

# GEA VALVE AUTOMATION

Control and Feedback Systems









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# CONTENTS

<b>06</b>	<b>Introduction</b>
06	Valve Technology
08	Control and Feedback Systems
11	Interface Types
12	Selection Matrix of Control and Feedback Systems
14	Selection Matrix
<b>16</b>	<b>Control and Feedback Systems</b>
16	T.VIS® A-15 Overview
18	T.VIS® A-15 – 24 V DC / AS-i / DeviceNet / IO-Link
20	T.VIS® M-20 Overview
22	T.VIS® M-20
24	T.VIS® M-15 Overview
26	T.VIS® M-15 – 24 V DC
28	T.VIS® M-15 – AS-i/DeviceNet
30	T.VIS® E-20 Overview
32	T.VIS® E-20
34	T.VIS® V-1/V-20 Overview
35	T.VIS® V-1/V-20
36	T.VIS® V-1 – Valves up to DN 32
37	T.VIS® V-20 – Valves from DN 40
38	T.VIS® P-1/P-15 Overview
40	T.VIS® P-1
42	T.VIS® P-15
44	Connection Screw Fitting
45	Adaptation
47	Logic NOT-function
48	Connection 0, INA / RM, LAT / RMEA
50	Proximity Switches
51	IP Protection Classes
52	Technical Characteristics

<b>54</b>	<b>Appendix</b>
54	Sample Composition of the Order Code
56	Complete Order Code
59	GEA Service for Valve Technology
60	Description of Certificates
61	Abbreviations and Terms
64	CAD Files
65	General Sales Terms and Condition of Delivery





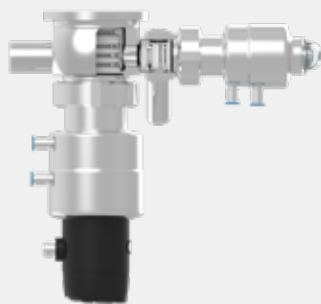
**GEA VARIVENT®**  
Valves



**GEA**  
Butterfly valves



**GEA VARICOVER®**  
Product recovery systems



**GEA VESTA®**  
Valves



**GEA D-tec®**  
Valves





**GEA Aseptomag®**  
Valves

# Valve Technology

## Efficiency delivering perfect results

Valves from GEA form the core component of matrix-piped process plants. Thanks to a pioneering valve concept that sets standards for its flexibility, as well as the latest control and automation functions, our valves offer manufacturers maximum product safety and process reliability.

All GEA Valves are designed to be efficient and cost-effective for their particular applications, leading to sustainable operation and considerable savings potential.

## GEA valve technology controls flow processes

Our valve technology ensures safe, efficient processes wherever sensitive liquid products are manufactured. In food production, the classic application areas range from milk processing (milk, yogurt, cheese ...) to liquid foods (sauces and pastes, instant products, baby food ...) and on to the brewing of beer and production of beverages. Further significant areas are

biotechnology and pharmaceuticals, as well as care products and cleaning agents/detergents.

Regardless of the sector, the application or production specifications: Our valve technology is sure to meet the demands of our users.

## Valve solutions for every task

Additional components in our portfolio are available to optimize the design of any process plant – from pigging systems for the recovery of valuable products, process connections, and expansion compensators for offsetting thermal stress, to tank safety systems for securing and cleaning tanks and containers.

Supported by our Research and Development Department we regularly launch new, technologically mature products on the markets. Our customers have high standards, which we continuously and systematically meet.





# Control and Feedback Systems

## **Valve automation for increased process reliability, efficiency and flexibility**

GEA's valve technology sets the standards for reliable, safe and permanently efficient liquid processes. Leading-edge control and automation options enable operators to achieve optimum control and monitoring of the valve – thereby realizing state-of-the-art, highly flexible operating and automation concepts.

The key component is the latest generation of GEA control tops with reliable, ground-breaking control and feedback technology. Mechanical valve components and a control top specified for the particular application together to form a finely tuned valve unit capable of realizing advanced system concepts and enhancing process options.

## **The control top – integral part of the valve unit**

The connection between valve and control top becomes particularly meaningful when looking at the air paths needed to actuate the main hub. In contrast to other manufacturers,

GEA valves have an internal air duct, which means that there is no need for tubing between the control top and the valve actuator. The control air from the control top enters and departs the actuator directly via the inner air duct through the piston rod, so that there is no unnecessary loss of compressed air and the valve can perform optimally.

The control top enables optimized production and cleaning processes with less effort in terms of personnel, energy and time. Valve functions can be automatically and continuously monitored, recorded, evaluated and, if necessary, corrected. Detectable valve positions make a decisive contribution to optimal system operation. This ensures smooth processes and maximum product safety.

Special priority is given to sustainability in intelligent valve control: Thanks to the selectable LEFF® function integrated in the T.VIS® A-15, up to 90 percent of cleaning agents can be saved by an optimized and PLC-independent pulsing of the valve discs during the cleaning process.



The economical air guidance in the control top and the integrated solenoid valves with low power intake minimize energy consumption as well as the demand for compressed air and the number of hose connections.

In addition, the control top offers the best protection to components against adverse ambient conditions such as moisture, dust, liquids of any kind, vibrations and other mechanical impact.

#### **Modern plant communication at the threshold to industry 4.0**

The control tops in the current GEA range can be configured for all common types of connection and control systems to make future-oriented, pioneering automation functions possible. For example, users can ensure early digital integration of their system control setup in Industry 4.0 environments by way of the modern IO-Link technology. Digital exchange of data enables central setting of component parameters and lossless information transfer.

Diagnostic data from the valve can be processed and displayed in central control unit of the plant. The options even extend to networking the system controller with the company's ERP system for optimized resource utilization.



#### **Easy start-up**

Thanks to pre-configurable system parameters and a fully automatic SETUP, the installation for digital valve control is easy even also without extensive technical knowledge. Regional requirements, application-specific certificates (UL/CSA/PMO/EX) and other individual specifications can be provided as needed.

As a true pioneer with decades of experience in the development of valves and control tops for all processes, GEA offers the perfect symbiosis of mechanical and electronic engineering, largely with standardized components. Extensive tests and countless valve units installed around the world have continuously proved the reliability and cost-effectiveness for the user, always ensuring maximum safety of operation.



## T.VIS® concept – for valves with pneumatic actuator



### **T.VIS® A-15 – control top with automatic setup**

- For open/close position feedback and actuator control
- Automatic setup
- Semi-automatic setup



### **T.VIS® M-20 – control top with automatic setup**

- Easy and time-saving commissioning
- For end position feedback and actuator control
- Simple setting options via DIP switches
- Extended tolerance ranges



### **T.VIS® M-15 – control top with manual sensor setting**

- For open/close position feedback and actuator control
- Proven sensor technology
- Modules and solenoid valves can be retrofitted



### **T.VIS® E-20 – control top for potentially explosive areas**

- For open/close position feedback and actuator control
- Intrinsically safe sensors and solenoid valves



### **T.VIS® V-1/V-20 – control top with automatic setup**

- Specially designed for VESTA® and other small valves
- For open/close position feedback and actuator control
- Automatic setup
- Semi-automatic setup



### **T.VIS® P-1 – Position controller**

- Specially designed for VESTA® and other small valves
- For infinitely definable positioning of the valve disc between the open/close positions
- Automatic setup



### **T.VIS® P-15 – Position controller**

- For infinitely definable positioning of the valve disc between the open/close positions
- Automatic setup



### **INA / RM – proximity switch holder on the actuator**

- For up to 2 proximity switches M12×1
- INA for the valve series VARIVENT®, VESTA® and D-tec®
- RM for the valve series Aseptomag®



### **LAT / RMEA – proximity switch holder in the lantern**

- For up to 2 proximity switches M12×1
- LAT for the valve series VARIVENT® and D-tec®
- RMEA for the valve series Aseptomag® (for 1 proximity switch M12×1)



# Interface Types

## 24 V (PNP / NPN)

In 24 V parallel wiring digital signals are exchanged between a terminal unit and generally the corresponding input and output modules of a PLC. In this case, it is necessary to have a separate wire for each signal, usually in the form of a multi-core cable.

- PNP (current-supplying) indicates signal transfer against reference potential L-.
- NPN (current-drawing) indicates signal transfer against reference potential L+.

## AS-Interface



AS-Interface (Actuator-Sensor Interface) is a standard in fieldbus communication that was developed for connecting actuators and sensors. This is to replace parallel wiring used in the past. The AS-Interface has been an international standard acc. to EN 50295 and IEC 62026-2 since 1999. AS-i products are certified by the AS International Association, thereby, ensuring that equipment from different manufacturers will work together in the same system. The transmission medium is an unshielded, two-core yellow cable which also carries the electrical power supply (24–30 V direct current voltage) for the communication electronics and the slaves. A maximum of 62 slaves can be used per AS-i master. The slaves are addressed manually using a manual addressing unit or automatically by the master. The maximum length of the AS-i cable is 100 m, although by using repeaters it is possible to extend the entire length up to 400 m.

## DeviceNet

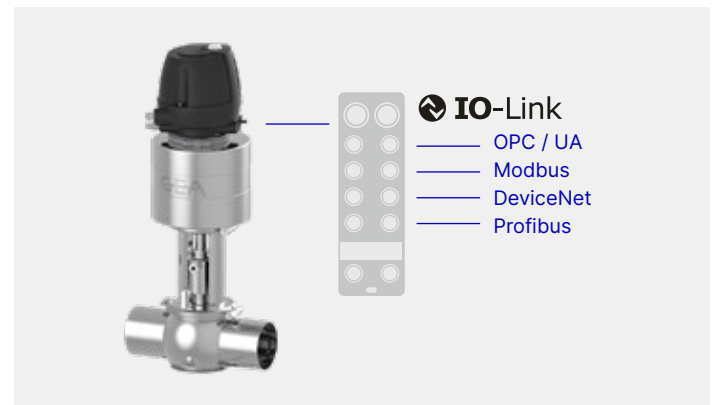


DeviceNet is a CAN-based fieldbus that is chiefly used in automation engineering. DeviceNet was developed by Allen-Bradley (part of Rockwell Automation) and later transferred to the ODVA (Open DeviceNet Vendor Association) as an open standard. DeviceNet is chiefly used in the USA and, to a certain extent, Asia. A maximum of 64 network nodes can be used per fieldbus segment. The nodes address is set either using dial or DIP switches on the device, or can be configured using the bus on the basis of software. The maximum length of the DeviceNet cable depends on the selected cable type and baud rate, although it cannot exceed 500 m.

## IO-Link



IO-Link is the first globally standardized IO technology (IEC 61131-9) to communicate with sensors and also actuators. The high-performance point-to-point communication is based on the long-known 3-wire sensor and actuator connection without any additional requirements for the cable material. IO-Link is therefore not a fieldbus, but the evolutionary further development of the previously proven connection technology for sensors and actuators.



## NAMUR



The 2-wire NAMUR sensors and solenoid valves used here can be operated in the Ex area because of their “intrinsically safe” ignition protection type. Using external isolating switching amplifiers, it is possible to operate control tops with this communication technology up to zone 1 or 21.

## 4–20 mA (3-wire)

In industrial automation engineering, the 4–20 mA current signal is the one most frequently used for analog measured value transmission. The enormously widespread use of this type of signal is explained by its ease of handling and, above all, its resistance to interference.

Using 4 mA as the initial value instead of 0 mA makes it very easy to detect and evaluate a wire break. As a rule, 4–20 mA corresponds to 0–100 % of the physical measuring range of an analog sensor or the working range of an actuator set in the parameters; the nominal value is supplied or the actual value is returned via an interface of this kind.



# Selection Matrix of Control and Feedback Systems

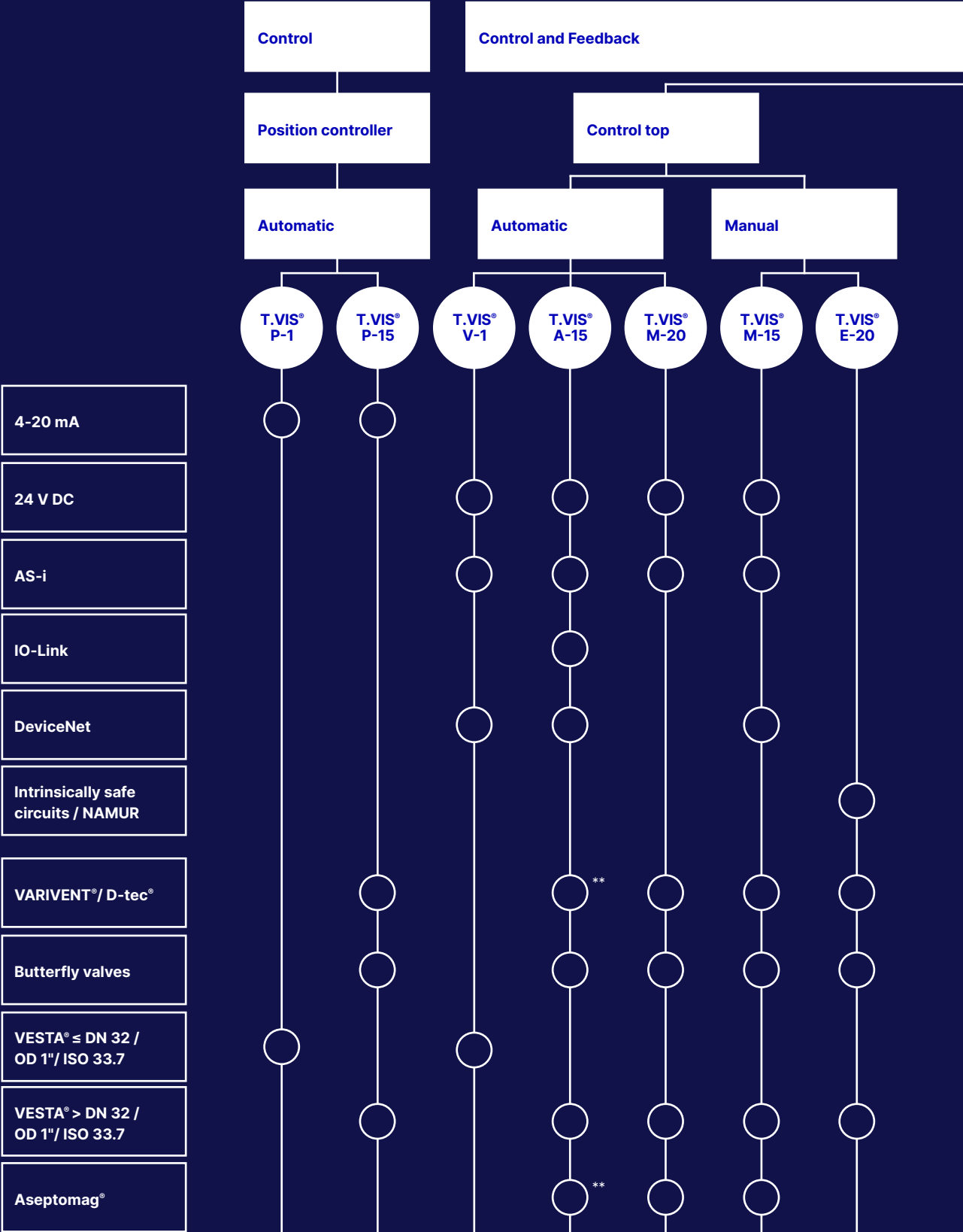
for Valves with Pneumatic Actuator

Function

Product

Available Interface

Available for

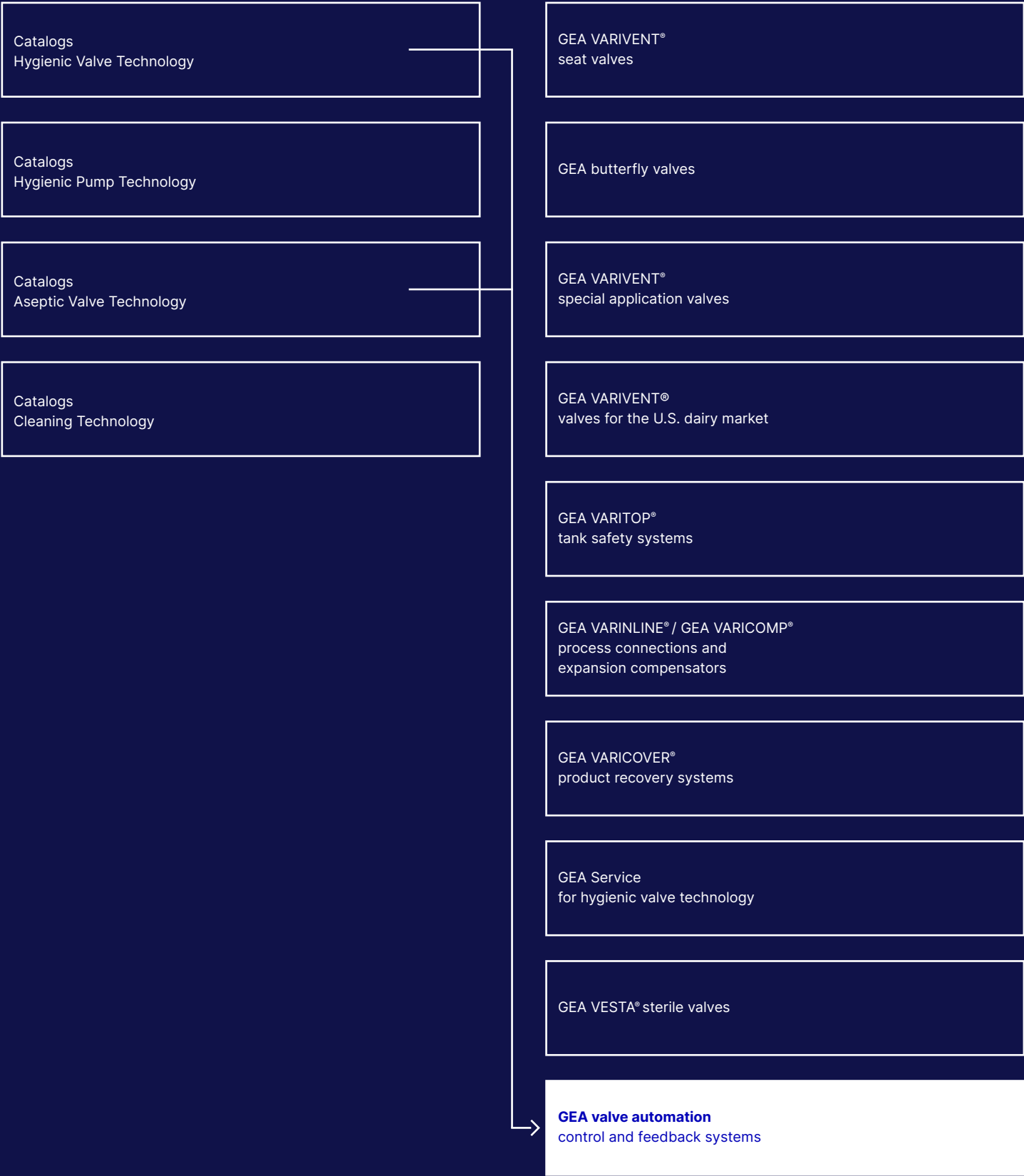








# Selection Matrix









# T.VIS® A-15 Overview

## Concept

The T.VIS® A-15 is equipped with a high-precision path measuring system. This automatic open/close position recognition is available on any valve from GEA, along with a T.VIS® feedback system.

Development has focussed on the requirements and necessities of our customers from the fluid-processing industry. In addition to safe control and monitoring of all functions of the process valves in breweries, dairies, plants for manufacturing fruit juices as well as pharmaceuticals, the T.VIS® A-15 offers significant advantages that are directly reflected in lower total cost of ownership.

## Features

Quick, automatic initialization
Tamper-proof setting of tolerances
Reduced energy consumption
Reduction in operating costs
Valve status display by LED
Filter protects solenoid valves
High-quality pneumatic fittings
Exchangeable compressed air connection
Supply and exhaust air throttles can be fitted
Logic NOT-element
LEFF® function
Semi-automatic setup
Standard protection class IP66

## Structure

The T.VIS® A-15 is equipped with a precise path measuring system for detecting its position.

The necessary wiring for control and feedback is performed, depending on the requirements, via the M12 plug connections accessible from the outside or through direct wiring and cable glands.

The control top can be opened for this.

Operation and configuration of the T.VIS® A-15 takes place either by the two push buttons on the cap or, with the cap removed, via the buttons below. The push buttons are secured electronically against inadvertent or incorrect operation, while in operating mode.

The supply air connection is equipped with a replaceable filter to protect the built-in solenoid valves.

## Position detection

Path measuring system – the valve position is registered by means of a highly modern path measuring system.

## Setting

Automatic – following unlocking, simply pressing the two buttons on the cap of the T.VIS® A-15 starts the initialization process which runs fully automatically. There is no need to open the control top for this purpose, resulting in particularly quick, easy and safe commissioning of the control top (on average < 1 minute).

Immediately following the set-up, it is possible to set the open/close position tolerances and signal attenuation in the parameter menu.

## Logic NOT-element

A logic NOT-element is an available option. It simplifies wiring with automatic air support of the spring in the actuator, in order to increase the holding force of the valve.

For more information about the logic NOT-element, refer to the end of this catalog.

## Visualization

### LED display

- green: valve in non-actuated position
- green flashing: valve moving towards non-actuated position
- yellow: valve in end position
- yellow flashing: valve moving towards end position
- red: in programming mode or fault

The programmable color change allows the display of colors yellow and green to be swapped over.



T.VIS® A-15



### Service mode

Activation of the main stroke, which may be required for valve maintenance, is carried out in the service mode that can be triggered via buttons. At the same time, all feedbacks are stopped (warning to the system control). Furthermore, input signals from the control room are not implemented by the T.VIS®, in order to protect the employee.

### Signal attenuation for position feedback

Attenuation suppresses the signal changes of the feedback device for the attenuation period specified. At the same time, a static change of a feedback signal is delayed by the attenuation period. This allows user-specific process sequences to be optimally set. For the reliable monitoring of the valve seat seal GEA recommends the factory setting without signal attenuation.

### Semi-automatic setup

By means of the semi-automatic setup, a control top can be replaced without interrupting the current process. For this, an employee only needs to perform the simple configuration

once on site: in the version in protection class IP66 with two push buttons on the T.VIS® cap, and for the optional protection classes IP67 and IP69 with the cap removed directly with the two buttons below.

For the semi-automatic set-up, the control top initially only learns the position of the valve disc on the non-actuated position and then remains until the valve is actuated in the scope of a running process. Only then will the end position of the valve be stored. The process thus does not need to be stopped!

The semi-automatic set-up is integrated into the T.VIS® A-15 as standard and does not require any additional hardware.

### Air guidance

In most process valves (VARIVENT®, D-tec®), the control air for actuating the valve is fed directly from the control top into the actuator via internal air duct. In the case of process valves that do not permit internal air flow (Aseptomag®, VESTA®), the air is supplied from the control top via external tubing.

### LEFF® function

LEFF® stands for Low Emission Flip Flop. The function describes modulation of the valve disc during the lifting procedure. It is steadily monitored by the path measuring system and the electronics of the T.VIS® A-15, and works independently from the PLCs cycle time.

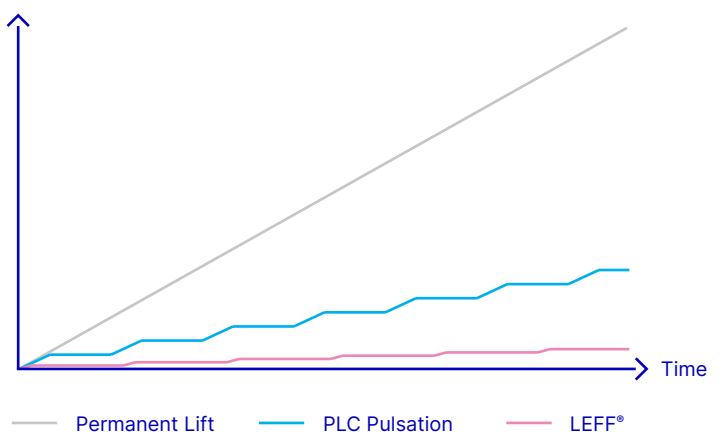
The LEFF® function is automatically integrated in the T.VIS® A-15 and for double seat valves simply utilizes standard feedback units, without needing any special components. The straightforward configuration using two push buttons on the T.VIS® cap allows the LEFF® function to be activated separately at any time during set-up for the valve or double disc. To allow the LEFF® function to be used with the double disc, the optional external proximity switch is required.

Modulation of the valve disc during lifting makes it possible to drastically reduce cleaning agent consumption, respectively discharge into the drains and thus, reducing operating costs, compared to the conventional lifting method. Even compared to modulation controlled in the PLC, the T.VIS® A-15 offers markedly lower CIP losses per cycle due to significantly shorter data pathways, as well as the ability to register disc movement sooner internally due to the measuring system. Significant savings are possible. However, these values are highly dependent on process parameters, the level of contamination as well as cleaning pressure and flow rate, so that each CIP situation has to be considered case-by-case.

### Features

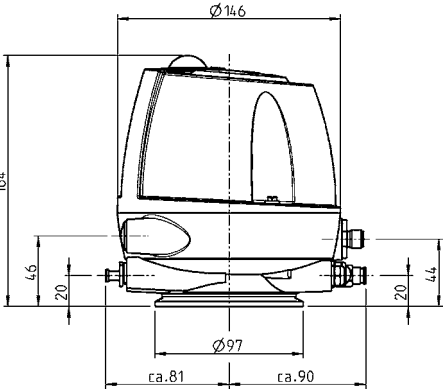
- No additional system technology required
- Independent from the time cycle of the PLC
- Automatic monitoring of the lift functions
- Significant cost reduction  
(CIP medium losses, waste water costs, etc.)

CIP Loss Volume





T.VIS® A-15 –  
24 V DC / AS-i /  
DeviceNet / IO-Link



Technical data of the standard version

Position detection	Path measuring system	
Housing material	PA 12/L	
Ambient temperature	-20 to +55 °C	
Air supply	Pressure range	2 to 8 bar
	Standard	acc. to ISO 8573-1:2010
	Solid content	Quality class 6
	Water content	Quality class 4
	Oil content	Quality class 3
Dimensions of air connections	Metric 6/4 mm, inch 6.35/4.31 mm (¼")	
Protection class	IP66*	
Sound pressure level via exhaust air throttle	Max. 72 dB	
Visualization	LED (green, yellow, red)	

\* Overview on page 51

Type of interface	24 V DC, 3-wire, PNP	AS-Interface bus	DeviceNet	IO-Link
<b>Supply</b>				
Operating voltage	24 V DC (+20 % – 12.5 %)	26.5–31.0 V DC	21.5–26.0 V DC	24 VDC (±25 %)
No-load current	≤ 25 mA	≤ 25 mA	≤ 35 mA	≤ 45 mA
Maximum current consumption	200 mA	90 mA	90 mA	135 mA
Polarity reversal protection	Yes	Yes	Yes	Yes
Specification		AS-i V3.0		V1.1 Port Class A / COM2
Additional information		IO.ID.ID2-Code: 7.A.E	221-002917DNET-TVIS_R1.eds	GEA-TVIS-A15-IO-LINK_8_2_38k Bd-20200217-IODD1.1
Conformity		AS-i Association	ODVA	PNO

<b>Inputs</b>				
Connection type	24 V DC (PNP)			
Short circuit-proof	Yes			
Overload-proof	Yes			
Maximum current carrying capacity per feedback output	100 mA			
Voltage drop on the outputs	≤ 1 V			
Feedback “start position”	Electronic output	Data bit DI 0* Data bit DI 3**	Data bit DI 0* Data bit DI 3**	Data bit DI 0* Data bit DI 3**
Feedback “end position”	Electronic output	Data bit DI 1	Data bit DI 1	Data bit DI 1
Feedback “double disc”		Data bit DI 2	Data bit DI 2	Data bit DI 2
Feedback “valve disc”		Data bit DI 0**	Data bit DI 0**	Data bit DI 0**

<b>Outputs</b>				
Activation voltage	High = > 13 V; low = < 6 V			
Current consumption per input	< 10 mA			
Activation “PV Y1”	Electronic input	Data bit DO 0	Data bit DO 0	Data bit DO 0
Activation “PV Y2”	Electronic input	Data bit DO 1	Data bit DO 1	Data bit DO 1
Activation “PV Y3”	Electronic input	Data bit DO 2	Data bit DO 2	Data bit DO 2

\* Single-seat valves / Butterfly valves    \*\* Double-seat valves



Position	Description of the order code	
14	Feedback location	
	TA15	Control top T.VIS® A-15
15	Control top type	
	N	Without solenoid valve
	P	1 solenoid valve Y1 <sup>1)</sup>
	I	2 solenoid valves Y1, Y2 (Y2 for lower seat lift)
	J	2 solenoid valves Y1, Y3 (Y3 for upper seat lift, air/air actuator or external process valve)
	L	3 solenoid valves Y1, Y2, Y3
	V	1 solenoid valve Y1, logic NOT-element
	X	2 solenoid valves Y1, Y2, logic NOT-element
16	Feedback	
	8	2 digital feedbacks
	9	2 digital feedbacks with external proximity switch
17	Type of interface	
	A	AS-Interface bus
	B	24 V DC, 3-wire, PNP
	D	DeviceNet
	I	IO-Link
18	Solenoid valve	
	A	24 V DC, 0.85 W
	0	Without
19	Screw connection <sup>2)</sup>	
	J	Metric air connection, 5-pin M12 plug (M20×1.5) for 24 V DC (1 PV, 2 feedbacks), IO-Link, AS-Interface, DeviceNet
	H	Metric air connection, 8-pin M12 plug (M20×1.5) for 24 V DC (> 1 solenoid valve, > 2 feedbacks)
	M	Metric air connection, M20×1.5 cable gland with integrated terminal strip for 24 V DC
	P	Inch air connection, 5-pin M12 plug (M20×1.5) for 24 V DC (1 PV, 2 feedbacks), IO-Link, AS-Interface, DeviceNet
	I	Inch air connection, 8-pin M12 plug (M20×1.5) for 24 V DC (> 1 solenoid valve, > 2 feedbacks)
	Z	Inch air connection, 0.5" NPT cable gland with integrated terminal strip for 24 V DC
	Options (multiple selection possible)	
/18	Supply air throttle: regulates the opening speed of the valve (not available with control top types V, X, or Y)	
/19	Exhaust air throttle: regulates the closing speed of the valve	
/22	24 V DC/AS-i/DeviceNet/IO-Link: 5-pin connection socket for screw connection J, P (article no. 508-963) 24 V DC: 8-pin connection socket for screw fitting H, I (article no. 508-061)	
/50	Metal plate engraved	
/51	Metal plate (US-Version)	
/52	Adhesive label	
/66	Protection class IP66 <sup>3)</sup>	
/67	Protection class IP67 <sup>3)</sup>	
/69k	Protection class IP69k <sup>3), 4)</sup>	
/81	AS-i connection box on cable 1 m with 5-pin M12 connection socket (article no. 508-027)	
/82	AS-i connection box on cable 2 m with 5-pin M12 connection socket (article no. 508-028)	
/UC	Certification UL/CSA, only for indoor use and only with interface type A, B, D, and I	
/CD	UL 121201: Non-igniting electrical equipment for use in potentially explosive areas of Class I, Division 2, Group A, B, C, D	
	CSA C22.2 No. 213-17: Non-igniting electrical equipment for use in potentially explosive areas of Class I, Division 2, Group A, B, C, D	
Additional information for order code		
/A	Suitable for installation on Aseptomag® valves	

The code is composed as following, depending on the chosen configuration:

Position	14	15	16	17	18	19	Options				
Code	TA15						/66				

<sup>1)</sup> On Aseptomag® valves due to the external air guidance in "R" variant.

<sup>2)</sup> J/H/M = for air hose Ø 6/4 mm; P/I/Z = for air hose Ø 6.35/4.31 mm

<sup>3)</sup> Overview on page 51

<sup>4)</sup> Not available in combination with option /22, /81 or /82. Cap without buttons.



# T.VIS® M-20 Overview

### Concept

The T.VIS® M-20 is now equipped with the same tried and tested, high-precision path measuring system as the T.VIS® A-15 to ensure automatic end position detection for each GEA valve.

The main focus of development was on the requirements and wishes of our customers in the liquid processing industries.

Particular attention was given to the standardization of the components and to the easiest and most time-saving handling possible at the highest level of reliability.

Features
Proven housing technology
The highest protection class as standard
High vibration and shock resistance
Individual connection technology
Self-learning initialization
Extremely easy commissioning
Parameters can be preset
Standardized T.VIS® visualization with diagnostic function
Standard protection class IP66



### Important note

The T.VIS® M-20 is the successor of the T.VIS® M-15 and will replace it on September 1, 2021.

As of now, the T.VIS® M-15 will only be available for selected markets and valves. See also note on page 24.

### Structure

The T.VIS® M-20 is equipped with reliable and robust control electronics, containing the proven path measurement system of the T.VIS® A-15 as an on-board version.

The cable connection to the central control level is implemented by the customer, either via externally accessible M12 plugs or via direct wiring to internal spring-loaded terminals, depending on the requirements.

Parameters can be preset via DIP switches so that the actual commissioning no longer requires any further operation or configuration.

Using an internal reset button, the electronics can be reset to delivery status after a valve service, so that a new self-learning process takes place automatically when the system is restarted.

The supply air connection is equipped with a replaceable filter to protect the built-in solenoid valves.

### Position detection

Path measuring system – standardized execution in all T.VIS® M, A and P systems.

### Setting

Parameters such as tolerances, color switching or air support can be set using integrated DIP switches.

The actual initialization process runs automatically. The procedure only requires completed connections of the control top to the air supply and electrical system. No other tools are necessary.

### Logic NOT-function

Optionally, a logic NOT-function can be integrated into the control top without additional control effort.

This provides automatic air support for the spring in the actuator in order to increase the holding force of the valve.



## Visualization

### LED display

- green: valve in non-actuated position
- yellow: valve in end position
- green flashing: valve moving towards non-actuated position
- yellow flashing: valve moving towards end position
- red: SETUP is activated

The colors green and yellow can be changed, if required, via dip switch.



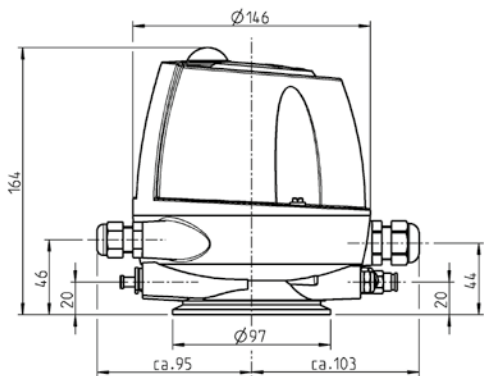
T.VIS® M-20

## Air guidance

In most process valves (VARIVENT®, D-tec®), the control air for actuating the valve is fed directly from the control top into the actuator via internal air duct. In the case of process valves that do not permit internal air flow (Aseptomag®, VESTA®), the air is supplied from the control top via external tubing.



T.VIS® M-20



Technical data of the standard version

Position detection	Path measuring system	
Housing material	PA 12/L	
Ambient temperature	-20 to +55 °C	
Air supply	Pressure range	2 to 8 bar
	Standard	acc. to ISO 8573-1:2010
	Solid content	Quality class 6
	Water content	Quality class 4
	Oil content	Quality class 3
Dimensions of air connections	Metric 6/4 mm, inch 6.35/4.31 mm (¼")	
Protection class	IP6K9k	
Sound pressure level via exhaust air throttle	Max. 72 dB	
Visualization	LED (green, yellow, red)	

Type of interface	AS-Interface bus	24 V DC, 3-wire, PNP
<b>Supply</b>		
Operating voltage	23-31.6 V DC	24 V DC (+/-25 %)
No-load current	35 mA	30 mA
Maximum current consumption	155 mA	200 mA
Polarity reversal protection	Yes	Yes
Specification	AS-i V3.0	
Additional information	IO.ID.ID2-code: 7.A.E	
Conformity	AS-i Association	
<b>Inputs</b>		
Connection type		24 V DC
Maximum current carrying capacity per feedback output		100 mA
Voltage drop on the outputs		≤ 1.8 V
Feedback "start position"	Data bit DI 0	Electronic output
Feedback "end position"	Data bit DI 1	Electronic output
<b>Outputs</b>		
Activation voltage		21-28.8 V DC
Current consumption per input		35 mA
Activation "PV Y1"	Data bit DO 0	Electronic input
Activation "PV Y2"	Data bit DO 1	Electronic input
Activation "PV Y3"	Data bit DO 2	Electronic input



<sup>1)</sup> On Aseptomag® valves due to the external air guidance in "R" variant.

[illegible]



# T.VIS® M-15 Overview

## Concept

The T.VIS® M-15 is equipped with manually adjustable sensors and a modular system of options, all of which form the basics of the T.VIS® feedback technology. This means it is optimally adapted to the basic requirements of the process system.

With proven sensor technology, it offers the advantages of the modern T.VIS® series in an inexpensive manner.

## Features

Flexible modular system
Use of proven sensor technology
Quick and easy adjustment of the sensors
Valve status indication by LED
Various communication standards available
Components can be upgraded/converted subsequently
Filter protects solenoid valves
High-quality pneumatic fittings
Exchangeable compressed air connection
Supply and exhaust air throttles can be fitted
Logic NOT-element
Standard protection class IP66

## Important note

The T.VIS® M-15 is exclusively available for applications in the USA or Canada and for selected aseptic valves (Aseptomag®).

## Structure

The T.VIS® M-15 is characterized by proven sensor technology. The basic equipment of the control top comprises of the 24 V DC interface module with two sensors for feedback of the valve position and up to three solenoid valves which can be installed subsequently, if necessary.

In the interface types with DeviceNet and AS-Interface an adapter module is connected ahead of the standard interface module, and can also be retrofitted or converted.

The supply air connection is equipped with a replaceable filter to protect the built-in solenoid valves.

## Position detection

Inductive sensor system – The valve positions are detected using two manually adjustable sensors.

## Setting

Mechanical – the sensors are calibrated mechanically using the positioning spindles, which are subsequently secured to prevent self-adjustment.

## Logic NOT-element

A logic NOT-element is available as an option. It simplifies wiring with automatic air support of the spring in the actuator, in order to increase the holding force of the valve.

For more information about the logic NOT-element, refer to the end of this catalog.



## Visualization

### LED display

- green: valve in non-actuated position
- yellow: valve in end position
- yellow flashing: valve neither in non-actuated nor end position

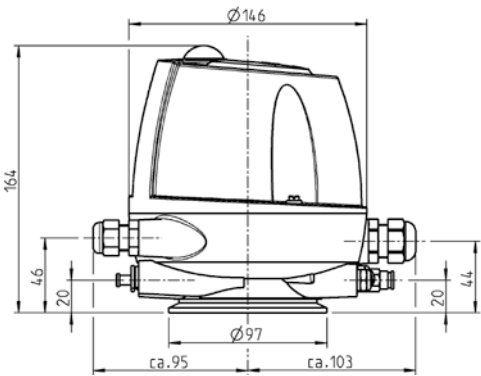


## Air guidance

In most process valves (VARIVENT®, D-tec®), the control air for actuating the valve is fed directly from the control top into the actuator via internal air duct. In the case of process valves that do not permit internal air flow (Aseptomag®, VESTA®), the air is supplied from the control top via external tubing.



T.VIS® M-15 –  
24 V DC



Technical data of the standard version

Position detection	Sensors	
Housing material	PA 12/L	
Ambient temperature	-20 to +55 °C	
Air supply	Pressure range	2 to 8 bar
	Standard	acc. to ISO 8573-1:2010
	Solid content	Quality class 6
	Water content	Quality class 4
	Oil content	Quality class 3
Dimensions of air connections	Metric 6/4 mm, inch 6.35/4.31 mm (¼")	
Protection class	IP66*	
Sound pressure level via exhaust air throttle	Max. 72 dB	
Visualization	LED (green, yellow)	

\* Overview on page 51

Type of interface	24 V DC, 3-wire, PNP / 24 V DC, 3-wire, NPN
Supply	
Operating voltage	24 V DC (+20 %, -12.5 %)
No-load current	≤ 40 mA
Maximum current consumption	255 mA
Polarity reversal protection	Yes
Inputs	
Activation voltage	High = 21 – 28.8 V; low = < 16 V
Current consumption per input	≤ 35 mA
Activation “PV Y1”	Direct PV activation
Activation “PV Y1”	Direct PV activation
Activation “PV Y1”	Direct PV activation
Outputs	
Connection type	24 V DC (PNP/NPN with changeover function)
Maximum current carrying capacity per feedback output	50 mA
Voltage drop on the outputs	≤ 3 V
Feedback “start position”	Electronic outputs
Feedback “end position”	Electronic outputs
Feedback “seat lift position”	Electronic outputs



Position	Description of the order code	
14	Feedback location	
	TM15	Control top T.VIS® M-15
15	Control top type	
	N	Without solenoid valve
	P	1 solenoid valve Y1 <sup>1)</sup>
	R	1 solenoid valve Y1 (retrofittable: Y2, Y3)
	I	2 solenoid valves Y1, Y2 (retrofittable: Y3)
	J	2 solenoid valves Y1, Y3 (retrofittable: Y2)
	L	3 solenoid valves Y1, Y2, Y3
	V	1 solenoid valve Y1 (retrofittable: Y2, Y3), logic NOT-element
	X	2 solenoid valves Y1, Y2 (retrofittable: Y3), logic NOT-element
Y	3 solenoid valves Y1, Y2, Y3, logic NOT-element	
16	Feedback	
	2	2 digital feedbacks
	3	2 digital feedbacks with external proximity switch
17	Type of interface	
	A	24 V DC, 3-wire, PNP
	N	24 V DC, 3-wire, NPN
18	Solenoid valve	
	A	24 V DC, 0.85 W
	0	Without
19	Screw connection	
	M	Metric air connection, M20×1.5 cable gland
	Z	Inch air connection, 0.5" NPT cable gland
	J	Metric air connection, 5-pin M12 plug (1 solenoid valve, 2 feedbacks)
	P	Inch air connection, 5-pin M12 plug (1 solenoid valve, 2 feedbacks)
	H	Metric air connection, 8-pin M12 plug (> 1 solenoid valve, > 2 feedbacks)
	I	Inch air connection, 8-pin M12 plug (> 1 solenoid valve, > 2 feedbacks)
	B	Inch air connection, Brad Harrison 0.5" NPT 5-pin plug (US)
Options (multiple selection possible)		
/18	Supply air throttle: regulates the opening speed of the valve	
/19	Exhaust air throttle: regulates the closing speed of the valve	
/22	5-pin M12 connection socket for screw fitting J, P (article no. 508-963) 8-pin M12 connection socket for screw fitting H, I (article no. 508-061)	
/50	Metal plate engraved	
/51	Metal plate (US-Version)	
/52	Adhesive label	
/66	Protection class IP66 <sup>2)</sup>	
/67	Protection class IP67 <sup>2)</sup>	
/69k	Protection class IP69k <sup>2), 3)</sup>	
/UC	Certification UL/CSA for indoor use	
Additional information for order code		
/A	Suitable for installation on Aseptomag® valves	

<sup>1)</sup> On Aseptomag® valves due to the external air guidance in "R" variant.

<sup>2)</sup> Overview on page 51

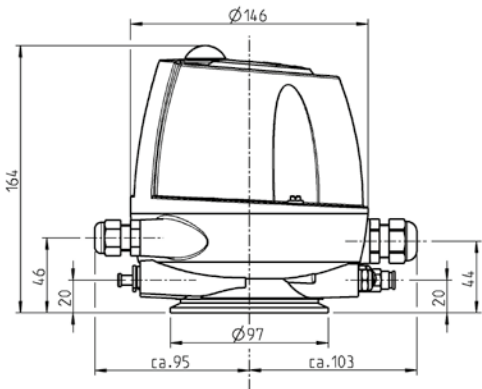
<sup>3)</sup> Not available in combination with option /22.

The code is composed as following, depending on the chosen configuration:

Position	14	15	16	17	18	19	Options				
Code	TM15						/66				



T.VIS® M-15 –  
AS-i/DeviceNet



Technical data of the standard version

Position detection	Sensors	
Housing material	PA 12/L	
Ambient temperature	-20 to +55 °C	
Air supply	Pressure range	2 to 8 bar
	Standard	acc. to ISO 8573-1:2010
	Solid content	Quality class 6
	Water content	Quality class 4
	Oil content	Quality class 3
Dimensions of air connections	Metric 6/4 mm, inch 6.35/4.31 mm (¼")	
Protection class	IP66*	
Sound pressure level via exhaust air throttle	Max. 72 dB	
Visualization	LED (green, yellow)	

\* Overview on page 51

Type of interface	AS-Interface bus	DeviceNet
<b>Supply</b>		
Operating voltage	25.0–31.6 V DC	21.5–26.0 V DC
No-load current	≤ 62 mA	≤ 58 mA (at 24 V DC)
Maximum current consumption	140 mA	140 mA
Polarity reversal protection	Yes	Yes
Specification	AS-i V3.0 (max. 62 slaves with master V3.0)	
Additional information	IO.ID.ID2-code: 7.A.E	EDS file: F1022_R4.eds
Certificate	AS-i association	ODVA
<b>Inputs</b>		
Feedback “start position”	Data bit DI 0	Data bit I-0
Feedback “end position”	Data bit DI 1	Data bit I-1
Feedback “seat lift position” (ext. NI)	Data bit DI 2	Data bit I-2
Collective fault		Data bit I-7
<b>Outputs</b>		
Activation “PV Y1”	Data bit DO 0	Data bit O-0
Activation “PV Y2”	Data bit DO 1	Data bit O-1
Activation “PV Y3”	Data bit DO 2	Data bit O-2



Position	Description of the order code	
14	Feedback location	
	TM15	Control top T.VIS® M-15
15	Control top type	
	N	Without solenoid valve
	P	1 solenoid valve Y1 <sup>1)</sup>
	R	1 solenoid valve Y1 (retrofittable: Y2, Y3)
	I	2 solenoid valves Y1, Y2 (retrofittable: Y3)
	J	2 solenoid valves Y1, Y3 (retrofittable: Y2)
	L	3 solenoid valves Y1, Y2, Y3
	V	1 solenoid valve Y1 (retrofittable: Y2, Y3), logic NOT-element
	X	2 solenoid valves Y1, Y2 (retrofittable: Y3), logic NOT-element
Y	3 solenoid valves Y1, Y2, Y3, logic NOT-element	
16	Feedback	
	2	2 digital feedbacks
	3	2 digital feedbacks with external proximity switch
17	Type of interface	
	A	AS-Interface bus
	D	DeviceNet
18	Solenoid valve	
	A	24 V DC, 0.85 W
	0	Without
19	Screw connection	
	A	Metric air connection M20×1.5 cable gland with connection box on cable 1 m (AS-i)
	S	Inch air connection M20×1.5 cable gland with connection box on cable 1 m (AS-i)
	L	Metric air connection, 2-pin M12 plug (AS-i)
	U	Inch air connection, 2-pin M12 plug (AS-i)
	D	Metric air connection, 5-pin M12 plug (DeviceNet)
	K	Inch air connection, 5-pin M12 plug (DeviceNet)
Options (multiple selection possible)		
/18	Supply air throttle: regulates the opening speed of the valve	
/19	Exhaust air throttle: regulates the closing speed of the valve	
/22	5-pin M12 connection socket for screw fitting L, U, D, K (A-coded, article no. 508-963)	
/50	Metal plate engraved	
/51	Metal plate (US-Version)	
/52	Adhesive label	
/66	Protection class IP66 <sup>2)</sup>	
/67	Protection class IP67 <sup>2)</sup>	
/69k	Protection class IP69k <sup>2), 3)</sup>	
/81	AS-i connection box on cable 1 m with M12 connection socket (article no. 508-027) for screw fitting L, U	
/82	AS-i connection box on cable 2 m with M12 connection socket (article no. 508-028) for screw fitting L, U	
/UC	Certification UL /CSA for indoor use	
Additional information for order code		
/A	Suitable for installation on Aseptomaq® valves	

<sup>1)</sup> On Aseptomag® valves due to the external air guidance in "R" variant.

<sup>2)</sup> Overview on 51

<sup>3)</sup> Not available in combination with option /22, /81, /82 or /A.

The code is composed as following, depending on the chosen configuration:

Position	14	15	16	17	18	19	Options				
Code	TM15						/66				



# T.VIS® E-20 Overview

## Concept

The technology of the T.VIS® E-20 is based on two separate, magnet-based sensors combined in one sensor module. They are used to detect the valve position and provide the corresponding feedback signals for automated plant operation. The sensor module also provides the connection for the solenoid valves to control the valve actuators.

The development focused on the requirements and wishes of our customers in the liquid processing industry, but the field of dust explosion protection was also taken into account.

Special attention was paid to the standardization of the components, as well as to the simplest and most time-saving handling with the highest reliability and safety.

Features

- Proven housing technology and extensive standardization of component use
- Highest protection class as standard
- High vibration and shock resistance
- Easy commissioning
- 2-color 360° status identification
- Certifications for worldwide use

## Structure

The T.VIS® E-20 has 2 position sensors integrated in a compact module as standard. The LEDs, which are also integrated, enable status identification by means of the illuminated dome incorporated in the control top cap.

The required cabling by the customer to the necessary operating equipment and therefore ensuring the intrinsically safe operation of the control top is achieved by direct wiring to internal spring-loaded terminals, both for the feedback signals and for the valve activations.

The supply air connection is equipped with a replaceable filter to protect the built-in solenoid valves.

## Position detection

Two manually adjustable sensors for detection of the valve positions for start/safety and end position.

## Settings

The sensors are mounted on guide blocks and can be individually adjusted over the entire stroke of the valve via two threaded spindles integrated in the sensor module.



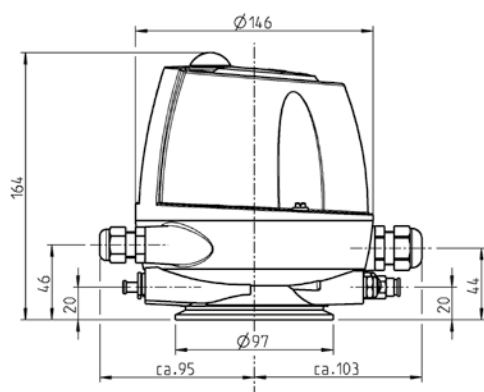
**Visualization**LED display

- green: valve in non-actuated position
- yellow: valve in end position





**T.VIS® E-20**



### Technical data of the standard version

Position detection	Magnetoresistive proximity switch	
Housing material	PA 12/L	
Air supply	Pressure range	2 to 8 bar
	Standard	acc. to ISO 8573-1:2010
	Solid content	Quality class 6
	Water content	Quality class 4
	Oil content	Quality class 3
Dimensions of air connections	Metric 6/4 mm, inch 6.35/4.31 mm (¼")	
Protection class	IP69*	
Sound pressure level via exhaust air throttle	Max. 72 dB	
Visualization	LED (green, yellow)	

\* Overview on page 51

Type of conformity	ATEX/UKEX/IECEX/CCCEX	
Application		
Gas	(II 2G) Ex ia IIC T4...T5 Gb	
Ambient temperature	-10 °C ≤ Ta ≤ +42 °C	
Dust	(II 2D) Ex tb IIIC T85 °C Db	
Ambient temperature	-10 °C ≤ Ta ≤ +38 °C	
Sensors		
NAMUR		
Current consumption not operated	≤ 1.2 mA	
Current consumption operated	≥ 2.1 mA	
Voltage	8.2 V DC/NAMUR	
Solenoid valve	12 V DC +10 %	24 V DC +10 %
Current consumption	50 mA	25 mA
Nominal power	0.6 W	0.6 W
Resistance	252 Ω	1028 Ω
Pull-in voltage	9.5 VDC	19.2 VDC
Minimum switching current	37.7 mA	18.5 mA

### Technical data: 2-wire sensor safety ratings (intrinsic safety)

Temperature class	Ui	Ii	Pi	Li	Ci
Group II	VDC	mA	W	μH	nF
T4	20	60	200	150	150
T5	20	60	130	150	150
T85 °C	20	60	130	150	150

### Technical data: Solenoid safety ratings (intrinsic safety)

Voltage	Nom. Power	Temperature class	Ui	Ii	Pi	Li*	Ci*
VDC	mW	Group II	VDC	mA	W	μH	nF
24	600	T4	30	210	1.6	–	–
24	600	T5	30	120	0.9	–	–
12	600	T4	30	210	1.6	–	–
12	600	T5	30	120	0.9	–	–

\* negliabile



Position	Description of the order code	
14	<b>Feedback location</b>	
	TE20	Control top T.VIS® E-20
15	<b>Control top type</b>	
	N	Without solenoid valve
	R	1 solenoid valve Y1
	I	2 solenoid valves Y1, Y2
	J	2 solenoid valves Y1, Y3
	L	3 solenoid valves Y1, Y2, Y3
16	<b>Feedback</b>	
	2	2 feedbacks
17	<b>Type of interface</b>	
	E	Ex 12/24VDC-NAMUR
18	<b>Solenoid valve</b>	
	0	Without
	E	12 V DC
	X	24 V DC
19	<b>Screw connection</b>	
	E	Metric air connection, M20×1.5 cable gland
	N	Inch air connection, M20×1.5 cable gland
<b>Options (multiple selection possible)</b>		
/18	Supply air throttle: regulates the opening speed of the valve	
/19	Exhaust air throttle: regulates the closing speed of the valve	
/50	Metal plate engraved	
/51	Metal plate (US-Version)	
/52	Adhesive label	
/AEx	ATEX/UKEx certified	
/CCx	CCCEx certified	
/IEx	IECEx certified	

The code is composed as following, depending on the chosen configuration:

Position	14	15	16	17	18	19	Options					
Code	TE20		2	E								



# T.VIS® V-1/V-20 Overview

## Concept

The T.VIS® V-1/V-20 has been specially developed for sterile VESTA® valves and can be configured as a position indicator or control top. The end position can be programmed automatically within seconds using the buttons in the cap. The buttons are also used for customer-specific parameterization of the connection module. VESTA® sterile valves larger DN 32/ OD 1"/ISO 33.7 can also be equipped with all other control and feedback modules of the T.VIS® series.

Features
Fast, automated initialization
Manipulation-proof setting of tolerances
Reduced energy consumption
Lower operating costs
Valve status display via LED
High-quality pneumatic connections
Semi-automatic setup

## Structure

The control top T.VIS® V-1/V-20 consists of a base element and the cap. The base element incorporates an integrated high-precision path measurement system. The cap contains the control electronics and must therefore not be opened by the customer. An external hose connection is provided for supplying the process valve with control air. When used as a control top, a solenoid valve is integrated and the air connections are accessible from the outside. When used as a position indicator, the pneumatic valve control is carried out by a customer-side solenoid valve, e.g. in a solenoid valve terminal. The necessary cabling for feedback and/or control is carried out via externally accessible M12 plug connections. The T.VIS® V-1/V-20 is operated and configured using two push buttons on the cap. The push buttons are secured electronically against inadvertent or incorrect operation, while in operating mode.

## Position detection

Path measuring system – the valve positions are recorded via a state-of-the-art path measuring system.

## Setting

Automatic setting – after unlocking, the fully automatic initialization can be started by simply pressing the two buttons on the cover of the T.VIS® V-1/V-20. The control top does not have to be opened for this, which leads to a simple, safe and particularly quick start-up. Immediately after the setup, the end position tolerances and the signal attenuation can be set in the parameter menu.

## Visualization

### LED display

- green: valve in non-actuated position
- green flashing: valve moving towards non-actuated position
- yellow: valve in end position
- yellow flashing: valve moving towards end position
- red: in programming mode or fault

The programmable color change enables switching of the display colors yellow and green.



## Service Mode (T.VIS® V-1)

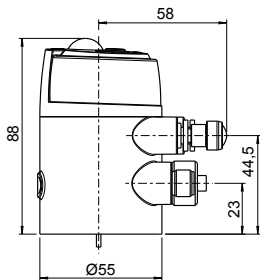
Activation of the main stroke which may be required for valve maintenance is performed using the service mode which can be activated by the buttons. At the same time, all feedbacks are stopped (warning to the system control). Furthermore, input signals from the control room are not implemented by the T.VIS®, in order to protect the employee.

## Air guidance

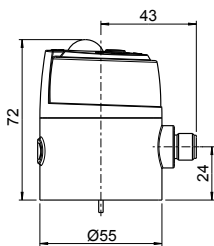
In the control top version of the T.VIS® V-1, the process valves are activated via external tubing for the control air from the control top to the actuator.



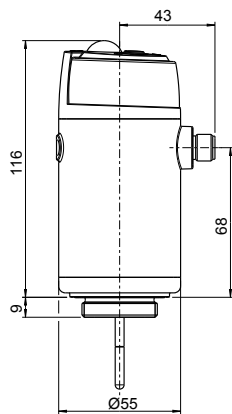
## T.VIS® V-1/V-20



T.VIS® V-1  
(Control top)



T.VIS® V-1  
(Position indicator)



T.VIS® V-20  
(Position indicator)



### Technical data of the standard version

Position detection	Position Measuring System	
Housing material	PA 12/L	
Ambient temperature	Without solenoid valve	-20 to +70 °C
	With solenoid valve	0 to +50 °C
Air supply	Pressure range	2 to 8 bar
	Standard	acc. to ISO 8573-1:2010
	Solid content	Quality class 6
	Water content	Quality class 4
	Oil content	Quality class 3
Dimensions of air connections	Metric 6/4 mm, inch 6.35/4.31 mm (¼")	
Protection class	IP65*	
Sound pressure level via exhaust air throttle	Max. 72 dB	
Visualization	LED (green, yellow)	

\* Overview on page 51

Type of interface	24 V DC, 3-wire, PNP	AS-Interface bus	DeviceNet
<b>Supply</b>			
Operating voltage	24 V DC (+20 %, -12.5 %)	26.5–31.0 V DC	21.5–26.0 V DC
No-load current	≤ 25 mA	≤ 25 mA	35 mA
Maximum current consumption	185 mA	80 mA	80 mA
Polarity reversal protection	Yes	Yes	Yes
Specification		AS-i V3.0 (max. 62 slaves)	
Additional information		IO.ID.ID2-Code: 7.A.E	221-002917DNET-TVIS_R1.eds
Conformity		AS-i Association	ODVA
<b>Inputs</b>			
Connection type	24 V DC (PNP)		
Short circuit-proof	Yes		
Overload-proof	Yes		
Maximum current carrying capacity per feedback output	100 mA		
Voltage drop on the outputs	≤ 1 V		
Feedback "Open"	Electronic Output	Data bit DI 0	Data bit DI 0
Feedback "Closed"	Electronic Output	Data bit DI 1	Data bit DI 1
Modus		Data bit DI 2	Data bit DI 4
Status		Data bit DI 3	Data bit DI 5
Interference			IGS
<b>Outputs*</b>			
Activation "PV Y1"	Electronic Input	Data bit DO 0	Data bit O-0

\* Only for T.V1 with solenoid valve



# T.VIS® V-1 – Valves up to DN 32

Position	Description of the order code	
14	T.VIS® version	
	TV1	Position indication/Control top T.VIS® V-1
15	Control top type	
	N	Without solenoid valve
	P	1 solenoid valve
	I	2 solenoid valves
16	Feedback	
	1	1 digital feedback
	2	2 digital feedbacks
17	Type of interface	
	A	AS-Interface bus
	B	24V DC, 3 Wire PNP
	D	DeviceNet
19	Screw connection	
	D	5-pin connection M12 6/4 mm
	K	5-pin connection M12 ¼" OD
Options (multiple selection possible)		
	/22	Connection socket 24V DC
	/50	Metal plate engraved
	/52	Adhesive label
	/55	10 digits
	/65	IP65*
	/66	IP66*
	/67	IP67*

\* Overview on page 51

The code is composed as following, depending on the chosen configuration:

Position	14	15	16	17	19		Options				
Code	TV1						/65				



## T.VIS® V-20 – Valves from DN 40

Position	Description of the order code	
14	<b>T.VIS® version</b>	
	TV20	Position indication T.VIS® V-20
15	<b>Control top type</b>	
	N	Without solenoid valve
16	<b>Feedback</b>	
	1	1 digital feedback
	2	2 digital feedbacks
17	<b>Type of interface</b>	
	A	AS-Interface bus
	B	24V DC, 3 Wire PNP
	D	DeviceNet
19	<b>Screw connection</b>	
	D	5-pin connection M12 6/4 mm
	K	5-pin connection M12 ¼" OD
<b>Options (multiple selection possible)</b>		
	/22	Connection socket 24V DC
	/50	Metal plate engraved
	/52	Adhesive label
	/55	10 digits
	/65	IP65*
	/66	IP66*
	/67	IP67*

\* Overview on page 51

The code is composed as following, depending on the chosen configuration:

Position	14	15	16	17	19	Options					
Code	TV20					/65					



# T.VIS® P-1/P-15 Overview

### Concept

The T.VIS® P-1 / P-15 is a compact position controller for pneumatic process valves. The process valve can be adjusted into in any position by specifying a setpoint (4–20 mA). The position is monitored by a path measuring system with a resolution of 0.01 mm and regulated via two integrated pilot valves.

As a controller, the T.VIS® P1 / P-15 can, in combination with an air-spring actuator, move the valve to any position between the learned end positions.

The T.VIS® P1/P-15 is characterized not only by its performance but also by its ease of operation and outstanding price/performance ratio.

Features
Automatic initialization
Simple and safe operation
Manual operation of the process valve
Valve status display by LED
Open/close position feedback (optional)
Selectable dead band (control hysteresis)
High-quality pneumatic fittings
High potential for cost reduction
Standard protection class IP65 (T.VIS® P-1)/IP66 (T.VIS® P15)

### Structure

The T.VIS® P1/P-15 is equipped with a precise path measuring system for detecting its position.

The necessary wiring for control and feedback is configured using M12 plug connections that can be accessed externally.

The T.VIS® P-1 / P-15 is operated and configured using two push buttons on the cap. Alternatively, the cap of the T.VIS® P-15 can be removed. Operation is then possible using the buttons underneath.

The push buttons are secured electronically against inadvertent or incorrect operation, while in operating mode.

The T.VIS® P-15 is equipped as standard with adjustable supply and exhaust air throttles.

### Position control

The T.VIS® P1/P-15 position controller works with an integrated microprocessor which contains the software for operation, visualization as well as intelligent position detection and evaluation. When a nominal value is specified (4–20 mA), e.g. by the PLC, the process valve can be set to any required position. The push buttons on the cap also make it possible to specify a nominal value manually, in order to set the process valve to the required position. The position is detected using a position transducer and is automatically controlled using two integrated solenoid valves. The valve disc position can also be permanently evaluated using the analog actual value output, as well as, three binary outputs in the PLC.

### Setting

Automatic – following unlocking, simply pressing the two buttons on the cap of the T.VIS® P1/P-15 starts the initialization process which runs fully automatically. There is no need to open the position controller for this purpose, resulting in particularly quick, easy and safe commissioning of the position controller (on average in < 1 minute).

Directly following the set-up, the open/close position tolerances, the control hysteresis and control characteristics can be set in the parameter menu.





## Visualization

### LED display:

- green: valve in non-actuated position
- green flashing: valve moving towards non-actuated position
- yellow: valve in end position
- yellow flashing: valve moving towards end position
- red: in programming mode or fault
- blue: valve adjusted
- blue flashing: valve not adjusted

## Feedback

- Standard: valve position 0–100 %, opening amount (4–20 mA)
- Optional: additionally 24 V DC feedback signals for open/close position and error output

## Service mode

Activation of the main stroke which may be required in valves with closed (non-actuated) position for valve maintenance is performed using service mode that can be activated by the buttons. At the same time, all feedbacks are stopped (warning to the system control). Furthermore, input signals from the control room are not implemented by the T.VIS®, in order to protect the employee.

## Field of application

The T.VIS® P-1 has been specially developed for VESTA® valves and is used for nominal sizes up to DN 32/OD 1"/ISO 33.7. The T.VIS® P-15 can be used on VESTA® valves from DN40/OD 1.5"/ISO 42.4 and on VARIVENT®, ECOVENT®, D-tec®, as well as butterfly valves. Opening the valves to specific intermediate positions makes it possible to influence the hydraulic characteristics of the system.

## Flow control

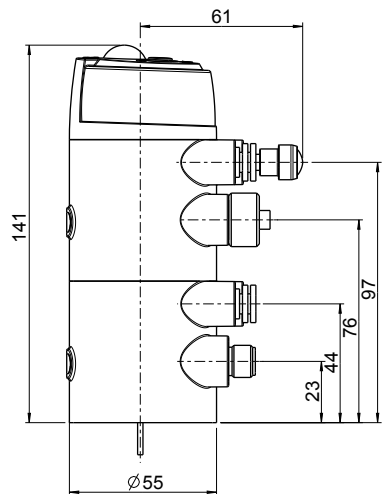
The T.VIS® P1/P-15 position controller offers not only linear position signal transformation, but also the possibility of equal percentage position signal transformation. This permits significantly more precise position control of the valve disc in positions close to the non-actuated position.

## Air guidance

In most process valves (VARIVENT®, D-tec®), the control air for actuating the valve is fed directly from the control top into the actuator via internal air duct. In the case of process valves that do not permit internal air flow (Aseptomag®, VESTA®), the air is supplied from the control top via external tubing.



T.VIS® P-1



Technical data of the standard version

Position detection	Position Measuring System	
Housing material	PA 12/L	
Ambient temperature	0 to +60 °C	
Air supply	Pressure range	2 to 8 bar
	Standard	acc. to ISO 8573-1:2010
	Solid content	Quality class 6
	Water content	Quality class 4
	Oil content	Quality class 3
Dimensions of air connections	Metric 6/4 mm, inch 6.35/4.31 mm (¼")	
Protection class	IP65*	
Sound pressure level via exhaust air throttle	Max. 72 dB	
Visualization	LED (green, yellow, red, blue)	

\* Overview on page 51

Type of interface	24 V DC, programmable
<b>Supply</b>	
Supply voltage U <sub>v</sub>	24 V DC (+20 %, -12.5 %)
No-load current	≤ 20 mA
Max. power input	260 mA
Max. periodic and random deviation	5 %
<b>Inputs</b>	
Setup	High = ≥ 13 V DC; low = ≤ 6 V DC
Analog input	Desired value 4–20 mA/0–100 % Stroke
Control voltage	≤ 10 mA
<b>Outputs</b>	
Digital feedbacks*	High = UV - ≤ 5 %; low = ≤ 5 V
Max. voltage	100 mA per Output
Operating voltage	Internal solenoid valve 35 ... 45 mA
Analog output	Actual value 4–20 mA/0–100 % Stroke
Load	Max. 600 Ω

\* Optional on T.VIS® P-15



Position	Description of the order code	
14	<b>T.VIS® version</b>	
	TP1	Positioner T.VIS® P-1
15	<b>Control top type</b>	
	I	2 solenoid valves
16	<b>Feedback</b>	
	1	1 digital feedback
	2	2 digital feedbacks
17	<b>Type of interface</b>	
	P	24 V DC, programmable
19	<b>Screw connection</b>	
	D	5-pin connection M12 6/4 mm
	K	5-pin connection M12 ¼" OD
<b>Options (multiple selection possible)</b>		
	/22	Connection socket 24V DC
	/52	Adhesive label
	/55	10 digits
	/65	IP65*
	/66	IP66*
	/67	IP67*

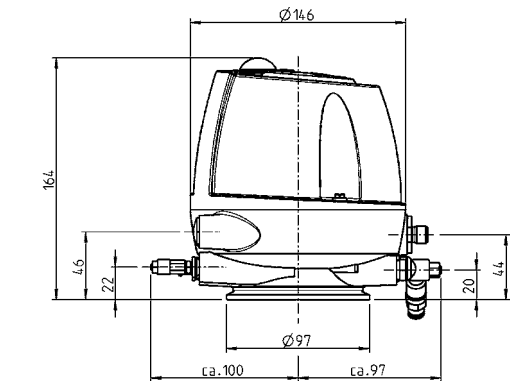
\* Overview on page 51

The code is composed as following, depending on the chosen configuration:

Position	14	15	16	17	19	Options					
Code	TP1	I		P		/65					



T.VIS® P-15



Technical data of the standard version

Position detection	Path measuring system	
Housing material	PA 12/L	
Ambient temperature	-20 to +55 °C	
Air supply	Pressure range	2 to 8 bar
	Standard	acc. to ISO 8573-1:2010
	Solid content	Quality class 6
	Water content	Quality class 4
	Oil content	Quality class 3
Dimensions of air connections	Metric 6/4 mm, inch 6.35/4.31 mm (¼")	
Protection class	IP66*	
Sound pressure level via exhaust air throttle	Max. 72 dB	
Visualization	LED (green, yellow, red, blue)	

\* Overview on page 51

Type of interface	24 V DC, programmable
Supply	
Supply voltage U <sub>v</sub>	24 V DC (+20 %, -12.5 %)
No-load current	≤ 20 mA
Maximum current consumption	260 mA
Maximum residual ripple	5 %
Inputs	
Control voltage max. 28.8 V DC	High = ≥ 13 V DC; low = ≤ 6 V DC
Pilot current	≤ 10 mA
Outputs	
Output voltage	High = UV - ≤ 5 %; low = ≤ 5 V
Max. current	200 mA short circuit-proof
Switching frequency	(ohmic + inductive loads ≤ 25 mH) 2 Hz
Operating current	Internal solenoid valve (IPV) 35 ... 45 mA
Analog input	Setpoint 4-20 mA/0-100 % stroke
Analog output	Actual value 4-20 mA/0-100 % stroke
Load	Max. 600 Ω



Position	Description of the order code	
14	T.VIS® version	
	TP15	Control top T.VIS® P-15
15	Control top type	
	I	2 solenoid valves
16	Feedback	
	4	T.VIS® P-15 (with analog module)
	5	T.VIS® P-15 (with analog module + 2 digital feedbacks/error output)
17	Type of interface	
	P	24 V DC, programmable
18	Type of interface	
	A	24 V DC, 0.85 W
19	Screw connection	
	J	Metric air connection, 5-pin M12 plug, A-coded With feedback code 5: additional M12 plug B-coded inclusive
	P	Inch air connection, 5-pin M12 plug, A-coded With feedback code 5: additional M12 plug B-coded inclusive
	IMPORTANT: Please also order the appropriate connection sockets as well.	
Options (multiple selection possible)		
/18/19	Supply and exhaust air throttle	
/22	5-pin connection socket for screw connection A-coded (article no. 508-963)	
	5-pin connection socket for screw connection B-coded (article no. 508-964)	
/50	Metal plate engraved	
/51	Metal plate (US-Version)	
/52	Adhesive label	
/66	Protection class IP66 <sup>1)</sup>	
/67	Protection class IP67 <sup>1)</sup>	
/69k	Protection class IP69 <sup>1), 2)</sup>	
/UC	Certification UL / CSA for indoor use	

<sup>1)</sup> Overview on page 51<sup>2)</sup> Not available in combination with option /22. Cap without buttons.

The code is composed as following, depending on the chosen configuration:

Position	14	15	16	17	18	19	Options					
Code	TP15			P	A		/18	/19	/66			



## Control and Feedback Systems

### Connection Screw Fitting

	Order code for air connection		In conjunction with screw fitting or plug	Use	Matching connection socket		
	Metric	Inch			Option	Item no.	Designation
	M		M20×1.5 cable gland for cable diameter 6–12 mm	T.VIS® M-15 T.VIS® M-20 T.VIS® A-15	–	–	–
	E		M20×1.5 cable gland for cable diameter 6–12 mm	T.VIS® E-20	–	–	–
		Z	0.5" NPT cable gland for cable diameter 6–12 mm	T.VIS® M-15 T.VIS® M-20 T.VIS® A-15	–	–	–
		N	M20×1.5 cable gland for cable diameter 6–12 mm	T.VIS® E-20	–	–	–
	A	S	M20×1.5 cable gland with connection box on cable 1 m*	T.VIS® M-15 (AS-i) T.VIS® M-20	–	–	–
	L	U	2-pin M12 plug (A-coded) Protection class IP69	T.VIS® M-15 (AS-i) T.VIS® M-20	/22	508-963	5-pin M12-connection socket (A-coded) Protection class IP67
					/81	508-027	AS-i connection box on cable 1 m with 5-pin M12 connection socket (A-coded) Protection class IP67
					/82	508-028	AS-i connection box on cable 2 m with 5-pin M12 connection socket (A-coded) Protection class IP67
	D	K	5-pin M12 plug (A-coded) Protection class IP69	T.VIS® M-15 (DeviceNet) T.VIS® V-1 T.VIS® V-20 T.VIS® P-1	/22	508-963	5-pin M12-connection socket (A-coded)
	J	P	5-pin M12 plug (A-coded) Protection class IP69	T.VIS® M-15 (24 V DC) T.VIS® M-20 T.VIS® A-15 (24 V DC) T.VIS® A-15 (AS-i) T.VIS® A-15 (IO-Link) T.VIS® P-15	/22	508-963	5-pin M12-connection socket (A-coded) Protection class IP67
				5-pin M12 plug (B-coded) Protection class IP69		508-964	5-pin M12-connection socket (B-coded) Protection class IP67
	H	I	8-pin M12 plug (A-coded) Protection class IP69	T.VIS® M-15 (24 V DC) T.VIS® M-20 T.VIS® A-15 (24 V DC)	/22	508-061	8-pin M12-connection socket (A-coded) Protection class IP67

\* Standard protection class IP67, optional IP69.



# Control and Feedback Systems Adaptation

## Switch bars and adapters

The following components are required for subsequent installation of a control and feedback system on a VARIVENT® valve.

If a complete control and feedback system is ordered, switch bar 221-589.80 or 221-589.104 is already included. If an alternative switch bar is required, please state the corresponding part number or the valve provided.

Valve type			Control top		
			T.VIS® A-15/ T.VIS® M-20	T.VIS® M-15/ T.VIS® E-20	T.VIS® P-15
VARIVENT® Single-seat valves	N, U, W, X		Switch bar		
			221-589.104	221-589.80	221-589.104
VARIVENT® Mixproof seat valves	D, B, R, L, C, K, Y, T		221-589.104	221-589.80	–
VARIVENT® Mixproof seat valves with seat lifting	Axial sealing: D, B, Y	Actuator	Switch bar		
			221-589.104	221-589.80	–
	Radial sealing: R, L, T, 24/7 PMO Valve® 2.0 24/7 PMO Tank Valve MT/T 24/7 Cheese Curd Valve type M_C/2.0	AA, BA, BB, BD, CA, CB, CD, CF	221-618.20	221-618.25	–
		BD (DN25), BD (PMO 2.0), BD5, BE, CE, CF5, DB, DD, DF, DG, DH, ED, EF, EG, EH	221-618.21	221-618.26	–
		DD5, DF5, DG5, ED5, EF5, EG5, EH5	221-618.22	221-618.27	–
		DF6Z	221-618.23	221-618.28	–
		SG6Z, SH6Z, SK6Z, SM6Z, SN6Z, EF6Z, EG6Z, EH6Z, EK6Z, SG8A, SH6A, SK6A, SM6A, SN6A, EF6A, EG6A, EH6A, EK6A	221-618.24	221-618.29	–
ECOVENT® Single-seat valves	N/ECO, W/ECO (DN 25 to DN 100)	Add-on parts	Switch bar		
		Switch bar	221-589.104	221-589.80	221-589.104
		Ring	221-002396	221-002396	221-002396
		Mounting socket	221-589.32	221-589.32	221-589.32
	N/ECO, W/ECO (DN 10 and DN 15)	Switch bar	221-589.104	221-589.80	221-589.104
		Ring	221-624.04	221-624.01	221-624.04
		Mounting socket	221-589.32	221-589.32	221-589.32



Switch bar  
221-589.80  
for T.VIS®  
M-15 / E-20



Switch bar  
221-589.104  
for T.VIS®  
A-15 / P-15 /  
M-20



Extended switch bars for radial sealing  
double-seat valves with seat lifting:  
221-618.25 for T.VIS® M-15 / E-20  
and 221-618.20 for T.VIS® A-15 / M-20



# Control and Feedback Systems Adaptation

## Switch bars and adapters

The following components are required for installation of a control and feedback system on an Aseptomag® valve.

If a complete control and feedback system is ordered, switch bar 221-589.87 or 221-589.88 is already included.

Valve type			Control top	
			T.VIS® A-15/ T.VIS® M-20	T.VIS® M-15
Aseptomag® single-seat valves	AF, AV, AVBS, GD, UV	Switch bar		
			221-589.88	221-589.87
		Mounting kit (depending on air connection type)		
		Air connections metric (Ø 6 mm)	0984.00038	0984.00038
		Air connections inch (Ø 6.35 mm)	0984.00048	0984.00048
Aseptomag® mixproof valves	ADV, AXV, DK, DKBS, DDK	Switch bar		
			221-589.88	221-589.87
		Mounting kit (depending on air connection type)		
		Air connections metric (Ø 6 mm)	0984.00038	0984.00038
		Air connections inch (Ø 6.35 mm)	0984.00048	0984.00048



**Installation on a valve**  
The installation of a T.VIS® on an Aseptomag® valve is achieved by using a mounting kit. The following procedure has to be executed:

1. Place adaptor plate with o-ring on the pneumatic actuator and tighten it with the four bolts.
2. Mount switch bar on piston rod and tighten it with a wrench.
3. Place control top on the adaptor plate and tighten the two together by using the clamp.

With Aseptomag® valves all air tubes are connected externally. By orienting the control top, it must be considered that the air tubes are free of kinks and as short as possible.







## Connection 0, INA/RM, LAT/RMEA



**Connection 0**  
Connection 0 can be used as an alternative to feedback systems if no feedback sensors are wanted above the actuator. Connection 0 is available in a metric and inch variant for these valve series: VARIVENT®, D-tec®.

**Technical data**

Material	1.4301 (AISI 304)
Surface	Metal blank



**Visual status indication**  
Pneumatic actuators for VESTA® valves have a visual position indicator as standard, which means the valve position can be detected manually if feedback sensors above the actuator are not wanted.

**Technical data**

Material	PA6
Surface	Polished



**INA/RM – proximity switch holder on the actuator**  
The proximity switch holder M12×1 (INA) makes it possible to use feedback sensors above the actuator. The proximity switch holder has prepared M12×1 holes which allow the sensors to be set optimally. A direct connection to the controller provides the feedback on the valve position. The proximity switch holder (INA) is available for these valve series: VARIVENT®, D-tec®, VESTA®

For the Aseptomag® valve series, an open feedback unit for M12 proximity switches is also available with the proximity switch holder (RM), which is characterized by the same features.

**Technical data**

Material	1.4301 (AISI 304)
Surface	Metal blank



**LAT – lantern for 2 proximity switches M12×1**  
Feedback in the lantern is preferably used wherever control and feedback systems cannot be employed (e.g. in valves with manual actuator or two-position-stop cylinder).

The position of the upper valve disk of Mixproof Valves with Seat Lifting can be detected by a proximity switch which is installed in the lantern.



**RMEA – proximity switch holder on the lantern**  
The proximity switch holder (RMEA) is the counterpart to the LAT option for the Aseptomag® valve series. A M12 proximity switch can be inserted into the lantern via the proximity switch holder, which can be used to monitor the position of the upper valve disc stroke at mixproof valves with seat lifting.

**Technical data**

Material	1.4301 (AISI 304)
Surface	Metal blank



Position	Description of the order code	
*	<b>Feedback location</b>	
	000	Connection 0 (without feedback)
	INA.	Proximity switch holder for connection 0 for max. 2 proximity switches M12×1
	LAT.	Lantern for max. 2 proximity switches M12×1
	<b>Control top type</b>	
	0	Connection 0
	<b>Feedback</b>	
	0	Without (INA, 000)
	1	1 feedback (INA, LAT)
	2	2 feedbacks (INA, LAT)
	3	3 feedbacks in the lantern (LAT)
	7	Without, prepared for 2 feedbacks in the lantern (LAT)
	<b>Type of switch</b>	
	0	Without (INA, LAT, 000)
	B	NI 24 V DC 3-wire PNP M12×1 with terminal chamber (INA, LAT)
	F	NI 24 V DC 2-wire M12×1 with terminal chamber (INA, LAT)
	E	NI NAMUR M12×1 with terminal chamber (INA, LAT)
	X	NI 24 V DC 3-wire NPN M12×1 with terminal chamber (INA, LAT)
	S	NI 24 V DC 3-wire PNP M12×1 with plug connector (INA, LAT)
	<b>Cable connection</b>	
	0	Without
	<b>Air connection</b>	
	0	Without
	M	Metric (article no. 221-140.02)
	Z	Inch (article no. 2214-140.04)
<b>Options</b>		
/59	Hinged clamp connection 1.4401	

\* The positions for the indication of the order code correspond to the consecutive numbering of the components for which the control and feedback systems can be selected (see selection matrix at the beginning of this catalog).

The code is composed as following, depending on the chosen configuration:

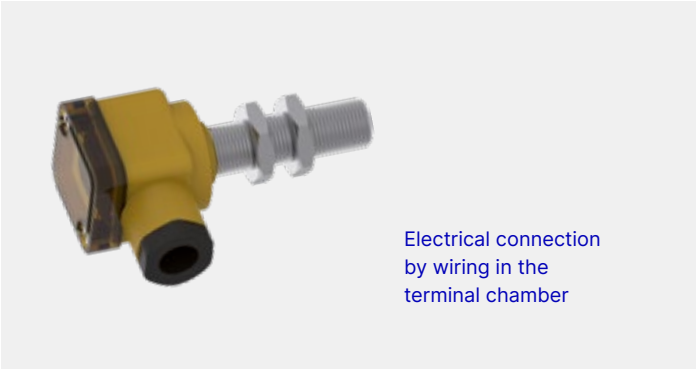
Position							Options
Code		0			0		



# Control and Feedback Systems

## Proximity Switches

External proximity switches M12×1 for mounting on the actuator (INA) or in the lantern (LAT\*).




\* It is recommended to install external proximity switches in the lantern LAT by the use of two nuts article number 221-478.07.

Technical data	
Protection class	IP67
Operating voltage	10–30 V DC
Material	PA 12/VA
Permitted ambient temperature	–25 to +85 °C

Proximity switch M12×1 for INA, LAT without T.VIS®	Nominal switching distance	Article no.
2-wire (terminal chamber)	2 mm	505-104
3-wire PNP (terminal chamber)	3 mm	505-088
3-wire PNP (Connector M12×1)	4 mm	505-096
4-wire NPN/changeover contact (terminal chamber)	3 mm	505-105

Technical data	
Protection class	IP67
Operating voltage	7.5–30 V DC
Material	316L/PEEK
Permitted ambient temperature	–20 to +55 °C

Proximity switch M12×1 for Valves with T.VIS® and LAT*	Nominal switching distance	Article no.
2-wire/NAMUR (Connector M12×1)	4 mm	505-098
2-wire/NAMUR (Connector M12×1)	2 mm	505-102

Technical data	
Protection class	IP67
Operating voltage	8.2 V DC nom.
Material	Brass, chrome-plated / PA12
Permitted ambient temperature	–25 to +70 °C
Marking	 II 2 G EEx ia IIC T6

Proximity switch M12×1 for SES, INA and LAT	Nominal switching distance	Article no.
2-wire/NAMUR (terminal chamber)	2 mm	505-085



# Control and Feedback Systems

## IP Protection Classes

The IP protection classes inform about the scope at which the housing of an electrical device is protected against ingress of solids (first number) and moisture (second number).

So called IP-codes are assigned to the protected systems. Their index figures represent common error options against which the system is protected. The code starts with the letters IP for "International Protection".

### Meaning of the index numbers

#### Index numbers

1. Index*		Meaning	
ISO 20653	DIN EN 60529	Protection against contact	Protection from solids
6K	6	Full protection against contact	Complete protection against ingress of dust (dust-tight)
2. Index*		Meaning	
ISO 20653	DIN EN 60529	Protection from moisture	
5	5	Protection from water jet (nozzle) from any angle	
6	6	Protection from powerful water jet	
6K		Protection against strong water jets under increased pressure	
7	7	Protection from temporary immersion	
	9	Protection from water at high pressure / steam jet cleaning	
9K		Protection from water at high pressure / steam jet cleaning	

\* Further indices and more precise explanations can be found in the corresponding standard.

If an index number is not to be stated, it is replaced by the letter x (e.g. IPx6).

For the 2nd index figure (protection from moisture), the following applies:

- The protection class IPx6 includes all protection classes below.
- This does not apply to the higher protection class IPx7.  
If this protection class is to include a lower protection class, this is to be indicated by a combination of index figures (e.g. IP67/69k).

The T.VIS® control top designs of the M-15, A-15 and P-15 comply with the requirements of protection class IP66 (DIN EN 60529) as standard. Designs in the stronger protection classes IP67 or IP69 (both DIN EN 60529) are also available.

The T.VIS® M-20 and E-20 control top meets the requirements of protection classes IP66, IP67 and IP69 (DIN EN 60529) as well as protection class IP6k9k (ISO 20653) as standard.

The T.VIS® control top in the versions V-1, V-20 and P-1 comply with the requirements of protection class IP65 (DIN EN 60529) as standard. Versions in the stronger protection classes IP66 or IP67 (both DIN EN 60529) are also available.



# Control and Feedback Systems

## Technical Characteristics

### Ambient conditions

Control and feedback system	Ambient temperatures
T.VIS® M-15; T.VIS® M-20; T.VIS® A-15; T.VIS® P-15	–20 °C to +55 °C –4 °F to 131 °F
T.VIS® V-1/V-20 without solenoid valve	–20 °C to +70 °C –4 °F to +158 °F
T.VIS® V-1/V-20 with solenoid valve	0 °C to +50 °C +32 °F to +122 °F
T.VIS® P-1	0 °C to +60 °C +32 °F to +140 °F
T.VIS® E-20	–10°C ≤ Ta ≤ +42 °C (Gas) 14 °F ≤ Ta ≤ +107.6 °F (Gas) –10 °C ≤ Ta ≤ +38 °C (Dust) 14 °F ≤ Ta ≤ +100.4 °F (Dust)
Proximity switches	Depending on type, see page 51

The ambient conditions refer to the electronic components of the respective control and feedback system. In addition, the specific requirements for the particular valve must be taken into account.

The control and feedback systems can also be used in exterior areas. The plastic housing is made of a polyamide material, has excellent strength and is UV-resistant. If they are used outdoors, they must be protected against possible icing.

### Air supply

The valve actuators are configured for operation with min. 4 bar and max. 8 bar air pressure. The standard actuator sizes are configured for an air supply pressure of min. 6 bar (with a product pressure of 5 bar). The quality of the air supply must meet the requirements of ISO 8573-1:2010.

#### ISO 8573-1:2010

Solid content	Quality class 6
	Particle size max. 5 µm
	Particle density max. 5 mg/m³
Water content	Quality class 4
	Max. dew point 3 °C
	A correspondingly different dew point is required for applications at high altitude or with low ambient temperatures
Oil content	Quality class 3
	Max. 1 mg oil per 1 m³ air, preferably oil-free



## Certificates

The certificates listed here are valid for corresponding GEA control and feedback systems. Components conforming to the requirements of the European Hygienic Engineering and Design Group (EHEDG) as well as 3-A Sanitary Standards, Inc. (3-A SSI) are available for numerous fields of applications.

EHEDG certificates apply only to the specific control head type as listed. However, they can be transferred to other types, owing to identical design characteristics.












Moreover, independent, standardized tests have confirmed the efficient, problem-free cleanability of numerous components – for optimum safety and economic gain.

Optional Certificates	ATEX / UKEx	IECEX	CCCEX	GOST	IP65	IP66	IP67	IP69	UL / CSA	NEC/CEC Class I, Division 2
										
Control and Feedback System										
T.VIS® A-15				•		•	•	•	•	•
T.VIS® M-20				•				•	•	
T.VIS® M-15				•		•	•	•	•	
T.VIS® E-20	•	•	•	•				•		
T.VIS® V-1					•	•	•			
T.VIS® V-20					•	•	•			
T.VIS® P-1					•	•	•			
T.VIS® P-15				•		•	•	•	•	









# Sample Composition of the Order Code

Procedure for valve selection (positions 1 – 13), incl. a feedback system

Position	Description of the order code for the standard version			
1	Valve type			
		D	VARIVENT® double-seat valve	
2	Housing combinations			
	A	B	C	E
3	Supplement to the valve type			
		L	With lifting actuator and spray cleaning	
		C	With lifting actuator without spray cleaning	
4/5	Nominal width (upper housing / lower housing)			
	DN 25		OD 1"	
	DN 40		OD 1 ½"	
	DN 50		OD 2"                      IPS 2"	
		DN 65	OD 2 ½"	
	DN 80		OD 3"                      IPS 3"	
	DN 100		OD 4"                      IPS 4"	
	DN 125			
	DN 150		OD 6"                      IPS 6"	
6	Actuator type			
		S	Air / Spring	
7	Air connection			
		Z	Spring-to-close (NC)	
8	Standard configuration with 6 bar supply air pressure for 5 bar product pressure			
	Actuator (spring-to-close)	/ Lifting actuator	For nominal widths	
	BA	/ BLB	DN 25, OD 1"	
	BB	/ BLB	DN 40, DN 50, OD 1 ½", OD 2", IPS 2"	
		CD	/ CLB	
	DF	/ DLB	DN 65, DN 80, OD 2 ½", OD 3", IPS 3"	
	SH6	/ EL6	DN 100, OD 4", IPS 4"	
	SK6	/ EL6	DN 125	
			DN 150, OD 6", IPS 6"	
9	Valve seat version		Housing combination	
			A	B
			C	E
		L0	Loose seat ring / Clamp connection	
		V1	Welded seat ring / Port orientation 90°	
		V2	Welded seat ring / Port orientation 180°	
		V3	Welded seat ring / Port orientation 270°	
10	Seal material in contact with the product			
		1	EPDM (FDA)	
		2	FKM (FDA)	
		3	HNBR (FDA); (up to DN 100, OD 4")	
11	Surface quality of the housing			
		1	Inside R <sub>a</sub> ≤ 1.2 µm, outside matte blasted (IPS)	
		2	Inside R <sub>a</sub> ≤ 0.8 µm, outside matte blasted (DN, OD)	
12	Connection fittings			
		N	Welding end	
13	Accessories			
		/52	Adhesive ID tag	



### Procedure for feedback system selection (positions 14 – 19)

Position	Description of the order code for the standard version	
14	<b>Feedback location</b>	
	 <b>TM20</b>	Control top T.VIS® M-20
15	<b>Control top type</b>	
	N	Without solenoid valve
	P	1 solenoid valve Y1 <sup>1)</sup>
	R	1 solenoid valve Y1 (retrofitable: Y2, Y3)
	I	2 solenoid valves Y1, Y2 (retrofitable: Y3)
	J	2 solenoid valves Y1, Y3 (retrofitable: Y2)
	<b>L</b>	3 solenoid valves Y1, Y2, Y3
	V	1 solenoid valve Y1, air support
16	<b>Feedback</b>	
	 <b>8</b>	2 digital feedbacks
17	<b>Type of interface</b>	
	A	AS-Interface bus
	 <b>B</b>	24 V DC, 3-wire, PNP
18	<b>Solenoid valve</b>	
	 <b>A</b>	24 V DC, 0.85 W
	0	Without
19	<b>Screw connection</b>	
	L	Metric air connection, 2-pole M12 connection (AS-i)
	U	Inch air connection, 2-pole M12 connection (AS-i)
	M	Metric air connection, M20×1.5 cable gland
	Z	Inch air connection, 0.5" NPT cable gland
	J	Metric air connection, 5-pin M12 plug (1 solenoid valve, 2 feedbacks)
	P	Inch air connection, 5-pin M12 plug (1 solenoid valve, 2 feedbacks)
	 <b>H</b>	Metric air connection, 8-pin M12 plug (> 1 solenoid valve, > 2 feedbacks)
	I	Inch air connection, 8-pin M12 plug (> 1 solenoid valve, > 2 feedbacks)
	<b>Options (multiple selection possible)</b>	
	/18	Supply air throttle: regulates the opening speed of the valve
	/19	Exhaust air throttle: regulates the closing speed of the valve
	/22	5-pin M12 connection socket for screw fitting J, P (article no. 508-963) 8-pin M12 connection socket for screw fitting H, I (article no. 508-061)
	/50	Metal plate engraved
	/51	Metal plate (US-Version)
	 <b>/52</b>	Adhesive label
	/81	AS-i connection box on 1 m cable with 5-pin M12 connection socket (Article No. 508-027) for screw connection L, U (IP67)
	/82	AS-i connection box on 2 m cable with 5-pin M12 connection socket (Article No. 508-028) for screw connection L, U (IP67)
	/UC	Certification UL/CSA for indoor use
	<b>Additional information for order code</b>	
	/A	Suitable for installation on Aseptomag® valves

<sup>1)</sup> On Aseptomag® valves due to the external air guidance in "R" variant.

Example for a complete order code, comprising valve and feedback system:

Position	1	2	3	4/5		6	7	8		9	10	11	12	13	14 to 19										
Code	D	E	L	-	DN 65/DN 65	-	S	Z	-	CD/CLB	-	L0	-	1	2	N	/52	+	TM20	L	8	B	A	H	/52



# Complete Order Code

The complete order code makes it possible to assemble an order code for a control and feedback system. All options possible for the particular control or feedback system are included.

Position	Description of the order code	Available for control and feedback system									
14	<b>Feedback location</b>	TA15	Control top T.VIS® A-15	TM20	Control top T.VIS® M-20	TM15	Control top T.VIS® M-15	TP15	Control top T.VIS® P-15	TE20	Control top T.VIS® E-20
		TV1	Control top T.VIS® V-1	TV20	Control top T.VIS® V-20	TP1	Control top T.VIS® P-1	TP15	Control top T.VIS® P-15	INA.	Proximity switch mount for connection 0 for 2× proximity switches M12×1
		LAT.	Lantern for 2× proximity switches M12×1	000	Connection 0						
15	<b>Control top type</b>	0	Connection 0	N	Without solenoid valve	P	1 Solenoid valve Y1 1)	R	1 Solenoid valve Y1 (retrofittable: Y2, Y3)	I	2 Solenoid valve Y1, Y2 (retrofittable: Y3)
		J	2 Solenoid valve Y1, Y3 (retrofittable: Y2)	L	3 Solenoid valve Y1, Y2, Y3	V	1 Solenoid valve Y1 (for T.VIS® M-15: logic NOT-element, retrofittable: Y2, Y3 / T.VIS® M-20: NO solenoid valve)	X	2 solenoid valves Y1, Y3 (for T.VIS® M-15 retrofittable: Y2), logic NOT-element	Y	3 solenoid valves Y1, Y2, Y3, logic NOT-element
16	<b>Feedback</b>	0	Without feedback	1	1 feedback	2	2 feedbacks	3	2 feedbacks with external proximity switch	4	T.VIS® P-1 & P-15 (with analog module)
		5	T.VIS® P-1 & P-15 (with analog module + 2 feedbacks/error output)	7	Without (prepared for 2 feedbacks in the lantern)	8	2 digital feedbacks	9	2 (3) feedbacks with external proximity switch		
17	<b>Type of interface</b>	0	Without	A	AS-Interface bus	B	24 V DC, 3-wire, PNP	D	DeviceNet	E	Ex 12/24VDC/NAMUR
		E	NI NAMUR M12×1 with terminal chamber	F	NI 24 V DC 2-wire M12×1 with terminal chamber	I	IO-Link	N	24 V DC, 3-wire, NPN	P	24 V DC programmable
		S	NI 24 V DC 3-wire PNP M12×1 with plug connector	W	NI 24 V DC 4-wire NPN M12×1 with plug connector						

<sup>1)</sup> On Aseptomag® valves due to the external air guidance in "R" variant.



Available for control and feedback system										
TA15	TM20	TM15	TE20	TV1	TV20	TP1	TP15	INA	LAT	000
•	•	•	•					•	•	•
•	•	•								
			•							
			•							
								•	•	•
		•								
		•								
		•								
•	•	•								
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		•								
•	•	•								
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•	•	•						•	•	•

/A Suitable for installation on Aseptomag® valves

2) Overview on page 51

The code is composed as following, depending on the chosen configuration:

[illegible]



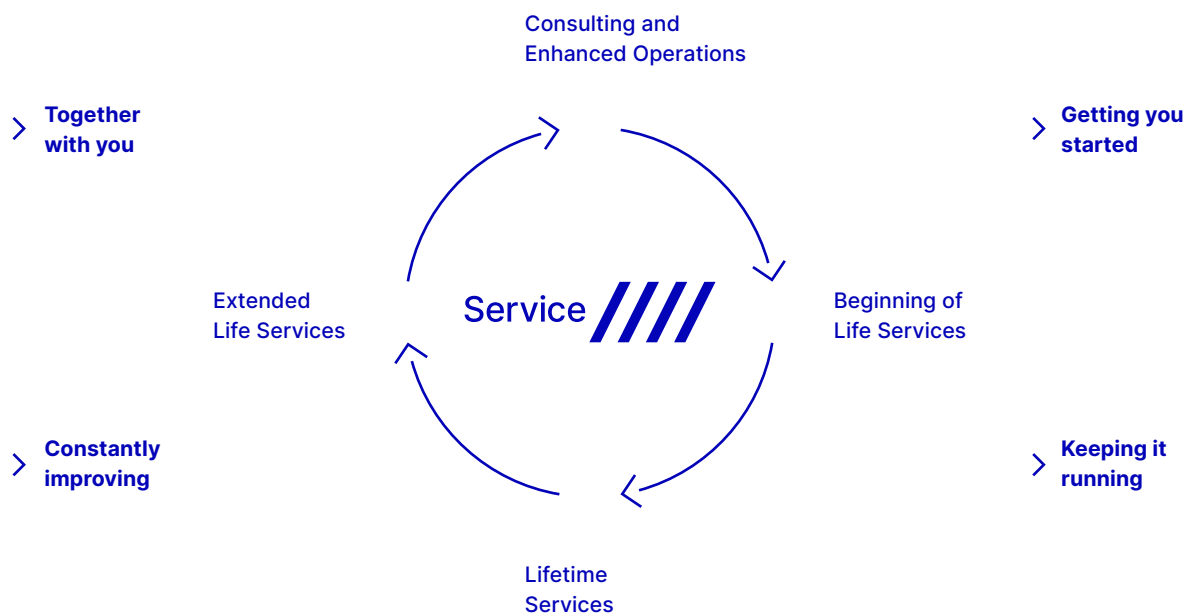




# Our service package for dependable valve technology

With a tailored service concept, you can extend the service life of your hygienic valve technology. Professional services and original spare parts from GEA help to ensure maximum system availability and security, smooth operation and precise process execution.

Our service specialists are here to help you in every phase of system utilization – from the initial process concept and throughout the entire performance period to advising on your best strategies for the future.



## Beginning of life services

We draw on our decades of experience to support you in configuring your system and providing extensive employee training. Our consultations and training sessions take place in our Competence Centre in Büchen or, upon request, at your premises.

## Lifetime services

We optimize your spare parts logistics by using our modular component system and our extensive service network. Preventive maintenance programmes based on comprehensive data, routine troubleshooting and efficient repair logistics keep downtimes to a minimum.

## Extended life services














When upgrades are available to enhance your system, you benefit from our continuing advances in hygienic valve technology. We offer extensive advice and consultation.

## Consulting and enhanced operations

Working in partnership with you, we support your enduring success and develop service strategies and Service Level Agreements for a profitable future operation.



# Description of Certificates

<b>3-A</b>		3-A Sanitary Standards, Inc. (3-A SSI) is an independent, non-profit corporation dedicated to advancing hygienic equipment design for the food, beverage, and pharmaceutical industries.
<b>24/7 PMO VALVE 2.0® NON-STOP PRODUCTION</b>		24/7 PMO VALVE® is a registered trade mark of GEA Tuchenhausen GmbH. It describes double-seat valves that have been authorized for use in PMO-regulated systems for carrying out the seat lift in order to clean the leakage chamber while the other pipeline is carrying product. This grants system operators the possibility of cleaning all valve components in contact with the product in parallel with the production process. In this way, the valves permit uninterrupted production on a 24/7 basis.
<b>AS-i</b>		Actuator Sensor interface. BUS system for the lowest field level.
<b>ATEX</b>		Atmosphères Explosibles. ATEX comprises the directives of the European Union in the area of explosion protection. Complies with the applicable requirements of ATEX directives: 2014/34/EU.
<b>CCCEX</b>		Complies with the applicable requirements of CCCEX directives in China.
<b>cCSAus</b>		Test of a product by CSA according to applicable safety standards in Canada and the USA.
<b>CE</b>		Conformité Européenne. By affixing the CE mark, the manufacturer confirms that the product complies with the European directives 765/2008 applicable to the specific product.
<b>CSA</b>		Canadian Standards Association. A non-governmental Canadian organization which issues standards as well as checking and certifying the safety of products. It is now globally active.
<b>cULus</b>		Test of a product by UL according to applicable safety standards in Canada and the USA.
<b>DeviceNet</b>		BUS system of the ODVA organization for complex communication on various field levels.
<b>EG 1935/2004*</b>		Materials in contact with the product used in valves from GEA Tuchenhausen GmbH are in accordance with EC regulation 1935/2004. This defines a general framework for materials and objects intended to come into contact with foodstuffs.
<b>EHEDG</b>		European Hygienic Engineering & Design Group. European supervisory authority for foodstuffs and pharmaceuticals. This authority issues approvals and certificates for products and materials that are used in the foodstuffs and pharmaceuticals industries.
<b>FDA</b>		Food and Drug Administration. US supervisory authority for foodstuffs and pharmaceuticals. This authority issues approvals and certificates for products and materials that are used in the foodstuffs and pharmaceuticals industries.
<b>IECEX</b>		IECEX: International Electrotechnical Commission System for Certification to Standards Relating to Equipment for Use in Explosive Atmospheres. Complies with the applicable requirements according to IECEX directives.
<b>ODVA</b>		ODVA is a worldwide association comprising leading automation companies. It develops network protocols and standards in the joint interests of its members, which are used for the international interoperability of production systems.
<b>TÜV</b>		Technischer Überwachungs-Verein. The German TÜV is a private company which carries out technical safety checks as prescribed in national legislation or regulations.
<b>UKCA</b>		UK Conformity Assessed. By affixing the UKCA marking, the manufacturer confirms that the product complies with the product-specific applicable UK regulations.
<b>UKEx</b>		UKEx includes the guidelines for Great Britain. Complies with applicable requirements acc. UKEx Directive: UKSI 2016: 1107.
<b>UL</b>		Underwriters Laboratories. An organization founded in the USA for checking and certifying products and their safety.

\* not possible for HNBR



# Abbreviations and Terms

Abbreviation	Explanation
°C	Degrees Celsius, unit of measurement for temperature
°F	Degrees Fahrenheit, unit of measurement for temperature
3-A	Standard of 3-A Sanitary Standards, Incorporated (3-A SSI)
3D	Three-dimensional
A	Ampere, unit of measurement of current intensity or Output, term used in automation
AC	Alternating Current
ADI free	All elastomer compounds are free of animal-derived ingredients
AISI	American Iron and Steel Institute, association of the American steel industry
ANSI	American National Standards Institute, American body for standardizing industrial processes
approx.	approximately
AS-i	Actuator Sensor interface, standard for fieldbus communication
ASME	American Society of Mechanical Engineers, professional association of mechanical engineers in the USA
ASME-BPE	Standard of the ASME's – bioprocessing equipment association
ATEX	Atmosphères Explosibles, synonymous with the directives of the European Union for potentially explosive areas
bar	Unit of measurement for pressure. All pressure values [barg/psig] refer to positive pressure [bar <sub>g</sub> /psi <sub>g</sub> ], unless specifically stated otherwise.
bar <sub>g</sub>	Unit of measurement for pressure relative to atmospheric pressure
CAN	Controller Area Network; asynchronous serial bus system
CE	Conformité Européenne, administrative symbol for the free movement of industrial products
CIP	Cleaning In Place, designates a process for cleaning technical process systems.
CRN	The Canadian Registration Number is issued by a Canadian Jurisdiction and covers pressurized components. The authorization is needed to operate these components in Canada.
CSA	Canadian Standards Association, a non-governmental Canadian Standardization organization
dB	Decibel, one tenth of a bel, named after Alexander Graham Bell and used for identifying levels and dimensions
DC	Direct Current
DIN	Deutsches Institut für Normung e. V. Standardization organization in the Federal Republic of Germany, DIN = synonym for standards issued by the organization
DIP	Dual Inline Package, design of a switch
DN	Diameter Nominal, DIN nominal width
Device Net	Network system used in the automation industry to interconnect control devices for data exchange
E	Input, term used in automation
EAC	Certification of technical conformity from the customs union of Russia/Balarus/Kazakhstan
Pressure Equipment Directive 2014/68/EU	Directive of the European Parliament and the Council Directive for layout and conformity evaluation for pressure equipment and assemblies with a maximim pressure (PS) of more than 0.5 bars.
EG No. 1935/2004	Regulation of the European Parliament which lays down common rules for materials which come, or may come, into contact with food, either directly or indirectly.
EHEDG	European Hygienic Engineering and Design Group. Consortium of equipment manufacturers, food industries, research institutes as well as public health authorities
EN	European standard, rules of the European Committee for Standardization
EPDM	Ethylene propylene diene rubber, acronym acc. to DIN/ISO 1629
Ex	Synonym for ATEX
FDA	Food and Drug Administration, official foodstuffs monitoring in the United States
FEM calculation	Finite Element Method; calculation process for simulating solids
FKM	Fluorinated rubber, acronym acc. to DIN/ISO 1629
H	Henry, unit of measurement for inductance
HNBR	Hydrated acrylonitrile butadiene rubber, acronym acc. to DIN / ISO 1629
Hz	Hertz, unit of frequency named after Heinrich Hertz
I	Formula symbol for electrical current
IEC	International Electrotechnical Commission, international standardization organization for electrical and electronic engineering
IP	Ingress Protection / International Protection, index of protection class acc. to IEC 60529
IPS	Iron Pipe Size, American pipe dimension
ISA	International Society of Automation, international US organization of the automation industry



# Abbreviations and Terms

Abbreviation	Explanation
ISO	International Organization for Standardization, international organization that produced international standards, ISO = synonym for standards from the organization
kg	Kilogram, unit of measurement for weight
Kv	The Kv value corresponds to the water flow rate through a valve (in m <sup>3</sup> /h) at a pressure differential of 0.98 bar and a water temperature of 5 °C to 30 °C.
Kvs	The Kv values of a valve at nominal stroke (100 % opening) is designated the Kvs value
L	Conductive
LED	Light-Emitting Diode
LEFF®	Function of the T.VIS® valve informations system for cyclical pulsing during the lifting process; Low-Emission Flip Flop
mm	Millimeter, unit of measurement for length
M	Metric, system of units based on the meter or Mega, one million times a unit
m <sup>3</sup> /h	Cubic meters per hour, unit of measurement for volumetric flow
max.	Maximum
NAMUR	Standardization working association for measuring and control technology in the chemical industry, synonym for the interface type of the organization, especially for potentially explosive atmospheres
NC	Normally Closed; valve or solenoid valve control which is closed in idle status
NO	Normally Open; valve or solenoid valve control which is open in idle status
NOT-element	Logic element, NOT gate
NPN	Signal transmission against reference potential, current-consuming
NPT	National Pipe Thread, US thread standard for self-sealing pipe fittings
OD	Outside Diameter, pipe dimension
ODVA	Open DeviceNet Vendor Association, global association for network standards
PA 12/L	Polyamide
Pg	Armoured thread
PMO	Pasteurized Milk Ordinance
PN	Nominal pressure for pipeline systems according to EN 1333, rated pressure in bar at room temperature (20 °C)
PNP	Signal transmission against reference potential, current-supplying
PPO	Polyphenylene oxide, thermoplastic material
PS	Maximum permitted operating pressure at which the components can operate safely at maximum allowable temperature (TS)
psi	Unit of measurement for pressure, pound-force per square inch, 1 psi = 6894.75 Pa. All pressure values [bar/psi] refer to positive pressure [bar <sub>g</sub> /psi <sub>g</sub> ], unless specifically stated otherwise.
psi <sub>g</sub>	Unit of measurement for pressure relative to atmospheric pressure
PV	Solenoid valve
R <sub>a</sub> in µm	Average roughness value, describes the roughness of a technical surface
RM	Feedback
International Protection-Code IP67, IP66, IP69	Classifies and rates the degree of protection provided against intrusion dust, accidental contact, and water
SET-UP	Self-learning installation, the SET-UP procedure carries out all necessary settings for generating messages during commissioning and maintenance.
SIP	Sterilization in Place, refers to a process for cleaning technical process systems
SMS	Svensk Mjolk Standard, Scandinavian pipe dimension
SW	Indicates the size of a tool spanner, "Schlüsselweite"
TA-Luft VDI 2440	If a product is certified according to TA Luft it meets the requirements for proof of high grade performance according to TA Luft of 1.0× 10 <sup>-4</sup> mbar x l / (s x m) at service conditions under the VDI guideline 2440. The product will hence be tested for tightness.
TEFASEP® gold	Brand name for GEA's proprietary valve seat seal (hard sealing)
T.VIS®	GEA Tuchenhausen valve information system, control top system from GEA Tuchenhausen
TS	Maximum permitted operating temperature
UL	Underwriters Laboratories, a certification organization established in the USA
USP Class VI	The United States Pharmacopeial Convention (USP) is a scientific nonprofit organization that sets standards to help protecting public health. Class VI administer tests and impacts of material and their substances on animal and human tissues.
UV	Ultraviolet, ultraviolet radiation is a wavelength of light



Abbreviation	Explanation
V	Volt, unit of measurement for voltage
VARICOMP®	Pipe expansion compensator from GEA Tuchenhausen
VMQ	High-polymer vinyl methyl polysiloxane, silicone rubber, MVQ = synonym
W	Watt, unit of measurement for power
Y	Control air connection for the working cylinder, designation from pneumatic systems
μ	Micro, one millionth of a unit
Ω	Ohm, the unit of electrical resistance named after Georg Simon Ohm



# CAD Files

### Typical application and description

You can receive two-dimensional and/or three-dimensional drawing files of our components for making your piping planning. For this purpose, please send us your specific request, stating the particular order code and the required drawing format. The required files will then be individually prepared for you.

### Available drawing formats:

	Format	Name
2D formats	drw	Native Pro/E
	igs (2D)	IGS file
	dxf	AutoCAD drawing exchange
	pdf (2D)	Adobe Acrobat document
	tif	TIFF (plot)
3D formats	asm	Native Pro/E
	igs (3D)	IGS file
	pdf (3D)	Adobe Acrobat document
	stp	STP file
	bmp (3D)	Bitmap image
	jpg (3D)	JPEG image
	tif (3D)	TIFF image
	sat	Standard ACIS



# General Sales Terms and Condition of Delivery

**Please note**

All our sales and/or services are exclusively subject to our valid terms and conditions of sale and/or service applicable in the respective country of business, which can be found on our internet platform: [www.gea.com](http://www.gea.com).

If not available or if you otherwise wish to receive such terms and conditions directly from us, please contact us and we of course will send you the applicable version of our terms and conditions for the envisaged business.





**T.VIS® M-20**  
GEA Valve Automation



**T.VIS® A-15**  
GEA Valve Automation



**T.VIS® P-1**  
GEA Valve Automation



**T.VIS® V-1/V-20**  
GEA Valve Automation







