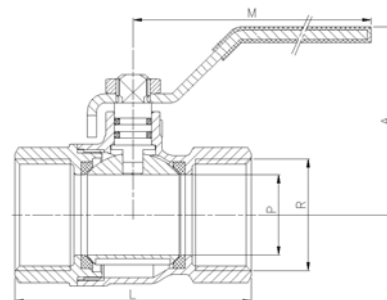
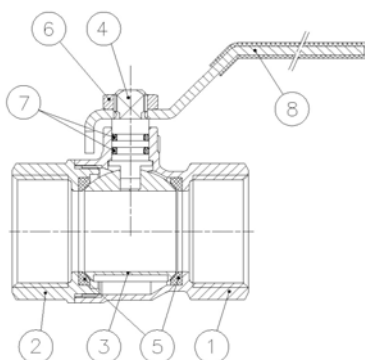


## Art.: 3030I

### Válvula de esfera con maneta de acero inoxidable AISI 304

### Ball valve with stainless steel lever handle AISI 304

Características	Features
1. Válvula esfera con paso total.	1. Ball valve with full bore.
2. Construcción en latón s/ UNE-EN 12165 niquelado.	2. Brass construction acc./ UNE-EN12165 nickel plated.
3. Extremos rosca gas (BSP) hembra-hembra (H-H) según ISO 228/1.	3. Gas (BSP) threaded female-female (F-F) ends according ISO 228/1.
4. Eje con doble o-ring NBR.	4. Stem with double NBR o-ring.
5. <b>Accionamiento mediante palanca de acero inoxidable AISI 304.</b>	5. <b>Working by means of AISI 304 stainless steel lever handle.</b>
6. Temperatura de trabajo desde -20°C a 110°C.	6. Working temperature from -20°C to 110°C.
7. Presión máxima de trabajo 25 bar (PN 25).	7. Maximum working pressure 25 bar (PN 25).
8. Asientos PTFE.	8. PTFE Seats.



Nº	Denominación / Name	Material	Acabado Superficial / Surface Treatment
1	Cuerpo / Body	Latón / Brass (CW617N)	Granallado + Niquelado Peened + Nickel plated
2	Tapa / Cap	Latón / Brass (CW617N)	Granallado + Niquelado Peened + Nickel plated
3	Esfera / Ball	Latón / Brass (CW617N)	Cromado / Chrome plated
4	Eje / Stem	Latón / Brass (CW617N)	Cromado / Chrome plated
5	Asientos / Ball seats	PTFE	-
6	<b>Tuerca / Nut</b>	<b>AISI 304</b>	-
7	Tóricas / O-Rings	NBR	-
8	<b>Maneta / Handle</b>	<b>AISI 304</b>	-

Ref.	Medida / Size		Dimensiones / Dimensions (mm)				Peso / Weight (Kg)
	R	DN	P	A	L	M	
3030I 04	1/2"	15	14	45	49	84	0,149
3030I 05	3/4"	20	19	53	56	93	0,244
3030I 06	1"	25	24	56	70	93	0,374
3030I 07	1 1/4"	32	30	68	79	115	0,589
3030I 08	1 1/2"	40	37	77	89	126	0,855
3030I 09	2"	50	46,5	86	104	158	1,349

## DIAGRAMA PÉRDIDA DE CARGA / HEAD LOSS CHART

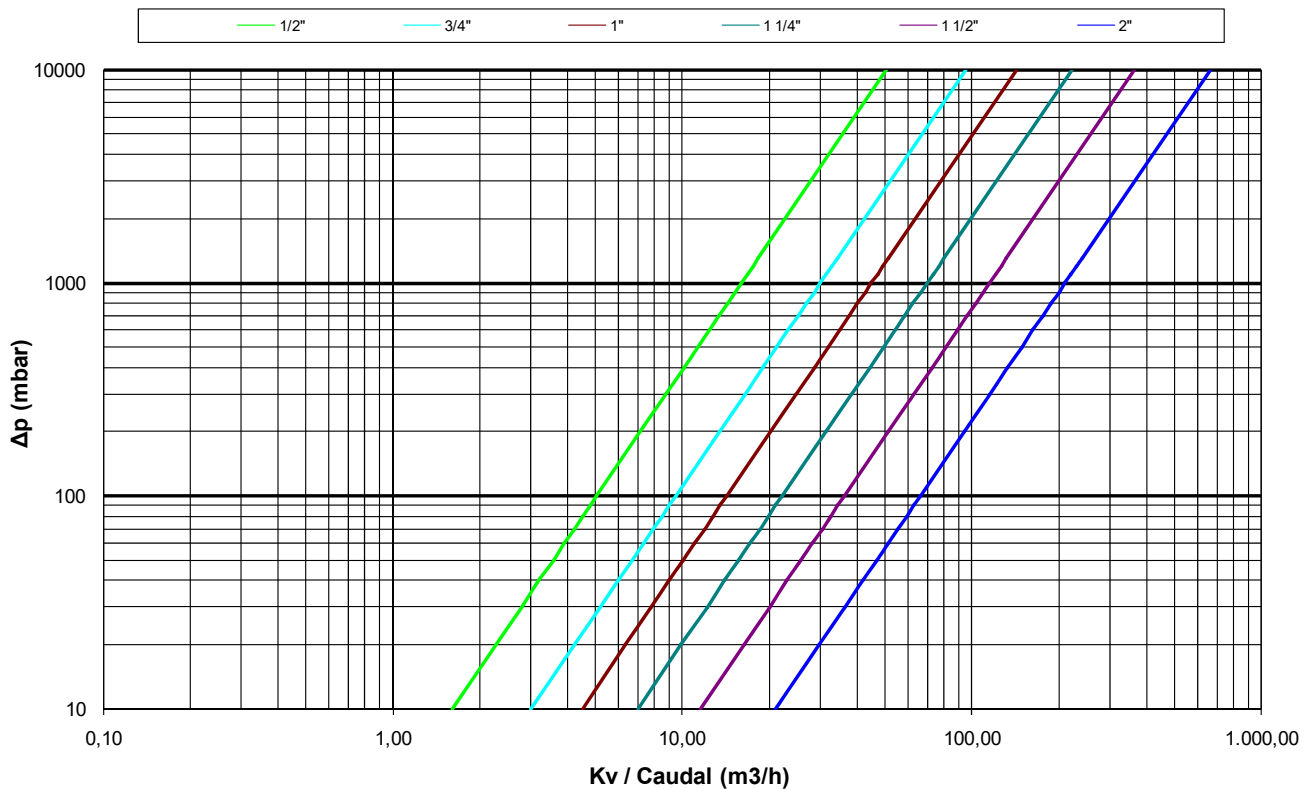
(Válvulas paso total roscadas / Threaded ends full bore ball valves)

Valores de Kv / Kv Values:

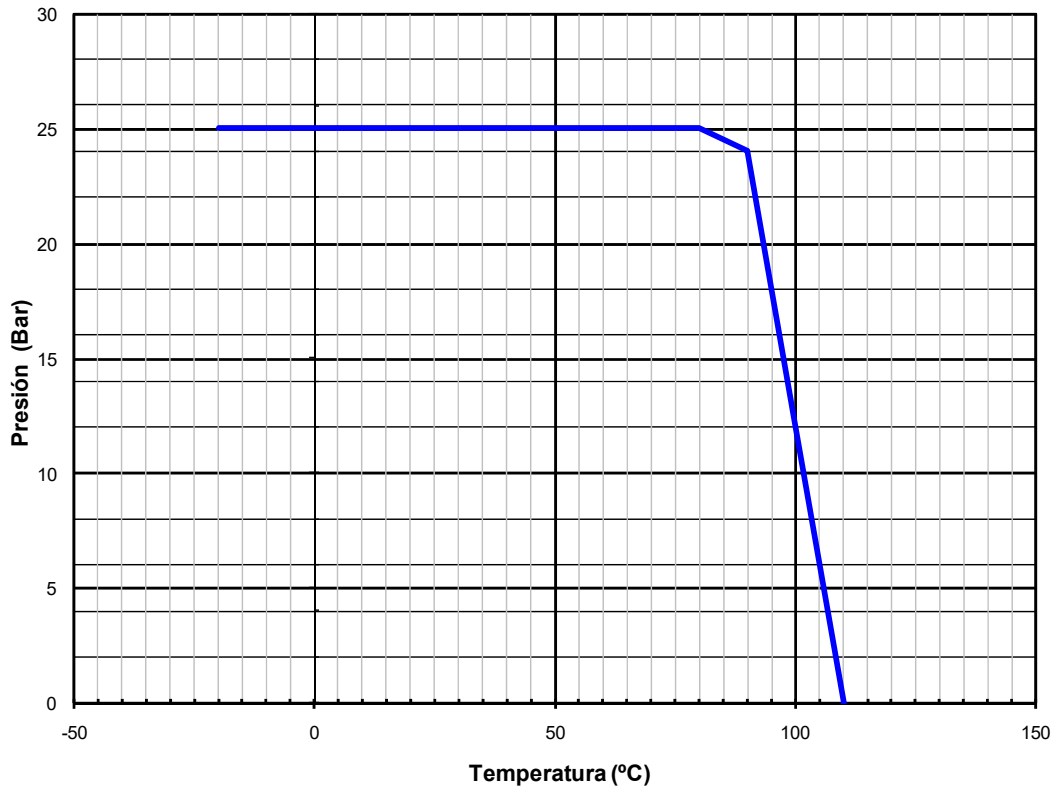
**Kv** = Es la cantidad de metros cúbicos por hora que pasará a través de la válvula generando una pérdida de carga de 1 bar.

**Kv** = The flow rate of water in cubic meters per hour that will generate a pressure drop of 1 bar across the valve.

Medida / Size	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
Kv	16	30	45	70	115	210



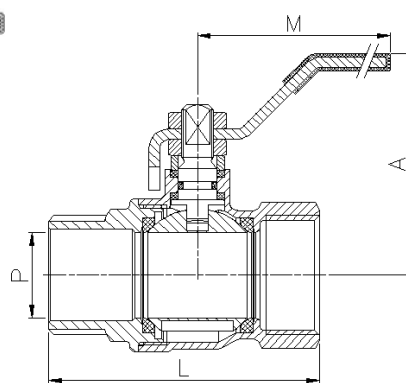
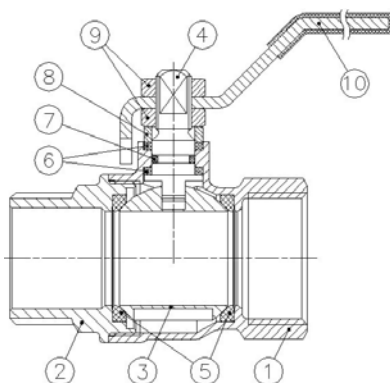
## CURVA PRESIÓN - TEMPERATURA / PRESSURE - TEMPERATURE RATING



## Art.: 3034

### Válvula de esfera accionamiento palanca / Ball valve lever handle

Características	Features
1. Válvula esfera con paso total.	1. Ball valve with full bore.
2. Construcción en latón s/ UNE-EN 12165 cromado.	2. Brass construction acc./ to UNE-EN 12165 chrome plated.
3. Extremos rosca gas (BSP) macho-hembra según ISO 228/1.	3. Threaded male-female ends gas (BSP) according to ISO 228/1.
4. Accionamiento mediante palanca de acero.	4. Working by means of steel lever handle.
5. Temperatura de trabajo desde -20°C a 110°C.	5. Working temperature from -20°C to 110°C.
6. Presión máxima de trabajo 25 bar (PN 25).	6. Maximum working pressure 25 bar (PN 25).
7. Asientos PTFE.	7. PTFE Seats.



Nº	Denominación / Name	Material	Acabado Superficial / Surface Treatment
1	Cuerpo / Body	Latón / Brass (CW617N)	Granallado + Cromado / Peened + Chromed
2	Tapa / Cap	Latón / Brass (CW617N)	Granallado + Cromado / Peened + Chromed
3	Esfera / Ball	Latón / Brass (CW617N)	Cromado / Chrome plated
4	Eje / Stem	Latón / Brass (CW617N)	Cromado / Chrome plated
5	Asientos / Ball seats	PTFE	-
6	Anillo prensa / Stem packing	PTFE	-
7	Tórica / O-Ring	NBR	-
8	Anillo prensa / Stem ring	Latón / Brass	Cromado / Chrome plated
9	Tuerca / Nut	Latón / Brass	Cromado / Chrome plated
10	Maneta / Handle	Acero / Steel	Dacromet

Ref.	Medida / Size	DN	Dimensiones / Dimensions (mm)				Peso / Weight (Kg)
			P	A	L	M	
3034 02	1/4"	10	10	46	48	84	0,115
3034 03	3/8"	10	10	46	49	84	0,120
3034 04	1/2"	15	15	47	55	84	0,170
3034 05	3/4"	20	20	58	64	98	0,275
3034 06	1"	25	25	61	76	98	0,410
3034 07	1 1/4"	32	32	74	87	126	0,650
3034 08	1 1/2"	40	40	80	95	126	0,875
3034 09	2"	50	50	91	109	158	1,370

## DIAGRAMA PÉRDIDA DE CARGA / HEAD LOSS CHART

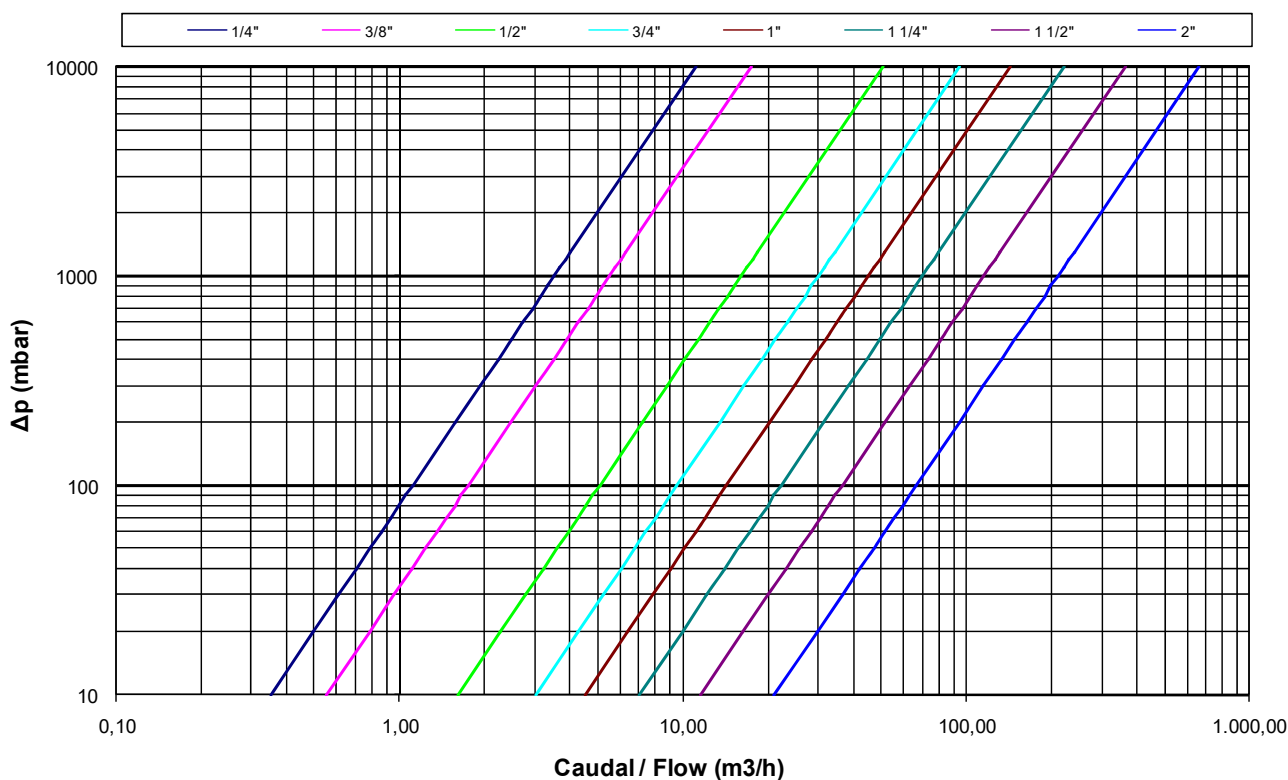
(Válvulas paso total roscadas / Threaded ends full bore ball valves)

Valores de Kv / Kv Values:

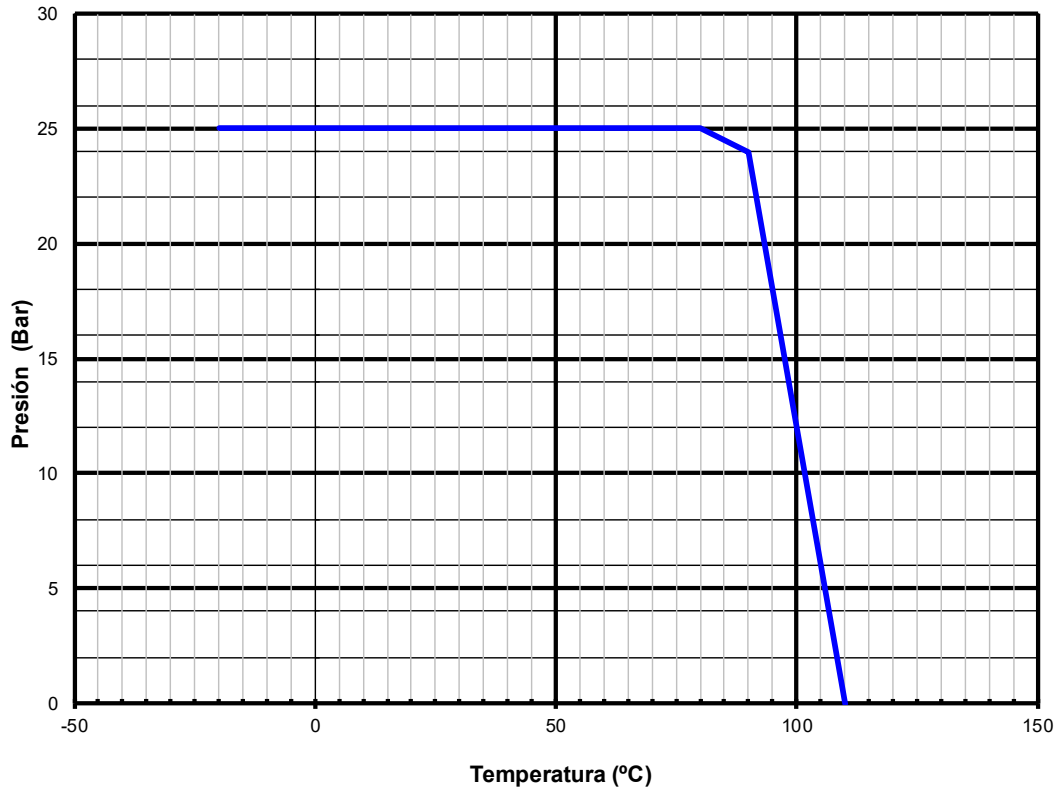
**Kv** = Es la cantidad de metros cúbicos por hora que pasará a través de la válvula generando una pérdida de carga de 1 bar.

**Kv** = The flow rate of water in cubic meters per hour that will generate a pressure drop of 1 bar across the valve.

Medida / Size	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
Kv	3.5	5.5	16	30	45	70	115	210



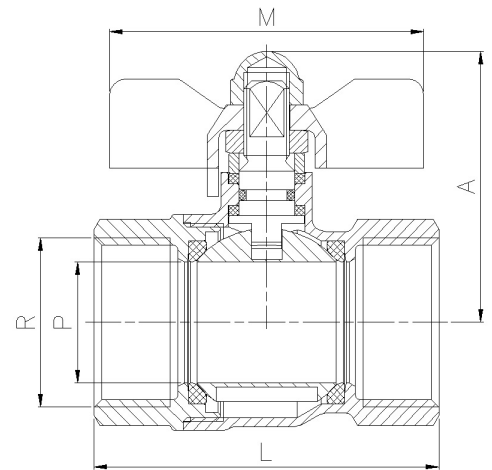
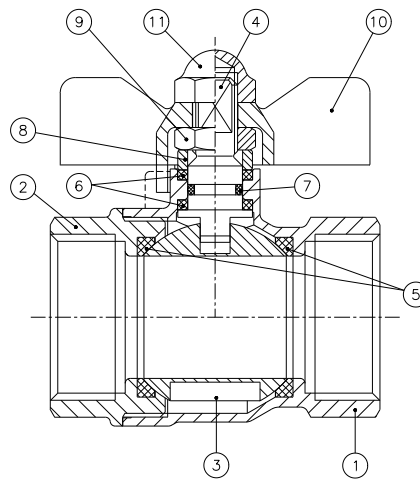
## CURVA PRESIÓN - TEMPERATURA / PRESSURE - TEMPERATURE RATING



## Art.: 3035

### Válvula de esfera con palomilla / Ball valve with butterfly handle

Características	Features
1. Válvula esfera con paso total.	1. Ball valve with full bore.
2. Construcción en latón UNE-EN 12165 cromado	2. Brass construction acc./ to UNE-EN 12165 chrome plated.
3. Extremos rosca gas (BSP) hembra s/ ISO 228/1	3. Threaded female ends gas (BSP) acc/ ISO 228/1
4. Accionamiento mediante palomilla de aluminio. (Color azul - indicador agua fría).	4. Working by means of aluminium butterfly handle. (Blue colour - cold water indicator).
5. Temperatura de trabajo desde -20°C a 110°C	5. Working temperature from -20°C to 110°C
6. Presión máxima de trabajo 25 bar (PN 25)	6. Maximum working pressure 25 bar (PN 25)
7. Asientos PTFE	7. PTFE Seats
8. Producto certificado ACS	8. ACS approval product



Nº	Denominación / Name	Material	Acabado Superficial / Surface Treatment
1	Cuerpo / Body	Latón / Brass (CW617N)	Granallado + Cromado / Peened + Chromed
2	Tapa / Cap	Latón / Brass (CW617N)	Granallado + Cromado / Peened + Chromed
3	Esfera / Ball	Latón / Brass (CW617N)	Cromado / Chrome plated
4	Eje / Stem	Latón / Brass (CW617N)	Cromado / Chrome plated
5	Asientos / Ball seats	PTFE	-
6	A.prensa / Stem packing	PTFE	-
7	Tórica / O-Ring	NBR	-
8	Anillo prensa / Stem ring	Latón / Brass	Cromado / Chrome plated
9	Tuerca / Nut	Latón / Brass	Cromado / Chrome plated
10	Maneta / T-Handle	Aluminio / Aluminium	Pintado / Painted
11	Tuerca / Nut	Latón / Brass	Cromado / Chrome plated

Ref.	Medida / Size		DN	Dimensiones / Dimensions (mm)				Peso / Weight (Kg)
	R			P	A	L	M	
3035 02	1/4"		10	10	38	40	50	0,088
3035 03	3/8"		10	10	38	43	50	0,094
3035 04	1/2"		15	14	40	49	50	0,127
3035 05	3/4"		20	19	50	56	62	0,222
3035 06	1"		25	24	53	68	62	0,336

## DIAGRAMA PÉRDIDA DE CARGA / HEAD LOSS CHART

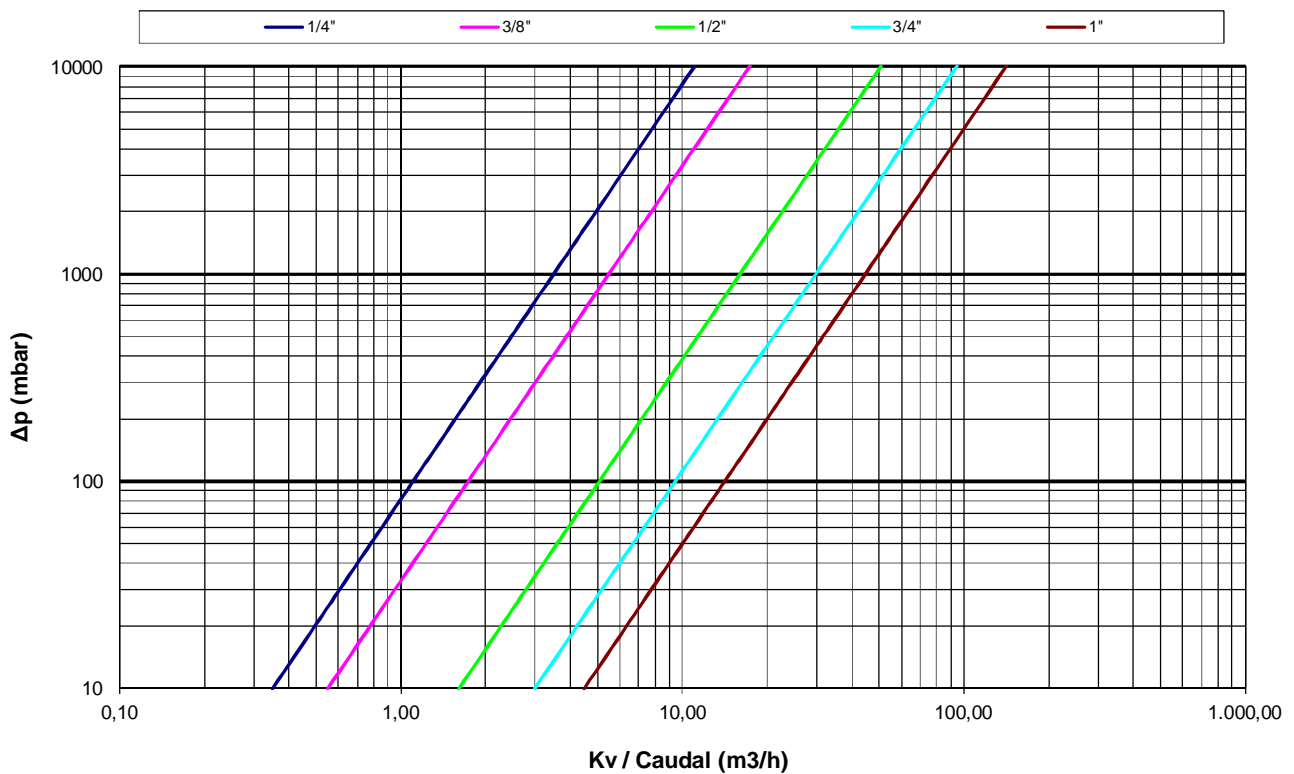
(Válvulas paso total roscadas / Threaded ends full bore ball valves)

Valores de Kv / Kv Values:

**Kv** = Es la cantidad de metros cúbicos por hora que pasará a través de la válvula generando una pérdida de carga de 1 bar.

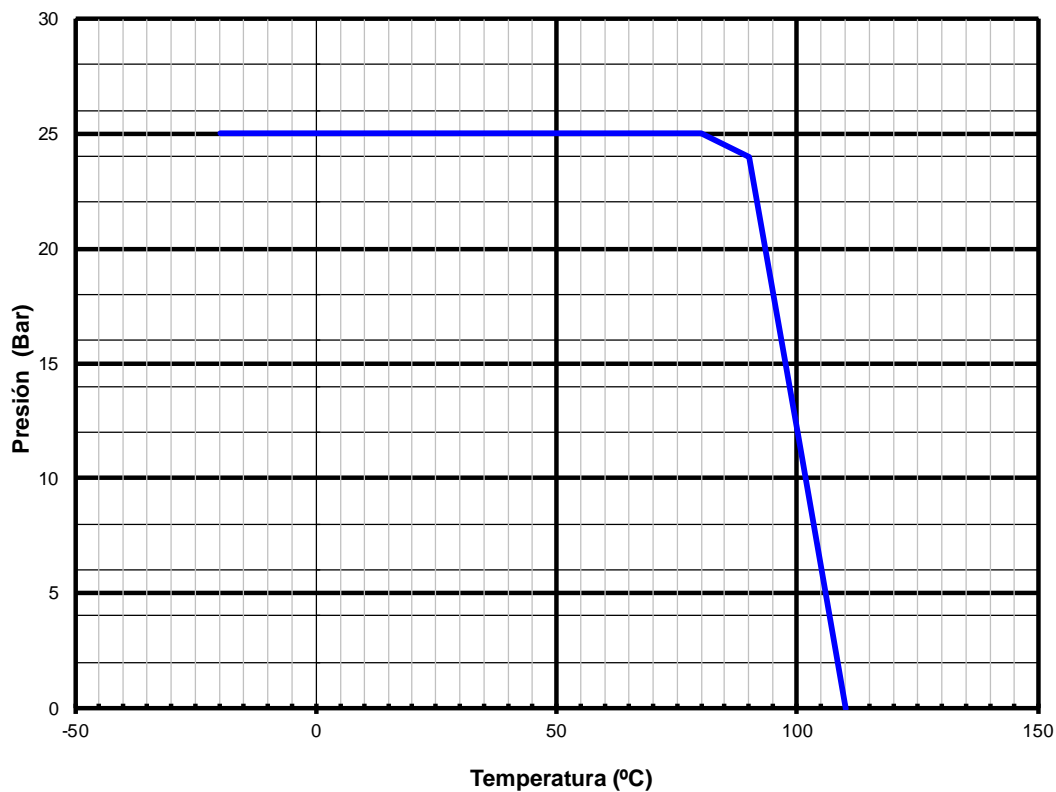
**Kv** = The flow rate of water in cubic meters per hour that will generate a pressure drop of 1 bar across the valve.

Medida / Size	1/4"	3/8"	1/2"	3/4"	1"
Kv	3.5	5.5	16	30	45





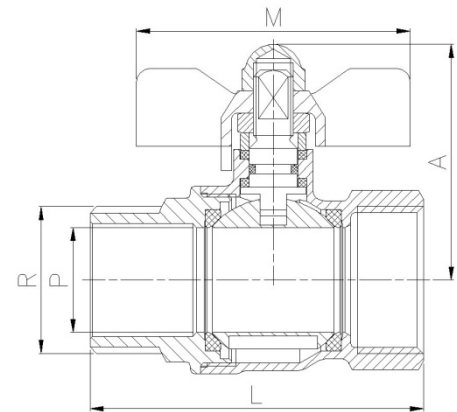
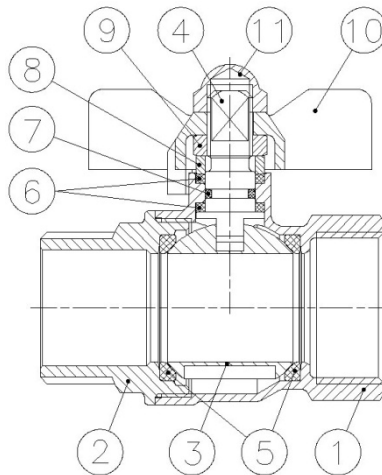
## CURVA PRESIÓN - TEMPERATURA / PRESSURE - TEMPERATURE RATING



## Art.: 3036

### Válvula de esfera accionamiento mariposa / Brass ball valve butterfly handle

Características	Features
1. Válvula esfera con paso total.	1. Ball valve with full bore.
2. Construcción en latón s/ UNE-EN 12165 cromado.	2. Brass construction acc/ to UNE-EN 12165 chrome plated.
3. Extremos rosca gas (BSP) macho-hembra s/ ISO 228/1.	3. Threaded male-female ends gas (BSP) acc/ ISO 228/1.
4. Accionamiento mediante palomilla de aluminio. (Color azul - indicador agua fría).	4. Working by means of aluminium butterfly handle. (Blue colour - cold water indicator)
5. Temperatura de trabajo desde -20°C a 110°C.	5. Working temperature from -20°C to 110°C.
6. Presión máxima de trabajo 25 bar (PN 25).	6. Maximum working pressure 25 bar (PN 25).
7. Asientos PTFE.	7. PTFE Seats.



Nº	Denominación / Name	Material	Acabado Superficial / Surface Treatment
1	Cuerpo / Body	Latón / Brass (CW617N)	Granallado + Cromado / Peened + Chromed
2	Tapa / Cap	Latón / Brass (CW617N)	Granallado + Cromado / Peened + Chromed
3	Esfera / Ball	Latón / Brass (CW617N)	Cromado / Chrome plated
4	Eje / Stem	Latón / Brass (CW617N)	Cromado / Chrome plated
5	Asientos / Ball seats	PTFE	-
6	Anillo junta / Stem packing	PTFE	-
7	Junat tórica / O-Ring	NBR	-
8	Anillo prensa / Stem ring	Latón / Brass	Cromado / Chrome plated
9	Tuerca / Nut	Latón / Brass	Cromado / Chrome plated
10	Maneta / T-Handle	Aluminio / Aluminium	Pintado / Painted
11	Tuerca / Nut	Latón / Brass	Cromado / Chrome plated

Ref.	Medida / Size R	DN	Dimensiones / Dimensions (mm)				Peso / Weight (Kg)
			P	A	L	M	
3036 02	1/4"	10	10	38	48	50	0,100
3036 03	3/8"	10	10	38	49	50	0,105
3036 04	1/2"	15	14	40	56	50	0,150
3036 05	3/4"	20	19	50	64	62	0,250
3036 06	1"	25	24	53	76	62	0,380

## DIAGRAMA PÉRDIDA DE CARGA / HEAD LOSS CHART

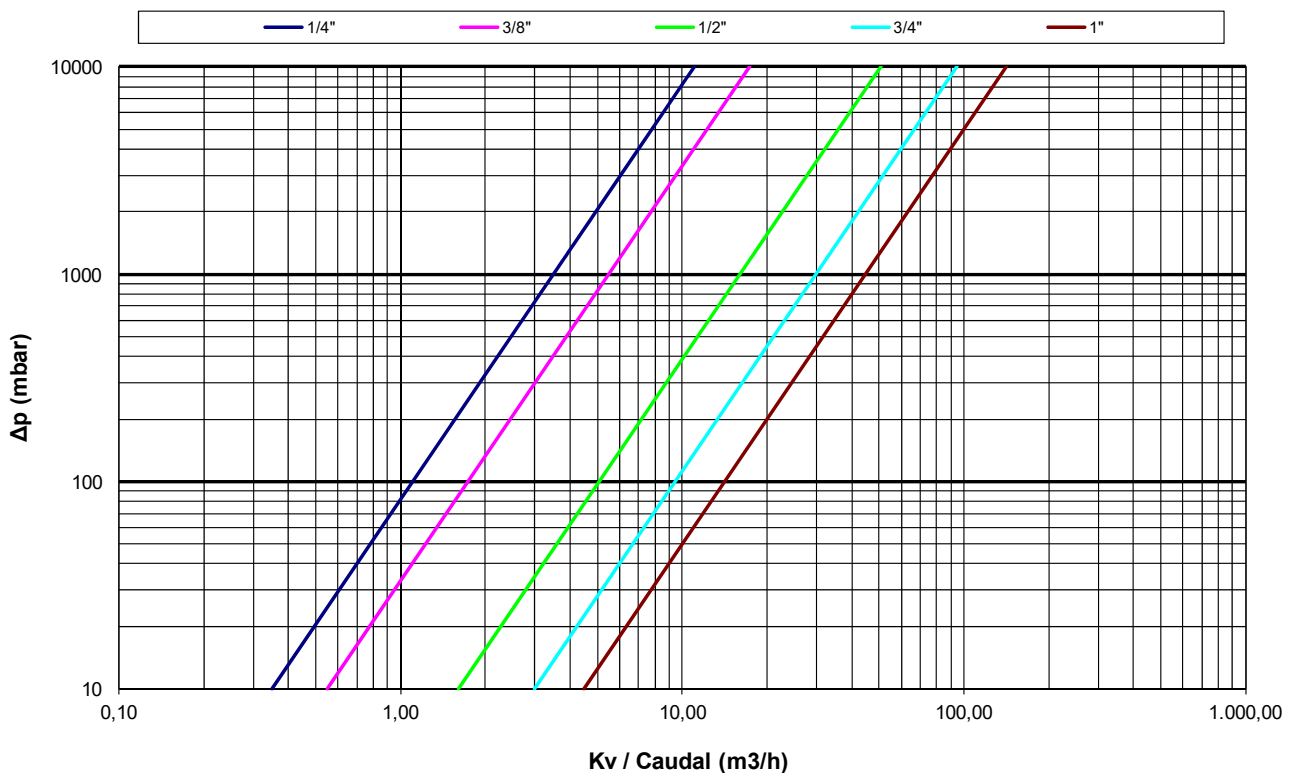
(Válvulas paso total roscadas / Threaded ends full bore ball valves)

Valores de Kv / Kv Values:

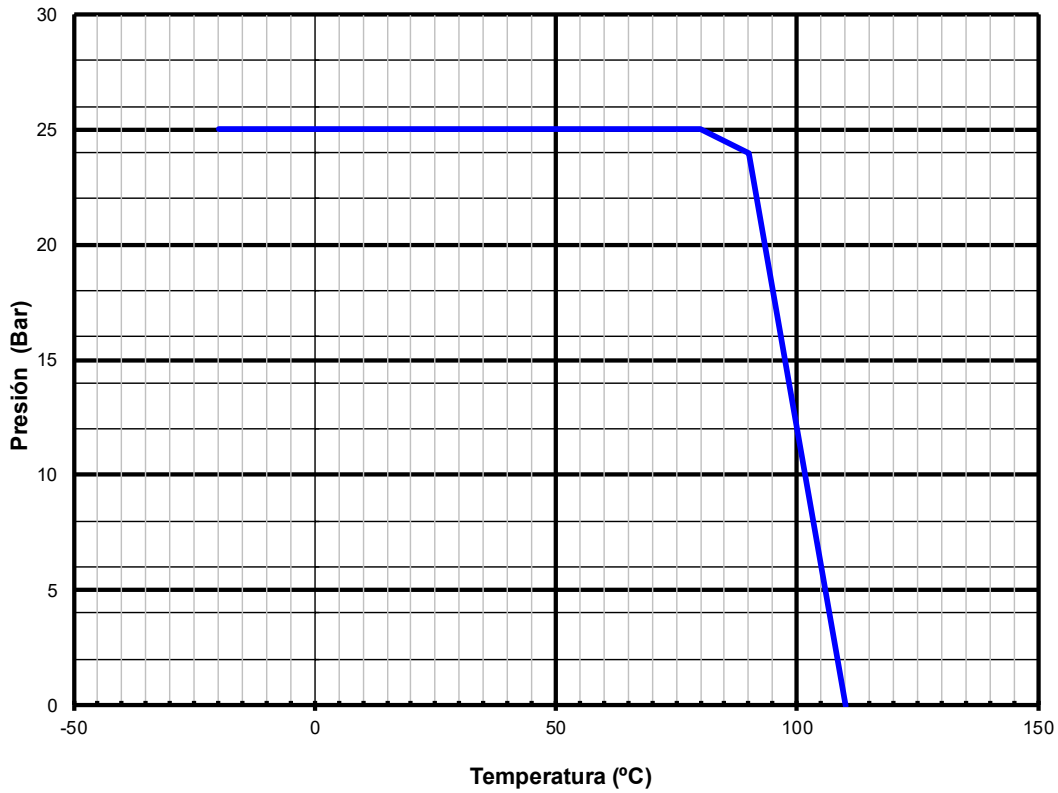
**Kv** = Es la cantidad de metros cúbicos por hora que pasará a través de la válvula generando una pérdida de carga de 1 bar.

**Kv** = The flow rate of water in cubic meters per hour that will generate a pressure drop of 1 bar across the valve.

Medida / Size	1/4"	3/8"	1/2"	3/4"	1"
Kv	3.5	5.5	16	30	45



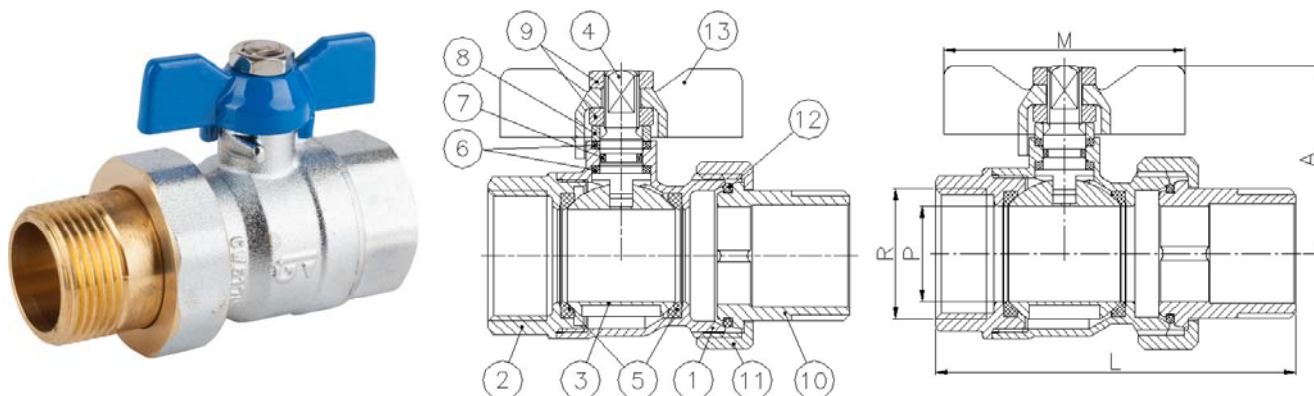
## CURVA PRESIÓN - TEMPERATURA / PRESSURE - TEMPERATURE RATING



## Art.: 3046

### Válvula de esfera con racor 2 piezas / Ball valve with 2 pieces connector

Características	Features
1. Válvula de esfera con paso total.	1. Ball valve with full bore.
2. Construcción en latón s/ UNE-EN 12165 cromado.	2. Brass construction acc/ to UNE-EN 12165 chrome plated.
3. Extremos rosca gas (BSP) macho-hembra s/ ISO 228/1. Un extremo racor dos piezas.	3. Thread ends gas (BSP) male-female acc./ to ISO 228/1. One end two piece connector.
4. Accionamiento mediante palomilla aluminio.	4. Working by means of aluminium T-handle.
5. Temperatura de trabajo desde -20°C a 110°C.	5. Working temperature from -20°C to 110°C.
6. Presión máxima de trabajo 25 bar (PN 25).	6. Maximum working pressure 25 bar (PN 25).
7. Asientos PTFE.	7. PTFE Seats.



Nº	Denominación / Name	Material	Acabado Superficial / Surface Treatment
1	Cuerpo / Body	Latón / Brass (CW617N)	Granallado + Cromado / Peened + Chromed
2	Tapa / Cap	Latón / Brass (CW617N)	Granallado + Cromado / Peened + Chromed
3	Esfera / Ball	Latón / Brass (CW617N)	Cromado / Chrome plated
4	Eje / Stem	Latón / Brass (CW617N)	Cromado / Chrome plated
5	Asientos / Ball seats	PTFE	-
6	Anillo prensa / Stem packing	PTFE	-
7	Tórica / O-Ring	NBR	-
8	Anillo prensa / Stem ring	Latón / Brass	Cromado / Chrome plated
9	Tuerca / Nut	Latón / Brass	Cromado / Chrome plated
10	Conexión / Male connection	Latón / Brass	Cromado / Chrome plated
11	Tuerca / Nut	Latón / Brass	Granallado + Cromado / Peened + Chromed
12	Tórica / O-Ring	NBR	-
13	Maneta / T-Handle	Aluminio / Aluminium	Pintado / Painted

Ref.	Medida / Size		Dimensiones / Dimensions (mm)				Peso / Weight (Kg)
	R	P	A	L	M		
3046 04	1/2"	14	36	69	50	0,185	
3046 05	3/4"	19	44	76	62	0,305	
3046 06	1"	24	48	92	62	0,490	
3046 07	1 1/4"	30	57	106	78	0,715	

## DIAGRAMA PÉRDIDA DE CARGA / HEAD LOSS CHART

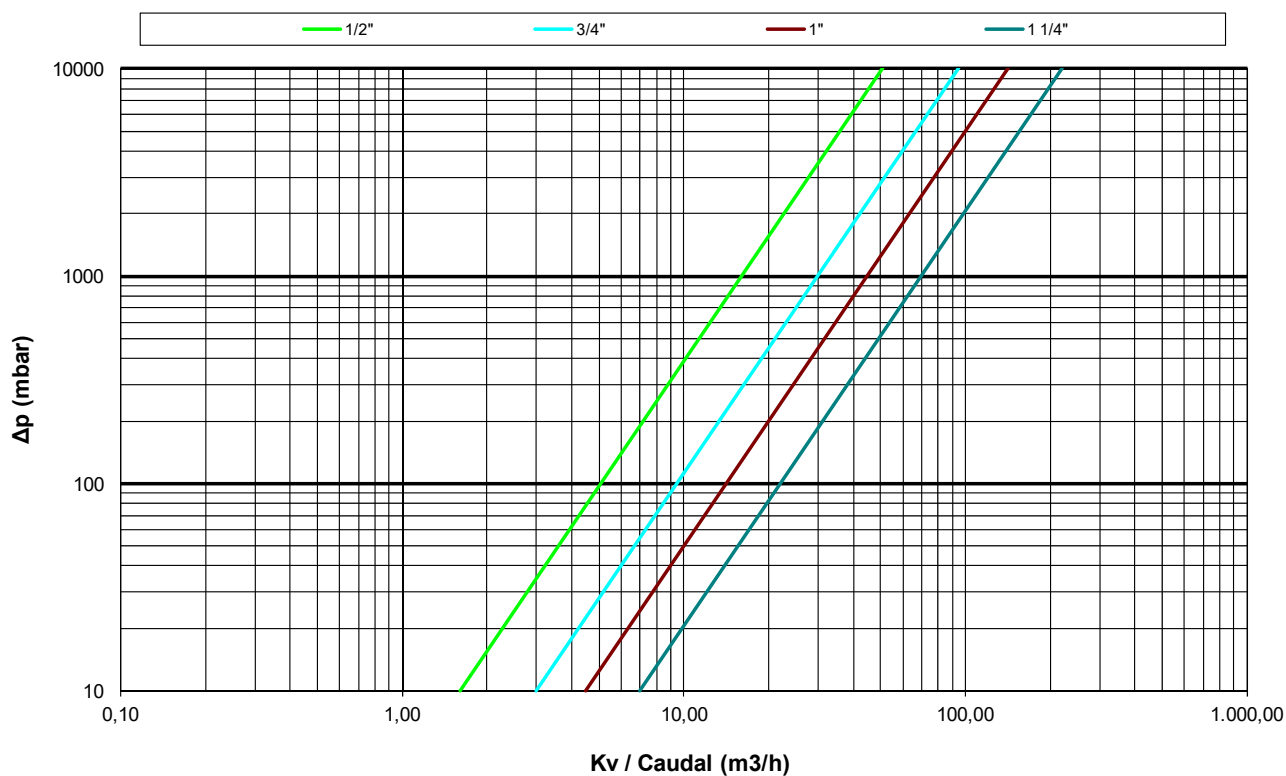
(Válvulas paso total roscadas / Threaded ends full bore ball valves)

Valores de Kv / Kv Values:

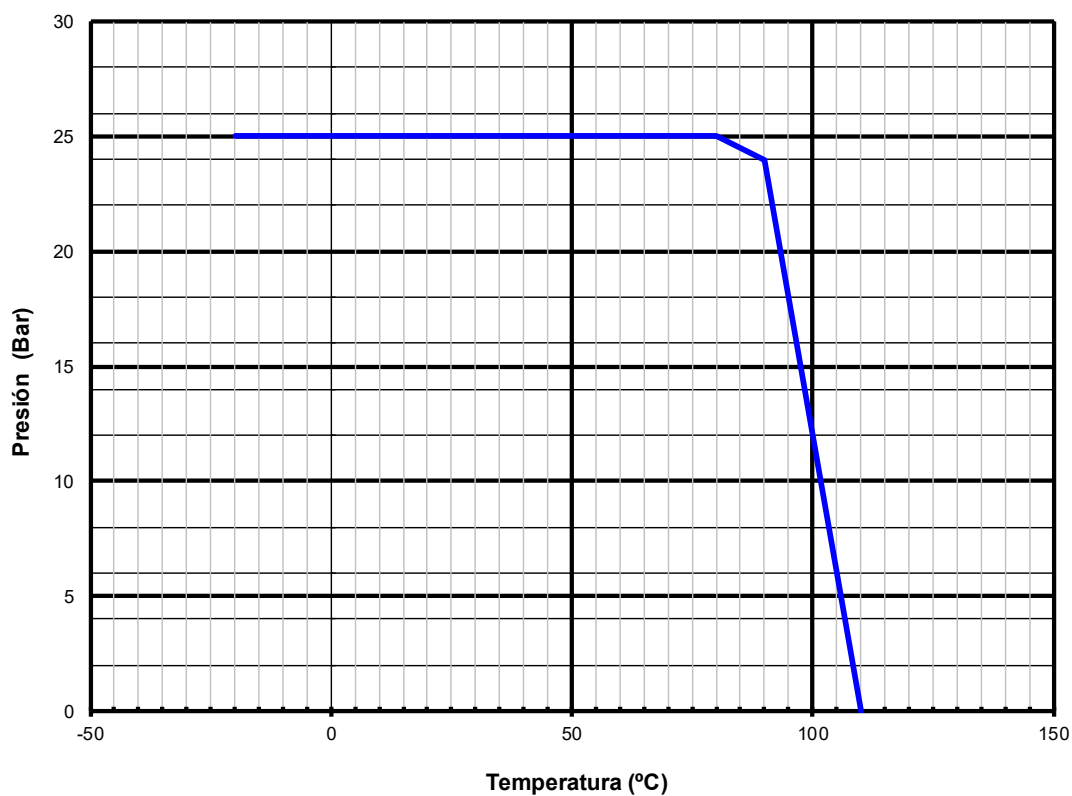
**Kv** = Es la cantidad de metros cúbicos por hora que pasará a través de la válvula generando una pérdida de carga de 1 bar.

**Kv** = The flow rate of water in cubic meters per hour that will generate a pressure drop of 1 bar across the valve.

Medida / Size	1/2"	3/4"	1"	1 1/4"
Kv	16	30	45	70



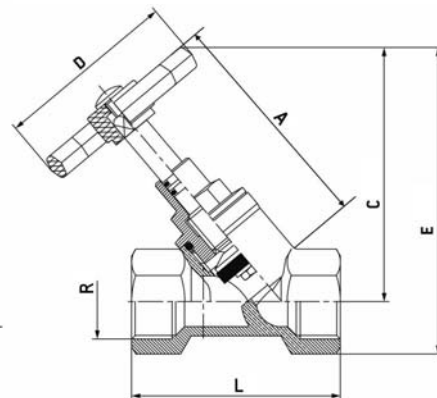
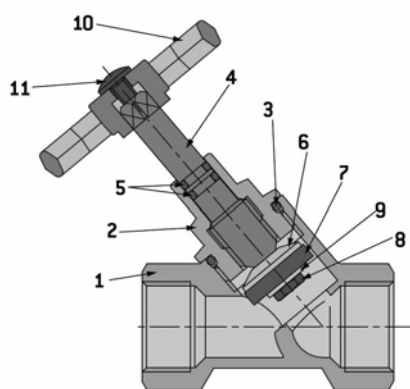
## CURVA PRESIÓN - TEMPERATURA / PRESSURE - TEMPERATURE RATING



## Art.: 3230

### Válvula de asiento inclinado / Slanted seat valve

Características	Features
1. Apta para cualquier tipo de instalación de fontanería o calefacción.	1. Suitable for all kind of hydraulic or heating installations.
2. Presión máxima de trabajo: - PN 16 (1/2" a 2") - PN 15 (2 1/2") - PN 12 (3") - PN 10 (4")	2. Max. working pressure: - PN 16 (1/2" to 2") - PN 15 (2 1/2") - PN 12 (3") - PN 10 (4")
3. Construcción en latón s/UNE-EN 12165 (1/2" a 2") y en Bronce s/UNE-EN 1982 (2 1/2" a 4").	3. Brass according to UNE-EN 12165 and Bronze according to UNE-EN 1982 (2 1/2" to 4").
4. Extremos roscados gas (BSP) hembra-hembra según ISO 228/1.	4. Thread ends gas (BSP) female-female according to ISO 228/1.
5. Apta para agua caliente y fría.	5. Suitable for hot and cold water.
6. Temperatura de trabajo desde 0°C a 100°C.	6. Working temperature from 0°C to 100°C.
7. Volante de plástico pintado (1/2" a 2") / acero recubierto de plástico (2 1/2" a 4").	7. Plastic painted handwheel (1/2" to 2") / steel with red plastic coating (2 1/2" to 4").



Nº	Denominación / Name	Material
1	Cuerpo / Body	Latón / Brass CW617N (1/2" - 2") - Bronce / Bronze (2 1/2" - 4")
2	Tapa / Cap	Latón / Brass CW617N
3	Tórica / O-ring	EPDM Perox (1/2" - 2") - PTFE (2 1/2" - 4")
4	Eje / Stem	Latón / Brass CW617N (1/2" - 2") - CW614N (2 1/2" - 4")
5	Tórica / O-ring	EPDM Perox (1/2" - 2") - Fibra / Fiber (2 1/2" - 4")
6	Obturador / Shutter	Latón / Brass CW617N
7	Junta / Gasket	EPDM Perox (1/2" - 2") - PTFE (2 1/2" - 4")
8	Tuerca / Nut	Latón / Brass CW617N (1/2" - 2") - CW614N (2 1/2" - 4")
9	Arandela / Washer	Latón / Brass CW508L (1/2" - 2") - CW614N (2 1/2" - 4")
10	Volante / Handwheel	Plástico pintado / Painted plastic (1/2" - 2") - Acero / Steel (2 1/2" - 4")
11	Tornillo / Screw	Latón / Brass CW508L (1/2" - 2") - CW614N (2 1/2" - 4")

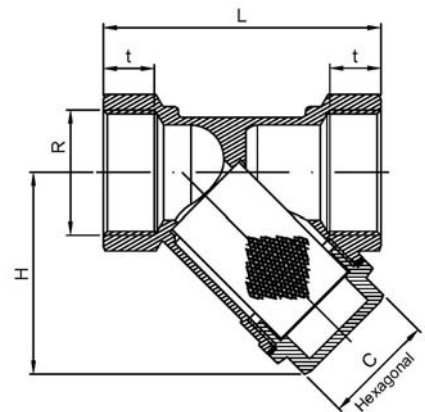
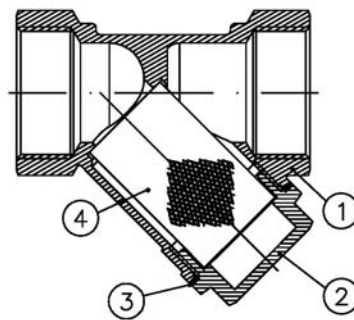


Ref.	Medida / Size	PN	DN	Dimensiones / Dimensions (mm)					Peso / Weight (Kg)
	R			A	L	C	E	D	
3230 04	1/2"	16	15	66	57	67	81	50	0,176
3230 05	3/4"	16	20	70	66	77	94	50	0,264
3230 06	1"	16	25	97	80	96	118	55	0,467
3230 07	1 1/4"	16	32	115	92	115	141	55	0,823
3230 08	1 1/2"	16	40	131	101	131	160	70	0,996
3230 09	2"	16	50	155	121	157	192	70	1,576
3230 10	2 1/2"	15	65	225	151	204	245	110	3,550
3230 11	3"	12	78	232	172	220	268	120	5,100
3230 12	4"	10	98	320	219	290	352	140	9,000

## Art.: 3302

### Filtro colador tipo "Y" latón / "Y" Type brass strainer filter

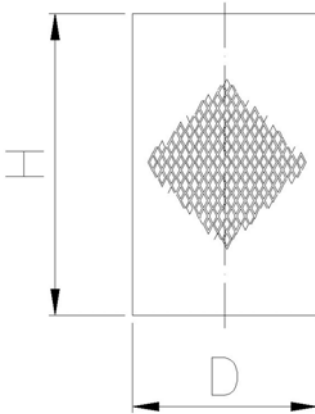
Características	Features
1. Construcción en latón (ver lista de materiales)	1. Brass construction (see materials list)
2. Extremos roscados Gas (BSP) hembra según ISO 228/1	2. Gas (BSP) threaded ends female according to ISO 228/1
3. Presión máxima de trabajo 16 bar (PN-16)	3. Maximum working pressure 16 bar (PN-16)
4. Temperatura de trabajo desde -20°C a 100°C	4. Working temperature from -20°C to 100°C
5. Tamiz en acero inoxidable AISI 304	5. Sieve in stainless steel AISI 304
6. Junta tapa O-ring en NBR	6. NBR O-ring cap gasket



Nº	Denominación / Name	Material	Acabado Superficial / Surface Treatment
1	Cuerpo / Body	Latón / Brass CW617N (1/2" - 3") Latón / Brass CS754S (4")	Granallado / Peened
2	Tapa / Cap	Latón / Brass CW617N	Granallado / Peened
3	Junta / Joint	NBR	-
4	Tamiz / Sieve	Acero Inoxidable / Stainless Steel AISI 304	-

Ref.	Medida / Size R	Luz malla / Sieve light	Dimensiones / Dimensions (mm.)				Peso / Weight (Kg)
			L	H	t	C (Hexagonal)	
3302 04	1/2"	500µ.	56,5	38	11,5	20	0,115
3302 05	3/4"	500µ.	66	44	12,5	20	0,195
3302 06	1"	500µ.	74	50	14	25,5	0,265
3302 07	1 1/4"	500µ.	96	66	16,5	35	0,540
3302 08	1 1/2"	500µ.	104	71	17	38	0,610
3302 09	2"	500µ.	125	89	18	46,5	1,150
3302 10	2 1/2"	1200µ.	154	110	22	54	2,100
3302 11	3"	1200µ.	173	120	26	63	2,900
3302 12	4"	1200µ.	210	152	25	80	5,500

## TAMIZ (RECAMBIO) / SIEVE (SPARE PARTS)



Código/Code Tamiz/Sieve	Medida / Size	Luz malla / Sieve light	Dimensiones / Dimensions (mm.)		Peso / Weight (g)
			H	D	
T302XO 04	1/2"	500 $\mu$ .	30,5	18,5	1
T302XO 05	3/4"	500 $\mu$ .	39,5	23	2
T302XO 06	1"	500 $\mu$ .	40	25	3
T302XO 07	1 1/4"	500 $\mu$ .	46,5	33,2	7
T302XO 08	1 1/2"	500 $\mu$ .	48,5	41	8
T302XO 09	2"	500 $\mu$ .	70	50,5	13
T302XO 10	2 1/2"	1200 $\mu$ .	80	62	22
T302XO 11	3"	1200 $\mu$ .	91,5	72,5	36
T302XO 12	4"	1200 $\mu$ .	123	95	53

## DIAGRAMA PÉRDIDA DE CARGA / HEAD LOSS CHART

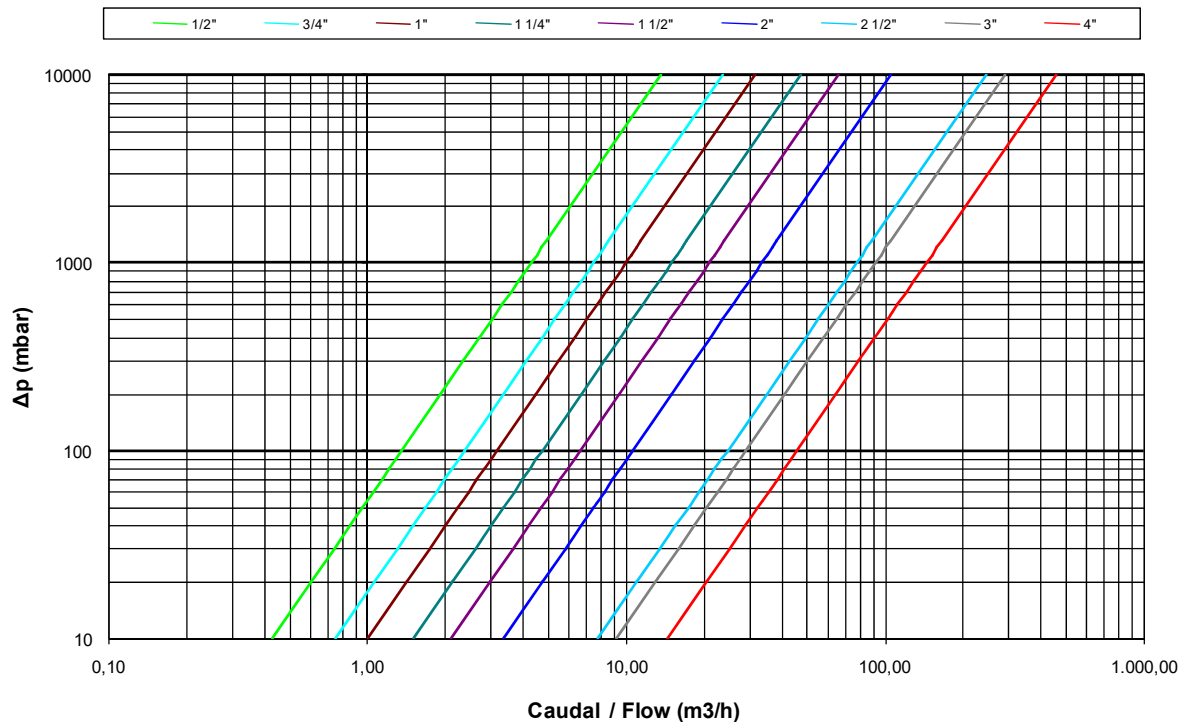
(Filtro tipo "Y" / "Y" Type strainer filter)  
 (H<sub>2</sub>O / 20°C Flujo Horizontal / Horizontal flow)

Valores de Kv / Kv Values:

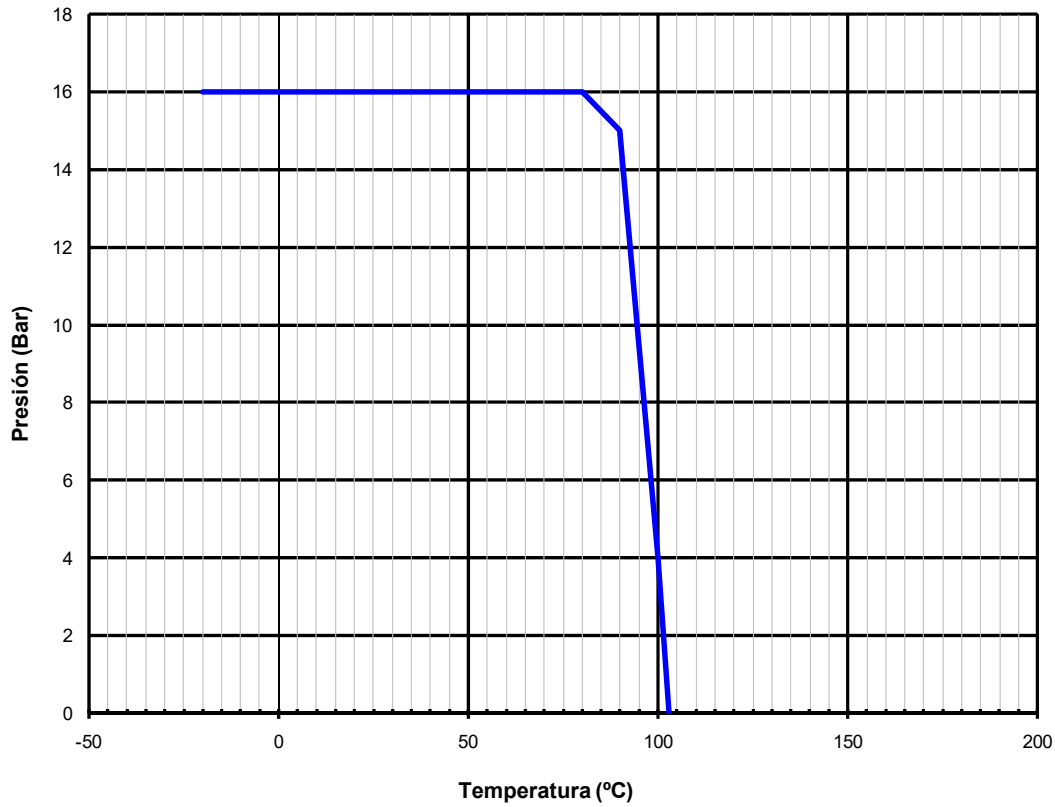
**Kv** = Es la cantidad de metros cúbicos por hora que pasará a través del filtro generando una pérdida de carga de 1 bar.

**Kv** = The flow rate of water in cubic meters per hour that will generate a pressure drop of 1 bar across the filter.

Med. /Size	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
Kv	4.3	7.5	10	15	21	33.5	78	92	145



## CURVA PRESIÓN - TEMPERATURA / PRESSURE - TEMPERATURE RATING



## ARTICULO: 8405D

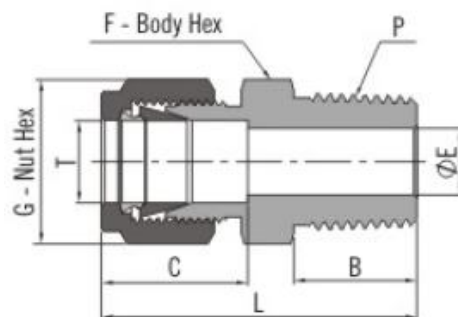
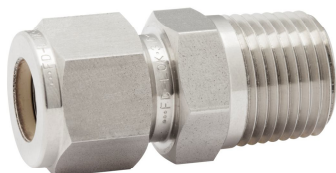
### Rácores Bicono: Conector Rosca M - Tubo Compression fittings: Connector Thread M - Tube

#### Características

1. Conector Rosca M - Tubo para tubería rígida en milímetros.
2. Rosca Macho cónica R según ISO 7-1 (EN 10226-1).
3. Construcción en Acero Inox. ASTM A479 (316).
4. Diseño con doble cono: bajo torque de apriete y transmisión axial de la presión de cierre evitando torsión en el tubo.
5. Cono frontal tratado térmicamente por nitruración.
6. Aplicación en sistemas neumáticos e hidráulicos (estanqueidad incluso con gases ligeros: H<sub>2</sub>, He, ...).
7. Fácil desmontaje y reapriete (recubrimiento de plata en la rosca de la tuerca para evitar gripaje).
8. Presión máxima de trabajo 6000 psi (414 bar).
9. Temperatura de trabajo -54 °C a 426 °C.

#### Features

1. Connector Thread F - Tube for rigid tubing in millimeter.
2. Male Thread conical R acc. to ISO 7-1 (EN 10226-1).
3. Made of Stainless Steel ASTM A479 (AISI 316).
4. Design with double ferrule: low tightening torque and axial pressure transmission torque to prevent from tube torsion.
5. Front ferrule heat treated by nitriding process.
6. For pneumatic and hydraulic applications (sealing even with light gases such as H<sub>2</sub>, He, ...).
7. Easy disconnecting and retightening (nut thread is silver coated to avoid "galling").
8. Maximum working pressure 6000 psi (414 bar).
9. Working temperature -54 °C to 426 °C.



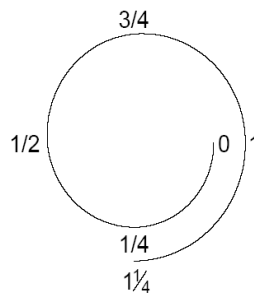
#### DIMENSIONES GENERALES / GENERAL DIMENSIONS

Ref.	Thread (P)	Tube (T)	Dimensiones / Dimensions (mm)						Weight (Kg.)
			L	B	C	ØE	G	F	
8405D 02 006	1/4"	6	37,9	14,2	15,3	4,8	14	14	0,034
8405D 03 006	3/8"	6	38,4	14,2	15,3	4,8	14	18	0,042
8405D 03 008	3/8"	8	39,2	14,2	16,2	6,4	16	18	0,045
8405D 03 010	3/8"	10	40,9	14,2	17,2	7,9	19	18	0,058
8405D 04 006	1/2"	6	44,7	19,1	15,3	4,8	14	22	0,066
8405D 04 008	1/2"	8	45,6	19,1	16,2	6,4	16	22	0,076
8405D 04 010	1/2"	10	46,5	19,1	17,2	7,9	19	22	0,090
8405D 04 012	1/2"	12	49	19,1	22,8	9,5	22	22	0,099

## **INSTRUCCIONES DE INSTALACIÓN / INSTALLATION INSTRUCTIONS**

1. Afloje la tuerca 1/4 de vuelta desde la posición de suministro.
2. Inserte el tubo de montaje en el rácor, cerciorándose de que el mismo apoya firmemente en el diámetro de paso y que hace tope en el fondo del interior del cuerpo.
3. Apretar la tuerca a mano.
4. Apriete la tuerca 1 1/4 vuelta (Fig.1) con la llave, manteniendo firmemente el cuerpo del rácor.

1. Loosen the nut for 1/4 turn from finger tight position.
2. Insert tubing into the tube fitting, ensuring that the tubing rests firmly on the shoulder of the port and it bottoms inside the body of the fitting.
3. Finger-tighten the nut.
4. Tighten the nut 1 1/4 turns (Fig. 1) with wrench while holding steady the body of the fitting.



## **PRECAUCIONES / CAUTIONS**

- Nunca afloje o apriete rácores cuando el sistema esté presurizado / *Do not loose or tight fittings when system is pressurized.*
- Asegúrese durante el montaje de que el tubo apoya firmemente en el diámetro de paso / *Make sure that the tubing rests firmly on the shoulder of the port.*
- El extremo del tubo debe cortarse perpendicularmente y estar completamente libre de rebabas / *The tube end must be cut perpendicularly and fully burr free.*
- Deje siempre un tramo recto de tubo entre el rácor y cualquier cambio de dirección de la tubería / *Always leave enough length of straight tubing between the tubing bend and the fitting.*
- No rebase en ningún caso la presión nominal o la temperatura de trabajo del tubo / *Never exceed the Nominal Pressure or the working temperature of the tube.*
- La temperatura de trabajo del rácor no debe exceder el límite de los posibles elementos usados para la estanqueidad / *The working temperature must not exceed the limit of the sealants.*
- Durante la instalación, mantenga firme el cuerpo mediante una llave y gire la tuerca en lugar de fijar la tuerca y girar el cuerpo / *When assemble the tube fitting, hold the body with a wrench and turn the nut instead of hold the nut and turn the body.*

# High efficiency Circulation Pumps



01.2023 | EX

Moving people and elements

## We are Biral

“Our intelligent solutions save energy and resources.”

Sjef de Bruijn, CEO



For over 100 years, we have dedicated ourselves to one task – to make the best pumps and systems. Developed and built in Switzerland, supplied across the globe, and working incredibly efficiently and reliably. This is another reason why we are a leading supplier for heating, waste water, sewage and high-pressure systems.

## The versatile range of pumps

Whether heating/ventilation, air-conditioning/cooling, domestic hot water or waste-water disposal – our pumps and our support improve any system.

You have access to a uniquely varied range of pumps. Biral technology is equally as sophisticated when it comes to saving energy as to economic efficiency: high performance and extremely low consumption are must-haves for us, for you and to sustainability.

### Heating / ventilation / air-conditioning / cooling



Select powerful and efficient wet- and dry-running pumps as well as standard centrifugal pumps for pleasantly warm or icy cold circuits. You benefit from our consistent operating philosophy, the networking option to building management systems and wireless communication via the Biral ONE smartphone app.

### Domestic hot water



Compact through to powerful: The Biral DHW range offers top-quality pumps with maximum reliability and outstanding ease of maintenance.

### Water supply



Everything flows: Particularly with our pressure boosting systems and submersible pumps for every conceivable application.



### Waste water disposal



Well-designed: Pumps, pump stations and ready-made pump stations collect and conduct all types of waste water.

### Control system



Whether for standard pumps or mass-produced, we offer the perfect, internally developed control system for every application.



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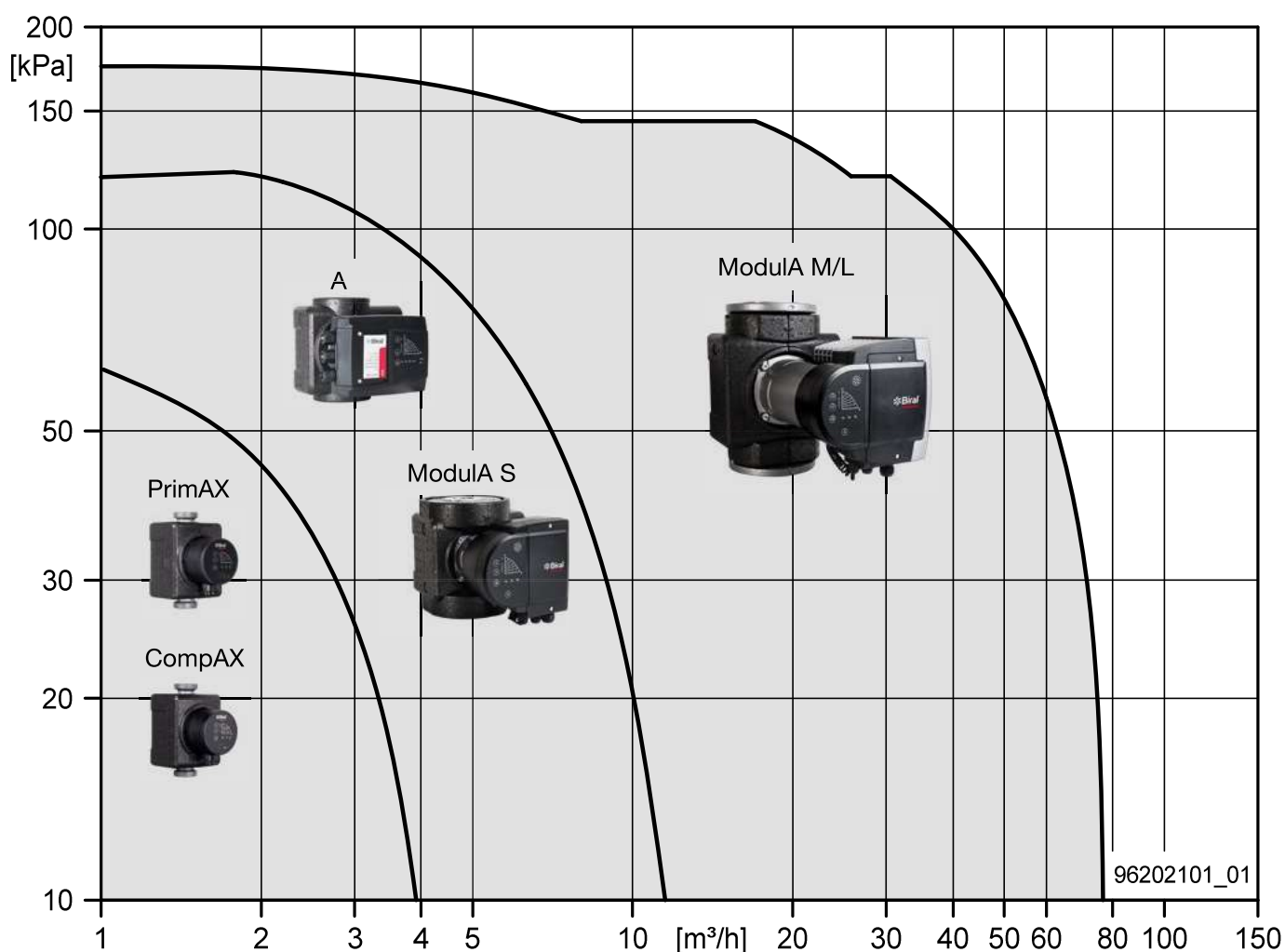
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## General information

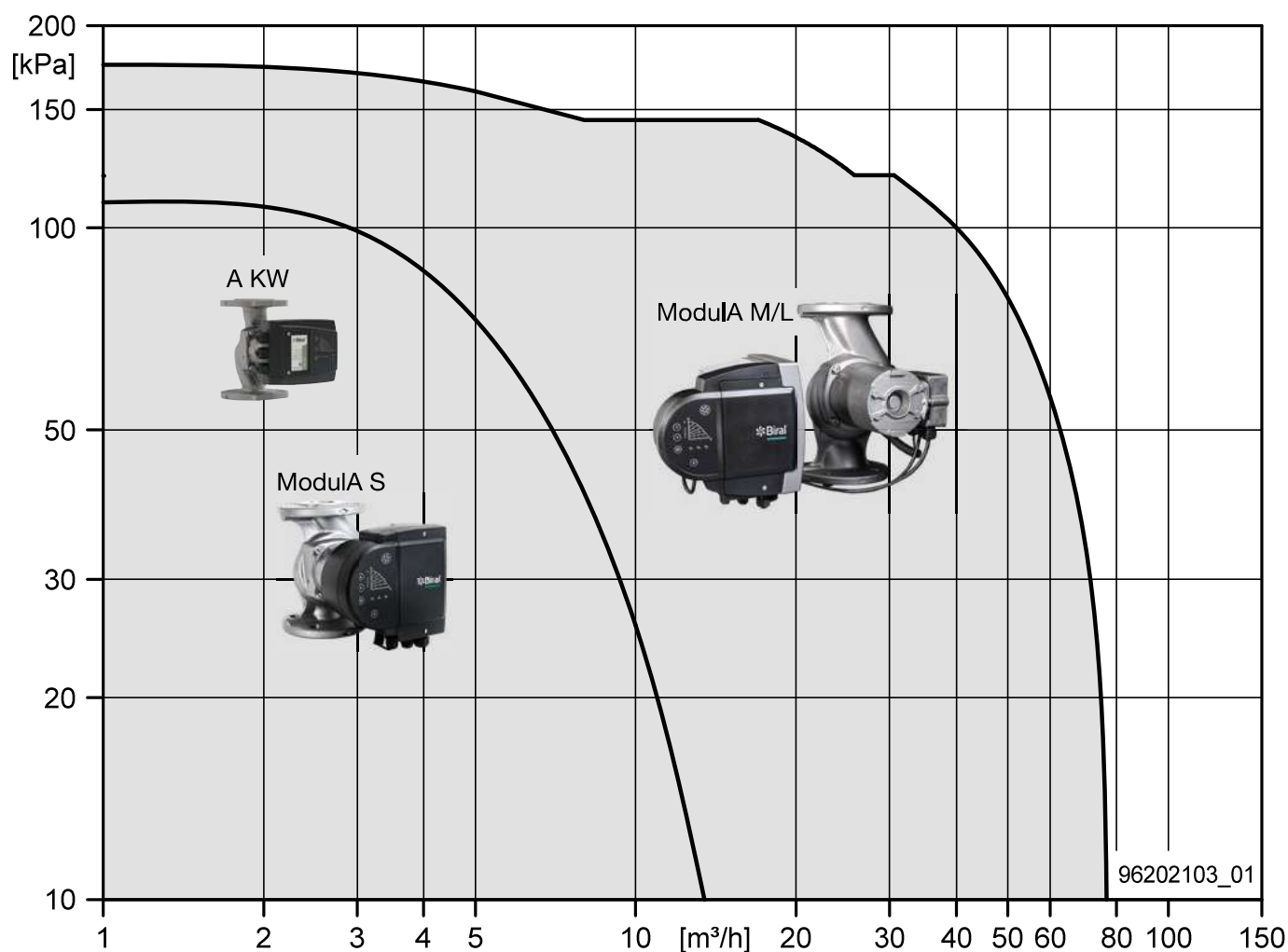
### Overview of characteristics for heating circulation pumps



Functions	PrimAX RED T2	CompAX RED	ModuA RED T2 S	ModuA RED T2 M/L	A
Medium temperature	2 – 110 °C	2 – 110 °C	15 – 110 °C	15 – 110 °C	15 – 95 °C
Discrete installation of electronics	–	–	–	optional	–
Fault message/Operational message (switchable between)	–	–	✓	✓	✓
External OFF or external ON (switchable between)	–	–	✓	✓	–
Power Limit (activatable)	–	–	✓	✓	–
Power limiting deactivatable	–	–	–	–	✓
Button lock	✓	–	✓	✓	–
Flow rate display (m³/h)	✓	–	Biral ONE App	Biral ONE App	–
Flow rate indicator	✓	✓	✓	✓	✓
Bluetooth Connect ‡	–	–	✓	✓	–
Biral ONE App	–	–	✓	✓	–
BIM Biral Interface Module	–	–	✓	✓	✓

## General information

### Overview of characteristics for cold water circulation pumps



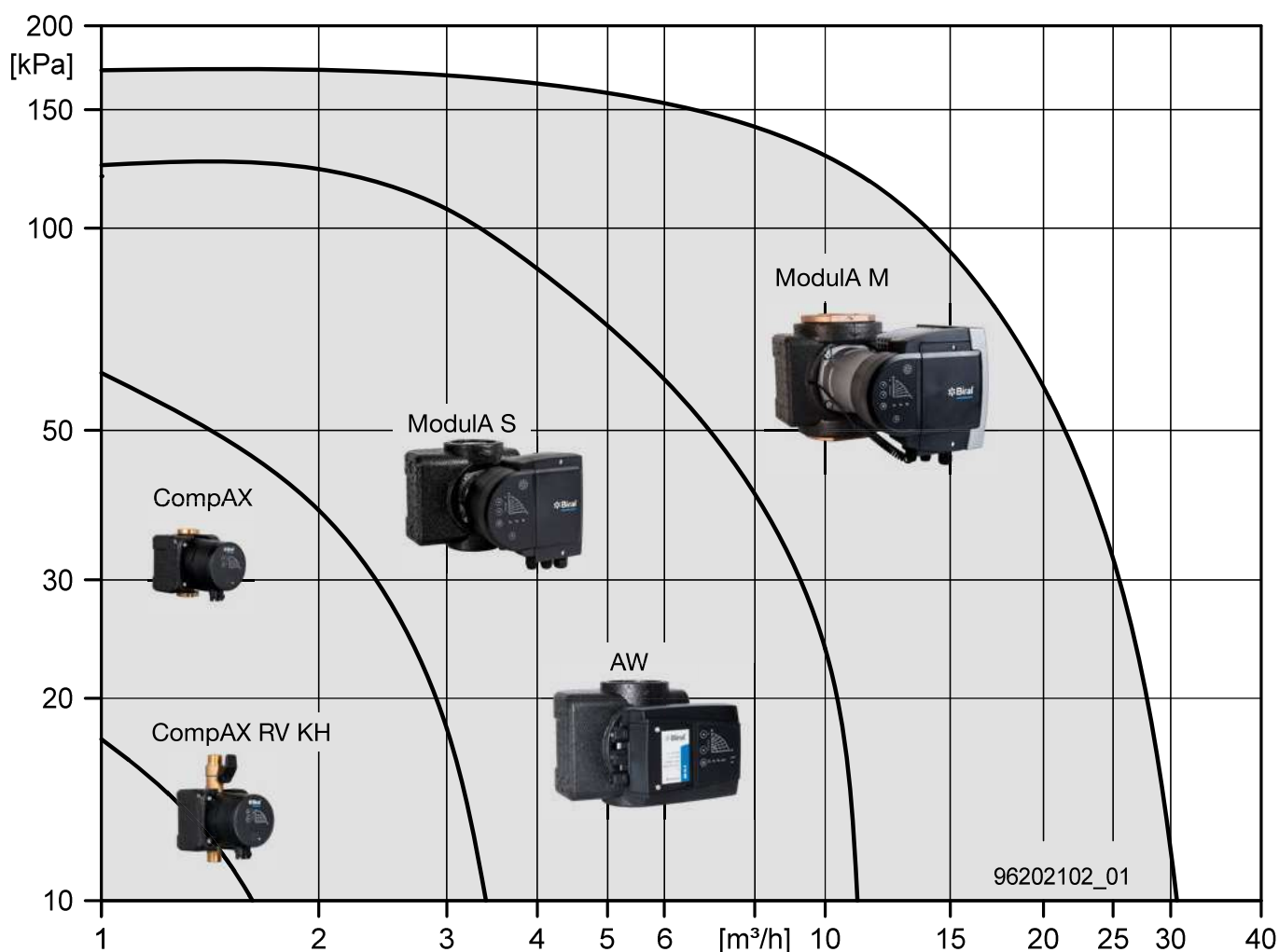
**GREEN**

**Air conditioning / refrigeration**

Functions	Modula GREEN T2 S	Modula GREEN T2 M/L	A KW
Medium temperature	-10 – 110 °C	-10 – 110 °C	-10 – 95 °C
Discrete installation of electronics	-	✓	-
Fault message/Operational message (switchable between)	✓	✓	✓
External OFF or external ON (switchable between)	✓	✓	-
Power Limit (activatable)	✓	✓	-
Power limiting deactivatable	-	-	✓
Button lock	✓	✓	-
Flow rate indicator	✓	✓	✓
Bluetooth Connect ‡	✓	✓	-
Biral ONE App	✓	✓	-
BIM Biral Interface Module	✓	✓	✓

## General information

### Overview of characteristics for Domestic hot water pumps



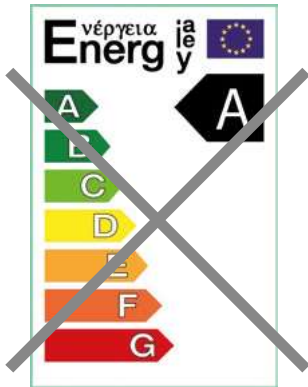
**BLUE**  
Domestic hot water

Functions	CompAX BLUE	Modula BLUE T2 S	Modula BLUE T2 M/L	AW
Medium temperature	2 – 85 °C	15 – 85 °C	15 – 85 °C	15 – 85 °C
Discrete installation of electronics	–	–	optional	–
Fault message/Operational message (switchable between)	–	✓	✓	✓
External OFF or external ON (switchable between)	–	✓	✓	–
Power Limit (activatable)	–	✓	✓	–
Power limiting deactivatable	–	–	–	✓
Button lock	–	✓	✓	–
Flow rate indicator	✓	✓	✓	✓
Bluetooth Connect ↯	–	✓	✓	–
Biral ONE App	–	✓	✓	–
BIM Biral Interface Module	–	✓	✓	✓

## General information

### Biral ECO Design

The old energy label with the ratings from «A» to «G» have been replaced by a new energy efficiency index (EEI) as of 1 January 2013.



### The new Biral ECO Design label

The new ECO Design label from Biral shows you at a glance that your pump belongs to the top of the class in energy efficiency. A Biral product labelled with the «ECO Design» saves up to 80 % energy.

Exchanging older pumps with a new Modula from Biral already pays off in significantly lower energy costs even after just a short time.



### Efficiency as an obligation

Biral PrimAX	EEI ≤ 0,14
Biral Modula	EEI ≤ 0,17
Biral CompAX	EEI ≤ 0,18
ErP* Benchmark «Best in Class»	EEI ≤ 0,20

\*ErP: Energy-related Product Directive

The highly efficient mini-energy circulation pumps from Biral are extremely energy-efficient and meet the requirements of the ECO Design guidelines (EC Regulation no. 641/2009), that have been informed since 1 January 2013. Even the more stringent EEI values as of August 2015 are surpassed.

#### Reference value

for the most efficient circulation pumps:  
EEI ≤ 0,20

Drinking water circulation pumps do not come under the ECO Design guidelines. nevertheless, Biral has highly efficient, energy-saving pumps in its product range here as well.



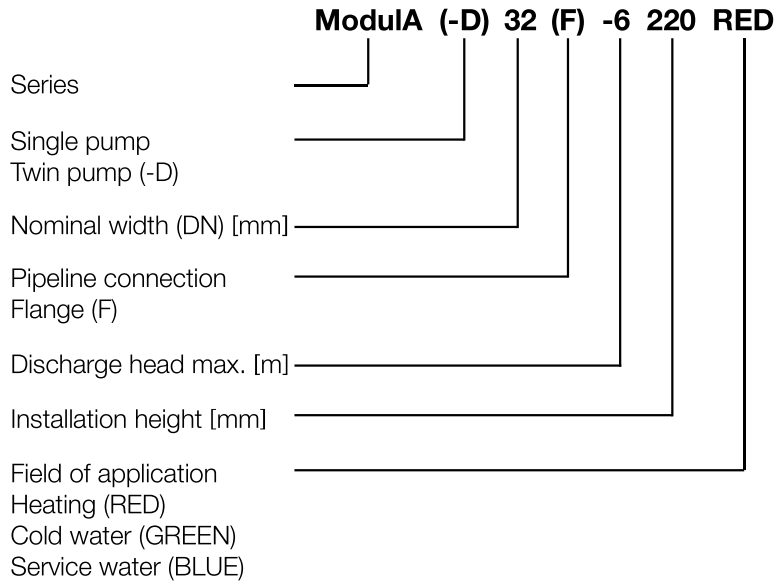
## Heating circulation pumps

### ModulA RED T2 with threaded connection

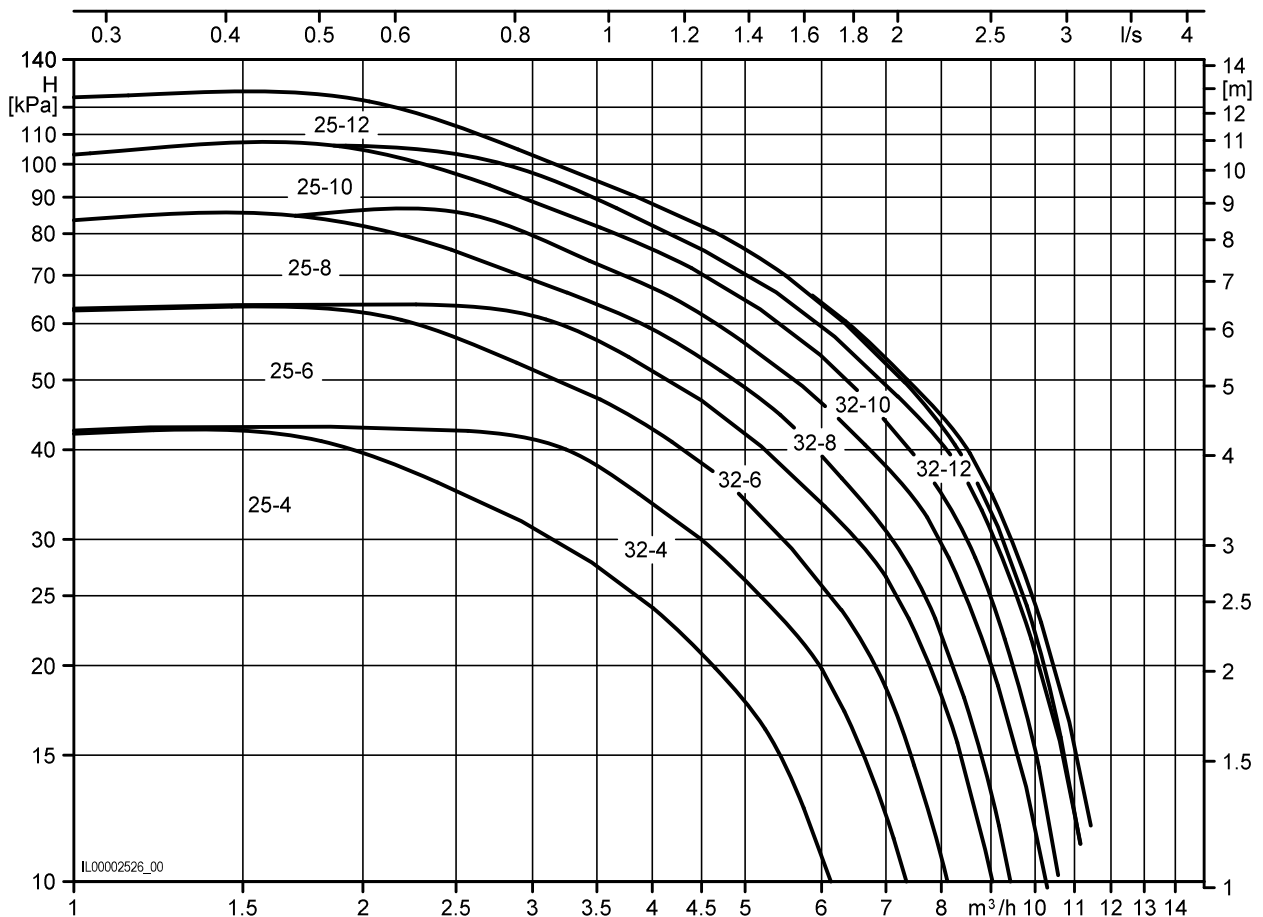
#### Übersicht

Type	Art. no.	Nominal width	Flow head H max.	Overall length	Threaded connection	Operating pressure max.	EEI
		DN	m	mm		bar	EEI
ModulA 25-4 180 RED	7000000057	25	4	180	G 1½"	10	≤0.18
ModulA 25-6 180 RED	7000000058	25	6	180	G 1½"	10	≤0.18
ModulA 25-8 180 RED	7000000059	25	8	180	G 1½"	10	≤0.18
ModulA 25-10 180 RED	7000000060	25	10	180	G 1½"	10	≤0.18
ModulA 25-12 180 RED	7000000061	25	12	180	G 1½"	10	≤0.18
ModulA 32-4 180 RED	7000000067	32	4	180	G 2"	10	≤0.18
ModulA 32-6 180 RED	7000000068	32	6	180	G 2"	10	≤0.18
ModulA 32-8 180 RED	7000000069	32	8	180	G 2"	10	≤0.18
ModulA 32-10 180 RED	7000000070	32	10	180	G 2"	10	≤0.18
ModulA 32-12 180 RED	7000000071	32	12	180	G 2"	10	≤0.18
ModulA 32-4 170 RED	7000000062	32	4	170	G 2"	10	≤0.18
ModulA 32-6 170 RED	7000000063	32	6	170	G 2"	10	≤0.18
ModulA 32-8 170 RED	7000000064	32	8	170	G 2"	10	≤0.18
ModulA 32-10 170 RED	7000000065	32	10	170	G 2"	10	≤0.18
ModulA 32-12 170 RED	7000000066	32	12	170	G 2"	10	≤0.18

**Order reference**

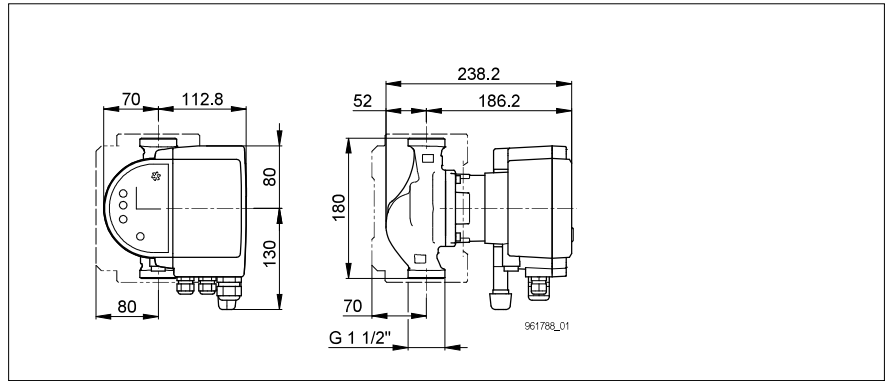


Heizung



## Modula 25-4 180 RED

Version	T2 S
Nominal width	DN 25
Flow head H max.	4 m
Overall length	180 mm
Threaded connection	G 1 1/2"
Operating pressure max.	10 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Ambient temperature min.	0°C
Ambient temperature max.	40°C
Net weight	4.5 kg
Gross weight	5.2 kg



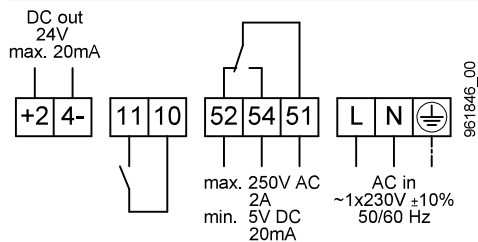
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	7-49 W
Nominal current	0.08-0.37 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.35 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

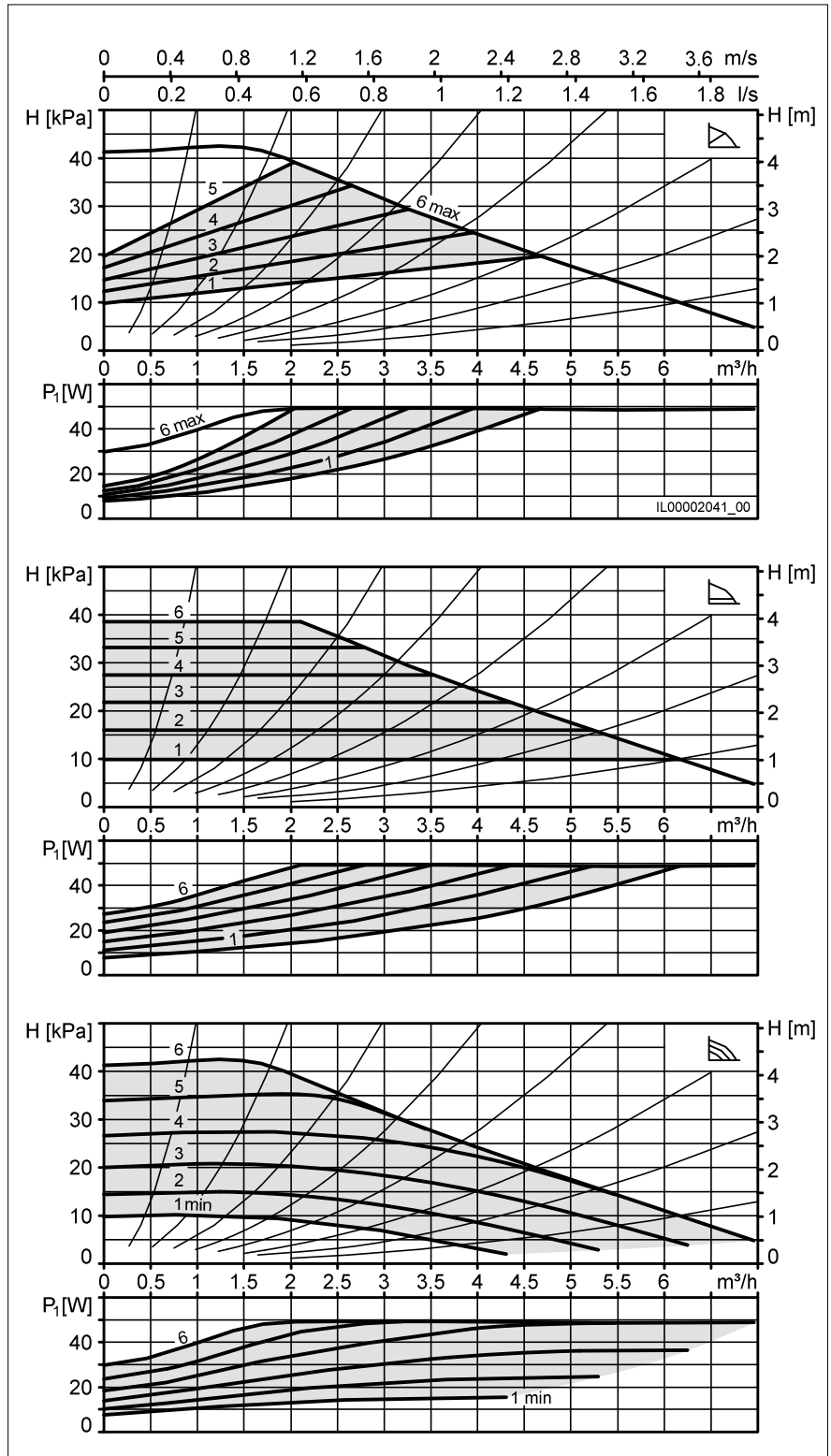
### Switch

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

<b>Type</b>	<b>Art. no.</b>
Modula 25-4 180 RED	7000000057





## Modula 25-6 180 RED

Version	T2 S
Nominal width	DN 25
Flow head H max.	6 m
Overall length	180 mm
Threaded connection	G 1 1/2"
Operating pressure max.	10 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Ambient temperature min.	0°C
Ambient temperature max.	40°C
Net weight	4.5 kg
Gross weight	5.2 kg

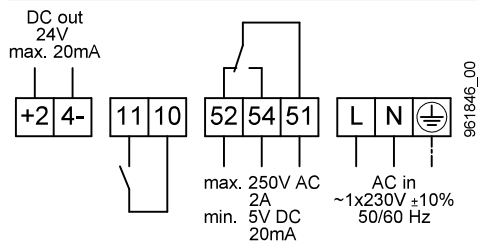
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	7-83 W
Nominal current	0.08-0.62 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.35 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

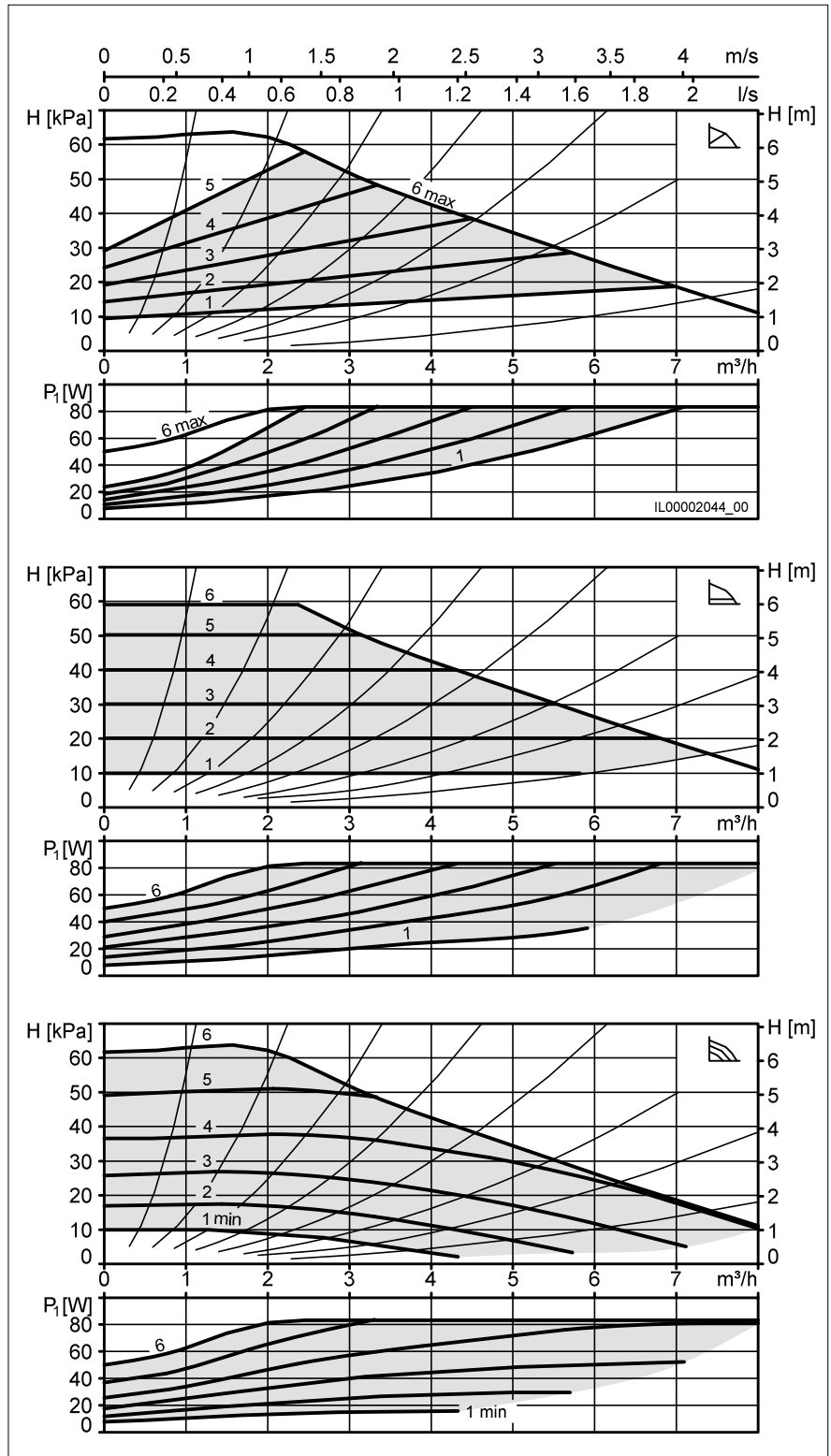
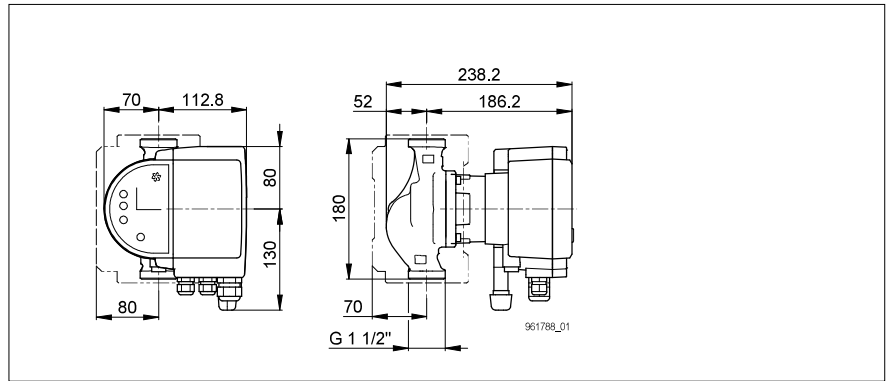
### Switch

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

<b>Type</b>	<b>Art. no.</b>
Modula 25-6 180 RED	7000000058

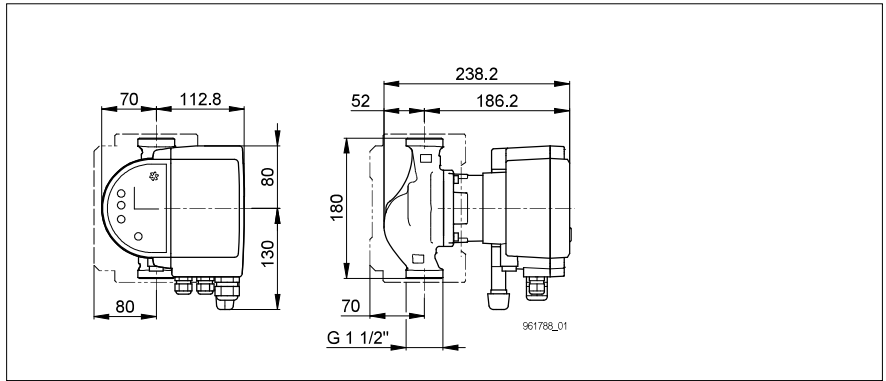


Heizung



## Modula 25-8 180 RED

Version	T2 S
Nominal width	DN 25
Flow head H max.	8 m
Overall length	180 mm
Threaded connection	G 1 1/2"
Operating pressure max.	10 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Ambient temperature min.	0°C
Ambient temperature max.	40°C
Net weight	4.5 kg
Gross weight	5.2 kg



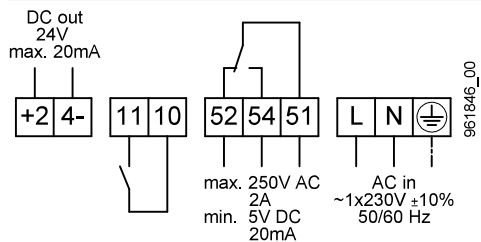
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	7-115 W
Nominal current	0.08-0.85 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.35 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

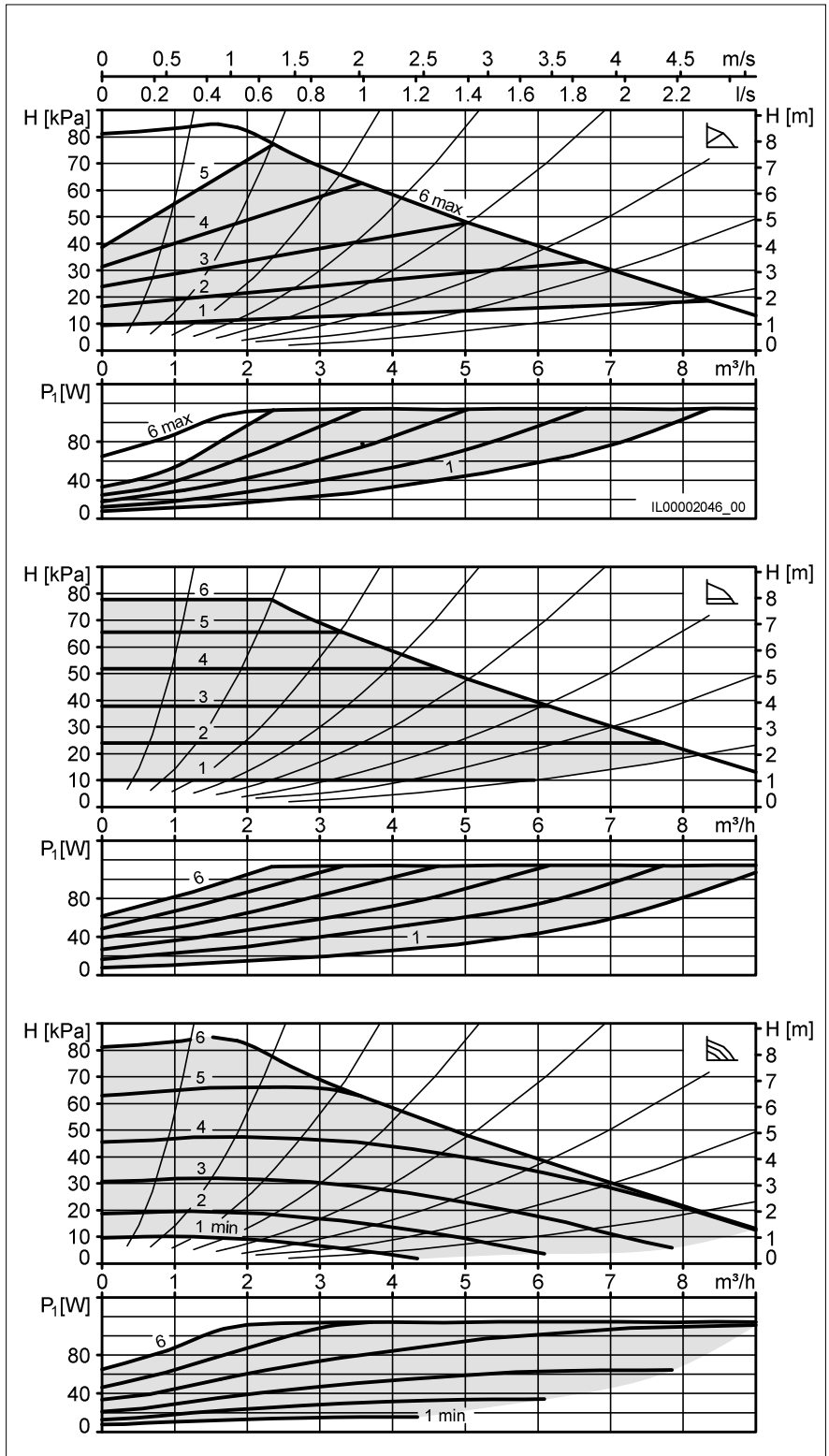
### Switch

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

<b>Type</b>	<b>Art. no.</b>
Modula 25-8 180 RED	7000000059



## Modula 25-10 180 RED

Version	T2 S
Nominal width	DN 25
Flow head H max.	10 m
Overall length	180 mm
Threaded connection	G 1 1/2"
Operating pressure max.	10 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Ambient temperature min.	0°C
Ambient temperature max.	40°C
Net weight	4.5 kg
Gross weight	5.2 kg

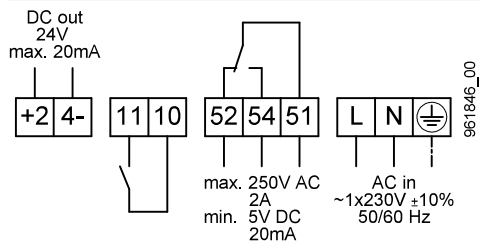
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	7-153 W
Nominal current	0.08-1.15 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.35 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

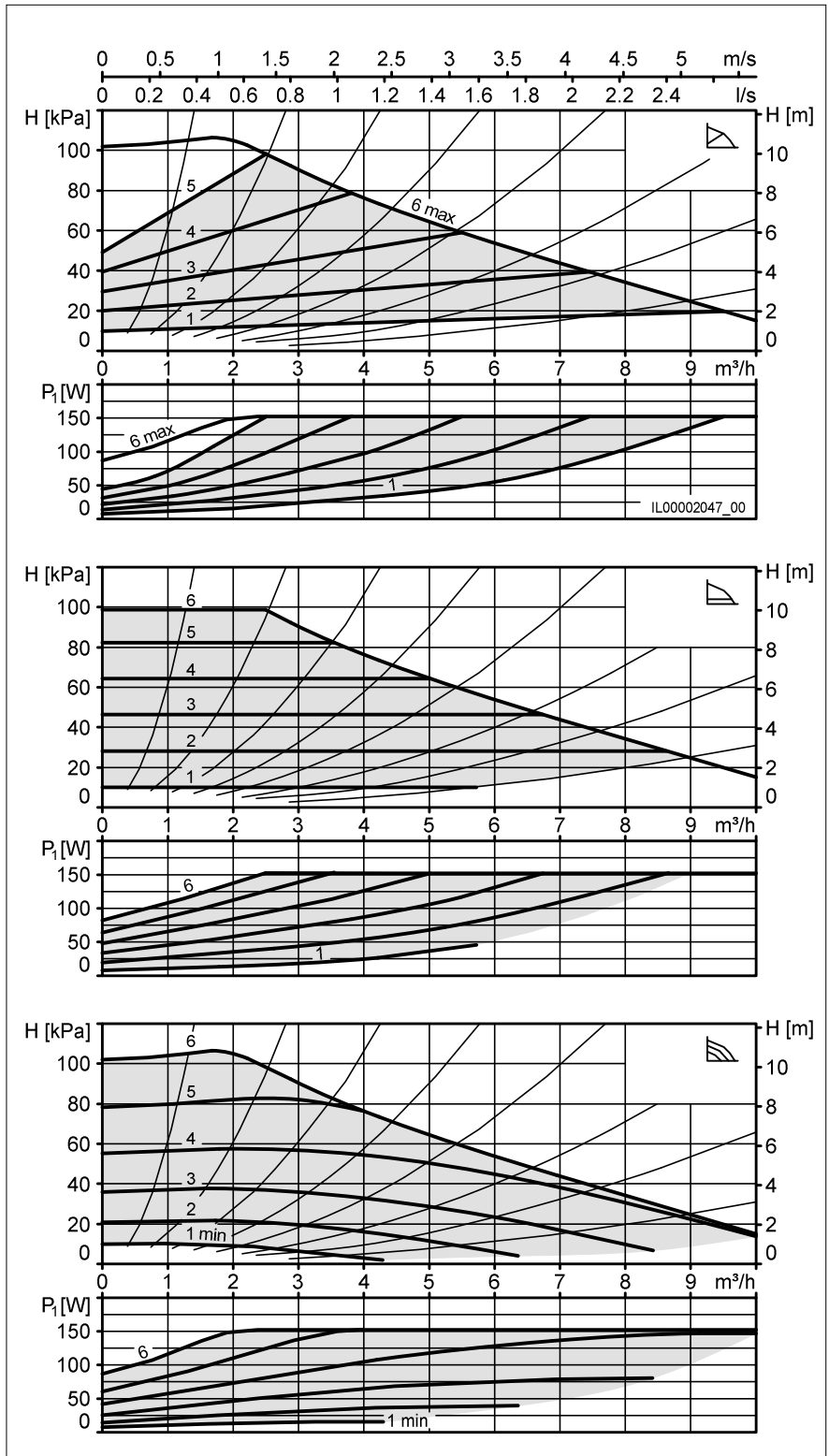
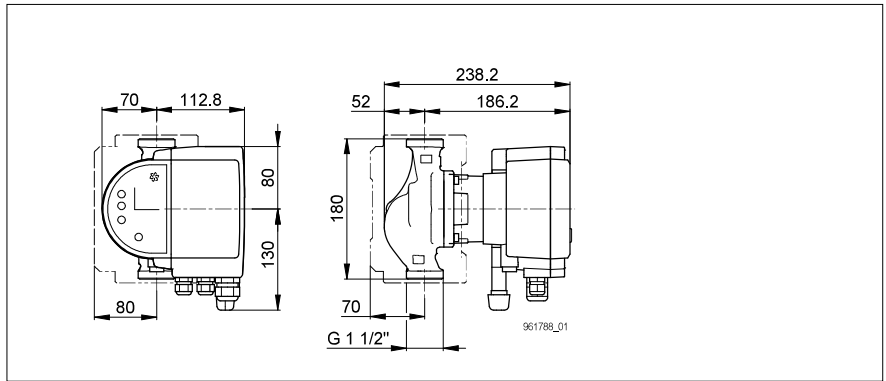
### Switch

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

<b>Type</b>	<b>Art. no.</b>
Modula 25-10 180 RED	7000000060

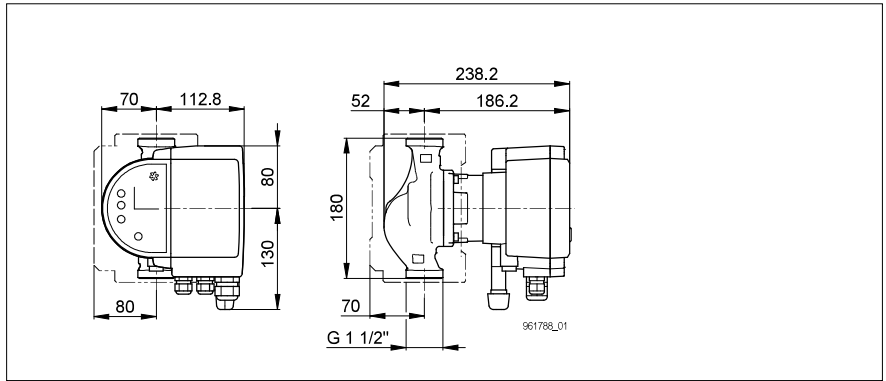


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## ModulA 25-12 180 RED

Version	T2 S
Nominal width	DN 25
Flow head H max.	12 m
Overall length	180 mm
Threaded connection	G 1 1/2"
Operating pressure max.	10 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Ambient temperature min.	0°C
Ambient temperature max.	40°C
Net weight	4.5 kg
Gross weight	5.2 kg



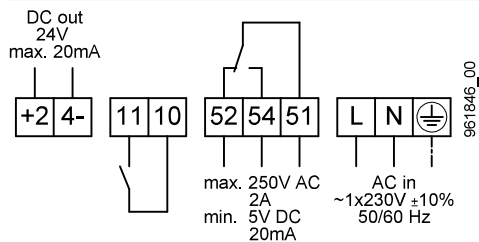
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	7-181 W
Nominal current	0.08-1.36 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.35 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



<b>+24-</b>	24 V DC out
<b>11, 10</b>	External OFF or external ON
<b>52, 54, 51</b>	Error or operating message
<b>L, N, PE</b>	Power supply

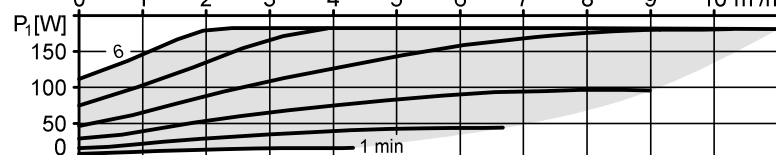
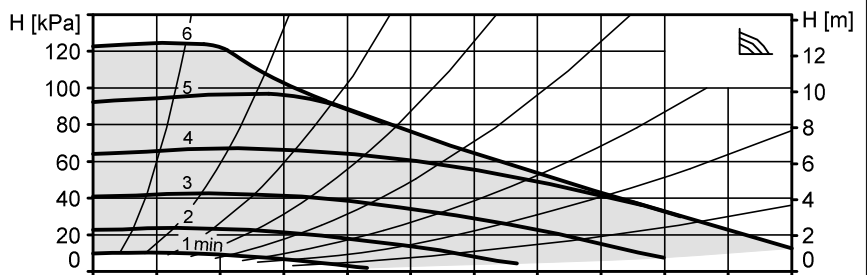
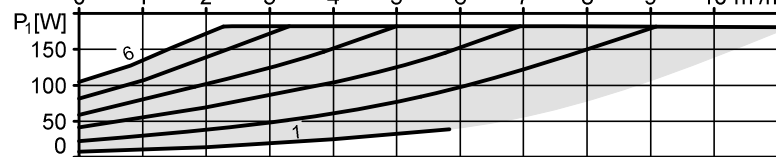
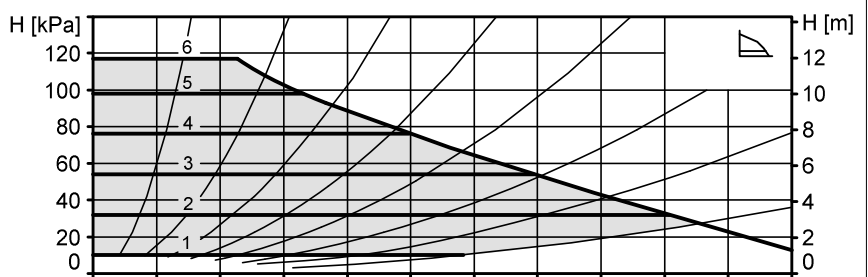
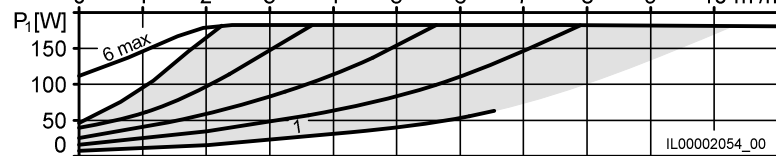
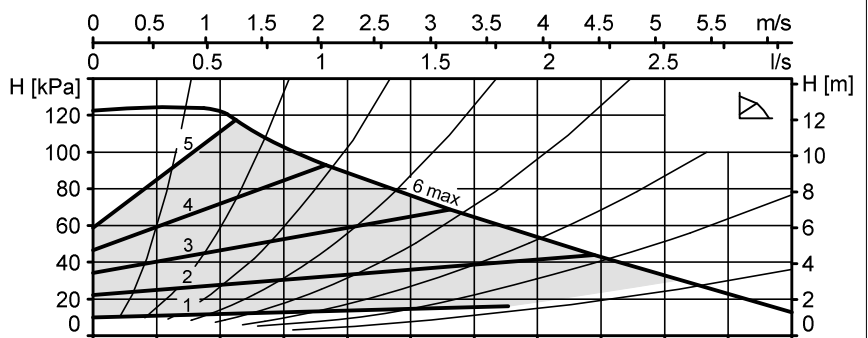
### Switch

- 1 Fault or operating message (switchable)
- 2 External OFF or external ON (switchable)
- 3 Power Limit (activatable)

### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

<b>Type</b>	<b>Art. no.</b>
ModulA 25-12 180 RED	7000000061



**Modula 32-4 180 RED**

**Modula 32-4 170 RED**

Version	T2 S
Nominal width	DN 32
Flow head H max.	4 m
Overall length	180   170 mm
Threaded connection	G 2"
Operating pressure max.	10 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Ambient temperature min.	0°C
Ambient temperature max.	40°C
Net weight	4.7 kg
Gross weight	5.35 kg

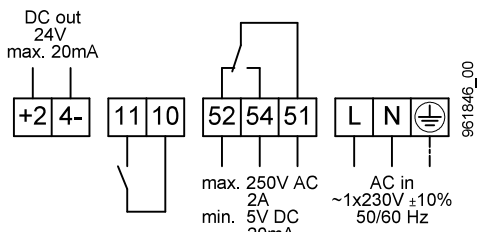
**Electrical data**

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	7-66 W
Nominal current	0.08-0.48 A
Motor protection	integrated

**Required operating pressure at 500m a.s.l.**

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.35 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

**Connction diagram**



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

**Switch**

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

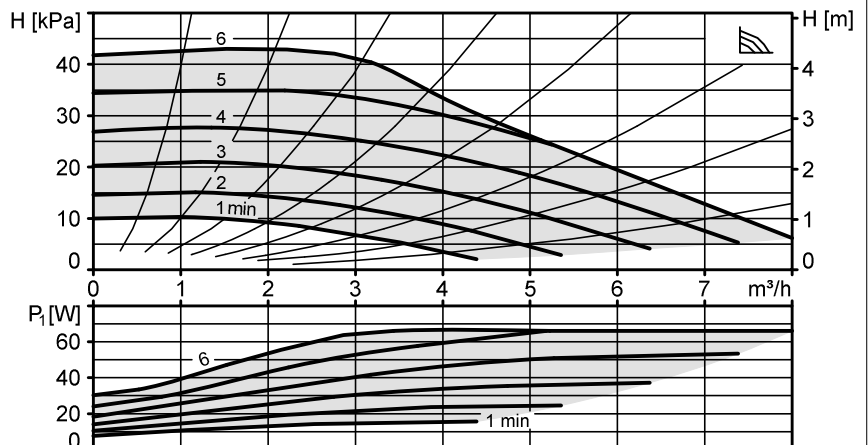
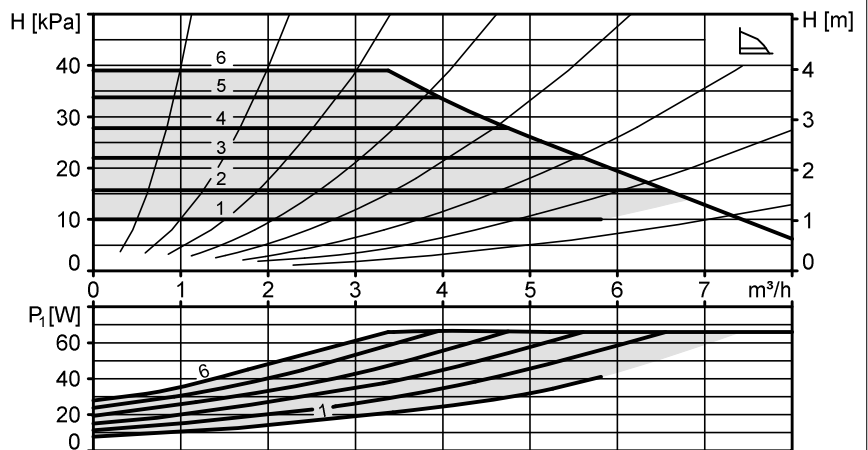
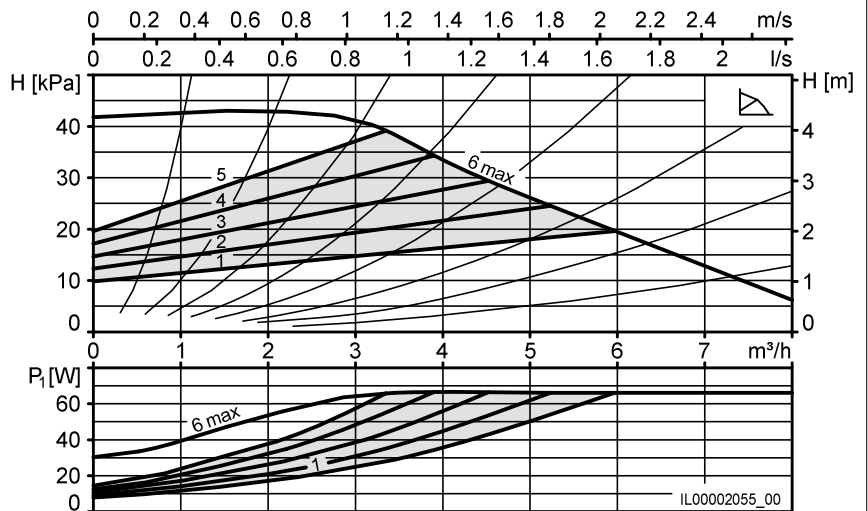
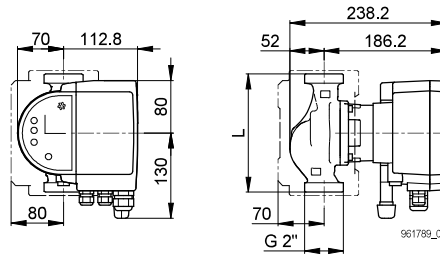
**Included in the scope of delivery**

- Heat insulation shell
- Biral Connector
- AFM seal

Type	Art. no.
Modula 32-4 180 RED	7000000067
Modula 32-4 170 RED	7000000062

**Modula 32-4 180 RED**  
DN 32  
L = 180 mm

**Modula 32-4 170 RED**  
DN 32  
L = 170 mm



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### Modula 32-6 180 RED

### Modula 32-6 170 RED

Version	T2 S
Nominal width	DN 32
Flow head H max.	6 m
Overall length	180   170 mm
Threaded connection	G 2"
Operating pressure max.	10 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Ambient temperature min.	0°C
Ambient temperature max.	40°C
Net weight	4.7 kg
Gross weight	5.35 kg

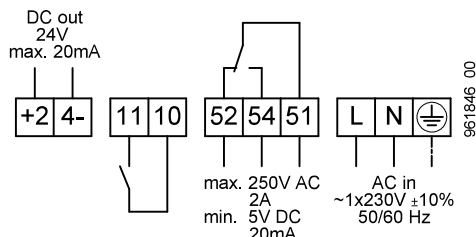
#### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	7-102 W
Nominal current	0.08-0.73 A
Motor protection	integrated

#### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.35 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

#### Connction diagram



+24-	24 V DC out
11, 10	External OFF or external ON
52, 54, 51	Error or operating message
L, N, PE	Power supply

#### Switch

- 1 Fault or operating message (switchable)
- 2 External OFF or external ON (switchable)
- 3 Power Limit (activatable)

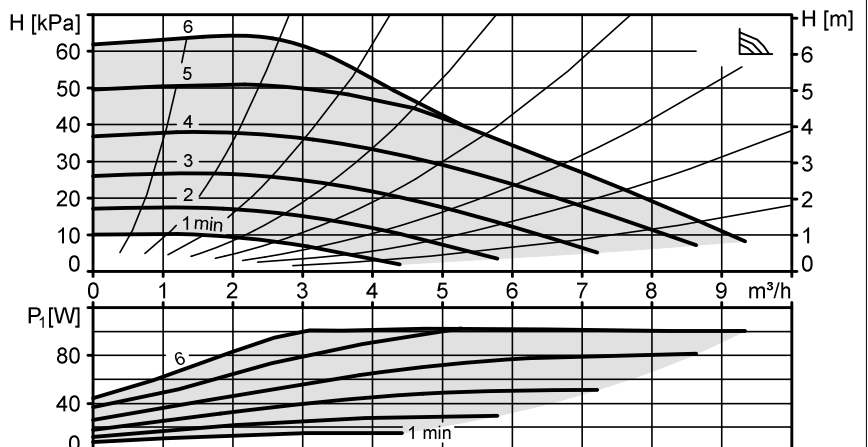
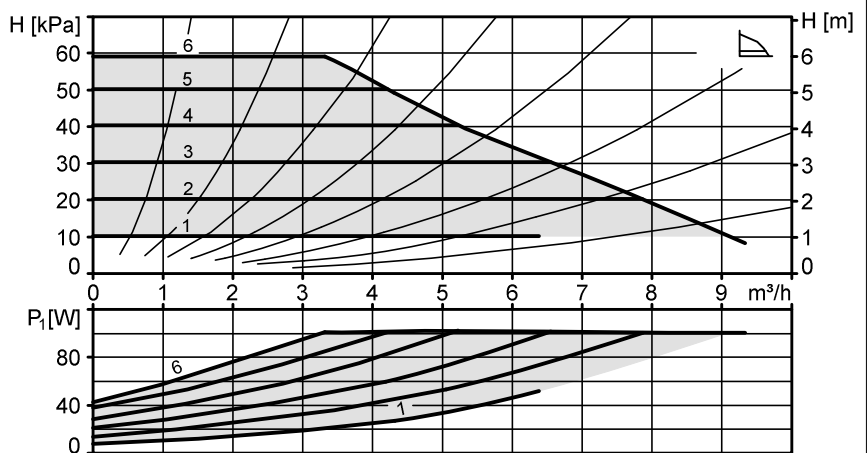
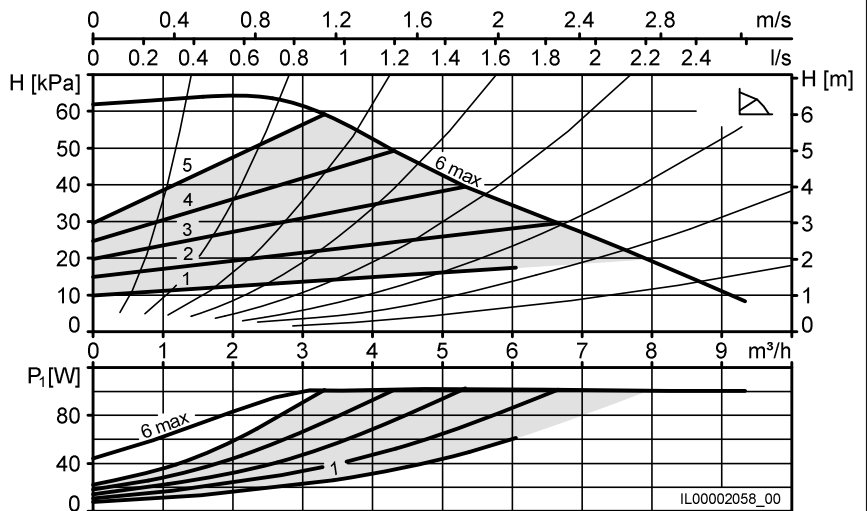
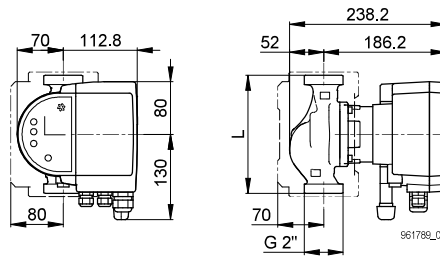
#### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

Type	Art. no.
Modula 32-6 180 RED	7000000068
Modula 32-6 170 RED	7000000063

**Modula 32-6 180 RED**  
DN 32  
L = 180 mm

**Modula 32-6 170 RED**  
DN 32  
L = 170 mm



### Modula 32-8 180 RED

### Modula 32-8 170 RED

Version	T2 S
Nominal width	DN 32
Flow head H max.	8 m
Overall length	180   170 mm
Threaded connection	G 2"
Operating pressure max.	10 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Ambient temperature min.	0°C
Ambient temperature max.	40°C
Net weight	4.7 kg
Gross weight	5.35 kg

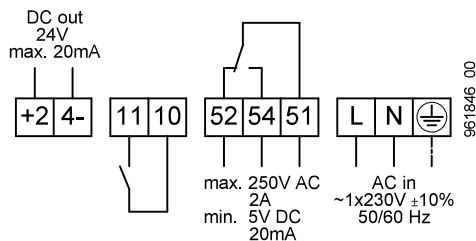
#### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	7-134 W
Nominal current	0.08-0.97 A
Motor protection	integrated

#### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.35 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

#### Connction diagram



<b>+24-</b>	24 V DC out
<b>11, 10</b>	External OFF or external ON
<b>52, 54, 51</b>	Error or operating message
<b>L, N, PE</b>	Power supply

#### Switch

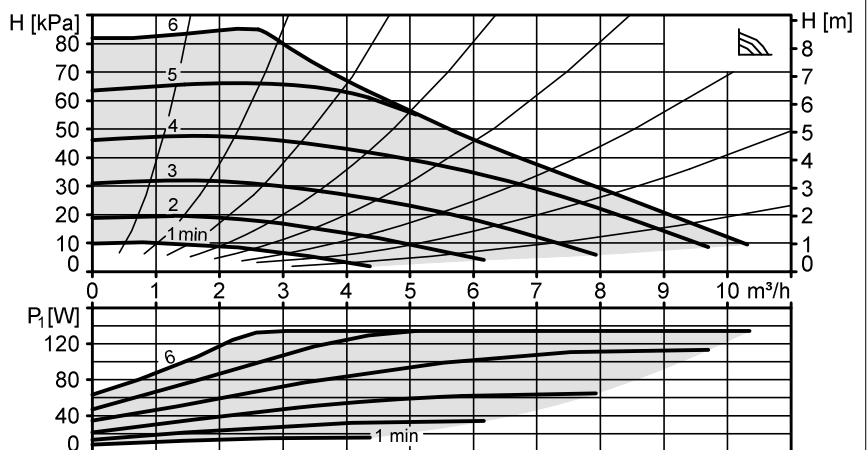
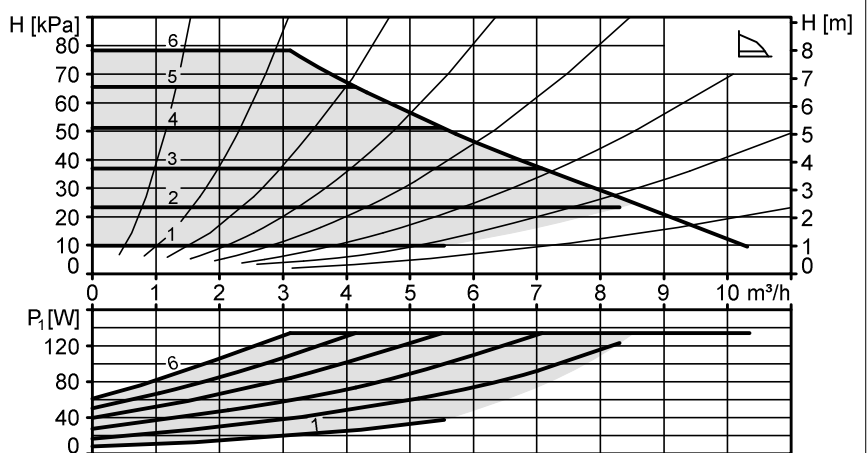
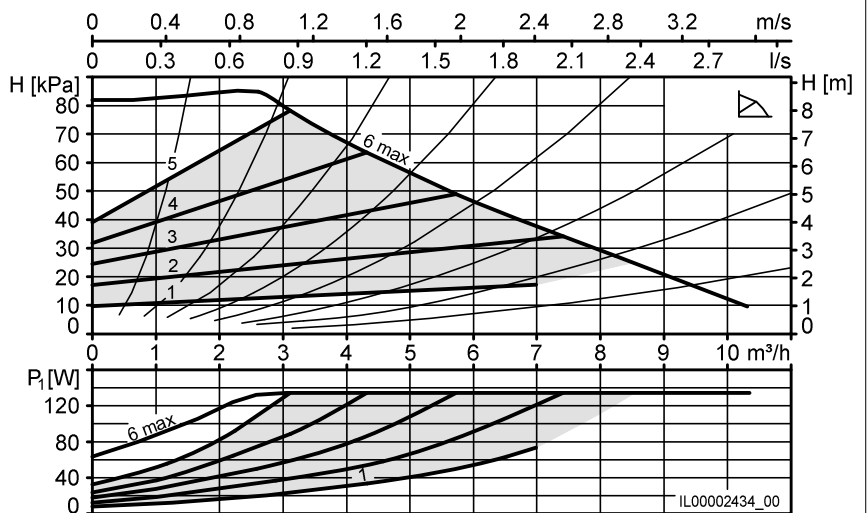
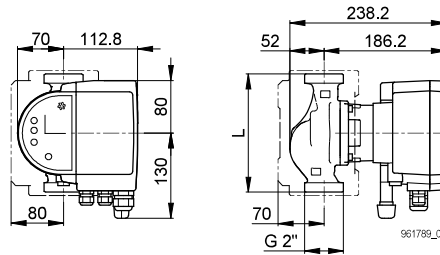
- 1 Fault or operating message (switchable)
- 2 External OFF or external ON (switchable)
- 3 Power Limit (activatable)

#### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

Type	Art. no.
Modula 32-8 180 RED	7000000069
Modula 32-8 170 RED	7000000064

<b>Modula 32-8 180 RED</b>	<b>Modula 32-8 170 RED</b>
DN 32	DN 32
L = 180 mm	L = 170 mm



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### Modula 32-10 180 RED

### Modula 32-10 170 RED

Version	T2 S
Nominal width	DN 32
Flow head H max.	10 m
Overall length	180   170 mm
Threaded connection	G 2"
Operating pressure max.	10 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Ambient temperature min.	0°C
Ambient temperature max.	40°C
Net weight	4.7 kg
Gross weight	5.35 kg

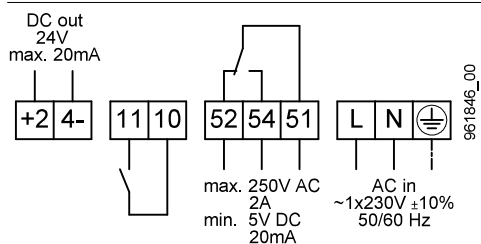
#### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	7-169 W
Nominal current	0.08-1.25 A
Motor protection	integrated

#### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.35 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

#### Connction diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

#### Switch

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

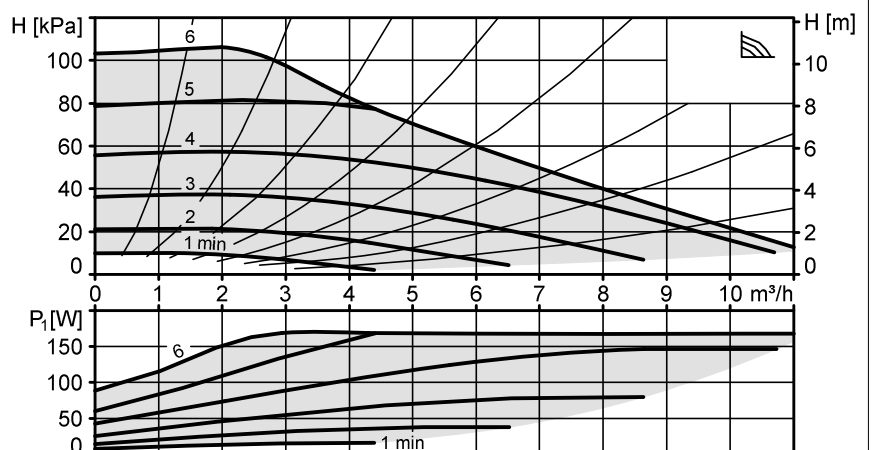
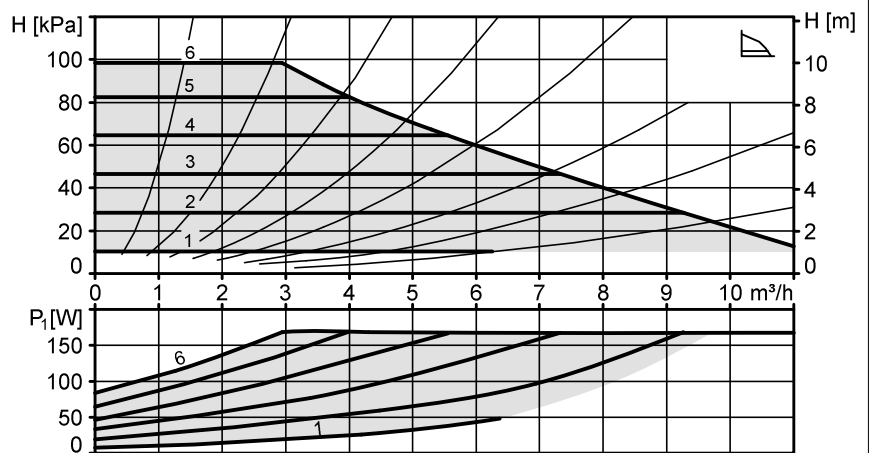
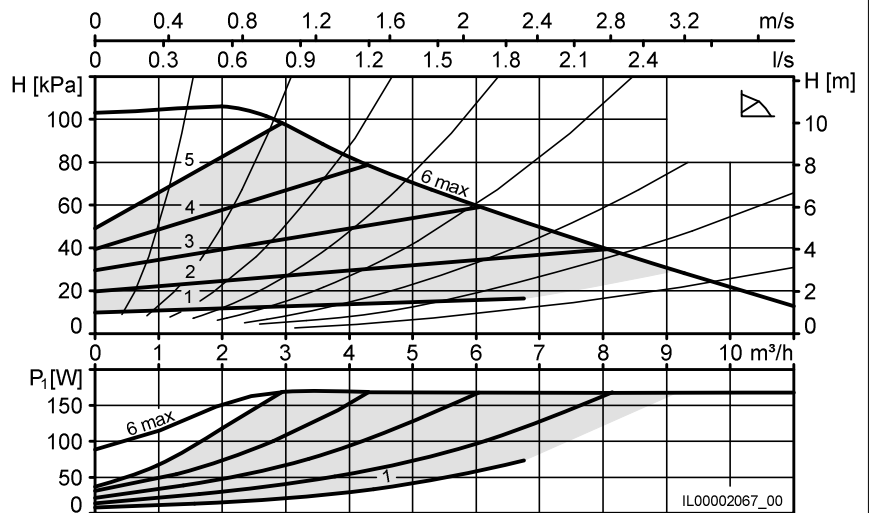
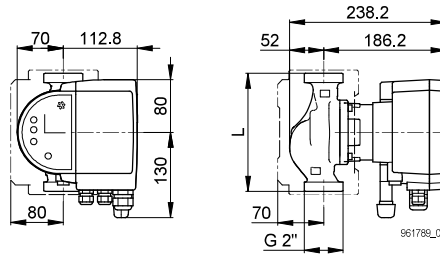
#### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

Type	Art. no.
Modula 32-10 180 RED	7000000070
Modula 32-10 170 RED	7000000065

**Modula 32-10 180 RED**  
DN 32  
L = 180 mm

**Modula 32-10 170 RED**  
DN 32  
L = 170 mm





**Modula 32-12 180 RED**

**Modula 32-12 170 RED**

Version	T2 S
Nominal width	DN 32
Flow head H max.	12 m
Overall length	180   170 mm
Threaded connection	G 2"
Operating pressure max.	10 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Ambient temperature min.	0°C
Ambient temperature max.	40°C
Net weight	4.7 kg
Gross weight	5.35 kg

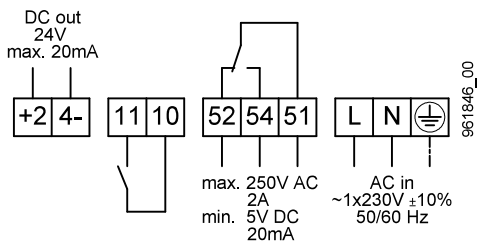
**Electrical data**

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	7-182 W
Nominal current	0.08-1.36 A
Motor protection	integrated

**Required operating pressure at 500m a.s.l.**

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.35 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

**Connction diagram**



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

**Switch**

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

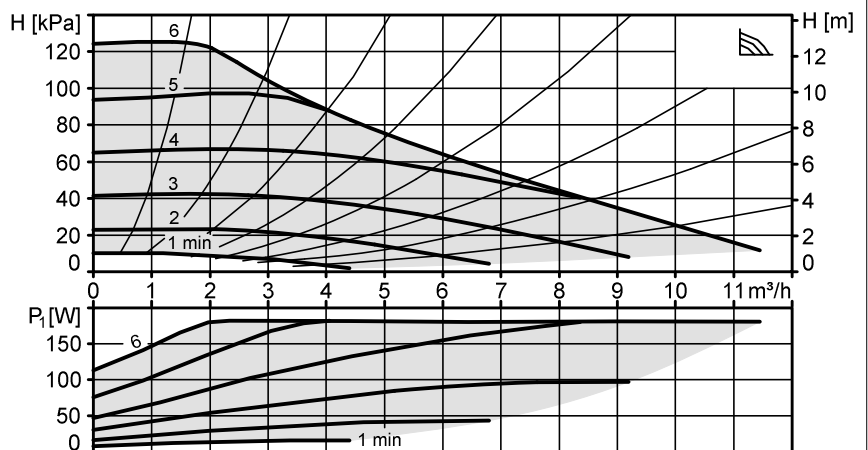
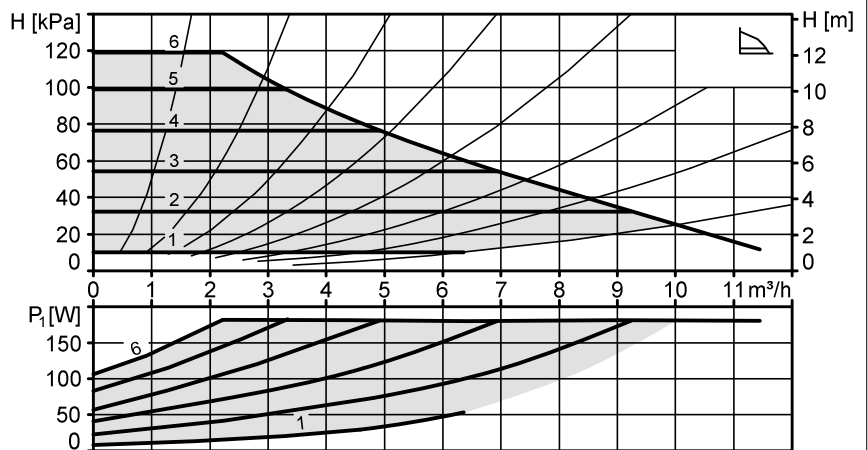
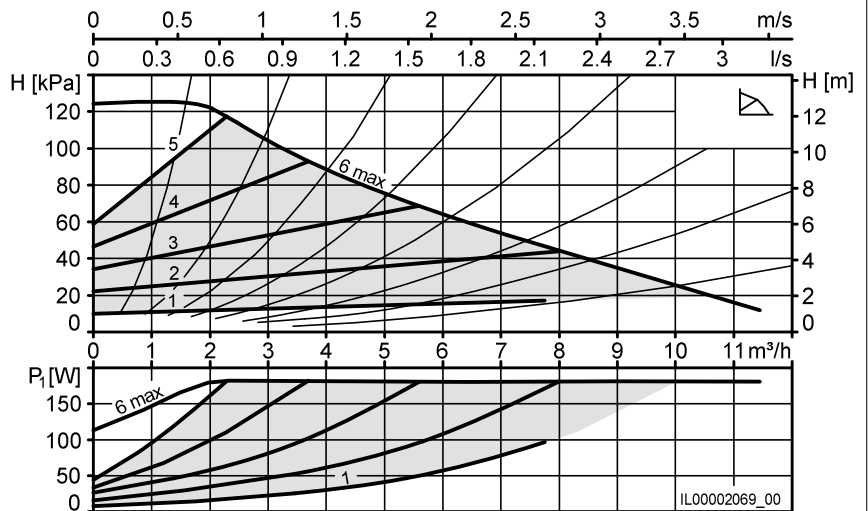
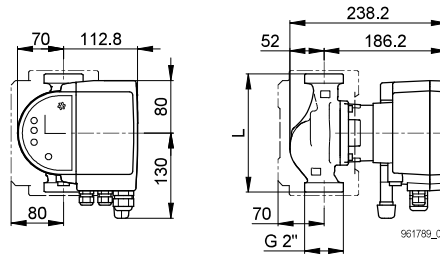
**Included in the scope of delivery**

- Heat insulation shell
- Biral Connector
- AFM seal

Type	Art. no.
Modula 32-12 180 RED	7000000071
Modula 32-12 170 RED	7000000066

**Modula 32-12 180 RED**  
DN 32  
L = 180 mm

**Modula 32-12 170 RED**  
DN 32  
L = 170 mm



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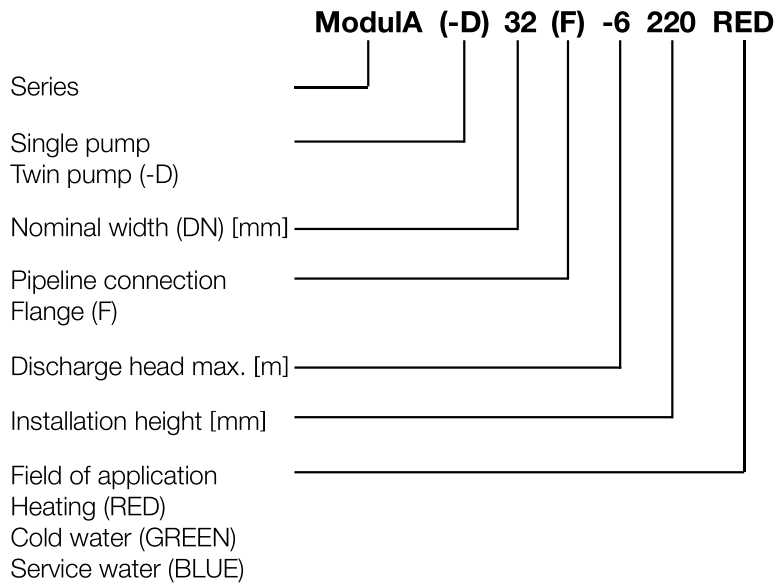
## Heating circulation pumps

### ModulA RED T2 with flanged connection

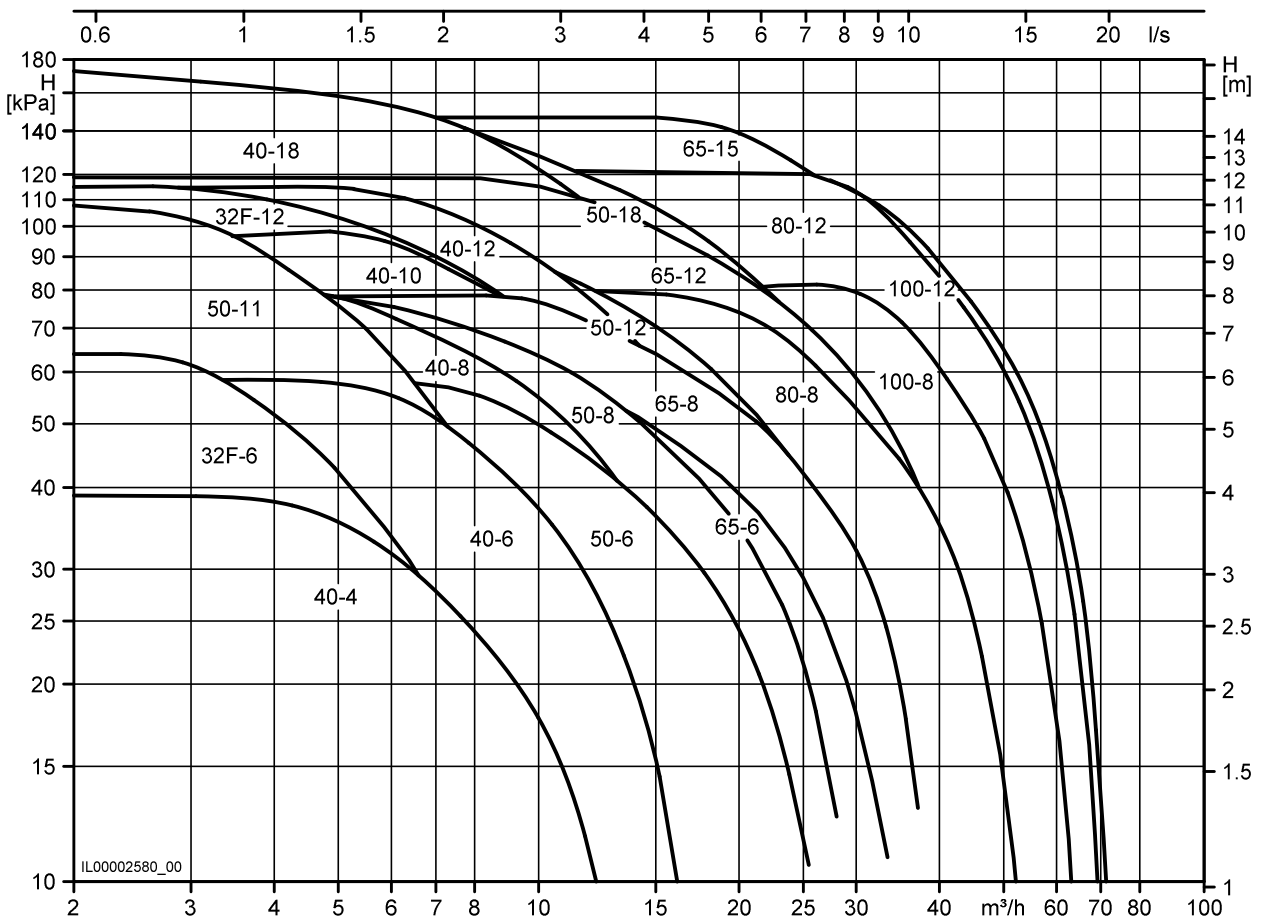
#### Übersicht

Type	Art. no.	Nominal width	Flow head H max.	Overall length	Flanged connection	Operating pressure max.	EEI
		DN	m	mm		bar	EEI
ModulA 32F-6 220 RED	7000000072	32	6	220	PN 6	6	≤0.18
ModulA 32F-12 220 RED	7000000076	32	12	220	PN 6-16	16	≤0.20
ModulA 40-4 220 RED	7000000073	40	4	220	PN 6-16	16	≤0.18
ModulA 40-6 220 RED	7000000074	40	6	220	PN 6-16	16	≤0.19
ModulA 40-8 220 RED	7000000077	40	8	220	PN 6-16	16	≤0.20
ModulA 40-10 220 RED	7000000078	40	10	220	PN 6-16	16	≤0.20
ModulA 40-12 250 RED	7000000079	40	12	250	PN 6-16	16	≤0.18
ModulA 40-18 250 RED	7000000080	40	18	250	PN 6-16	16	≤0.18
ModulA 50-6 240 RED	7000000081	50	6	240	PN 6-16	16	≤0.19
ModulA 50-6 270 RED	7000000082	50	6	270	PN 6-16	16	≤0.20
ModulA 50-8 240 RED	7000000083	50	8	240	PN 6-16	16	≤0.19
ModulA 50-11 220 RED	7000000075	50	11	220	PN 6-16	16	≤0.18
ModulA 50-12 270 RED	7000000084	50	12	270	PN 6-16	16	≤0.18
ModulA 50-18 270 RED	7000000085	50	18	270	PN 6-16	16	≤0.17
ModulA 65-6 270 RED	7000000086	65	6	270	PN 6-16	16	≤0.18
ModulA 65-8 270 RED	7000000087	65	8	270	PN 6-16	16	≤0.18
ModulA 65-8 340 RED	7000000088	65	8	340	PN 6-16	16	≤0.18
ModulA 65-12 340 RED	7000000089	65	12	340	PN 6-16	16	≤0.17
ModulA 65-15 340 RED	7000000054	65	15	340	PN 6-16	16	≤0.18
ModulA 80-8 360 RED PN6	7000000090	80	8	360	PN 6	6	≤0.17
ModulA 80-8 360 RED PN10/16	7000000091	80	8	360	PN 10/16	16	≤0.17
ModulA 80-12 360 RED PN6	7000000092	80	12	360	PN 6	6	≤0.17
ModulA 80-12 360 RED PN10/16	7000000093	80	12	360	PN 10/16	16	≤0.17
ModulA 100-8 450 RED PN6	7000000094	100	8	450	PN 6	6	≤0.18
ModulA 100-8 450 RED PN10/16	7000000095	100	8	450	PN 10/16	16	≤0.18
ModulA 100-12 450 RED PN6	7000000096	100	12	450	PN 6	6	≤0.18
ModulA 100-12 450 RED PN10/16	7000000097	100	12	450	PN 10/16	16	≤0.18

**Order reference**



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## ModulA 32F-6 220 RED

Version	T2 S
Nominal width	DN 32
Flow head H max.	6 m
Overall length	220 mm
Flanged connection	PN 6
Operating pressure max.	6 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	7.0 kg
Gross weight	8.4 kg

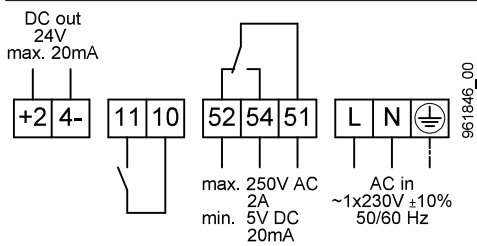
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	7-102 W
Nominal current	0.08-0.73 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.35 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



<b>+24-</b>	24 V DC out
<b>11, 10</b>	External OFF or external ON
<b>52, 54, 51</b>	Error or operating message
<b>L, N, PE</b>	Power supply

### Switch

- 1 Fault or operating message (switchable)
- 2 External OFF or external ON (switchable)
- 3 Power Limit (activatable)

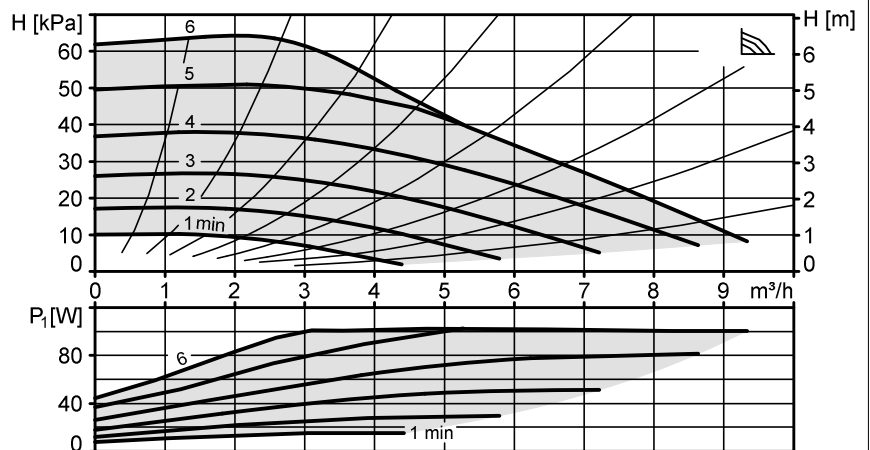
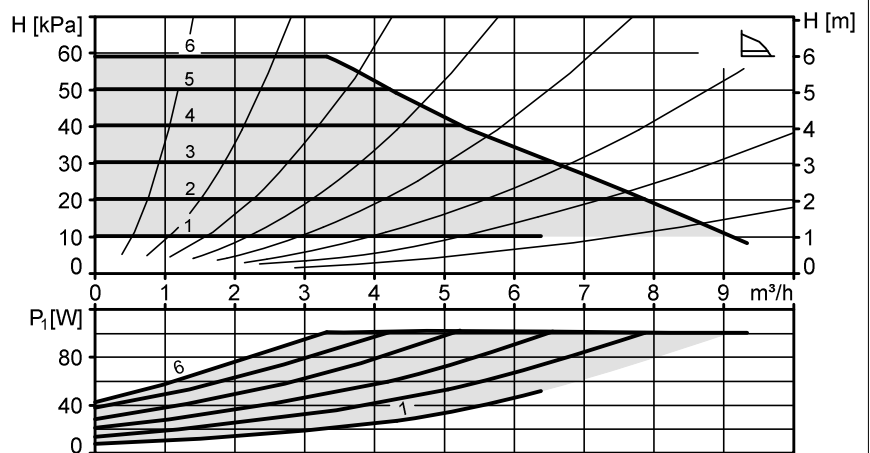
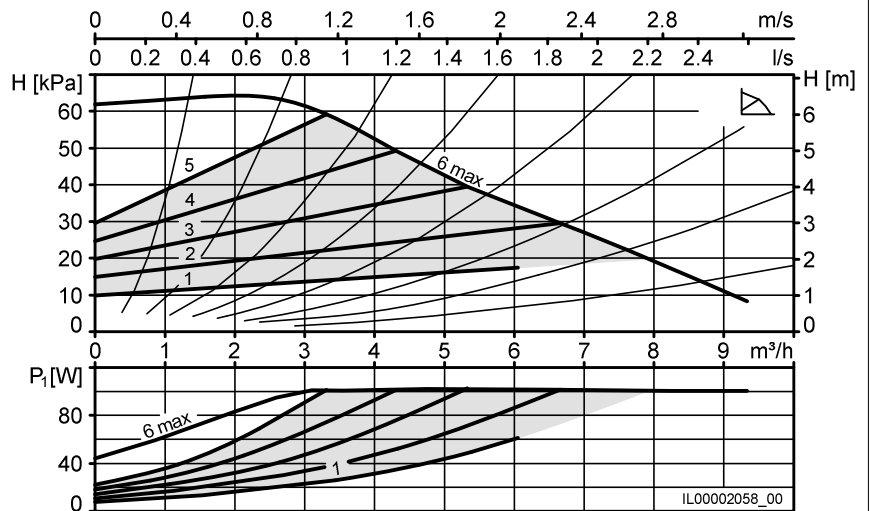
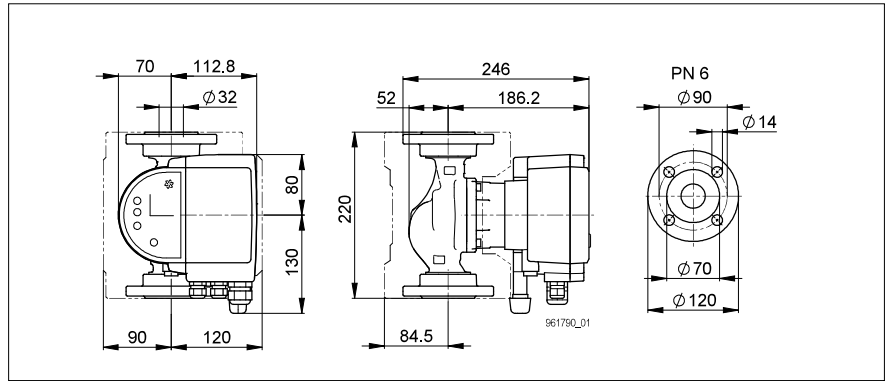
### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules

Type	Art. no.
ModulA 32F-6 220 RED	7000000072



## Modula 32F-12 220 RED

Version	T2 M
Nominal width	DN 32
Flow head H max.	12 m
Overall length	220 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	15.3 kg
Gross weight	19.4 kg

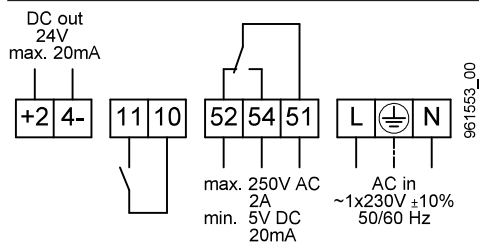
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	15-329 W
Nominal current	0.17-1.51 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.35 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



<b>+24-</b>	24 V DC out
<b>11, 10</b>	External OFF or external ON
<b>52, 54, 51</b>	Error or operating message
<b>L, N, PE</b>	Power supply

### Switch

- 1 Fault or operating message (switchable)
- 2 External OFF or external ON (switchable)
- 3 Power Limit (activatable)

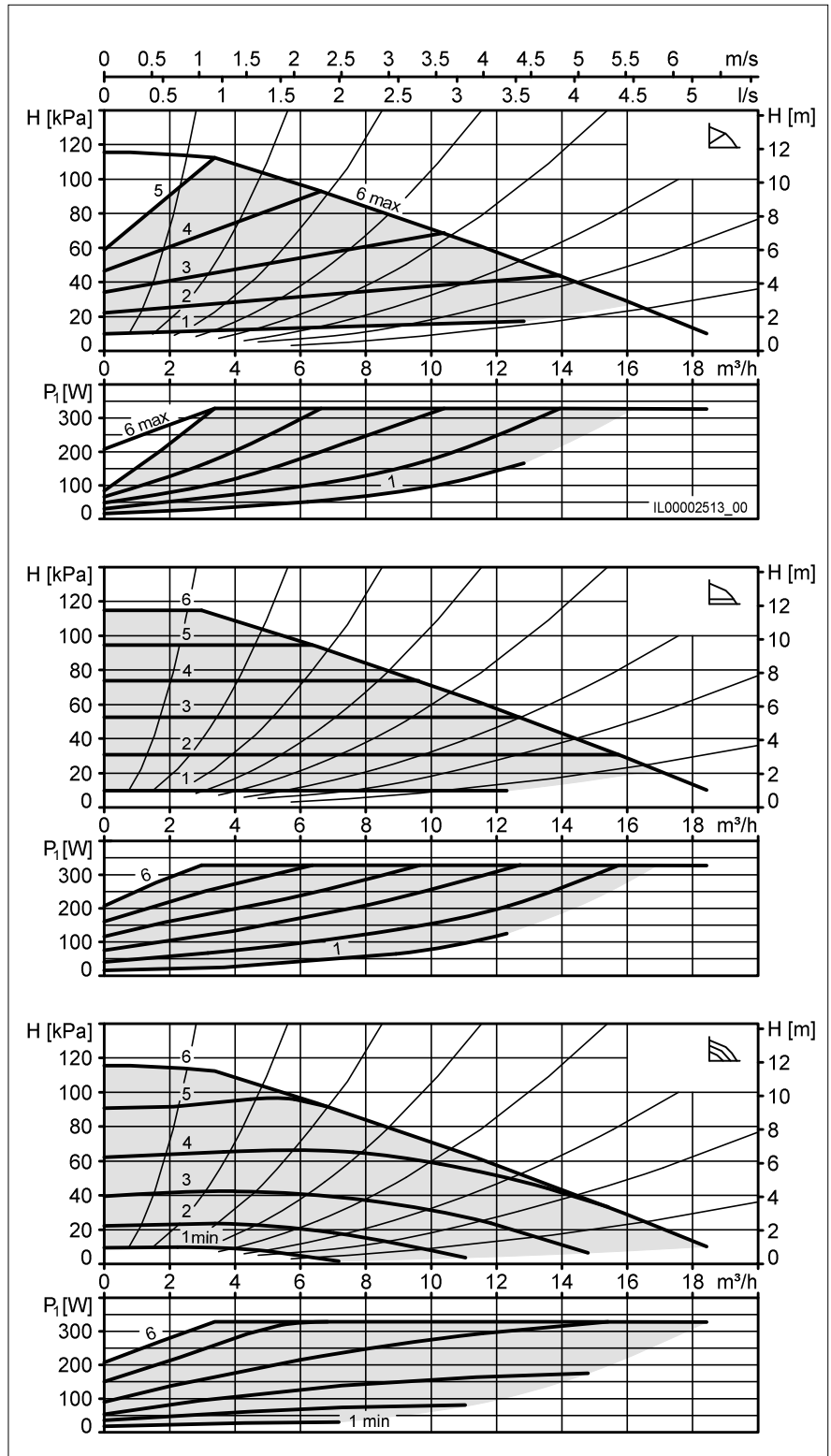
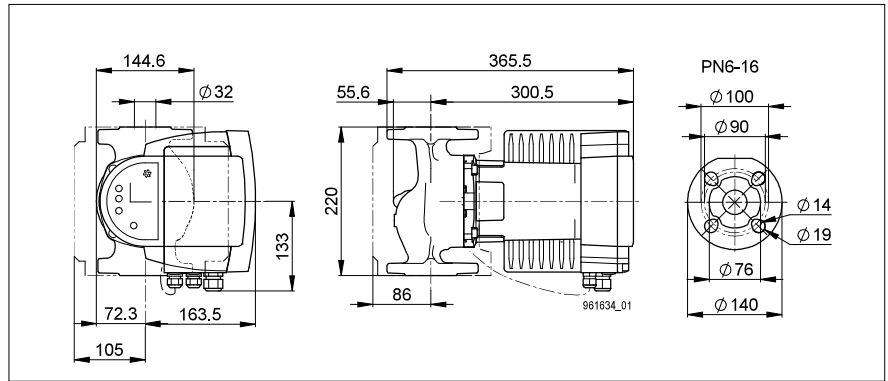
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 32F-12 220 RED	7000000076



Heizung

## Modula 40-4 220 RED

Version	T2 S
Nominal width	DN 40
Flow head H max.	4 m
Overall length	220 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	9.2 kg
Gross weight	10.5 kg

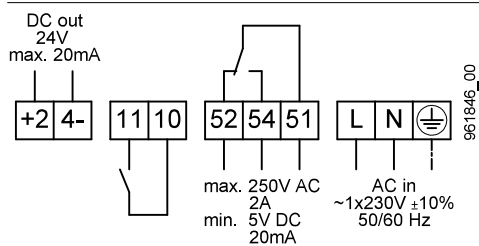
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>i</sub>	11-97 W
Nominal current	0.11-0.74 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.35 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

### Switch

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

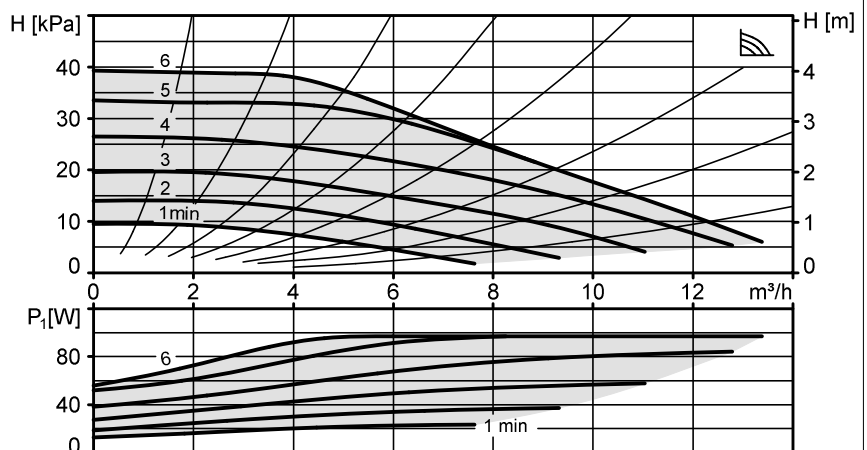
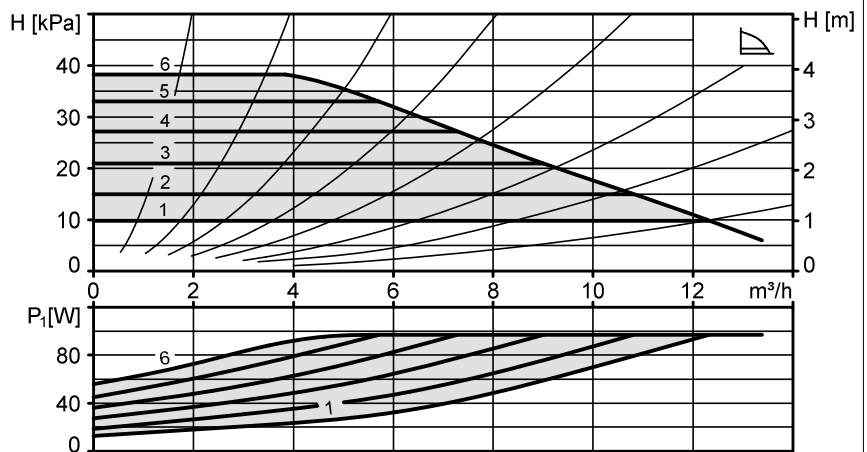
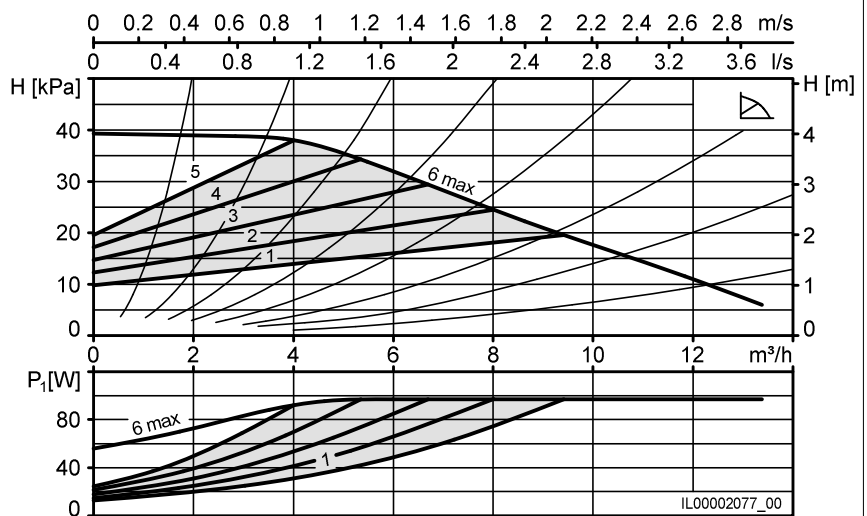
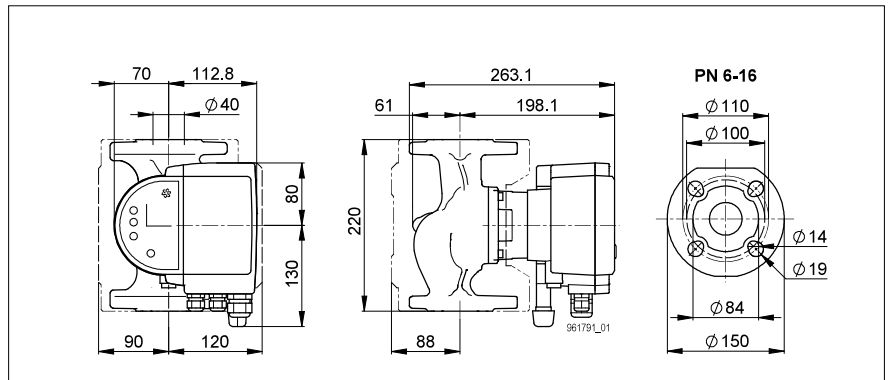
### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 40-4 220 RED	7000000073



## Modula 40-6 220 RED

Version	T2 S
Nominal width	DN 40
Flow head H max.	6 m
Overall length	220 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	9.2 kg
Gross weight	10.5 kg

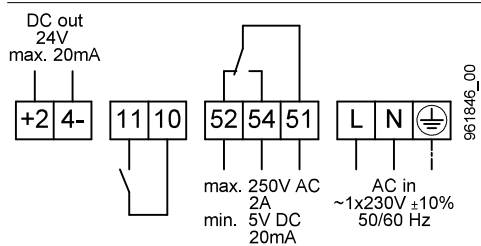
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	11-185 W
Nominal current	0.11-1.47 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.35 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

### Switch

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

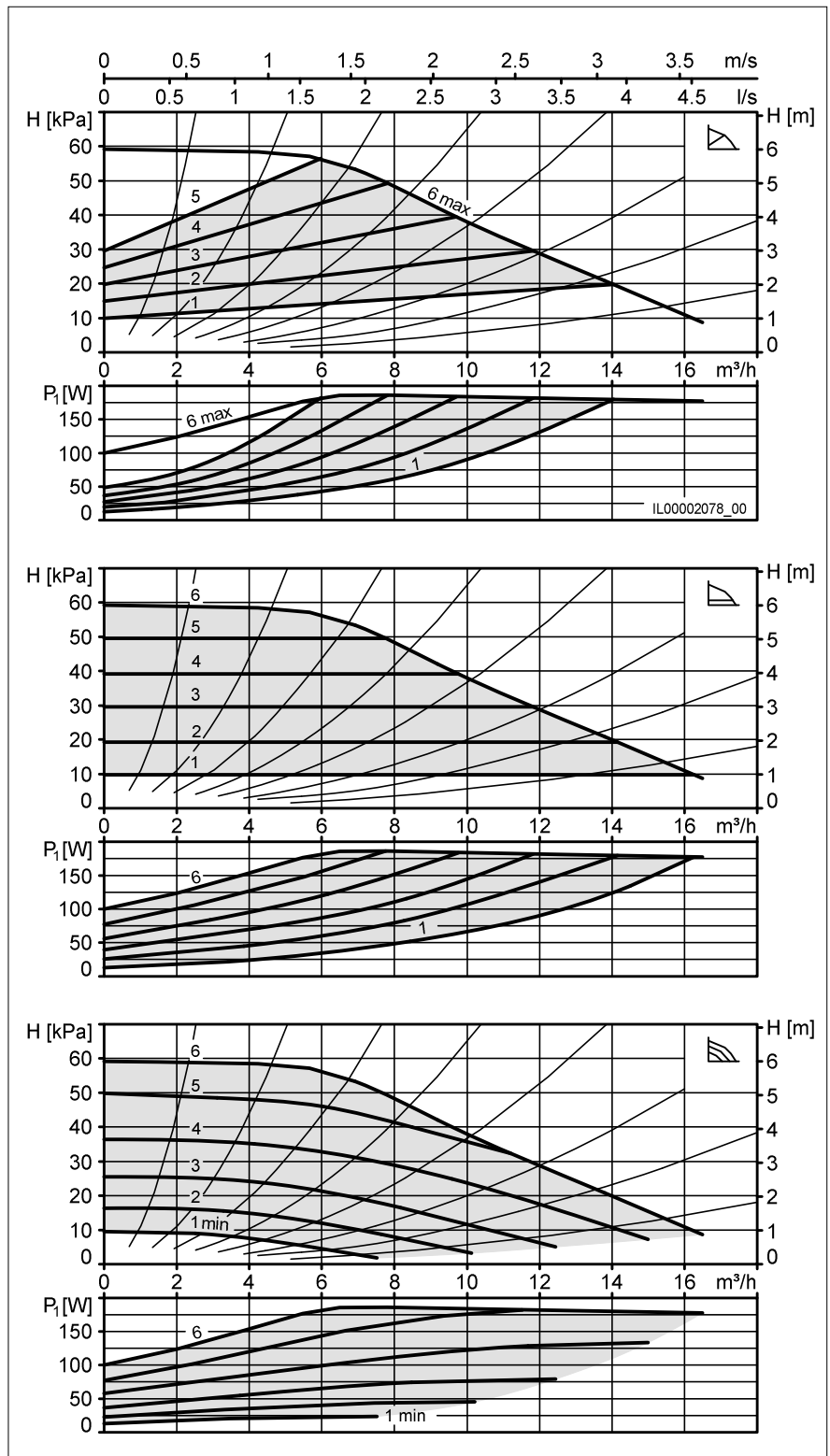
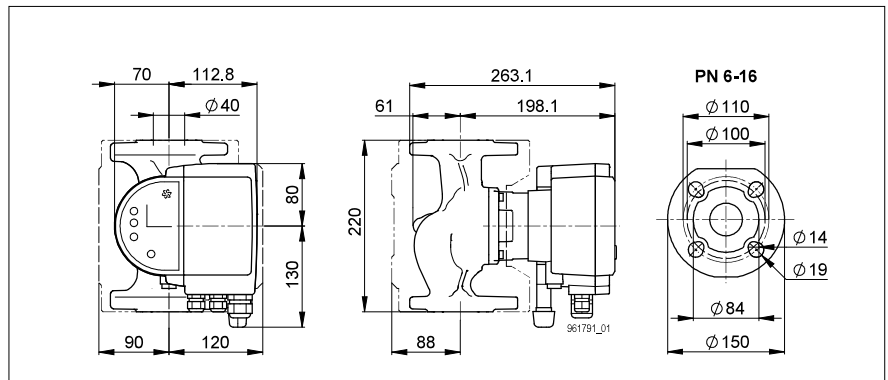
### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 40-6 220 RED	7000000074



Heizung

## Modula 40-8 220 RED

Version	T2 M
Nominal width	DN 40
Flow head H max.	8 m
Overall length	220 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	16.3 kg
Gross weight	19.3 kg

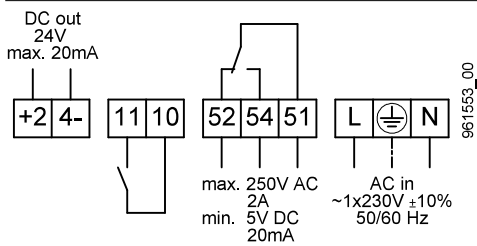
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	18-264 W
Nominal current	0.19-1.23 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.50 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

### Switch

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

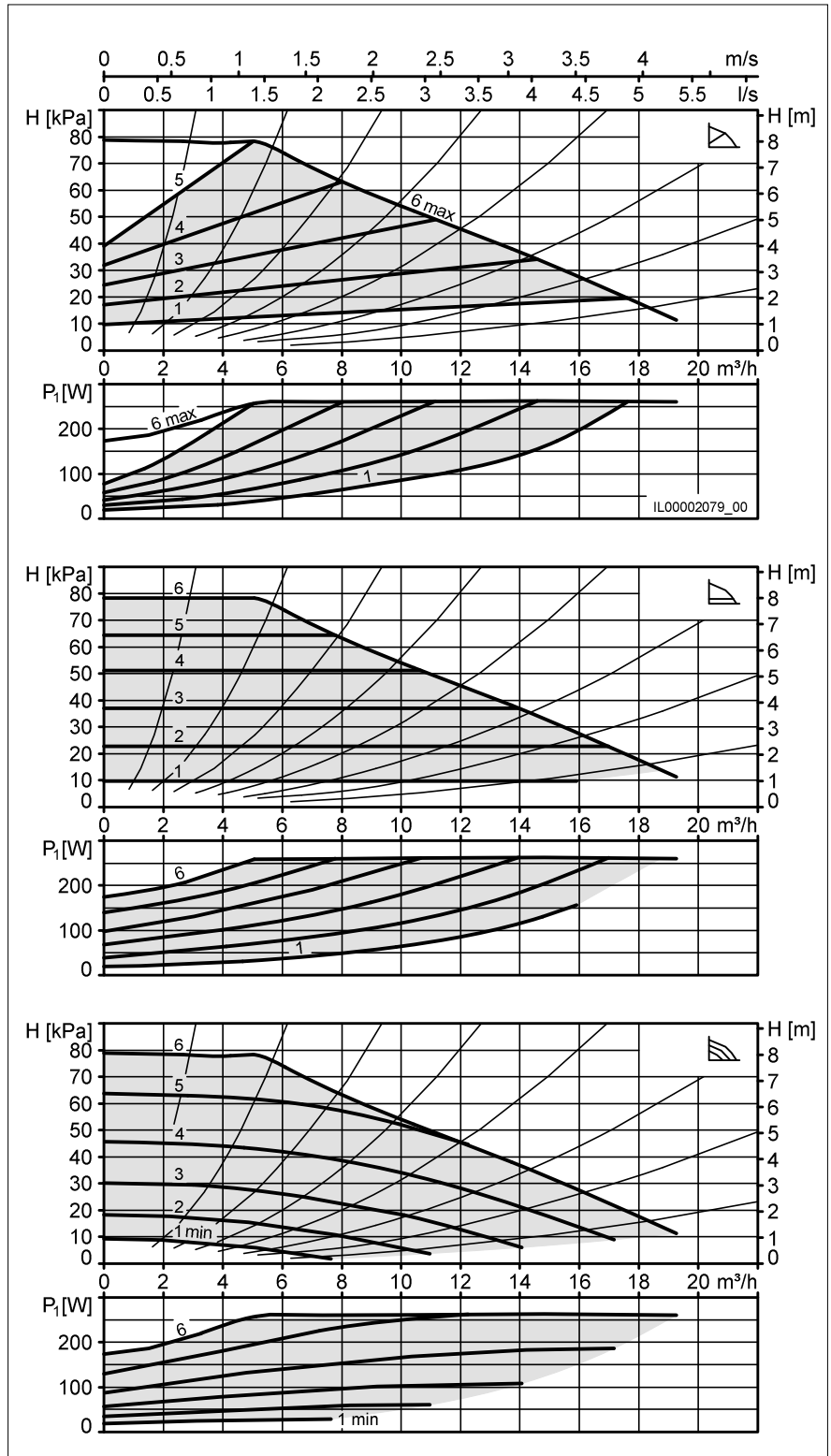
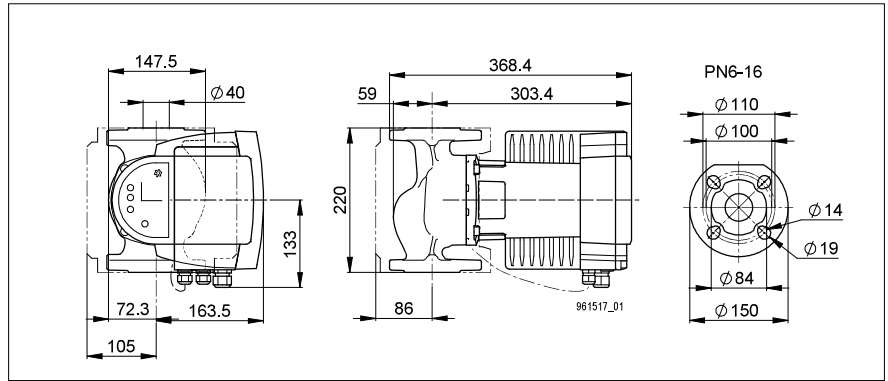
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 40-8 220 RED	7000000077





## Modula 40-10 220 RED

Version	T2 M
Nominal width	DN 40
Flow head H max.	10 m
Overall length	220 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	16.3 kg
Gross weight	20.3 kg

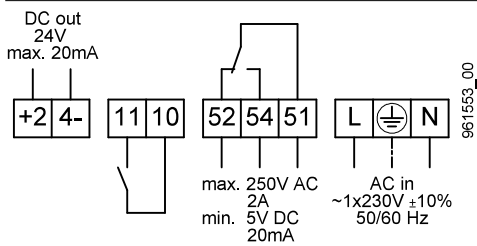
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power $P_1$	18-352 W
Nominal current	0.18-1.60 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.50 bar
at a water temp. of 110 °C	1.00 bar
for every $\pm 100$ m of altitude	$\pm 0.01$ bar

### Connction diagram



<b>+24-</b>	24 V DC out
<b>11, 10</b>	External OFF or external ON
<b>52, 54, 51</b>	Error or operating message
<b>L, N, PE</b>	Power supply

### Switch

- 1 Fault or operating message (switchable)
- 2 External OFF or external ON (switchable)
- 3 Power Limit (activatable)

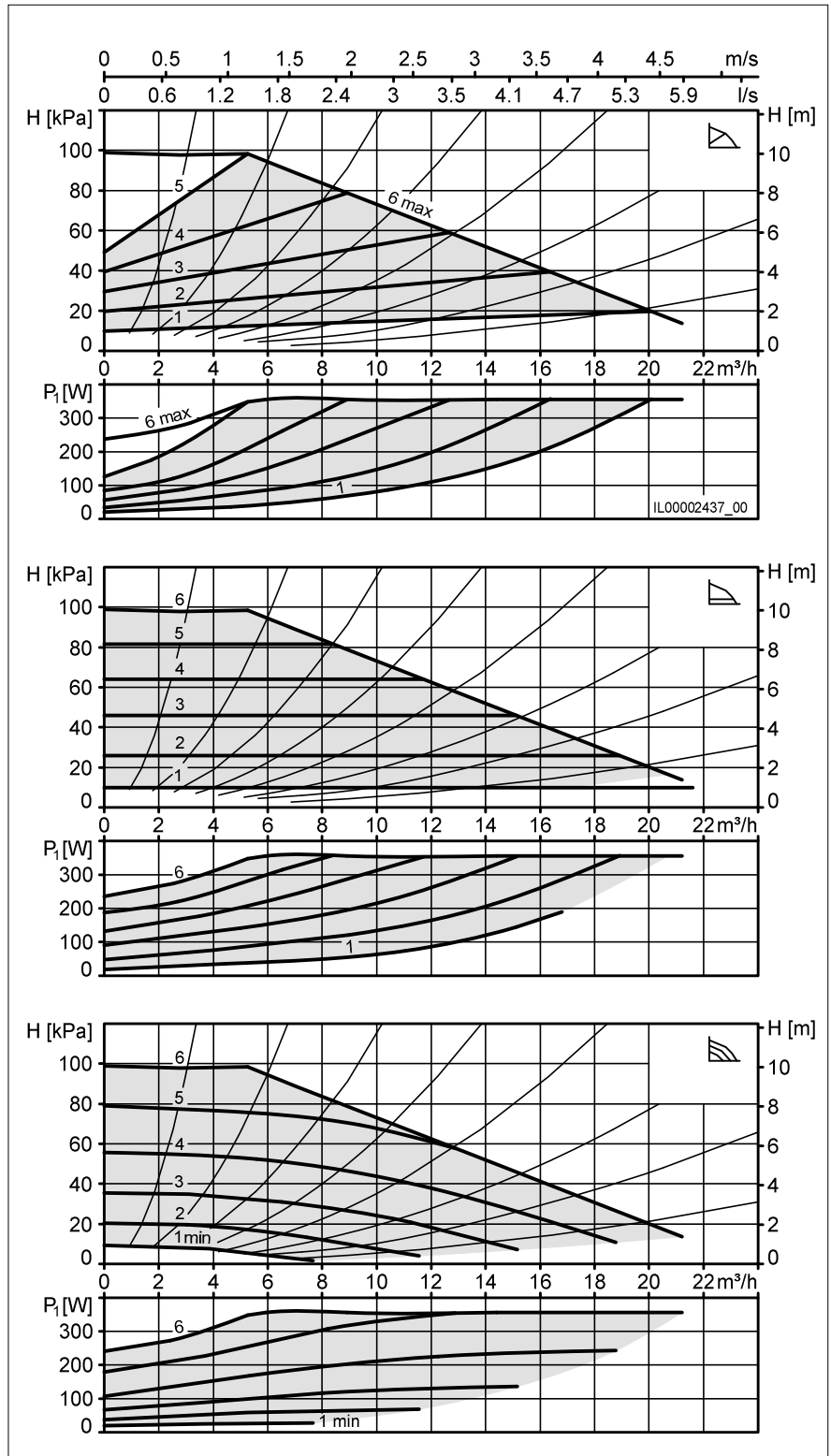
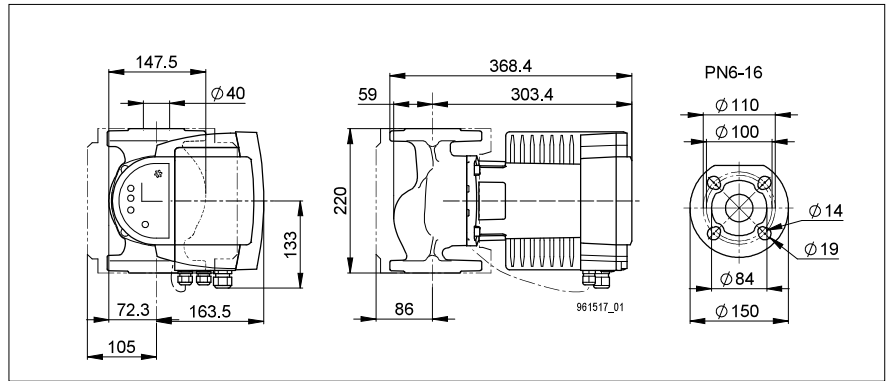
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 40-10 220 RED	7000000078



Heizung

## Modula 40-12 250 RED

Version	T2 M
Nominal width	DN 40
Flow head H max.	12 m
Overall length	250 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	16.1 kg
Gross weight	19.5 kg

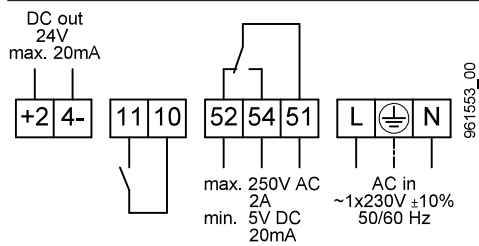
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	16-423 W
Nominal current	0.17-1.93 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.50 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



<b>+24-</b>	24 V DC out
<b>11, 10</b>	External OFF or external ON
<b>52, 54, 51</b>	Error or operating message
<b>L, N, PE</b>	Power supply

### Switch

- 1 Fault or operating message (switchable)
- 2 External OFF or external ON (switchable)
- 3 Power Limit (activatable)

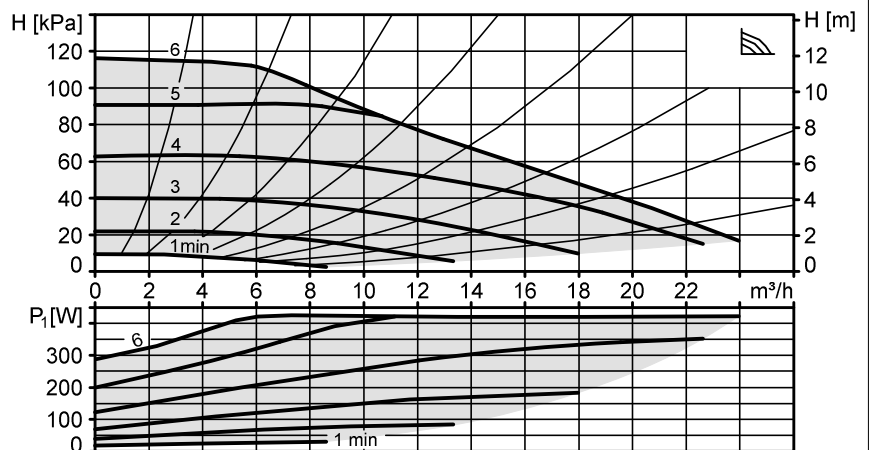
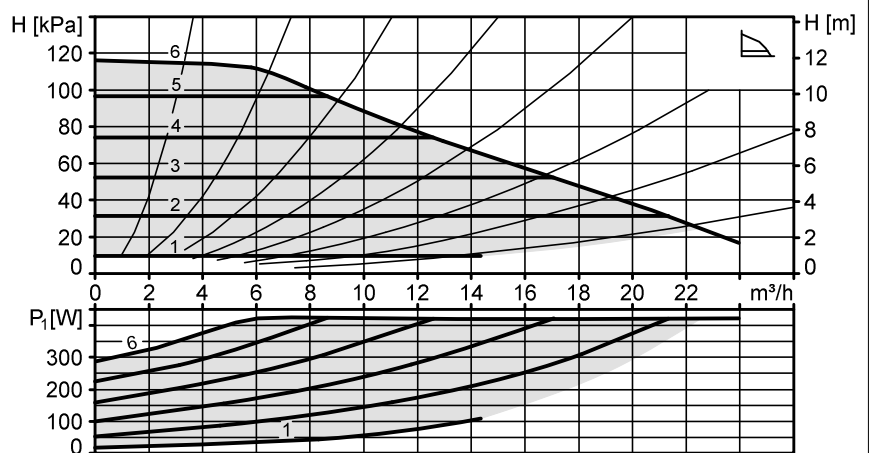
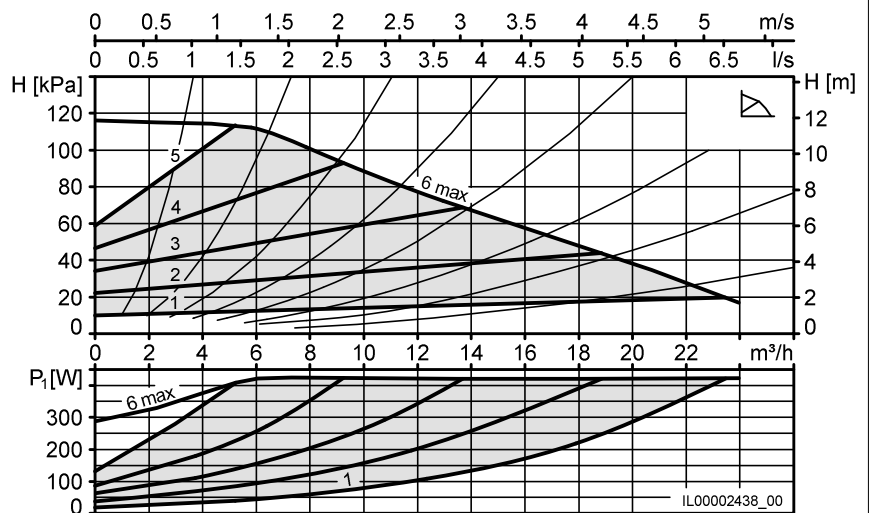
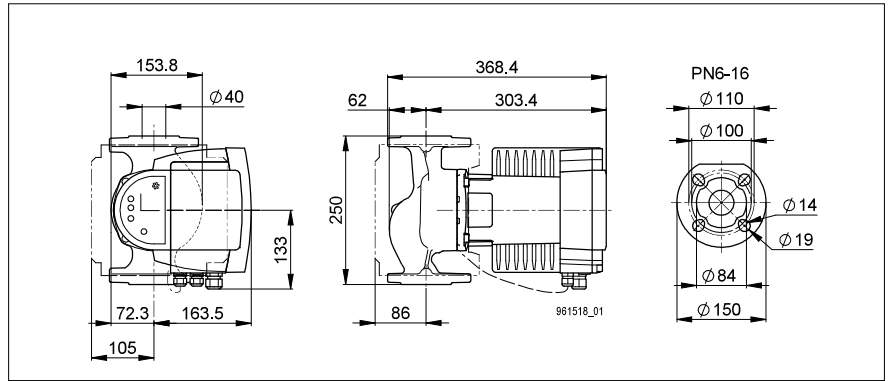
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 40-12 250 RED	7000000079



## Modula 40-18 250 RED

Version	T2 M
Nominal width	DN 40
Flow head H max.	18 m
Overall length	250 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	16.1 kg
Gross weight	19.5 kg

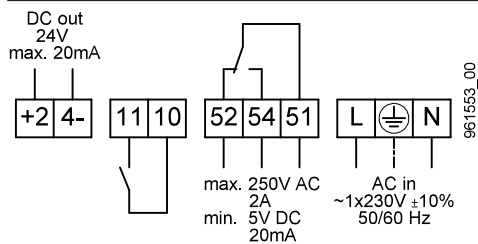
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	16-600 W
Nominal current	0.17-2.70 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.50 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



<b>+24-</b>	24 V DC out
<b>11, 10</b>	External OFF or external ON
<b>52, 54, 51</b>	Error or operating message
<b>L, N, PE</b>	Power supply

### Switch

- 1 Fault or operating message (switchable)
- 2 External OFF or external ON (switchable)
- 3 Power Limit (activatable)

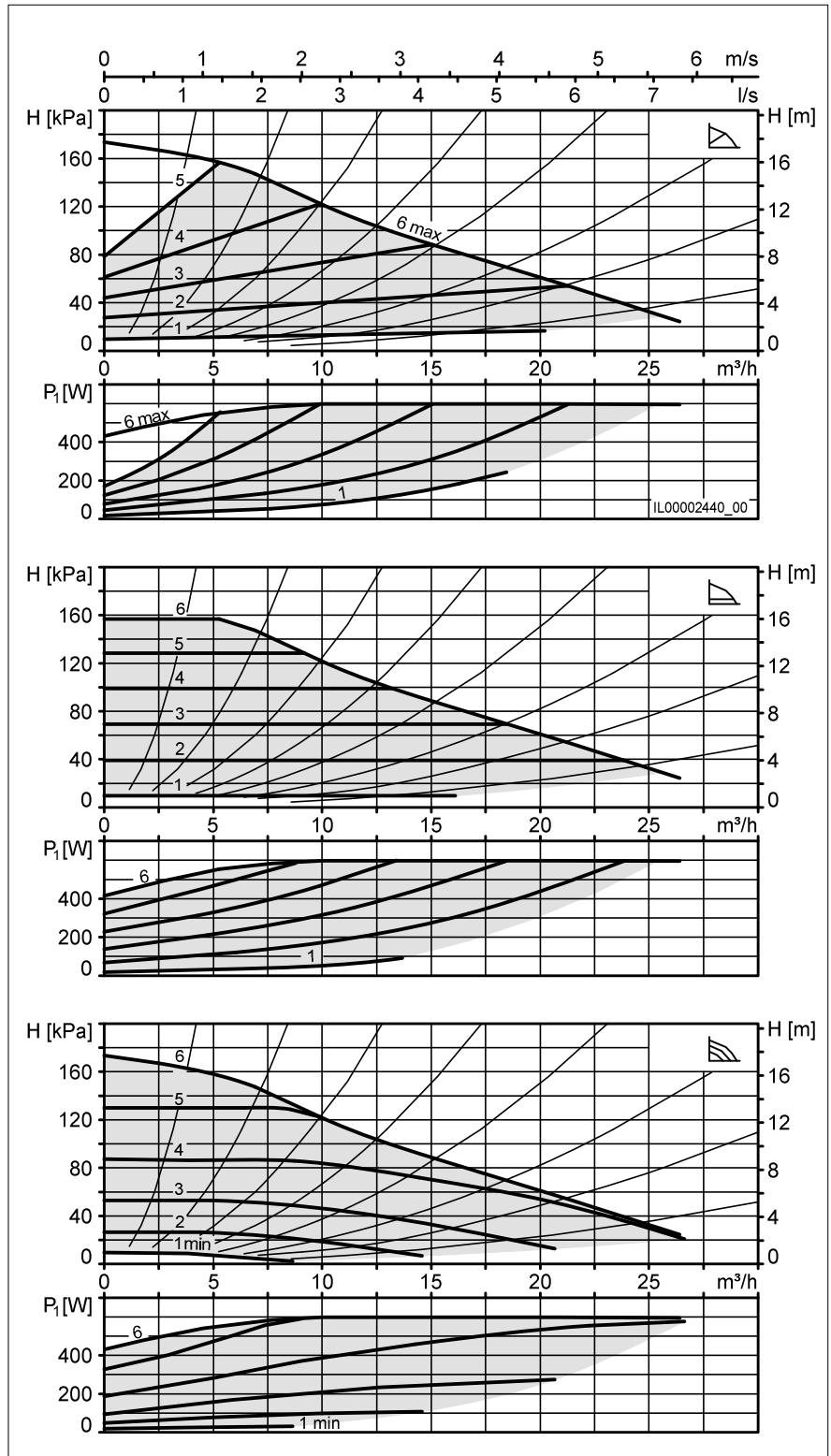
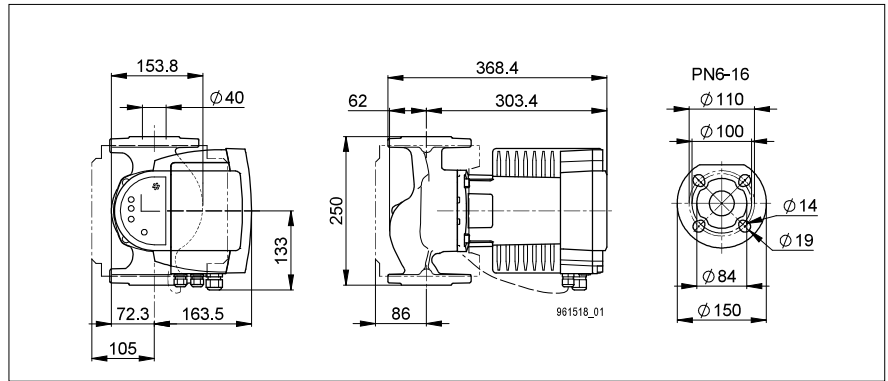
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 40-18 250 RED	7000000080



Heizung

## Modula 50-6 240 RED

Version	T2 M
Nominal width	DN 50
Flow head H max.	6 m
Overall length	240 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	17.6 kg
Gross weight	21.5 kg

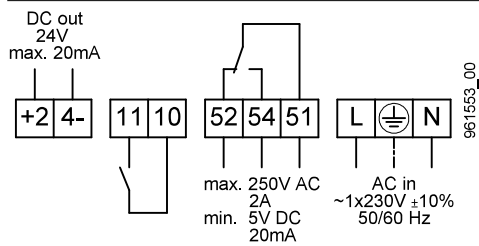
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	21-249 W
Nominal current	0.20-1.15 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.40 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

### Switch

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

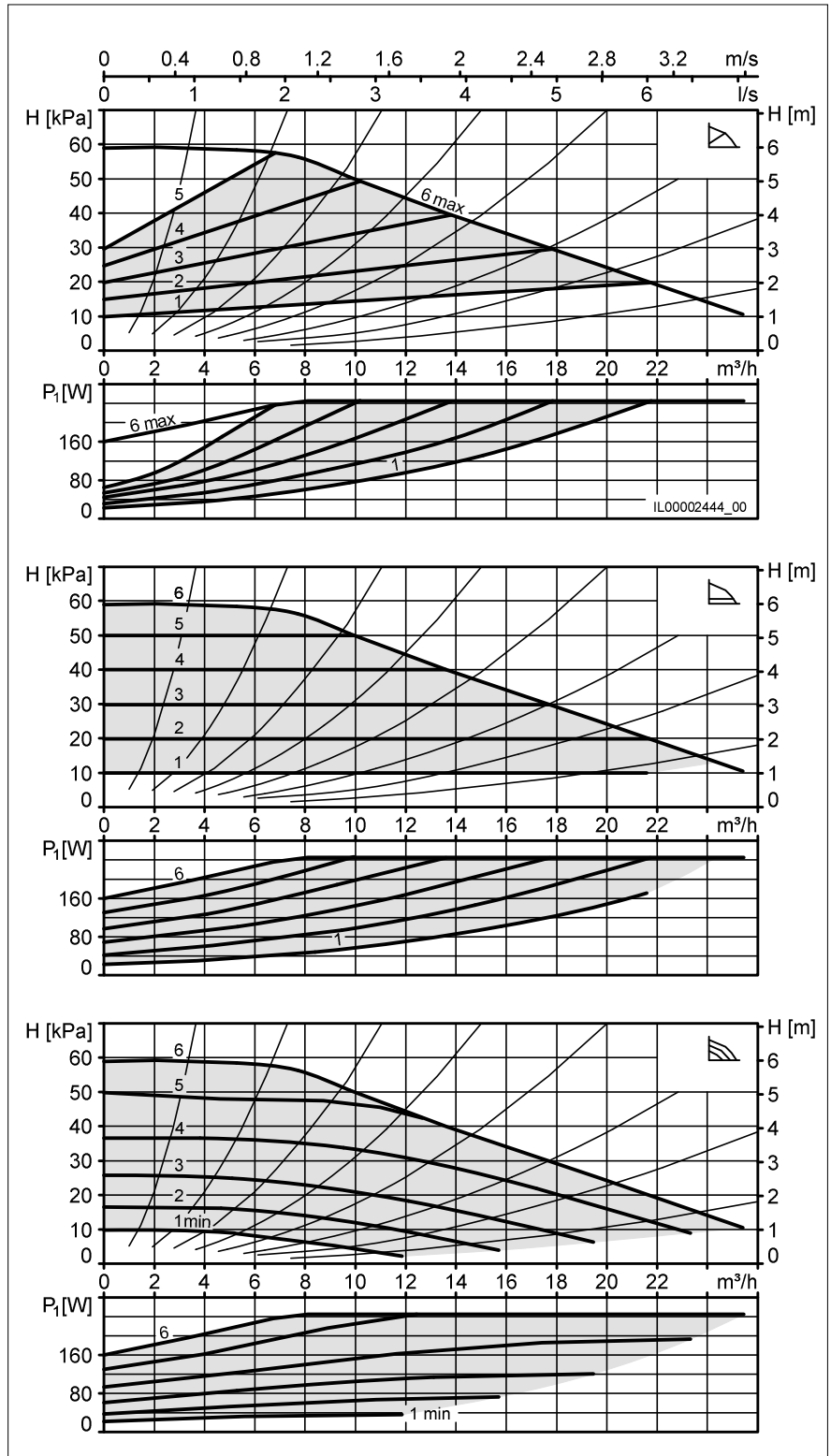
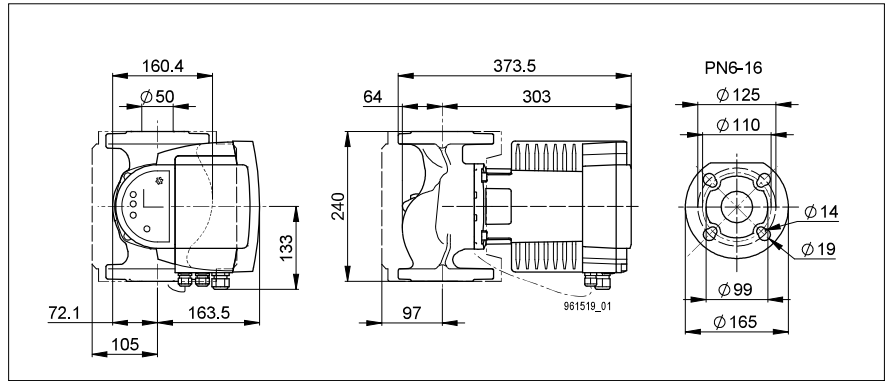
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 50-6 240 RED	7000000081



## Modula 50-6 270 RED

Version	T2 M
Nominal width	DN 50
Flow head H max.	6 m
Overall length	270 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	18.1 kg
Gross weight	21.5 kg

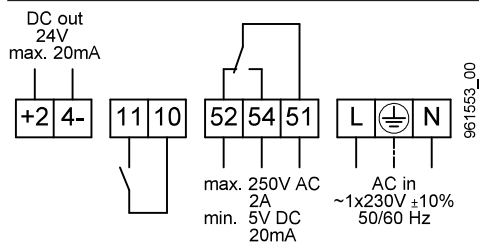
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	21-247 W
Nominal current	0.20-1.16 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.40 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



<b>+24-</b>	24 V DC out
<b>11, 10</b>	External OFF or external ON
<b>52, 54, 51</b>	Error or operating message
<b>L, N, PE</b>	Power supply

### Switch

- 1 Fault or operating message (switchable)
- 2 External OFF or external ON (switchable)
- 3 Power Limit (activatable)

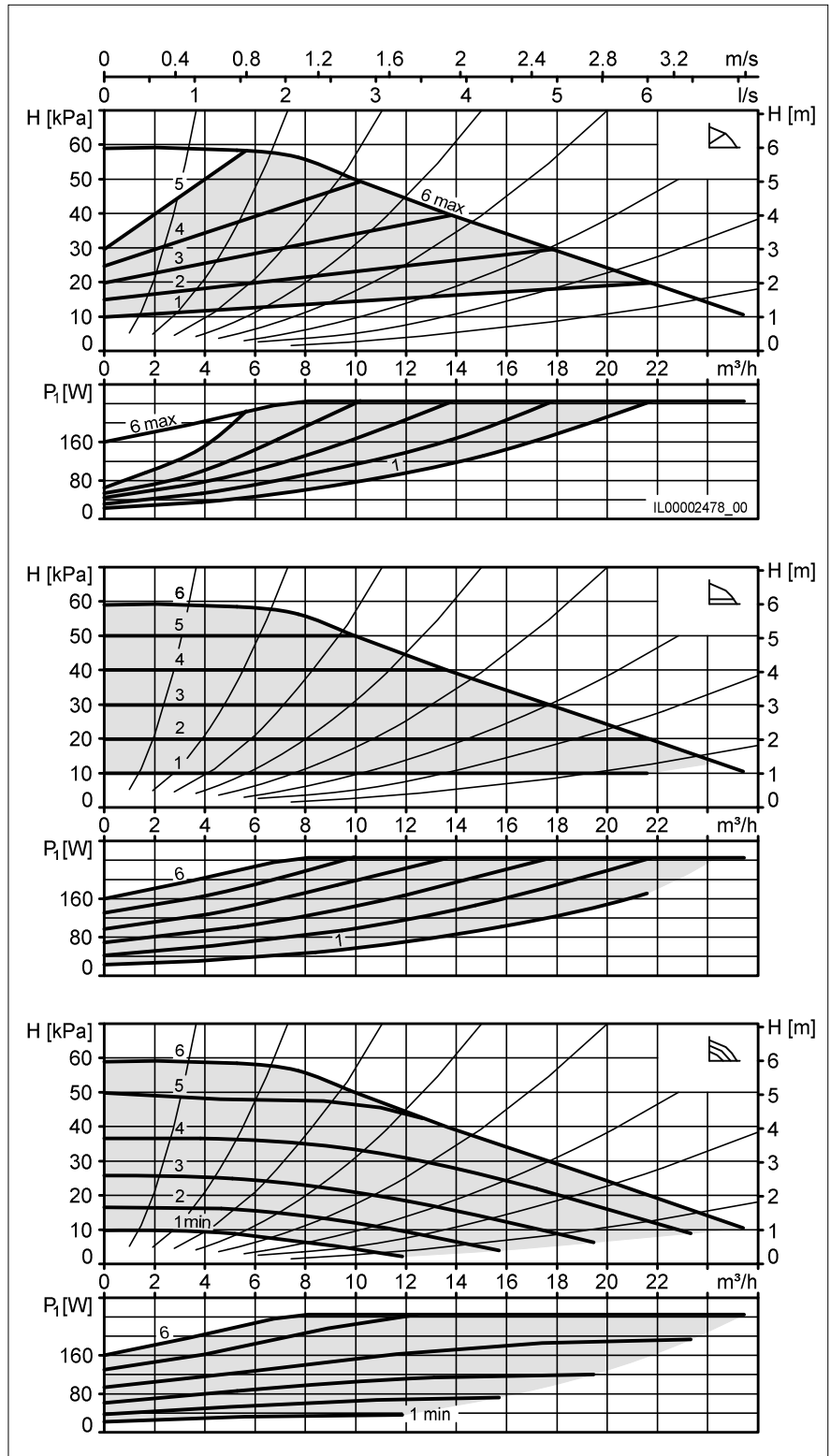
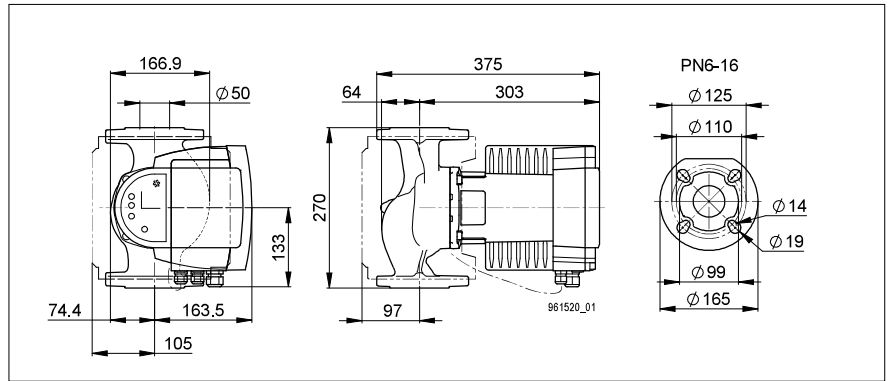
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 50-6 270 RED	7000000082



Heizung

## Modula 50-8 240 RED

Version	T2 M
Nominal width	DN 50
Flow head H max.	8 m
Overall length	240 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	17.6 kg
Gross weight	21.5 kg

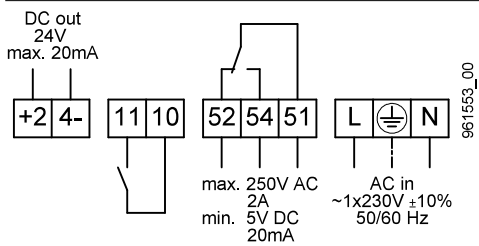
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	21-326 W
Nominal current	0.20-1.49 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.40 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

### Switch

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

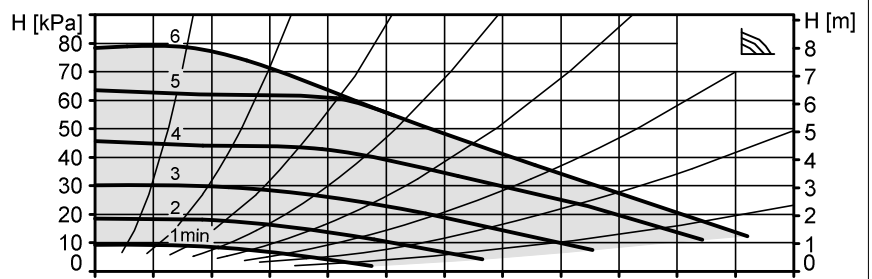
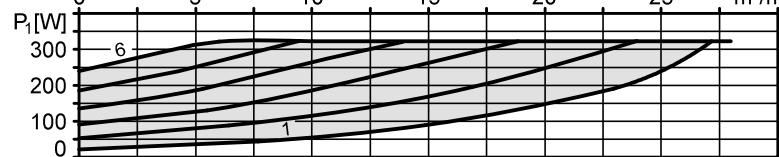
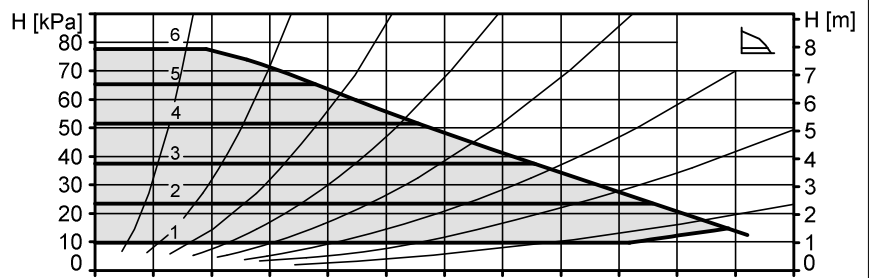
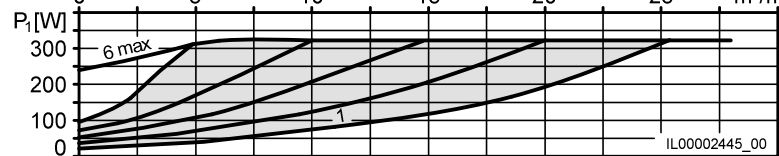
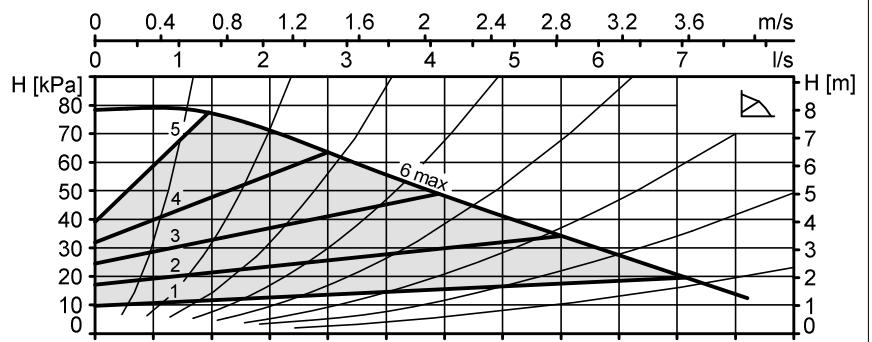
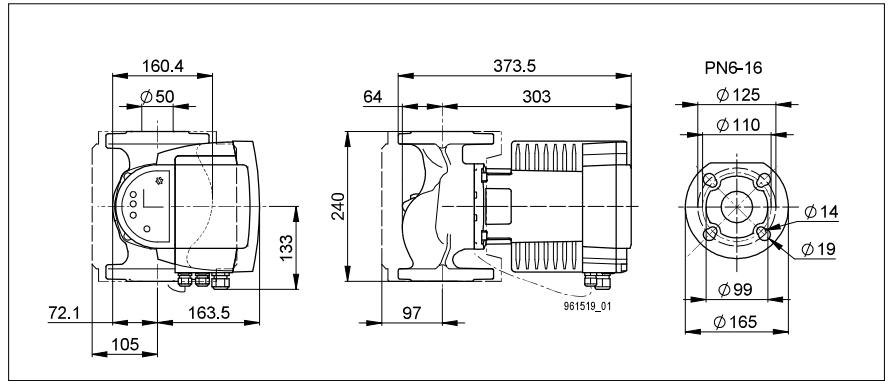
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 50-8 240 RED	7000000083



## Modula 50-11 220 RED

Version	T2 S
Nominal width	DN 50
Flow head H max.	11 m
Overall length	220 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	8.8 kg
Gross weight	10.5 kg

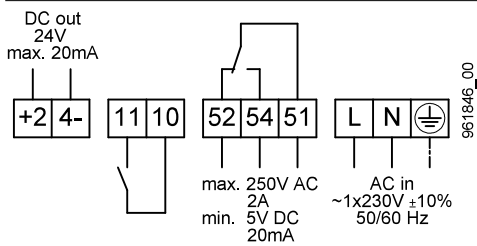
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	8-182 W
Nominal current	0.08-1.39 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.50 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



<b>+24-</b>	24 V DC out
<b>11, 10</b>	External OFF or external ON
<b>52, 54, 51</b>	Error or operating message
<b>L, N, PE</b>	Power supply

### Switch

- 1 Fault or operating message (switchable)
- 2 External OFF or external ON (switchable)
- 3 Power Limit (activatable)

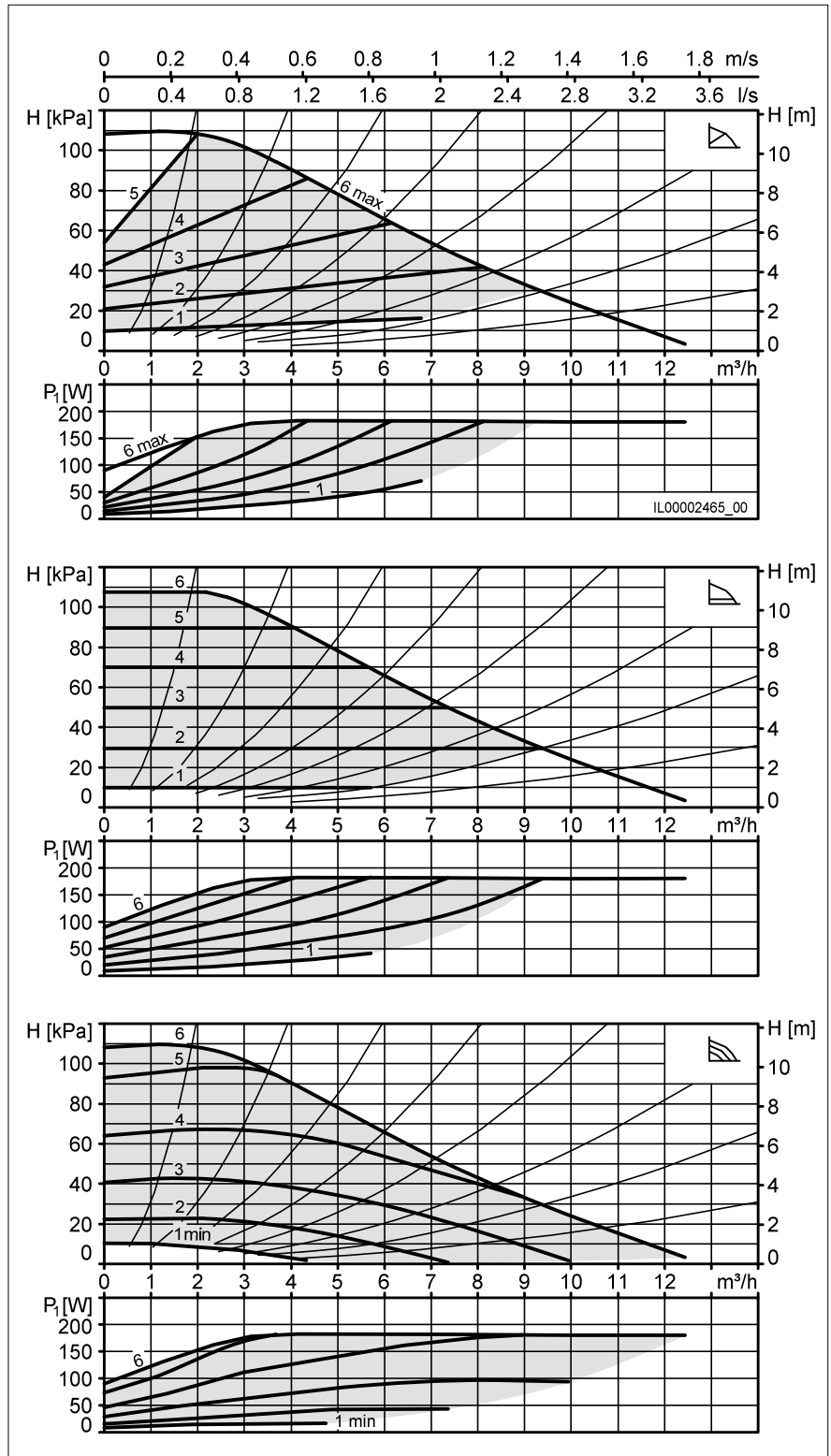
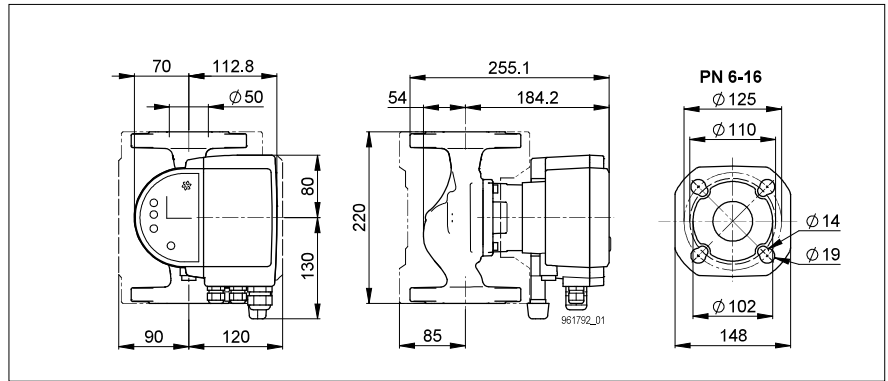
### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 50-11 220 RED	7000000075



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## Modula 50-12 270 RED

Version	T2 M
Nominal width	DN 50
Flow head H max.	12 m
Overall length	270 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	18.1 kg
Gross weight	21.5 kg

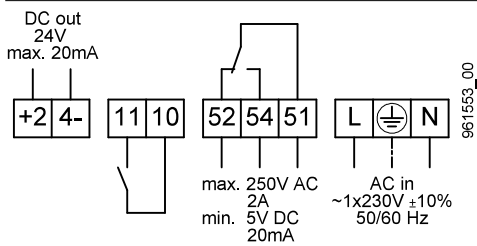
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	21-488 W
Nominal current	0.20-2.23 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.10 bar
at a water temp. of 95 °C	0.50 bar
at a water temp. of 110 °C	1.00 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



<b>+24-</b>	24 V DC out
<b>11, 10</b>	External OFF or external ON
<b>52, 54, 51</b>	Error or operating message
<b>L, N, PE</b>	Power supply

### Switch

- 1 Fault or operating message (switchable)
- 2 External OFF or external ON (switchable)
- 3 Power Limit (activatable)

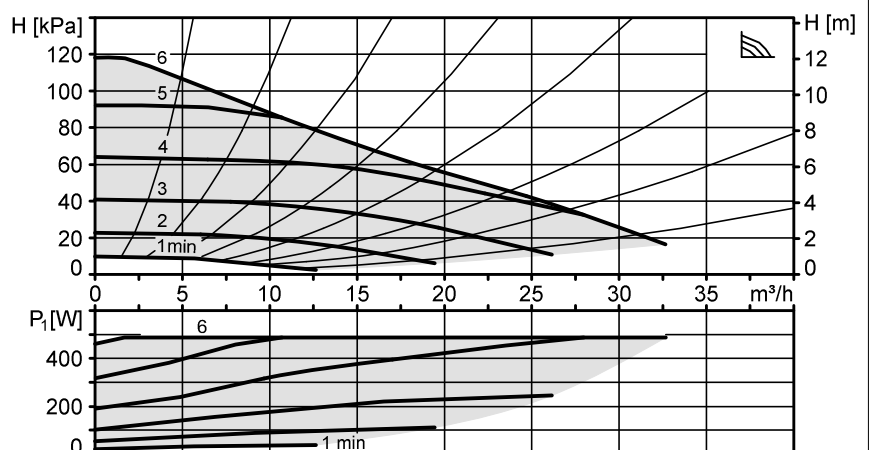
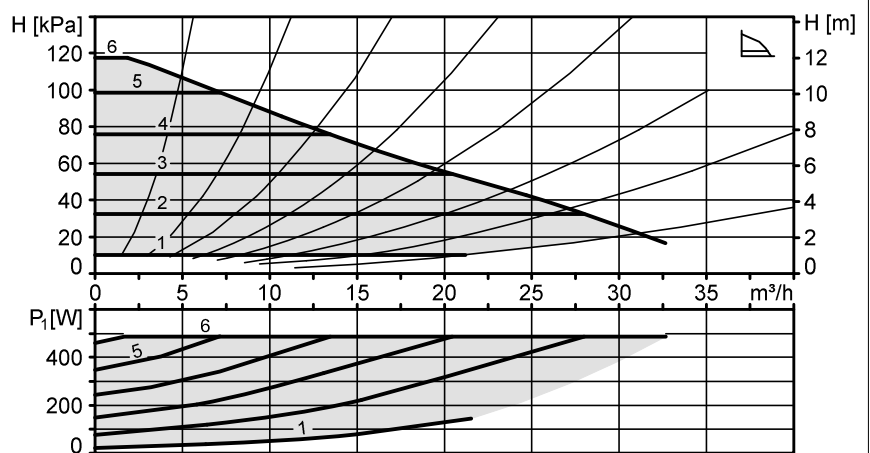
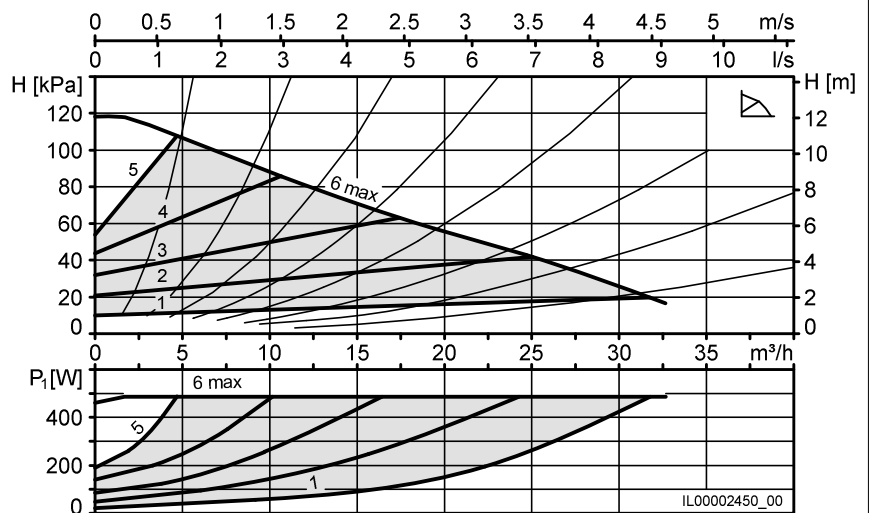
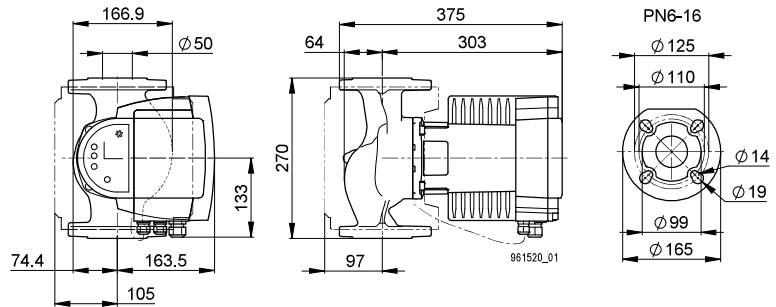
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 50-12 270 RED	7000000084





## Modula 50-18 270 RED

Version	T2 M
Nominal width	DN 50
Flow head H max.	18 m
Overall length	270 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	18.8 kg
Gross weight	22.5 kg

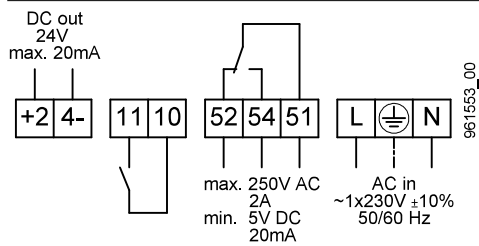
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power $P_1$	21-767 W
Nominal current	0.24-3.44 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.70 bar
at a water temp. of 95 °C	1.20 bar
at a water temp. of 110 °C	1.70 bar
for every $\pm 100$ m of altitude	$\pm 0.01$ bar

### Connction diagram



<b>+24-</b>	24 V DC out
<b>11, 10</b>	External OFF or external ON
<b>52, 54, 51</b>	Error or operating message
<b>L, N, PE</b>	Power supply

### Switch

- 1 Fault or operating message (switchable)
- 2 External OFF or external ON (switchable)
- 3 Power Limit (activatable)

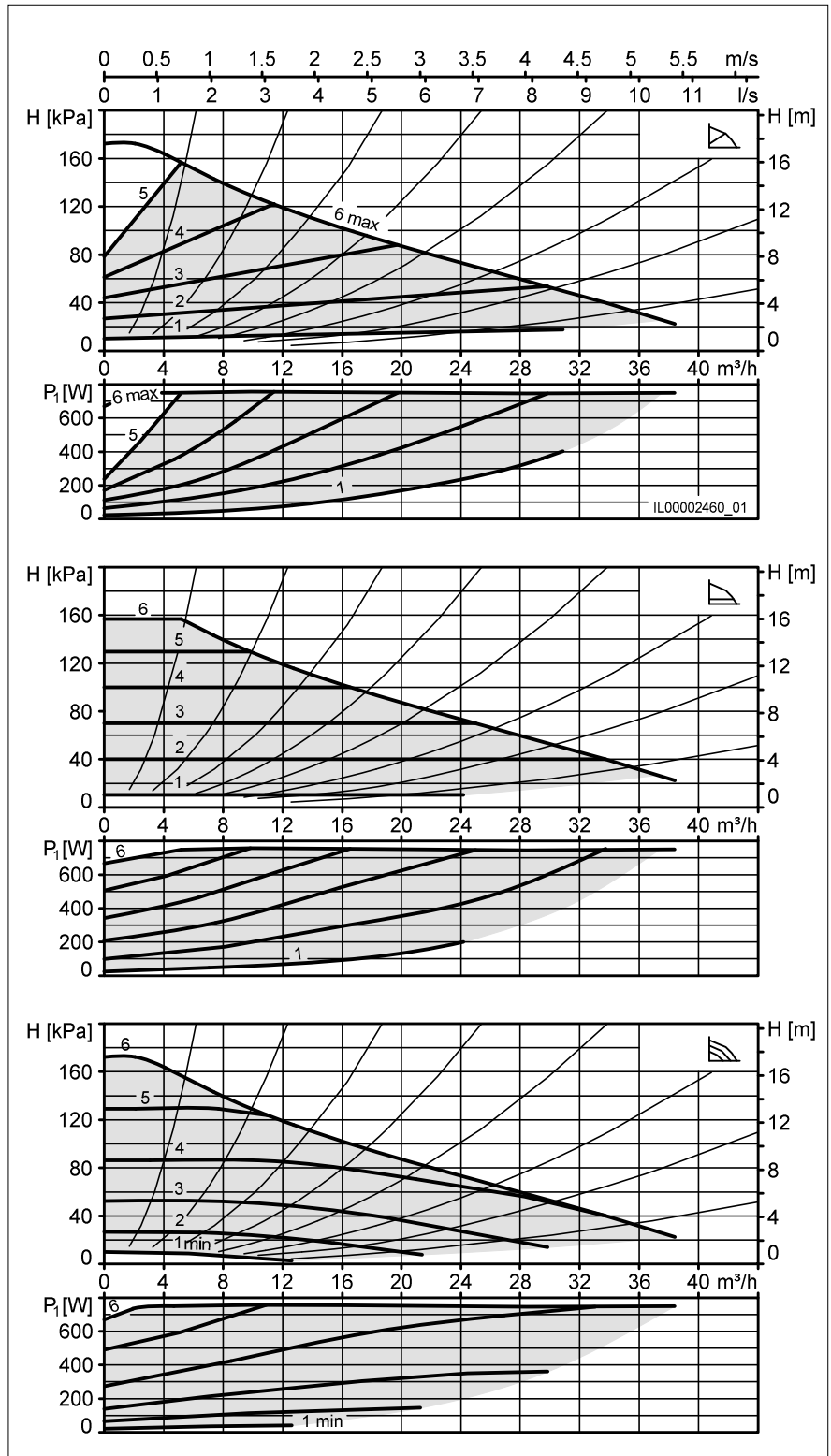
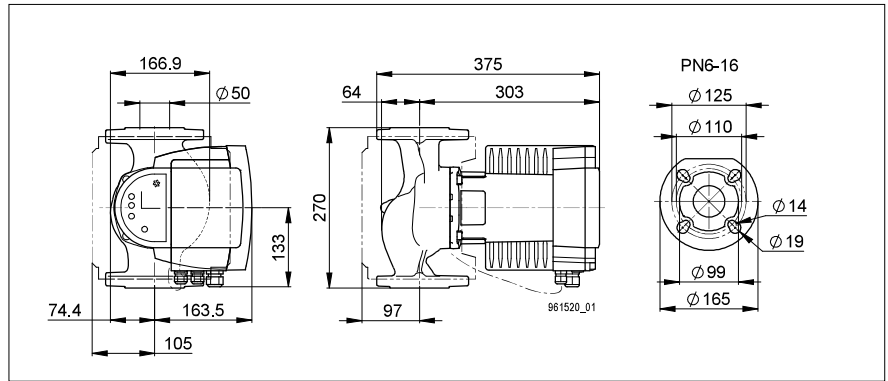
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 50-18 270 RED	7000000085



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## Modula 65-6 270 RED

Version	T2 M
Nominal width	DN 65
Flow head H max.	6 m
Overall length	270 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	20.6 kg
Gross weight	25.5 kg

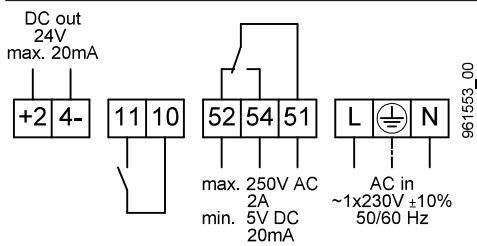
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power $P_1$	23-355 W
Nominal current	0.22-1.58 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.70 bar
at a water temp. of 95 °C	1.20 bar
at a water temp. of 110 °C	1.70 bar
for every $\pm 100$ m of altitude	$\pm 0.01$ bar

### Connction diagram



<b>+24-</b>	24 V DC out
<b>11, 10</b>	External OFF or external ON
<b>52, 54, 51</b>	Error or operating message
<b>L, N, PE</b>	Power supply

### Switch

- 1 Fault or operating message (switchable)
- 2 External OFF or external ON (switchable)
- 3 Power Limit (activatable)

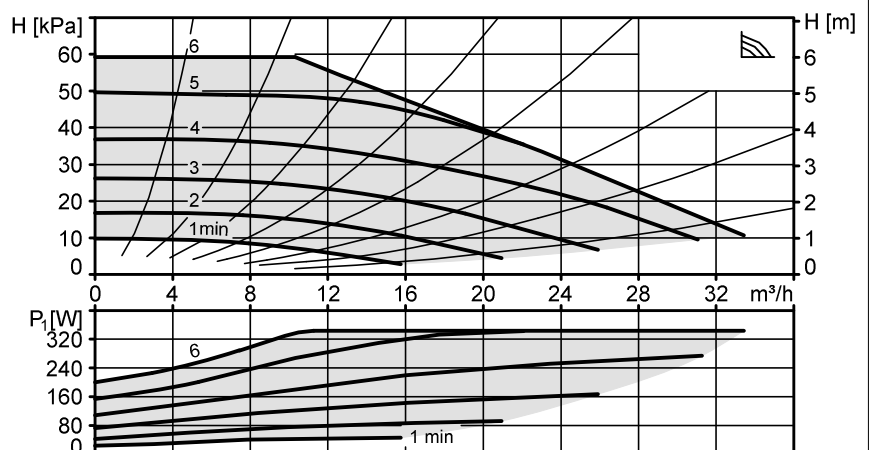
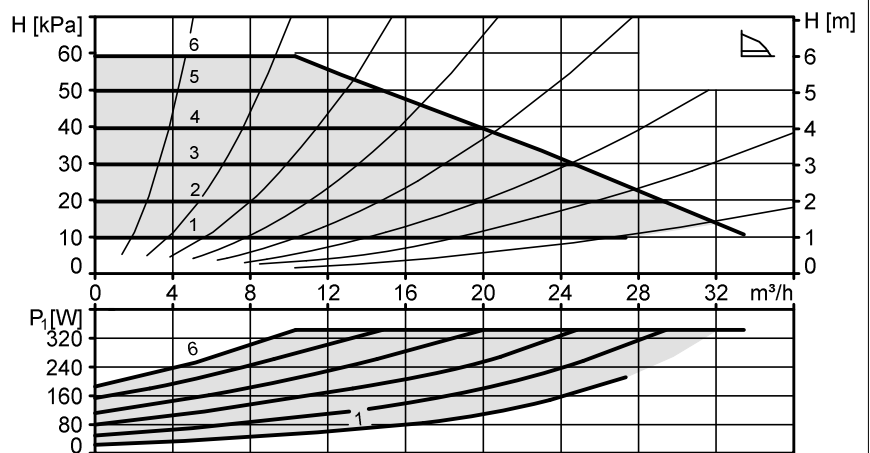
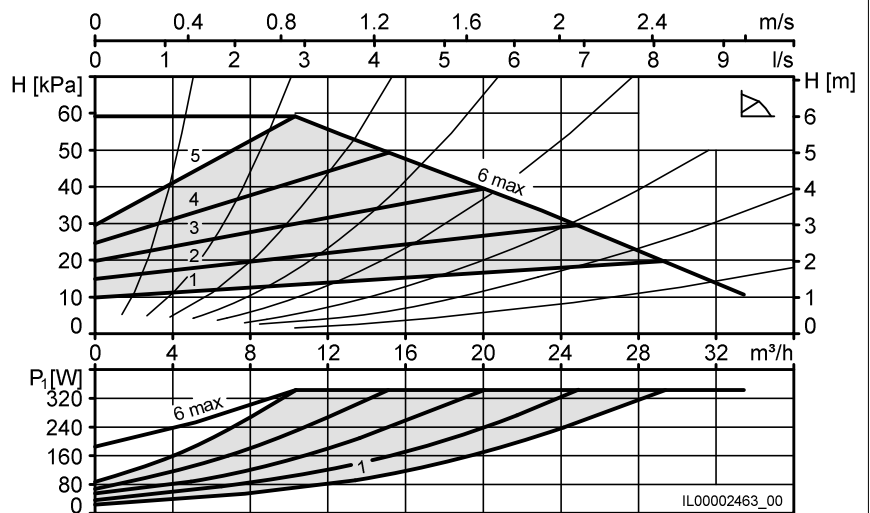
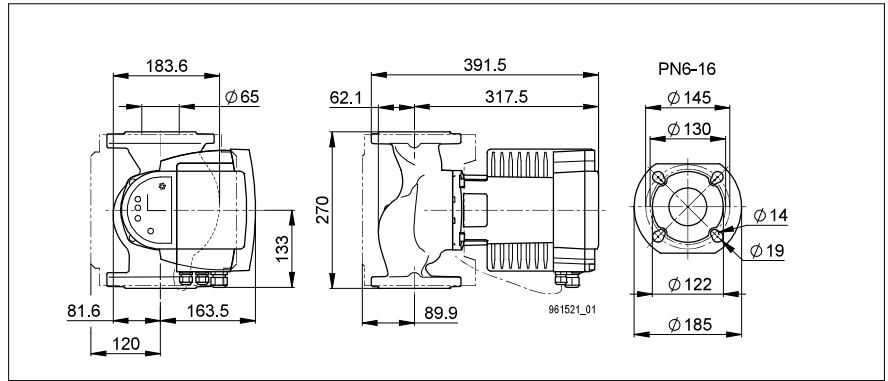
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 65-6 270 RED	7000000086



## Modula 65-8 270 RED

Version	T2 M
Nominal width	DN 65
Flow head H max.	8 m
Overall length	270 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	20.6 kg
Gross weight	25.5 kg

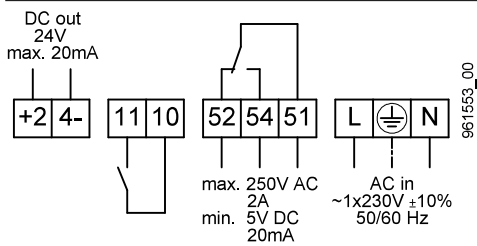
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	24-450 W
Nominal current	0.23-2.05 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.70 bar
at a water temp. of 95 °C	1.20 bar
at a water temp. of 110 °C	1.70 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

### Switch

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

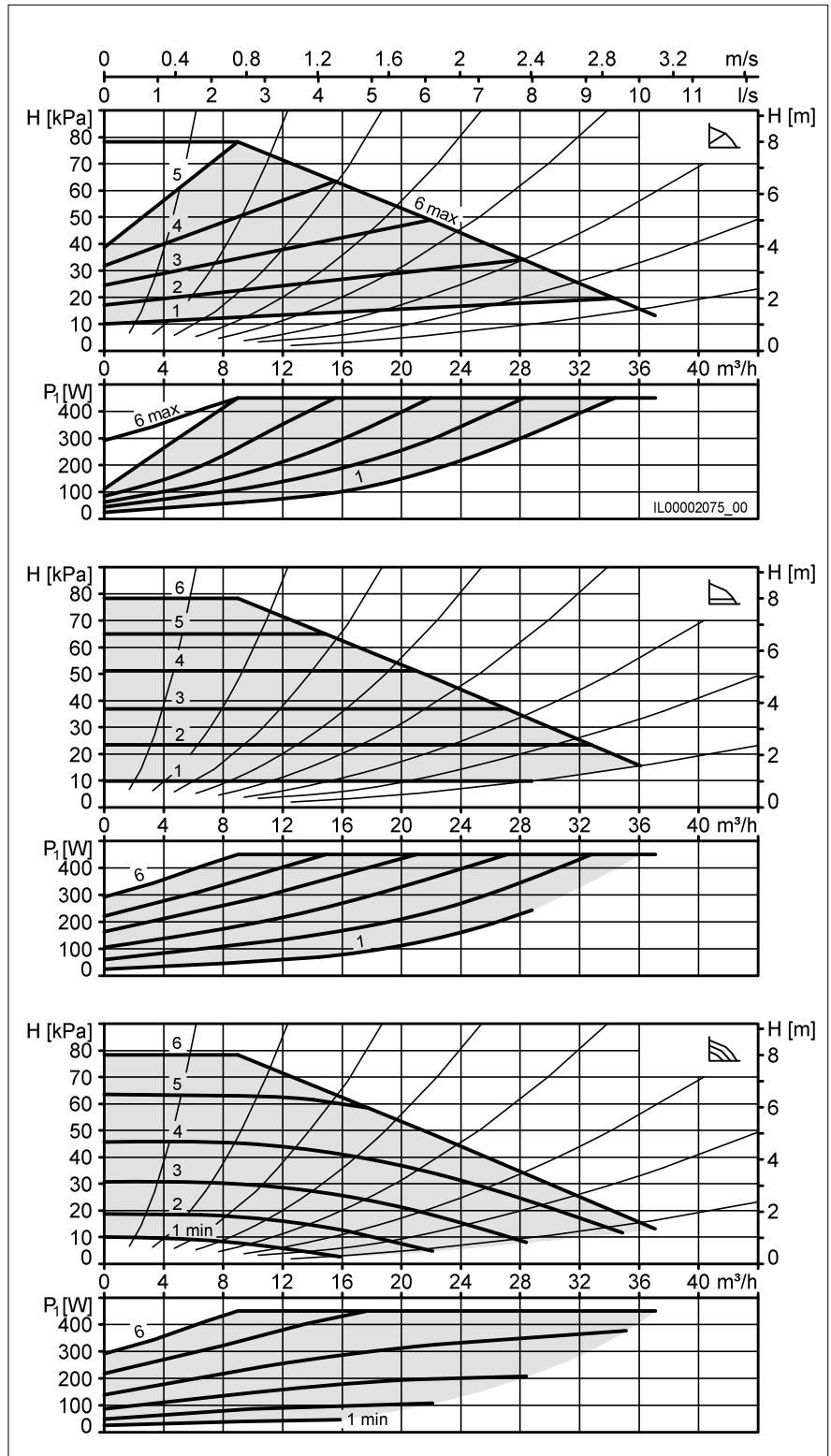
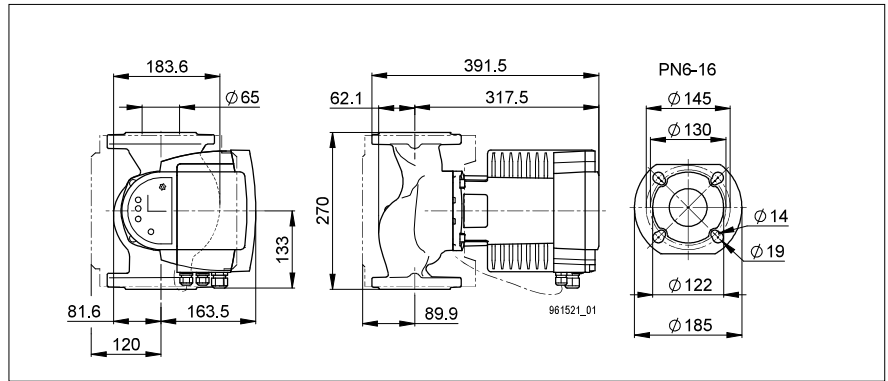
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 65-8 270 RED	7000000087



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## Modula 65-8 340 RED

Version	T2 M
Nominal width	DN 65
Flow head H max.	8 m
Overall length	340 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	21.5 kg
Gross weight	26 kg

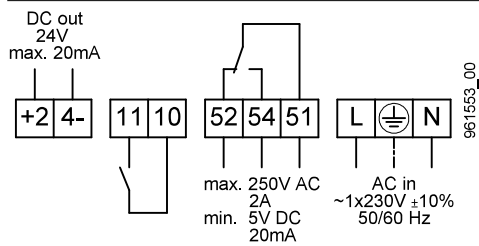
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	24-450 W
Nominal current	0.24-2.06 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.70 bar
at a water temp. of 95 °C	1.20 bar
at a water temp. of 110 °C	1.70 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

### Switch

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

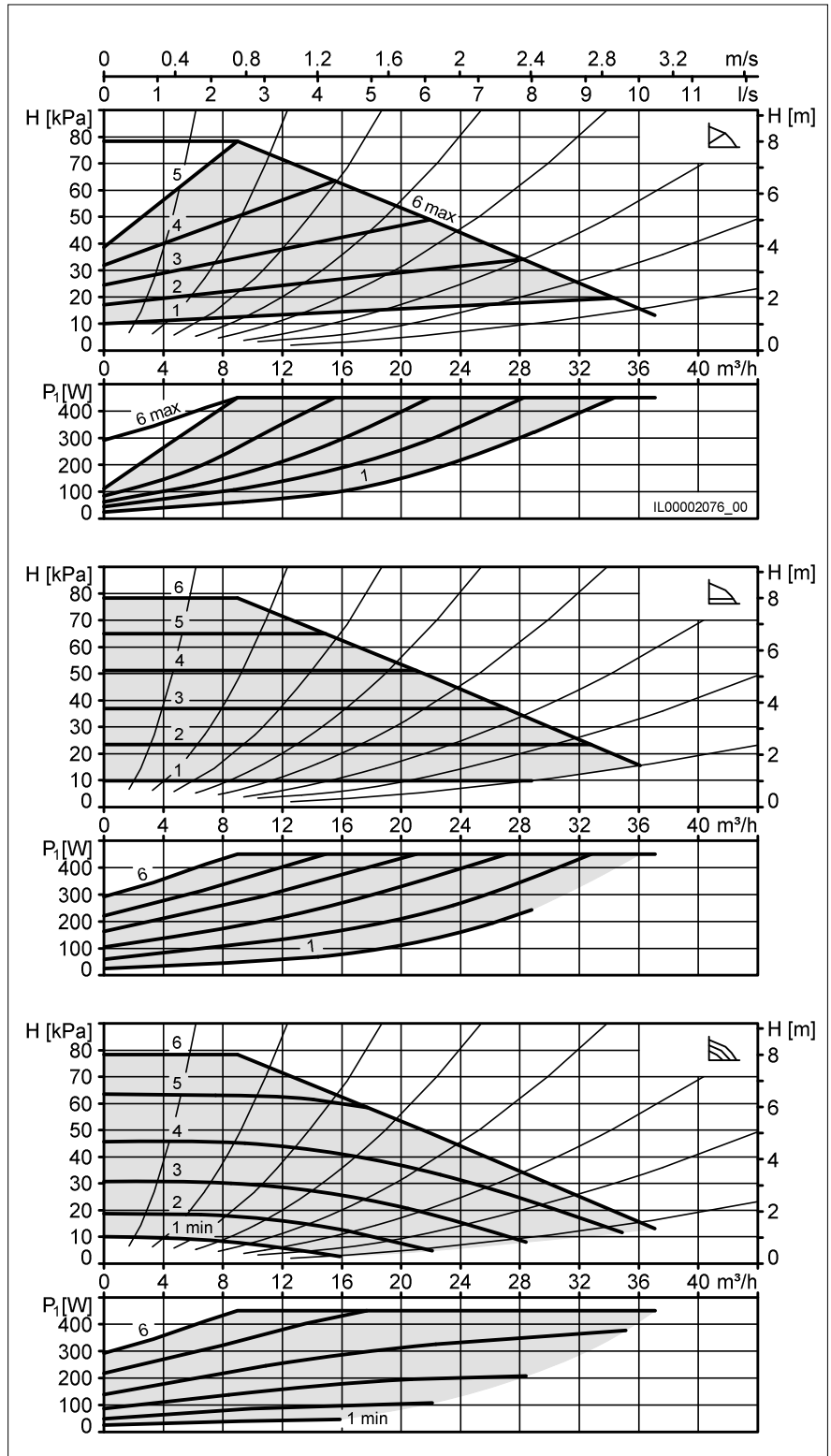
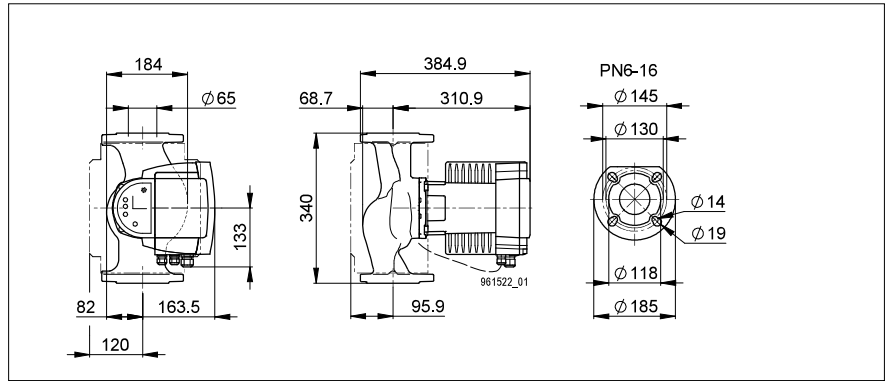
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 65-8 340 RED	7000000088



## Modula 65-12 340 RED

Version	T2 M
Nominal width	DN 65
Flow head H max.	12 m
Overall length	340 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	21.5 kg
Gross weight	26.5 kg

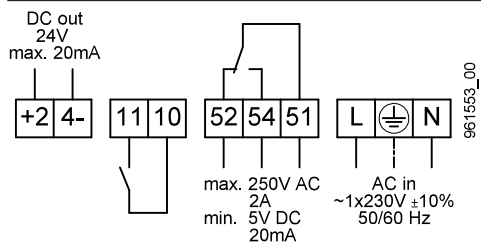
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	25-759 W
Nominal current	0.23-3.36 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.70 bar
at a water temp. of 95 °C	1.20 bar
at a water temp. of 110 °C	1.70 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

### Switch

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

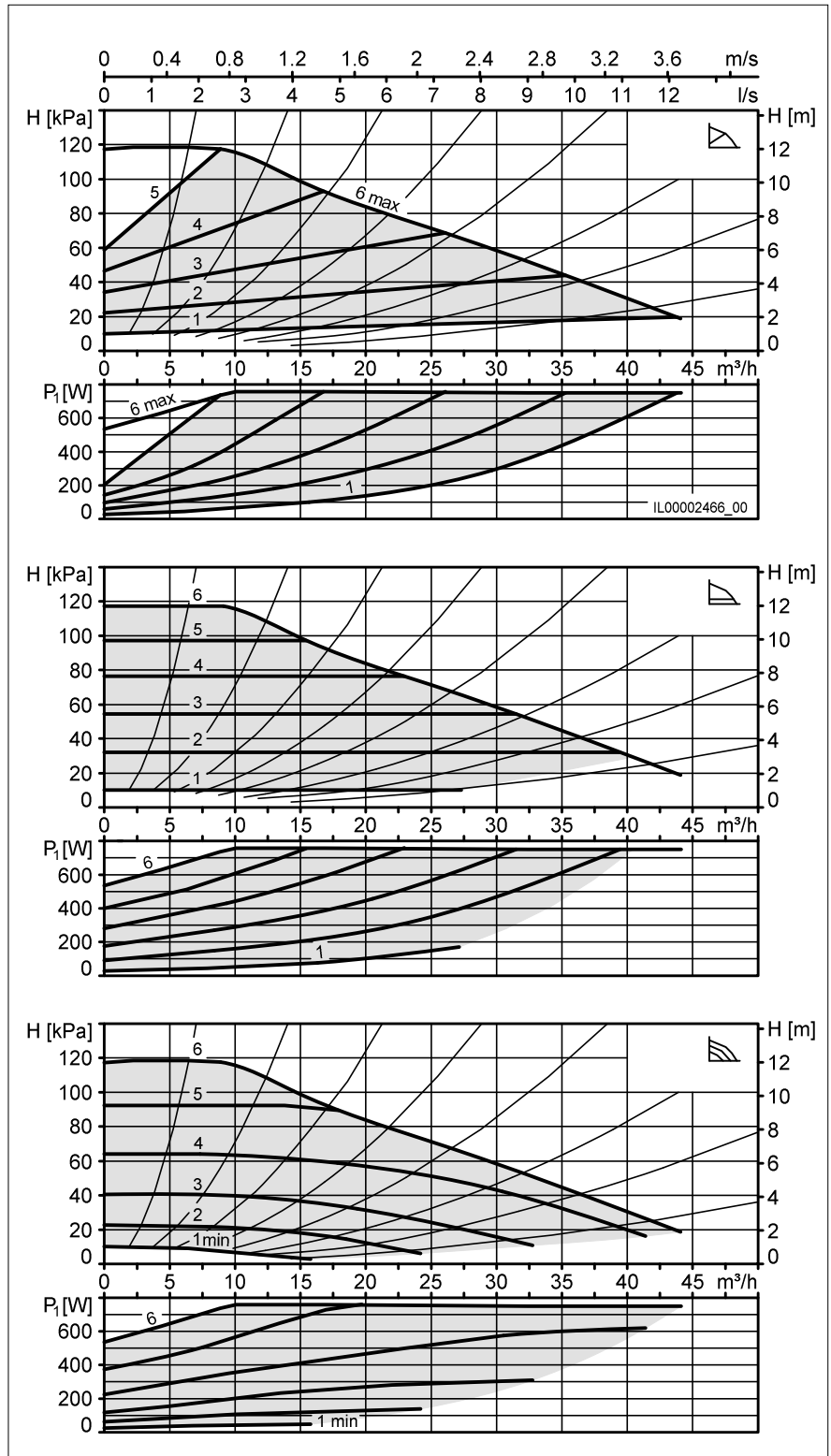
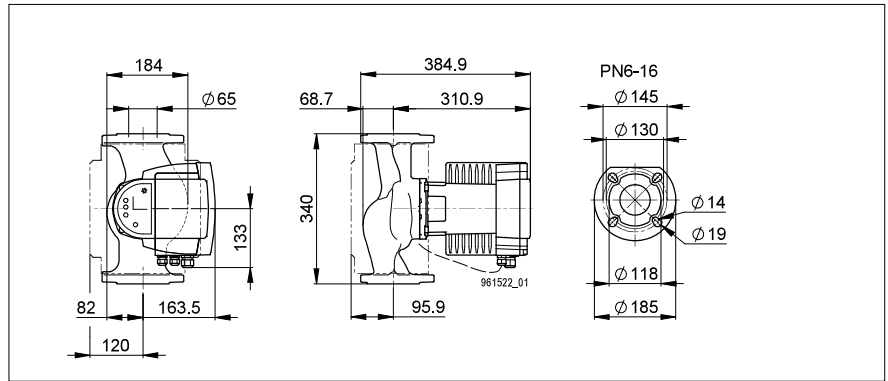
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics
- Seal kit for flanges PN10/PN16

<b>Type</b>	<b>Art. no.</b>
Modula 65-12 340 RED	7000000089



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## Modula 65-15 340 RED

Version	T2 L
Nominal width	DN 65
Flow head H max.	15 m
Overall length	340 mm
Flanged connection	PN 6-16
Operating pressure max.	16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	24.0 kg
Gross weight	29 kg

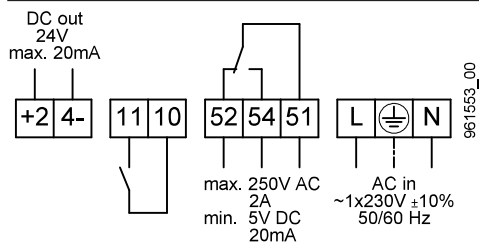
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	30-1343 W
Nominal current	0.27-6.08 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.70 bar
at a water temp. of 95 °C	1.20 bar
at a water temp. of 110 °C	1.70 bar
for every ±100 m of altitude	±0.01 bar

### Connction diagram



<b>+24-</b>	24 V DC out
<b>11, 10</b>	External OFF or external ON
<b>52, 54, 51</b>	Error or operating message
<b>L, N, PE</b>	Power supply

### Switch

- 1 Fault or operating message (switchable)
- 2 External OFF or external ON (switchable)
- 3 Power Limit (activatable)

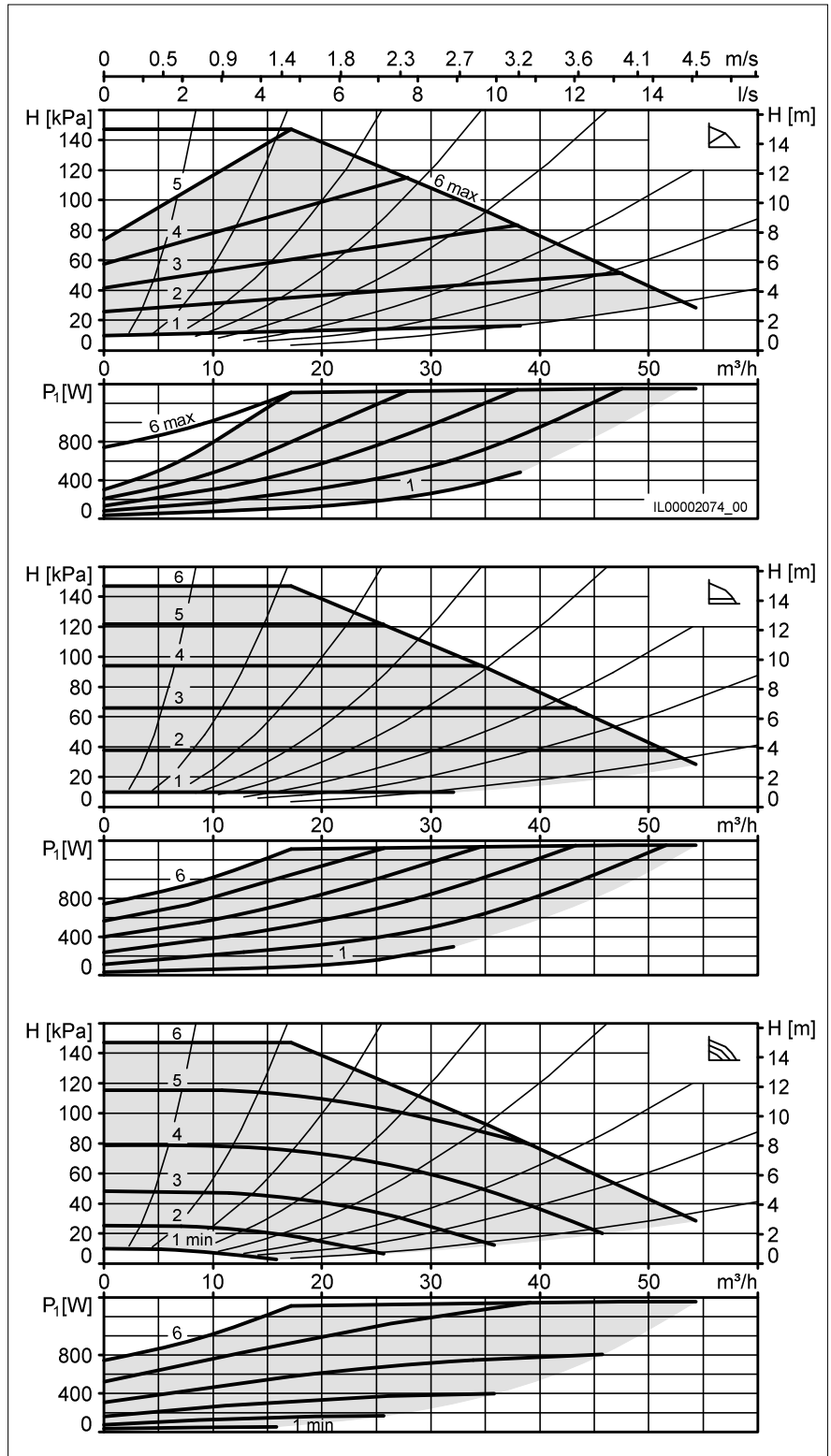
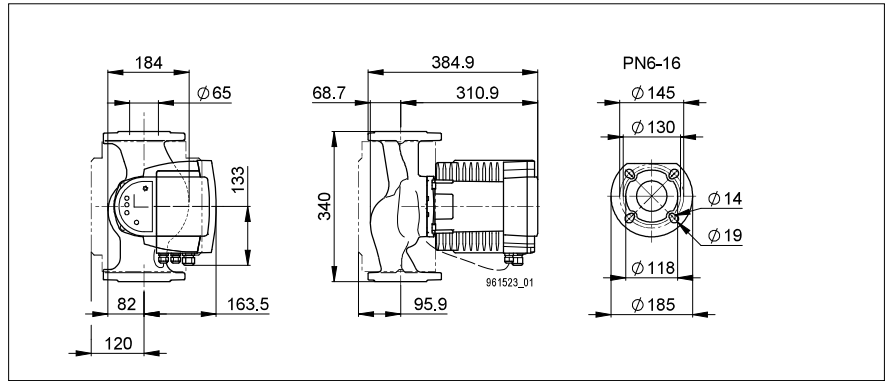
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics
- Seal kit for flanges PN10/PN16
- Seal kit for flanges PN6

<b>Type</b>	Modula 65-15 340 RED	<b>Art. no.</b>	7000000054
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### ModulA 80-8 360 RED PN6

### ModulA 80-8 360 RED PN10/16

Version	T2 M
Nominal width	DN 80
Flow head H max.	8 m
Overall length	360 mm
Flanged connection	PN 6   PN 10/16
Operating pressure max.	6   16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	29.1 kg
Gross weight	34.1   35 kg

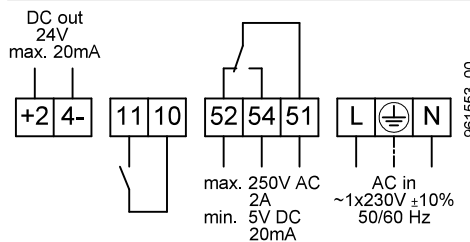
#### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	25-685 W
Nominal current	0.24-3.09 A
Motor protection	integrated

#### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.50 bar
at a water temp. of 95 °C	1.00 bar
at a water temp. of 110 °C	1.50 bar
for every ±100 m of altitude	±0.01 bar

#### Connection diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

#### Switch

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

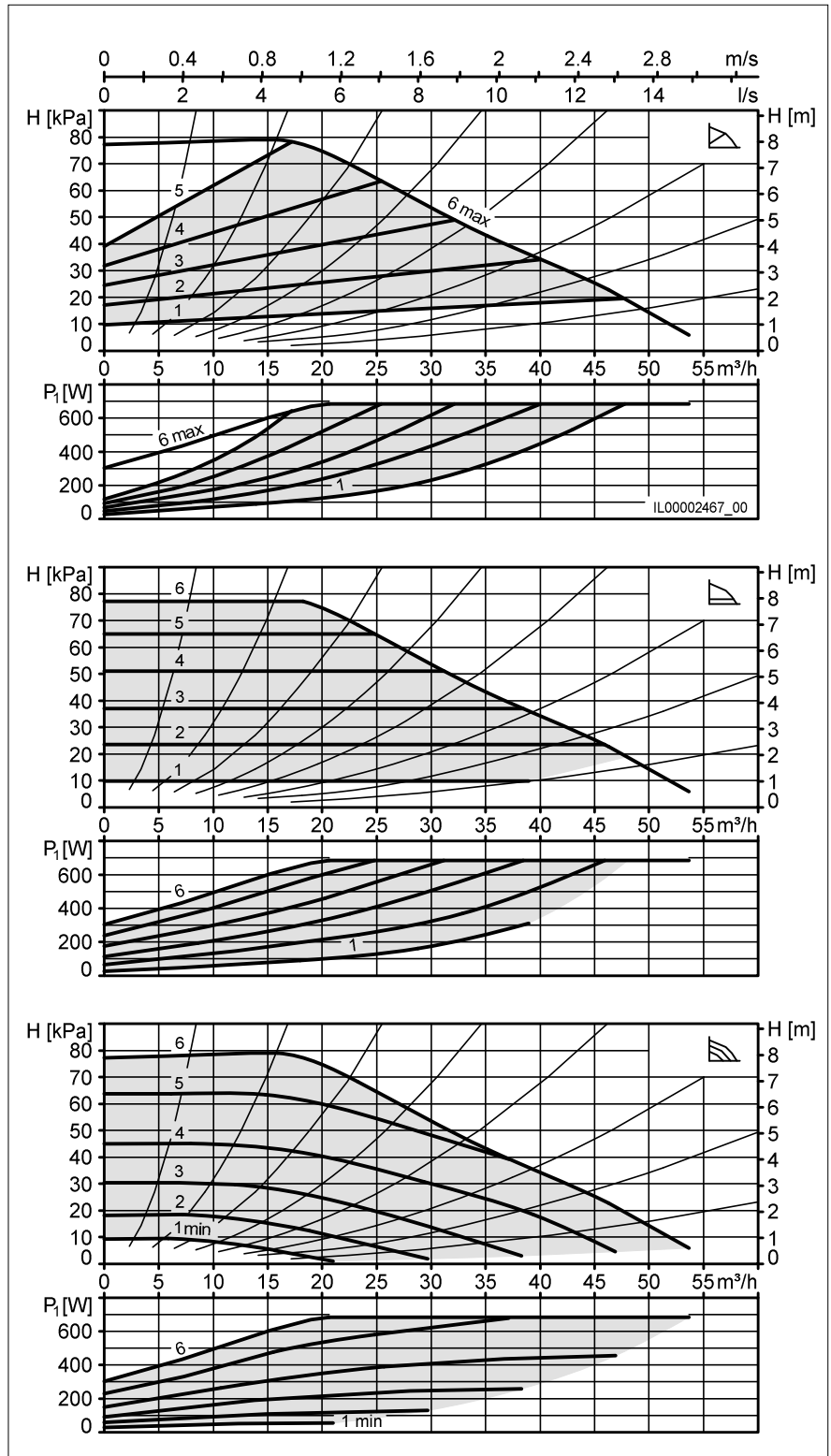
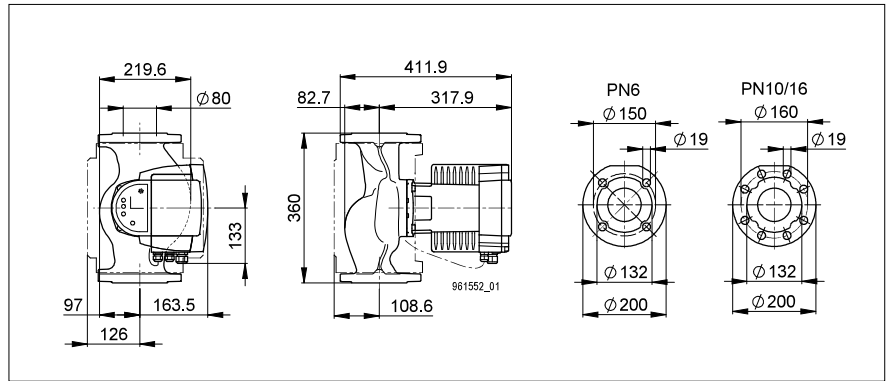
#### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6 or PN 10/16

#### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics

Type	Art. no.
ModulA 80-8 360 RED PN6	7000000090
ModulA 80-8 360 RED PN10/16	7000000091

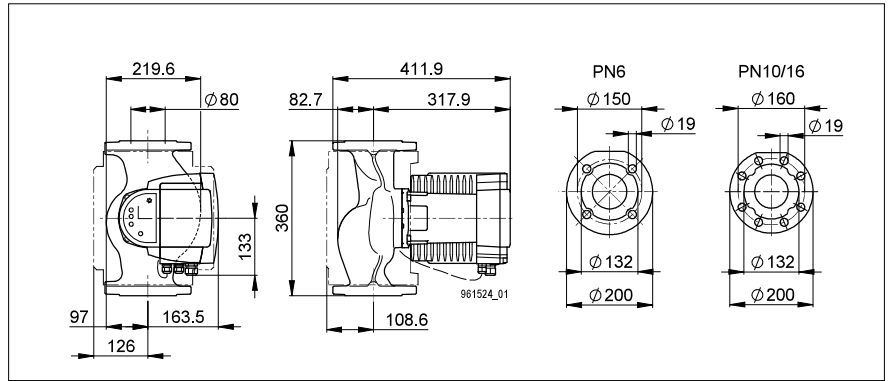


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## ModulA 80-12 360 RED PN6

## ModulA 80-12 360 RED PN10/16

Version	T2 L
Nominal width	DN 80
Flow head H max.	12 m
Overall length	360 mm
Flanged connection	PN 6   PN 10/16
Operating pressure max.	6   16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	29.1 kg
Gross weight	34 kg



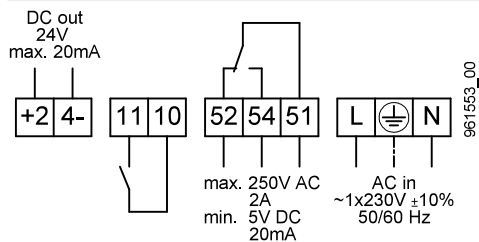
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	30-1476 W
Nominal current	0.27-6.63 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.50 bar
at a water temp. of 95 °C	1.00 bar
at a water temp. of 110 °C	1.50 bar
for every ±100 m of altitude	±0.01 bar

### Connection diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

### Switch

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

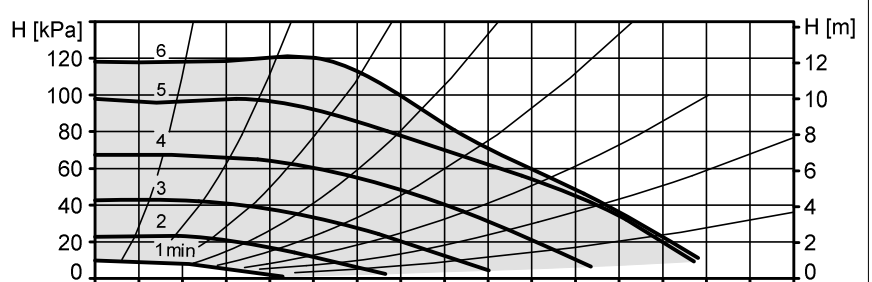
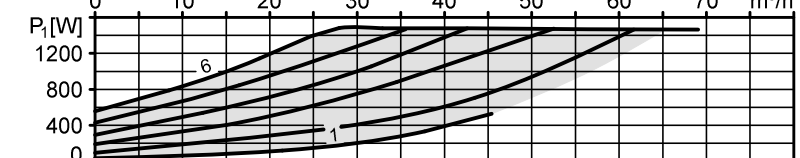
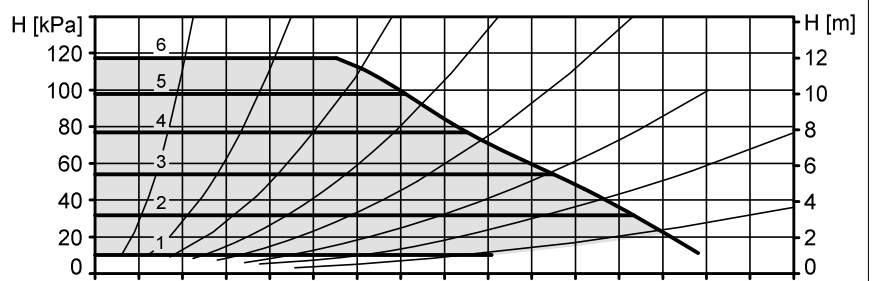
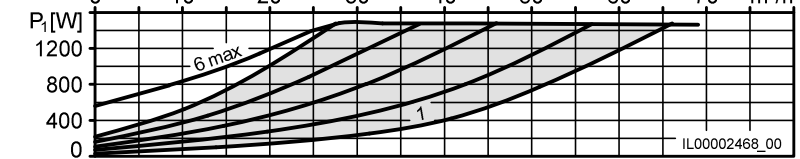
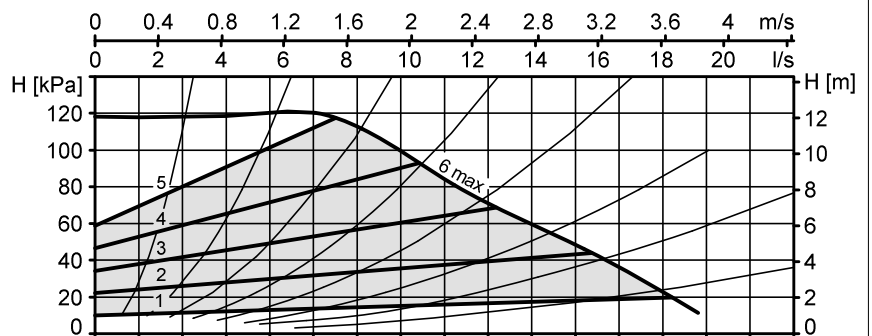
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6 or PN 10/16

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics

Type	Art. no.
ModulA 80-12 360 RED PN6	7000000092
ModulA 80-12 360 RED PN10/16	7000000093





### ModulA 100-8 450 RED PN6

### ModulA 100-8 450 RED PN10/16

Version	T2 L
Nominal width	DN 100
Flow head H max.	8 m
Overall length	450 mm
Flanged connection	PN 6   PN 10/16
Operating pressure max.	6   16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	34.0 kg
Gross weight	34 kg

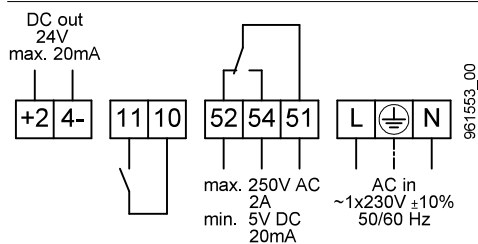
#### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	30-1082 W
Nominal current	0.28-4.85 A
Motor protection	integrated

#### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.70 bar
at a water temp. of 95 °C	1.20 bar
at a water temp. of 110 °C	1.70 bar
for every ±100 m of altitude	±0.01 bar

#### Connection diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

#### Switch

- 1** Fault or operating message (switchable)
- 2** External OFF or external ON (switchable)
- 3** Power Limit (activatable)

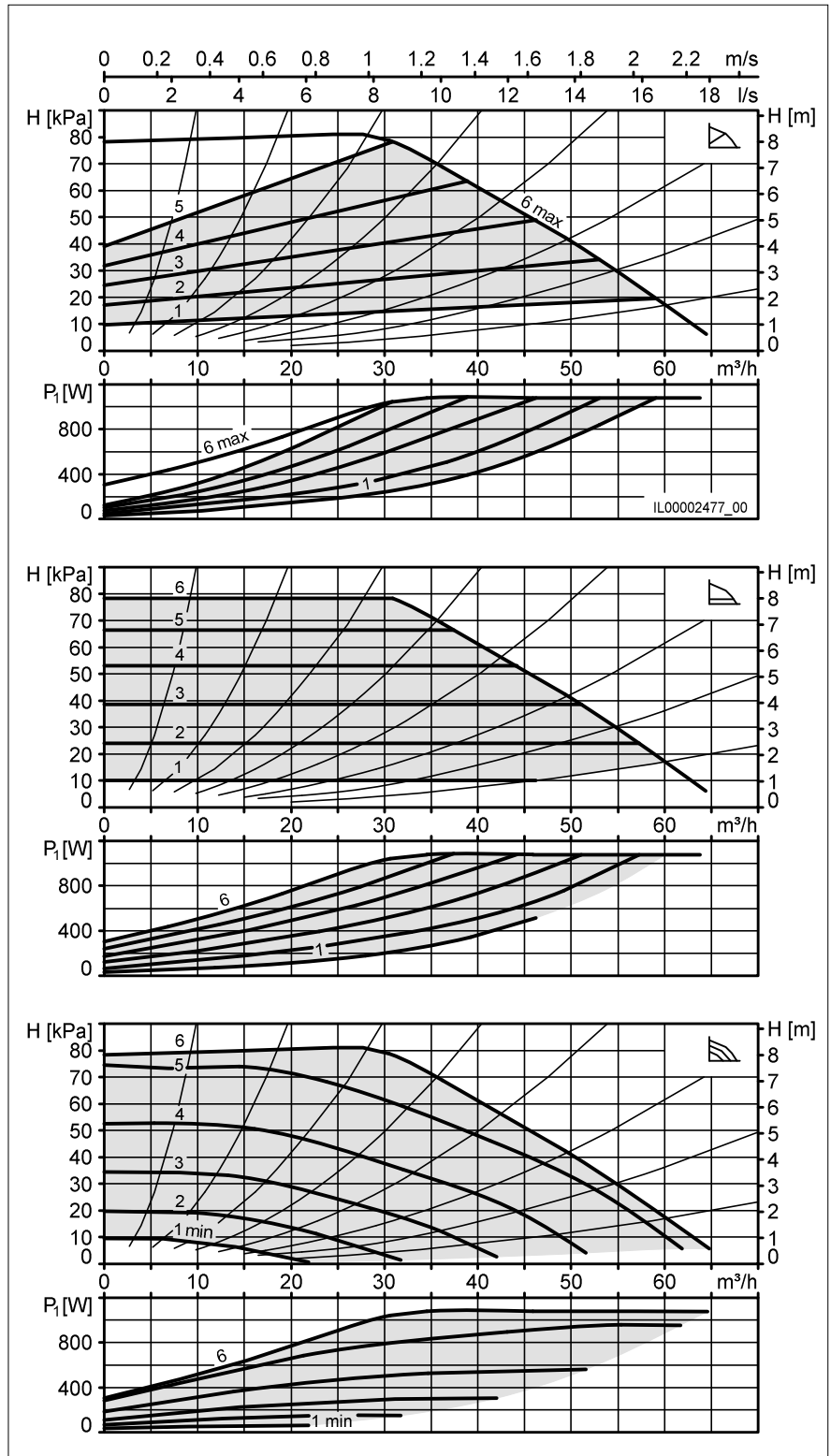
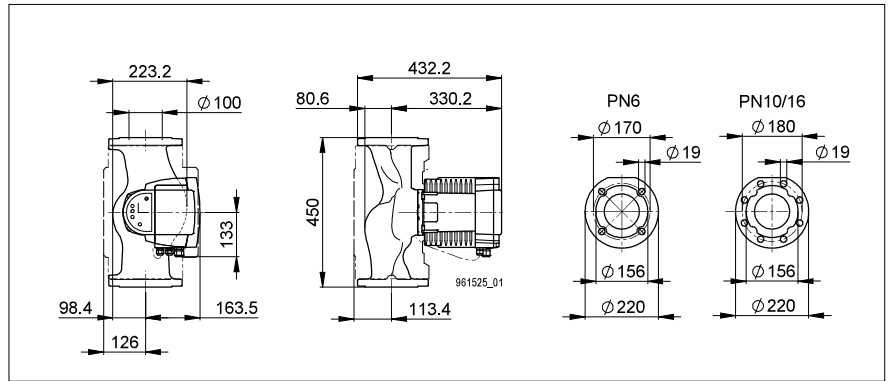
#### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6 or PN 10/16

#### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics

Type	Art. no.
ModulA 100-8 450 RED PN6	7000000094
ModulA 100-8 450 RED PN10/16	7000000095

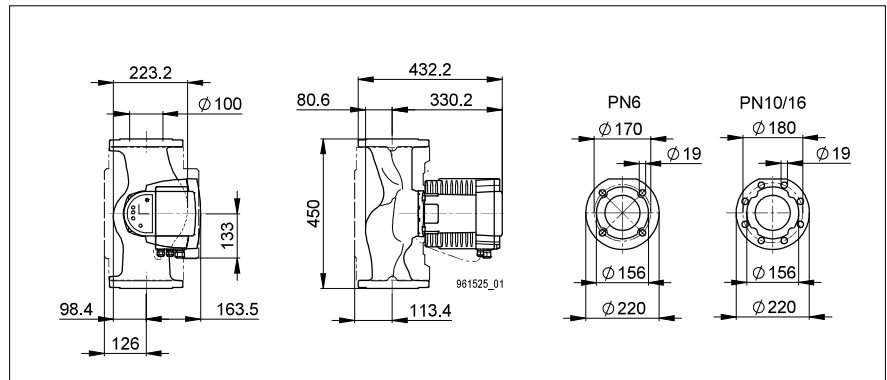


Heizung

## ModulA 100-12 450 RED PN6

## ModulA 100-12 450 RED PN10/16

Version	T2 L
Nominal width	DN 100
Flow head H max.	12 m
Overall length	450 mm
Flanged connection	PN 6   PN 10/16
Operating pressure max.	6   16 bar
Media temperature min.	+15°C
Media temperature max.	+110°C
Ambient temperature	0°C to 40°C
Net weight	34.0 kg
Gross weight	39 kg



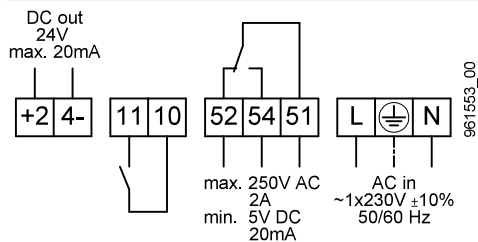
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power $P_1$	30-1551 W
Nominal current	0.28-6.81 A
Motor protection	integrated

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.70 bar
at a water temp. of 95 °C	1.20 bar
at a water temp. of 110 °C	1.70 bar
for every ±100 m of altitude	±0.01 bar

### Connection diagram



- +24-** 24 V DC out
- 11, 10** External OFF or external ON
- 52, 54, 51** Error or operating message
- L, N, PE** Power supply

### Switch

- 1 Fault or operating message (switchable)
- 2 External OFF or external ON (switchable)
- 3 Power Limit (activatable)

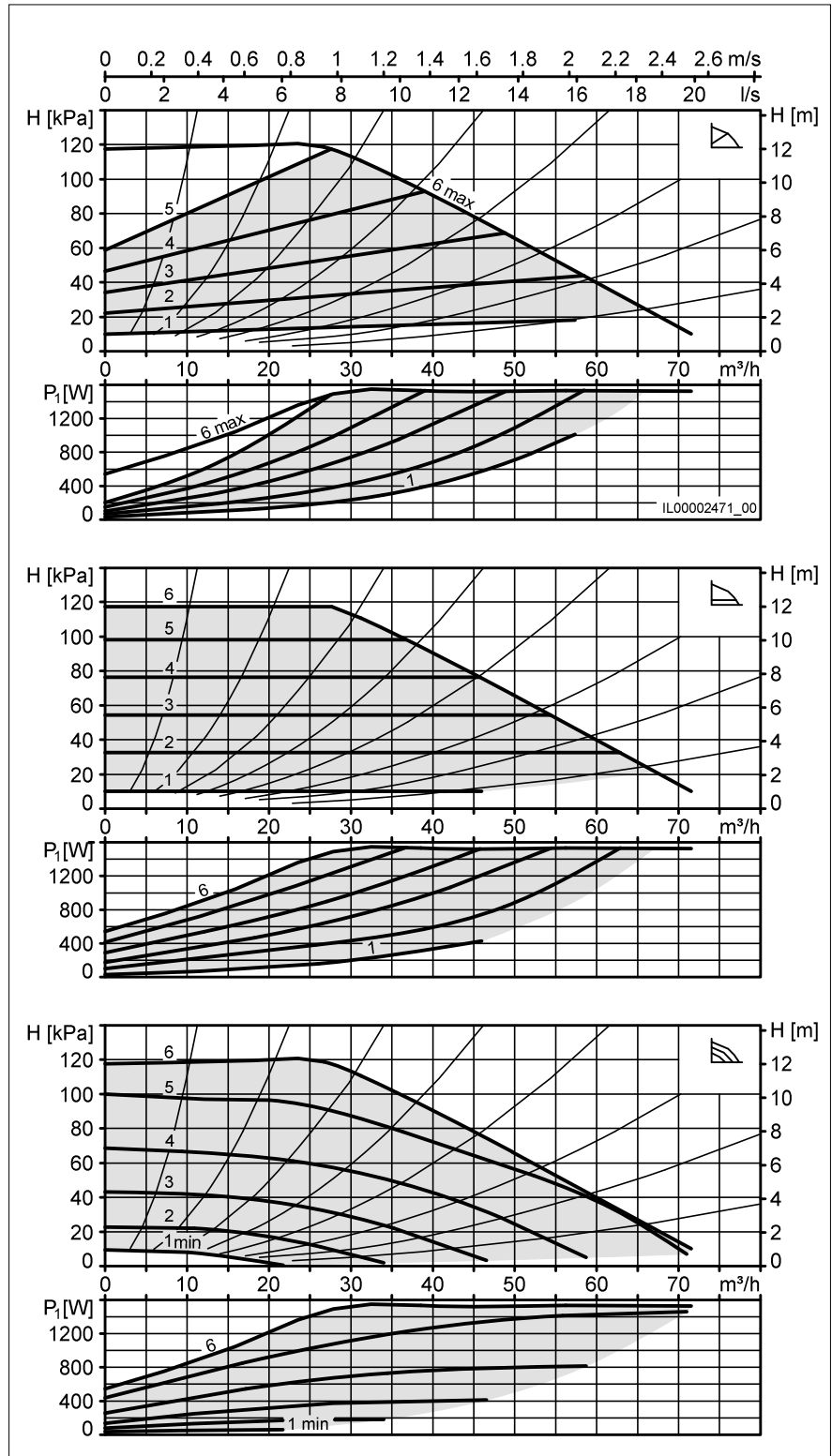
### Included in the scope of delivery

- Heat insulation shell
- Sealing set for flange PN 6 or PN 10/16

### Accessories

- Biral Interface Modules
- Set for recessed installation of electronics

Type	Art. no.
ModulA 100-12 450 RED PN6	7000000096
ModulA 100-12 450 RED PN10/16	7000000097





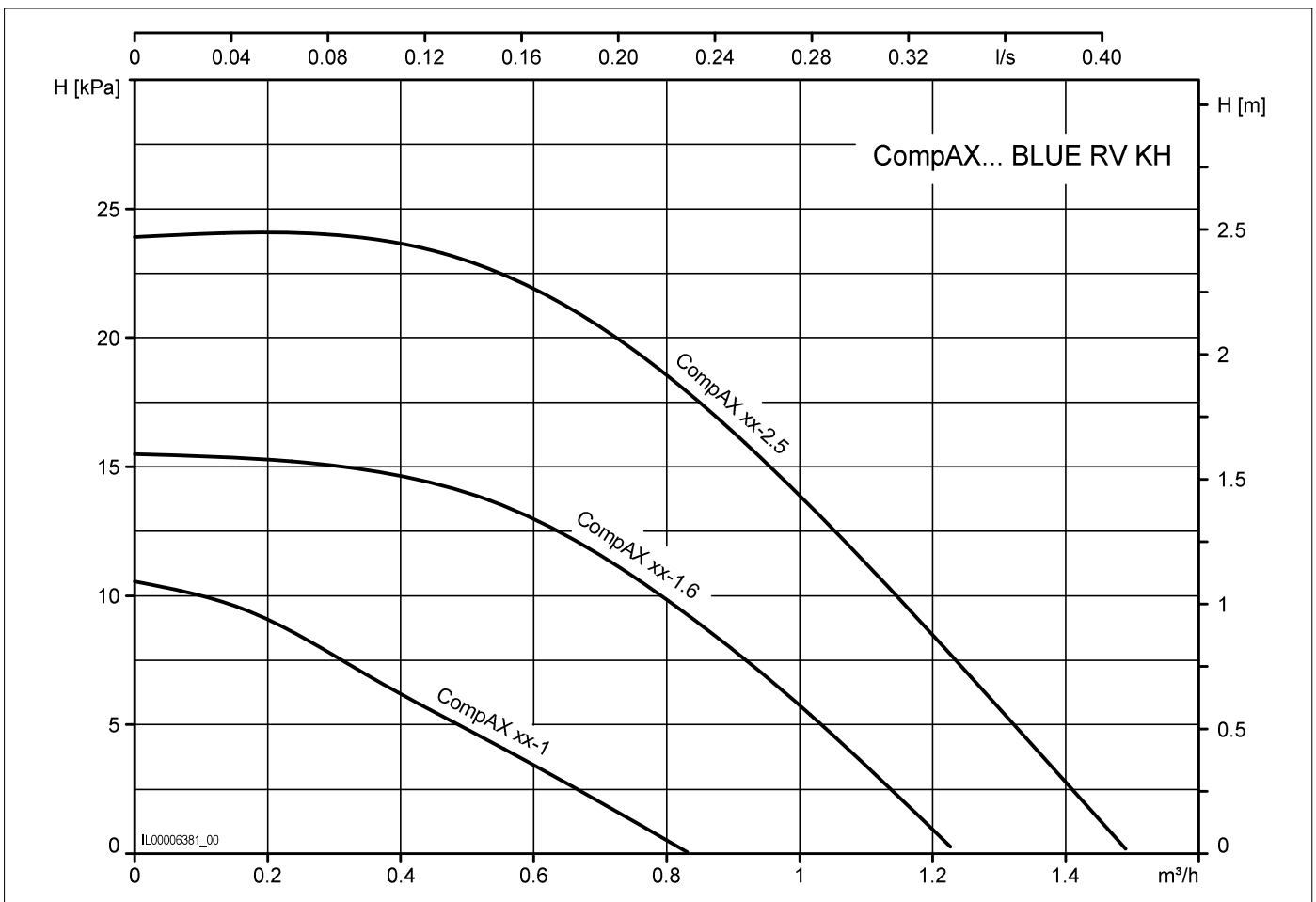
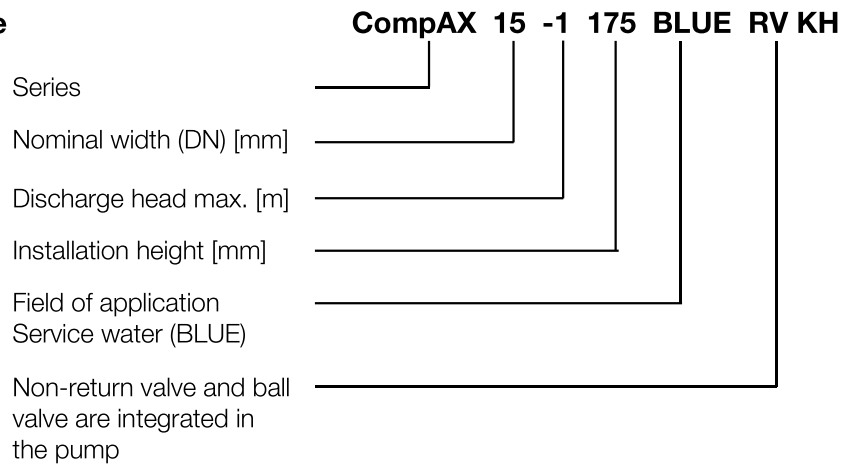
## Domestic hot water pumps

### CompAX BLUE RV KH

#### Übersicht

Type	Art. no.	Nominal width	Flow head H max.	Overall length	Threaded connection	Operating pressure max. bar	EEI
		DN	m	mm			
CompAX 15-1 175 BLUE RV KH	7000001518	15	1	175	G 3/4"	10	ECO Design
CompAX 15-1.6 175 BLUE RV KH	7000001519	15	1.6	175	G 3/4"	10	ECO Design
CompAX 15-2.5 175 BLUE RV KH	7000001520	15	2.5	175	G 3/4"	10	ECO Design

### Ordering reference



Brauchwasser

## CompAX 15-1 175 BLUE RV KH

Nominal width	DN 15
Flow head H max.	1 m
Overall length	175 mm
Threaded connection	G 3/4"
Operating pressure max.	10 bar
Media temperature min.	+ 2°C
Media temperature max.	+85°C
Ambient temperature	0°C bis 40°C
Water hardness max. at 65 °C	35°fH/20°dH
Water hardness max. at 85 °C	25°fH/14°dH
Net weight	2.0 kg
Gross weight	2.2 kg

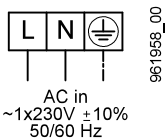
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	3-5 W
Nominal current	0.04-0.05 A
Motor protection	integriert

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.05 bar
at a water temp. of 85 °C	0.28 bar
for every ±100 m of altitude	0.01 bar

### Connction diagram



L, N, PE Netzanschluss

### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

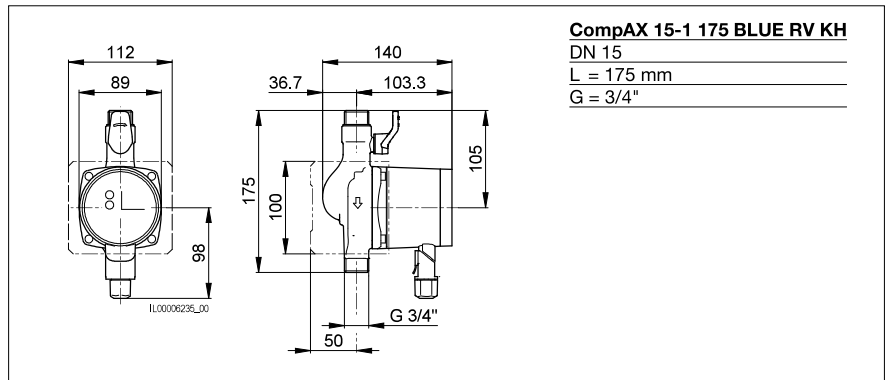
### Accessories

- Angle plug

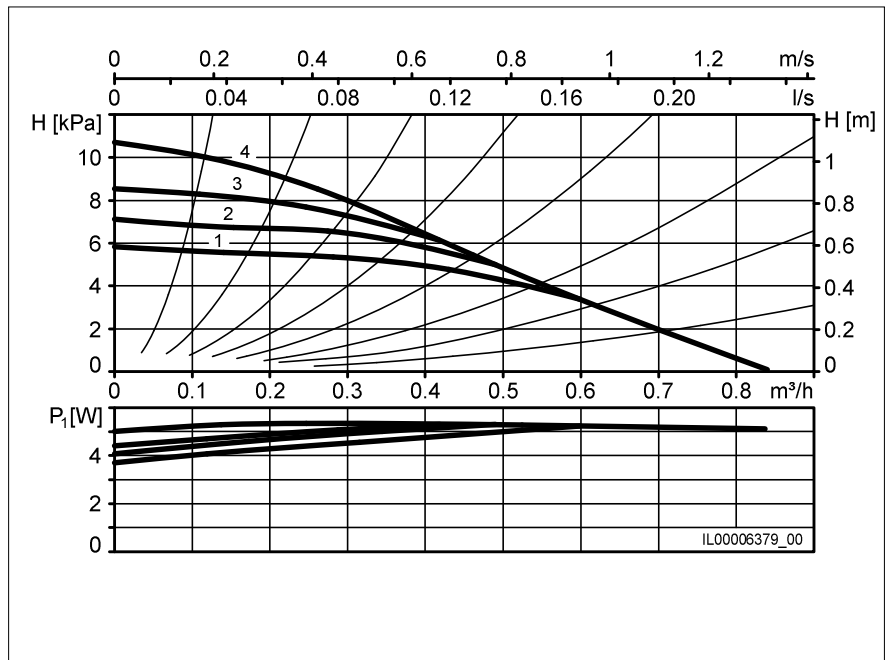
### Remarks

Pump housing: bronze  
Non-return valve and ball valve are integrated in the pump

<b>Type</b>	<b>Art. no.</b>
CompAX 15-1 175 BLUE RV KH	7000001518



**CompAX 15-1 175 BLUE RV KH**  
DN 15  
L = 175 mm  
G = 3/4"



## CompAX 15-1.6 175 BLUE RV KH

Nominal width	DN 15
Flow head H max.	1.6 m
Overall length	175 mm
Threaded connection	G 3/4"
Operating pressure max.	10 bar
Media temperature min.	+ 2°C
Media temperature max.	+85°C
Ambient temperature	0°C bis 40°C
Water hardness max. at 65 °C	35°fH/20°dH
Water hardness max. at 85 °C	25°fH/14°dH
Net weight	2.0 kg
Gross weight	2.2 kg

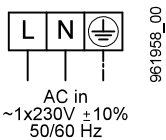
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	4-9 W
Nominal current	0.04-0.08 A
Motor protection	integriert

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.05 bar
at a water temp. of 85 °C	0.28 bar
for every ±100 m of altitude	0.01 bar

### Connction diagram



L, N, PE Netzanschluss

### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

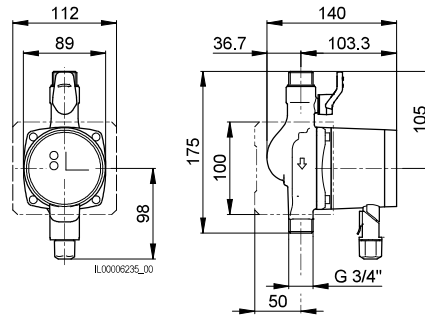
### Accessories

- Angle plug

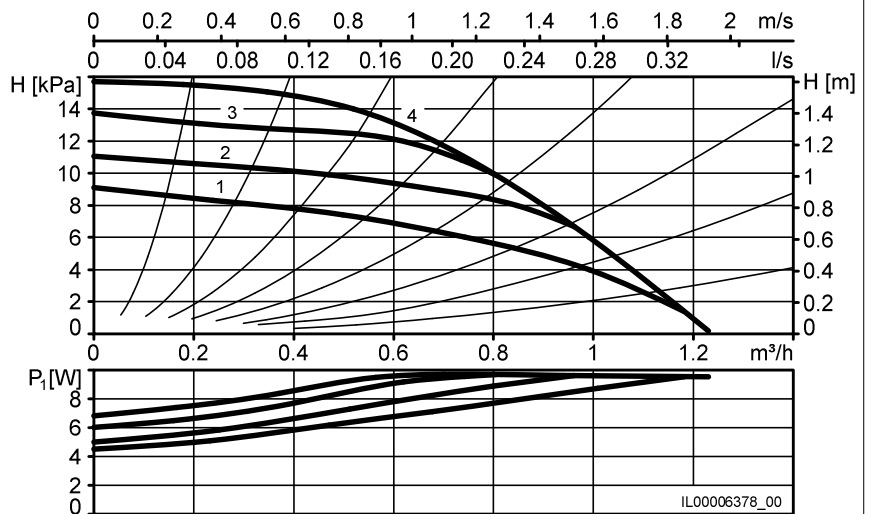
### Remarks

Pump housing: bronze  
Non-return valve and ball valve are integrated in the pump

<b>Type</b>	<b>Art. no.</b>
CompAX 15-1.6 175 BLUE RV KH	7000001519



**CompAX 15-1.6 175 BLUE RV KH**  
DN 15  
L = 175 mm  
G = 3/4"



## CompAX 15-2.5 175 BLUE RV KH

Nominal width	DN 15
Flow head H max.	2.5 m
Overall length	175 mm
Threaded connection	G 3/4"
Operating pressure max.	10 bar
Media temperature min.	+ 2°C
Media temperature max.	+85°C
Ambient temperature	0°C bis 40°C
Water hardness max. at 65 °C	35°fH/20°dH
Water hardness max. at 85 °C	25°fH/14°dH
Net weight	2.0 kg
Gross weight	2.2 kg

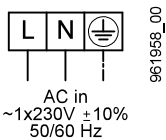
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	4-14 W
Nominal current	0.05-0.13 A
Motor protection	integriert

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.05 bar
at a water temp. of 85 °C	0.28 bar
for every ±100 m of altitude	0.01 bar

### Connction diagram



L, N, PE Netzanschluss

### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

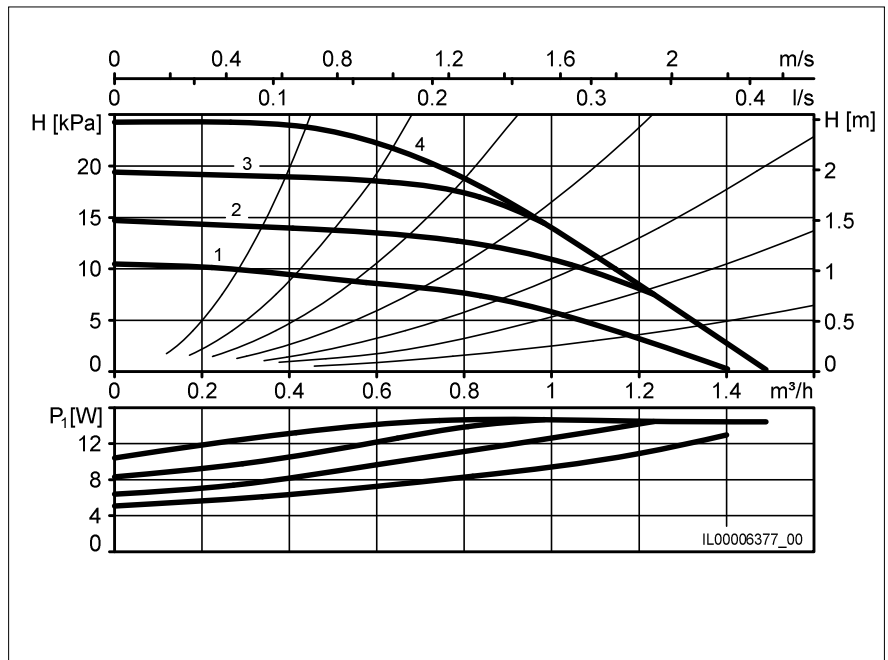
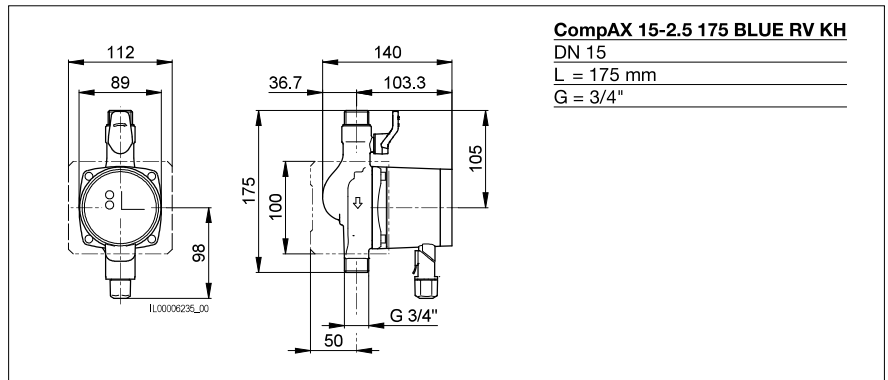
### Accessories

- Angle plug

### Remarks

Pump housing: bronze  
Non-return valve and ball valve are integrated in the pump

<b>Type</b>	<b>Art. no.</b>
CompAX 15-2.5 175 BLUE RV KH	7000001520







## Domestic hot water pumps

### CompAX BLUE

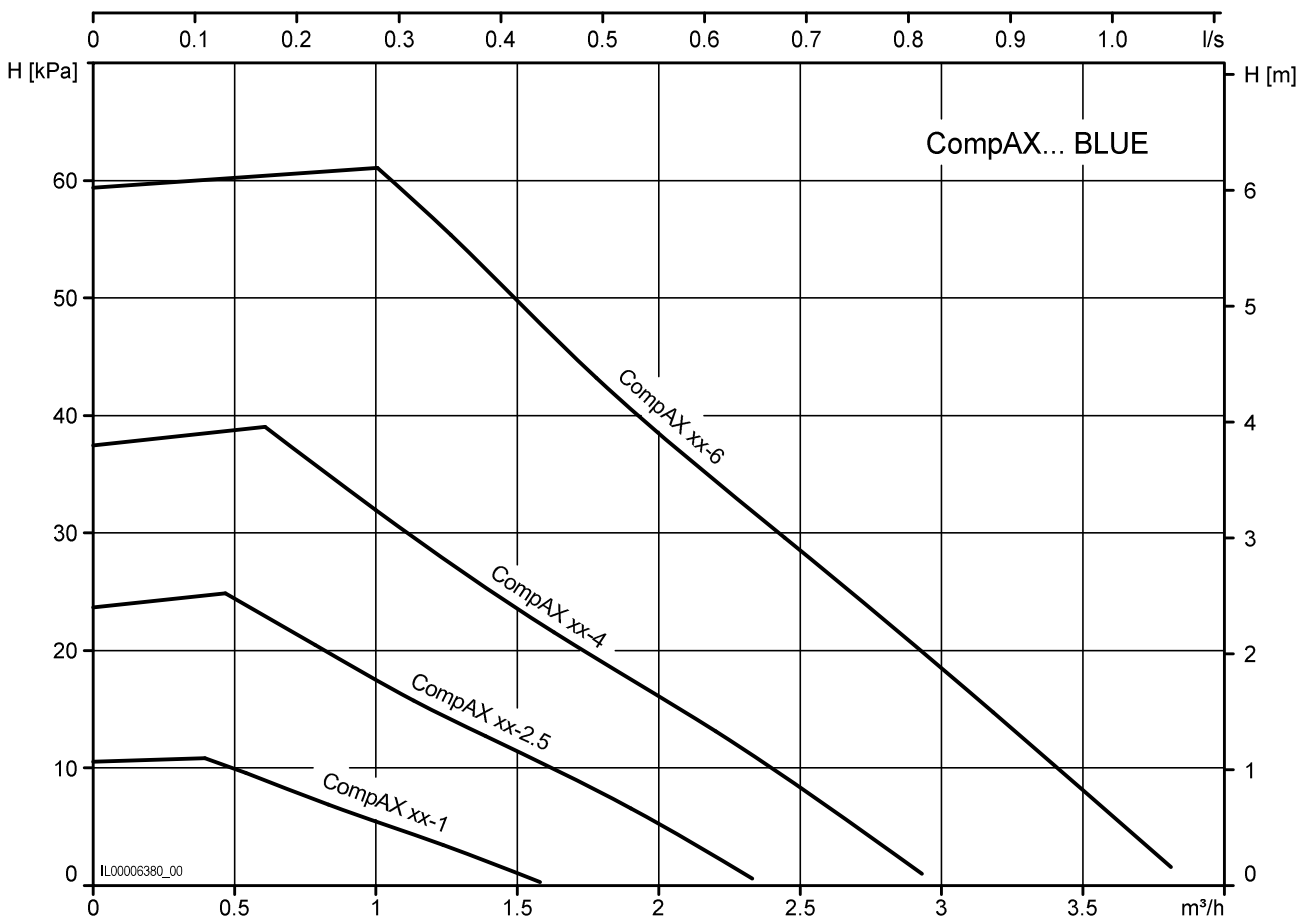


#### Übersicht

Type	Art. no.	Nominal width	Flow head H max.	Overall length	Threaded connection	Operating pressure max. bar	EEI
		DN	m	mm			
CompAX 20-1 120 BLUE	7000001511	20	1	120	G 1 1/4"	10	ECO Design
CompAX 20-1 150 BLUE	7000001512	20	1	150	G 1 1/4"	10	ECO Design
CompAX 20-2.5 120 BLUE	7000001530	20	2.5	120	G 1 1/4"	10	ECO Design
CompAX 20-4 120 BLUE	7000001513	20	4	120	G 1 1/4"	10	ECO Design
CompAX 20-4 150 BLUE	7000001514	20	4	150	G 1 1/4"	10	ECO Design
CompAX 20-6 150 BLUE	7000001516	20	6	150	G 1 1/4"	10	ECO Design
CompAX 25-4 180 BLUE	7000001515	25	4	180	G 1 1/2"	10	ECO Design
CompAX 25-6 180 BLUE	7000001517	25	6	180	G 1 1/2"	10	ECO Design

### Ordering reference

	<b>CompAX 20 -1 120 BLUE</b>
Series	_____
Nominal width (DN) [mm]	_____
Discharge head max. [m]	_____
Installation height [mm]	_____
Field of application Service water (BLUE)	_____



Brauchwasser

### CompAX 20-1 120 BLUE

### CompAX 20-1 150 BLUE

Nominal width	DN 20
Flow head H max.	1 m
Overall length	120   150 mm
Threaded connection	G 1 1/4"
Operating pressure max.	10 bar
Media temperature min.	+ 2°C
Media temperature max.	+85°C
Ambient temperature	0°C bis 40°C
Water hardness max. at 65 °C	35°fH/20°dH
Water hardness max. at 85 °C	25°fH/14°dH
Net weight	1.8   1.9 kg
Gross weight	2.0   2.1 kg

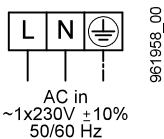
#### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	2-5 W
Nominal current	0.03-0.05 A
Motor protection	integriert

#### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.05 bar
at a water temp. of 85 °C	0.28 bar
for every ±100 m of altitude	0.01 bar

#### Connction diagram



L, N, PE Netzanschluss

#### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

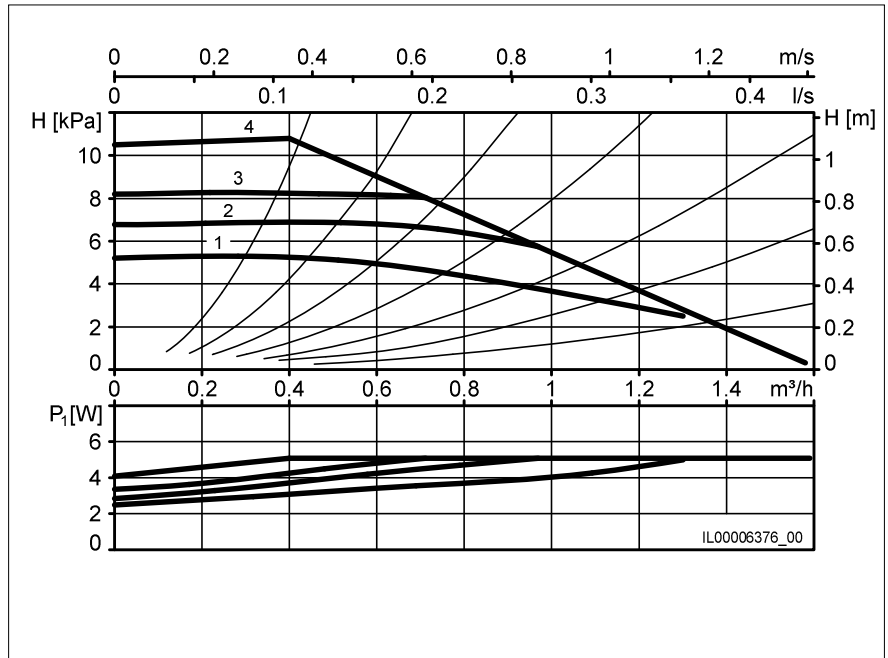
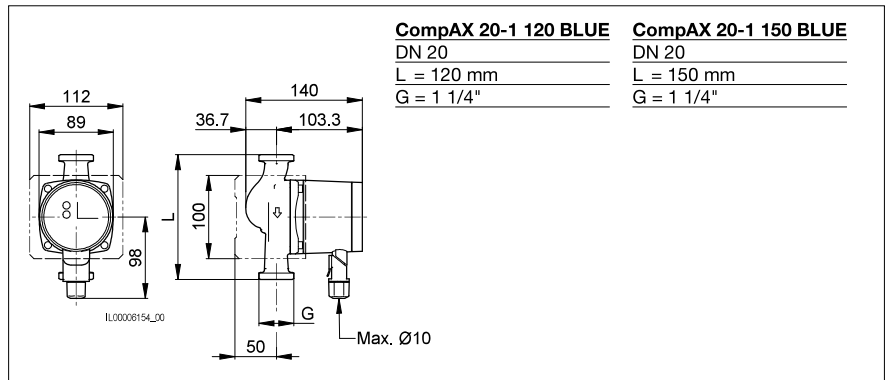
#### Accessories

- Angle plug
- Blocking set (non-return valve and ball valve)

#### Remarks

Pump housing: bronze

Type	Art. no.
CompAX 20-1 120 BLUE	7000001511
CompAX 20-1 150 BLUE	7000001512



## CompAX 20-2.5 120 BLUE

Nominal width	DN 20
Flow head H max.	2.5 m
Overall length	120 mm
Threaded connection	G 1 1/4"
Operating pressure max.	10 bar
Media temperature min.	+ 2°C
Media temperature max.	+85°C
Ambient temperature	0°C bis 40°C
Water hardness max. at 65 °C	35°fH/20°dH
Water hardness max. at 85 °C	25°fH/14°dH
Net weight	1.8 kg
Gross weight	2.0 kg

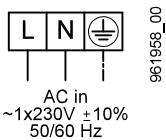
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	3-12 W
Nominal current	0.04-0.11 A
Motor protection	integriert

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.05 bar
at a water temp. of 85 °C	0.28 bar
for every ±100 m of altitude	0.01 bar

### Connction diagram



L, N, PE Netzanschluss

### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

### Accessories

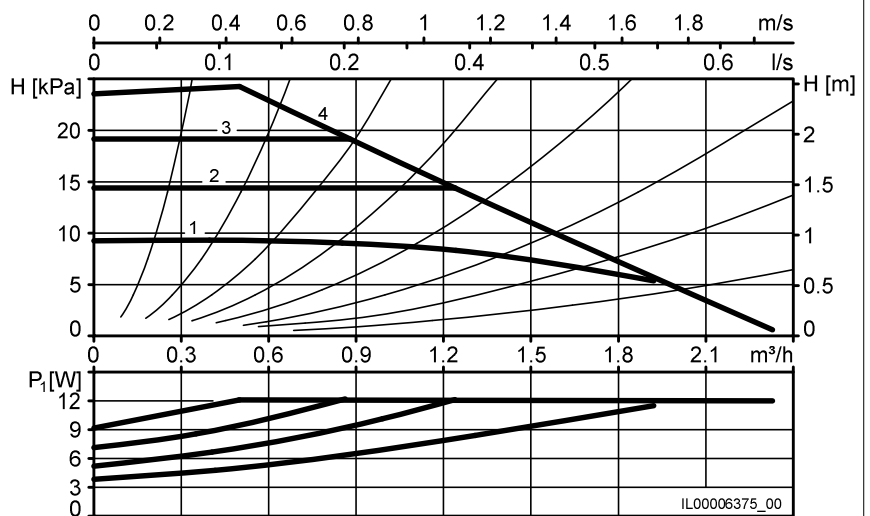
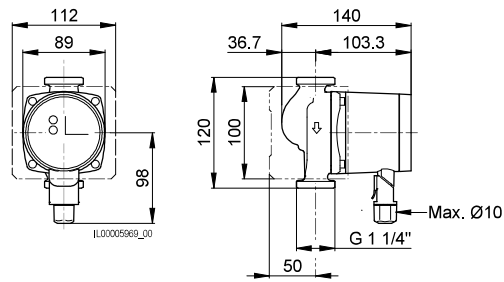
- Angle plug
- Blocking set (non-return valve and ball valve)

### Remarks

Pump housing: bronze

Type	Art. no.
CompAX 20-2.5 120 BLUE	7000001530

**CompAX 20-2.5 120 BLUE**  
 DN 20  
 L = 120 mm  
 G = 1 1/4"



### CompAX 20-4 120 BLUE

### CompAX 20-4 150 BLUE

Nominal width	DN 20
Flow head H max.	4 m
Overall length	120   150 mm
Threaded connection	G 1 1/4"
Operating pressure max.	10 bar
Media temperature min.	+ 2°C
Media temperature max.	+85°C
Ambient temperature	0°C bis 40°C
Water hardness max. at 65 °C	35°fH/20°dH
Water hardness max. at 85 °C	25°fH/14°dH
Net weight	1.8 kg
Gross weight	2.0 kg

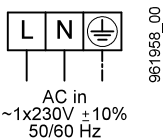
#### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	4-22 W
Nominal current	0.05-0.19 A
Motor protection	integriert

#### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.05 bar
at a water temp. of 85 °C	0.28 bar
for every ±100 m of altitude	0.01 bar

#### Connction diagram



L, N, PE Netzanschluss

#### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

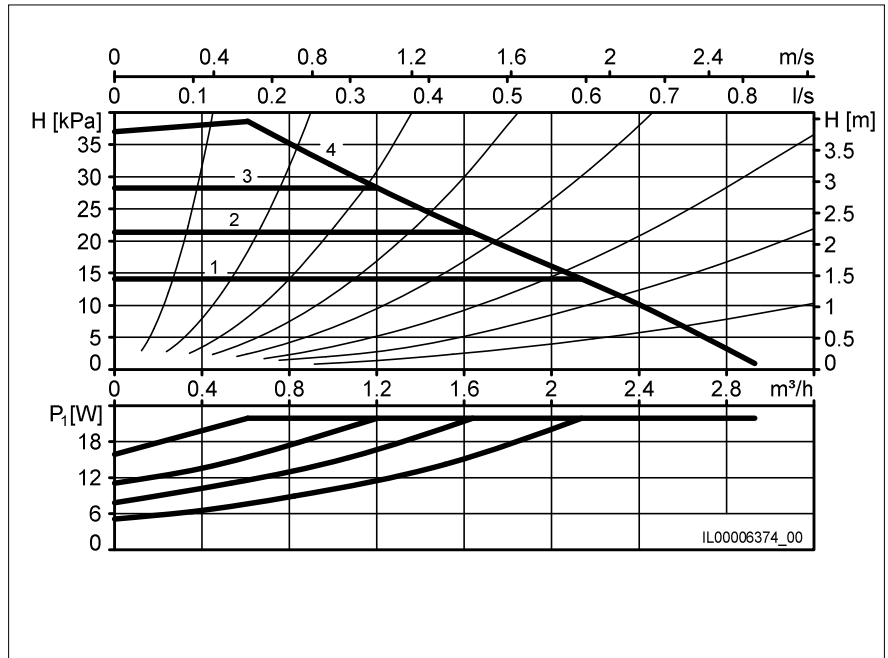
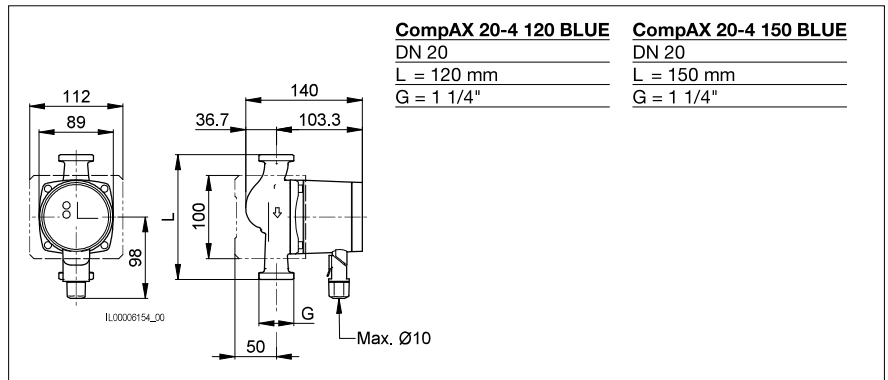
#### Accessories

- Angle plug
- Blocking set (non-return valve and ball valve)

#### Remarks

Pump housing: bronze

Type	Art. no.
CompAX 20-4 120 BLUE	7000001513
CompAX 20-4 150 BLUE	7000001514



## CompAX 20-6 150 BLUE

Nominal width	DN 20
Flow head H max.	6 m
Overall length	150 mm
Threaded connection	G 1 1/4"
Operating pressure max.	10 bar
Media temperature min.	+ 2°C
Media temperature max.	+85°C
Ambient temperature	0°C bis 40°C
Water hardness max. at 65 °C	35°fH/20°dH
Water hardness max. at 85 °C	25°fH/14°dH
Net weight	1.9 kg
Gross weight	2.1 kg

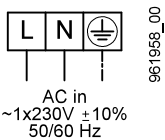
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	6-45 W
Nominal current	0.06-0.40 A
Motor protection	integriert

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.05 bar
at a water temp. of 85 °C	0.28 bar
for every ±100 m of altitude	0.01 bar

### Connction diagram



L, N, PE Netzanschluss

### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

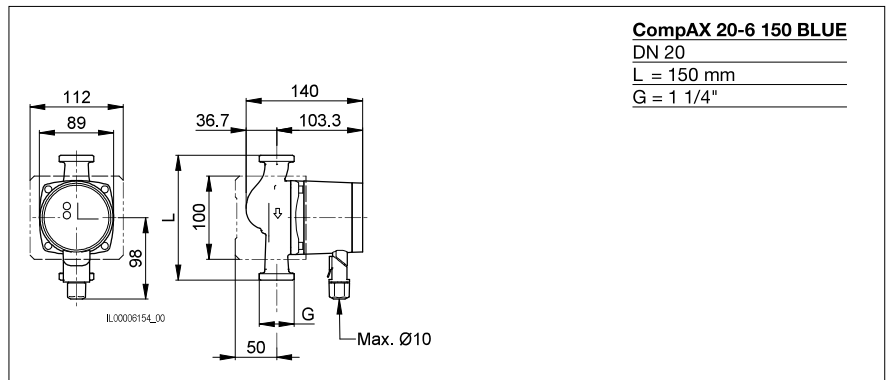
### Accessories

- Angle plug
- Blocking set (non-return valve and ball valve)

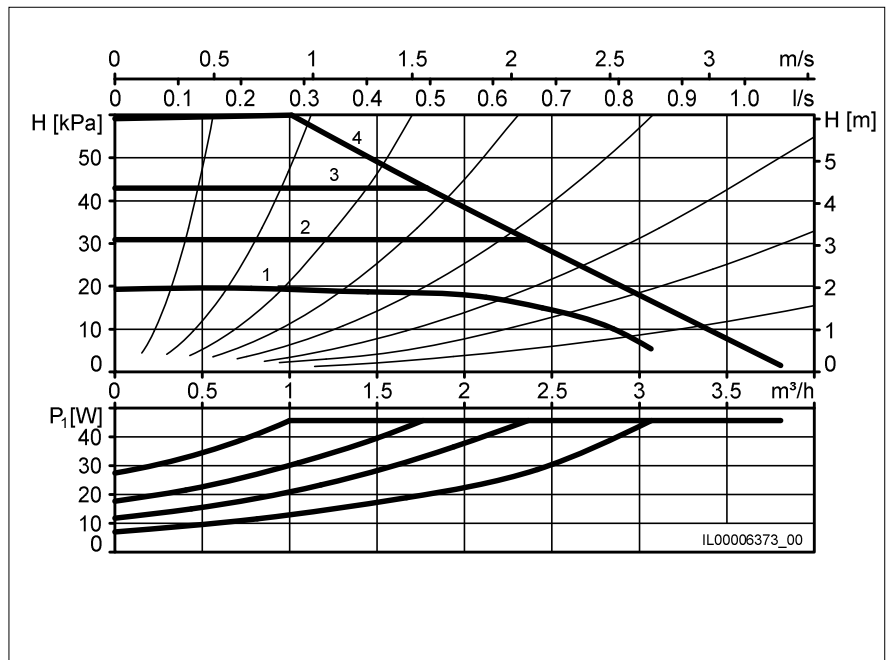
### Remarks

Pump housing: bronze

<b>Type</b>	<b>Art. no.</b>
CompAX 20-6 150 BLUE	7000001516



**CompAX 20-6 150 BLUE**  
 DN 20  
 L = 150 mm  
 G = 1 1/4"



## CompAX 25-4 180 BLUE

Nominal width	DN 25
Flow head H max.	4 m
Overall length	180 mm
Threaded connection	G 1 1/2"
Operating pressure max.	10 bar
Media temperature min.	+ 2°C
Media temperature max.	+85°C
Ambient temperature	0°C bis 40°C
Water hardness max. at 65 °C	35°fH/20°dH
Water hardness max. at 85 °C	25°fH/14°dH
Net weight	2.1 kg
Gross weight	2.3 kg

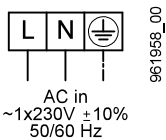
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	4-22 W
Nominal current	0.05-0.19 A
Motor protection	integriert

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.05 bar
at a water temp. of 85 °C	0.28 bar
for every ±100 m of altitude	0.01 bar

### Connction diagram



L, N, PE Netzanschluss

### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

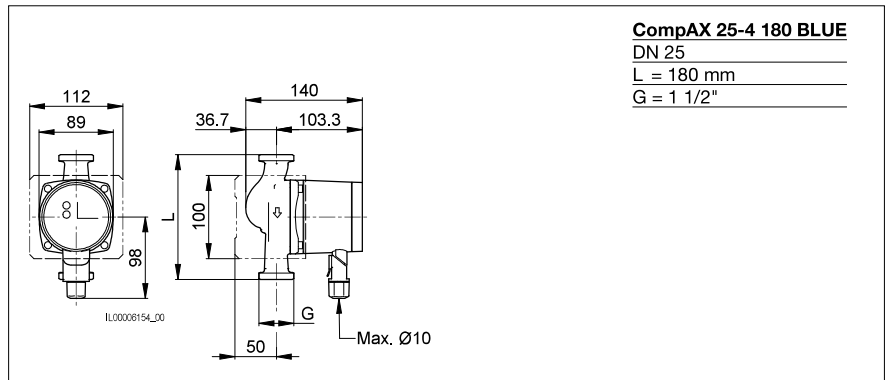
### Accessories

- Angle plug

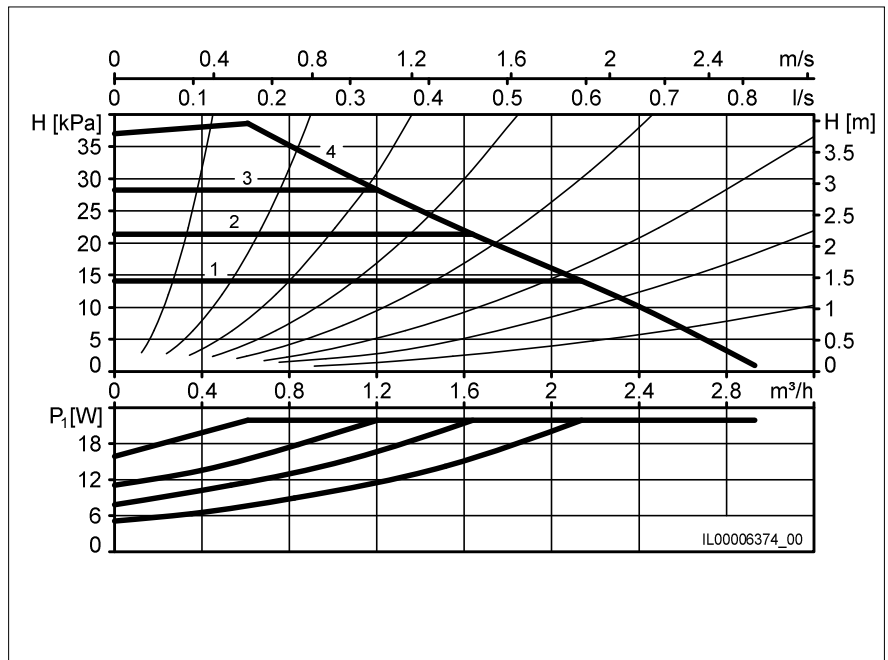
### Remarks

Pump housing: bronze  
Shut-off set not available

<b>Type</b>	<b>Art. no.</b>
CompAX 25-4 180 BLUE	7000001515



**CompAX 25-4 180 BLUE**  
DN 25  
L = 180 mm  
G = 1 1/2"



## CompAX 25-6 180 BLUE

Nominal width	DN 25
Flow head H max.	6 m
Overall length	180 mm
Threaded connection	G 1 1/2"
Operating pressure max.	10 bar
Media temperature min.	+ 2°C
Media temperature max.	+85°C
Ambient temperature	0°C bis 40°C
Water hardness max. at 65 °C	35°FH/20°dH
Water hardness max. at 85 °C	25°FH/14°dH
Net weight	2.1 kg
Gross weight	2.3 kg

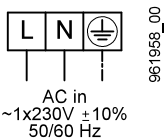
### Electrical data

Voltage	1x230 V
Frequency	50/60 Hz
Power P <sub>1</sub>	6-45 W
Nominal current	0.06-0.40 A
Motor protection	integriert

### Required operating pressure at 500m a.s.l.

at a water temp. of 75 °C	0.05 bar
at a water temp. of 85 °C	0.28 bar
for every ±100 m of altitude	0.01 bar

### Connction diagram



L, N, PE Netzanschluss

### Included in the scope of delivery

- Heat insulation shell
- Biral Connector
- AFM seal

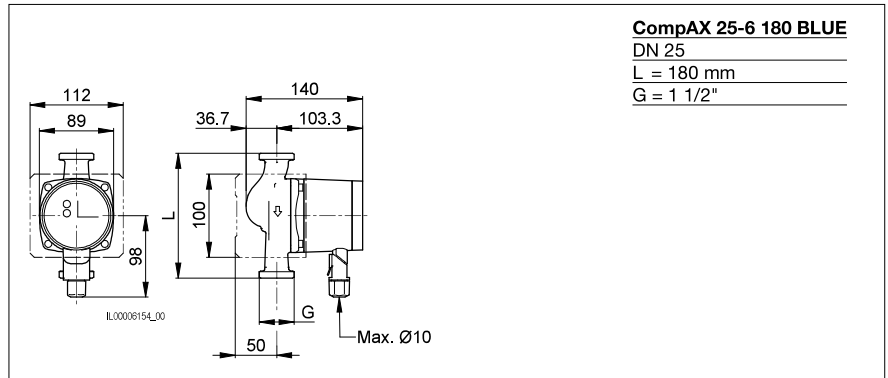
### Accessories

- Angle plug

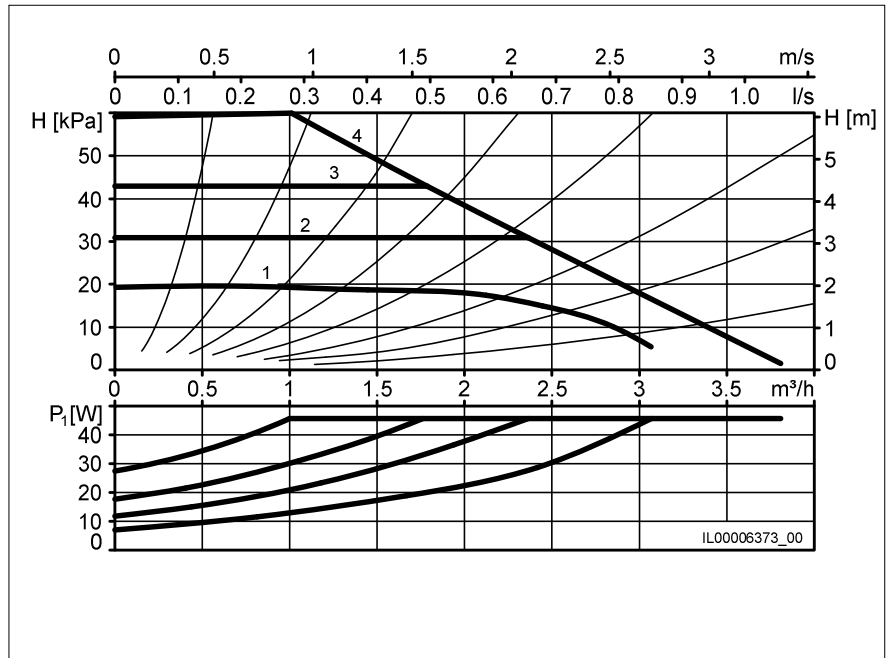
### Remarks

Pump housing: bronze  
Shut-off set not available

<b>Type</b>	<b>Art. no.</b>
CompAX 25-6 180 BLUE	7000001517



**CompAX 25-6 180 BLUE**  
DN 25  
L = 180 mm  
G = 1 1/2"





Zertifikat Energie-Agentur der Wirtschaft

# Freiwilliger Klimaschutz und Energieeffizienz



## Biral AG

Das Unternehmen Biral AG setzt sich aus Überzeugung für den nachhaltigen Klimaschutz ein. Mit der freiwilligen Teilnahme am Programm der Energie-Agentur der Wirtschaft bekennt sich das Unternehmen Biral AG zur aktiven Reduktion der CO<sub>2</sub>-Emissionen und zur Optimierung der Energieeffizienz. Die Zielvereinbarung ist vom Bund, den Kantonen und Partnern der Wirtschaft anerkannt.

  
Dr. Armin Eberle  
Energie-Agentur der Wirtschaft

1. Januar 2017

  
Stefan Krummenacher  
Energie-Agentur der Wirtschaft



# Certificate

The SQS herewith attests that the organisation named below has a management system that meets the requirements of the normative base mentioned.



**Biral AG**  
**Südstrasse 10**  
**3110 Münsingen**  
**Switzerland**

Scope

**Design, development, manufacture and sale  
of products for the transportation of liquids**

Normative base

**ISO 9001:2015**

**Quality Management System**

Reg. no. 10342

Validity 25.02.2021–24.02.2024  
Issue 25.02.2021

  
A. Grisard, President SQS

  
F. Müller, CEO SQS



sqs.ch



Swiss Association for Quality  
and Management Systems (SQS)  
Bernstrasse 103, 3052 Zollikofen, Switzerland





THE INTERNATIONAL CERTIFICATION NETWORK

# CERTIFICATE

*SQS has issued an IQNet recognized certificate that the organization:*

***Biral AG  
Südstrasse 10  
3110 Münsingen  
Switzerland***

*has implemented and maintains a*

***Management System***

*for the following scope:*

***Design, development, manufacture and sale  
of products for the transportation of liquids***

*which fulfills the requirements of the following standard(s):*

***ISO 9001:2015***

*Issued on: 2021-02-25*

*Expires on: 2024-02-24*

*This attestation is directly linked to the IQNet Partner's original certificate and shall not be used as  
a stand-alone document*

***Registration Number: CH-10342***



*Alex Stoichitoiu  
President of IQNet*

*Felix Müller  
CEO SQS*



**IQNet Partners\*:**

AENOR Spain AFNOR Certification France APCER Portugal CCC Cyprus CISQ Italy  
CQC China CQM China CQS Czech Republic Cro Cert Croatia DQS Holding GmbH Germany EAGLE Certification Group USA  
FCAV Brazil FONDONORMA Venezuela ICONTEC Colombia Inspecta Sertifiointi Oy Finland INTECO Costa Rica  
IRAM Argentina JQA Japan KFQ Korea MIRTEC Greece MSZT Hungary Nemko AS Norway NSAI Ireland  
NYCE-SIGE México PCBC Poland Quality Austria Austria RR Russia SII Israel SIQ Slovenia  
SIRIM QAS International Malaysia SQS Switzerland SRAC Romania TEST StPetersburg Russia TSE Turkey YUQS Serbia

\* The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under [www.iqnet-certification.com](http://www.iqnet-certification.com)

# Certificate

## Quality Assurance System acc. to Directive 2014/68/EU

Certificate no.: 01 202 E/Q-13 4584

Name and address of the  
certificate holder:

**Genebre, S.A.**  
**Av. Joan Carles I, 46-48**  
**08908 L'Hospitalet de Llobregat**  
**Spain**

**GENEBRE**

Herewith we certify that the above -mentioned manufacturer operates a quality system according to the European Directive 2014/68/EU.

The manufacturer has the permission to affix the following CE marking to pressure equipment described and manufactured in accordance to the scope covered by this Quality-Assurance System:

**CE 0035**

Test basis:

**Directive 2014/68/EU: QA-System (Module D)**  
(the QS-Modules E1, E, D1 are covered by Module D)

Audit report no.:

01 202 E/Q-13 4584

Scope:

**Manufacture of industrial valves and pressure accessories,  
see annex to certificate**

Manufacturing plant:

see certificate holder

Validity:

**This certificate is valid until 2025-12-19.**

Cologne, 2022-11-30

Dipl.-Ing. (FH) Vera Ruff



TÜV Rheinland Industrie Service GmbH  
Notified Body for Pressure Equipment, ID-No. 0035  
Am Grauen Stein, D-51105 Cologne

MS-0037317 E-008-Rev01

## Data sheet

### flowIQ® 3100

- Nominal flow from 2.5 m<sup>3</sup>/h up to 63 m<sup>3</sup>/h
- Approved with dynamic range up to R630
- 'Drive-by', network or IoT
- Pinpoint accuracy
- Designed for operation in submerged environments
- Integrated communication supporting:
  - Wireless M-Bus & linkIQ®
  - Wired M-Bus
- Long life
- Simple installation
- GDPR ready



## Contents

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## Electronic ultrasonic meter - for measuring the distribution and consumption of cold water in blocks of flats and commercial premises.

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### Pinpoint accuracy

Ultrasonic flow measurement guarantees pinpoint measuring accuracy and long life. All measurements, references, readings, calculations and data communication are controlled by an advanced, specially designed, electronic circuit. The meter has no built-in moving parts and is therefore less sensitive to impurities in the water and to wear and tear. This ensures increased longevity and better performance compared to traditional mechanical meters.

### Vacuum-sealed construction

flowIQ® 3100 is constructed as a hermetically vacuum-sealed unit, which prevents humidity from reaching the electronics. Therefore, condensation water between the glass and the large display is avoided.

The meter is waterproof, IP68 type tested, so also suitable for installation in meter pits.

The meter has been MID approved and type tested according to OIML R 49.

### Longevity

The water meter is powered by an internal lithium battery, providing up to 16 years' lifetime.

### Many possibilities for communication

flowIQ® 3100 comes with the newest radio technology to meet increasing market demands for smart metering, and supports several different types of communication such as:

- Wireless M-Bus C1+T1
- Wired M-Bus
- linkIQ®
- Sigfox

### Radio communication

flowIQ® 3100 has built-in radio communication for data communication on 868 MHz. Consumption data can be read directly and manually from the display or using an optical eye. Furthermore, consumption data can be remotely read by means of the radio communication.

### Wireless M-bus

flowIQ® 3100 is supplied with Wireless M-Bus 868 Mhz, Mode C1 and Mode T1 OMS, and it is possible to configure various data packets.

### linkIQ® *(only for selected markets)*

linkIQ® is a Kamstrup Wireless M-Bus protocol which contains hourly data and is designed for a very high data performance in a fixed network by using turbo coding supported by Kamstrup READY Concentrator 1M.

With Kamstrups new READY Concentrator 1M, linkIQ® can be used in an existing Wireless M-Bus network and will perform with a higher range.

linkIQ® transmits on the 868 MHz band at 25 mW.

**Note:** Not all variants of flowIQ® 3100 are supporting linkIQ®.

### Wired M-Bus

flowIQ® 3100 is also available in a version with Wired M-Bus providing a comprehensive datagram according to EN 13757:2013 – used in applications using M-Bus protocol.

### Simple and safe Installation

The meter housing, which is made of the plastic material PPS, is mounted on a measuring tube of brass or stainless steel, and as the meter can be installed both vertically and horizontally, it is quickly mounted independent of existing piping and installation conditions.

The unique combination of pinpoint measuring accuracy, longevity and built-in Wireless M-Bus – wireless radio communication – reduces the current operating costs of the water utility measurably.

In addition, leakage monitoring helps the utility and the consumer to detect any leaks in the system, with the aim of preventing further loss of water thus minimizing unforeseen costs to the consumer.

### Hygiene

To protect the health of the consumers Kamstrup has a hygienic manufacturing process of the water meters. Kamstrup has a highly automated manufacturing process, and only uses materials which are approved for drinking water. Furthermore the products gets disinfected before dispatch. The hygiene is being controlled by external accredited laboratories and by frequent audits.

### General description

flowIQ® 3100 is a series of integrated water meters intended for consumption and distribution measurement of cold domestic water. The water meter uses the ultrasonic principle and has been constructed on the basis of Kamstrup's experience since 1991 with the development and production of static ultrasonic meters.

flowIQ® 3100 has been subjected to a very comprehensive OIML R 49 type test with a view to securing a long-term stable, accurate and reliable meter.

The meter housing is constructed as a vacuum chamber of moulded composite material, which is mounted on a measuring tube of brass or stainless steel. Thus, the electronics are fully protected against penetration of water, both from medium pipes and from the environment. The meter is specially suited for small pump stations and distribution wells as well as meter pits which are frequently filled with water.

flowIQ® 3100 is also suited for consumption measurement in big blocks of flats and in commercial buildings. The meter fits perfectly into a network of MULTICAL® 21 household meters.

The volume is measured using ultrasonic technique which is proven as a long-term stable and accurate measuring principle. Two ultrasonic transducers are used to send sound signals both against and with the flow. The ultrasonic signal travelling with the flow reaches the opposite transducer first. The time difference between the two signals can be converted into flow velocity and subsequently volume.

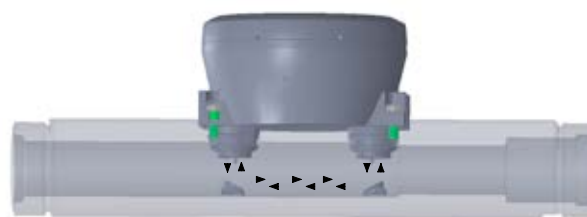
The accumulated water consumption is displayed in cubic meters (m<sup>3</sup>) with five digits and up to three decimals, i.e. the resolution has been extended to 1 litre only. The large and clear display has been specially designed to obtain long life and sharp contrast in a wide temperature range.

In addition to volume reading, a graphic indication of current flow and a number of information codes are displayed.

All registers are saved daily in an EEPROM for 460 days. Furthermore, monthly data for the latest 36 months and yearly data for the last 10 years are saved.

The meter is fitted with an optical eye which makes it possible to read saved consumption data and info codes, stored in the meter's data logger. Using a USB connection, the optical eye furthermore gives access to the configuration of the water meter.

The meter can and must only be opened by Kamstrup A/S. If the meter has been opened and the seals have thus been broken, the meter is no longer valid for billing purposes. Furthermore, the factory guarantee no longer applies.



*The ultrasonic principle*

- Characteristics – in short:**
- OIML R 49 type tested
  - electronic ultrasonic meter
  - accurate and reliable
  - no moving parts – no wear
  - low start flow
  - hermetically sealed
  - large clear display
  - multiple info codes
  - long-term stable
  - long life
  - powered by a lithium battery
  - suitable for mounting in pits

## Approved meter data

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### MID classifications

Approvals	DK-0200-MI001-017
- Up to 63 m <sup>3</sup> /h	
Mechanical environment	Class M1
Electromagnetic environment	Class E2 for Wireless M-Bus, linkIQ® and Sigfox version Class E1 for Wired M-Bus version
Climatic environment	5...55 °C, condensing humidity (indoors mounted in utility rooms and outdoors in meter pits – mounting in direct prolonged sunlight must be avoided)

### OIML R 49 designations

Accuracy class	2
Sensitivity class	U0/D0
Ambient class	Fulfils OIML R 49 class B and O indoors/outdoors
Medium temperature, cold water	0.1...30 °C (T30) or 0.1...50 °C (T50)

### Meter type

Q<sub>3</sub> = 2.5 4.0 6.3 10 16 25 40 and 63 m<sup>3</sup>/h

### Drinking water approvals

DVGW W 421, WRAS, ACS, Belgaqua, SCU, PZH

### ATEX approval

According to 2014/34/EU  
(equipment intended for use in potentially explosive atmospheres, zone 2)

## Materials

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### Wetted parts

Meter housing, threaded	DZR brass (dezincification-resistant brass) (CW511L) – an environmentally friendly quality of brass – low lead
Meter housing, flanged	Stainless steel W.no. 1.4408
O-ring (gasket)	EPDM
Spring ring	Stainless steel
Measuring tube	Polyphenylene sulfide PPS with 40 % fibreglass
Reflectors	Stainless steel
Strainer	Polyarylethersulfone PES

### External meter parts

Meter housing	Polyphenylene sulfide PPS with 40 % fibreglass
Cover	Glass
Top ring (sealing)	Polycarbonate (dyed, blue)



## Technical data

### Electrical data

Battery	3.65 VDC, one C cell lithium
Battery lifetime:	up to 16 years at tBAT < 30 °C depending on selected module up to 8 years at tBAT < 55 °C (M-Bus only, Sigfox max 35 °C)
EMC data	Fulfils MID class: - E2 for Wireless M-Bus - E1 for Wired M-Bus, linkIQ® and Sigfox version
Sigfox classification	Class zero
Sigfox radio zone	RC1, 868 MHz, 14 dBm

### Mechanical data

Metrological class	2
Ambient class	Fulfils OIML R 49 class B and C (B and O, new MID) indoors/outdoors
Ambient/meter temperature	2...55 °C
Protection class	IP68
Water temperature	0.1...30 °C (T30) [Sigfox] or 0.1...50 °C (T50) [Wired and Wireless M-Bus only]
Storage temp. empty sensor	-25...60 °C
Pressure stage	Thread mounted PN16 Flange mounted PN25, acc. EN 1092-1

### Accuracy

MPE [maximum permissible error]

MPE according to OIML R 49

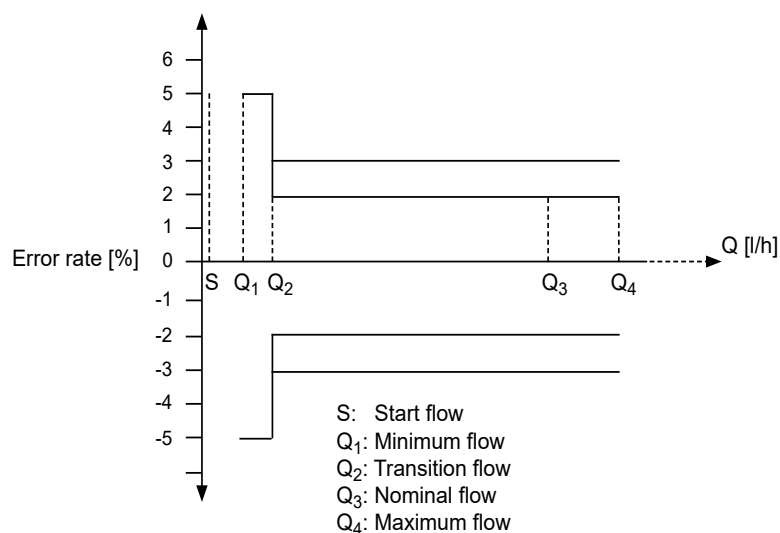
Meter approved for 0.1...30 °C

± 5 % in range  $Q_1 \leq Q < Q_2$

± 2 % in range  $Q_2 \leq Q \leq Q_4$

For 30 °C < t < 50 °C

± 3 % in range  $Q_2 \leq Q \leq Q_4$



## Meter sizes

flowIQ® 3100 is available in different combinations of overall length and nominal flow Q<sub>3</sub>.

YY = choice of communication

XX = country code

- also see section 'Ordering Details'

Type number	Nom. flow Q <sub>3</sub> [m <sup>3</sup> /h]	Connection on meter	Min. flow Q <sub>1</sub> [l/h]	Max flow Q <sub>4</sub> [m <sup>3</sup> /h]	Dynamic range Q <sub>3</sub> /Q <sub>1</sub>	Min. cutoff [l/h]	Max cutoff [m <sup>3</sup> /h]	Pressure loss Δp at Q <sub>3</sub> [bar]	Length [mm]	Check valve
031-YY-C5C-8XX	2.5	G1B (R¾)	25	3.1	100	2.0	4.6	0.34	190	Yes
031-YY-C03-8XX	4.0	G5/4B (R1)	40	5.0	100	3.2	11	0.095	175	Yes
031-YY-C1T-8XX	4.0	G5/4B (R1)	40	5.0	100	3.2	30	0.028	260	Yes
031-YY-C1U-8XX	6.3	G5/4B (R1)	63	7.8	100	5.1	30	0.07	260	Yes
031-YY-C2U-8XX	6.3	G5/4B (R1)	40	7.8	160	5.1	30	0.07	260	Yes
031-YY-C0K-8XX*	6.3	G1½B (R5/4)	63	7.8	100	5.1	30	0.07	260	No
031-YY-C1K-8XX	6.3	G1½B (R5/4)	40	7.8	160	5.1	30	0.07	260	No
031-YY-C0D-8XX*	10.0	G5/4B (R1)	100	12.5	100	8	30	0.175	260	Yes
031-YY-C1D-8XX	10.0	G5/4B (R1)	62.5	12.5	160	8	30	0.175	260	Yes
031-YY-C0Y-8XX*	10.0	G1½B (R5/4)	100	12.5	100	8	30	0.175	260	No
031-YY-C1Y-8XX	10.0	G1½B (R5/4)	62.5	12.5	160	8	30	0.175	260	No
031-YY-C5J-8XX	10.0	G2B (R1½)	100	12.5	100	8	30	0.13	300	Yes
031-YY-C7V-8XX*	16.0	G2B (R1½)	160	20	100	13	30	0.33	300	Yes
031-YY-C8V-8XX	16.0	G2B (R1½)	100	20	160	13	30	0.33	300	Yes
031-YY-C0L-8XX	16.0	DN50	160	20.0	100	13	45	0.19	270	No
031-YY-C1W-8XX*	25.0	DN50	250	31	100	20	45	0.47	270	No
031-YY-C2W-8XX	25.0	DN50	156	31	160	20	45	0.47	270	No
031-YY-C0M-8XX	25.0	DN65	250	31	100	20	76	0.06	300	No
031-YY-C1Q-8XX*	40.0	DN65	400	50	100	32	76	0.15	300	No
031-YY-C2Q-8XX	40.0	DN65	250	50	160	32	76	0.15	300	No
031-YY-C0N-8XX	40.0	DN80	400	50	100	32	114	0.05	300	No
031-YY-C1X-8XX*	63.0	DN80	630	79	100	50	114	0.12	300	No
031-YY-C2X-8XX	63.0	DN80	394	79	160	50	114	0.12	300	No

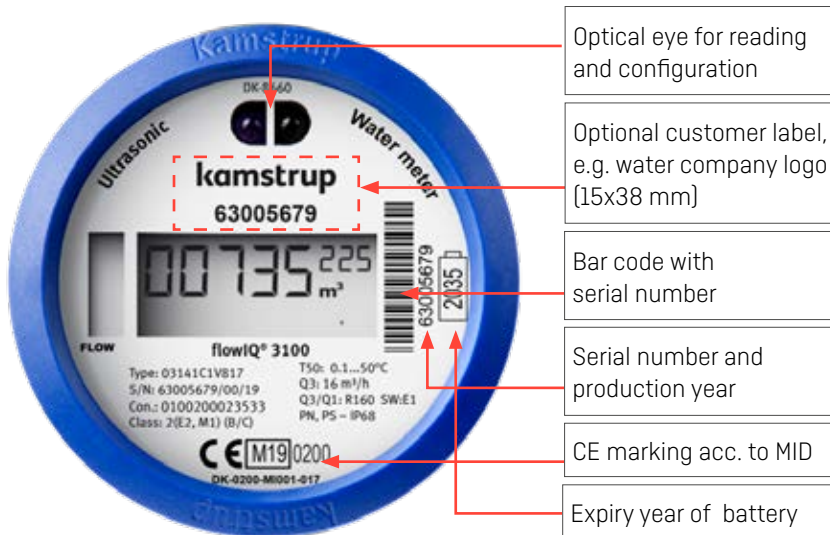
\* Only for selected markets

Check valves are ordered separately.

Strainers are factory-mounted on threaded meters, except for meter type C03. Strainers can be ordered together with these meter sizes.

## Meter details

Meter information in permanent, laser engraved text.



For further information about the data on the label, please see the Technical description.

## Display and info codes



flowIQ® 3100 can be read from the large, easily readable, specially designed display. The five large figures indicate number of cubic meters. The three small figures are decimals.

The sign L [to the right of m<sup>3</sup>] is always 'off' when the meter is in operation as it is solely used during factory control and verification of the meter.

The flow arrows in the left side of the display indicate water flow through the meter. If there is no flow, all arrows will be off.

The info codes in the displays have the following meaning and function:

Info code flashes in the display	Meaning
LEAK	The water in the meter has not been stagnant for one continuous hour during the latest 24 hours. This can be a sign of a leaky faucet or toilet cistern.
BURST	The water consumption has been consistently high for half an hour which indicates a pipe burst.
TAMPER	Attempt of fraud. The meter is no longer valid for billing.
DRY	The meter is not water-filled. In this case nothing will be measured.
REVERSE	The water flows through the meter in the wrong direction.
RADIO OFF flashes	The meter is still in transport mode with the built-in radio transmitter turned off. The transmitter turns on automatically when the first litre of water has run through the meter.
RADIO OFF	RADIO OFF lights permanently. The radio is switched off permanently. Can be activated via DataTool (module 96 and 99 only).
■ ■ [two square 'dots']	Two small squares flashing alternately indicate that the meter is active.
'A' followed by a number	Indicates the number of metrologic changes the meter has gone through after factory verification. If no adjustments have been made, both the 'A' symbol and the digit are inactive.

The info codes 'LEAK', 'BURST', 'DRY' and 'REVERSE' switch off automatically when the conditions that activated them no longer exist. In other words, LEAK disappears when the water has been stagnant for an hour, BURST disappears when the consumption falls to normal level, REVERSE disappears when the water no longer flows in the wrong direction, and DRY disappears when the meter is filled with water.

## Measurement of temperatures

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### Temperature monitoring

flowIQ® 3100 measures temperatures, water<sup>1)</sup> and ambient temperature respectively. The measurements can be used to monitor the installation and to give an indication of the quality of the water. Both temperatures are logged in the daily, monthly and yearly records.

Minimum, average and maximum values are being registered daily. The register contains the last 460 days.

The first day of each month minimum, maximum and average temperatures are stored in the register. The first day of each year minimum and maximum temperatures are stored. The register contains the last 36 months, and the last 10 years.

Temperature values are referred to in °C and can be read via the optical eye and sent by the radio signal. Optional temperature combinations in the radio package are described in the section 'Data registers'.

### Ambient/meter temperatures

Monitoring the ambient/meter temperature of the installation can be used as a warning of freezing temperatures or unintended high temperatures. The measurement in the meter housing corresponds to the ambient temperature where the meter is installed. The temperature is measured every minute. The calculation of maximum and minimum values is based on a two-minute averaging value. The average temperature is a time-weighted average value.

### Water temperatures <sup>1)</sup>

Measuring the water temperature can be used to give an indication of the quality of the water when it reaches the consumer. This temperature is logged daily and monthly. The water temperature is measured as an indirect measurement of the water using the ultrasound signal.

The water temperature is measured every 32 seconds. The maximum and minimum values are calculated every 2 minutes based on an average since the latest calculation. Measurement of water temperature requires that the meter is filled with water. If there is no water in the meter, a code is saved, saying that the meter is not water filled.

During periods of very low water consumption, the water temperature approaches the ambient temperature. To give a correct indication of the average water temperature, this value is a volume weighted average. During periods without water flow, the weighted average cannot be calculated, and then a code 128 is stored.

<sup>1)</sup> Water temperature only available for sizes up to Q<sub>3</sub> = 4 m<sup>3</sup>/h.

## Data registers

flowIQ® 3100 has a permanent memory in which the values of various data loggers are saved.

The meter includes the following registers:

Data logging interval	Data logging depth	Logged value
Yearly logger	10 years	See table below
Monthly logger	36 months	See table below
Daily logger	460 days	See table below
Info logger	50 events	Info code, meter reading and date

It is always possible to read target volume and info codes for each of the latest 36 months as well as corresponding meter reading and possible info codes for each of the latest 460 days. The loggers can only be read via the meter's optical eye.

The following registers are logged:

The monthly/yearly logger is written on the first day of the month/year, the daily logger is written at midnight.

Register type	Description	Yearly logger, 10 years	Monthly logger, 36 months	Daily logger, 460 days
Date (YY.MM.DD)	Logging time, year, month and day	✓	✓	✓
Volume	Current meter reading (legal)	✓	✓	✓
Operating hour counter	Accumulated number of operating hours	✓	✓	✓
Info	Information code	-	✓	✓
Vol. Reverse	Volume during reverse flow	✓	✓	-
Date of max flow	Date stamp of max flow during period	✓	✓	-
<sup>1)</sup> Max flow	Value of max flow during period	✓	✓	✓
Date of min. flow	Date stamp of min. flow during period	✓	✓	-
Min. flow	Value of min. flow during period	✓	✓	✓
<sup>2)</sup> Min. temp. water	Water temperature – minimum	✓	✓	✓
<sup>2)</sup> Max temp. water	Water temperature – maximum	✓	✓	✓
<sup>2)</sup> Average temp. water	Volume weighted average water temp.	-	✓	✓
Min. temp.	Meter temperature – minimum	✓	✓	✓
Max temp.	Meter temperature – maximum	✓	✓	✓
Average temp.	Meter temp. – time weighted average	-	✓	✓

<sup>1)</sup> Max flow is measured in l/h for meter sizes 2.5 m<sup>3</sup> to 16 m<sup>3</sup>. For meter sizes 25 m<sup>3</sup> to 63 m<sup>3</sup>, max flow is measured in m<sup>3</sup> from the following SW revisions:

SW:T1 (Wireless M-Bus)

SW:G1 (Wired M-Bus)

(Sigfox is always measured in l/h)

<sup>2)</sup> Applies only for the meter sizes 2.5 and 4.0 m<sup>3</sup>/h.

Every time the information code changes, date and info codes are logged. Thus, it is possible to data read the latest 50 changes of the information code as well as the date the change was made. Reading is only possible via the optical eye.

## Wireless M-Bus communication and data packages

Part of the data transmitted through the Wireless M-Bus radio signal are optional.

It is possible to choose between different protocols (C1, T1), and various reading intervals, by choosing a specific module. Each module contains the option of choosing between up to 10 different data packages. You MUST choose one data package.

	868 MHz		
	C1	T1 OMS	Radio disabled
Modules with actual values	40/XX*	41/XX*	
Module - 'Radio off'			99/XX*

\*] For more module options see document [5512-2336](#).

Note that the logger is reset whenever you change between the various modules.

Also note that the target date is always 31/12 when selecting 'yearly reading'.

### DataTool

With DataTool, the water utility can itself make various settings on the water meters allocated to its customer number. After successful installation on the computer, the utility has the possibility of selecting between various modules and communication standards. If the meter, for example, is purchased with module 40, it can be reconfigured for one of the other modules. In addition, it is also possible to switch off the radio, if necessary. The required preset is already taken into account in the ordering process. DataTool can be requested from Kamstrup by sending an email to [service@kamstrup.com](mailto:service@kamstrup.com).

Module	Battery lifetime		
	16 Years	12 Years	10 Years
868			
40	✓		
41		✓	
48 <sup>1]</sup>			✓
99	✓		
XX <sup>2]</sup>	✓	✓	✓

<sup>1]</sup> Only for selected markets

<sup>2]</sup> Depends on the chosen module

A Wireless M-Bus data package is transmitted every 16 seconds ('drive-by') or 96 seconds ('fixed network').

When sending a data package every 16 seconds the package is kept short and compressed to achieve a long battery life.

At 96 second intervals, a longer and intelligent radio package with built-in 'repair coding' is sent - the long battery life is still guaranteed since the transmission interval is increased.

'Drive-by' or 'Fixed network' need to be chosen when ordering, and can be re-programmed by METERTOOL or DataTool.

## Sigfox communication and data packages

Part of the data transmitted through the Sigfox radio signal is optional.

It is also possible to choose between the different data so it changes from one data package to another. The target volume is mandatory for each transmission, but transmission 1 can have information on max flow, whereas transmission 2 can have information on min. flow. This is called 'Sigfox sequence'.

Module	
11	Daily values
13	Daily values sequence
97	Radio disabled

### Data packages

R-package	0	1	2	3	4
Info codes	✓	✓	✓	✓	✓
Target volume V1	✓	✓	✓	✓	✓
Max flow target		✓	✓	✓	✓
Min. flow target	✓		✓		
Min. water temp.				✓	✓
Max ambient temp.					✓
Min. ambient temp.				✓	

### Sequences

R-package	2	3
Sequence	✓	✓

Info codes are pushed one time as soon as they occur. If the info code disappears and appears once again, a new info code is pushed.

The planned transmission will always hold information on active info codes.

## linkIQ® communication and data packages\*

Module 29 is selected when ordering and cannot be subsequently changed to other modules (except module 28) that are available for flowIQ® 3100.

Module 29 can be reconfigured to module 28 with DataTool and an optical read-out head. Module 28 is identical to Wireless M-Bus, module 40.

**Note:** Module 28 cannot be selected when ordering.

linkIQ® module 29 is configured with 4 data packets. See document [5512-2336](#).

	linkIQ®
Module	29

\*1) Only for selected markets.



## Wired M-Bus version

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Wired M-Bus is available for all sizes.

### For billing and analysis

- Fixed datagram
- Up to 9600 baud communication speed
- Primary/secondary/enhanced secondary addressing
- According to M-Bus standard EN 13757:2013

### Introduction

flowIQ® 3100 is available with Wired M-Bus offering easy reading of the water meter via, for example, an M-Bus Master. Also electricity meters or heat/cool meter with a built-in M-Bus micro-master can be used.

The M-Bus interface fulfills the requirements in the M-Bus standard EN 13757:2013 and can be used in a wide variety of applications using M-Bus protocol.

### Applications

The M-Bus meter is designed with focus on high flexibility, to fulfill a wide pallet of applications.

### Analytics

flowIQ® 3100 supports high quantities of data in a fixed datagram. This is valid for both actual meter data as well as for historical logger data.

### Billing

All relevant data for billing purposes can be transmitted from flowIQ® 3100.

### M-Bus Addressing

The M-Bus interface supports primary, secondary and enhanced secondary addressing.

#### Primary addressing – (000-250)

When nothing else is specified, the M-Bus interface will automatically use the last 2-3 digits of the flowIQ® 3100 serial number as the primary address.

During the order process or by use of the METERTOOL HCW programming software, dedicated primary addresses can be selected. Further on, the primary address can be changed over the M-Bus network using standardized M-Bus commands.

#### Secondary addressing – (M-Bus ID No. 00000000-99999999)

The last eight digits of the serial number are used as M-Bus ID number for secondary addressing.

#### Enhanced Secondary addressing

– (M-Bus ID No. 00000000-99999999)/( M-Bus fabrication No. 00000000-99999999)

Enhanced secondary addressing is supported by adding the meter's serial number as M-Bus Fabrication Number to the secondary address.

### Installation

The meter is delivered with a 1.5 meter long standard polarity independent connection.

### Communication standard

Communication is in accordance with the M-Bus standard EN 13757:2013.

### Communication speed

The meter supports 300, 2400 and 9600 baud communication speed and automatically detects the communication speed used by the M-Bus master.

### Communication interval

Reading intervals  $\geq$  one minute may not reduce the water meter battery lifetime, at any communication speed. Reading intervals  $\geq$  15 seconds are supported, but this will reduce battery lifetime and provide redundant information.

### Communication via optical read-out head

Apart from the configurations in the flowIQ® 3100 itself, the primary M-Bus address can be configured via the optical readout head and METERTOOL HCW.

### Communication from M-Bus master

The following parameters can be configured with M-Bus commands via the connected M-Bus master:

- Primary address
- Meter clock synchronization.



## Wired M-Bus version

### Communication from flowIQ® 3100 M-Bus

Available data (fixed datagram)

flowIQ® 3100			
M-Bus data header	Actual data	Monthly data	Meter data
M-Bus ID	Water meter reading (volume)	Monthly target meter reading	Information codes
Manufacturer ID	Volume reverse	Min. flow last full month	Config number
Version ID	Hour counter	Max. flow last full month	Meter type (main / sub type)
Device type	Actual flow	Min. water temp. last full mo. <sup>2)</sup>	Meter SW Revision
Access counter	Actual water temperature <sup>2)</sup>	Avg. water temp. last full mo. <sup>2)</sup>	
Status (info codes)	Actual temp ambient.	Min. ambient temp. last full mo.	
Configuration (not used)	Min. flow day <sup>1)</sup>	Max. ambient temp. last full mo.	
	Max. flow day <sup>1)</sup>	Avg. ambient temp. last full mo.	
	Min. water temp. day <sup>2)</sup>	Target date	
	Avg. water temp. day <sup>2)</sup>		
	Min. temp. ambient day <sup>1)</sup>		
	Max. temp. ambient day <sup>1)</sup>		
	Avg. temp. ambient day <sup>1)</sup>		
	Date/Time		

<sup>1)</sup> The daily flow and temperatures are the actual daily minimum, average or maximum values, logged from midnight until the present reading time.

<sup>2)</sup> Only available for sizes up to 4 m<sup>3</sup>/h.

### Technical specifications

Physical Fully integrated M-Bus interface

### Communication

Readout speed 300/2400/9600 baud with automatic speed detection

Communication interval Longer than 1 minute (recommended)

Protocol EN 13757:2013

Configuration METERT00L HCW via optical read-out head (see page 13)

### Supply

Power consumption 1 unit load (1.5 mA) per M-Bus slave

Rin / Cin 422 Ω/0.5 nF

Max cable resistance 29 Ω/180 nF per pair

Operational temperature 5 - 55 °C

### Markings/approvals

- EN 13757CE approval
- MID

### Ordering

See sections 'Ordering details' and 'Configuration'

## Pressure loss

According to OIML R 49 the maximum pressure loss must not exceed 0.63 bar (0.063 MPa) in the range Q<sub>1</sub> to Q<sub>3</sub>. The pressure loss in a meter increases with the square of the flow and can be stated as:

$$Q = k_v \times \sqrt{\Delta p}$$

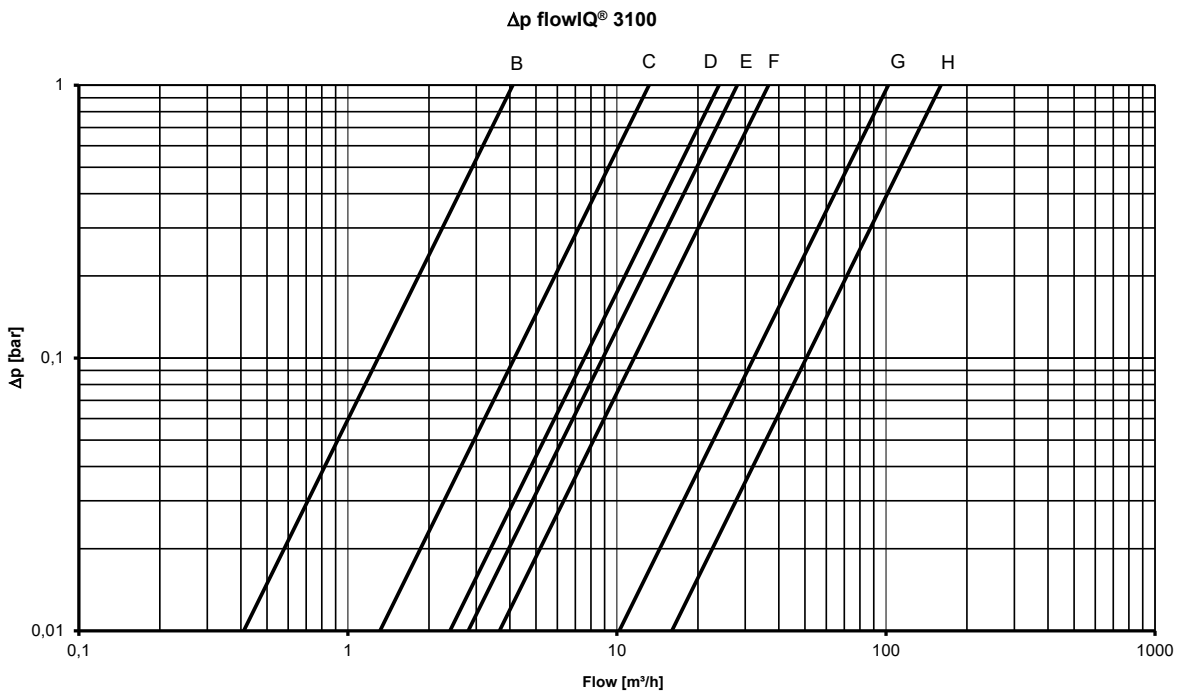
where:

Q = volume flow rate [m<sup>3</sup>/h]

k<sub>v</sub> = volume flow rate at 1 bar pressure loss

Δ<sub>p</sub> = pressure loss [bar]

Graph	Q <sub>3</sub> [m <sup>3</sup> /h]	Nom. diameter [mm]	k <sub>v</sub>	Q at 0.63 bar [m <sup>3</sup> /h]	Type 031-YY-CXX-8XX
B	2.5	G1B[R¾]	4.1	3	C5C
C	4.0	G5/4[R1]	13	10	C03
D	4.0	G5/4[R1]	24	19	C1T
	6.3	G5/4[R1] & G1½[R5/4]	24	19	C1U-C2U-C0K-C1K
E	10	G5/4[R1] & G1½[R5/4]	24	19	C0D-C1D-C0Y-C1Y
	10 & 16	G2B[R1½]	28	22	C5J-C7V-C8V
F	16 & 25	DN50	36.6	29	C1W-C2W-C0L
G	25 & 40	DN65	102	81	C1Q-C2Q-C0M
H	40 & 63	DN80	179	142	C0N-C1X-C2X



## Ordering details

---

An order is initiated by stating the type number of the selected model of flowIQ® 3100. The type number includes information on meter type, meter size, overall length, battery life, country code, etc. Some of the features included in the type number cannot be changed.

Subsequently, the meter configuration, which determines customer specific requirements such as number of digits in display, etc., is selected. The configuration is completed during programming of the finished meter.

Finally, required accessories, if any, in the form of gaskets, different extension pipes, non-return valve, strainer and standard couplings are selected.

Accessories are enclosed separately to be mounted by the installer.

## Ordering details

<b>flowIQ® 3100</b>				<b>Type 031</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Communication</b>											
Wireless M-Bus. 868 MHz. mode C1				XX <sup>1</sup>							
Wireless M-Bus. 868 MHz. mode T1 - OMS				XX <sup>1</sup>							
Wired M-Bus				XX <sup>1</sup>							
linkIQ® (only for selected markets and sizes)				29							
Module with disabled radio communication				XX <sup>1</sup>							
Sigfox sequence				XX <sup>1</sup>							
<sup>1</sup> See document <a href="#">5512-2336</a>											
<b>Supply</b>											
16 years' battery life						C					
<b>Meter size</b>											
<b>Q<sub>3</sub> [m<sup>3</sup>/h]</b>	<b>Connection</b>	<b>Length [mm]</b>	<b>Dynamic range</b>								
2.5 <sup>2)</sup>	G1B (R¾)	190	100		5	C					
4.0	G5/4B (R1)	175	100		0	3					
4.0	G5/4B (R1)	260	100		1	T					
6.3	G5/4B (R1)	260	100		1	U					
6.3 <sup>2)</sup>	G5/4B (R1)	260	160		2	U					
6.3 <sup>1)</sup>	G1½B (R5/4)	260	100		0	K					
6.3 <sup>2)</sup>	G1½B (R5/4)	260	160		1	K					
10 <sup>1)</sup>	G5/4B (R1)	260	100		0	D					
10 <sup>2)</sup>	G5/4B (R1)	260	160		1	D					
10 <sup>1)</sup>	G1½B (R5/4)	260	100		0	Y					
10 <sup>2)</sup>	G1½B (R5/4)	260	160		1	Y					
10	G2B (R1½)	300	100		5	J					
16 <sup>1)</sup>	G2B (R1½)	300	100		7	V					
16 <sup>2)</sup>	G2B (R1½)	300	160		8	V					
16	DN50	270	100		0	L					
25 <sup>1)</sup>	DN50	270	100		1	W					
25 <sup>2)</sup>	DN50	270	160		2	W					
25 <sup>2)</sup>	DN65	300	100		0	M					
40 <sup>1)</sup>	DN65	300	100		1	Q					
40	DN65	300	160		2	Q					
40 <sup>2)</sup>	DN80	300	100		0	N					
63 <sup>1)</sup>	DN80	300	100		1	X					
63 <sup>2)</sup>	DN80	300	160		2	X					
<sup>1</sup> Only for selected markets											
<sup>2</sup> Available with linkIQ®											
Cold water meter										8	
Country code (language on label, etc.)										XX	

The country code is used for:

- Language and approval on type label
- Temperature class of cold water meter (T30 and T50)

## Configuration

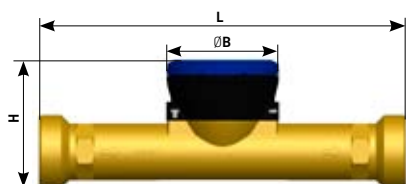
	KK	LLL	MMM	N	P	R	S	T
<b>Target date (fixed)</b>	01							
<b>Average time of max values</b>								
2 minutes		002						
<b>Customer label 2005-MMM</b>			MMM					
<b>Leakage message limit</b>								
OFF				0				
Flow continuously > 0.5 % of Q <sub>3</sub>				1				
Flow continuously > 1.0 % of Q <sub>3</sub>				2				
Flow continuously > 2.0 % of Q <sub>3</sub>				3				
<b>Pipe burst limit</b>								
OFF					0			
Flow > 5 % of Q <sub>3</sub> for 30 minutes					1			
Flow > 10 % of Q <sub>3</sub> for 30 minutes					2			
Flow > 20 % of Q <sub>3</sub> for 30 minutes					3			
<b>Optional register in data logger</b>								
Depending on the selected communication type, it is possible to select between up to 10 data packages. For further information see document <a href="#">5512-2336</a> .								
<b>Display resolution</b>								
00001 m <sup>3</sup>							0	
00000.1 m <sup>3</sup>							1	
00000.01 m <sup>3</sup>							2	
00000.001 m <sup>3</sup>							3	
<b>Encryption level</b>								
No encryption								0
Utility encryption (only available for selected markets)								2
Encryption with separately forwarded key								3

**Unless otherwise stated in the order, Kamstrup supplies the following:**

01	002	000	2	3	5	3	3
----	-----	-----	---	---	---	---	---

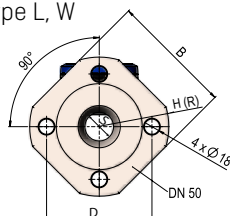
## Dimensioned sketches

### Threaded meters

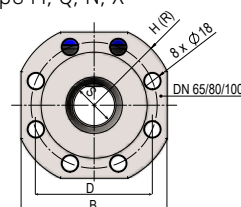


### Flanged meters

Type L, W



Type M, Q, N, X



## Dimensions

Q <sub>3</sub> [m <sup>3</sup> /h]	Thread/ flange on meter	L [mm]	H [mm]	B [mm]	S [mm]	D [mm]	Approx weight [kg]	Meter type
2.5	G1B (R¾)	190	97	91.6	-	-	1.1	C
4.0	G5/4B (R1)	175	89.5	91.6	-	-	1.7	3
4.0	G5/4B (R1)	260	89.5	91.6	-	-	1.7	T
6.3	G5/4B (R1)	260	89.5	91.6	-	-	1.7	U
6.3	G1½B (R5/4)	260	89.5	91.6	-	-	1.7	K
10.0	G5/4B (R1)	260	89.5	91.6	-	-	1.7	D
10.0	G1½B (R5/4)	260	89.5	91.6	-	-	1.7	Y
10.0	G2B (R1½)	300	104.5	91.6	-	-	2.3	J
16.0	G2B (R1½)	300	104.5	91.6	-	-	2.3	V
16.0	DN50	270	R83	165	Ø34	125	8.5	L
25.0	DN50	270	R83	165	Ø34	125	8.5	W
25.0	DN65	300	R93	168	Ø47	145	12.0	M
40.0	DN65	300	R93	168	Ø47	145	12.0	Q
40.0	DN80	300	R100	185	Ø59	160	14.2	N
63.0	DN80	300	R100	185	Ø59	160	14.2	X

## Accessories and additional documentation

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See Accessories for Water Meters: [58101270\\_GB](#).

For further information about READy, USB Meter Reader and Wireless M-Bus see Technical Description and/or the installation guide.

For information about our Hygiene concept go to: [kamstrup.com](http://kamstrup.com).

For more module options see document [5512-2336](#).

---

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info@kamstrup.com  
kamstrup.com



## Data Sheet

### MULTICAL® 21 & flowIQ® 2101

- Pinpoint accuracy
- Approved with dynamic range up to R400
- 'Drive-by', network or IoT
- Temperature measurement
- Low leakage limit
- Long range
- Long life
- Simple installation
- Environment-friendly
- GDPR ready



## Contents

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## Smart water meter – ultrasonic compact meter for measurement of cold and hot water consumption in households, apartment buildings and small commercial properties

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### Pinpoint accuracy

Ultrasonic flow measurement guarantees pinpoint measuring accuracy. The meter has no built-in moving parts and is therefore less sensitive to impurities in the water and to wear and tear. This ensures increased longevity and better performance compared to traditional mechanical meters.

### Many possibilities for communication

The water meter comes with the newest radio technology to meet increasing market demands for smart metering, both for 'Drive-by', network or Sigfox installations. Radio packages are available with transmission intervals of 16 or 96 seconds for Wireless M-Bus and daily for Sigfox. Consumption data can be read manually directly from the display or using an optical eye. Furthermore, consumption data can be remotely read by means of Wireless M-Bus, which is built into the meter.

### Temperature

The meter measures both water and ambient temperatures.

### Low leakage limits

MULTICAL® 21/flowIQ® 2101 has built-in sensitive leak monitoring, as low as 0.1 % of  $Q_3$ , which means that even the smallest water losses are detected very quickly. The unique combination of pinpoint measuring accuracy, longevity and built-in radio communication reduces the operating costs for the water company continuously and contingencies, caused by any leakage, are minimized, as waste of water is discovered immediately.

### Long range

MULTICAL® 21/flowIQ® 2101 is equipped with a long range antenna that transmits strong radio signals with intelligent coding to the network. The meter can also be read from a long distance with 'Drive-by'.

### Installation

The water meter is easy to install in all operating environments, horizontally as well as vertically, independent of piping and installation conditions.

The meter is waterproof, IP68 type tested, so also suitable for installation in meter pits.

### User-friendly

The meter comes with a large and easy to read display and the meter is constructed as a hermetically vacuum sealed unit, which prevents humidity from reaching the electronics. Therefore condensation water between the glass and the large display is avoided.

### Environment-friendly meter

The compact water meter has been approved for drinking water in several countries. Meter housing and flow parts are made of the synthetic materials PPS and PSU, which means that the meter does not contain lead or other heavy metals. The environmental report for the water meter, documents that the meter has low environmental impact, and high recyclability of materials when the meter is taken out of service.

### Hygiene

To protect the health of the consumers Kamstrup has a hygienic manufacturing process of the water meters. Kamstrup has a highly automated manufacturing process, and only uses materials which are approved for drinking water. Furthermore the products gets disinfected before dispatch. The hygiene is being controlled by external accredited laboratories and by frequent audits.

### General description

MULTICAL® 21/flowIQ® 2101 is a hermetically closed compact static water meter intended for the registration of cold and hot water consumption. The water meter uses the ultrasonic principle and has been constructed on the basis of Kamstrup's experience since 1991 with the development and production of static ultrasonic meters.

MULTICAL® 21/flowIQ® 2101 has been subjected to a very comprehensive OIML R49 type test with a view to securing a long-term stable, accurate and reliable meter. Furthermore, the meter has a low-flow cut-off (start flow) of only 2 l/h for  $Q_3 = 1.6 \text{ m}^3/\text{h}$  and  $2.5 \text{ m}^3/\text{h}$  and 3.2 l/h for  $Q_3 = 4.0 \text{ m}^3/\text{h}$ , which provides accurate measurement also at low water flows.

This water meter is constructed as a vacuum chamber of moulded composite material. Thus, the electronics are fully protected against penetration of water. This means that the meter can without problems be placed in e.g. bathrooms where it is sprayed with water daily, and it is also suitable for mounting in meter pits, which are frequently filled with water.

The meter can and must only be opened by Kamstrup A/S. If the meter has been opened and the seals have thus been broken, the meter is no longer valid for billing purposes.

Furthermore, the factory guarantee no longer applies.

The volume is measured using ultrasonic technique which is proven as a long-term stable and accurate measuring

principle. Two ultrasonic transducers are used to send sound signals both against and with the flow. The ultrasonic signal travelling with the flow reaches the opposite transducer first. The time difference between the two signals can be converted into flow velocity and subsequently volume.

The accumulated water consumption is displayed by the meter in cubic metres ( $\text{m}^3$ ) with five digits and up to three decimals, i.e. the resolution has been extended to 1 liter only. The large and clear display has been specially designed to obtain long life and sharp contrast in a wide temperature range.

In addition to volume reading, a graphic indication of current flow and a number of information codes are displayed.

The meter measures continuously both water and ambient temperature, and stores minimum, mean and maximum temperatures daily. All registers are saved daily in the meter's memory for 460 days. Furthermore, monthly data for the latest 36 months and yearly data for the latest 10 years are saved.

The water meter is fitted with an optical eye which makes it possible to read saved consumption data and info codes, stored in the meter's data logger. Using a serial PC connection, the optical eye furthermore gives access to configure the water meter.

The water meter is powered by battery with up to 16 years' lifetime.

The meter comes with the newest radio technology to meet increasing market demands for smart metering. It has built-in data communication for Wireless M-Bus and the built-in radio can be configured for both 'Drive-by' reading and reading in 'Fixed network'. It is also possible to choose the meter with integrated Sigfox communication.

### Wired M-Bus

The meter is also available in a version with Wired M-Bus, providing a comprehensive datagram acc. to EN 13757:2013 - used in applications using M-Bus protocol. MULTICAL® 21 with Wired M-Bus is ordered under the name flowIQ® 2101, see also section 'Ordering details'.

- Characteristics in short:
- accurate and reliable
  - ultrasonic metering
  - low start flow
  - measuring water and ambient temperatures
  - remote reading
  - no moving parts – no wear
  - long-term stable – long life
  - powered by a lithium battery
  - multiple info codes
  - large clear display
  - hermetically sealed
  - fully waterproof
  - suitable for mounting in pits.

## Approved meter data

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### MID classifications

Approval	DK-0200-MI001-015
Mechanical environment	Class M1
Electromagnetic environment	Class E1 and E2 for Wireless M-Bus version Class E1 for Wired M-Bus version
Climatic environment	5...55 °C, condensing humidity (indoors mounted in utility rooms and outdoors in meter pits – mounting in direct prolonged sunlight must be avoided)

### OIML R49 designations

Accuracy class	2
Sensitivity class	U0/D0
Ambient class	Fulfils OIML R49 class B and O (building/outdoor)
Medium temperature, cold water	0.1...30 °C (T30) or 0.1...50 °C (T50)
Medium temperature, hot water	0.1...70 °C (T70) or T30/70 (Wired and Wireless M-Bus only)
Meter types	Q <sub>3</sub> = 1.6 m <sup>3</sup> /h, 2.5 m <sup>3</sup> /h and 4.0 m <sup>3</sup> /h

### Drinking water approvals

DVGW W 421, WRAS, ACS, Belgaqua, SCU, PZH, NNK

### ATEX approval

According to 2014/34/EU  
(equipment intended for use in potentially explosive atmospheres, zone 2)

## Technical data

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### Electrical data

Battery	3.65 VDC, 1 C-cell lithium
Battery lifetime:	Up to 16 years at tBAT < 30 °C depending on selected module Up to 8 years at tBAT < 55 °C (M-Bus only)
Battery lifetime Sigfox variants:	Up to 16 years at tBAT < 35 °C depending on selected module
EMC data	Fulfils MID class: - E1 and E2 for Wireless M-Bus and Sigfox version - E1 for Wired M-Bus version
Sigfox classification	Class zero
Sigfox radio zone	RC1, 868 MHz, 14 dBm

### Mechanical data

Metrological class	2
Ambient class	Fulfils OIML R49 class B and O (building/outdoor)
Ambient temperature	2...55 °C
Protection class	IP68
Storage temp. empty sensor	-25...60 °C
Pressure stage	PN16

## Technical data

### Accuracy

MPE [maximum permissible error]

MPE according to OIML R49

Meter approved 0.1...30 °C

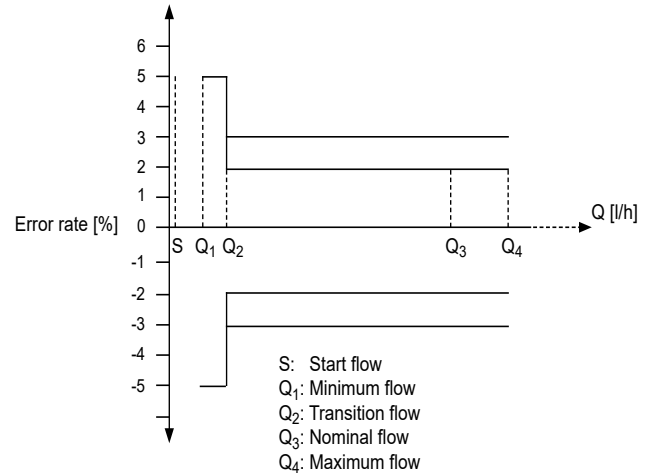
± 5 % in range  $Q_1 \leq Q < Q_2$

± 2 % in range  $Q_2 \leq Q \leq Q_4$

At 30 °C < t < 70 °C

± 5 % in range  $Q_1 \leq Q < Q_2$

± 3 % in range  $Q_2 \leq Q \leq Q_4$



## Material

### Wetted parts

Meter housing and meter pipe PPS with 40 % fibreglass and PSU

Reflectors Stainless steel

Strainer PES

## Meter sizes

MULTICAL® 21/flowIQ® 2101 is available in different combinations of overall length and nominal flow  $Q_3$ .

Type number	Nom. flow $Q_3$ [m <sup>3</sup> /h]	Min. flow $Q_1$ [l/h]	Max. flow $Q_4$ [m <sup>3</sup> /h]	Dynamic range $Q_3/Q_1$	Min. cutoff [l/h]	Max. cutoff [m <sup>3</sup> /h]	Pressure loss $\Delta p$ at $Q_3$ [bar]	Connection on meter	Length [mm]
021-YY-C0A-8XX	1.6	10	2.0	160	2	4.6	0.17	G¾B	110
021-YY-C0B-8XX	1.6	16	2.0	100	2	4.6	0.17	G¾B	110
021-YY-C0T-8XX <sup>1)</sup>	1.6	10	2.0	160	2	4.6	0.17	G¾B	170
021-YY-C0V-8XX <sup>1)</sup>	2.5	10	3.1	250	2	4.6	0.40	G¾B	170
021-YY-C0D-8XX	2.5	10	3.1	250	2	4.6	0.40	G¾B	110
021-YY-C0C-8XX	2.5	25	3.1	100	2	4.6	0.40	G¾B	110
021-YY-C0G-8XX	2.5	10	3.1	250	2	4.6	0.40	G1B	105
021-YY-C0F-8XX	2.5	25	3.1	100	2	4.6	0.40	G1B	105
021-YY-C0H-8XX	2.5	10	3.1	250	2	4.6	0.40	G1B	130
021-YY-C0J-8XX	2.5	25	3.1	100	2	4.6	0.40	G1B	130
021-YY-C0E-8XX	2.5	10	3.1	250	2	4.6	0.40	G1B	190
021-YY-C0K-8XX	2.5	25	3.1	100	2	4.6	0.40	G1B	190
021-YY-C0L-8XX	4.0	16	5	250	3.2	8.5	0.40	G1B	130
021-YY-C0M-8XX	4.0	40	5	100	3.2	8.5	0.40	G1B	130
021-YY-C0N-8XX	4.0	16	5	250	3.2	8.5	0.40	G1B	190
021-YY-C0P-8XX	4.0	40	5	100	3.2	8.5	0.40	G1B	190

<sup>1)</sup> Only for selected markets.

## Meter sizes

The meter is available in cold and hot water versions, controlled by the type number, which is:

- 8XX for cold water and 7XX for hot water.
- XX = country code
- YY = choice of communication
- also see section 'Ordering Details'

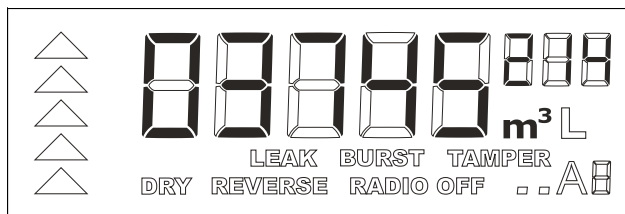
Different extension pipes can be enclosed as accessories. These extension pipes make it possible to adjust the meter to most existing current overall lengths. [See Accessories for Water Meters: 58101270].

## Meter details

Meter information in permanent laser engraved text.



## Display and info codes



The water meter can be read from the large, easily readable, specially designed display. The five large figures indicate number of cubic meters. The three small figures are decimals.

The sign L [to the right of m<sup>3</sup>] will always be off when the meter is in operation as it is solely used during factory control and verification of the meter.

The flow arrows in the left side of the display indicate water flow through the meter. If there is no flow, all arrows will be off.

The info codes in the display have the following meaning and function:

Info code flashes in the display	Meaning
LEAK	The water in the meter has not been stagnant for one continuous hour during the latest 24 hours. This can be a sign of a leaky faucet or toilet cistern.
BURST	The water consumption has been consistently high for half an hour, which indicates a pipe burst.
TAMPER	Attempt of fraud. The meter is no longer valid for billing.
DRY	The meter is not water-filled. In this case nothing will be measured.
REVERSE	The water flows through the meter in the wrong direction.
RADIO OFF flashes	The meter is still in transport mode with the built-in radio transmitter turned off. The transmitter turns on automatically when the first liter of water has run through the meter.
RADIO OFF	RADIO OFF lights permanently. The radio is switched off permanently. Can be activated via DataTool (module 96 and 99 only).
■■ [two squared 'dots']	Two small squares flashing alternately indicate that the meter is active.
'A' followed by a number	Indicates the number of metrologic changes the meter has gone through after factory verification. If no adjustments have been made both the 'A' symbol and the digit are inactive.

Info codes 'LEAK', 'BURST', 'DRY' and 'REVERSE' switch off automatically, when the conditions that activated them no longer exist. In other words, LEAK disappears when the water has been stagnant for one hour, BURST disappears when the consumption falls to normal level, REVERSE disappears when the water no longer flows in the wrong direction, and DRY disappears when the meter is filled with water.

## Measurement of temperatures

---

### Temperature monitoring

MULTICAL® 21/flowIQ® 2101 measures water and ambient temperatures respectively.

The measurements can be used to monitor the installation and to give an indication of the quality of the water.

Both temperatures are logged in the daily, monthly and yearly records.

Minimum, mean and maximum values are being registered daily. The register contains the last 460 days.

The first day of each month minimum, maximum and mean temperatures are stored in the register. The first day of each year minimum and maximum temperatures are stored. The register contains the last 36 months, and the last 10 years.

Temperature values are referred to in °C and can be read via the optical eye and sent by the radio signal. Optional temperature combinations in the radio package are described in the section '*Data registers*'.

### Ambient/meter temperatures

Monitoring the ambient/meter temperature of the installation can be used as a warning of freezing temperatures or unintended high temperatures. The measurement in the meter housing corresponds to the ambient temperature where the meter is installed. The temperature is measured every minute. The calculation of maximum and minimum values is based on a two-minute averaging value. The mean temperature is a time-weighted average value.

### Water temperatures

Water temperature is measured as an indirect measurement of the water using the ultrasound signal. The water temperature is measured every 32 seconds.

The maximum and minimum values are calculated every 2 minutes based on an average since the latest calculation. Measurement of water temperature requires that the meter is filled with water. If there is no water in the meter a code will be saved, saying that the meter is not water filled.

During periods of very low water consumption the water temperature approaches the ambient temperature. To give a correct indication of average water temperature this value is a volume weighted average. During periods without water flow the weighted average cannot be calculated and then a code 128 is stored.



## Data registers

The water meter has a permanent memory, in which the values of various data loggers are saved.

The meter includes the following registers:

Data logging interval	Data logging depth	Logged value
Yearly logger	10 years	See table below
Monthly logger	36 months	See table below
Daily logger	460 days	See table below
Info logger	50 events	Info code, meter reading and date

It is always possible to read target volume and info codes for each of the latest 36 months as well as corresponding meter reading and possible info codes for each of the latest 460 days. The loggers can only be read via the meter's optical eye.

The following registers are logged:

The monthly/yearly logger is written on the first day of the month/year, the daily logger is written at midnight.

Register type	Description	Yearly logger. 10 years	Monthly logger. 36 months	Daily logger. 460 days
Date (YY.MM.DD)	Logging time, year, month and day	✓	✓	✓
Volume	Current meter reading (legal)	✓	✓	✓
Operating hour counter	Accumulated number of operating hours	✓	✓	✓
Info	Information code	–	✓	✓
Vol Reverse	Volume during reverse flow	✓	✓	–
Date of max. flow	Date stamp of max. flow during period	✓	✓	–
Max flow	Value of max. flow during period	✓	✓	✓
Date of min. flow	Date stamp of min. flow during period	✓	✓	–
Min. flow	Value of min. flow during period	✓	✓	✓
Min. temp. water	Water temperature – minimum	✓	✓	✓
Max. temp. water	Water temperature – maximum	✓	✓	✓
Mean temp. water	Volume weighted mean water temp.	–	✓	✓
Min. temp.	Meter temperature – minimum	✓	✓	✓
Max. temp.	Meter temperature – maximum	✓	✓	✓
Mean temp.	Meter temp. – time weighted average	–	✓	✓

Every time the information code changes, date and info codes are logged. Thus, it is possible to data read the latest 50 changes of the information code as well as the date the change was made. Reading is only possible via the optical eye.

## Optional data packages Wireless M-Bus

Part of the data transmitted through the Wireless M-Bus radio signal is optional.

It is possible to choose between different protocols (C1, T1), and various reading intervals, by choosing a specific module. Each module contains the option of choosing between up to 10 different data packages. You MUST choose one data package.

868 MHz			
	C1	T1 OMS	Radio disabled
Modules with actual values	40/XX*	41/XX*	
Module – ‘Radio disabled’			99/XX*

\*] For more module options see document [5512-2336](#).

Note that the logger is reset whenever you change between the various modules.

Also note that the target date is always 31/12 when selecting ‘yearly reading’.

### DataTool

With DataTool, the water utility can itself make various settings on the water meters allocated to its customer number. After successful installation on the computer, the utility has the possibility of selecting between various modules and communication standards. If the meter, for example, is purchased with module 40, it can be reconfigured for one of the other modules. In addition, it is also possible to disable the radio, if necessary. The required preset is already taken into account in the ordering process. DataTool can be requested from Kamstrup by sending an email to [service@kamstrup.com](mailto:service@kamstrup.com).

Module	Battery lifetime		
	16 Years	12 Years	10 Years
868			
40	✓		
41		✓	
48 <sup>1)</sup>			✓
99	✓		
XX <sup>2)</sup>	✓	✓	✓

<sup>1)</sup> Only for selected markets.

<sup>2)</sup> Depends on the chosen module.

A Wireless M-Bus data package is transmitted every 16 seconds (‘drive-by’) or 96 seconds (‘fixed network’).

When sending a data package every 16 seconds the package is kept short and compressed to achieve a long battery life.

At 96 second intervals, a longer and intelligent radio package with built-in ‘repair coding’ is sent – the long battery life is still guaranteed since the transmission interval is increased.

‘Drive-by’ or ‘Fixed network’ need to be chosen when ordering, and can be re-programmed by METERTOOL or DataTool.

## Data package options Sigfox

---

Part of the data transmitted through the Sigfox radio signal is optional.

It is also possible to choose between the different data so it changes from one data package to another. The target volume is mandatory for each transmission, but transmission 1 can have information on max flow, whereas transmission 2 can have information on min. flow. This is called 'Sigfox sequence'.

### Sigfox modules

Module	Sigfox (for climates max 35 °C)
11	Daily values
13	Daily values sequence
97	Radio disabled

### Data packages

Package	0	1	2	3	4
Info codes	✓	✓	✓	✓	✓
Target volume V1	✓	✓	✓	✓	✓
Max flow target		✓	✓	✓	✓
Min. flow target	✓		✓		
Min. water temp.				✓	✓
Max ambient temp.					✓
Min. ambient temp.				✓	

### Sequences

Package	2	3
Sequence	✓	✓

Info codes are pushed one time as soon as they occur. If the info code disappears and appears once again, a new info code is pushed.

The planned transmission will always hold information on active info codes.

## Wired M-Bus version

---

### For billing and analysis

- Fixed datagram
- Up to 9600 baud communication speed
- Primary/secondary/enhanced secondary addressing
- According to M-Bus standard EN 13757:2013

### Introduction

flowIQ® 2101 is available with Wired M-Bus offering easy reading of the water meter via, for example, an M-Bus Master. Also electricity meters or heat/cool meter with a built-in M-Bus micro-master can be used.

The M-Bus interface fulfills the requirements in the M-Bus standard EN 13757:2013 and can be used in a wide variety of applications using M-Bus protocol.

### Applications

The M-Bus meter is designed with focus on high flexibility, to fulfill a wide pallet of applications.

### Analysis

The water meter supports high quantities of data in a fixed datagram. This is valid for both actual meter data as well as for historical logger data.

### Billing

All relevant data for billing purposes can be read out from flowIQ® 2101.

### M-Bus Addressing

The M-Bus interface supports primary, secondary and enhanced secondary addressing.

### Primary addressing – (000-250)

When nothing else is specified, the M-Bus interface will automatically use the last 2-3 digits of the water meter serial number as the primary address.

During the order process or by use of the METERTOOL HCW programming software, dedicated primary addresses can be selected. Further on, the primary address can be changed over the M-Bus network using standardized M-Bus commands.

### Secondary addressing

– [M-Bus ID No. 00000000-99999999]

The last eight digits of the serial number are used as M-Bus ID number for secondary addressing.

### Enhanced Secondary addressing

– [M-Bus ID No. 00000000-99999999]/[ M-Bus fabrication No. 00000000-99999999]

Enhanced secondary addressing is supported by adding the meter's serial number as M-Bus Fabrication Number to the secondary address.

### Installation

The meter is delivered with a 1.5 meter long standard polarity independent connection.

### Communication

Communication is in accordance with the M-Bus standard EN 13757:2013

### Communication speed

The meter supports 300, 2400 and 9600 baud communication speed and automatically detects the communication speed used by the M-Bus master.

### Communication interval

Reading intervals  $\geq$  one minute may not reduce the water meter battery lifetime, at any communication speed. Reading intervals  $\geq$  15 seconds are supported, but this will reduce battery lifetime and provide redundant information.

### Communication via optical read-out head

Apart from the configurations in the flowIQ® 2101 itself, the primary M-Bus address can be configured via the optical readout head and METERTOOL HCW.

### Communication from M-Bus master

The following parameters can be configured with M-Bus commands via the connected M-Bus master:

- Primary address
- Meter clock synchronization.



## Wired M-Bus version

### Communication from flowIQ® 2101 M-Bus

Available data (fixed datagram)

flowIQ® 2101			
M-Bus data header	Actual data	Monthly data	Meter data
M-Bus ID	Water meter reading (volume)	Monthly target meter reading	Information codes
Manufacturer ID	Volume reverse	Min. flow last full month	Config number
Version ID	Hour counter	Max. flow last full month	Meter type (main / sub type)
Device type	Actual flow	Min. water temp. last full mo.	Meter SW Revision
Access counter	Actual water temperature	Avg. water temp. last full mo.	
Status (info codes)	Actual ambient temperature	Min. ambient temp. last full mo.	
Configuration (not used)	Min. flow day <sup>1)</sup>	Max. ambient temp. last full mo.	
	Max. flow day <sup>1)</sup>	Avg. ambient temp. last full mo.	
	Min. water temp. day <sup>1)</sup>	Target date	
	Avg. water temp. day <sup>1)</sup>		
	Min. ambient temp. day <sup>1)</sup>		
	Max. ambient temp. day <sup>1)</sup>		
	Avg. ambient temp. day <sup>1)</sup>		
	Date/time		

<sup>1)</sup>The daily flow and temperatures are the actual daily minimum, average or maximum values, logged from midnight until the present reading time.

### Technical specifications

Physical	Fully integrated M-Bus interface
<b>Communication</b>	
Readout speed	300/2400/9600 baud with automatic speed detection
Communication interval	Longer than 1 minute (recommended)
Protocol	EN 13757:2013
Configuration	METERTOOL HCW via optical read-out head (see page 12)
<b>Supply</b>	
Power consumption	1 unit load (1.5 mA) per M-Bus slave
Rin / Cin	422 Ω/0.5 nF
Max cable resistance	29 Ω/180 nF per pair
Operational temperature	5 - 55 °C

### Markings/approvals

- EN 13757CE approval
- MID

### Ordering

See sections: 'Ordering details' and 'Configuration'.

## Pressure loss

According to OIML R49 the maximum pressure loss must not exceed 0.63 bar (0.063 MPa) in the range  $Q_1$  to  $Q_3$ . The pressure loss in a meter increases with the square of the flow and can be stated as:

$$Q = k_v \times \sqrt{\Delta p}$$

where:

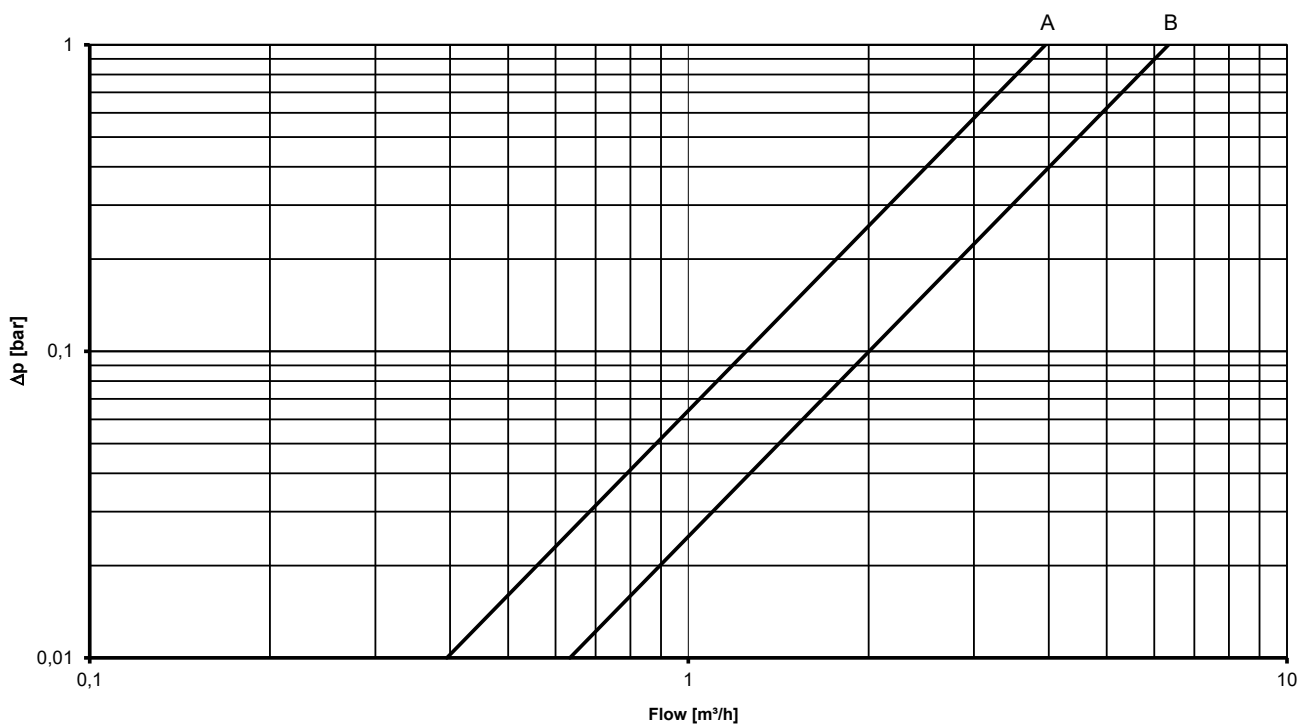
$Q$  = volume flow rate [ $m^3/h$ ]

$k_v$  = volume flow rate at 1 bar pressure loss

$\Delta p$  = pressure loss [bar]

Graph	$Q_3$ [ $m^3/h$ ]	Nom. diameter [mm]	$k_v$	$Q$ at 0.63 bar [ $m^3/h$ ]
A	1,6 & 2,5	DN15 & DN20	3,95	3,1
B	4,0	DN20	6,3	5,0

**$\Delta p$  MULTICAL® 21/flowIQ® 2101**



## Ordering details

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An order is initiated by stating the type number of the selected model of MULTICAL® 21/flowIQ® 2101.

The type number includes information on meter type - cold or hot water, meter size, overall length, battery supply, country code etc. Some of the features included in the type number cannot be changed.

Subsequently, the meter configuration, which determines customer specific requirements, such as number of digits in display etc., is selected. The configuration is completed during programming of the finished meter.

Finally, required accessories, if any, in the form of gaskets, different extension pipes, non-return valve and standard couplings are selected.

Accessories are enclosed separately to be mounted by the installer.

## Ordering details

<b>MULTICAL® 21 /flowIQ® 2101</b>		<b>Type 021</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>0</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Communication</b>											
Wireless M-Bus. 868 MHz. mode C1			XX*								
Wireless M-Bus. 868 MHz. mode T1 - OMS			XX*								
Wired M-Bus			XX*								
Module with disabled radio communication			XX*								
Sigfox			XX*								
*) See document <a href="#">5512-2336</a>											
<b>Supply</b>											
16 years' battery supply, 1 C-cell						C					
<b>Meter size</b>											
<b>Q<sub>3</sub> [m<sup>3</sup>/h]</b>	<b>Connection</b>	<b>Length [mm]</b>	<b>Dynamic range</b>								
1.6	G¾B (R½)	110	160				A				
1.6	G¾B (R½)	110	100				B				
1.6 <sup>1)</sup>	G¾B (R½)	170	160				T				
2.5 <sup>1)</sup>	G¾B (R½)	170	250				V				
2.5	G¾B (R½)	110	250				D				
2.5	G¾B (R½)	110	100				C				
2.5	G1B (R¾)	105	250				G				
2.5	G1B (R¾)	105	100				F				
2.5	G1B (R¾)	130	250				H				
2.5	G1B (R¾)	130	100				J				
4.0	G1B (R¾)	130	250				L				
4.0	G1B (R¾)	130	100				M				
2.5	G1B (R¾)	190	250				E				
2.5	G1B (R¾)	190	100				K				
4.0	G1B (R¾)	190	250				N				
4.0	G1B (R¾)	190	100				P				
1) Only for selected markets											
<b>Meter type</b>											
Hot water meter						7					
Cold water meter						8					
Country code (language on label etc.)									XX		

The country code is used for:

- Language and approval on type label
- Temperature class of water meter, cold water (T30 and T50) or hot water (T70 and T30/70)



## Configuration

	KK	LLL	MMM	N	P	R	S	T
<b>Target date</b> (fixed)	01							
<b>Average time of max. values</b>								
2 minutes		002						
<b>Customer label 2005-MMM</b>			MMM					
<b>Leakage message limit</b>								
OFF				0				
Flow continuously > 0.5 % of Q <sub>3</sub>				1				
Flow continuously > 1.0 % of Q <sub>3</sub>				2				
Flow continuously > 2.0 % of Q <sub>3</sub>				3				
Flow continuously > 0.25 % of Q <sub>3</sub>				4				
Flow continuously > 0.1 % of Q <sub>3</sub>				5				
<b>Pipe burst limit</b>								
OFF					0			
Flow > 5 % of Q <sub>3</sub> for 30 minutes					1			
Flow > 10 % of Q <sub>3</sub> for 30 minutes					2			
Flow > 20 % of Q <sub>3</sub> for 30 minutes					3			
<b>Optional register in data logger</b>								
Depending on the selected communication type, it is possible to select between up to 10 data packages. For further information see document <a href="#">5512-2336</a> .								
<b>Display resolution</b>								
00001 m <sup>3</sup>							0	
00000.1 m <sup>3</sup>							1	
00000.01 m <sup>3</sup>							2	
00000.001 m <sup>3</sup>							3	
<b>Encryption level</b>								
No encryption								0
Utility encryption (only available for selected markets)								2
Encryption with separately forwarded key								3

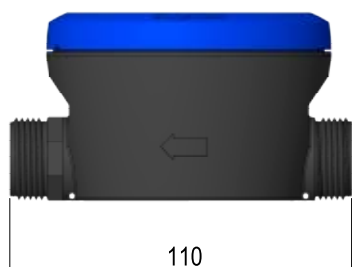
**Unless otherwise stated in the order, Kamstrup supplies the following:**

01	002	000	2	3	5	3	3
----	-----	-----	---	---	---	---	---

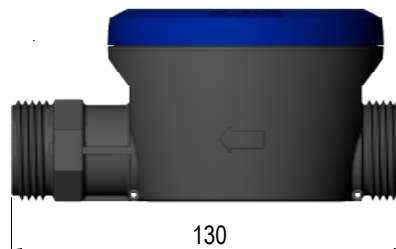
## Dimensioned sketches

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Type A and D – G½B x 110 mm



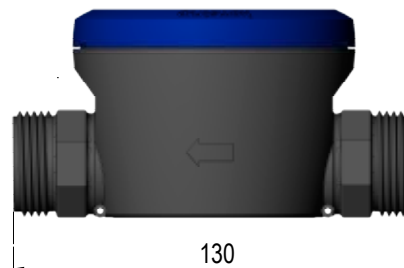
Type H – G1B x 130 mm



Type G – G1B x 105 mm



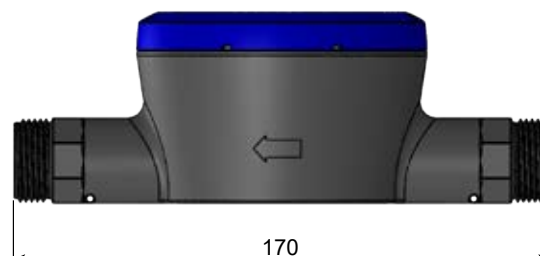
Type L – G1B x 130 mm



Type E and N – G1B x 190 mm



Type T and V – G½B x 170 mm



## Accessories

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See Accessories for Water Meters: 58101270-GB.

For further information about READy, USB Meter Reader and Wireless M-Bus please see the technical description and the installation guide.

Information about Kamstrup's hygiene concept can be found on [products.kamstrup.com](https://products.kamstrup.com).

For more module options see document [5512-2336](#).

MULTICAL® 21 & flowIQ® 2101

Kamstrup A/S • 5810827\_Z2\_GB\_06.2021

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## Data sheet

### MULTICAL® 603

#### The future-proof heat and cooling meter with full flexibility

- Fully programmable data logger with minute loggers
- 2-second integration interval
- 16-years battery lifetime at a reading interval down to 10 seconds
- Possibility of built-in M-Bus
- 2 communication modules
- 7- or 8-digit display resolution
- User-friendly interface with 3 push buttons
- Possibility of backlit display
- Auto Detect of ULTRAFLOW®
- Mixed fluid compatible



MID 2014/32/EU

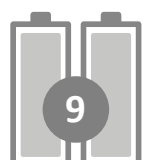
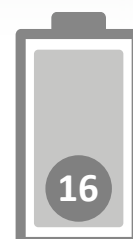


EN 1434

DK-BEK 1178 – 06/11/2014



EN 1434



## Contents

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## Description

---

MULTICAL® 603 is an all-round calculator, suitable as heat meter, cooling meter or combined heat/cooling meter together with 1 or 2 flow sensors and 2 or 3 temperature sensors. The meter is intended for energy measurement in almost all types of thermal installations where water is used as the energy-conveying medium.

MULTICAL® 603 can, in addition to heat and cooling measurement, be used for leakage monitoring, permanent performance monitoring, as power and flow limiter with valve control as well as for energy measurement in both open and closed systems.

According to EN 1434 and MID, MULTICAL® 603 can be designated as a "calculator" with separate type approval and verification, and it can be delivered either as a separate calculator or as a complete meter, with mounted temperature sensors and flow sensor according to customer requirements.

MULTICAL® 603 has 2 flow sensor inputs that can be used for both electronic and mechanical flow sensors. The pulse figure can be programmed from 0.001 to 300 pulses/liter, and the calculator can be programmed to all nominal flow sensor sizes from 0.6 to 15,000 m<sup>3</sup>/h. The calculator can be delivered with both galvanically connected and separated flow sensor inputs.

The accumulated heat energy and/or cooling energy can be displayed in kWh, MWh, GJ or Gcal, all in the form of seven or eight significant digits plus measuring unit. The display has

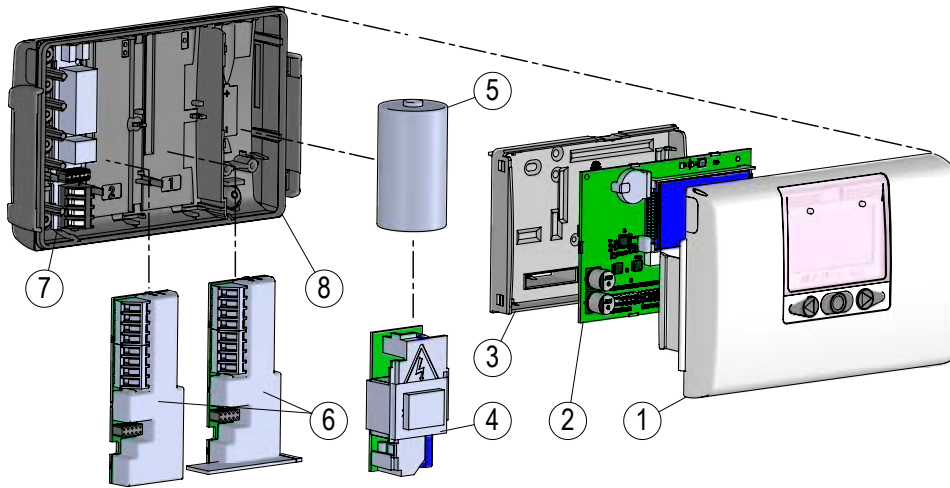
been specially designed with a view to obtaining long lifetime and sharp contrast in a wide temperature range. Furthermore, MULTICAL® 603 can be delivered in a variant with backlit display (type 603-F).

MULTICAL® 603 is powered by an internal D-cell lithium battery with a lifespan of up to 16 years or a 2xAA lithium packet with a lifespan of up to 9 years. Alternatively, the meter can be mains supplied, either by 24 VAC or 230 VAC.

In designing MULTICAL® 603, great importance has been attached to flexibility through programmable functions and plug-in modules in order to secure optimum use in a wide range of applications. The meter has been configured from the factory and is ready for use. It can, however, be changed/reconfigured after installation via the front keys of the meter, READY or METERTOOL HCW.

Auto Detect enables the exchange of ULTRAFLOW® X4 on MULTICAL® 603 without the need for reconfiguration (change of the CCC code). MULTICAL® 603 can automatically adjust the pulse figure and  $q_p$  to match the connected ULTRAFLOW® X4 via Auto Detect. Auto Detect is active with CCC code 8xx and is initiated when the calculator top and base are separated and reassembled.

## Mechanical design



- |   |   |   |  |
|---|---|---|--|
| 1 | Calculator top with front keys and laser engraving                  | 5 | ... or a battery can be mounted                    |
| 2 | PCB with microcontroller, display, etc.                             | 6 | 1 or 2 communication modules                       |
| 3 | Verification cover (may only be opened at an authorised laboratory) | 7 | Connection of temperature sensors and flow sensors |
| 4 | Either a power supply module can be mounted...                      | 8 | Calculator base                                    |

## Mechanical data

Weight	450 g
Ambient temperature	5...55 °C. Non-condensing, closed location (indoor installation)
Protection class	IP65
Medium temperatures ULTRAFLOW®	2...130 °C
Medium in ULTRAFLOW®	Water (district heating water as described in AGFW FW510)
Storage temperature	-25...60 °C (drained flow sensor)
Connection cable	ø3.5...6 mm
Supply cable	ø5...8 mm

At medium temperatures below ambient temperature or above 90 °C in the flow sensor, we recommend that the calculator is wall-mounted.

### Materials

Calculator case	
- Top and base	Thermoplastic, PC 10 % GF with TPE (thermoplastic elastomer)
- Verification cover	ABS
Cables	Silicone cable with inner Teflon insulation



## Approved meter data

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### Approvals

<ul style="list-style-type: none"> <li>- Heat meter</li> <li>- Temperature range</li> <li>- Differential area</li> <li>- Cooling meter</li> <li>- Temperature range</li> <li>- Differential area</li> <li>- Bifunctional heat/cooling meter</li> <li>- Temperature range</li> <li>- Differential area</li> <li>- Mixed fluid meter</li> <li>- Temperature range</li> <li>- Differential area</li> </ul>	<p>DK-0200-MI004-040</p> <p><math>\theta</math>: 2 °C...180 °C</p> <p><math>\Delta\theta</math>: 3 K...178 K</p> <p>TS 27.02 012</p> <p><math>\theta</math>: 2 °C...180 °C</p> <p><math>\Delta\theta</math>: 3 K...178 K</p> <p>Marked with DK-0200-MI004-040 and TS 27.02 012 as well as yearly mark of MID</p> <p><math>\theta</math>: 2 °C...180 °C</p> <p><math>\Delta\theta</math>: 3 K...178 K</p> <p>EN 1434 without MID approval</p> <p><math>\theta</math>: -40 °C...140 °C</p> <p><math>\Delta\theta</math>: 3 K...180 K</p>	<p>The stated minimum temperatures apply to the type approval only. The meter has no cut-off for low temperature and thus measures as low temperatures as 0.01 °C and 0.01 K.</p>
		<p>The temperature area -40 °C ...140 °C indicates the technical functional area in which the calculator calculates energy.</p> <p>The temperature area for any installation depends on the design of the installation and the type of fluid and solution used.</p>

### Standard

EN 1434:2007/AC:2007  
 EN 1434:2015+A1:2018  
 FprEN 1434:2022 from 2022-04

### EU directives

Measuring Instrument Directive  
 Low Voltage Directive  
 Electromagnetic Compatibility Directive  
 Radio Equipment Directive  
 RoHS Directive  
 Pressurised Equipment Directive

### EN 1434 designation

Environmental class A and C

### MID designation

<ul style="list-style-type: none"> <li>- Mechanical environment</li> <li>- Electromagnetic environment</li> </ul>	<p>Class M1 and M2</p> <p>Class E1 and E2 Non-condensing environment, closed location (indoors), 5...55°C</p>
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### Temperature sensor connection

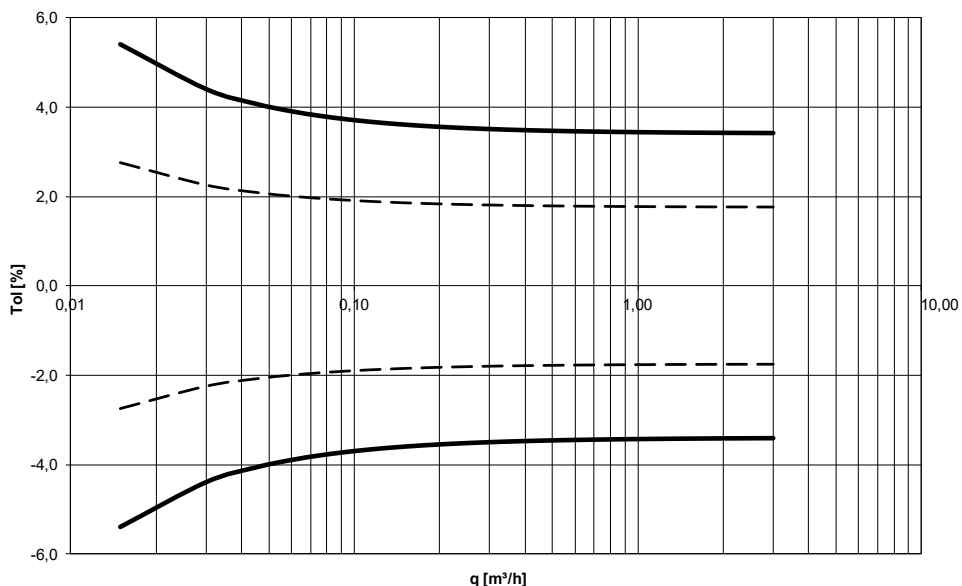
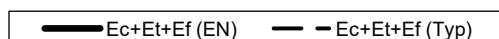
<ul style="list-style-type: none"> <li>- Type 603-A</li> <li>- Type 603-B</li> <li>- Type 603-C/E/F/M</li> <li>- Type 603-D/G/H</li> </ul>	<p>Pt100 – EN 60751, 2-wire connection</p> <p>Pt100 – EN 60751, 4-wire connection</p> <p>Pt500 – EN 60751, 2-wire connection</p> <p>Pt500 – EN 60751, 4-wire connection</p>
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## Accuracy

Heat meter components	MPE according to EN 1434-1	Typical accuracy
MULTICAL® 603	$E_c = \pm [0.5 + \Delta\Theta \text{ min}/\Delta\Theta] \%$	$E_c = \pm [0.15 + 2/\Delta\Theta] \%$
ULTRAFLOW®	$E_f = \pm [2 + 0.02 q_p/q]$ , but not above $\pm 5 \%$	$E_f = \pm [1 + 0.01 q_p/q] \%$
Temperature sensor set	$E_t = \pm [0.5 + 3 \Delta\Theta \text{ min}/\Delta\Theta] \%$	$E_t = \pm [0.4 + 4/\Delta\Theta] \%$

### MULTICAL® 603 and ULTRAFLOW® $q_p 1.5 \text{ m}^3/\text{h} @ \Delta\Theta 30\text{K}$

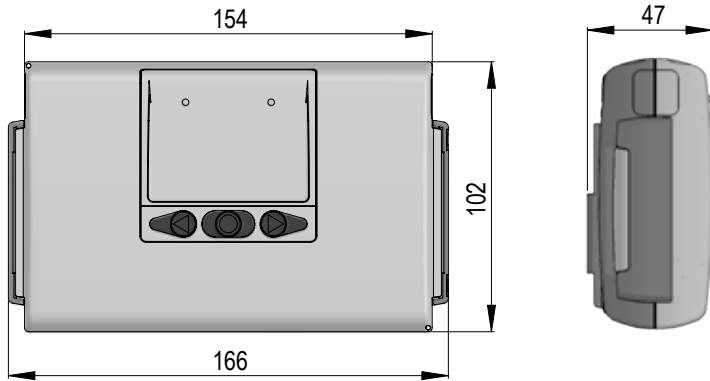
Total typical accuracy of MULTICAL® 603, sensor pair and ULTRAFLOW® compared to EN 1434-1.



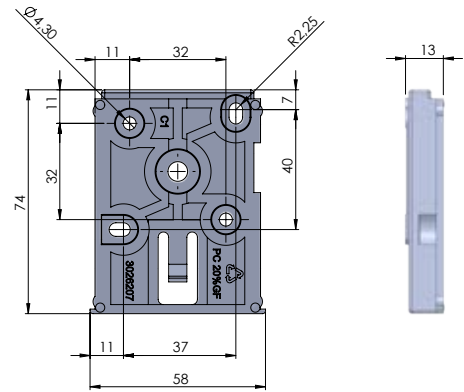
## Dimensioned sketches

All measurements in [mm].

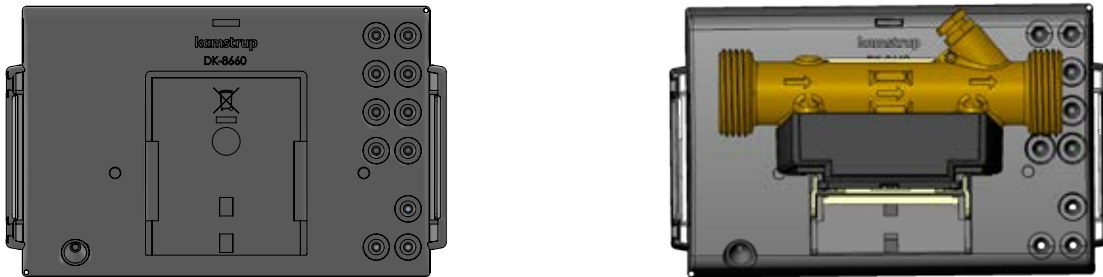
### Mechanical measurements for MULTICAL® 603 calculator



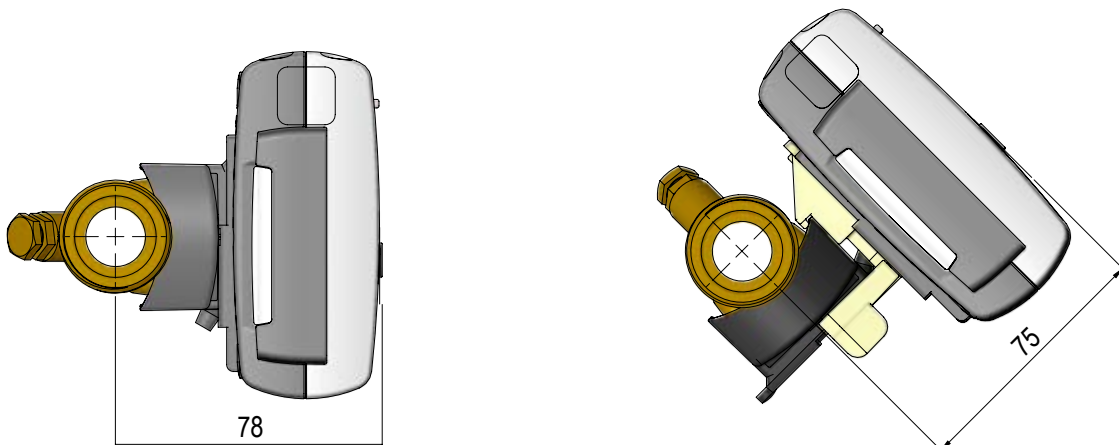
### Bracket for wall mounting



### Calculator base separate and mounted on ULTRAFLOW®



### MULTICAL® 603 mounted on ULTRAFLOW® with G $\frac{3}{4}$ threaded connection



## Electrical data

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### Calculator data

Display	LCD – 7 or 8 digits, digit height 8.2 mm
Resolutions	999,9999 – 9999,999 – 99999,99 – 999999,9 – 9999999 9999,9999 – 99999,999 – 999999,99 – 9999999,9 – 99999999
Energy units	MWh – kWh – GJ – Gcal
Data logger (EEPROM)	
– Logger contents	Programmable – all registers can be selected
– Logging interval	Programmable – from 1 minute to 1 year
– Logging depth	Programmable – standard: 20 years, 36 months, 460 days, 1400 hours
Info logger (EEPROM)	250 info codes (last 50 are shown in the display)
Clock/calender (with backup battery)	Clock, calendar, leap year compensation, target date
Daylight saving time/wintertime (DST)	Programmable This function can be disabled so that “technical normal time” is used
Time accuracy	Without external adjustment: Less than 15 min./year With external adjustment every 48 hours: Less than 7 s from legal time
Data communication	KMP protocol with CRC16 used for optical communication as well as for modules
Power in temperature sensors	< 10 µW RMS
Power supply	3.6 VDC ± 0.1 VDC

## Electrical data

Battery

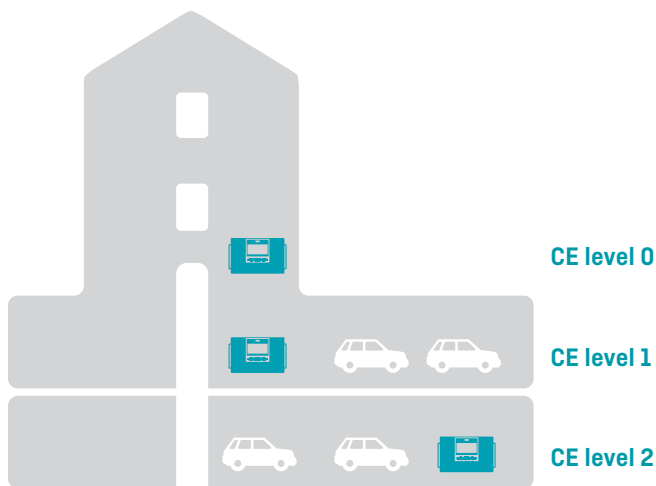
	3.65 VDC, D-cell lithium	3.65 VDC, 2xA cell lithium
Wall-mounted	16 years @ $t_{BAT} < 30\text{ °C}$	9 years @ $t_{BAT} < 30\text{ °C}$
Mounted on flow sensor	14 years @ $t_{BAT} < 40\text{ °C}$	7 years @ $t_{BAT} < 40\text{ °C}$

**Note:** Depends on the meter and module configuration

Battery lifetime expected for a meter fitted with a NB-IoT module

Up to 16 years (daily transmission) depending on the installation site and the NB-IoT coverage level called "CE level"

CE level	C-Cell IoT
0	Up to 16 years
1	Up to 15 years
2	Up to 12 years



Mains supply

230 VAC +15/-30 %, 50/60 Hz  
24 VAC ±50 %, 50/60 Hz or 24 VDC +75/-25 % [24 VDC only High Power SMPS]

Insulation voltage

3.75 kV

Power consumption

< 1 W

Backup supply

Integrated supercap eliminates interruptions due to short-term power failures (only supply modules type 7 and 8)

## Electrical data

Temperature measurement	t1 Inlet	t2 Outlet	t3 Control	t4 Extra	$\Delta\Theta$ (t1-t2) Heat measurement	$\Delta\Theta$ (t2-t1) Cooling measurement	t5 Preset for A1 and A2
Measuring range	0.00...185.00 °C (t1 and t2: Approved for 2.00...180.00°C)						
603-A, 2-wire, Pt100	0.00...185.00 °C (t1 and t2: Approved for 2.00...180.00°C)						
603-B, 4-wire, Pt100	0.00...185.00 °C (t1 and t2: Approved for 2.00...180.00°C)						
603-C/E/F, 2-wire, Pt500	0.00...185.00 °C (t1 and t2: Approved for 2.00...180.00°C)						
603-D/G/H, 4-wire, Pt500	0.00...185.00 °C (t1 and t2: Approved for 2.00...180.00°C)						
603-M, 2-wire, Pt500	-42,00...143,00 °C (Labelled -40 °C...140 °C on the meter)						
Offset adjustment	± 0.99 K joint zero point adjustment for t1, t2 and t3						
<b>Note:</b> The offset adjustment is only active on measured temperatures. If, for example, t3 has been selected for a preset value, the offset adjustment will not influence the preset value.							
Max cable lengths (max $\varnothing$ 6 mm cable)	Pt100, 2-wire		Pt100, 4-wire		Pt500, 2-wire		Pt500, 4-wire
	2 x 0.25 mm <sup>2</sup> : 2.5 m 2 x 0.50 mm <sup>2</sup> : 5 m 2 x 1.00 mm <sup>2</sup> : 10 m		4 x 0.25 mm <sup>2</sup> : 100 m		2 x 0.25 mm <sup>2</sup> : 10 m		4 x 0.25 mm <sup>2</sup> : 100 m
Flow measurement V1/V2	ULTRAFLOW® V1: 9-10-11 V2: 9-69-11		Reed contacts V1: 10-11 V2: 69-11		FET contacts V1: 10-11 V2: 69-11		24 V active pulses V1: 10B-11B V2: 69B-79B
CCC-code	1xx-2xx-4xx-5xx-8xx		0xx		9xx		2xx and 9xx
EN 1434 pulse class	IC		IB		IB		[IA]
Pulse input	680 k $\Omega$ pull-up to 3.6 V		680 k $\Omega$ pull-up to 3.6 V		680 k $\Omega$ pull-up to 3.6 V		12 mA at 24 V
Pulse ON	< 0.4 V in > 1 ms		< 0.4 V in > 300 ms		< 0.4 V in > 30 ms		< 4 V in > 3 ms
Pulse OFF	> 2.5 V in > 4 ms		> 2.5 V in > 100 ms		> 2.5 V in > 70 ms		> 12 V in > 4 ms
Pulse frequency	< 128 Hz		< 1 Hz		< 8 Hz		< 128 Hz
Integration frequency	< 1 Hz		< 1 Hz		< 1 Hz		< 1 Hz
Electrical isolation	No		No		No		2 kV
Max cable length	10 m		10 m		10 m		100 m
Max cable length with Cable Extender Box, Type 66-99-036	30 m		30 m		30 m		-
Pulse inputs In-A/In-B	Electronic switch				Reed-switch		
Pulse input	680 k $\Omega$ pull-up to 3.6 V				680 k $\Omega$ pull-up to 3.6 V		
Pulse ON	< 0.4 V in > 30 ms				< 0.4 V in > 500 ms		
Pulse OFF	> 2.5 V in > 30 ms				> 2.5 V in > 500 ms		
Pulse frequency	< 3 Hz				< 1 Hz		
Electrical isolation	No				No		
Max cable length	25 m				25 m		
Requirements to external contact	Leakage current at function open < 1 $\mu$ A						
Pulse outputs Out-C/Out-D	HC-003-11 HC-003-21/-31 (before 2017-05) (before 2018-04)				HC-003-11 HC-003-21/-31 (after 2017-05) (after 2018-04)		
Pulse output type	Open collector (OB)				Opto FET		
External voltage	5...30 VDC				1...48 VDC/VAC		
Current	< 10 mA				< 50 mA		
Residual stress	$U_{CE} \approx 1$ V at 10 mA				$R_{ON} \leq 40 \Omega$		
Electrical isolation	2 kV				2 kV		
Max cable length	25 m				25 m		

## Product variants

### MULTICAL® 603 type number

					Statistical data Written on the meter's front 603-X X XX –			Dynamic data Appearing from display X XX X XX XX					
Type 603-					□	□	□□	-	□	□□	□	□□	□□
<b>Calculator type</b>													
Pt100 2-wire	t1-t2	V1	M-Bus	A									
Pt100 4-wire	t1-t2	V1	M-Bus	B									
Pt500 2-wire	t1-t2	V1	M-Bus	C									
Pt500 4-wire	t1-t2	V1	M-Bus	D									
Pt500 2-wire	t1-t2-t3	V1-V2		E									
Pt500 2-wire	t1-t2-t3	V1-V2	Backlit display	F									
Pt500 4-wire	t1-t2	V1 [24 V active pulses]	M-Bus	G									
Pt500 4-wire	t1-t2-t3	V1-V2		H									
Pt500 2-wire	t1-t2-t3	V1-V2	(Mixed fluid only)	M									
<b>Meter type</b>													
Heat meter		MID module B		1									
Heat meter		MID module B+D		2									
Heat/cooling meter		MID module B+D & TS 27.02 *	$\theta_{HC} = \text{OFF}$	3									
Heat meter		National approval		4									
Cooling meter		TS 27.02+BEK1178		5									
Heat/cooling meter		MID module B+D & TS 27.02 *	$\theta_{HC} = \text{ON}$	6									
Volume meter, hot				7									
Volume meter, cold				8									
Energy meter				9									
<b>Country code</b>													
Determined by Kamstrup upon receipt of order													XX

\* In some countries bi-functional meters type 3 and 6 are only allowed to be assigned with the MID marking, due to national law.

## Product variants

### MULTICAL® 603 type number

Statistical data  
Written on the  
meter's front  
603-X XX X -

Dynamic data  
Appearing from display

X XX X XX XX

Type 603- □ □ □□ - □ □□ □ □□ □□

#### Flow sensor connection type

Delivered with one ULTRAFLOW®	1
Delivered with two identical ULTRAFLOW®	2
Prepared for one ULTRAFLOW®	7
Prepared for two identical ULTRAFLOW®	8
Prepared for flow sensor with fast and bounce-free electronic pulses	C
Prepared for flow sensor with slow and bounce-free electronic pulses	J
Prepared for flow sensor with slow pulses with bounce	L
Prepared for flow sensor with 24 V active pulses	P
Delivered with one flow sensor (Mixed fluid only)	G

#### Temperature sensor set

Supplied without temperature sensors	00		
<b>2-wire Pt500 temperature sensors</b>			
Direct short temperature sensors, 2 pcs.	DS 27.5 mm	L 1.5 m - 3.0 m	5x
Direct short temperature sensors, 2 pcs.	DS 38.0 mm	L 1.5 m - 3.0 m	2x
Pocket temperature sensors, 2 pcs.	PL ø5.8 mm	1.5 m - 10 m	8x
<b>2-wire Pt100 temperature sensors</b>			
Direct short temperature sensors, 2 pcs.	DS 27.5 mm	L 2.0 m	J6
<b>4-wire Pt500/Pt100 temperature sensors</b>			
Pocket temperature sensors with connection head, 2 pcs.	PL ø6.0 mm	L 105 mm - 230 mm	Ax
Pocket temperature sensors with connection head, 2 pcs.	PL ø5.8 mm	L 65 mm - 180 mm	Cx

#### Supply

No supply	0
Battery, 1 x D-cell	2
230 VAC high-power SMPS	3
24 VAC/VDC high-power SMPS	4
Battery, 1 x D-cell IoT	5
230 VAC power supply	7
24 VAC power supply	8
Battery, 2 x A-cells	9

#### Communication module (2 module slots)

No module	00	M1	M2
Data Pulse, inputs (In-A, In-B)	10	10	10
Data Pulse, outputs (Out-C, Out-D)	11	11	11
Wired M-Bus, inputs (In-A, In-B)	20	20	20
Wired M-Bus, outputs (Out-C, Out-D)	21	21	21
Wired M-Bus, Thermal Disconnect	22	22	22
linkIQ/wM-Bus, inputs (In-A, In-B), EU	32	32	32
linkIQ/wM-Bus, outputs (Out-C, Out-D), EU	33	33	33
wM-Bus, inputs (In-A, In-B), 912,5/915/918,5 MHz	34	34	34
Analog outputs 2 x 0/4...20 mA	40	40	40
Analog inputs 2 x 4...20 mA/0...10 V	41	41	41
PQT Controller	43	43	43
Low Power Radio, inputs (In-A, In-B), 434 MHz	50	50	50
Low Power Radio GDPR, inputs (In-A, In-B), 434 MHz	51	51	51
NB-IoT, inputs (In-A, In-B)	56	56	56
LON TP/FT-10, inputs (In-A, In-B)	60	60	60
BACnet MS/TP, inputs (In-A, In-B)	66	66	66
Modbus RTU, inputs (In-A, In-B)	67	67	67
2G/4G Network	80	80	80
BACnet IP, inputs (In-A, In-B)	81	81	81
Modbus/KMP TCP/IP, inputs (In-A, In-B)	82	82	82
READy TCP/IP, inputs (In-A, In-B)	83	83	83
High Power Radio Router, inputs (In-A, In-B), 444 MHz	84	84	84
High Power Radio Router GDPR, inputs (In-A, In-B), 444 MHz	85	85	85

Contact Kamstrup A/S for further information about product variants.



## Meter configuration

	A	B	CCC	DDD	EE	FF	GG	L	M	N	PP	RR	T	VVV
<b>Flow sensor position</b>														
Inlet	3													
Outlet	4													
<b>Measuring unit</b>														
GJ	2													
kWh	3													
MWh	4													
Gcal	5													
<b>Auto Detect CCC codes (UF x4)</b>														
Normal resolution (7 digits)			807											
High resolution (8 digits)			818											
<b>Static CCC codes</b>														
Reed contact (7 digits)			0xx											
Electronic, fast pulses (7 digits)			1xx											
Electronic, fast pulses (8 digits)			2xx											
Kamstrup, UF X4 (7 digits)			4xx											
Kamstrup, UF X4 (8 digits)			5xx											
Electronic, slow pulses (7 digits)			9xx											
<b>Display</b>														
Heat meter (standard)				210										
Heat/cooling meter (standard)				310										
Cooling meter (standard)				510										
<b>Tariffs</b>														
No active tariff					00									
Power tariff					11									
Flow tariff					12									
t1-t2 tariff					13									
Inlet tariff					14									
Outlet tariff					15									
Time-controlled tariff					19									
Heat/cooling volume tariff					20									
PQ tariff					21									
<b>Pulse inputs In-A/In-B</b>														
10 m <sup>3</sup> /h, 10 l/imp, pre-counter 1 (standard)						24	24							
<b>Integration mode</b>														
Adaptive mode (2-64 s)	Display on							1						
Normal mode (32 s)	Display on							2						
Fast mode (8 s)	Display on							3						
Fast mode (2 s)	Display on							4						
Adaptive mode (2-64 s)	Display off							5						
Normal mode (32 s)	Display off							6						
Fast mode (8 s)	Display off							7						
<b>Leakage limits (V1/V2)</b>														
OFF										0				
1.0 % of q <sub>p</sub> + 20 % of q										1				
1.0 % of q <sub>p</sub> + 10 % of q										2				
0.5 % of q <sub>p</sub> + 20 % of q										3				
0.5 % of q <sub>p</sub> + 10 % of q										4				
<b>Cold water leakage limits (In-A/In-B)</b>														
OFF														0
30 min. without pulses														1
One hour without pulses														2
Two hours without pulses														3

## Meter configuration

	A	B	CCC	DDD	EE	FF	GG	L	M	N	PP	RR	T	VVVV
<b>Pulse outputs Out-C/Out-D</b>														
Out-C: V1/4											73			
Out-C: V1/1, Out-D: V2/1											80			
Out-C: V1/1											82			
Out-C: V1/4											83			
E1 and V1 or E3 and V1											94			
E1 and V1 or E3 and V1											95			
E1 and V1 or E3 and V1											96			
Controlled output based on data commands											99			
<b>Data logger profile</b>														
Standard data logger profile												10		
<b>Encryption level</b>														
Individual key													3	
<b>Customer label</b>														
Serial number														0000

Contact Kamstrup A/S for further information about meter configuration.

## Information codes in display

Display digit								Description
1	2	3	4	5	6	7	8	
Info	t1	t2	t3	V1	V2	In-A	In-B	
1								No voltage supply
2								Low battery level
9								External alarm (e.g. via KMP)
	1							t1 Above measuring range or switched off
		1						t2 Above measuring range or switched off
			1					t3 Above measuring range or switched off
	2							t1 Below measuring range or short-circuited
		2						t2 Below measuring range or short-circuited
			2					t3 Below measuring range or short-circuited
	9	9						t1-t2 Invalid temperature difference
				1				V1 Communication error
					1			V2 Communication error
				2				V1 Wrong pulse figure
					2			V2 Wrong pulse figure
				3				V1 Air
					3			V2 Air
				4				V1 Wrong flow direction
					4			V2 Wrong flow direction
				6				V1 Increased flow (flow1 > q <sub>s</sub> , for more than 1 hour)
					6			V2 Increased flow (flow2 > q <sub>s</sub> , for more than 1 hour)
				7				V1/V2 Burst, water loss (flow1 > flow2)
					7			V1/V2 Burst, water penetration (flow1 < flow2)
				8				V1/V2 Leakage, water loss (M1 > M2)
					8			V1/V2 Leakage, water penetration (M1 < M2)
						7		In-A2 Leakage in the system
						8		In-A1 Leakage in the system
						9		In-A1/A2 External alarm
							7	In-B2 Leakage in the system
							8	In-B1 Leakage in the system
							9	In-B1/B2 External alarm

### Example:

1	0	2	0	0	0	9	0	
---	---	---	---	---	---	---	---	--

**Note:** Info codes are configurable. Therefore, it is not certain that all the parameters are available in a given MULTICAL® 603. An info logger saves the info code every time the info log is changed. It is possible to read the latest 250 changes of the info code and the date of the change.

## Accessories

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Article number	Description
HC-993-02	Battery module with one D-cell
HC-993-03	230 VAC High Power supply module
HC-993-04	24 VAC/VDC High Power supply module
HC-993-05	Battery module with one D-cell IoT
HC-993-07	230 VAC supply module
HC-993-08	24 VAC supply module
HC-993-09	Battery module with two A-cells
2105-002	Sealing cap, G $\frac{3}{4}$ B (R $\frac{1}{2}$ )
3026-1148	Sealing cap, self locking, G $\frac{3}{4}$ B (R $\frac{1}{2}$ )
3026-207.A	Wall bracket with screws and plugs for MULTICAL® 603
3026-517	Sealing cap for temperature sensors, blue 2 pcs.
3026-518	Sealing cap for temperature sensors, red 2 pcs.
3026-858	Angle fitting ULTRAFLOW® (qp 0.6...2.5)
3026-909	Holder for optical readout head
3026-963	Disassemble tool for MULTICAL® 603
3130-262	Blind plug with O-ring
3130-269	Cable clamp with screws
5000-337	Module cable, 2 m (2 x 0.25 mm <sup>2</sup> )
6699-035	USB module configuration cable
6699-036	Cable Extender Box
6699-042	Metal plate for optical read-out head (20 pcs)
6699-047	Supply label MULTICAL® 403/603, 10 pcs. (2006-681)
6699-099	Infrared optical read-out head w/USB plug
6699-110	Panel bracket
6699-403	230/24 VAC safety transformer 5 VA
6699-404	230/24 VAC safety transformer 10 VA
6699-405	230/12/24 VAC safety transformer 63 VA
6699-447.E	Internal antenna for Kamstrup radio, 434 MHz
6699-448	Mini Triangle antenna for Wireless M-Bus and 2G/4G Network Module
6699-482.E	Internal antenna for Wireless M-Bus 868 MHz
6699-724	METERTOOL HCW
6699-725	LogView HCW

### Calibration units

Article number	Description
6699-363	2-wire Pt500, heat/cooling (used with METERTOOL HCW)
6699-364	4-wire Pt500, heat/cooling (used with METERTOOL HCW)
6699-365	2/4-wire Pt100, heat/Cooling (used with METERTOOL HCW)

For further information on MULTICAL® 603 and its accessories, please refer to the technical description, which you can find on [Kamstrup Product Centre](#).

### Kamstrup A/S

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 T: +45 89 93 10 00  
 info@kamstrup.com  
 kamstrup.com

## ARTICULO: 2103

### Válvula de mariposa tipo wafer

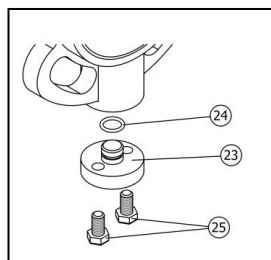
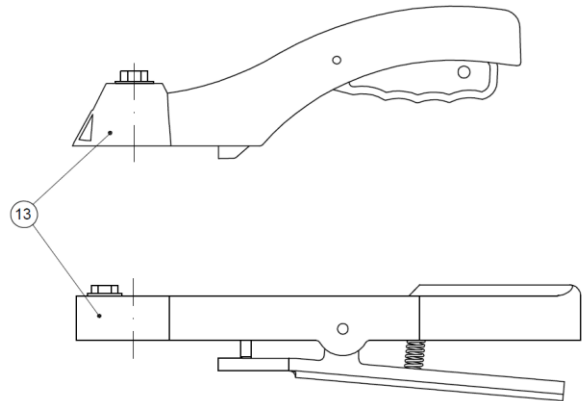
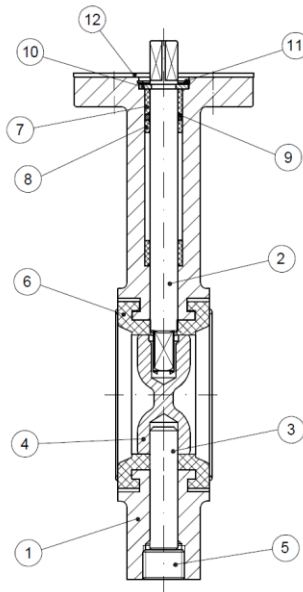
### Butterfly valve wafer type

#### Características

1. Válvula de mariposa tipo wafer.
2. Cuerpo de fundición EN-GJL-200 (GG-20) para montaje entre bridas ANSI 150 y EN 1092 PN 10/16.
3. Elastómero de EPDM.
4. Disco de fundición dúctil EN-GJS-400 (GGG-40).
5. Brida montaje actuadores según ISO 5211.
6. Longitud entre caras según UNE EN 558-1 Serie 20 (DIN 3202 K1).
7. Recubrimiento con pintura Epoxi.
8. Temperatura de trabajo  $-20^{\circ}\text{C}$   $+120^{\circ}\text{C}$ .
9. Máxima presión de trabajo:  
16 bar (medidas 2" a 12")  
10 bar (medidas 14" a 24")

#### Features

1. Butterfly valve wafer type.
2. EN-GJL-200 (GG-20) CI body allows installation between ANSI 150 and EN 1092 PN 10/16 flanges.
3. EPDM body seat.
4. Disc made of Ductile Iron EN-GJS-400 (GGG-40).
5. Actuator mounting plate according to ISO 5211.
6. Face to face according to UNE EN 558-1 Series 20 (DIN 3202 K1).
7. Epoxy coating.
8. Working Temperature  $-20^{\circ}\text{C}$   $+120^{\circ}\text{C}$ .
9. Maximum working pressure:  
16 bar (sizes 2" to 12")  
10 bar (sizes 14" to 24")

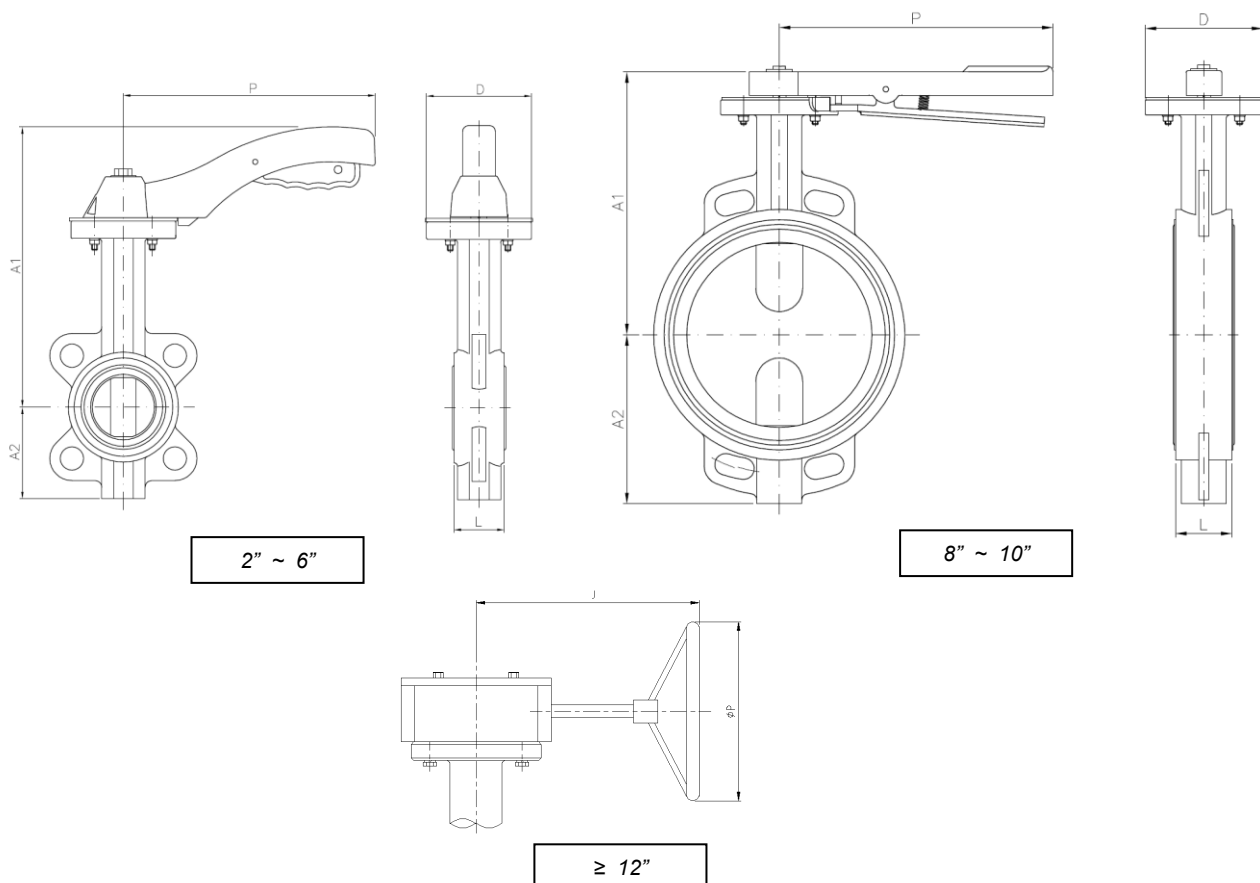


**Solamente /  
Only  $\geq 14''$**

N.	Denominación / Name	Material	Acabado Superficial / Surface Treatment	Cód. Recambio Spare Part Code
1	Cuerpo / Body	Fundición / Cast Iron EN-GJL-200	Pintado Epoxi / Epoxy Painted	-----
2	Eje / Stem	Acero Inox. / Stainless Steel AISI 416	-----	-----
3	Pivote / Pivot	Acero Inox. / Stainless Steel AISI 416 ( $\leq 12''$ )	-----	-----
4	Disco / Disc	Fundición / Ductile Iron EN-GJS-400	Niquelado / Nickel Plated	-----
5	Tapón / Plug	Acero Carbono / Carbon Steel ( $\leq 12''$ )	Cincado / Zinc Plated	-----
6*	Elastómero / Seat	EPDM	-----	E2109
7	Casquillo / Bush	PTFE + Grafito / Graphite	-----	-----
8	Casquillo / Bush	PTFE + Grafito / Graphite	-----	-----
9	Tórica / O' ring	NBR	-----	-----
10	Arandela / Washer	Acero Carbono / Carbon Steel	Cincado / Zinc Plated	-----
11	Seguro / Stop Ring	Acero Carbono / Carbon Steel	Cincado / Zinc Plated	-----
12	Placa dentada / Plate	Acero Carbono / Carbon Steel	Cincado / Zinc Plated	-----
13	Palanca / Handle	Aluminio o Fundición EN-GJL-200 / Aluminium or Cast iron EN-GJL-200	Pintado Epoxi / Epoxy Painted	-----
23	Tapón /	Fundición / Cast Iron EN-GJL-200 ( $\geq 14''$ )	Pintado Epoxi / Epoxy Painted	-----
24	Tórica / O'ring	NBR ( $\geq 14''$ )	-----	-----
25	Tornillo / Bolt	Acero Carbono / Carbon Steel ( $\geq 14''$ )	Cincado / Zinc Plated	-----

\* Piezas de recambio disponibles / Available spare parts

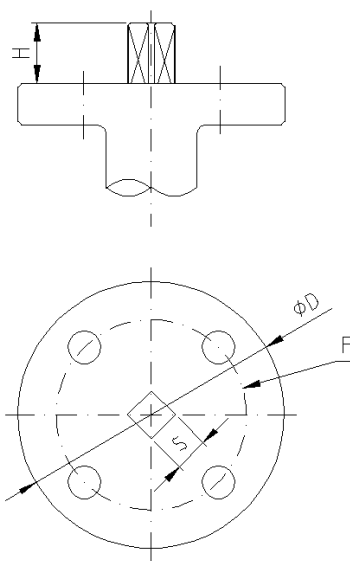
## DIMENSIONES GENERALES / GENERAL DIMENSIONS



Ref	Medida / Size	DN	PN	L	Dimensiones / Dimensions (mm)				Peso / Weight (kg)
					A1	A2	J	P	
2103 09	2"	50	16	43	238	70	***	170	2,800
2103 10	2 ½"	65	16	46	238	80	***	170	3,300
2103 11	3"	80	16	46	238	100	***	170	3,800
2103 12	4"	100	16	52	270	115	***	215	5,800
2103 13	5"	125	16	56	300	135	***	215	7,400
2103 14	6"	150	16	56	300	150	***	215	8,350
2103 16	8"	200	16	60	280	180	***	300	14,400
2103 18	10"	250	16	68	330	215	***	300	21,800
2103 20	12"	300	16	78	360	250	240	290	38,800
2103 22	14"	350	10	78	390	260	257	290	56,100
2103 24	16"	400	10	102	420	300	257	290	77,600
2103 26	18"	450	10	114	445	330	306	400	115,500
2103 28	20"	500	10	127	480	370	306	400	144,500
2103 32	24"	600	10	152	710	467	342	400	243,000

\*\*\* Nota: De 2" a 6" Maneta de aluminio / From 2" to 6" Aluminium handle.  
De 8" a 10" Maneta de fundición de hierro / From 8" to 10" cast iron handle.  
A partir de 12" operación mediante reductor manual / From 12", handling by gear box.

### Dimensiones de brida superior / Top flange dimensions:



Top flange dimensions						
Article	DN	F (ISO5211)	S	D	H	Torque N·m
2103 09	50	F05	11	65	16	12
2103 10	65	F05	11	65	16	20
2103 11	80	F05	11	65	16	27
2103 12	100	F07	14	90	16	40
2103 13	125	F07	14	90	16	60
2103 14	150	F07	14	90	16	90
2103 16	200	F07/F10	17	125	28	130
2103 18	250	F10	22	125	28	180
2103 20	300	F10/F12	22	150	28	270
2103 22	350	F12	22	150	45	610
2103 24	400	F14	27	175	45	805
2103 26	450	F14	27	175	45	1100
2103 28	500	F14	36	175	45	1500
2103 32	600	F16	∅ 50,65	210	70	2500

**Perdidas de Carga ( Kv ) según posición del disco / Head losses according to disc position:**

DN	Posición del Disco (grados) / Disc Position (degrees)								
	90°	80°	70°	60°	50°	40°	30°	20°	10°
50	125	99	73	53	37	23	14	6	0,9
65	244	193	141	93	58	37	21	10	1,3
80	399	315	231	133	83	53	30	13	1,7
100	727	606	429	237	148	94	54	23	2,6
125	1190	991	670	370	232	147	85	37	4
150	1600	1334	887	490	306	195	112	48	5
200	2868	2458	1611	935	588	364	208	88	10
250	4697	3914	2550	1479	931	577	330	140	16
300	6987	5822	3800	2217	1379	869	480	203	23
350	9115	7676	5137	2927	1859	1142	654	259	29
400	12081	10173	6805	3878	2463	1513	866	343	39
450	14890	12539	8706	4962	3151	1935	1108	439	50
500	19323	16272	10843	6180	3924	2410	1380	547	62
600	37295	33939	22626	14297	8640	4848	2238	1057	130

**VALORES DE Kv / Kv VALUES**

Kv = Es la cantidad de metros cúbicos por hora (m<sup>3</sup>/h) que pasará a través de la válvula generando una pérdida de carga de 1 bar.

*Kv = Flow rate of water in cubic meter per hour (m<sup>3</sup>/h) that will generate a pressure drop of 1 bar across the valve.*

**VALORES DE Cv / Cv VALUES**

Cv = Es la cantidad de galones por minuto (gpm) que pasará a través de la válvula generando una pérdida de carga de 1 psi.

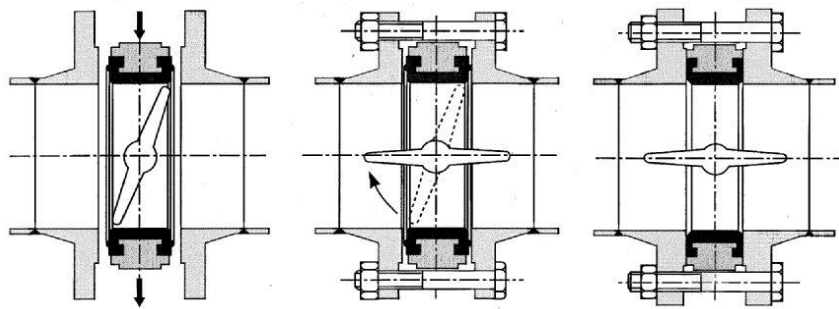
*Cv = Flow rate of water (g.p.m.) which generates a pressure drop of 1 psi across the valve.*

$$\boxed{Cv = 1,156 \cdot Kv}$$

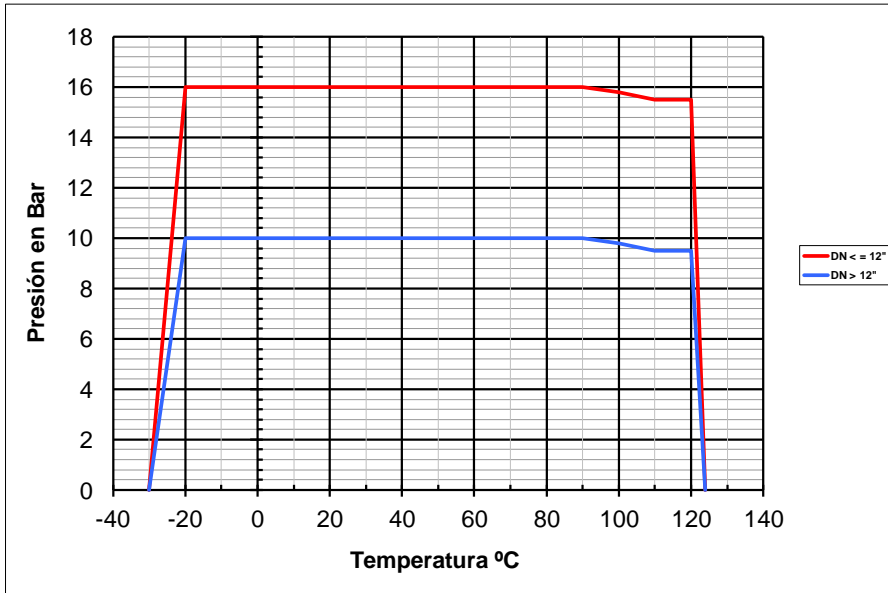
**Medidas de Precaución para la instalación / Caution measures for Installation:**

1. No instale la válvula en posición totalmente cerrada / *Do not install the butterfly valve in total closed position.*
2. Verifique el buen paralelismo de las bridas / *Check the good parallelism of the flanges.*
3. No coloque otras juntas entre las bridas / *Do not insert other gaskets between flange and valve.*
4. Abra totalmente la válvula antes de apretar las bridas / *Open completely the valve before tightening flanges.*





**CURVA PRESIÓN TEMPERATURA / PRESSURE TEMPERATURE RATING**



## ARTICULO: 2458G

### Filtro "Y" extremos bridados

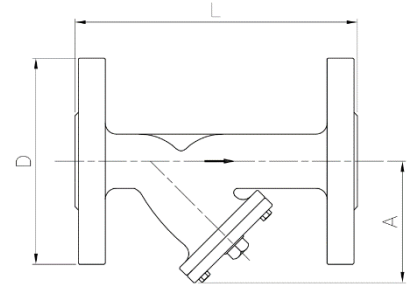
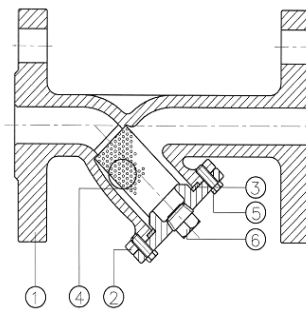
### Flanged ends "Y" Strainer

#### Características

1. Filtro "Y".
2. Extremos bridados según EN 1092 PN 16.
3. Longitud entre caras según EN 558 serie1 (DIN 3202 F1).
4. Construcción en Fundición Nod. EN-GJS-400 (GGG-40).
5. Recubrimiento externo e interno de pintura epoxi.
6. Tamiz en Acero Inoxidable AISI 304.
7. Junta cuerpo / tapa en PTFE+Grafito.
8. Tapon de purga.
9. Presión de trabajo máxima 16 bar.
10. Temperatura de trabajo -10 °C + 120 °C.

#### Features

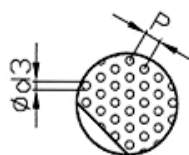
1. "Y" strainer.
2. Flanged ends according to EN 1092 PN 16.
3. Face to Face according to EN 558 series 1 (DIN 3202 F1).
4. Made of Ductile Iron EN-GJS-400 (GGG-40).
5. External and internal coating of epoxy paint.
6. Screen made of Stainless Steel AISI 304.
7. Body / cover gasket made of PTFE+Graphite.
8. Drain plug.
9. Max. working pressure 16 bar.
10. Working temperature -10 °C + 120 °C.



Nº	Denominación / Name	Material	Acabado Superficial / Surface Treatment	Cód. Recambio / Spare Part Code
1	Cuerpo / Body	Fundición / Ductile Iron EN-GJS-400	Pintura epoxi / Epoxy coating	-----
2	Tapa / Cover	Fundición / Ductile Iron EN-GJS-400	Pintura epoxi / Epoxy coating	-----
3*	Junta / Gasket	PTFE+Grafito / PTFE+Graphite	-----	J2458G
4*	Tamiz / Mesh	Acero Inox / St. Steel AISI 304	-----	T2458G
5	Tornillo / Bolt	Acero Inox / St. Steel AISI 304	-----	-----
6	Tapón / Plug	Acero Inox / St. Steel AISI 304	-----	-----

\* Piezas de recambio disponibles / Available spare parts

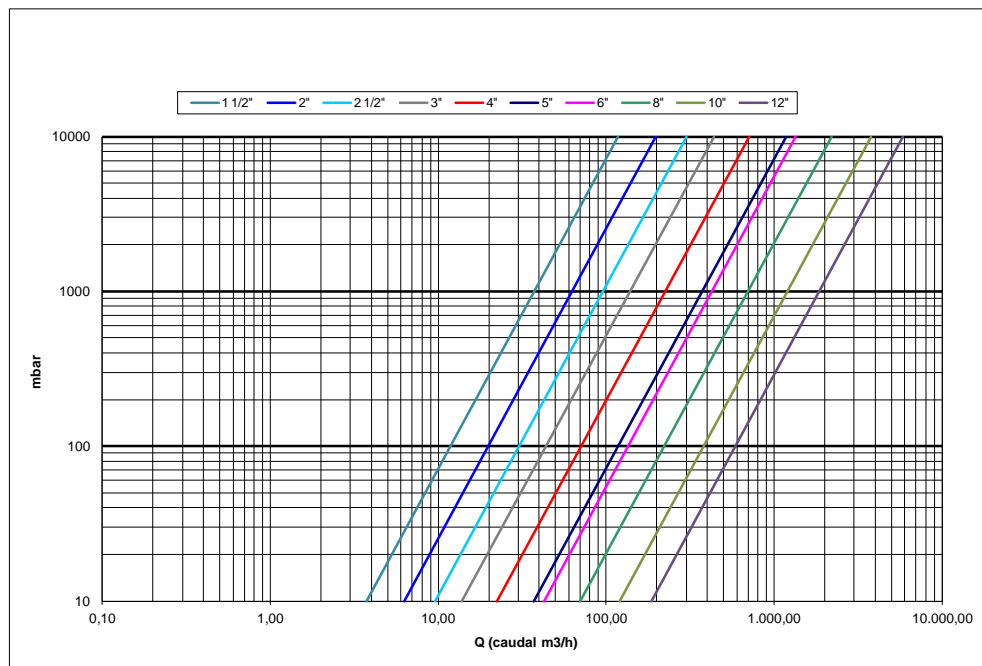
#### Detalle de la Malla / Mesh detail:



## DIMENSIONES GENERALES / GENERAL DIMENSIONS

Ref.	DN	Medida / Size	PN	Dimensiones / Dimensions (mm)					Tapón/Plug	Peso / Weight (Kg)
				A	D	L	P	d 3		
2458G 08	40	1 1/2"	16	125	150	200	2,5	1,5	G1/4"	6
2458G 09	50	2"	16	145	165	230	2,5	1,5	G1/2"	8
2458G 10	65	2 1/2"	16	161	185	290	2,5	1,5	G1/2"	11
2458G 11	80	3"	16	170	200	310	2,5	1,5	G3/4"	13
2458G 12	100	4"	16	208	220	350	2,5	1,5	G3/4"	18
2458G 13	125	5"	16	258	250	400	2,5	1,5	G3/4"	26
2458G 14	150	6"	16	285	285	480	2,5	1,5	G1"	37
2458G 16	200	8"	16	350	340	600	3	2	G1"	56
2458G 18	250	10"	16	412	400	730	3	2	G1"	82
2458G 20	300	12"	16	480	455	850	3	2	G1"	118

## **DIAGRAMA DE PÉRDIDAS DE CARGA / HEAD LOSSES DIAGRAM**



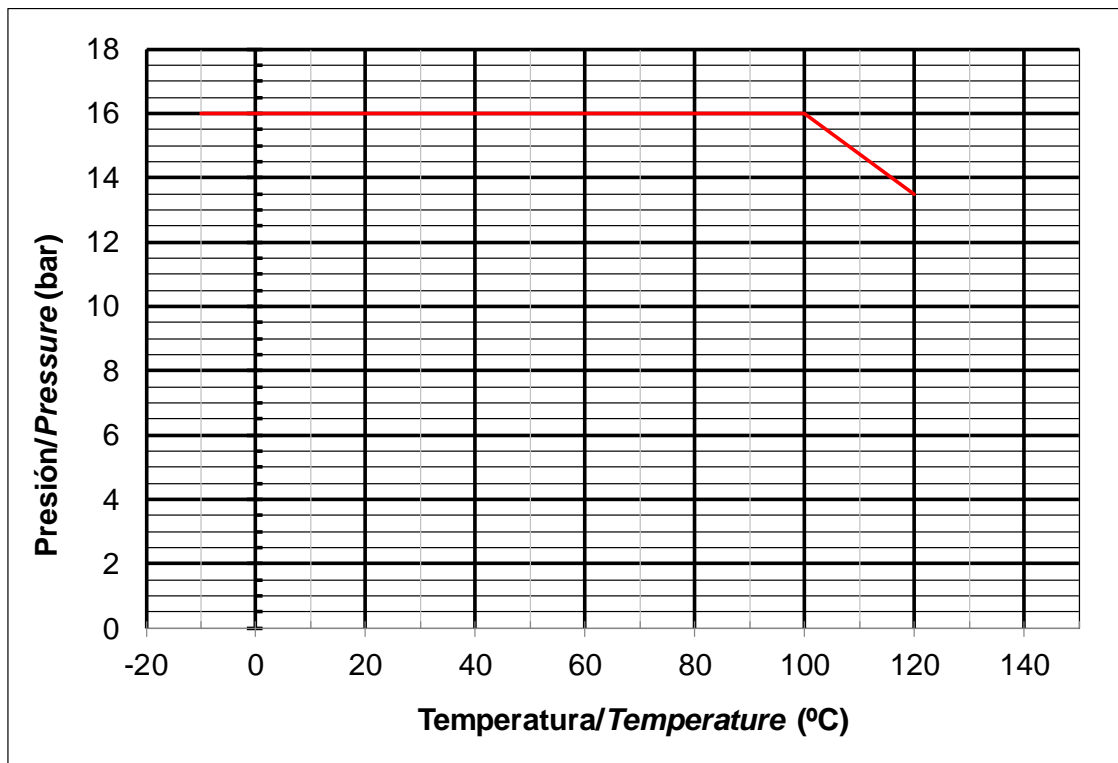
## VALORES DE Kv / Kv VALUES

Kv = Es la cantidad de metros cúbicos por hora (m<sup>3</sup>/h) que pasará a través de la válvula generando una pérdida de carga de 1 bar.

Kv = Flow rate of water in cubic meter per hour (m<sup>3</sup>/h) that will generate a pressure drop of 1 bar across the valve.

D	Inch	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"
Kv	m <sup>3</sup> /h	37,3	62,4	95,6	138,5	224,4	371,2	425,4	698,2	1204	1852

**CURVA PRESIÓN TEMPERATURA / PRESSURE TEMPERATURE RATING**



## ARTICULO: 2830

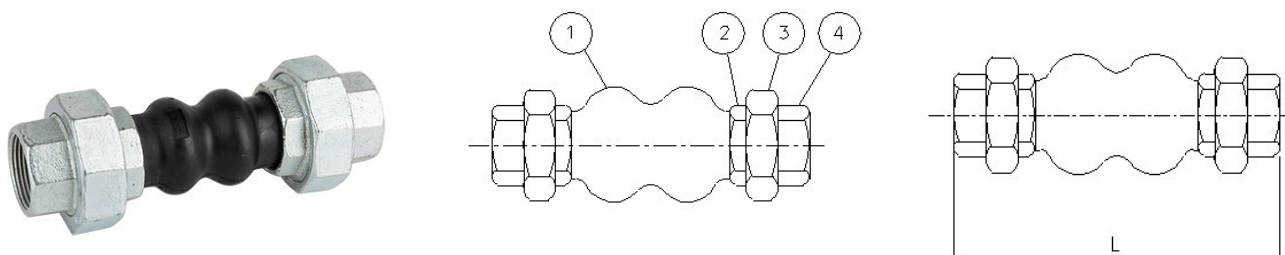
### Junta de expansión de EPDM extremos roscados. Rubber Expansion Joint, Threaded ends.

#### Características

1. Junta de expansión.
2. Reducción de Ruidos.
3. Absorción de Vibraciones.
4. Compensación de dilataciones.
5. Facil instalación.
6. Cuerpo de EPDM, Extremos acero carbono.
7. Extremos roscados s/ ISO 7-1 (EN 10226-1).
8. Presión de trabajo máxima 10 bar.
9. Depresión máxima (vacío) 400 mbar.
10. Temperatura de Trabajo – 10 °C + 105 °C.
11. Presión de Ruptura 30 bar.

#### Features

1. Expansion Joint.
2. Reduction of Noise
3. Absortion of vibration.
4. Allows axial and lateral movement.
5. Easy to install.
6. Body made of EPDM, Ends of carbon steel.
7. Threaded ends acc. to ISO 7-1 (EN 10226-1).
8. Max. Working pressure 10 bar.
9. Max. Working Vacuum 400 mbar.
10. Working temperature – 10 °C + 105 °C.
11. Burst Pressure 30 bar.

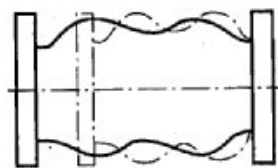


Nº	Denominación / Name	Material	Acabado Superficial / Surface Treatment
1	Cuerpo / Body	EPDM + Nylon	-----
2	Brida / Clamp	Acero Carbono / Carbon steel	Cincado / Zinc plated.
3	Unión / Union	Acero Carbono / Carbon steel	Cincado / Zinc plated.
4	Rácor / Racord	Acero Carbono / Carbon steel	Cincado / Zinc plated.

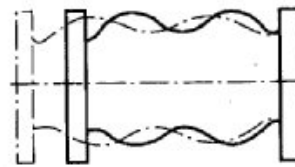
## DIMENSIONES GENERALES / GENERAL DIMENSIONS

Ref	Medida / Size	PN	Dimensiones / Dimensions (mm) L	Peso / Weight (Kg)
2830 05	3/4"	10	200	0.71
2830 06	1"	10	200	1.09
2830 07	1 1/4"	10	200	1.31
2830 08	1 1/2"	10	200	1.78
2830 09	2"	10	200	2.65
2830 10	2 1/2"	10	245	3.80
2830 11	3"	10	245	5.30

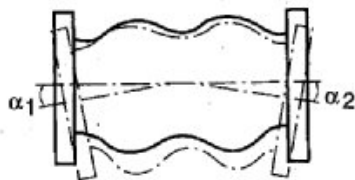
## Diagrama de desplazamientos / Diagram of displacements



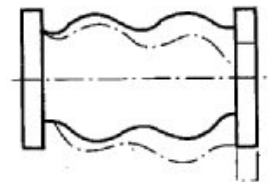
Compresión axial / Axial compression



Elongación axial / Axial stretch



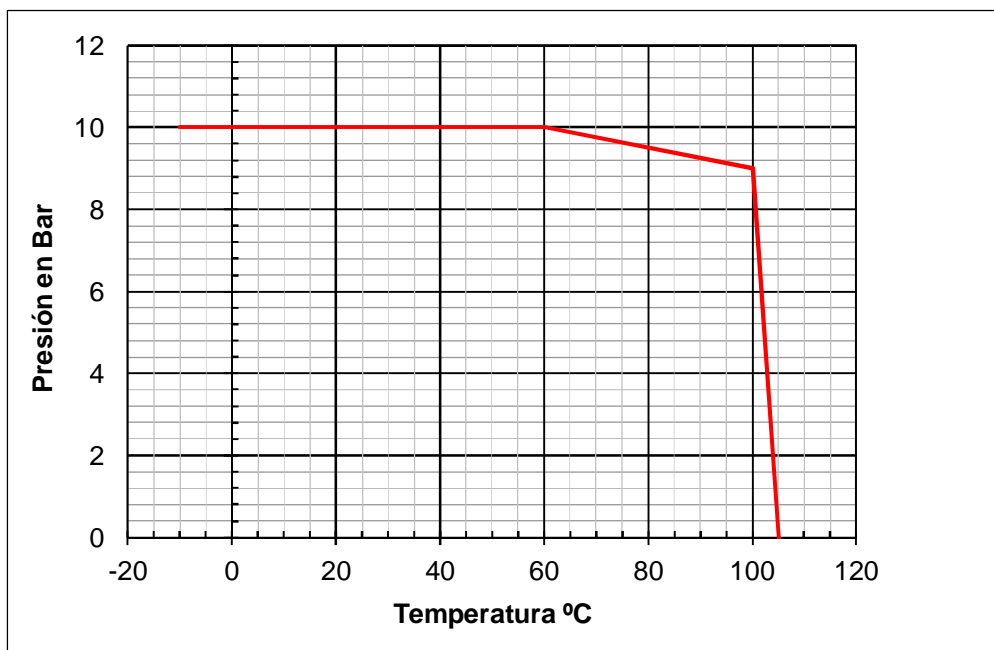
Deflexión angular / Angular deflection



Desplazamiento lateral / lateral displacement

Ref.	Compresión Axial / Axial Compression (mm)	Elongación Axial / Axial Stretch (mm)	Deflexión Angular / Angular deflection ( $\alpha 1 + \alpha 2$ )	Desplazamiento lateral / Lateral Displacement (mm)
2830 05	22	5	45°	22
2830 06	22	6	45°	22
2830 07	22	6	45°	22
2830 08	22	6	35°	22
2830 09	22	6	25°	22
2830 10	22	6	25°	22
2830 11	22	6	25°	22

## CURVA PRESIÓN TEMPERATURA / *PRESSURE TEMPERATURE RATING*



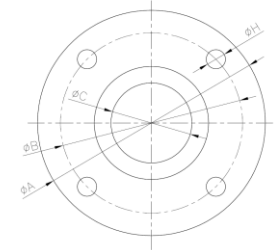
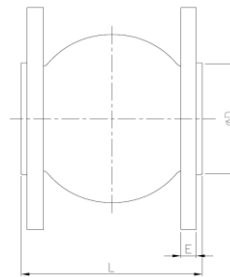
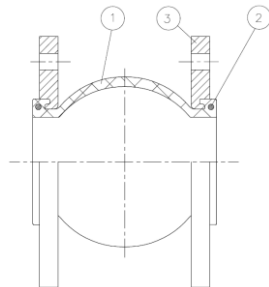
## ARTICULO: 2831

### Junta de expansión de EPDM extremos Bridados

### Rubber Expansion Joint, Flanged ends

Características
1. Junta de expansión.
2. Reducción de Ruidos.
3. Absorción de Vibraciones.
4. Compensación de dilataciones.
5. Facil instalación.
6. Cuerpo de EPDM, Extremos acero carbono.
7. Extremos para montar entre bridas EN 1092: PN10/16 (medidas 1 ¼" a 6") PN10 (medidas 8" a 20")
8. Presión de trabajo máxima: 16 bar (medidas 1 ¼" a 12") <b>(Nota: Bridas DIN PN10 para 8" – 10" y 12")</b> 10 bar (medidas 14" a 20")
9. Temperatura de Trabajo – 10 °C + 105 °C
10. Presión de Ruptura 30 bar.
11. Depresión máxima (vacío) 400 mbar.

Features
1. Expansion Joint.
2. Reduction of Noise.
3. Absortion of vibration.
4. Allows axial and lateral movement.
5. Easy to install.
6. Body made of EPDM, Ends of carbon steel.
7. Ends connecting with flanges EN 1092: PN10/16 (sizes 1 ¼" to 6") PN10 (sizes 8" to 20")
8. Maximum working pressure: 16 bar (sizes 1 ¼" to 12") <b>(Note: Flanged DIN PN10 for 8" – 10" &amp; 12")</b> 10 bar (sizes 14" to 20")
9. Working temperature – 10 °C + 105 °C.
10. Burst Pressure 30 bar.
11. Max. Working Vacuum 400 mbar.



Nº	Denominación / Name	Material	Acabado Superficial / Surface Treatment
1	Cuerpo / Body	EPDM + Nylon	-----
2	Aro / Ring	Acero Carbono / Carbon steel	Cincado / Zinc plated.
3	Brida / Flange	Acero Carbono / Carbon steel	Cincado / Zinc plated.

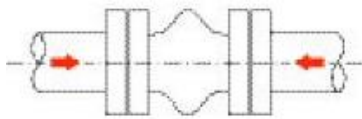
### DIMENSIONES GENERALES / GENERAL DIMENSIONS

Ref	Medida / Size	DN	PN	Dimensiones / Dimensions (mm)							Peso / Weight (Kg)
				ØA	ØB	ØC	ØD	n x ØH	L	E	
2831 07	1 1/4"	32	16	140	100	32	69	4 x 18	95	16	2.86
2831 08	1 1/2"	40	16	150	110	40	69	4 x 18	95	16	3.24
2831 09	2"	50	16	165	125	52	86	4 x 18	105	16	4.10

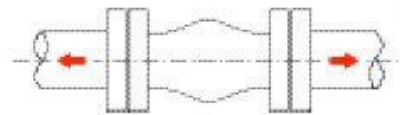


Ref	Medida / Size	DN	PN	Dimensiones / Dimensions (mm)							Peso / Weight (Kg)
				ØA	ØB	ØC	ØD	n x ØH	L	E	
2831 10	2 1/2"	65	16	185	145	68	106	4 x 18	115	16	4.87
2831 11	3"	80	16	200	160	76	126	8 x 18	130	18	6.20
2831 12	4"	100	16	220	180	103	150	8 x 18	135	18	6.80
2831 13	5"	125	16	250	210	128	180	8 x 18	170	20	9.50
2831 14	6"	150	16	285	240	152	209	8 x 23	180	22	12.40
2831 16	8"	200	16	340	295	194	260	8 x 23	200	22	16.86
2831 18	10"	250	16	395	350	250	320	12x23	240	24	21.20
2831 20	12"	300	16	445	400	300	367	12x23	260	24	28.10
2831 22	14"	350	10	505	460	320	408	16x23	265	26	36.70
2831 24	16"	400	10	565	515	372	472	16x28	265	26	44.40
2831 26	18"	450	10	615	565	415	522	20x28	265	26	46.80
2831 28	20"	500	10	670	620	454	570	20x28	265	28	59.00

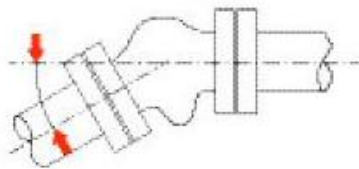
### Diagrama de desplazamientos / Diagram of displacements



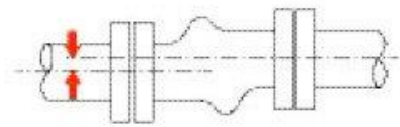
*Compresión Axial / Axial Compression*



*Elongación Axial / Axial Elongation*



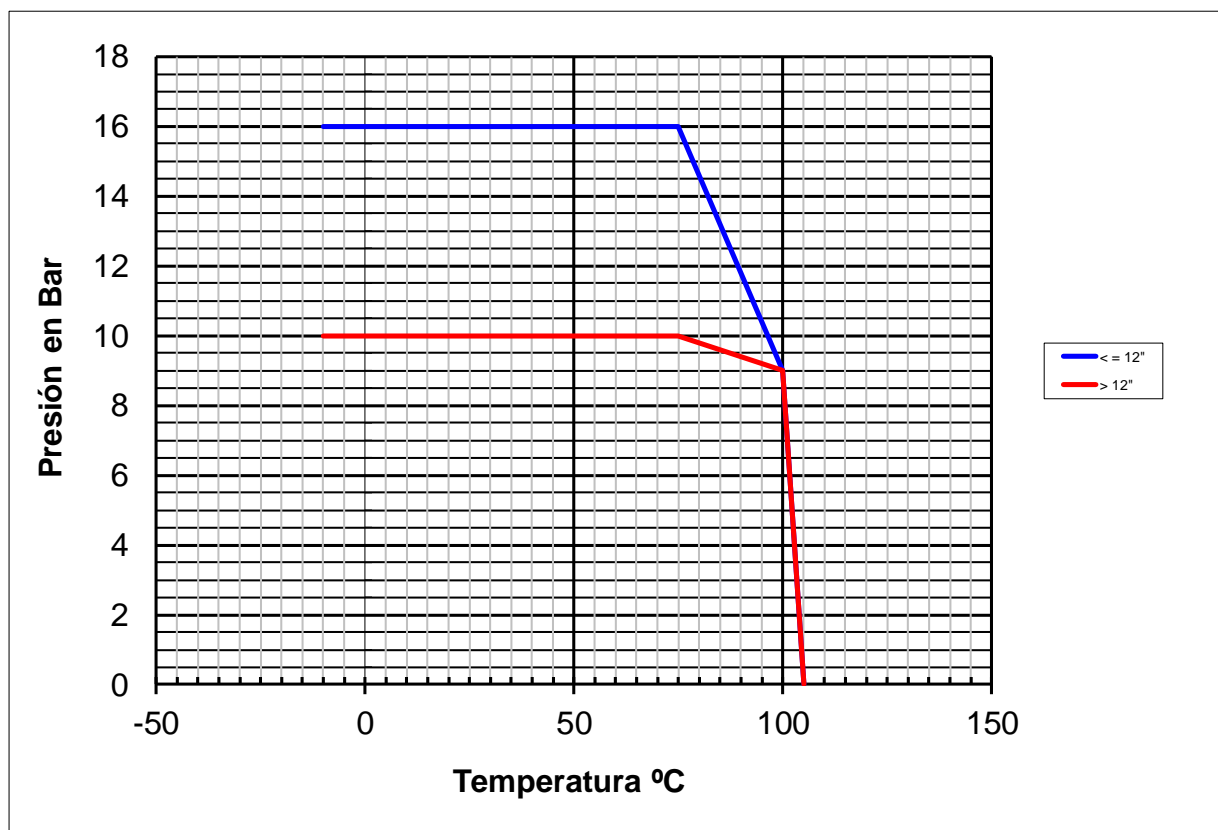
*Deflexión Angular / Angular Deflection*



*Desplazamiento Lateral / Lateral Displacement*

Ref.	Compresión Axial <i>Axial Compression</i> (mm)	Elongación Axial <i>Axial Stretch</i> (mm)	Deflexión Angular <i>Angular deflection</i> (α 1)	Desplazamiento lateral <i>Lateral Displacement</i> (mm)
2831 07	10	6	15°	9
2831 08	10	6	15°	9
2831 09	10	7	15°	10
2831 10	13	8	15°	12
2831 11	15	8	15°	12
2831 12	19	12	15°	15
2831 13	19	12	15°	15
2831 14	20	12	10°	15
2831 16	20	12	10°	22
2831 18	28	16	10°	22
2831 20	28	16	10°	25
2831 22	28	16	10°	25
2831 24	28	16	10°	25
2831 26	28	16	10°	25
2831 28	28	16	10°	25

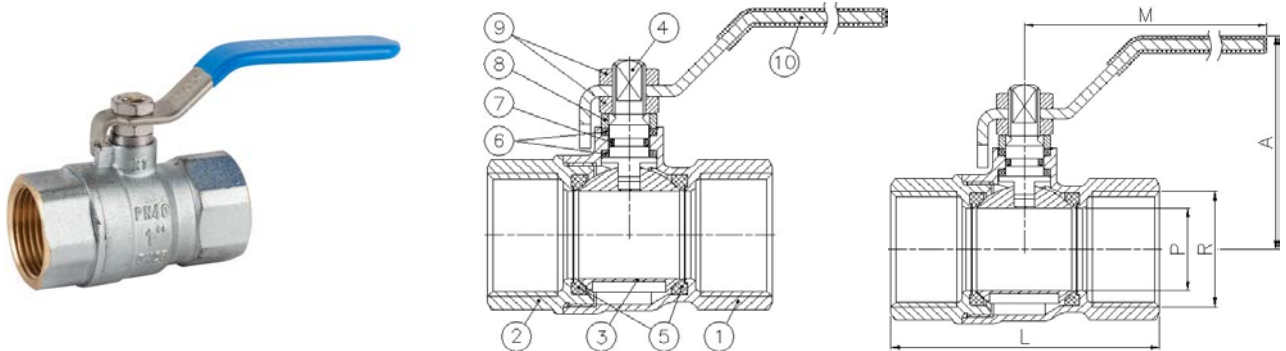
## CURVA PRESIÓN TEMPERATURA / PRESSURE TEMPERATURE RATING



## Art.: 3021

### Válvula de esfera serie pesada / Ball valve heavy series

Características	Features
1. Válvula esfera con paso total.	1. Ball valve with full bore.
2. Construcción en latón s/ UNE-EN 12165 cromado.	2. Brass construction acc/ to UNE-EN 12165 chrome plated.
3. Extremos rosca gas (BSP) hembra según ISO 228/1.	3. Gas (BSP) threaded female ends according to ISO 228/1.
4. Accionamiento mediante palanca de acero inoxidable AISI 304.	4. Working by means of AISI 304 stainless steel lever handle.
5. Temperatura de trabajo desde -20°C a 110°C.	5. Working temperature from -20°C to 110°C.
6. Presión máxima de trabajo 40 bar (PN 40).	6. Maximum working pressure 40 bar (PN 40).
7. Asientos PTFE.	7. PTFE Seats.



Nº	Denominación / Name	Material	Acabado Superficial / Surface Treatment
1	Cuerpo / Body	Latón / Brass (CW617N)	Granallado + Cromado / Peened + Chromed
2	Tapa / Cap	Latón / Brass (CW617N)	Granallado + Cromado / Peened + Chromed
3	Esfera / Ball	Latón / Brass (CW617N)	Cromado / Chrome plated
4	Eje / Stem	Latón / Brass (CW617N)	Cromado / Chrome plated
5	Asientos / Ball seats	PTFE	-
6	Anillo prensa / Stem packing	PTFE	-
7	Tórica / O-Ring	NBR	-
8	Anillo prensa / Stem ring	Latón / Brass	Cromado / Chrome plated
9	Tuerca / Nut	Latón / Brass	Cromado / Chrome plated
10	Maneta / Handle	AISI 304	-

Ref.	Medida / Size		Dimensiones / Dimensions (mm)				Peso / Weight (Kg)
	R	DN	P	A	L	M	
3021 02	1/4"	10	10	45	48	84	0,135
3021 03	3/8"	10	10	45	50	84	0,135
3021 04	1/2"	15	14	47	58	84	0,180
3021 05	3/4"	20	19	58	65	98	0,305
3021 06	1"	25	24	61	78	98	0,450
3021 07	1 1/4"	32	30,5	74	88	126	0,715
3021 08	1 1/2"	40	37,5	80	105	126	1,075
3021 09	2"	50	47	91	122	158	1,645
3021 10	2" 1/2"	65	58,5	96	140	160	2,467
3021 11	3"	80	72	118	163	196	3,900
3021 12	4"	100	90	133	190	266	6,183

## DIAGRAMA PÉRDIDA DE CARGA / HEAD LOSS CHART

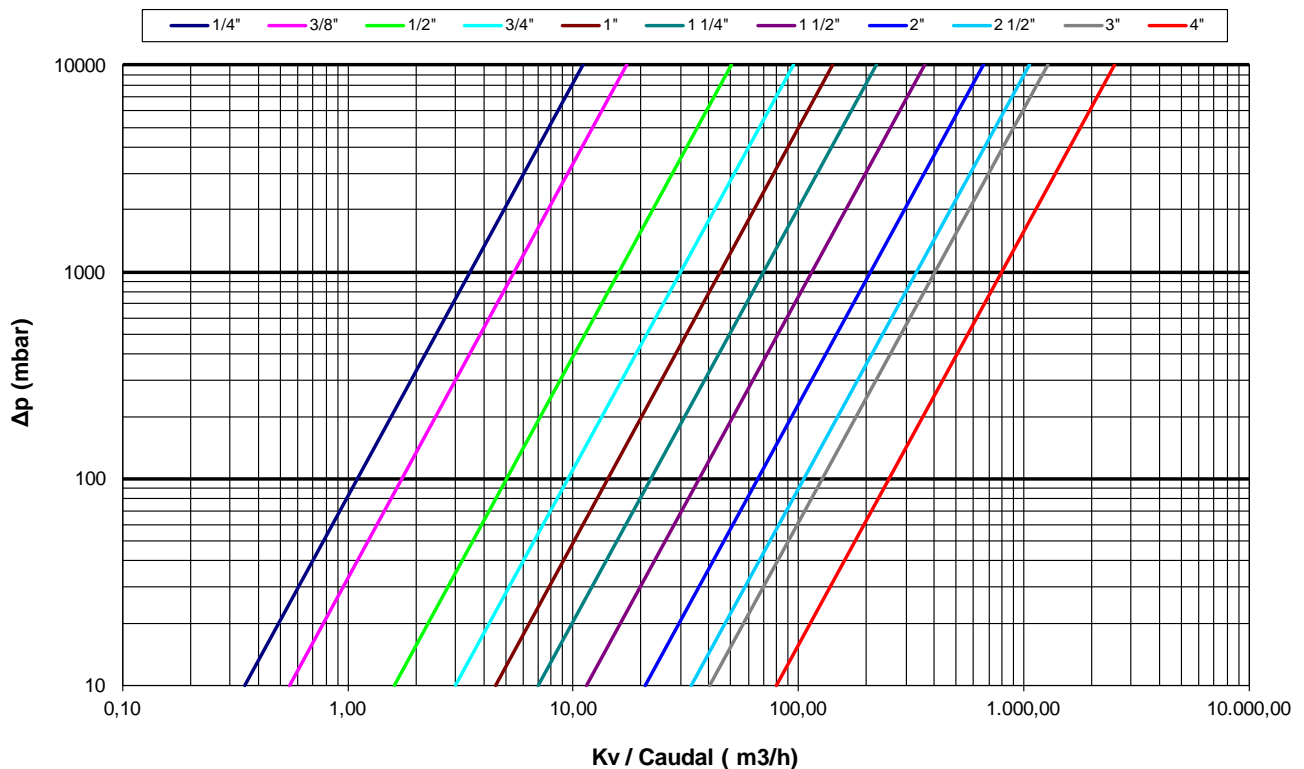
(Válvulas paso total roscadas / Threaded ends full bore ball valves)

Valores de Kv / Kv Values:

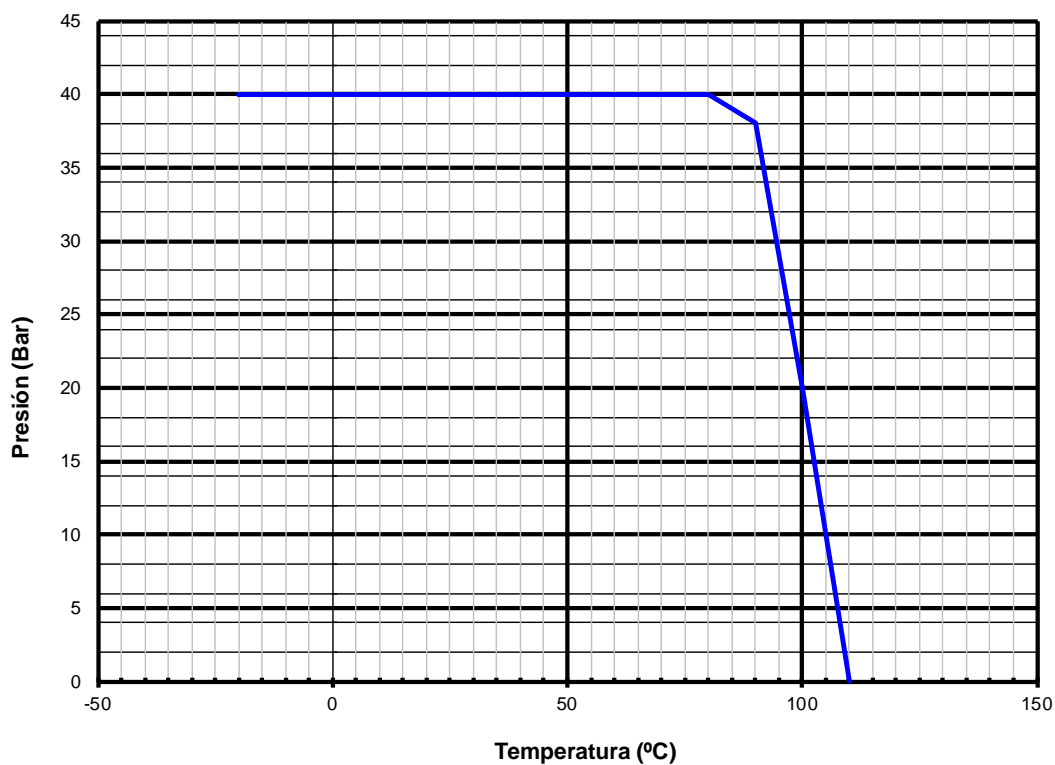
**Kv** = Es la cantidad de metros cúbicos por hora que pasará a través de la válvula generando una pérdida de carga de 1 bar.

**Kv** = The flow rate of water in cubic meters per hour that will generate a pressure drop of 1 bar across the valve.

Medida / Size	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
Kv	3.5	5.5	16	30	45	70	115	210	335	405	800



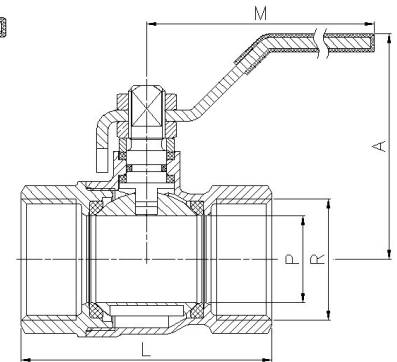
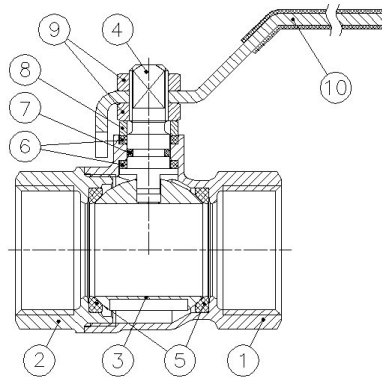
## CURVA PRESIÓN - TEMPERATURA / PRESSURE - TEMPERATURE RATING



## Art.: 3029

### Válvula de esfera accionamiento palanca / Ball valve lever handle

Características	Features
1. Válvula esfera con paso total	1. Ball valve with full bore
2. Construcción en latón s/ UNE-EN 12165 cromado	2. Brass acc./ UNE-EN12165 chrome plated
3. Extremos rosca gas (BSP) H-H según ISO 228/1	3. Gas (BSP) threaded F-Fends acc/ ISO 228/1
4. Accionamiento mediante palanca de acero	4. Working by means of steel lever handle
5. Temperatura de trabajo desde -20°C a 110°C	5. Working temperature from -20°C to 110°C
6. Presión máxima de trabajo 25 bar (PN 25)	6. Maximum working pressure 25 bar (PN 25)
7. Asientos PTFE	7. PTFE Seats
8. Producto certificado WRAS	8. Approved product WRAS



Nº	Denominación / Name	Material	Acabado Superficial / Surface Treatment
1	Cuerpo / Body	Latón / Brass (CW617N)	Granallado + Cromado / Peened + Chromed
2	Tapa / Cap	Latón / Brass (CW617N)	Granallado + Cromado / Peened + Chromed
3	Esfera / Ball	Latón / Brass (CW617N)	Cromado / Chrome plated
4	Eje / Stem	Latón / Brass (CW617N)	Cromado / Chrome plated
5	Asientos / Ball seats	PTFE	-
6	Anillo prensa / Stem packing	PTFE	-
7	Tórica / O-Ring	NBR	-
8	Anillo prensa / Stem ring	Latón / Brass	Cromado / Chrome plated
9	Tuerca / Nut	Latón / Brass	Cromado / Chrome plated
10	Maneta / Handle	Acero / Steel	Dacromet ®

Ref.	Medida / Size		Dimensiones / Dimensions (mm)					Peso / Weight (Kg)
	R	DN	P	A	L	M		
3029 02	1/4"	10	10	46	40	84	0,106	
3029 03	3/8"	10	10	46	43	84	0,113	
3029 04	1/2"	15	14	47	49	84	0,153	
3029 05	3/4"	20	19	58	56	98	0,267	
3029 06	1"	25	24	61	68	98	0,389	
3029 07	1 1/4"	32	30	74	80	126	0,602	
3029 08	1 1/2"	40	37	80	89	126	0,826	
3029 09	2"	50	46,5	91	104	158	1,323	
3029 10	2 1/2"	65	58,5	101	137	158	2,432	
3029 11	3"	80	72	131	158	196	3,898	
3029 12	4"	100	90	145	183	265	6,104	

## DIAGRAMA PÉRDIDA DE CARGA / HEAD LOSS CHART

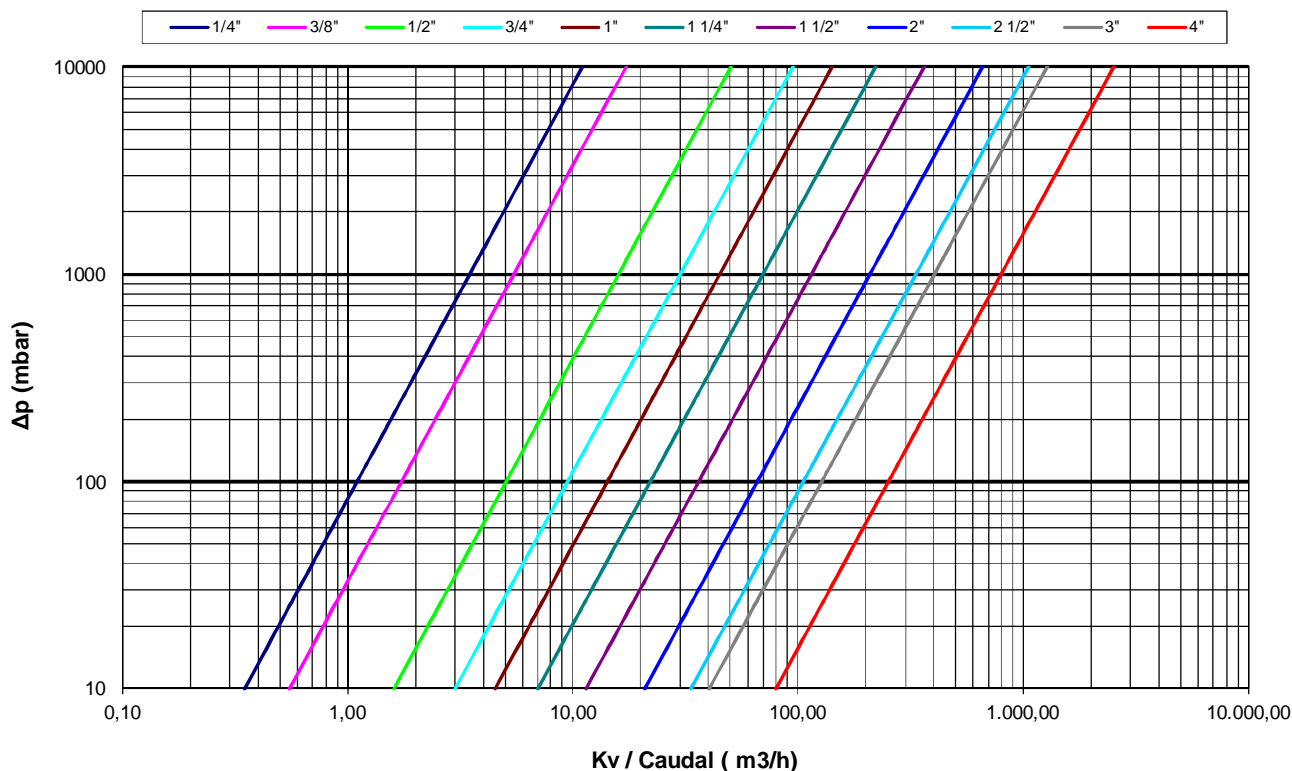
(Válvulas paso total roscadas / Threaded ends full bore ball valves)

Valores de Kv / Kv Values:

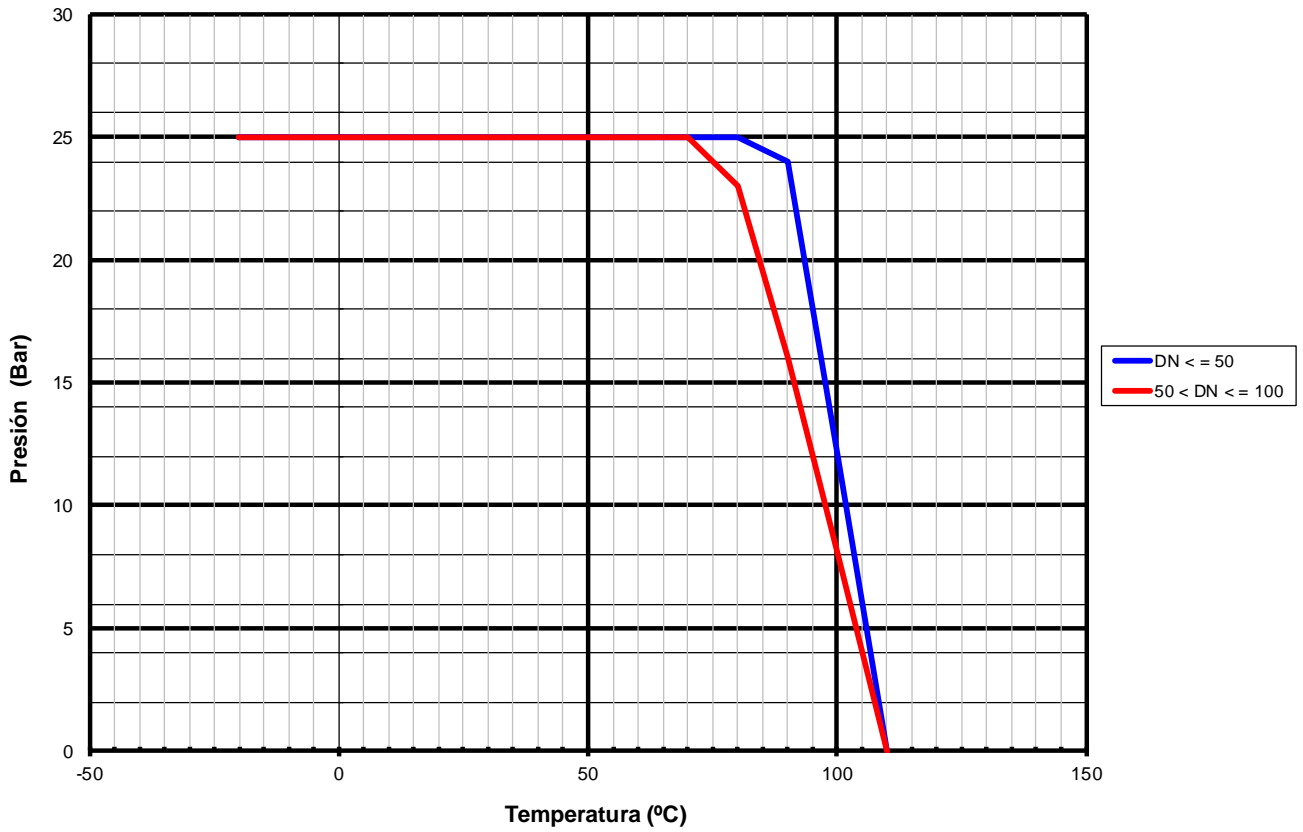
**Kv** = Es la cantidad de metros cúbicos por hora que pasará a través de la válvula generando una pérdida de carga de 1 bar.

**Kv** = The flow rate of water in cubic meters per hour that will generate a pressure drop of 1 bar across the valve.

Medida / Size	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
Kv	3.5	5.5	16	30	45	70	115	210	335	405	800



## CURVA PRESIÓN - TEMPERATURA / PRESSURE - TEMPERATURE RATING

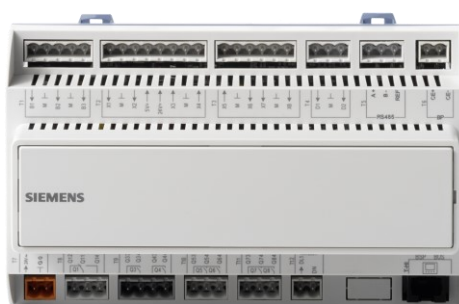




Climatix™

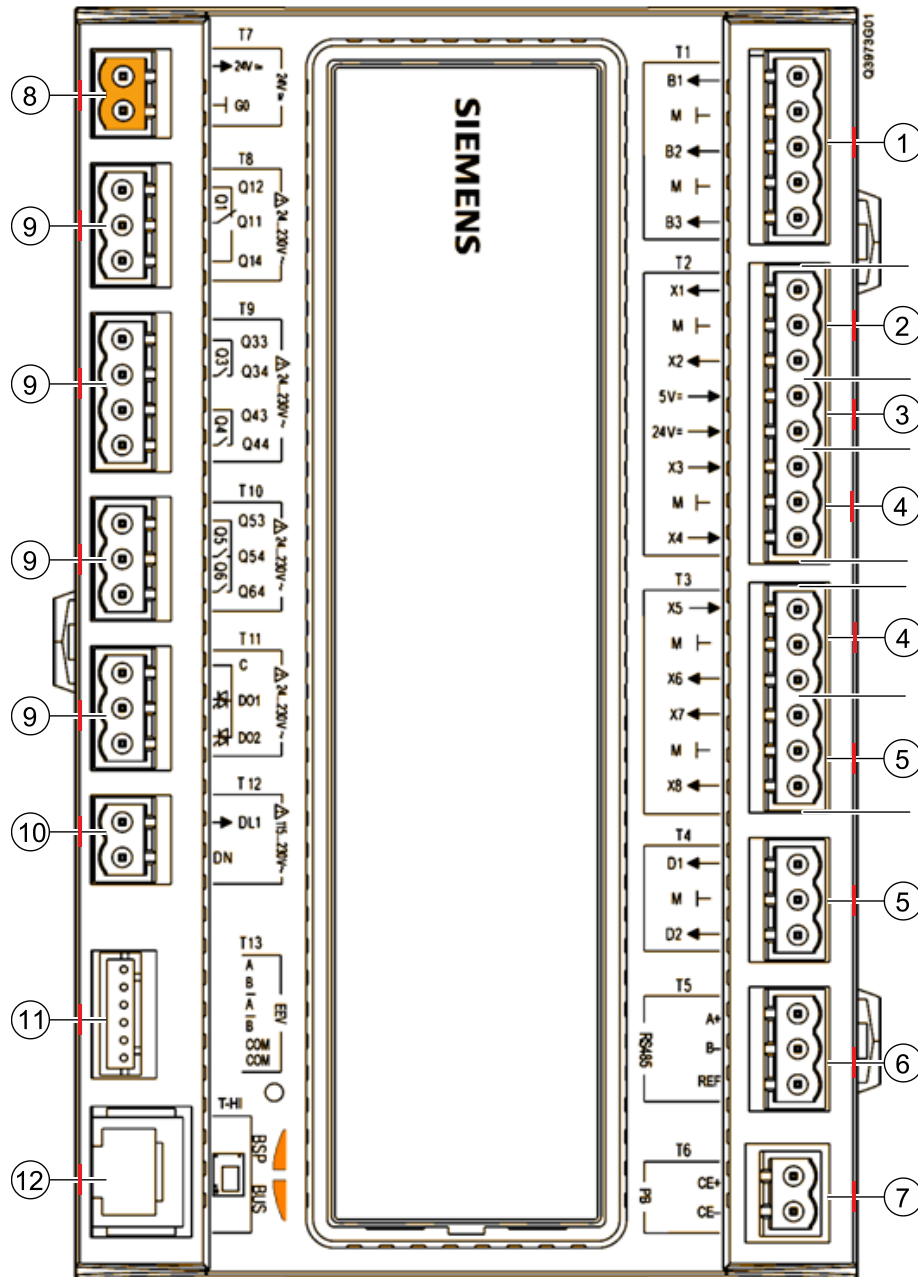
## Climatix programmable controllers

POL424.50/XXX



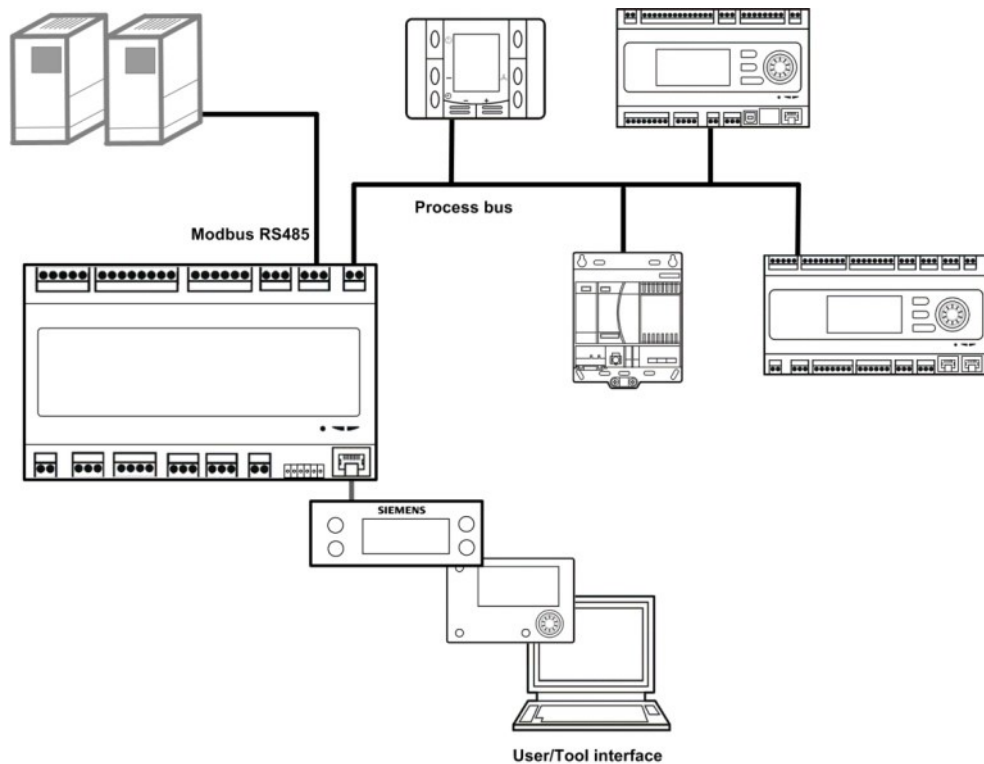
**The Climatix POL424.50/XXX programmable controllers are HVAC controllers optimized for air handling units, rooftop units, chillers and heat pumps.**

- Power supply AC 24 V or DC 24 V
- DC 24 V and DC 5 V power supplies for active sensors on board
- 3 analog inputs for temperature sensor
- 2 configurable inputs as digital input/DC 0...10 V input/temperature sensor
- 3 configurable outputs as DC 0...10 V analog output/digital output for off-board load
- 4 digital inputs for potential-free contacts
- 1 digital input for potential-free contact or fan speed measurement
- 1 digital input galvanically isolated (AC 115...230 V)
- 7 relay outputs (6 NO contacts, 1 changeover switching type)
- RS-485 for Modbus RTU or BACnet MS/TP (with VVS10.50 or higher) for third-party bus communication
- Process bus for network functionalities
- Local service connector for user interface and PC tools (supporting USB)



- |   |                      |    |                      |
|---|----------------------|----|----------------------|
| 1 | Analog inputs        | 7  | Process bus          |
| 2 | Configurable inputs  | 8  | Power supply         |
| 3 | Sensor power supply  | 9  | Digital outputs      |
| 4 | Configurable outputs | 10 | Active digital input |
| 5 | Digital inputs       | 11 | EEV                  |
| 6 | RS-485               | 12 | Service interface    |

## Communication concept



## Type summary

Type	Photo
POL424.50/XXX	

## Notes

### Engineering

- In order to protect against accidental contact with relay connections at voltages above 42 Veff, the device must be installed in an enclosure (preferably a control panel). It must be impossible to open the enclosure without the aid of a key or tool.
- AC 115...230 V cables must be double-insulated against safety extra-low voltage (SELV) cables.
- Do NOT mix SELV / PELV and line voltage on the same terminal.
- Use external protection for inductive load of relay outputs.
- Use external fuse for over current protection of relay outputs.
- Avoid negative voltage on analogue inputs, because the measured ADC values are undefined. The accuracy of the 10 V analogue inputs is valid for values above 100 mV.

## Disposal

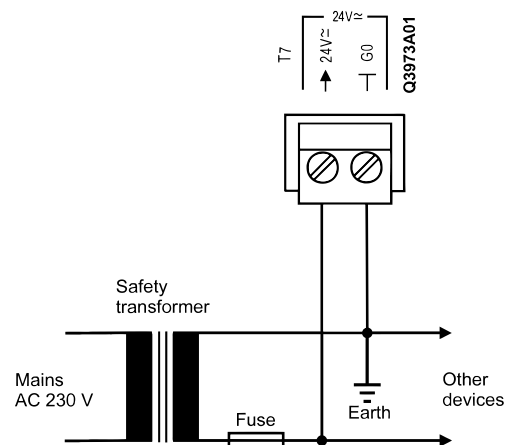
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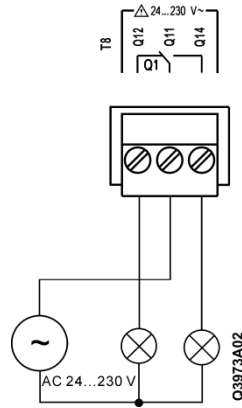
The device is considered an electronics device for disposal in terms of European Directive 2012/19/EU and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Power supply AC 24 V, G0 (T7)	
Operating voltage	AC 24 V $\pm 20\%$ / DC 24 V $\pm 10\%$
Frequency	45...65 Hz @ AC 24 V
Max. AC current	1.6 A @ AC 24 V
Max. DC current	1.5 A @ DC 24 V
Max. external supply line fusing	6.3 A slow wire fuse or circuit breaker

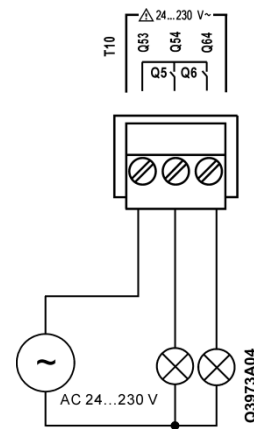
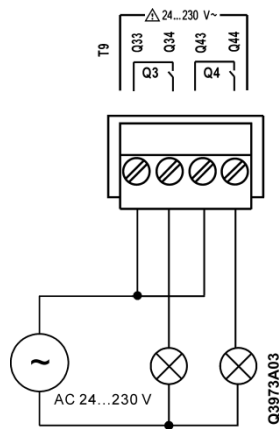


Relay output Q1 (T8)	
Contact	Monostable, NO/NC contact, SPDT
Switching voltage	AC 24...230 V (-20%, +10%) DC 18...30 V
Rated current (res./ind.)	AC 3 A (res.)/2 A (ind. $\cos\phi$ 0.6) DC 3 A (res.)
Min. switching current at AC 19 V	30 mA
Endurance	100,000 cycles @ AC 230 V, 3.0 A (res.)
Max. external supply line fusing	6.3 A slow wire fuse or circuit breaker



<b>⚠ WARNING</b>	
	<p>Do NOT mix SELV / PELV and line voltage on the same terminal. Use external protection for inductive load.</p>

<b>Relay output</b> <b>Q3, Q4 (T9)</b> <b>Q5, Q6 (T10)</b>	
Contact	Monostable, NO contact, SPST
Switching voltage	AC 24...230 V (-20%, +10%) DC 18...30 V
Rated current (res./ind.)	AC 3 A (res.)/2 A (ind. $\cos\phi$ 0.6) DC 3 A (res.)
Min. switching current @ AC 19 V	30 mA
Endurance	100,000 cycles @ AC 230 V, 3.0 A (res.)
Max. external supply line fusing	6.3 A slow wire fuse or circuit breaker



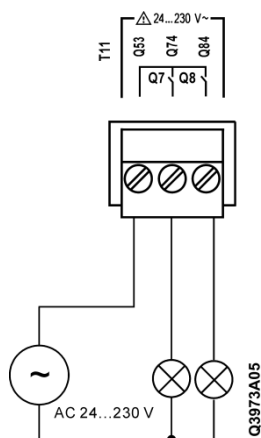
**⚠ WARNING**



Do NOT mix SELV / PELV and line voltage on the same terminal.  
Use external protection for inductive load.

**Relay output  
Q7, Q8 (T11)**

Contact	Monostable, NO contact, SPST
Switching voltage	AC 24...230 V (-20%, +10%) DC 18...30 V
Rated current (res./ind.)	AC 3 A (res.)/2 A (ind. cosφ 0.6) DC 3 A (res.)
Min. switching current @ AC 19 V	30 mA
Endurance	100,000 cycles @ AC 230 V, 3.0 A (res.)
Max. external supply line fusing	6.3 A slow wire fuse or circuit breaker

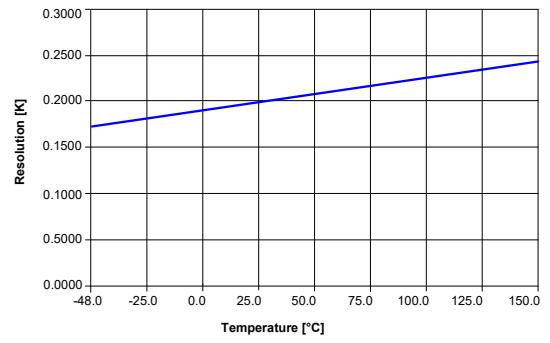
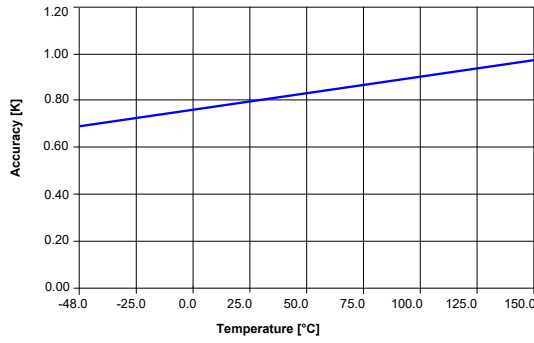


**⚠ WARNING**

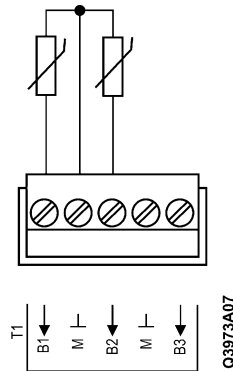


Do NOT mix SELV / PELV and line voltage on the same terminal.  
Use external protection for inductive load.

<b>Ni1000 (TK5000) / Pt1000</b>	
Sensor current	1.4 mA @ 0 °C
Temperature range	-48...150 °C
Accuracy	±1 K
Resolution	±0.25 K



These data are acquired under operating temperature of 25 °C.



<b>Configurable inputs</b>	
<b>X1, X2 (T2)</b>	
Configurable	By software
Reference potential	Terminals ⊥

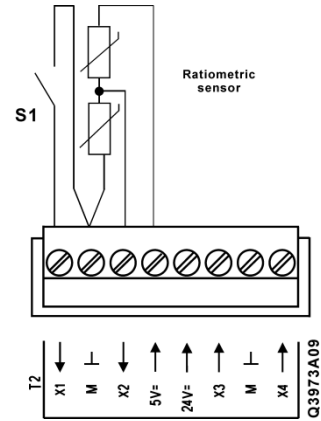
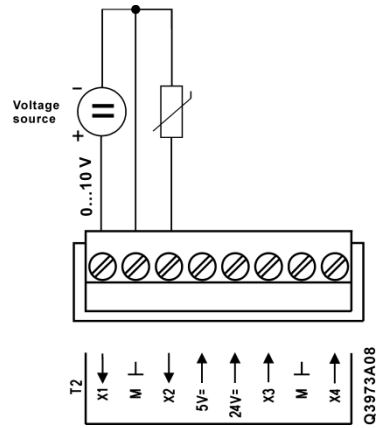
<b>Ni1000 (TK5000) / Pt1000</b>	
Accuracy	Please refer to B1...B3

<b>DC 0...5/0...10 V ratiometric sensor</b>	
Resolution	50 mV
Accuracy	100 mV
Input resistance	100 kΩ

<b>Digital input</b>	
0/1 digital signal (binary)	For potential free contacts
Sampling voltage/current	DC 24 V, 8 mA



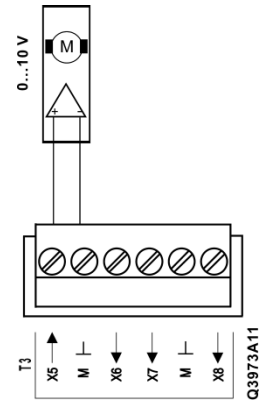
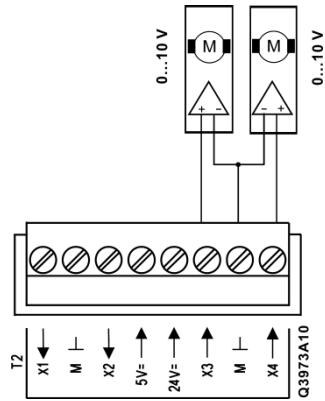
Contact resistance	Max. 200 $\Omega$ (closed) Min. 50 k $\Omega$ (open)
Delay	10 ms
Pulse frequency	Max. 20 Hz



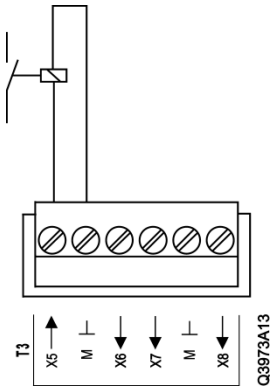
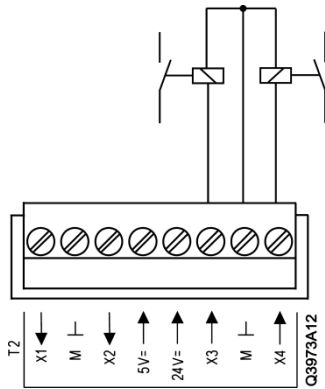
<b>⚠ WARNING</b>	
	Avoid negative voltages at the analog inputs because the conversion leads to undetermined results.

<b>Configurable outputs</b> <b>X3, X4 (T2), X5(T3)</b>	
Configurable	By software
Reference potential	Terminals $\perp$

<b>DC 0...10 V output</b>	
Resolution	30 mV
Accuracy	100 mV
Output current	Max. 1 mA

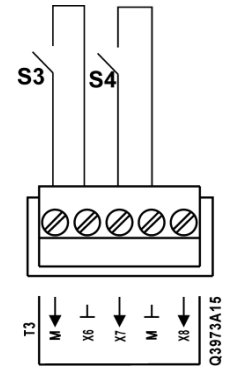
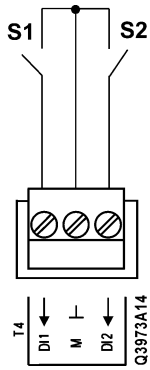


DC output for off-board load	
Switching voltage	DC 24 V
Switching capacity	Max. 25 mA



Use free wheel diode for inductive load.

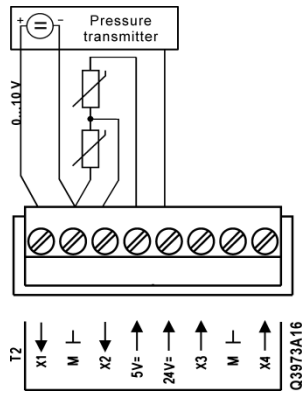
Digital inputs X6, X7 (T3) DI1, DI2 (T4)	
0/1digital signal (binary)	For potential free contacts
Sampling voltage/current	DC 24 V, 8 mA
Contact resistance	Max. 200 Ω (closed) Min. 50 kΩ (open)
Delay	10 ms
Pulse frequency	Max. 20 Hz



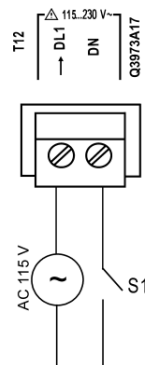
<b>Digital input X8 (T3)</b>	
Configurable	By software

<b>0/1 digital signal (binary)</b>	For potential free contacts
Sampling voltage/current	DC 24 V, 8 mA
Contact resistance	Max. 200 $\Omega$ (closed) Min. 50 k $\Omega$ (open)
Delay	10 ms
Pulse frequency	Max. 20 Hz
<b>Pulse measurement</b>	
Sensor	Open-collector
Sampling voltage	DC 24 V, Max. 8 mA
Max. speed	6000 RPM
Min. ON/OFF time	500 $\mu$ s

<b>Powering sensors Active/ratiometric DC 5 V, DC 24 V (T2)</b>	
Voltage/current	DC 5 V $\pm$ 2.5%, 20 mA
Voltage/current	DC 24 V (-25%, +10%), 40 mA
Reference potential	Terminals $\perp$
Connection	Short circuit protected



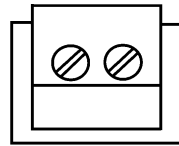
Active digital input DL1 (T12)	
Digital input (0/1 binary)	Galvanically isolated voltage input
Nominal voltage	AC 115...230 V (-15%, +10%)
Frequency range	45...65 Hz
Input current	3 mA @ AC 230 V
Delay	100 ms
Pulse frequency	Max. 5 Hz



## Interfaces

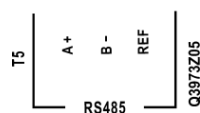
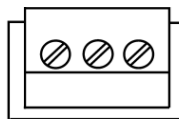
Process bus CE+, CE- (T6)	
Based on KNX TP1	
Bus connection	CE+, CE-, NOT interchangeable
Bus electronics	Galvanically isolated
Bus load	Max. 5 mA
Bus cable	Must be shielded; Please refer to KNX manual "System Specifications"

<b>Process bus CE+, CE- (T6)</b>	
Bus cable length between 2 nodes	Max. 350 m
Total length of bus cable	Max. 700 m
DPSU	40 mA rated current



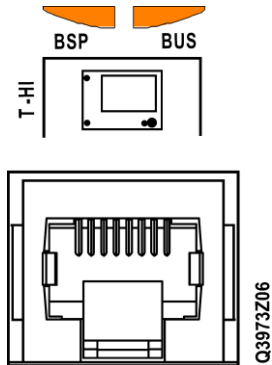
<b>Third party bus (RS-485 Modbus RTU) A+, B-, REF (T5)</b>	
<b>RS-485 (EIA-485)</b>	Modbus RTU or BACnet MS/TP <sup>o</sup> mode
Bus connection	A+, B-, REF
Bus electronics	NOT galvanically isolated
Bus cable	Shielded if length>3 m, twisted pair
Bus polarization	Configurable by software
Bus termination	None*

- ° BACnet MS/TP (with BSP 10.50 or higher)
- \* On RS485 network, it is essential to use termination resistors that match the cable's characteristic impedance to prevent signal echoes from corrupting the data on the line.



<b>Tools/HMI Local service interface (T-HI)</b>	
Cable connection	RJ45 jack, 8 pins, length of cable<3 m

<b>Local-HMI</b>	
RS-485 (EIA-485)	NOT galvanically isolated
Bus polarization	680 Ω/680 Ω
Bus termination	120 Ω /1 nF
Supply voltage	DC 24 V, Max. 100 mA (short circuit protected)
<b>Tool</b>	
USB	Use PC service cable POL0C2 for tools



<b>LED for BSP run/stop</b>	
Mode	LED status
SW update mode (download active on a new BSP, application)	Alternating between red and green every second
Application running	Green on
Application loaded but not running	Orange on
Application not loaded	Orange on
BSP error (software error)	Red flashing at 2 Hz
Hardware error	Red on

<b>NOTICE</b>	
<b>!</b>	LED for bus only indicates the status of the integrated modem communication. POL42X controllers do not provide this modem communication.

<b>Connection terminals</b>	
Possible plugs for I/O signals and communication (available on request)	Phoenix FKCVW 2,5/x-ST Phoenix FKCT 2,5/x-ST Phoenix MVSTBW 2,5/x-ST
Possible plugs for power supply	Phoenix FKCVW 2,5/2-ST OG

<b>Connection terminals</b>	
(available on request)	Phoenix FKCT 2,5/2-ST OG Phoenix MVSTBW 2,5/2-ST OG
Solid wire	0.5...2.5 mm <sup>2</sup>
Stranded wire (twisted or with ferrule)	0.5...1.5 mm <sup>2</sup>
Cable length	In compliance with the load, local regulations and installation documents

<b>Real-time clock</b>	
Buffering with internal Gold Cap	Min. 4 hours

<b>SD card</b>	
SD card	At the right side of the housing
Max. capability	32 GB
Formation	FAT32

<b>Ambient conditions and protection classification</b>	
<b>Climatic ambient conditions</b>	
<ul style="list-style-type: none"> <li>Transport (packaged for transport) as per EN 60721-3-2</li> </ul>	Temperature: -40...70 °C Air humidity: <95% r.h. (no condensation) Air pressure: Min. 260 hPa, corresponding to Max. 10,000 m above sea level
<ul style="list-style-type: none"> <li>Operation as per EN 60721-3-3.</li> </ul>	Temperature -40...70 °C Restriction process bus -25...70 °C Air humidity <95% r.h. (no condensation). Air pressure Min. 700 hPa, corresponding to Max. 3,000 m above sea level
<b>Mechanical ambient conditions</b>	
<ul style="list-style-type: none"> <li>Transport as per EN 60721-3-2</li> </ul>	Class 2M2
Degree of protection of housing to EN 60529	IP20
Safety class	Suitable for use in plants with safety class II

<b>Standards, directives and approvals</b>	
Product standard	EN 60730-1 Automatic electronic controls for household and similar use.
Electromagnetic compatibility	For residential, commercial, and light-

Standards, directives and approvals	
(applications)	industrial and industrial environments.
EU conformity (CE)	CE1T3973xx *)
RCM conformity (EMC)	CE1T3973en_C1 *)
Listings	UL916, UL873 <a href="http://database.ul.com/">http://database.ul.com/</a> CSA Class 4812 <a href="http://www.csagroup.org">http://www.csagroup.org</a>
Environmental compatibility	The product environmental declaration (232370-T-1109_EN *) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).

\*) The documents can be downloaded from <http://siemens.com/bt/download>.

General data	
Dimensions	180 x 110 x 75 mm
Weight excl. packaging	400 g
Base	Plastic, pigeon blue RAL 5014
Housing	Plastic, light grey RAL 7035

Accessory parts	
PC service cable 1.5 m	POL0C2.40/STD
<b>Connector set (screw, cable side entry)</b> 1 x Phoenix MVSTBW 2,5/2-ST OG 2 x Phoenix MVSTBW 2,5/2-ST GY7035 7 x Phoenix MVSTBW 2,5/3-ST GY7035 1 x Phoenix MVSTBW 2,5/4-ST GY7035 1 x Phoenix MVSTBW 2,5/5-ST GY7035 1 x Phoenix MVSTBW 2,5/8-ST GY7035	POL042.25/STD

#### Climatix 42X variants list

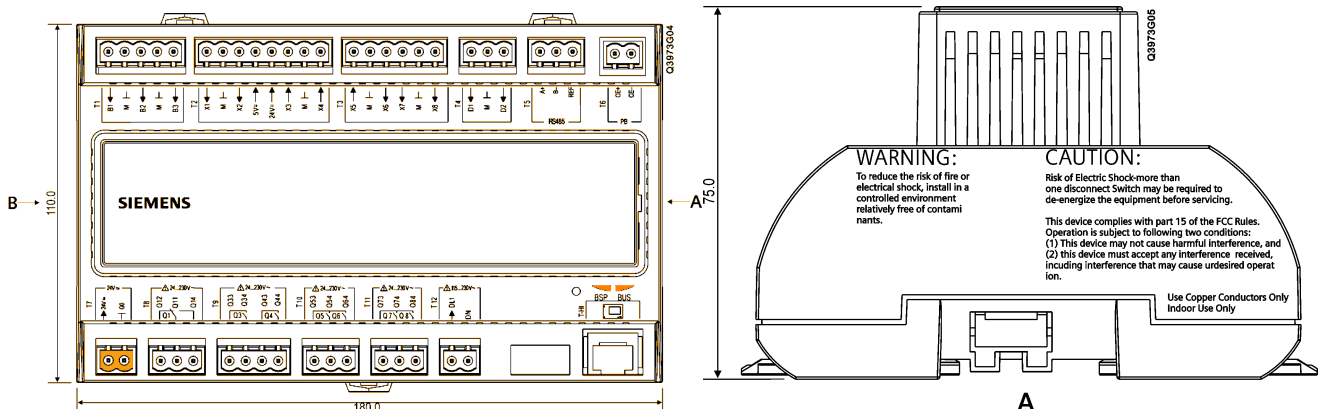
Hardware I/Os		POL424.50
Analog inputs	B1, B2, B3 (NTC 10k)	
	B1, B2, B3 (Ni1000/Pt1000)	✓
Configurable inputs	X1, X2 (NTC 10k / 0...10 V / DI)	



Hardware I/Os		POL424.50
	X1, X2 (Ni1000/ Pt1000 / 0...10 V / DI)	✓
Digital inputs	X6, X7 (binary)	✓
	X8 (binary/fan speed)	✓
	D1, D2 (binary)	✓
	DL1 (active AC 115...230 V)	✓
Configurable outputs	X3, X4, X5 (DC 0...10 V analog output / off-board digital output)	✓
Digital outputs	Q1, Q3, Q4, Q5, Q6 (relay output)	✓
	Q7, Q8 (relay output)	✓
	DO1, DO2 (triac output)	
Interfaces	Process bus interface	✓
	Modbus RTU or BACnet MS/TP (with BSP 10.50 or higher) over RS485 interface	✓
	EEV (stepper motor drive/PWM)	
	SD card interface	✓

## Dimensions

### POL424.50/XXX



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Document ID    CB1Q3973\_en--\_e  
Edition        2022-03-21

Climatix™

## HMI-TM

POL871.71, POL871.72



### The HMI-TM for display and system configuration for Climatix controllers

- Advanced operation and IP protection level for use outside
- High resolution 240 x 128 dpi
- 6 keys for easy operation
- ALARM, INFO, and CANCEL with LEDs
- User passwords for each access level
- Supports multiple languages
- Local HMI settings
- Data point access
- Powered by controller via the local HMI connection
- Version POL871.71 for magnetic mounting and as a mobile unit
- Version POL871.72 for permanent installation in the control panel
- Firmware can be upgraded

**Communication concept**

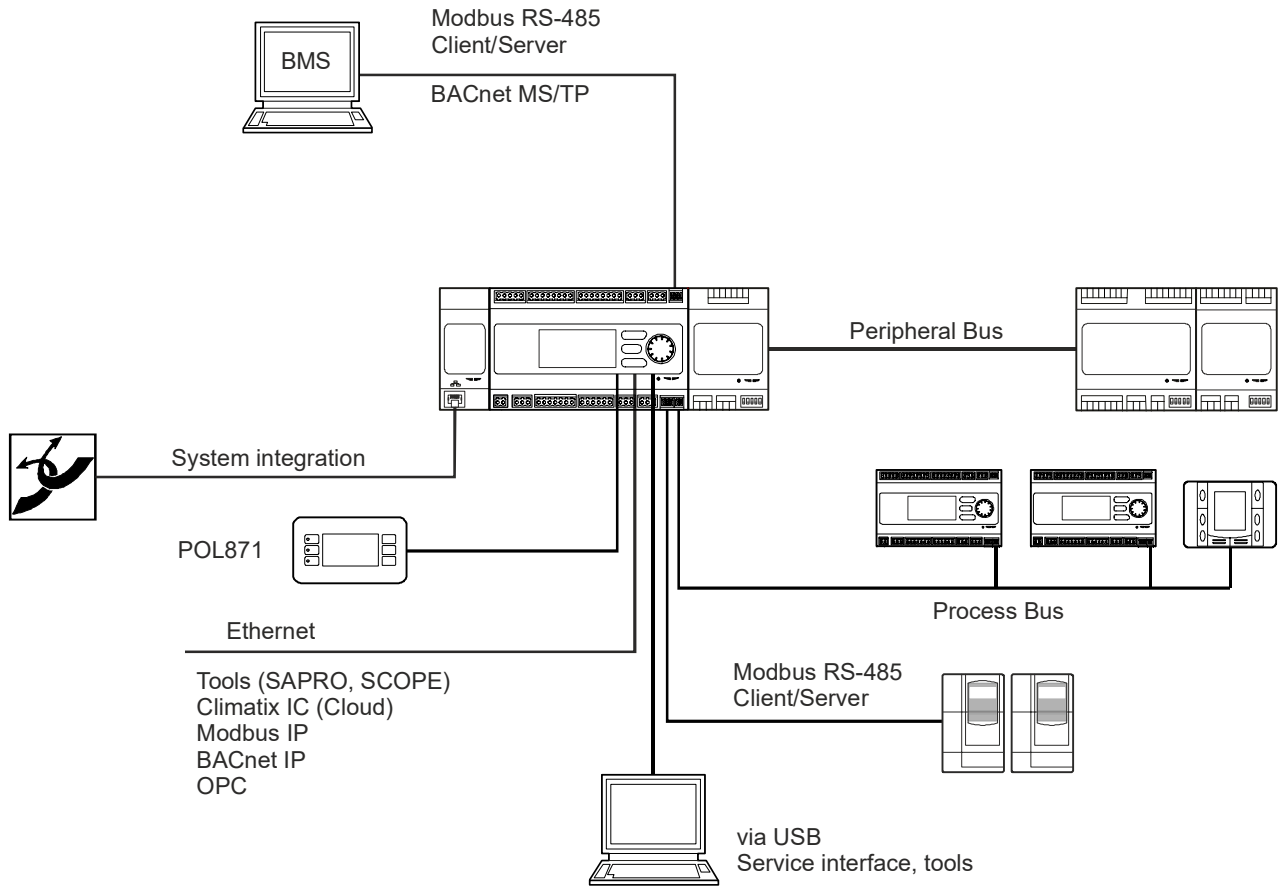


Fig. 1: Climatix POL6xx communication concept (here C600)

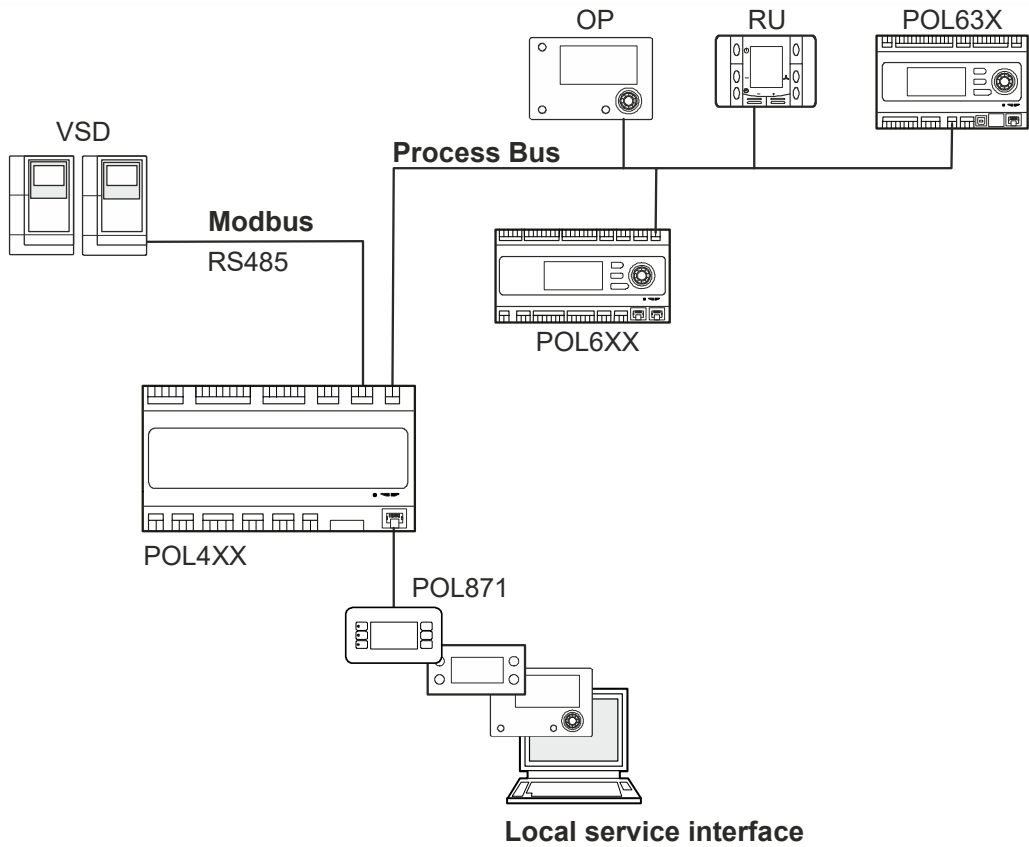


Fig. 2: Climatix POL4xx communication concept (here POL4xx)

General data	
Dimensions (W x H x D)	173.2 x 95.5 x 21.6 mm for POL871.71 173.2 x 95.5 x 33.1 mm for POL871.72
Materials and colors	Lens: Makrolon 2405, transparent Keyboard: Silicone rubber, RAL7035 Housing: Front: Makrolon 6485, RAL7035 Rear: Makrolon 6485, RAL5014
Without packaging	350 g for POL871.71 221 g for POL871.72
Weight (with packaging)	433 g for POL871.71 371 g for POL871.72
Panel thickness restriction for POL871.72 installation	Min. 0.5 mm Max. 1.5 mm

Power supply	
Power supply via controller	DC 24 V, 60 mA

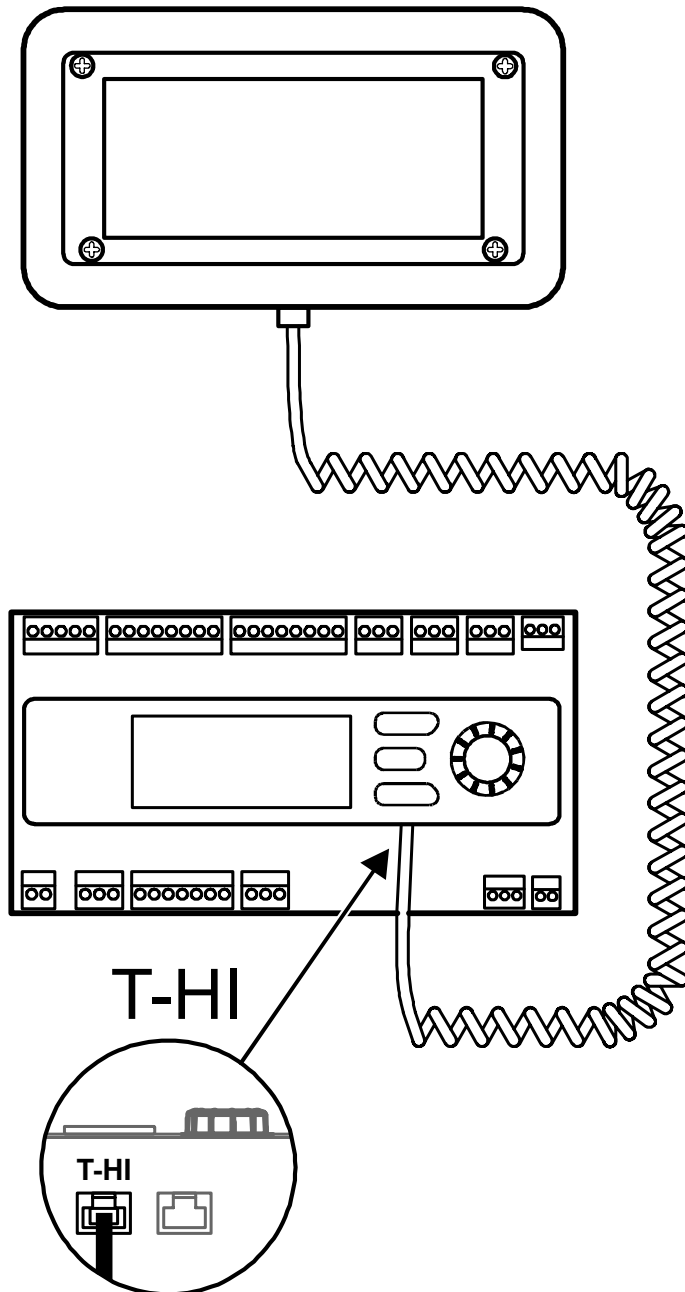
Display	
LCD type	STN blue, negative
Resolution	Dot-matrix 240 X 128
Backlit display	White LEDs
Size	
LCD size	93 x 58 mm
Display Size	86.15 x 47.78 mm
Viewing angle <sup>1)</sup>	
From above	41°
From below	21°
<sup>1)</sup> The viewing angle corresponds to the angle at a contrast ratio that is greater than 2.	

Ambient conditions and protection classification	
Classification as per EN 60730 Degree of pollution	2
Protect against shock	Protection class III
Degree of protection of housing to EN 60529	IP65 for entire POL871.71 IP65 for front of POL871.72 (use fasteners for assembly) IP20 for rear of POL871.72
Climatic ambient conditions <ul style="list-style-type: none"> <li>• Transport and storage (packaged) Per IEC/EN 60721-3-2 / -3-1</li> </ul>	<ul style="list-style-type: none"> <li>• Temperature -40...+70 °C (-40...+158 °F)</li> <li>• Air humidity 5...95 % (non-condensing)</li> <li>• Min. air pressure of 260 hPa, corresponding to max. 10,000 m above sea level</li> </ul>
<ul style="list-style-type: none"> <li>• Operation per IEC/EN 60721-3-3</li> </ul>	<ul style="list-style-type: none"> <li>• Temperature -40...+70 °C (-40...+158 °F)</li> <li>• <b>On LCD:</b> Temperature limitation -20...60 °C !</li> <li>• Air humidity 5...95 % (non-condensing)</li> <li>• Min. air pressure 700 hPa, corresponding to max. 3,000 m above sea level.</li> </ul>

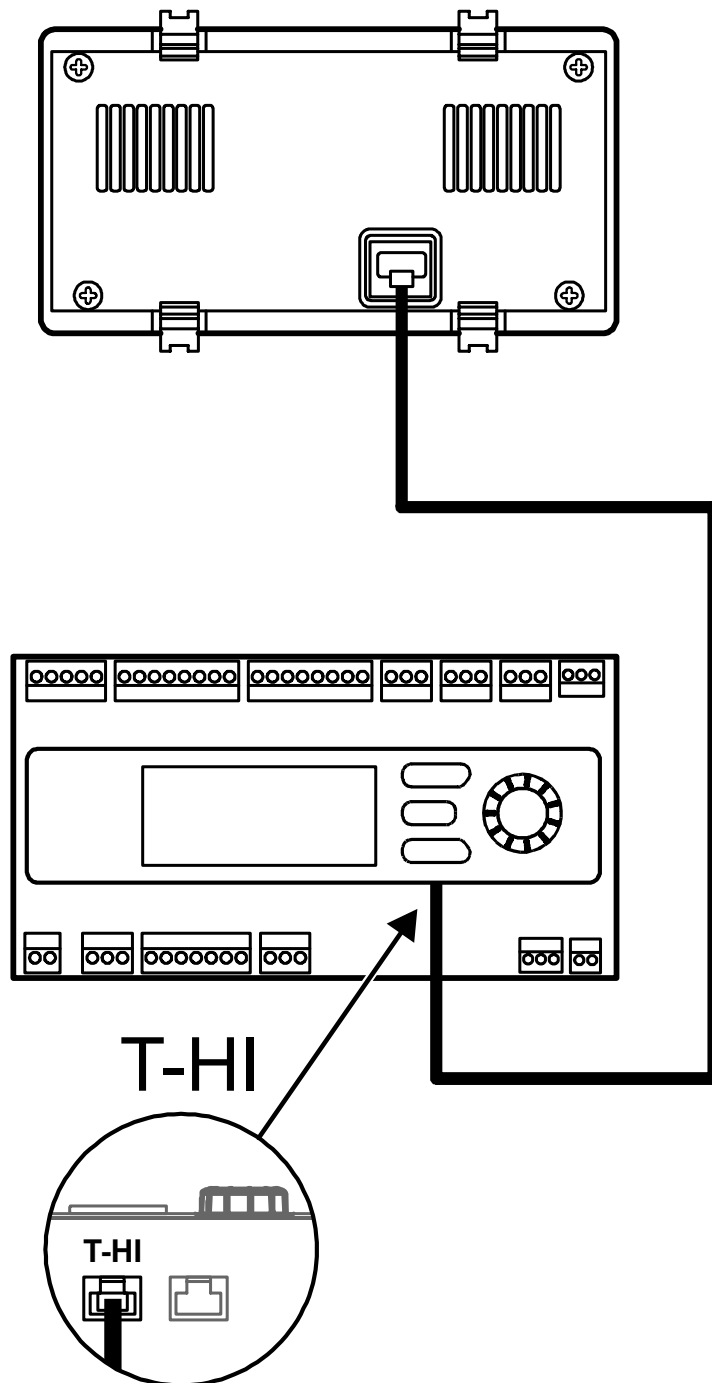
Standards, directives and approvals	
Product standards	IEC/EN 60730-1 Automatic electronic controls for household and similar use
Electromagnetic compatibility	For residential, commercial, and industrial environments
EU conformity (CE)	CB1T3917xx
UK compliance (UKCA)	A5W00192704A
RCM Conformity	CB1T3917en_C1
UL certification FCC	cUL916, UL873, <a href="http://database.ul.com">http://database.ul.com</a> CFR 47 part 15 B. (devices without WLAN/RF)
Environmental compatibility	Environmental Declarations 233006-T-0601_EN (POL871.71/STD) and 233006-T-0602_EN (POL871.72/STD) contain data on environmental-compatible product design and assessment (RoHS compliance, compositions, packaging, environmental benefits and disposal)..

**Local HMI connection**

POL871.71	
Connection	Cable in HMI-TM 1 RJ45 port on the controller
Cable length on the HMI side	2.5 m expandable spiral cable (1 m flat + 1.5 m expandable spiral cable)
Cable type	Integrated cable with RJ45 plug (4-wire twisted pair)



POL871.72	
Connection	Cable with RJ45 plugs on both sides
Cable length on the HMI side	1.5 m
Cable type	A separate Cat-5 Ethernet cable with two RJ45 plugs (8-wire twisted pair)





## Ordering

Type	Stock number	Designation
POL871.71/STD	S55626-H517-B100	HMI-TM for magnetic mounting and mobile operation
POL871.72/STD	S55626-H517-C100	HMI-TM for mounting in control panels

## Scope of delivery

Type	Contents
POL871.71/STD	<ul style="list-style-type: none"><li>• One HMI-TM</li><li>• With 4-wire twisted pair spiral cable, with one RJ45 plug</li><li>• Total cable length 2.5 m (1 m flat, 1.5 m spiral when extended)</li></ul>
POL871.72/STD	<ul style="list-style-type: none"><li>• One HMI-TM</li><li>• Separate 1.5 m Cat-5 Ethernet cable (8-wire twisted pair), with two RJ45 plugs</li><li>• Two terminals with screws (for assemblies requiring IP65)</li></ul>

## Product documentation

Document ID	Title	Topic
Q3900	Climatix range	Climatix product range
M3910	Mounting instructions for POL871.xx	Mounting and installation
P3917	"Climatix HMI application", Basic document	Basic documentation

## Notes

### Safety: National safety regulations

#### CAUTION



#### National safety regulations

Failure to comply with national safety regulations may result in personal injury and property damage.

- Observe national provisions and comply with the appropriate safety regulations.

### Engineering notes

#### NOTICE



Design to SELV per EN 60730-1. Use caution when wiring to protect against accidental contact with other parts when energized above 42 V<sub>eff</sub>.

## Disposal

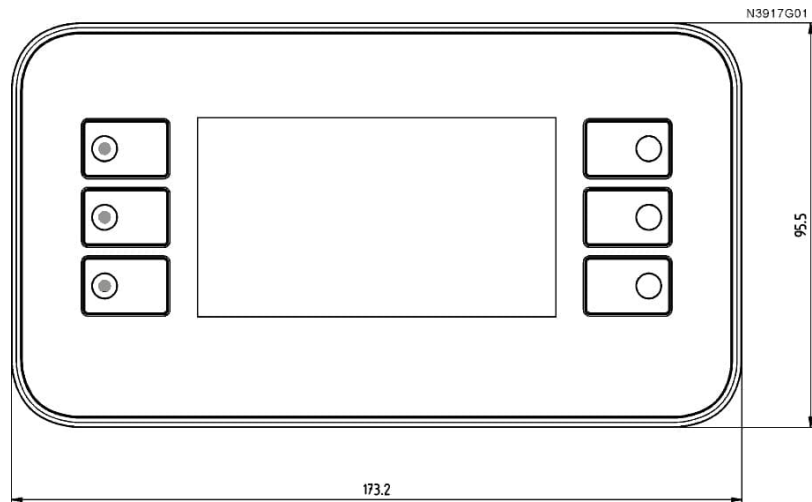


This symbol or any other national label indicate that the product, its packaging, and, where applicable, any batteries may not be disposed of as domestic waste. Delete all personal data and dispose of the item(s) at separate collection and recycling facilities in accordance with local and national legislation.

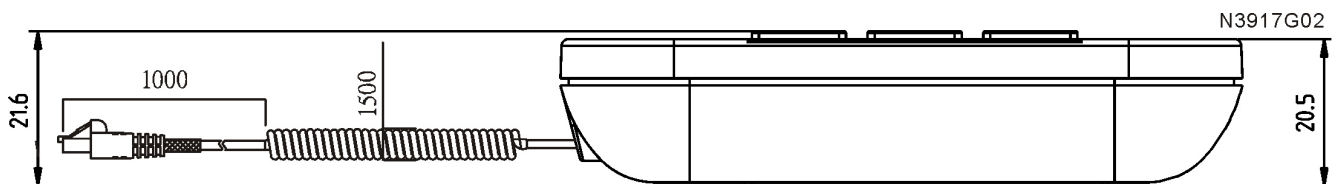
For additional details, refer to [Siemens information on disposal](#).

## Dimensions

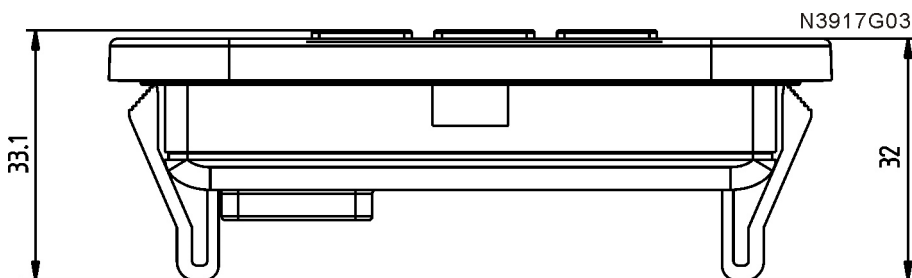
Dimensions in mm



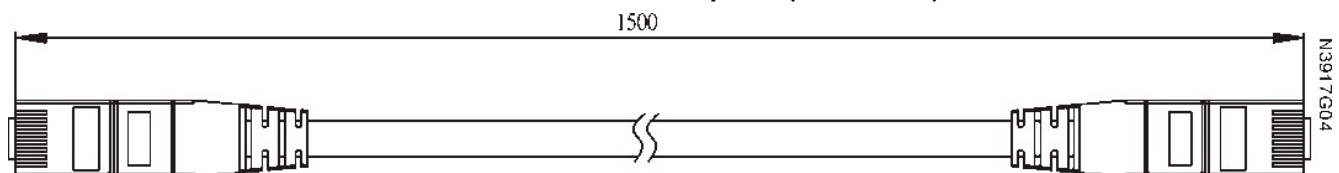
**POL871.71**



**POL871.72**



**Cable for mounted version in control panel (POL871.72)**



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Edition            2023-03-20

ACVATIX™

## Electromotive actuators for valves

SAS..



### Electromotive actuators with 5.5 mm stroke and 400 N positioning force

- SAS31.. Operating voltage AC 230 V, 3-position control signal
- SAS61.. Operating voltage AC 24 V / DC 24 V, positioning signal DC 0...10 V / DC 4...20 mA / 0...1000 Ω
- SAS61../MO operating voltage AC 24 V / DC 24 V, RS-485 for Modbus RTU communication
- SAS81.. Operating voltage AC/DC 24 V, 3-position control signal
- For direct mounting on valves; no adjustments required
- Manual adjuster, position and status indication (LED)
- Optional function extension with auxiliary switch

## Application

To operate Siemens 2-port and 3-port valves:

- Types V..G44.., VVG55.., and VVG549..
- 5.5 mm stroke

Used as control and shutoff valves in heating and ventilation plants.

Together with the ASK30 mounting kit, all former Landis & Gyr valves with 4 mm or 5.5 mm stroke can also be operated: X3i.., VVG45.., VXG45.., VXG46.., VVI51...

## Functions

Function	Description	Type
3-position control	A 3-position signal controls the actuator via connection terminals Y1 or Y2. The desired position is transmitted to the valve.	SAS31.. SAS81..
Modulating control	The modulating positioning signal provides stepless motor control. The positioning signal range (DC 0...10 V / DC 4...20 mA / 0...1000 Ω) corresponds to the positioning range (closed...open, or 0...100% stroke) in a linear manner.	SAS61..
Positioning signal and characteristic changeover	Setting with DIL switch. Factory setting SAS..: <ul style="list-style-type: none"> <li>• Characteristic curve: log = Equal percentage (switch set to Off)</li> <li>• Positioning signal: DC 0...10 V (switch set to Off)</li> </ul>	
Position feedback U	Signal returned to acquire the position via input.	
Forced control (Z-mode)	Forced control helps override automatic mode and is implemented via higher control.	
Calibration	Carry out during initial commissioning. The actuator drives to the top or bottom end position; the measured values are saved.	SAS61.. SAS61../MO
Valve seat detection	The actuators have power-dependent seat detection. After calibration, the exact valve stroke is stored in the actuator's memory.	
Foreign body detection	After clogging is detected, three attempts are made to get past clogging. If unsuccessful, the actuator continues to following the positioning signal only within a limited range, and the LED blinks red.	
Modbus RTU (RS-485), not galvanically isolated	Setpoint 0...100 % valve position Actual value 0...100 % for valve position Override control Open / Close / Min / Max / Stop Setpoint monitoring and backup mode	SAS61../MO

## Types

Type	Item no.	Operating voltage	Control signal	Power consumption	Pos. time	Spring return		Manual adjustment <sup>1)</sup>	Position feedback	Remark
						Func.	Time			
SAS31.00	S55158-A106	AC 230 V	3-position	2.8 / 2.4 VA <sup>6)</sup>	120 s	No	–	Yes	-	2) 4)
SAS31.03	S55158-A107			3.5 / 2.9 VA <sup>6)</sup>	30 s					
SAS31.50	S55158-A108				120 s	Yes	<28 s <sup>7)</sup>	No		
SAS31.53	S55158-A109			5.5 / 3.8 VA <sup>6)</sup>	30 s	Yes	<14 s <sup>7)</sup>			
SAS61.03	S55158-A100	AC / DC 24 V	DC 0...10 V	5.3 / 4.5 VA <sup>6)</sup>	30 s	No	–	Yes	DC 0...10 V	2) 3) 5)
SAS61.03U	S55158-A100-A100		DC 4...20 mA 0...1000 Ω							
SAS61.03/MO	S55158-A121		Modbus RTU							
SAS61.33	S55158-A101		DC 0...10 V	5.9 / 4.8 VA <sup>6)</sup>		Yes	<14 s <sup>7)</sup>	No	DC 0...10 V	
SAS61.33U	S55158-A101-A100		DC 4...20 mA 0...1000 Ω							
SAS61.33/MO	S55158-A122		Modbus RTU							
SAS61.53	S55158-A102		DC 0...10 V DC 4...20 mA 0...1000 Ω	5.8 / 5.0 VA <sup>6)</sup>					DC 0...10 V	
SAS81.00	S55158-A103	AC / DC 24 V	3-position	2.2 / 2.0 VA <sup>6)</sup>	120 s	No	–	Yes	-	2) 3)
SAS81.03	S55158-A104			2.5 / 2.1 VA <sup>6)</sup>	30 s					
SAS81.03U	S55158-A104-A100									
SAS81.33	S55158-A105									
SAS81.33U	S55158-A105-A100			3.4 / 2.4 VA <sup>6)</sup>	Yes					

1) Not designed for continuous operation.

2) Cable gland: M16, M20 (ISO50262)

3) Cable gland ½" (UL514C)

4) Approbation: CE

5) Approbation: CE, UL

6) Second value: Power consumption in normal position

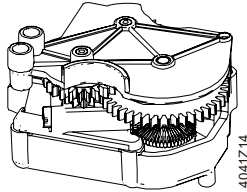
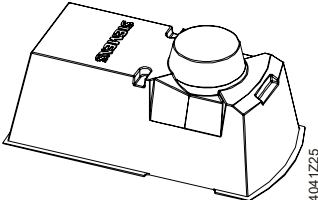
7) Spring return time at low temperatures slightly longer

8) Fixed connection cable 5 x 0.75 mm<sup>2</sup>

## Delivery

Actuators, valves, and accessories are supplied in individual packs.

## Accessories

Electrical accessories	Mechanical accessory
Auxiliary switch ASC10.51 	Weather shield <sup>1)</sup> ASK39.2 

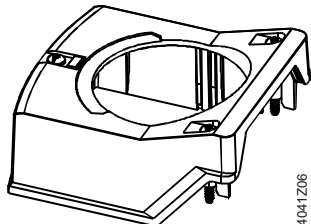
1) SAS61../MO is not intended for outdoor use

## Ordering (example)

Type	Stock number	Designation	Number of pieces
SAS31.00	S55158-A106	Actuator	1
+ auxiliary components such as connections, aux switches, etc.			

## Spare parts

Stock number	Description
S55845-Z180	Type ASQ1: Housing cover with associated screws and light guide as component, without laser labeling



4041206

## Compatibility

Valves PN16					Actuators SAS..	
VVG44.. (2-port)	VXG44.. (3-port)	DN	G	k <sub>vs</sub>	Δp <sub>s</sub>	Δp <sub>max</sub>
Medium: 1...120 °C			[inch]	[m <sup>3</sup> /h]	[kPa]	[kPa]
VVG44.15-.. <sup>1)</sup>	VXG44.15-.. <sup>1)</sup>	15	G 1 B	0,25 / 0,4 / 0,63	1600	400
VVG44.15-.. <sup>1)</sup>	VXG44.15-.. <sup>1)</sup>	15	G 1 B	1 / 1,6	725	400
VVG44.15-.. <sup>1)</sup>	VXG44.15-.. <sup>1)</sup>	15	G 1 B	2,5 / 4	400	400
VVG44.20-6.3	VXG44.20-6.3	20	G 1 ¼ B	6,3	750	400
VVG44.25-10	VXG44.25-10	25	G 1 ½ B	10	400	400
VVG44.32-16	VXG44.32-16	32	G 2 B	16	250	250
VVG44.40-25	VXG44.40-25	40	G 2 ¼ B	25	125	125

<sup>1)</sup> = use k<sub>vs</sub> value

Valves PN25					Actuators SAS.. <sup>1)</sup>	
VVG549. (2-port)		DN	G	k <sub>vs</sub>	Δp <sub>s</sub>	Δp <sub>max</sub>
Medium: 1...130 °C			[inch]	[m <sup>3</sup> / h]	[kPa]	[kPa]
VVG549.15-0.25		15	G ¾ B	0,25	2500	1200
VVG549.15-0.4		15	G ¾ B	0,4	2500	1200
VVG549.15-0.63		15	G ¾ B	0,63	2500	1200
VVG549.15-1		15	G ¾ B	1,0	1500	1200
VVG549.15-1.6		15	G ¾ B	1,6	1500	1200
VVG549.15-2.5		15	G ¾ B	2,5	1500	1200
<b>Pressure compensated</b>						
VVG549.20-4K		20	G 1 B	4,0	1600	1200
VVG549.25-6.3K		25	G 1 ¼ B	6,3	1600	1200

<sup>1)</sup> SAS.. combined with VVG549: Change DIL switch setting to linear (factory setting = log).

SAS../MO: Change Modbus register 263 to 0 = linear → only possible with Firmware release 2.0, not with 0.27 and 1.0!



Valves PN25				Actuators SAS..		
VVG55.. (2-port) <sup>1)</sup>		DN	G	k <sub>vs</sub>	Δp <sub>s</sub>	Δp <sub>max</sub>
Medium: 1...130 °C			[inch]	[m <sup>3</sup> / h]	[kPa]	[kPa]
VVG55.15-.. <sup>2)</sup>		15	G ¾ B	0,25 / 0,4 / 0,63	2500	1200
VVG55.15-.. <sup>2)</sup>		15	G ¾ B	1 / 1,6 / 2,5	2000	1200
VVG55.20-4		20	G 1 B	4	1000	1000
VVG55.25-6.3		25	G 1 ¼ B	6,3	800	800

1) VVG55 is replaced by VVG549 from Jan 1, 2017.

2) = use k<sub>vs</sub> value

## Product documentation


Title	Content	Document ID
Actuators SAS.., SAT.. for valves	Basic documentation: Comprehensive information on actuators SAS..	CE1P4041
Electromotive actuators for valves SAS..	Data sheet: Product description SAS..	CE1N4581
Electromotive actuators for valves SA.., Modbus RTU	Data sheet: Modbus communication profiles	A6V101037195
Mounting instructions G..161../MO and S..6../MO	Mounting instructions: Mounting and installation instructions for Modbus actuators	A5W00027551
Valve Actuator DIL Switch Characteristic Overview	Commissioning / Configuration: Describes the characteristics of valve and actuator combinations, it describes the DIL Switch function.	A6V12050595

Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following Internet address:

<http://siemens.com/bt/download>

## Notes

### Safety

	<p><b>⚠ CAUTION</b></p>
	<p><b>National safety regulations</b></p> <p>Failure to comply with national safety regulations may result in personal injury and property damage.</p> <ul style="list-style-type: none"> <li>Observe national provisions and comply with the appropriate safety regulations.</li> </ul>

**SAS31.. and SAS81..**

3-position actuators must have their own specific controller, see "Conenction Diagrams".

**SAS61..**

Up to 10 actuators can drive in parallel on a controller output with a rating of 1 mA. Modulating actuators have an input impedance of 100 kΩ.

**SAS61../MO**

The Modbus converter is dimensioned for analog control at 0...10 V.

**Note:** Keep the analog signal setting on the actuator as is (switch 1 to Off); adjustment not possible.

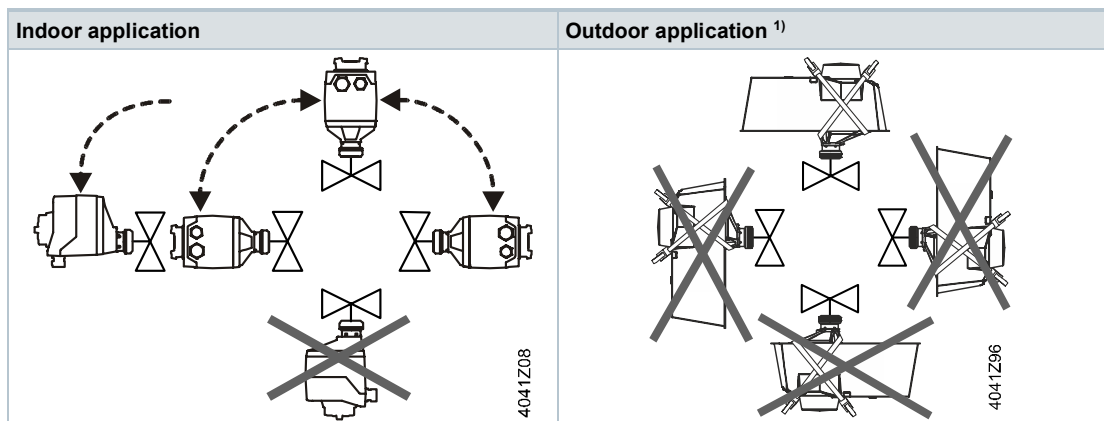
The actuators are parameterized at the factory to an equal-percentage characteristic; this corresponds to their use with valves VVG/VXG44.

When using SAS61../MO with valve series VVG549, the following must be set:

- Actuator: DIL switch (internal actuator characteristic changeover) to linear (switch 2 to On).
- Modbus register 263: Set "Y\_U\_Characteristic" to "0 = linear".

**Installation**

**Mounting positions**



<sup>1)</sup> Only together with weather shield ASK39.2. IP54 housing protection unchanged. SAS61../MO is not intended for outdoor use.

**Maintenance**


The SAS.. actuators are maintenance-free.

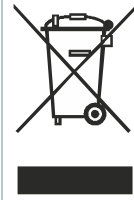
Mounting:

- Do not touch the valve coupling if the components (valve/pipes) are hot
- If necessary, disconnect electrical connections from the terminals

The actuator must be correctly fitted to the valve before recommissioning.

## Disposal

	<p><b>⚠ WARNING</b></p> <p><b>Tensioned return spring</b></p> <p>Opening the actuator housing can release the tensioned return spring resulting in flying parts that may cause injury.</p> <ul style="list-style-type: none"><li>• Do not open the actuator body.</li></ul>
---	---



The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

## Warranty

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

## Technical data

Power supply		
Operating voltage	SAS31..	AC 230 V ± 15%
	SAS61..	AC 24 V ± 20% / DC 24 V +20% / -15% or AC 24 V class 2 (US)
	SAS81..	AC/DC 24 V ± 20 % or AC 24 V class 2 (US)
Frequency		45...65 Hz
External supply line fusing (EU)		Fuse slow 6 A...10 A or fuse switch max. 13 A, release characteristic B,C,D as per EN 60898 power source with current limitation of max. 10 A
Power consumption	At 50 Hz	See "Type summary"; stem retracts/extends
Typical inrush current <sup>1)</sup> (3-position actuators without permanent power supply)	SAS31..	2.3 A
	SAS81..	2.8 A

Function data		
Positioning time for nominal stroke	SAS..0	120 s
	SAS..3 / SAS..3U	30 s
Positioning force		400 N
Nominal stroke		5.5 mm
Permissible medium temperature	With valve	1...130 °C

Signal inputs		
Y1 / Y2	SAS31..., SAS81..	3-position
	SAS31..	Voltage AC 230 V ± 15%
	SAS81..	Voltage AC 24 V ± 20% / DC 24 V + 20% / - 15%
Positioning signal "Y"	SAS61..	DC 0...10 V / DC 4...20 mA / 0...1000 Ω
	SAS61.. (DC 0...10 V)	
		Current draw ≤ 0.1 mA
		Input impedance ≥100 kΩ
	SAS61.. (DC 4...20 mA)	
		Current draw DC 4...20 mA ± 1%
		Input impedance ≤ 500 Ω

Communication SAS61../MO			
Communication protocol	Modbus RTU	RS-485, not galvanically isolated	
	Number of nodes	Max. 32	
	Address range		1...248 / 255
		Factory setting	255
	Transmission formats		1-8-E-1 / 1-8-O-1 / 1-8-N-1 / 1-8-N-2
		Factory setting	1-8-E-1
	Baud rates (kBaud)		Auto / 9.6 / 19.2 / 38.4 / 57.6 / 76.8 / 115.2
		Factory setting	Auto
	Bus termination		120 Ω electronically switchable
		Factory setting	Off

Parallel connection		
SAS61..		≤ 10 (depending on controller output)

Forced control		
Z positioning signal	SAS61..	R = 0...1000 Ω, G, G0
	R = 0...1000 Ω	Stroke proportional to R
	Z connected to G	Max. stroke 100%
	Z connected to G0	Min. stroke 0%
	Voltage	Max. AC 24 V ±20% / Max. DC 24 V +20% / -15%
	Current draw	≤ 0.1 mA

Position feedback		
U	Voltage range SAS61..	DC 0...10 V
	Load impedance	> 10 kΩ resistive
	Load	Max. 1 mA

Connection cables			
Wire cross-sectional areas		0.75...1.5 mm <sup>2</sup> , AWG 20...16 <sup>2)</sup>	
Cable entries	SAS.. (EU)	1 entry dia. 16.4 mm (für M16) 1 entry dia. 20.5 mm (für M20) Thread length max. 9mm	
	SAS..U (US)	2 entries dia. 21.5 mm for ½" tube connection	
	SAS61../MO	Fixed connection cable	0.9m
		Number of cores	5 x 0.75 mm <sup>2</sup>

Protection class		
Housing	See "Mounting"	IP 54 as per EN 60529
Insulation class		As per EN 60730
	Actuators SAS31.. AC 230 V	II
	Actuators SAS61.. AC / DC 24 V	III
	Actuators SAS81.. AC / DC 24 V	III

Environmental conditions		
Operation		IEC 60721-3-3
	Climatic conditions	Class 3K5
	Mounting location	Indoors, outdoors <sup>3)</sup>
	Temperature, general	-5...55 °C
	Humidity (non-condensing)	5...95 % r. h.
Transport		IEC 60721-3-2
	Climatic conditions	Class 2K3
	Temperature	-25...70 °C
	Humidity	< 95 % r. h.
Storage		IEC 60721-3-1
	Temperature	-15...55 °C
	Humidity	5...95 % r. h.

<b>Standards</b>	
Product standard	EN60730-x
Electromagnetic compatibility (field of use)	For residential, commercial and industrial environment
EU conformity (CE)	CE1T4581xx <sup>4)</sup> (8000073402)
RCM conformity	CE1T4581en_C1 <sup>4)</sup> (8000069574)
UL, cUL	UL 873 <a href="http://ul.com/database">http://ul.com/database</a> File number E35198
EAC compliance	Eurasien compliance for all SAS variants

<b>Environmental compatibility</b>
The product environmental declarations CE1E4581en <sup>4)</sup> and A6V101083254 <sup>4)</sup> contain data on environmentally compatible product design and assessments (RoHS compliance, material composition, packaging, environmental benefit, and disposal).

<b>Dimensions / Weight</b>
Refer to "Dimensions"

<b>Accessories <sup>5)</sup></b>		
Auxiliary switch ASC10.51	Switching capacity	AC 24...230 V, 6 (2) A, potential free
	External supply line fusing	See "Power supply"
	US installation, UL & cUL	AC 24 V class 2, 5 A general purpose

<sup>1)</sup> Switching moment at RMS value of sine wave at nominal voltage.

<sup>2)</sup> AWG = American wire gauge.

The planner/installer is responsible for matching wire cross sections and fuses. Standard regarding protective measures – Note protection for overcurrent:

IEC 60364-4-43:2008 or German adoption HD 60364-4-43:2010.

<sup>3)</sup> For outdoor operation, always use weather shield ASK39.2, housing protection class IP 54 remains as is. SAS61.../MO is not intended for outdoor use.

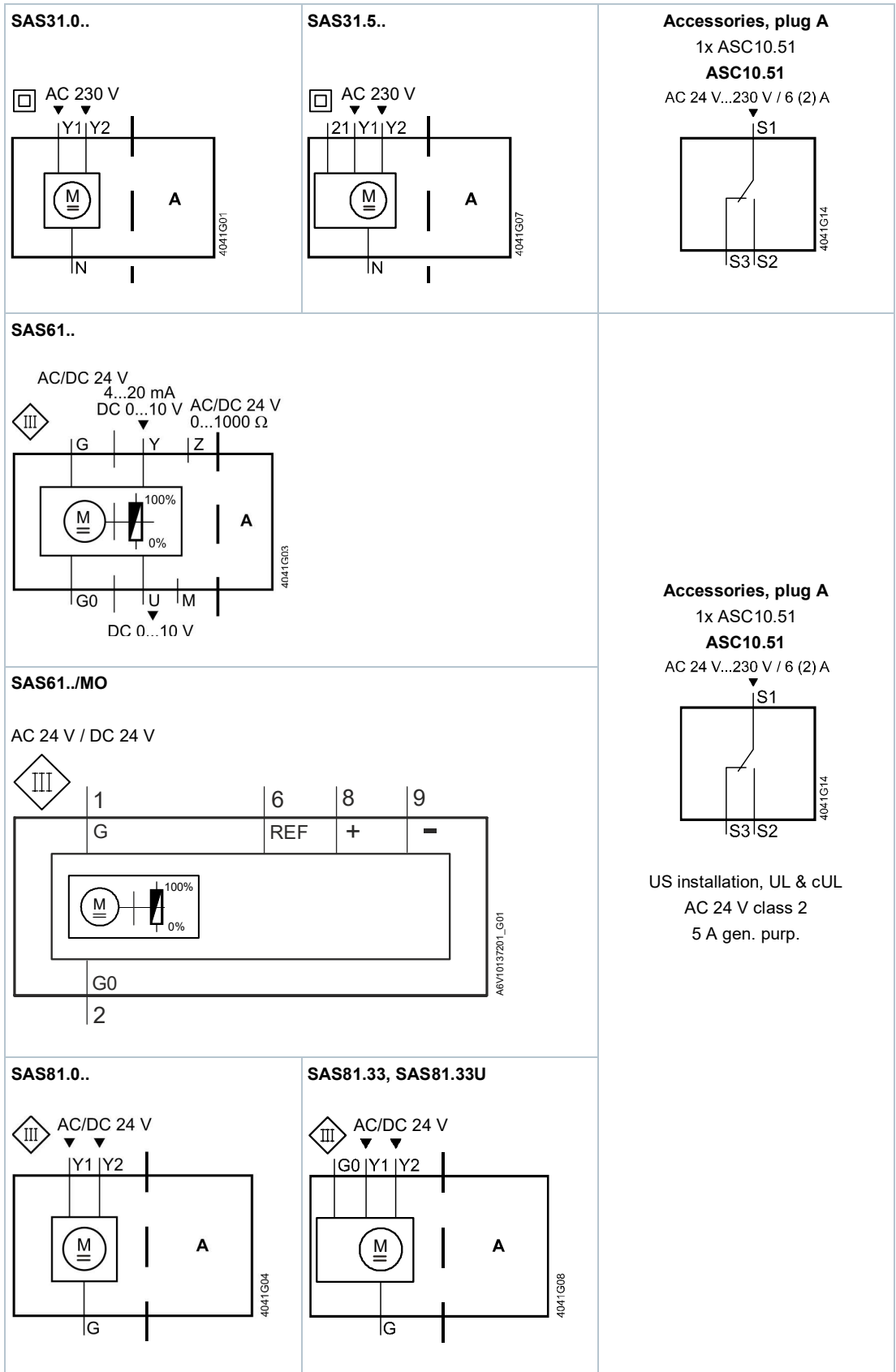
<sup>4)</sup> The documents can be downloaded via the Internet address, see Section "Product documentation".

<sup>5)</sup>

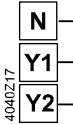
UL-approved component

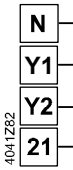


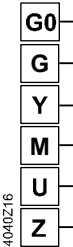
Internal diagrams




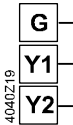
## Connection terminals

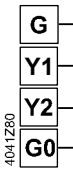
SAS31.0..	AC 230 V, 3-position
4040Z17 	System neutral (SN)
	Positioning signal (actuator's stem extends)
	Positioning signal (actuator's stem retracts)

SAS31.5..	AC 230 V, 3-position
4041Z82 	System neutral (SN)
	Positioning signal (actuator's stem extends)
	Positioning signal (actuator's stem retracts)
	Fail-safe function

SAS61..	AC/DC 24 V, DC 0...10 V / 4...20 mA / 0...1000 Ω
4040Z16 	System neutral (SN)
	System potential (SP)
	Positioning signal for DC 0...10 V / 4...20 mA
	Measuring neutral
	Position feedback DC 0...10 V
	Positioning signal forced control AC/DC ≤ 24 V, 0...1000 Ω

SAS61../MO	AC/DC 24 V, Modbus RTU connection cable	
4040Z59 	System neutral (SN)	black
	System potential (SP) AC 24 V ~ / DC 24 V =	red
	Reference line (Modbus RTU)	violet
	Bus + (Modbus RTU)	gray
	Bus - (Modbus RTU)	pink

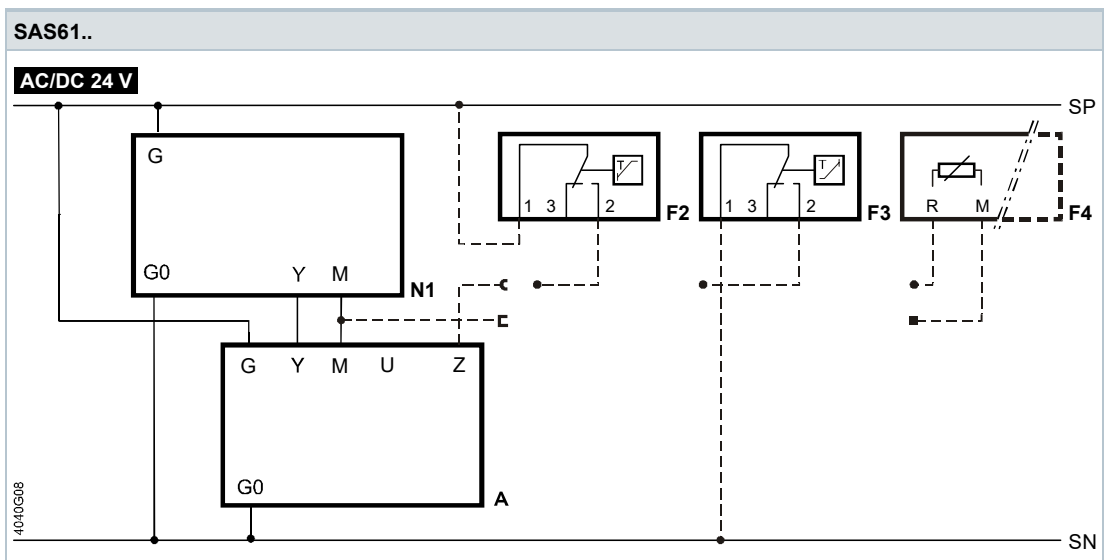
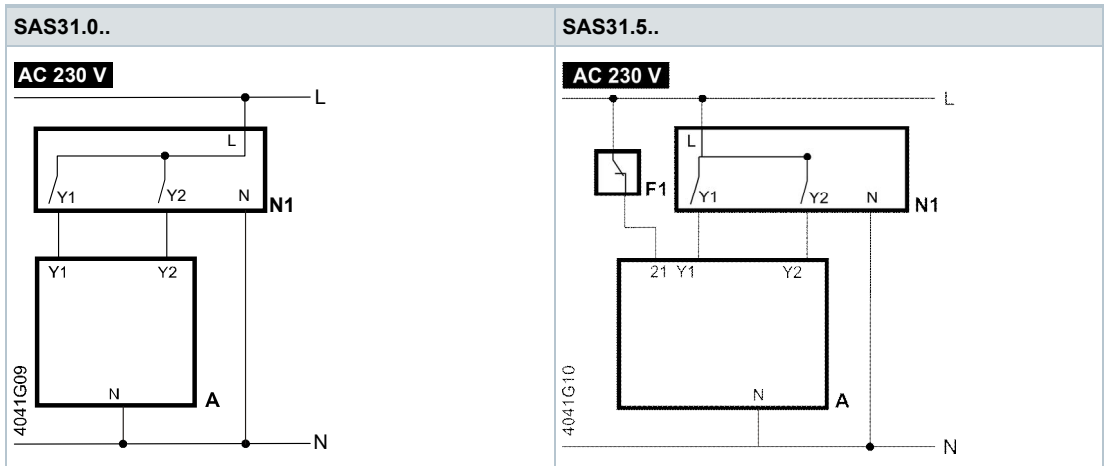
SAS81.0..	AC/DC 24 V, 3-position
4040Z19 	System potential (SP)
	Positioning signal (actuator's stem extends)
	Positioning signal (actuator's stem retracts)

SAS81.33U	AC/DC 24 V, 3-position
4041Z80 	System potential (SP)
	Positioning signal (actuator's stem extends)
	Positioning signal (actuator's stem retracts)
	System neutral (SN)



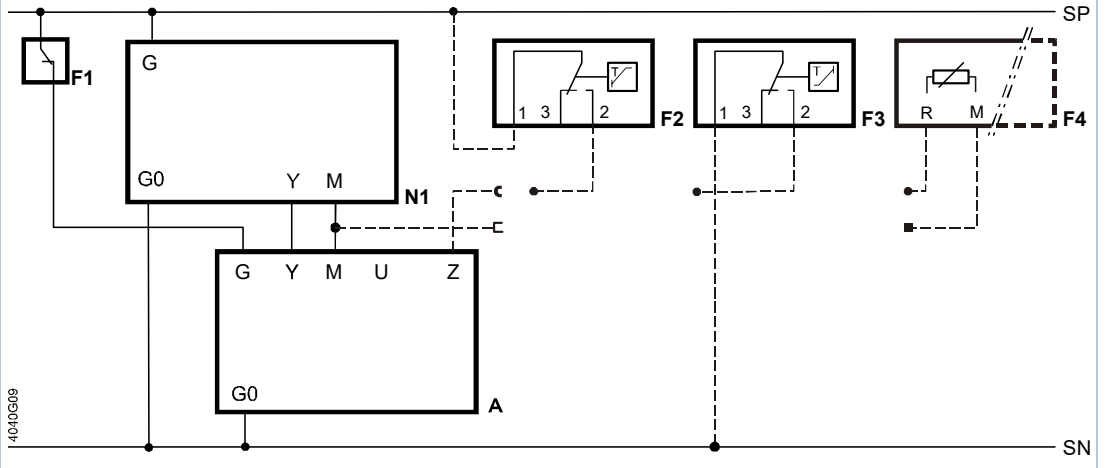
Electrical accessories		
ASC10.51	Auxiliary switch, adjustable switching positions, AC 24...230 V	
	1	System potential (SP)
	2	Closes (actuator stem extends)
	3	Opens (actuator stem extends)
		AC 24 V...230 V / 6 (2) A 

## Connection diagrams



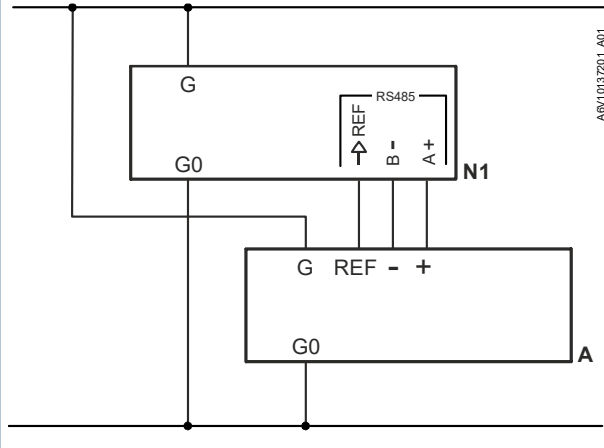
SAS61.33 / SAS61.33U / SAS61.53

AC/DC 24 V



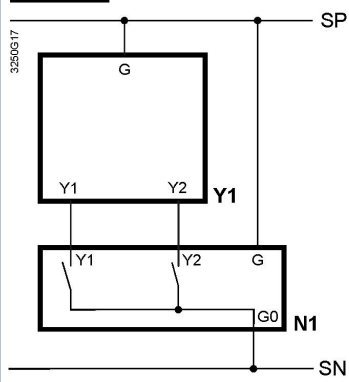
SAS61../MO

AC/DC 24 V

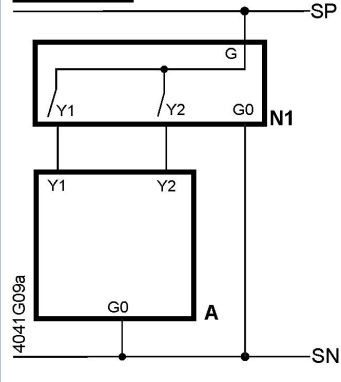


SAS81.0..

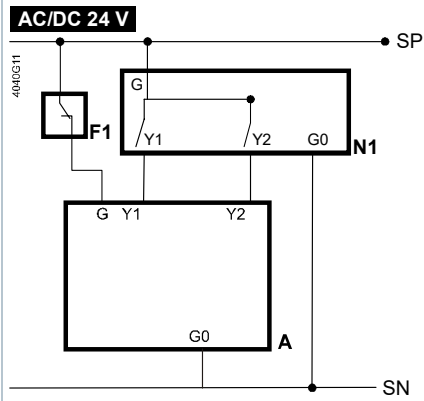
AC 24 V



AC/DC 24 V

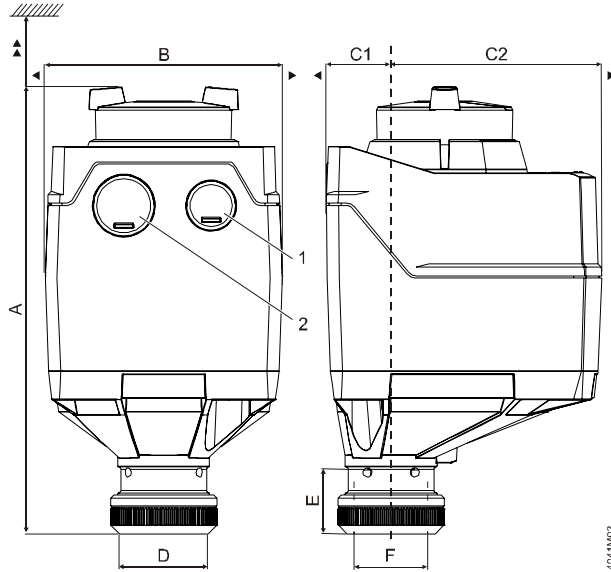


SAS81.33, SAS81.33U



A	Actuator	REF	Reference line (Modbus RTU)
F1	Temperature limiter	SN	System zero
F2	Frost protection thermostat; terminals: 1 – 2 Frost hazard / sensor is Off (thermostat closes upon frost) 1 – 3 normal operation	SP	System potential AC/DC 24 V
F3	Thermal reset limit thermostat	U	Position feedback
F4	Frost protection monitor with 0...1000 Ω signal output, does <b>NOT</b> support QAF21.. or QAF61..	Y	Positioning signal
G	System potential (SP)	Y1, Y2	Positioning signals
G0	System neutral (SN)	Z	Control signal forced control
L	Phase	21	Fail-safe function
M	Measuring neutral	+	Bus + (Modbus RTU)
N	Neutral	-	Bus - (Modbus RTU)
N1	Controller		

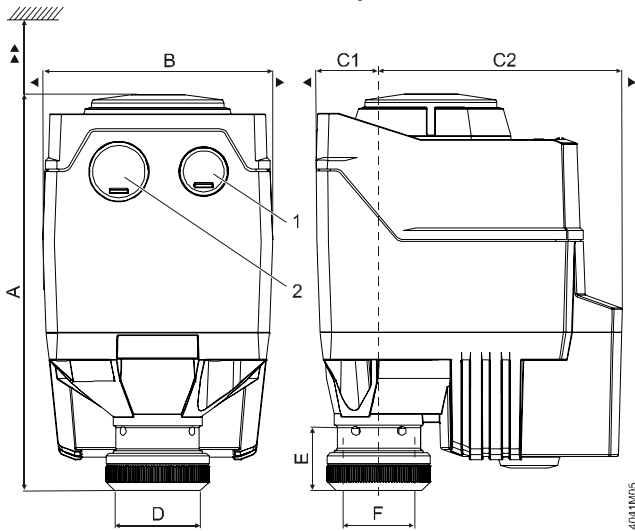
**Actuators SAS.. with manual adjustment**



Type	A [mm]	B [mm]	C [mm]	C1 [mm]	C2 [mm]	D [mm]	E [mm]	F [inch]	▶ [mm]	▶▶ [mm]	kg [kg]	1	2
SAS..	151	80	93	21,9	71.1	29,9	21,8	G ¾	100	200	0,4	M16 <sup>1)</sup> <sub>3)</sub>	M20 <sup>1)</sup> <sub>3)</sub>
SAS../MO <sup>2)</sup>											0,55		
With ASK39.2											0,55		

- 1) SAS..U: ½" (dia. 21.5 mm)
- 2) Device has fixed connection cable - cable entry 2 occupied
- 3) Thread length max. 9 mm

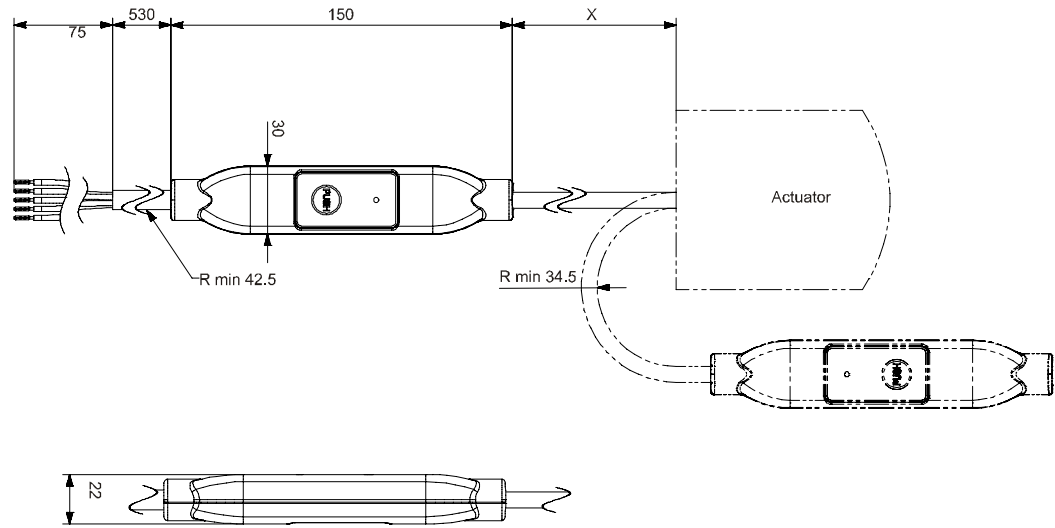
**Actuators SAS.. without manual adjustment**



Type	A [mm]	B [mm]	C [mm]	C1 [mm]	C2 [mm]	D [mm]	E [mm]	F [inch]	▶ [mm]	▶▶ [mm]	kg [kg]	1	2
SAS..	137,6 <sup>1)</sup>	80	106,5	21,9	84,6	29,9	21,8	G ¾	100	200	0,68	M16 <sup>3)</sup>	M20 <sup>3)</sup>
	151 <sup>2)</sup>										0,83		
With ASK39.2	155	126	248	99	149								

- 1) Black cover
- 2) Blue handwheel
- 3) Thread length max. 9 mm

**External Modbus converter**



Type	A [mm]	 [kg]
SAS../MO	250	0,15 <sup>1)</sup>

<sup>1)</sup> Included in total weight

Dimensions in mm

## Revision numbers

Type	Valid from rev. no.
SAS31.00	..B
SAS31.03	..B
SAS31.50	..B
SAS31.53	..B
SAS61.03	..B
SAS61.03U	..B
SAS61.03/MO	..B
SAS61.33	..B
SAS61.33U	..B
SAS61.33/MO	..A
SAS61.53	..B
SAS81.00	..B
SAS81.03	..B
SAS81.03U	..B
SAS81.33	..B
SAS81.33U	..B

ACVATIX™

## Electromotoric actuators for valves

SAX..



### Actuators with 20 mm stroke and 800 N force

- SAX31.. Operating voltage AC 230 V, 3-position control signal
- SAX61.. Operating voltage AC/DC 24 V, positioning signal 0...10V, 4...20 mA  
With position feedback, forced control, characteristic changeover
- SAX61../MO operating voltage AC/DC 24 V,  
RS-485 for Modbus RTU communication
- SAX81.. Operating voltage AC/DC 24 V, 3-position control signal
- For direct mounting on valves; no adjustments required
- Manual adjuster, position and status indication (LED)
- Optional functions with auxiliary switches, potentiometer, function module, stem heating

## Use

Electromotoric actuators to operate Siemens 2-port and 3-port valves, types V..F21.., V..F22.., V..F31.., V..F32.., V..F40.., V..F41.., V..F42.., V..F52.., and V..F53.. with 20 mm stroke as control and safety shut-off valves in heating, ventilation and air conditioning systems.

## Functions

Function	Description	Type
3-position control	A 3-position signal controls the actuator via connection terminals Y1 or Y2. The desired position is transmitted to the valve.	SAX31.., SAX81..
Modulating control	The modulating positioning signal provides stepless motor control. The positioning signal range (DC 0...10 V / DC 4...20 mA / 0...1000 Ω) corresponds to the positioning range (closed...open, or 0...100% stroke) in a linear manner.	SAX61..
Positioning signal and characteristic changeover	Setting with DIL switch. Factory setting: <ul style="list-style-type: none"> <li>Characteristic curve: log = Equal percentage (switch set to Off)</li> <li>Positioning signal: DC 0...10 V (switch set to Off)</li> </ul>	
Position feedback U	Signal returned to acquire the position via input.	SAX61.., SAX61../MO
Forced control (Z-mode)	Forced control helps override automatic mode and is implemented via higher control.	
Calibration	Carry out during initial commissioning. The actuator drives to the top or bottom end position; the measured values are saved.	
Valve seat detection	The actuators have power-dependent seat detection. After calibration, the exact valve stroke is stored in the actuator's memory.	
Foreign body detection	After clogging is detected, three attempts are made to get past clogging. If unsuccessful, the actuator continues to follow the positioning signal only within a limited range, and the LED blinks red.	
Modbus RTU (RS-485), not galvanically isolated	Setpoint 0...100 % valve position Actual value 0...100 % for valve position Override control Open / Close / Min / Max / Stop Setpoint monitoring and backup mode	SAX61../MO



## Type summary

Type	Item NO.	Stroke	Positioning force	Operating voltage	Positioning signal	Spring return time	Positioning time	LED	Manual adjustment <sup>3)</sup>	Auxiliary functions
SAX31.00 <sup>1)</sup>	S55150-A105	20 mm	800 N	AC 230 V	3-position	-	120 s	-	Push and fix	-
SAX31.03 <sup>1)</sup>	S55150-A106						30 s			
SAX61.03 <sup>2)</sup>	S55150-A100			DC ... 10 V DC 4...20 mA 0...1000 Ω	Yes		4)			
SAX61.03U <sup>2)</sup>	S55150-A100-A100									
SAX61.03/MO <sup>2)</sup>	S55150-A140			AC 24 V DC 24 V	Modbus RTU		5)			
SAX81.00 <sup>2)</sup>	S55150-A102							120 s		
SAX81.03 <sup>2)</sup>	S55150-A103			3-position	-		-			
SAX81.03U <sup>2)</sup>	S55150-A103-A100							30 s		

1) Approbation: CE

2) Approbation: CE, UL

3) Not designed for continuous operation.

4) Position feedback, forced control, characteristic changeover

5) Position feedback, forced control

### Scope of delivery

Actuators, valves and accessories are supplied in individual packs.

## Accessories/spare parts

### Electrical accessories

Type	Auxiliary switch ASC10.51	Potentiometer ASZ7.5	Function module AZX61.1	Stem heating element ASZ6.6
Item No.	S55845-Z103	S55845-Z106	S55845-Z107	S55845-Z108
		Max. 2		Max. 1
SAX31..	Max. 2	Max. 1	-	
SAX61..		-	Max. 1	
SAX61../MO		-		
SAX81..		Max. 1	-	


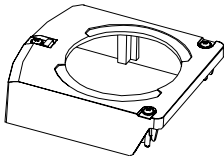

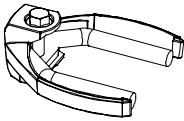
### Mechanical accessory

Type	Weather shield ASK39.1 <sup>1)</sup>
Item No.	S55845-Z109

## Ordering (example)

Type	Stock number	Designation	Number of pieces
SAX81.03	S55150-A103	Actuator	1
ASZ7.5	S55845-Z106	Potentiometer	1

## Spare parts

Product number  Stock number		
8000060843	<b>Housing cover</b>	<b>Screw (valve stem coupling)</b>
		 <b>U-bracket</b>
		

## Equipment combinations

### 2-port valves VV.. (control or safety shutoff valves)

Valve type		DN	PN class	$k_{vs}$ [m <sup>3</sup> /h]	Data sheet
VVF21..	Flange	25...80	6	1.9...100	N4310
VVF22..				2.5...100	N4401
VVF31..				15...80	10
VVF32..		1.9...100	N4402		
VVF40..		1.9...100	N4330		
VVF41..		50	16	19 / 31	N4340
VVG41..	Thread	15...50		0.63...40	N4363
VVF42..	Flange	15...80		1.6...100	N4403
VVF42..K		50...80	40...100		
VVF52..		15...40	25	0.16...25	N4373
VVF53..		15...50		0.16...40	N4405

### 3-port valves VX.. (Control valves for functions "mixing" and "distribution")

Valve type		DN	PN class	$k_{vs}$ [m <sup>3</sup> /h]	Data sheet
VXF21..	Flange	25...80	6	1.9...100	N4410
VXF22..				2.5...100	N4401
VXF31..				15...80	10
VXF32..		1.9...100	N4402		
VXF40..		1.9...100	N4430		
VXF41..		15...80	16	1.9...31	N4440
VXG41..	Thread	15...50		1.6...40	N4463
VXF42..	Flange	15...80		1.6...100	N4403
VXF53..		15...50	25	1.6...40	N4405


Title	Contents	Document ID
Actuators SAX..., SAY..., SAV..., SAL.. for valves	Basic documentation: Detailed information on stroke actuators including Modbus types Stroke actuators for valves with 15/20/40 mm stroke and rotary actuators for butterfly valves	CE1P4040en
Electromotoric actuators for valves SA..., Modbus RTU	Data sheet: Modbus communication profiles	A6V101037195
Mounting instructions G..161../MO and S..6/MO	Mounting instructions: Mounting and installation instructions for Modbus actuators	A5W00027551
Valve Actuator DIL Switch Characteristic Overview	Commissioning / Configuration: Describes the characteristics of valve and actuator combinations, it describes the DIL Switch function.	A6V12050595


Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following Internet address:

<http://siemens.com/bt/download>

Notes

Safety

	<p><b>⚠ CAUTION</b></p>
	<p><b>National safety regulations</b> Failure to comply with national safety regulations may result in personal injury and property damage.</p> <ul style="list-style-type: none"> <li>● Observe national provisions and comply with the appropriate safety regulations.</li> </ul>

	<p><b>⚠ WARNING</b></p>
	<p><b>Risk of burns from hot actuator brackets</b> The actuator brackets on heating plants can also become hot from the contact with the hot valve during operation. The temperature of the actuator bracket can reach 100 °C.</p> <p>When servicing the actuator:</p> <ul style="list-style-type: none"> <li>● Switch off both pump and operating voltage.</li> <li>● Close the main shutoff valve in the piping.</li> <li>● Allow the piping to cool off.</li> </ul>

**SAX31.. / SAX81..**

3-position actuators must be controlled by a controller, see Connection diagrams [→ 14].

**SAX61..**

Up to 10 actuators can drive in parallel on a controller output with a rating of 1 mA. Modulating actuators have an input impedance of 100 kΩ.

**SAX61../MO**

The Modbus converter is designed for analog control at 0...10 V.



Keep the analog signal setting on the actuator as is (switch 1 to OFF); adjustment not permitted.

The actuators are factory configured for equal-percentage characteristic.



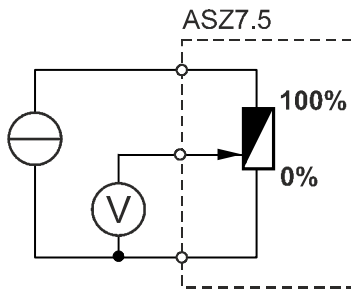
DIL switch (internal actuator characteristic changeover) to "log" (switch 2 to OFF).

**ASZ7.5**

Actuators with a DC 0...9.8 V feedback signal are recommended for the combination SIMATIC S5/S7 and position feedback.

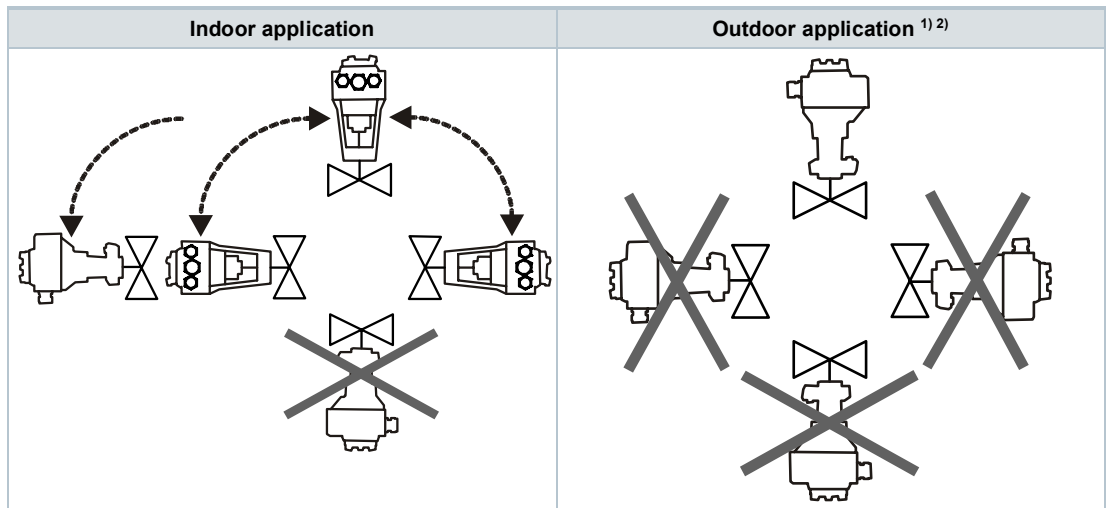
Signal peaks in potentiometer ASZ7.5 may result in error messages on Siemens SIMATIC. This is not the cause, however, when combined with Siemens HVAC controllers. The reason is the higher resolution and faster reaction time on SIMATIC.

Use the potentiometer as voltage divider on the 3-wire connection. Powering the potentiometer over the wiper may shorten the life cycle of the potentiometer. Signal peaks increase in frequency and scope over the lifespan in this operating mode.



## Mounting

### Mounting positions



1) Only together with weather shield ASK39.2. IP54 housing protection remains unchanged.

2) SAX61.../MO is not intended for outdoor use.

## Maintenance

The actuators are maintenance-free.

## Disposal



The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

## Warranty service

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

## Technical data

Power		
Operating voltage		
SAX31..		AC 230 V $\pm$ 15%
SAX61..		AC 24 V $\pm$ 20 % / DC 24 V +20 % / -15 % (SELV / PELV)
SAX81..		
External supply line fusing (EU)		<ul style="list-style-type: none"> <li>Non-renewable fuse 6...10 A slow</li> <li>Circuit break max. 13 A, tripping characteristic B, C, D to EN 60898</li> <li>Power source with current limitation of max. 10 A</li> </ul>
Fusing per DIN 57100 part 430 (supply line)		6...10 A slow
Power consumption at 50 Hz		
SAX31.00	Stem retracts/extends	3.5 VA / 2 W
SAX31.03		6 VA / 3.5 W
SAX61.03..		8 VA / 3.75 W
SAX61.03/MO		8.7 VA / 4.25 W
SAX81.00		3.5 VA / 2.25 W
SAX81.03..		5 VA / 3.75 W
Typical inrush current <sup>1)</sup> (3-position actuators)		
SAX31..		2.3 A
SAX81..		4.5 A

Operating data	
Positioning times (with the specified nominal stroke)	The positioning time may vary depending on the type of valve (Type summary [ $\rightarrow$ 3])
SAX31.00, SAX81.00	120 s
SAX31.03, SAX61.03.., SAX81.03..	30 s
Positioning force	800 N
Nominal stroke	20 mm
Working stroke range at which the actuator is calibrated	8...23 mm
Permissible media temperature (valve fitted)	-25...130 °C

Signal inputs		
Positioning signal "Y"		
SAX31.., SAX81..		3-position
SAX31..	Voltage	AC 230 V $\pm$ 15%
SAX81..		AC 24 V $\pm$ 20% / DC 24 V + 20% / - 15%
SAX61..		
DC 0...10 V	Power consumption	$\leq$ 0.1 mA
	Input impedance	$\geq$ 100 k $\Omega$
DC 4...20 mA	Power consumption	DC 4...20 mA $\pm$ 1%
	Input impedance	$\leq$ 500 k $\Omega$

Communication SAX61../MO		
Communication protocol		
Modbus RTU		RS-485, not galvanically isolated
Number of nodes		Max. 32
Address range		1...247 / 255
	Factory setting	255
Transmission formats		1-8-E-1 / 1-8-O-1 / 1-8-N-1 / 1-8-N-2
	Factory setting	1-8-E-1
Baud rates (kbaud)		Auto / 9.6 / 19.2 / 38.4 / 57.6 / 76.8 / 115.2
	Factory setting	Auto
Bus termination		120 Ω electronically switchable
	Factory setting	Off

Parallel connection	
SAX61..	≤ 10 (depending on controller output)

Forced control		
Z positioning signal		
SAX61..		R = 0...1000 Ω, G, G0
	R = 0...1000 Ω	Stroke proportional to R
	Z connected to G	Max. stroke 100 % <sup>2)</sup>
	Z connected to G0	Max. stroke 0 % <sup>2)</sup>
	Voltage	Max. AC 24 V ± 20 % Max. DC 24 V +20% / -15%
	Power consumption	≤ 0.1 mA

Position feedback		
Position feedback U		
SAX61..		DC 0...10 V
	Load impedance	> 10 kΩ resistive
	Load	Max. 1 mA

Connection cables		
Wire cross-sectional areas		0.13...1.5 mm <sup>2</sup> , AWG 24...16 <sup>3)</sup>
Cable entries		
SAX..		EU: <ul style="list-style-type: none"> <li>• 2 entries ø 20.5 mm (for M20)</li> <li>• 1 entry ø 25.5 mm (for M25)</li> </ul>
SAX..U		US: <ul style="list-style-type: none"> <li>• 3 entries ø 21.5 mm for ½" tube connection</li> </ul>
SAX61../MO		
	Fixed connection cable	0.9 m
	Number of cores	5 x 0.75 mm <sup>2</sup>

Degree of protection and class		
Housing from vertical to horizontal		IP 54 as per EN 60529 <sup>4)</sup>
Protection class		To EN 60730-1
SAX31..	AC 230 V	II
SAX61..	AC / DC 24 V	III
SAX81..		

Environmental conditions		
Operation		IEC 60721-3-3
	Climatic conditions	Class 3K5
	Mounting location	Indoors (weather-protected) <sup>4)</sup>
	Temperature, general	-5...<55 °C
	Humidity (non-condensing)	5...95 % r.h.
Transportation		IEC 60721-3-2
	Climatic conditions	Class 2K3
	Temperature	-25...70 °C
	Humidity	5...95 % r.h.
Storage		IEC 60721-3-1
	Climatic conditions	Class 1K3
	Temperature	-15...55 °C
	Humidity	5...95 % r.h.
Max. media temperature when mounted on valve		130 °C


Directives and standards		
Product standard		EN 60730-x
Electromagnetic compatibility (field of use)		For residential, commercial, and industrial environments
EU conformity (CE)		CE1T4501X1 <sup>5)</sup>
RCM conformity		CE1T4515X4 <sup>5)</sup>
EAC compliance		Eurasian compliance for all SAX..
UL, cUL	AC 230 V	-
	AC / DC 24 V	UL 873 <a href="http://ul.com/database">http://ul.com/database</a> ; file number E35198

Environmental compatibility
Product environmental declarations 71 7331 0559 <sup>5)</sup> und A6V101083254 <sup>5)</sup> include data on environmentally friendly product design and testing (RoHS compliance, material composition, packaging, environmental benefits, disposal).

Dimensions
See Dimensions [→ 16]



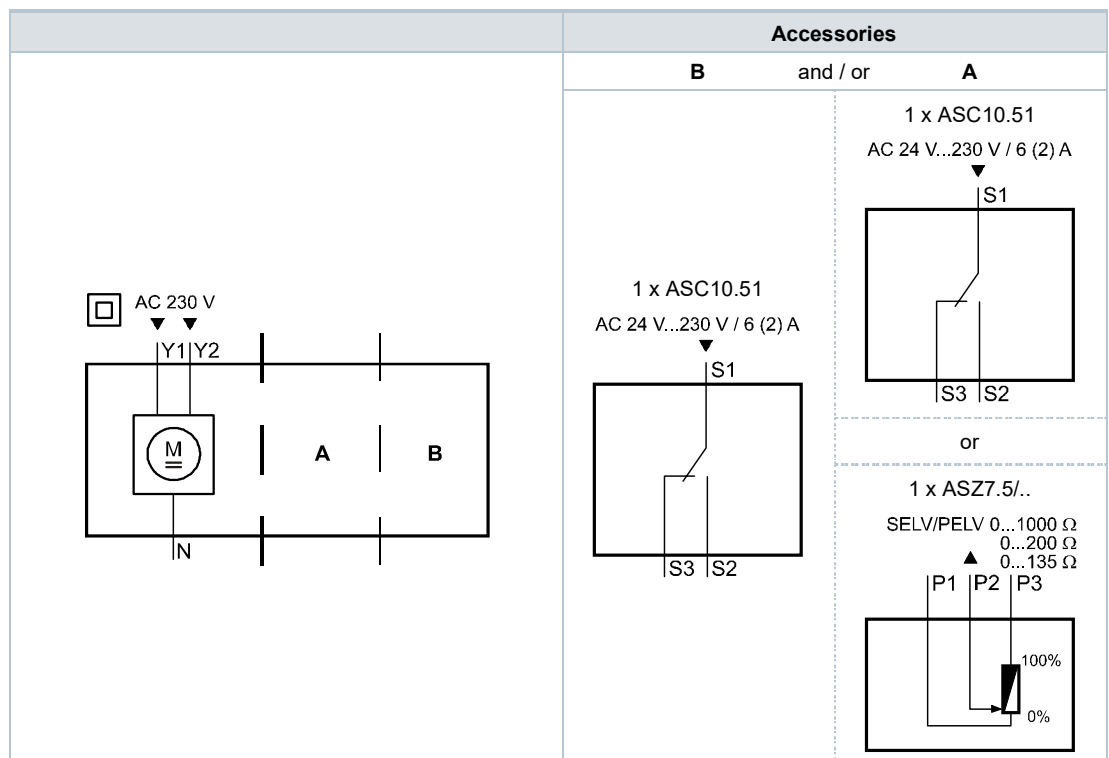
Accessories		
Potentiometer ASZ7.5 <sup>6)</sup>		0...1000 $\Omega \pm 5 \%$
	Voltage	DC 10 V
	Current rating	<4 mA
Auxiliary switch ASC10.51 <sup>6)</sup>	Switching capacity	AC 24...230 V, 6 (2) A, potential free
External fusing of supply line		<ul style="list-style-type: none"> <li>• Non-renewable fuse 6...10 A slow</li> <li>• Circuit break max. 13 A, tripping characteristic B, C, D to EN 60898</li> <li>• Power source with current limitation of max. 10 A</li> </ul>
US installation, UL & cUL		AC 24 V class 2, 5 A general purpose
Stem heating element ASZ6.6	Operating voltage	AC/DC 24 V $\pm 20 \%$ .
	Power consumption	50 VA, 30 W
	Switch-on current (cold)	Max. 8.5 A (max. temperature 85 °C/185 F)

- 1) Switching time for RMS value of the sine wave at nominal voltage
- 2) Observe acting direction of DIL switches
- 3) AWG = American wire gauge
- 4) For outdoor operation, always use weather shield ASK39.1, housing protection class IP 54 remains as is. SAX61../MO is not intended for outdoor use.
- 5) Documents can be downloaded at <http://www.siemens.com/bt/download>
- 6) UL-approved component 

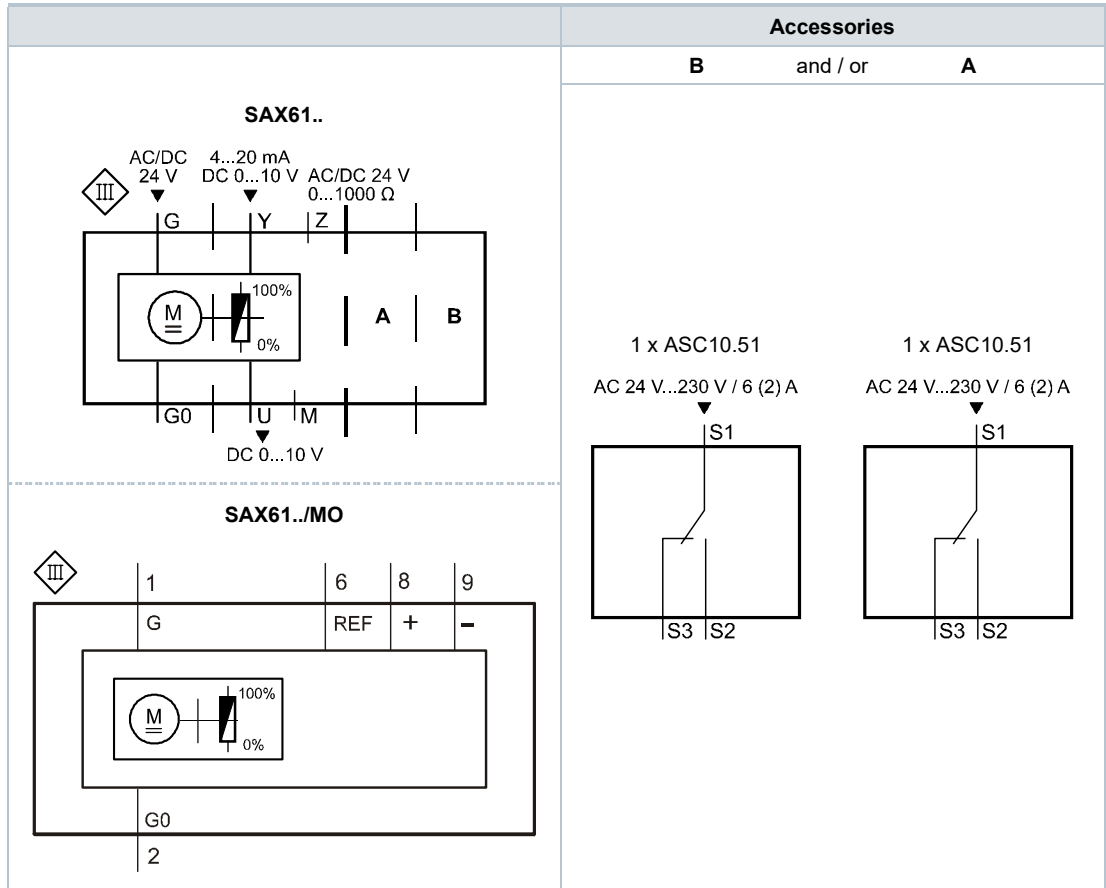
## Connection diagrams

### Internal Diagrams

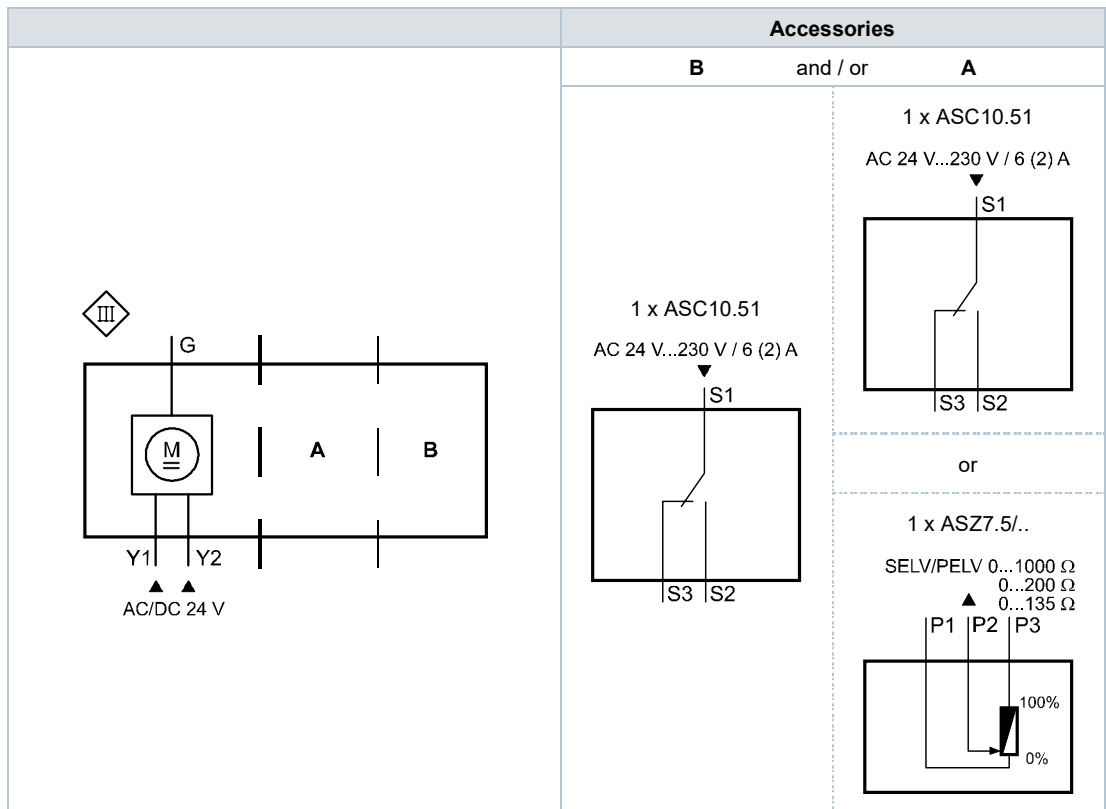
#### SAX31..



**SAX61..**



**SAX81..**



## Connection terminals

### SAX31..

	AC 230 V	3-position
<b>N</b>	System neutral (SN)	
<b>Y1</b>	Positioning signal (actuator's stem extends)	
<b>Y2</b>	Positioning signal (actuator's stem retracts)	

### SAX61..

	AC / DC 24 V	D 0...10 V 4...20 mA 0...1000
<b>G0</b>	System neutral (SN)	
<b>G</b>	System potential (SP)	
<b>Y</b>	Positioning signal for DC 0...10 V / 4...20 mA	
<b>M</b>	Measuring neutral	
<b>U</b>	Position feedback DC 0...10 V - (System neutral is measuring ground M)	
<b>Z</b>	Control signal forced control	

### SAX61../MO

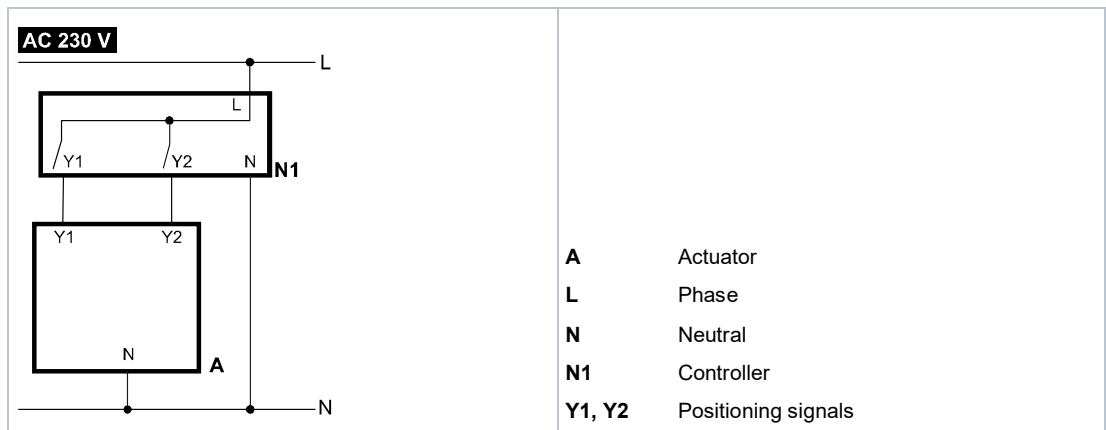
	AC / DC 24 V	Modbus RTU connecting cable
<b>G0</b>	System neutral (SN)	black
<b>G</b>	System potential (SP) AC 24 V / DC 24 V	red
<b>REF</b>	Reference line (Modbus RTU)	violet
<b>+</b>	Bus + (Modbus RTU)	gray
<b>-</b>	Bus - (Modbus RTU)	pink

### SAX81..

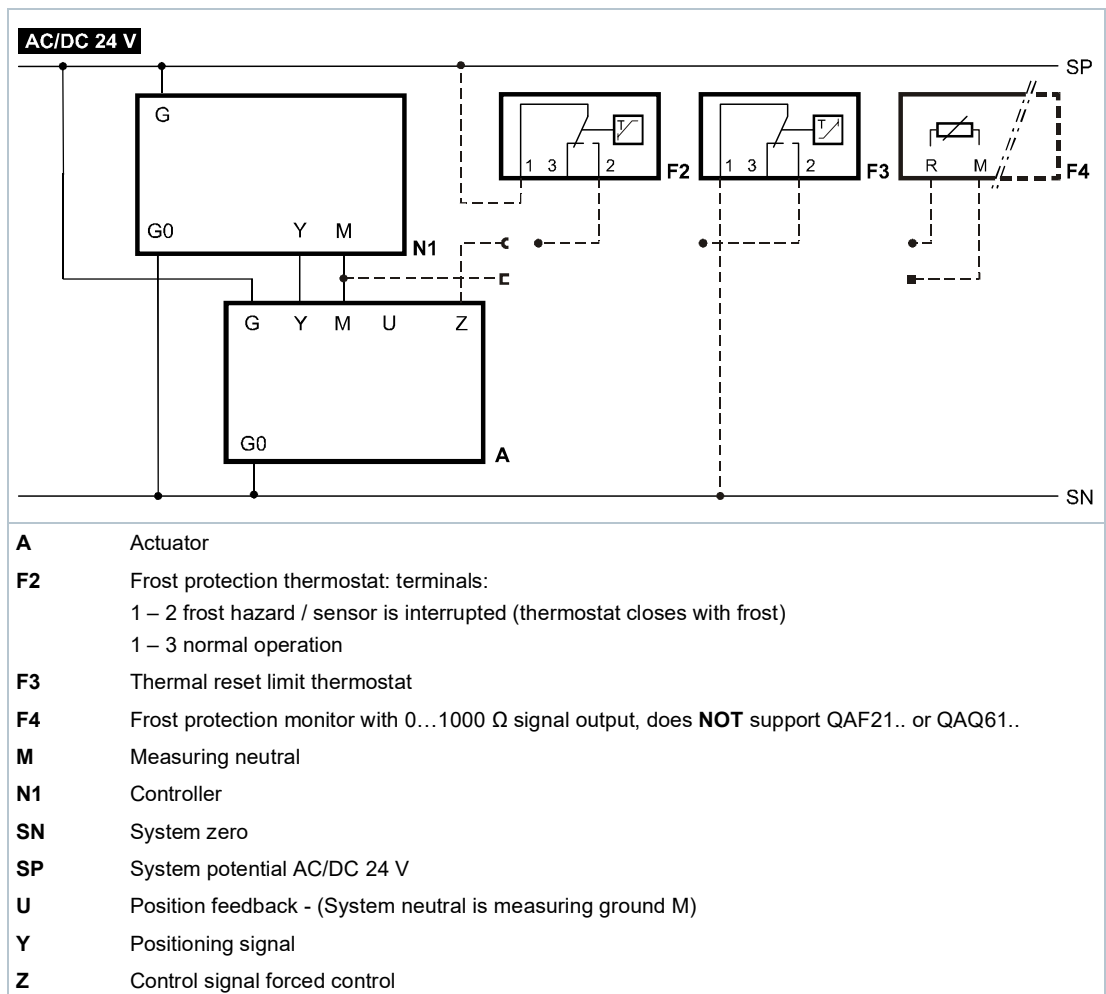
	AC / DC 24 V	3-position
<b>G</b>	System potential (SP)	
<b>Y1</b>	Positioning signal (actuator's stem extends)	
<b>Y2</b>	Positioning signal (actuator's stem retracts)	

## Connection diagrams

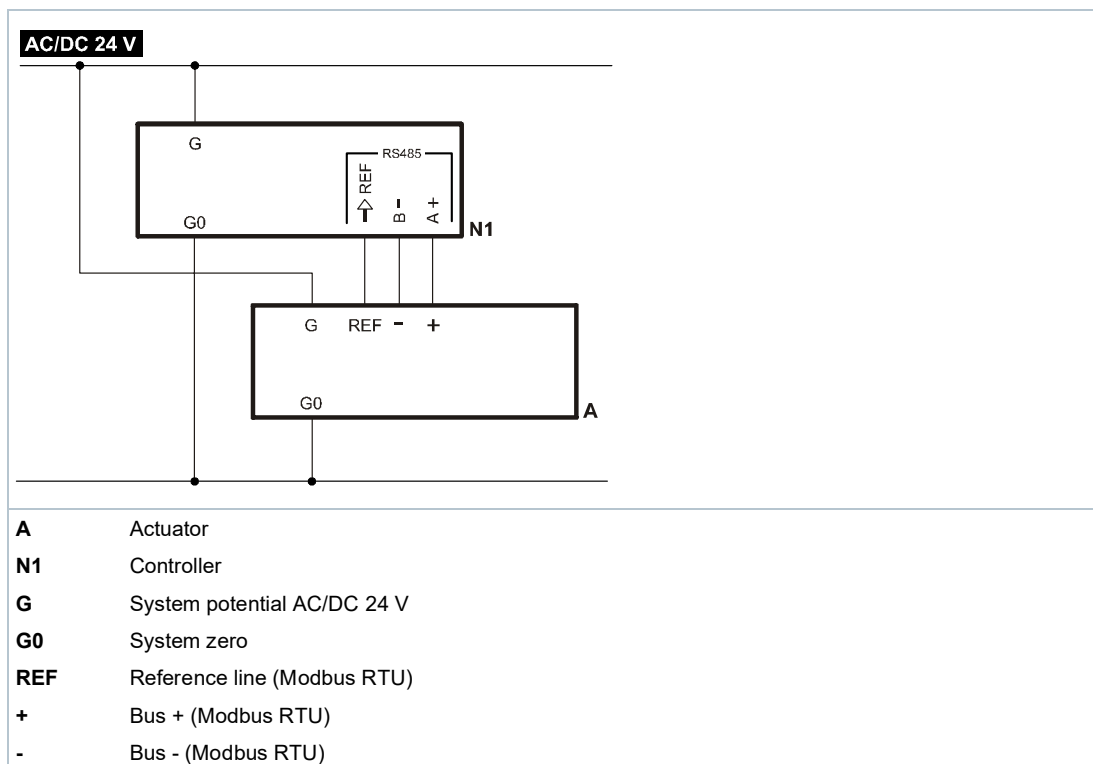
### SAX31..



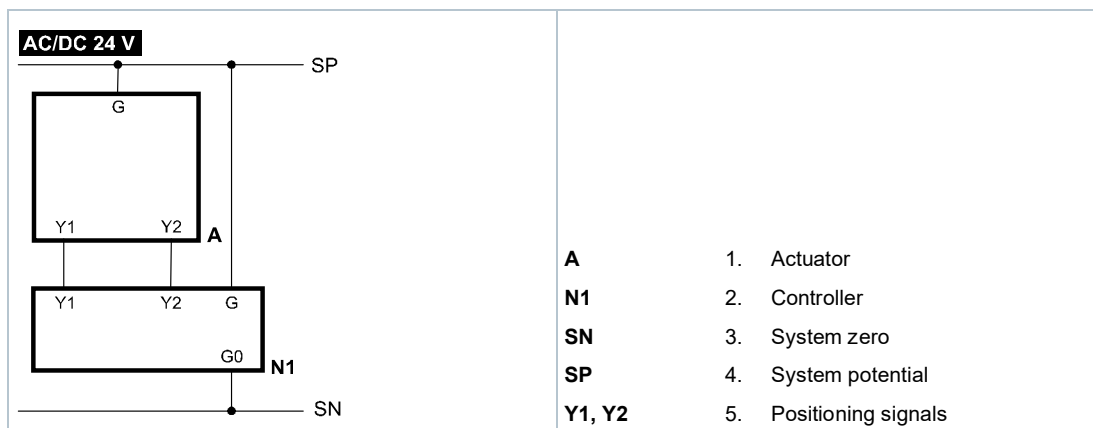
### SAX61..



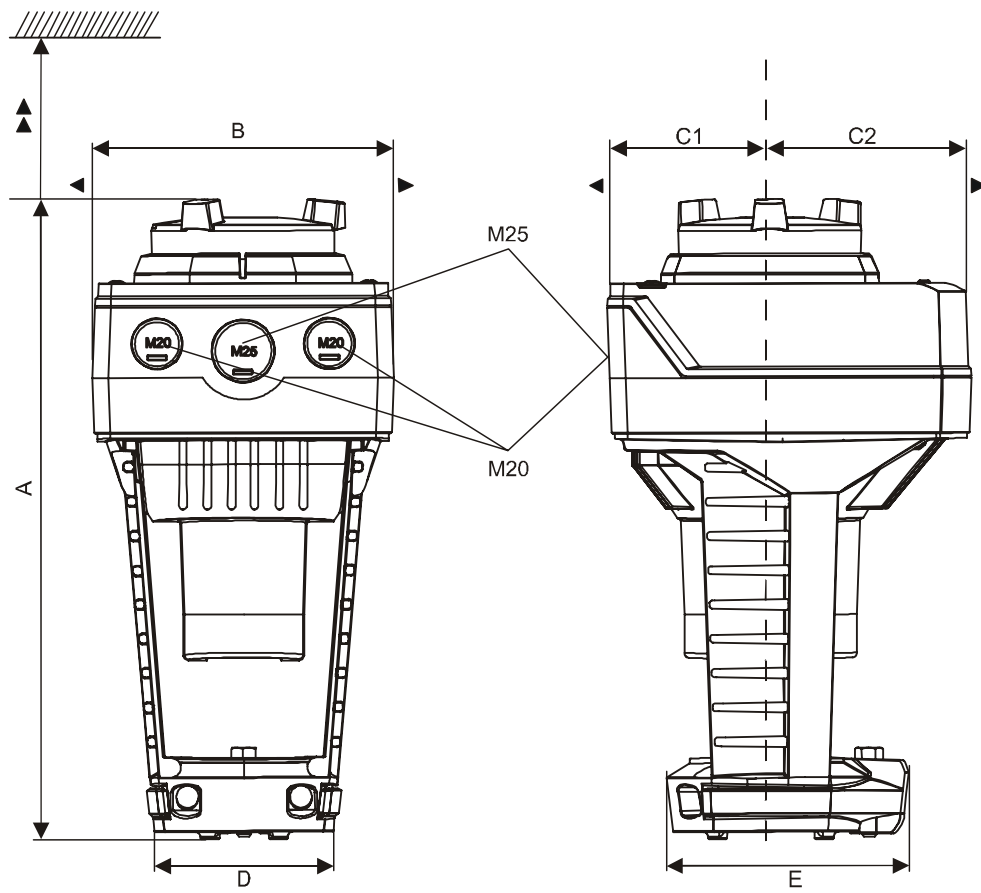
**SAX61../MO**



**SAX81..**



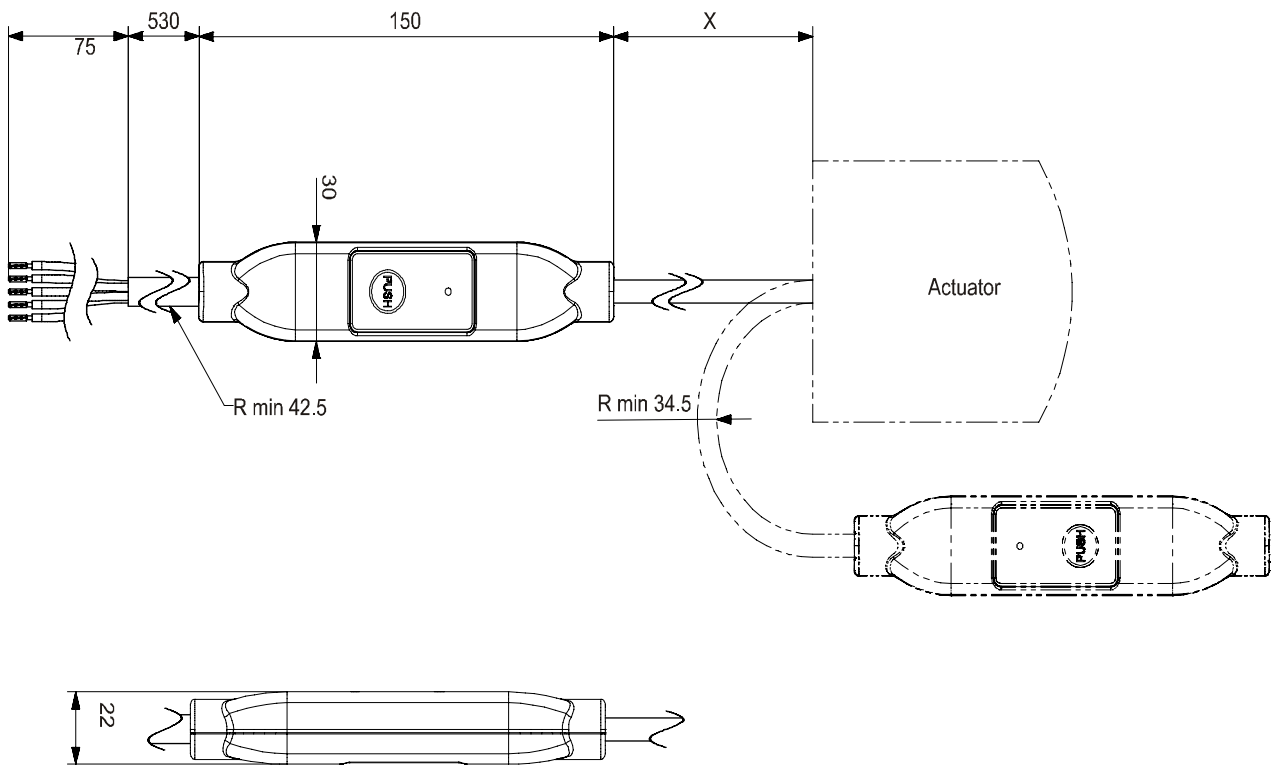
Actuator



Type	A	B	C	C1	C2	D	E	▶	▶▶	kg
	[mm]									[kg]
SAX..(U <sup>1)</sup> )	242	124	150	68	82	80	100	100	200	1,780
SAX61../MO <sup>2)</sup>										1,930
With ASK39.1 (SAX..U <sup>1)</sup> )	267	154	300	200	100	-			2,010	

- <sup>1)</sup> SAX..U: For ½" tube connections (ø 21.5 mm) – 1,850 kg / 2,080 kg with ASK39.1
- <sup>2)</sup> Device has fixed connection cable – left cable entry occupied

### External Modbus converter



Dimensions in mm

Type	X	kg
	[mm]	[kg]
SAX61../MO	250	0.15 <sup>1)</sup>

<sup>1)</sup> Included in total weight.

## Revision numbers

Type	Valid from rev. no.
SAX31.00	..H
SAX31.03	..H
SAX61.03	..I
SAX61.03/MO	..I
SAX81.00	..I
SAX81.03	..I



## Electro-hydraulic actuators for valves

SKD..



### with a 20 mm stroke

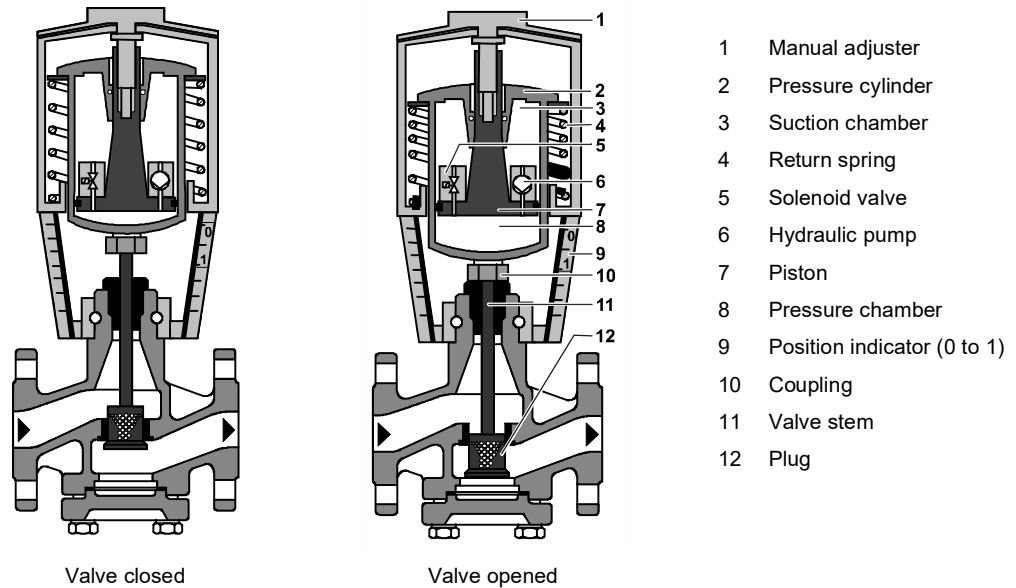
- SKD32.. Operating voltage AC 230 V, 3-position control signal
- SKD82.. Operating voltage AC 24 V, 3-position control signal
- SKD6.. Operating voltage AC 24 V
  - Control signal DC 0...10 V, 4...20 mA or 0...1000 Ω
  - SKD62/MO RS-485 for Modbus RTU communication
  - Selection of flow characteristic, position feedback, stroke calibration, LED status indication, override control
  - SKD62UA with selection of direction of operation, stroke limit control, sequence control with adjustable start point and operation range, operation of frost protection monitors QAF21.. and QAF61..
- Positioning force 1000 N
- Versions with or without spring-return function
- For direct mounting on valves; no adjustments required
- Manual adjuster and position indicator
- Optional functions with auxiliary switches, potentiometer, stem heater and mechanical stroke inverter
- SKD..U are UL-approved

## Use

For the operation of Siemens 2-port and 3-port valves of the types VVF..., VVG..., VXF... and VXG... with a 20 mm stroke as control and safety shut-off valves in heating, ventilation and air conditioning plants.

## Technical design

### Principle of electro-hydraulic actuators



**Opening the valve** The hydraulic pump [6] forces oil from the suction chamber [3] to the pressure chamber [8], thereby moving the pressure cylinder [2] downwards. The valve stem [11] retracts and the valve opens. Simultaneously, the return spring [4] is compressed.

**Closing the valve** Activating the solenoid valve [5] allows the oil in the pressure chamber to flow back into the suction chamber. The compressed return spring moves the pressure cylinder upwards. The valve stem extends and the valve closes.

**Manual operation mode** Turning the manual adjuster [1] clockwise moves the pressure cylinder downwards and opens the valve. Simultaneously, the return spring [4] is compressed.

In the manual operation mode, the positioning signals Y and Z can further open the valve but cannot move to the 0 % stroke position of the valve. To retain the manually set position, switch off the power supply or disconnect the positioning signals Y and Z. The red indicator marked "MAN" is visible.

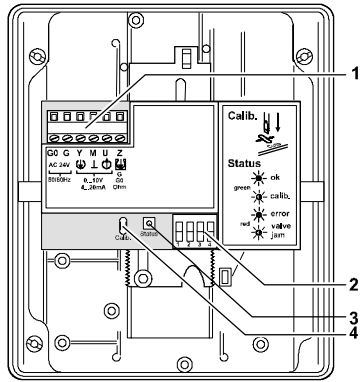


**Note:** When setting the controller to manual operation for a longer period of time, we recommend adjusting the actuator with the manual adjuster to the desired position. This guarantees that the actuator remains in this position for that period of time.

Attention: Do not forget to switch back to automatic operation after the controller is set back to automatic control.

<b>Automatic operation mode</b>	For automatic operation, turn the manual adjuster [1] counter-clockwise to the end stop. The pressure cylinder moves upward to the 0 % stroke position of the valve. The red indicator marked "MAN" is no longer visible.
<b>Minimal volumetric flow</b>	The actuator can be manually adjusted to a stroke position > 0%, allowing its use in applications requiring a constant minimal volumetric flow.
<b>SKD32.. SKD82..</b> 3-position control signal	<p>The actuator is controlled by a 3-position signal either via terminals Y1 or Y2 and generates the desired stroke, which is transferred to the valve stem:</p> <ul style="list-style-type: none"> <li>● Voltage on Y1:                      Piston extends                      Valve opens</li> <li>● Voltage on n Y2:                    Piston retracts                      Valve closes</li> <li>● No voltage on Y1 and Y2:        Piston and valve stem remain in the respective position</li> </ul>
<b>SKD62.. SKD60</b> Y positioning signal DC 0...10 V and/or 0...1000 Ω, DC 4...20 mA	<p>The actuator is either controlled via terminal Y or override control Z. The positioning signals generate the desired stroke by means of the above described principle of operation, which is transferred to the valve stem:</p> <ul style="list-style-type: none"> <li>● Signal Y increasing:                Piston extends                      Valve opens</li> <li>● Signal Y decreasing:                Piston retracts                      Valve closes</li> <li>● Signal Y constant:                    Piston and valve stem remain in the respective position</li> <li>● Override control Z:                    See Functions [→ 8]</li> </ul>
<b>Frost protection monitor Frost protection thermostat</b>	<p>A frost protection thermostat can be connected to the SKD6.. actuator. The added signals from the frost protection monitors QAF21.. and QAF61.. require the use of SKD62UA actuators. Notes on special programming of the electronics are described under Electronics [→ 5].</p> <p>Connection diagrams for operation with frost protection thermostat or frost protection monitor can be found under Connection diagrams [→ 26].</p>

SKD60 <sup>1)</sup>

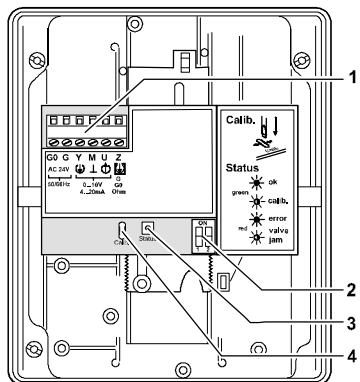


- 1 Connection terminals
- 2 DIL switches
- 3 LED status indication
- 4 Stroke calibration

<sup>1)</sup> From version ..L onward





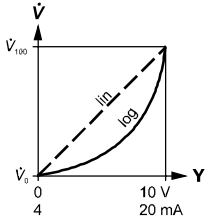
DIL switches							
Direction of operation		Fail-in-place (behaviour in case of control signal loss) **		Positioning signal Y Positioning feedback U		Flow characteristic	
ON		Reverse acting		Stops at current position		DC 4...20 mA	lin = linear
OFF *		Direct acting		Closes		DC 0...10 V	log = equal percentage
						<p>Relationship between positioning signal Y and volumetric flow</p>	
* Factory setting: all switches OFF							
** Only considered when DIL switch 3 ON (control signal = DC 4...20 mA)							

SKD60 <sup>2)</sup>, SKD62..

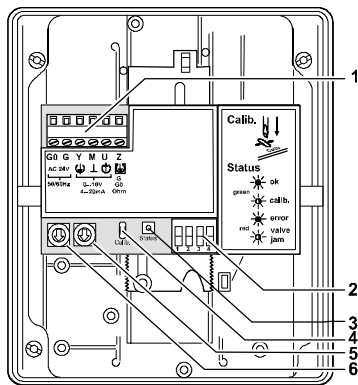


- 1 Connection terminals
- 2 DIL switches
- 3 LED status indication
- 4 Stroke calibration


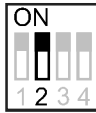
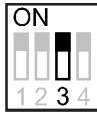





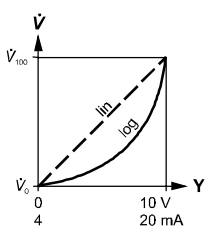
<sup>2)</sup> Up to and including version ..K

DIL switches			
		Positioning signal Y Positioning feedback U	Flow characteristic
ON		DC 4...20 mA	 lin = linear
OFF *		DC 0...10 V	 log = equal percentage
		* Factory setting: all switches OFF	Relationship between positioning signal Y and volumetric flow 

### SKD62UA



- 1 Connection terminals
- 2 DIL switches
- 3 LED status indication
- 4 Stroke calibration
- 5 Rotary switch UP (factory setting 0)
- 6 Rotary switch LO

DIL switches					
Direction of operation		Sequence control or stroke limit control		Positioning signal Y Positioning feedback U	Flow characteristic
ON	 Reverse acting	 Sequence control Signal addition QAF21../QAF61..	 DC 4...20 mA	 lin = linear	
OFF *	 Direct acting	 Stroke limit control	 DC 0...10 V	 log = equal percentage	
		* Factory setting: all switches OFF	Relationship between positioning signal Y and volumetric flow 		

## SKD62/MO

The Modbus converter is designed for analog control at 0...10 V.



Keep the analog signal setting on the actuator as is (switch 1 to OFF); adjustment not permitted.

The actuators are factory configured for equal-percentage characteristic.



DIL switch (internal actuator characteristic changeover) to "log" (switch 2 to OFF).

## Functions


### Notstellfunktion

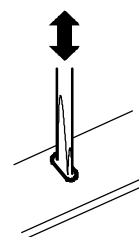
The SKD32.21, SKD32.51, SKD82.51.. and SKD62.. actuators, which feature a spring-return function, incorporate a solenoid valve which opens if the control signal or power fails. The return spring causes the actuator to move to the 0% stroke position and closes the valve.

### Calibration

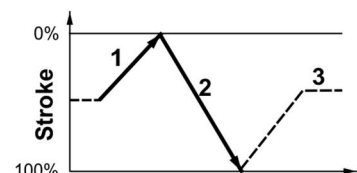
#### SKD60, SKD62.., SKD62/MO

In order to determine the stroke positions 0% and 100% in the valve, calibration is required on initial commissioning.

- Mechanical coupling of the actuator SKD6.. with a Siemens valve.
-  **Actuator must be in „Automatic operation mode“ enabling stroke calibration to capture the effective 0% and 100% values.**
- AC 24 V power supply applied.
- Housing cover removed.
- 1. Short-circuit contacts in calibration slot (e.g. with a screwdriver) and trigger calibration process.
- 2. Actuator moves to 0% stroke position [1].
  - Valve closes.
- 3. Actuator moves to 100% stroke position [2].
  - Valve opens.
- Measured values are stored.
- Normal operation:  
Actuator moves to the position [3] as indicated by signals Y or Z.  
LED is lit green permanently, positioning feedback U active, values correspond to the actual positions.



LED flashes grün, positioning feedback U inactive



A red lit LED on the actuator indicates a calibration error.








The LED on the SKD62/MO cable adapter flashes red during the calibration, as the positioning signal Y and the positioning feedback U do not correspond anymore. This is interpreted as a blockage and thus indicated as an error.

If necessary, the calibration can be repeated any number of times.

### LED indication of operational status

#### SKD60, SKD62.., SKD62/MO

The dual-colored LED indicating the operational status is visible when the cover is removed.

LED indication	Function	Remarks, troubleshooting
 Lit green	Normal operation	Automatic operation; everything o.k.
 Flashing green	Stroke calibration in progress	Wait until calibration is finished (LED stops flashing, will be lit green or red)
 Lit red	Faulty stroke calibration	Check mounting; restart stroke calibration (by short-circuiting calibration slot)
	Internal error	Replace electronics
 Flashing red	Inner valve jammed	Troubleshoot, check valve, restart stroke calibration
 Dark	No power supply	Check mains network, check wiring
	Electronics faulty	Replace electronics

As a general rule, the LED can only assume the states shown above – continuously lit red or green, flashing red or green, or off/dark.

## Override control Z

### SKD60, SKD62..

D The override control input Z can be operated in the following modes of operation:

Z-mode					
	No function	Fully open	Closed	Override with 0...1000 Ω	Signal addition SKD62UA only
<b>Connections</b>					
<b>Transfer</b>					
	Equal percentage or linear			Equal percentage or linear	
	<ul style="list-style-type: none"> <li>Z-contact not connected</li> </ul>	<ul style="list-style-type: none"> <li>Z-contact directly connected to G</li> </ul>	<ul style="list-style-type: none"> <li>Z-contact directly connected to G0</li> </ul>	<ul style="list-style-type: none"> <li>Z-contact connected to M via resistor R</li> <li>Starting position at 50 Ω</li> <li>End position at 900 Ω</li> </ul>	<ul style="list-style-type: none"> <li>Z-contact connected to R of frost protection monitor QAF21.. or QAF61..</li> </ul>
	<ul style="list-style-type: none"> <li>Valve stroke follows Y-input</li> </ul>	<ul style="list-style-type: none"> <li>Y-input has no effect</li> </ul>			<ul style="list-style-type: none"> <li>Valve stroke follows Y and R(Z) signal</li> </ul>



Shown operation modes are based on the factory setting “direct acting”.  
Y-input has no effect in Z-mode.

### Selection of direction of operation

#### SKD60 (from version ..L), SKD62UA

- With normally-closed valves, “direct acting” means that with a signal input of 0 V, the valve closes (applies to all Siemens valves listed under Equipment combinations [→ 12]).
- With normally-open valves, “direct acting” means that with a signal input of 0 V, the valve is open.

Direct acting		Reverse acting		Stroke
Input	DC 0...10 V DC 4...20 mA 0...1000 Ω	Input	DC 0...10 V DC 4...20 mA 0...1000 Ω	



The mechanical spring-return function is not affected by the direction of operation selected.



## Stroke limit control and sequence control

### SKD62UA

Setting the stroke limit control	Setting the sequence control
The rotary switches LO and UP can be used to apply a lower and upper limit to the stroke in increments of 3%, up to a maximum of 45%.	The rotary switches LO and UP can be used to determine the start point or the operating range of a sequence.

Position of LO	Lower stroke limit	Position of UP	Upper stroke limit	Position of LO	Sequence control start point	Position of UP	Sequence control operating range
0	0 %	0	100 %	0	0 V	0	10 V
1	3 %	1	97 %	1	1 V	1	10 V *
2	6 %	2	94 %	2	2 V	2	10 V **
3	9 %	3	91 %	3	3 V	3	3 V ***
4	12 %	4	88 %	4	4 V	4	4 V
5	15 %	5	85 %	5	5 V	5	5 V
6	18 %	6	82 %	6	6 V	6	6 V
7	21 %	7	79 %	7	7 V	7	7 V
8	24 %	8	76 %	8	8 V	8	8 V
9	27 %	9	73 %	9	9 V	9	9 V
A	30 %	A	70 %	A	10 V	A	10 V
B	33 %	B	67 %	B	11 V	B	11 V
C	36 %	C	64 %	C	12 V	C	12 V
D	39 %	D	61 %	D	13 V	D	13 V
E	42 %	E	58 %	E	14 V	E	14 V
F	45 %	F	55 %	F	15 V	F	15 V

\* Operating range of QAF21.. (see below)

\*\* Operating range of QAF61.. (see below)

\*\*\* The smallest adjustment possible is 3 V; control with 0...30 V is only possible via Y.

## Stroke control with QAF21.. / QAF61.. signal addition

### SKD62UA

Setting the signal addition			
The operating range of the frost protection monitor QAF21.. or QAF61.. can be defined with rotary switches LO and UP.			
Position of LO	Sequence control start point	Position of UP	QAF21.. / QAF61.. operating range
0	→	1	QAF21..
0	→	2	QAF61..

## Type summary

Type		Operating voltage	Positioning signal	Spring-return		Positioning time				
				Function	Time					
SKD32.21 <sup>1)</sup>	-	AC 230 V	3-position	yes	8 s	30 s	10 s			
SKD32.50 <sup>1)</sup>				-	-					
SKD32.51 <sup>1)</sup>				yes	8 s					
SKD82.50 <sup>1)</sup>				Standard electronics	AC 24 V	DC 0...10 V 4...20 mA 0...1000 Ω	-	-	120 s	120 s
SKD82.50U <sup>2)</sup>							-	-		
SKD82.51 <sup>1)</sup>							-	-		
SKD82.51U <sup>2)</sup>							yes	8 s		
SKD60 <sup>1), 3)</sup>	Enhanced electronics	AC 24 V	DC 0...10 V 4...20 mA 0...1000 Ω	-	-	30 s	15 s			
SKD60U <sup>2)</sup>				-	-					
SKD62 <sup>1)</sup>				-	-					
SKD62U <sup>2)</sup>				yes	15 s					
SKD62UA <sup>2), 4)</sup>	Standard-elektronik	AC 24 V	Modbus RTU	-	-	30 s	15 s			
SKD62/MO <sup>2)</sup>				S55195-A129	yes			15 s		

<sup>1)</sup> Approbation: CE

<sup>2)</sup> Approbation: CE, UL

<sup>3)</sup> Enhanced functions, from version ..L onward: Direction of operation, fail-in-place

<sup>4)</sup> Enhanced functions: Direction of operation, stroke control limit, sequence control, signal addition

### Scope of delivery

The actuator, valve and accessories are supplied in separate packaging and not assembled prior to delivery.

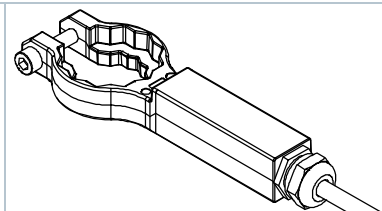
## Accessories / spare parts

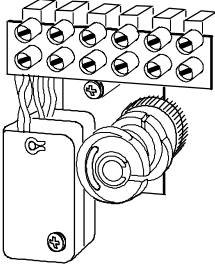
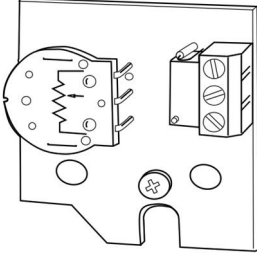
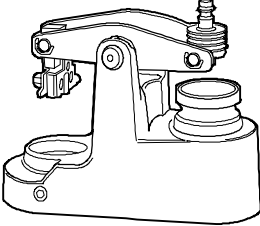
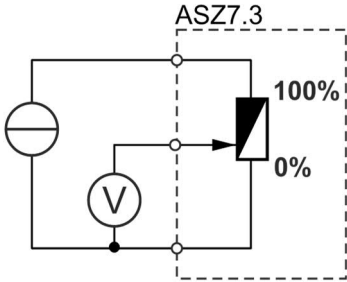
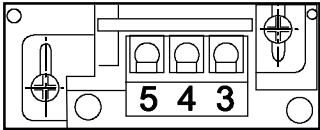
### Accessories

Type	Auxiliary switch	Double auxiliary switch	Potentiometer 1000 Ω	Stem heater AC 24 V	Mechanical stroke inverter
	ASC1.6	ASC9.3	ASZ7.3	ASZ6.6 (S55845-Z108)	ASK50
			Max. 2		
SKD32..	-	Max.1	Max.1	Max.1	Max.1
SKD82					
SKD6..	Max.1	-	-		

**SKD..** **ASZ6.6** (S55845-Z108)  
Stem heater

- For media below 0 °C
- Mount between valve and actuator



<b>SKD32..</b> <b>SKD82..</b>	<b>ASC9.3</b> Double auxiliary switch 	<b>ASZ7.3</b> Potentiometer 	<b>ASK50</b> Mechanical stroke inverter 
	Adjustable switching points	0...1000 Ω	0% actuator stroke corresponds to 100% valve stroke Mount between valve and actuator
	Note: ASZ7.3	<p>For the combination SIMATIC S5/S7 and use of positioning feedback, we recommend actuators with DC 0...9.8 V feedback signals.</p> <p>The signal peaks that occur in the potentiometer ASZ7.3 may result in error messages on Siemens SIMATIC. This is not the case when combined with Siemens HVAC controllers. The reason is that SIMATIC has a higher resolution and faster response time.</p> <p>Use the potentiometer as voltage divider on the 3-wire connection. Powering the potentiometer over the wiper may shorten the life cycle of the potentiometer. Signal peaks increase in frequency and scope over the lifespan in this operating mode.</p> 	
<b>SKD60</b> <b>SKD62..</b>	<b>ASC1.6</b> Auxiliary switch 	Switching point 0...5 % stroke	

For more information, see Technical data [→ 19]

### Ordering (example)

Type / Stock number <sup>1)</sup>	Designation	Number of pieces
SKD62/MO / S55195-A129	Actuator Modbus RTU	1
ASC1.6	Auxiliary switch	1

<sup>1)</sup> Specify stock number if available.

## Spare parts

Actuator	Cover	Hand control <sup>1)</sup>	Control unit
			
SKD32.21	410456348	426855048	-
SKD32.50			
SKD32.51			
SKD82.50			
SKD82.50U			
SKD82.51			
SKD82.51U			
SKD60			466857598
SKD60U			466857488
SKD62			
SKD62U			
SKD62UA			
SKD62/MO			

<sup>1)</sup> Hand control, blue with mechanical parts

## Equipment combinations

### 2-port valves VV.. (control or safety shut-off valves)

Valve type		DN	PN class	k <sub>vs</sub> [m <sup>3</sup> /h]	Data sheet	
VVF21.. <sup>1)</sup>	Flanged	25...80	6	1.9...100	N4310	
VVF22..				2.5...100	N4401	
VVF31.. <sup>1)</sup>				15...80	10	1.6...100
VVF32..		1.9...100	N4402			
VVF40.. <sup>1)</sup>		50	16	1.9...100	N4330	
VVF41.. <sup>1)</sup>				19... 31	N4340	
VVF42..		15...80	25	1.6...100	N4403	
VVF52.. <sup>1)</sup>		15...50		0.16...25	N4373	
VVF53..		15...40	40	0.16...40	N4405	
VVF61..		15...50		0.19...31	N4382	
VVF63..		15...50		0.2...36	A6V11459527	
VVG41..		Threaded	15...50	16	0.63...40	N4363

Admissible differential pressures  $\Delta p_{max}$  and closing pressures  $\Delta p_s$ : cf. relevant valve data sheets

<sup>1)</sup> Valves are no longer available

### 3-port valves VX.. (control valves for “mixing” and “distribution”)

Valve type		DN	PN class	$k_{vs}$ [m <sup>3</sup> /h]	Data sheet
VXF21.. <sup>1)</sup>	Flansch	25...80	6	1.9...100	N4410
VXF22..				2.5...100	N4401
VXF31.. <sup>1)</sup>					N4420
VXF32..		15...80	10	1.6...100	N4402
VXF40.. <sup>1)</sup>				1.9...100	N4430
VXF41.. <sup>1)</sup>		15...50	16	1.9...31	N4440
VXF42..		15...80		1.6...100	N4403
VXF53..		15...50		25	1.6...40
VXF61..			40	1.9...31	N4482
VXF63..				0.2...36	A6V11459527
VXG41..	Gewinde		16	1.6...40	N4463

Admissible differential pressures  $\Delta p_{max}$  and closing pressures  $\Delta p_s$ : cf. relevant valve data sheets

<sup>1)</sup> Valves are no longer available



Third-party valves with strokes between 6...20 mm can be motorized, provided they are “closed with the de-energized” fail-safe mechanism and provided that the necessary mechanical coupling is available. For SKD32.. and SKD82.. the Y1 signal must be routed via an additional, freely adjustable end switch (ASC9.3) to limit the stroke.

We recommend that you contact your local Siemens office for the necessary information.


#### Product documentation


SKD..			Accessories	Mounting instructions	
Mounting instructions SKD..	M3250	74 319 0325 0	<b>ASC1.6</b>	G4563.3	4 319 5544 0
		74 319 0326 0	<b>ASC9.3</b>	G4561.3	4 319 5545 0
		(Setting instructions Standard electronics)	<b>ASK50</b>	M4561.5	4 319 5549 0
		A5W00027551	<b>ASZ7.3</b>		74 319 0247 0
		(Mounting instructions Modbus converter)	<b>ACT control unit</b>	M4568	74 319 0554 0
		A6V12057657	<b>QAF21..</b>		74 319 0399 0
		(Communication profiles Modbus)	<b>ASZ6.6</b>	M4501.1	74 319 0750 0


Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following Internet address:


<http://siemens.com/bt/download>

## Sicherheit


	<b>⚠ CAUTION</b>
	<p><b>National safety regulations</b></p> <p>Failure to comply with national safety regulations may result in personal injury and property damage.</p> <ul style="list-style-type: none"> <li>• Observe national provisions and comply with the appropriate safety regulations.</li> </ul>


	<b>⚠ WARNING</b>
	<p><b>Tensioned spring return</b></p> <p>Opening the actuator housing can release the highly tensioned return spring, which can cause flying parts and injuries.</p> <ul style="list-style-type: none"> <li>• Do not open the actuator housing.</li> </ul>

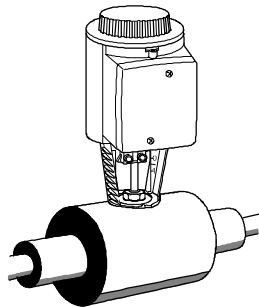
	<b>⚠ WARNING</b>
	<p><b>Risk of injury through broken housing or cover</b></p> <p>Dismounting the actuator with broken housing from the valve can release the highly tensioned spring return, which can cause flying parts and injury.</p> <ul style="list-style-type: none"> <li>• NEVER dismount actuator from valve.</li> <li>• Dismount valve-actuator combination (control device) as complete unit.</li> <li>• Disassembly only by qualified personnel.</li> <li>• Send the control device along with an error report to the local Siemens office for analysis and disposal.</li> <li>• Mount new control device (valve and actuator) properly.</li> </ul>

	<b>⚠ WARNING</b>
	<p><b>Risk of burns from hot actuator brackets</b></p> <p>The actuator brackets on heating plants can also become hot from the contact with the hot valve during operation. The temperature of the actuator bracket can reach 100 °C.</p> <p>When servicing the actuator:</p> <ul style="list-style-type: none"> <li>• Switch off both pump and operating voltage.</li> <li>• Close the main shutoff valve in the piping.</li> <li>• Release pressure in the pipes and allow them to cool off completely.</li> </ul>

Der elektrische Anschluss ist gemäss den örtlichen Vorschriften für Elektroinstallationen und dem Kapitel Anschlussschaltpläne [→ 26] durchzuführen.

	<b>NOTE</b>
	<b>Using a safety limiter</b> Failure to comply with applicable regulations for cable insulation may result in the suspension of the safety limiter function. <ul style="list-style-type: none"><li>• Compliance with all applicable regulations for cable insulation must be ensured by the plant operator.</li></ul>

	<b>▲ WARNING</b>
	<b>Risk of injury and fire from hot device parts</b> For media below 0 °C, the stem heater ASZ6.6 keeps the valve stem ice-free. In this case, the actuator bracket and the valve stem must not be insulated in order to ensure air circulation. Touching heated parts without safety measures leads to burns. <ul style="list-style-type: none"><li>• For safety reasons, the steam heater is operated with AC 24 V / 30 W.</li><li>• Recommendation: For media above 140 °C, the valve must be insulated.</li></ul>



Observe admissible temperatures, see Use [→ 2] and Technical data [→ 19].

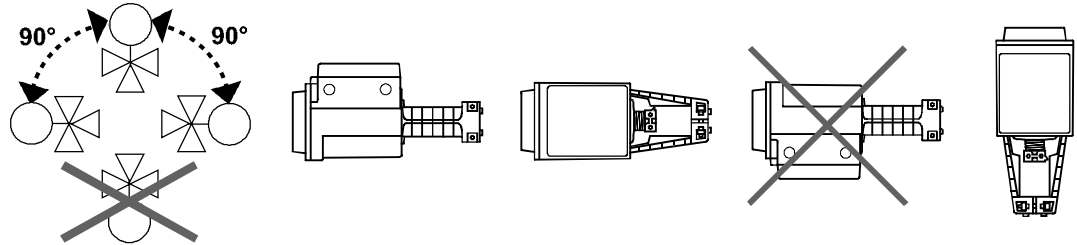
If an auxiliary switch is used, its switching point should be indicated on the plant schematic.

Every actuator must be driven by a dedicated controller, see Connection diagrams [→ 26].

## Mounting

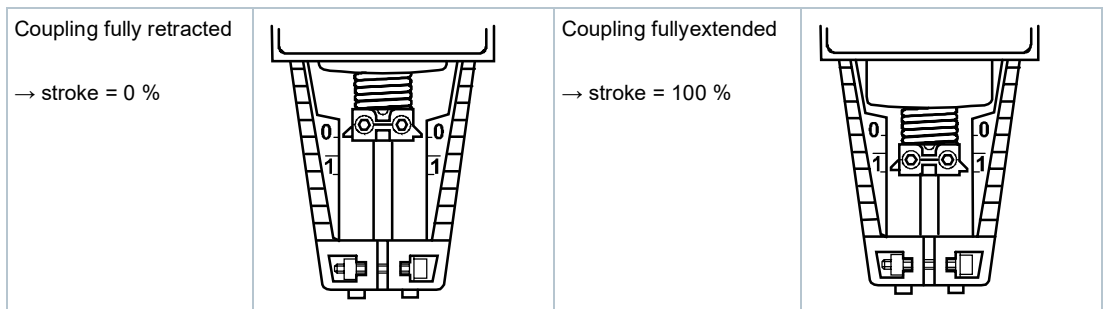
Mounting instructions 74 319 0324 0 for fitting the actuator to the valve and A5W00027551 for SKD62/MO are enclosed in the actuator packaging. The instructions for accessories are enclosed with the accessories themselves (see Product documentation [→ 13]).

### Mounting positions

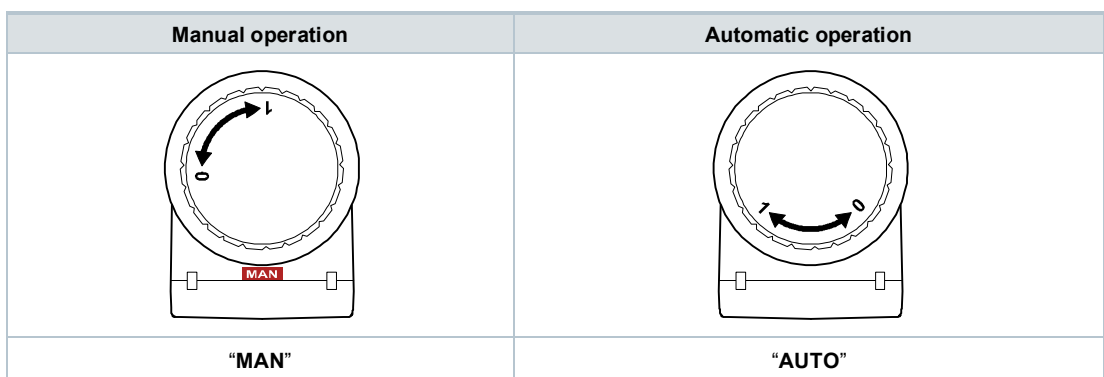


## Commissioning

When commissioning the system, check the wiring and functions, and set any auxiliary switches and potentiometers as necessary, or check the existing settings.



The manual adjuster must be rotated counter-clockwise to the end stop, i.e. until the red indicator marked "MAN" is no longer visible. This causes the Siemens valve, types VVF..., VVG..., VXF... and VXG... to close (stroke = 0 %).







## Maintenance

The actuators are maintenance-free.

When **servicing** the control device:

	<b>▲ WARNING</b>
	<b>Verbrennungsgefahr durch heiße Antriebskonsole</b> The actuator brackets on heating plants can also become hot from the contact with the hot valve during operation. The temperature of the actuator bracket can reach 100 °C. When servicing the actuator: <ul style="list-style-type: none"><li>• Switch off both pump and operating voltage.</li><li>• Close the main shutoff valve in the piping.</li><li>• Release pressure in the pipes and allow them to cool off completely.</li></ul>

	<b>▲ WARNING</b>
	<b>Risk of injury</b> <ul style="list-style-type: none"><li>• Disconnect electrical connections from the terminals as needed.</li><li>• The actuator must be properly installed prior to recommissioning the valve.</li></ul>




### **Recommendation SKD6..:**

Trigger stroke calibration after maintenance.

### **Repair:**

See Spare parts [→ 12]

	<b>▲ WARNING</b>
	<b>Risk of injury through broken housing or cover</b> Dismounting the actuator with broken housing from the valve can release the highly tensioned spring return, which can cause flying parts and injury. <ul style="list-style-type: none"><li>• NEVER dismount actuator from valve.</li><li>• Dismount valve-actuator combination (control device) as complete unit.</li><li>• Disassembly only by qualified personnel.</li><li>• Send the control device along with an error report to the local Siemens office for analysis and disposal.</li><li>• Mount new control device (valve and actuator) properly.</li></ul>

## Disposal



### **⚠️ WARNUNG**

#### **Tensioned spring return**

Opening the actuator housing can release the highly tensioned return spring, which can cause flying parts and injuries.

- Do not open the actuator housing.




The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

## Warranty

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

Power supply		
Operating voltage		
	SKD32..	AC 230 V ± 15 %
	SKD82..	AC 24 V ± 20 % (SELV/PELV)
	SKD6..	
	SKD62/MO	
Frequency		50 / 60 Hz
Maximum power consumption at 50 Hz		
	SKD32.21	16 VA / 12 W
	SKD32.50	11 VA / 8 W
	SKD32.51	17 VA / 12 W
	SKD82.50, SKD82.50U	9 VA / 7 W
	SKD82.51, SKD82.51U	14 VA / 10 W
	SKD60..	10 VA / 8 W
	SKD62..	14 VA / 10 W
External supply cable fuse		
	SKD32..	Min. 0.5 A, slow Max. 6 A slow
	SKD82..	Min. 1 A, slow
	SKD6..	Max. 10 A slow

Function data			
Positioning time at 50 Hz <sup>1)</sup>			
	SKD32.21	Opening	30 s
		Closing	10 s
	SKD32.5.. SKD82.5..	Opening, closing	120 s
	SK6..	Opening	30 s
		Closing	15 s
Spring-return time <sup>1)</sup>			
	SKD32..	8 s	
	SKD82..		
	SKD62..	15 s	
Positioning force		1000 N	
Nominal stroke		20 mm	
Maximum permissible medium temperature (valve fitted)		-25...150 °C	
		 < 0 °C: Requires stem heater ASZ6.6	

Signal inputs / signal outputs		
Control signal		
	SKD32..	3-position
	SKD82..	
	SKD6..	DC 0...10 V
		DC 4...20 mA
		0...1000 Ω

Signal inputs / signal outputs			
Positioning signal Y SK6..			
	Input impedance	DC 0...10 V	100 k $\Omega$
		DC 4...20 mA	240 $\Omega$
	Signal resolution		< 1 %
	Hysteresis		1 %
Override control Z SK6..			
	Resistor		1000 $\Omega$
	Z not connected, priority terminal Y		No function
	Z connected directly to G		Max. stroke 100 %
	Z connected directly to G0		Min. stroke 0 %
	Z connected to M via 0...1000 $\Omega$		Stroke proportional to R
Position feedback U SK6..			
	Load impedance	DC 0...9,8 V	> 10 k $\Omega$
		DC 4...19.6 mA	< 500 $\Omega$

Enhanced functions SKD60 <sup>2)</sup> , SKD62UA			
Selection of direction of operation			
	SKD60, SKD62UA	Direct-acting / reverse-acting	DC 0...10 V / DC 10...0 V
			DC 4...20 mA / DC 20...4 mA
			0...1000 $\Omega$ / 1000...0 $\Omega$
Stroke limit control			
	SKD62UA	Range of lower limit	0...45 % adjustable
		Range of upper limit	100...55% adjustable
Sequence control			
	SKD62UA	Terminal Y	
		Starting point of sequence	0...15 V adjustable
		Operating range of sequence	3...15 V adjustable
Signal addition			
	SKD62UA	Z connected to R of	
		Frost protection monitor QAF21..	0...1000 $\Omega$ , added to Y signal
		Frost protection monitor QAF61..	DC 1,6 V, added to Y signal

Communication SKD62/MO			
Communication protocol			
	Modbus RTU		RS-485, not galvanically isolated
	Number of nodes		Max. 32
	Address range		1...248 / 255
		Factory setting	255
	Transmission formats		1-8-E-1 / 1-8-O-1 / 1-8-N-1 / 1-8-N-2
		Factory setting	1-8-E-1
	Baud rates (kBaud)		Auto / 9.6 / 19.2 / 38.4 / 57.6 / 76.8 / 115.2
		Factory setting	Auto
	Bus termination		120 $\Omega$ electronically switchable
		Factory setting	Off

Electrical connections and connecting cable		
Wire cross-sectional area		0.5...2.5 mm <sup>2</sup> , AWG 21...14 <sup>3)</sup>
Cable entries		4 x M20 (Ø 20.5 mm)
	With knockouts for standard ½" conduit connectors (Ø 21.5 mm)	Mit Ausbrechöffnungen für ½" Schlauchverbindungen (Ø 21,5 mm)
	SKD62/MO	Fixed connection cable
	Cable length	0.9 m
	Number of cores	5 x 0.75 mm <sup>2</sup>

Degree and class of protection		
Protection class		As per EN 60730
	Automatic action	Typ 1AA / Typ 1AC / Modulation Action
	Pollution degree	2
Housing protection upright to sideways		IP 54 as per EN 60529

Environmental conditions		
Operation		IEC 60721-3-3
	Climatic conditions	Class 3K5
	Temperature, general	-15...<50 °C
	Humidity (non-condensing)	5...95 % r.h.
Transportation		IEC 60721-3-2
	Climatic conditions	Class 2K3
	Temperature	-30...65 °C
	Humidity (non-condensing)	5...95 % r.h.
Storage		IEC 60721-3-1
	Climatic conditions	Class 1K3
	Temperature	-15...50 °C
	Humidity (non-condensing)	-5...95 % r.h.

Directives and standards		
Product standard		EN 60730-x
Electromagnetic compatibility (Applications)		For use in residential, commercial, and industrial environments
EU conformity (CE)		A5W00007752 <sup>4)</sup>
RCM conformity		A5W00007898 <sup>4)</sup>
EAC conformity		Eurasia conformity for all SKD..
UL, cUL	AC 230 V	-
	AC 24 V	UL 873 <a href="http://ul.com/database">http://ul.com/database</a>

Environmental compatibility
The product environmental declarations CE1E4561enX1 (SKD3.., SKD8..) <sup>4)</sup> , CE1E4561enX2 (SKD6..) <sup>4)</sup> and A6V101083254 (external Modbus converter) <sup>4)</sup> contain data on RoHS compliance, materials composition, packaging, environmental benefit and disposal.

Dimensions / weight		
Dimensions		See Dimensions [→ 30]
Weight		
	SKD32.21	3.65 kg
	SKD32.50	3.60 kg
	SKD32.51	3.65 kg
	SKD82.50	3.60 kg
	SKD82.50U	3.85 kg
	SKD82.51	3.65 kg
	SKD82.51U	3.90 kg
	SKD60 SKD62, SKD62/MO	3.60 kg
	External Modbus converter	0.15 kg
	SKD62U SKD62UA	3.85 kg
	Stroke inverter ASK50	1.10 kg

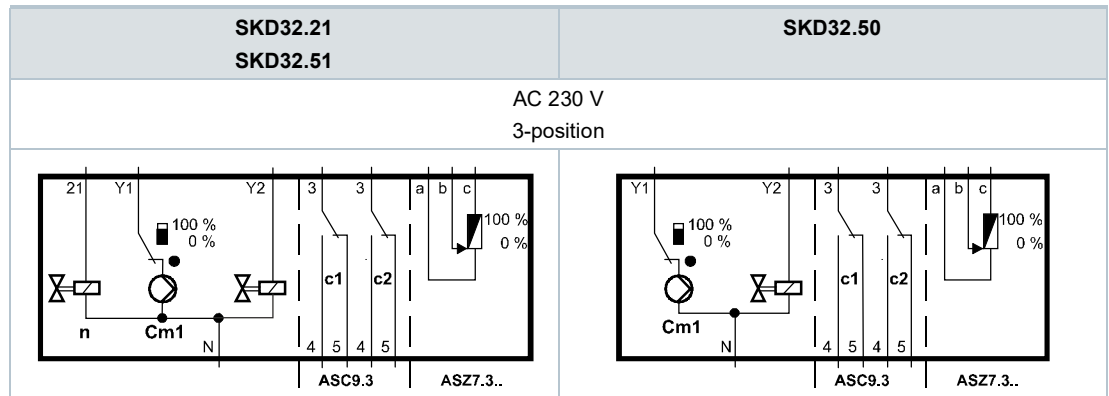
Materials	
Housing	Die-cast aluminium
Bracket	
Housing box	Plastic
Manual adjuster	

Accessories			
Auxiliary switch ASC1.6			
	SKD6..	Switching capacity	AC 24 V, 10 mA...4 A resistive, 2 A inductive
Double auxiliary switch ASC9.3			
	SKD32.., SKD82..	Switching capacity per auxiliary switch	AC 250 V, 6 A resistive, 2.5 A inductive
Potentiometer ASZ7.3			
	SKD32.., SKD82..	Change in overall resistance of potentiometer at nominal stroke	0... 1000 Ω
Stem heater ASZ6.6			
		Operating voltage	AC 24 V ± 20 %
		Power consumption	40 VA / 30 W
		Inrush current	Max. 8.5 A (Max. temperature 85 °C / 185 °F)

- 1) At room temperature (23 °C); low ambient temperatures or high  $\Delta p$  may prolong these times
- 2) From version ..L onward
- 3) AWG = American wire gauge
- 4) The documents can be downloaded at <http://www.siemens.com/bt/download>

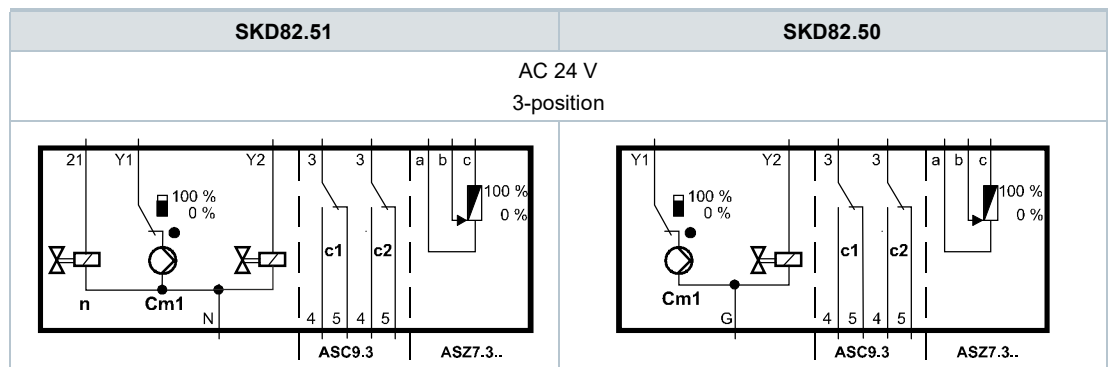
Internal diagrams

SKD32..



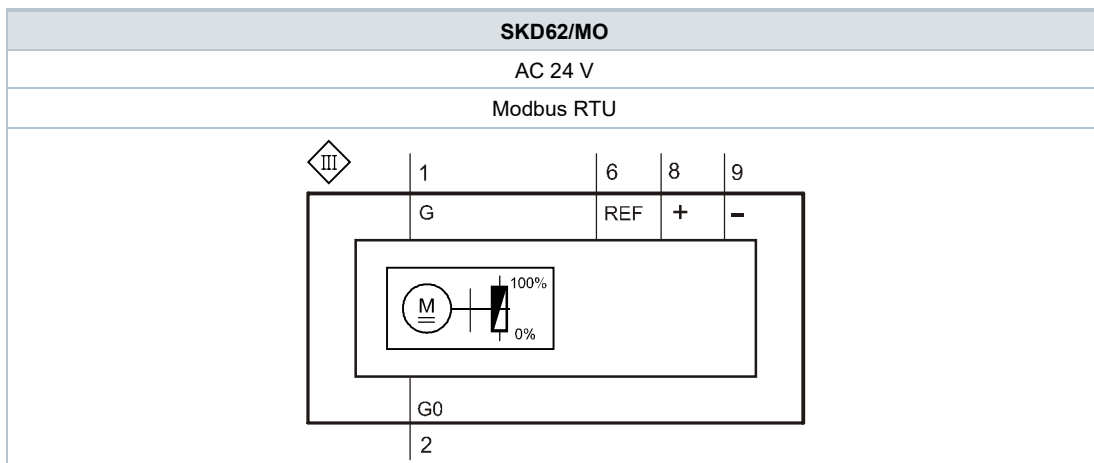
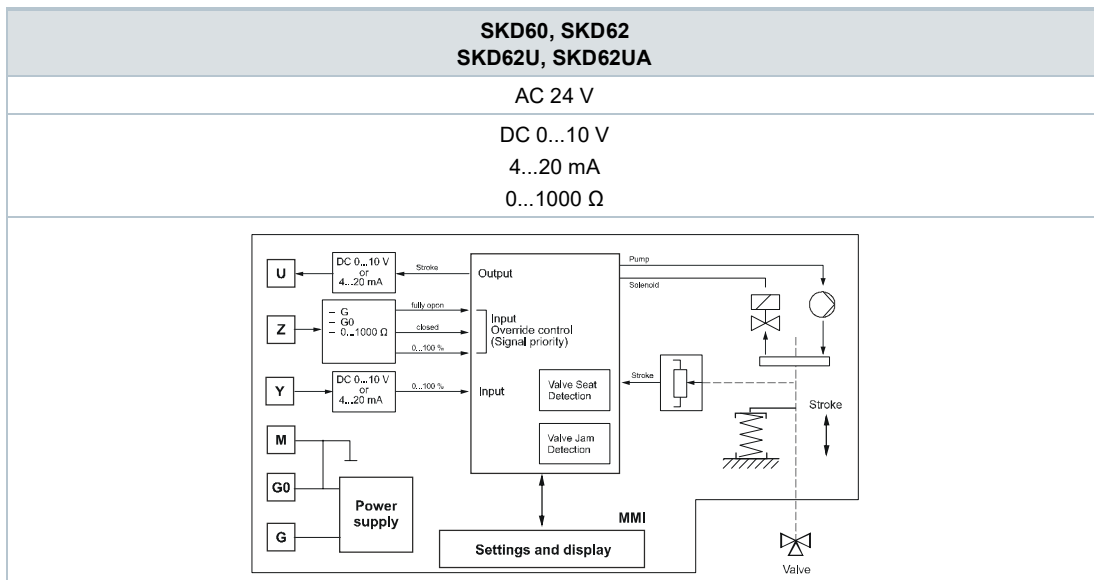
<b>Cm1</b>	End switch
<b>n</b>	Solenoid valve for spring-return
<b>c1, c2</b>	ASC9.3 double auxiliary switch
<b>a, b, c</b>	ASZ7.3 potentionmeter
<b>Y1</b>	Positioning signal „open“
<b>Y2</b>	Positioning signal „close“
<b>21</b>	Spring-return function
<b>N</b>	Neutral conductor

SKD82..



<b>Cm1</b>	End switch
<b>n</b>	Solenoid valve for spring-return
<b>c1, c2</b>	ASC9.3 double auxiliary switch
<b>a, b, c</b>	ASZ7.3 potentionmeter
<b>Y1</b>	Positioning signal „open“
<b>Y2</b>	Positioning signal „close“
<b>21</b>	Spring-return function
<b>G</b>	System potential

SKD6..

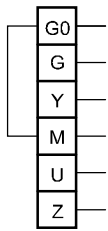


<b>U</b>	Position indication	<b>REF</b>	Reference line (Modbus RTU)
<b>Z</b>	Override control	<b>+</b>	Bus + (Modbus RTU)
<b>Y</b>	Positioning signal	<b>-</b>	Bus - (Modbus RTU)
<b>M</b>	Measuring neutral		
	<b>G0</b>	Operating voltage AC 24 V: System neutral (SN)	
	<b>G</b>	Operating voltage AC 24 V: System potential (SP) Switching without power as a spring-return function	

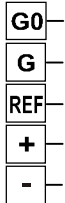


## Connection terminals

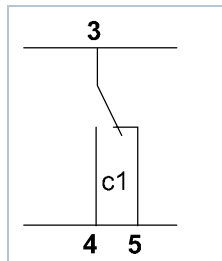
### SKD6..

	AC 24 V	DC 0...10 V 4...20 mA 0...1000 Ω
	System neutral (SN)	
	System potential (SP)	
	Positioning signal DC 0...10 (30) V or DC 4...20 mA	
	Measuring neutral (= G0)	
	Position indication DC 0...10 V oder DC 4...20 mA	
	Override control (Functions [→ 8])	

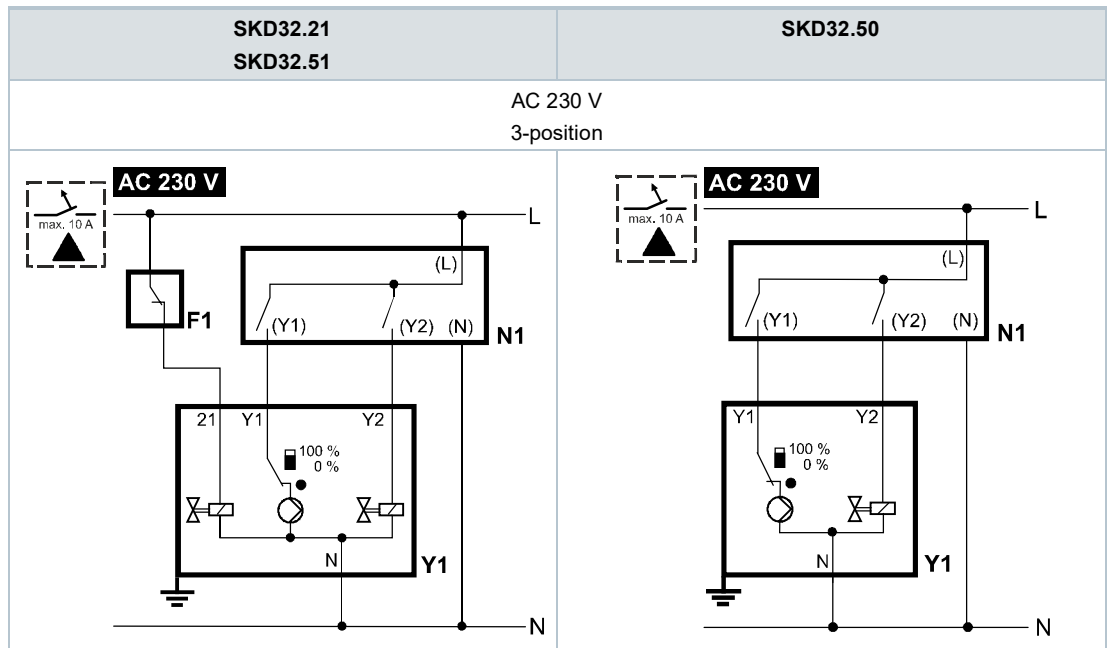
### SKD62/MO

	AC 24 V	Modbus RTU Connection cable
	System neutral (SN)	Black
	System potential (SP)	Red
	Reference line (Modbus RTU)	Violet
	Bus + (Modbus RTU)	Gray
	Bus - (Modbus RTU)	Pink

### Auxiliary switch ASC1.6

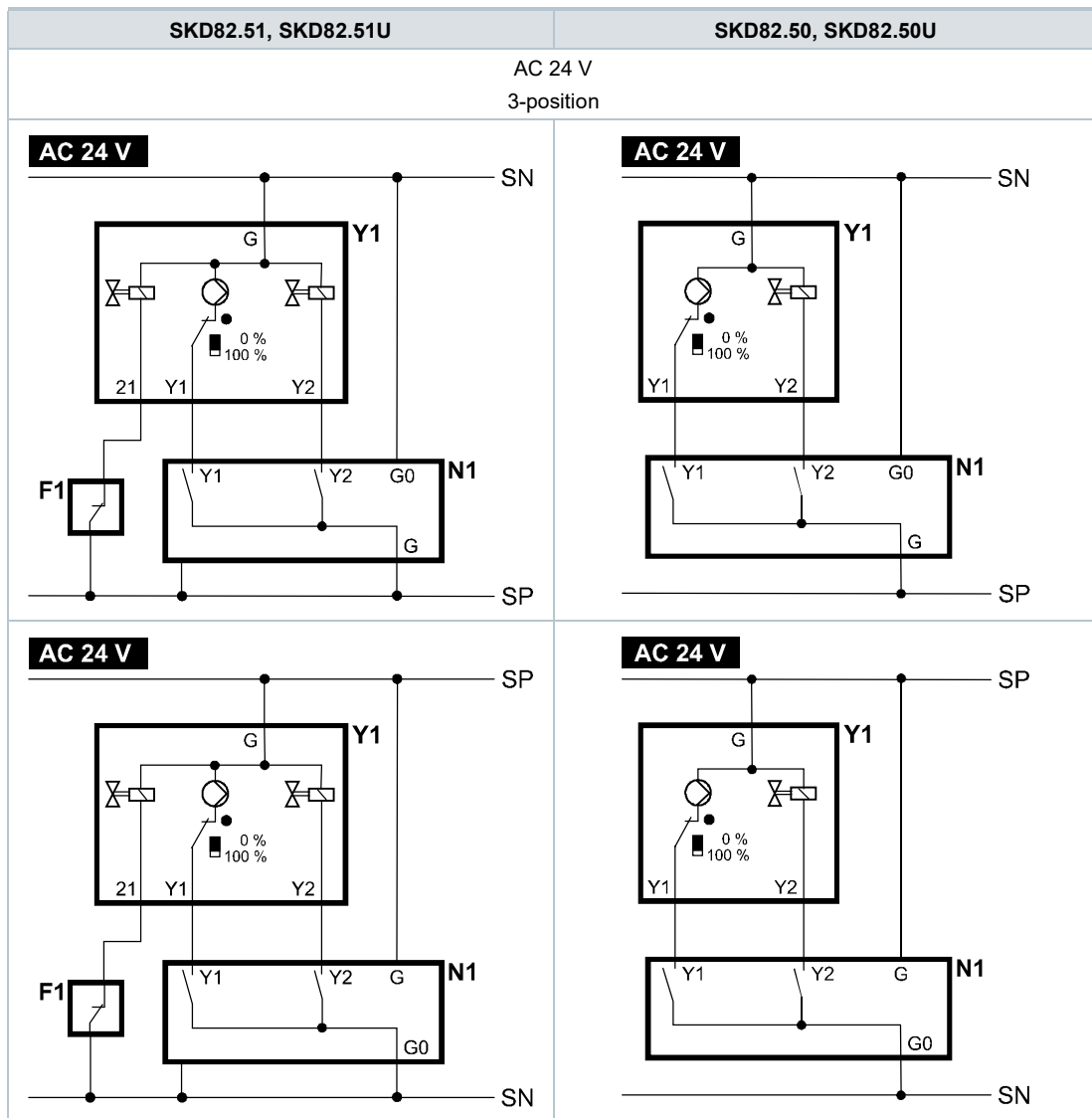


SKD32..



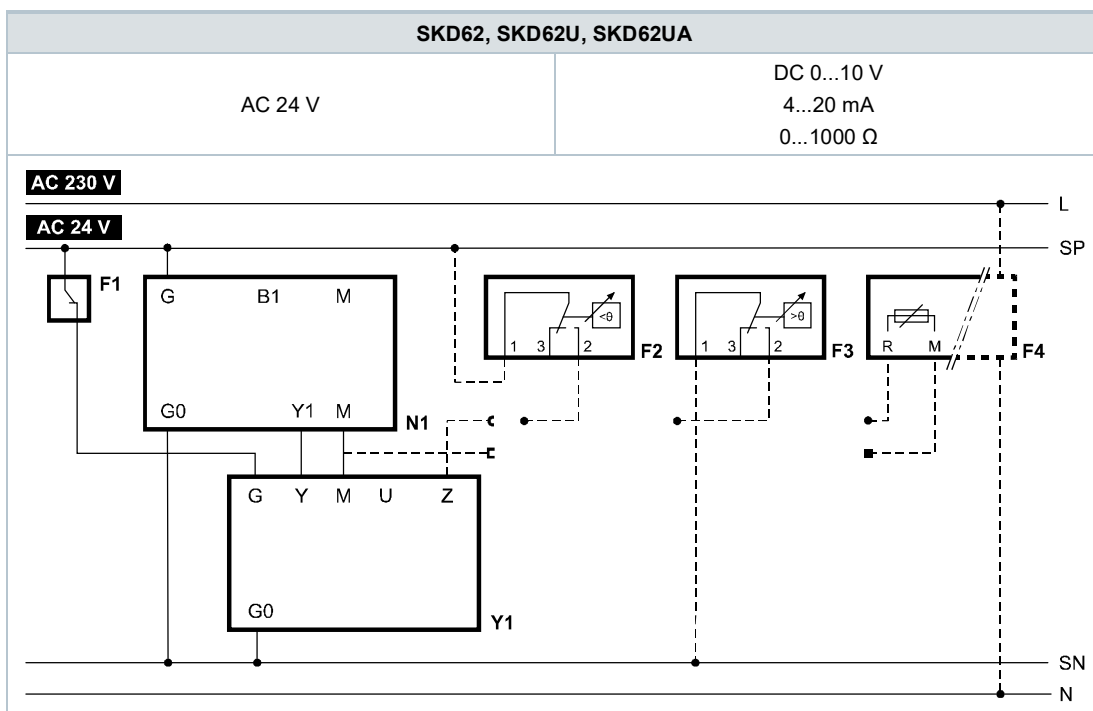
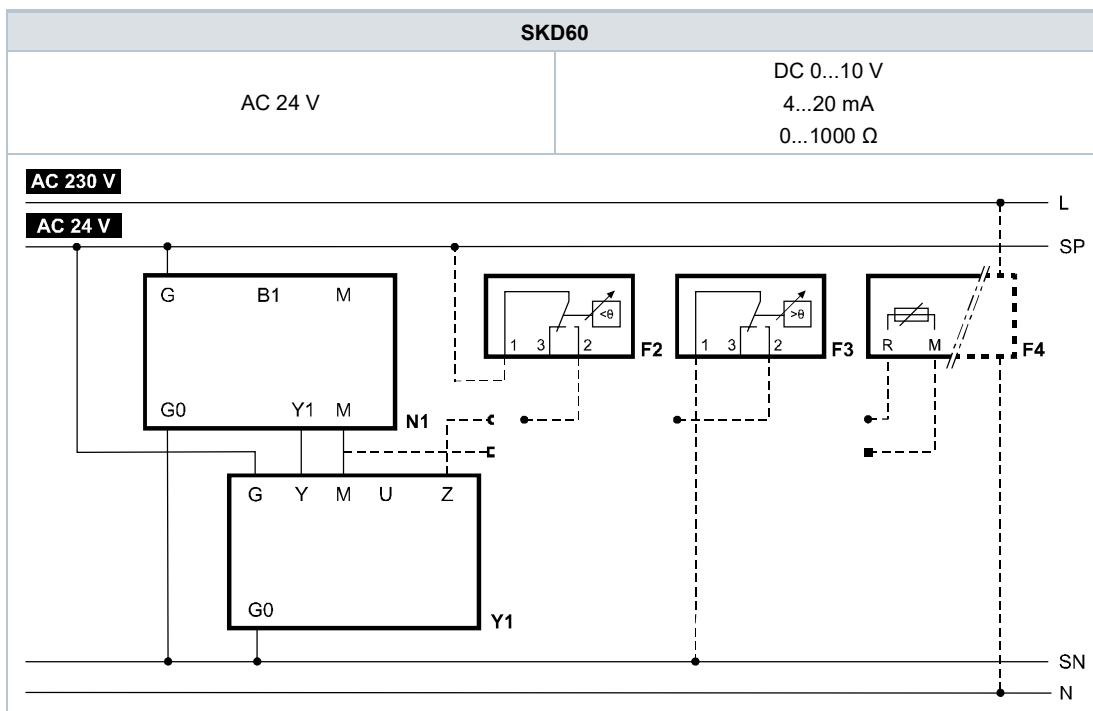
<b>F1</b>	Safety limiter (e.g. temperature limiter)			<b>Y1</b>	Positioning signal „open“
<b>N1, N2</b>	Controller	<b>L</b>	Phase	<b>Y2</b>	Positioning signal „close“
<b>Y1, Y2</b>	Actuators	<b>N</b>	Neutral	<b>21</b>	Spring-return function

SKD82..



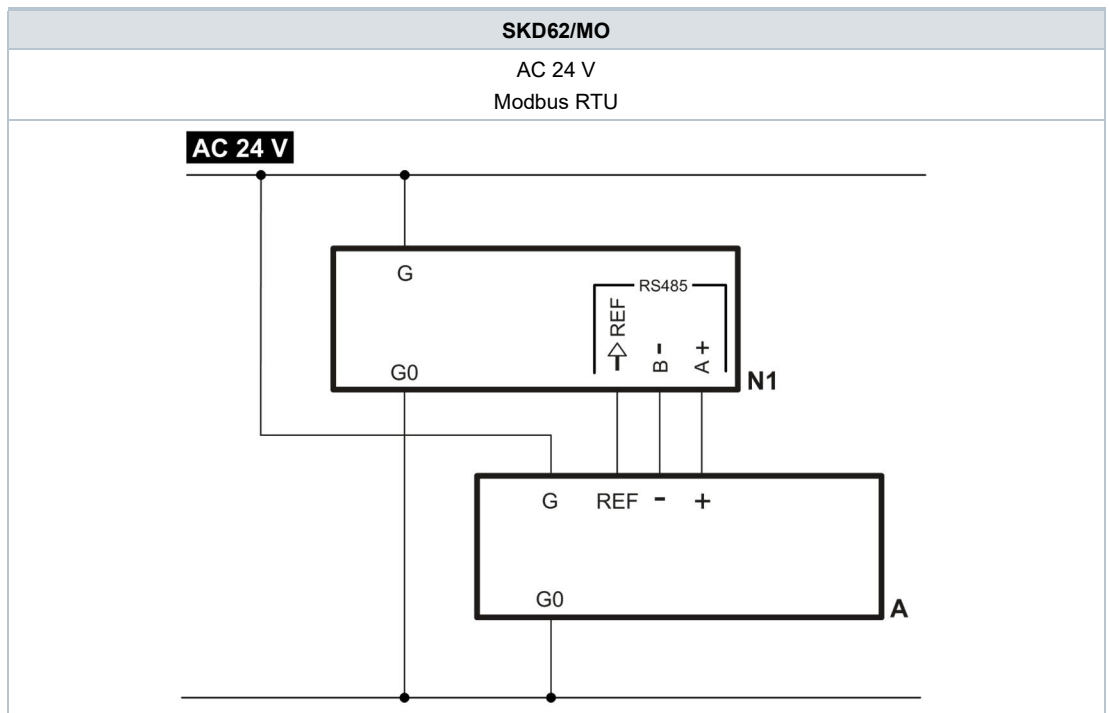
<b>F1</b>	Safety limiter (e.g. temperature limiter)			<b>(Y1), (Y2)</b>	Controller contacts
		<b>SP</b>	System potential AC 24 V	<b>Y1</b>	Positioning signal „open“
<b>N1, N2</b>	Controller	<b>SN</b>	System neutral	<b>Y2</b>	Positioning signal „close“
<b>Y1, Y2</b>	Actuators			<b>21</b>	Spring-return function

SKD6..



<b>Y1</b>	Actuator	<b>F3</b>	Temperature detector
<b>N1</b>	Controller	<b>F4</b>	Frost protection monitor with 0...1000 Ω signal output, e.g. QAF21.. or QAF61.. (only SKB62UA) *)
<b>F1</b>	Safety limiter (e.g. temperature limiter)	<b>G (SP)</b>	System potential AC 24 V
<b>F2</b>	Frost protection thermostat	<b>G0 (SN)</b>	System neutral
Terminals:	1-2	Frost hazard/sensor is interrupted (thermostat closes with frost)	
	1-3	Normal operation	

\*) Only SKD62UA: only with sequence control and the appropriate selector switch settings, see Electronics [→ 5], Functions [→ 6]



<b>A</b>	Actuator
<b>N1</b>	Controller
<b>G</b>	System potential
<b>G0</b>	System neutral
<b>REF</b>	Reference line (Modbus RTU)
<b>+</b>	Bus + (Modbus RTU)
<b>-</b>	Bus - (Modbus RTU)



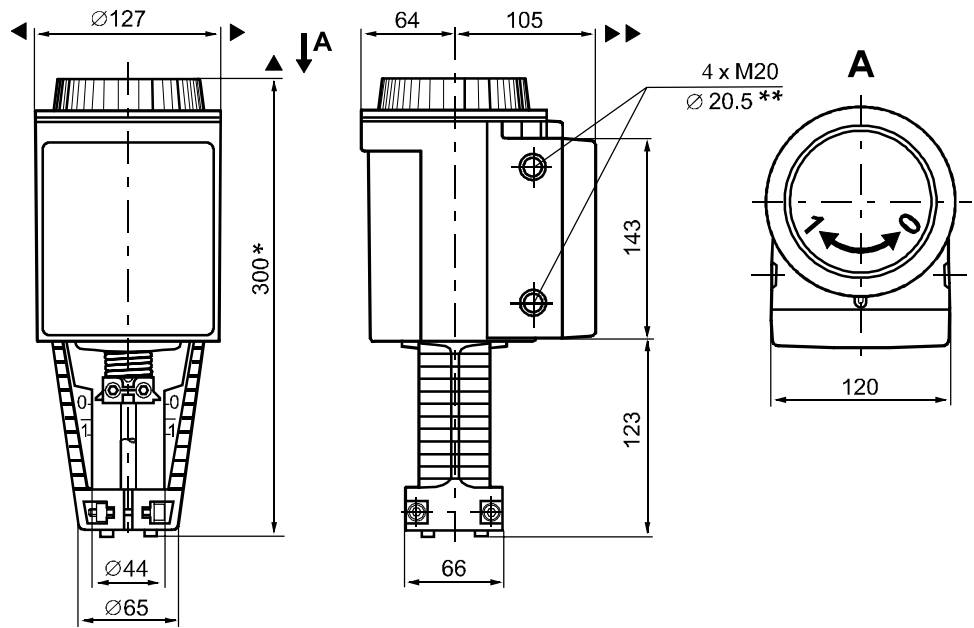
### **HINWEIS**

#### **Using safety limiter F1**

When using the safety limiter F1, ensure that no mistakes may occur on cable insulation that may cancel out the temperature limiter function (applies to both 230 V as well as 24 V types).

- For SN earthing (e.g. PELV) comply under all circumstances with the note above.

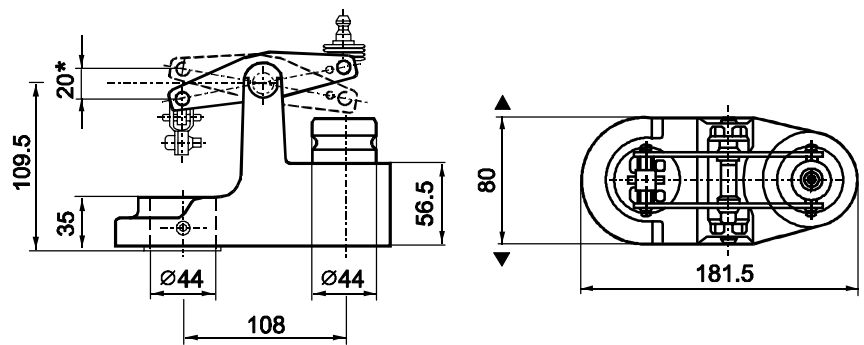
Actuator



All dimensions in mm

*	Height of actuator from plate <b>without</b> stroke inverter <b>ASK50 = 300 mm</b> Height of actuator from plate <b>with</b> stroke inverter <b>ASK50 = 357 mm</b>
**	<b>SKD..U: with knockouts for standard 1/2" conduit connectors (<math>\varnothing 21.5</math> mm)</b>
▶	> 100 mm, um clearance form ceiling or wall for mounting
▶▶	> 200 mm, connection, operation, maintenance, etc.

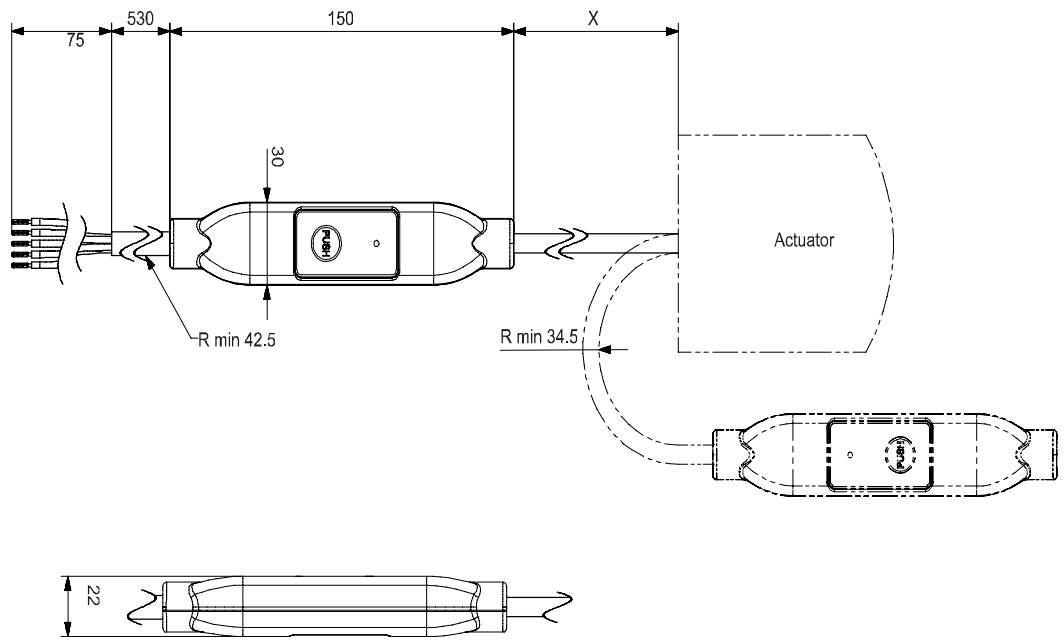
Stroke inverter ASK50



All dimensions in mm

*	Maximum stroke = 20 mm
---	------------------------

## External Modbus converter



All dimensions in mm

X	250 mm
---	--------

## Revision numbers

Type	Valid from rev. no.	Type	Valid from rev. no.
SKD32.50	..F	SKD62	..H
SKD32.51	..F	SKD62U	..H
SKD32.21	..F	SKD60	..H
SKD82.50	..F	SKD62UA	..H
SKD82.50U	..F	SKD62/MO	..J
SKD82.51	..F		
SKD82.51U	..F		

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ACVATIX™

## 2- and 3-port valves with flanged connections, PN 16

VVF42.., VVF42..K, VXF42..



VVF42..  
VVF42..K



VXF42..


### From the large-stroke valve line


- Control valves for medium temperatures from -10...150 °C
- Valve body of grey cast iron EN-GJL-250
- DN 15...150
- $k_{vs}$  1.6...400 m<sup>3</sup>/h
- Flange type 21, Flange design B
- VVF42..K with pressure compensation to handle high differential pressure
- Equipable with electro-motoric actuators SAX.., SAV.. or electro-hydraulic actuators SKD.., SKB.., SKC..

## Use


In boiler, district heating and refrigeration plants, cooling towers, heating groups, in ventilation and air-handling units as control or shutoff valves.  
For use in closed hydraulic circuits (observe cavitation).












## Type summary

Valves	Actuators				SAX.. <sup>1)</sup>	SKD..	SKB..	SAV.. <sup>1)</sup>	SKC..											
	Stroke				20 mm				40 mm											
PN 16	Positioning force				800 N	1000 N	2800 N	1600 N	2800 N											
	Data sheet				N4501	N4561	N4564	N4503	N4566											
	Stock no.	DN	k <sub>VS</sub> [m <sup>3</sup> /h]	S <sub>V</sub>	Δp <sub>s</sub>	Δp <sub>max</sub>	Δp <sub>s</sub>	Δp <sub>max</sub>	Δp <sub>s</sub>	Δp <sub>max</sub>	Δp <sub>s</sub>	Δp <sub>max</sub>	Δp <sub>s</sub>	Δp <sub>max</sub>						
					[kPa]															
VVF42.15-1.6	S55204-V100	15	1.6	> 50	1600	400	1600	400	1600	400	-	-	-	-						
VVF42.15-2.5	S55204-V101	15	2.5																	
VVF42.15-4	S55204-V102	15	4																	
VVF42.20-6.3	S55204-V103	20	6.3																	
VVF42.25-6.3	S55204-V104	25	6.3																	
VVF42.25-10	S55204-V105	25	10																	
VVF42.32-16	S55204-V106	32	16	> 100	900		1200		1200		1250	400								
VVF42.40-16	S55204-V107	40	16								550	750								
VVF42.40-25	S55204-V108	40	25																	
VVF42.50-31.5	S55204-V109	50	31.5								350	300	450	1200	750					
VVF42.50-40	S55204-V110	50	40																	
VVF42.65-50	S55204-V111	65	50								200	150	250	200	700	450				
VVF42.65-63	S55204-V112	65	63																	
VVF42.80-80	S55204-V113	80	80								125	75	175	125	450	250	225			
VVF42.80-100	S55204-V114	80	100																	
VVF42.100-125	S55204-V115	100	125								-	-	-	-	-	-	160	125	300	250
VVF42.100-160	S55204-V116	100	160																	
VVF42.125-200	S55204-V117	125	200														125	90	190	160
VVF42.125-250	S55204-V118	125	250																	
VVF42.150-315	S55204-V119	150	315							80	60	125	100							
VVF42.150-400	S55204-V120	150	400																	

Valves	Actuators				SAX.. <sup>1)</sup>	SKD..	SKB..	SAV.. <sup>1)</sup>	SKC..					
	Stroke				20 mm				40 mm					
PN 16	Positioning force				800 N	1000 N	2800 N	1600 N	2800 N					
	Data sheet				N4501	N4561	N4564	N4503	N4566					
	Stock no.	DN	k <sub>vs</sub> [m <sup>3</sup> /h]	S <sub>v</sub>	Δp <sub>s</sub>	Δp <sub>max</sub>	Δp <sub>s</sub>	Δp <sub>max</sub>	Δp <sub>s</sub>	Δp <sub>max</sub>	Δp <sub>s</sub>	Δp <sub>max</sub>	Δp <sub>s</sub>	Δp <sub>max</sub>
					[kPa]									
<b>-5...150 °C</b>														
VVF42.50-40K	S55204-V121	50	40	> 100	1600	400	1600	400	1600	400	-	-	-	-
VVF42.65-63K	S55204-V122	65	63								-	-	-	-
VVF42.80-100K	S55204-V123	80	100								-	-	-	-
VVF42.100-160K	S55204-V124	100	160		-	-	-	-	1600	400	1600	400		
VVF42.125-250K	S55204-V125	125	250		-	-	-	-	1400	-	-	-		
VVF42.150-360K	S55204-V126	150	360		-	-	-	-	1400	-	-	-		

<sup>1)</sup> Permissible medium temperature (coupled valve) -25...130 °C - up to 150 °C in horizontal mounting position.

Valves	Actuators				SAX.. <sup>1)</sup>	SKD..	SKB..	SAV.. <sup>1)</sup>	SKC..					
	Stroke				20 mm				40 mm					
PN 16	Positioning force				800 N	1000 N	2800 N	1600 N	2800 N					
	Data sheet				N4501	N4561	N4564	N4503	N4566					
	Stock no.	DN	k <sub>vs</sub> [m <sup>3</sup> /h]	S <sub>v</sub>	Δp <sub>max</sub> [kPa]									
					A → AB B	AB → A B	A → AB B	AB → A B	A → AB B	AB → A B	A → AB B	AB → A B	A → AB B	AB → A B
<b>-10...150 °C</b>														
VXF42.15-1.6	S55204-V127	15	1.6	> 50	400	100	400	100	400	100	-	-	-	-
VXF42.15-2.5	S55204-V128	15	2.5								-	-	-	-
VXF42.15-4	S55204-V129	15	4								-	-	-	-
VXF42.20-6.3	S55204-V130	20	6.3		-	-	-	-						
VXF42.25-6.3	S55204-V131	25	6.3		-	-	-	-						
VXF42.25-10	S55204-V132	25	10		-	-	-	-						
VXF42.32-16	S55204-V133	32	16		-	-	-	-	400	100	-	-		
VXF42.40-16	S55204-V134	40	16		-	-	-	-	400	100	-	-		
VXF42.40-25	S55204-V135	40	25		-	-	-	-	400	100	-	-		
VXF42.50-31.5	S55204-V136	50	31.5		300	-	-	-	-	-	-	-		
VXF42.50-40	S55204-V137	50	40		300	-	-	-	-	-	-	-		
VXF42.65-50	S55204-V138	65	50		150	50	200	80	-	-	-	-		
VXF42.65-63	S55204-V139	65	63		150	50	200	80	-	-	-	-		
VXF42.80-80	S55204-V140	80	80		75	125	50	-	225	50	-	-		
VXF42.80-100	S55204-V141	80	100		75	125	50	-	225	50	-	-		

Valves	Actuators				SAX.. <sup>1)</sup>	SKD..	SKB..	SAV.. <sup>1)</sup>	SKC..					
	Stroke				20 mm			40 mm						
PN 16	Positioning force				800 N	1000 N	2800 N	1600 N	2800 N					
	Data sheet				N4501	N4561	N4564	N4503	N4566					
	Stock no.	DN	k <sub>vs</sub> [m <sup>3</sup> /h]	S <sub>v</sub>	Δp <sub>max</sub> [kPa]									
														
-10...150 °C														
VXF42.100-125	S55204-V142	100	125		-	-	-	-	-	-	125	50	250	50
VXF42.100-160	S55204-V143	100	160											
VXF42.125-200	S55204-V144	125	200								90		160	
VXF42.125-250	S55204-V145	125	250											
VXF42.150-315	S55204-V146	150	315								60		100	
VXF42.150-400	S55204-V147	150	400											

<sup>1)</sup> Permissible medium temperature (coupled valve) -25...130 °C - up to 150 °C in horizontal mounting position

DN = Nominal size

k<sub>vs</sub> = Flow nominal value of cold water (5...30 °C) through the fully opened valve (H<sub>100</sub>) at a differential pressure of 100 kPa (1 bar)

S<sub>v</sub> = Rangeability

Δp<sub>s</sub> = Maximum permissible differential pressure at which the motorized valve still closes securely against the pressure

Δp<sub>max</sub> = Maximum permissible differential pressure across the valve's throughport for the entire positioning range of the motorized valve

### Ordering (example)

Type	Stock no.	Description
VXF42.65-63	S55204-V139	3-port valve with flange, PN 16
SKD32.50	SKD32.50	Electro-hydraulic actuator

### Delivery

Valves, actuators, and accessories are packaged and delivered separately.

### Note

Counter-flanges, bolts, and gaskets must be provided on site.

## Equipment combinations

Type	Stock no.	Stroke	Positioning force	Operating voltage	Positioning signal	Spring return time	Positioning time	LED	Manual adjuster	Auxiliary functions			
<b>SAX31.00</b>	S55150-A105	20 mm	800 N	AC 230 V	3-position	-	120 s	-	Press and fix	1)			
<b>SAX31.03</b>	S55150-A106						30 s						
<b>SAX61.03</b> <b>SAX61.03U</b>	S55150-A100 S55150-A100-A100			AC 24 V DC 24 V	0...10 V 4...20 mA 0...1000 Ω	-	-	x		2), 3)			
<b>SAX81.00</b>	S55150-A102							3-position			-	120 s	-
<b>SAX81.03</b> <b>SAX81.03U</b>	S55150-A103 S55150-A103-A100			30 s									
<b>SKD32.21</b>	SKD32.21	20 mm	1000 N	AC 230 V	3-position	8 s	Opening: 30 s Closing: 10 s	-	Turn, position is maintained	1)			
<b>SKD32.50</b>	SKD32.50						-				120 s		
<b>SKD32.51</b>	SKD32.51						8 s						
<b>SKD60</b>	SKD60			AC 24 V	0...10 V 4...20 mA 0...1000 Ω	-	-	Opening: 30 s Closing: 15 s		x	2)		
<b>SKD62</b> <b>SKD62U</b>	SKD62 SKD62U											15 s	
<b>SKD62UA</b>	SKD62UA			4)									
<b>SKD82.50</b> <b>SKD82.50U</b>	SKD82.50 SKD82.50U			3-position	-	-	120 s	-		-	1)		
<b>SKD82.51</b> <b>SKD82.51U</b>	SKD82.51 SKD82.51U											8 s	
<b>SKB32.50</b>	SKB32.50			20 mm	2800 N	AC 230 V	3-position	-		120 s	-	Turn, position is maintained	1)
<b>SKB32.51</b>	SKB32.51												
<b>SKB60</b>	SKB60	AC 24 V	0...10 V 4...20 mA 0...1000 Ω			-	-	Opening: 120 s Closing: 10 s	x	2)			
<b>SKB62</b> <b>SKB62U</b>	SKB62 SKB62U										10 s		
<b>SKB62UA</b>	SKB62UA	4)											
<b>SKB82.50</b> <b>SKB82.50U</b>	SKB82.50 SKB82.50U	3-position	-			-	120 s	-	-	1)			
<b>SKB82.51U</b> <b>SKB82.51</b>	SKB82.51 SKB82.51U										10 s		
<b>SAV31.00</b>	S55150-A112	40 mm	1600 N	AC 230 V	3-position	-	120 s	-	Press and fix	1), 5)			
<b>SAV61.00</b> <b>SAV61.00U</b>	S55150-A110 S55150-A110-A100			AC 24 V DC 24 V				0...10 V 4...20 mA 0...1000 Ω			x	1), 2), 5), 6)	
<b>SAV81.00</b> <b>SAV81.00U</b>	S55150-A111 S55150-A111-A100			3-position				-		-	1), 5)		

Type	Stock no.	Stroke	Positioning force	Operating voltage	Positioning signal	Spring return time	Positioning time	LED	Manual adjuster	Auxiliary functions	
<b>SKC32.60</b>	SKC32.60	40 mm	2800 N	AC 230 V	3-position	-	120 s	-	Turn, position is maintained	1)	
<b>SKC32.61</b>	SKC32.61					18 s					
<b>SKC60</b>	SKC60			AC 24 V	0...10 V 4...20 mA 0...1000 Ω	-	Opening: 120 s Closing: 20 s	x		2)	
<b>SKC62</b> <b>SKC62U</b>	SKC62 SKC62U					20 s					
<b>SKC62UA</b>	SKC62UA			3-position		-	120 s	-		4)	
<b>SKC82.60</b> <b>SKC82.60U</b>	SKC82.60 SKC82.60U					-					1)
<b>SKC82.61</b> <b>SKC82.61U</b>	SKC82.61 SKC82.61U					18 s					

1) Auxiliary switch, potentiometer

4) Plus sequence control, stroke limitation, selection of acting direction

2) Position feedback, forced control, selection of valve characteristic

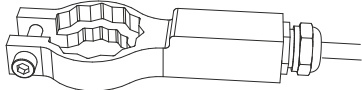
5) Stem heating element (optional)

3) Optional: sequence control, selection of acting direction



6) Function module (optional)

## Accessories / Spare parts

### Accessories

Type	Stock no.	Description	Notes	Example
ASZ6.6	S55845-Z108	Stem heating element	Required for medium temperatures < 0 °C	

### Spare parts

Stem sealing gland				
Type	DN	Stock no.	Notes	Image
VVF42.. VXF42..	DN 15...80	4 284 8806 0	Series A	 4 284 8806 0
	DN 100...150	4 284 8806 0	Series A, B and C until October 2015	
	DN 100...150	4 679 5629 0	Series D as of October 2015	
VVF42..K	DN 50...80	4 284 8806 0	Series A, B	 4 679 5629 0
	DN 100...150	4 284 8806 0	Series A	
	DN 100...150	4 679 5629 0	Series B	

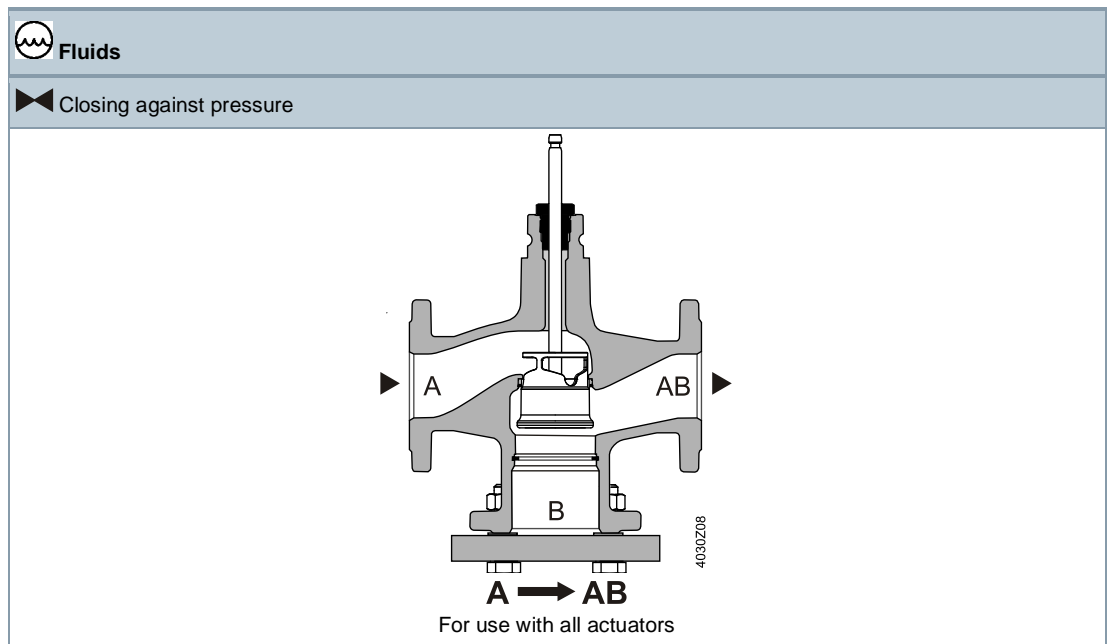
## Product documentation

Title	Content	Document ID
Mounting instructions valves VVF.. VXF..	Mounting instructions	M4030 74 319 0749 0
Valves VVF...,VXF...,VVG41..., VXG41..., VVI41..., VXI41..	Basic documentation: Contains background information and general technical basics for valves	P4030

## Technical and mechanical design

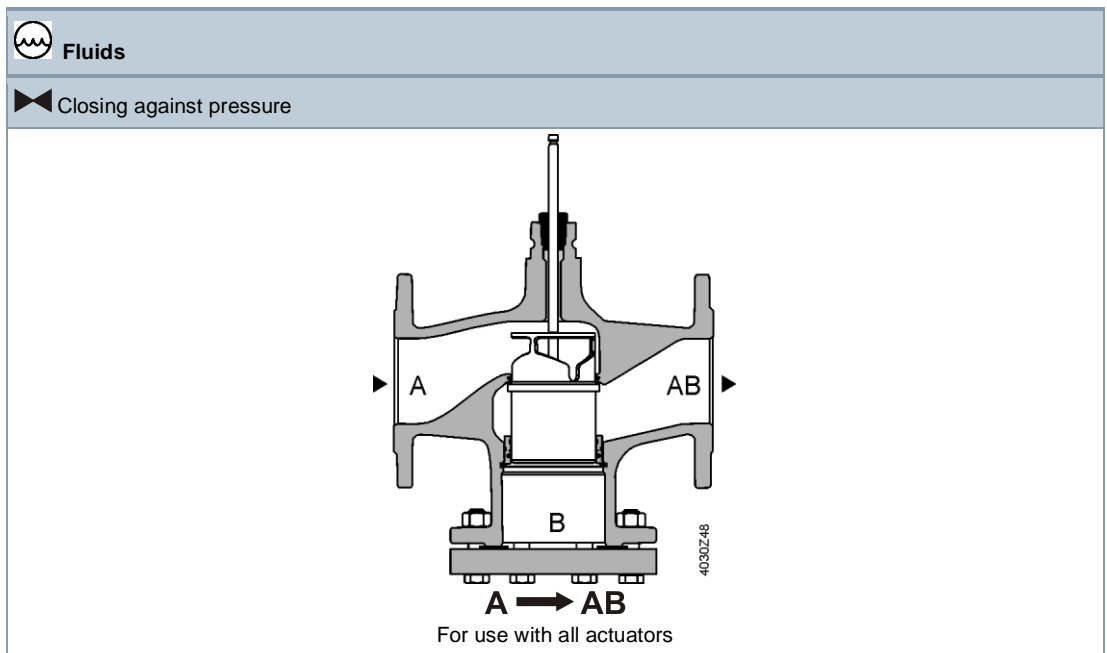
The illustrations below show the basic design of the valves. Constructional features, such as the shape of plugs, may differ.

### 2-port valves



## 2-port valves pressure compensated

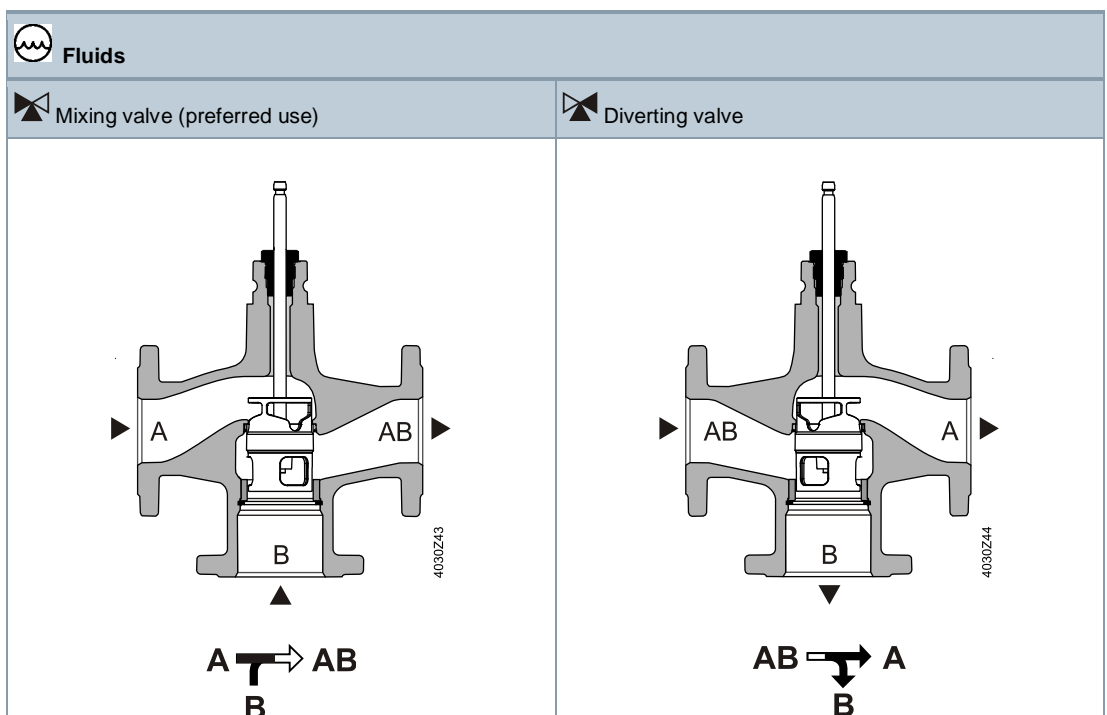
The VVF42..K valves use a pressure compensated plug. This enables the same type of actuators to be used for the control of volumetric flow at higher differential pressures.



Note

2-port valves do not become 3-port valves by removing the blank flange!

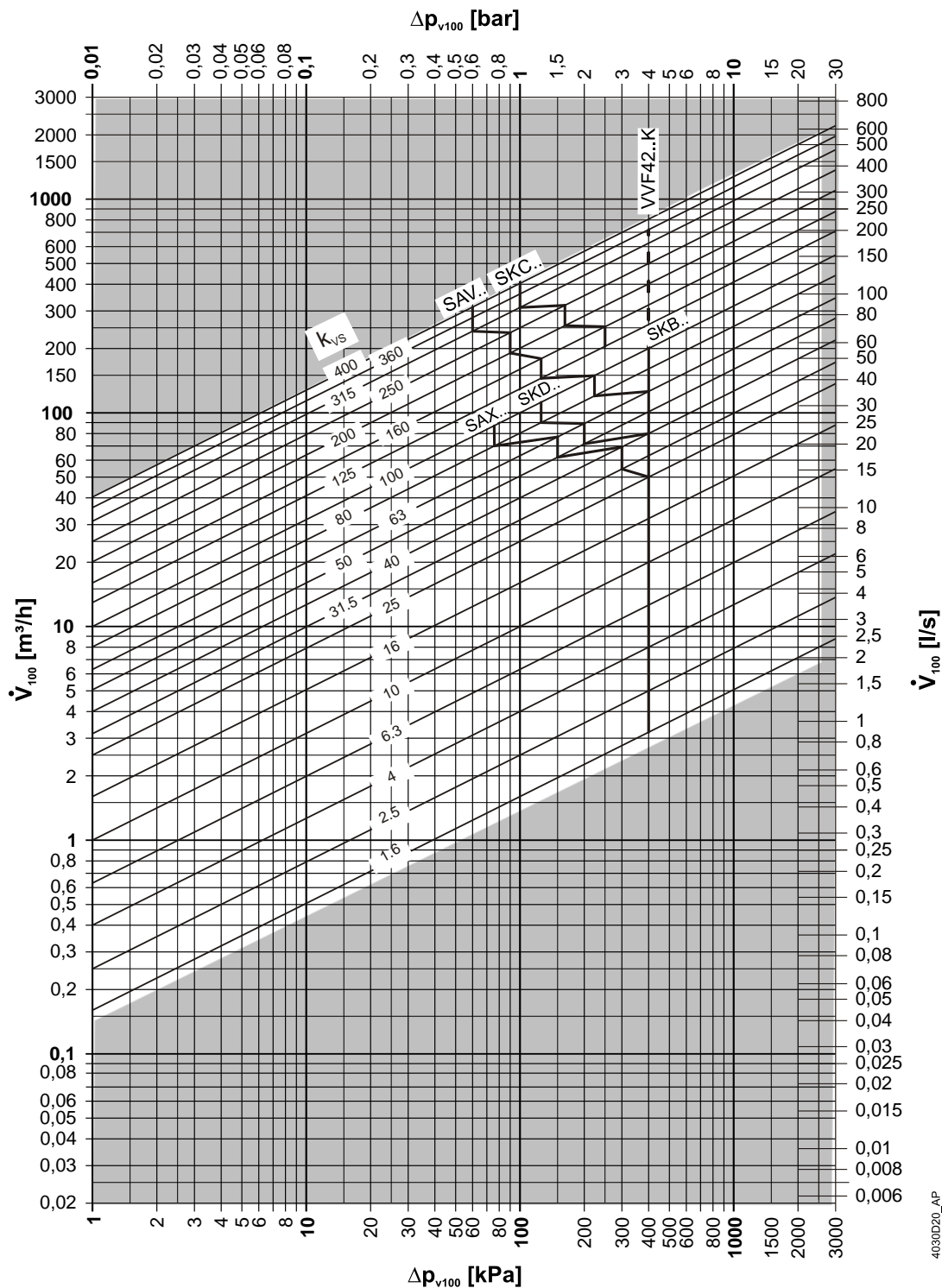
## 3-port valves





# Sizing

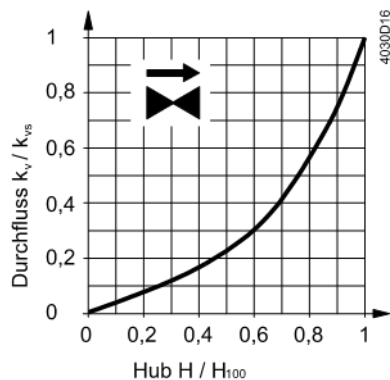
## Flow chart



$\Delta p_{max}$  values apply for the mixing function.  $\Delta p_{max}$  values for diverting function, see "Type summary", page 2 [▶ 2].

## Valve characteristics

### 2-port valves



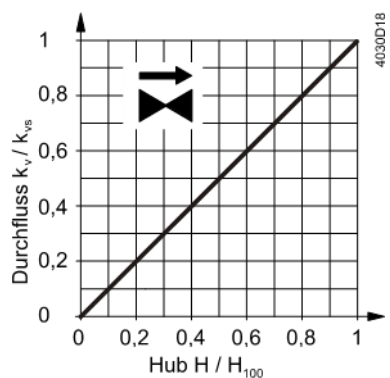
0...30 %: Linear

30...100 %: Equal percentage

$n_{gl} = 3$  to VDI / VDE 2173

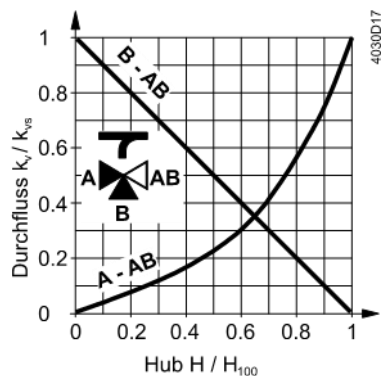
For high  $k_{vs}$  values the valve characteristic is optimized for maximum volumetric flow  $k_{v100}$ .

For product lines:  
VVF42.125-250  
VVF42.125-250K  
VVF42.150-400  
VVF42.150-360K



0...100 %: Linear

### 3-port valves



#### Throughport A-AB

0...30 %: Linear

30...100 %: Equal percentage

$n_{gl} = 3$  to VDI / VDE 2173

For high  $k_{vs}$  values the valve characteristic is optimized for maximum volumetric flow  $k_{v100}$ .

#### Bypass B-AB

0...100 %: Linear

Tor AB = constant flow

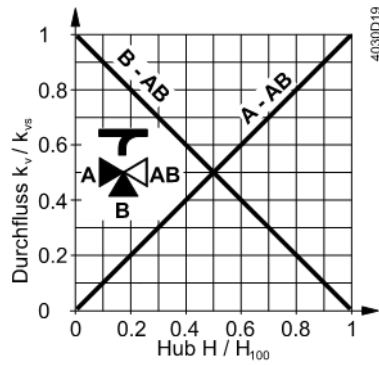
Tor A = variable flow

Tor B = bypass (variable flow)

**Mixing:** Flow from port a and port B to port AB

**Diverting:** Flow from port AB to port A and port B

For product lines:  
VXF42.125-250  
VXF42.150-400



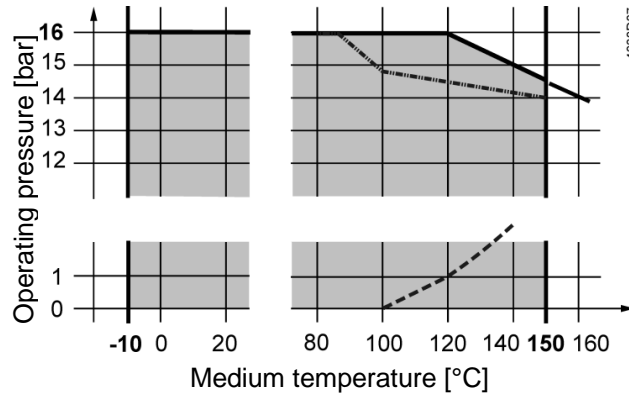
**Throughport A-AB**

0...100%: Linear

**Bypass B-AB**

0...100%: Linear

**Operating pressure and medium temperature Fluids, PN16 with V...F42..**



Curve for saturated steam; steam forms below this line



Operating pressure according to EN 1092-1, valid for 2-port valves with blank flange

**Operating pressure and operating temperatures according to ISO 7005, EN 1092, and EN 12284**

Notes

All relevant local directives must be observed.

**Medium compatibility and temperature ranges**

Medium	Temperature range		Type			Notes
	T <sub>min</sub> [°C]	T <sub>max</sub> [°C]	VVF42..	VVF42..K	VXF42..	
Cold water	1	25	x	x	x	-
Low-temp. hot water	1	130	x	x	x	-
High temp. hot water <sup>1)</sup>	130	150	x	x	x	-
	150	180	-	-	-	-
Water with antifreeze	-5	150	x	x	x	For medium temperatures below 0 °C, the stem heating ASZ6.6 has to be installed.
	-10	150	x	- <sup>3)</sup>	x	
	-20	150	-	-	-	
Cooling water <sup>2)</sup>	1	25	-	-	-	-
Brines	-5	150	x	x	x	For medium temperatures below 0 °C, the stem heating ASZ6.6 has to be installed.
	-10	150	x	- <sup>3)</sup>	x	
	-20	150	-	-	-	

Medium	Temperature range		Type			Notes
	T <sub>min</sub> [°C]	T <sub>max</sub> [°C]	VVF42..	VVF42..K	VXF42..	
Super-clean water (demineralized and deionized)	1	150	-	-	-	
Demineralized water according to VDI2035 / SWKI_BT102-01	1	150	x	x	x	

- 1) Differentiation due to saturated steam curve
- 2) Open circuits
- 3) VVF42..K valves cannot be used with media below -5 °C due to the compensation sealing material.

## Fields of use

Fields of use		Type		
		VVF42..	VVF42..K	VXF42..
<b>Generation</b>	Boiler plants	x	x	x
	District heating plants	x	x	-
	Refrigeration plants	x	x	x
<b>Distribution</b>	Heating groups	x	x	x
	Ventilation and air-handling units	x	x	x

## Notes

### Engineering

#### Mounting location

Preferably mount the valves at the return, as the temperature is lower there and the strain on the stem sealing gland is lower.

#### Dirt trap

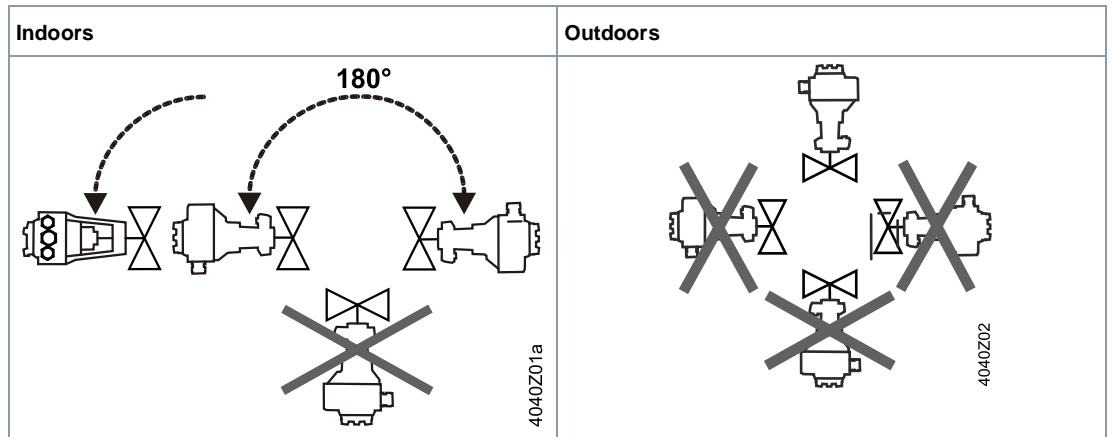
Mount a dirt filter or dirt trap before the valve to ensure the proper functioning and long service life of the valve. Remove dirt, welding beads, etc. from the valves and pipes.

#### Cavitation

Cavitation can be avoided by limiting the pressure differential across the valve depending on the medium temperature and prepressure.

## Mounting

### Mounting position



Mounting positions apply to both 2- and 3-port valves.

## Commissioning



**The valve may be put into operation only if actuator and valve are correctly assembled.**

Note

Ensure that the actuator stem and valve stem are rigidly connected in all positions.

Function check

Valve	Throughport A->AB	Bypass B->AB
Valve stem extends	Closes	Opens
Valve stem retracts	Opens	Closes

## Maintenance

The valves are equipped with maintenance-free, continuously lubricated stem sealing glands. See Accessories / Spare parts [▶ 6] for replacement stem sealing glands.

### **! CAUTION**



**When servicing valves or actuators:**

- Deactivate the pump and turn off the power supply.
  - Close the shutoff valves.
  - Fully reduce the pressure in the piping system and allow pipes to completely cool down.
- If necessary, disconnect the electrical wires.

## Disposal

---

Do not dispose of the valve as part of domestic waste.

- Special treatment for individual components may be required by law or make ecological sense.
- Comply with all local and currently applicable laws and regulations.

## Warranty

Application-related technical data are guaranteed only when the valves are used in connection with the Siemens actuators listed under "Type summary" and "Equipment combinations". When used with actuators of other manufacture, any warranty by Siemens becomes void.

Functional data		
PN class		PN 16
Connection		Flange
Operating pressures		See section "Operating pressure and medium temperature", page 11
Valve characteristic <sup>1)</sup>		See section "Valve characteristics", page 10
Leakage rate	Throughport	0...0.02% of $k_{VS}$ value
	Bypass	0.5...2% of $k_{VS}$ value ( $k_{VS} \geq 6.3$ ) 0.5...3% of $k_{VS}$ value ( $k_{VS}$ 1.6; 2.5; 4)
Permissible media		See table "Medium compatibility and temperature ranges", page 11
Medium temperatures		-10...150 °C
	VVF42..K	-5...150 °C
Rangeability	To DN 25	> 50
	From DN 32	>100
Nominal stroke	To DN 80	20 mm
	From DN 100	40 mm

Materials			
Valve body		EN-GJL-250	
Blank flange	VVF..	S235JRG2	
Valve stem		Stainless steel	
Seat		Machined	
Plug	VVF.., VXF..		Brass / bronze
	VVF..K..:	DN65, DN80	Brass / bronze
		DN50, DN100...150	Stainless steel
Stem sealing gland		Brass EPDM O-rings PTFE sleeve silicone-free grease	
Compensation sealing		Stainless steel FEPM (silicone-free)	

Standards, directives and approvals		
Pressure Equipment Directive		PED 2014/68/EU
Pressure-carrying accessories		Scope: Article 1, section 1 Definition: Article 2, section 5
Fluid group 2:		PN 16
	≤ DN 50	Without CE certification as per article 4, section 3 (sound engineering practice) <sup>2)</sup>
	DN 65...125	Category I, Module A, with CE-marking as per article 14, section 2

Standards, directives and approvals		
	DN 150	Category II, Module A2, with CE-marking as per article 14, section 2 notified body number 0036
EU conformity (CE)	DN 65...150	A5W00006523 <sup>3)</sup>
PN class		ISO 7268
Operating pressure		ISO 7005, DIN EN 12284
Flanges		ISO 7005
Length of flanged valves		DIN EN 558-1, line 1
Valve characteristic		VDI 2173
Leakage rate		Throughport, bypass according to EN 60534-4 / EN 1349
Water treatment		VDI 2035

Environmental conditions		
Storage		IEC 60721-3-1
	Class	1K3
	Temperature	-15...55 °C
	Rel. humidity	5...95 % r.h.
Transport		IEC 60721-3-2
	Class	2K3, 2M2
	Temperature	-30...65 °C
	Rel. humidity	< 95 % r.h.
Operation		IEC 60721-3-3
	Class	3K5, 3Z11
	Temperature	-15...+5 °C
	Rel. humidity	5...95 % r.h.

Environmental compatibility
The product environmental declarations CE1E4403en01 <sup>3)</sup> , CE1E4403en02 <sup>3)</sup> und CE1E4403en03 <sup>3)</sup> contain data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).

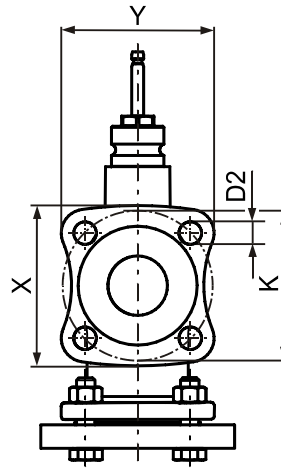
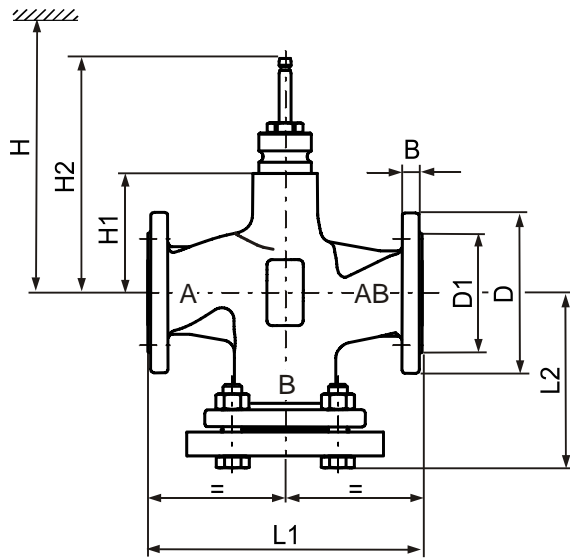
Dimensions / Weight
See "Dimensions", [▶ 17]

- 1) For certain valve lines and high  $k_{vs}$  values, the valve characteristic is optimized for maximum volumetric flow  $K_{V100}$ .
- 2) Valves where  $PS \times DN < 1000$  do not require special testing and cannot carry the CE label.
- 3) The documents can be downloaded from <http://www.siemens.com/bt/download>.

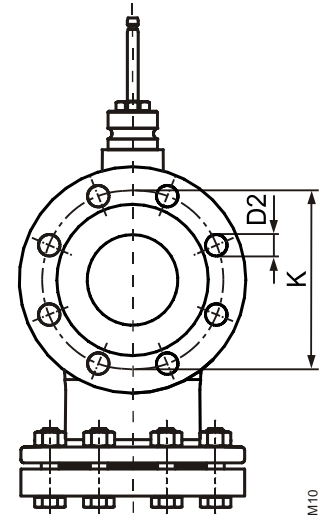


Dimensions

VVF42..  
VVF42..K



DN 15..DN 65

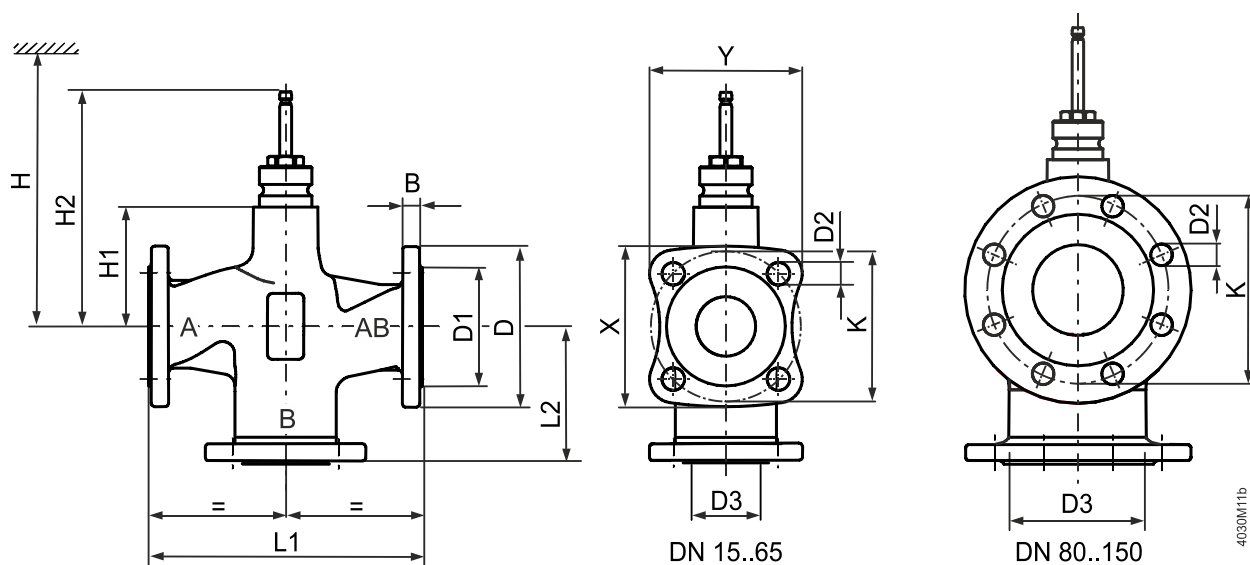


DN 80..DN 150

4030M10

Type	DN	kg	B	Ø D	Ø D1	Ø D2	L1	L2	X	Y	Ø K	H1	H2	H				
														SAX..	SKD..	SKB..	SAV..	SKC..
VVF42..	15	3.7	14	95	46	14 (4x)	130	86	79	76	65	37	133.5	479	537	612	-	-
	20	4.7	16	105	56	14 (4x)	150	97	86.6	83	75	37	133.5	479	537	612	-	-
	25	5.4	15	115	65	14 (4x)	160	106.5	94.4	90.1	85	37	133.5	479	537	612	-	-
	32	8.4	17	140	76	19 (4x)	180	119	115.6	110.7	100	37	133.5	479	537	612	-	-
	40	9.3	16	150	84	19 (4x)	200	126	123.2	117.8	110	37	133.5	479	537	612	502	-
	50	12.2	16	165	99	19 (4x)	230	144	135.2	128.4	125	50	146.5	492	550	625	525	-
	65	17	17	185	118	19 (4x)	290	174	150	142.5	145	75	171.5	517	575	650	540	-
	80	25	17	200	132	19 (8x)	310	186	-	-	160	75	171.5	517	575	650	540	-
	100	35.9	17	220	156	19 (8x)	350	205	-	-	180	110	226.5	-	-	-	575	685
	125	52.5	17	250	184	19 (8x)	400	233	-	-	210	123	239.5	-	-	-	588	698
VVF42..K	150	74.9	17	284	211	23 (8x)	480	275.5	-	-	240	150.5	267	-	-	-	616	726
	50	12	16	165	99	19 (4x)	230	144	135.2	128.4	125	50	146.5	492	550	625	-	-
	65	17.7	17	185	118	19 (4x)	290	174	150	142.5	145	75	171.5	517	575	650	-	-
	80	26.8	17	200	132	19 (8x)	310	186	-	-	160	75	171.5	517	575	650	-	-
	100	35.3	17	220	156	19 (8x)	350	206	-	-	180	110	226.5	-	-	-	575	685
	125	51.6	17	250	184	19 (8x)	400	233	-	-	210	123	239.5	-	-	-	588	698
	150	74.8	17	284	211	23 (8x)	480	275.5	-	-	240	150.5	267	-	-	-	616	726

## VXF42..



Type	DN	kg	B	Ø D	Ø D1	Ø D2	Ø D3 <sup>1)</sup>	L1	L2	X	Y	Ø K	H1	H2	H				
															SAX..	SKD..	SKB..	SAV..	SKC..
VXF42..	15	2.6	14	95	46	14 (4x)	23	130	65	79	76	65	37	133.5	479	537	612	-	-
	20	3.3	16	105	56	14 (4x)	29	150	75	86.6	83	75	37	133.5	479	537	612	-	-
	25	3.8	15	115	65	14 (4x)	36	160	80	94.4	90.1	85	37	133.5	479	537	612	-	-
	32	5.7	17	140	76	19 (4x)	46	180	90	115.6	110.7	100	37	133.5	479	537	612	-	-
	40	6.3	16	150	84	19 (4x)	56	200	100	123.2	117.8	110	37	133.5	479	537	612	502	-
	50	8.7	16	165	99	19 (4x)	69	230	115	135.2	128.4	125	50	146.5	492	550	625	525	-
	65	12.9	17	185	118	19 (4x)	85	290	150	150	142.5	145	75	171.5	517	575	650	540	-
	80	19.2	17	200	132	19 (8x)	102	310	155	-	-	160	75	171.5	517	575	650	540	-
	100	29	17	220	156	19 (8x)	124	350	175	-	-	180	110	226.5	-	-	-	575	685
	125	43.2	17	250	184	19 (8x)	149	400	200	-	-	210	123	239.5	-	-	-	588	698
	150	62.1	17	284	211	23 (8x)	174	480	240	-	-	240	150.5	267	-	-	-	616	726

1) Interior opening of the bypass port

## Revision numbers

Type	Valid from rev. no.	Type	Valid from rev. no.
VVF42.15-1.6	..A	VXF42.15-1.6	..A
VVF42.15-2,5	..A	VXF42.15-2.5	..A
VVF42.15-4	..A	VXF42.15-4	..A
VVF42.20-6.3	..A	VXF42.20-6.3	..A
VVF42.25-6.3	..A	VXF42.25-6.3	..A
VVF42.25-10	..A	VXF42.25-10	..A
VVF42.32-16	..A	VXF42.32-16	..A
VVF42.40-16	..A	VXF42.40-16	..A
VVF42.40-25	..A	VXF42.40-25	..A
VVF42.50-31.5	..A	VXF42.50-31.5	..A
VVF42.50-40	..A	VXF42.50-40	..A
VVF42.65-50	..A	VXF42.65-50	..A
VVF42.65-63	..A	VXF42.65-63	..A
VVF42.80-80	..A	VXF42.80-80	..A
VVF42.80-100	..A	VXF42.80-100	..A
VVF42.100-125	..D	VXF42.100-125	..D
VVF42.100-160	..D	VXF42.100-160	..D
VVF42.125-200	..D	VXF42.125-200	..D
VVF42.125-250	..D	VXF42.125-250	..D
VVF42.150-300	..D	VXF42.150-300	..D
VVF42.150-400	..D	VXF42.150-400	..D
VVF42.50-40K	..B		
VVF42.65-63K	..A		
VVF42.80-100K	..A		
VVF42.100-160K	..B		
VVF42.125-250K	..B		
VVF42.150-360K	..B		

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ACVATIX™

## 2-port and 3-port valves, externally threaded, PN16

VVG44.., VXG44..

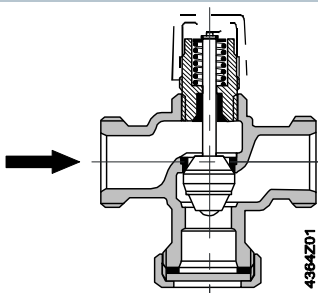


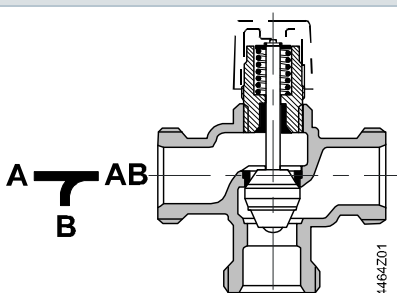
**In small and medium-sized heating, ventilating and air conditioning systems as a control valve for mixing and diverting functions or as a shutoff valve. For closed circuits only.**

- Housing made of bronze CC499K
- DN 15...40
- $k_{vs}$  0.25...25 m<sup>3</sup>/h
- Flat sealing, externally threaded connections G..B, as per ISO 228-1
- Siemens can deliver fitting sets ALG.. with threaded connection and ALS.. with welded connection
- Manual adjustment by means of mounted knob
- Can be equipped with motorized SAS.. actuators

**Design**

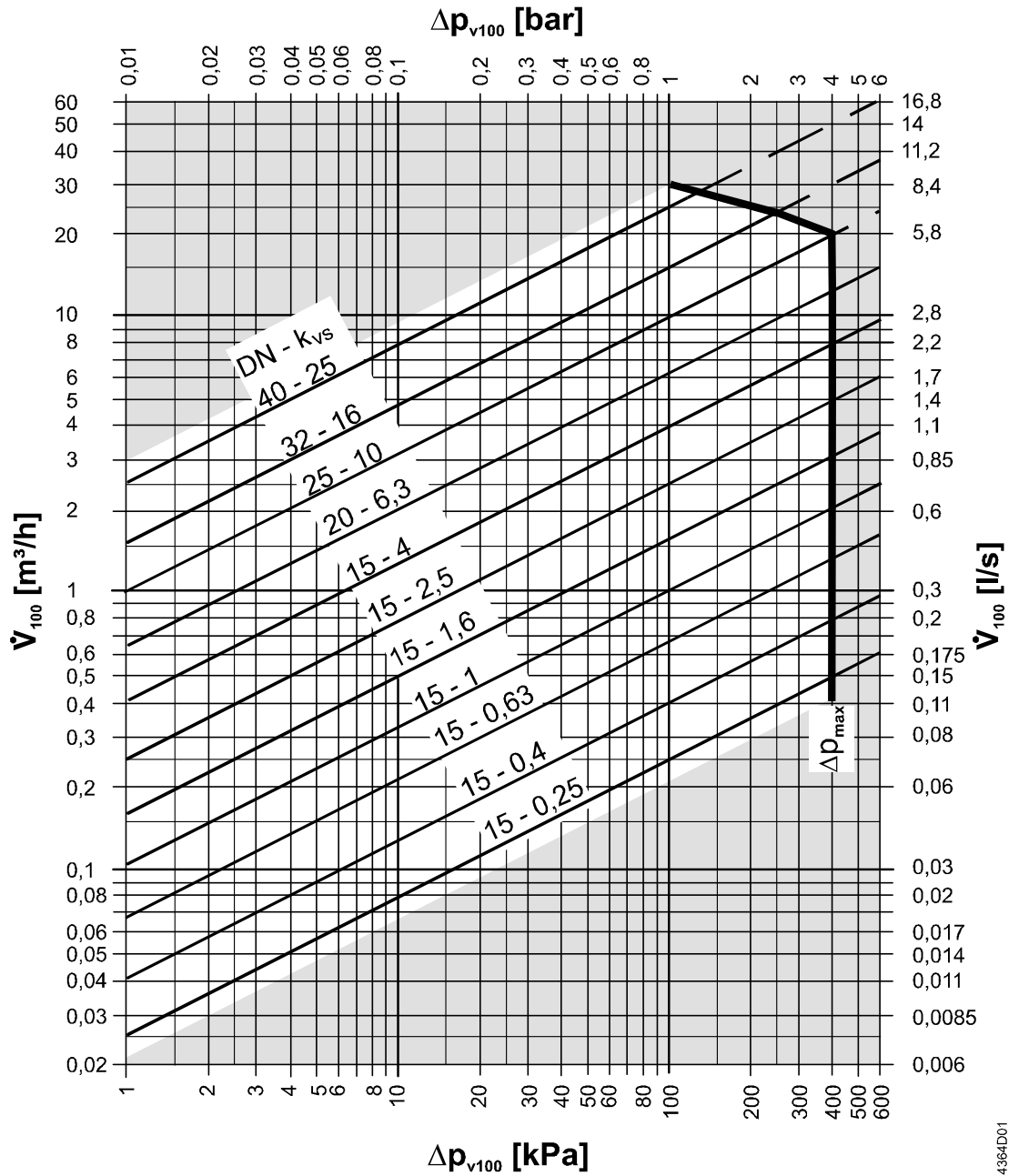
Valve cross-section:

<b>VVG44..</b>	
	<p>Guided parabolic plug, integrated in the valve stem.</p> <p>The seat is pressed to the valve body with the aid of special gland material.</p>
<p>Caution: The 2-port seat valve does not become a three-port valve by removing the cover plate!</p>	

<b>VXG44..</b>	
	<p>Guided parabolic plug (as of DN25) which is integrated in the valve stem.</p> <p>The seat is fitted in the through-port and attached directly to the valve body in the bypass.</p> <p>From DN25, the seat in the through-port is attached directly to the valve body and fitted to the ring in the bypass.</p>

## Sizing

Flow diagram:



$\Delta p_{max}$  = Maximum permissible differential pressure across the valve  
(VXG44..: mixing port: Ports A-AB, B-AB, diverting: Ports AB-A, AB-B),  
valid for the entire actuating range valve-actuator unit

$\Delta p_{v100}$  = Differential pressure across the fully open valve and the valve's control path  
(VXG44..: A - AB, B - AB) at a volume flow  $V_{100}$

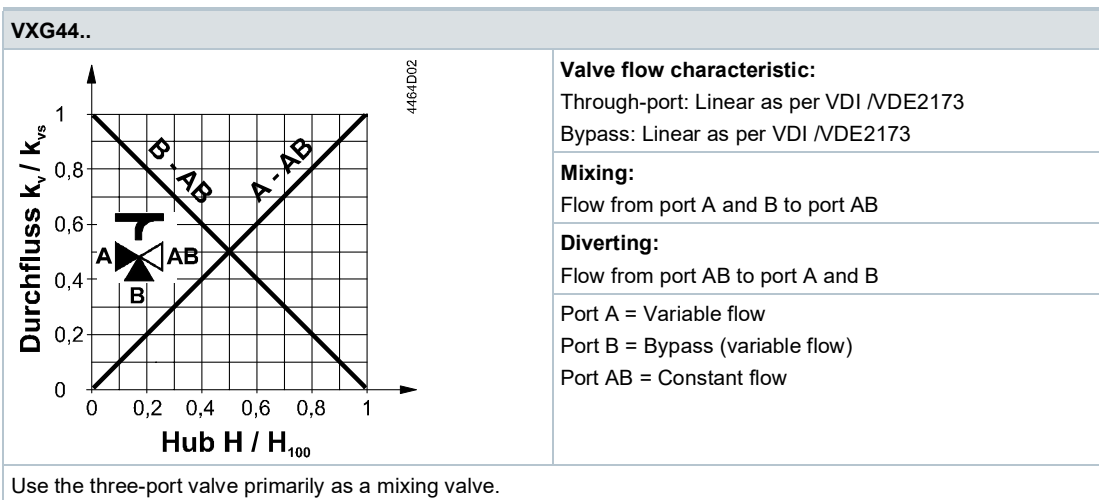
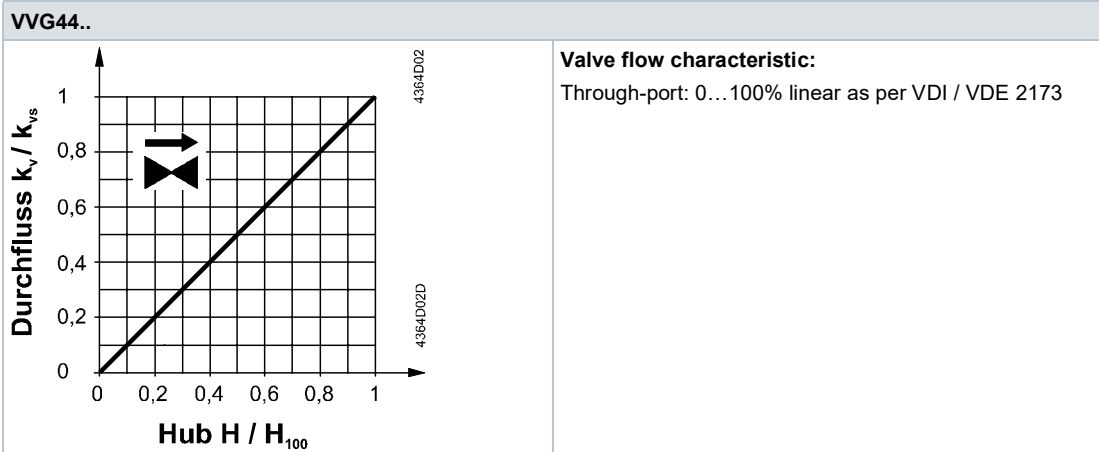
$V_{100}$  = Volume flow through the fully open valve ( $H_{100}$ )

100 kPa = 1 bar  $\approx$  10 mWS

1  $m^3/h$  = 0.278  $l/s$  water at 20 °C

4384D01

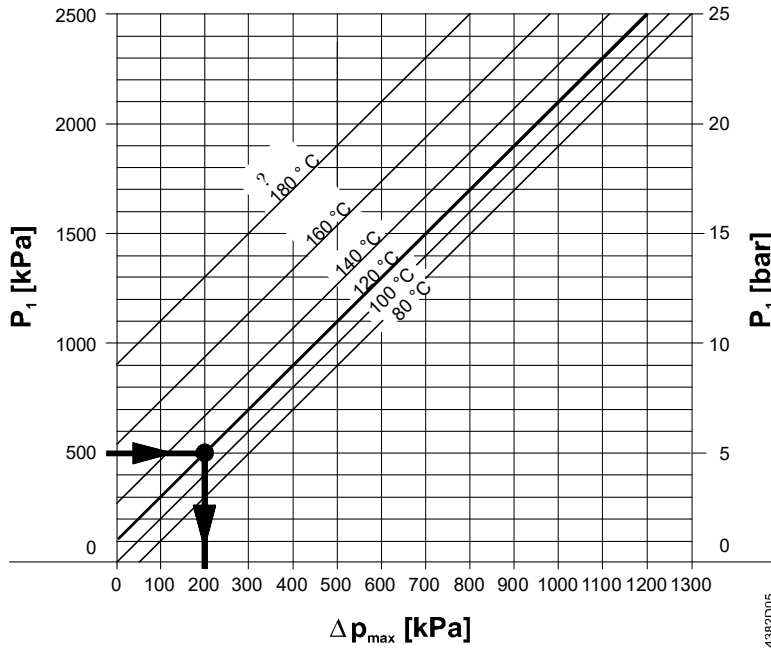
## Valve flow characteristic





## Cavitation

Cavitation increases wear and tear on the parabolic plug and seat and results in unwanted noise. Cavitation can be prevented by not exceeding the differential pressures as per the flow diagram and maintaining the static pressures depicted below.



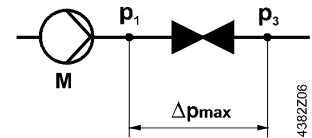
$\Delta p_{\max}$  = Differential pressure at a nearly closed valve to largely avoid cavitation

$p_1$  = Static pressure and the valve inlet

$P_3$  = Static pressure and the valve outlet

M Pump

J Water temperature



Example with hot water:

Pressure  $p_1$  at valve inlet: 500 kPa (5 bar)

Water temperature: 120 °C

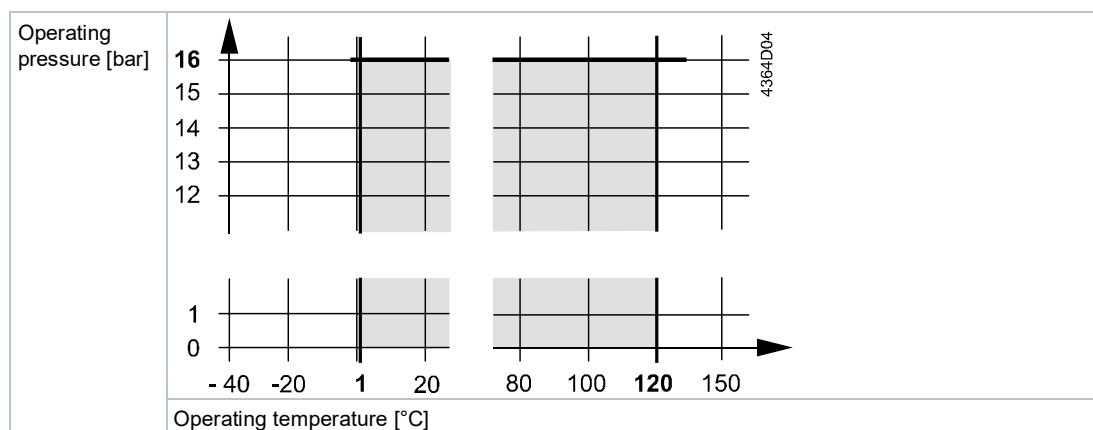
The above diagram clearly indicates that the maximum permissible differential pressure is  $\Delta p_{\max} \rightarrow 200$  kPa (2 bar) at a nearly closed valve.

Note on chilled water applications

To prevent cavitation in chilled water circuits, sufficient counter pressure must be supplied to the valve output, e.g. using an additional butterfly valve downstream of the valve. Maximum permissible differential pressure over the valve: See 80 °C curve in the above diagram.

## Operating pressure and operating temperature

Liquids:



Operating pressure and medium temperature per ISO 7005  
(Observe all local and applicable laws).

### Type summary

Type	DN	$k_{vs}$	$S_v$	
		[m <sup>3</sup> /h]		
VVG44.15-0.25 VXG44.15-0.25	15	0.25	>50	
VVG44.15-0.4 VXG44.15-0.4		0.4		
VVG44.15-0.63 VXG44.15-0.63		0.63		
VVG44.15-1 VXG44.15-1		1		
VVG44.15-1.6 VXG44.15-1.6		1.6		>100
VVG44.15-2.5 VXG44.15-2.5		2.5		
VVG44.15-4 VXG44.15-4	4			
VVG44.20-6.3 VXG44.20-6.3	20	6.3		
VVG44.25-10 VXG44.25-10	25	10	>100	
VVG44.32-16 VXG44.32-16	32	16		
VVG44.40-25 VXG44.40-25	40	25		

DN = Nominal size

$k_{vs}$  = Flow nominal value for cold water (5...30 °C) through a fully opened valve (H100), at a differential pressure of 100 kPa (1 bar)

$S_v$  = Rangeability  $k_{vs} / k_{vr}$

$k_{vr}$  = Smallest  $k_v$  value at which the characteristic curve tolerance is still maintained, at a differential pressure of 100 kPa (1 bar)

**Fittings**

Type	Stock number	Description
ALG..2	BPZ:ALG..2	2 piece fittings set for 2-port valves, existing of 2 cap nuts, 2 insert nuts, and 2 flat seals. ALG..2B are fittings made of brass for media temperatures up to 100 °C
ALG..2B	S55846-Z1..	
ALG..3	BPZ:ALG..3	3 piece fittings set for 3-port valves, existing of 3 cap nuts, 3 insert nuts, and 3 flat seals. ALG..3B are fittings made of brass for media temperatures up to 100 °C
ALG..3B	S55846-Z1..	
ALS..2	BPZ:ALS..	2 piece on pipe fittings set with welded connection for 2-port valves, existing of 2 cap nuts, 2 insert nuts, and 2 flat seals

**Filter**

Installed upstream of the valve:

Type	Stock number	Description	DN	Mesh width [mm]
ALX15	S55845-Z174	Filter with internal threading	15	0.5
ALX20	S55845-Z175	Filter with internal threading	20	0.8
ALX25	S55845-Z176	Filter with internal threading	25	0.8
ALX32	S55845-Z177	Filter with internal threading	32	0.8
ALX40	S55845-Z178	Filter with internal threading	40	0.8
ALX50	S55845-Z179	Filter with internal threading	50	0.8

## Equipment combinations

Valves	SAS.. actuators	
	Dp <sub>max</sub> Mixing <sup>1)</sup>	Dp <sub>s</sub> Diverting <sup>1)</sup>
	[kPa]	[kPa]
VVG44.15-0.25	400	1600
VVG44.15-0.4		
VVG44.15-0.63		
VVG44.15-1		725
VVG44.15-1.6		
VVG44.15-2.5		
VVG44.15-4		400
VVG44.20-6.3		
VVG44.25-10		
VVG44.32-16	250	250
VVG44.40-25	125	125
VXG44.15-0.25	400	100
VXG44.15-0.4		
VXG44.15-0.63		
VXG44.15-1		
VXG44.15-1.6		
VXG44.15-2.5		
VXG44.15-4		
VXG44.20-6.3		
VXG44.25-10		
VXG44.32-16		250
VXG44.40-25	125	35

<sup>1)</sup> = Three-port valves only: If noise is permitted, the same values apply as for a mixing valve

Valves	Fittings set			
	Threaded connection			Welded connection
	Malleable cast iron	Brass <sup>1)</sup>		Steel
	Type / Item NO.	Type	Item NO.	Type / Item NO.
VVG44.15-0.25	ALG152	ALG152B	S55846-Z100	ALS202
VVG44.15-0.4				
VVG44.15-0.63				
VVG44.15-1				
VVG44.15-1.6				
VVG44.15-2.5				
VVG44.15-4				
VVG44.20-6.3	ALG202	ALG202B	S55846-Z102	ALS252
VVG44.25-10	ALG252	ALG252B	S55846-Z104	-
VVG44.32-16	ALG322	ALG322B	S55846-Z106	-
VVG44.40-25	ALG402	ALG402B	S55846-Z108	-
VXG44.15-0.25	ALG153	ALG153B	S55846-Z101	-
VXG44.15-0.4				
VXG44.15-0.63				
VXG44.15-1				
VXG44.15-1.6				
VXG44.15-2.5				
VXG44.15-4				
VXG44.20-6.3	ALG203	ALG203B	S55846-Z103	-
VXG44.25-10	ALG253	ALG253B	S55846-Z105	-
VXG44.32-16	ALG323	ALG323B	S55846-Z107	-
VXG44.40-25	ALG403	ALG403B	S55846-Z109	-

<sup>1)</sup> Medium temperature: Maximal 100 °C

$\Delta p_{\max}$  = Maximum permissible differential pressure over the valve control path, valid for the entire positioning range of the valve-actuator unit; if low noise operation is desired, we recommend a differential pressure of 200 kPa

$\Delta p_s$  = Maximum permissible differential pressure (closing pressure) at which the valve-actuator unit securely closes against the pressure

## Actuators: Overview

Typ3	Stock number	Operating voltage	Positioning		Spring return		Data sheet
			Signal	Time		Signal	
SAS31.00	S55158-A106	AC 230 V	3-position	120 s	-	-	N4581
SAS31.03	S55158-A107			30 s			
SAS31.50	S55158-A108			120 s	ja	< 28 s	
SAS31.53	S55158-A109			30 s	ja	< 14 s	
SAS61.03 <sup>1)</sup>	S55158-A100	AC/DC 24 V	DC 0...10 V DC 4...20 mA 0...1000 Ω Modbus RTU	30 s	-	-	
SAS61.03U <sup>2)</sup>	S55158-A100-A100						
SAS61.03/MO	S55158-A121						
SAS61.33 <sup>1)</sup>	S55158-A101			DC 0...10 V DC 4...20 mA 0...1000 Ω Modbus RTU	ja	< 14 s	
SAS61.33U <sup>2)</sup>	S55158-A101-A100						
SAS61.33U/MO	S55158-A122						
SAS61.53 <sup>1)</sup>	S55158-A102						
SAS81.00 <sup>1)</sup>	S55158-A103	AC/DC 24 V	3-position	120 s	-	-	
SAS81.00U <sup>2)</sup>	S55158-A103-A100			30 s			
SAS81.03 <sup>1)</sup>	S55158-A104						
SAS81.03U <sup>2)</sup>	S55158-A104-A100			ja	< 14 s		
SAS81.33 <sup>1)</sup>	S55158-A105						
SAS81.33U <sup>2)</sup>	S55158-A1105-A100						

<sup>1)</sup> Approbation CE+UL

<sup>2)</sup> Approbation CE+UL, cable gland: ½" (UL514C)

## Ordering

Please indicate material, article type, order text, and quantity; example:

Material	Article type	Order text	Quantity
VVG44.25-10	VVG44.25-10	Valve.	3
ALG252B	S55846-Z104	Fitting sets	3

## Delivery


Valves, rotary actuators, and mounting kits are not assembled and are delivered in individual packaging and without a minimum order size.


## Product documentation

Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following Internet address:

<http://siemens.com/bt/download>

## Safety

	<b>⚠ DANGER</b>
	<p><b>There is a risk to operating personnel and device when working on the unit</b></p> <p>Failure to comply with these safety notes can result in personal injury and damage to property from pipe pressure, electrical voltage, or device in operation.</p> <p><input type="checkbox"/> Note the following when servicing a valve/actuator:</p> <ul style="list-style-type: none"> <li>● Switch off both pump and operating voltage.</li> <li>● Close shutoff valves.</li> <li>● Release pressure in the pipes and allow them to cool down completely.</li> <li>● Disconnect electrical connections from the terminals as needed.</li> <li>● The actuator must be properly installed or manually adjusted prior to recommissioning the valve.</li> </ul>

	<b>⚠ CAUTION</b>
	<p><b>National safety regulations</b></p> <p>Failure to comply with national safety regulations may result in personal injury and property damage.</p> <ul style="list-style-type: none"> <li>● Observe national provisions and comply with the appropriate safety regulations.</li> </ul>

## Engineering

We recommend installing the valve with spring return since temperatures are lower on heating plants which increases the lifespan of the sealing gland on the stem.

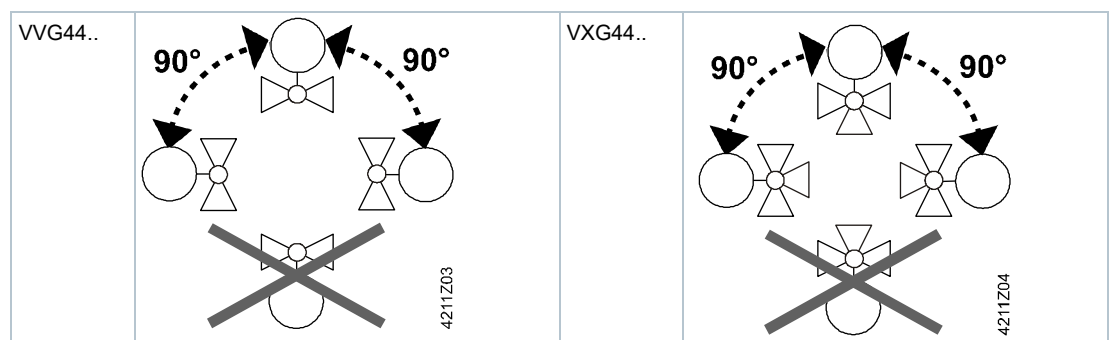
A filter must be installed upstream of the valve to increase functional safety.

## Mounting

It is easy to assemble the valve and actuator; it can be done at the construction site. No special tools or settings required.

Valve VVG44.. / VXG44.. is supplied with Mounting instructions M4364 (4 319 9564 0).

## Mounting position



### Pipe connection


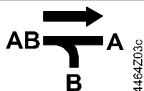
Avoid leakage:

- Install fittings as per ISO 7-1.
- Do not use too much hemp or PTFE tape.
- Do not tighten pipe threading to "the very end".

### Flow direction

Make sure that the valve is mounted in the proper flow direction. A symbol is applied to the valve body:

<b>VVG44.. :</b>	
Flow direction:	

<b>VXG44.. :</b>			
Mixing A / B to AB:		Diverting AB to A / B:	

### Commissioning

The actuator must be properly mounted or manually adjusted before commissioning the valve.

<b>VVG44..</b>	
Turn the manual adjuster clockwise:	Valve opening = Increasing flow
Turn the manual adjuster counter clockwise:	Valve closing = Decreasing flow

<b>VXG44..</b>	
Turn the manual adjuster clockwise:	Through-put A – AB opens, bypass B closes
Turn the manual adjuster counter clockwise:	Through-put A – AB closes, bypass B opens



### Maintenance

Valves VVG44.. and VXG44.. are maintenance free.

#### Stem sealing gland

The stem sealing gland cannot be exchanged. The entire valve must be replaced in the event of leakage. Contact your local Siemens office or branch for information.

### Disposal

	<b>⚠ WARNING</b>
	<p><b>Tensioned return spring</b> Opening the valve housing can release the tensioned return spring resulting in flying parts that may cause injury.</p> <ul style="list-style-type: none"> <li>• Do not open the valve body.</li> </ul>
	<p>The valve is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.</p> <ul style="list-style-type: none"> <li>• Dispose of the valve through channels provided for this purpose.</li> <li>• Comply with all local and currently applicable laws and regulations.</li> </ul>



## Warranty

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

## Technical data

Functional data		
	VVG44..	VXG44..
PN class	PN 16 per ISO 7268	
Operating pressure	Per ISO 7005 within the permissible media temperature as per Section Technical design [→ 2]	
Characteristic curve 0...100 %	linear as per VDI / VDE 2173	
Leakage rate	0...0.02 % of $k_{vs}$ value per DIN EN 1349	0...0.02 % of $k_{vs}$ value per DIN EN 1349 (through-put and bypass)
Permissible media	Chilled water, hot water, water with frost temperature. Recommendation: Water treatment per VDI 2035	
Medium temperature <sup>1)</sup>	1...120 °C	
Rangeability $S_v$	DN 15: >50 or >100, see Section Type overview [→ 6] DN ≥20: >100	
Nominal stroke	5.5 mm	

Materials	
Housing	Bronze CC499K
Seat in through-put	CrNi steel, bronze (worked directly into housing) or Messing
Seat in bypass (VXG44.. only)	Bronze (worked directly into housing) or brass
Plug	CrNi steel or brass
Stem	CrNi steel
Sealing gland	Brass
Gland materials	EPDM-O rings

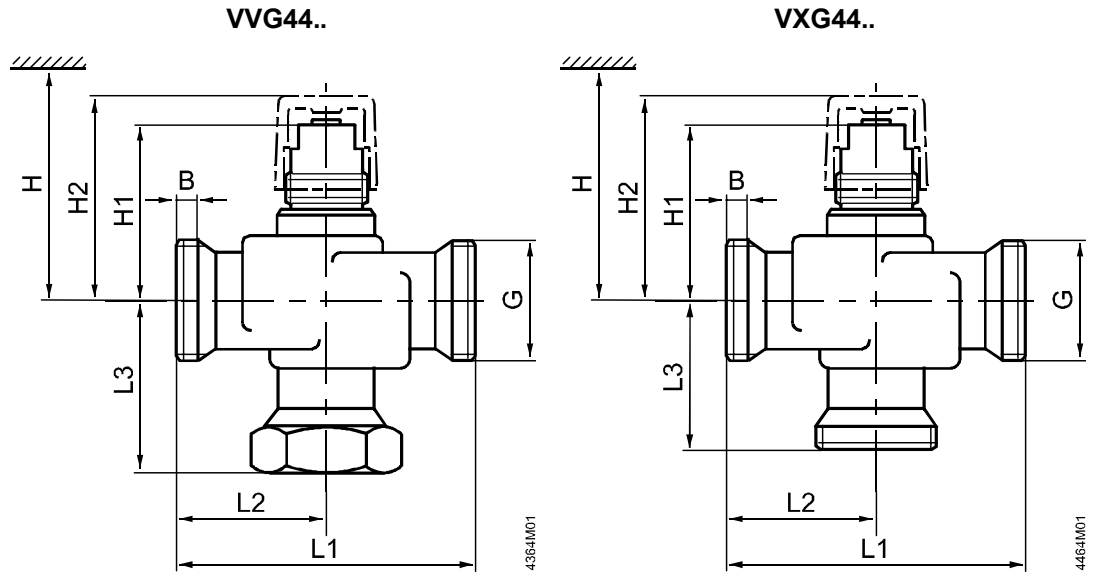
Dimensions / Weight	
See Dimensions [→ 14]	
Connections with external threading	G..B per ISO 228-1
Actuator fixing	G ¾"

Standards, directives and approvals	
Pressure Equipment Directive	DGR 2014/68/EU
Pressure accessories	Range: Article 1, para. 1 Definition: Article 2, para. 5
Fluid group 2	Without CE certification as per article 3, para. 3 (generally applicable engineering practice) <sup>2)</sup>
EAC compliance	Eurasian compliance
Environmental compatibility	Environmental Declaration CE1E4364en <sup>3)</sup> contains data on environmental-compatible product design and assessment (RoHS compliance, compositions, packaging, environmental benefits and disposal).

<sup>1)</sup> With ALG..B fitting up to 100 °C

<sup>2)</sup> Fittings for a product where  $PS \times DN < 1000$ , do not require special testing and cannot have CE labeling

<sup>3)</sup> See Section Product documentation [→ 10]



DN = Nominal size

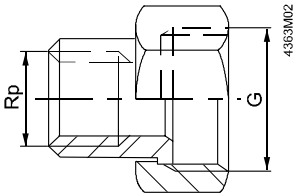
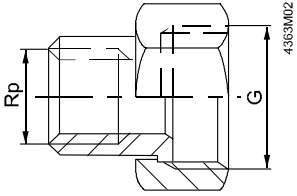
H = Total height of actuator plus minimum mounting distance to wall or ceiling, for mounting, connection, operation, maintenance, etc.

H1 = Dimension from the pipe to the center to install actuator (upper edge)

H2 = Pipe center to the upper edge of the manual adjustment button, valve is in the "closed" position

Valve type	DN	B	G	L1	L2	L3	H1	H2	H	Weight
		mm	Inch	mm	mm	mm	mm	mm	SAS..	kg
VVG44.15-0.25	15	8,5	G 1B	100	50	58	45	55	>381	0.65
VVG44.15-0.4										
VVG44.15-0.63										
VVG44.15-1		12				59	63	0.67		
VVG44.15-1.6										
VVG44.15-2.5										
VVG44.15-4										
VVG44.20-6.3	20	9	G 1¼B	105	52.5	59	68	78	>396	1.0
VVG44.25-10	25	11	G 1½B			62.5	71	81	>399	1.48
VVG44.32-16	32	11	G 2B	130	65	63.5	77.5	87.5	>406	1.95
VVG44.40-25	40		G 2¼B			76	80.5	90.5	>409	2.75
VVG44.15-0.25	15		8,5			G 1B	100	50	50	45
VVG44.15-0.4										
VVG44.15-0.63										
VVG44.15-1		12		59	63				0.59	
VVG44.15-1.6										
VVG44.15-2.5										
VVG44.15-4										
VVG44.20-6.3	20	9	G 1¼B	105	52.5	59	68	78	>396	0.90
VVG44.25-10	25	11	G 1½B			62.5	71	81	>399	1.30
VVG44.32-16	32	11	G 2B	130	65	63.5	77.5	87.5	>406	1.74
VVG44.40-25	40		G 2¼B			76	80.5	90.5	>409	2.39

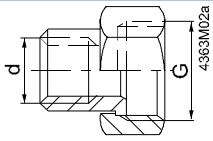
## Fittings

	Type	Article no.	Type	Article no.	For valve type	G	Rp
						[inch]	[inch]
	ALG152	BPZ:ALG152	ALG152B	S55846-Z100	VVG44.15..	G 1	Rp ½
	ALG202	BPZ:ALG202	ALG202B	S55846-Z102	VVG44.20	G 1¼	Rp ¾
	ALG252	BPZ:ALG252	ALG252B	S55846-Z104	VVG44.25	G 1½	Rp 1
	ALG322	BPZ:ALG322	ALG322B	S55846-Z106	VVG44.32	G 2	Rp 1¼
	ALG402	BPZ:ALG402	ALG402B	S55846-Z108	VVG44.40	G 2¼	Rp 1½
	ALG153	BPZ:ALG153	ALG153B	S55846-Z101	VXG44.15..	G 1	Rp ½
	ALG203	BPZ:ALG203	ALG203B	S55846-Z103	VXG44.20	G 1¼	Rp ¾
	ALG253	BPZ:ALG253	ALG253B	S55846-Z105	VXG44.25	G 1½	Rp 1
	ALG323	BPZ:ALG323	ALG323B	S55846-Z107	VXG44.32	G 2	Rp 1¼
	ALG403	BPZ:ALG403	ALG403B	S55846-Z109	VXG44.40	G 2¼	Rp 1½

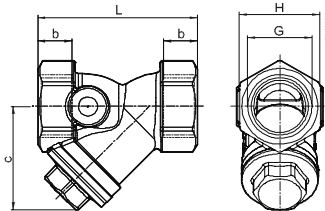
- Valve side with cylindrical threading per ISO 228-1

- Pipe side with cylindrical threading per ISO 7-1

- ALG..B fittings up to 100 °C medium temperature

	Type	Article no.	For valve type	G	Rp
				[inch]	[inch]
	ALS202	BPZ:ALS202	VVG44.15..	G 1	26.8
	ALS252	BPZ:ALS252	VVG44.20	G 1¼	33.7
	-	-	VVG44.25	-	-
	-	-	VVG44.32	-	-
	-	-	VVG44.40	-	-

## Filter

	Type	DN	b	c	G	L	H	K <sub>vs</sub>	Weight
			mm	mm	Inch <sup>1)</sup>	mm	mm		kg
	ALX15	15	12	38	G ½	54	27	3.5	0.178
	ALX20	20	15	43	G ¾	67	34	5.8	0.290
	ALX25	25	16	53	G 1	79	41	9.1	0.410
	ALX32	31	17	64	G 1¼	98	51	19	0.680
	ALX40	40	18	70	G 1½	106	57	24	0.874
	ALX50	50	20	85	G 2	122	69	36	1.428

<sup>1)</sup> ISO 228-1

## Replacement parts

Type	Item no.	Designation	Quantity
74 676 0273 0	74 676 0273 0	Rotary knob for small-stroke valves	10

## Revision numbers

Type	Valid from rev. no.	Type	Valid from rev. no.
<b>VVG44.. 2-port</b>		<b>VXG44.. 3-port</b>	
VVG44.15-0.25	..A	VXG44.15-0.25	..A
VVG44.15-0.4	..A	VXG44.15-0.4	..A
VVG44.15-0.63	..A	VXG44.15-0.63	..A
VVG44.15-1	..A	VXG44.15-1	..A
VVG44.15-1.6	..A	VXG44.15-1.6	..A
VVG44.15-2.5	..A	VXG44.15-2.5	..A
VVG44.15-4	..A	VXG44.15-4	..A
VVG44.20-6.3	..A	VXG44.20-6.3	..A
VVG44.25-10	..A	VXG44.25-10	..A
VVG44.32-16	..A	VXG44.32-16	..A
VVG44.40-25	..A	VXG44.40-25	..A

# B28

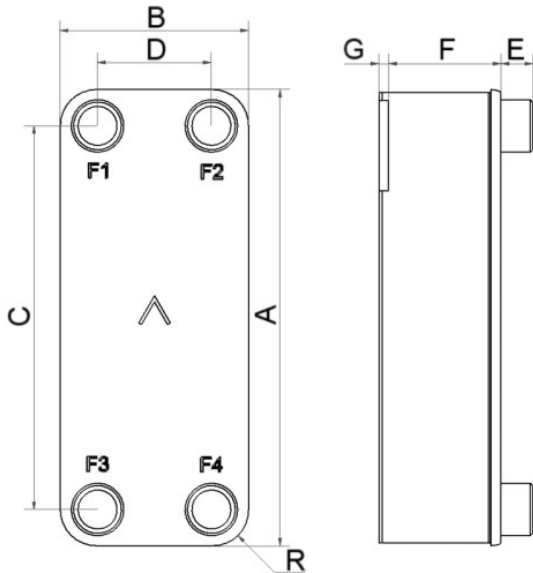
The B28 has been specially designed for one-phase applications, and has been tailored to cover the capacities and specifications of district heating substations, radiator circuits, and tap water heating applications over a wide capacity range. The B28 is also optimal for oil cooling.



## Basic specifications

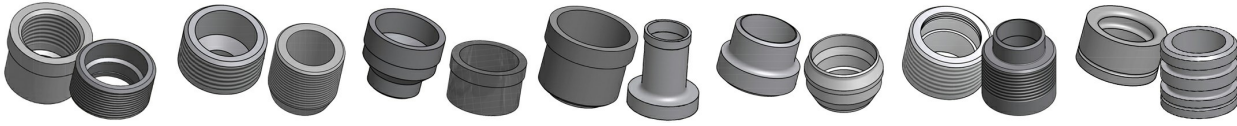
Maximum number of plates (NoP)	140
Max flow	16.9 m³/h (74.41 gpm)
Channel volume	0.116/0.116 dm³ (0.0041/0.0041 ft³)
Material	316/316L stainless steel plates, copper brazing
Weight excl. connections	2.09+(0.164*NoP) kg 4.61+(0.362*NoP) lb
Max Particle Size (mm)	1

## Standard dimensions



#	MM	IN
A	526	20.71
B	119	4.69
C	470	18.5
D	63	2.48
F	4,00+2,24*(NoP)	0.16+0.09*(NoP)
G	6	0.24
R	23	0.91
E_1	27	1.06
E_2	45	1.77

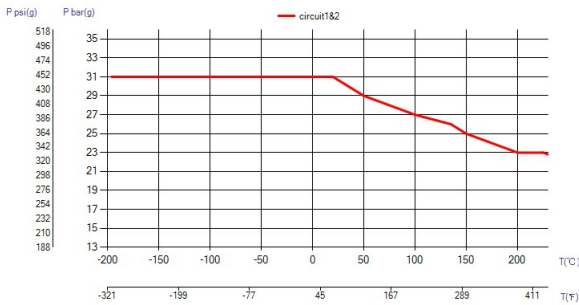
## Available connections



Threaded Connection Threaded Ultra High Approved Victaulic Connection Solder Connection Weld Connection Combo Connection O-Ring Connection

\*For specific dimensions, or information about other types of connections, please contact your SWEP sales representative.

## PED Pressure / Temperature



## Product Concept

The Brazed Plate Heat Exchanger (BPHE) is constructed as a plate package of corrugated channel plates with a filler material between each plate. During the vacuum brazing process, the filler material forms a brazed joint at every contact point between the plates, creating complex channels. The BPHE allows media at different temperatures to come into close proximity, separated only by channel plates that enable heat from one media to be transferred to the other with very high efficiency. The concept is similar to other plate and frame technology, but without the gaskets and frame parts.

## 3rd party Approvals

Most SWEP products are approved by below listed certification organizations: Europe, Pressure Equipment Directive (PED) America, Underwriters Laboratories Inc (UL) Japan, Kouatsu-Gas Hoan Kyoukai (KHK) Additionally SWEP holds approvals from a vast variety of other certification organizations. For more details please contact your local SWEP representative. SWEP reserves the right to make changes without prior notice.

## Find product solution - SSP

With SWEP's unique SSP, the SWEP Software Package, you can do advanced heat transfer calculations yourself. It's also easy to choose connections and generate drawings of the complete product. If you would like advice, SWEP offers all the service and support you need. Several SWEP accessories are also available to fulfill additional needs.

## Disclaimer

The information and recommendations in regards to the products are presented in good faith, however, SWEP makes no representations or warranties as to the completeness or accuracy of the information. Information is supplied upon the condition that the purchasers will make their own determination as to the products' suitability for their purposes prior to use. Purchasers should note that the properties of the products are both application and material selection dependent and that products containing stainless steel are still object to corrosion if used in unsuitable environments. Standard data is presented, product variants with different data may exist. Contact your SWEP sales representative for more details. SWEP may change any data without notice.

# B35T

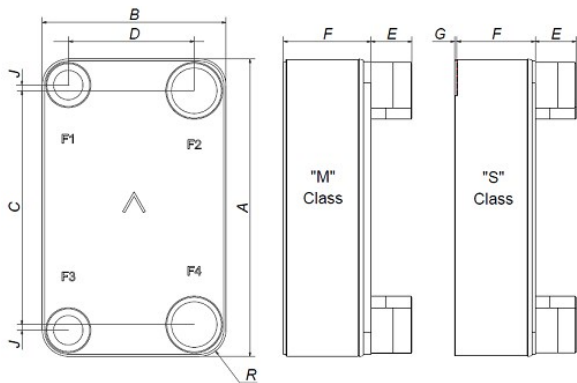
The B35T is ideal for many applications in district heating, heat recovery for industry, HVAC, combined heat & power and engine oil cooling. It is the perfect choice for efficient heat transfer with a low pressure drop in systems with up to 2½" piping and 58 m³/h (255 gpm) water flow.



## Basic specifications

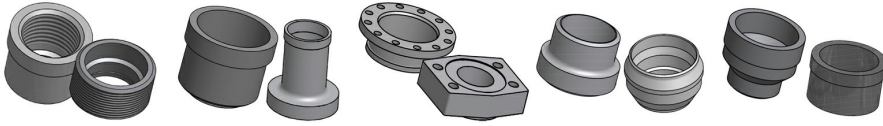
Maximum number of plates (NoP)	260
Max flow	27 m³/h (118.88 gpm)
Channel volume	0.18/0.18 dm³ (0.0064/0.0064 ft³)
Material	316/316L stainless steel plates, copper brazing
Weight excl. connections	15.76+(0.256*NoP) kg 34.73+(0.564*NoP) lb
Max Particle Size (mm)	1

## Standard dimensions



#	MM	IN
A	393	15.47
B	243	9.57
C	324	12.76
D	174	6.85
F	22,00+2,26*(NoP)	0.87+0.09*(NoP)
G	0	0
R	35	1.38
E_1	27	1.06
E_2	54	2.13

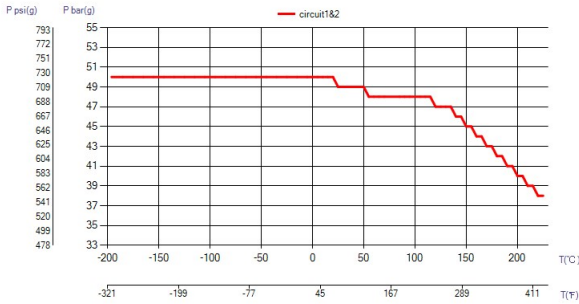
## Available connections



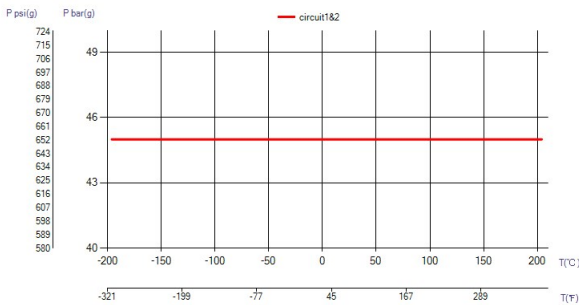
Threaded Connection   Solder Connection   Flange Connection   Weld Connection   Victaulic Connection

\*For specific dimensions, or information about other types of connections, please contact your SWEP sales representative.

## PED Pressure / Temperature



## UL Pressure / Temperature



## Product Concept

The Braze Plate Heat Exchanger (BPHE) is constructed as a plate package of corrugated channel plates with a filler material between each plate. During the vacuum brazing process, the filler material forms a brazed joint at every contact point between the plates, creating complex channels. The BPHE allows media at different temperatures to come into close proximity, separated only by channel plates that enable heat from one media to be transferred to the other with very high efficiency. The concept is similar to other plate and frame technology, but without the gaskets and frame parts.

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# SINGLE PHASE - DESIGN

## HEAT EXCHANGER: B28Hx76/1P

SWEF SSP G8 2023.823.1.0

Date: 15/10/2023

SSP Alias: B28

DUTY REQUIREMENTS		Side 1	Side 2
Fluid		Water	Water
Flow type		Counter-Current	
Circuit		Inner	Outer
Heat load	kW		175,0
Inlet temperature	°C	85,00	50,00
Outlet temperature	°C	53,00	70,00
Flow rate	kg/s	1,305	2,091
Pressure drop (Design PD)	kPa	8,58 (20,00)	19,9 (20,00)
Thermal length		4,292	2,682

PLATE HEAT EXCHANGER		Side 1	Side 2
Total heat transfer area	m <sup>2</sup>		4,44
Heat flux	kW/m <sup>2</sup>		39,4
Mean temperature difference	K		7,46
O.H.T.C. (available/required)	W/m <sup>2</sup> , °C		5760/5290
Pressure drop - total*	kPa	8,58	19,9
- in ports	kPa	1,14	2,91
Port diameter (up/down)	mm	33,0/33,0	33,0/33,0
Number of channels per pass		37	38
Number of plates			76
Oversurfacing	%		9
Fouling factor	m <sup>2</sup> , °C/kW		0,015
Reynolds number		1523	2086
Port velocity (up/down)	m/s	1,56/1,56	2,49/2,49
Channel velocity	m/s	0,160	0,248
Shear stress	Pa	15,8	36,2
Average wall temperature	°C	64,35	63,54
Largest wall temperature difference	K		1,52
Min./Max. wall temperature	°C	51,47/77,34	51,17/75,83

\*Excluding pressure drop in connections.

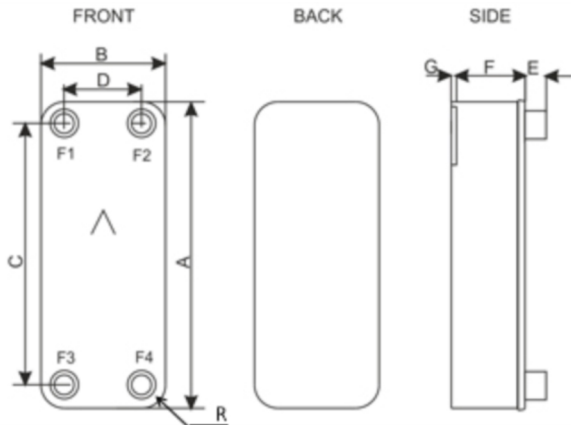
PHYSICAL PROPERTIES		Side 1	Side 2
Reference temperature	°C	69,00	60,00
Dynamic viscosity	cP	0,410	0,467
Dynamic viscosity - wall	cP	0,438	0,443
Density	kg/m <sup>3</sup>	978,3	983,2
Heat capacity	kJ/kg, °C	4,191	4,185
Thermal conductivity	W/m, °C	0,6623	0,6544
Film coefficient	W/m <sup>2</sup> , °C	11300	14800

TOTALS		Side 1	Side 2
Total weight empty (no connections)*	kg	14,56 - 39,42	
Total weight filled (no connections)*	kg	23,09 - 47,95	
Hold-up volume (Inner Circuit)	dm <sup>3</sup>	4,29	
Hold-up volume (Outer Circuit)	dm <sup>3</sup>	4,41	
Port size F1/P1	mm	33	
Port size F2/P2	mm	33	
Port size F3/P3	mm	33	
Port size F4/P4	mm	33	
Carbon footprint	kg	102,3	



\*Weight depends on the selected product.

**DIMENSIONS**



A*	mm	526 - 562 ±2
B*	mm	119 - 155 ±1
C	mm	470 ±1
D	mm	63 ±1
E*	mm	27 - 45 / 45 ±1
F*	mm	174,24 - 195,16 ±2,5%
G	mm	6 ±1
P	mm	15
R*	mm	15 - 23

\*Dimensions depend on the selected product.

\*This is a schematic sketch. For correct drawings please use the order drawing function or contact your SWEP representative.

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# SINGLE PHASE - DESIGN

## HEAT EXCHANGER: B28Hx96/1P

SWEF SSP G8 2023.823.1.0

Date: 15/10/2023

SSP Alias: B28

DUTY REQUIREMENTS		Side 1	Side 2
Fluid		Water	Water
Flow type		Counter-Current	
Circuit		Inner	Outer
Heat load	kW		212,0
Inlet temperature	°C	85,00	50,00
Outlet temperature	°C	53,00	70,00
Flow rate	kg/s	1,581	2,533
Pressure drop (Design PD)	kPa	8,51 (20,00)	19,9 (20,00)
Thermal length		4,292	2,682

PLATE HEAT EXCHANGER		Side 1	Side 2
Total heat transfer area	m <sup>2</sup>		5,64
Heat flux	kW/m <sup>2</sup>		37,6
Mean temperature difference	K		7,46
O.H.T.C. (available/required)	W/m <sup>2</sup> , °C		5620/5040
Pressure drop - total*	kPa	8,51	19,9
- in ports	kPa	1,68	4,29
Port diameter (up/down)	mm	33,0/33,0	33,0/33,0
Number of channels per pass		47	48
Number of plates			96
Oversurfacing	%		11
Fouling factor	m <sup>2</sup> , °C/kW		0,020
Reynolds number		1452	2001
Port velocity (up/down)	m/s	1,89/1,89	3,01/3,01
Channel velocity	m/s	0,152	0,237
Shear stress	Pa	14,5	33,3
Average wall temperature	°C	64,33	63,54
Largest wall temperature difference	K		1,45
Min./Max. wall temperature	°C	51,46/77,29	51,17/75,84

\*Excluding pressure drop in connections.

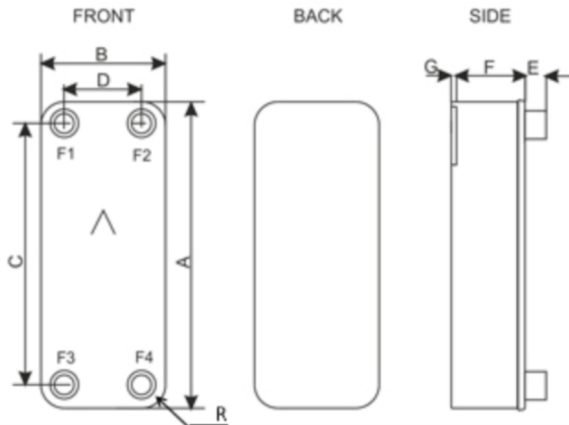
PHYSICAL PROPERTIES		Side 1	Side 2
Reference temperature	°C	69,00	60,00
Dynamic viscosity	cP	0,410	0,467
Dynamic viscosity - wall	cP	0,438	0,443
Density	kg/m <sup>3</sup>	978,3	983,2
Heat capacity	kJ/kg, °C	4,191	4,185
Thermal conductivity	W/m, °C	0,6623	0,6544
Film coefficient	W/m <sup>2</sup> , °C	10900	14400

TOTALS		Side 1	Side 2
Total weight empty (no connections)*	kg	17,84 - 42,7	
Total weight filled (no connections)*	kg	28,64 - 53,51	
Hold-up volume (Inner Circuit)	dm <sup>3</sup>	5,45	
Hold-up volume (Outer Circuit)	dm <sup>3</sup>	5,57	
Port size F1/P1	mm	33	
Port size F2/P2	mm	33	
Port size F3/P3	mm	33	
Port size F4/P4	mm	33	
Carbon footprint	kg	125,35	



\*Weight depends on the selected product.

**DIMENSIONS**



A*	mm	526 - 562 ±2
B*	mm	119 - 155 ±1
C	mm	470 ±1
D	mm	63 ±1
E*	mm	27 - 45 / 45 ±1
F*	mm	219,04 - 243,36 ±2,5%
G	mm	6 ±1
P	mm	15
R*	mm	15 - 23

\*Dimensions depend on the selected product.

\*This is a schematic sketch. For correct drawings please use the order drawing function or contact your SWEP representative.

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# SINGLE PHASE - DESIGN

## HEAT EXCHANGER: B320HTHx284/1P

SWEF SSP G8 2023.823.1.0

Date: 15/10/2023

SSP Alias: B320HTH

DUTY REQUIREMENTS		Side 1	Side 2
Fluid		Water	Water
Flow type		Counter-Current	
Circuit		Inner	Outer
Heat load	kW		854,0
Inlet temperature	°C	85,00	50,00
Outlet temperature	°C	53,00	70,00
Flow rate	kg/s	6,368	10,20
Pressure drop (Design PD)	kPa	8,47 (20,00)	20,7 (20,00)
Thermal length		4,292	2,682

PLATE HEAT EXCHANGER		Side 1	Side 2
Total heat transfer area	m <sup>2</sup>		35,0
Heat flux	kW/m <sup>2</sup>		24,4
Mean temperature difference	K		7,46
O.H.T.C. (available/required)	W/m <sup>2</sup> , °C		4620/3280
Pressure drop - total*	kPa	8,47	20,7
- in ports	kPa	2,06	5,27
Port diameter (up/down)	mm	63,0/63,0	63,0/63,0
Number of channels per pass		141	142
Number of plates			284
Oversurfacing	%		41
Fouling factor	m <sup>2</sup> , °C/kW		0,089
Reynolds number		925,9	1293
Port velocity (up/down)	m/s	2,09/2,09	3,33/3,33
Channel velocity	m/s	0,118	0,186
Shear stress	Pa	12,1	29,3
Average wall temperature	°C	64,26	63,51
Largest wall temperature difference	K		1,30
Min./Max. wall temperature	°C	51,43/77,13	51,17/75,83

\*Excluding pressure drop in connections.

### NOTES

i Two Stack model B320HT H+L could offer a more efficient design

PHYSICAL PROPERTIES		Side 1	Side 2
Reference temperature	°C	69,00	60,00
Dynamic viscosity	cP	0,410	0,467
Dynamic viscosity - wall	cP	0,438	0,443
Density	kg/m <sup>3</sup>	978,3	983,2
Heat capacity	kJ/kg, °C	4,191	4,185
Thermal conductivity	W/m, °C	0,6623	0,6544
Film coefficient	W/m <sup>2</sup> , °C	8820	11900

TOTALS		Side 1	Side 2
Total weight empty (no connections)*	kg	120,09 - 123,81	
Total weight filled (no connections)*	kg	172,82 - 176,54	
Hold-up volume (Inner Circuit)	dm <sup>3</sup>	26,79	
Hold-up volume (Outer Circuit)	dm <sup>3</sup>	26,98	
Port size F1/P1	mm	63	
Port size F2/P2	mm	63	

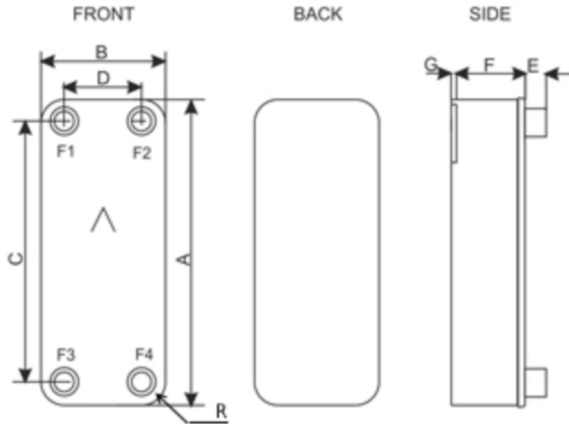


**TOTALS**

		Side 1	Side 2
Port size F3/P3	mm		63
Port size F4/P4	mm		63
Carbon footprint	kg		870,07

\*Weight depends on the selected product.

**DIMENSIONS**



A	mm	525 ±2
B	mm	243 ±1
C	mm	441 ±1
D	mm	159 ±1
E	mm	54 (opt. 20) ±1
F*	mm	572,32 - 576,32 ±2%
G*	mm	2 - 4 ±1
R	mm	35

\*Dimensions depend on the selected product.

\*This is a schematic sketch. For correct drawings please use the order drawing function or contact your SWEP representative.

**Disclaimer:**

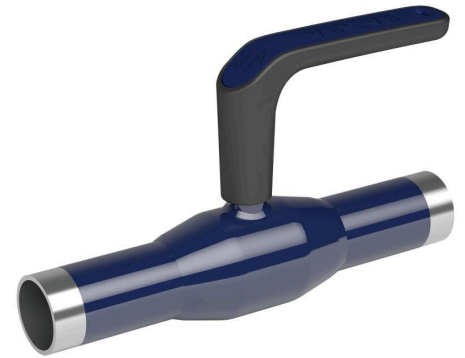
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# X-steel ball valves, reduced bore

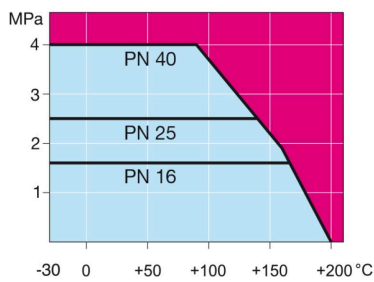
100X series, X-series, welding / welding, EN (DIN), DN 10-50, reduced bore

Body	DN 10-50 Steel, P235GH (1.0345)
Ball	DN 10-50 Stainless steel, X5CrNi18-10 (1.4301)
Ball seal	DN 10-50 PTFE+C
Stem	DN 10-50 Stainless steel, X8CrNiS18-9 (1.4305)
Stem seal	DN 10-50 FPM
Operation	DN 10-50 with composite handle

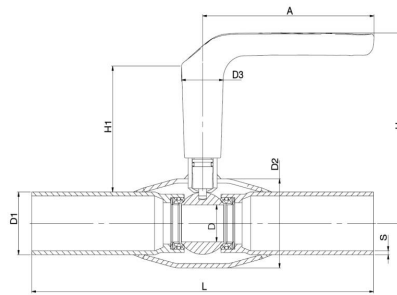


## Operation conditions

-20 ° – +200 °C  
 Below -20 °C contact manufacturer  
 Lowest allowed ambient temperature -40 °C  
 Leakage rate A (EN 12266-1)



DN 10-50

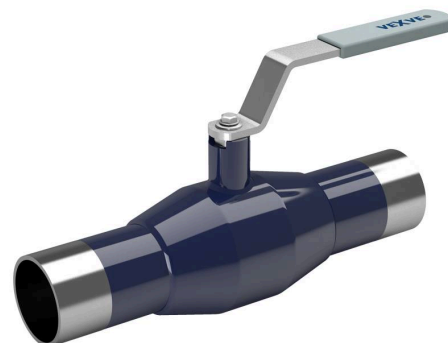


DN	PN	Product no.	A	D	D1	D2	D3	H	H1	L	S	kg
10	40	100010X	130	10	17.2	33.7	32.0	119	86	230	2	0.6
15	40	100015X	130	10	21.3	33.7	32.0	119	86	230	2	0.6
20	40	100020X	130	15	26.9	42.4	32.0	123	87	230	2.3	0.9
25	40	100025X	130	20	33.7	48.3	32.0	125	86	230	2.6	0.9
32	40	100032X	130	25	42.4	60.3	32.0	129	85	260	2.6	1.4
40	40	100040X	130	32	48.3	70.0	32.0	133	87	260	2.6	1.5
50	40	100050X	130	40	60.3	76.1	32.0	140	88	300	2.9	2.1

# Steel ball valves, reduced bore

100 series, welding / welding, EN (DIN), DN 65-250, reduced bore

Body	DN 65-250 Steel, P235GH (1.0345)
Ball	DN 65-250 Stainless steel, X5CrNi18-10 (1.4301)
Ball seal	DN 65-250 PTFE+C
Stem	DN 65-250 Stainless steel, X8CrNiS18-9 (1.4305)
Stem seal	DN 65-250 FPM
Operation	DN 65-250 With zinc-plated steel handle



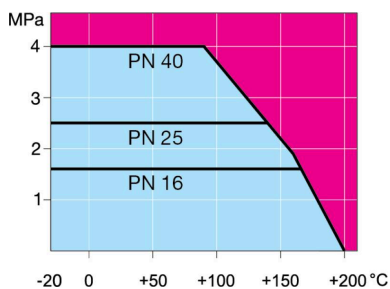
## Operation conditions

-20 °C – +200 °C

Below -20 °C contact manufacturer

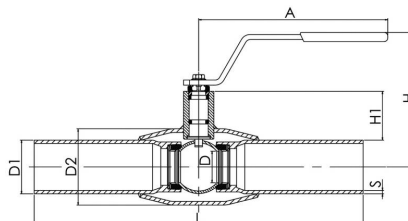
Lowest allowed ambient temperature -40 °C

Leakage rate A (EN 12266-1)

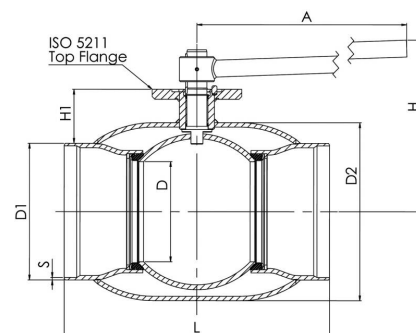


Not for steam

DN 65-150



DN 200-250



DN	PN	Product no.	A	D	D1	D2	H	H1	L	S	kg
65	25	100065	277,5	50	76.1	101.6	159	62	300	2,9	4.0
80	25	100080	277,5	65	88.9	121.0	171	68	300	3,2	5.4
100	25	100100	278,5	80	114.3	139.7	218	101	325	3,6	8.4
125	25	100125	400	100	139.7	177.8	252	101	325	4	13.0
150	25	100150	600	125	168.3	219.1	272	107	350	4,5	18.0
200	25	100200	870	150	219.1	273.0	280	92	400	4.5	38.0
250	25	100250	1200	200	273.0	355.6	350	108	530	5	74.0



# Steel ball valves, reduced bore

100 series, welding / welding, EN (DIN), DN 300-500, reduced bore

Body	DN 300-500 Steel, P235GH (1.0345)
Ball	DN 300-500 Stainless steel, X5CrNi18-10 (1.4301)
Ball seal	DN 300-500 PTFE+C
Stem	DN 300-500 Stainless steel, X8CrNiS18-9 (1.4305)
Stem seal	DN 300-500 FPM
Operation	DN 300-500 Valves are available with manual gear or with an electric or hydraulic actuator



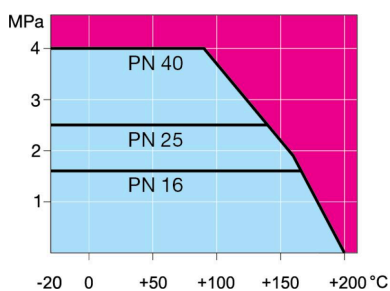
## Operation conditions

-20 °C – +200 °C

Below -20 °C contact manufacturer

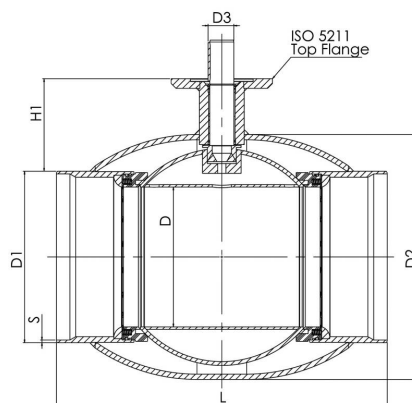
Lowest allowed ambient temperature -40 °C

Leakage rate A (EN 12266-1)



Not for steam

DN 300-500



DN	PN	Product no.	D	D1	D2	D3	H1	L	S	kg
300	25	100300	250	323.9	457.0	50.0	133	550	5.6	110.0
350	25	100350	290	355.6	508.0	50.0	192	686	6,3	170.0
400	25	100400	340	406.4	610.0	70.0	242	762	7,0	250.0
500	25	100500	390	508.0	660.0	90.0	259	914	7,0	400.0