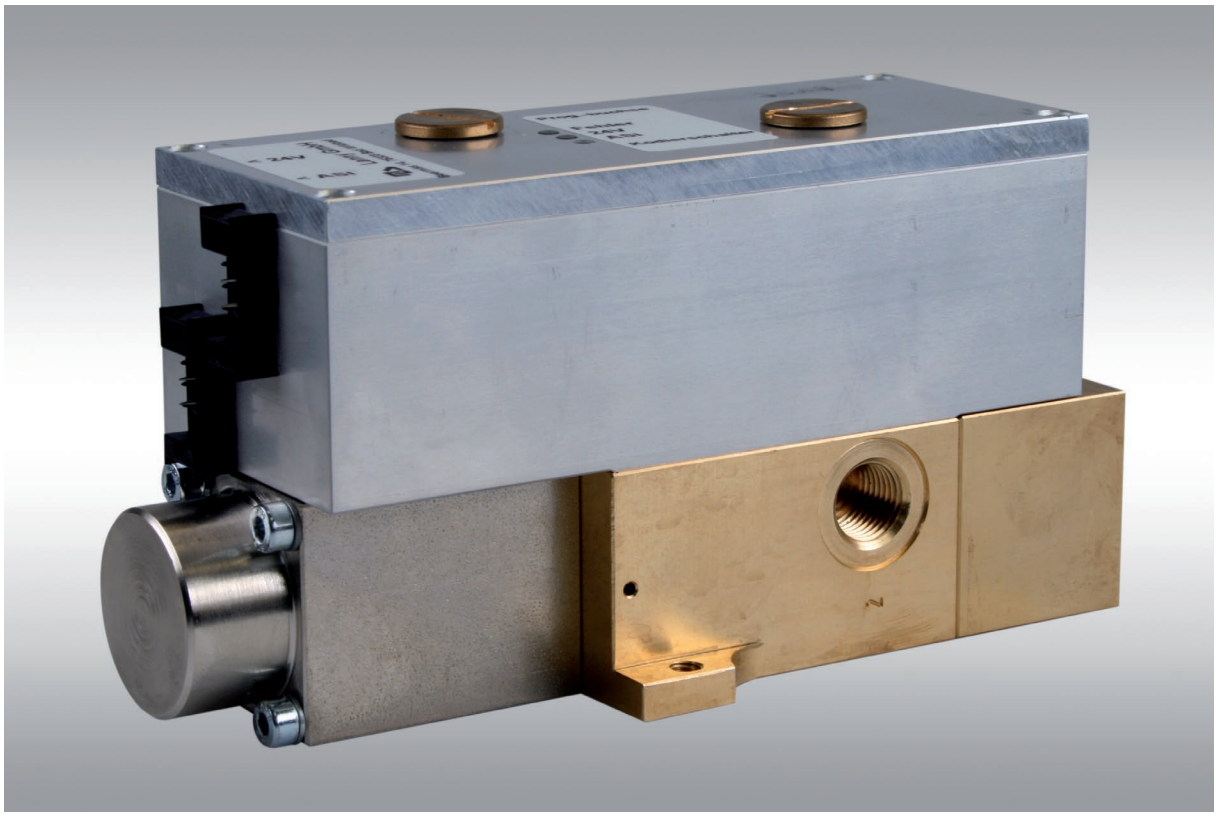
Regulating valve G 1/4" ASI

Trumpf No.: 0 353 070 V2.6
(Lanny No. DFASI B3.5A)



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1. Important information about the operating instructions

1.1. Important information about the operating instructions and target group

Read these operating instructions completely before installing and using the valve for the first time!

Follow the safety instructions and the intended use of the valve!

The operating instructions are only intended for qualified personnel having the necessary qualifications to install and put the valve into operation professionally.

Keep the operating instructions long-lasting and always accessible to the qualified personnel. Include these operating instructions when passing the valve to another user.

Comply with the rules of accident prevention and general safety regulations definitely when installing and operating the valve.

1.2. The operator's duty

The operator's duty is
- to comply with the operational safety regulations
- to comply with the valid national on-the-job safety regulations
- to comply with the intended use of the valve.
- to give a competent instruction to the operation personnel

1.3. Obligation of the personnel

All persons being instructed to work with the valve have
- to follow the regulations of on-the-job safety and accident prevention of the trade association for electric installation,
- to read and to follow the safety instructions in these operating instructions.

1.4. Liability

The manufacturer does not take responsibility for harms, damages and faults resulting from noncompliance with the operating instructions and safety instructions.

The manufacturer cannot assume any liability in that case if the valve is used for other purposes than its intended use or handled, repaired or serviced improperly.

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2. Safety

2.1. Explanation of the symbols

Important notes, as safety-relevant notes, are marked by corresponding symbols. Always comply with these notes, in order to avoid accidents and a damage to the valve.

 **WARNING!** Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

 **CAUTION!** Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE! Indicates a property damage message.

2.2. Intended use

The regulating valve G 1/4" ASI is an electronically controlled, directly operated seating valve with a metal bellows seal and a differential area.

The regulating valve G 1/4" ASI is only intended for pressure control of water for the application in laser cutting machines. It is intended for the medium water only.

The regulating valve G 1/4" ASI is only permitted for
- an input pressure of maximal water pressure of 5 bar (72.5 psi)
- a pressure control range from 0.3 to 3.5 bar (from 4.35 to 50.76 psi)
- a supply voltage of 24 V DC (±5%)
- an operating temperature from 0°C to +50°C
- a storage temperature from -40°C to +85°C

2.3. Contrary to intended use

The regulating valve G 1/4" ASI is only permitted for the use defined within the intended use.

It must not be used as safety valve.

It must not be operated with other fluids than water. It must not be operated with explosive, highly-inflammable, inflammable, fire promoting, toxic liquids, acids or bases.

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2.4. General safety instructions

WARNING! Operator errors can result in serious injury or property damages.

- **Pressurized systems and facilities are only to be operated by qualified staff.**
  - Pressurized systems can be dangerous, if the operator is not acquainted with the handling with pressurized systems. Assembly, startup and maintenance of pressurized systems may only be performed by qualified and experienced staff.
- **The person constructing the pressurized system or defining its specifications takes responsibility for it.**
  - As the components can be operated under various conditions, the decision on suitability for a specific application may be only made after a careful analysis and/or tests, in which it is to be examined if the specific requirements are fulfilled.
- **Service measures at machines and facilities or the removal of individual components may be only performed if you comply with the following safety instructions.**
  - Service measures at machines or facilities may be only performed if it has been checked that they are in a safe or blocked switching status.
  - If components shall be removed, comply with the safety instructions above. In this case interrupt the pressure supply and power supply and let out the rest of the pressure in the system.
- **Contact the manufacturer if the pressure equipment shall be used under following conditions:**
  - Operating conditions or ambient conditions differing from the specified technical data or when the valve is intended to be used in the open air.
  - Installing the valve inside machines and facilities operated in connection with nuclear power, railroads, aviation, motor vehicles, medical devices, food and beverages, devices for leisure and recreation, emergency stop circuits, punching machines and presses or as safety equipment.
  - Applications requiring a particular safety analysis, because there might be a risk of injuries of persons or animals or a risk of property damages.

WARNING! Pressure can be dangerous. Risk of injury.

- Pressure lines and screwed connections have to be permitted for the input and output pressure of the valve.
- Make sure that the pressure lines are connected to the input and output of the valve correctly.
- Pay attention to the screwed connections being tightened, in order to prevent them from unintentional loosening.
- Before performing necessary work at the mechanism, turn off the pressure supply and remove all pressure connections.

WARNING! Danger of explosion. Do not operate the valve in rooms, where can be inflammable gases, steams, dusts or something like that. Do not use the control valve for the pressure control of inflammable or explosive gases.

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WARNING! If the valve cannot be operated safely any more, switch it off and make it safe against unintentional operation. Safe operation will not be possible any more

- if the valve is damaged,
- if the valve does not work any more,
- if parts of the valve are loose,
- if the electric connections and cables are damaged.

CAUTION! Heavy objects falling down can cause severe injuries. Make sure that the valve cannot fall down. Store the valve so that it cannot fall down. Build in the valve so that it will be safe and tight in the facility.

2.5. Notices for avoiding property damages

NOTICE! Electrostatic discharge can result in damages to sensitive microelectronic components.

- Don not touch the contact pins of the connector(s) without taking care for sufficient electrostatic discharge protection.
- If you open the housing of the electronics and if you want to work on the electronics, take care of sufficient electrostatic discharge protection.

NOTICE! Risk of overheating the magnet coil and therefore risk of damage to the magnet.

- Before operating the valve, make sure that the valve is always pressurized with an input pressure that has to be at least 10% greater than the given set value. An input pressure less than or equal to the given set value or operating the valve without pressurizing the valve results in overheating and damaging the magnet coil of the valve.

NOTICE! Risk of a property damage to the valve. Pay attention to the following notes:

- While inserting the valve, bear in mind that the magnet of the valve must not be built-in pointing down, because otherwise the condensate can accumulate inside the magnet at the bottom and damage it or disturb its action.
- Take care that the valve does not get dirty. Take care that the valve is free of dust, oil and grease.
- Do not use the valve in a dusty, wet or humid environment or in areas, where liquids like oil, coolant or water are splashing on it. As the valve is not sealed against water or dust, such liquids can get into it and cause failures.
- When you tighten the screwed connection between the pressure line and the valve, take care that the screwed connection is not tilted, because otherwise swarf can arise and damage the valve.
- In order to avoid failures of the valve, avoid strong magnetic fields.

NOTICE! Failure of the water valve by clogged (dirty) filter. **Check the input filter regularly.**

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NOTICE! Risk of a property damage at the electronics of the valve. To avoid a damage to the electronics, pay attention to the following notes:

- Overvoltage can destroy the electronics. Check the electrical connections and the power supply carefully before putting the valve into operation. Make sure that the power supply does not exceed the voltage of maximal 24 V (±5%). Use a fuse of T 2.0 A.
- Only use fuses of the specified type and with the specified fuse current rating. It is not permitted to use patched fuses or a bypass of the fuse switch.
- Never switch on your device immediately after having brought it from a cold into a warm room. Under unfavourable circumstances the occurring condensed water can destroy your device. Let the device come to full room temperature.
- Do not operate the valve in wet or humid surroundings. The electronics must not come in contact with moisture or liquids.
- Do not lay the control cable in parallel to power lines or control cables of servo motors.
- Use a supply cable with a line cross-section of at least 0.75 mm² with a cable length of maximal 10 m. Otherwise it will come to a voltage drop and the electronics will not receive the given supply voltage. With cables of a length of more than 10 m, use a cable with an accordingly increased line cross-section.
- In order to fulfil the electromagnetic compatibility, the vlave must be connected to the protective earth conductor (equipment grounding conductor). The housing must be connected to the protective earth conductor. Take care of screened cables. The screen has to be put on according to electromagnetic compatibility.
- Do not damage the cable insulation or the housing of the device!
- If covers are opened or parts are removed, active components can be exposed. Also terminations can be active. Before maintenance, repair or exchange of parts the valve must be disconnected from all power supplies. If it cannot be avoided to work at the opened energized device, it will have to be only carried out by qualified personnel being acquainted with the relevant regulations.
- Only put the valve into operation again, if the housing is closed and screwed together safe.

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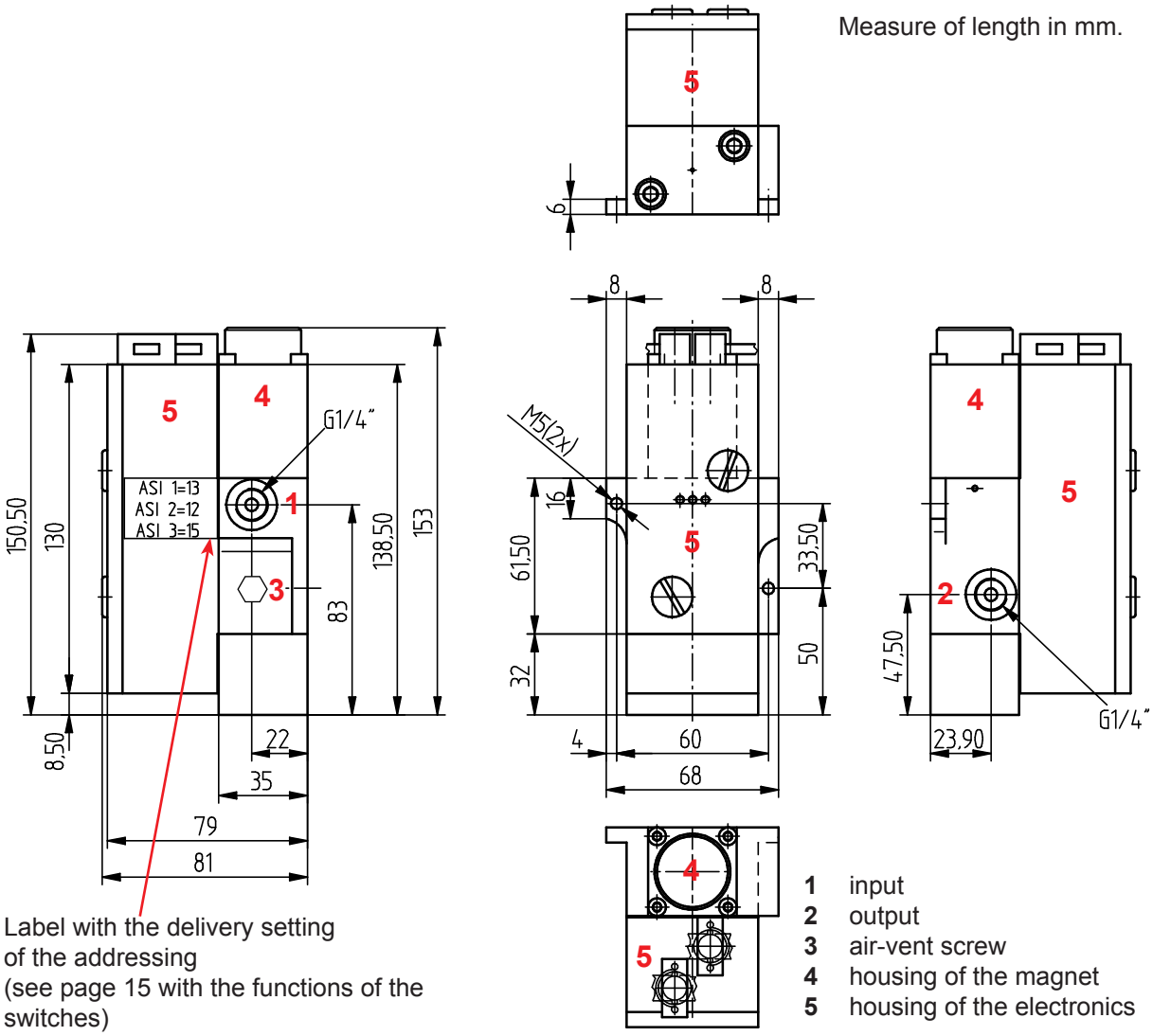
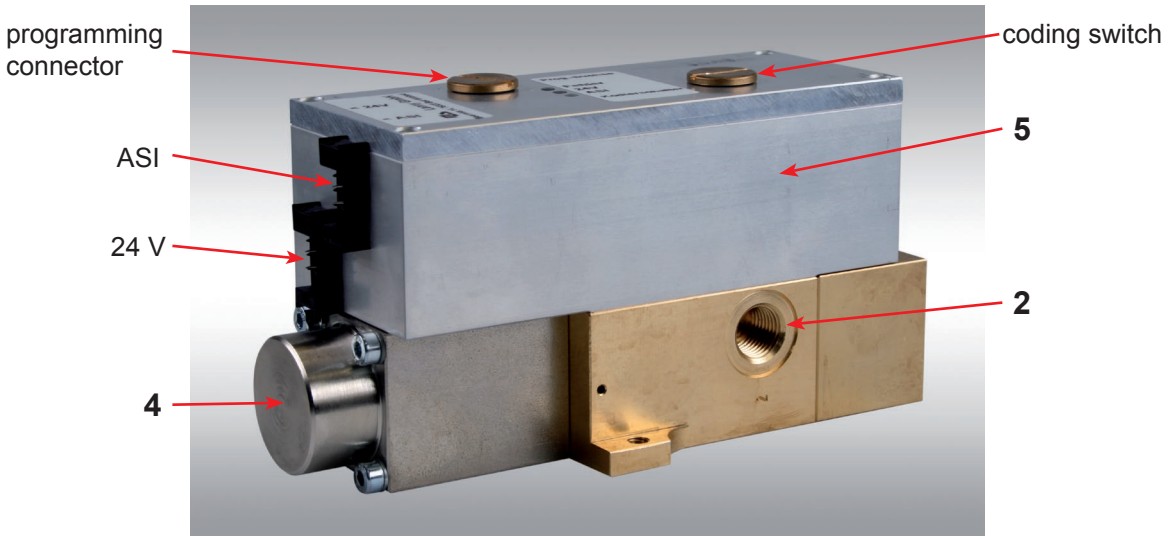
3. Dimensions and description of the valve

Measure of length in mm.



Label with the delivery setting of the addressing
(see page 15 with the functions of the switches)

1	input
2	output
3	air-vent screw
4	housing of the magnet
5	housing of the electronics



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4. Technical data and delivery scope

4.1. General technical data of the valve

nominal size	NG 6
connection	G 1/4"
type	directly actuated seating valve with metal bellows seal and a differential area
valve seat size	8 mm, effectively 6 mm
medium	water
assembling position	any except for the magnet pointing down
weight	ca. 2.2 kg
material	brass (CuZn30Pb3), in touch with the medium: stainless steel
seals	Viton
protection class	IP 40
maximal input pressure	5 bar (72.5 psi)
range of controlled pressure	0.3 to 3.5 bar (4.35 to 50.76 psi)
hysteresis	< 0.5 %
linearity	< 0.5 %
supply voltage	24 V DC ±5%
current consumption	ca. 2 A
reference input	0.3 to 3.5 bar = 4.35 to 50.76 psi = 0 to 1023 digit 0,003128 bar/digit
actual value output	0 to 4.096 bar = 0 to 59.408 = 0 to 1023 digit 0,003128 bar/digit
resolution	10 bit ASI
ambient temperature	0 °C to +50 °C
storage temperature	-40°C to +85°C

4.2. Delivery scope

- Regulating valve G 1/4" ASI
- Operating instructions on demand

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5. Assembly and connection of the valve

CAUTION! Heavy objects falling down can cause severe injuries. Make sure that the valve cannot fall down. Store the valve so that it cannot fall down. Build in the valve so that it will be safe and tight in the facility.

NOTICE! Electrostatic discharge can result in damages to sensitive microelectronic components.

- Don not touch the contact pins of the connector(s) without taking care for sufficient electrostatic discharge protection.
- If you open the housing of the electronics and if you want to work on the electronics, take care of sufficient electrostatic discharge protection.

5.1. Unpacking

Unpack the device and check if the contents are complete (see delivery scope). Throw the packaging materials homogeneously into the dedicated accumulation bins.
If you notice a damage from transport, contact the manufacturer immediately.

5.2. Installing the valve and connecting the pressure lines

CAUTION! Risk of injury. Before working on the mechanism, make sure that the pressure system is pressureless. Do not put the valve into operation before it is connected to pressure system and power supply completely and correctly.

NOTICE! Risk of damages to the valve.

- While inserting the valve, bear in mind that the magnet of the valve must not be built-in pointing down, because otherwise the condensate can accumulate inside the magnet at the bottom and damage it or disturb its action.
- Take care that you connect the pressure lines to the valve correctly. Do not confuse the connections.
- When you tighten the screw connection between the pressure line and the valve, take care that the screwed connection is not tilted, because otherwise swarf can arise and damage the valve.

1. Mount the valve in your facility.
   While mounting the valve, the magnet **4** must not point in the vertical axis down.
2. Connect the input pressure line to the input **1** of the valve (see page 8) and tighten the screwed connection.
3. Connect the output pressure line to the output **2** of the valve (see page 8) and tighten the screwed connection.

Now, the control valve is built-in and connected to the pressure lines correctly.
Next, the electric connection will be described.

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5.3. Electric connection of the valve

NOTICE! Risk of a property damage to the electronics of the valve. To avoid a damage to the electronics, pay attention to the following notes:

- Overvoltage can destroy the electronics. Check the electrical connections and the power supply carefully before putting the valve into operation. Make sure that the power supply does not exceed the voltage of maximal 24 V (±5%). Use a fuse of T 2.0 A.
- Do not lay the control cable in parallel to power lines or control cables of servo motors.
- Use a supply cable with a line cross-section of at least 0.75 mm² with a cable length of maximal 10 m. Otherwise it will come to a voltage drop and the electronics do not receive the given supply voltage. With cables of a length of more than 10 m, use a cable with an accordingly increased line cross-section.
- Before operating the valve, make sure that the valve is always pressurized with an input pressure that has to be at least 10% greater than the given set value. An input pressure less than or equal to the given set value or operating the valve without pressurizing the valve results in overheating and damaging the magnet coil of the valve.

NOTICE! In order to operate the regulating valve according to the electromagnetic compatibility, the following conditions have to be fulfilled:

- Only use shielded cables for the electric connection of the valve.
- Connect the shield, the plug and the equipment cabinet to ground according to the electromagnetic compatibility.
- Connect the valve body to the protective earth conductor (equipment grounding conductor). The housing must be connected to the protective earth conductor (equipment grounding conductor).

1. Before connecting the valve electrically, pay attention to the informations about the AS-Interface address and the bit assignment in chapter 6.
2. Connect the supply voltage to the 24V-connector of the valve.
3. Connect the ASI-line to the ASI-connector of the valve.
4. Before putting the valve into operation, pressurize the valve with an input pressure that has to be always greater than the given set value.
5. Switch on the power supply and put the valve into operation.

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6. Important informations about the AS-Interface (ASI)

6.1. ASI specifications

ASInterface	
protocol	ASI specification version 2.1
connections	ASI flat ribbon cable auxiliary supply cable
programming	connector 3 mm
address setting	choice of the target address by programming unit and DIP switch (accessible from outside)
diagnostic LED	green = ASI voltage OK red = ASI error green = 24V supply voltage OK
pressure check function	enable if the output pressure is equal to the set value
electric characteristics	reverse polarity protection U_{ASI} = 26.5 to 31.6 V I_{ASI} = ca. 110 mA U_B = 24 V (±5%) I_B = ca. 2 A
potential isolation	U_{ASI} | U_B= 24 V
insulation test	according to DIN EN 50178
operating conditions	free of corrosive gases and dust
operating temperature	0°C to +50°C
storage temperature	-40°C to +85°C

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6.2. AS-Interface address and bit assignment

ASI address	bit	actuator	sensor
n	D0	D/A LSB	A/D LSB
n	D1	D/A 1	A/D 1
n	D2	D/A 2	A/D 2
n	D3	D/A 3	A/D 3
n+1	D0	D/A 4	A/D 4
n+1	D1	D/A 5	A/D 5
n+1	D2	D/A 6	A/D 6
n+1	D3	D/A 7	A/D 7
n+2	D0	D/A 8	A/D 8
n+2	D1	D/A 9	A/D 9
n+2	D2	free	valve error
n+2	D3	enable	pressure OK

D/A	Value to the digital-to-analog converter (DAC).
A/D	Measured value from the analog-to-digital converter (ADC). The valve error switches to high, if it is detected an error in the electronics of the valve (in the digital part) (e.g. no communication over the ASI bus or no supply voltage for the valve).
Enable	The programmed pressure is built up in the output of the valve.
Pressure OK	The output pressure equals the programmed pressure.
All signals are in positive logic.	

Comment:
The delivery setting for the ASI address is n=1.
I/O Code 0x7
ID Code 0xF

	Programmed pressure	Enable	OK-signal	Pressure output
1	0	0	0	0
2	0	1	1	0
3	$P_{max}/2$	1	1*	$P_{max}/2$ ±tol.
4	$P_{max}/2$	1	0	< $P_{max}/2$ −tol. or > $P_{max}/2$ +tol.

1 = signal is logically true
0 = signal is logically not true
* = logically true, if $P_{output} = P_{set}$
tol. = tolerance

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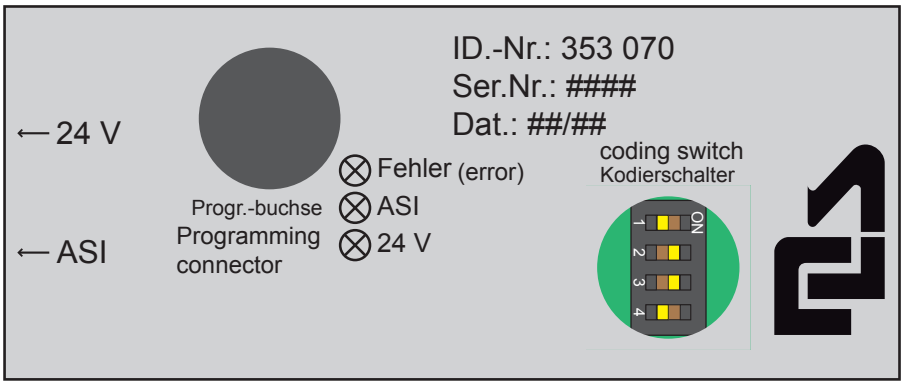
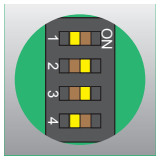
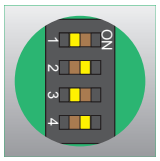
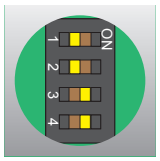
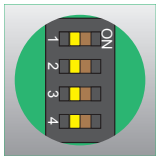
6.3. AS-Interface adress setting by addressing unit

In order to change the preset addresses by an addressing unit, it is necessary to operate the slaves of the interface separately. In order to make possible to do this, the interface has got a built-in switch panel. The switch panel is below a cover on the top surface of the device. For the address setting it can be used the two-pin connector or the ASI connection.



The addressing can be carried out according to the following scheme:

1. Deactivation of slave n+1 and n+2 2. Programming of the slave address n	Switch position 
3. Deactivation of slave n and n+2 4. Programming of the slave address n+1	Switch position 
5. Deactivation of slave n and n+1 6. Programming of the slave address n+2	Switch position 
7. Activation of all slaves	Switch position 

Functions of the switches			
1	test switch for calibration and test (delivery setting)		
2	address n+2	MSB	ASI 3 = 15
3	address n+1		ASI 2 = 12
4	address n	LSB	ASI 1 = 13

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7. Failure

WARNING! If the valve cannot be operated safely any more, switch it off and make it safe against unintentional operation. Safe operation will not be possible any more
- if the valve is damaged,
- if the valve does not work any more,
- if parts of the valve are loose,
- if the electric connections and cables are damaged.

Dear customer, our products undergo stringent quality controls. If this device should nevertheless fail to function properly, this is a matter of regret for us. Before contacting our service department, check to see if you can eliminate the problem yourself.

fault/ failure	potential reason	measures
no output pressure	• the connecting plug is missing • no supply voltage • no set value • no input pressure at the input • the mechanism has got jammed • the electronics is faulty (e.g. sensor, short circuit,…)	 • exchange the valve • exchange the valve
output pressure is oscil-lating	• the control is not OK • Was the connection changed?	
wrong output pressure	• the input pressure is too low • check the set value input • the line cross-section is too small • the cable is too long	
overheating of the valve	• no input pressure • the input pressure is less or equal than the set value input	
the pressure is too slow	• the input filter is very dirty • the pressure line is clogged • the pressure line cross-section is too small • the input pressure is not OK	

If you were not able to eliminate the problem yourself, please contact our

support hotline 07081 9534-55

8. Maintenance

NOTICE! Failure of the water valve by clogged (dirty) filter. **Check the input filter regularly.**

Parts list			
filter:	• O-ring	7.65 × 1.78 Viton 70 Shore	151 807 02
	• filter of stainless steel		530 301 70
	• thread case		530 301 60

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9. Disposal at the end of the operational life

When the valve has reached the end of its operational life, dispose of the valve in accordance with the applicable environmental regulations for your country.

Do not dispose of electrical equipment with the household refuse. Take the device to a central recycling facility for electronic industry waste.

The packaging of the valve is made of recyclable materials. Sort the packaging material and recycle accordingly.

For information about recycling, please contact your local authorities or the manufacturer.

RoHS-konform
gemäß 2002/95/EG

The device is lead-free and only contains components in conformity with RoHS.

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10. EC declaration of conformity

This valve fulfils the requirements of the EC Directives
2006/95/EG „low-voltage directive“
2004/108/EC „Electromagnetic Compatibility“.
The valve bears the CE mark on the rating plate with reference to the EC Directives mentioned above.

According to the Pressure Equipment Directive 97/23/EG, Art. 3 Paragraph 3 this regulating valve has to be constructed and producted according to good engineering practice (GEP) only and must not bear the CE mark with reference to the Pressure Equipment Directive, because the crucial values of the volume V and maximum pressure PS is within the limits (see Pressure Equipment Directive 97/23/EG, appendix II, diagram 4).

The statement of compliance may be viewed or requested at the manufacturer.

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11. Imprint

These operating instructions is published by
MLS Lanny GmbH, Beermiss 12-14, 75323 Bad Wildbad.

These operating instructions correspond to the technical state at stage of printing.

Modifications in technology and equipment are reserved.

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