Valve Innovations

2008

Solenoid Valves

Valve Electronics

Micro Valves
simply giant, the small one!

more information

↑ detailed description
Micro-Flat-Pack®-Valve on page 30 in this catalog

Full Scale!
Tailor-made, innovative solutions

Our Know How

Customer specific Solutions

Solenoid Valves
Valve Electronics
Micro Valves

Resource and Test Equipment
Research and Engineering
With over 30 years of experience and more than 150 patents and utility patents we have essentially affected the evolution of valve technology world wide.

Our expertise in solenoid valve technology and valve electronics is complemented by our leading technology in the field of micro solenoid valves. We provide to our customers tailor-made, innovative solutions, based on the large number of our diverse valve designs and functional principles.

Our engineers, in conjunction with the customer, are developing holistic, profitable product solutions, supported by the components of process, resource and test equipment scheduling.
High-Tech on the Park
Our medium-sized enterprise is attractively located between woods and vineyards in Erligheim, in the county of Ludwigsburg. However much more than just our romantic location, it’s our innovation and performance capabilities that our customers and business partners value in us.
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B. F. Staiger-Forum – live
Creative, innovative and always focused on customising.

With this catalog, our third in the compact format, we hereby document the entire diversity of our products. In addition to our standard program of solenoid valves, valve electronics and pneumatic modules we also offer, as known specialists, complete and innovative solutions according to customer-specific wishes.

The diverse range of industries our valve-related products serve include engineering, automotive, pharmaceutical, medical, dental, gas, water, analytical, chemical, pneumatic and hydraulic. Today we’re working with high urgency on what the future requires; an ever higher density of integration. The key term here is called „micro-system technology“.

We know that the design and assembly of non-housed complete solutions („non-housed“ integration) will have ever greater significance. This means that you will be best prepared for the future with Staiger.

As Managing Director you have my word that we will stay true to the motto’s upon which we have based our success, namely: technical creativity, economic consequence and always customer-oriented in both thought and trade.

Yours,

Bruno F. Staiger
The history of Staiger

**Product history**
- Oil burner valve: 1974
- Mini diaphragm valve: 1976
- PCB mount valves: 1978
- PTFE-Valve: 1980
- Modular design of solenoids: 1982
- Light emitting seal: 1984

**Company history**
- Founding of company: 1974
- First trade fair: 1976
- Entry into valve electronics: 1978
- First CNC work station: 1980
- Trade fair container: 1982
- First Hannover fair: 1984
COMPANY HISTORY

- Electronic water guard (1986)
- 15 mm valve (1986)
- New building (1987)
- Development Micro Valve (1987)
- Set up clean room (1988)
- Modular Pneumatic Controller (1988)
- Latching valves (1989)
- New generation of CNC machines (1989)
- Set up of PC network (1990)
- First trade fair in the USA (1987)
- 2D-CAD (1990)

New trade fair stand (1992)
The history of Staiger

Product history

- Redesign electronic-adapter
- Pneumatic Modul with programmable controller
- Light emitting socket
- Development flat armature valve
- Micro Valve technology

Company history

- 1994: 75 employees
- 1996: First edition of Junior Catalog
- 1997: 3D-CAD
- 1998: Hotmelt encapsulation technology
- 1999: Certification DIN EN ISO 9001
- 2000: Automated storage
- 2000: Spider®-Valve
Visions mean, take heart to enter new dimensions. “

Bruno F. Staiger
Impressions
Certificates
Quality and environment

Quality Management System

Quality means to us that we will strive to orient our products and services on the needs, requirements, and expectations of our customers, thereby increasing customer satisfaction. To realize our goals we have introduced a quality management system according to DIN EN ISO 9001. We attain a continuous process of improvement through which the high quality standard of our products are built according to and thereby assured.

Environmental Management System

We want to preserve the environment. Therefore environmental protection is one of the highest goals within our enterprise. Furthermore, each of the employees within our company is motivated to work conscious of the environment. For example, through the application of new, energy saving technologies; through the usage of renewable resources, even rain water where applicable, we reduce the environmental strain to the absolute minimum possible level. The introduction of the environmental management system DIN EN ISO 14001 within our firm guarantees both a trustworthy and open cooperation between our business, environmental authorities, and the public.
Innovative concepts, that surprise and convince.

- Latching Spider®-Valve
- Micro Pneumatic Modul
- DIVA® Digital-Valve-Array
- Flat-Pack®-Valve
- Mikro-Flat-Pack®-Valve
INNOVATIONS

Latching Spider®-Valve

**key Features**

- Frictionless movement
- High durability
- Low power consumption
- For battery supply
- Small size

**Principal of function**

2/2-way, latching, flat armature valve.

This valve combines the advantages of the Spider®-Valve technology with the advantages of the latching solenoid valves. Because of the low power consumption of the pulse control, the valve can be controlled by battery operated systems. The small size and the cylindrical cartridge constructions, gives the possibility of multiple ways of installation. Typical application areas include self-soustaining water faucets and dosing systems.

**Product example**
2-way latching Spider®-Valve

cross-sectional drawing

Solenoid with
permanent magnet

Valve body with
flat armature
key Features

- 3-way-manifold with 8 Spider®-Valves
- Orifice 0.5 mm, 6 bar
- Fast switching times till 1 ms
- High durability > 10⁹ switches
- Power reduction integrated
- Free programmable micro controller

Principal of function

Manifold, direct actuated, flat armature valve, normally closed, small in size. Small dimensions and the low weight for installation on movable axes. The integrated micro controller has a serial interface, sensor inlets and digital I/Os for external communication. The application is realized by a sequence controller with a maximum of 256 steps. Additionally, with features like time delay or overlap of programmed steps, the programming can be done by the operator with a simple interface on every personal computer.

Application

Pneumatic handling systems, robots, apparatuses, operating equipment and test rigs.
3-way-Micro-Pneumatic Module
Product example

Electric connector view

Port connector view
INNOVATIONS

DIVA® Digital-Valve-Array

key Features

- Fast response valves
- Proportional behaviour because of PWM
- All pneumatic control functions could be realized
- Small size

Principle of operation

DIVA® (Digital-Ventil-Array) is the digital connection of 2-way valves. DIVA® realizes 3- or multi-way valves and special function. Hereby, fast response 2-way valves are pneumatically linear connected and electrically combined. A lot of different multi-way positions could be realized with the intelligent logical control system. The PWM-control system allows a quasi proportional function in order to realize eg. reduced air inlet or outlet.

Valve size

- 7 mm
- 15 mm
- 21 mm
Section view of a DIVA® Digital-Valve-Array in 5/X-way version
INNOVATIONS

Flat-Pack®-Valve

key Features

- Extremely flat sliding-valve
- Free of overlap
- Long life
- Zero deadspace
- Metal sealings
- Resilient against dirt

Principle of operation

Flat-Pack®-Valves are sliding valves in an extremely flat design. The slide itself is made of a thin metal foil, which is housed between two connection plates. The slide is a metal to metal seal. Through a hole in the slide and the channels in the connection plates the valve function is realized. The slide is direct actuated with a solenoid or via other actuators. Flat-Pack®-Valves are free of overlap and have no dead volume. They are preferably used for liquids.

Active principle of proportional Flat-Pack®-Valves

closed view  half-open view  open view
Product examples of Flat-Pack®-Valves

Flat-Pack®-Valve
motor-actuated with eccentric wheel

Flat-Pack®-Valve
orifice 13 mm
Port size G1/2
INNOVATIONS

Micro-Flat-Pack®-Valve

**key Features**

- Extremely flat sliding-valve
- Free of overlap
- Long life
- Free of dead volume
- Metal sealing
- Insensitive against dirt

**Principle of operation**

Flat-Pack®-Valves are sliding valves in an extremely flat design. The slide itself is made of a thin metal foil, which is housed between two connection plates. The slide is a metal to metal seal. Through a hole in the slide and the channels in the connection plates the valve functions are realized. The slide is direct actuated with a Faulhaber Smoovy motor drive.

Flat-Pack®-Valves are free of overlap and have no dead volume. They are preferably used for liquids.
Micro-Flat-Pack®-Valve with motor drive

Micro motor drive
Faulhaber Smoovy

Flat-Pack assembly

Full-scale
The future begins with solutions of Staiger.

Air and space applications | Air dryers | Aquariums | Automobile applications of every type | Automation technology | Blood pressure measurement | Chemical industry | Chromatography | Color mixing devices | Compressors
Dental technology | Dialysis applications | Dispensing devices | Dosing technology in all areas | Drink dispensers
Dry freezers | Environmental protection/control devices | Food industry | Gas and particle analyzers | Gas applications (furnaces, boilers, etc.) | Handling / Processing | Heat counters | High pressure cleaners | Industrial sewing applications | Industrial sewing machines | Infrared heaters | Ink jet printers | Medical applications
Milk, cheese and yogurt processing | Mushroom cultivation | Oil and gas burners | Optical sorting and rejection devices | Packing machines | Paper folding devices | Paper machines | Paper moistening | Pharmaceutical industry | Photo developers | Pneumatic applications | Pumps | Refrigeration units and devices | Respiratory devices
Sanitary applications | Semiconductor production | Sensor-controlled water armatures | Solar devices | Solder devices | Spray systems | Steam cleaners | Steam generators | Steam irons | Steam sterilization | Textile machines
Vacuum applications | Waste water treatment | Water dispersion | Welding devices | Wood working machines
APPLICATIONS | CUSTOMER SPECIFIC SOLUTIONS

Customer specific solutions

Because of the variety of Staiger solutions, they can be found in many different branches:

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Air and space applications
Air dryers
Aquariums
Automobile applications of every type
Automation technology
Blood pressure measurement
Chemical industry
Chromatography
Color mixing devices
Compressors

Dental technology
Dialysis applications
Dispensing devices
Dosing technology in all areas
Drink dispensers
Dry freezers
Environmental protection/control devices
Food industry
Gas and particle analyzers
Gas applications (furnaces, boilers, etc.)

Handling / Processing
Heat counters
High pressure cleaners
Industrial sewing applications
Industrial sewing machines
Infrared heaters
Ink jet printers
Medical applications
Milk, cheese and yogurt processing
Mushroom cultivation
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Oil and gas burners
Optical sorting and rejection devices
Packing machines
Paper folding devices
Paper machines
Paper moistening
Pharmaceutical industry
Photo developers
Pneumatic applications
Pumps
Refrigeration units and devices
Respiratory devices
Sanitary applications
Semiconductor production
Sensor-controlled
Water armatures
Solar devices
Solder devices
Spray systems
Steam cleaners
Steam generators
Steam irons
Steam sterilization
Textile machines
Vacuum applications
Waste water treatment
Water dispersion
Welding devices
Wood working machines
Customer specific solutions

Automation
Type MA 711-001 | 2-fold manifold-valve with 2-way solenoid valves, direct actuated, NC
Port connection: G1/8
Orifice (DN): 1.3 mm
Pressure: 0...2 bar
Valve body: Brass

Automotive | seat adjustment
Type PA 201-023 | 2-way solenoid valve, direct actuated, NC, with pressure switch
Port connection: Hose nozzle
Orifice (DN): 1.3 mm
Pressure: –275...600 mbar
Valve body: POM
Gas installations
Type PA 262-001 | 2-way solenoid valve, direct actuated, NC
Port connection: Special solution
Orifice (DN): 3.5 mm
Pressure: 0...7 bar
Valve body: PVC

Outdoor power tools
Type MA 202-062 | 2-way solenoid valve, direct actuated, NC, with controller
Port connection: Hose nozzle, G1/8
Orifice (DN): 3.2 mm
Pressure: 0...10 bar
Valve body: POM
Customer specific solutions

Automation
Type MA 733-003 | **8-fold manifold valve block with 2-way solenoid valves, direct actuated, NC, with cable plugs**
Port connection: G1/4
Orifice (DN): 4 mm
Pressure: 0...5.5 bar
Valve body: Brass

Fire-extinguishing system
Type MA 203-019 | **2-way solenoid valve, direct actuated, NC, with plug**
Port connection: Flange
Orifice (DN): 0.8 mm
Pressure: bis 170 bar
Valve body: Brass
Water treatment
Type PH 208-001 | 2-way valve, manuell override, NC
Port connection: Cartridge
Orifice (DN): 10 mm
Pressure: 1...16 bar
Valve body: Plastic

Water treatment
Type PN 200-001 | 2-way solenoid valve, servo actuated, NC, electronic controlled, battery supply
Port connection: Cartridge
Orifice (DN): 10 mm
Pressure: 1...16 bar
Valve body: Plastic
Customer specific solutions

Automotive
Type VA 206-001 | 2-way solenoid valve, direct actuated, NC

Port connection: Hose nozzle
Orifice (DN): 0.6 mm
Pressure: -0.5...1.8 bar
Valve body: Stainless steel
Water supply
Type PA 209-001 | 2-way solenoid valve, direct actuated, NC
Port connection: Cartridge
Orifice (DN): 0.6 mm
Pressure: 1...10 bar
Valve body: Plastic

Water supply
Type PI 209-002 | 2-way solenoid valve, direct actuated, latching function
Port connection: Cartridge
Orifice (DN): 0.6 mm
Pressure: 1...10 bar
Valve body: Plastic
Customer specific solutions

Water treatment

**2-way solenoid valve, servo actuated, NC**
- Port connection: Flange
- Orifice (DN): 6.5 mm
- Pressure: 0.5...10 bar
- Valve body: Brass

Automatic car wash system

**3-station 2-way manifold valve block, servo actuated, NC**
- Port connection: G1
- Orifice (DN): 10 mm
- Pressure: 3...80 bar
- Valve body: Brass
Packing machines

2-fold manifold, direct actuated, NC, with pressure control

Port connection: Push-in connector
Orifice (DN): 2.0 mm
Pressure: 1...5 bar
Valve body: Aluminium

Automotive | emission control

2-way solenoid valve, direct actuated, NO, axial flow

Port connection: Hose nozzle, M10x1
Orifice (DN): 2.5 mm
Pressure: 1...10 bar
Valve body: Stainless steel
Customer specific solutions

Automotive | seat adjustment

**3-way manifold valve block, direct actuated, NC**

- Port connection: Push-in connector
- Orifice (DN): 1.0 mm
- Pressure: 6...12 bar
- Valve body: Plastic

Gas installations

Type MA 253-017 | **2-way solenoid valve, direct actuated, NC**

- Port connection: G1/2
- Orifice (DN): 13 mm
- Pressure: 2 bar
- Valve body: Brass
Textile machines

**9-fold manifold 3-way Spider®-valve, direct actuated, NC**

Port connection: Hose nozzle
Orifice (DN): 0.9 / 1.5 mm
Pressure: 0...3 bar
Valve body: Aluminium

Dosing technology

**3-way Spider®-valve, size 7 mm, direct actuated, diverting function**

Port connection: Push-in connector
Orifice (DN): 0.5 mm
Pressure: 0...2 bar
Valve body: PA12
Customer specific solutions

Automation
Type MA 304-707 | 3-way Spider®-valve, size 7 mm, direct actuated, NC
Port connection: Hose nozzle
Orifice (DN): 0.6 mm
Pressure: 0...6 bar
Valve body: Stainless steel

Automation
Type MA 204-706 | 2-way Spider®-valve, size 7 mm, axial flow, direct actuated, NC
Port connection: Hose nozzle/Cartridge
Orifice (DN): 0.5 mm
Pressure: 0...6 bar
Valve body: Brass
Outdoor power tools
Type VA 204-708 | 2-way Spider®-valve, size 7 mm, axial flow, direct actuated, NC
Port connection: Cartridge/Hose nozzle
Orifice (DN): 0.7 mm
Pressure: 1...3 bar
Valve body: Stainless steel

Automation
Type MA 104-705 | 3-way Spider®-valve, size 7 mm, axial flow, direct actuated, NO
Port connection: Hose nozzle
Orifice (DN): 1.1 mm
Pressure: 0...400 mbar
Valve body: Brass
Customer specific solutions

Medical technology
Type MA 204-007 | 2-way Spider®-valve, size 7 mm, direct actuated, NC
Port connection: Hose nozzle
Orifice (DN): 1 mm
Pressure: 0...350 mbar
Valve body: POM

Analytical equipment
Type VA 704-718 | 2-fold manifold with 2-way Spider®-valve, size 7 mm, direct actuated, NC
Port connection: Customer solution
Orifice (DN): 1 mm
Pressure: 0...0.5 bar
Valve body: Stainless steel
Automotive | gas injection
Type VA 204-507 | Assembly with 3-way Spider®-valve, size 15 mm, direct actuated, NC
Port connection: M5
Orifice (DN): 1.5 mm
Pressure: 0...6 bar
Valve body: Brass

Textile printing
Type VA 204-713 | 2-way Spider®-valve, size 7 mm, direct actuated, NC, axial flow
Port connection: Cartridge
Orifice (DN): 0.7 mm
Pressure: 0...3.5 bar
Valve body: Stainless steel
Customer specific solutions

Papermanufacture
Type VA 204-013 | 2-way Spider®-valve, Size 15 mm, direct actuated, NC
Port connection: Push-in connector
Orifice (DN): 1,5 mm
Pressure: 0...2.5 bar
Valve body: Stainless steel

Papermanufacture
Type VA 704-501 | manifold with 2-way Spider®-valve, size 15 mm, direct actuated, NC
Port connection: Push-in connector
Orifice (DN): 1.5 mm
Pressure: 1...5 bar
Valve body: Stainless steel
Outdoor power tools
Type PA 104-001 | 2-way Spider®-valve, size 7 mm, direct actuated, NC
Port connection: Cartridge
Orifice (DN): 0.8 mm
Pressure: 0...500 mbar
Valve body: Plastic

Analytical equipment
Type VA 204-515 | 2-way Spider®-valve, size 15 mm, direct actuated, NC, with threaded bolt M3
Port connection: Flange
Orifice (DN): 1.0 mm
Pressure: -1...8 bar
Valve body: Stainless steel
Customer specific solutions

Aerospace industry
Type MA 704-703 | **2-way Spider®-manifold, direct actuated, NC**
Port connection: Cartridge
Orifice (DN): 0.2 mm
Pressure: 0...6 bar
Valve body: Stainless steel

Medical technology
Type MH 218-001 | **2-way Spider®-valve, manual actuated, NC**
Port connection: Push-in connector
Orifice (DN): 2.2 mm
Pressure: 1...8 bar
Valve body: Brass
Automotive | commercial vehicle
Type VA 204-519 | 2-way Spider®-valve, size 15 mm, direct actuated, NC
Port connection: Cartridge
Orifice (DN): 0.6 mm
Pressure: 1...6 mbar
Valve body: Stainless steel

Vacuumgripper
Type MA 444-100 | 2-way Spider®-valve, size 21 mm, direct actuated, NO
Port connection: G3/8
Orifice (DN): 4 mm
Pressure: -1...0 bar
Valve body: Aluminium
Customer specific solutions

Gas installations
Type MA 702-002 | 2-way manifold valve block, 2-fold, direct actuated, NC
Port connection: Hose nozzle
Orifice (DN): 3.5 mm
Pressure: 0...50 mbar
Valve body: Brass

Photo developer
Type PE 702-001 | 2-way manifold valve block, direct actuated, NO, medium separation
Port connection: Hose nozzle
Orifice (DN): 10 mm
Pressure: 1...50 mbar
Valve body: POM
Compressor condensate drain
Type MA 222-040 | 2-way solenoid valve, direct actuated, NC, with electronic timer
Orifice (DN): 1.5 mm
Pressure: 1...10 mbar
Valve body: Brass
Cycle time: $t_{\text{on}}$ 5 sek / $t_{\text{off}}$ 45 min.

Automotive | climate control
Type MA 203-009 | 2-way solenoid valve, direct actuated, NC
Port connection: Hose nozzle
Orifice (DN): 26 mm
Pressure: 0...0.1 bar
Valve body: Aluminium
Customer specific solutions

Automotive | heating system
Type MA 202-007 | 2-way solenoid valve, direct actuated, NC
Port connection: M14x1,5
Orifice (DN): 3.5 mm
Pressure: 0...1 bar
Valve body: Aluminium

Vacuum technology
Type VA 101-001 | 2-way solenoid valve, direct actuated, NO
Port connection: M8x0,75
Orifice (DN): 2.2 mm
Pressure: 100 % Vakuum
Valve body: Stainless steel
Automotive | heating system
Type MA 253-014 | **2-way solenoid valve, direct actuated, NC, with electronic timer**
Port connection: Hose nozzle
Orifice (DN): 13 mm
Pressure: -0.10...0 bar
Valve body: Brass

Fire-extinguishing system
Type MA 203-002 | **2-way solenoid valve, direct actuated, NC**
Port connection: M22x1,5
Orifice (DN): 1.6 mm
Pressure: 0...40 bar
Valve body: Brass
Customer specific solutions

Textile machines
Type PB 207-002 | pinch valve, pneumatic controlled
Tube diameter: 14 mm
Pressure: 0...1 bar
Valve body: Polypropylen

Food industry
Type PA 800-001 | 3-fold manifold, sevo actuated, microcontroller and fieldbus controlled
The position of the main valve is sensor controlled
Packaging machines
Type MA 753-001 | 2-fold manifold with 3-way solenoid valves, direct actuated
Port connection: G1/2
Orifice (DN): 6 and 2.2 mm
Pressure: 0...1 bar
Valve body: Aluminium/Brass

Analytical equipment
Type VA 301-006 | 3-way solenoid valve, direct actuated, NC
Port connection: M10 x 1
Orifice (DN): 2.2 mm
Pressure: 0,7...0,1 bar
Valve body: Stainless steel (1.4305)
Customer specific solutions

Gas installations
Type MA 753-002 | **2-fold 2-way manifold, with pressur control**
- Port connection: G1/2
- Orifice (DN): 13 mm
- Pressure: 0...100 mbar
- Valve body: Aluminium, anodized

Analytical equipment
Type VA 801-001 | **3-fold manifold, with 3-way solenoid valve, direct actuated, NC**
- Port connection: M12x1,25
- Orifice (DN): 2.2 mm
- Pressure: -0,7...0,1 bar
- Valve body: Stainless steel (1.4305)
Gas installations
Type MA 702-003 | 2-way manifold valve block, direct actuated, NC
Port connection: M12 x 1
Orifice (DN): 3.5 mm
Pressure: 0...3 bar
Application: Gases according to DVGW worksheet G 260/I

Massflow Controller
Type VP 209-001 | 2-way proportional valve, direct actuated, NC
Port connection: Flange
Orifice (DN): 4.5 mm
Pressure: 0...3 bar
Valve body: Stainless steel (1.4301)
Customer specific solutions

Textile machines
Type MA 800 | 2-way solenoid valves, 7-fold manifold, direct actuated
Port connection: G1/8, hose nozzle
Orifice (DN): 2.0 mm
Pressure: 0...6 bar
Valve body: Aluminium

Analytical equipment
Type MA 800-001 | 8-fold manifold with 3-way solenoid valves, direct actuated, NC, PCB mounted
Port connection: Hose nozzle
Orifice (DN): 0.8 mm
Pressure: 0...5 bar
Photo developer
Type PE 202 | 2-way solenoid valve, diaphragm principle, direct actuated
Orifice (DN): 10 mm
Pressure: 0...0.2 bar
Sealing: Viton, EPDM, Perbunan
Valve body: PVC

Medical technology
Type MX 700 | Assembly 2-way solenoid valve and electric pump
Port connection: Hose nozzle
Orifice (DN): 0.8 mm
Pressure: 0...0.7 bar
Valve body: Aluminium
Customer specific solutions

Medical technology
Type MA 700-003 | 2-fold manifold with 2-way valves, NC and NO
Port connection: Hose nozzle
Orifice (DN): 0.8 / 0.25 mm
Pressure: 0...500 bar
Valve body: Aluminium/POM

Automotive | heating system
Type PA 200-006 | 2-way cartridge valve, direct actuated, NC, adjustable stroke
Port connection: Customer specific
Orifice (DN): 1.6 mm
Pressure: 0...3 bar
Valve body: POM
Automation
Type MA 720-004 | 6-fold manifold, direct actuated, NC, with pressure switch
Port connection: Hose nozzle
Orifice (DN): 1.0 mm
Pressure: 0...8 bar
Valve body: Aluminium

Automotive | seat adjustment
Type PH 808-001 | 5-fold manifold, 3-way lever actuated valves
Port connection: Hose nozzle
Orifice (DN): 0.6 mm
Pressure: 2...10 bar
Valve body: POM
Customer specific solutions

Photo developer
Type PE 202-025 | 2-way valve, direct actuated, NC
Port connection: Hose Nozzle OD18
Orifice (DN): 15 mm
Pressure: 0...50 mbar
Valve body: PVC

Automatic car wash system
Type PA 703-004 | 15-fold manifold with 2-way valves, direct actuated, NC
Port connection: Hose nozzle
Orifice (DN): 11 mm
Pressure: 0...0.5 bar
Valve body: PP
Dental technical equipment
Type MA 811-003 | **2-fold manifold with 3-way valves, direct actuated, NC**
Port connection: Hose nozzle OD6
Orifice (DN): 1.6 und 2.2 mm
Pressure: -0.5...0 bar
Valve body: Brass

Water-tap
Type PI 200-005 | **2-way valves, direct actuated, latching function**
Port connection: Flange
Orifice (DN): 0,8 mm
Pressure: 1...8 bar
Valve body: POM
Customer specific solutions

Analytical equipment
Type MI 800-001 | 2-fold valve with 3-way valves, direct actuated latching function
Port connection: Flange
Orifice (DN): 1 mm
Pressure: 0...100 bar
Valve body: Aluminium

Paint mixer equipment
Type ME 633-003 | 3-way valve, media separated, direct actuated, diverting function, with manuall override
Port connection: G1/4
Orifice (DN): 4 mm
Pressure: 0...3 bar
Valve body: Brass
Automotive | pneumatic suspension
Type MA 701-005 | **2-fold manifold with 2-way valves, direct actuated, NC**
Port connection: Push-in-connector
Orifice (DN): 1.6 mm
Pressure: 0...10 bar
Valve body: Brass

Analytical equipment
Type QE 233-001 | **2-way valve, diaphragm principle, direct actuated, NC**
Port connection: G1/4
Orifice (DN): 4 mm
Pressure: 0...2 bar
Valve body: Teflon PFA
Customer specific solutions

Gas installation
Type MA 202-047 | 2-way valve with manuell override, direct actuated, NC
Port connection: G1/4 left
Orifice (DN): 4 mm
Pressure: 0...2 bar
Valve body: Brass

Medical technology
Type MA 710-032 | 2-fold valve with 2-way valves, direct actuated, NC
Port connection: Hose nozzle
Orifice (DN): 0.8 mm
Pressure: 0...260 mbar
Valve body: Brass/POM
Automotive | climate control
Type ZL | **Power reduction for solenoid valves**
Voltage: 12...24 VDC
Power rating: 30 W
Stand by power: 5 W
Housing: Plastic

Water treatment
Type MI 240-006 | **2-way latching valve, with electronic timer and battery supply**
Port connection: G3/8
Orifice (DN): 8 mm
Pressure: 1...8 bar
Valve body: Brass
Customer specific solutions

Connector for solenoid valves
Type LL | Connector for solenoid valves
Voltage: 24 VDC
Indicator lamp: LED green
Protection circuit: Suppressor diodes
Valve connector type: DIN EN 175301-803-A

Connector cable for solenoid valves
Type LL | Pin-and-socket connector cable
Voltage: 12...24 VDC
Indicator lamp: LED green
Protection circuit: Suppressor diodes
Valve connector type: DIN EN 175301-803-BI
Connector cable for solenoid valves
Type LL | **Pin-and-socket connector cable**
Voltage: 24 VDC
Protection circuit: Varistor
Valve connector type: DIN EN 175301-803-B

Connector cable for general purpose
Type LL | **Pin-and-socket connector cable**
Diameter: 8 mm
Voltage: max. 60 VDC
Current: max. 1A
Degree of protection: IP65 (EN 60529)
The standard product program of Staiger can be separated in three segments: solenoid valves, valve electronics and pneumatic modules. The following pages show the standard product range with their main characteristic features and the type summary.

Detailed information, about the various types, can be found on our website www.staiger.de, this site is continuously updated. Detailed data sheets of the different product types can be downloaded from there.

Our sales staff is eager to answer your questions about our product range at any time.
Die Zukunft beginnt mit Staiger...

...denn wir entwickeln die Technologie von morgen. Unsere technische Kreativität, unser wirtschaftliches und konsequentes Handeln bieten Ihnen die Vorteile, die Sie ganz nach vorne bringen. Dabei orientieren wir uns in erster Linie an ganz spezifischen Wünschen unserer Kunden und bieten ihnen den entscheidenden innovativen Nutzen.
Solenoid valves
Standard product range

- Latching Valves
- Stainless Steel Valves
- Cartridge Valves
- Gas Valves
- Plastic Valves
- Solenoids
- Brass and Aluminium Valves
- Micro Valves size 10
- Proportional Valves
- Pinch Valves
- Spider®-Valves
- Teflon Valves
- Valves for water-taps
- Servo actuated Valves
- Water Guards
SOLENOID VALVES

Latchng valves

**key Features**

- Impulse solenoid actuated
- 2-way and 3-way solenoid valves, latching function
- Low current
- Body material plastic and brass

Type MI 230  
Type MI 210  
Type PI 200
### Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Orifice [mm]</th>
<th>Port size</th>
<th>Pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>neutral liquids, gases and vapors</td>
<td>2-way solenoid latching valve</td>
<td>MI 210</td>
<td>1.0</td>
<td>M5</td>
<td>0 to 8</td>
</tr>
<tr>
<td>direct actuated</td>
<td></td>
<td>PI 200</td>
<td>0.8 to 1.6</td>
<td>Flange</td>
<td>0 to 8</td>
</tr>
<tr>
<td>2-way solenoid latching valve</td>
<td>2-way solenoid latching valve</td>
<td>MI 230</td>
<td>8.0</td>
<td>G1/4</td>
<td>0.5 to 8</td>
</tr>
<tr>
<td>servo actuated</td>
<td>servo actuated</td>
<td>MI 240</td>
<td>8.0</td>
<td>G3/8</td>
<td>0.5 to 8</td>
</tr>
<tr>
<td>3-way solenoid latching valve</td>
<td>3-way solenoid latching valve</td>
<td>PI 300</td>
<td>0.8</td>
<td>Flange</td>
<td>0 to 8</td>
</tr>
<tr>
<td>direct actuated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For detailed information look at [www.staiger.de](http://www.staiger.de)
SOLENOID VALVES

Stainless steel valves

key Features

- Seat principle, direct solenoid actuation
- 2-way and 3-way solenoid valves, normally closed
- Manifold valves
- Internal parts stainless steel
### Type summary

For detailed information look at [www.staiger.de](http://www.staiger.de)

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Orifice [mm]</th>
<th>Port size</th>
<th>Pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>neutral and mildly aggressive liquids, gases and vapors</td>
<td>2-way solenoid valve, direct actuated, NC</td>
<td>VA 210</td>
<td>0.8 to 2.0</td>
<td>M5</td>
<td>0 to 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VA 211</td>
<td>1.0 to 2.2</td>
<td>M5</td>
<td>0 to 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VA 221</td>
<td>1.0 to 2.2</td>
<td>G1/8</td>
<td>0 to 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VA 281</td>
<td>1.0 to 2.2</td>
<td>1/4&quot;-28</td>
<td>0 to 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VA 291</td>
<td>1.0 to 2.2</td>
<td>1/8&quot;-NPT</td>
<td>0 to 12</td>
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<tr>
<td></td>
<td>3-way solenoid valve, direct actuated, NC</td>
<td>VA 311</td>
<td>1.0 to 2.2</td>
<td>M5</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VA 321</td>
<td>1.0 to 2.2</td>
<td>G1/8</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VA 381</td>
<td>1.0 to 2.2</td>
<td>1/4&quot;-28</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VA 391</td>
<td>1.0 to 2.2</td>
<td>1/8&quot;-NPT</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td>2-way solenoid valve, direct actuated, NC, manifold valves</td>
<td>VA 721</td>
<td>1.0 to 2.2</td>
<td>G1/8</td>
<td>0 to 12</td>
</tr>
</tbody>
</table>
Solenoid Valves

Cartridge Valves

**Key Features**

- Seat principle, direct solenoid actuation
- 2-way and 3-way solenoid valves, normally closed
- Without body
- Flange and screw-in types

![Typ EA 200](image)

![Typ EA 201](image)

![Type EA 203](image)

![Type EA 303](image)
## Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Typ</th>
<th>Orifice [mm]</th>
<th>Port size</th>
<th>Pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>neutral liquids, gases and vapors</td>
<td>2-way solenoid valve, direct actuated, NC</td>
<td>EA 200</td>
<td>0.8 to 2.0</td>
<td>Flange</td>
<td>0 to 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EA 201</td>
<td>1.0 to 2.2</td>
<td>Flange</td>
<td>0 to 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EA 201</td>
<td>1.0 to 2.2</td>
<td>M14x0.75</td>
<td>0 to 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EA 202</td>
<td>1.0 to 5.0</td>
<td>M12x0.75</td>
<td>0 to 35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EA 202</td>
<td>1.0 to 3.5</td>
<td>M14x0.75</td>
<td>0 to 35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EA 203</td>
<td>1.0 to 6.0</td>
<td>M20x1</td>
<td>0 to 50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EA 203</td>
<td>1.0 to 6.0</td>
<td>M24x1</td>
<td>0 to 50</td>
</tr>
<tr>
<td></td>
<td>3-way solenoid valve, direct actuated, NC</td>
<td>EA 301</td>
<td>1.0 to 2.2</td>
<td>Flange</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EA 301</td>
<td>1.0 to 2.2</td>
<td>M14x0.75</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EA 302</td>
<td>1.0 to 2.2</td>
<td>M14x0.75</td>
<td>0 to 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EA 303</td>
<td>1.0 to 3.5</td>
<td>M20x1</td>
<td>0 to 16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EA 303</td>
<td>1.0 to 3.5</td>
<td>M24x1</td>
<td>0 to 16</td>
</tr>
</tbody>
</table>
SOLENOID VALVES

Gas valves

key Features

- Seat principle, direct solenoid actuation
- 2-way function NC
- Body material brass
- Internal parts stainless steel

Type MA 243

Type MA 232

Type MA 222
## Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Orifice [mm]</th>
<th>Port size</th>
<th>Pressure [bar]</th>
<th>CE-Nummer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gases according to DVGW worksheet G 260/I approval according to EN 161</td>
<td>2-way solenoid valve, direct actuated, NC</td>
<td>MA 202</td>
<td>3.5</td>
<td>M12x1</td>
<td>0 to 3</td>
<td>CE-0085AN0079</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 202</td>
<td>3.5</td>
<td>M12x1</td>
<td>0 to 0.05</td>
<td>CE-0085AN0080</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 203</td>
<td>6.0</td>
<td>M12x1</td>
<td>0 to 0.3</td>
<td>CE-0085AN0077</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 222</td>
<td>3.5</td>
<td>Rp 1/8</td>
<td>0 to 3</td>
<td>CE-0085AN0078</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 232</td>
<td>3.5</td>
<td>Rp1/4</td>
<td>0 to 3</td>
<td>CE-0085AN0078</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 233</td>
<td>13.0</td>
<td>Rp1/4 G1/4</td>
<td>0 to 0.2</td>
<td>CE-0085AN0076</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 243</td>
<td>13.0</td>
<td>Rp3/8 G3/8</td>
<td>0 to 0.2</td>
<td>CE-0085AN0076</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 253</td>
<td>13.0</td>
<td>Rp1/2 G1/2</td>
<td>0 to 0.2</td>
<td>CE-0085AN0076</td>
</tr>
</tbody>
</table>
SOLENOID VALVES

Plastic valves

**key Features**

- Seat principle, direct solenoid actuation
- 2-way and 3-way solenoid valves, normally closed
- With or without media separation
- Body material POM, PVDF, PPO

Type PE 202

Type PA 301

Type PA 200

Type PA 201
## Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Orifice [mm]</th>
<th>Port size</th>
<th>Pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral liquids, Gases and vapors</td>
<td>2-way solenoid valve, direct actuated, NC</td>
<td>PA 200</td>
<td>0.8 to 2.0</td>
<td>Flange</td>
<td>0 to 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PA 201</td>
<td>2.0</td>
<td>Nozzle OD6</td>
<td>0 to 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PA 202</td>
<td>1.0 to 4.0</td>
<td>Nozzle OD7</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td>3-way solenoid valve, direct actuated, NC</td>
<td>PA 300</td>
<td>0.8</td>
<td>Flange</td>
<td>0 to 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PA 301</td>
<td>2.0</td>
<td>Nozzle OD6</td>
<td>0 to 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PA 301</td>
<td>0.8 to 2.5</td>
<td>Flange</td>
<td>0 to 8</td>
</tr>
<tr>
<td>Neutral and aggressive liquids, Gases and vapors</td>
<td>2-way solenoid valve, direct actuated, NC, with diaphragm separation</td>
<td>PE 202</td>
<td>1.0 to 4.0</td>
<td>Nozzle OD6</td>
<td>0 to 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PE 202</td>
<td>1.0 to 4.0</td>
<td>Nozzle OD7</td>
<td>0 to 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PE 203</td>
<td>1.0 to 4.0</td>
<td>Nozzle OD7</td>
<td>0 to 1</td>
</tr>
</tbody>
</table>

For detailed information look at [www.staiger.de](http://www.staiger.de)
Solenoids

key Features

- Steel encased solenoid
- Modular design for highest flexibility
- Pin-connector with integrated surge protection
- High degree of protection with hotmelt overmold
# Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Type</th>
<th>Voltage</th>
<th>Nom. power consumption</th>
<th>Circuit</th>
<th>el. Port size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solenoid valve with size 15 mm</td>
<td>Type 15</td>
<td>DC: 24V, 12V, 6V</td>
<td>1W, 2.5W</td>
<td>-</td>
<td>SAB, SAL, SAK</td>
</tr>
<tr>
<td>Solenoid valve with size 20 mm</td>
<td>Type 20</td>
<td>AC (50 oder 60 Hz): 230V, 115V, 42V, 24V, 12V, DC: 24V, 12V, 6V</td>
<td>5VA, 4W, 5W</td>
<td>V, X, Y, Z</td>
<td>SAF, SAH, SAL, SAV, SAW, SAZ</td>
</tr>
<tr>
<td>Solenoid valve with size 27 mm</td>
<td>Type 27</td>
<td>AC (50 oder 60 Hz): 230V, 115V, 42V, 24V, 12V, DC: 24V, 12V, 6V</td>
<td>11VA, 5W, 8W</td>
<td>V, X, Y, Z</td>
<td>SAF, SAH, SAL, SAV, SAW, SAZ</td>
</tr>
<tr>
<td>Solenoid valve with size 32 mm</td>
<td>Type 32</td>
<td>AC (50 oder 60 Hz): 230V, 115V, 42V, 24V, 12V, DC: 24V, 12V, 6V</td>
<td>15VA, 8W, 11W</td>
<td>V, X, Y, Z</td>
<td>SAF, SAH, SAL, SAV, SAW, SAZ</td>
</tr>
</tbody>
</table>

For detailed information look at [www.staiger.de](http://www.staiger.de)
Solenoid coils

The solenoids used for Staiger valves are built as steel encased electro-magnets. The magnetic housings are manufactured as patented, folded metal stampings. A high temperature resistant plastic coil carries the windings. The coil is wrapped in isolating tape. An electrical connector is also integrated into the design. These components are assembled in a „snap together“ process, resulting in compact sub-assembly. This sub-assembly is installed into the metal solenoid housing which builds the magnetic yoke. Through the modular design the highest flexibility is realized. In addition, the construction permits electrical circuits for e.g. surge protection to be built directly into the magnetic coil. For yet higher performance and protection the complete solenoid can be encapsulated with plastic; e.g. type „Macromelt“. Hereby can protection degrees be realized up to IP68.

Order code for solenoids

15 SAK 00 - 24/00 SW X

- Type
- Electrical connector
- Cable length [mm] only for SAL, SAV, SAZ
- Internal circuit
- Housing color SW=black, GZ=gal. zinc coating
- Frequency [Hz]
- Voltage [V]
Electrical connectors

SAB  Three-pole pin connector according to DIN | EN 175301-803 | - C

SAF  Three-pole mini pin connector

SAH  Three-pole pin connector according to DIN | EN 175301-803 | - B1 (industry)

SAK  Three-pole pin connector according to DIN | EN 175301-803 | - C1 (industry)

SAL  Two-pole lead wires, standard length 400 mm

SAP  Two-pole pin connector for soldering or plugging into e.g. PC boards

SAT  Three-pole cable, electronic timer inside

SAV  Three-pole cable with standard lengths of 500 mm and 1000 mm (3 x 0.75 sq. mm)

SAW  Three-pole pin connector according to DIN | EN 175301-803 | - A

SAZ  Two-pole cable with standard lengths of 500 mm and 1000 mm (2 x 0.75 sq. mm)
Brass and aluminium valves

**key Features**

- Seat principle, direct solenoid actuation
- 2-way valves NC und NO
- Body material brass and aluminium
- Internal parts stainless steel

Type MA 233
Type MA 232
Type MA 210
Type MA 211
## Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Orifice [mm]</th>
<th>Port size</th>
<th>Pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral liquids, Gases and vapors</td>
<td>2-way solenoid valve, direct actuated, NO</td>
<td>MA 122</td>
<td>2.0 to 3.5</td>
<td>G1/8</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 132</td>
<td>10.0</td>
<td>G1/4</td>
<td>0 to 0.5</td>
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<td></td>
<td></td>
<td>MA 132</td>
<td>2.0 to 3.5</td>
<td>G1/4</td>
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<td></td>
<td>MA 142</td>
<td>10.0</td>
<td>G3/8</td>
<td>0 to 0.5</td>
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<td></td>
<td>MA 152</td>
<td>10.0</td>
<td>G1/2</td>
<td>0 to 0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 200</td>
<td>0.8 to 2.0</td>
<td>Flange</td>
<td>0 to 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 201</td>
<td>1.0 to 2.2</td>
<td>Flange</td>
<td>0 to 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 202</td>
<td>2.0 to 3.5</td>
<td>Nozzle OD6</td>
<td>0 to 15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 210</td>
<td>0.8 to 2.0</td>
<td>M5</td>
<td>0 to 8</td>
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<td></td>
<td>MA 211</td>
<td>1.0 to 2.2</td>
<td>M5</td>
<td>0 to 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 211</td>
<td>1.5</td>
<td>M5</td>
<td>0 to 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 221</td>
<td>1.0 to 2.2</td>
<td>G1/8</td>
<td>0 to 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 222</td>
<td>2.0 to 3.5</td>
<td>G1/8</td>
<td>0 to 15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 223</td>
<td>4.0</td>
<td>G1/8</td>
<td>0 to 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 232</td>
<td>2.0 to 5.0</td>
<td>G1/4</td>
<td>0 to 15</td>
</tr>
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<td></td>
<td>MA 232</td>
<td>10.0</td>
<td>G1/4</td>
<td>0 to 0.3</td>
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<tr>
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<td></td>
<td>MA 233</td>
<td>1.0 to 6.0</td>
<td>G1/4</td>
<td>0 to 50</td>
</tr>
</tbody>
</table>

for more information look at [www.staiger.de](http://www.staiger.de)
Brass and aluminium valves

key Features

- Seat principle, direct solenoid actuation
- 2-way and 3-way solenoid valves, normally closed
- Manifold valves
- Body material brass and aluminium

Type MA 211
Type MA 302
Type MA 323
Type MA 710
<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Orifice [mm]</th>
<th>Port size</th>
<th>Pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral liquids,</td>
<td>2-way solenoid valve, direct actuated, NC</td>
<td>MA 242</td>
<td>3.0 to 5.0</td>
<td>G3/8</td>
<td>0 to 6</td>
</tr>
<tr>
<td>Gases and vapors</td>
<td></td>
<td>MA 242</td>
<td>8.0 to 10.0</td>
<td>G3/8</td>
<td>0 to 0.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 252</td>
<td>10.0</td>
<td>G1/2</td>
<td>0 to 0.6</td>
</tr>
<tr>
<td></td>
<td>3-way solenoid valve, direct actuated, NC</td>
<td>MA 301</td>
<td>1.0 to 2.2</td>
<td>Flange</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 302</td>
<td>1.6 to 2.7</td>
<td>Nozzle OD5</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 302</td>
<td>1.6 to 2.7</td>
<td>Flange</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td>3-way solenoid valve, direct actuated, NC</td>
<td>MA 311</td>
<td>1.0 to 2.2</td>
<td>M5</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 311</td>
<td>1.5</td>
<td>M5</td>
<td>0 to 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 321</td>
<td>1.0 to 2.2</td>
<td>G1/8</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 322</td>
<td>1.0 to 2.2</td>
<td>G1/8</td>
<td>0 to 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 323</td>
<td>2.5</td>
<td>G1/8</td>
<td>0 to 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 333</td>
<td>1.0 to 3.0</td>
<td>G1/4</td>
<td>0 to 16</td>
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<tr>
<td></td>
<td>2-way solenoid valve, direct actuated, NC,</td>
<td>MA 710</td>
<td>0.8 to 1.0</td>
<td>M5</td>
<td>0 to 8</td>
</tr>
<tr>
<td>manifold valves</td>
<td></td>
<td>MA 710</td>
<td>1.2 to 2.0</td>
<td>G1/8</td>
<td>0 to 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MA 721</td>
<td>1.2 to 2.2</td>
<td>G1/8</td>
<td>0 to 12</td>
</tr>
</tbody>
</table>
SOLENOID VALVES

Micro valves size 10 mm

Principle and design
The new compact 10 mm Valve range is based on a modular and flexible system. The basis is a cartridge-valve which can be integrated into customer specific subbases or standard valve bodies out of plastic, ALU, stainless steel or similar. The flange view by the standard subbase version is selectable between the usual market connection STA and the ISO-Norm. In combination with a diaphragm between coil and body, the valve can also be used for aggressive media.

Model variety
- Cartridge valve in 2/2 and 3/2, NC and NO
- Stand alone valve in 2/2 and 3/2, NC and NO
- Isolation valves
- Accessories, mounting plates
- Customer specific mounting plates

Characteristics
- Cartridge based valve directly insertable into mounting plates
- High cycle life
- Just one seal and spring inside
- Designed as a flexible cid
- Two different subbase connection STA and ISO with one subbase seal possible
- Multitude of electrical connection
- With Cartridge version coil is rotatable
- With flange version coil is in 90° steps rotatable

STA

ISO

A great selection of electrical connections are also available.
Section view of 3-way Micro Valve size 10

- Solenoid coil
- Plunger
- Manual override
- Valve seat
- Subbase seal
- Screw
SOLENOID VALVES

Micro valves size 10 mm

**key Features**

- Seat principle, direct solenoid actuation
- 2-way and 3-way solenoid valves, normally closed and open
- Manifold valves
- Grid dimension 10 mm width

Type PA 106  
Type MA 206  
Type EA 106  
Type PA 306
### Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Orifice [mm]</th>
<th>Port size</th>
<th>Pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neutral liquids, gases and vapors</strong></td>
<td><strong>2-way solenoid valve, direct actuated, NO</strong></td>
<td>PA 106</td>
<td>0.6 to 1.0</td>
<td>Flange ISO</td>
<td>0 to 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PA 106</td>
<td>0.6 to 1.0</td>
<td>Flange STG</td>
<td>0 to 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EA 106</td>
<td>0.6 to 1.0</td>
<td>Cartridge</td>
<td>0 to 6</td>
</tr>
<tr>
<td><strong>2-way solenoid valve, direct actuated, NC</strong></td>
<td></td>
<td>MA 206</td>
<td>0.6 to 1.0</td>
<td>M3</td>
<td>0 to 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PA 206</td>
<td>0.6 to 1.0</td>
<td>Flange ISO</td>
<td>0 to 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PA 206</td>
<td>0.6 to 1.0</td>
<td>Flange STG</td>
<td>0 to 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EA 206</td>
<td>0.6 to 1.0</td>
<td>Cartridge</td>
<td>0 to 6</td>
</tr>
<tr>
<td><strong>3-way solenoid valve, direct actuated, NC</strong></td>
<td></td>
<td>MA 306</td>
<td>0.6 to 1.0</td>
<td>M3</td>
<td>0 to 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PA 306</td>
<td>0.6 to 1.0</td>
<td>Flange ISO</td>
<td>0 to 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PA 306</td>
<td>0.6 to 1.0</td>
<td>Flange STG</td>
<td>0 to 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EA 306</td>
<td>0.6 to 1.0</td>
<td>Cartridge</td>
<td>0 to 6</td>
</tr>
<tr>
<td><strong>3-way solenoid valve, direct actuated, NO</strong></td>
<td></td>
<td>PA 406</td>
<td>0.6 to 1.0</td>
<td>Flange ISO</td>
<td>0 to 6</td>
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<td></td>
<td></td>
<td>PA 406</td>
<td>0.6 to 1.0</td>
<td>Flange STG</td>
<td>0 to 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EA 406</td>
<td>0.6 to 1.0</td>
<td>Cartridge</td>
<td>0 to 6</td>
</tr>
</tbody>
</table>
SOLENOID VALVES

Proportional valves

Key Features

- Proportional principle, direct actuated
- 2- and 3-way valves NC
- Body material brass and aluminium
- Internal parts stainless steel

Type MP 203
Type MP 209
Type MP 223
## Type Summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Orifice [mm]</th>
<th>Port size</th>
<th>Pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral liquids, gases and vapors</td>
<td>2-way-Proportional solenoid valve, direct actuated, NC</td>
<td>MP 203</td>
<td>1.0 to 5.0</td>
<td>Flange</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MP 223</td>
<td>1.0 to 4.0</td>
<td>G1/8</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MP 209</td>
<td>4.5</td>
<td>Flange</td>
<td>0 to 3</td>
</tr>
</tbody>
</table>

For more information look at [www.staiger.de](http://www.staiger.de)
SOLENOID VALVES

Pinch valves

key Features

- Pinch valve principle, direct actuated
- 2-way valves NC and NO
- 3-way valve
- Application for flexible tubes
<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Tube diameter [mm]</th>
<th>Tube hardness [Shore A]</th>
<th>Pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral and aggressive liquids and gases</td>
<td>2-way pinch valve, direct actuated, NC</td>
<td>MB 200</td>
<td>OD3 / ID2</td>
<td>max. 60</td>
<td>0 to 0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MB 200</td>
<td>OD3 / ID1.5</td>
<td>max. 60</td>
<td>0 to 1.0</td>
</tr>
<tr>
<td></td>
<td>3-way pinch valve, direct actuated</td>
<td>MB 300</td>
<td>OD3 / ID1.5</td>
<td>max. 60</td>
<td>0 to 1.0</td>
</tr>
<tr>
<td></td>
<td>2-way pinch valve, direct actuated, NO</td>
<td>PB 103</td>
<td>OD7 / ID5</td>
<td>max. 60</td>
<td>0 to 1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PB 103</td>
<td>OD9 / ID7</td>
<td>max. 60</td>
<td>0 to 0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PB 103</td>
<td>OD10 / ID8</td>
<td>max. 60</td>
<td>0 to 0.2</td>
</tr>
<tr>
<td></td>
<td>2-way pinch valve, direct actuated, NC</td>
<td>PB 203</td>
<td>OD7 / ID5</td>
<td>max. 60</td>
<td>0 to 1.0</td>
</tr>
</tbody>
</table>
Spider®-Valves

Principle of operation
Instead of having a plunger which moves through a coil, Spider®-Valves have a flat armature that is pulled against the magnetic yoke in the energized position. The flat armature is fastened together with a leaf spring that presses the integrated sealing element against the valve seat in the de-energized position. Flat armature valves distinguish themselves according through practically frictionless movement throughout very high cycle life (depending upon application > 10⁹) and, due to the very low mass of the armature, through switching times in the microsecond (ms) range. Therefore, they are applicable as quasi-proportional valves in that they can be driven with current pulses. The response time in switching can be varied as desired to attain variable flow rates (so called pulse width modulation).

Characteristics
- Frictionless movement
- High cycle life
- Fast response times
- Small size
Cartridge type 3-way Spider®-Valve cross-sectional drawing

- solenoid connector
- Solenoid coil assembly
- R-Port size (exhaust)
- Flat armature
- A-Port size
- P-Port size
**SOLENOID VALVES**

**Spider®-Valves**

**key Features**

- Seat principle, direct actuated
- Flat armature actuation
- 2- and 3-way valves NC
- Body and inner parts stainless steel

---

Type VA 204-5

Type VA 204-7

Type VA 204-1
## Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Size</th>
<th>Orifice [mm]</th>
<th>Port size</th>
<th>Pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral and mildly aggressive liquids, Gases and vapors</td>
<td>2-way Spider®-Valve, direct actuated, NC</td>
<td>VA 204-1</td>
<td>21</td>
<td>1.0 to 4.0</td>
<td>Cartridge</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VA 204-5</td>
<td>15</td>
<td>0.5 to 2.0</td>
<td>Cartridge</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VA 204-7</td>
<td>7</td>
<td>0.3 to 1.0</td>
<td>Cartridge</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td>3-way Spider®-Valve, direct actuated, NC</td>
<td>VA 304-1</td>
<td>21</td>
<td>1.0 to 4.0</td>
<td>Cartridge</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VA 304-5</td>
<td>15</td>
<td>0.5 to 2.0</td>
<td>Cartridge</td>
<td>0 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VA 304-7</td>
<td>7</td>
<td>0.3 to 1.0</td>
<td>Cartridge</td>
<td>0 to 10</td>
</tr>
</tbody>
</table>
SOLENOID VALVES

Teflon valves

key Features

► Media separated, direct actuated
► 2-way valves NC
► 3-way switching function
► Bellow separation

Type QE 202
Type QE 203
Type QE 622
Type QE 633
## Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Orifice [mm]</th>
<th>Port size</th>
<th>Pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral and aggressive liquids,</td>
<td>2-way solenoid valve, direct actuated, NC, with bellow separation</td>
<td>QE 202</td>
<td>1.0 to 4.0</td>
<td>1/4&quot;-NPT</td>
<td>0 to 1</td>
</tr>
<tr>
<td>gases and vapors. The materials</td>
<td></td>
<td>QE 203</td>
<td>1</td>
<td>Nozzle OD6</td>
<td>0 to 1</td>
</tr>
<tr>
<td>are inherently safe.</td>
<td></td>
<td>QE 212</td>
<td>1.0 to 2.0</td>
<td>M5</td>
<td>0 to 1</td>
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<tr>
<td></td>
<td></td>
<td>QE 222</td>
<td>1.0 to 4.0</td>
<td>G1/8</td>
<td>0 to 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QE 232</td>
<td>1.0 to 4.0</td>
<td>G1/4</td>
<td>0 to 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QE 282</td>
<td>1.0 to 2.0</td>
<td>1/4&quot;-28</td>
<td>0 to 1</td>
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<tr>
<td></td>
<td></td>
<td>QE 292</td>
<td>1.0 to 2.0</td>
<td>1/8&quot;-NPT</td>
<td>0 to 1</td>
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<tr>
<td></td>
<td></td>
<td>QE 603</td>
<td>2.0 to 5.0</td>
<td>1/4&quot;-NPT</td>
<td>0 to 1</td>
</tr>
<tr>
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<td>3-way solenoid valve, switching function, with bellow separation</td>
<td>QE 612</td>
<td>1.0 to 2.0</td>
<td>M5</td>
<td>0 to 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QE 622</td>
<td>1.0 to 2.0</td>
<td>G1/8</td>
<td>0 to 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QE 623</td>
<td>3.0 to 5.0</td>
<td>G1/8</td>
<td>0 to 1</td>
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<tr>
<td></td>
<td></td>
<td>QE 633</td>
<td>2.0 to 5.0</td>
<td>G1/4</td>
<td>0 to 1</td>
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<td></td>
<td>QE 682</td>
<td>1.0 to 2.0</td>
<td>1/4&quot;-28</td>
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<td>QE 692</td>
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<td>1/8&quot;-NPT</td>
<td>0 to 1</td>
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<td></td>
<td>QE 693</td>
<td>3.0 to 5.0</td>
<td>1/8&quot;-NPT</td>
<td>0 to 1</td>
</tr>
</tbody>
</table>
SOLENOID VALVES

Valves for water-taps

key Features

- Servo actuated diaphragm principle, direct actuated
- 2-way valves NC
- Latching function
- Thread, flange and cartridge types
## Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Orifice [mm]</th>
<th>Port size</th>
<th>Pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral liquids, water</td>
<td>2-way solenoid valve, direct actuated, latching function</td>
<td>MI 210</td>
<td>1.0</td>
<td>M5</td>
<td>0 to 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PI 200</td>
<td>0.8 to 1.6</td>
<td>Flange</td>
<td>0 to 8</td>
</tr>
<tr>
<td></td>
<td>2-way solenoid valve, servo actuated, latching function</td>
<td>MI 230</td>
<td>8</td>
<td>G1/4</td>
<td>0.5 to 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MI 240</td>
<td>8</td>
<td>G3/8</td>
<td>0.5 to 8</td>
</tr>
<tr>
<td></td>
<td>2-way solenoid valve, servo actuated, latching function</td>
<td>PI 209</td>
<td>7</td>
<td>Cartridge</td>
<td>0.3 to 10</td>
</tr>
</tbody>
</table>
SOLENOID VALVES

Servo actuated valves

**key Features**

- Servo actuated diaphragm principle, direct actuated
- 2-way valves NC and NO
- Body material brass
- Inner parts stainless steel

Type MG 232
Type MG 102
Type MG 162
## Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Orifice [mm]</th>
<th>Port size</th>
<th>Pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral liquids, gases and vapors</td>
<td>2-way solenoid valve, servo actuated, NO</td>
<td>MG 102</td>
<td>32</td>
<td>G1 1/4</td>
<td>0.5 to 10</td>
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<tr>
<td></td>
<td></td>
<td>MG 102</td>
<td>40</td>
<td>G1 1/2</td>
<td>0.5 to 10</td>
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<tr>
<td></td>
<td></td>
<td>MG 102</td>
<td>50</td>
<td>G2</td>
<td>0.5 to 10</td>
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<tr>
<td></td>
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<td>MG 152</td>
<td>15</td>
<td>G1/2</td>
<td>0.5 to 10</td>
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<td>MG 162</td>
<td>20</td>
<td>G3/4</td>
<td>0.5 to 10</td>
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<td>MG 172</td>
<td>25</td>
<td>G1</td>
<td>0.5 to 10</td>
</tr>
<tr>
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<td>2-way solenoid valve, servo actuated, NC</td>
<td>MG 202</td>
<td>32</td>
<td>G1 1/4</td>
<td>0.5 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MG 202</td>
<td>40</td>
<td>G1 1/2</td>
<td>0.5 to 10</td>
</tr>
<tr>
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<td>MG 202</td>
<td>50</td>
<td>G2</td>
<td>0.5 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MG 232</td>
<td>10</td>
<td>G1/4</td>
<td>0.5 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MG 242</td>
<td>10</td>
<td>G3/8</td>
<td>0.5 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MG 252</td>
<td>10</td>
<td>G1/2</td>
<td>0.5 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MG 252</td>
<td>15</td>
<td>G1/2</td>
<td>0.5 to 10</td>
</tr>
<tr>
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<td>MG 262</td>
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<td>G3/4</td>
<td>0.5 to 10</td>
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<td>25</td>
<td>G1</td>
<td>0.5 to 10</td>
</tr>
<tr>
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<td>2-way solenoid valve, force actuated, NC</td>
<td>MZ 242</td>
<td>10</td>
<td>G3/8</td>
<td>0 to 4</td>
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<tr>
<td></td>
<td></td>
<td>MZ 252</td>
<td>10</td>
<td>G1/2</td>
<td>0 to 4</td>
</tr>
</tbody>
</table>
Water guards

Application
Solenoid valve system for automatic monitoring the leaks of water supply pipes and tubes. To be used in household and laboratory equipment.

Installation
Fully automatic monitoring can be built in to the supply pipes of a water source. The sensor lays on the floor and is connected with the control electronics through a cable. The solenoid coil and control electronics are built in to a plastic housing. The voltage supply occurs over a network cable with an adapter connector.

Function
Upon energizing, the control electronics opens the solenoid valve. The sensor can monitor a water film of approximately 0.5 mm and sends a signal to the electronics. The solenoid valve is closed and an audible alarm sounds. This condition is then reset by breaking the supply voltage.

Characteristics
- Reduces the usage of electricity by sinking the electronic holding current
- A fixed setting within the inner parts of the valve are hindered through an automatic, daily valve closing impulse (optional also without closing impulse).
- Normal widths from DN10 to DN50
- Fittings G1/2 to G2
- Sensor cable length 2 m to 20 m
- Piezo alarm system
- LED indicator of operation
SOLENOID VALVES

Water guards

**key Features**

- 2-way valve, servo actuated, NC
- Electronic control unit with leak detector
- Force actuated by leak detector
- Audible alarm

Type MW 252

Type MW 262

Type MW 202
### Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Orifice [mm]</th>
<th>Port size</th>
<th>Pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral, electrical conducting liquids and water</td>
<td>2-way solenoid valve, servo actuated, NC</td>
<td>MW 202</td>
<td>32</td>
<td>G1 1/4</td>
<td>0.5 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MW 202</td>
<td>40</td>
<td>G1 1/2</td>
<td>0.5 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MW 202</td>
<td>50</td>
<td>G2</td>
<td>0.5 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MW 252</td>
<td>15</td>
<td>G1/2</td>
<td>0.5 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MW 262</td>
<td>10</td>
<td>G3/4</td>
<td>0.5 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MW 262</td>
<td>20</td>
<td>G3/4</td>
<td>0.5 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MW 272</td>
<td>25</td>
<td>G1</td>
<td>0.5 to 10</td>
</tr>
</tbody>
</table>

For more information look at [www.staiger.de](http://www.staiger.de)
Valve electronics
Valve electronic accessories

- Electronic adapters
- Light emitting seals
- Light emitting sockets
VALVE ELECTRONICS

Electronic adapter

**key Features**

- Electronic devices for solenoid valves
- Pluggable to solenoid
- Timer functions
- Transient voltage protection, power reduction

Type EG

Type ZE-SAW

Type ZV-SAH

Type ZI-SAD
## Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic timer</td>
<td>Cycle controller</td>
<td>ZE-SAD</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ZE-SAH</td>
<td>BI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ZE-SAW</td>
<td>A</td>
</tr>
<tr>
<td>Transient voltage protection</td>
<td>Switch-on impulse</td>
<td>ZI-SAD</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ZI-SAH</td>
<td>BI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ZI-SAW</td>
<td>A</td>
</tr>
<tr>
<td>Power reduction</td>
<td>Switch-on delay</td>
<td>ZV-SAD</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ZV-SAH</td>
<td>BI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ZV-SAW</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Transient voltage protection</td>
<td>EG-SAD</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EG-SAH</td>
<td>BI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EG-SAW</td>
<td>A</td>
</tr>
</tbody>
</table>

For more information, look at [www.staiger.de](http://www.staiger.de)
Light emitting seal

**key Features**

- Lights – seals – protects
- Flat seal with integrated circuit
- LED and transient voltage suppression
- Sealing material PUR

**Type LD-SAW**

**Type LD-SAH**

**Type LD-SAD**
### Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Circuit</th>
<th>Voltage</th>
<th>Solenoid valve power consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>pin-connector DIN EN 175301-803 size A</td>
<td>seal and light</td>
<td>LD-SAW-R</td>
<td>LED</td>
<td>24V / 48V / 115 V / 230 V</td>
<td>max. 100W</td>
</tr>
<tr>
<td></td>
<td>seal and light and protection</td>
<td>LD-SAW-B</td>
<td>LED and Zener diodes</td>
<td>24V</td>
<td>max. 15W</td>
</tr>
<tr>
<td></td>
<td>seal and light and protection</td>
<td>LD-SAW-S</td>
<td>LED and Suppressor diodes</td>
<td>24V / 48V / 115 V / 230 V</td>
<td>max. 50W</td>
</tr>
<tr>
<td>pin-connector DIN EN 175301-803 size B</td>
<td>seal and light</td>
<td>LD-SAD-R</td>
<td>LED</td>
<td>24V / 48V / 115 V / 230 V</td>
<td>max. 100W</td>
</tr>
<tr>
<td></td>
<td>seal and light and protection</td>
<td>LD-SAD-B</td>
<td>LED and Zener diodes</td>
<td>24V</td>
<td>max. 15W</td>
</tr>
<tr>
<td></td>
<td>seal and light and protection</td>
<td>LD-SAD-S</td>
<td>LED and Suppressor diodes</td>
<td>24V / 48V / 115 V / 230 V</td>
<td>max. 50W</td>
</tr>
<tr>
<td></td>
<td>seal and light and protection</td>
<td>LD-SAH-B</td>
<td>LED and Zener diodes</td>
<td>24V</td>
<td>max. 15W</td>
</tr>
<tr>
<td></td>
<td>seal and light and protection</td>
<td>LD-SAH-S</td>
<td>LED and Suppressor diodes</td>
<td>24V / 48V / 115 V / 230 V</td>
<td>max. 50W</td>
</tr>
<tr>
<td>pin-connector DIN EN 175301-803 size C</td>
<td>seal and light</td>
<td>LD-SAB-R</td>
<td>LED</td>
<td>24V / 48V / 115 V / 230 V</td>
<td>max. 100W</td>
</tr>
<tr>
<td></td>
<td>seal and light and protection</td>
<td>LD-SAB-Z</td>
<td>LED and Zener diodes</td>
<td>24V</td>
<td>max. 15W</td>
</tr>
<tr>
<td>pin-connector DIN EN 175301-803 size CI</td>
<td>seal and light</td>
<td>LD-SAK-R</td>
<td>LED</td>
<td>24V / 48V / 115 V / 230 V</td>
<td>max. 15W</td>
</tr>
<tr>
<td></td>
<td>seal and light and protection</td>
<td>LD-SAK-Z</td>
<td>LED and Zener diodes</td>
<td>24V</td>
<td>max. 15W</td>
</tr>
</tbody>
</table>
VALVE ELECTRONICS

Light emitting socket

key Features

- Socket with moulded cable
- Integrated seal and screw
- LED
- Transient voltage protection
## Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Circuit</th>
<th>Voltage</th>
<th>Solenoid valve power consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>pin-connector DIN EN 175301-803 size A</td>
<td>cable socket</td>
<td>LL-SAW-O</td>
<td>-</td>
<td>max. 250V</td>
<td>max. 100W</td>
</tr>
<tr>
<td></td>
<td>cable socket, LED and protection</td>
<td>LL-SAW-S</td>
<td>LED and Suppressor diodes</td>
<td>24V</td>
<td>max. 50W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LL-SAW-V</td>
<td>LED and Varistor</td>
<td>230V</td>
<td>max. 50W</td>
</tr>
<tr>
<td>pin-connector DIN EN 175301-803 size B</td>
<td>cable socket</td>
<td>LL-SAD-O</td>
<td>-</td>
<td>max. 250V</td>
<td>max. 100W</td>
</tr>
<tr>
<td></td>
<td>cable socket, LED and protection</td>
<td>LL-SAD-S</td>
<td>LED and Suppressor diodes</td>
<td>24V</td>
<td>max. 50W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LL-SAD-V</td>
<td>LED and Varistor</td>
<td>230V</td>
<td>max. 50W</td>
</tr>
<tr>
<td>pin-connector DIN EN 175301-803 size B</td>
<td>cable socket</td>
<td>LL-SAH-O</td>
<td>-</td>
<td>max. 250V</td>
<td>max. 100W</td>
</tr>
<tr>
<td></td>
<td>cable socket, LED and protection</td>
<td>LL-SAH-S</td>
<td>LED and Suppressor diodes</td>
<td>24V</td>
<td>max. 50W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LL-SAH-V</td>
<td>LED and Varistor</td>
<td>230V</td>
<td>max. 50W</td>
</tr>
<tr>
<td>pin-connector DIN EN 175301-803 size C</td>
<td>cable socket</td>
<td>LL-SAB-O</td>
<td>LED</td>
<td>max. 250V</td>
<td>max. 100W</td>
</tr>
<tr>
<td></td>
<td>cable socket, LED and protection</td>
<td>LL-SAB-Z</td>
<td>LED and Zener diodes</td>
<td>24V</td>
<td>max. 15W</td>
</tr>
</tbody>
</table>

All sockets are available with cable 3 x 0.75 mm² in length 1.5 m / 3 m / 5 m
CHAPTER 05

Pneumatic Module
3-way and 4-way manifolds for pneumatic-applications

- Pneumatic Module with parallel control unit
- Pneumatic Module with distributor unit
- Pneumatic Module with programmable Controller
Pneumatic Module

High performance pneumatics in European card format with multifaceted control possibilities – an alternative valve manifold.

The development of this idea goes all the way back to the year 1977 when the very first valve manifolds were mounted onto PC boards. A subsequent further development of this concept has enabled us to realize our universal Pneumatic Module through „non-housed integration technology“. The number of valves per module corresponds to the base unit of digital information and signal processing: 8 bits – 8 valves. The system overlapping relationship enables control of the Pneumatic Module through SPS, IC’s, ASIC’s or PC in a meaningful way. With it’s modular elements, the compact module is suitable for many centralized and decentralized control assignments.

**Characteristics**
- Multiple-port valve block, servo controlled, spool principle, normally closed and normally open
- Compact design form, small dimensions
- Simple installation
- Minimal installation work through quick connect pneumatic and electrical connections
- Very affordable price versus performance relationship

**Application**
- High performance pneumatics
  Orifice 4 mm, 8 bar, 0,4 m³/h
- Compressed air and neutral gases
- Pneumatic applications for devices, systems, and testing
**Connector cable for electrical control**

**Air dampening for common exhaust**

**Pilot valve**

**Manual override**

**Contact strip, internal connections with LED and protective circuits, encapsulated**

**Quick connector for pneumatic hoses (exits and common supplies)**

**Base block with internal channels for air distribution**

**Non-housed integration: main control valve integrated in the base block**
PNEUMATIC MODULE

Pneumatic Module & parallel control unit

key Features

- Spool principle, servo actuated
- 3-way and 4-way manifold valves
- Parallel control
- Power pneumatics
## Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>Number of 3-way valves</th>
<th>Number of 4-way valves</th>
</tr>
</thead>
<tbody>
<tr>
<td>compressed air and neutral gases</td>
<td>Multiple-port valve block, servo actuated, with parallel control unit</td>
<td>MR 000-001</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MR 000-003</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MR 000-005</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MR 800-001</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MR 900-001</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

For more information look at [www.staiger.de](http://www.staiger.de)
**PNEUMATIC MODULE**

Pneumatic Module & distributer unit

**key Features**

- Spool principle, servo actuated
- 3-way and 4-way manifold valves
- Parallel control with distributer unit
- Power pneumatics

Type CR 000-003

Type CR 800-001

Type CR 900-001
### Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>No. of 3-way valves</th>
<th>No. of 4-way valves</th>
</tr>
</thead>
<tbody>
<tr>
<td>compressed air and neutral gases</td>
<td>Multiple-port valve block, servo actuated, with parallel control unit and M8-distributor</td>
<td>CR 000-001</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CR 000-003</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CR 000-005</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CR 800-001</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CR 900-001</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

For more information look at [www.staiger.de](http://www.staiger.de)
Pneumatic Module & programmable controller

<table>
<thead>
<tr>
<th>key Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>✍ Spool principle, servo actuated</td>
</tr>
<tr>
<td>✍ 3-way and 4-way manifold valves</td>
</tr>
<tr>
<td>✍ Programmable control unit</td>
</tr>
<tr>
<td>✍ Power pneumatics</td>
</tr>
</tbody>
</table>

Type SR 800-001
Type SR 000-003
Type MR 900-001
### Type summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Function</th>
<th>Type</th>
<th>No. of 3-way valves</th>
<th>No. of 4-way valves</th>
</tr>
</thead>
<tbody>
<tr>
<td>compressed air and neutral gases</td>
<td>Multiple-port valve block, servo actuated, programmable</td>
<td>SR 000-001</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SR 000-003</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SR 000-005</td>
<td>2</td>
<td>3</td>
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<tr>
<td></td>
<td></td>
<td>SR 800-001</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SR 900-001</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>
Technical information
Useful and worth knowing

- Type designation of solenoid valves
- Principles of operation
- Valve characteristics
- Certification, product safety and CE marking
- Transient voltage suppression
- Patents and Trade fairs
- Sales partners and how to find us
- Architecture
TECHNICAL INFORMATION

Type designation

M A 2 1 1 - 0 0 1 P

- Sealing material
- Serial number
- Actuation
- Port size
- Operating function
- Principle of operation
- Version
# Version

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Manifolds with Bus control</td>
</tr>
<tr>
<td>C</td>
<td>Manifolds with electrical distributor</td>
</tr>
<tr>
<td>E</td>
<td>Cartridge valve without housing</td>
</tr>
<tr>
<td>M</td>
<td>Body material non-ferrous metal (brass, aluminum, red bronze, etc.)</td>
</tr>
<tr>
<td>P</td>
<td>Body material plastic</td>
</tr>
<tr>
<td>Q</td>
<td>Body material fluoro-plastic (e.g. Teflon®)</td>
</tr>
<tr>
<td>S</td>
<td>Manifolds with electrical controller</td>
</tr>
<tr>
<td>V</td>
<td>Body material stainless steel</td>
</tr>
</tbody>
</table>
**TECHNICAL INFORMATION**

**Type designation**

M A 2 1 1 - 0 0 1 P

- Sealing material
- Serial number
- Actuation
- Port size
- Operating function
- Principle of operation
- Version
# Principle of operation

<table>
<thead>
<tr>
<th>A</th>
<th>Seat principle, direct solenoid actuation</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Pinch valve principle</td>
</tr>
<tr>
<td>C</td>
<td>Non-return valve</td>
</tr>
<tr>
<td>D</td>
<td>Diaphragm pressure switch</td>
</tr>
<tr>
<td>E</td>
<td>Diaphragm principle</td>
</tr>
<tr>
<td>F</td>
<td>Level (filling) control</td>
</tr>
<tr>
<td>G</td>
<td>Servo actuated diaphragm principle, same medium, direct solenoid actuation</td>
</tr>
<tr>
<td>H</td>
<td>Mechanically actuated</td>
</tr>
<tr>
<td>I</td>
<td>Impulse solenoid actuated (latching valve)</td>
</tr>
<tr>
<td>J</td>
<td>External actuated</td>
</tr>
<tr>
<td>K</td>
<td>Actuator</td>
</tr>
<tr>
<td>L</td>
<td>Motor actuated</td>
</tr>
<tr>
<td>M</td>
<td>Coil control pushing principle, direct solenoid actuation</td>
</tr>
<tr>
<td>N</td>
<td>Lever-diaphragm principle</td>
</tr>
<tr>
<td>O</td>
<td>Proportional principle</td>
</tr>
<tr>
<td>P</td>
<td>Coil control seat principle, direct working solenoid actuation</td>
</tr>
<tr>
<td>Q</td>
<td>Condensation drain valve</td>
</tr>
<tr>
<td>R</td>
<td>Coil control pushing principle, remote controlled</td>
</tr>
<tr>
<td>S</td>
<td>Coil control seat principle, remote controlled</td>
</tr>
<tr>
<td>T</td>
<td>Water guard (watcher)</td>
</tr>
<tr>
<td>U</td>
<td>Special device</td>
</tr>
<tr>
<td>V</td>
<td>Force actuated</td>
</tr>
</tbody>
</table>
**Type designation**

```
M A 211 - 001 P
```

- **Sealing material**
- **Serial number**
- **Actuation**
- **Port size**
- **Operating function**
- **Principle of operation**
- **Version**
### Operating function

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2-way function NO (normally open)</td>
</tr>
<tr>
<td>2</td>
<td>2-way function NC (normally closed)</td>
</tr>
<tr>
<td>3</td>
<td>3-way function NC (normally closed)</td>
</tr>
<tr>
<td>4</td>
<td>3-way function NO (normally open)</td>
</tr>
<tr>
<td>5</td>
<td>4- and 5-way function</td>
</tr>
<tr>
<td>6</td>
<td>3-way switching function</td>
</tr>
<tr>
<td>7</td>
<td>2-way function, multiple</td>
</tr>
<tr>
<td>8</td>
<td>3-way function, multiple</td>
</tr>
<tr>
<td>9</td>
<td>4- and 5-way function, multiple</td>
</tr>
<tr>
<td>0</td>
<td>special function</td>
</tr>
</tbody>
</table>
Type designation

M A 2 1 1 - 0 0 1 P

- Sealing material
- Serial number
- Actuation
- Port size
- Operating function
- Principle of operation
- Version
## Port size

<table>
<thead>
<tr>
<th></th>
<th>Port Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M5 thread</td>
</tr>
<tr>
<td>2</td>
<td>G 1/8 thread</td>
</tr>
<tr>
<td>3</td>
<td>G 1/4 thread</td>
</tr>
<tr>
<td>4</td>
<td>G 3/8 thread</td>
</tr>
<tr>
<td>5</td>
<td>G 1/2 thread</td>
</tr>
<tr>
<td>6</td>
<td>G 3/4 thread</td>
</tr>
<tr>
<td>7</td>
<td>G 1 thread</td>
</tr>
<tr>
<td>8</td>
<td>1/4&quot;-28 thread</td>
</tr>
<tr>
<td>9</td>
<td>1/8&quot;-NPT thread</td>
</tr>
<tr>
<td>0</td>
<td>Special connection (e.g. flange, hose-barb, other threads, etc.)</td>
</tr>
</tbody>
</table>
**TECHNICAL INFORMATION**

**Type designation**

M A 2 1 1 - 0 0 1 P

- **Sealing material**
- **Serial number**
- **Actuation**
- **Port size**
- **Operating function**
- **Principle of operation**
- **Version**
## Actuation

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>0</td>
<td>15 mm solenoid actuation</td>
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<tr>
<td>1</td>
<td>20 mm solenoid actuation</td>
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<tr>
<td>2</td>
<td>27 mm solenoid actuation</td>
</tr>
<tr>
<td>3</td>
<td>32 mm solenoid actuation</td>
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<tr>
<td>4</td>
<td>Flat armature actuation</td>
</tr>
<tr>
<td>5</td>
<td>-</td>
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<tr>
<td>6</td>
<td>10 mm solenoid actuation</td>
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<tr>
<td>7</td>
<td>Pneumatic actuation</td>
</tr>
<tr>
<td>8</td>
<td>Mechanical actuation</td>
</tr>
<tr>
<td>9</td>
<td>Special actuation</td>
</tr>
</tbody>
</table>
TECHNICAL INFORMATION

Type designation

M  A  2  1  1  -  0  0  1  P

- Sealing material
- Serial number
- Actuation
- Port size
- Operating function
- Principle of operation
- Version
## Sealing material

<table>
<thead>
<tr>
<th>Letter</th>
<th>Sealing Material</th>
<th>Temperature Range</th>
<th>Compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Ethylene Propylene EPDM Nitrile</td>
<td>-30 °C to +130 °C</td>
<td>Hot water, steam, detergents, and other oil- and fat-free medium</td>
</tr>
<tr>
<td>P</td>
<td>NBR / Perbunan®</td>
<td>-10 °C to +90 °C</td>
<td>Water, pressurized air, natural gas, LP gas, gasoline, hydraulic oil, including similar neutral medium</td>
</tr>
<tr>
<td>Q</td>
<td>Fluorosilicone MFQ</td>
<td>-55 °C to +175 °C</td>
<td>Fuels, mineral oils, and glycol-based brake fluids</td>
</tr>
<tr>
<td>R</td>
<td>Ruby / Sapphire</td>
<td>-40 °C to +200 °C</td>
<td>Hot oils, steam, carbon-based liquids, and similar medium</td>
</tr>
<tr>
<td>S</td>
<td>Silicone MVQ</td>
<td>-60 °C to +200 °C</td>
<td>Oxygen, ozone, water up to 100 °C, and carbon-based liquids</td>
</tr>
<tr>
<td>T</td>
<td>Polytetrafluoroethylene PTFE / Teflon®</td>
<td>&lt;-80 °C to +260 °C</td>
<td>Aggressive liquids, gases, steam; inherently safe</td>
</tr>
<tr>
<td>V</td>
<td>FPM / Viton®</td>
<td>-10 °C to +150 °C</td>
<td>Heated air, hot oils, solvents, and medium not suitable for EPDM</td>
</tr>
<tr>
<td>Z</td>
<td>Kalrez® / Simriz®</td>
<td>-20 °C to +150 °C</td>
<td>Polarized and organic solvents, inorganic and organic acids, lye, chlorine, metallic halogen solutions, etc.</td>
</tr>
</tbody>
</table>
Principles of operation

2-way solenoid valve, direct actuated, NC (normally closed)

In the resting position a spring pushes the plunger with seal against the valve seat. The media hereby supports the sealing action. Upon energizing the solenoid, the plunger is pulled away from the valve seat through magnetic energy and thereby opened. The media can flow uninhibited from P to A. Upon de-energizing the solenoid, a spring pushes the plunger against the valve seat and closes the valve.

3-way solenoid valve, direct actuated, NC (normally closed)

In the resting position a spring pushes the plunger against valve seat P, and exhaust A is connected with R. Upon energizing the solenoid, the plunger is pulled against seat R through magnetic energy and thereby closed. The connection P to A is thus opened. The media flows along the plunger. Upon de-energizing the solenoid, a spring pushes the plunger back into the resting position again.
2-way solenoid valve, direct actuated, NO (normally open)

In the resting position a spring pushes the sealing element against the plunger. The valve is open. Upon energizing the solenoid, the plunger is pulled through magnetic energy. The plunger presses thereby the sealing element against the valve seat. The valve is then closed. The media supports the sealing action. Upon de-energizing the solenoid, a spring presses the sealing element including plunger upwards and the valve is then opened.
Principles of operation

2-way solenoid valve, direct actuated, with diaphragm separation, NC (normally closed)
In the resting position a spring presses the plunger including diaphragm against the valve seat. Upon energizing the solenoid, the plunger and diaphragm are pulled away from the valve seat through magnetic energy. The valve is thereby opened. Upon de-energizing the solenoid, a spring presses the plunger with diaphragm against the valve seat and the valve is closed. The diaphragm separates the media from the inner solenoid components.

2-way solenoid valve, direct actuated, with diaphragm separation, NC (normally closed)
In the resting position a spring presses the plunger including diaphragm against the valve seat. Upon energizing the solenoid, the plunger and diaphragm are pulled away from the valve seat through magnetic energy. The valve is thereby open. Upon de-energizing the solenoid, a spring presses the plunger with diaphragm against the valve seat and the valve is closed. The diaphragm is designed such that the working diameter equals the inner diameter of the plunger tube.
2-way solenoid valve, direct actuated, with bellow separation, NC (normally closed)

In the resting position a spring presses the plunger including bellow against the valve seat. Upon energizing the solenoid, the plunger and bellow are pulled away from the valve seat through magnetic energy. The valve is thereby opened. Upon de-energizing the solenoid, a spring presses the plunger with bellow against the valve seat and the valve is closed. The bellow separates the media from the internal solenoid components.

3-way solenoid valve, direct actuated, with bellow separation, universal function

In the resting position a spring pushes the plunger including sealing element against the NC valve seat and seals it shut. The C port is connected with the NO port. Upon energizing the solenoid, the plunger with sealing element are pulled against the spring force through magnetic energy. Hereby is port C connected with port NC, and port NO is closed. Upon de-energizing the solenoid, the resting position is assumed again. The bellows separates the media from the inner solenoid components.
Principles of operation

2-way solenoid valve, servo acutated, NC (normally closed)

In the resting position a spring presses the plunger including sealing element against the servo valve seat located in the diaphragm. The valve is closed. Upon energizing the solenoid, the plunger is pulled against the spring force through the magnetic energy and the servo orifice opens. The pressure relieved diaphragm is lifted upwards by the pressure of the media and the main valve seat opens. Upon de-energizing the solenoid, the spring pushes the plunger back against the servo valve seat. Hereby pressure accumulates behind the diaphragm which presses the diaphragm against the main valve seat. The valve is thus closed.

2-way solenoid valve, servo acutated, NC (normally closed)

In the resting position a spring pushes the plunger including sealing element against the servo valve seat. The valve is closed. Upon energizing the solenoid, the plunger is pulled against the spring force through magnetic energy and the servo valve opens. The pressure relieved diaphragm is lifted up by the pressure of the media and the valve is opened. Upon de-energizing the solenoid, a spring pushes the plunger back against the servo valve seat. Hereby pressure accumulates behind the diaphragm which presses the diaphragm against the valve seat. The valve is thus closed.
2-way solenoid valve, servo actuated, NO (normally open)

In the resting position a spring pushes the plunger against the sealing element. The normally open servo orifice relieves the diaphragm and thereby the valve is open. Upon energizing the solenoid, the plunger is pulled against the upper spring force through magnetic energy. The sealing element closes the servo orifice. Hereby the pressure behind the diaphragm rises and presses the diaphragm against the valve seat and closes the valve. Upon de-energizing the solenoid, the spring pushes the plunger against the sealing element and the servo valve opens. Through the relief of pressure the diaphragm gives the valve seat free and the valve is thus opened.

2-way proportional solenoid valve, direct actuated, NC (normally closed)

In the resting position a spring pushes the plunger including sealing element against the valve seat. A proportional magnet field builds within the current when the solenoid is energized. The plunger is lifted away from the valve seat according to the current and thereby the equivalent through flow of the valve is proportional to the changing current. Upon de-energizing the solenoid, the spring pushes the plunger with sealing element against the valve seat and the valve is thereby closed.
**Principles of operation**

**2-way solenoid valve, latching function**
The valve has two stable positions of resting. In the spring resting position a spring pushes the plunger with sealing element against the valve seat. Through a short current impulse the plunger is lifted up from the valve seat and goes into the magnetic resting position; the built-in permanent magnet supports hereby the opening. The media can flow from P to A. A short current impulse in the reversed polarity pushes the plunger back into the spring resting position. The valve is closed. The media supports the sealing action.

**2-way solenoid valve, servo actuated, latching function**
The valve has two stable resting positions. In the spring resting position a spring pushes the plunger with sealing element against the servo valve seat; the valve is closed. A short current impulse pulls the plunger away from valve seat and goes into the magnetic resting position. The pressure relieved diaphragm is lifted up by the pressure of the media; the valve is open. Through a short current impulse in the reversed polarity the plunger is pushed away and goes back into the spring resting position. The pressure rise behind the diaphragm and presses the diaphragm against the valve seat and the valve is closed.
3-way solenoid valve, latching function

The valve has two stable resting positions. In the spring resting position a spring pushes the plunger with sealing element against the valve seat P. Exhaust A is connected with R. Through a short current impulse the plunger is pulled against the seat R and goes into the magnetic resting position. A built-in permanent magnet supports thereby the opening. The media flows from P to A. Through a short current impulse in the reversed polarity the plunger is pushed away and goes back into the spring resting position.

3-way lever diaphragm valve, direct actuated, switching function

In the resting position a spring pushes the plunger against the lever with a diaphragm; and those against the valve seat NC. Hereby is port C connected with NO. Upon energizing the solenoid, the plunger is attracted and the lever closes NO; the port C is connected with NC. The media is separated from the magnet system by the diaphragm. Upon de-energizing the solenoid, the spring pushes the plunger back into the resting position again and the port C to NO is again connected.
**Principles of operation**

**2-way lever diaphragm valve, direct actuated, NC (normally closed)**

In the resting position a spring pushes the plunger against the lever which presses the sealing surface against the valve seat P. The valve is closed. Upon energizing the solenoid, the plunger is attracted and the lever moves away from port P, and the valve is opened. The media is separated from the magnet system by the diaphragm. Upon de-energizing the solenoid, the spring pushes the plunger back into the resting position again and closes the valve.

**2-way pinch valve, direct actuated, NO (normally open)**

In the resting position the cross section of the tube is open. Upon energizing the solenoid the plunger is pulled against the spring force through magnetic energy. Hereby is the tube pinched shut. Upon de-energizing the solenoid, the cross section of the tube is open up again. With this design the media does not come into contact with the inner parts of the valve.
2-way pinch valve, direct actuated, NC (normally closed)

In the resting position the cross section of the tube is pinched shut. Upon energizing the solenoid, the plunger is pulled against the spring force through magnetic energy. Hereby is the tube opened. Upon de-energizing the solenoid, the cross section of the tube is pinched shut again. With this design the media does not come into contact with the internal parts of the valve.

4-way pinch valve, direct actuated

In the resting position a spring pushes the plunger against the lower tube and pinches it shut. The upper tube is open. Upon energizing the solenoid the plunger is pulled against the spring force. Hereby is the upper tube pinched shut and the lower tube opened again. Upon de-energizing the solenoid the spring pushes the plunger back into the resting position. With this valve design the media only comes into contact with the applied tube.
Principles of operation

3-way solenoid valve, servo actuated, spool control principle, NC (normally closed)

In the resting position a spring pushes the sealing element with seal against valve seat P.

The connection A to R is opened. Upon energizing the solenoid the 3-way valve is opened and the control spool is actuated from pressure. Hereby the sealing element is pushed against the valve seat R. The connection P to A is simultaneously made, and the valve is opened. Upon de-energizing the solenoid, the servo valve closes and the spring pushes the sealing element back into the resting position.

3-way spool valve, servo actuated, NC (normally closed)

In the normal state a spring holds the spool in its resting position; hereby is P blocked; and the pilot valve is also closed. Upon energizing the solenoid, the pilot valve is opened and the control cylinder pushes the spool into the switching position. The connection from P to A is opened; and R is blocked. Upon closing the pilot valve, a spring pushes the plunger back again into the resting position and the spool comes through the spring also into its resting position. The valve is closed.
5-way spool valve, servo actuated

In the normal state a spring holds the spool in its resting position. Hereby are the connections P with B and A with R made; and S is blocked. The pilot valve is closed. Upon energizing the solenoid, the pilot valve is opened and the control cylinder pushes the spool into the switch position. The connections from P to A and B to S are opened; R is blocked. Upon de-energizing the solenoid, the pilot valve pushes a spring against the plunger back into the resting position and the spool comes through the spring into its resting position. The connections P-B and A-R are opened again.

5-way solenoid valve, direct actuated

In the resting position a spring pushes the plunger including sealing element against the valve seat. The connections P with B and A with R are made; and S is closed. Upon energizing the solenoid, the connections P with A and B with S are made; and R is closed. Upon de-energizing the solenoid, the plunger and the sealing element fall back into its resting position.
Principles of operation

2-way tube-seat valve, direct actuated, NC (normally closed)
In the resting position a spring pushes the plunger with the tube system against the sealing element. The media supports the sealing action hereby. Upon energizing the solenoid, the plunger with the tube system is pulled away from the seal and through flow is free. The media flows from P to A. Upon de-energizing the solenoid, a spring pushes the plunger back into the resting position and the valve is closed.

3-way tube-seat valve, direct actuated, switching function
In the resting position a spring pushes the plunger with the tube system against the sealing element by NC; C is connected with NO. The media supports the sealing action hereby. Upon energizing the solenoid, the plunger with the tube system is pushed against the upper sealing element and seals NO shut; C to NC is open. Upon de-energizing the solenoid, a spring pushes the plunger back into the resting position and C to NO is connected again.
2-way tube-seat valve, direct actuated, NC (normally closed)

In the resting position a spring pushes the plunger with the tube system against the sealing element. The media supports the sealing action hereby. Upon energizing the solenoid, the plunger with the tube system is pulled away from the seal and through flow is free. The media flows from P to A. Upon de-energizing the solenoid, a spring pushes the plunger back into the resting position and the valve is closed.

2-way solenoid valve, direct actuated, NO (normally open)

In the resting position a spring pushes the sealing element against the plunger. The servo valve seat is open and the control chamber is depressurized. The diaphragm is held in the „open“ position by the through flow of the media. Upon energizing the solenoid, the plunger is pulled away through the electrical energy. The plunger thereby pushes the sealing element against the servo valve seat. Pressure begins to accumulate in the control chamber and because of its working area, the diaphragm is held in the „closed“ position.
Principles of operation

2-way solenoid valve, servo actuated, NC (normally closed)
In the resting position a spring pushes the plunger against the servo valve seat. Pressure accumulates in the control chamber and because of its working area, the diaphragm is held in the „closed“ position. Upon energizing the solenoid, the plunger is pulled against the spring force through magnetic energy and the servo valve seat opens. Hereby the control chamber is relieved and the diaphragm held in the „open“ position by the through flow of the media. Hereto is a minimum pressure differential necessary.

2-way Spider®-Valve, direct actuated, NC (normally closed)
In the resting position the leaf spring pushes the disk armature with sealing element against the valve seat. The media supports the sealing action. Upon energizing the solenoid, the disk armature is lifted away from valve and allows through flow. The media flows from P to A. Upon de-energizing the solenoid, the leaf spring pushes the disk armature back against the valve seat and the valve is closed.
3-way Spider®-Valve, direct actuated, NC (normally closed)

In the resting position a leaf spring pushes the disk armature with sealing against valve seat P. Port A is connected with port R. Upon energizing the solenoid, the disk armature is attracted and seals off exhaust R. The connection from P to A is opened. The media flows around the armature. Upon de-energizing the solenoid, the leaf spring pushes the disk armature back into the resting position again, and the valve is closed.

2-way Spider®-Diaphragm-Valve, direct actuated, NC (normally closed)

In the resting position a leaf spring pushes the disk armature with integrated sealing element against the valve seat. The media separated from the magnet system by the diaphragm. Upon energizing the solenoid, the disk armature is lifted away from the valve seat allowing flow through the valve. The media flows from P to A. Upon de-energizing the solenoid the leaf spring pushes the disk armature against the valve seat and the valve is closed.
Principles of operation

**2-way Spider®-Valve, direct actuated, NO (normally open)**

In the resting position a leaf spring pushes the disk armature into the lower position. Port P is connected with port A. Upon energizing the solenoid the armature is lifted and seals port P, the valve is closed. Upon de-energizing the leaf spring pushes the armature back into the resting position and opens the valve.

**2-way valve, direct actuated, NO (normally open)**

In the resting position a spring pushes the plunger against a block. The valve is open, the media can flow. Upon energizing the solenoid, the plunger is pulled against the upper seat. The valve is closed. Upon de-energizing the solenoid the spring pushes the plunger back to the resting position and opens the valve.
2-way valve, direct actuated, NC (normally closed)
In the resting position a spring pushes the plunger with seal against the valve seat. The media hereby supports the sealing action. Upon energizing the solenoid, the plunger is pulled away from the valve seat through magnetic energy and thereby opened. The media can flow uninhibited from P to A. Upon de-energizing the solenoid, a spring pushes the plunger against the valve seat and closes the valve.

3-way valve, direct actuated, NO (normally open)
In the resting position a spring pushes the plunger against the exhaust seat. The valve is open, the media can flow from P to A. Upon energizing the solenoid, the plunger is pulled against the upper seat. The valve is closed. The media can exhaust from A to R. Upon de-energizing the solenoid the spring pushes the plunger back to the resting position and opens the valve.
Principles of operation

3-way valve, direct actuated, NC (normally closed)
In the resting position a spring pushes the plunger against valve seat P, and exhaust A is connected with R. Upon energizing the solenoid, the plunger is pulled against seat R through magnetic energy and thereby closed. The connection P to A is thus opened. Upon de-energizing the solenoid, a spring pushes the plunger back into the resting position again.

2-way Flat-Pack®-Valve, direct actuated, with solenoid
The slide is made of a thin metal foil, which is beared between two connection plates P and A. The position of the hole in the slide defines the way through the valve body. The slide is direct actuated with a solenoid.
2-way Flat-Pack®-Valve, direct actuated, with motor drive

The slide is made of a thin metal foil, which is beared between two connection plates P and A. The position of the hole in the slide defines the way through the valve body. The slide is direct actuated with a Faulhaber Smoovy motor drive.

2-way Flat-Pack®-Valve, direct actuated, with piezo-actuator

The slide is made of a thin metal foil, which is beared between two connection plates P and A. The position of the hole in the slide defines the way through the valve body. The slide is direct actuated with a piezo-actuator.
Valve characteristics

**Orifice [mm]**
The orifice is indicated as nominal equivalent orifice (DN). This is the diameter of the smallest cross section of flow, measured in [mm], that the media of the valve flows through.

**Pressure Differential [bar]**
The pressure differential is the maximum pressure drop over the valve by the operating functions of the valve. Valves for alternating current have higher values as direct current valves. The minimum pressure difference is the smallest pressure drop, by which the valve still reliably operates.

**kv-Value [ltr/min] and Kv-Value [m³/h]**
The flow coefficient „kv“ is a specific volumetric through flow, referenced to the media water (temperature 5°C to 40°C), that flows through a a valve with a given orifice size by a pressure difference of 1 bar.
Conversion factor: 1 [m³/h] = 16,7 [ltr./min.] oder 0,06 [m³/h] = 1 [ltr./min.]
Static Pressure [bar]
The static pressure is the maximum pressure that the connections of the valve can withstand.

Viscosity of the Media [mm²/s], [°E]
The viscosity is the flow resistance of a media determined through the internal friction of the valve. The dynamic viscosity is listed in our data sheets, which are expressed in the units of mm²/s (Centistroke) and °E (°Engler).

Response Time
The response time is expressed as the maximum number of actuation per second. The switch on time is the time between the closing of the current flow and final impact of the plunger in its end position.
The switch off time is the time between the opening of the current flow and the arrival of the plunger in its resting position.
Staiger solenoid valves are used in a vast array of applications and therefore must comply with all of the required regulations.

In general, it goes without saying that our products are designed, assembled and tested according to all of the applicable VDE regulations. Above and beyond these however, there are also special areas of technical safety; for example usage in gas applications or in potentially explosive areas.

Special rules and regulations apply hereto. A series of our solenoid valves have been approved for usage in gas applications according to the requirements outlined in DIN EN 161 Class A and B.

A further production series of our solenoid valves was especially designed for applications requiring no electrical emissions, in particular for usage in explosion endangered areas, and are thereby approved as individually safe.
Solenoid valves, valve electronics and Pneumatic Module from the house of Staiger are tested according to DIN and IEC regulations and are also, of course, accordingly marked. Hereby taken into consideration is the low voltage regulation 73/23/EWG and the criteria according to the EG machine safety, regulation 89/392/EWG. Any applicable manufacturers declaration can also be requested.

A further important base which our products are evaluated are the regulations applicable to electromagnetic compatibility. In general, the EMV regulation 89/336/EWG applies hereto. For the determination of unwanted electrical transmissions, especially safety against transient disturbance, the special norms EN 50081-1 and 50082-2 are taken into design consideration.

Our solenoid valves are divided into two basic categories according to the applicable regulations which must be taken into consideration, namely: Solenoid valves without additional electronic parts. Solenoid valves with electrical parts, such as suppressor diodes, rectifiers, varistors etc.
When switching off solenoid valves, transient voltage occurs that can damage both switching components and control electronics. Therefore with solenoid valve applications it is relevant to consider methods of suppression unwanted electrical impulses. There are several possibilities offered to achieve impulse suppression, and these are by their methodology optimally suited for each application. There are, for example, solenoids with integrated protection switches (suppresordiodes or varistors) built into the connector or lead assembly between adapters.

With each electrical control element such as timers, connector housings or adapters, the switching elements are already optimally protected internally. We also offer other types of products with integrated protective circuits, such as our light emitting seals and light emitting plugs.
Components for transient voltage suppression

Solenoid with integrated circuit in the connector

Light emitting seal with integrated circuit

Light emitting socket with integrated circuit

Adapter with voltage suppression components

Detailed information upon request
TECHNICAL INFORMATION

Patents in valve electronics

Solenoid valve plugged into PCB
Plugged into printed circuit board,
plug-in unit for 19" card-cage.

<table>
<thead>
<tr>
<th>Patent</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P 31 00 519</td>
<td></td>
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</tbody>
</table>

Electronic Adapter
Timers, power reduction, surge protectors
an other special functions.

<table>
<thead>
<tr>
<th>Patent</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P 28 49 062</td>
<td></td>
</tr>
</tbody>
</table>
Solenoid coil

with integrated rectifiers and surge protection circuits.

**Patent**

P 32 00 023

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Light emitting seal

Lights – seals – protects. For solenoid valves, actuators and sensors with connectors according to DIN EN 175301-803.

**Patente**

P 37 08 393 / P 36 10 979
EP 0287703 / US 4846 698
JAP 1687 672
Technical Information

Patents in Valve Electronics

**Light emitting Plug**

<table>
<thead>
<tr>
<th>Patent</th>
</tr>
</thead>
<tbody>
<tr>
<td>P 42 07 850</td>
</tr>
</tbody>
</table>

**Timer**
Programmable time-controller special electronic functions small outline.

<table>
<thead>
<tr>
<th>Patent</th>
</tr>
</thead>
<tbody>
<tr>
<td>P 33 29 651</td>
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</tbody>
</table>
### Field bus connector
Field bus connector system for single solenoid valves.

<table>
<thead>
<tr>
<th>Patente</th>
</tr>
</thead>
<tbody>
<tr>
<td>P 43 05 444</td>
</tr>
<tr>
<td>US 5501 611</td>
</tr>
<tr>
<td>JAP 26 885/94</td>
</tr>
</tbody>
</table>

### Pneumatic Module
Manifold-valve block, compact design, small dimensions, various electrical control devices.

<table>
<thead>
<tr>
<th>Patente</th>
</tr>
</thead>
<tbody>
<tr>
<td>P 38 34 815</td>
</tr>
<tr>
<td>P 38 34 816</td>
</tr>
</tbody>
</table>
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Pyramid House | A PLUS Energy House

The pyramid house consists out of a specially designed steel structure, that works without screws and welding and still bears the cover made out of double glazing. The house itself is designed with pre-fabricated sections that are only 17 cm (6.7 inch) thick. This is possible because of the „house in house construction“, this saves about 50 to 60 % a lot on building materials.

The regulation of heating and cooling, as well as the hot water treatment will work by the usage through solar collectors and „air to water“ heat pumps. As a source for heating and cooling, the system uses ambient air, which is available at no charge. For improved effectiveness, the air from the Atrium (winter garden underneath the pyramid cover) can be used.

A house will be created that will withstand wind and weather, with an evergreen view and a Mediterranean climate. This could be the answer to a modern living space for the 21st century.

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