Control and feedback systems

GEA T.VIS® A-15/Class I, Div. 2

Operating instruction (Translation from the original language)

430BAL013622EN_7

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We kindly request that you answer a few short questions about these instruction manual. Use the following QR code or link to access the questionnaire:

https://www.ntgt.de/ra/s.aspx?s=367112X57707125X58087

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1 General Information

1.1 Information on the Document

The present Operating Instructions are part of the user information for the product. The Operating Instructions contain all the information you need to transport, install, commission, operate and carry out maintenance for the product.

1.1.1 Binding Character of These Operating Instructions

These Operating Instructions contain the manufacturer's instructions to the operator of the product and to all persons who work on or use the product regarding the procedures to follow.

Carefully read these Operating Instructions before starting any work on or using the product. Your personal safety and the safety of the product can only be ensured if you act as described in the Operating Instructions.

Store the Operating Instructions in such a way that they are accessible to the operator and the operating staff during the entire life cycle of the product. When the location is changed or the product is sold make sure you also provide the Operating Instructions.

1.1.2 Notes on the Illustrations

The illustrations in these Operating Instructions show the product in a simplified form. The actual design of the product can differ from the illustration. For detailed views and dimensions of the product please refer to the design documents.

1.1.3 Symbols and Highlighting

In these Operating Instructions, important information is highlighted by symbols or special formatting. The following examples illustrate the most important types of highlighting.

Danger

Warning: Fatal Injuries

Failure to observe the warning can result in serious damage to health, or even death.

► The arrow identifies a precautionary measure you have to take to avoid the hazard.

Warning: Explosions

Failure to observe the warning can result in severe explosions.

► The arrow identifies a precautionary measure you have to take to avoid the hazard.

Warning!

Warning: Serious Injuries

Failure to observe the warning can result in serious damage to health.

► The arrow identifies a precautionary measure you have to take to avoid the hazard.

Caution!

Warning: Injuries

Failure to observe the warning can result in minor or moderate damage to health.

► The arrow identifies a precautionary measure you have to take to avoid the hazard.

Notice

Warning: Damage to Property

Failure to observe the warning can result in serious damage to the component or in the vicinity of the component.

► The arrow identifies a precautionary measure you have to take to avoid the hazard.

Carry out the following steps: = Start of a set of instructions.

1. First step in a sequence of operations.
2. Second step in a sequence of operations.

   → Result of the previous operation.

→ The operation is complete, the goal has been achieved.

Hint!

Further useful information.

1.2 Manufacturer address

GEA Tuchenhagen GmbH
Am Industriepark 2-10
21514 Büchen

1.3 Contact

Tel.:+49 4155 49-0
Fax:+49 4155 49-2035

flowcomponents@gea.com
www.gea.com

1.4 EU Declaration of Conformity

Engineering for a better world.

EU Declaration of Conformity

Manufacturer: **GEA Tuchenhagen GmbH**
Am Industriepark 2-10
21514 Büchen, Germany

We hereby declare that the devices named below

Model:	Control Top T.VIS® A-15 Control top T.VIS® A-15/ Class I Division 2
Type:	24 VDC AS-i DeviceNet IO-Link

due to their design and construction as well as in the versions sold by us, meet the basic safety and health requirements of the following guideline:

Relevant EC directives:	2014/30/EU 2011/65/EU	EMC RoHS
Applicable harmonized standards, in particular:	EN 61000-6-2: 2019 EN 61000-6-4: 2019 EN IEC 62026-1:2019 EN 62026-2:2013 IEC 61131-9:2013	
Other applied standards and technical specifications:	DIN EN 61326-1 :2013-07 DIN EN 61131-2: 2008 CISPR11:2015	

Remarks:

- The device type IO-Link meets the IO-Link test specification (Version 1.1.2 - 2014)
- Model T.VIS® A-15/ Class I Div. 2 not for type IO-Link!
- The above mentioned standards have been taken into account in accordance with the respective scope of application

Person authorised for compilation and handover of technical documentation:

GEA Tuchenhagen GmbH
CE Documentation Officer
Am Industriepark 2-10
21514 Büchen, Germany

Büchen, 08 November 2022

Franz Bürmann
Managing Director

pp. Stephan Dirks
Director Hygienic Valves I & Control Top

GEA INTERNAL

1.5 Translated copy of the EU Declaration of Conformity

Manufacturer:	**GEA Tuchenhagen GmbH** **Am Industriepark 2-10** **21514 Buchen, Germany**

We hereby declare that the devices named below

Model:	Control top T.VIS® A-15 Control top T.VIS® A-15/Class I Division 2
Type:	24 VDC AS-i DeviceNet IO-Link

due to their design and construction as well as in the versions sold by us, meet the basic safety and health requirements of the following guideline:

Relevant EC directives:	2014/30/EU EMC 2011/65/EU RoHS
Applicable harmonized standards, in particular:	EN 61000-6-2: 2019 EN 61000-6-4: 2011-09 DIN IEC 62026-2: 2013 IEC 61131-9: 2013
Other applied standards and technical specifications:	DIN EN 61326-1: 2013-07 DIN EN 61131-2: 2008 CISPR11: 2015

Remarks:

- The device type IO-Link complies with the IO-Link test specifications (version 1.1.2 - 2014)
- Model T.VIS® A-15/ Class I Div. 2 cannot be used with the type IO-Link!
- The standards stated have been taken into consideration according to the respective application area.

Person authorised for compilation and handover of technical documentation:	**GEA Tuchenhagen GmbH** **CE Documentation Officer** **Am Industriepark 2-10** **21514 Büchen, Germany**

Büchen, 08. November 2022

Franz Bürmann
Managing Director

by order Stephan Dirks
Director Hygienic Valves I & Control Top

1.6 Manufacturer's Declaration

Engineering for a better world.

Manufacturer declaration

Manufacturer:	**GEA Tuchenhagen GmbH** **Am Industriepark 2-10** **21514 Buchen, Germany**

We hereby declare that the device named below

Model:	control top T.VIS® A-15/ Class I, Division 2
Type:	24 VDC AS-i DeviceNet

due to its design and construction as well as in the versions sold by us meet the basic requirements of the following standards:

UL 12121	Nonincendive Electrical Equipment for Use in Class I, Division 2 Hazardous (Classified) Locations, Group A, B, C, D
CSA C22.2 No.213-17	Nonincendive Electrical Equipment for Use in Class I, Division 2 Hazardous (Classified) Locations, Group A, B, C, D

Certification body:	The UL LLC has certified this device under file E501413 (QUZW, QUZW7) certified and approved for use as control top for process valves in hazardous atmosphere in accordance with the above safety standards. Additional information can be found under UL online https://iq.ulprospector.com
Certification number:	20181213-E501413

Remarks:	• This declaration will become invalid if any alterations are made to the device which have not been agreed with us. • The electrical connection wiring must be locked according to UL listing Class I, Div. 2. • Only M12 mating connectors/cable sockets listed by UL may be used (CYJX/CYJX7).

Person authorized for compilation and handover of technical documentation:	**GEA Tuchenhagen GmbH** **CE Documentation Officer** **Am Industriepark 2-10** **21514 Buchen, Germany**

Büchen, 08. November 2022

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Managing Director

pp Stephan Dirks
Director Hygienic Valves I & Control Tops

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GEA INTERNAL

1.7 Translated copy of the Manufacturer's Declaration

Manufacturer:	**GEA Tuchenhagen GmbH** **Am Industriepark 2-10** **21514 Buchen, Germany**

We hereby declare that the devices named below

Model:	Control top T.VIS® A-15/ Class I, Division 2
Type:	24 VDC AS-i DeviceNet

due to their design and construction as well as in the versions sold by us meet the basic requirements of the following standards:

UL 12121	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

Certifying body:	UL LLC has certified this device under file E501413 (QUZW, QUZW7) and approved it for use as a control top for process valves in hazardous atmospheres in accordance with the above safety standards. For additional information, visit UL online **https://iq.ulprospector.com**
Certification number:	20181213-E501413

Remarks:

- This declaration will become invalid if any alterations are made to the device which have not been agreed with us.
- Interlocking of the electrical connection wiring must be provided in accordance with UL listing Class I, Div. 2.
- Only UL-listed M12 mating connectors/cable sockets may be used (CYJX/CYJX7).

Person authorised for compilation and handover of technical documentation:	**GEA Tuchenhagen GmbH** **CE Documentation Officer** **Am Industriepark 2-10** **21514 Büchen, Germany**

Büchen, 08. November 2022

Franz Bürmann
Managing Director

i.V. Stephan Dirks
Director Hygienic Valves I & Control Tops

1.8 UK Declaration

Engineering for a better world.

UK- Declaration of Conformity by Electromagnetic Compatibility Regulations 2016

Manufacturer: **GEA Tuchenhagen GmbH**
Am Industriepark 2-10
21514 Büchen, Germany

Hereby, we declare that the machine designated in the following

Model:	Control top T.VIS® A-15 Control top T.VIS® A-15 / Class I Division 2
Type:	24 VDC AS-i DeviceNet IO-Link

by virtue of its design and construction and in the versions placed on the market by us, complies with the essential health and safety requirements of the following directive:

Relevant UK legislation:	Electromagnetic Compatibility Regulations 2016 Regulations: restriction of hazardous substances (RoHS)
Applicable harmonized standards, in particular:	EN IEC 61000-6-2: 2019 EN IEC 61000-6-4: 2019 EN IEC 62026-1: 2019 EN IEC 62026-2: 2013 EN IEC 61131-9:2013
Other applied standards and technical specifications:	DIN EN 61326-1:2013 DIN EN 61161-2: 2008 CISPR11:2015

Remarks:
- The device type IO-Link meets the IO-Link test specification (Version 1.1.2 – 2014)
- Model T.VIS® A-15/ Class I Div. 2 not for type IO-Link!
- The above-mentioned standards have been taken into account in accordance with the respective scope of application

Person authorised for compilation and handover of technical documentation:

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2 Safety

2.1 Intended use

With the automatic control top T.VIS A-15/Class I, Div. 2 all GEA Tuchenhagen and ASEPTOMAG process valves with VARIVENT adaptation can be connected pneumatically and electrically. Using the device for any other purpose is considered contrary to its designated use.

The control top T.VIS A-15/Class I, Div. 2 is available as

- without solenoid valve as position indicator
- with solenoid valve as control top

The control top T.VIS A-15/Class I, Div. 2 is completely installed on the dedicated actuator/adapter of the process valve by means of a clamp connection. Due to the internal air guiding system, the control air can pass directly from the control top into the actuator on suitable process valves. For process valves which do not allow the air to be guided internally, the control top has a connection option for supplying the air externally via a hose.

The control top T.VIS A-15/Class I, Div. 2 can be used in areas where safety standards in accordance with UL 121201 - non-incendive electrical equipment for use in class I, division 2, group A, B, C and D for hazardous locations or CSA C22.2 No. 213-17 - non-incendive electrical equipment for use in class I, division 2 for hazardous locations are mandatory.

Hint!

The external electrical connection wiring to the control and feedback must be protected from unintentional disconnection. The approval for the T.VIS A-15/ class I div.2 control top is issued without external M12 mating connector / cable box. Only M12 mating connectors/ cable boxes that are UI-listed (CYJX/CYJX7) may be used.

Hint!

The manufacturer will not accept any liability for damage resulting from any use of the valve which is not in accordance with the designated use of the valve. The risk is borne solely by the operating company.

2.1.1 Requirements for operation

The prerequisite for reliable and safe operation of the component is proper transportation and storage as well as professional installation and assembly. Operating the unit within the limits of its designated use also involves adhering to the operating, inspection and maintenance instructions.

2.1.2 Improper operating conditions

The operational safety of the component can not be guaranteed under improper operating conditions. Therefore avoid improper operating conditions.

The operation of the component is not permitted if:

- Persons or objects are in the danger zone.
- Safety devices are not working or were removed.
- Malfunctions have been detected on the component.
- Damage to the component has been detected.
- Maintenance intervals have been exceeded.

2.2 Operator’s Duty of Care

The operating company of the component has a special responsibility for the proper and safe handling of the component within their company. Only use the component when it is in perfect operating condition in order to prevent danger to persons and property.

This operating manual contains information that you and your employees need for safe operation over the life of the component. Be sure to read these Operating Instructions carefully and ensure that the measures described here are observed.

The operator's duty of care includes planning the necessary safety measures and monitoring that these measures are observed. The following principles apply:

- Only qualified personnel may work on the component.
- The operating company must authorize personnel to carry out the relevant tasks.
- Order and cleanliness must be maintained at the work stations and in the entire area surrounding the component.
- Personnel must wear suitable work clothing and personal protective equipment. As the operating company must ensure that work clothing and personal protective equipment are used.
- Inform personnel regarding any properties of the product which might pose a health risk and the preventative measures to be taken.
- Have a qualified first-aid representative on call during the operation. This person must be able to initiate any necessary first-aid measures in case of an emergency.
- Clearly define procedures, competences and responsibilities for those working in the area of the component. Everybody must know what to do in case of an emergency. Instruct the staff in this respect at regular intervals.
- The signs on the component must always be complete and easy to read. Check, clean and replace the signs as necessary at regular intervals.
- Observe the Technical Data specified and the limits of use!

Hint!

Carry out regular checks. This way you can ensure that these measures are actually observed.

2.3 Subsequent changes

No technical modifications should ever be made to this component. Otherwise you will have to undergo a new conformity process in accordance with the EC Machinery Directive on your own.

In general, only original spare parts supplied by GEA Tuchenhagen GmbH should be fitted. This ensures that the component is always operating properly and efficiently.

2.4 General safety instructions and dangers

The component is safe to operate. It was built according to state-of-the-art science and technology.

Nevertheless, dangers can arise from the component, if:

- the component is not used as intended
- the component is used improperly
- the component is operated under impermissible conditions

2.4.1 Principles for safe operation

Dangerous situations during operation can be avoided by safety-conscious and proactive behaviour of the staff.

To ensure safe operation of the valve the following principles apply:

- The Operating Instructions must be kept ready to hand at the valve's place of use. They must be complete and in clearly legible form.
- Only use the valve for its intended use.
- The valve must be functional and in good working order. Check the condition of the valve before starting work and at regular intervals.
- Wear tight-fitting work clothing for all work on the valve.
- Ensure that nobody can get hurt on the parts of the valve.
- Immediately report any faults or noticeable changes on the valve to the person responsible.
- Never touch the pipes and the valve when these components are hot! Avoid opening the valve unless the process plants have been emptied and depressurised.
- Observe the accident prevention regulations and all local regulations.

2.4.2 Environmental Protection

Harm to the environment can be avoided by safety-conscious and proactive behaviour of the staff.

For environmental protection the following principles apply:

- Substances harmful to the environment must not be discharged into the ground or the sewage system.
- Always observe the pertinent regulations relating to waste avoidance, disposal and utilization.

- Substances harmful to the environment must be collected and stored in suitable containers. Clearly mark the containers.
- Dispose of lubricants as hazardous waste.

2.4.3 Electrical Equipment

For all work on electrical equipment, the following principles apply:

- Access to electrical equipment should only be allowed to qualified electricians. Always keep unattended switch cabinets locked.
- Modifications of the control system can affect the safe and reliable operation. Modifications are only permitted with the express permission of the manufacturer.
- After completion of all work, check that the protective devices are fully functional.

2.5 Supplementary Regulations

In addition to the instructions in this documentation the following also has to be observed:

- pertinent accident prevention regulations,
- generally accepted safety rules,
- national regulations applicable in the country of use,
- work and safety instructions applicable in the facility,
- installation and operating regulations for use in potentially explosive areas.

2.6 Qualification of personnel

This section provides information on how the personnel working on the component must be trained.

Operating and maintenance personnel must

- have the necessary qualification to carry out their tasks,
- be instructed with regard to possible dangers,
- know and observe the safety instructions given in the documentation.

Only allow qualified electricians to carry out work on the electrical equipment or have a qualified electrician supervise the work.

Only allow specially trained personnel to carry out work on an explosion-protected system. When working on explosion-protected equipment observe the standards DIN EN 60079-14 for gases and DIN EN 50281-1-2 for dusts.

The following minimum qualifications are required:

- Training as a specialist for working independently on the component.
- Adequate instruction to work on the component under the supervision and guidance of a trained specialist

Each employee must meet the following requirements to work on the component:

- Personal suitability for the respective task.
- Sufficient professional qualification for the respective task.
- Received instruction about the functionality of the component.
- Received instruction about operating sequences on the component.
- Familiar with the safety devices and their function.
- Familiar with these Operating Instructions, especially with the safety instructions and the information which is relevant for the task on hand.
- Familiar with the basic regulations with regard to occupational health and safety and accident prevention.

When working with the component, a distinction is made between the following user groups:

User groups	
Staff	**Qualifications**
Operating personnel	Adequate instruction and sound knowledge in the following areas: • Functionality of the component • Operating sequences on the pump • What to do in case of an emergency • Lines of authority and responsibilities with respect to the task
Maintenance personnel	Appropriate training and a sound knowledge of the structure and functionality of the component. Sound knowledge in the following areas: • Mechanical equipment • Electrical equipment • Pneumatic system Authorization with regard to safety engineering standards to carry out the following tasks: • Setting devices into operation • Earthing of devices • Marking of devices The relevant certificates of qualification must be submitted before work can be carried out on ATEX certified machines.

2.7 Safety equipment

2.7.1 Signs

Dangerous points on the control top are indicated by warning signs, prohibition signs and mandatory signs.

The signs and notes on the control top must always be legible. Any illegible signs must be replaced immediately.

Hint!

If the control top is used without legible warning notices on the metal sign, the type approval is no longer valid.

Item 1.1 - Warning notice in English

Item 1.2 - Warning notice in French

Warning risk of explosion

Do not connect or disconnect while the circuit is live unless the area is free of ignitable concentrations of flammable substances.

Do not connect or disconnect when switched on.

Warning notices on the control top

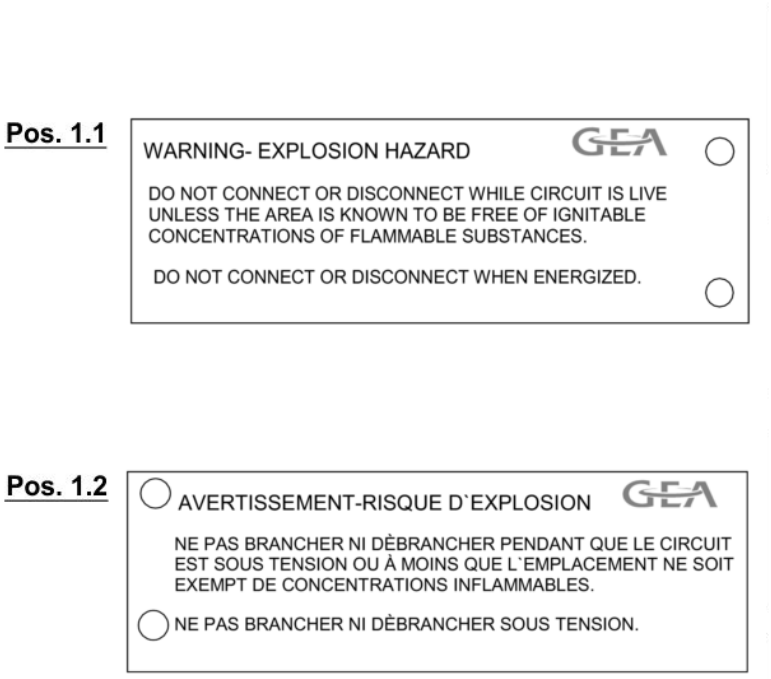

Fig.1: Metal sign with warning notice on both sides

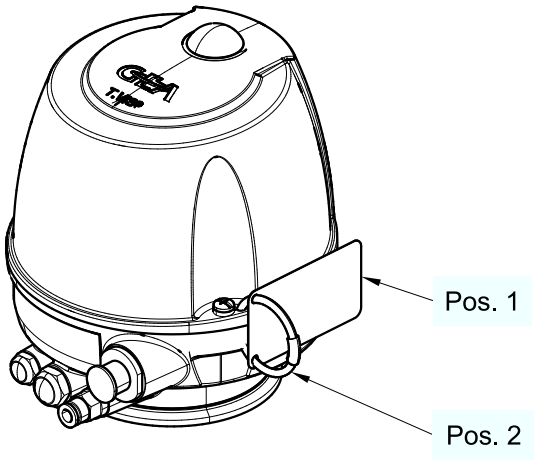

Fig.2

Metal sign, item 1, with wire cable connector, item 2, installed on the hood and on the base.

2.8 Residual dangers

Dangerous situations can be avoided by safety-conscious and proactive behaviour of the personnel and by wearing personal protective equipment.

Residual dangers on the control top and measures		
Danger	**Cause**	**Measure**
Danger to life	Inadvertent switch-on of the control top	Effectively disconnect all components, effectively prevent switch-on.
	Electric power	Observe the following safety rules: 1. Isolate from the power supply. 2. Take appropriate measures to prevent switch on. 3. Test absence of voltage. 4. Earthing and short-circuiting. 5. Cover or safeguard any adjacent live parts.
	Pneumatic pressure	Observe the following safety rules: 1. Switch control air pressure off. 2. Take appropriate measures to prevent switch on. 3. Check permissible control air pressure.
Damage to property	Welding can cause damage to the electronics or result in data loss.	Do not carry out any welding work in the vicinity of the control top or make sure electronics are properly protected.

2.8.1 Electrostatically Endangered Components and Modules

The control top contains electronic components that are sensitive to electrostatic discharge (ESD). Contact with electrostatically-charged persons or objects can endanger these components. In the worst case they are destroyed immediately or fail after being put into operation.

To minimize or prevent the possibility of damage resulting from sudden electrostatic discharge,

- observe the requirements of DIN EN 61340-5-1 and 5-2 and
- take care not to touch the electronic components!

2.8.2 Instructions for the Safe Handling of Electronic Components During Welding Work

Notice

Stray welding currents during welding

Can cause damage to electronic components

► Follow the steps below to prevent this.

1. Before starting welding work, carry out the following preparations:
   1.a. Ensure the device is switched off and no electrical connections are active.
   1.b. Disconnect the device from the power supply.
   → This protects the electronic components from potential damage caused by stray welding currents.
2. Establish a correct grounding connection:
   2.a. Place the ground connection of the welding machine as close as possible to the welding point.
   → This minimises the risk of stray welding currents and helps protect nearby electronic components from damage.
3. After completing the welding work, proceed as follows:
   3.a. Remove the welding machine’s ground connection.
   3.b. Reconnect the device to the power supply.
   3.c. Perform a function test.

2.9 Danger zones

Please observe the following notes:

- In the event of malfunctions, shut down the control top (disconnect from the power and air supply) and secure it against being used.
- Before starting any service, maintenance or repair work, disconnect the control top from the power supply and secure it against inadvertently being switched back on again.
- Only allow a qualified electrician to carry out any work on the electrical power supply.
- Check the electrical equipment of the control top at regular intervals. Immediately remedy loose connections and molten cables.
- If work on live parts cannot be avoided, call in a second person, who can operate the main switch in case of an emergency.

3 Description

3.1 Functional description

3.1.1 Operation Principle

The control top T.VIS A-15/Class I, Div. 2 works with a microprocessor that contains the software for operation, visualization and intelligent position detection. The valve stroke is detected by a contactless position measuring system integrated in the control top and the information is supplied to the microprocessor.

Electrostatically endangered components/modules!

- The control top contains electronic components that are sensitive to electrostatic discharge (ESD). Contact with electrostatically-charged persons or objects can endanger these components. In the worst case they are destroyed immediately or fail after being put into operation.
- Observe the requirements of DIN EN 61340-5-1 and 5-2 to minimize or prevent the possibility of damage resulting from sudden electrostatic discharge.
- Also take care not to touch electronic components when supply voltage is present.
- Use ESD-compliant packaging when returning electronic components. (Contact GEA Tuchenhagen if you have any questions.)

3.1.2 Control Top without Solenoid Valves

The control top T.VIS A-15/Class I, Div. 2 without solenoid valves works as a position indicator. After programming, it indicates the status of the process valve locally by coloured LEDs under the illuminated dome so that it is visible over a long distance.

The position feedback signals are supplied to the user in one of the following ways, depending on the communication method selected:

- 24V DC switching output
- AS interface data bit
- DeviceNet data bit

For programming, the process valve must be moved once to its end positions by an external solenoid valve.

3.1.3 Control Top with Solenoid Valves

The control top with solenoid valves acts as a control top. The signalling takes place in the same way as with the control top without solenoid valves. with the difference being that the solenoid valve integrated in the base is operated in accordance with the control signals. Depending on the design of the process valve, up to 3 NC normally closed solenoid valves can be installed in the control top.

In addition, a pneumatic NOT logic element can be used to support the compressed air of the drive spring.

The control signals are given by the user's process control system or by the microprocessor in the control top during automatic end position programming.

In manual mode, the main actuator can be controlled using the push buttons in the hood in order to move the process valve to its end positions or by operating the solenoid valve manually Y1. To do this, use a screwdriver to turn the screw (S) from 0 to 1, see figure.

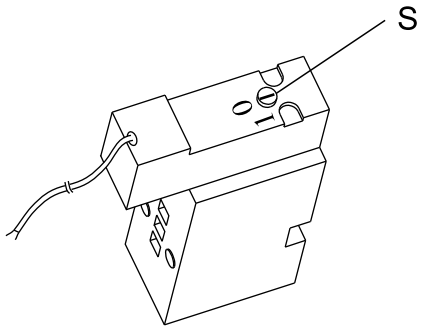

Fig.3

To assemble or disassemble the valve insert, the main actuator can be controlled in service mode using the buttons in the cap in order to relieve the spring tension, which depends on the valve type.

3.1.4 Control top with hood without buttons

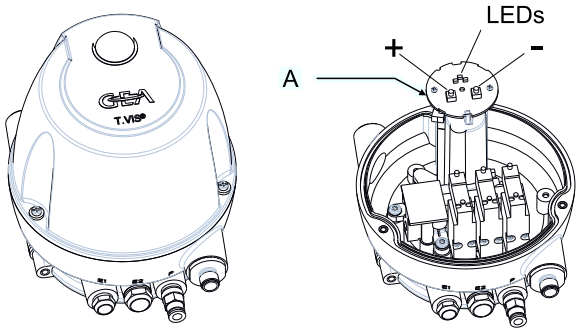

Fig.4: Control top with hood without buttons

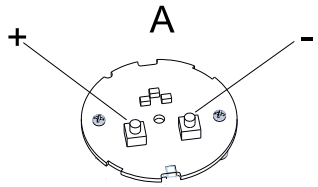

Fig.5: Circuit board (A)

The control top T.VIS A-15/Class I, Div. 2 is suitable for use in accordance with protection class IP66/IP67 (EN 60529) in this design and with proper installation of the electric and pneumatic connections.

To operate the control top, take off the cap and press the plus/minus buttons directly on the circuit board (A).

Observe the general instructions regarding ESD protection.

Operation see Section 8.3, Page 70.

3.1.5 Function of the push button on the printed circuit board

Automatic end position programming and manual mode are generally activated using the buttons in the cap. For safety reasons, the buttons are only enabled within a specific time window after activation of the operating voltage. During this time window, functions can be started. The buttons are automatically locked again after the allowed time has expired.

During automatic end position programming, the control top autonomously detects the number of solenoid valves fitted in the control top and carries out the required programming steps fully automatically.

After end position programming the following is also possible:

- Changing the tolerance ranges manually,
- factory setting to set the attenuation of feedback signals to inactive,
- activating the LEFF function on double-seat valves with lifting actuator.

It is also possible to change the colours for visualizing the end positions using the "colour variant" function, which also results in the outputs for the feedback signals being switched.

3.1.6 Safety Air Exhaust/Installation Position

To provide protection against excess pressure which can build up in the inside of the control top, a vent plug E2 is fitted in the base. In operating mode, the exhaust air from the lifting actuators is discharged via this vent plug. In the unlikely event of a damaged solenoid valve or in case of sealing problems, pressure relief is ensured.

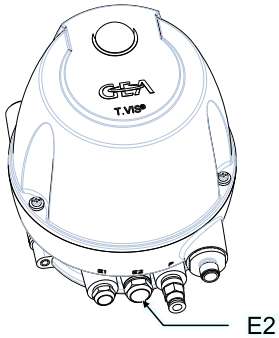

Fig.6: Control top (standard variant in IP66)

This vent plug is a safety device that must be handled as such. Do not cover the vent plug. When fitting the control top note that the installation position of the vent plug E2 must never be pointing vertically upwards.

4 Transport and storage

4.1 Storage conditions

You must first dry and preserve the control top to prevent damage if the control top is exposed to temperatures ≤ 0°C during transport or storage.

Hint!

We recommend that the valve should be stored at a temperature of ≥ 5 °C for a period of 24 hours prior to any handling (disassembling the housings / activation of actuators) so that any ice crystals formed by condensation water can melt.

4.2 Transport

For transport, the following principles apply:

- Only use suitable hoist and slings for transporting the package units/control tops.
- Observe the pictograms on the package.
- Control tops must be protected from animal and vegetable fats.
- The synthetic materials of the control tops are susceptible to breaking. Take care when transporting the control top. Do not grip sensitive parts of the unit to lift or push the unit or to support yourself.

4.2.1 Scope of supply

After taking delivery of the component, check if

- the details on the type plate correspond to the data in the order and delivery documents,
- the equipment is complete and all components are in good order.

5 Technical data

5.1 Type plate

The type plate is used to uniquely identify the control top.

Fig.7: Example of a type plate, see pos. 5 in Fig. 2 Section 2.7.1, Page 20

Code/Type	T A 1 5	L	8	B	A	H
Item in the order code	14	15	16	17	18	19

Explanation of the items in the order code		
Item in the order code	**Designation**	**Explanation**
14	**Feedback location**	
	T A 1 5	Control top T.VIS A-15 Class I, Div. 2
15	**Control top type**	
	N	without solenoid valve
	P	1 solenoid valve
	N	2 solenoid valves Y1=main stroke; Y2= valve disk lifting
	J	2 solenoid valves Y1=main stroke; Y3=lifting of the double-disk, for the external air connection of an air/air actuator or an external process valve
	L	3 solenoid valves
	V	1 solenoid valve, 1 NOT element

Explanation of the items in the order code		
Item in the order code	**Designation**	**Explanation**
	X	2 solenoid valves, 1 NOT element
	Y	3 solenoid valves, 1 NOT element
16	**Feedback**	
	8	2 digital feedback signals
17	**Type of interface/mode**	
	A	AS-interface (A/B slave)
	B	24 V DC 3-wire PNP
	D	DeviceNet
18	**Solenoid valve**	
	A	24 V DC 0.85 W
	0	without
19	**Screw connection (cable/air) for air hose Ø 6/4 mm**	
	J	5-pin connector M12/5-wire/M20x1.5 24 V DC; AS-Interface; DeviceNet
	H	8-pin plug M12/8-wire/ M20x1.5 24 V DC
	for air hose Ø 6,35/4,31 mm	
	P	5-pin connector M12/5-wire/M20x1.5 24 V DC; AS-Interface; DeviceNet
	N	8-pin plug M12/8-wire/ M20x1.5 24 V DC
Options	/18	Supply air throttle: regulates the opening speed of the valves (cannot be used with control top type V; X or Y)

Explanation of the items in the order code		
Item in the order code	**Designation**	**Explanation**
	/19	Exhaust air throttle: regulates the closing speed of the valves
	/22	5-pin M12 junction box for screw connection J, P (Material No. 508-963) 8-pin M12 junction box for screw connection H, I (Material No. 508-061)
	/66	Protection class IP 66 (powerful water jet)
	/67	Protection class IP 67 (immersion)
	/69k	Protection class IP 69K (high-pressure cleaner)
	/81	ASi junction box on cable 1m with M12 junction box for screw connection L or U
	/82	ASi junction box on cable 2m with M12 junction box for screw connection L or U
	/A	For ASEPTOMAG valves Example: TA15L8BAH/A
	/CD	UL 121201 - Non-igniting electrical equipment: for use in Class I, Division 2 potentially explosive (classified) areas. CSA C22.2 No. 213-17 - Non-igniting electrical equipment: for use in Class I, Division 2 hazardous (classified) areas.

5.2 Technical data

Refer to the following tables for the key technical data of the control top:

Technical data: temperatures and compressed air supply	
Designation	**Description**
Ambient temperature	-20 to +55 °C
Operating temperature	Code T5
Housing assessment	Type 1
Control air	acc. to ISO 8573-1
- Solid particle content:	Quality class 6 (recommended) Particle size max. 5mu Particle density max. 5 mg/m^3
- Water content:	Quality class 4 (max.) Dew point +3°C If the unit is used at higher altitudes or at low ambient temperatures, the dew point must be adapted accordingly.
- Oil content:	Quality class 3 preferably oil free, max. 1 mg oil to 1 m^3 air
Air hose	
- metric	Material PE-LD Outside Ø 6 mm Inside Ø 4 mm
- Inch	Material PA Outside Ø 6.35 mm Inside Ø 4.3 mm
Control air pressure	max 8 bar, min 2 bar
Sound pressure level using sound absorber	max. 72 dB

Technical data: materials	
Designation	**Description**
Housing	PA 12/L
Seals	NBR / EPDM / FKM

Technical data: electrical specifications	
Designation	**Description**
Protection class EN 60529*	Standard: IP66 - powerful water jet Optional: IP67 - immersion Optional: IP69k - high pressure cleaner
EC EMC directives	2014/30/EU
Immunity for industrial environments	EN 61000-6-2: 2005
Radio frequency interference	EN ISO 61000-6-4:2007 + A1: 2011
EC Low Voltage Directive	73/23/EEC
Electrical wiring configuration	– 5-pin M12 circular connector or – 8-pin M12 circular connector only for 24 V version with 2 to 3 solenoid valves
Switch point tolerance	adjustable 0.3; 0.7; 1.0; 2.0 mm
Signal attenuation of feedback group	none; short; medium; long

5.3 Specifications for 24V DC Version

Technical data: supply	
Designation	**Description**
Supply voltage UV	24 V DC (+20%... -12.5%)
Current consumption	
– No-load current	≤ 25 mA
– one solenoid valve	35...45 mA
– Max. load of the feedback	50 mA
Total	approx. 200 mA

Technical data: inputs	
Designation	**Description**
Control voltage	max. 28.8 V DC High = ≥ 13 V DC Low = ≤ 6 V DC
Control current	≤ 10mA

Hint!

When detergents with high surface tension reduction and/or high-pressure cleaners are used, we recommend the use of optional protection class IP69k.

Technical data: outputs	
Designation	**Description**
Output voltage	High = UV - ≤ 1 V Low = ≤ 5 V
Max. current per output	100 mA short circuit proof
Switching frequency (ohmic + inductive loads ≤ 25 mH)	2 Hz

5.4 Specifications for AS-Interface

Technical data: supply	
Designation	**Description**
Supply voltage UV	26.5...31 V DC
Current consumption - No-load current - One solenoid valve	 ≤ 25 mA 35...45 mA
Total	approx. 90 mA

Technical data: inputs as seen from the AS-interface master		
Bit	**Function**	**Signal**
DI0*	Feedback Main stroke	1 = valve in non-actuated position 0 = valve outside tolerance for non-actuated position
DI1*	Feedback Main stroke	1 = valve in actuated position 0 = valve outside tolerance for actuated position
DI2		not assigned
DI3		not assigned

* Assignment for colour variant green, seeSection 6.5.2, Page 49

Technical data: outputs as seen from the AS-interface master		
Bit	**Function**	**Signal**
DO0	Activation of solenoid valve Y1	1 = solenoid valve activated 0 = solenoid valve not activated
DO1	Activation of solenoid valve Y2	1 = solenoid valve activated 0 = solenoid valve not activated
DO2	Activation of solenoid valve Y3	1 = solenoid valve activated 0 = solenoid valve not activated
DO3	Reserved for A/B identification	

Technical data: electrical specifications	
Designation	**Description**
AS-i specification	V3.0 (A/B slave)
Configuration IO code / ID code / ID2 code	7.A.E.
Reverse voltage protection	yes

5.5 DeviceNet Specifications

Technical data: supply	
Designation	**Description**
Supply voltage UV without solenoid valve	11...26 V DC
Supply voltage UV with solenoid valve	21...26 V DC
Current consumption - No-load current - One solenoid valve	 ≤ 35 mA 35...45 mA
Total	approx. 90 mA

Technical data: inputs		
Bit	**Function**	**Signal**
DI-0*	Feedback Main stroke	1 = valve in non-actuated position 0 = valve outside tolerance for non-actuated position
DI-1*	Feedback Main stroke	1 = valve in actuated position 0 = valve outside tolerance for actuated position
DI-2		not assigned

* Assignment for colour variant green, seeSection 6.5.2, Page 49

Technical data: outputs		
Bit	**Function**	**Signal**
DO0	Activation of solenoid valve Y1	1 = solenoid valve activated 0 = solenoid valve not activated
DO1	Activation of solenoid valve Y2	1 = solenoid valve activated 0 = solenoid valve not activated
DO2	Activation of solenoid valve Y3	1 = solenoid valve activated 0 = solenoid valve not activated
DO3		not assigned

Technical data: LED indicators for module and network status	
Designation	**Description**
Green	Operation
Flashing green	Communication time-out or module faulty
Flashing red	Power-up test
Flashing orange	Baud rate detection
Red	Communication not possible

DIP switches

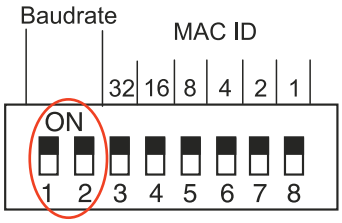

Fig.8: DIP switches: switches 1 and 2 = Baud rate

Switches 1 and 2 = baud rate		
DIP 1	**DIP 2**	**Baud rate**
OFF	OFF	125 kBaud
ON	OFF	250 kBaud
OFF	ON	500 kBaud
ON	ON	Selectable via software Delivery state

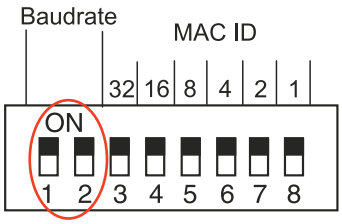

Fig.9: DIP switches: switches 3 and 8 = MAC ID (address)

Switches 3 to 8 = MAC ID (address)						
DIP 3	**DIP 4**	**DIP 5**	**DIP 6**	**DIP 7**	**DIP 8**	**MAC ID**
OFF	OFF	OFF	OFF	OFF	OFF	0
OFF	OFF	OFF	OFF	OFF	ON	1
OFF	OFF	OFF	OFF	ON	OFF	2
...	...	...	...	...	...	...
ON	ON	ON	ON	ON	OFF	62
ON*	ON	ON	ON	ON	ON	63

* Factory setting

5.6 Accessories

Accessories must be ordered separately.

Hint!

Note! The electrical wiring connection between connector M12 and cable socket M12 must be secured against unauthorised disconnection. A quick-release fastener with UL listing for use in a hazardous environment in accordance with approval Class I, Div. 2 Group A, B, C, D can be used for this purpose, see Section 6.4.1, Page 44

Accessories	Part no.
Cable socket, straight – M12; with 1 m cable and ASI insulation displacement terminal	508-027
Cable socket, straight – M12; with 2 m cable and ASI insulation displacement terminal	508-028
Supply air throttle for reducing the opening speed of the main stroke at the central air supply P	603-042
Exhaust air throttle for reducing the closing speed of the main stroke at the exhaust air connection E1	603-042

5.7 Tool

List of tools	
Tool	**Material no.**
Hose cutter	407-065
Hex key, size 3	408-121
Pin-type face spanner, pin dia. 4	9065837
Open-ended wrench a/f 23	408-046
Open end spanner a/f 16x18	408-138
Open-ended wrench a/f 15	408-035
Open end spanner a/f 13x17	408-036
Open-ended wrench, a/f 24+27	408-040

5.8 Lubricants

Lubricants	Material no.
Rivolta F.L.G. MD-2	413-071
PARALIQ GTE 703	413-064

5.9 Equipment

Technical data - equipment	
Equipment	**Material no.**
Logic element NOT • Pressure range: 2.0...8.0 bar • Ambient temperature: -20...+70 °C	512-137
Solenoid valve • 24 V DC (+20% / -12.5%), 0.85 W • Ambient temperature: -20...+60 °C • Protection class IP 51 • Pressure range: 2.0...8.0 bar	512-169
Sound absorber G 1/8" • Filter material: stainless steel wool • Ambient temperature: -20...+70 °C • max. pressure 10 bar	933-175
Sound absorber G 1/4" • Filter material: stainless steel wool • Ambient temperature: -20...+70 °C • max. pressure 10 bar	933-174
Supply/exhaust air throttle G ¹/8" • Filter material: sintered stainless steel • Pressure range: 0.2 ... 10 bar • Infinitely adjustable flow at Δp 6 bar: 310 dm^3 / min_n • Ambient temperature: -10 ... +70 °C • Flow rate setting at 0 ... +70 °C	603-042

6 Assembly and installation

6.1 Safety instructions

Hazardous situations during installation can be avoided by safety-conscious and proactive behaviour of the personnel.

For installation, the following principles apply:

- Only qualified personnel are allowed to set-up, install and commission the component.
- Ensure that adequate working and traffic areas are available at the place of installation.
- Observe the maximum load-bearing capacity of the installation surface.
- Observe the transport instructions and markings on the part(s) to be transported.
- Remove any nails protruding from transport crates immediately after opening the crate.
- Under no circumstances should anyone stand under a suspended load.
- Safety devices of the component may not work effectively during installation.
- Reliably secure sections of the plant which have already been connected against inadvertently being switched on.

6.2 Establishing Hose Connections

To ensure reliable operation, the compressed air hoses must be cut exactly at a right angle.

Tools required:

- Hose cutter

Carry out the following steps:

1. Shut off the compressed air supply.
2. Use the hose cutter to cut the pneumatic hoses at a right angle.
3. Push the air hose into the air connector on the control top.
4. Re-open the compressed air supply.

→ Done.

Hint!

Avoid kinks in the pneumatic hoses!

6.3 Pneumatic connections

6.3.1 Control Top with 1 Solenoid Valve or Without Solenoid Valve

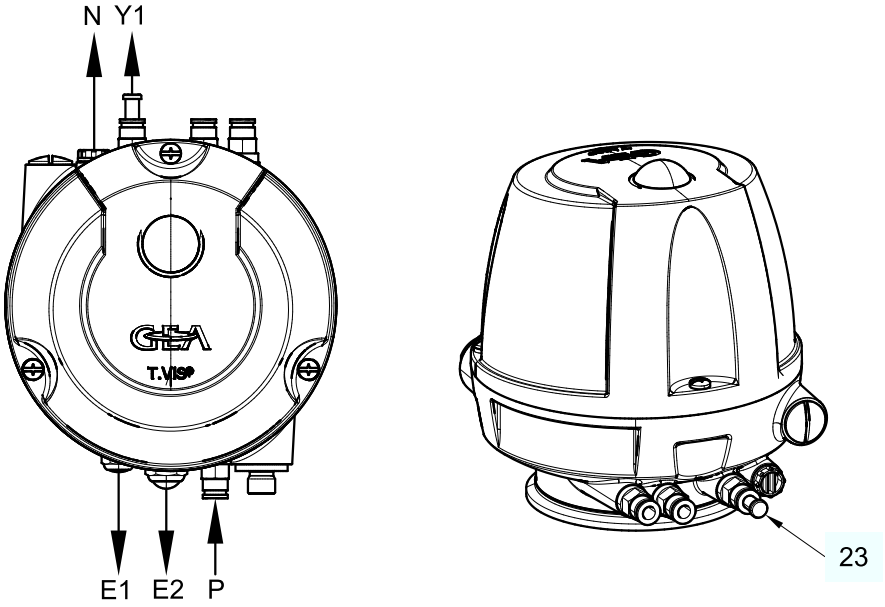

Fig.10: Control top (standard variant in IP66)

E1	Exhaust air of the main stroke Y1 with sound absorber Optional: Exhaust air throttle Connection E1 must not be closed!
E2	Safety vent against excess pressure and exhaust air of lifting actuators Y2 and Y3 via sound absorber Non-return valve Connection E2 must not be closed!
P	Central air supply with integrated filter Optional: supply air throttle
N	Air connection for spring force backup Only with logic element NOT
Y1	Air connection for external main stroke connection with plug (23)
23	Plug Control air pressure can be present at the plugs for the air connections! Before removing a sealing plug (23), make sure that the respective air connection is pressure-free!

On most of the GEA Tuchenhagen valve types, solenoid valve Y1 internally guides the main control air through the switch bar into the main actuator. The external air connection Y1 is provided in addition.

6.3.2 Control Top with 2 Solenoid Valves – for Lifting the Valve Disk

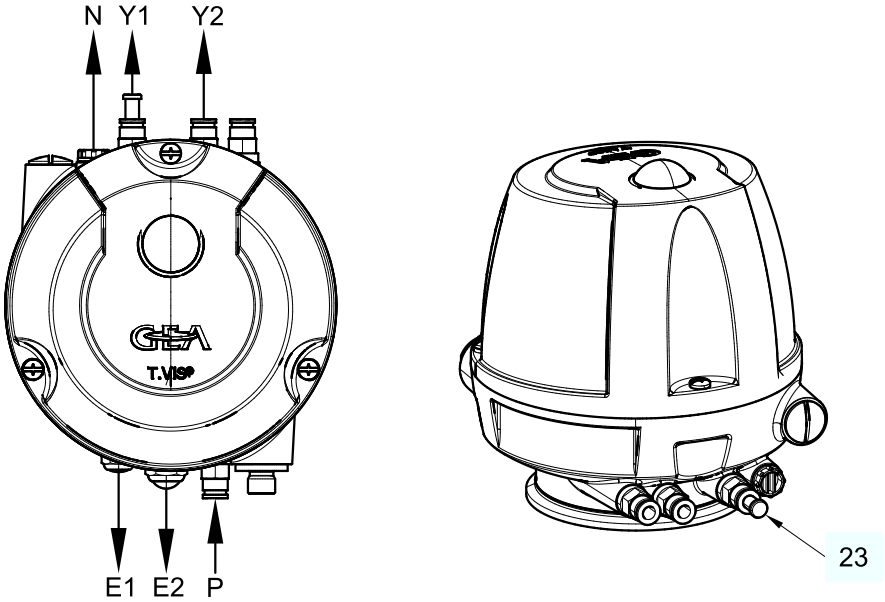

Fig.11: Control top (standard variant in IP66)

E1	Exhaust air of the main stroke Y1 with sound absorber Optional: Exhaust air throttle Connection E1 must not be closed!
E2	Safety vent against excess pressure and exhaust air of lifting actuators Y2 and Y3 Non-return valve Connection E2 must not be closed!
P	Central air supply with integrated filter Optional: supply air throttle
N	Air connection for spring force backup Only with logic element NOT
Y1	Air connection for external main stroke connection with plug (23)
Y2	Air connection for lifting the valve disk Not permitted for the main stroke of an external process valve!
23	Plug Control air pressure can be present at the plugs for the air connections! Before removing a sealing plug (23), make sure that the respective air connection is pressure-free!

On most of the GEA Tuchenhagen valve types, solenoid valve Y1 internally guides the main control air through the switch bar into the main actuator. The external air connection Y1 is provided in addition.

6.3.3 Control Top with 2 Solenoid Valves – for Lifting the Double Disk, for External Air Connection of an Air/Air Actuator or for Main Stroke of an External Process Valve

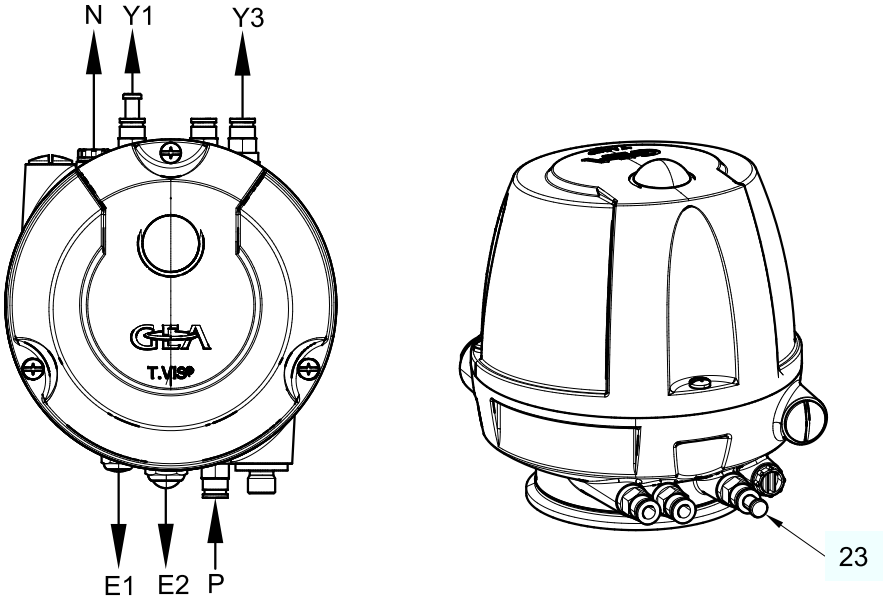

Fig.12: Control top (standard variant in IP66)

E1	Exhaust air of the main stroke Y1 with sound absorber Optional: Exhaust air throttle Connection E1 must not be closed!
E2	Safety vent against excess pressure and exhaust air of lifting actuators Y2 and Y3 Non-return valve Connection E2 must not be closed!
P	Central air supply with integrated filter Optional: supply air throttle
N	Air connection for spring force backup Only with logic element NOT
Y1	Air connection for external main stroke connection with plug (23)
Y3	Air connection for lifting the double disk, for external air connection of an air/air actuator or for main stroke of an external process valve or for ASEPTOMAG valves with seat ventilation
23	Plug Control air pressure can be present at the plugs for the air connections! Before removing a sealing plug (23), make sure that the respective air connection is pressure-free!

On most of the GEA Tuchenhagen valve types, solenoid valve Y1 internally guides the main control air through the switch bar into the main actuator. The external air connection Y1 is provided in addition.

6.3.4 Control Top with 3 Solenoid Valves

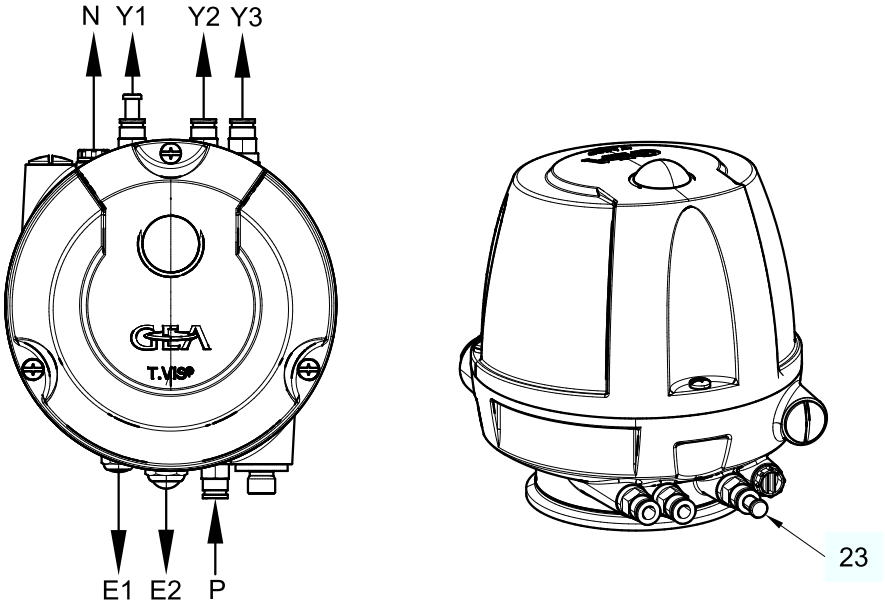

Fig.13: Control top (standard variant in IP66)

E1	Exhaust air of the main stroke Y1 with sound absorber Optional: Exhaust air throttle Connection E1 must not be closed!
E2	Safety vent against excess pressure and exhaust air of lifting actuators Y2 and Y3 Non-return valve Connection E2 must not be closed!
P	Central air supply with integrated filter Optional: supply air throttle
N	Air connection for spring force backup Only with logic element NOT
Y1	Air connection for external main stroke connection with plug (23)
Y2	For VARIVENT® valves with lifting actuator: Air connection for lifting the valve disk For STERICOM® double-seal valves: Lift down (air connection at actuator top) Not permitted for the main stroke of an external process valve! On ASEPTOMAG valves with lifting of the upper seat

Y3	For VARIVENT® valves with lifting actuator: Air connection for lifting the double disk For STERICOM® double-seal valves: Lift up (air connection at actuator bottom) On ASEPTOMAG valves with lifting of the lower seat
23	Plug Control air pressure can be present at the plugs for the air connections! Before removing a sealing plug (23), make sure that the respective air connection is pressure-free!

On most of the GEA Tuchenhagen valve types, solenoid valve Y1 internally guides the main control air through the switch bar into the main actuator. The external air connection Y1 is provided in addition.

Hint!

To ensure adequate compressed air supply to the process actuators, a max. of 2 solenoid valves are electrically activated at the same time!

It must be ensured that there can be no simultaneous control of the actuator or the lifts at the same process valve!

6.4 Electrical connections

Danger

To satisfy the UL requirements, use a protective insulation power-limited power supply according to UL/IEC 60950 or power limited according to UL/IEC 61010-1 3cd cl. 9.4 or a Class II power supply according to NEC.

►

6.4.1 Overview

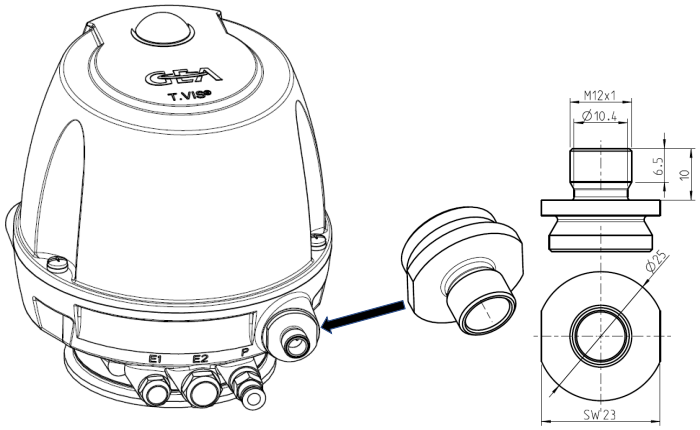

Fig.14: T.VIS connector M12

Fig.15: Example: Circlip at T.VIS

Danger

Only allow properly qualified staff to carry out work on the electrical equipment. Prior to establishing electrical connections check the maximum permissible operating voltage.

►

Hint!

The electrical wiring connection between connector M12 and cable socket M12 must be secured against unauthorised disconnection. A quick-release fastener with UL listing for use in a hazardous environment in accordance with approval Class I, Div. 2 Group A, B, C, D e.g. TPC Wire Quick-Connect ™ or MOLEX Brad ® Ultra-Lock ®

Hint!

This wiring connection must be permanently connected to the connection cable. When using the control top without approved fuse of the electrical wiring connection, the operating permit becomes invalid!

Hint!

The electrical cable must be long enough to allow the control top to be removed via the switch bar!

The cables must be suitable for use in the temperature range from -20 °C to 75 °C!

6.4.2 Electrical 24 V DC Wiring

6.4.2.1 Plug M12 / 5-pin (24.1)

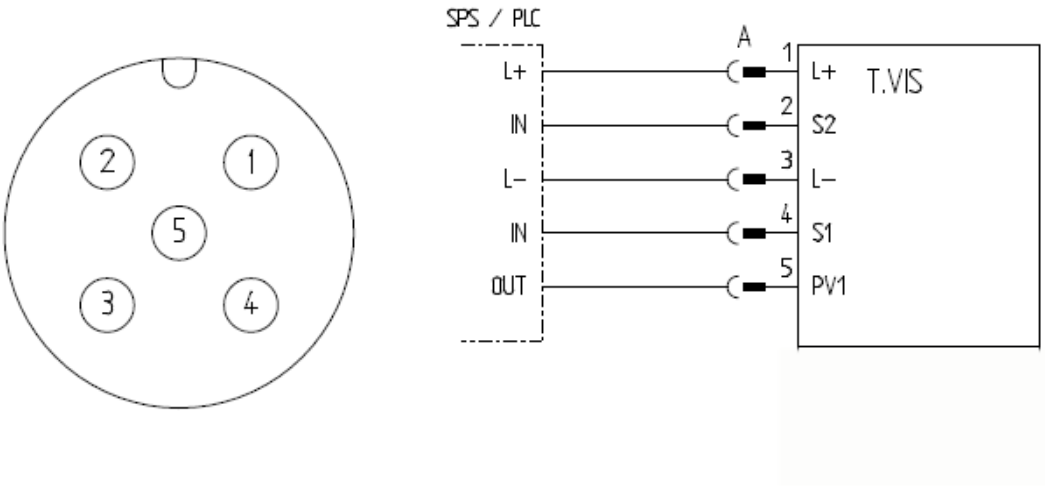

Fig.16: 5-pin M12 connector A-coded: device connector and view of male connector

1	L+	U_V L+24 V DC supply voltage
2	S2	Feedback of actuated position*
3	L-	U_V L- reference potential
4	S1	Feedback of non-actuated position*
5	PV1	Actuation of solenoid valve Y1

* Assignment for colour variant green, see "Colour changeover" (Page 38).

Carry out the following steps:

1. Connect cable via air connector M12/5-pole.

→ Done.

6.4.2.2 Plug M12 / 8-pin (24.1)

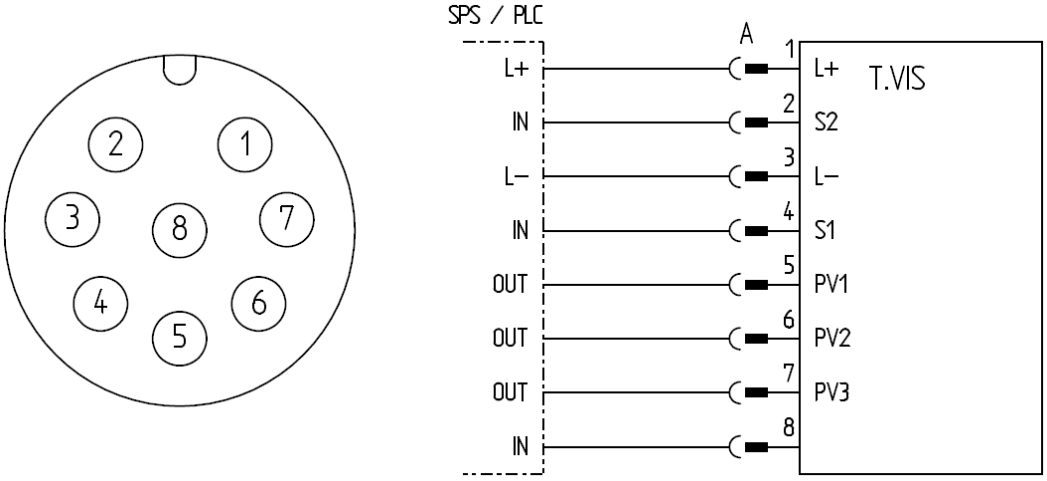

Fig.17: 8-pin M12 connector A-coded: device connector and view of male connector

1	L+	U_V L+24V DC supply voltage
2	S2	Feedback of actuated position*
3	L-	U_V L- reference potential
4	S1	Feedback of non-actuated position*
5	PV1	Actuation of solenoid valve Y1
6	PV2	Actuation of solenoid valve Y2
7	PV3	Actuation of solenoid valve Y3
8	-	not assigned

*Assignment for green colour variant.

Carry out the following steps:

1. Connect cable via air connector M12/8-pole.

→ Done.

6.4.3 Electrical Wiring of AS-Interface

6.4.3.1 Plug M12 / 5-pin (24.1)

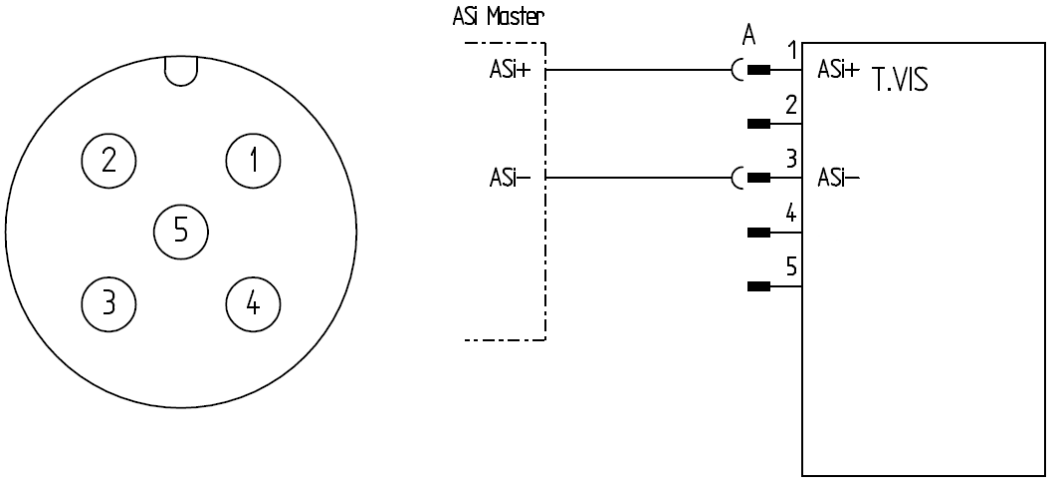

Fig.18: 5-pin M12 connector A-coded: device connector and view of male connector

Corresponding cable sockets part no. 508-027 and 508-028, see .

1	AS-I+
2	Not connected
3	AS-I-
4	Not connected
5	Not connected

Carry out the following steps:

1. Connect cable via air connector M12/5-pole.

→ Done.

6.4.4 Electrical DeviceNet Wiring

6.4.4.1 Plug M12 / 5-pin (24.1)

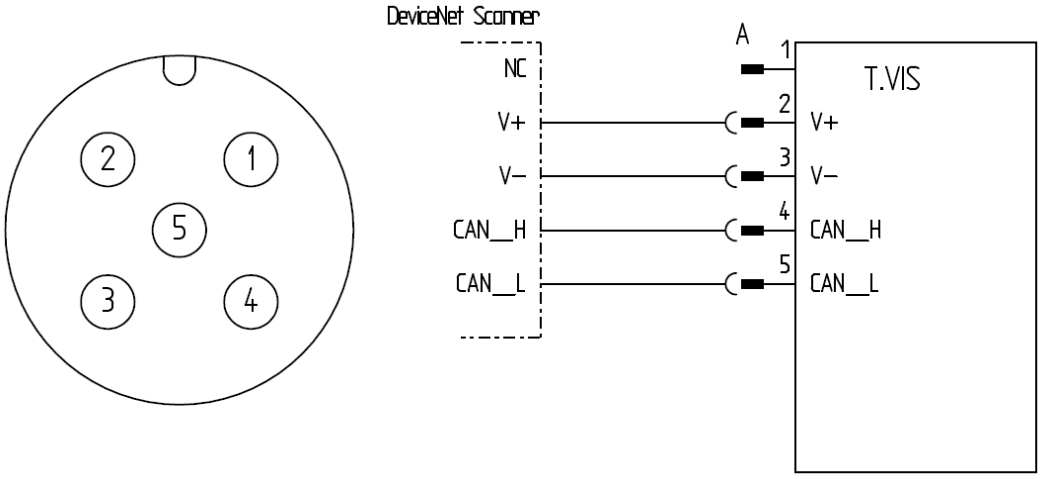

Fig.19: 5-pin M12 connector A-coded: device connector and view of male connector

1	Not connected
2	V+
3	V-
4	CAN_H
5	CAN_L

Carry out the following steps:

1. Connect cable via air connector M12/5-pole.

→ Done.

6.5 Visual Display

6.5.1 Illuminated dome

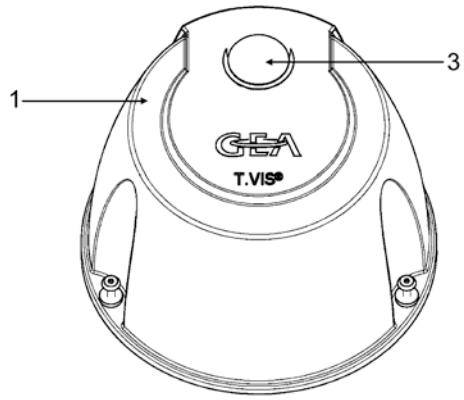

Fig.20

1	Cap
3	Illuminated dome

The following statuses are visualized by the illuminated dome:

- Valve in non-actuated position: green
- Valve in actuated position: yellow
- Valve disk lifting (without LEFF): yellow flashing
- Valve disk VT or double disk DT LEFF: flashing yellow/green (with proximity switch only)
- Valve disk moving to the non-actuated position: flashing green
- Valve disk moving to the actuated position: flashing yellow
- Programming mode active: red
- Error/malfunction: rapidly flashing red
- Default, standard version:
  Control top unprogrammed: flashing 3 times - pause - flashing 3 times - pause
- Default, special version:
  Control top unprogrammed: flashing 2 times - pause - flashing 2 times - pause

There is a power failure if no signal is displayed for more than 5 seconds!

6.5.2 Colour Changeover

The "colour changeover" function allows you to swap the colour from green to yellow or yellow to green for the following visualizations: Valve in non-actuated position, valve in actuated position, moving, valve disk lifting (without LEFF).

Carry out the following steps:

1. Disconnect the control top from the power supply.
2. Press both buttons at the same time and keep them pressed.

3. Switch the power supply back on. After switching on the power supply voltage, continue to press the buttons for another 3 seconds.

→ Done.

Hint!

When the colours are swapped, the feedback signals are also swapped!

6.5.3 Connection Diagram for T.VIS Circuit Board (Bottom)

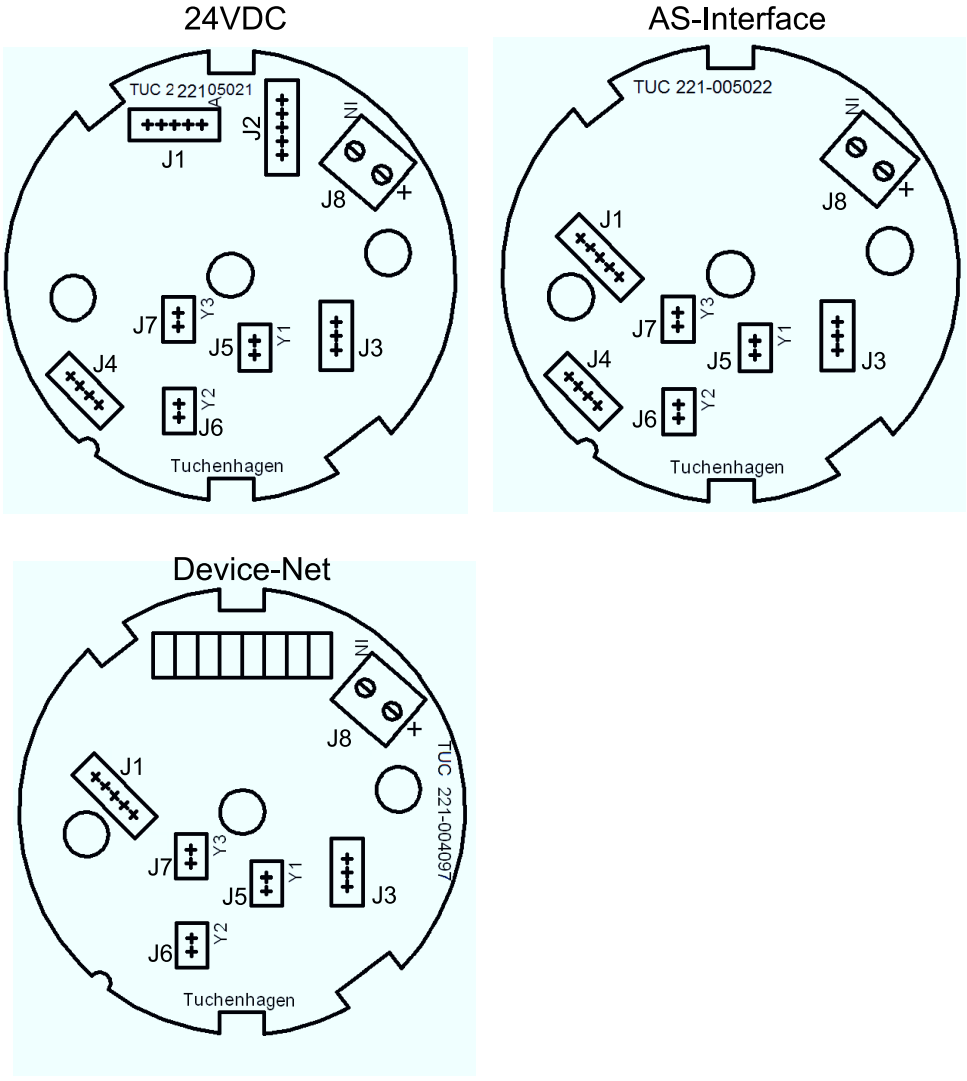

Fig.21

Explanation of the pin assignment			
Plug position	**Connector type**	**Item no. in the Spare Parts List**	**Designation**
J1	PicoBlade 5-pin	24.1	Plug-in connector M12/5-wire/M20
J2	PicoBlade 5-pin	24.1	Plug-in connector M12 / 3-wire/M20 (only with circuit board 24VDC)
J3	PicoBlade 3-pin	9	T.VIS sensor module
J4	PicoBlade 4-pin	Diagnostic connection (not connected during the operation)	
J5	PicoBlade 2-pin	63	Solenoid valve Y1
J6	PicoBlade 2-pin	63	Solenoid valve Y2
J7	PicoBlade 2-pin	63	Solenoid valve Y3
J8	Screw terminal 2-pin	171	Circular connector with cable for sensor in the lantern

6.6 Mounting the Control Top to Different Valves

This chapter describes how the control top is installed and removed on actuators of different valve types. Observe the following notes when doing so.

Notice

The vent plug E2 is a safety element.

If the element is not installed correctly or if the vent is covered, the safety function is no longer guaranteed.

► The installation position of the vent plug E2 must never be pointing vertically upwards.
► The vent plug E2 must never be covered.

6.6.1 Mounting to a VARIVENT Valve

This chapter describes how the control top is installed on VARIVENT single and double-seat valves (also with lifting actuator). The instructions do not apply to installation on VARIVENT double-seat valves type R, T_R with lifting actuator. This installation is described below in the chapter “Installation on VARIVENT double-seat valves wtih lifting actuator type R, T_R”.

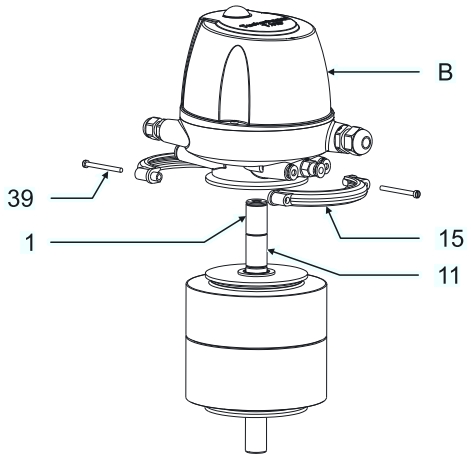

Fig.22

Requirement:

- Pay attention not to kink the air hoses when mounting the control top.

Carry out the following steps:

1. Check that the switch bar (1) is firmly in place. If necessary, tighten using an a/f 13 open end spanner; torque 2 Nm (1.4 lbft).
2. Fit the control top (B) over the switch bar (1) and on the actuator (A.1).
3. Tighten the clamps (15) and screws (39) to a torque of 1Nm (0.7 lbft).
4. Align the pneumatic and electrical connections in accordance with the valve block configuration.
5. Close the air connection Y1 with a sealing plug (23) since the control top T.VIS A-15/Class I, Div. 2 has an inner air duct.

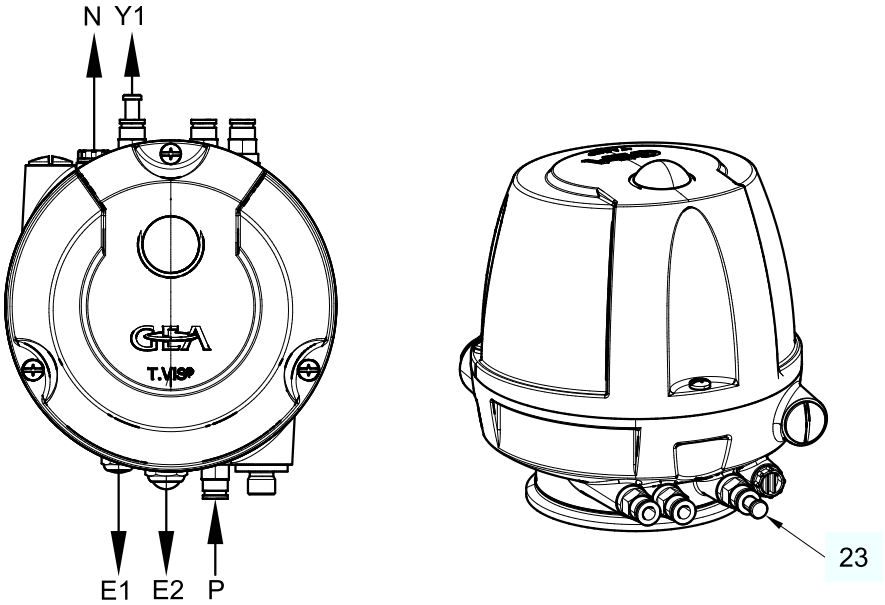

Fig.23

6. Perform commissioning, see Chapter 6, Page 38 and Chapter 7, Page 64.

→ Done.

6.6.2 Installation on VARIVENT Double-Seat Valves with Lifting Actuator Type R, T_R

Requirement:

- Pay attention not to kink the air hoses when mounting the control top.

Carry out the following steps:

1. Insert sliding piece (1.2) with flat-head screwdriver, 12 mm, into piston rod A 4.1 of the actuator A.4, torque 2 Nm (1.4 lbft).

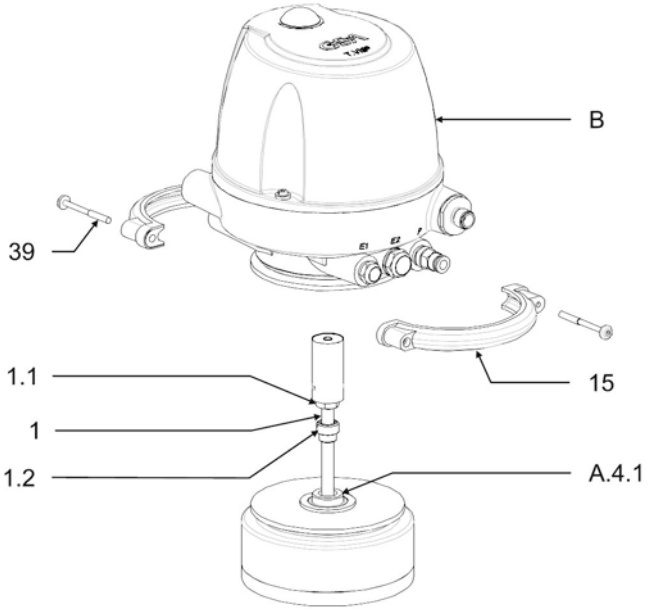

Fig.24

2. Insert the switch bar (1) through the sliding piece into the piston rod A 4.1 and tighten with an open end spanner (a/f 13) at 1.1 (22 Nm).
3. Fit the control top (B) over the switch bar (1) and on the actuator.
4. Tighten the clamps (15) and screws (39) to a torque of 1 Nm (0.7 lbft).
5. Align the pneumatic and electrical connections in accordance with the valve block configuration.
6. Close the air connection Y1 with a sealing plug (23) since the control top T.VIS A-15/Class I, Div. 2 has an inner air duct.

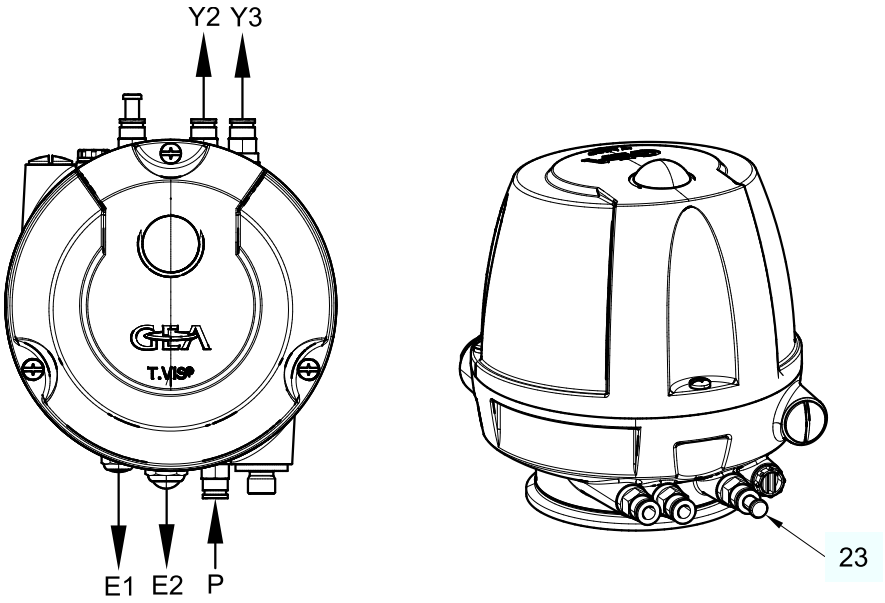

Fig.25

7. Perform commissioning, see Chapter 6, Page 38 and Chapter 7, Page 64.

→ Done.

6.6.3 Mounting to a Butterfly Valve T-smart 8000

Requirement:

- Pay attention not to kink the air hoses when mounting the control top.

Carry out the following steps:

1. Fit the bearing (201) into the locking screw (198).

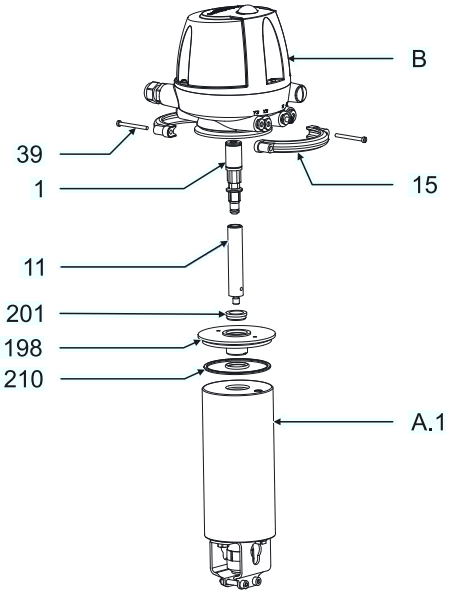

Fig.26

2. Fit the O-ring (210).
3. Use a face spanner to screw the locking screw (198) into the actuator (A.1).

4. Screw the switch bar (1) together with switch bar (11) into the actuator, torque 2 Nm.
5. Fit the control top (B) over the switch bar (1) and on the actuator.
6. Tighten the clamps (15) and screws (39) to a torque of 1 Nm (0.7 lbft).
7. Align the pneumatic and electrical connections in accordance with the valve block configuration.
8. Close the air connection Y1 with a sealing plug (23) since the control top T.VIS A-15/Class I, Div. 2 has an inner air duct.

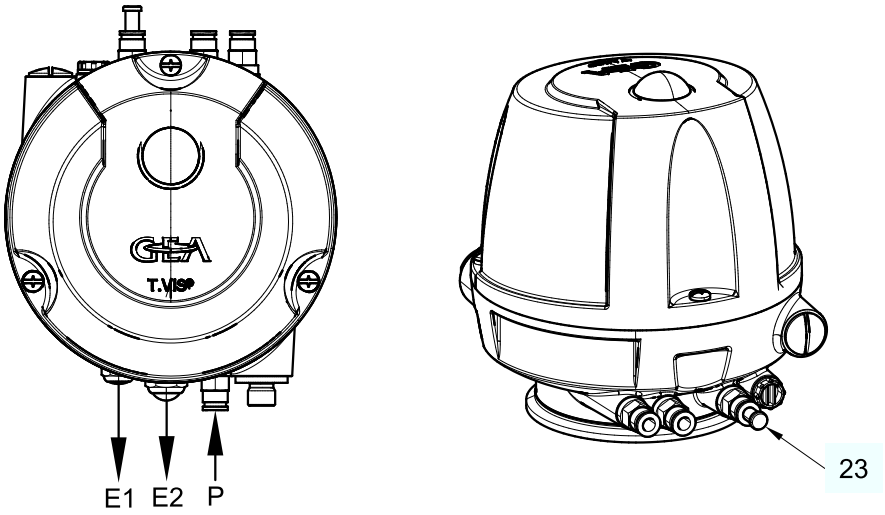

Fig.27

9. Perform commissioning, see Chapter 6, Page 38 and Chapter 7, Page 64.

→ Done.

6.6.4 Mounting to a Butterfly Valve T-smart 7 and a Mixproof Butterfly Valve T-smart 9

Requirement:

- Pay attention not to kink the air hoses when mounting the control top.

Carry out the following steps:

1. Screw the switch bar (240) into the actuator and secure it at a torque of 22 Nm (16 lbft).

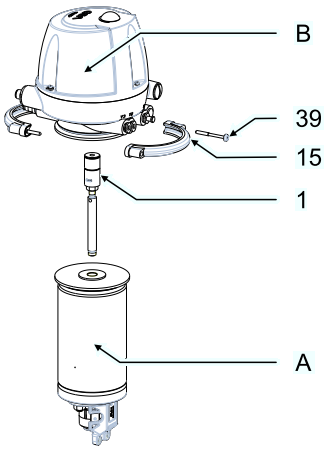

Fig.28

2. Fit the control top (B) over the switch bar (240) and on the actuator.
3. Tighten the clamps (15) and screws (39) to a torque of 1 Nm (0.7 lbft).
4. Align the pneumatic and electrical connections in accordance with the valve block configuration.
5. Close the air connection Y1 with a sealing plug (23) since the control top T.VIS A-15/Class I, Div. 2 has an inner air duct.

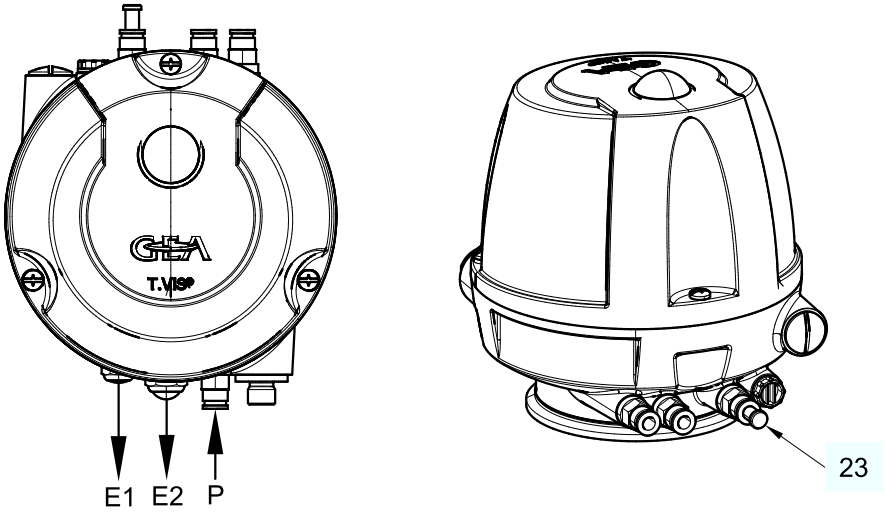

Fig.29

6. Perform commissioning, see Chapter 6, Page 38 and Chapter 7, Page 64.

→ Done.

6.6.5 Mounting to ECOVENT Valves N_ECO and W_ECO

Requirement:

- Pay attention not to kink the air hoses when mounting the control top.

Carry out the following steps:

1. Complete the T.VIS mounting base (198) with O-rings (29, 101) and a plain bearing (202).

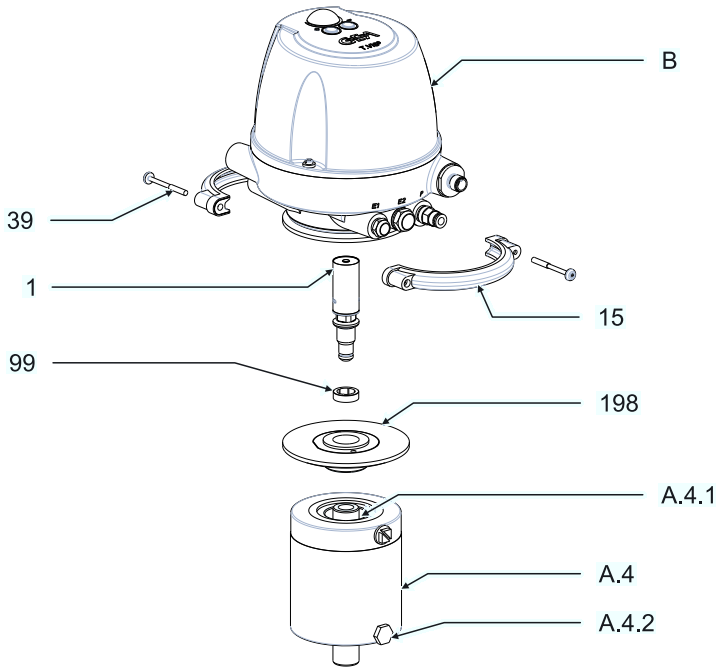

Fig.30

2. Screw the mounting base (198) into the actuator (A4) and tighten using a face spanner.
3. Screw the switch bar (1) with ring (99) into the piston rod (A4.1) and tighten by applying an a/f 13 open end spanner at (1.1); torque 2 Nm (1.4 lbft).
4. Fit the control top (B) over the switch bar (1) and on the actuator. 5. Tighten the clamps (15) and screws (39) to a torque of 1 Nm (0.7 lbft).
5. Align the pneumatic and electrical connections in accordance with the valve block configuration.
6. Due to the internal air guiding of the control top T.VIS A-15/Class I, Div. 2 (B), the connection A 4.2 on the actuator and air hose Y1 (23) on the steering top are closed.

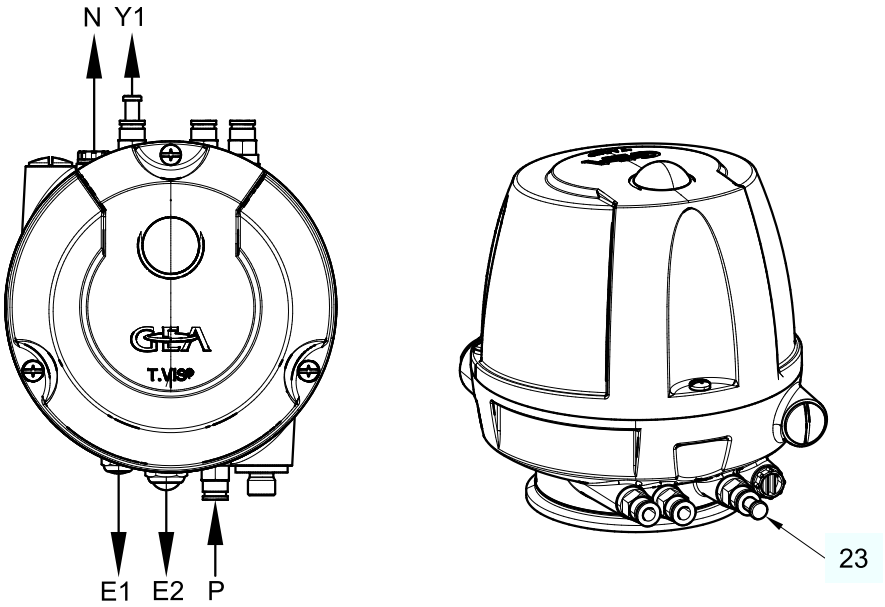

Fig.31

7. Perform commissioning, see Chapter 6, Page 38 and Chapter 7, Page 64.

→ Done.

6.6.6 Mounting to VESTA Valve H_A/M

Requirement:

- Pay attention not to kink the air hoses when mounting the control top.

Carry out the following steps:

1. Complete the T.VIS mounting base (198) with O-rings (29, 101) and a plain bearing (202).

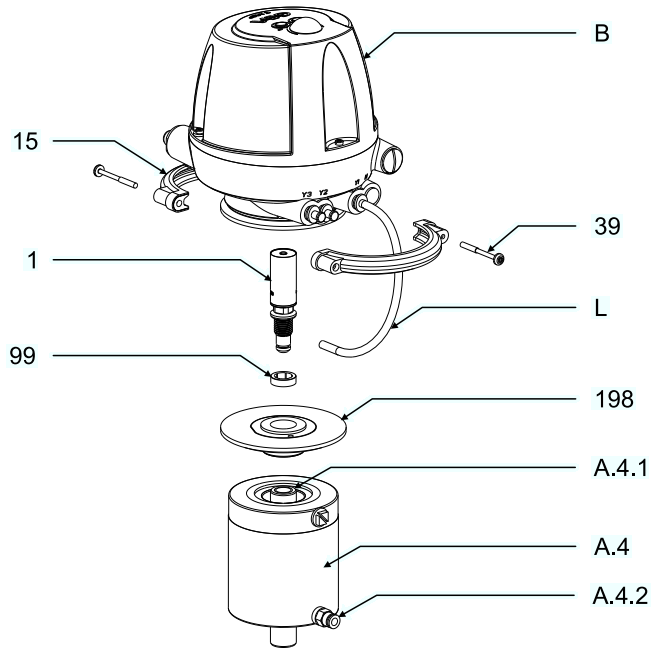

Fig.32

2. Screw the mounting base (198) into the actuator (A4) and tighten using a face spanner.
3. Screw switch bar (1) with ring (99) into the piston rod (A4.1) and tighten with open-end wrench SW 13, torque 2 Nm (1.4 lbft).
4. Fit the control top (B) over the switch bar (1) and on the actuator.
5. Tighten the clamps (15) and screws (39) to a torque of 1 Nm (0.7 lbft).
6. Align the pneumatic and electrical connections in accordance with the valve block configuration.
7. As internal air guiding is not possible on VESTA valves, connect the air connection (Y1) on the control top to connection A4.2 on the actuator with an air hose (L).
8. Perform commissioning, see Chapter 6, Page 38 and Chapter 7, Page 64.

→ Done.

6.6.7 Mounting to VESTA Valve H_A/M

Requirement:

- Pay attention not to kink the air hoses when mounting the control top.

Carry out the following steps:

1. Place O-rings (139.2) in the adapter (139) at the bottom side of the thread (139.1).

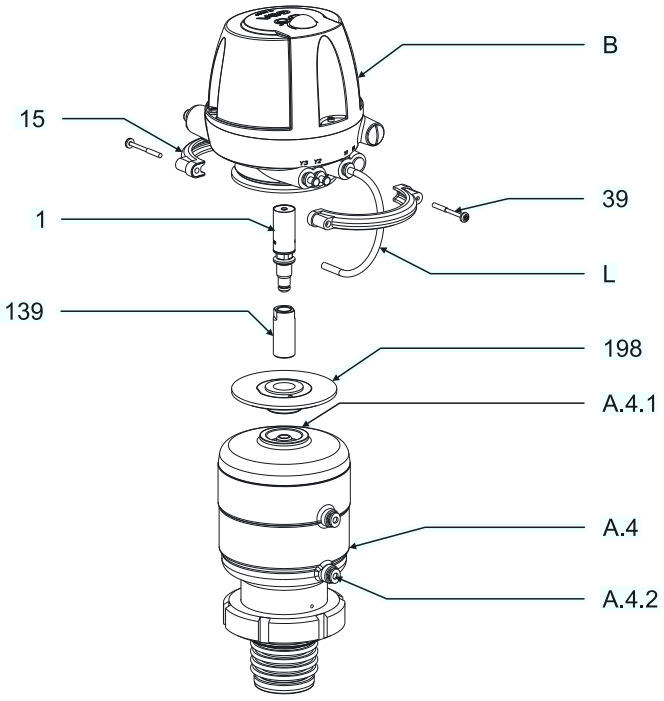

Fig.33

2. Screw the adapter into the actuator (A4.1) and tighten using an a/f 17 open end spanner.
3. Complete the T.VIS mounting base (198) with O-rings (29, 101) and a plain bearing (202).

4. Screw the mounting base (198) into the actuator (A4) and tighten using a face spanner.
5. Screw the switch bar (1) into the adapter (139) and tighten using an a/f 13 open end spanner; torque 2 Nm (1.4 lbft).
6. Fit the control top (B) over the switch bar (1) and on the actuator.
7. Tighten the clamps (15) and screws (39) to a torque of 1 Nm (0.7 lbft).
8. Align the pneumatic and electrical connections in accordance with the valve block configuration.
9. As internal air guiding is not possible on VESTA valves, connect the air connection (Y1) on the control top to connection A4.2 on the actuator with an air hose (L).
10. Perform commissioning, see Chapter 6, Page 38 and Chapter 7, Page 64.

→ Done.

6.6.8 Mounting to Valve N_/E or W_/E or STERICOM Valve

Requirement:

- Pay attention not to kink the air hoses when mounting the control top.

Carry out the following steps:

1. Complete the T.VIS mounting base (198) with O-rings (29, 101) and a plain bearing (202).

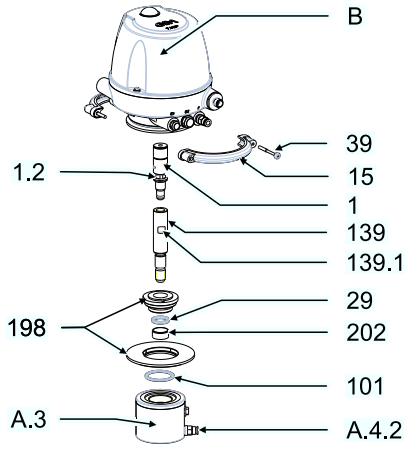

Fig.34

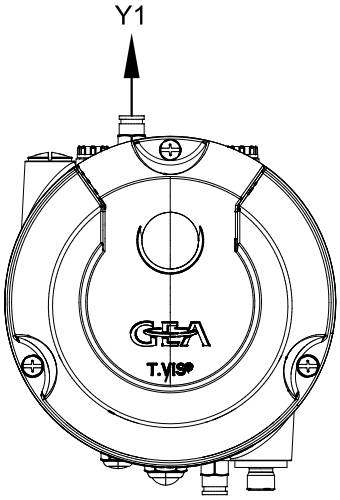

Fig.35

2. Screw the adapter T.VIS E/SHO (139) into the actuator with open-end wrench on wrench surface (139.1) and tighten.
3. Screw the mounting base (198) into the actuator (A.3) via the adapter T.VIS E/SHO (139) and tighten using a face spanner.
4. Screw the switch bar T.VIS (1) into the adapters T.VIS E / SHO (139) and tighten with open-end wrench at (1.2), torque 2 Nm.
5. Place the control top over the T.VIS switch bar (1) and on the actuator.
6. Tighten the clamp connection (15) with screws (39) at a torque of 1 Nm.
7. Align the pneumatic and electrical connections in accordance with the valve block configuration.

   ! As internal air guiding is not possible on these valve types, connect the air connection (Y1) on the control top to connection (A.4.2) on the actuator with an air hose (L).
8. Perform commissioning, see Chapter 6, Page 38 and Chapter 7, Page 64.

→ Done.

6.6.9 Mounting to a T-smart Single-Seat and Double-Seal Valve

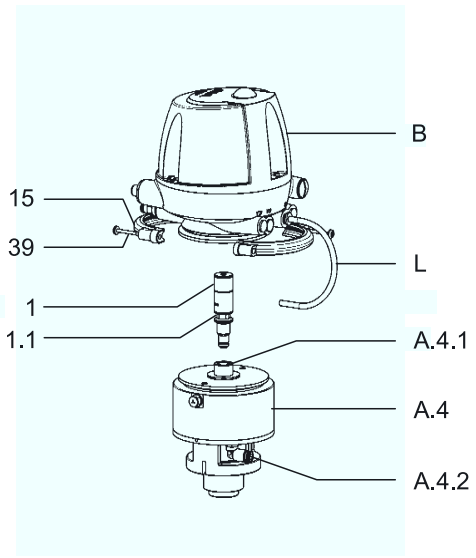

Fig.36

Requirement:

- Pay attention not to kink the air hoses when mounting the control top.

Carry out the following steps:

1. Screw the switch bar (1) into the piston rod A4.1 and tighten with open-end wrench SW13 at (1.1), torque 2 Nm.
2. 2. Fit the control top (B) over the switch bar (1) and on the actuator (A.4).
3. 3. Tighten the clamp connection (15) and screws (39) to a torque of 1 Nm.
4. 4. Align the pneumatic and electrical connections in accordance with the valve block configuration.

   ! Internal air guiding is not possible on these valve types. Therefore connect the air connection (Y1) on the control top and the connection (A.4.2) on the actuator to the air hose (L).
5. Perform commissioning, see Chapter 6, Page 38 and Chapter 7, Page 64.

→ Done.

6.6.10 Fitting to an ASEPTOMAG Valve

Requirement:

- Pay attention not to kink the air hoses when mounting the control top.

Carry out the following steps:

1. Place the T.VIS adapter plate (M), with O-rings (M1), on the actuator (A.4) and secure it with four M5 screws (M.2).

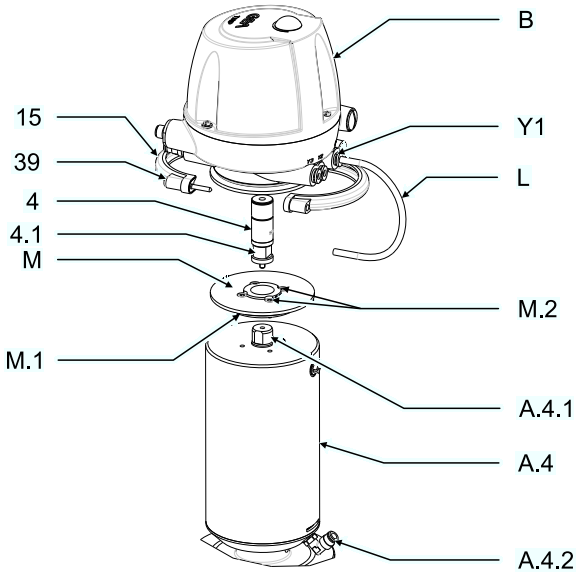

Fig.37

2. Screw the switch bar (4) Mat. 221-589.87, into the piston rod (A4.1) and tighten with open-end wrench SW 13, torque 3 Nm.
3. Fit the control top (B) over the switch bar (4) and on the actuator.
4. Tighten the clamp connection (15) and screws (39) to a torque of 1 Nm.
5. Align the pneumatic and electrical connections in accordance with the valve block configuration. ! On ASEPTOMAG valves, internal air guiding is not possible. Therefore connect the air connection (Y1) on the control top and the connection (A.4.2) on the actuator to the air hose (L).
6. Connect the pneumatic hose, or 2-3 hoses for valves with seat lifting, in accordance with the hose connection diagram for the valve.
7. Perform commissioning, see Chapter 6, Page 38 and Chapter 7, Page 64.

→ Done.

6.6.11 Replacing Control Tops

When replacing the control top observe the following warning note:

⚠ Caution!

Collision of the switch bar with the pneumatic block

If a valve with the wrong type of switch bar is used, there is a risk of injury as the switch bar can damage the pneumatic block.

► When replacing a predecessor model with a control top T.VIS A-15/Class I, Div. 2 the switch bar must always be replaced!

7 Start-up

7.1 Safety precautions

Initial commissioning

For initial commissioning, the following principles apply:

- Take protective measures against dangerous contact voltages in accordance with pertinent regulations.
- The control top must be completely assembled and correctly adjusted. All screw connections must be securely tightened. All electrical cables must be installed correctly.
- Reliably secure machine parts which have already been connected against inadvertently being switched on.
- After conversion of the control top, residual risks must be reassessed.

Commissioning

For commissioning, the following principles apply:

- Only allow properly qualified staff to set the control top into operation.
- Make sure all connections are properly established.
- The safety devices for the control top must be complete, fully functional and in perfect condition. Check the function before starting any work.
- Check safety lock on electrical connector M12 for correct function. Use only blanking plates with approval for class I Div.2 Group A, B, C, D!
- When the control top is switched on, the danger zones must be free.
- Remove any liquids that have escaped without leaving residues.

7.2 Commissioning – Control Top without Solenoid Valves

Activating the Control Top

Once the control top has been properly mounted on the valve and the electrical connections have been established correctly, commissioning can be carried out.

Requirement:

- The process valve must be in the safety position, i.e. an external solenoid valve must not be actuated.

Carry out the following steps:

1. Check the function of the external solenoid valve.
2. Switch on the power supply.
3. Press the relevant buttons to switch to programming mode, see Section 8.3, Page 70.
4. Wait at least 5 seconds after starting the programming function before activating the external solenoid valve and keeping it activated until the process valve has reliably reached its actuated end position.

5. Deactivate the solenoid valve. During this period, the illuminated dome is lit red.

   → After completion of end position programming, the colours in the illuminated dome change cyclically. Here you can select switching point tolerances and attenuations which deviate from the factory setting, see Section 8.3, Page 70.

   → If no selection is made within 30 seconds, the setting last selected is automatically adopted. The process valve moves to the non-actuated position, which is visualized by a steady light in the selected colour.

→ The control top is activated.

Hint!

When the colours are swapped, the feedback signals are also swapped!

Checking the Control Top

Carry out the following steps:

1. Activate and deactivate the external solenoid valve in order to check the proper function of the T.VIS feedback signals.

→ This completes commissioning.

7.3 Commissioning – Control Top with Solenoid Valves

Activating the Control Top

Once the control top has been properly mounted on the valve and the electrical connections have been established correctly, commissioning can be carried out. Since the T.VIS A-15/Class I, Div. 2 detects its solenoid valve fitting and therefore requires corresponding process valve conditions, the so-called special default must selected prior to SETUP in the event of a different.

Notice

Solenoid valve Y3 for the main stroke of an external process valve is connected.

The main stroke of the external process valve is briefly activated during the SETUP.

► Only carry out the SETUP when the pipe is empty.

Carry out the following steps:

1. Switch on the control air supply.
2. Check the valve function by activating the solenoid valves:

   → Switch on the solenoid valves in the order Y1, Y2 and Y3 (if fitted) using the manual operating element on the solenoid valve: Use a screwdriver to turn the screw (S) 0 in direction 1.

→ Switch all of the solenoid valves off again one after the other in the order Y1, Y2 and Y3 (if fitted): use a screwdriver to turn the screw (S) in direction 0.

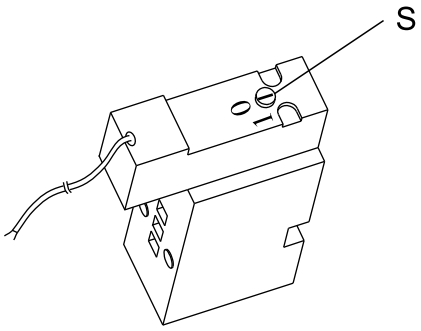

Fig.38

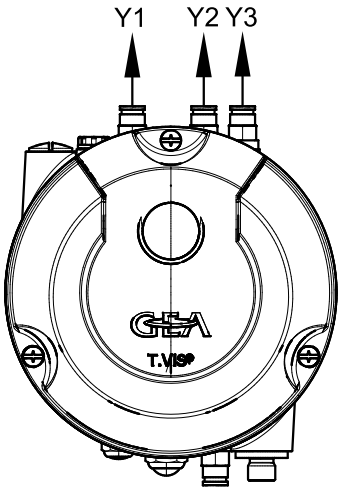

Fig.39

→ Further information about Y1/Y2/Y3: seeSection 6.3, Page 38.

3. Switch on the power supply.
4. Press the relevant buttons to switch to programming mode, see Section 8.3, Page 70.

   → While the programming routine runs automatically, the solenoid valves in the control top are activated and deactivated, which causes the process valve to automatically move to the positions in succession. During this period, the illuminated dome is continuously lit red. After completion of end position programming, the colours in the illuminated dome change cyclically.

   → In deviation from the factory setting you can select switching point tolerances, attenuations and the LEFF function (only if the valve is LEFF compatible, i.e. double-seat valve with lifting actuator), see Section 8.3, Page 70.

   → If no selection is made within 30 seconds, the setting last selected is automatically adopted and visualized in accordance with the colours selected.

→ The control top is activated.

Checking the Control Top

Once the control top has been properly mounted on the valve and the electrical connections have been established correctly, commissioning can be carried out.

Carry out the following steps:

1. Activate the solenoid valves in succession via the PLC in order to check the proper function of the T.VIS feedback signals.

→ This completes commissioning.

Hint!

The solenoid valve can also be activated and deactivated in manual mode using the operating buttons, see Section 8.3, Page 70.

7.4 Service Function

If maintenance must be conducted on a process valve that is fitted with a control top T.VIS A-15/Class I, Div. 2, the valve core must be pulled out of the housing. For this purpose, the valve disk pretension of the process valve must be relieved by actuating the main actuator. This is possible with the service function, see “Operating overview” .

Another option with the hood removed is the manual override on the solenoid valve Y1, see “Control top with solenoid valves” .

7.5 Initiator in the lantern

Hint!

The electrical connection of external initiators is not approved in the control top T.VIS A-15/Class I, Div. 2!

8 Operation and control

8.1 Safety instructions

Dangerous situations during operation can be avoided by safety-conscious and proactive behaviour of the personnel.

For operation, the following principles apply:

- Monitor the component during operation.
- Safety devices must not be changed, removed or taken out of service. Check all safety devices at regular intervals.
- All guards and hoods must be fitted as intended.
- The installation location of the component must always be properly ventilated.
- Structural changes to the component are not permitted. Report any changes to the component immediately to the person in charge.
- Always keep danger zones clear. Do not leave any objects in the danger zone. Only allow persons to enter the danger zone when the machine is de-energized.
- Regularly check that all emergency stop devices are working correctly.

8.2 Settings in Programming Mode

Hint!

The use of external initiators is not approved!

Setting the Position Tolerance for the Main Stroke

If the tolerance is not set in accordance with the intended purpose, this can result in malfunctions of the valve. GEA Tuchenhagen will not accept any liability for damage resulting from improper setting: the risk lies entirely with the operator of the facility.

Tolerance	Size	Setting for
Tolerance 1	0.3 mm	Valves with bellows; not for ASEPTOMAG valves
Tolerance 2	0.7 mm	Seat valves (factory setting)
Tolerance 3	1.0 mm	Valves with logic element NOT Control air for spring-side power assistance and ASEPTOMAG valves
Tolerance 4	2.0 mm	Butterfly valves

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 Tuchenhagen recommends the factory setting without signal attenuation. GEA Tuchenhagen will not accept any liability for damage resulting from the use of signal attenuation. The risk lies entirely with the operator of the facility.

Setting the LEFF Function

The LEFF function achieves steady pulsing (opening and closing) of the valve disks during the typical lifting operation for cleaning the leakage cavity on mixproof valves. For this purpose, solenoid valve Y2 is actuated by the PLC.

When the LEFF function is used on valve types D or B, a lifting stroke of 1.2 to 1.4 must be set in the lifting actuator; also refer to the operating instructions for the mixproof valve types D and B.

LEFF activation	
Off	Factory setting
Valve disk and double disk	Not approved!
Valve disk	For mixproof valves with lifting actuator and solenoid valve Y2
Double-disc	Not approved!

Semi-Automatic SETUP

In the event that SETUP should be required while a process is running that does not allow activation of the relevant valve, a semi-automatic SETUP can be performed.

This makes it possible after the replacement of a control top to automatically detect the defined rest position of a process valve, whereas the end position is only approached and detected by the next process step. If semi-automatic SETUP is activated, the production process can be continued without any danger to the product. Monitoring of the valve is still ensured.

8.3 Operating Overview

Hint!

LEFF activation only approved for bottom valve disk!

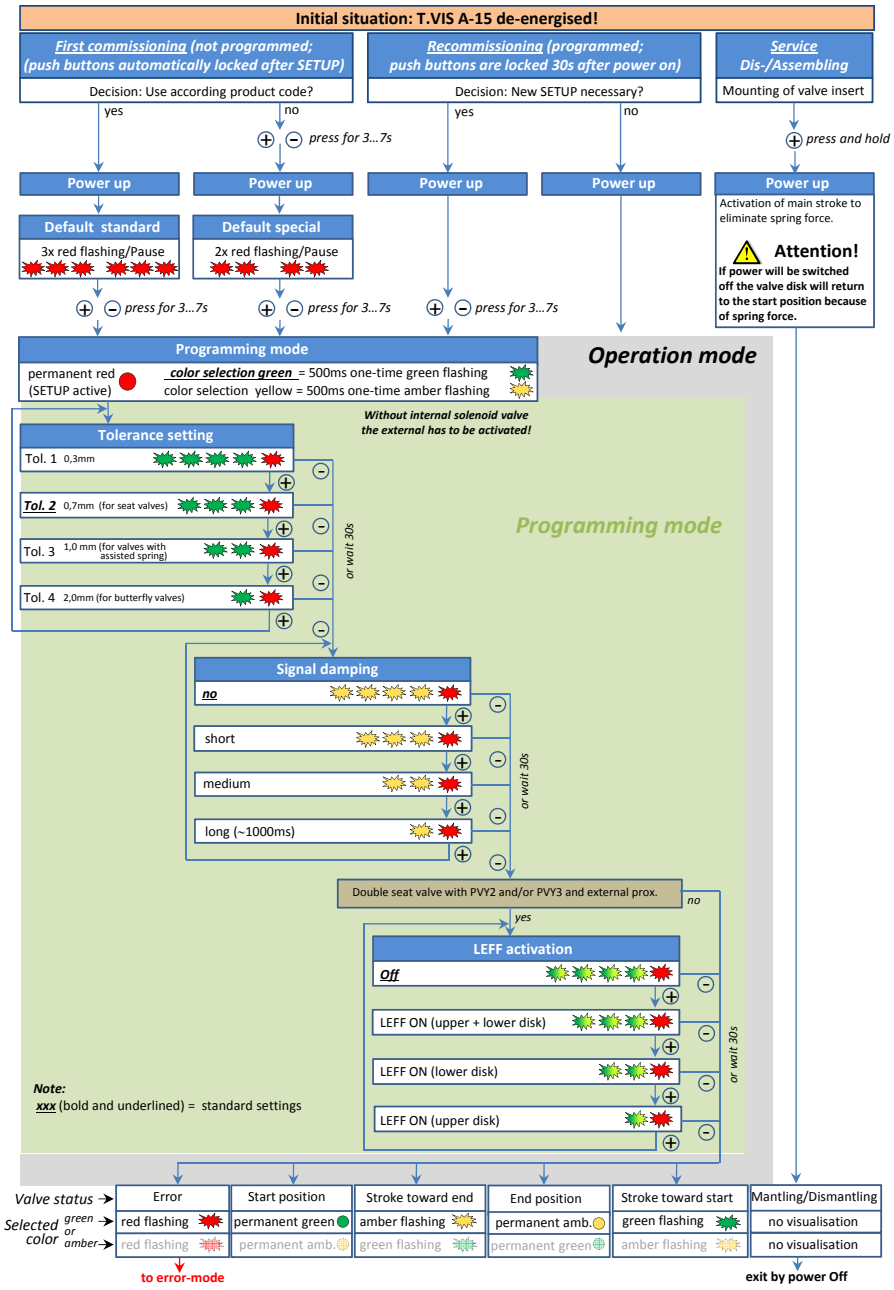

Fig.40

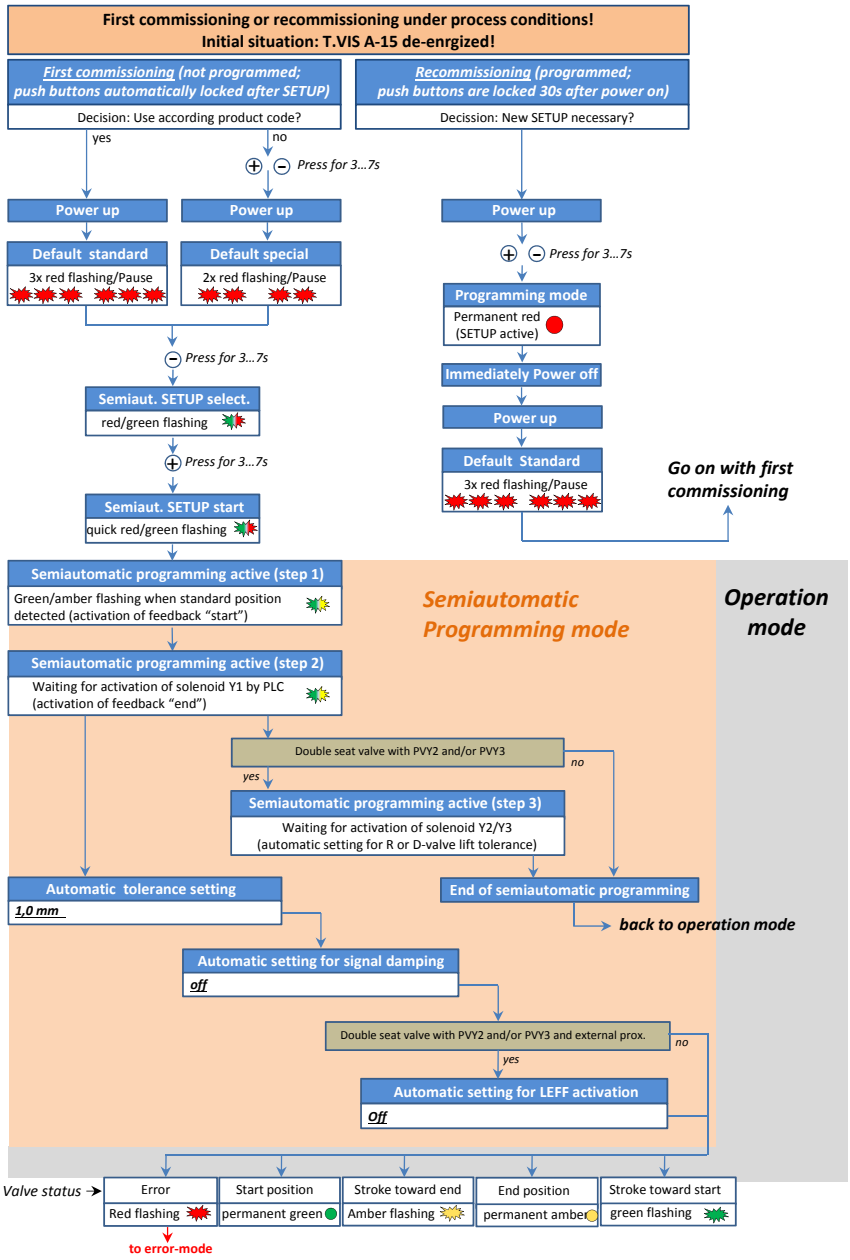
First commissioning or recommissioning under process conditions!
Initial situation: T.VIS A-15 de-enrgized!
First commissioning (not programmed; push buttons automatically locked after SETUP)
Recommissioning (programmed; push buttons are locked 30s after power on)
Decision: Use according product code?
Decission: New SETUP necessary?
yes
no
Press for 3...7s
Power up
Power up
Power up
Default standard
3x red flashing/Pause
Default special
2x red flashing/Pause
Press for 3...7s
Programming mode
Permanent red (SETUP active)
Immediately Power off
Power up
Default Standard
3x red flashing/Pause
Go on with first commissioning
Press for 3...7s
Semiaut. SETUP select.
red/green flashing
Press for 3...7s
Semiaut. SETUP start
quick red/green flashing
Semiautomatic programming active (step 1)
Green/amber flashing when standard position detected (activation of feedback "start")
Semiautomatic Programming mode
Operation mode
Semiautomatic programming active (step 2)
Waiting for activation of solenoid Y1 by PLC (activation of feedback "end")
Double seat valve with PVY2 and/or PVY3
no
yes
Semiautomatic programming active (step 3)
Waiting for activation of solenoid Y2/Y3 (automatic setting for R or D-valve lift tolerance)
Automatic tolerance setting
1,0 mm
End of semiautomatic programming
back to operation mode
Automatic setting for signal damping
off
Double seat valve with PVY2 and/or PVY3 and external prox.
no
yes
Automatic setting for LEFF activation
Off
Valve status
Error
Red flashing
Start position
permanent green
Stroke toward end
Amber flashing
End position
permanent amber
Stroke toward start
green flashing
to error-mode

Fig.41

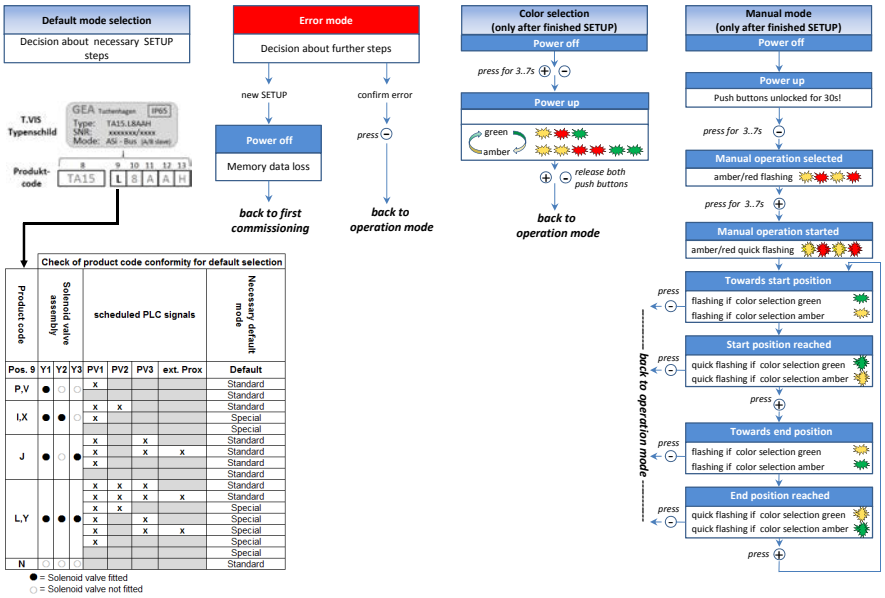
Default mode selection
Decision about necessary SETUP steps
T.VIS Typenschild
Produkt-code
TA15
Error mode
Decision about further steps
new SETUP
confirm error
Power off
Memory data loss
back to first commissioning
press
back to operation mode
Color selection (only after finished SETUP)
Power off
press for 3..7s
Power up
green
amber
release both push buttons
back to operation mode
Manual mode (only after finished SETUP)
Power off
Power up
Push buttons unlocked for 30s!
press for 3..7s
Manual operation selected
amber/red flashing
press for 3..7s
Manual operation started
amber/red quick flashing
Towards start position
flashing if color selection green
flashing if color selection amber
Start position reached
quick flashing if color selection green
quick flashing if color selection amber
Towards end position
flashing if color selection green
flashing if color selection amber
End position reached
quick flashing if color selection green
quick flashing if color selection amber
back to operation mode
Check of product code conformity for default selection
Product code
Solenoid valve assembly
scheduled PLC signals
Necessary default mode
Pos. 9 Y1 Y2 Y3 PV1 PV2 PV3 ext. Prox Default
P,V Standard
I,X Standard
Special
J Standard
Standard
Standard
L,Y Standard
Special
Special
Special
Special
N Standard
● = Solenoid valve fitted
○ = Solenoid valve not fitted

Fig.42

9 Cleaning

9.1 Cleaning

Observe the safety data sheets supplied by the detergent manufacturers.

Only use detergents which are not aggressive towards synthetic materials and the sealing materials used and which are non-abrasive.

Hint!

After all cleaning work, make sure that the control top still complies with all safety instructions in this operating manual and thus that intended use is still given.

10 Maintenance

10.1 Safety instructions

Maintenance and repair

Before carrying out maintenance and repair work on the component's electrical equipment, perform the following steps in accordance with the "5 safety rules":

- Isolate from the power supply
- Take appropriate measures to prevent switch on
- Test absence of voltage
- Earthing and short-circuiting
- Cover or safeguard any adjacent live parts.

For maintenance and repair, the following principles apply:

- Observe the intervals specified in the maintenance schedule.
- Only qualified personnel may carry out maintenance or repair work on the component.
- The component must be switched off and secured against being switched back on before maintenance or repair work. Work may only be started once any residual energy has been discharged.
- Block access for unauthorized persons. Put up notice signs which draw attention to the maintenance or repair work going on.
- Do not climb on the component. Use suitable access aids and working platforms.
- Wear suitable protective clothing.
- Only use suitable and undamaged tools to carry out maintenance work.
- When replacing parts only use approved, fully functional load lifting devices and lifting accessories which are suitable for the intended purpose.
- Before setting the unit back into operation, refit all safety devices as originally provided in the factory. Then check that all safety devices are working correctly.
- Make sure lubricants are used properly.
- Check pipes are firmly secured, also check for leaks and damage.
- Check that all emergency stop devices are working correctly.

Disassembly

For disassembly, the following principles apply:

- Only qualified personnel are allowed to dismantle the component.
- The component must be switched off and secured against being switched back on before it is dismantled. Work may only be started once any residual energy has been discharged.

- Disconnect all power and utility lines.
- Markings, e.g. on lines, must not be removed.
- Do not climb on the component. Use suitable access aids and working platforms.
- Mark the lines (if unmarked) prior to disassembly to ensure they are not confused when re-assembling.
- Protect open line ends with blind plugs against ingress of dirt.
- Pack sensitive parts separately.
- For longer periods of standstill, observe the storage conditions, see .

10.2 Inspections

Checking parts are firmly secured

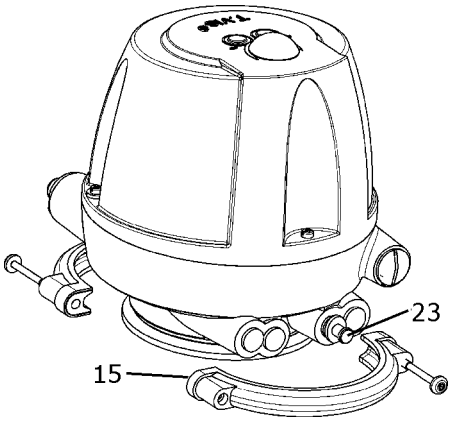

Fig.43

Carry out the following steps:

1. Check that the electrical connectors are properly secured. Check safety lock on the electrical plug-in connector M12 for correct function. Only use locks with approval for Class I Div. 2 Group A, B, C, D!
2. Check that the air hose connections are firmly secured.
3. Check that the clamp (15) is firmly in place.
4. Check that the plug (23) is firmly in place.
5. Check the sound absorber, filter, non-return valve and the exhaust air throttle for soiling.
6. Check the housing for mechanical damage.
7. Check the union nut for the cable glands for a tight fit.
8. Check solenoid valves and optional NOT element for pressure-tight fit.
9. Check warning notice on metal sign for legibility.
10. Check hood and base for firm screws, if necessary tighten all three screws to 2 Nm.

→ Done

10.3 Maintenance intervals

To ensure the highest operational reliability of the magnetic separator, all wearing parts should be replaced at longer intervals.

The actual maintenance intervals can only be determined by the user since they depend on the operating conditions, for instance:

- daily period of use,
- switching frequency,
- type and temperature of the product,
- type and temperature of the cleaning solution,
- ambient conditions.

Maintenance intervals	
Applications	**Maintenance intervals (guideline values)**
Media at temperatures of 60 °C to 130 °C (140 °F to 266 °F)	approx. every 3 months
Media at temperatures of < 60 °C (< 140 °F)	approx. every 12 months

10.4 Removing the Control Top from the Valve

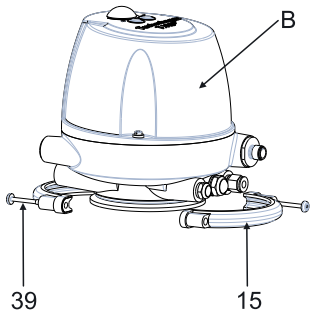

Fig.44

Requirement:

- Make sure that the solenoid valve is not actuated.

Carry out the following steps:

1. Undo the screw connection (39).
   Remove the clamp (15).
   Pull the control top vertically off the valve.
   → The green LED goes out after 5 seconds and the yellow LED flashes.

→ Done

10.5 Dismantling the Control Top into its Components

10.5.1 Variants of the Control Top

The control top can be fitted with:

- 3 solenoid valves (63) and without or with 1 logic element NOT (64) or
- 2 solenoid valves (63) and 1 control plate (65) and without or with 1 logic element NOT (64) or
- 1 solenoid valve (63) and 2 control plates (65) and without or with 1 logic element NOT (64) or
- 1 solenoid valve (63) or
- without solenoid valve with 1 control plate (65).

10.5.2 Opening the hood

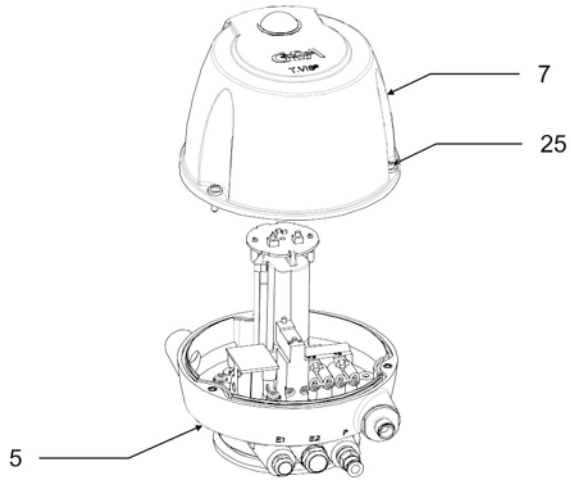

Fig.45

Notice

Electrical voltage and pneumatic pressure

Danger to life

► Switch off the voltage supply and the control air before removing the control top.

Carry out the following steps:

1. Unscrew the 3 screws (25) of the hood (7) and take the hood (7) off the base (5) or fold down using the wire cable connector.

→ Done

10.5.3 Remove the circuit board

Carry out the following steps:

1. Unscrew and remove the screws (77).

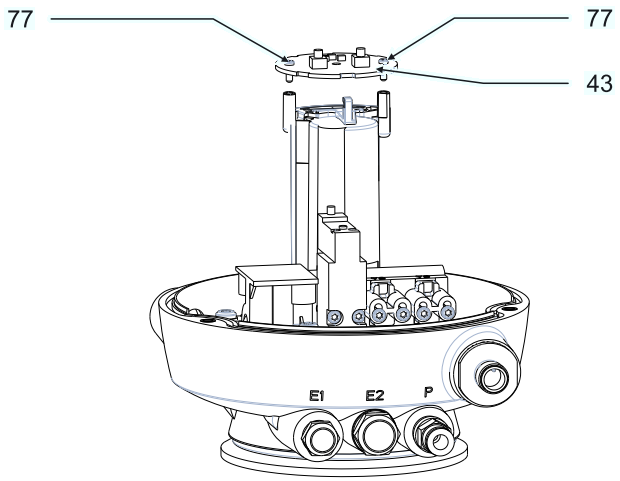

Fig.46

2. Remove all wires from the printed circuit board (43).

→ Done

Hint!

In order to avoid or minimize the possibility of damage from electrostatic discharge:

- Observe the requirements of DIN EN 61340-5-1 and 5-2.
- Be careful not to touch the electronic components!

10.5.4 Install the circuit board

To install the circuit board, observe the wiring diagram for the T.VIS circuit board (underside), see Section 6.5.3, Page 50!

10.5.5 Removing the sensor module (9)

Carry out the following steps:

1. Loosen the screws (57).

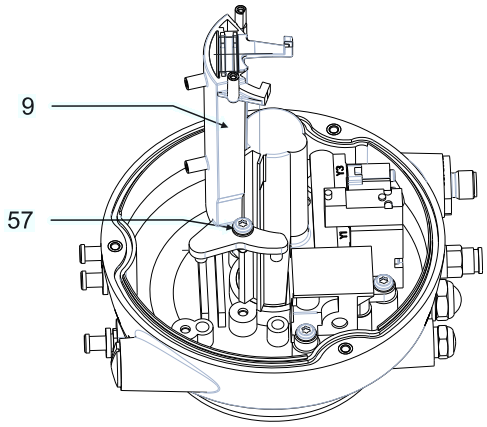

Fig.47

2. Lift the sensor module (9) off the base plate.

→ Done

10.5.6 Removing the logic element NOT (seal pack)

Requirement:

- Logic element NOT is only provided in connection with the pneumatic block T.VIS/NOT!

Carry out the following steps:

1. Loosen the screws (67) and remove logic element NOT (64) with flat gasket and adapter plate (64.1).

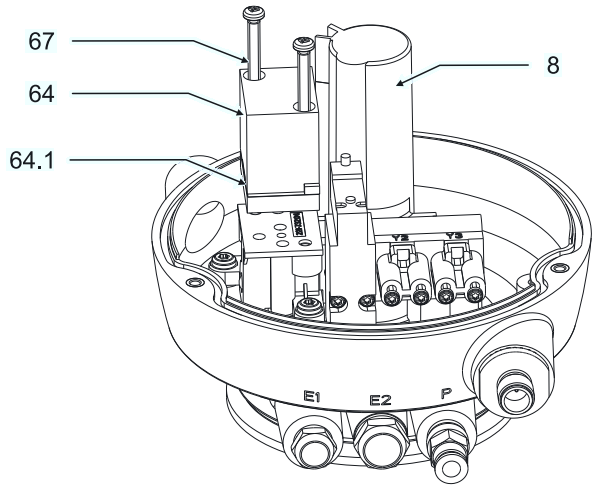

Fig.48

→ Done.

10.5.7 Fitting the Logic Element NOT (Sealing Package)

Requirement:

- Logic element NOT is only provided in connection with the pneumatic block T.VIS/NOT!

Carry out the following steps:

1. Fit the logic element NOT (64) in the reverse order.

   ! Place the logic element NOT, with adapter plate and seal, on the pneumatic block (8) as shown in the illustration.

   ! When inserting and tightening the screws, be careful to use existing threads.

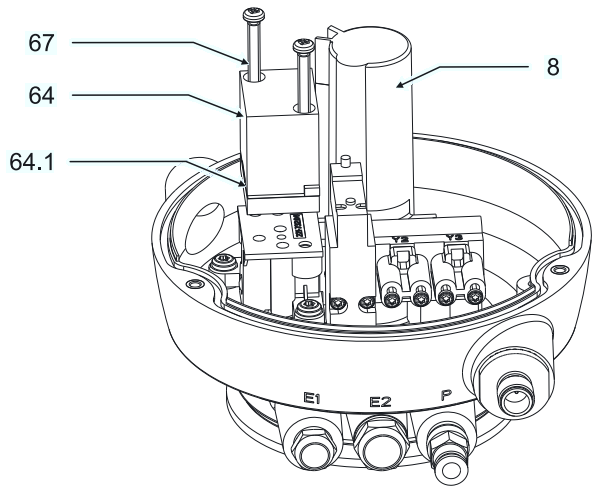

Fig.49

→ Done

Hint!

Faulty assembly may cause malfunctions, as the spring force backup is then not given.

10.5.8 Removing the Solenoid Valves and the Control Plate

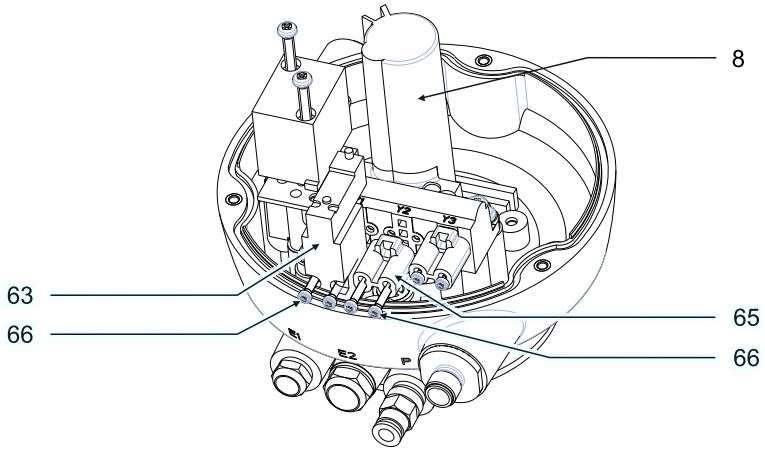

Fig.50

Requirement:

- Pay attention to the correct assignment of cables between the solenoid valves and the circuit board (9) – solenoid valve Y1 must be connected to terminal Y1; solenoid valve Y2 to terminal Y2 and solenoid valve Y3 to terminal Y3.
- Use only solenoid valves as listed in the chapter "Technical data", see Chapter 5, Page 27.

Warning!

Long switch-on time and high ambient temperature.

Risk of burns from the solenoid valve

► Allow to cool before dismantling.

Carry out the following steps:

1. Disconnect the electrical connection from the solenoid valve to the Pico Blade on the circuit board (43).
2. Loosen the screws (66) and remove the solenoid valve (63) from the pneumatic block (8).
3. Loosen the screws (66) and remove the control plates (65) from the pneumatic block (8).

→ Done

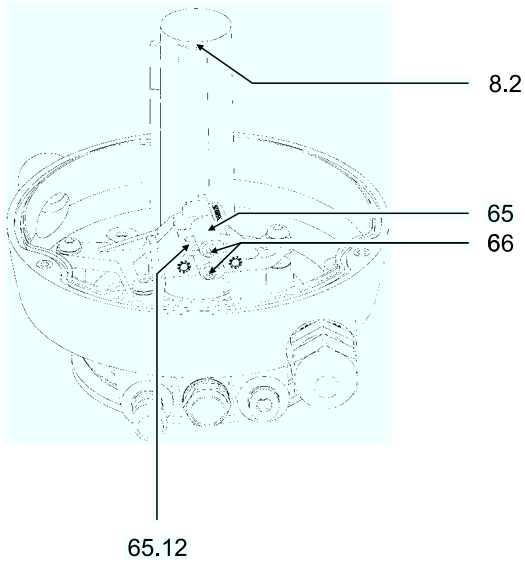

Fig.51

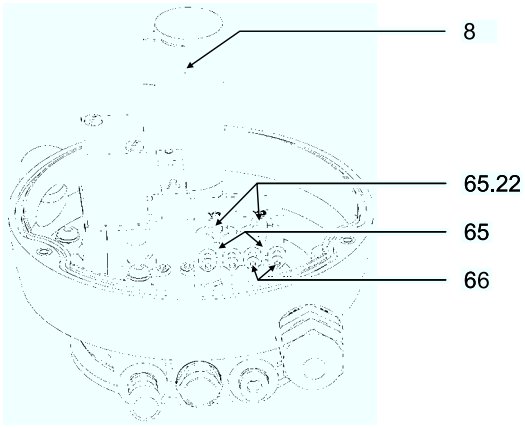

Fig.52

Hint!

When using the pneumatic block (8.2) with 1 valve plate (65), the groove (65.12) must be fitted on the left side.

The two screws (66) are located in the left mounting holes.

When using the pneumatic block (8) with 1 or 2 control plates (65), the groove (65.22) must be mounted upward.

The screws (66) are located in the lower mounting holes.

Hint!

For ASEPTOMAG valves, use special types of the pneumatic block!

Tighten the screws (66) at a tightening torque of 0.8 Nm (0.5 lbft).

10.5.9 Removing the pneumatic block

Requirement:

- If only the O-rings (42) and (55) must be changed then the solenoid valves (63)/control plate (65) and element NOT (64) can remain on the pneumatic block (8).

Carry out the following steps:

1. Undo the screws (57.1, 57.2).

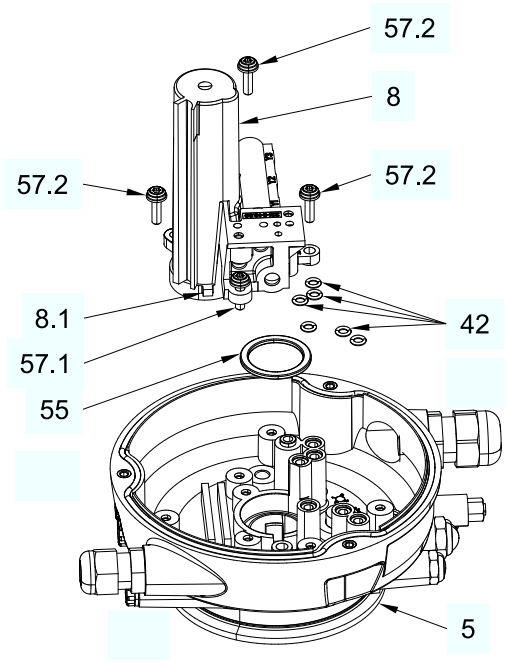

Fig.53

2. Pull off the pneumatic block (8).
3. Change the 6 O-rings (42) of the base (5).
4. Replace the O-ring (55).

→ Done

10.5.10 Fitting the Pneumatic Block

Requirement:

- When fitting the pneumatic block, make sure that it is compatible!
- Insert the journal (8.1) on the pneumatic block into the groove of the base (5)!
- Use the following pneumatic block types on ASEPTOMAG valves:
  - Pneumatic block T.VIS-15/NOT 3PV/ASG material no. 221-646.93
  - Pneumatic block T.VIS-15/ 3PV/ASG material no. 221-646.92

Carry out the following steps:

1. Tighten the screw (57.1): Tightening torque: 1.5 Nm (1.0 lbft).

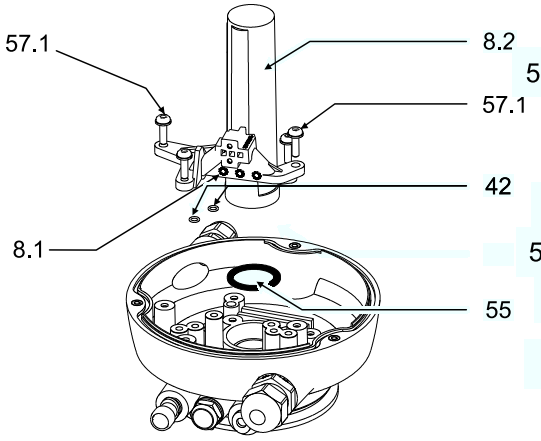

Fig.54

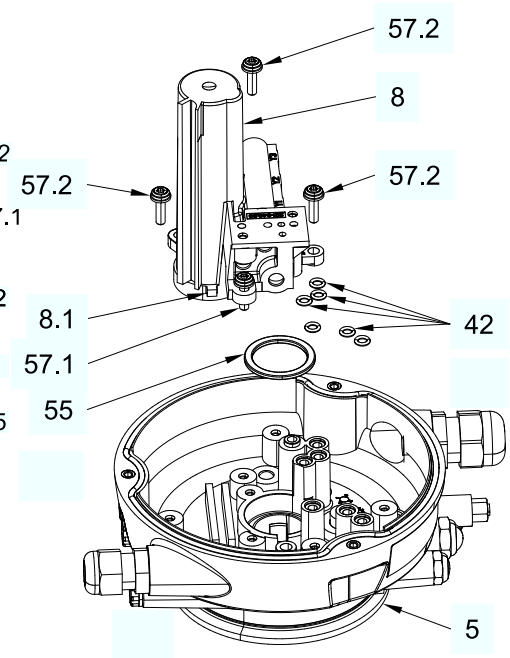

Fig.55

Pneumatic block (8.2) for max. 1 solenoid valve / pneumatic block (8) for max. 3 solenoid valves

2. Tighten the screw (57.2): Tightening torque: 1.5 Nm (1.0 lbft).
3. For other parts to be installed (sensor, circuit board, solenoid valves, control plate, element NOT) see previous pages.

→ Done

10.6 Install pneumatic connections

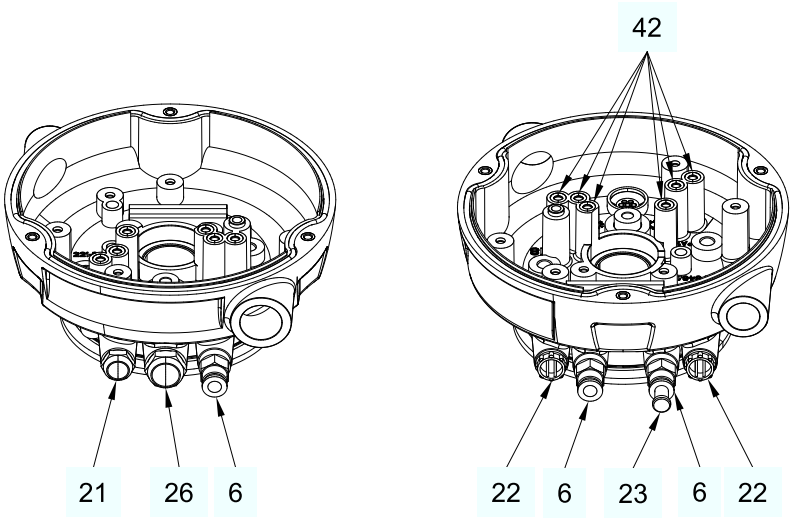

Fig.56

No.	Designation	Tightening torques
6	Screw-in plug connection	2.0 Nm
21	Sound absorber	2.0 Nm
22	Locking screw	0.5 Nm
23	Plug	
26	Sound absorber	2.0 Nm
42	O-ring	

Carry out the following steps:

1. Establish the pneumatic connections in accordance with the codes on the control top.

→ Done

10.7 Maintenance

10.7.1 Replacing the Seals on the Base

On VARIVENT actuators with a vent hole in the actuator cover the control top must be fitted without O-ring (54)!

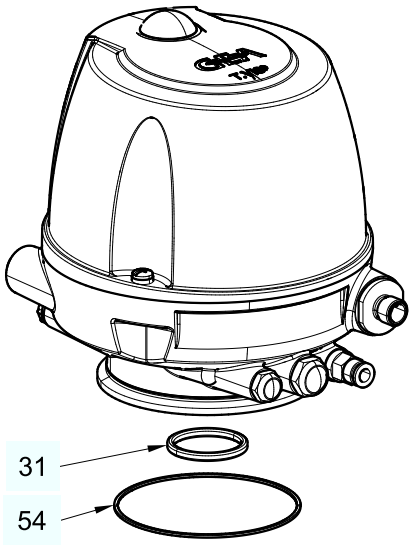

Fig.57

Carry out the following steps:

1. Remove the O-rings (31, 54) and replace.

→ Done

10.7.2 Maintenance of Sound Absorber, Filter, Non-Return Valve and Exhaust Air Throttle

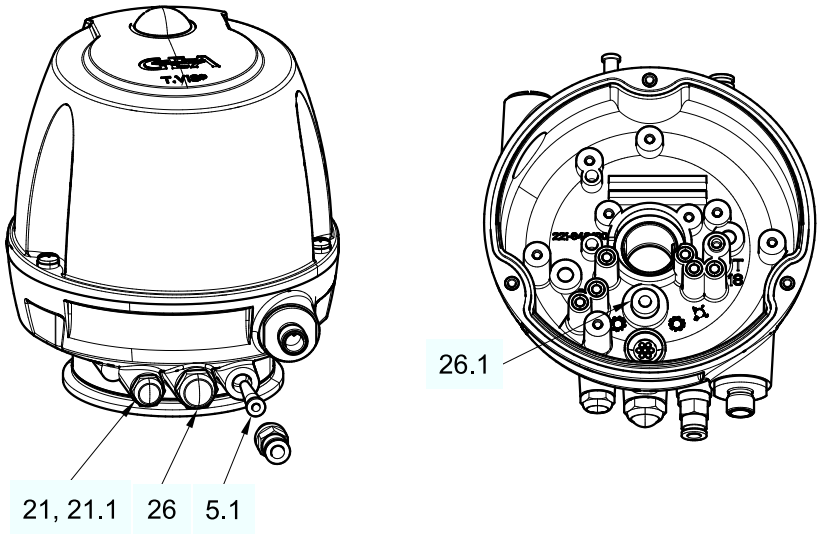

Fig.58

Requirement:

- Use only the throttle (21.1) and sound absorber (26) specified in the spare parts list, see Chapter 13, Page 91.

Carry out the following steps:

1. Check the sound absorber (21, 26), non-return valve (26.1), filter (5.1) and exhaust air throttle (21.1) for free control air leakage and replace if necessary.

   ! The non-return valve (26.1) cannot be replaced.

2. Do not grease the spare parts before fitting them.

Hint!

Only use the control top with warning sign item 10!

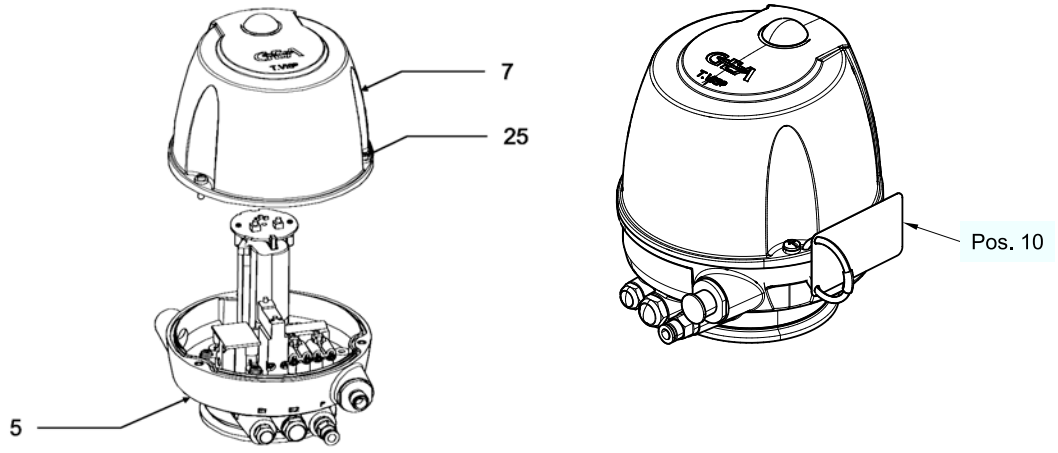

Fig.59

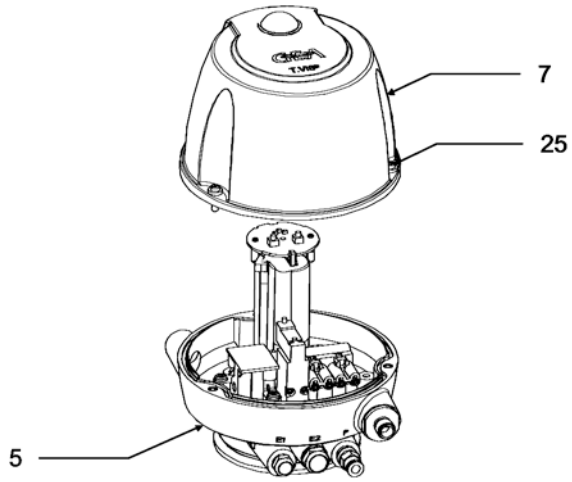

Fig.60

3. Use three screws (25) to fasten the hood (7) on the base (5) to tightening torque 2 Nm.

→ Done

11 Alarms

11.1 Malfunctions and remedies

In the event of malfunctions immediately deactivate the valve and secure it against inadvertent reactivation. Malfunctions may only be remedied by qualified staff, who must observe the safety precautions.

Malfunction, signalling, cause, remedy			
Malfunction	**Signalling**	**Cause**	**Remedy**
Programming is not possible after connecting the supply voltage.	No LED is lit	• No voltage at connector 1 (PINs 1 and 3) • Polarity of PINs 1 and 3 mixed up • Service function active	• Check the electrical connections for correct wiring • Connect PIN 1 and PIN 3 correctly • Disconnect the plug
SETUP cannot be activated	Green or yellow	Time window no longer active	Disconnect from the power supply again and carry out the operation within 30 s
Manual operation cannot be activated	Green or yellow	Time window no longer active	Disconnect from the power supply again and carry out the operation within 30 s
After connecting the supply voltage, green/ yellow is indicated immediately	Green or yellow	Device already programmed at least 1 x	Reprogram in order to adjust to the process conditions: Press the + and - buttons at the same time for 3 ... Actuate 7 s, see restarting, Section 8.3, Page 70

Malfunction, signalling, cause, remedy			
Malfunction	**Signalling**	**Cause**	**Remedy**
Valve opens very slowly	Time exceeded in PLC	Fault in the compressed air supply or filter clogged up	• Clean or replace the filter • Open the supply air throttle further
Programming cannot be completed	Rapidly flashing red light	End positions cannot be reached	
		due to missing control air pressure or	Check the control air pressure: observe the minimum pressure for the process valve indicated on the type plate
		due to incorrectly fitted switch bar	Check and tighten the fitted adapter, see
		Throttle settings are incorrect	Open the supply air throttle further
		The control top configuration is not suitable for the valve, i.e. the number of solenoid valves does not correspond to the number of actuators	Open the exhaust air throttle further
		Air hoses for the lifting actuators mixed up	Use a suitable control top
		The minimum stroke when lifting the valve disk has not been reached.	Correct the lifting stroke

Malfunction, signalling, cause, remedy			
Malfunction	**Signalling**	**Cause**	**Remedy**
No feedback signal is pending at the PLC although one of the end positions has been reached	Red LED flashing	T.VIS A-15/Class I, Div. 2 in factory setting and not yet programmed	Programming according to Operating overview, see Section 8.3, Page 70
	Red LED continuous light	T.VIS A-15/Class I, Div. 2 currently in programming mode	Wait until programming mode ends
	Red LED flashing rapidly	T.VIS A-15/Class I, Div. 2 has a malfunction: Programmed position overrun (possibly from shape change of the bellows) only at 0.3 mm tolerance setting) or LEFF function malfunctioning	Check the bellows and possibly reprogram, see operating overview Section 8.3, Page 70 Acknowledge the fault on the valve by pressing the button or on the PLC by activating the 3 solenoid valves. Afterwards check the LEFF requirements: Air pressure In addition to the LEFF function, pulsing is programmed in the PLC

11.2 Carrying out a Reset – Back to Default Standard

Carry out the following steps:

1. Start the SETUP procedure.
2. Switch off the operating voltage while running the SETUP.

   → LED goes out, loss of data in the memory module.
3. Commissioning the control top, see "Commissioning - control top without solenoid valves" (Section 7.2, Page 64) or "Commissioning - control top with solenoid valves" ().

→ Done.

12 Decommissioning

12.1 Safety instructions

For shutting down, the following principles apply:

- Switch off the compressed air.
- Switch off the component with the main switch.
- Padlock the main switch (if fitted) in the off position to prevent it from being switched back on. The key to the padlock must be deposited with the person responsible until the machine is restarted.
- For longer periods of standstill, observe the storage conditions, see Chapter 4, Page 26.

12.2 Disposal

12.2.1 General notes

Dispose of the component in an environmentally safe manner. Observe the statutory waste disposal regulations applicable at the place of installation.

The component consists of the following materials:

- Metals
- Synthetic materials
- Electronic parts
- Lubricants containing oil and grease

Separate the different materials and dispose of them correctly sorted. Also observe the instructions regarding disposal in the operating instructions for the individual components.

13 Spare parts list - control top T.VIS A-15/Class I, Div. 2

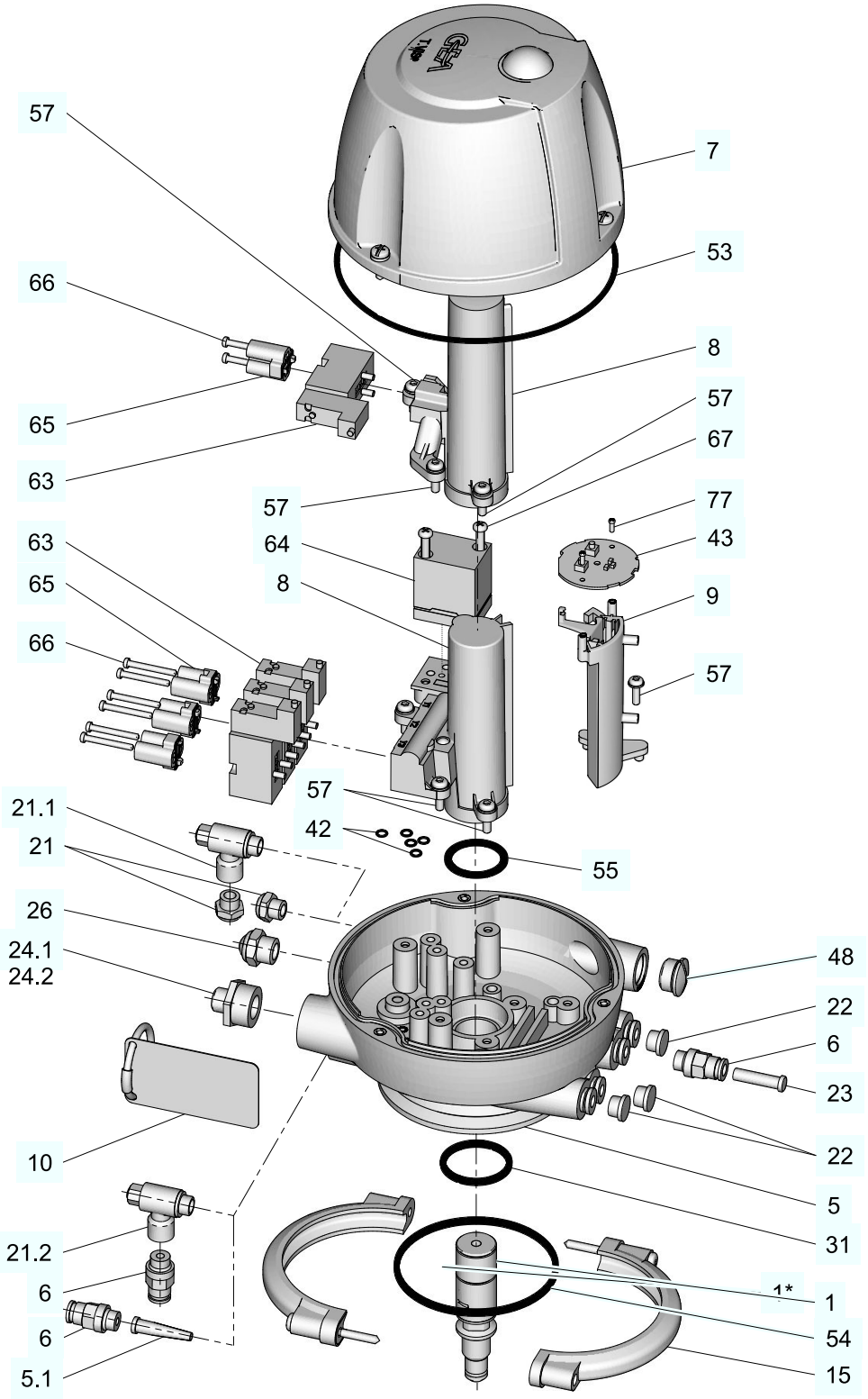

Fig.61

Only use original spare parts since otherwise the type approval in accordance with Approval Clas I; Div.2 Group A, B, C, D will be rendered invalid!					
Control Top T.VIS® A-15/class I, div.2 with cable connection and air connection with metric connections					
			without NOT logic element		**with NOT logic element**
Order code				**TA18R...M/CD**	
			TA18N...M/CD	**TA18I...M/CD**	**TA18V...M/CD**
			TA18P...M/CD	**TA18J...M/CD**	**TA18X...M/CD**
Item	**Designation**	**Material**		**TA18L...M/CD**	**TA18Y...M/CD**
1	For switch bar T.VIS A-15 refer to the separate spare parts list 221ELI010728EN.				
5	Base T.VIS-T18	PA12/L	221-646.100	221-646.100	221-646.100
5.1	Filter	PE	221-003869	221-003.869	221-003869
6	Screw-in plug connection D 6.0	MS CV	933-176	933-176	933-176
7	Hood T.VIS A-15/CD with warning message	PA12/L	221-646.88	221-646.88	221-646.88
8	Pneumatic block 3PV without NOT	PA12/L	--	221-646.89	--
	Pneumatic block 3PV with NOT	PA12/L	--	--	221-646.90
	Pneumatic block with NOT for ASEPTOMAG valves	PA12/L	--	--	221-646.93
	Pneumatic block without NOT for ASEPTOMAG valves	PA12/L	221-646.92	221-646.92	--
	Pneumatic block 1PV, not for ASEPTOMAG valves	PA12/L	221-646.94	--	--
9	Sensor module T.VIS A/P-15	PA6/GF30	221-589.74	221-589.74	221-589.74
10	Sign T.VIS A-15/CD with wire	1.4301	700-167	700-167	700-167
15	Clamp connection KU	--	221-507.08	221-507.08	221-507.08
21	Sound absorber G1/8"	MS CV	933-175	933-175	933-175
22	Locking screw G1/8"	PE-HD	922-369	922-369	922-369
23	Plug	PP	922-281	922-281	922-281
26	Sound absorber G1/4"	MS CV	933-174	933-174	933-174
31	O-ring	NBR	930-041	930-041	930-041
42	O-ring	FKM	930-169	930-169	930-169
43	Printed circuit board 24V DC	--	221-005021C	221-005021C	221-005021C
	Printed circuit board ASi	--	221-005022C	221-005022C	221-005022C
	Printed circuit board DeviceNet	--	221-004097C	221-004097C	221-004097C
48	Locking screw	PA6	922-371	922-371	922-371
53	O-ring	NBR	930-833	930-833	930-833
54	O-ring	NBR	930-117	930-117	930-117
55	O-ring	NBR	930-038	930-038	930-038
57	Thread-forming screw	A2	514-750	514-750	514-750
63	Solenoid valve 24VDC	PBT	512-169* *without TA18N...	512-169	512-169
64	Logic element NOT	--	--	--	512-137
65	Valve plate	PPO	221-589.27	221-589.27* *without TA18L...	221-589.27* *without TA18Y...
66	Thread-forming screw	A2	514-761	514-761	514-761
67	Thread-forming screw	A2	--	--	514-758

Control Top T.VIS® A-15/class I, div.2 with metric cable connection and air connection with inch connections					
			without NOT logic element		with NOT logic element
Order code				TA18R...ZM/CD	
			TA18N...ZM/CD	TA18I...ZM/CD	TA18V...ZM/CD
			TA18P...ZM/CD	TA18J...ZM/CD	TA18X...ZM/CD
Item	Designation	Material		TA18L...ZM/CD	TA18Y...ZM/CD
1	For switch bar T.VIS A-15 refer to the separate spare parts list 221ELI010728EN.				
5	Base T.VIS-T18	PA12/L	221-646.100	221-646.100	221-646.100
5.1	Filter	PE	221-003869	221-003.869	221-003869
6	Screw-in plug connection D 6.35	MS CV	933-173	933-173	933-173
7	Hood T.VIS A-15/CD with warning message	PA12/L	221-646.88	221-646.88	221-646.88
8	Pneumatic block 3PV without NOT	PA12/L	--	221-646.89	--
	Pneumatic block 3PV with NOT	PA12/L	--	--	221-646.90
	Pneumatic block SPV with NOT for ASEPTOMAG valves	PA12/L	--	--	221-646.93
	Pneumatic block SPV without NOT for ASEPTOMAG valves	PA12/L	221-646.92	221-646.92	--
	Pneumatic block 1PV, not for ASEPTOMAG valves	PA12/L	221-646.94	--	--
9	Sensor module T.VIS A/P-15	PA6/GF30	221-589.74	221-589.74	221-589.74
10	Sign T.VIS A-15/CD with wire	1.4301	700-167	700-167	700-167
15	Clamp connection KU	--	221-507.08	221-507.08	221-507.08
21	Sound absorber G1/8"	MS CV	933-175	933-175	933-175
22	Locking screw G1/8"	PE-HD	922-369	922-369	922-369
23	Plug	PP	922-281	922-281	922-281
26	Sound absorber G1/4"	MS CV	933-174	933-174	933-174
31	O-ring	NBR	930-041	930-041	930-041
42	O-ring	FKM	930-169	930-169	930-169
43	Printed circuit board 24V DC	--	221-005021C	221-005021C	221-005021C
	Printed circuit board ASi	--	221-005022C	221-005022C	221-005022C
	Printed circuit board DeviceNet	--	221-004097C	221-004097C	221-004097C
48	Locking screw	PA6	922-371	922-371	922-371
53	O-ring	NBR	930-833	930-833	930-833
54	O-ring	NBR	930-117	930-117	930-117
55	O-ring	NBR	930-038	930-038	930-038
57	Thread-forming screw	A2	514-750	514-750	514-750
63	Solenoid valve 24VDC	PBT	512-169* *without TA18N...	512-169	512-169
64	Logic element NOT	--	--	--	512-137
65	Valve plate	PPO	221-589.27	221-589.27* *without TA18L...	221-589.27* *without TA18Y...
66	Thread-forming screw	A2	514-761	514-761	514-761
67	Thread-forming screw	A2	--	--	514-758

Item	Designation	Material	Material no.	Optional functions
21.1	Throttle valve G 1/8	Brass/ nickel-plated	603-042	to reduce the closing speed main stroke (air outlet with sound absorber pos. 21)
21.2	Throttle valve G 1/8	Brass/ nickel-plated	603-042	to reduce the opening speed main stroke (connection with screw-in plug connection pos. 6)
24.1	Connector M12/8-pin/ M20x1.5	Brass/ nickel-plated	221-005.102	Cable connection 24VDC with cable socket M12/8-pole/A-coded
24.2	Connector M12/5-pole/ 5-wire/M20x1.5	Brass/ nickel-plated	221-005.101	Cable connection 24VDC max.1 pilot valve with cable socket M12/5-pin/A-coded; cable connection ASi and Device Net

14 Spare parts list - switch bar T.VIS A-15

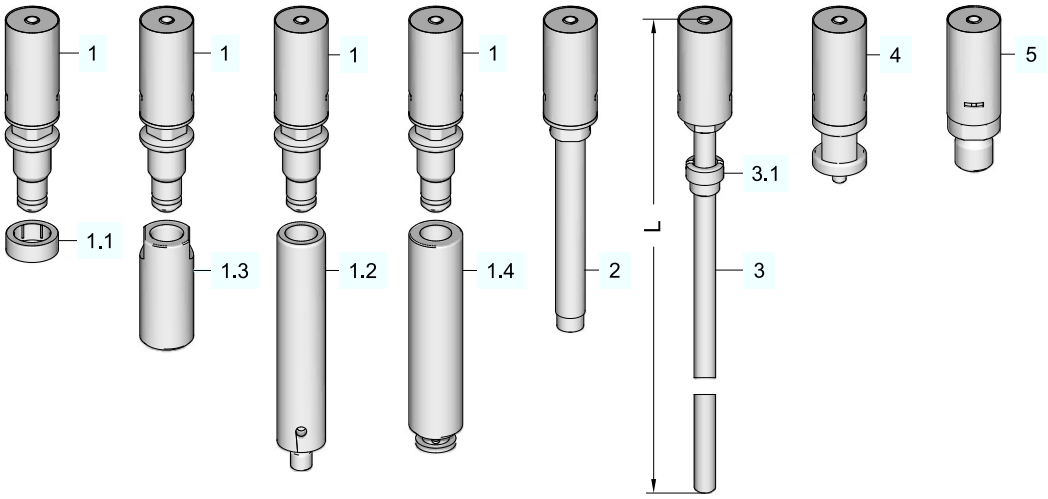

Fig.62

Item	Designation	Material	Material no.	Application
1	Switch bar	PA6/GK30	221-589.104	Standard for all valves with the exception of butterfly valves T-smart 7 and valves with lifting actuator R; T_R; L; M_O(06); MT/T_R(08); M/2.0
1.1	Ring T.VIS®/ECO	Noryl/GFN2	221-002396	In addition to item 1, only for ECOVENT-valves and VESTA XL H_A/M-valves
1.2	Switch bar	1.4301	224-000214	In addition to item 1, adapter only for T-smart 8000 butterfly valves
1.3	Switch bar incl. O-ring	1.4305	221-589.57	In addition to item 1, adapter only for valves type XL H_A
1.4	TME/T.VIS adapter	1.4305	221-573.06	In addition to item 1, only for butterfly valves ECOVENT-S
2	Switch bar BFV-7	1.4301/PA6	224-001696	For butterfly valves T-smart 7 and 9
3	Switch bar LFT-R	1.4301/PA6	see type	For valves with lifting actuator R; T_R; L; M_O(06); MT/T_R(08); M/2.0
4	Switch bar A/P-15 ASG	1.4305/PA6	221-589.88	For all GEA ASEPTOMAG valves
5	Switch bar A/P-15 N_V	1.4305/PA6	221-589.90	only for VARIVENT long-stroke valves with ZEF/V and ZFD/V actuator

Type		125	200	205	166	256
Use on standard actuators		see dimension sheet 221MBL010805EN				
Item	Designation	Material no.				
3	Switch bar LFT-R cpl. incl. slider	221-618.20	221-618.21	221-618.22	221-618.23	221-618.24
L = Length		286	316	346	405	453
3.1	Sliding piece	221-619.04				

15 Dimension sheet - control top T.VIS A-15 Class 1; Div. 2

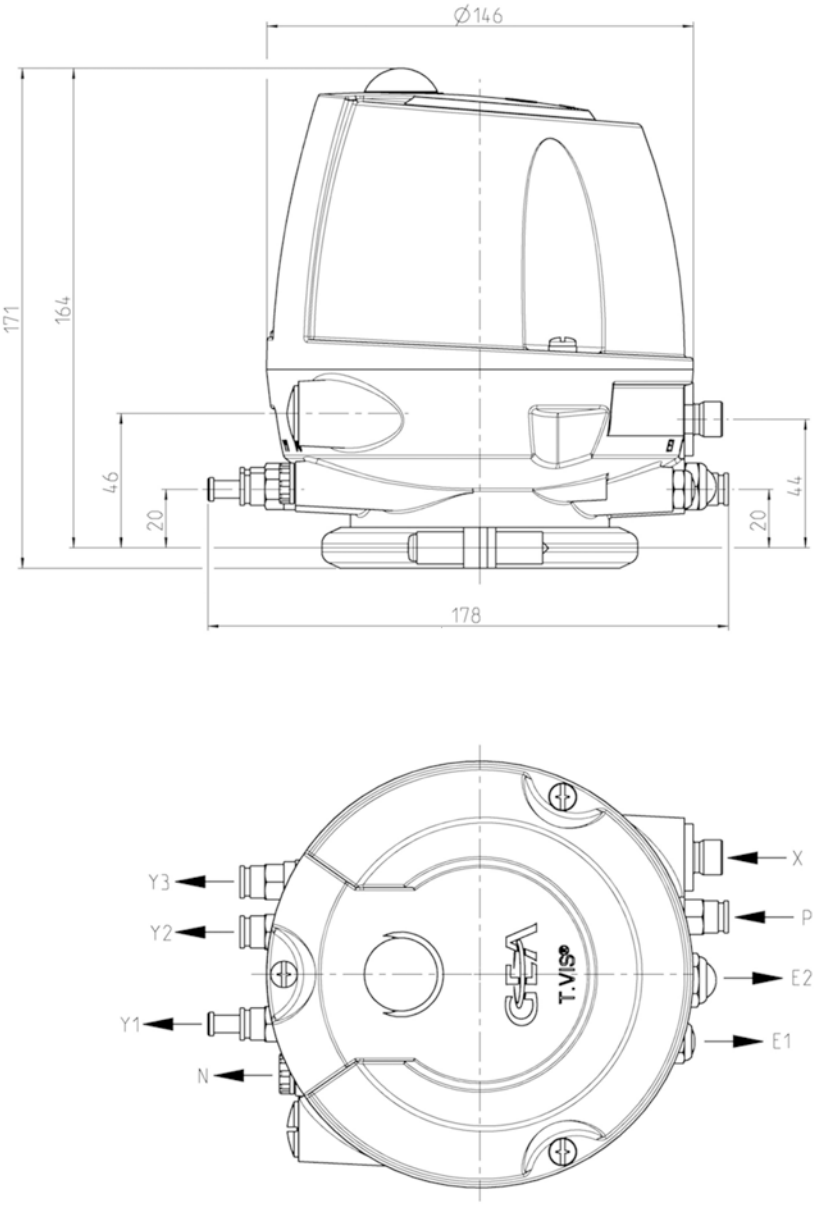

Fig.63

For assignment of N, Y1, Y2, Y3, E1, E2 and P refer to the Operating Instructions Control Top T.VIS A-15 Class 1; Div. 2

X= supply voltage, electric actuation and feedback

16 Dimension sheet - switch bar LFT-R T.VIS A-15/M-20 for lifted valves R; T_R; L; M_O(06); MT/T_R(08); M/2.0; MT; MT-DA; MX

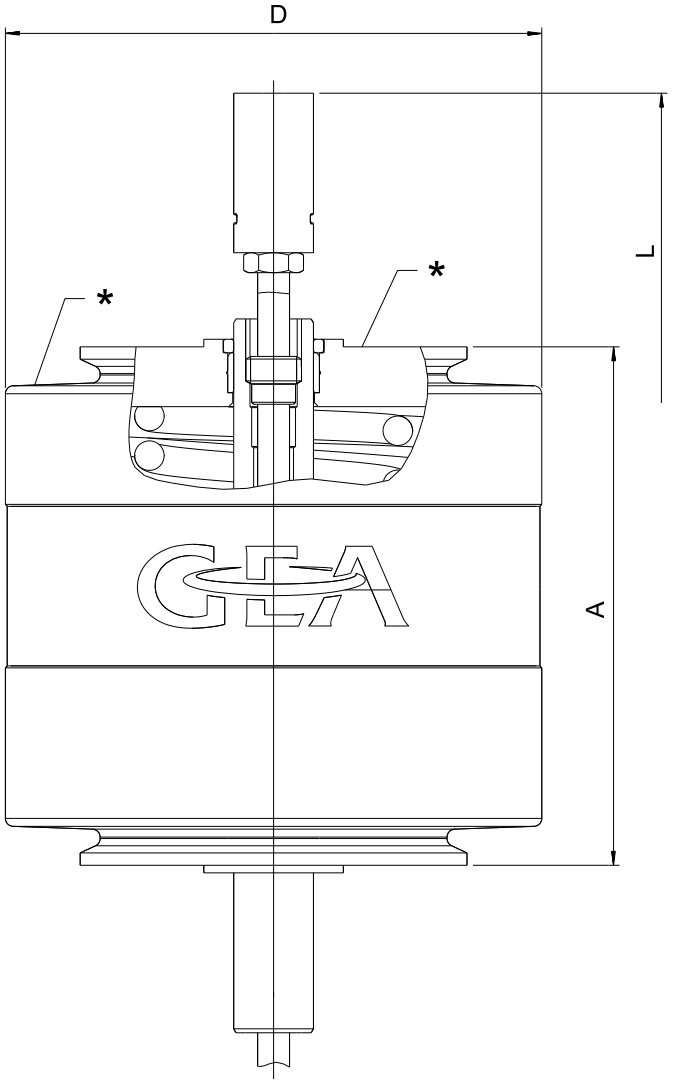

Fig.64

Actuator				Switch bar T.VIS A-15	
Type	Material no.	Actuator		Material no.	Length
		A	D		L
AA	221-118.01	95	99	--	--
BA	221-120.01	130	110	221-618.20	286
BB	221-118.02	130	110	221-618.20	286
BD	221-119.02	130	110	221-618.20	286
				221-618.21 in valve DN25; 1"OD; or PMO 2.0	316
BE	221-119.09	130	110	221-618.21	316
CA	221-181.01	130	135	221-618.20	286
CB	221-120.02	130	135	221-618.20	286
CD	221-118.03	130	135	221-618.20	286
CF	221-119.03	130	135	221-618.20	286
DB	221-181.02	160	170	221-618.21	316
DD	221-120.03	160	170	221-618.21	316
DF	221-118.04	160	170	221-618.21	316
DG	221-119.04	160	170	221-618.21	316
DH	221-265.05	160	170	221-618.21	316
ED	221-181.03	160	210	221-618.21	316
EF	221-120.04	160	210	221-618.21	316
EG	221-118.05	160	210	221-618.21	316
EH	221-119.05	160	210	221-618.21	316
BD5	221-119.06	140	110	221-618.21	316
BE5	221-119.07	140	110	221-618.21	316
CE5	221-119.08	140	135	221-618.21	316
CF5	221-119.10	140	135	221-618.21	316
DD5	221-183.01	160	170	221-618.22	346
DE5	221-183.06	160	170	221-618.22	346
DF5	221-184.01	170	170	221-618.22	346
				221-618.30 in valve PMO/06	356
DG5	221-185.01	170	170	221-618.22	346
ED5	221-183.05	160	210	221-618.22	346
EF5	221-183.02	170	210	221-618.22	346
EG5	221-184.02	170	210	221-618.22	346
EH5	221-185.02	170	210	221-618.22	346
DF6Z	221-585.11	199	170	221-618.23	405
DG6Z	221-585.13	199	170	221-618.23	405
SH6Z	221-585.02	246	260.5	221-618.24	453
SK6Z	221-585.03	246	260.5	221-618.24	453
SM6Z	221-585.04	246	260.5	221-618.24	453

Actuator				Switch bar T.VIS A-15	
Type	Material no.	Actuator		Material no.	Length
		A	D		L
SN6Z	221-585.05	246	260.5	221-618.24	453
EF6Z	221-585.07	246	210	221-618.24	453
EG6Z	221-585.08	246	210	221-618.24	453
EH6Z	221-585.09	246	210	221-618.24	453
EK6Z	221-585.10	246	210	221-618.24	453
SG6A	221-586.01	246	260.5	221-618.24	453
SH6A	221-586.02	246	260.5	221-618.24	453
SK6A	221-586.03	246	260.5	221-618.24	453
SM6A	221-586.04	246	260.5	221-618.24	453
SN6A	221-586.05	246	260.5	221-618.24	453
EF6A	221-586.07	246	210	221-618.24	453
EG6A	221-586.08	246	210	221-618.24	453
EH6A	221-586.09	246	210	221-618.24	453
EK6A	221-586.10	246	210	221-618.24	453

17 Appendix

17.1 Lists

17.1.1 Abbreviations and terms

Abbreviation	Explanation
BS	British Standard
bar	Unit of measurement of pressure [bar] All pressure data expressed in [bar/psi] is assumed to be gauge pressure [barg/psig] unless explicitly specified otherwise.
approx.	approximately
°C	Unit of measurement of temperature [degree Celsius]
C_v	valve coefficient, non-metric flow coefficient, see K_v
dm^3_n	Unit of measurement of volume [cubic decimetre] standard volume (standard litres)
DN	DIN nominal width
DIN	German standard issued by DIN (Deutsches Institut für Normung e.V., German Institute for Standardization)
EN	European Standard
EPDM	Material designation Short designation according to DIN/ISO 1629: Ethylene Propylene Diene Rubber
°F	Unit of measurement of temperature [degree Fahrenheit]
FKM	Material designation, short designation according to DIN/ISO 1629: Fluorine rubber
h	Unit of measurement of time [hour]
HNBR	Material designation Short designation according to DIN/ISO 1629: Hydrogenated Acrylonitrile Butadiene Rubber
IP	Protection class
ISO	International Standard of the International Organization for Standardization
kg	Unit of measurement of weight [kilogram]
kN	Unit of measurement of force [kilonewton]
K_v value	Flow coefficient [m^3/s], 1 $K_v = 0.86 \times C_v$
l	Unit of measurement of volume [litre]
max.	maximum
mm	Unit of measurement of length [millimetre]
µm	Unit of measurement of length [micrometre]
M	Metric
NC	normally closed
NO	normally open
Nm	Unit of measurement of work [newton metre] TORQUE SPECIFICATION: 1 Nm = 0.737 lb-ft Pound-Force (lb)× Feet (ft)
PA	Polyamide
PE-LD	Low-density polyethylene
PPE	Polytetrafluoroethylene
psi	Anglo-American unit of measurement for pressure [pound-force per square inch] All pressure data expressed in [bar/psi] is assumed to be gauge pressure [barg/psig] unless explicitly specified otherwise.
PTFE	Polytetrafluoroethylene

Abbreviation	Explanation
SET-UP	Self-learning installation During commissioning and maintenance, the SET-UP procedure carries out all the necessary settings for the generation of messages.
SW	Indicates the size of spanners [width across flats]
T.VIS	Tuchenhagen valve information system
V AC	Volt alternating current
V DC	Volt direct current
W	Unit of measurement of power [Watt]
TIG	Welding method Tungsten inert gas welding
Inch	Unit of measurement of length in the Anglo-American language area
Inch OD	Tube measurement according to British Standard (BS), outside diameter
Inch IPS	American pipe measurement, iron pipe size

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