Uni-Geräte E. Mangelmann
Elektrotechnische Fabrik GmbH
Holtumsweg 13, 47652 Weeze, Germany

Operating manual

Flow-Control-Butterfly-Valve

Series MRK

Control valve

EN

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Operating manual

Contents

Operating manual

1.0 General remarks

This operating manual includes instructions to assemble and operate the control valve in the prescribed and safe way.
In addition the respectively applicable operating instruction of the actuators are to be taken into consideration.
If any difficulties appear that can not be solved by means of the operating manual, further information may be demanded from the manufacturer.
This operating manual is in accordance with the relevant valid EN safety standards and the valid prescriptions and rules of the Federal Republic of Germany. If the control valve is used abroad of the FRG, the operator and/or the person who is responsible for the plant concept must take care that the valid national rules are met. The manufacturer reserves the right of any technical change and improvement. The use of these operating instructions suppose the qualification of the user according to paragraph 2.3 “qualified staff”.
The operating staff must be trained in accordance with the operating instructions. The operating manual must always be available at the location where used.

1.1 Control valve data

Manufacturer:
Uni-Geräte E. Mangelmann Elektrotechnische Fabrik GmbH
Holtumsweg 13, 47652 Weeze, Germany

Designation
Control valve as actuator for controlling without zero obturation

Working pressure:	0 - 4 bar (0 - 400 kPa)
Medium temperature:	MRK…-4 -20 °C to + 60 °C (253 K to 333 K) MRK…Ü200 -20 °C to + 200 °C (253 K to 473 K) MRK…Ü550 -20 °C to + 550 °C (253 K to 823 K)
Ambient temperature:	-20 °C to + 60 °C (253 K to 333 K)
Actuation type:	We with free shaft end St with electrical actuator Pn with pneumatic actuator
Fitting position:	We arbitrarily St/Pn vertical or horizontal drive
Design:	Butterfly plate through passage Butterfly plate limit stop (-2) (in case of construction with limit stop a „-2“ is added to the model designation e.g. MRK…-4**-2**)
Optional:	Manual operation (Ha) Manual actuation with hand lever and scala (B) disengageable hand lever (Bn) Special control butterfly plate (55) Through passage drawn in Additional limit switch for ignition position

Installation between to flanges acc. to DIN EN 1092-2 / ANSI

Type	15	20	25	32	40	50	65	80
MRK…-4	X	X	X	X	X	X	X	X
MRK...Ü200	O	O	O	O	O	O	O	O
MRK…Ü550	O	O	O	O	O	O	O	O

X Type examination EU2016/426, CE-0085AR0408

Type	100	125	150	200	250	300	350	400
MRK…-4	X	X	X	X	X	X	X	X
MRK...Ü200	O	O	O	O	O	O	O	O
MRK…Ü550	O	O	O	O	O	O	O	O

X Type examination EU2016/426, CE-0085AR0408

1.2 Application

The flow-control-butterfly-valves MRK are used as actuators for control tasks in the entire firing technology.

The flow-control-butterfly-valve are suitable for gases of the 1st, 2nd and 3rd gas families to DIN EN 437 and for neutral gases and air. As variation with material design for hot air, flue gas, exhaust gas and aggressive gases.

MRK…-4	Gases of the 1.,2.,3. gas families and air
MRK…Ü200 / MRK…Ü550	Hot air / as well neutral and non-aggressive gases
MRK…Ü550.30	Flue gas / as well as aggressive gases

If used in other cases, the operator must carefully check if construction/design of control valve, accessories and materials are suitable for the new application. The range of application is subject to the responsibility of the plant planner. The service life of the control valve is 20 years.

2.0 Danger notices

2.1 Safety terms

The signal terms DANGER, CAUTION und NOTICE are used in this operating manual in case of notices concerning special dangers, or for unusual information, requiring a special marking.

DANGER!
means that in case of non-observance there is danger to life and/or considerable damage.

CAUTION!
means that in case of non-observance there is danger of injury and/or damage.

NOTICE!
means that attention is drawn to technical correlations/connections.

Observance of other, not especially marked notices concerning transport, assembly, operation and maintenance and other data (in the operating manual, product documentation and at the unit itself) is also essential, in order to avoid disturbances that might affect direct or indirect damage to property or injury to persons.

2.2 Safety notice

Non observance of safety instructions can lead to loss of any claim for damages.

Non observance can lead to the following mentioned dangers:

- Failure of important functions of the control valve/plant.
- Endangering of persons by electrical or mechanical influences.
- Protection against accidental contact for moving parts may not be removed as long as the valve is in operation.
- Leakage of dangerous media (e.g. explosive, toxic, hot) must be removed in the way that there is no danger for persons or environment. Laws and regulations must be observed.

2.3 Qualified staff

These are persons who are familiar with erection, assembly, starting, operation and maintenance of the product and who have special qualifications acc. to their activities and functions, e.g.:

- Instruction and obligation to carry out and meet all regional and in-house orders and requirements.
- Education or instruction according to the safety engineering standards in use and maintenance of adequate safety and working protection equipment.
- Training in first aid.

2.4 Unauthorized modification and spare part production

Modification or changes of the control valve are only allowed after agreement of the manufacturer. Original drawings and accessories authorized by the manufacturer are for safety purposes. The use of other parts or unauthorized changes at the control valve by third persons may cancel and abolish the manufacturer's liability for resulting consequences.

2.5 Unauthorized operation

Operational reliability of the delivered control valve is only guaranteed in case of determined use in accordance to paragraph 1 of the operating manual. **The application limits mentioned on the type sign may on no account be exceeded.**

2.6 Safety information for the use in explosion-prone areas guideline 2014/34/EU

- The temperature of the medium must not exceed the respective temperature class, and respectively, the respective maximum permitted medium temperature as per operation guideline.
- If the valve is heated (e.g. heating jacket), care must be taken, that the specified temperature class is kept in the time.
- The valve must be connected to the ground.
  In the case most simple this can be realized via pipe screws by means of tooth disc.
  Otherwise the connection to the ground must be implemented by other measures e.g. cable links.
- Control valves, electrical and electrical/mechanical drives as well as sensors must undergo a separate conformity check as per ATEX. In doing so the respective safety and explosion protection information in the operation instructions are to taken into special consideration.
- Any modifications whatsoever to the valve are not allowed. The ATEX approval is void with immediate effect if the valve is modified without prior authorization (even including painting).
- Uni-Geräte GmbH must be consulted before any modifications are made.

Furthermore we point out the guideline 1999/92/EG, which include the minimum regulations for the improvement of the health-related situation and the safety of the employees, who might be jeopardized by an explosive atmosphere.

2.7 Safety information regarding guideline 2014/68/EU attachment I

DANGER!
Uni-control valves are not an accessory with a safety function as defined in the PED 2014/68/EU Article 2 (4) and Article 4 (1) (d) by category IV Use or classify!

3.0 Handling

3.1 Transport

For any transport works, the generally recognised technical rules and standards as well as rules for prevention of accidents must be observed.

During transport, storage and decommissioning, protective caps must be attached to the sides of the control valve.

The goods to be transported must be carefully treated. During transport, the control valve must be protected against strokes, impacts or vibration. The coat of lacquer may not be damaged. Transport temperature is -20 °C up to +60 °C.

Never transport the flow-control-butterfly-valve at screwed cable glands, appliance plugs or add-on units. Transport the flow-control-butterfly-valve with a belt below the connection flange (see illustration).

Transport the control valve in a box or on a pallet with soft base and it smoothly on even floor. **Never put valve on attachment parts.**

The goods must be checked on completeness and transport damage. See also section 9.0

3.2 Storage

If the control valve is not installed immediately after delivery, it must be stored properly.

- Storage of the flow-control-butterfly-valve with an opening of approximately 15°.
- Storage temperature -20 °C up to +60 °C, dry and clean.
- The lacquer protects against corrosion in neutral dry atmosphere. Do not damage colour.
- In humid rooms, a drying agent or a heating resp. is necessary because of condensation of water.

Requirements according to DIN 7716 (products made of caoutchouc and rubber) must be met.

3.3 Handling before mounting

- Protect against atmospheric influences such as humidity.
- Appropriate treatment protects against damage.

4.0 Product description

The flow-control-butterfly-valves in the MRK series are control valves as actuators for controlling without zero obturation.

The sectional Drawing in section 11.1 shows the butterfly plate - version
11.2 Fig. 1 - Fig. 6 shows the construction.

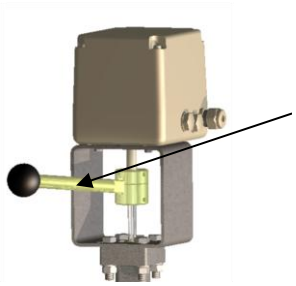
4.1 Function

- NC normally closed MRK…
- NO normally opened MRK...**R**
  (in case of version normally opened a „**R**“ is added to the model designation e.g. MRK…**R**)

4.2 Technical data

Control: without zero obturation

Electrical actuator (St)



Actuator including bracket

Type	Torque Nm	Operating time * 60s/90°	Operating time * 50s/90°	Voltage * 230 VAC	Voltage * 115 VAC	Voltage * 24 VDC	Position controller
NK 6010	10	X	-	X	X	n.A.	PMR-NK
NK 6015	15	X	-	X	X	n.A.	PMR-NK
NK 6020	20	X	-	X	X	n.A.	PMR 2-LC
NK 6040	40	X	-	X	X	n.A.	PMR 2-LC
N 1	15	X	-	X	X	X	PMR 3
N 2A	21	X	-	X	X	X	PMR 3
N 3	35	X	-	X	X	X	PMR 3
N 4A	60	X	-	X	X	X	PMR 3
N 5A	80	-	X	X	X	X	PMR 3
N 5S	110	-	X	X	X	X	PMR 3

* further operating times and voltages on request

Pneumatic actuator (Pn)

Actuator - single effect, including bracket

Type	PGF07	PGF10	PGF15	PGF20	PGF25	PGF30	PGF33
Torque Nm	6	10	22	30	60	90	160
Control pressure	5 – 10bar						

Max. control valve loading by pipe power
The indicated moments may not work longer than 10s.

DN		8	10	15	20	25	32	40	50	65	80	100	125	≥150
Torsion	**Nm**	20	35	50	85	125	160	200	250[1)]	325[1)]	400[1)]	-	-	-
Bending	**Nm**	35	70	105	225	340	475	610	1100	1600	2400	5000	6000	7600

[1)] Not valid in case of valves with flanges

Starting torque, pipe screws greased

DN		8	10	15	20	25	32	40	50	65	80	100	125	≥150
Torque	**Nm**	20	30	30	30	30	50	50	50	50	50	80	160	160

Starting torque, product screws and nuts greased

Screw		M6	M8	M10	M12	M16	M20	M24
Torque	**Nm**	5	11	22	39	70	110	150

4.3 Marking

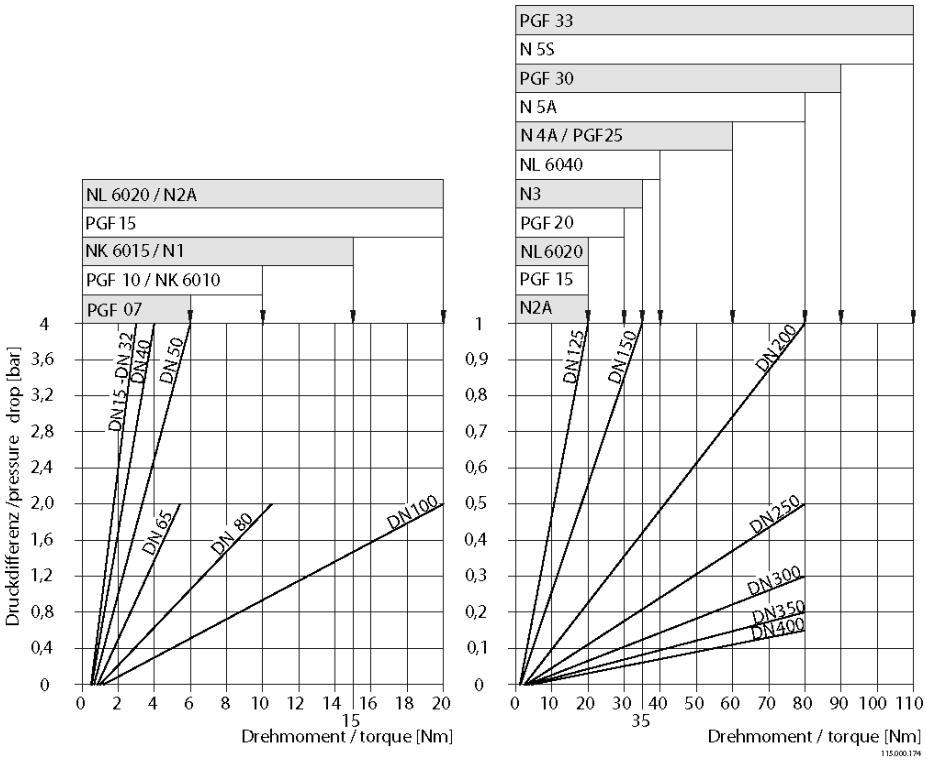
The type sign has the following information:

- Fabricator
- Valve type, nominal width, pressure and temperature indication, fitting position
- Year of construction / production no.
- Valve class and valve group
- CE-Sign and no. of relevant location
- Fluid group and test pressure PT

Refer also to section 10.0

4.4 Choice of electrical and pneumatic actuator

The total torque value for the flow-control-butterfly-valve type MRK results from adding the torque valves taken as well from the diagram as from the table „torque spindle sealing“ (see below).
While in operating, the admissible max. differential pressure (pe – pa) may not be exceeded. See pressure limits from diagram.



Torque spindle sealing

Design	DN 15 – DN 150	DN 200 – DN 400
+60 °C / +200 °C	0 Nm	0 Nm
+550 °C	3 Nm	15 Nm

Example:		**Solution:**
Inlet pressure	p_e = 0,5 bar	Total torque value = 50 Nm + 15 Nm = 65 Nm
Outlet pressure	p_a = 0,2 bar	Chosen: electrical actuator type N 5A
Size	DN 250	
Design	+550 °C	

5.0 Installation

5.1 Warning of dangers during installation, operation and maintenance

DANGER!
Safe operation of the control valve can only be guaranteed if it is installed, commissioned and maintained by qualified personnel (see point 2.3 “Qualified staff“) correctly and in observance of the warnings in this operating manual. Apart from that, the operation safety order and the qualified use of tools and protection equipment must be guaranteed. The operating instructions for the control valve must be observed during all work on or with the valve. Failure to observe these instructions may result in injury or in damage to the control valve or other installations.

5.2 Installation

Apart from the general installation guidelines, the following points should be observed:

NOTICE!
- The inside of the control valve and the pipeline must be free from foreign particles.
- Centre gaskets between the flanges.
- The connecting flanges must be aligned.
- Ensure that none of the components is strained during installation.
- The control valve must not be used as a fixed point; it is supported by the pipework system.
- Protect valves from soiling, particularly during construction work.
- Thermal expansion of the pipework must be equalized using compensators.

The flow-control-butterfly-valve MRK…St/Pn can depending on version be installed with horizontal or vertical but not suspended Actuator.

NOTICE!
Observe the actuator documentation.

6.0 Operation

DANGER!
Before commissioning a new installation or before starting up an installation again after repairs or modifications, ensure:
- The proper completion of all installation and assembly work!
- Commissioning only by „qualified staff“ (see point 2.3).
- Installation or repair of existing guards and protection equipment.

6.1 Commissioning

- Before commissioning, check the data on material, pressure, temperature and flow direction with the layout plan of the pipework system.
- Depending on the field of application, the local regulations have to be observed, e.g. the operation safety order.
- Residues in the pipework and the control valve (dirt, weld beads, etc.) will inevitably result in leaks.
- Leakage inspection of the installed control valve.

6.2 Shutting down

- Depending on the field of application, the local regulations have to be observed, e.g. the operation safety order.

6.3 Maintenance

Flow-control-butterfly-valves have to be checked at regular intervals for proper function. The intervals for regular inspections have to be defined by the operator according to the operating conditions. Uni-Geräte recommends an external visual inspection once a year.

Repair or maintenance works at the manufacturing company (UNI- Geräte)

- Valves and fittings must be delivered clean and free from substances which are harmful to health or to the environment.

6.4 Wiederinbetriebnahme

Bei Wiederinbetriebnahme der Regelarmatur ist darauf zu achten, dass alle entsprechenden Schritte, wie in Abschnitt 5.2 (Einbau) und Abschnitt 6.1 (Erstinbetriebnahme) beschrieben, wiederholt werden.

7.0 Troubleshooting

7.1 Detection of defects

DANGER!
Be sure to observe the safety instructions during troubleshooting.

If the malfunctions cannot be remedied using the following ***"Troubleshooting plan (7.2)"*** please contact the manufacturer.

In the event of faults in the function or operating behaviour of the valve, check whether the installation work was carried out and completed as described in this operating manual.
Depending on the field of application, the operation safety order must be observed.

Check the data on material, pressure, temperature, voltage and flow direction with the layout plan of the pipework system. In addition, check whether the operating conditions correspond to the technical data in the data sheet or on the rating plate.

7.2 Troubleshooting plan

Malfunction	Possible causes	Remedy
No flow	Clogging in the pipework system	Check pipework system
No external tightness	Gaskets damaged	See section 8 or replace flow-control-butterfly-valve

Malfunction	Possible causes	Remedy
MRK… (version normally closed NC)		
Low flow rate	Flow-control-butterfly-valve does not open completely	Check setting of limit switch
Flow-control-butterfly-valve does not open	Working pressure too high	Compare working pressure with the data on the rating plate
	Foreign matter in pipe	Clean pipe
	Actuator without function	Switch on actuator
	Position controller without function	Check connection of compressed air
	Existing voltage too low	Check voltage
Flow-control-butterfly-valve does not close	Foreign matter in pipe	Clean pipe
	Actuator without function	Switch off actuator
	Position controller without function	Check connection of compressed air
	Existing voltage too high	Check voltage
MRK…R (version normally opened NO)		
Low flow rate	Flow-control-butterfly-valve does not close completely	Check setting of limit switch
Flow-control-butterfly-valve does not open	Foreign matter in pipe	Clean pipe
	Actuator without function	Switch off actuator
	Position controller without function	Check connection of compressed air
	Existing voltage too high	Check voltage
Flow-control-butterfly-valve does not close	Working pressure too high	Compare working pressure with the data on the rating plate
	Foreign matter in pipe	Clean pipe
	Actuator without function	Switch on actuator
	Position controller without function	Check connection of compressed air
	Existing voltage too low	Check voltage

NOTICE!
Observe section 9.0 before all installation and repair work!

Observe section 6.4 when putting the valve back into operation!

8.0 Replace the control valve

In addition to the general installation guidelines and the operation safety order, the following points must also be observed:

DANGER!

- Depressurised pipework system
- Cooled medium
- Emptied installation
- Vent pipework systems containing corrosive, inflammable, aggressive or toxic media
- Have dismantling work carried out only by qualified staff (see point 2.3)
- For special application such as for oxygen use only the approved lubricants and appropriate sealing materials (BAM- approval)

In case of flow-control-butterfly-valves MRK (Ro) St/ Pn disconnect actuator. De-install actuator with console from the flow-control-butterfly-valve.

Replace the complete flow-control-butterfly-valves

9.0 Warranty

Scope and period of the warranty is specified in the edition of the “General Terms of Business of the Uni-Geräte E. Mangelmann Elektrotechnische Fabrik GmbH” valid at the time of delivery or else in the purchase agreement.

We warranty that the valve is free from faults in line with the state of the art and for the confirmed field of application.

No warranty claims will be accepted for damage resulting from improper use or failure to observe these operating and installation instructions, the statutory accident prevention regulations, the EN, DIN and VDE standards and other codes and regulations.

Warranty claims will also not be accepted for damage occurring during operation due to operating conditions deviating from those specified in the data sheet or in other agreements.

Justified complaints will be remedied by reworking by us or specialist companies authorized by us.

Claims going beyond the scope of the warranty will not be accepted. The customer shall have no right to the supply of a replacement valve.

Maintenance work, installation of parts from other manufacturers, any modifications to the design and natural wear are not covered by the warranty.

Transport damage must be reported not to us but ***without delay*** to your responsible goods handling company, the railway company or the shipping agent as otherwise all claims for damages against these companies will be voided.

10.0 Explanation on codes and directives

The Commission of the European Union has laid down common directives resp. regulations for the free trading of goods within the Union specifying minimum requirements for safety and health protection. The CE symbol confirms that products comply with the EU directives resp. regulations, i.e. in conformity with the relevant, in particular harmonised standards. Regulation EU/2016/426 and directive 2014/68/EU are of relevance for the control valve (mechanical part).

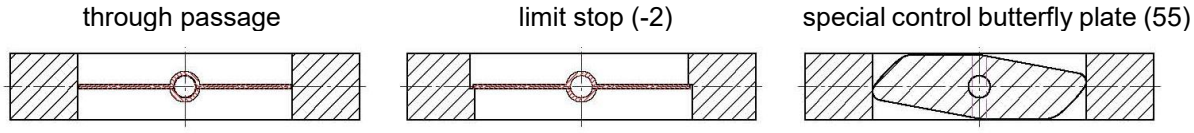
Notes on Regulation EU/2016/426 (Gas Appliances Regulation GAR):
The control valves have been developed, manufactured and tested in compliance with the applicable harmonised standard and comply with the relevant requirements of the Regulation EU/2016/426. Unless otherwise stated separately, this has been confirmed by a type examination.

Notes on Directive 2014/68/EU (Pressure Equipment Directive, DGRL):
It has been conformed that the quality assurance in design control, manufacture and final acceptance of the manufacturer, Uni-Geräte E. Mangelmann Elektrotechnische Fabrik GmbH, satisfy the requirements of 2014/68/EU Article 14 Module H. The control valves comply with the fundamental requirements of Directive 2014/68/EU. Control valves in according to Article 1 Paragraph 2,f,v or Article 4 paragraph 3 are not allowed to have the CE Mark in according to Article 18.

Note concerning ex-guideline 2014/34/EU (explosion guideline ATEX):
The product is not subject to guideline 2014/34/EU, since due to the loads occurring during practical operation, there is no effective source of ignition even in case of an error case to be assumed. This also applies to spring loaded components in medium filled rooms. In case of electric drives, sensors or other electric components the application as per 2014/34/EU is to be checked separately.

11.0 Drawing

11.1 Version butterfly plate



11.1 Fig. 1 MRK…We…-4 / MRK…We…Ü200 / MRK…We…Ü550

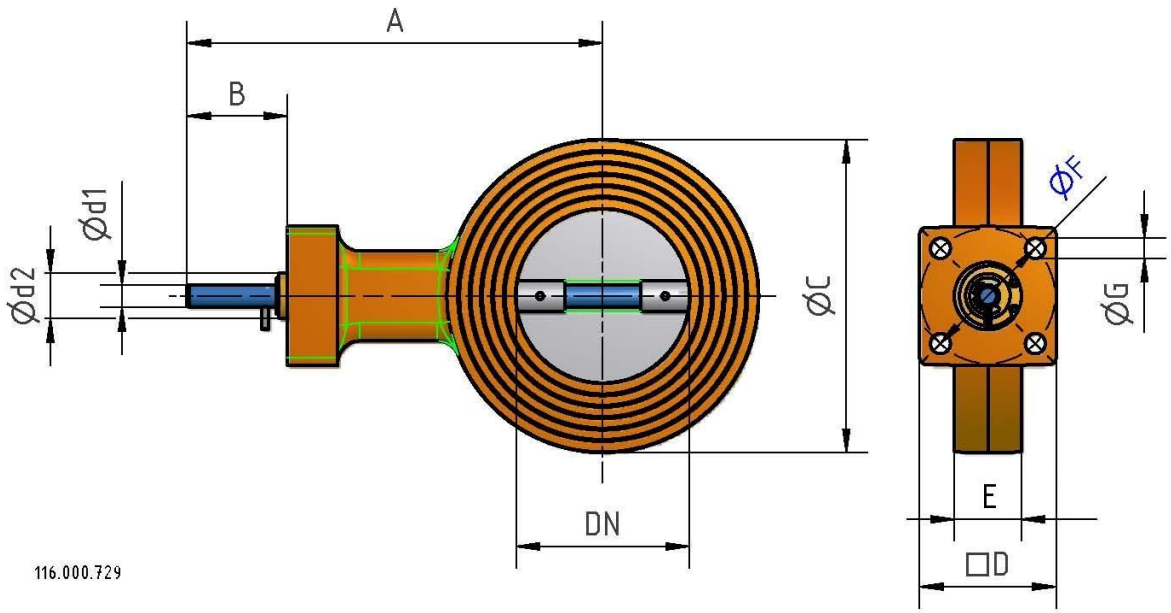


Fig.2 MRK…We…B

Version with manual actuation with hand lever and scala (B)

Fig.3 MRK…Ha

Version with manual operation (Ha)

Fig.4 MRK…St

Version with electrical actuator (St)

Fig.5 MRK…Pn

Version with pneumatic actuator (Pn)

Fig.6 MRK…

Version with through passage drawn in

11.3 Dimension MRK…We…-4 / MRK…We…Ü200 / MRK…We…Ü550

Type	DN	A	B	ØC	D	Ød1	Ød2	E	ØF	ØG	Weight in kg
MRK…We 5N...	15	157	45	45	60	10	20	25	60	9	1,0
MRK…We 7N…	20	161	45	58	60	10	20	25	60	9	1,1
MRK…We 10N…	25	163	45	70	60	10	20	25	60	9	1,5
MRK…We 12N…	32	163	45	70	60	10	20	25	60	9	1,5
MRK…We 15N…	40	166	45	90	60	10	20	25	60	9	1,8
MRK…We 20N…	50	171	45	104	60	10	20	25	60	9	2,0
MRK…We 25N…	65	178	45	124	60	10	20	25	60	9	2,4
MRK…We 30N…	80	186	45	139	60	10	20	30	60	9	3,1
MRK…We 100...	100	196	45	161	60	10	20	30	60	9	3,7
MRK…We 125…	125	208	45	191	60	10	20	35	60	9	5,2
MRK…We 150…	150	221	45	214	60	10	20	35	60	9	5,6
MRK…We 200…	200	259	50	270	80	20	25	40	80	11	12,0
MRK…We 250…	250	284	50	320	80	20	25	40	80	11	13,0
MRK…We 300…	300	309	50	370	80	20	25	45	80	11	15,5
MRK…We 350…	350	359	50	428	80	20	25	45	80	11	27,0
MRK…We 400…	400	379	50	465	80	20	34	50	80	11	38,0

In the version with through passage drawn in, the nominal diameter is reduced while maintaining the same size.

Example: MRK…We…25N/20N
Size: DN 65
Drawn in: DN 50

NOTICE!
For versions with actuator (St/Pn), the dimensions depend on the selected actuator; please refer to the actuator documentation.