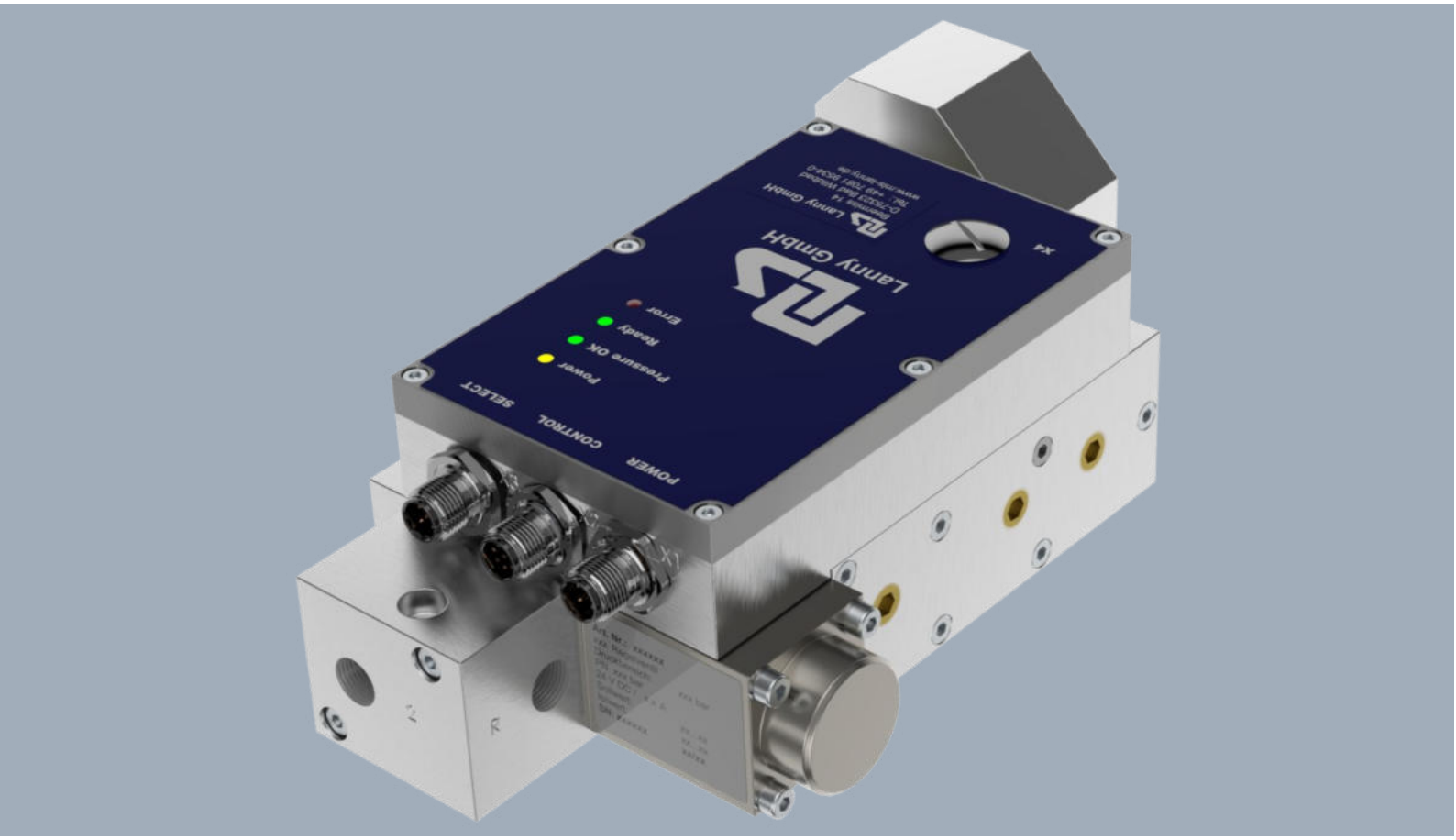
MLS Lanny GmbH

OPERATING INSTRUCTIONS

CRV3 1B25ADFM



The Lanny Valve –
Precision valve technology for high performance engineering.

Summary

The CRV31B25ADFM is a valve block that combines the functions of control and switching valves in a single unit. It offers flexibility and efficiency for complex industrial processes that require both precise control and fast switching operations. It is ideal for applications where space and resources need to be optimized.

Main features:

- Three integrated switching valves that can be used to switch between three gases
- Integrated pressure control valve for precise control of outlet pressure
- Set value input 0 to 10 V, Actual value output 0 to 10 V
- Integrated pressure switch
- Integrated inlet pressure monitoring
- Suitable gases: Oxygen, nitrogen and air
- Inlet pressure: Maximum 20 bar for oxygen, maximum 35 bar for nitrogen and air
- Pressure control range: 0 to 20 bar for oxygen, 0 to 25 bar for nitrogen and air
- Flow rate: 920 l/min (air), 965 l/min (oxygen) at 8 bar inlet pressure and 7 bar outlet pressure
- Pilot pressure range: 4 to 10 bar
- Inlet filter: 150 µm in ports A, B, C
- Ambient temperature: 0 to 45 °C
- Medium temperature: 0 to 45 °C
- Protection rating: IP54
- Ports: Gas inlets (G3/8), outlet (G1/4), pilot pressure (G1/8), measuring connection (G1/8), vent (G1/4)
- Electrical connections: M12 plug for power supply, control and gas selection

MLS Lanny GmbH
Beermiss 14, D-75323 Bad Wildbad (Germany)
Fon: +49 (0)7081 9534-0
E-Mail: info@mls-lanny.de
Website: www.mls-lanny.de

Table of contents

1 Important notice regarding these operating instructions

1.1 About these operating instructions

IMPORTANT
READ CAREFULLY BEFORE OPERATING
KEEP FOR FUTURE USE

The operating instructions are intended exclusively for qualified specialists who have the appropriate qualifications to professionally install, commission and disassembly MLS valves.

Keep the operating instructions permanently and always accessible to qualified personnel. If the device is being handed over to third parties, make sure to hand over the operating instructions as well.

The accident prevention regulations and the general safety regulations must be adhered to when operating the device.

1.2 Operator duty

Duties of the operator include:

- Compliance with the Industrial Safety Ordinance
- Compliance with the valid national regulations for work safety
- Compliance with the intended use of the device
- Expert instruction of the operating personnel

1.3 Obligations of the operating personnel

All persons who are commissioned to work on this device have to

- comply with the general regulations for work safety and accident prevention.
- read and comply with all safety instructions in this manual.

1.4 Liability

The manufacturer assumes no liability for damage and malfunctions that occur as a result of non-compliance with the operating instructions.

If the device is misused, not used as intended, falsely operated, or not professionally installed, repaired and maintained, no liability can be granted.

1.5 Important notes on warranty / guarantee

NOTICE

The warranty / guarantee expires automatically if the type sticker or the serial number is changed, made illegible or removed.

2 Safety

2.1 Intended use

The MLS valve block serves exclusively as a unit for switching and controlling compressed air, oxygen and other gases for industrial applications.

The valve block is intended solely for operation within the limits specified in the technical data (chapter5).

The valve may only be used in compliance with the instructions in this manual and the safety instructions

The device may not be converted or changed in any other way.

2.2 Not intended use

The MLS valve block is only approved for the purpose as defined under the intended use.

- It must not be used with gases or pressure ranges other than those specified under the intended use.
- It is not approved for outdoor use.

2.3 Explanation of the symbols

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

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

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

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury

NOTICE

NOTICE indicates a property damage message.

2.4 General safety instructions

⚠ Danger

Danger to life due to incorrect installation

Improperly fastened connections can come loose due to the high pressure and cause life-threatening injuries.

- The valve must be secured to all mounting holes on the machine structure.
- All connections must be made using lines designed for this pressure.
- Observe the correct tightening values of the parts manufacturer for fastening and connections.

⚠ WARNING

Operator errors or failure to comply with the safety instructions can result in serious injury or property damage.

- Read the operating instructions attentively and carefully before installing and comissioning.
- Observe the safety instructions at all times.
- Operate the product exclusively in the sense of its intended use.
- Operate the product only within the intended limits of the technical data as specified in this specification.

⚠ WARNING

Pressurized systems and facilities must be operated by qualified personnel only!

Assembly, installation, commissioning, maintenance and disassembly of compressed air systems may only be carried out by trained and experienced personnel.

⚠ WARNING

Pressurized systems!

- Note that the product is only designed for the highest permissible input pressure described in the technical data. This input pressure must not be exceeded.
- Pressure lines and screw connections must be adequately designed for the input pressure and output pressure of the valve. Permissible input and output pressure can be found in the technical data.
- Ensure that the pressure lines are connected properly to the input and output, before pressurizing the system.
- Make sure the screw connections between the compressed air supply lines and the product are tight to prevent unintentional loosening.
- Turn off the pressure supply, release the residual pressure, and remove all pressure connections before replacing or maintenance of the valve.

⚠ WARNING

Danger of explosion!

- Do not operate the valve in rooms with flammable gases, steams or dust.

⚠ WARNING

A product with malfunction or which cannot be used safely can cause injury!

Safe operation is no longer possible if:

- the product is damaged.
- the product is not fully functional.
- parts of the product are loose.
- the connection lines are damaged.

In these cases, the product must be put out of operation, considering all relevant safety instructions.

NOTICE

Optimum operation is only guaranteed if the valve is operated at a pressure within the specified pilot pressure range. Exceeding or falling below this pressure range may damage the valve.

NOTICE

In order to operate the product EMC-compliant, the following conditions must be met:

- Use only shielded cables for the electrical connection of the product.
- Lay shield connection, plug and switch cabinet to earth in compliance with EMC.
- Lay the product body and housing electrically to ground (PE, machine ground).
- While under voltage, do not connect or disconnect the plug.
    - First connect the plug and then switch on the power supply.
    - Switch off the power supply first, then disconnect the plug.
- The maximum length of the connection cable must not exceed 30 m.

NOTICE

Risk of damage to the product

The following instructions must be observed to prevent damage:

- Make sure that the product is not contaminated during the assembly. Keep it free of dust, oil and grease.
- Make sure that the compressed air supply system is equipped with filters for air quality according to the information in the technical data.
- Make sure that the compressed air supply system for the pilot valve is equipped with an air dryer, aftercooler, water separator, oil separator. Compressed air containing condensate can cause malfunction of the product.
- Operate the product only with the specified supply voltage.
- Overvoltage can destroy the electronics! Use a suitable fuse. Earth the product at the central grounding point (at the marked screw connection).
- Use shielded cables for the electrical connection.
- Do not lay control cables parallel to power cables or control lines of servomotors, otherwise the control signal may be disturbed.
- Do not operate the device in humid environments, max. 5 – 95%. The electronics must not come into contact with moisture or liquids.

NOTICE

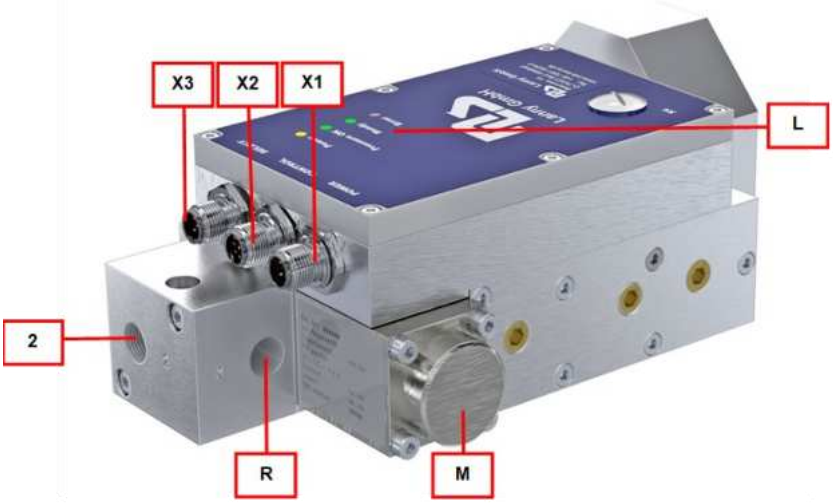
The warranty / guarantee expires immediately if the product is changed, not used as intended or if labels or serial numbers are altered, defaced or removed.

NOTICE

Subject to technical changes without special notice. Design may differ from the actual product. Its design and technical data may change in the process of development without notification.

3 Device description

3.1 Components, ports and diagnostic elements



1A	Input gas 1
1B	Input gas 2
1C	Input gas 3
2	Output
H	Input pilot pressure
K	Measuring connection
PE	Protective earth

L	LED elements
M	Solenoid
R	Exhaust
X1	POWER Plug, M12, 4 pin for supply voltage
X2	CONTROL Socket, M12, 8 pin for set value and actual value
X3	SELECT Socket, M12, 5 pin for gas selection

3.2 LED description

LED		Color	LED state	Description
POWER		yellow	On	Supply voltage of the electronics is ok
		-	Off	No supply voltage for the electronics
PRESSURE OK		green	On	Output pressure corresponds to set value
		-	Off	Error output pressure
READY		green	On	Gas selected and no error
		-	Off	Error and/or no gas selected
ERROR		red	On	Collective message At least one of the following errors occurred: - Undervoltage, if U < 19 V, (Reset at U > 20 V) - Overvoltage, if U > 31 V, (Reset if U < 30 V) - Under pressure, if Set value > (Pin - 500 mbar) (Reset at Set value < (Pin - 500 mbar)) - Over pressure, if Input pressure > 41 bar (Reset at < 40 bar) - Overtemperature, if Electronics temperature >85°C (Reset at < 82°C)
		-	Off	No error

4 Technical specifications

Description	Unit	Value
Design		Regulating valve: Directly actuated seating valve (3/2 WV) Switching valve: Pneumatically pre-controlled seating valve
Materials		Aluminium anodized, brass, stainless steel
Seals		NBR and FKM with approval for oxygen PTFE
Pneumatic ports		1A: Input gas 1 1B: Input gas 2 1C: Input gas 3 2: Output regulated gas H: Input pilot air K: Measuring connection R: Exhaust
Input pressure	[bar]	max. 20 (oxygen) max. 35 (nitrogen, air)
Pressure control range	[bar]	0 ... 20 (oxygen) 0 ... 25 (nitrogen, air)
Flow rate at 8 bar(a) input pressure / 7 bar(a) output pressure 20,05°C, 1,01325 bara	l/min	920 (air) 965 (oxygen)
Operating medium		Oxygen, nitrogen and air, free of oil and condensate-free, 50 µm filtered according to ISO 8573-1:2010 [4:3:3]
Operating conditions		Operating medium free of corrosive gases and dust
Pilot pressure range	[bar]	4 ... 10
Pilot pressure medium		Compressed air according to ISO 8573-1:2010 [7:4:4]
Input filter	[µm]	150 in A, B, C
Mounting position		Solenoid must not face downwards
Degree of protection		IP54
Weight	[g]	ca. 3100

Temperatures	Unit	Value
Ambient temperature	[°C]	0 ... 45
Temperature of medium	[°C]	0 ... 45
Storage temperature	[°C]	-40 ... 85

Maximum Accuracy	Unit	Value
Hysteresis	[% FS]	< 0.5
Linearity	[% FS]	< 0.5
Response sensitivity	[% FS]	< 0.5
Repeatability	[% FS]	< 0.5
Temperature drift	[% /10K]	< 0.1
Long-term drift	[% FS/a]	< 0.5

The content of this technical data is also available as a separate data sheet.

Further technical information:
The MLS valve blocks are available in design for 2, respectively 3 switched gases.
The valve blocks can be controlled by means of different interfaces such as:
Profibus, Profinet, Ethercat, IO-Link or analog.

4.1 Electrical data table

Description	Unit	Value
Supply voltage electronics	[V]	24 V DC (– 10 % … +20 %)
Current consumption electronics	[A]	typ. 50 mA
Supply voltage actuator	[V]	20 ... 30 (– 10 % … +20 %)
Current consumption actuator	[A]	max. 1,8 A
Protected against polarity reversal		

4.2 Pin assignment

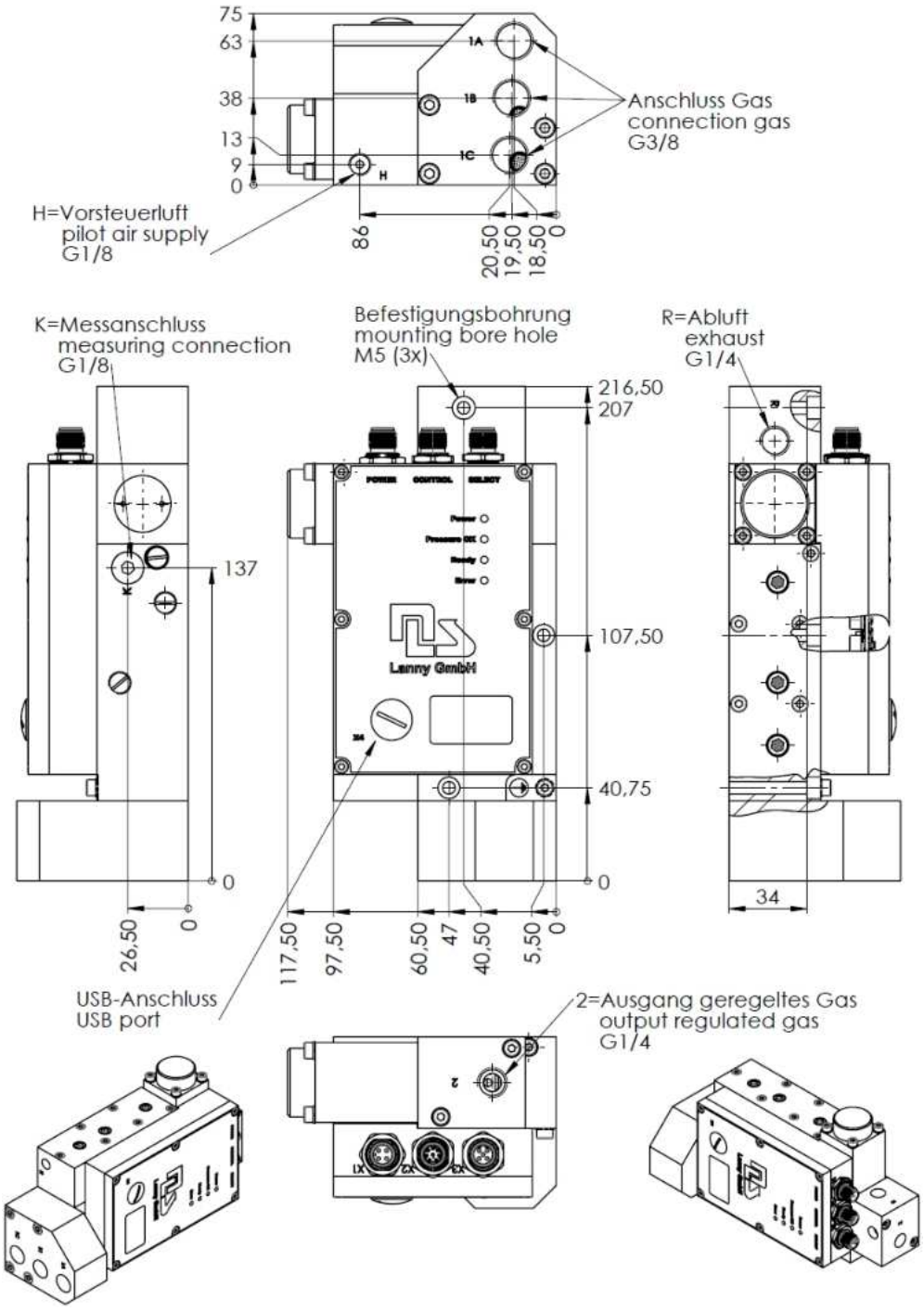
Plug	Pin	Value
X1		POWER Supply voltage – 4-pin A-coded M12 plug
		 Pole diagram, contact side plug
	1	+24 V DC supply voltage
	2	n.c. (optional 2. connection +24 V DC supply voltage)
	3	0 V DC supply voltage supply voltage
	4	n.c. (optional 2. connection +0 V DC supply voltage)

Plug	Pin	Value
X2		CONTROL Control – 8-pin A-coded plug
		 Pole diagram, contact side plug
	1	Set value +, 0 ... 10 V or 4 ... 20 mA, dependent on design
	2	Set value -, Default GND, optional Differential input, dependent on design
	3	GND
	4	Feedback input pressure, 0 ... 10 V or 4 ... 20 mA, dependent on design
	5	Feedback output pressure, 0 ... 10 V or 4 ... 20 mA, dependent on design
	6	DIO1, Default "Ready output", optional "Enable Input"
	7	DIO2, Default "Pressure OK Output", optional "Unused input"
	8	DIO3, Default "Vent input, optional "Venting output"

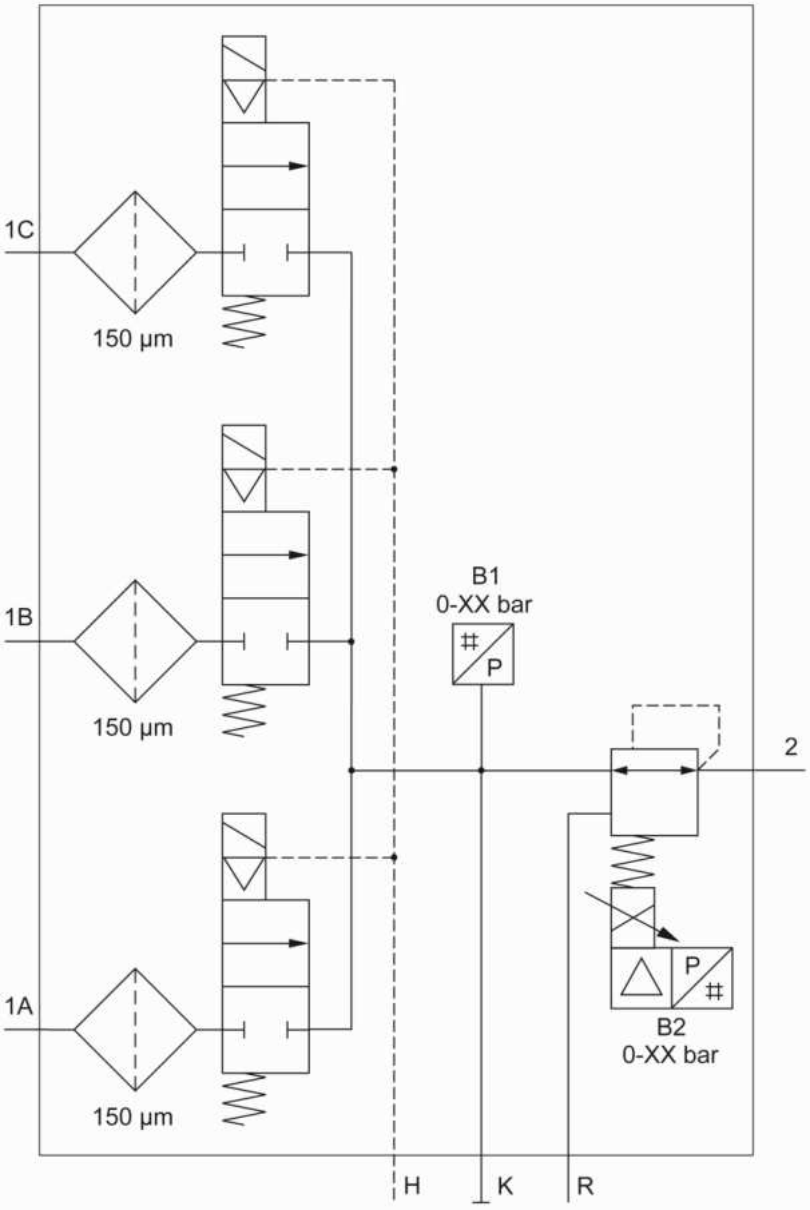
Plug	Pin	Value
X3		SELECT Selection – 5-pin B-coded M12-plug
		 Pole diagram, contact side plug
	1	DI, "Select Gas A"
	2	DI, "Select Gas B"
	3	GND
	4	DI, "Select Gas C"
	5	n.c.

4.3 Dimensions

Dimensions in mm

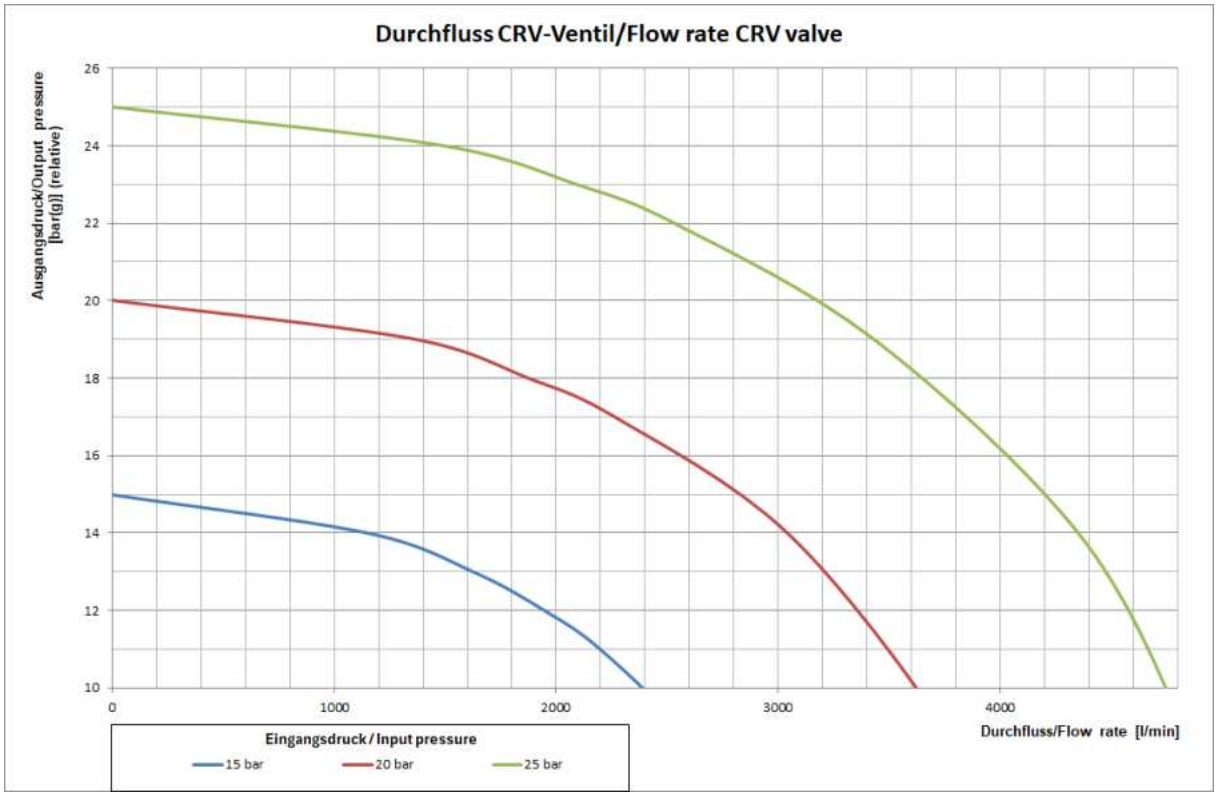


4.4 Pneumatics diagram



1A	Input gas 1 (G3/8)
1B	Input gas 2 (G3/8)
1C	Input gas 3 (G3/8)
2	Output (G1/4)
H	Input pilot pressure (G1/8)
K	Measuring connection (G1/8)
R	Exhaust (G1/4)
B1	Sensor input pressure enabled gas
B2	Sensor output pressure

4.5 Flow chart



Depending on the orientation and nature of the supply pressure line, the flow may vary.

5 Packaging and transport

NOTICE

Only use original packaging materials.
Only original packaging materials ensure clear identification, a safe storage and an easy handling.

- Keep the device in original packaging just before installation.
- For the disposal of the packaging, see the disposal chapter.
- Only remove the sealing plugs or adhesive films before installation

6 Installation and connection

⚠ Danger

Danger to life due to incorrect installation

Improperly fastened connections can come loose due to the high pressure and cause life-threatening injuries.

- The valve must be secured to all mounting holes on the machine structure.
- All connections must be made using lines designed for this pressure.
- Observe the correct tightening values of the parts manufacturer for fastening and connections.

⚠ WARNING

Pressurized systems and facilities must be operated by qualified personnel only!

Assembly, installation, commissioning, maintenance and disassembly of compressed air systems may only be carried out by trained and experienced personnel.

⚠ WARNING

Observe all safety instructions of chapter 2

Failure to observe the safety instructions may result in injury to personnel or damage to the equipment.

6.1 Prior to installation

Before installing the valve make sure that

- the stationary pipe system is depressurized and vented.
- the pipes are clean and free from particles.
- the shut-off valves are connected to the pressure pipe system of the plant.

6.2 Mounting and pneumatic installation

⚠ WARNING

Pressurized systems and facilities must be operated by qualified personnel only!

Assembly, installation, commissioning, maintenance and disassembly of compressed air systems may only be carried out by trained and experienced personnel.

The valve must be fastened to the system with screws at all mounting holes acc. to the dimension drawing

The valve must be installed in accordance with the connection markings and specifications in the technical data and device description.

6.3 Electrical installation

⚠ WARNING

- Electrical connections and systems must be installed and operated by trained and experienced personnel only.
- Use a power supply with electrically protective separation, according to DIN EN 60204-1.
- Comply with the requirements for PELV circuits, as specified in DIN EN 60204-1.

Always connect the valve to the protective earth. The connection point is shown in the device description.

The valve must be installed in accordance with the connection markings and specifications in the technical data and device description.

7 Commissioning, operation, malfunction

⚠ WARNING

Pressurized systems and facilities must be operated by qualified personnel only!

Assembly, installation, commissioning, maintenance and disassembly of compressed air systems may only be carried out by trained and experienced personnel.

NOTICE

Optimum operation is only guaranteed if the valve is operated at a pressure within the specified pilot pressure range. Exceeding or falling below this pressure range may damage the valve.

NOTICE

The device only works properly within the defined pilot pressure range.

NOTICE

If a set value is given without pressurizing the device or if the operating pressure is smaller than or equal to the set value, an exceeded warming of the solenoid will be the consequence. This can result in a reduced accuracy of the sensor system as well as a shortened service lifetime of the sensitive electronic components.

- Ensure that the operating pressure is always at least 1 bar greater than the maximum regulated output pressure or maximum set value.

Comply with the operating conditions and permissible limit values (→ Technical specifications).

- Keep high-frequency electromagnetic radiation sources (e. g. radio equipment, mobile phones, other jamming transmitters) and strong magnetic fields away from the device in order to avoid disturbances of the set value signal.

7.1 Failure

⚠ WARNING

- If the device can no longer be operated safely, it must be taken out of operation and secured against unintentional operation.
- A safe operation is no longer possible if:
  - The device is damaged
  - The device is no longer working
  - Parts of the device are loose
  - The connection lines are damaged

Dear customer, our products are subject to a strict quality control. If this product is still not working properly, we regret it very much.

If you have not been able to eliminate the error yourself, please contact our

Service-Hotline +49(0)7081 9534-0
E-Mail: info@mls-lanny.de

NOTE

The warranty / guarantee expels automatically if any label or serial number is changed, made illegible or removed.

8 Maintenance and cleaning

⚠ WARNING

Improper maintenance may result in injury!

- Repairs and maintenance must only be carried out by the manufacturer or by specialists commissioned by the manufacturer.
- Inspection or maintenance of products and equipment may only be carried out once it has been verified that they are in safe and locked switching state.
- The housing of the device may only be opened by the manufacturer or by a specialist assigned by him.
- If components should be removed, all relevant safety instructions must be observed. Then disconnect the compressed air and power supply and drain all residual air from the system.

8.1 Maintenance

Apart from regular cleaning, there are no maintenance activities for the end user.
In the event of a repair, the appliance must be sent to the manufacturer.

8.2 Cleaning

Regularly clean the device with a soft cloth.
The permissible detergent is water or soap solution (max. 50 °C).

9 Disassembly

⚠ WARNING

Pressurized systems and equipment are dangerous for laymen!

Pressurized systems and equipment may only be mounted, installed, commissioned, maintained, repaired, decommissioned and disassembled by qualified personnel.

Follow these steps to disassemble the device:

1. Turn off all power sources:
   1.1. Power supply
   1.2. Air supply
2. Depressurize the system.
3. Remove all electrical and pneumatic connections.
4. Loosen the mounting screws and remove the device.

10 End of life – EOL disposal

Dispose the device in accordance with the applicable environmental regulations of your country.

The electrical equipment should not be disposed with other household wastes. Hand over the device to a central recycling facility for electronic waste.

The device packaging is made of recyclable materials. Sort the packaging materials and recycle them accordingly.

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

The device is lead-free and contains only RoHS-compliant components.

11 Imprint

This operating manual is published by

MLS Lanny GmbH
Beermiss 14, D-75323 Bad Wildbad (Germany)
Fon: +49 (0)7081 9534-0
E-Mail: info@mls-lanny.de
Website: www.mls-lanny.de