Aesculap Neurosurgery

DUALSWITCH® VALVE MONOSTEP® VALVE





Shunt systems for hydrocephalus treatment





Alliance for innovation

When two strong partners combine their know-how, this often leads to innovative and groundbreaking solutions, which could not be achieved independently by any of the partners.

Following this philosophy, Aesculap and Miethke have been cooperating since 1999. Our aim was and still is to develop and make available worldwide better solutions for the complex treatment of hydrocephalus.

This vision inspired and motivated everybody in our cooperation. It started with an intensive exchange with customers, doctors and patients about the difficult issues involved in hydrocephalus therapy. New solutions were conceived and discussed in small circles of experts and at scientific meetings.

This process finally resulted in the market launch of the first

gravitational system, which effectively prevents overdrainage of cerebrospinal fluid (CSF). – a world first and milestone in modern hydrocephalus therapy.

So we already achieved a lot, but this is only the beginning. We are determined to continue on the route we embarked on. For the good of the patient, we will continue with our considerable investments in research and development and will not tire to learn more, create further expertise and remain open for future developments.

Aesculap, Tuttlingen



Miethke, Potsdam

We will continue to venture in new directions and cross every frontier to provide help for cases where a solution has not been found yet.



DUALSWITCH® VALVE MONOSTEP® VALVE

the valve

When treated with a shunt system, patients with posthemorrhage hydrocephalus are faced with the risk of valve blockages due to blood-loaded cerebrospinal fluid. A high protein level or tumor cells in the CSF, too, can lead to such problems. These issues were given particular consideration in the development of the *DUALSWITCH® VALVE* and *MONOSTEP® VALVE*. The parallel valve chambers present a very large surface area to the CSF, thus ensuring reliable operation even with contaminated fluid.

As is evident from the equation

P=F/A (P=pressure, F=force, A=area),

a large area also allows a stronger force. This force is provided by a relatively stiff spring, making the valve mechanism effectively immune against any effects caused by proteins, blood or tumor cells.



With the *DUALSWITCH® VALVE* and the *MONOSTEP® VALVE* we offer you two "special solutions", which catch the eye not least because of their particular shell design.

For many years now, the *DUALSWITCH*[®] *VALVE* is also used very successfully in the treatment of NPH. Numerous publications offer evidence for its effectiveness for that indication. In a similar way as in our GAV[®] valve, a special gravitational mechanism in the *DUALSWITCH*[®] *VALVE* prevents shunt overdrainage.

"After 6 years of experience with the DSV, we arrived at a clearly positive assessment of the reliability of the design principle of this gravity-assisted hydrostatic valve. ... Because of the low incidence of over and underdrainage and the good postoperative results, we recommend implanting DSV as ventriculo-peritoneal shunts for patients with iNPH."*

> *U. Meier, Department of Neurosurgery, clinic for accident cases Berlin, Berlin, Germany "Gravity valves for idiopathic normal-pressure hydrocephalus: a prospective study with 60 patients" Acta Neurochir (2005) [Suppl] 95:201-205





DUALSWITCH® VALVE

the valve

"The gravitational ball valves...showed the closest relation to physiological flow requirements."*

*Oikonomou J., Aschoff A., Hashemi B., Kunze S., New valves – new dangers? 22 valves designed in the nineties in ultralong-term tests (365 days). Eur J Pediatr Surg 1999; 9 Suppl 1:23-6

- Valve system with parallel chambers and integrated gravity unit
- Physiological CSF drainage through active adaptation of the opening pressure to the patient's physical position
- Effective protection against CSF overdrainage, thus prevention of slit ventricle syndrome
- Reduced risk of blockage thanks to maximized flow volume and very robust yoke springs

DUALSWITCH®-VALVE



Our recommendation:**

Patient's height	Standard valve	NPH valve
up to 160 cm	10 / 30 cmH ₂ 0	5 / 30 cmH ₂ 0
160 - 180 cm	10 / 40 cmH ₂ 0	5 / 40 cmH ₂ 0
above 180 cm	10 / 50 cmH ₂ 0	5 / 50 cmH ₂ 0

DUALSWITCH® VALVE

Our recommendation Your choice

** These guide values are not binding. Other specifications may be preferable for the individual patient and anamnesis.

We recommend implanting the DUALSWITCH® VALVE in the thoracic region. The implantation height of the implant does not affect its functionality in any way.

Your choice:

The *DUALSWITCH*[®] *VALVE* is available with various pressure levels. Each pressure level is identified by a special marker code, which can be read through postoperative radiography.

Opening pressure horizontal/vertical (cmH ₂ O)	DUALSWITCH"-VALVE X-ray marker code	Opening pressure horizontal/vertical (cmH ₂ O)	<i>DUALSWITCH⁼-VALVE</i> X–ray marker code
5 / 30		10 / 50	
5 / 40		13 / 30	
5 / 50		13 / 40	
10 / 30		13 / 50	
10 / 40			



DUALSWITCH® VALVE Supine Function Precise and safe functioning of the DUALSWITCH® VALVE is ensured by The Functions implanting the valve parallel to the body axis. When the patient is supine, the DUALSWITCH® VALVE is in a horizontal position. The low-pressure level valve chamber keeps the patient's intraventricular pressure within physiological limits. The ball of the gravity unit can move freely and does not present an additional flow resistance while the patient is lying down, because the flow channel at this point is kept open automatically. Valve opening pressure (cmH₂0) 40 -30 20 DSV® 10/40 15°



30°

45°



Upright Function

The gravity unit is activated whenever the patient moves to an upright position.

- From a body angle of approx. 60°, the valve automatically switches to activation of the higher-pressure valve chamber.
- This higher valve opening pressure in the upright position effectively prevents overdrainage and ensures that a physiological brain pressure is maintained in this position too.



DUALSWITCH® VALVE



Scale 1:1

	Valve pressure level (cmH ₂ O*)			
Art. no.				
FV190T	5	30		
FV191T	5	40		
FV192T	5	50		
FV100T up to 1	60 cm** 10	30		
FV101T 160 - 1	80 cm** 10	40		
FV102T above 1	80 cm** 10	50		
FV103T	13	30		
FV104T	13	40		
FV105T	13	50		

**Standard pressure levels. These guide values are not binding. Other specifications may be preferable for the individual patient and anamnesis.

$DUALSWITCH^{\circ}VALVE$ with distal catheter



**Standard pressure levels. These guide values are not binding. Other specifications may be preferable for the individual patient and anamnesis.



$DUALSWITCH^{\circ}$ SHUNT SYSTEM with FLUSHING RESERVOIR



$DUALSWITCH^{\circ}$ SHUNT SYSTEM with BURRHOLE RESERVOIR





DUALSWITCH® SHUNT SYSTEM with SPRUNG RESERVOIR*



$\textit{DUALSWITCH}^{\circ}$ VALVE for L-P drainage



DUALSWITCH® VALVE

all catheters: $d_i = 1.2 \text{ mm}$, $d_0 = 2.5 \text{ mm}$

Scale 1:1

	Valve pressure level (cmH ₂ O*)		
Art. no.			
FV373T	5	30	
FV374T	5	40	
FV375T	5	50	
FV127T up to 10	60 cm** 10	30	
FV128T 160 - 1	80 cm** 10	40	
FV129T above 1	80 cm** 10	50	
FV130T	13	30	
FV131T	13	40	
FV132T	13	50	

**Standard pressure levels. These guide values are not binding. Other specifications may be preferable for the individual patient and anamnesis.



$DUALSWITCH^{\circ}$ SHUNT SYSTEM for L-P drainage



Scale 1:1

	Valve pressure level (cmH ₂ O*)				
Art. no.) SA				
FV382T	5	30			
FV383T	5	40			
FV384T	5	50			
FV163T up to 16	0 cm** 10	30			
FV164T 160 - 18	30 cm** 10	40			
FV165T above 18	80 cm** 10	50			
FV166T	13	30			
FV167T	13	40			
FV168T	13	50			

**Standard pressure levels. These guide values are not binding. Other specifications may be preferable for the individual patient and anamnesis.





Aesculap Neurosurgery

Adjustable ball-in-cone valve, 0-200 mmH₂0

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- Integrated "SHUNTASSISTANT®" for effective protection against overdrainage
- "Active-Lock" mechanism to prevent unintended readjustment in MRI fields up to 3 Tesla
- Set pressure level can be read without use of X-ray imaging
- Handy instruments for easy readjustment and reading of the pressure level
- High-precision titanium valve technology



MONOSTEP® VALVE

The valve Your choice In contrast to the *DUALSWITCH*[®] *VALVE*, the MONOSTEP[®] *VALVE* has only one valve chamber and no gravity unit, so that it operates as a standard differential pressure valve. Its unique configuration with a relatively large flow volume and a robust yoke spring ensure reliable operation.

MONOSTEP® VALVE



Your choice:

The *MONOSTEP*[®] *VALVE* is available with various pressure levels. Each pressure level is identified by a special marker code, which can be read through postoperative radiography.

Opening pressure horizontal (cmH ₂ O)	MONOSTEP" VALVE X–ray marker code
5	
7	
10	
13	
16	

Our recommendation:**

Patient's height	Standard valve	
any height	10 cmH ₂ 0	

** These guide values are not binding. Other specifications may be preferable for the individual patient and anamnesis.

Horizontal mode

- The MONOSTEP® VALVE is particularly suitable for passive, recumbent patients.
- For active patients who will stand up or sit, we recommend combining this valve with a SHUNT-ASSISTANT[®] or PAEDI-SHUNTASSISTANT[®], respectively.



MONOSTEP® VALVE

Our recommendation Mode of operation





$\textit{MONOSTEP}^{\circ}\textit{ VALVE}$



	Valve pressure level (cmH ₂ O*)	
Art. no.	05 <u>4</u>	
FV200T	5	
FV201T	7	
FV202T**	10	
FV203T	13	
FV204T	16	

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$\textit{MONOSTEP}^{\circ} \textit{ SHUNT SYSTEM with BURRHOLE RESERVOIR}$



Scale 1:1





$MONOSTEP^{\circ}$ SHUNT SYSTEM with FLUSHING RESERVOIR



	Valve pressure level (cmH ₂ O*)	
Art. no.		
FV220T	5	
FV221T	7	
FV222T**	10	
FV223T	13	
FV224T	16	

****Standard pressure level.** This guide value is not binding. Other specifications may be preferable for the individual patient and anamnesis.





AESCULAP[®]

Manufacturer acc. MDD 93/42/EEC

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