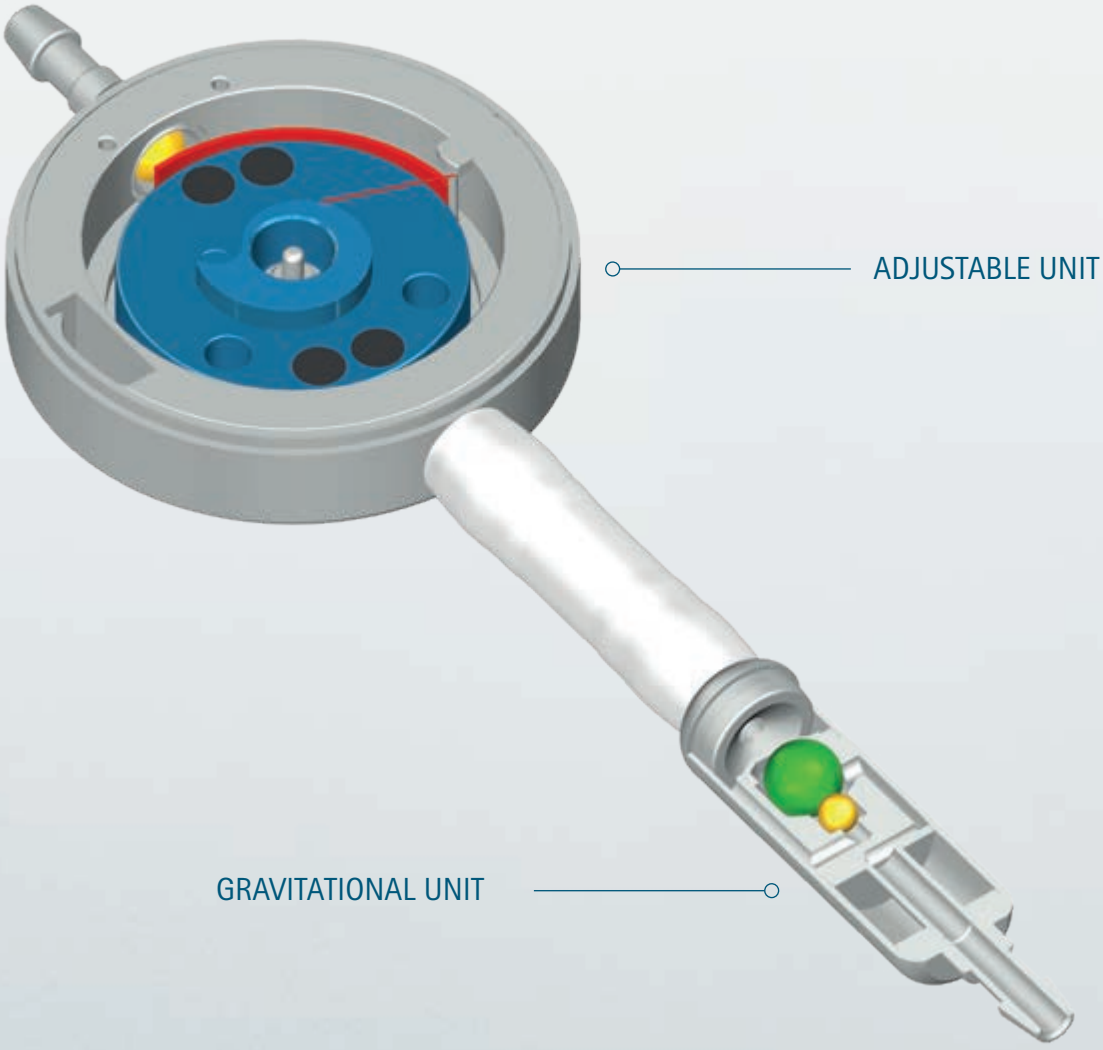
FUNCTIONALITY OF THE VALVE



The *proGAV® 2.0* is a posture-dependent valve, meaning the opening pressure changes gradually to correspond with the patients body position. *proGAV® 2.0* allows for complete customization of the patient's needs a specific opening pressure when the patient is lying down and an opening pressure for when the patient is upright.

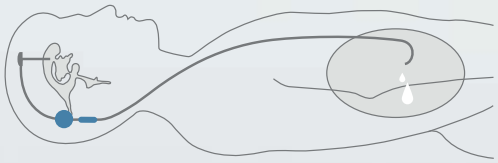
The adjustment unit is adjustable in 1 cmH_2O steps between 0 and 20 cmH_2O.

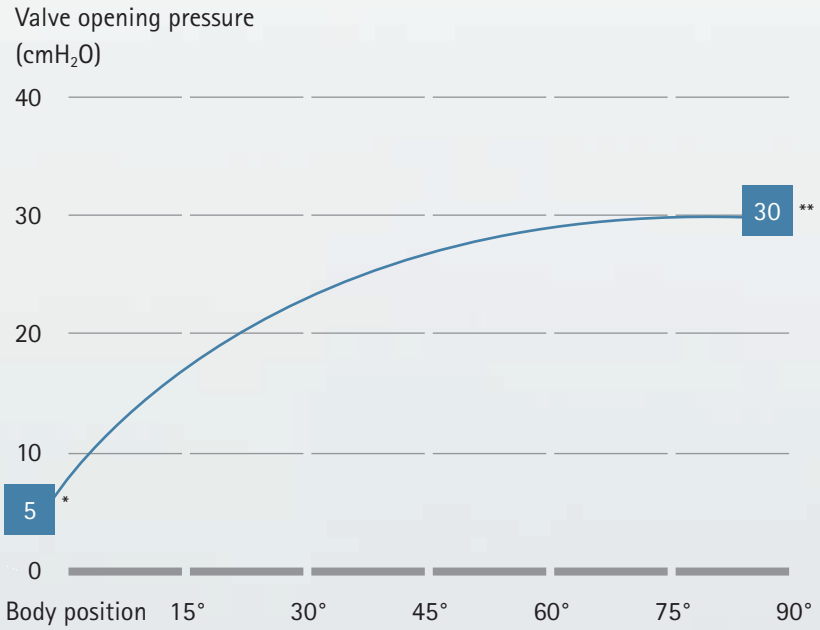
The gravitational unit is offered in different pressure levels.

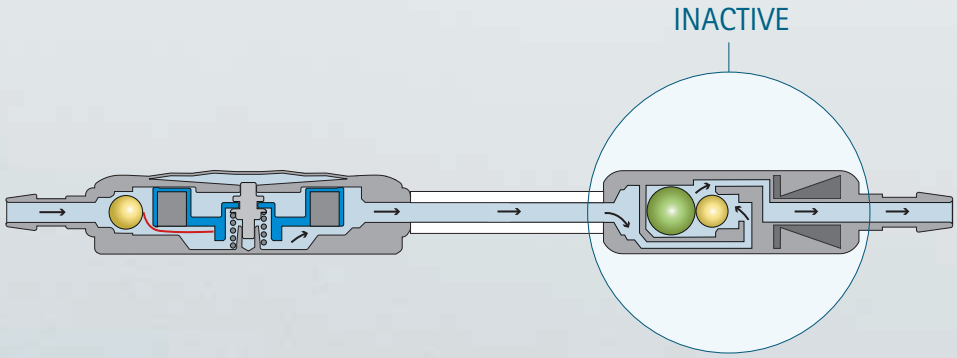
The functionality of *proGAV® 2.0* in different body positions is illustrated interactively in the Miethke App.

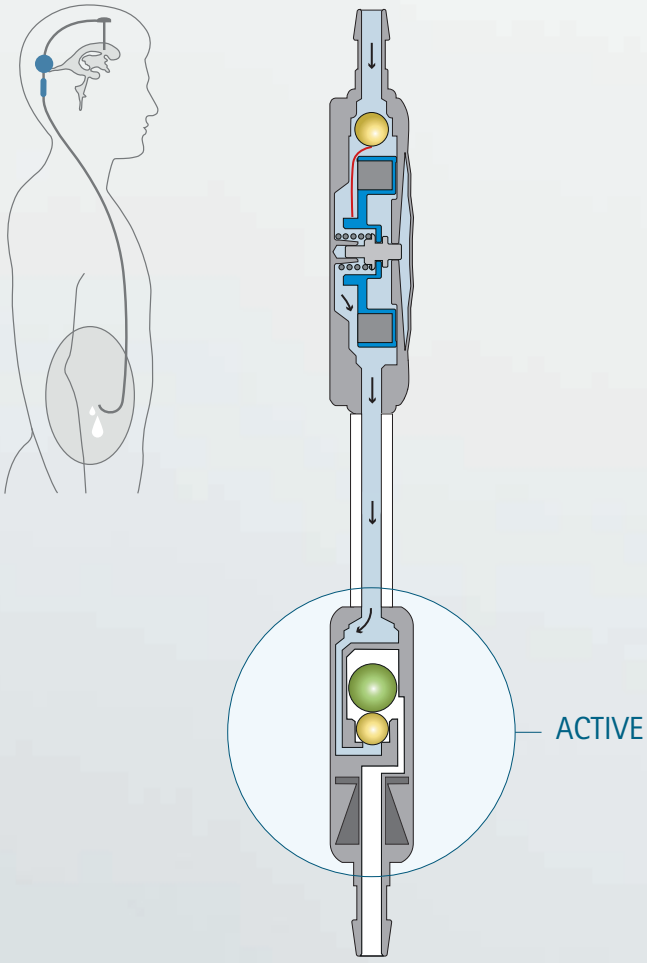
proGAV® 2.0

FUNCTIONALITY OF VALVE AND BODY POSITION









SUPINE POSITION

When the patient is in the supine position, only the adjustable unit is active and preset to 5 cmH_2O*.

The gravitational unit is not active in this body position.

UPRIGHT POSITION

In the upright position, the gravitational and adjustable unit work together. As the patient sits up, the tantalum ball (presented in green) is activated within the gravitational unit and due to its gravitational forces causes an increase in the valve opening pressure.

In the example shown, a gravitational unit with 25 cmH_2O has been selected. The total opening pressure therefore amounts to 30 cmH_2O** when standing.

proGAV® 2.0

SOFT TOUCH INSTRUMENTS FOR VALVE ADJUSTMENT

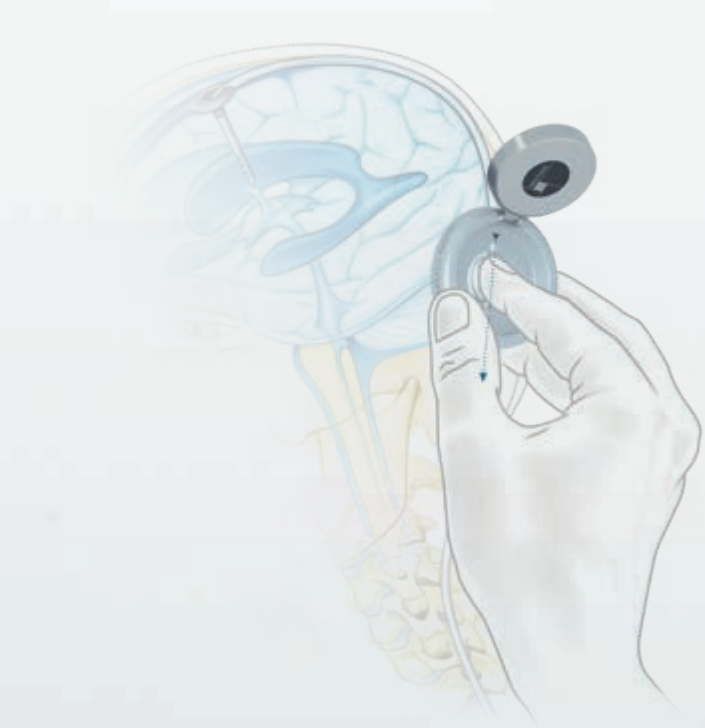


Fig. 1

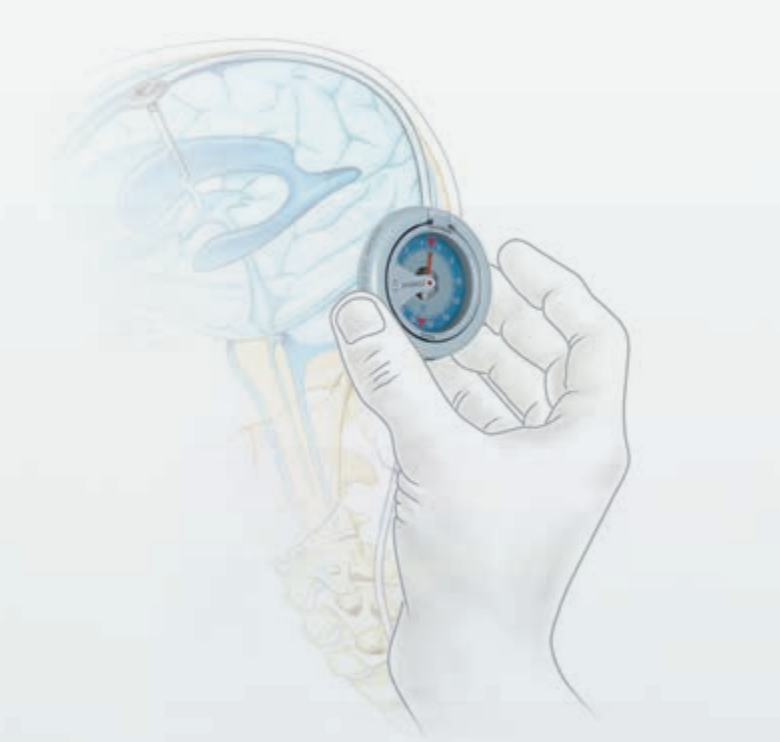


Fig. 2

LOCALIZATION AND SETTING IDENTIFICATION

The *proGAV® 2.0 Compass* is used to localize the adjustable unit and identify current setting of the valve.

The Compass should be aligned over the valve with the aid of the integrated template – Compass lid is open.

After the adjustable unit has been localized with the finger, the *proGAV® 2.0 Compass* is applied over the valve in the direction of flow (Fig. 1)

The closed Compass indicates the opening pressure setting (Fig. 2).

Fig. 3

ADJUSTING THE VALVE

The *proGAV® 2.0 Adjustment Tool* allows for an opening pressure of the adjustable unit to be set from 0 to 20 cmH_2O.

The *proGAV® 2.0 Adjustment Tool* should be positioned so that the desired opening pressure is reflected in the direction of the valve inlet connector.

The *proGAV® 2.0 Adjustment Tool* should be centered over the valve.

By pressing lightly with the finger on the adjustable unit, the mechanical "Active-Lock" mechaniscm is deactivated and the opening pressure is set. Releasing the finger pressure automatically locks the valve (Fig. 3).

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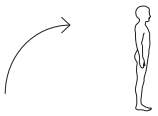
PRESSURE RECOMMENDATION

Patient	Selection of pressure levels		Combined opening pressure	
	 Adjustable differential pressure unit	 Gravitational unit (*SHUNTASSISTANT® 2.0*)		
Newborn and children up to 5 years	5	20	5	25
Children from 5 years	10	25	10	35
Adults	5	25	5	30
< 1.60 m	5	20	5	25
> 1.80 m	5	30	5	35
Adults from 65 years	5	20	5	25
< 1.60 m	5	15	5	20
> 1.80 m	5	25	5	30

All pressure levels shown here are in cmH_2O. This is a non-binding recommendation. The physician decides in each case individually.

OPENING PRESSURE RECOMMENDATION

The choice of the appropriate pressure level of *proGAV® 2.0* depends on several other factors, including age, degree of activity, size and stature of the patient. The values given apply to mobile patients. For patients with little mobility or a high BMI, the gravitational unit should be chosen lower than recommended here.

proGAV® 2.0

WITH *SA 2.0*

- Combination of adjustable unit with gravitational unit

* Recommendations should only be used as guideline as other settings may also be necessary depending on the patient and anatomy.

Connector: d_o = 1.9 mm
Adjustable unit: d_o = 4.5 mm
Gravitational unit: d_o = 4.2 mm

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX642T Children up to 5 years old and adults over 65*	0 - 20 cmH_2O	20 cmH_2O
FX643T Individuals between 5 and 65 years old*	0 - 20 cmH_2O	25 cmH_2O

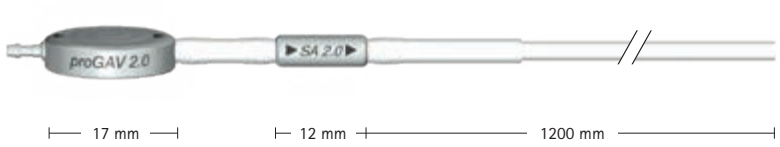
OPTIONAL CONFIGURATIONS

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX410T	0 - 20 cmH_2O	without
FX640T	0 - 20 cmH_2O	10 cmH_2O
FX641T	0 - 20 cmH_2O	15 cmH_2O
FX644T	0 - 20 cmH_2O	30 cmH_2O
FX645T	0 - 20 cmH_2O	35 cmH_2O

proGAV® 2.0

WITH *SA 2.0* AND DISTAL CATHETER

- Combination of adjustable unit and gravitational unit with an integrated distal catheter (1200 mm)



* Recommendations should only be used as guideline as other settings may also be necessary depending on the patient and anatomy.

Connector: d_o = 1.9 mm
Adjustable unit: d_o = 4.5 mm
Gravitational unit: d_o = 4.2 mm
Catheter: d_i = 1.2 mm, d_o = 2.5 mm

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX648T Children up to 5 years old and adults over 65*	0 - 20 cmH_2O	20 cmH_2O
FX649T Individuals between 5 and 65 years old*	0 - 20 cmH_2O	25 cmH_2O

OPTIONAL CONFIGURATIONS

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX417T	0 - 20 cmH_2O	without
FX646T	0 - 20 cmH_2O	10 cmH_2O
FX647T	0 - 20 cmH_2O	15 cmH_2O
FX650T	0 - 20 cmH_2O	30 cmH_2O
FX651T	0 - 20 cmH_2O	35 cmH_2O

proGAV® *2.0*

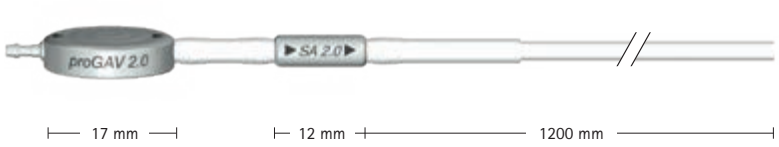
SHUNT SYSTEM WITH *SA 2.0* AND PEDIATRIC *SPRUNG RESERVOIR*

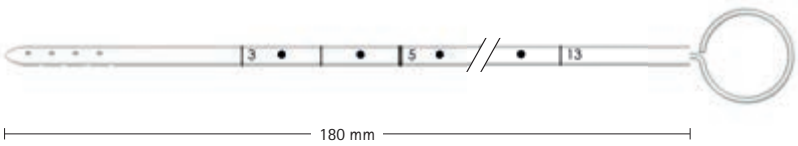
- Combination of adjustable unit and gravitational unit with an integrated distal catheter (1200 mm)
- Pediatric *SPRUNG RESERVOIR*** with an integrated distal catheter (200 mm)
- Ventricular catheter with introducing stylet (180 mm)

* Recommendations should only be used as guideline as other settings may also be necessary depending on the patient and anatomy.

** An additional valve in the base of the pediatric *SPRUNG RESERVOIR* makes it possible to flush the fluid only in the distal direction. This feature allows for controlling the patency of the ventricular catheter and the distal drainage.

Connector: d_o = 1.9 mm
Adjustable unit: d_o = 4.5 mm
Gravitational unit: d_o = 4.2 mm
Catheter: d_i = 1.2 mm, d_o = 2.5 mm





*pediatric SPRUNG RESERVOIR***

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX583T Children up to 5 years old and adults over 65*	0 - 20 cmH_2O	20 cmH_2O
FX584T Individuals between 5 and 65 years old*	0 - 20 cmH_2O	25 cmH_2O

OPTIONAL CONFIGURATIONS

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX580T	0 - 20 cmH_2O	without
FX581T	0 - 20 cmH_2O	10 cmH_2O
FX582T	0 - 20 cmH_2O	15 cmH_2O
FX585T	0 - 20 cmH_2O	30 cmH_2O
FX586T	0 - 20 cmH_2O	35 cmH_2O

proGAV® 2.0

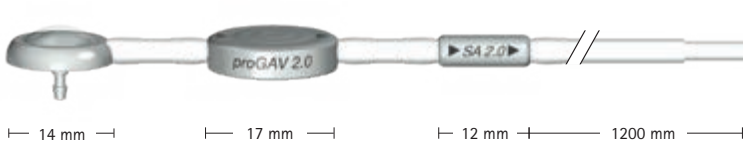
SHUNT SYSTEM WITH *SA 2.0* AND PEDIATRIC *SPRUNG RESERVOIR*

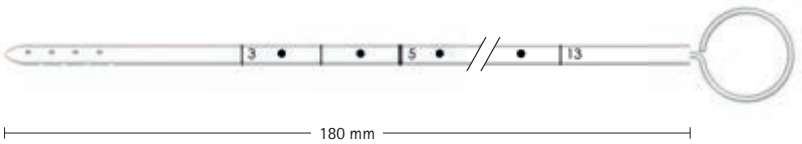
- Combination of adjustable unit with gravitational unit, pediatric *SPRUNG RESERVOIR*** with an integrated distal catheter (1200 mm)
- Ventricular catheter with introducing stylet (180 mm)

* Recommendations should only be used as guideline as other settings may also be necessary depending on the patient and anatomy.

** An additional valve in the base of the pediatric *SPRUNG RESERVOIR* makes it possible to flush the fluid only in the distal direction. This feature allows for controlling the patency of the ventricular catheter and the distal drainage.

Connector: d_o = 1.9 mm
Adjustable unit: d_o = 4.5 mm
Gravitational unit: d_o = 4.2 mm
Catheter: d_i = 1.2 mm, d_o = 2.5 mm





*pediatric SPRUNG RESERVOIR***

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX636T Children up to 5 years old and adults over 65*	0 - 20 cmH_2O	20 cmH_2O
FX637T Individuals between 5 and 65 years old*	0 - 20 cmH_2O	25 cmH_2O

OPTIONAL CONFIGURATIONS

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX633T	0 - 20 cmH_2O	without
FX634T	0 - 20 cmH_2O	10 cmH_2O
FX635T	0 - 20 cmH_2O	15 cmH_2O
FX638T	0 - 20 cmH_2O	30 cmH_2O
FX639T	0 - 20 cmH_2O	35 cmH_2O

proGAV® 2.0

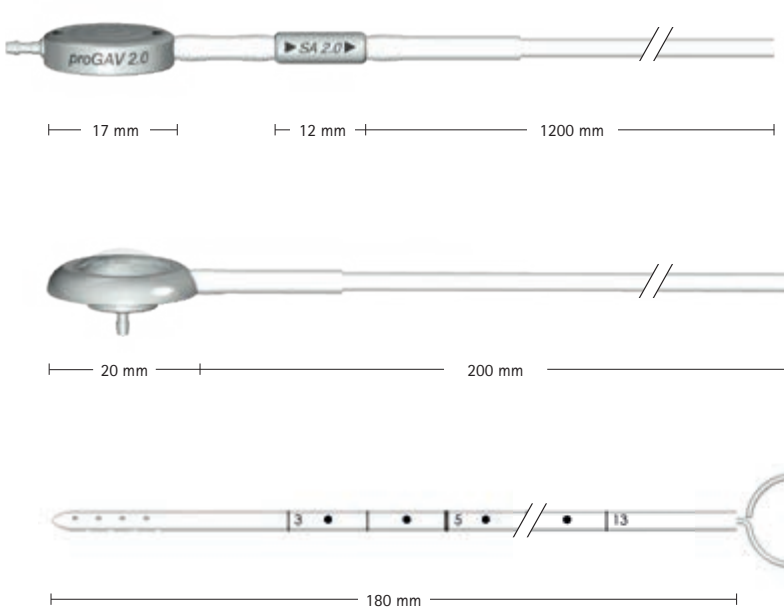
SHUNT SYSTEM WITH *SA 2.0* AND *SPRUNG RESERVOIR*

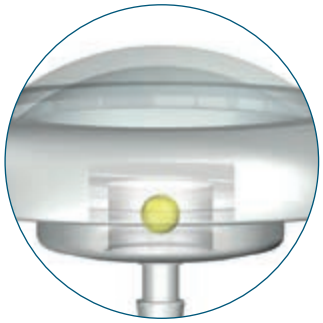
- Combination of adjustable unit with gravitational unit with an integrated distal catheter (1200 mm)
- *SPRUNG RESERVOIR*** with an integrated distal catheter (200 mm)
- Ventricular catheter with introducing stylet (180 mm)

* Recommendations should only be used as guideline as other settings may also be necessary depending on the patient and anatomy.

** An additional valve in the base of the *SPRUNG RESERVOIR* makes it possible to flush the fluid only in the distal direction. This feature allows for controlling the patency of the ventricular catheter and the distal drainage.

Connector: d_o = 1.9 mm
Adjustable unit: d_o = 4.5 mm
Gravitational unit: d_o = 4.2 mm
Catheter: d_i = 1.2 mm, d_o = 2.5 mmm





*SPRUNG RESERVOIR***

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX576T Children up to 5 years old and adults over 65*	0 - 20 cmH_2O	20 cmH_2O
FX577T Individuals between 5 and 65 years old*	0 - 20 cmH_2O	25 cmH_2O

OPTIONAL CONFIGURATIONS

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX424T	0 - 20 cmH_2O	without
FX574T	0 - 20 cmH_2O	10 cmH_2O
FX575T	0 - 20 cmH_2O	15 cmH_2O
FX578T	0 - 20 cmH_2O	30 cmH_2O
FX579T	0 - 20 cmH_2O	35 cmH_2O

proGAV® 2.0

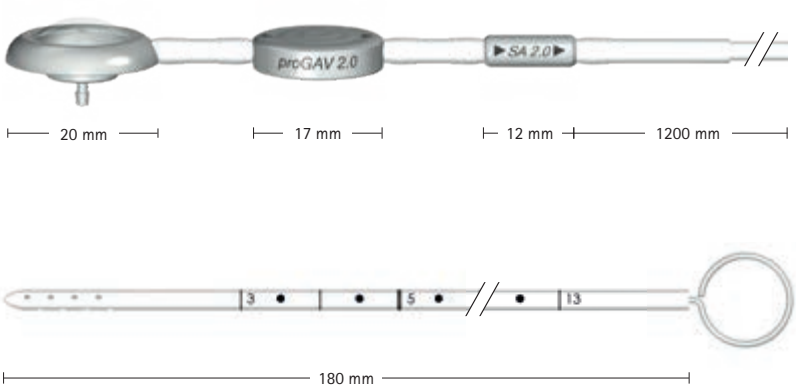
SHUNT SYSTEM WITH *SA 2.0* AND *SPRUNG RESERVOIR*

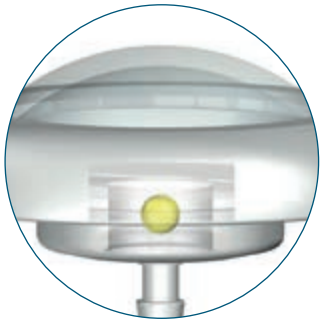
- Combination of adjustable unit with gravitational unit, *SPRUNG RESERVOIR*** with an integrated distal catheter (1200 mm)
- Ventricular catheter with introducing stylet (180 mm)

* Recommendations should only be used as guideline as other settings may also be necessary depending on the patient and anatomy.

** An additional valve in the base of the *SPRUNG RESERVOIR* makes it possible to flush the fluid only in the distal direction. This feature allows for controlling the patency of the ventricular catheter and the distal drainage.

Connector: d_o = 1.9 mm
Adjustable unit: d_o = 4.5 mm
Gravitational unit: d_o = 4.2 mm
Catheter: d_i = 1.2 mm, d_o = 2.5 mm





*SPRUNG RESERVOIR***

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX629T Children up to 5 years old and adults over 65*	0 - 20 cmH_2O	20 cmH_2O
FX630T Individuals between 5 and 65 years old*	0 - 20 cmH_2O	25 cmH_2O

OPTIONAL CONFIGURATIONS

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX626T	0 - 20 cmH_2O	without
FX627T	0 - 20 cmH_2O	10 cmH_2O
FX628T	0 - 20 cmH_2O	15 cmH_2O
FX631T	0 - 20 cmH_2O	30 cmH_2O
FX632T	0 - 20 cmH_2O	35 cmH_2O

proGAV® 2.0

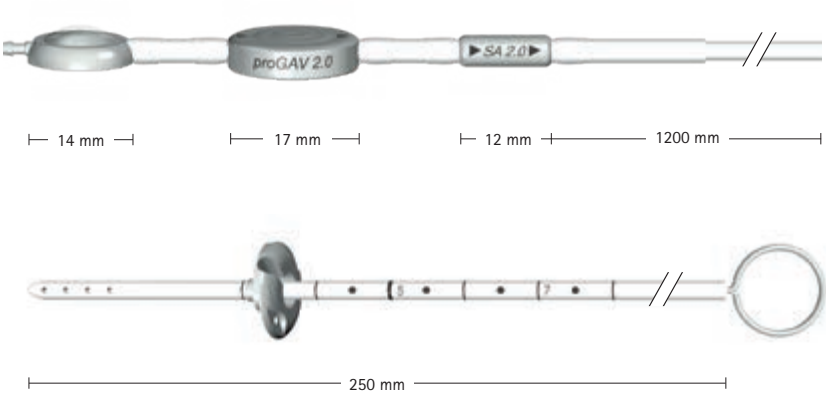
SHUNT SYSTEM WITH *SA 2.0* AND PEDIATRIC *CONTROL RESERVOIR*

- Combination of adjustable unit with gravitational unit, pediatric *CONTROL RESERVOIR*** with an integrated distal catheter (1200 mm)
- Ventricular catheter with pediatric deflector and introducing stylet (250 mm)

* Recommendations should only be used as guideline as other settings may also be necessary depending on the patient and anatomy.

** An additional valve in the inlet of the pediatric *CONTROL RESERVOIR* makes it possible to flush the fluid only in the distal direction. This feature allows for controlling the patency of the ventricular catheter and the distal drainage.

Connector: d_o = 1.9 mm
Adjustable unit: d_o = 4.5 mm
Gravitational unit: d_o = 4.2 mm
Catheter: d_i = 1.2 mm, d_o = 2.5 mm



*pediatric CONTROL RESERVOIR***

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX609T Children up to 5 years old and adults over 65*	0 - 20 cmH_2O	20 cmH_2O
FX610T Individuals between 5 and 65 years old*	0 - 20 cmH_2O	25 cmH_2O

OPTIONAL CONFIGURATIONS

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX606T	0 - 20 cmH_2O	without
FX607T	0 - 20 cmH_2O	10 cmH_2O
FX608T	0 - 20 cmH_2O	15 cmH_2O
FX611T	0 - 20 cmH_2O	30 cmH_2O
FX612T	0 - 20 cmH_2O	35 cmH_2O

proGAV® 2.0

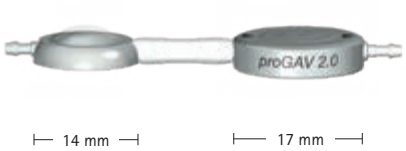
SHUNT SYSTEM WITH *SA 2.0* AND PEDIATRIC *CONTROL RESERVOIR*

- Adjustable unit with pediatric *CONTROL RESERVOIR***
- Gravitational unit with integrated distal catheter (1200 mm)
- Ventricular catheter with pediatric deflector and introducing stylet (250 mm)

* Recommendations should only be used as guideline as other settings may also be necessary depending on the patient and anatomy.

** An additional valve in the inlet of the pediatric *CONTROL RESERVOIR* makes it possible to flush the fluid only in the distal direction. This feature allows for controlling the patency of the ventricular catheter and the distal drainage.

Connector: d_o = 1.9 mm
Adjustable unit: d_o = 4.5 mm
Gravitational unit: d_o = 4.2 mm
Catheter: d_i = 1.2 mm, d_o = 2.5 mm



*pediatric CONTROL RESERVOIR***

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX558T Children up to 5 years old and adults over 65*	0 - 20 cmH_2O	20 cmH_2O
FX559T Individuals between 5 and 65 years old*	0 - 20 cmH_2O	25 cmH_2O

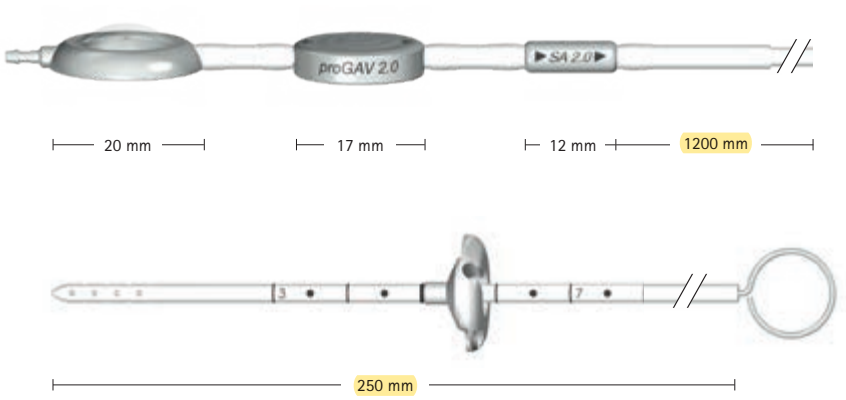
OPTIONAL CONFIGURATIONS

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX556T	0 - 20 cmH_2O	10 cmH_2O
FX557T	0 - 20 cmH_2O	15 cmH_2O
FX560T	0 - 20 cmH_2O	30 cmH_2O
FX561T	0 - 20 cmH_2O	35 cmH_2O

proGAV® 2.0

SHUNT SYSTEM WITH *SA 2.0* AND *CONTROL RESERVOIR*

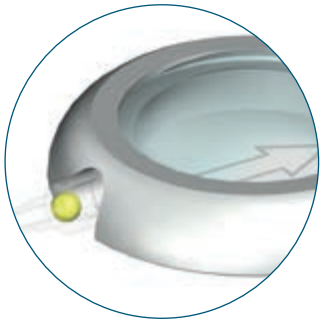
- Combination of adjustable unit and gravitational unit with *CONTROL RESERVOIR*** with an integrated distal catheter (1200 mm)
- Ventricular catheter with deflector and introducing stylet (250 mm)



* Recommendations should only be used as guideline as other settings may also be necessary depending on the patient and anatomy.

** An additional valve in the inlet of the *CONTROL RESERVOIR* makes it possible to flush the fluid only in the distal direction. This feature allows for controlling the patency of the ventricular catheter and the distal drainage.

Connector: d_o = 1.9 mm
Adjustable unit: d_o = 4.5 mm
Gravitational unit: d_o = 4.2 mm
Catheter: d_i = 1.2 mm, d_o = 2.5 mm



*CONTROL RESERVOIR***

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX602T Children up to 5 years old and adults over 65*	0 - 20 cmH_2O	20 cmH_2O
FX603T Individuals between 5 and 65 years old*	0 - 20 cmH_2O	25 cmH_2O

OPTIONAL CONFIGURATIONS

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX431T	0 - 20 cmH_2O	without
FX600T	0 - 20 cmH_2O	10 cmH_2O
FX601T	0 - 20 cmH_2O	15 cmH_2O
FX604T	0 - 20 cmH_2O	30 cmH_2O
FX605T	0 - 20 cmH_2O	35 cmH_2O

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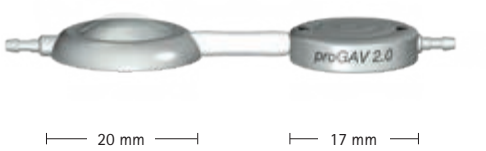
SHUNT SYSTEM MIT *SA 2.0* AND *CONTROL RESERVOIR*

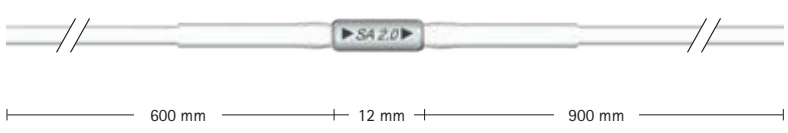
- Adjustable unit with integrated *CONTROL RESERVOIR***
- Gravitational unit with integrated proximal (600 mm) and distal catheter (900 mm)
- Ventricular catheter with deflector and introducing stylet (250 mm)

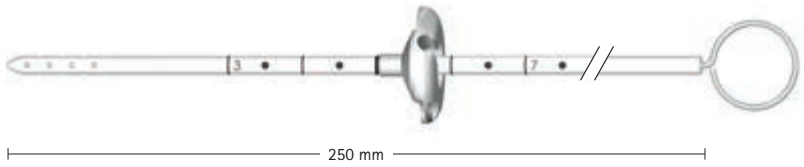
* Recommendations should only be used as guideline as other settings may also be necessary depending on the patient and anatomy.

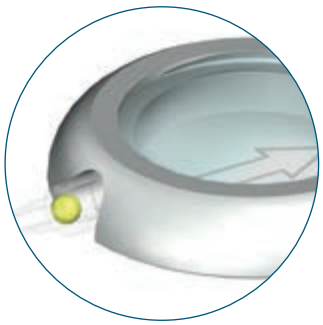
** An additional valve in the inlet of the *CONTROL RESERVOIR* makes it possible to flush the fluid only in the distal direction. This feature allows for controlling the patency of the ventricular catheter and the distal drainage.

Connector: d_o = 1.9 mm
Adjustable unit: d_o = 4.5 mm
Gravitational unit: d_o = 4.2 mm
Catheter: d_i = 1.2 mm, d_o = 2.5 mmm









*CONTROL RESERVOIR***

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX551T Children up to 5 years old and adults over 65*	0 - 20 cmH_2O	20 cmH_2O
FX552T Individuals between 5 and 65 years old*	0 - 20 cmH_2O	25 cmH_2O

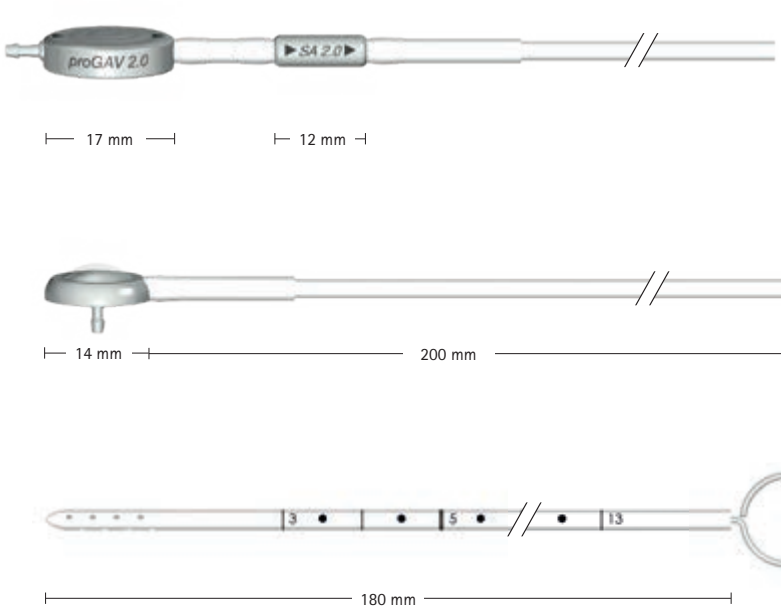
OPTIONAL CONFIGURATIONS

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX549T	0 - 20 cmH_2O	10 cmH_2O
FX550T	0 - 20 cmH_2O	15 cmH_2O
FX553T	0 - 20 cmH_2O	30 cmH_2O
FX554T	0 - 20 cmH_2O	35 cmH_2O

proGAV® 2.0

SHUNT SYSTEM WITH *SA 2.0* AND PEDIATRIC BURRHOLE RESERVOIR

- Combination of adjustable unit and gravitational unit with distal catheter (1200 mm)
- Pediatric burrhole reservoir with integrated distal catheter (200 mm)
- Ventricular catheter and introducing stylet (180 mm)



* Recommendations should only be used as guideline as other settings may also be necessary depending on the patient and anatomy.

Connector: d_o = 1.9 mm
Adjustable unit: d_o = 4.5 mm
Gravitational unit: d_o = 4.2 mm
Catheter: d_i = 1.2 mm, d_o = 2.5 mm

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX570T Children up to 5 years old and adults over 65*	0 - 20 cmH_2O	20 cmH_2O
FX571T Individuals between 5 and 65 years old*	0 - 20 cmH_2O	25 cmH_2O

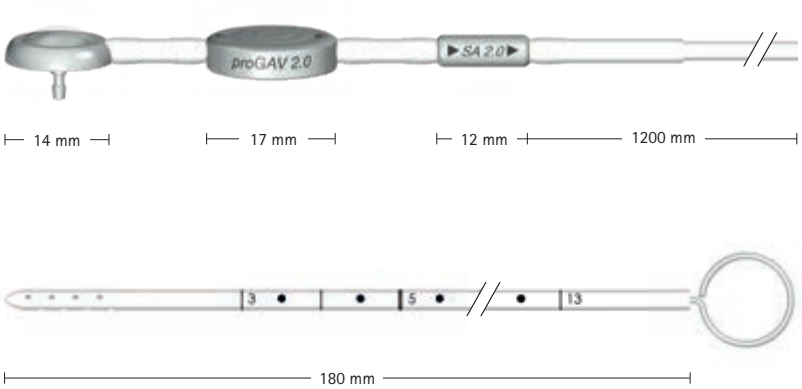
OPTIONAL CONFIGURATIONS

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX445T	0 - 20 cmH_2O	without
FX568T	0 - 20 cmH_2O	10 cmH_2O
FX569T	0 - 20 cmH_2O	15 cmH_2O
FX572T	0 - 20 cmH_2O	30 cmH_2O
FX573T	0 - 20 cmH_2O	35 cmH_2O

proGAV® 2.0

SHUNT SYSTEM WITH *SA 2.0* AND PEDIATRIC BURRHOLE RESERVOIR

- Combination of adjustable unit with gravitational unit, pediatric burrhole reservoir with an integrated distal catheter (1200 mm)
- Ventricular catheter and introducing stylet (180 mm)



* Recommendations should only be used as guideline as other settings may also be necessary depending on the patient and anatomy.

Connector: d_o = 1.9 mm
Adjustable unit: d_o = 4.5 mm
Gravitational unit: d_o = 4.2 mm
Catheter: d_i = 1.2 mm, d_o = 2.5 mmm

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX622T Children up to 5 years old and adults over 65*	0 - 20 cmH_2O	20 cmH_2O
FX623T Individuals between 5 and 65 years old*	0 - 20 cmH_2O	25 cmH_2O

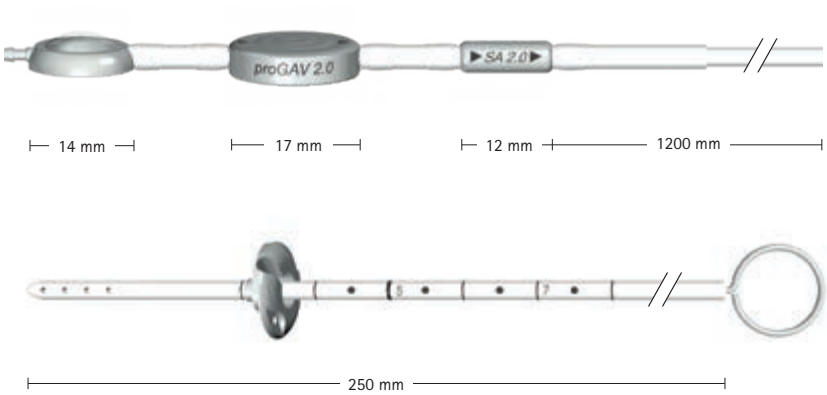
OPTIONAL CONFIGURATIONS

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX468T	0 - 20 cmH_2O	without
FX620T	0 - 20 cmH_2O	10 cmH_2O
FX621T	0 - 20 cmH_2O	15 cmH_2O
FX624T	0 - 20 cmH_2O	30 cmH_2O
FX625T	0 - 20 cmH_2O	35 cmH_2O

proGAV® 2.0

SHUNT SYSTEM WITH *SA 2.0* AND PEDIATRIC PRECHAMBER

- Combination of adjustable unit with gravitational unit, pediatric prechamber with an integrated distal catheter (1200 mm)
- Ventricular catheter with pediatric deflector and introducing stylet (250 mm)



* Recommendations should only be used as guideline as other settings may also be necessary depending on the patient and anatomy.

Connector: d_o = 1.9 mm
Adjustable unit: d_o = 4.5 mm
Gravitational unit: d_o = 4.2 mm
Catheter: d_i = 1.2 mm, d_o = 2.5 mm

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX596T Children up to 5 years old and adults over 65*	0 - 20 cmH_2O	20 cmH_2O
FX597T Individuals between 5 and 65 years old*	0 - 20 cmH_2O	25 cmH_2O

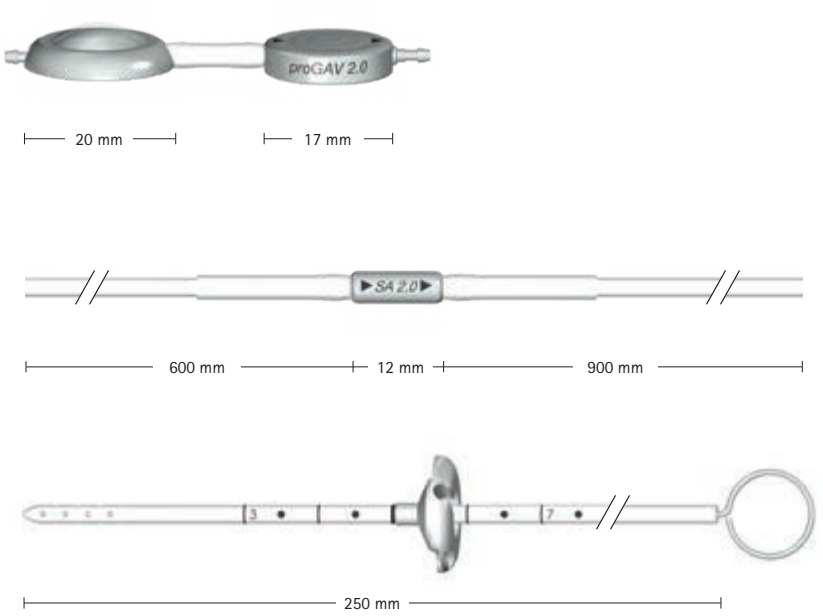
OPTIONAL CONFIGURATIONS

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX438T	0 - 20 cmH_2O	without
FX594T	0 - 20 cmH_2O	10 cmH_2O
FX595T	0 - 20 cmH_2O	15 cmH_2O
FX598T	0 - 20 cmH_2O	30 cmH_2O
FX599T	0 - 20 cmH_2O	35 cmH_2O

proGAV® 2.0

SHUNT SYSTEM WITH *SA 2.0* AND PRECHAMBER

- Adjustable unit with prechamber
- Gravitational unit with integrated proximal (600 mm) and distal catheter (900 mm)
- Ventricular catheter with deflector and introducing stylet (250 mm)



* Recommendations should only be used as guideline as other settings may also be necessary depending on the patient and anatomy.

Connector: d_o = 1.9 mm
Adjustable unit: d_o = 4.5 mm
Gravitational unit: d_o = 4.2 mm
Catheter: d_i = 1.2 mm, d_o = 2.5 mmm

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX539T Children up to 5 years old and adults over 65*	0 - 20 cmH_2O	20 cmH_2O
FX540T Individuals between 5 and 65 years old*	0 - 20 cmH_2O	25 cmH_2O

OPTIONAL CONFIGURATIONS

Art. No.	Adjustable unit (5 cmH_2O presetting)	Gravitational unit
FX537T	0 - 20 cmH_2O	10 cmH_2O
FX538T	0 - 20 cmH_2O	15 cmH_2O
FX541T	0 - 20 cmH_2O	30 cmH_2O
FX542T	0 - 20 cmH_2O	35 cmH_2O

proGAV® 2.0

TOOLS

- *proGAV® 2.0 Adjustment Tool*
- *proGAV® 2.0 Compass*
- *proGAV® 2.0 Tool Set*
- *proGAV® Check-mate,* re-sterilisable

proGAV® 2.0 Adjustment Tool

proGAV® 2.0 Compass

proGAV® 2.0 Tool Set

proGAV® Check-mate

Art. No.	Tools
FX400T	*proGAV® 2.0 Adjustment Tool*
FX401T	*proGAV® 2.0 Compass*
FX404T	*proGAV® 2.0 Tool Set* (contains FX400T and FX401T)
FV409T	*proGAV® Check-mate,* re-sterilisable
on request	*proGAV® 2.0* X-ray template and pressure recommendation card

proSA®

TOOLS

- *proSA® Adjustment Tool*
- *proSA® Verification Tool*

proSA® Adjustment Tool

proSA® Verification Tool

Art. No.	Tools
FV790T	*proSA® Adjustment Tool*
FV791T	*proSA® Verification Tool*

proSA®

TOOLS

- *proSA® Tool Set*
- *proSA® Masterdisc*
- *proSA® Compass*
- *proSA® Adjustment Disc*
- *proSA® Check-mate,* re-sterilisable

proSA® Tool Set

proSA® Masterdisc

proSA® Compass

proSA® Adjustment Disc

proSA® Check-mate

Art. No.	Instruments
FV792T	*proSA® Tool Set* (contains FV790T - FV791T, FV793T - FV795T)
FV793T	*proSA® Masterdisc*
FV794T	*proSA® Compass*
FV795T	*proSA® Adjustment Disc*
FV796T	*proSA® Check-mate,* re-sterilisable
on request	*proSA®* X-ray template and pressure recommendation card

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	proSA®	*proGAV® 2.0*	*GAV® 2.0*	*SHUNT-ASSISTANT® 2.0*	*DUALSWITCH Valve*	*miniNAV®*	*Accessories*
							
Description							
	Adjustable gravitational unit with differential pressure valve	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	Gravitational valve with large flow volumes for CSF	Differential pressure valve, specifically for premature babies and newborns or bedridden or non-mobile patients	
Indication							
LP			✓	✓	✓		
NPH	✓	✓	✓	✓	✓		
Pediatric HC	✓	✓	✓	✓		✓	
Adult HC	✓	✓	✓	✓	✓	✓	
Patient							
Lying	✓	✓				✓	
Active	✓	✓	✓	✓	✓	*	
Feature							
3-Tesla MR Conditional	✓	✓	✓	✓	✓	✓	
Gravitational unit	✓	✓	✓	✓	✓		
Adjustable	✓	✓					

* in combination with *SHUNTASSISTANT® 2.0* or *proSA®*

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Manufacturer acc. to MDD 93/42/EEC

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