mayr®

your reliable partner

EAS®-HT

Reliable High Torque safety clutches for heavy load applications

K.4050.V00.EN

www.mayr®.com

Always in use

EAS®-HT safety clutches for heavy load applications prolong the availability of your production systems.

They increase your profit, prevent damage caused by overload and save costs.

EAS®-HT safety clutches

the reliable, non-destructive overload protection

- **Disengaging**
- **Steplessly adjustable**
- **Precise**
- **Compact**
- **Robust**

Tested safety

For more than 40 years, we have been dimensioning, developing and manufacturing safety clutches for heavy load applications.

You can rely on the tested reliability and safety of our heavy load clutch.

Experts, not experiments

as safety does not allow for compromises

EAS®-HT short bearing-supported hub

Torque:
4 to 40 kNm

Sizes 7 to 10
Type 4050._0400

- Direct attachment of the drive element on the bearing-supported, output-side clutch flange.
- The bearing is able to absorb high additional forces in axial and radial directions.

Page 6

EAS®-HT lastic

Torque:
4 to 40 kNm

Sizes 7 to 10
Type 4053._0400

- Double shaft design with a flexible, positive locking coupling
- Absorbs impact-type loads

Page 8

EAS®-HT flange design

Torque:
7.5 to 440 kNm

Sizes 0 to 6
Type 4060.71400

- Compact, ready-to-install module
- Can easily be integrated into the drive line

Page 10

EAS®-HT Toothed coupling

Torque:
7.5 to 440 kNm

Sizes 0 to 6
Type 4061.71400

- Double shaft design
- Toothed coupling with crowned teeth cutting
- Robust and temperature-resistant
- High misalignment compensation capability

Page 12

EAS®-HT backlash-free

Torque:
7.5 to 140 kNm

Sizes 0 to 4
Type 4062.71400

- Double shaft design with a torsionally rigid, backlash-free disk pack coupling
- High torsional rigidity
- Backlash-free torque transmission
- Maintenance-free

Page 14

EAS®-HT lastic bolt

Torque:
40 to 260 kNm

Sizes 3 to 5
Type 4063.70400

- Double shaft design with a flexible, positive locking coupling
- Absorbs impact-type loads

Page 16

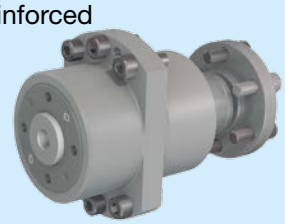
EAS®-HT Options

Customer-specific designs
Low temperature design
Alternative shaft connections
ATEX

Page 18

EAS®-elements

- Standard
- Reinforced



- Torque limiting or force limiting elements
- Installation into two flanges located towards one another
- Integration into existing constructions possible

Page 20

Technical Explanations

General
Pre-selection
Misalignment compensation capability

Page 23

Additional branch-optimised EAS® safety clutches

High-speed clutches EAS®-HSE

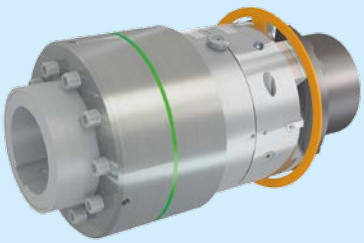
Torque:
100 to 8.400 Nm

Sizes 02 to 0
Type 404_ . _04_ _

Reliable overload protection at high speeds

For more information as well as detailed Technical Data and Dimensions, please see our product catalogue EAS®-HSC/ EAS®-HSE.

Extruder clutches EAS®-dutytorque



Torque:
70 to 17.000 Nm

Sizes 2 to 9
Type 4043. _1400

Protect extruder screws from expensive damage caused by overload

For more information as well as detailed Technical Data and Dimensions, please see our product catalogue EAS®-dutytorque.

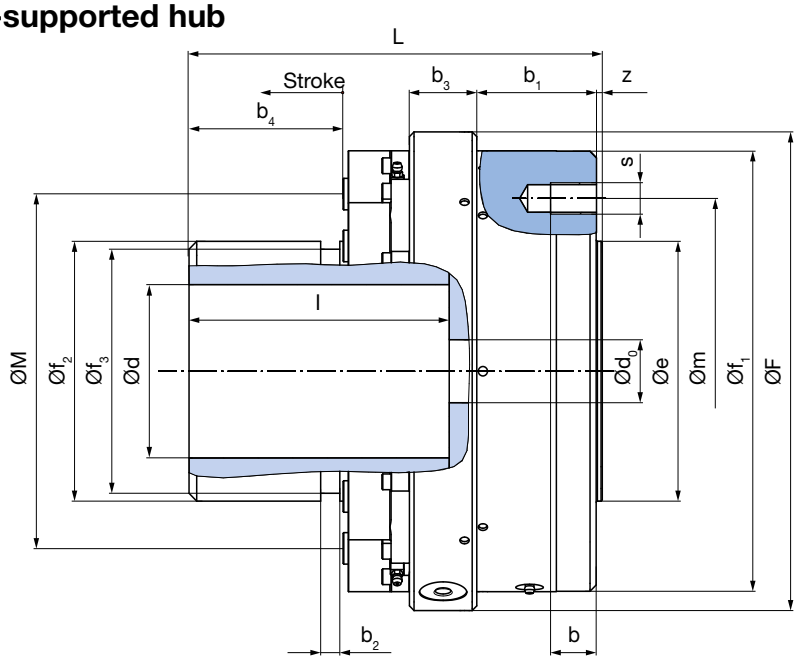
Rustproof design

Corrosion-protected safety clutches for environmental and waste water technology

EAS®-HT

Short bearing-supported hub

Type 4050._0400
Sizes 7 to 10



Order Number

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Sizes	Torque range [1]		Bores [1] Ø d^{H7}	Bore Ø d_0	Torque adjustment value [kNm]
7 to 10	low	**4**			
	medium	**5**			
	high	**6**			
	very high	**7**	Keyway acc. DIN 6885/1 - P9		

Example: Order Number 8 / 4050.60400 / 90 / 35 / 84050.60400 / 90 / 35 / 8

1) Position of the keyway to the tapped hole “s” in the thrust piece is not defined. Defined position available on request.

EAS®-element clutch

Technical Data				Sizes			
				7	8	9	10
Limit torques for overload	Type 4050.**4**0400	M_G	[kNm]	1.3 - 2.6	1.6 - 3.2	4 - 8	5 - 10
	Number of EAS®-elements			2	2	2	2
	Type 4050.**5**0400	M_G	[kNm]	2 - 4	3.2 - 6.4	6 - 12	10 - 20
	Number of EAS®-elements			3	4	3	4
	Type 4050.**6**0400	M_G	[kNm]	2.6 - 5.2	4.8 - 9.6	8 - 16	15 - 30
	Number of EAS®-elements			4	6	4	6
	Type 4050.**7**0400	M_G	[kNm]	4 - 8	6.5 - 13	12 - 24	20 - 40
	Number of EAS®-elements			6	8	6	8
Sizes EAS®-elements				0	0	1	1
Maximum speed		n_{max}	[rpm]	3000	2800	2500	2200
Bolt stroke on overload			[mm]	6	6	8	8

Max. permitted forces on the flange connection				Sizes			
				7	8	9	10
Radial forces	Type 4050._0400	F_R	[kN]	15	20	30	40
Axial forces		F_A	[kN]	10	15	20	30

Mass moments of inertia and weights				Sizes			
				7	8	9	10
EAS®-hub-side	Type 4050._0400	J	[kgm²]	0.18	0.38	1.05	2.37
Flange side	Type 4050._0400	J	[kgm²]	0.17	0.38	1.3	2.65
Weight at d_{max}	Type 4050._0400		[kg]	47	76	145	232

Bores [mm]			Sizes			
			7	8	9	10
EAS®-hub-side		d_{max}	90^{H7}	110^{H7}	135^{H7}	160^{H7}
Flange side		$d_{0\ max}$	30	40	48	58

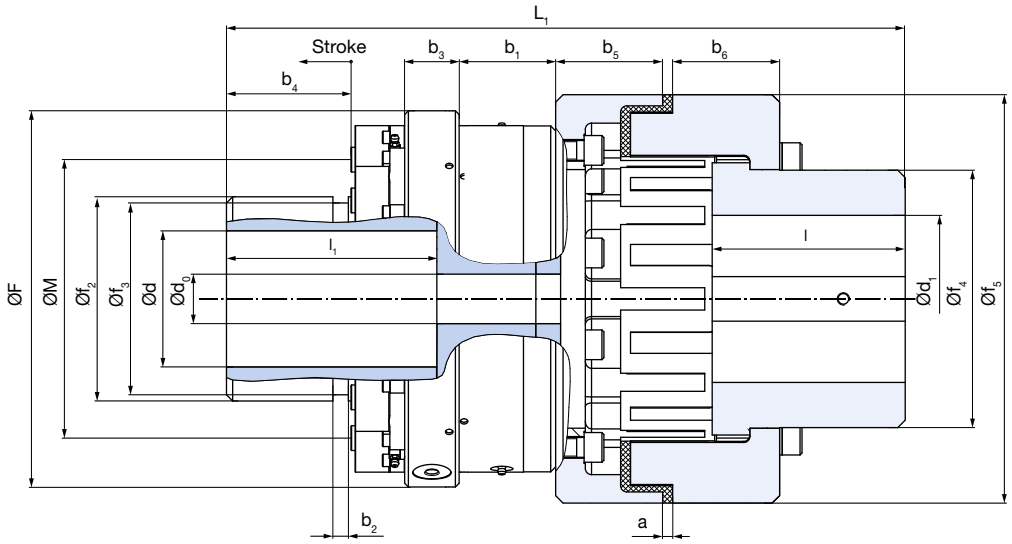
We reserve the right to make dimensional and constructional alterations.

Dimensions [mm]	Sizes			
	7	8	9	10
b	25	30	35	35
b_1	66	78	94	110
b_2	12.5	12.5	15	15
b_3	44	44	56	56
b_4	70.5	100.5	119.3	159.3
e_{h7}	147	165	242	276
F	260	304	380	450
f_1	237.5	279.5	359.5	417.5
f_2	120	165	190	245
f_3	110	155	180	230
L	228	270	330	387
l	140	170	210	250
M	180	225	270	340
m	190	220	285	325
s	8xM16	8xM20	8xM24	12xM24
z	4	4	5	6

EAS®-HT

lastic

Type 4053._0400
Sizes 7 to 10



Order Number

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Sizes	Torque range		Bore Ø d^{H7}	Bore Ø d_0	Bore Ø d_1^{H7}	Torque adjustment value [kNm]
7 to 10	low	4	Keyway acc. DIN 6885/1 - P9			
	medium	5				
	high	6				
	very high	7				

Example: Order Number 8 / 4053.60400 / 90 / 35 /115 / 8

EAS®-element clutch

Technical Data					Sizes			
					7	8	9	10
Limit torques for overload	Type 4053.40400		M_G	[kNm]	1.3 - 2.6	1.6 - 3.2	4 - 8	5 - 10
	Number of	EAS®-elements			2	2	2	2
	Type 4053.50400		M_G	[kNm]	2 - 4	3.2 - 6.4	6 - 12	10 - 20
	Number of	EAS®-elements			3	4	3	4
	Type 4053.60400		M_G	[kNm]	2.6 - 5.2	4.8 - 9.6	8 - 16	15 - 30
	Number of	EAS®-elements			4	6	4	6
	Type 4053.70400		M_G	[kNm]	4 - 8	6.5 - 13	12 - 24	20 - 40
	Number of	EAS®-elements			6	8	6	8
Sizes EAS®-elements					0	0	1	1
Maximum speed			n_{max}	[rpm]	2250	2000	1500	1400
Bolt stroke on overload				[mm]	6	6	8	8
Flexible shaft coupling	Permitted misalign-ments [1]	axial	ΔK_a	[mm]	±2.5	±2.5	±2.5	±2.5
		radial	ΔK_r	[mm]	0.3	0.3	0.3	0.3
		angular	ΔK_w	[mm]	0.3	0.3	0.3	0.3
Nominal and maximum torques, flexible coupling			T_{KN}	[kNm]	5.8	9.9	20.5	28
			$T_{K\,max}$	[kNm]	8.3	14.5	27	66

Mass moments of inertia and weights				Sizes			
				7	8	9	10
Mass moments of inertia	EAS®-hub-side	J	[kgm²]	0.18	0.38	1.05	2.37
	Flexible side	J	[kgm²]	0.57	1.62	5.0	10.7
Weight at d_{max}			[kg]	85	154	282	464

Bores [mm]		Sizes			
		7	8	9	10
EAS®-hub-side	d_{max}	90^{H7}	110^{H7}	135^{H7}	160^{H7}
Bearing flange	$d_{0\,max}$	30	40	48	58
Flexible side	$d_{1\,max}$	115^{H7}	135^{H7}	180^{H7}	200^{H7}

Dimensions [mm]	Sizes			
	7	8	9	10
a	5.5	8	8	8
b_1	66	78	94	110
b_2	12.5	12.5	15	15
b_3	44	44	56	56
b_4	70.5	100.5	119.3	159.3
b_5	76	86.5	102	108
b_6	76	86.5	102	108
F	260	304	380	450
f_2	120	165	190	245
f_3	110	155	180	230
f_4	164	208	275	289
f_5	265	330	415	480
L_1	469.5	548.5	668	754
l	137	156	196	220
l_1	140	170	210	250
M	180	225	270	340

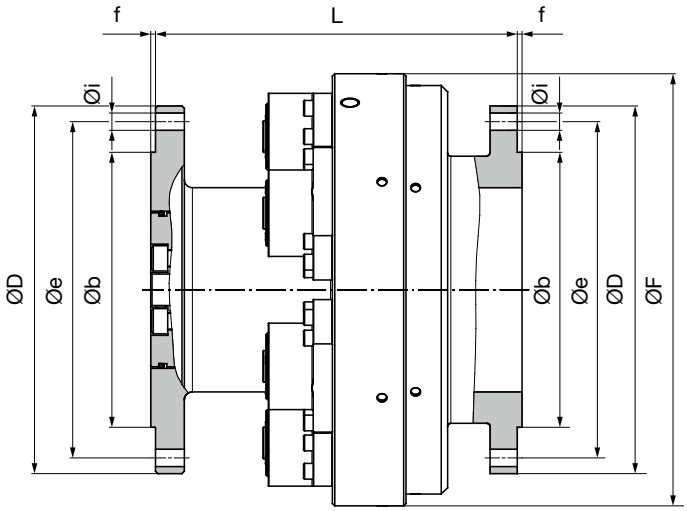
We reserve the right to make dimensional and constructional alterations.

1) The values refer to 1500 rpm.

EAS®-HT

flange design

Type 4060.71400
Sizes 0 to 6



Order Number

__	/	4	0	6	0	.	7	1	4	0	0	/	__	

Sizes 0 to 6	Torque adjustment value [kNm]

Example: Order number 5/ 4060.71400 / 200

EAS®-element clutch

Technical Data			Sizes						
			0	1	2	3	4	5	6
Limit torques for overload	M_G	[kNm]	7.5 - 15	12.5 - 25	20 - 40	37.5 - 75	70 - 140	125 - 250	220 - 440
Number of EAS®-elements			6	8	6	8	12	10	10
Sizes EAS®-elements			0	0	1	1	1	2	2 [1)]
Maximum speed	n_{max}	[rpm]	2000	1750	1500	1250	1000	900	750
Bolt stroke on overload		[mm]	6	6	8	8	8	12	12

Mass moments of inertia and weights			Sizes						
			0	1	2	3	4	5	6
EAS®-element-side	J	[kgm²]	0.25	0.5	1.16	2.71	5.51	16.29	27.87
EAS®-pressure flange side	J	[kgm²]	0.19	0.37	0.96	2.05	4.22	10.29	19.3
Weight at d_{max}		[kg]	56	77	142	212	303	627	814

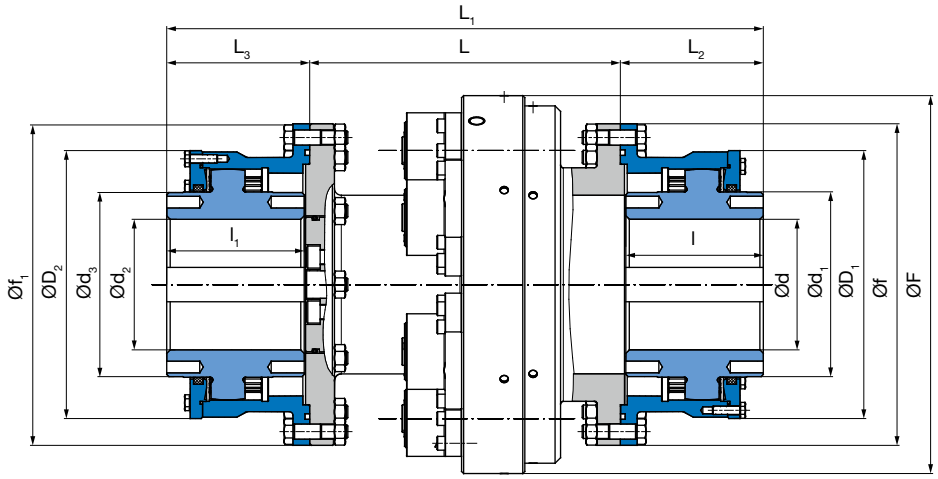
Dimensions [mm]	Sizes						
	0	1	2	3	4	5	6
b_{h7}	175	230	255	310	340	460	540
e	214	269	306	360	400	531	618
D	234	292	330	390	430	567	660
F	275	320	380	455	545	640	740
f	3	3	4	4	5	6	6
i	11	13	13	17	17	21	25
L	226	243	298	312	328	476	485

We reserve the right to make dimensional and constructional alterations.

EAS®-HT

Toothed coupling

Type 4061.71400
Sizes 0 to 6



Order Number

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Sizes 0 to 6	Bore Ø d^{H7}	Bore Ø d_2^{H7}	Torque adjustment value [kNm]
	Keyway acc. DIN 6885/1 - P9		

Example: Order number 4 / 4061.71400 / 180 / 200 / 90

EAS®-element clutch

Technical Data					Sizes						
					0	1	2	3	4	5	6
Limit torques for overload			M_G	[kNm]	7.5 - 15	12.5 - 25	20 - 40	37.5 - 75	70 - 140	125 - 250	220 - 440
Number of EAS®-elements					6	8	6	8	12	10	10
Sizes EAS®-elements					0	0	1	1	1	2	2 [1]
Maximum speed			n_{max}	[rpm]	2000	1750	1500	1250	1000	900	750
Bolt stroke on overload				[mm]	6	6	8	8	8	12	12
Toothed coupling	Permitted misalignments [1) 2)]	axial	ΔK_a	[mm]	±2	±3	±3	±3	±3	±4	±4
		radial	ΔK_r	[mm]	7.5	8.6	10.2	11.7	12.4	18.4	20.6
		angular	ΔK_w	[mm]	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Nominal and maximum torques, curved-tooth coupling			T_{KN}	[kNm]	12.5	25	40	63	100	250	400
			$T_{K\,max}$	[kNm]	25	50	80	12.6	200	500	800

1) The values refer to 1500 rpm.
2) Per joint

Mass moments of inertia and weights			Sizes						
			0	1	2	3	4	5	6
EAS®-pressure flange side	J	[kgm²]	0.27	0.65	1.48	3.33	6.43	19.17	39.74
EAS®-element side	J	[kgm²]	0.34	0.78	1.69	3.99	7.72	25.18	48.3
Weight at d_{max} / d_{2max}		[kg]	83	132	220	345	488	1053	1523

Bores [mm]		Sizes						
		0	1	2	3	4	5	6
EAS®-pressure flange side	d_{max}	95	130	150	185	210	285	340
EAS®-element side	$d_{2\,max}$	95	130	150	185	210	285	340

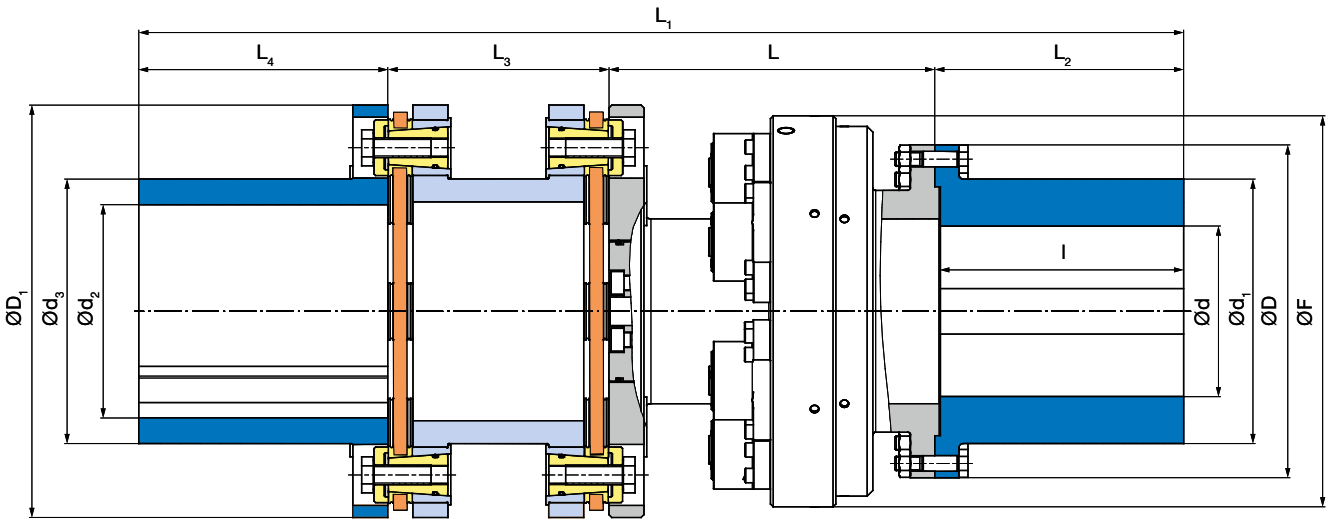
Dimensions [mm]	Sizes						
	0	1	2	3	4	5	6
d_1	135	185	210	255	290	400	480
d_3	135	185	210	255	290	400	480
D_1	195	251	288	337	375	502	584
D_2	195	251	288	337	375	502	584
F	275	320	380	455	545	640	740
f	234	292	330	390	430	567	660
f_1	234	292	330	390	430	567	660
L	226	242.5	298	312	328	476	485
L_1	434	502.5	588	685	740	1012	1125
L_2	104	130	145	186.5	206	268	320
L_3	104	130	145	186.5	206	268	320
l	100	125	140	180	200	260	310
l_1	100	125	140	180	200	260	310

We reserve the right to make dimensional and constructional alterations.

EAS®-HT

backlash-free

Type 4062.71400
Sizes 0 to 4



Order Number

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Sizes 0 to 4	Double-jointed coupling 0	Bore Ø d^{H7}	Bore Ø d_2^{H7}	Torque adjustment value [kNm]
		Keyway acc. DIN 6885/1 - P9		

Example: Order number 4 / 4062.71400 / 180 / 200 / 90

EAS®-element clutch

Technical Data					Sizes				
					0	1	2	3	4
Limit torques for overload			M_G	[kNm]	7.5 - 15	12.5 - 25	20 - 40	37.5 - 75	70 - 140
Number of EAS®-elements					6	8	6	8	12
Sizes EAS®-elements					0	0	1	1	1
Maximum speed			n_{max}	[rpm]	2000	1750	1500	1250	1000
Bolt stroke on overload				[mm]	6	6	8	8	8
Torsionally rigid shaft coupling	Permitted misalign-ments [1]	axial	ΔK_a	[mm]	1.6	1.7	2.1	2.3	2.3
		radial	ΔK_r	[mm]	1.0	1.0	1.1	1.3	1.4
		angular	ΔK_w	[°]	0.4	0.4	0.4	0.4	0.4
Nominal and maximum torques, torsionally rigid all-steel coupling			T_{KN}	[kNm]	22	33	50	73	110
			$T_{K\,max}$	[kNm]	44	66	100	146	220

1) The values refer to 1500 rpm.

Mass moments of inertia and weights				Sizes				
				0	1	2	3	4
Mass moments of inertia	Hub side	J	[kgm²]	0.35	0.76	1.58	3.68	6.56
	torsionally rigid side	J	[kgm²]	0.86	1.73	3.5	7.1	13.95
Weight at d_{max}			[kg]	132	195	308	468	665

Bores [mm]		Sizes				
		0	1	2	3	4
Hub-side	d_{max}	140	170	180	220	240
Torsionally rigid side	$d_{2\,max}$	140	160	180	210	240

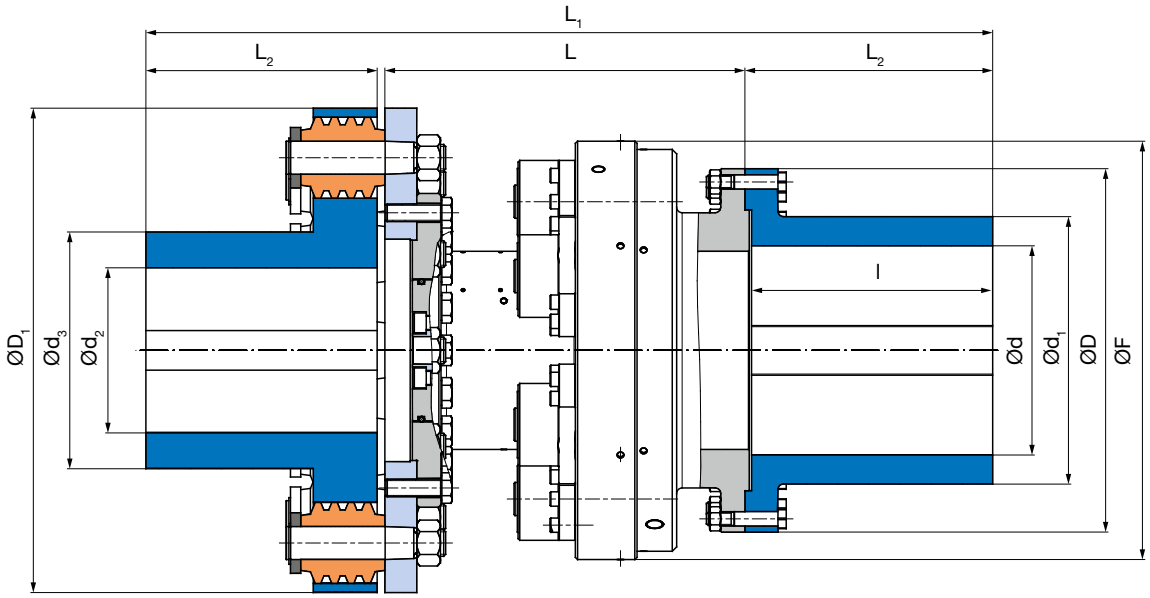
Dimensions [mm]	Sizes				
	0	1	2	3	4
d_1	186	230	243	300	321
d_3	186	215	243	279	321
D	234	292	330	390	430
D_1	290	332	378	431	492
F	275	320	380	455	545
L	229	245.5	302	316	330
L_1	735	811.5	934	1054.5	1173
L_2	175	200	225	265	310
L_3	155.6	166	182	208.4	223
L_4	175	200	225	265	310
l	171	195	219	260	302

We reserve the right to make dimensional and constructional alterations.

EAS®-HT

lastic bolt

Type 4063.70400
Sizes 4 to 6



Order Number

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Sizes 4 to 6	Bore Ø d^{H7}	Bore Ø d_2^{H7}	Torque adjustment value [kNm]
	Keyway acc. DIN 6885/1 - P9		

Example: Order number 4 / 4063.70400 / 270 / 180 / 90

EAS®-element clutch

Technical Data				Sizes		
				4	5	6
Limit torques for overload		M_G	[kNm]	40 - 80	72.5 - 145	130 - 260
Number of EAS®-elements				12	10	10
Sizes EAS®-elements				1	2	2
Maximum speed		n_{max}	[rpm]	1000	900	750
Bolt stroke on overload			[mm]	8	12	12
Flexible shaft coupling	Permitted misalign-ments [1] axial	ΔK_a	[mm]	±4	±4	±4
	radial	ΔK_r	[mm]	1.5	1.5	1.5
	angular	ΔK_w	[mm]	4.6	5.3	6.4
Nominal and maximum torques, flexible coupling		T_{KN}	[kNm]	48	100	160
		$T_{K\,max}$	[kNm]	96	200	320

Mass moments of inertia and weights				Sizes		
				4	5	6
Mass moments of inertia	Hub side	J	[kgm²]	6.6	20.02	39.63
	Flexible side	J	[kgm²]	22.35	55.18	110.68
Weight at d_{max}			[kg]	706	1407	1956

Bores [mm]		Size		
		4	5	6
Hub-side	d_{max}	240	300	340
Flexible side	$d_{2\,max}$	225	250	320

Dimensions [mm]	Sizes		
	4	5	6
d_1	321	420	500
d_3	320	360	450
D	430	567	660
D_1	660	760	920
F	545	640	740
L	375	533	543
L_1	946	1201	1231
L_2	310	350	370
L_3	250	300	300
l	302	342	362

We reserve the right to make dimensional and constructional alterations.

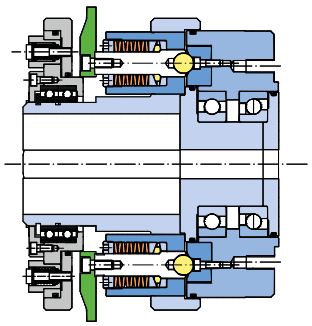
1) The values refer to 1500 rpm.

EAS®-HT Options

For the EAS®-HT clutches, designs specially created according to customer requests and different variants are also available.
EAS®-HT clutches can be combined with additional attachment parts.

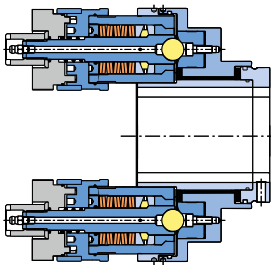
We are happy to advise you on the dimensioning and configuration of your optimum design.

EAS®-HT with automatic re-engagement



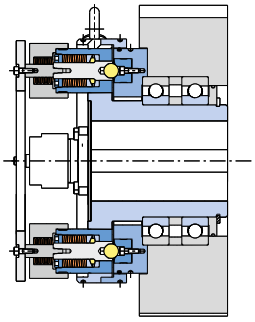
After overload occurrence, the EAS®-HT safety clutch is disengaged. It is possible to engage the EAS®-HT safety clutch via remote control by means of automatic re-engagement. Re-engagement can be carried out pneumatically, hydraulically, electromechanically or mechanically.

EAS®-HT with mechanical disengagement



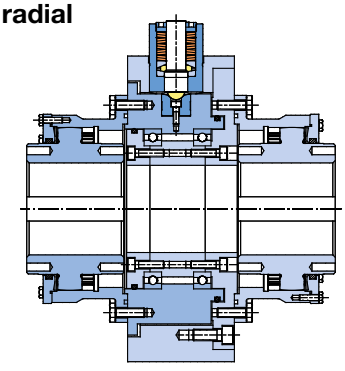
Mechanical disengagement device for the EAS®-elements.
The EAS®-elements can be disengaged individually mechanically.

EAS®-HT with engagement bowl



Engagement without aids.
Automatic engagement device for low operating speeds. Direct overload query possible through switching disk.

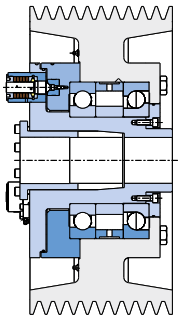
EAS®-HT radial



EAS®-HT radial for small construction space length values and low to medium operating speed values.

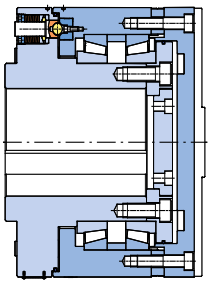
EAS®-HT Options

EAS®-HT with integrated drive elements



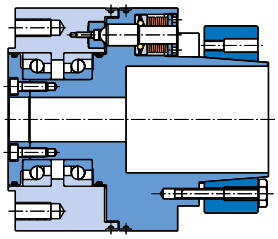
EAS®-HT, integrated attachment of sprocket and toothed wheels, V-belt disks etc.

EAS®-HT for roller gears



Highest torques at lowest diameters.
The alternative to hydraulic clamping sets and shear pins in rolling mills.

Frictionally-locking shaft-hub connection



Frictionally-locking shaft-hub connections:

- Shrink disk (see Fig.)
- External shrink disk
- Oil press fit

EAS®-HT low temperature design

Reliable overload protection **in case of very low temperatures to -48 °C.**

(Please contact the manufacturer separately for this).

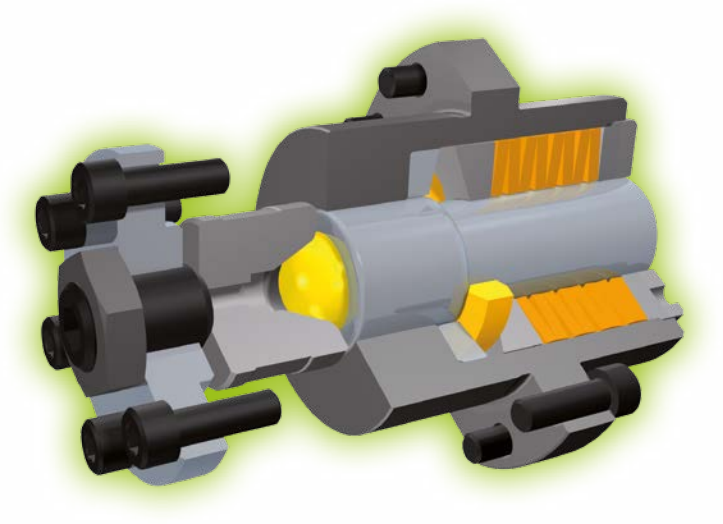
ATEX design

EAS®-HT safety clutches are also available in ATEX design according to the directive 94/9 EC (ATEX 95).
(Please contact the manufacturer separately for this).

EAS®-element

Application

- ❒ EAS®-elements for installation in two bearing-supported flanges facing each other or for integration into existing constructions
- ❒ As EAS®-HT safety clutch component
- ❒ For customer-specific constructions



Applications

- ❒ Conveyor belts
- ❒ Crushers
- ❒ Rolling mills
- ❒ Underground mining / mining
- ❒ Raw material extraction

Advantages/Benefits

- ❒ Safe overload protection
- ❒ Can be used flexibly and in modular form
- ❒ Maximum performance density
- ❒ Release forces adjustable
- ❒ Easy and quick engagement
- ❒ Large number of disengagement procedures

EDELSTAHL® Rostfrei

Rustproof design available on request

Function:
Positive locking transmission of circumferential force and axial force. In case of overload, the EAS®-elements separate the input and output mechanically, so that the system can slow down freely. Manual re-engagement of the individual elements (automatic re-engagement available on request).

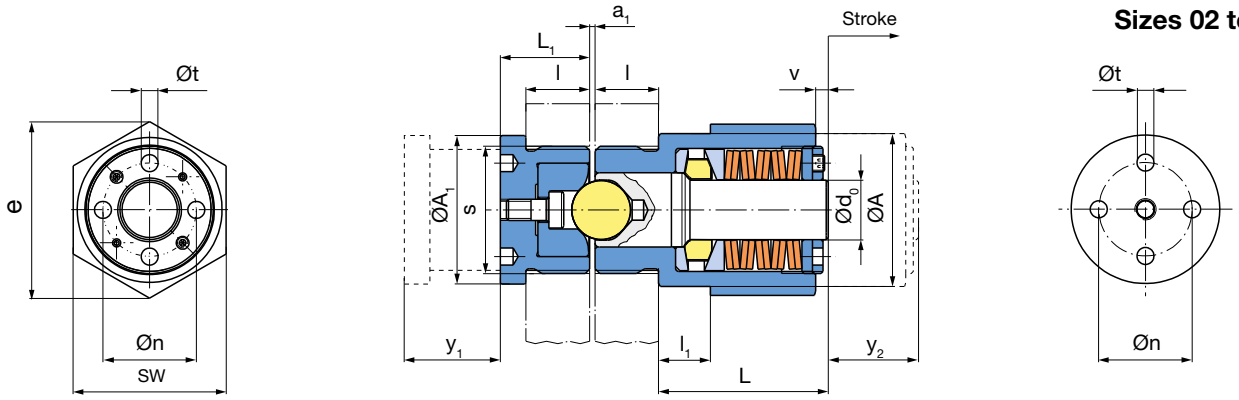
The catalogue contains basic information on pre-selection and dimensioning.

For detailed information on selection, dimensioning, installation, initial operation and maintenance, please see the Installation and Operational Instructions.

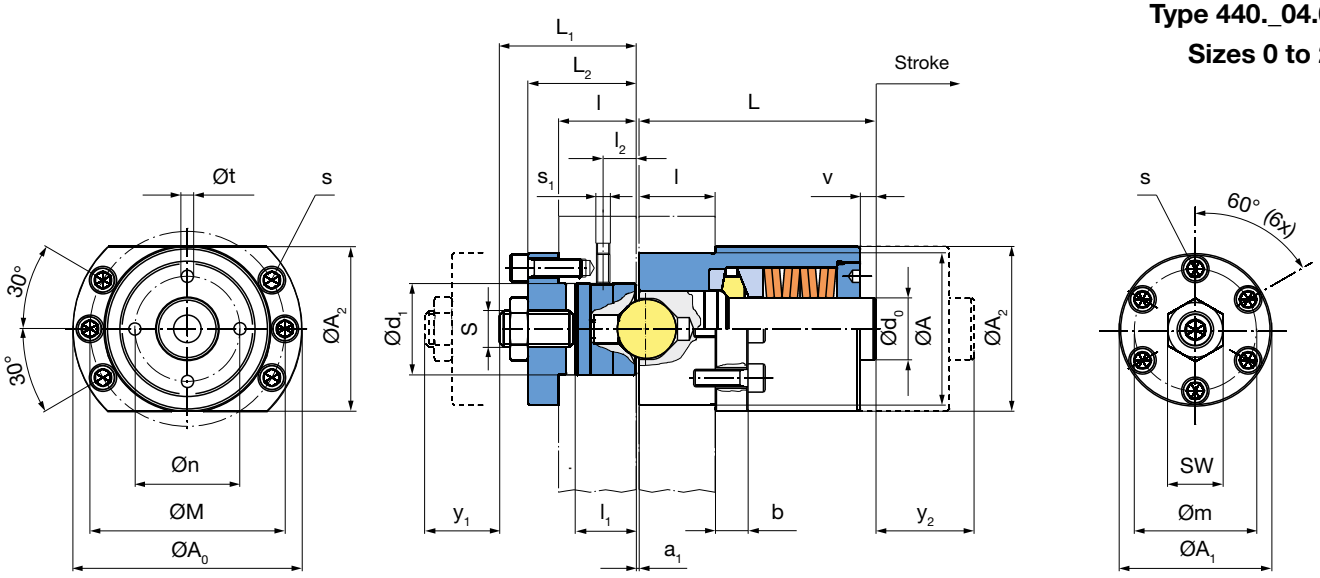
EAS®-element

Standard

Type 440._04.0
Sizes 02 to 01

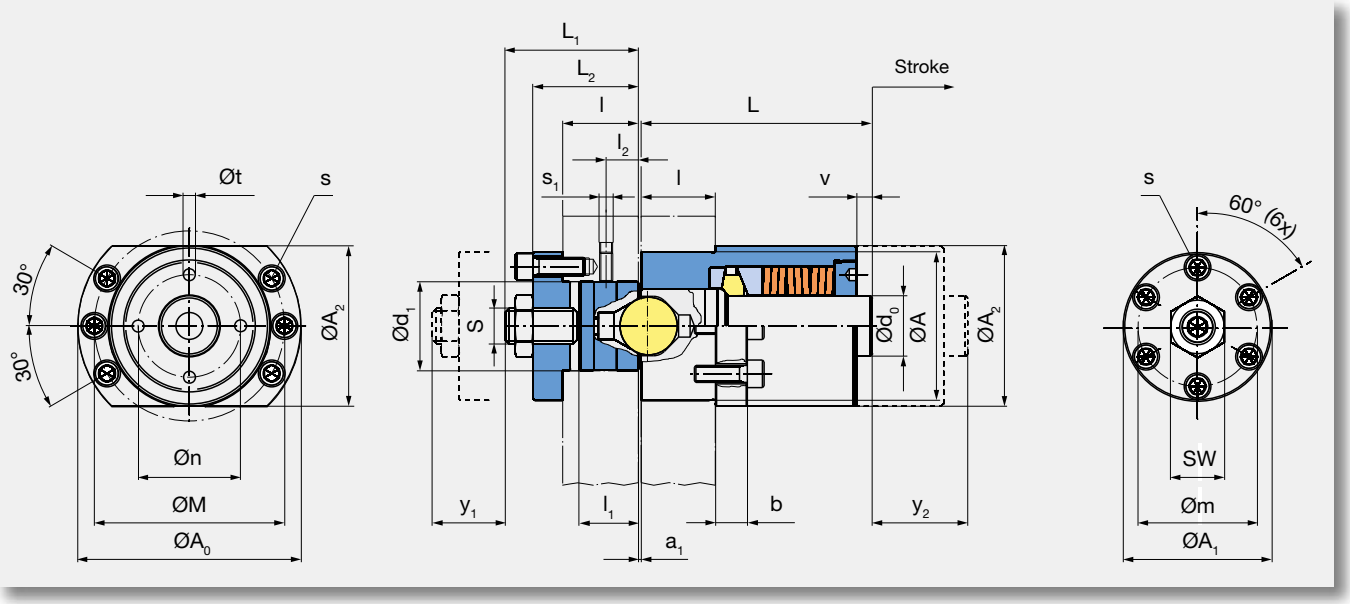


Type 440._04.0
Sizes 0 to 2



Reinforced

Type 441.604.0
Sizes 0 to 2



EAS®-element

Technical Data				Sizes				
				02	01	0	1	2
Circumferential force	Type 440.404.0 (Low torque range)	$F_{u\,min}$	[kN]	0.22	1	1.8	5	4
		$F_{u\,max}$	[kN]	0.54	2	5	10	11
	Type 440.504.0 (Medium torque range)	$F_{u\,min}$	[kN]	0.5	1.25	3.75	7.5	10
		$F_{u\,max}$	[kN]	1.4	2.5	7.5	15	30
	Type 440.604.0 (High torque range)	$F_{u\,min}$	[kN]	1.2	2.5	7.5	15	30
		$F_{u\,max}$	[kN]	2.5	5	15	30	60
	Type 441.604.0 Reinforced design	$F_{u\,min}$	[kN]	-	-	19	38	75
		$F_{u\,max}$	[kN]	-	-	38	75	150
Axial force	Type 440.404.0 (Low torque range)	$F_{ax\,min}$	[kN]	0.2	0.9	1.62	4.5	3.6
		$F_{ax\,max}$	[kN]	0.48	1.8	4.5	9	9.9
	Type 440.504.0 (Medium torque range)	$F_{ax\,min}$	[kN]	0.45	1.12	3.37	6.75	9
		$F_{ax\,max}$	[kN]	1.26	2.25	6.75	13.5	27
	Type 440.604.0 (High torque range)	$F_{ax\,min}$	[kN]	1.08	2.25	6.75	13.5	27
		$F_{ax\,max}$	[kN]	2.25	4.5	13.5	27	54
	Type 441.604.0 Reinforced design	$F_{ax\,min}$	[kN]	-	-	10	20	40
		$F_{ax\,max}$	[kN]	-	-	20	40	80
Bolt stroke on overload			[mm]	2.5	4	6	8	12
Weights			[kg]	0.25	0.6	1.75	4.1	11.3

Dimensions [mm]	Sizes				
	02	01	0	1	2
A^{H8}_{h7}	28	38	55	75	100
A_0	-	-	85	110	150
A_1	28	35	55	75	100
A_2	-	-	55	75	108
a_1	1.0	1.5	2	2	3
b	-	-	12	15	20
d_0	10	14	20	30	40.6
$d_1{}^{H8}_{h7}$	-	-	30	40	60
e	31.2	41.6	-	-	-
L	28	40	73	96	160
L_1	15	21	52	65	80
L_2	-	-	42	51	70
l	12	15	30	40	50

Dimensions [mm]	Sizes				
	02	01	0	1	2
l_1	7	10	22	30	40
l_2	-	-	12	17	22
M	-	-	72	95	128
m	-	-	44	60	80
n	17	22	31	48	69
S	-	-	M12	M20	M24
s	M24x1 [1]	M30x1,5 [2]	M6 [3]	M8 [4]	M12 [5]
s_1	-	-	M5	M6	M8
SW	27	36	19	30	36
t	3	4	5	6	8
v	2	3	3	4	15
y_1 [6]	12	15	8	10	10
y_2 [6]	16	21	38	50	65

We reserve the right to make dimensional and constructional alterations.

EAS®-element Standard

Order Number

__ / 4 4 0 . __ 0 4 . 0

Size	Torque range	
02	low	4
01	medium	5
0	high	6
1		
2		

Example: Order number 0 / 440.504.0

EAS®-element Reinforced

Order Number

__ / 4 4 1 . 6 0 4 . 0

Size
0
1
2

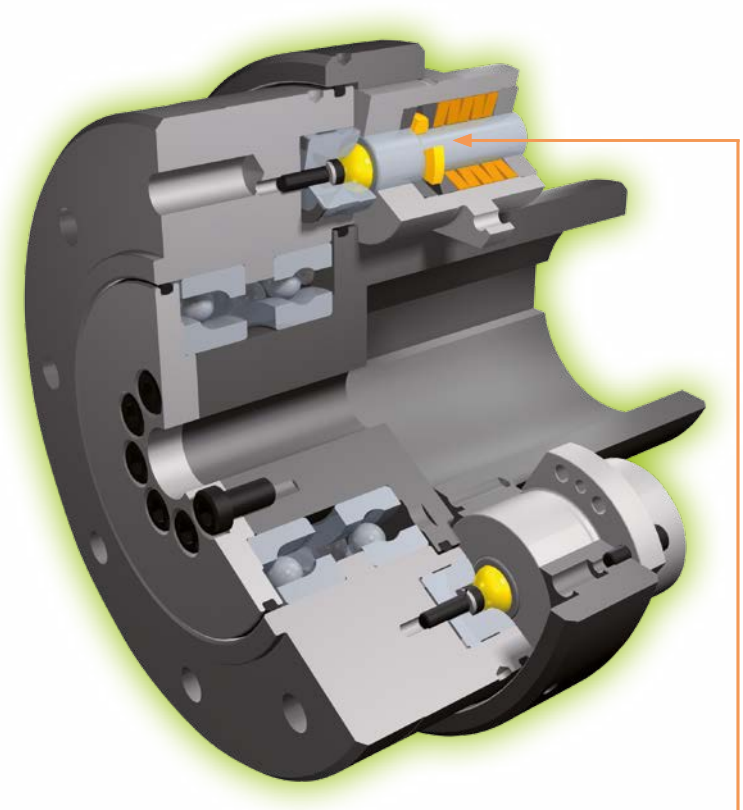
Example: Order number 0 / 441.604.0

1) Tightening torque M_A = 40 Nm
2) Tightening torque M_A = 60 Nm
3) Fixing screw DIN EN ISO 4762 10.9 M_A = 9 Nm
4) Fixing screw DIN EN ISO 4762 10.9 M_A = 19 Nm
5) Fixing screw DIN EN ISO 4762 10.9 MM_A = 76 Nm
6) y_1 and y_2 are extension dimensions

Technical explanations EAS®-HT safety clutch

Characteristics

- ❒ **Positive locking torque transmission acc. to the ball-detent principle**
- ❒ **Adjustable torque**
- ❒ **Separates disengagingly**
- ❒ **Easy repeat operation start-up**
- ❒ **Robust**
- ❒ **Long service lifetime**



Rustproof design available on request

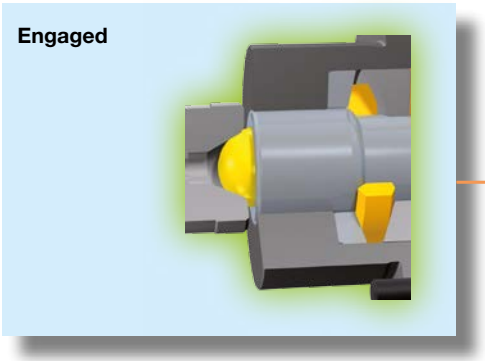
Design

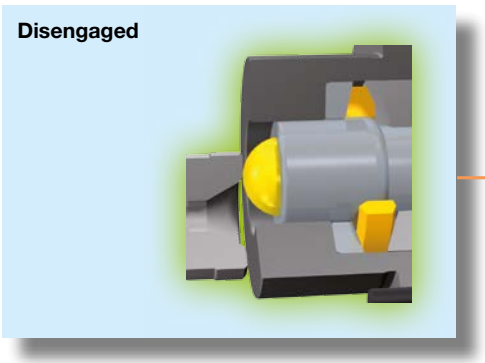
All clutch parts are made of steel. EAS®-HT safety clutch basic components have a zinc-phosphated surface which provides a basic corrosion protection for further surface treatments.

Clutch types 4050, 4060 are also suitable for oil-running.

The limit torque for overload on the clutch can be adjusted by changing the cup spring pre-tension of each overload element.

The EAS®-HT safety clutches can be set to the required limit torque for overload at the place of manufacture. Subsequent torque changes can be carried out using the Adjustment Diagram included in the delivery (see respective Installation and Operational Instructions).





Operating principle of the EAS®-HT safety clutch Overload elements

- ❒ If the proportional circumferential force on the individual elements proves too large, the resulting axial force causes an axial movement of the bolt via the ball/calotte system and therefore the disconnection of the torque transmission.
- ❒ The maximum circumferential force is individually determined through the adjusting nut and *mayr*®-cup springs. The transmittable torque is determined in this way.
- ❒ Due to the axial stroke of the bolt (ball carrier), the control segments move radially outwards, thereby disconnecting the components axially.
- ❒ Re-engagement of the balls through a bolt stroke in the direction of the calotte takes place either manually or via a mayr® re-engagement device (pneumatic, hydraulic, electromechanical or mechanical).

Technical explanations EAS®-HT safety clutch

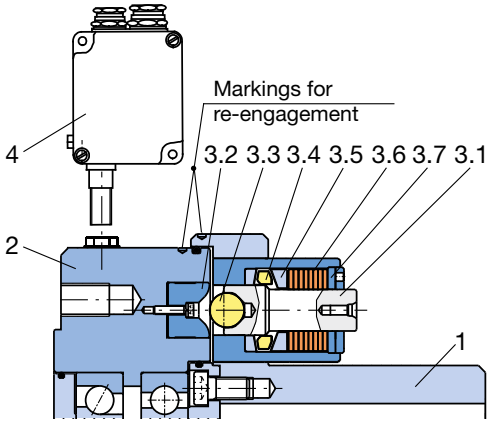


Fig. 2: EAS®-element clutch disengaged

Processes for torque switch-off on overload:

On overload, the hub part 1 and the output flange 2 begin to turn against each other. The bolts 3.1 in the overload elements are pressed via the control segments 3.4 against the force of the cup springs 3.6 from the thrust washers 3.2. The control segments 3.4 travel radially outwards over the bolt 3.1 switching edge and hold the bolts 3.1 in a disengaged position (see Fig. 2). The positive locking connection of the hub part 1 and the output flange 2 is nullified. The originally coupled masses can slow down freely. The drive is switched off electrically via speed monitoring device 4.

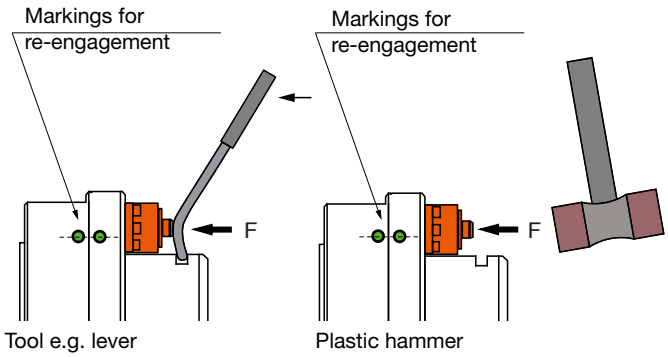


Fig. 3

Re-engagement:

Turn the hub part 1 and the output flange 2 into the correct angular position to one another (re-engagement position can be recognized via the marking bores on the clutch outer diameter, Fig. 3). By applying axial pressure on the bolt end, bolts 3.1 are brought back to their engaged position. The clutch is ready for operation when all clutch overload elements are engaged.

Maintenance

The EAS®-HT safety clutches do not require special maintenance work. They are largely protected against dust and humidity, they have an initial grease filling and are therefore mainly maintenance-free.

EAS®-elements Please find a detailed description in the respective Installation and Operational Instructions (go to www.mayr.com). Special maintenance work may be necessary, however, if the device is subject to large amounts of dirt or dust or is operating in extreme ambient conditions.

In this case, please contact the manufacturer.

Mounting onto the shaft:

In a standard delivery, the EAS®-HT safety clutches are delivered with a finish bore and a keyway acc. DIN 6885/1 P9. The clutch can be secured axially onto the shaft e.g. using a washer and a screw, screwed into the shaft threaded centre hole.

Optionally, we deliver a frictionally-locking shaft-hub connection (see EAS®-HT options, page 19).

Technical explanations EAS®-HT safety clutch

Pre-selection of the clutch

Drive lines in heavy engineering are robust and designed for operation in adverse conditions. In contrast to systems with servomotor-driven drives, the torque course and the system behaviour often cannot be determined precisely.

Frequently, only the drive power of the motor and the permitted max. torque of the gear output are known.

Using tried-and-tested operating factors, clutch sizes suitable for the application can be pre-selected.

Pre-selection

$$T_N = \frac{9550 \times P}{n} \quad [Nm]$$

$$T_G \approx T_N \times K_B \quad [Nm]$$

Names:		
T_N	[Nm]	Nominal torque of the motor
T_G	[Nm]	Pre-selected release torque on the overload clutch
P	[KW]	Input power motor
n	[rpm]	Speed
K_B	[-]	Service factor

Service factors:		
2.5 - 3	medium impacts	Stirring units / pumps (viscid fluids) / kneading machines / mixing systems / conveyor belts / etc.
3 - 5	high impacts	Shredding machines / centrifuges / crushers / roll trains / construction machines / mining machines / etc.

In normal operation, the EAS®-HT transmits the set overload torque via positive locking. All torques for normal operation, including torque peaks, must be transmitted safely and must not cause the safety clutch to respond.

Often, the actual complex of loads (impacts) during operation (e.g. for shredding machines / mixers) are not known and can only be measured in the system with great effort.
Using software specially developed for the purpose, it is possible to simulate the behaviour in case of collisions of such drive lines.
The prerequisite is that all specifications are known:

- ❒ Mass moments of inertia
- ❒ Rigidities of all overload elements, including the overload clutch
- ❒ Parameters of the motor and the control circuit

Particularly in case of load-side vibration generation (e.g. piston compressors / shredding machines / etc.) or alternating torques **please contact us** to select a reliable, tried and tested overload protection for your production systems.

Here, the overload clutch is combined with suitable clutches, depending on the application:
- ❒ Elastomer coupling
- ❒ Shaft Couplings
- ❒ Curved-tooth coupling

Profit from our many years of market and application experience in different branches.

Technical explanations EAS®-HT safety clutch

Misalignment compensation capability of the different shaft misalignment compensation couplings

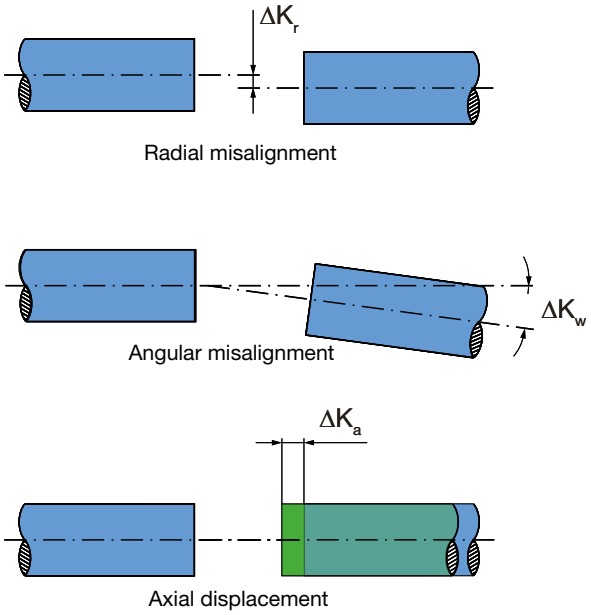


Fig. 4

Shaft Misalignment

Misalignments between shafts occur due to manufacturing and assembly tolerances, bearing backlash and temperature influences.

This can cause axial, radial and angular shaft misalignment.

The shaft misalignment compensation coupling of the EAS-HT safety clutch can compensate for misalignments.

The misalignment possibilities of the shaft misalignment compensation coupling are general guideline values (see table "Technical Data").

In the application, the aim is to produce as precise a shaft alignment as possible, so that the bearing loads are reduced to a minimum.

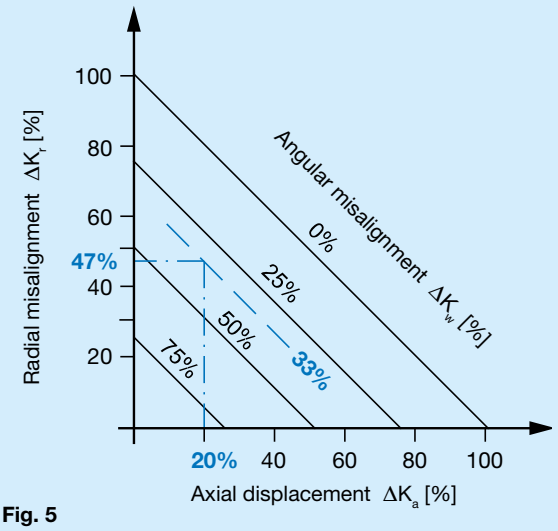


Fig. 5

If more than one kind of misalignment takes place simultaneously, they influence each other. The permitted misalignment values are dependent on one another. The sum total of the actual misalignments – in percent of the maximum value – must not exceed 100 %.

Example:

EAS®-HT lastic, Size 8
Type 4053.00400.0

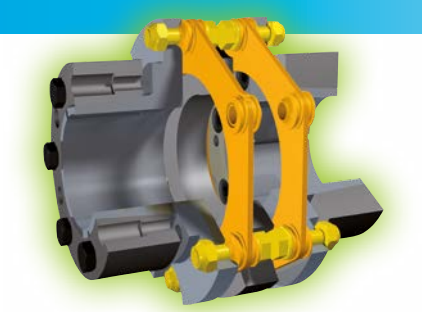
- **Axial displacement** occurrence:
  ΔK_a = 0.5 mm; equals **20 %** of the permitted maximum valueΔK_a = 2.5 mm
- **Angular misalignment** occurrence:
  ΔK_w = 0.1 mm, equals **33 %** of the permitted maximum value ΔK_w = 0.3 mm
- **Radial displacement** occurrence:
  ΔK_w = 0.14 mm, equals **47 %** of the permitted maximum value ΔK_w = 0.3 mm

Product Summary

Safety Clutches/Overload Clutches

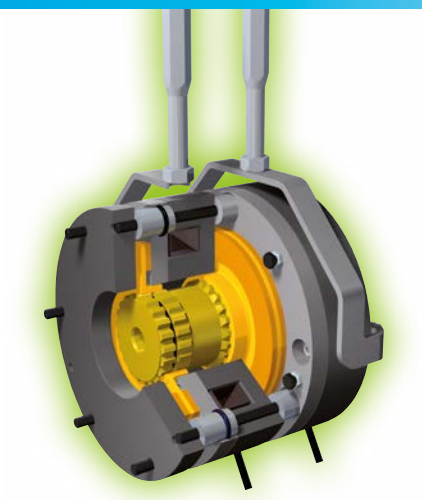
- **EAS®-Compact®/EAS®-NC**
  Positive locking and completely backlash-free torque limiting clutches
- **EAS®-smartic®**
  Cost-effective torque limiting clutches, quick installation
- **EAS®-element clutch/EAS®-elements**
  Load-disconnecting protection against high torques
- **EAS®-axial**
  Exact limitation of tensile and compressive forces
- **EAS®-Sp/EAS®-Sm/EAS®-Zr**
  Load-disconnecting torque limiting clutches with switching function
- **ROBA®-slip hubs**
  Load-holding, frictionally locked torque limiting clutches
- **ROBA®-contitorque**
  Magnetic continuous slip clutches
- **EAS®-HSC/EAS®-HSE**
  High-speed safety clutches for high-speed applications

Shaft Couplings



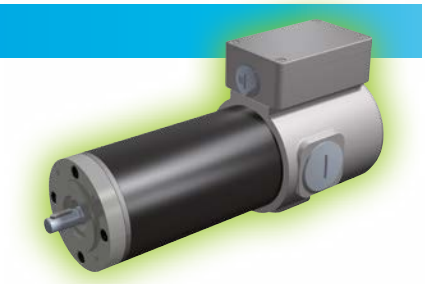
- **smartflex®/primeflex®**
  Perfect precision couplings for servo and stepping motors
- **ROBA®-ES**
  Backlash-free and damping for vibration-sensitive drives
- **ROBA®-DS/ROBA®-D**
  Backlash-free, torsionally rigid all-steel couplings
- **ROBA®-DSM**
  Cost-effective torque-measuring couplings

Electromagnetic Brakes/Clutches



- **ROBA-stop® standard**
  Multifunctional all-round safety brakes
- **ROBA-stop®-M motor brakes**
  Robust, cost-effective motor brakes
- **ROBA-stop®-S**
  Water-proof, robust monoblock brakes
- **ROBA-stop®-Z/ROBA-stop®-silenzio®**
  Doubly safe elevator brakes
- **ROBA®-diskstop®**
  Compact, very quiet disk brakes
- **ROBA®-topstop®**
  Brake systems for gravity loaded axes
- **ROBA®-linearstop**
  Backlash-free brake systems for linear motor axes
- **ROBA®-guidestop**
  Backlash-free holding brake for profiled rail guides
- **ROBATIC®/ROBA®-quick/ROBA®-takt**
  Electromagnetic clutches and brakes, clutch brake units

DC Drives



- **tendo®-PM**
  Permanent magnet-excited DC motors

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You can find the complete address for the representative responsible for your area under www.mayr.com in the internet.

02/05/2016 GF/BE/SC

mayr®

your reliable partner

ROBA-stop®

Electromagnetic Safety Brakes

C US
LR 108927

Your Advantages When Using ROBA-stop®

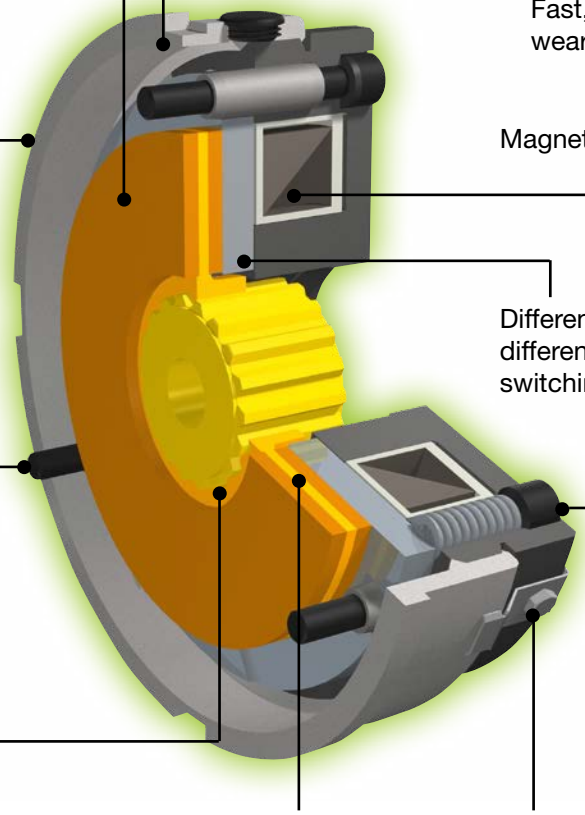
ROBA-stop® brakes attract customers because of their decided advantages in relation to operational safety and ease of maintenance.

For most applications, the enclosed structural shape can provide high functional brake safety without requiring additional protective measures.
The product's high reliability further improves the functional safety and increases the efficiency of the entire machine or system in which it is used.

The sensitive braking torque adjustment shows its value when exact positioning is required or when drives are to be adapted to changing production procedures. It simplifies production procedure optimization immensely, increases production, maximises flexibility and improves product quality.

A further, outstanding characteristic of the ROBA-stop® brake is the central wear re-adjustment. This minimises the danger of adjustment errors, simplifies maintenance, saves time and maintenance costs and therefore also reduces machine downtimes.

Your Customized Solution - Our Universal Brake



Regular braking times
Friction linings with a large surface area for high wear reserves and a long service lifetime

Fast wear re-adjustment
Fast, easily readable central wear re-adjustment

Small structural dimensions with high braking torques

Magnetic coil with class of insulation F

Completely enclosed design
Protection (electrical) IP54

Different armature disks to meet different friction work demands and switching time requirements

Simple and problem-free brake installation

Mounting possible without time-consuming adjustments

Sensitive adjustment of the holding point
via set screws make customized adaptations for different applications possible

Minimum torsional backlash between hub and rotor due to accurate toothing

Safe braking torque transmission via a metal rotor with a very low mass moment of inertia

No self-turning and therefore no inadvertent alteration of the air gap, meaning constant positioning accuracy

C US E189728

On request ROBA-stop® safety brakes can also be delivered with UL approval.

According to German notation, decimal points in this document are represented with a comma (e.g. 0,5 instead of 0.5).

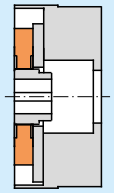
Wide Variety of Application Possibilities for ROBA-stop® safety brake

- **ROBA-stop® safety brakes** offer a complete range of the many and various designs needed for different applications. Nearly 30 years of experience with spring applied safety brakes and detailed knowledge of the multiple demands on electrical power transmission technology support our program. Our tried and tested technology and our continual advances with regard to user-specific optimization of our palette of structural shapes guarantee the perfect brake for each individual application.
- **ROBA-stop®-positioning brakes** provide high positioning and repetitive accuracy even at high switching frequencies. Sensitive adjustment of the braking torque is possible. This structural shape can be adapted to many different applications using different armature disks.
- **ROBA-stop®-holding brakes** can reach very high braking torques. They are suitable for holding masses or loads without friction work, although braking at low speeds with low friction work in suitable application conditions is also permitted.
- **ROBA-stop®-tacho brakes** feature a centering recess and tapped holes on the back of the brake for mounting a tacho-generator. This brake also allows exact positioning with high repetitive accuracy using its sensitive braking torque adjustment.
- **ROBA-stop®-tacho peak load brakes** have the same basic functions as the tacho brake. They are, however, additionally equipped with an extremely strong armature disk which permits high friction work.
- **ROBA-stop®-peak load brakes** come in two further variations. These are both equipped with an extremely strong armature disk for high friction work. The design with an open distance ring dissipates brake heat very quickly into the surrounding area. The design with a closed distance ring is used when high friction work must be absorbed and when higher protection against outer influences is required.
- **ROBA-stop®-sealed** and
- **ROBA-stop®-S** comply with Protection IP67. They are fully enclosed, sealed and protected against corrosion.

Contents

Summary of Constructional Designs ROBA-stop®

ROBA-stop®- positioning brake Size 2



Braking torque: 1,1 Nm

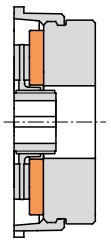
Size 2

Type 800.45_.0

- Design with a central brake spring and a friction lining rotor.
- Hand release and flange plate available on request as additional parts.

Page 7

ROBA-stop®- positioning brake



Braking torque: 3 to 800 Nm

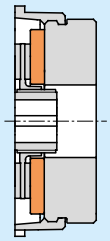
Sizes 3 to 11

Type 80_.41_._

- For braking and for exact positioning.
  Consistent repetitive accuracy, even at higher switching frequencies.
  The braking torque can be sensitively adjusted using adjusting screws.
- Most application requirements can be met by means of different armature disks.

Page 8

ROBA-stop® - holding brake



Braking torque: 5 to 1.250 Nm

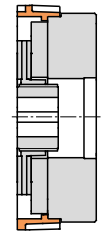
Sizes 3 to 11

Type 820.61_._

- The holding brake reaches a higher braking torque than the positioning brake.
  It is suitable for holding masses or loads without friction work.
- Braking at low speeds with low friction work is sometimes possible on request.
- We recommend operation with the fast acting rectifier ROBA®-switch (see pages 35 – 37).

Page 10

ROBA-stop® - tacho brake



Braking torque: 3 to 800 Nm

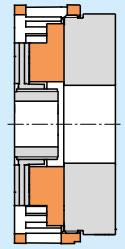
Sizes 3 to 11

Type 83_.41_._

- The tacho brake has a fixed distance ring and, on the back of the coil carrier, a centering recess as well as three tapped holes.
  The centering recess is centered with the outer diameter of the distance ring. This simplifies the attachment of tacho-generators.

Page 12

ROBA-stop® - peak load brake



Braking torque: 50 to 800 Nm

Sizes 7 to 11

Type 863.41_._

- Heat is dissipated efficiently by the high-strength armature disk and the open threaded distance ring. The peak load brake can therefore absorb a very high amount of friction work e.g. on EMERGENCY STOP.
  In normal switching operation, the brake functions in the same way as a positioning brake.

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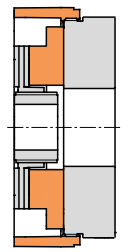
ROBA-stop®-peak load brake with closed distance ring



Braking torque: 50 to 800 Nm

Sizes 7 to 11

Type 866.41_._

- The peak load brake can absorb very high friction work e.g. on EMERGENCY STOP via the high-strength armature disk.
  In normal switching operation, the brake functions in the same way as a positioning brake.
- The closed threaded distance ring guarantees protection against ambient influences together with good heat dissipation.

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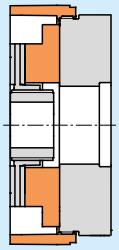
Summary of Constructional Designs ROBA-stop®

ROBA-stop® - tacho peak load brake



Braking torque:
50 to 800 Nm

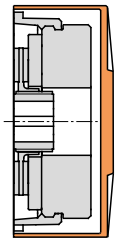
Sizes 7 to 11

Type 883.41_._

- Friction work is absorbed efficiently e.g. on EMERGENCY STOP by the high-strength armature disk and the closed distance ring, meaning that heat is dissipated efficiently. A centering recess and three tapped holes on the back of the coil carrier make attachment of the tacho-generator easy.

Page 18

ROBA-stop®-sealed



Braking torque:
3 to 26 Nm

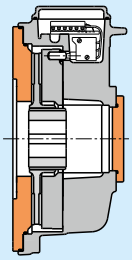
Sizes 3 to 6

Type 80_.418.3

- This design is completely enclosed and sealed by a cover.
- It complies with Protection IP67.

Page 19

ROBA-stop®-S



Braking torque:
100 to 800 Nm

Sizes 8 to 11

Type 856.41_._

- Corrosion-resistant, sealed design used for extreme ambient conditions.
- It complies with Protection IP67.

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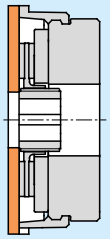
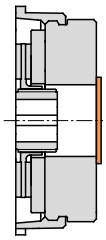
Additional Parts

Flange plate



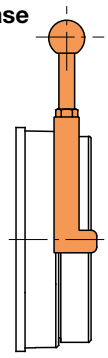
If no suitable friction surface for the brake linings is available customer-side, our flange plate can be used.

Cover plate



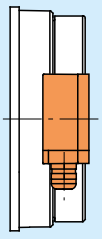
The brake is enclosed by the cover plate and complies with Protection IP54.
This function has been TÜV- (German Technical Inspectorate) approved in several tests.

Hand release



This function is used for mechanical release of the ROBA-stop® brake when the magnetic coil is de-energised (e.g. on power failure).

Terminal box



The terminal box serves as an interface for the supply cable and for housing the terminal, a spark quenching unit or a rectifier.

ROBA-stop® electromagnetic safety brake

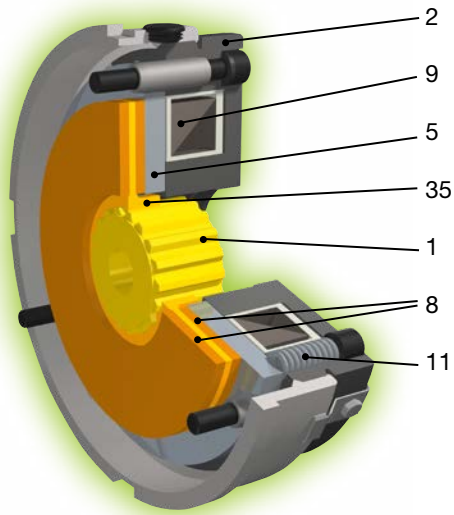
Function

ROBA-stop® brakes are spring applied, electromagnetic safety brakes.

Spring applied function:
In de-energised condition, helical springs (11) press against the armature disk (5). The rotor (35) friction linings (8), which are connected via a toothed hub (1) with the drive shaft, are clamped between the armature disk (5) and the brake mounting surface.

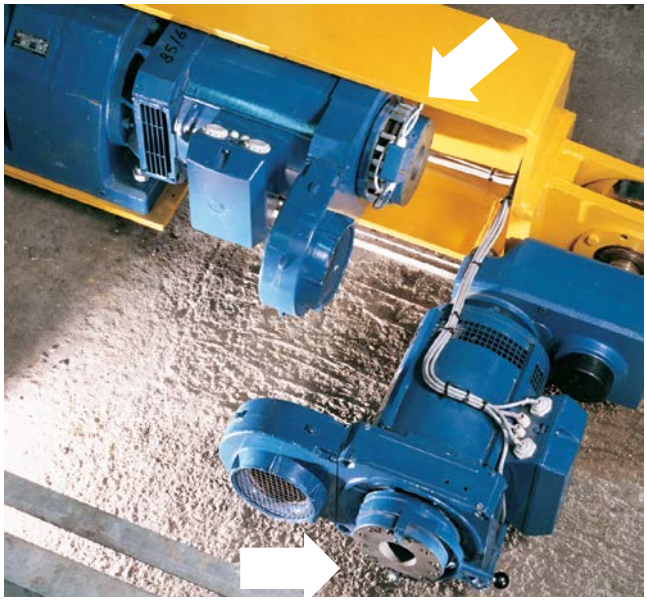
Electromagnetic function:
If the coil (9) is energised, a magnetic field is built up which attracts the armature disk (5) to the coil carrier (2), thereby releasing the rotor (35) with the friction linings (8).
The brakes are released if voltage is applied.

Safety brake function:
If the brake is de-energised, it is closed, thereby complying with the relevant safety demands e.g. on power failure or on EMERGENCY STOP.



Installation Example

ROBA-stop®: Application in a high rack warehouse



Hoist drives and traction drives on narrow aisle material handling systems are equipped with ROBA-stop® brakes. The ROBA-stop® positioning brake at the rear of the drive motor brakes the drive at slow speeds exactly at the required position. The ROBA-stop®-peak load brake on the hoist motor usually provides the same functions during normal operation – braking at slow speeds and exact positioning. This brake is additionally able to brake safely at high speeds and with downward-moving loads in case of EMERGENCY STOP or power failure. It is capable of absorbing extremely high friction work and of dissipating it quickly into the surrounding area.

Total Quality Management

Product Quality

Every delivery which leaves our firm has been subjected to a careful quality inspection, meaning that you are able to rely 100 % on *mayr*® products. If required, we pre-adjust our clutches and brakes accurately to the requested values and confirm the **product characteristics with an Inspection Report.**

Quality Management

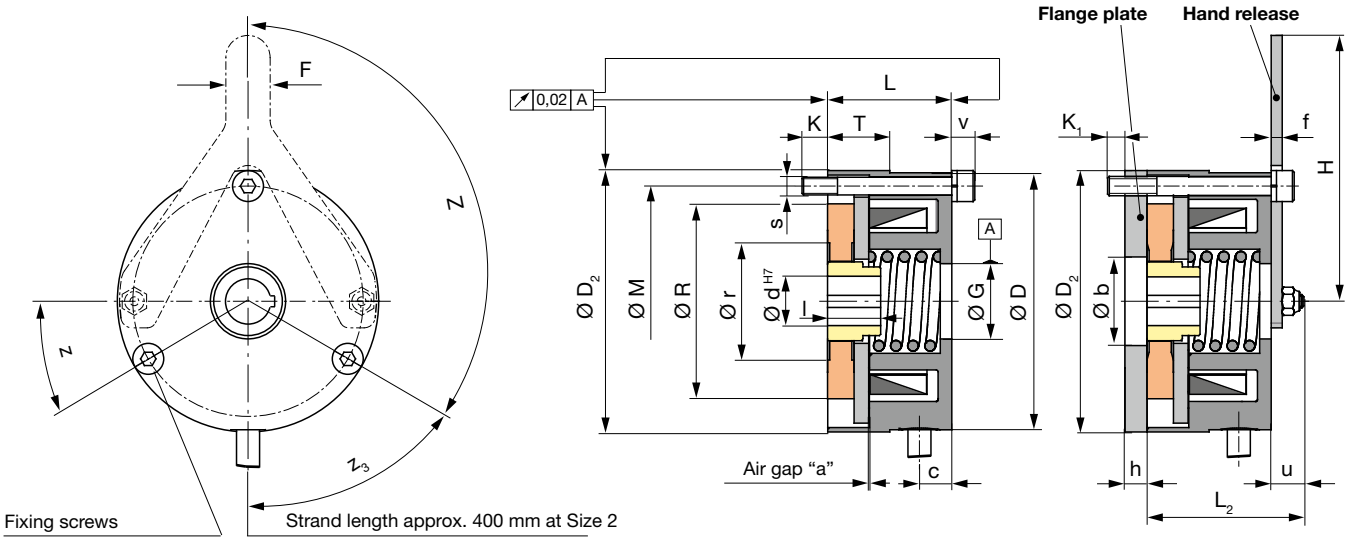
mayr® uses the term quality to describe its products and services. Certification of our quality management confirms the quality-consciousness of our colleagues at every level of the company.

Our integrated management system is certified according to **DIN EN ISO 9001:2000 (Quality)** and **DIN EN ISO 14001 (Environment)** and complies with the **OHSAS 18001/ OHRIS (Occupational Health and Safety)** demands.

ROBA-stop®- positioning brake
Type 800.45_.0
Size 2

Type 800.450.0
without additional parts

Type 800.455.0
with flange plate
and hand release



We reserve the right to make dimensional and constructional alterations.

Technical Data			Size 2
Braking torque [1]	M_N	[Nm]	1,1
Electrical power	P_{20}	[W]	12
Max. speed [2]	n_{max}	[rpm]	7000
Weight		[kg]	0,4

Dimensions [mm]			Size 2
Bores	$Ød_{min}$	DIN 6885/1	6
	$Ød_{max}$	DIN 6885/1	10
		Special keyway	11 [3]
		Preferred bores H7	9; 10

a	b	c	D	$D_{2\ h8}$	F	f	G^{H8}	H	h	K	K_1	L
0,15	20	4,5	58	59	10	2,5	17	60	5	6	6	28

L_2	l	M	R	r	s	T	u	v	Z	z	z_3
35,2	12	52	44	29	3 x M4	14	7,5	5,2	3 x 120°	30°	60°

The robust and simplified form of the ROBA-stop®-brake Size 2 guarantees problem-free installation and reliability in operation.
To ensure compact overall dimensions, the wear re-adjustment and braking torque adjustment are not included in the design.

In contrast to the other ROBA-stop® brakes, the braking force is generated by a central spring.

The rotor and hub toothing guarantee reliable braking torque transmission and prevent all but minimal torsional backlash between the hub and the rotor.

If no suitable counter friction surface for the friction lining rotor is available customer-side, our flange plate can be used.

The hand release is used for mechanical release of the brake.

The brake can easily be supplied with DC voltage using our comprehensive range of electrical accessories.

Design as tacho-generator brake available on request.

Order Number

2 / 8 0 0 . 4 5 __ . 0 / __ / __ / __

Size			Voltage [4] [VDC] ± 10 %	Bore Ø d H7	Keyway acc.
2	Without additional parts	0	24	(Dimensions page 7)	DIN 6885/1
	Flange plate	1	104		
	Hand release	3			
	Flange plate / hand release	5			

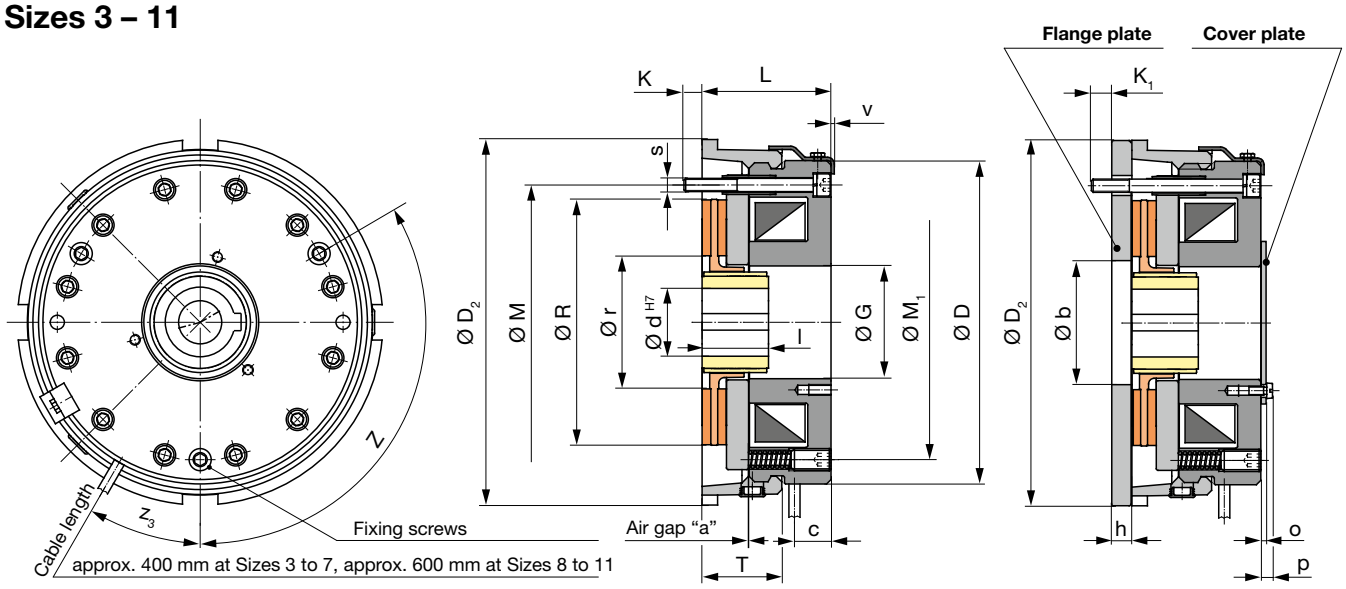
Example: 2 / 800.451.0 / 104 / 10 / 6885/1

1) Braking torque tolerance: + 40 % / - 20 %, other braking torques available on request
2) Higher speeds on request
3) Over Ø10 special keyway: width b = 4 ^{JS9}, depth t = 1,2 $^{+0,1}$
4) Standard voltages [VDC]: 24; 104
Permitted voltage tolerance: ± 10 % acc. DIN IEC 60038

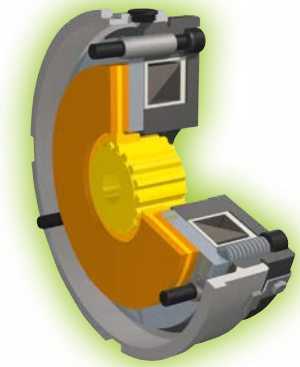
ROBA-stop®- positioning brake
Type 80_.41_._
Sizes 3 – 11

Type 80_.410.3
without additional parts

Type 80_.414.3
with flange plate
and cover plate



Technical Data			Size								
			3	4	5	6	7	8	9	10	11
Braking torque [1]	M_N	[Nm]	3	6	12	26	50	100	200	400	800
Electrical power	P_{20}	[W]	17	24	33	50	70	87	102	134	196
Max. speed [2]	n_{max}	[rpm]	6000	5000	4800	4000	3800	3400	3000	3000	3000
Weight		[kg]	0,6	0,95	1,8	3,1	5,4	9,4	15,5	30	55



This brake is an electromagnetic safety brake for braking and exact positioning. A high repetitive accuracy is guaranteed, even at high switching frequencies.

Two different armature disks are available to cope with different demands on friction work and on brake switching times.

Standard armature disk:
Short attraction time (brake release), longer drop-out time from power switch-off to the point at which the braking torque comes into effect. Solid structural shape allows high friction work absorption.

Fast acting armature disk:
This disk has the same characteristics as the standard armature disk; however, it has a slightly longer attraction time but a much shorter drop-out time.

The electrical switching and the type of power supply have a large influence on the switching times. Our wide range of electrical accessories allows a simple DC voltage brake supply connection (see pages 33 – 38).

Order Number

__ / 8 0 __ . 4 1 __ . __ / __ / __ / __

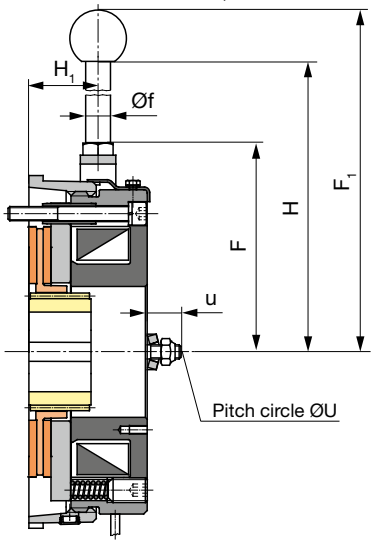
Size	Armature disk	Flange / cover / hand release		Voltage [4] [VDC] ± 10 %	Bore Ø d H7	Keyway acc.
3	Standard armature disk 0	Without additional parts	0	24	(Dimensions page 9)	DIN 6885/1
4	Fast acting armature disk 2	Flange plate	1	104		DIN 6885/2
5		Cover plate	2	180		DIN 6885/3
6		Hand release [3]	3	207		
7		Flange plate/cover plate	4			
8		Flange plate/hand release [3]	5			
9		Cover plate/hand release [3]	6			
10		Flange plate/cover plate/hand release [3]	7			
11						

1	Terminal box with terminal
3	Cable
4	Terminal box with half-wave rectifier
5	Terminal box with bridge rectifier
6	Terminal box with spark quenching unit

Example: 6 / 800.411.3 / 104 / 20 / 6885/1

Type 80_.413.3

with hand release (Size 11 differs from the figure)

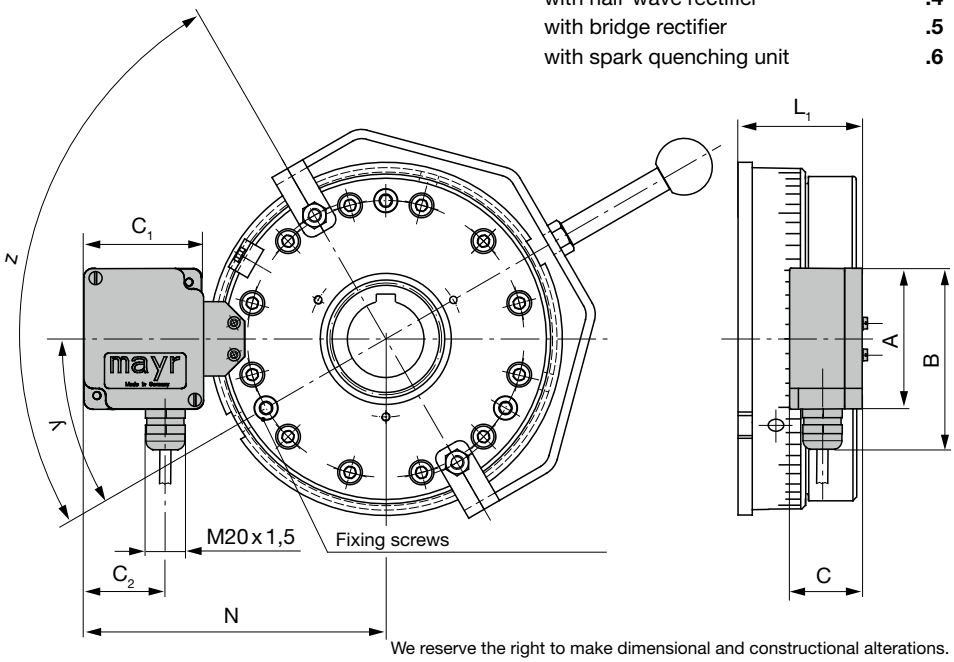


Type 80_.41_._

with terminal box

Terminal box

with terminal	**Type 80_.41_.1**
with half-wave rectifier	**.4**
with bridge rectifier	**.5**
with spark quenching unit	**.6**



We reserve the right to make dimensional and constructional alterations.

Dimensions [mm]			Size 3	4	5	6	7	8	9	10	11
Bores	$Ød_{min}$	DIN 6885/1	8	10	10	15	20	25	25	25	30
	$Ød_{max}$	DIN 6885/1	11	13	18	23	30	45	47	57	76
		DIN 6885/2	12 [5]	-	-	-	-	-	-	-	-
		DIN 6885/3	-	15	20	25	32	-	50	60	80
		Preferred bores H7	10; 11; 12	12; 15	15; 20	20; 25	25; 30	30; 40	40; 45	45; 50	60; 70

	Size 3	4	5	6	7	8	9	10	11
A	64	64	64	64	79,5	79,5	79,5	79,5	79,5
a	0,2	0,2	0,25	0,25	0,35	0,35	0,4	0,4	0,5
B	77	77	77	77	92,5	92,5	92,5	92,5	92,5
b	22	26	35	40	48	68	75	90	120
C	36	36	36	36	42	42	42	42	42
C_1	58	58	58	58	66,5	66,5	66,5	66,5	66,5
C_2	29	29	29	29	45,5	45,5	45,5	45,5	45,5
c	8	8	9	10,5	16,5	18	18	25	30
D	72	86	104,5	131,5	146	183	201	255	330
D_2	79	98	114	142	165	199	220	275	360
F	48,3	55,8	68,2	84,6	96,8	117,8	125,6	158	-
F_1	104,3	111,8	133,2	158,6	191,8	210,3	245,6	427	-
f	6	6	8	10	12	14	15	15	-
G^{H7}	21,9	26,9	30,9	38,9	50,9	73,9	80,4	90	129
H	86,3	93,8	115,2	136,1	169,3	181,3	208,6	390	-
H_1	19	21	22,5	27,5	38	38	50	65	-
h	6	7	8	8	8	10	12	14	16
K	6	5	6	8	8	12	9	12	24
K_1	5	8	8	10	10	12	12	18	18
L	30,2 [6]	32,2 [7]	39,3	43,2	58,2	66,7	74,3	96,3	116,3

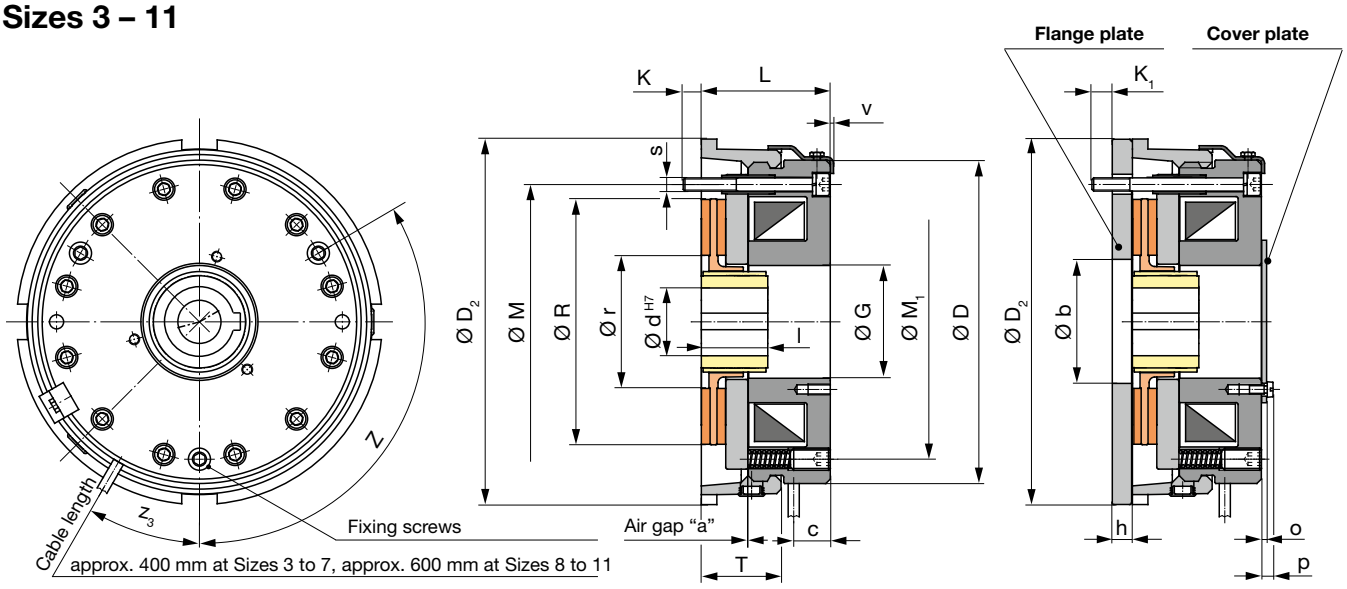
	Size 3	4	5	6	7	8	9	10	11
L_1	38,2	40,2	47,3	51,2	61,2	69,7	77,2	99,3	119,3
l	15	20	20	25	30	35	35	50	60
	Please observe the load on the shaft or key!								
M	58	72	90	112	124	156	175	215	280
M_1	58	72	89	112	124	156	175	215	280
N	102	109	118,5	132	151,5	170	179	206	243,5
o	1,5	2,5	2,5	3,5	3,5	2	2	2	2
p	3,5	5,1	5,1	6,1	6,8	5,3	5,9	5,9	7
R	50	62,5	79,5	99	110,5	139	158	188	253
r	25	32	40	45	60	77	83	94	128
s	3xM4	3xM4	3xM5	3xM6	3xM6	3xM8	6xM8	6xM8	6xM12
T	17	19	25	27	36	38	47	56	74
U	60,5	75	91	115,5	129	161	175	215	-
u	6,5	7	9	11,5	13,5	19	21,5	29	-
v	1	1	1	1,5	1,5	1,5	2	2	2
y	33°	32°	32°	32°	30°	30°	30°	30°	22,5 °
Z	3 x 120°						6x60°	6x60°	6x60°
z	98°	98°	105°	90°	90°	90°	90°	90°	90°
z_3	33°	32°	33°	33°	30°	30°	30°	30°	22,5 °

1) Braking torque tolerance: + 40 % / - 20 %, other braking torques available on request
2) Higher speeds on request
3) A rotating hand release is used as a hand release for Size 11 (dimensions on request)
4) Standard voltages [VDC]: 24; 104; 180; 207
Permitted voltage tolerance: ± 10 % acc. DIN IEC 60038
5) Width b = 4 ^{JS9}, depth t = 1,2 $^{+0,1}$
6) Fixing screws protruding 3,2 mm
7) Fixing screws protruding 2,2 mm

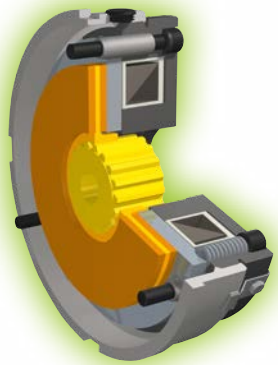
ROBA-stop®- holding brake
Type 820.61_._
Sizes 3 – 11

Type 820.610.3
without additional parts

Type 820.614.3
with flange plate
and cover plate



Technical Data			Size								
			3	4	5	6	7	8	9	10	11
Braking torque [1]	M_N	[Nm]	5	10	22	48	90	180	360	620	1250
Electrical power	P_{20}	[W]	17	24	33	50	70	87	102	134	196
Max. speed [2]	n_{max}	[rpm]	6000	5000	4800	4000	3800	3400	3000	3000	3000
Weight		[kg]	0,6	0,95	1,8	3,1	5,4	9,4	15,5	30	55



The holding brake is designed to hold large masses or loads without friction work.
Braking at low speeds with low friction work can be made possible, but if this is required, the application conditions should first be discussed with the manufacturer.

A higher braking torque is achieved by placing more pre-tension on the brake springs located at the external pole of the magnetic part.

A standard hand release for Sizes 9 – 11 cannot be supplied due to the high spring forces. Special hand release available on request.

The brake can easily be connected to a DC voltage supply via our comprehensive range of electrical accessories (see pages 33 – 38).

Order Number

__ / 8 2 0 . 6 1 __ . __ / __ / __ / __

Size
3
4
5
6
7
8
9
10
11

Without additional parts	0
Flange plate	1
Cover plate	2
Hand release [3]	3
Flange plate / cover plate	4
Flange plate / hand release [3]	5
Cover plate / hand release [3]	6
Flange plate / cover plate / hand release [3]	7

Voltage [4] [VDC] ± 10 %
24
104
180
207

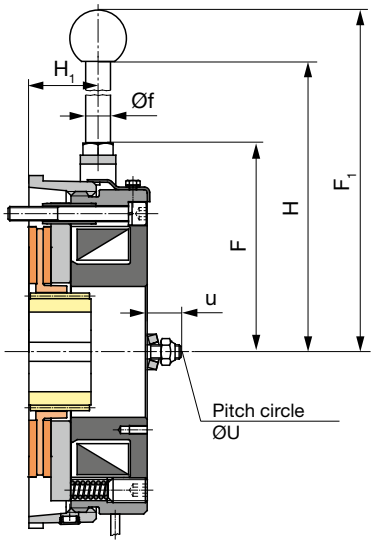
Bore Ø d H7
(Dimensions page 11)

Keyway acc.
DIN 6885/1
DIN 6885/2
DIN 6885/3

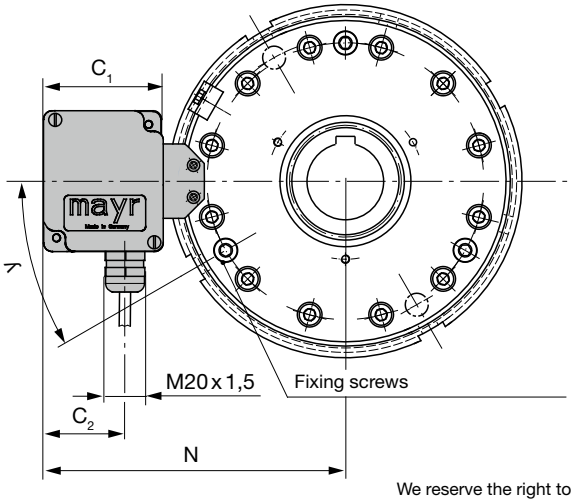
1	Terminal box with terminal
3	Cable
4	Terminal box with half-wave rectifier
5	Terminal box with bridge rectifier
6	Terminal box with spark quenching unit

Example: 6 / 820.611.3 / 104 / 22 / 6885/1

Type 820.613.3
with hand release (Sizes 3 – 8)

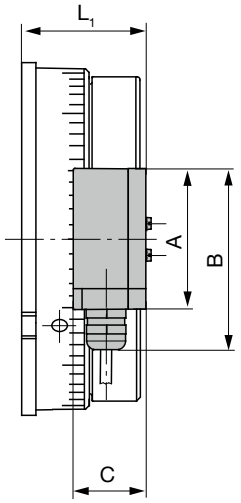


Type 820.61_._
with terminal box



Terminal box

with terminal	**Type 820.61_.1**
with half-wave rectifier	**.4**
with bridge rectifier	**.5**
with spark quenching unit	**.6**



We reserve the right to make dimensional and constructional alterations.

Dimensions [mm]			Size								
			3	4	5	6	7	8	9	10	11
Bores	$Ød_{min}$	DIN 6885/1	8	10	10	15	20	25	30	30	30
	$Ød_{max}$	DIN 6885/1	11	13	18	23	30	45	47	57	76
		DIN 6885/2	12 5)	-	-	-	-	-	-	-	-
		DIN 6885/3	-	15	20	25	32	-	50	60	80
		Preferred bores H7	10; 11; 12	12; 15	15; 20	20; 25	25; 30	30; 40	40; 45	45; 50	60; 70

	Size								
	3	4	5	6	7	8	9	10	11
A	64	64	64	64	79,5	79,5	79,5	79,5	79,5
a	0,2	0,2	0,25	0,25	0,35	0,35	0,4	0,4	0,5
B	77	77	77	77	92,5	92,5	92,5	92,5	92,5
b	22	26	35	40	48	68	75	90	120
C	36	36	36	36	42	42	42	42	42
C_1	58	58	58	58	66,5	66,5	66,5	66,5	66,5
C_2	29	29	29	29	45,5	45,5	45,5	45,5	45,5
c	8	8	9	10,5	16,5	18	18	25	30
D	72	86	104,5	131,5	146	183	201	255	330
D_2	79	98	114	142	165	199	220	275	360
F	48,3	55,8	68,2	84,6	96,8	117,8	-	-	-
F_1	104,3	111,8	133,2	158,6	191,8	210,3	-	-	-
f	6	6	8	10	12	14	-	-	-
G^{H7}	21,9	26,9	30,9	38,9	50,9	73,9	80,4	90	129
H	86,3	93,8	115,2	136,1	169,3	181,3	-	-	-
H_1	19	21	22,5	27,5	38	38	-	-	-
h	6	7	8	8	8	10	12	14	16
K	6	5	6	8	8	12	9	12	24
K_1	5	8	8	10	10	12	12	18	18
L	30,2 6)	32,2 7)	39,3	43,2	58,2	66,7	74,3	96,3	116,3

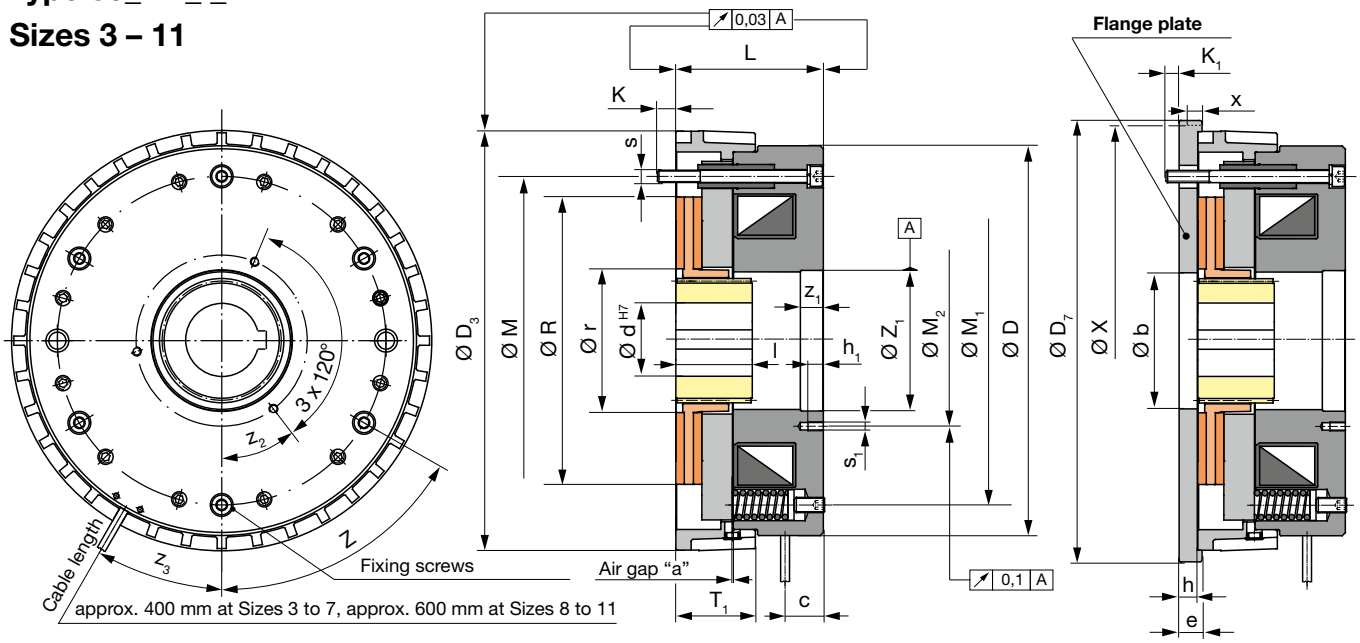
	Size								
	3	4	5	6	7	8	9	10	11
L_1	38,2	40,2	47,3	51,2	61,2	69,7	77,2	99,3	119,3
l	15	20	20	25	30	35	35	50	60
	Please observe the load on the shaft or key!								
M	58	72	90	112	124	156	175	215	280
M_1	58	72	89	112	124	156	175	215	280
N	102	109	118,5	132	151,5	170	179	206	243,5
o	1,5	2,5	2,5	3,5	3,5	2	2	2	2
p	3,5	5,1	5,1	6,1	6,8	5,3	5,9	5,9	7
R	50	62,5	79,5	99	110,5	139	158	188	253
r	25	32	40	45	60	77	83	94	128
s	3xM4	3xM4	3xM5	3xM6	3xM6	3xM8	6xM8	6xM8	6xM12
T	17	19	25	27	36	38	47	56	74
U	60,5	75	91	115,5	129	161	-	-	-
u	6,5	7	9	11,5	13,5	19	-	-	-
v	1	1	1	1,5	1,5	1,5	2	2	2
y	33°	32°	32°	32°	30°	30°	30°	30°	22,5 °
Z			3 x 120°				6x60°	6x60°	6x60°
z	98°	98°	105°	90°	90°	90°	90°	90°	90°
z_3	33°	32°	33°	33°	30°	30°	30°	30°	22,5 °

1) Braking torque tolerance: + 40 % / - 20 %, other braking torques available on request
2) Higher speeds on request
3) Standard hand release for Sizes 9 – 11 not possible

4) Standard voltages [VDC]: 24; 104; 180; 207
Permitted voltage tolerance: ± 10 % acc. DIN IEC 60038
5) Width b = 4 ^{JS9}, depth t = 1,2 $^{+0,1}$
6) Fixing screws protruding 3,2 mm
7) Fixing screws protruding 2,2 mm

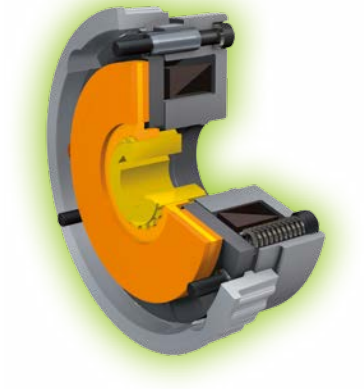
ROBA-stop® - tacho brake
Type 83_.41_._
Sizes 3 – 11

Type 83_.410.3
without additional parts



Type 83_.411.3
with flange plate

Technical Data			Size								
			3	4	5	6	7	8	9	10	11
Braking torque [1]	M_N	[Nm]	3	6	12	26	50	100	200	400	800
Electrical power	P_{20}	[W]	17	24	33	50	70	87	102	134	196
Max. speed [2]	n_{max}	[rpm]	6000	5000	4800	4000	3800	3400	3000	3000	3000
Weight		[kg]	0,6	0,95	1,8	3,1	5,4	9,4	15,5	30	55



The tacho brake has a fixed distance ring as well as a centering recess and three tapped holes on the rear side of the coil carrier. The centering recess is centered with the outer diameter of the distance ring.

The tacho-generator, the encoder or other components can be mounted via an intermediate flange. This flange must be manufactured according to the connection dimensions of the brake and the components, which are to be mounted.

When selecting a component to be mounted, the technical parameters and influences of the brake, such as the speed, the steady-state temperature, stray magnetic fields around the brake etc., must be taken into consideration by the customer.

The brake can easily be connected to a DC voltage supply via our comprehensive range of electrical accessories (see pages 33 – 38).

Order Number

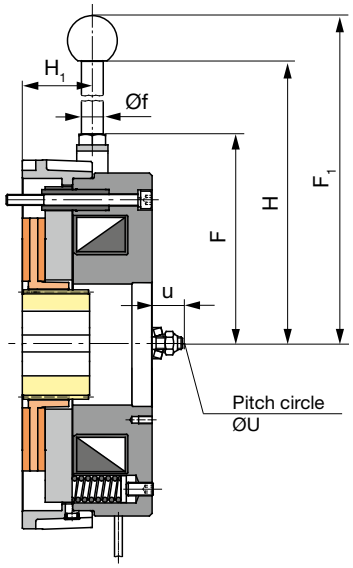
__ / 8 3 __ . 4 1 __ . __ / __ / __ / __

Size	Standard armature disk	Fast acting armature disk	Without additional parts	Flange plate	Hand release [3]	Flange plate/hand release [3]	Terminal box with terminal	Cable	Terminal box with half-wave rectifier	Terminal box with bridge rectifier	Terminal box with spark quenching unit	Voltage [4] [VDC] ± 10 %	Bore Ø d H7	Keyway acc.
3	0	2	0	1	3	5	1	3	4	5	6	24	(Dimensions page 13)	DIN 6885/1
4												104		DIN 6885/2
5												180		DIN 6885/3
6												207		
7														
8														
9														
10														
11														

Example: 6 / 830.410.3 / 104 / 20 / 6885/1

Type 83_.413.3

with hand release (Size 11 differs from the figure)

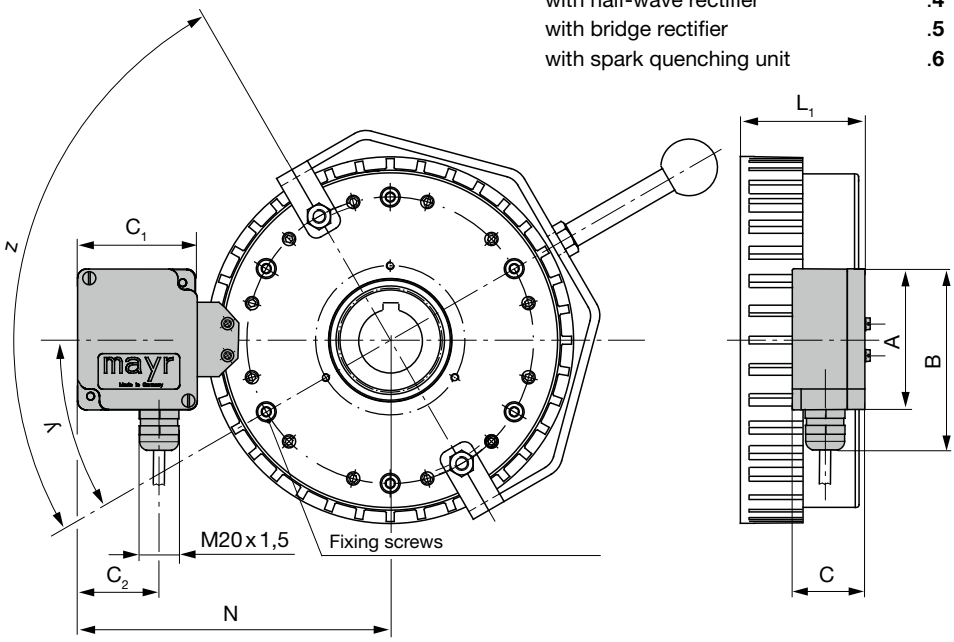


Type 83_.41_._

with terminal box

Terminal box

with terminal	**Type 83_.41_.1**
with half-wave rectifier	**.4**
with bridge rectifier	**.5**
with spark quenching unit	**.6**



We reserve the right to make dimensional and constructional

Dimensions [mm]			Size								
			3	4	5	6	7	8	9	10	11
Bores	$Ød_{min}$	DIN 6885/1	8	10	10	15	20	25	25	25	30
	$Ød_{max}$	DIN 6885/1	11	13	18	23	30	45	47	57	76
		DIN 6885/2	12 5)	-	-	-	-	-	-	-	-
		DIN 6885/3	-	15	20	25	32	-	50	60	80
		Preferred bores H7	10; 11; 12	12; 15	15; 20	20; 25	25; 30	30; 40	40; 45	45; 50	60; 70

	Size								
	3	4	5	6	7	8	9	10	11
A	64	64	64	64	79,5	79,5	79,5	79,5	79,5
a	0,2	0,2	0,25	0,25	0,35	0,35	0,4	0,4	0,5
B	77	77	77	77	92,5	92,5	92,5	92,5	92,5
b^{H7}	22	26	35	40	48	68	75	90	120
C	36	36	36	36	42	42	42	42	42
C_1	58	58	58	58	66,5	66,5	66,5	66,5	66,5
C_2	29	29	29	29	45,5	45,5	45,5	45,5	45,5
c	8	8	9	10,5	16,5	18	18	25	30
D	72	86	104,5	131,5	146	183	201	255	330
$D_{3\,g7}$	78,5	97,5	113,5	141,5	164,5	198	219	274	358
$D_{7\,h6}$	85	105	122	150	175	210	230	285	370
e	8,5	8,5	9,5	10	10	13	15	17	19
F	48,3	55,8	68,2	84,6	96,8	117,8	125,6	158	-
F_1	104,3	111,8	133,2	158,6	191,8	210,3	245,6	427	-
f	6	6	8	10	12	14	15	15	-
H	86,3	93,8	115,2	136,1	169,3	181,3	208,6	390	-
H_1	19	21	22,5	27,5	38	38	50	65	-
h	6,5	6,5	7,5	8	8	10	12	14	16
h_1	6	10	10	10	10	10	10	10	13
K	6	5	6	8	8	12	9	12	24
K_1	5	8	8	10	10	12	12	18	18
L	30,2 6)	32,2 7)	39,4	43,2	58,3	66,8	74,4	96,4	116,4
L_1	38,2	40,2	47,3	51,2	61,2	69,7	77,2	99,3	119,3

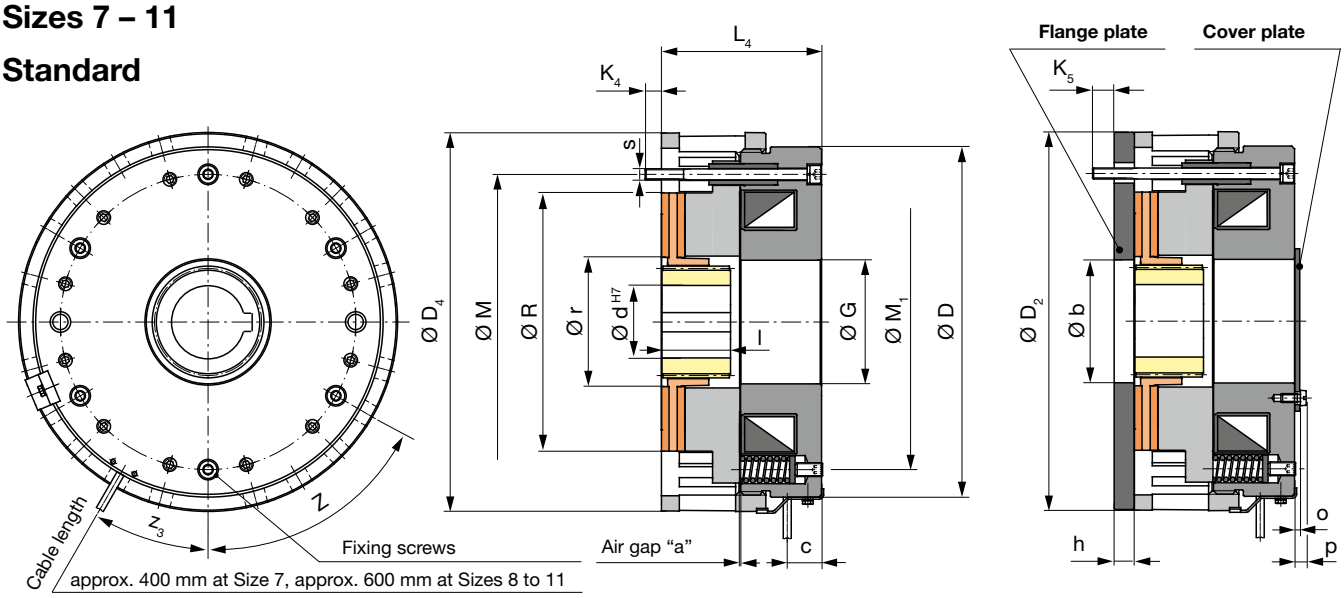
	Size								
	3	4	5	6	7	8	9	10	11
l	15	20	20	25	30	35	35	50	60
	Please observe the load on the shaft or key!								
M	58	72	90	112	124	156	175	215	280
M_1	58	72	89	112	124	156	175	215	280
M_2	29	35	41	52	61	88	100	112	145
N	102	109	118,5	132	151,5	170	179	206	243,5
R	50	62,5	79,5	99	110,5	139	158	188	253
r	25	32	40	45	60	77	83	94	128
s	3xM4	3xM4	3xM5	3xM6	3xM6	3xM8	6xM8	6xM8	6xM12
s_1	3xM3	3xM4	3xM4	3xM4	3xM5	3xM5	3xM6	3xM6	3xM8
T_1	15	16	20	23	34	38	40	52	77,5
U	60,5	75	91	115,5	129	161	175	215	-
u	6,5	7	9	11,5	13,5	19	21,5	29	-
X	84,5	104,5	121,5	149,5	-	-	-	-	-
x	4	4	4,5	5	-	-	-	-	-
y	33°	32°	32°	32°	30°	30°	30°	30°	22,5 °
Z	3 x 120°						6x60°	6x60°	6x60°
Z_1^{H7}	23,5	28,5	32,5	40,5	52,5	75,5	82,5	92	131
z	98°	98°	105°	90°	90°	90°	90°	90°	90°
z_1	8	8	8	9	9	10	15	15	15
z_2	22°	22,5 °	15°	30°	45°	60°	0°	0°	0°
z_3	33°	32°	33°	33°	30°	30°	30°	30°	22,5 °

1) Braking torque tolerance: + 40 % / - 20 %, other braking torques available on request
2) Higher speeds on request
3) A rotating hand release is used as a hand release for Size 11 (dimensions on request)
4) Standard voltages [VDC]: 24; 104; 180; 207
Permitted voltage tolerance: ± 10 % acc. DIN IEC 60038
5) Width b = 4^{JS9}, depth t = $1,2^{+0,1}$
6) Fixing screws protruding 3,2 mm
7) Fixing screws protruding 2,2 mm

ROBA-stop® - peak load brake
Type 863.41_._
Sizes 7 – 11
Standard

Type 863.410.3
without additional parts

Type 863.414.3
with flange plate
and cover plate



Technical Data			Size				
			7	8	9	10	11
Braking torque [1]	M_N	[Nm]	50	100	200	400	800
Electrical power	P_{20}	[W]	70	87	102	134	196
Max. speed [2]	n_{max}	[rpm]	3800	3400	3000	3000	3000
Weight		[kg]	6	10,4	17	33	61

The peak load brake can be used in normal switching operation for braking and exact positioning. Additionally, it is designed to absorb extremely high friction work which may occur, for example, during EMERGENCY STOP.

Several peak loads occurring in short succession can be dealt with problem-free by the brake.

The openings in the distance ring allow removal of the occurring friction dust, additional heat dissipation via convection and surface radiation as well as comfortable checking on the brake rotor or the air gap.

The brake can easily be connected to a DC voltage supply via our comprehensive range of electrical accessories (see pages 33 – 38).

Order Number

__ / 8 6 3 . 4 1 __ . __ / __ / __ / __

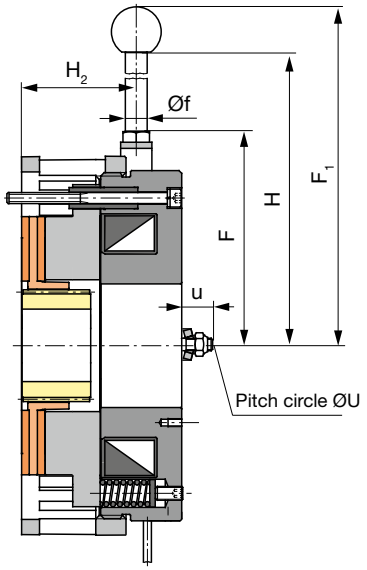
Size				Voltage [4] [VDC] ± 10 %	Bore Ø d H7	Keyway acc.
7	Without additional parts	0		24	(Dimensions page 15)	DIN 6885/1
8	Flange plate	1		104		DIN 6885/3
9	Cover plate	2		180		
10	Hand release [3]	3		207		
11	Flange plate / cover plate	4				
	Flange plate / hand release [3]	5				
	Cover plate / hand release [3]	6				
	Flange plate / cover plate / hand release [3]	7				

1	Terminal box with terminal
3	Cable
4	Terminal box with half-wave rectifier
5	Terminal box with bridge rectifier
6	Terminal box with spark quenching unit

Example: 8 / 863.411.3 / 104 / 45 / 6885/1

Type 863.413.3

with hand release (Size 11 differs from the figure)

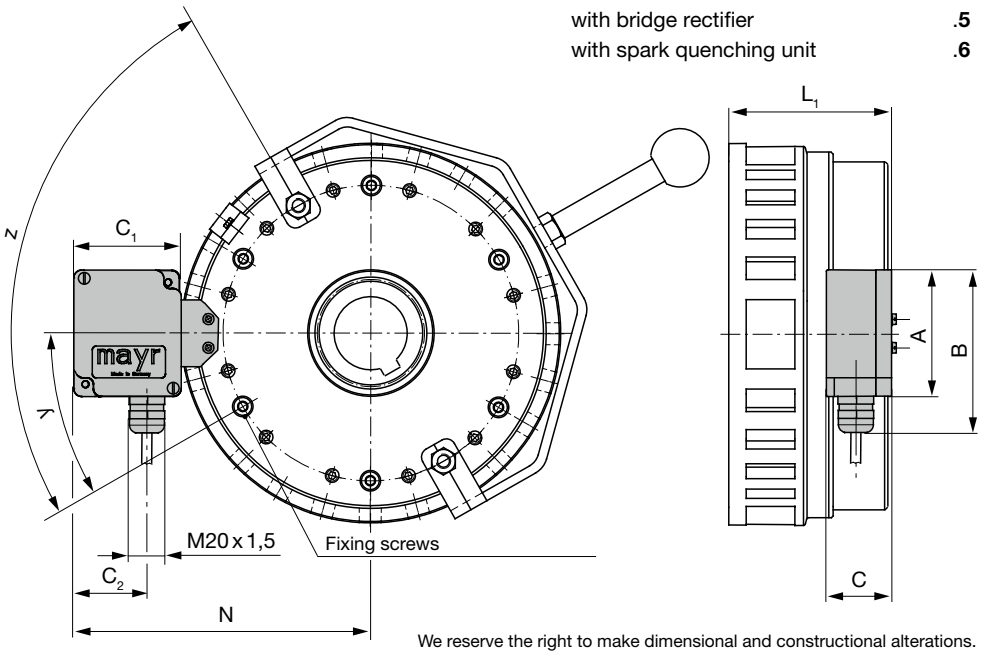


Type 863.41_._

with terminal box

Terminal box

with terminal	**Type 863.41_.1**
with half-wave rectifier	**.4**
with bridge rectifier	**.5**
with spark quenching unit	**.6**



We reserve the right to make dimensional and constructional alterations.

Dimensions [mm]			Size				
			7	8	9	10	11
Bores	$Ød_{min}$	DIN 6885/1	20	25	25	25	30
	$Ød_{max}$	DIN 6885/1	30	45	47	57	76
		DIN 6885/3	32	-	50	60	80
	Preferred bores H7		25; 30	30; 40	40; 45	45; 50	60; 70

	Size				
	7	8	9	10	11
A	79,5	79,5	79,5	79,5	79,5
a	0,35	0,35	0,4	0,4	0,5
B	92,5	92,5	92,5	92,5	92,5
b	48	68	75	90	120
C	42	42	42	42	42
C_1	66,5	66,5	66,5	66,5	66,5
C_2	45,5	45,5	45,5	45,5	45,5
c	16,5	18	18	25	30
D	146	183	201	255	330
D_2	165	199	220	275	360
D_4	166	199	220	276	360
F	96,8	117,8	125,6	158	-
F_1	191,8	210,3	245,6	427	-
f	12	14	15	15	-
G^{H7}	50,9	73,9	80,4	90	129
H	169,3	181,3	208,6	390	-
H_2	48	49	63	85	-
h	8	10	12	14	16
K_4	8,2	10,8	11,3	12,2	22,2

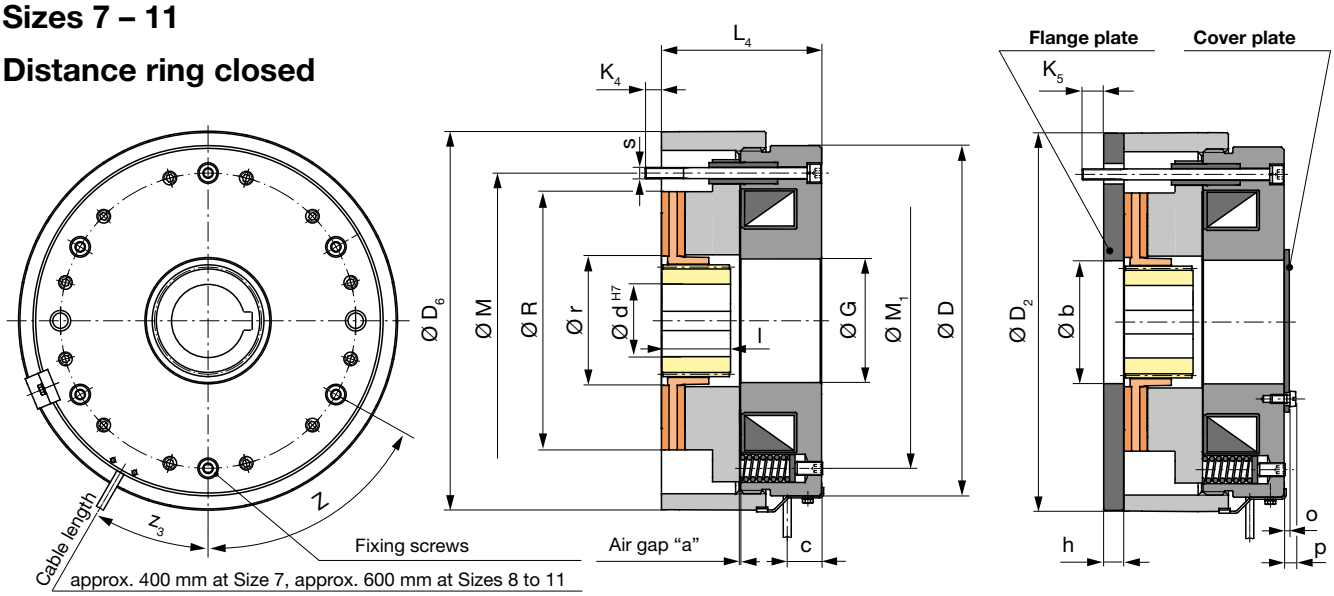
	Size				
	7	8	9	10	11
K_5	10,2	10,8	19,3	18	26,2
L_4	68,2	77,7	87,3	116,3	138,3
L_5	71,2	80,7	90,2	119,3	141,3
l	30	35	35	50	60
	Please observe the load on the shaft or key!				
M	124	156	175	215	280
M_1	124	156	175	215	280
N	151,5	170	179	206	243,5
o	3,5	2	2	2	2
p	6,8	5,3	5,9	5,9	7
R	110,5	139	158	188	253
r	60	77	83	94	128
s	3xM6	3xM8	6xM8	6xM8	6xM12
U	129	161	175	215	-
u	13,5	19	21,5	29	-
y	30°	30°	30°	30°	22,5 °
Z	3x120°	3x120°	6x60°	6x60°	6x60°
z	90°	90°	90°	90°	90°
z_3	30°	30°	30°	30°	22,5 °

1) Braking torque tolerance: + 40 % / - 20 %, other braking torques available on request
2) Higher speeds on request
3) A rotating hand release is used as a hand release for Size 11 (dimensions on request)
4) Standard voltages [VDC]: 24; 104; 180; 207
Permitted voltage tolerance: ± 10 % acc. DIN IEC 60038

ROBA-stop® - peak load brake
Type 866.41_._
Sizes 7 – 11
Distance ring closed

Type 866.410.3
without additional parts

Type 866.414.3
with flange plate
and cover plate



Technical Data			Size				
			7	8	9	10	11
Braking torque [1]	M_N	[Nm]	50	100	200	400	800
Electrical power	P_{20}	[W]	70	87	102	134	196
Max. speed [2]	n_{max}	[rpm]	3800	3400	3000	3000	3000
Weight		[kg]	6	10,4	17	33	61

The peak load brake can be used in normal switching operation for braking and exact positioning. Additionally, it is designed to absorb high friction work which may occur, for example, during EMERGENCY STOP.

Peak loads occurring in short succession can be dealt with problem-free by the brake.

The peak load brake is protected by the closed distance ring against dust and dirt. The brake in connection with the cover plate corresponds to Protection IP54.

The brake can easily be connected to a DC voltage supply via our comprehensive range of electrical accessories (see pages 33 – 38).

Order Number

__ / 8 6 6 . 4 1 __ . __ / __ / __ / __

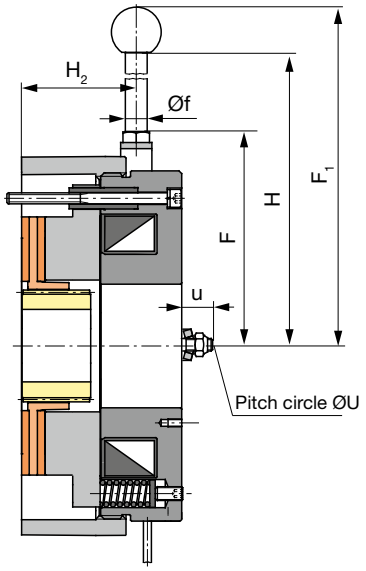
Size			Voltage [4] [VDC] ± 10 %	Bore Ø d H7	Keyway acc.
7	Without additional parts	0	24	(Dimensions page 17)	DIN 6885/1
8	Flange plate	1	104		DIN 6885/3
9	Cover plate	2	180		
10	Hand release [3]	3	207		
11	Flange plate / cover plate	4			
	Flange plate / hand release [3]	5			
	Cover plate / hand release [3]	6			
	Flange plate / cover plate / hand release [3]	7			

1	Terminal box with terminal
3	Cable
4	Terminal box with half-wave rectifier
5	Terminal box with bridge rectifier
6	Terminal box with spark quenching unit

Example: 8 / 866.411.3 / 104 / 45 / 6885/1

Type 866.413.3

with hand release (Size 11 differs from the figure)

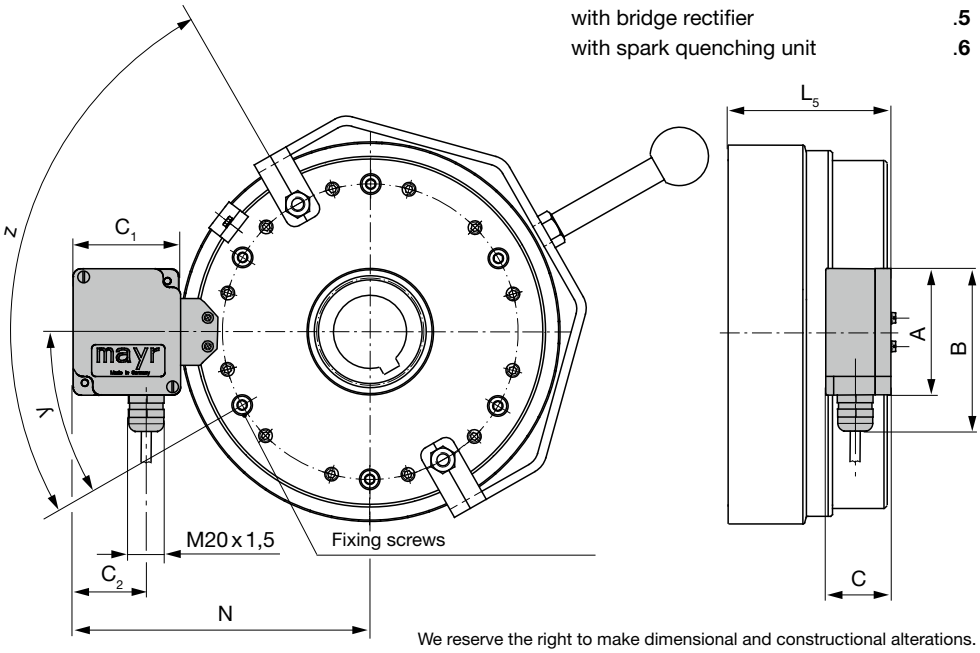


Type 866.41_._

with terminal box

Terminal box

with terminal	**Type 866.41_.1**
with half-wave rectifier	**.4**
with bridge rectifier	**.5**
with spark quenching unit	**.6**



We reserve the right to make dimensional and constructional alterations.

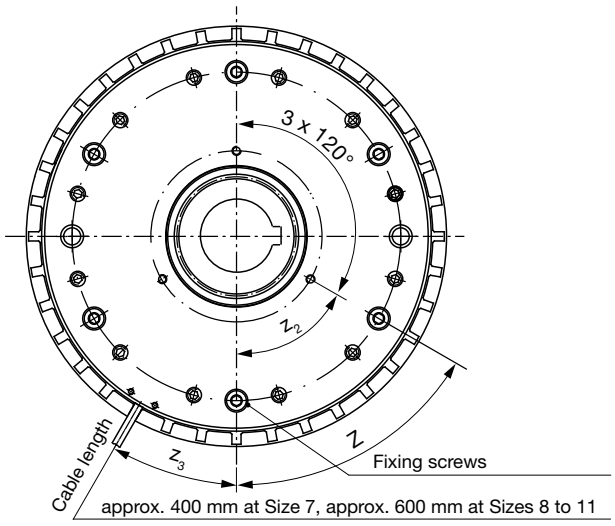
Dimensions [mm]			Size				
			7	8	9	10	11
Bores	$Ød_{min}$	DIN 6885/1	20	25	25	25	30
	$Ød_{max}$	DIN 6885/1	30	45	47	57	76
		DIN 6885/3	32	-	50	60	80
	Preferred bores H7		25; 30	30; 40	40; 45	45; 50	60; 70

	Size				
	7	8	9	10	11
A	79,5	79,5	79,5	79,5	79,5
a	0,35	0,35	0,4	0,4	0,5
B	92,5	92,5	92,5	92,5	92,5
b	48	68	75	90	120
C	42	42	42	42	42
C_1	66,5	66,5	66,5	66,5	66,5
C_2	45,5	45,5	45,5	45,5	45,5
c	16,5	18	18	25	30
D	146	183	201	255	330
D_2	165	199	220	275	360
D_6	166	199	220	276	360
F	96,8	117,8	125,6	158	-
F_1	191,8	210,3	245,6	427	-
f	12	14	15	15	-
G^{H7}	50,9	73,9	80,4	90	129
H	169,3	181,3	208,6	390	-
H_2	48	49	63	85	-
h	8	10	12	14	16
K_4	8,2	10,8	11,3	12,2	22,2

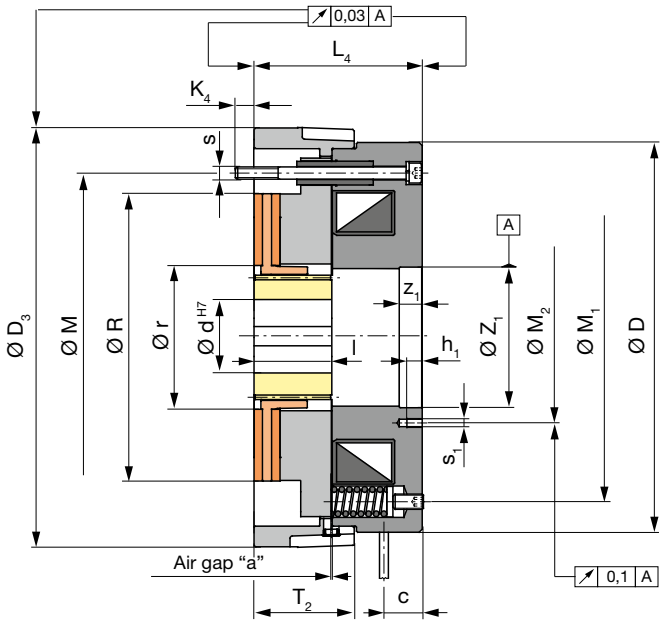
	Size				
	7	8	9	10	11
K_5	10,2	10,8	19,3	18	26,2
L_4	68,2	77,7	87,3	116,3	138,3
L_5	71,2	80,7	90,2	119,3	141,3
l	30	35	35	50	60
	Please observe the load on the shaft or key!				
M	124	156	175	215	280
M_1	124	156	175	215	280
N	151,5	170	179	206	243,5
o	3,5	2	2	2	2
p	6,8	5,3	5,9	5,9	7
R	110,5	139	158	188	253
r	60	77	83	94	128
s	3xM6	3xM8	6xM8	6xM8	6xM12
U	129	161	175	215	-
u	13,5	19	21,5	29	-
y	30°	30°	30°	30°	22,5 °
Z	3x120°	3x120°	6x60°	6x60°	6x60°
z	90°	90°	90°	90°	90°
z_3	30°	30°	30°	30°	22,5 °

1) Braking torque tolerance: + 40 % / - 20 %, other braking torques available on request
2) Higher speeds on request
3) A rotating hand release is used as a hand release for Size 11 (dimensions on request)
4) Standard voltages [VDC]: 24; 104; 180; 207
Permitted voltage tolerance: ± 10 % acc. DIN IEC 60038

ROBA-stop®-tacho peak load brake
Type 883.41_._
Sizes 7 – 11



Type 883.410.3
without additional parts



We reserve the right to make dimensional and constructional alterations.

Technical Data			Size				
			7	8	9	10	11
Braking torque [1]	M_N	[Nm]	50	100	200	400	800
Electrical power	P_{20}	[W]	70	87	102	134	196
Max. speed [2]	n_{max}	[rpm]	3800	3400	3000	3000	3000
Weight		[kg]	6	10,5	17,2	33,8	62,7

Dimensions [mm]			Size				
			7	8	9	10	11
Bores	$Ød_{min}$	DIN 6885/1	20	25	25	25	30
	$Ød_{max}$	DIN 6885/1	30	45	47	57	76
		DIN 6885/3	32	-	50	60	80
	Preferred bores H7		25; 30	30; 40	40; 45	45; 50	60; 70

	Size				
	7	8	9	10	11
a	0,4	0,4	0,45	0,45	0,55
c	16,5	18	18	25	30
D	146	183	201	255	330
$D_{3\ g7}$	164,5	198	219	274	358
h_1	10	10	10	10	13
K_4	8,2	10,8	11,3	12,2	22,2
L_4	68,3	77,8	87,4	116,4	138,4
l	30	35	35	50	60
	Please observe the load on the shaft or key!				
M	124	156	175	215	280
M_1	124	156	175	215	280

	Size				
	7	8	9	10	11
M_2	61	88	100	112	145
R	110,5	139	158	188	253
r	60	77	83	94	128
s	3xM6	3xM8	6xM8	6xM8	6xM12
s_1	3xM5	3xM5	3xM6	3xM6	3xM8
T_2	44	49	53	72	99,5
Z	3x120°	3x120°	6x60°	6x60°	6x60°
Z_1 H7	52,5	75,5	82,5	92	131
z_1	9	10	15	15	15
z_2	45°	60°	0°	0°	0°
z_3	30°	30°	30°	30°	22,5 °

Order Number

__ / 8 8 3 . 4 1 __ . __ / __ / __ / __

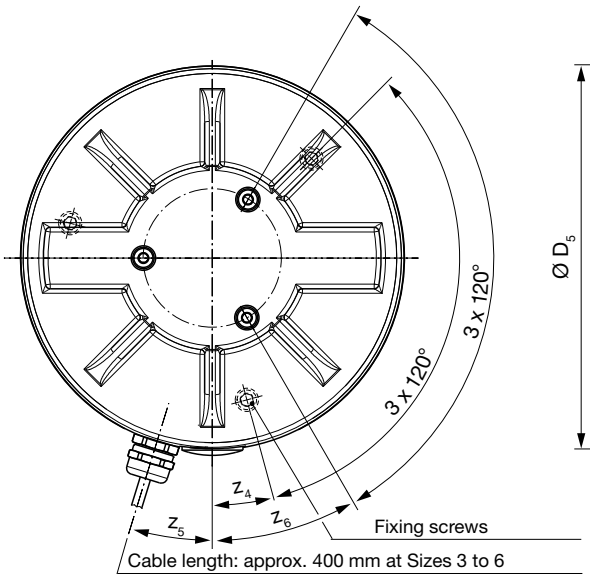
Size			Voltage [4] [VDC] ± 10 %	Bore Ø d H7	Keyway acc.
7	Without additional parts	0	24	(Dimensions page 18)	DIN 6885/1
8	Hand release [3]	3	104		DIN 6885/3
9	Terminal box with terminal	1	180		
10	Cable	3	207		
11	Terminal box with half-wave rectifier	4			
	Terminal box with bridge rectifier	5			
	Terminal box with spark quenching unit	6			

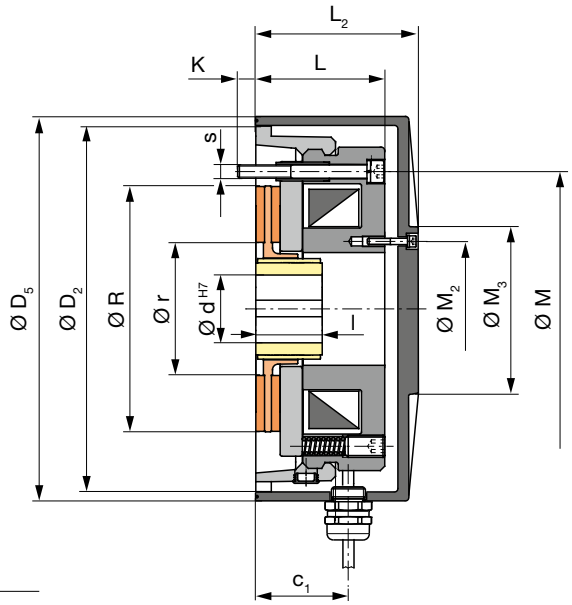
Example: 7 / 883.410.3 / 104 / 25 / 6885/1

1) Braking torque tolerance: + 40 % / - 20 %, other braking torques available on request
2) Higher speeds on request
3) A rotating hand release is used as a hand release for Sizes 10 and 11 (dimensions on request)
4) Standard voltages [VDC]: 24; 104; 180; 207
Permitted voltage tolerance: ± 10 % acc. DIN IEC 60038

ROBA-stop®-sealed
Type 80_.418.3
Sizes 3 – 6

Type 80_.418.3





We reserve the right to make dimensional and constructional alterations.

Technical Data			Size			
			3	4	5	6
Braking torque [1]	M_N	[Nm]	3	6	12	26
Electrical power	P_{20}	[W]	17	24	33	50
Max. speed [2]	n_{max}	[rpm]	6000	5000	4800	4000

Dimensions [mm]			Size			
			3	4	5	6
Bores	$Ød_{min}$	DIN 6885/1	8	10	10	15
	$Ød_{max}$	DIN 6885/1	11	13	18	23
		DIN 6885/2	12 [3]	-	-	-
		DIN 6885/3	-	15	20	25
	Preferred bores H7		10; 11; 12	12; 15	15; 20	20; 25

This positioning brake design is completely enclosed and corresponds to Protection IP67 (TÜV- (German Technical Inspectorate) approved).

Installation of the sealing cover is simple.

An aluminium cover is screwed onto the pre-installed standard positioning brake.

The cable outlet is protected by a completely watertight screw connector.

The brake magnetic coil can easily be connected to a DC voltage supply via our comprehensive range of electrical accessories (see pages 33 – 38).

Special variations of this sealed brake which are suitable for a continuous shaft can be designed and produced on request.

	Size			
	3	4	5	6
c_1	24	25	30	33
D_2	79	98	114	142
D_5	91	110	125	155
K	6	5	6	8
L	30,2	32,2	39,3	43,2
L_2	45	50	58	62
l	15	20	20	25
	Please observe the load on the shaft or key!			

	Size			
	3	4	5	6
M	58	72	90	112
M_2	29	35	41	52
M_3	48	55	60	75
R	50	62,5	79,5	99
r	25	32	40	45
s	3xM4	3xM4	3xM5	3xM6
z_4	8°	8°	15°	0°
z_5	25°	24°	17°	32°
z_6	30°	30,5°	30°	30°

1) Braking torque tolerance: + 40 % / - 20 %, other braking torques available on request
2) Higher speeds on request
3) Width b = 4 JS9, depth t = 1,2 +0,1
4) Standard voltages [VDC]: 24; 104; 180; 207
Permitted voltage tolerance: ± 10 % acc. DIN IEC 60038

Order Number

__ / 8 0 __ . 4 1 8 . 3 / __ / __ / __

Size	Standard armature disk	0	Cable	3	Voltage [4] [VDC] ± 10 %	Bore Ø d H7	Keyway acc.
3	Fast acting armature disk	2			24	(Dimensions page 19)	DIN 6885/1
4					104		DIN 6885/2
5					180		DIN 6885/3
6					207		

Example: 5 / 802.418.3 / 104 / 15 / 6885/1

ROBA-stop®-S

ROBA-stop®-S have two functions. During standard operation they work as holding brakes. When the drives have been switched off the brakes hold the system safely in position. During critical operational situations, e.g. with EMERGENCY STOP or power failure, ROBA-stop®-S are designed to absorb peak loads with high friction work. These brakes are designed for vertical and horizontal operations.

Dust and waterproof
Completely enclosed brake design corresponds to Protection IP67.

Permanent protection against corrosion
Protection IP67, a high-quality brake body primary coating, chrome or nickel-coated interior parts or use of rustproof steels ensure protection against corrosion.

Easy handling
Compact construction and small outer diameters mean easy brake handling.

Inspection without system downtimes
Should the friction linings be worn, just readjust the air gap or replace the rotor with its friction linings.

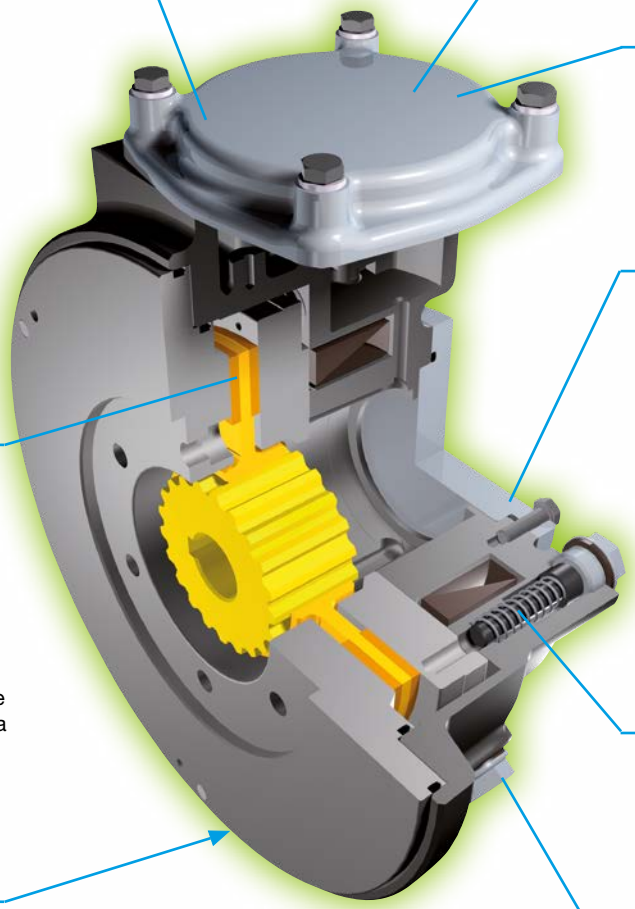
Minimum operating expenses
High working reliability and low maintenance expenditure reduce the operating expenses of the brake to a minimum.

Condensation water inspection
Regular inspection is possible via a drain plug.

Rectifier
A rectifier integrated in the terminal box allows a brake connection to AC-supply. The magnetic coil is designed as a DC-coil.

Wear Monitoring
An additional microswitch can be installed into the ROBA-stop®-S which monitors the wear on the friction linings.

Brake housing and integral terminal box
The one-piece cast iron housing with integrated terminal box is extremely robust and, therefore, protected against mechanical damages.



Anti-condensation heating
This heating system prevents condensation water inside the brake. Its usage is especially recommended at temperatures under zero degrees Celsius or in high air humidity.

Braking torque
By changing the number of springs, the braking torque can be adapted to the customer's requirements.

Optimum protection for electrical equipment
The electrical supply and the inspection and monitoring function microswitches are completely protected inside the cast terminal box.

Release monitoring
The ROBA-stop®-S is fitted with a microswitch for release monitoring. The microswitch emits a signal when the brake is opened.

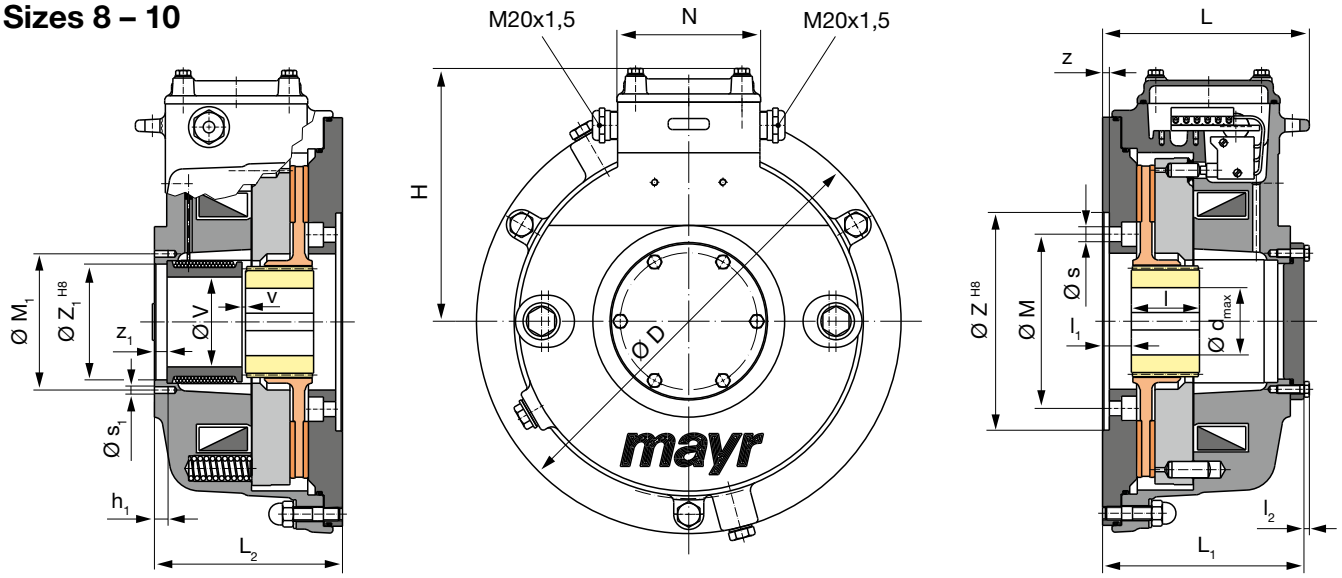
Tacho attachment
The brake body can be fitted with a tacho attachment.
If no tacho is used, the coil carrier is closed by a cover.

Emergency hand release
The ROBA-stop®-S is fitted with an emergency hand release.
The brake can be released mechanically via two screws (bracket hand release available on request).

Inspection without system downtimes
A threaded hole allows fast inspection of the air gap without dismantling the brake or system stoppage.

Motors with self-ventilation
In order to assemble the ROBA-stop®-S onto motors with continuous shafts on the B-bearing side, the closed standard-cover on the brake rear side is exchanged for the open cover with integrated radial shaft sealing ring.

ROBA-stop®- S
Type 856.417._
Sizes 8 – 10



We reserve the right to make dimensional and constructional alterations.

Technical Data				Size 8	Size 9	Size 10
Braking torque [1]		M_N	[Nm]	100	200	400
Electrical power		P_{20}	[W]	85	100	120
		ACH [2]	[W]	15	15	21
Max. speed		n_{max}	[rpm]	3400	3000	3000
Tightening torque	Fixing screws	s	[Nm]	23	23	46
Weight	with flange plate		[kg]	19	26	42

Dimensions [mm]			Size 8	Size 9	Size 10
Bores	$Ød_{min}$ [3]	DIN 6885/1	25	25	25
	$Ød_{max}$ [3]	DIN 6885/1	45	47	57
		DIN 6885/3	-	50	60

1) Tolerance: + 40 % / - 20 %, other braking torques available on request
2) ACH = Anti-condensation heating, standard voltages [VAC]: 115; 230
3) Please observe the load on the shaft or key!
4) Standard voltages [VDC]: 24; 104; 180; 207
Permitted voltage tolerance: ± 10 % acc. DIN IEC 60038

Size	ØD	H	h_1	L	L_1	L_2	l [3]	l_1	l_2	ØM	$ØM_1$	N	s	s_1	ØV	v	Z	Z_1	z	z_1
8	240	155	10	143,5	118	108	35	12	4	100	100	109	6 x ø9	M6	46	6,5	130	85	5	5,5
9	270	167	10	138,5	128,5	118,5	35	18	4	110	100	109	8 x ø9	M6	50	6,5	140	85	5	6
10	310	185	10	152,0	148	138	50	21_{-10}	4	128	100	109	8 x ø11	M6	66	$2,0^{+10}$	160	85	5	9

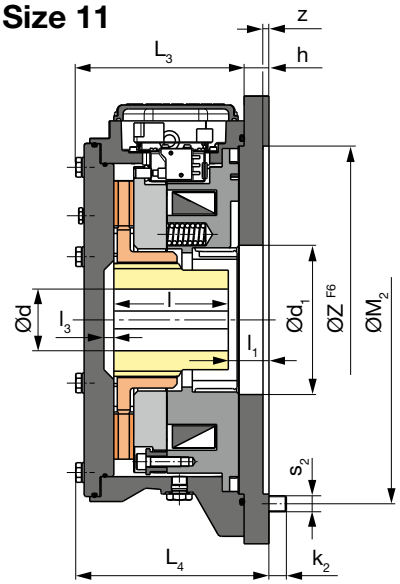
Order Number

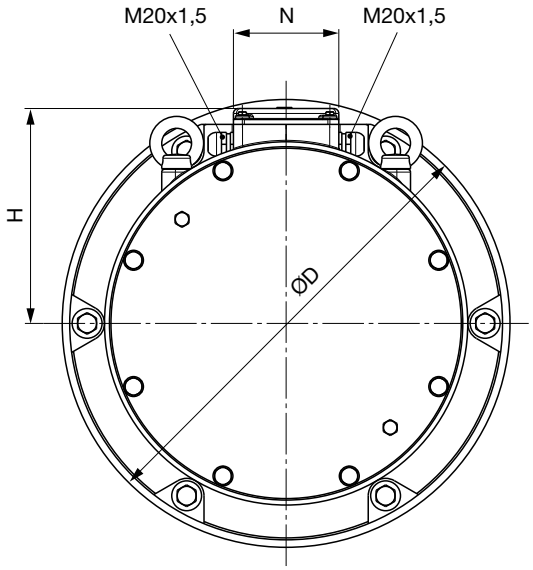
__ / 8 5 6 . 4 1 7 . __ / __ / __ / __

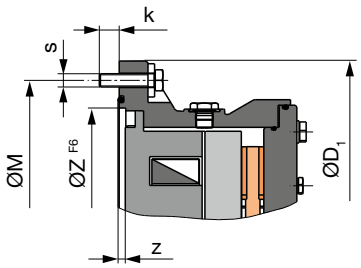
Size	Terminal box:		Voltage [4] [VDC] ± 10 %	Bore Ø d H7 (Dimensions page 21)	Keyway acc.
8		with terminal 1	24		DIN 6885/1
9		with half-wave rectifier 4	104		DIN 6885/3
10		with bridge rectifier 5	180		
	Options:	- Anti-condensation heating	207		
		- Microswitch for wear monitoring			
		- Other Types available on request			

Example: 9 / 856.417.4 / 104 / 30 / 6885/1

ROBA-stop®- S
Type 856.41_._
Size 11







View without flange plate

We reserve the right to make dimensional and constructional alterations.

Technical Data				Size 11
Braking torque [1]		M_N	[Nm]	800
Electrical power		P_{20}	[W]	268
		ACH [2]	[W]	on request
Max. speed		n_{max}	[rpm]	3000
Tightening torque	Fixing screws	s	[Nm]	61
		s_2	[Nm]	122
Weight	with flange plate		[kg]	95
	without flange plate		[kg]	86

Dimensions [mm]			Size 11
Bores	$Ød_{min}$ [3]	DIN 6885/1	55
	$Ød_{max}$ [3]	DIN 6885/1	75

1) Tolerance: + 40 % / - 20 %, other braking torques available on request
2) ACH = Anti-Condensation heating, standard voltages [VAC]: 115; 230
3) Please observe the load on the shaft or key!
4) Standard voltages [VDC]: 104; 180; 207 Permitted voltage tolerance: ± 10 % acc. DIN IEC 60038

Ø D_1	ØD	ØD_1	H	h	k	k_2	L_3	L_4	l [3]	l_1	l_3	ØM	ØM_2	N	s	s_2	Z	z
150	450	435	217	25	24	17,5	169,1	194,1	115	40,8	10	400	400	106	6 x M12	8 x M16	350	6

Order Number

11 / 8 5 6 . 4 1 __ . __ / __ / __ / __

Size
11

Additional Parts:
Without additional parts **3**
Flange plate **5**
Flange plate + wear monitoring **6**
Wear monitoring **8**

Options:
- Anti-condensation heating
- Tacho attachment possibility
- Other Types available on request

Terminal box:
1 with terminal
4 with half-wave rectifier
5 with bridge rectifier

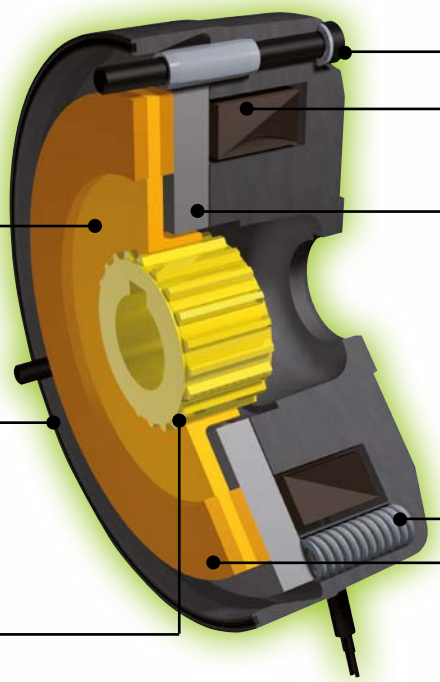
Voltage [4] [VDC] ± 10 %
104
180
207

Bore Ø d H7
(Dimensions page 22)

Keyway acc. DIN 6885/1

Example: 11 / 856.415.5 /180 / 60 / 6885/1

ROBA-stop®-M
the robust, cost-effective motor brake



Simple installation

Class of insulation F;
Can be used for 100 % duty cycle

Short switching times

Different torque variants due to variable equipment

Long service lifetime
Low wear

Maintenance-free over the entire service lifetime of the rotor (no re-adjustment)

Completely enclosed brake housing acc. Protection IP54 or IP65

Minimum torsional backlash due to accurate toothing

Designs

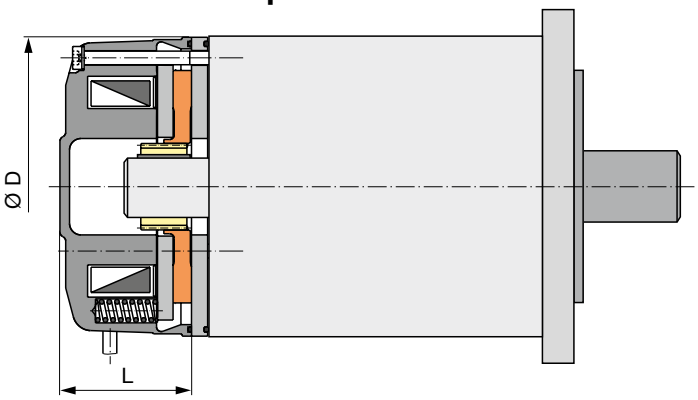
- **ROBA-stop®-M standard brake**
  As a working brake it brakes off movement, and positions at the required point.
- **ROBA-stop®-M holding brake**
  Holds drives safely in position when they are not running and brakes off movement on EMERGENCY STOP.

c UL us E189728

On request ROBA-stop®-M safety brakes can also be delivered with UL approval.

ROBA-stop®-M safety brakes are also available in ATEX design according to the directive 94/9 EC (ATEX 95).
(Please contact the manufacturer separately for this).

Installation Example



ROBA-stop®-M safety brake on the B-bearing side of an electromotor. The design with flange plate is used if there is no suitable counterfriction surface for the brake linings available motor-side.

Technical Data and Dimensions				Size										
				2	4	8	16	32	60	100	150	250	500	1000
Braking torque	Standard brake [1]	M_N	[Nm]	2	4	8	16	32	60	100	150	250	500	1000
	Holding brake [2]	M_N	[Nm]	4	8	16	32	64	100	180	250	450	800	1600
Shaft Ø	Standard brake		[mm]	8 – 15	10 – 15	11 – 20	14 – 25	19 – 30	22 – 35	24 – 45	30 – 50	40 – 60	50 – 80	75 – 90
	Holding brake		[mm]	8 – 15	10 – 15	11 – 20	14 – 25	19 – 30	22 – 35	24 – 45	30 – 50	40 – 55	50 – 75	75 – 90
Brake	Outer Ø	ØD	[mm]	76	87	103	128	148	168	200	221	258	310	382
	Length	L	[mm]	39	41,5	45,2	55,7	61,7	72,5	84	97	116	114	135

1) Tolerance +30 % / -10 % 2) Tolerance +40 % / -20 %

For detailed technical data and dimensions, please see catalogue: ROBA-stop®-M K.891.V_ _._ _

ROBA-stop® – Short Description Installation

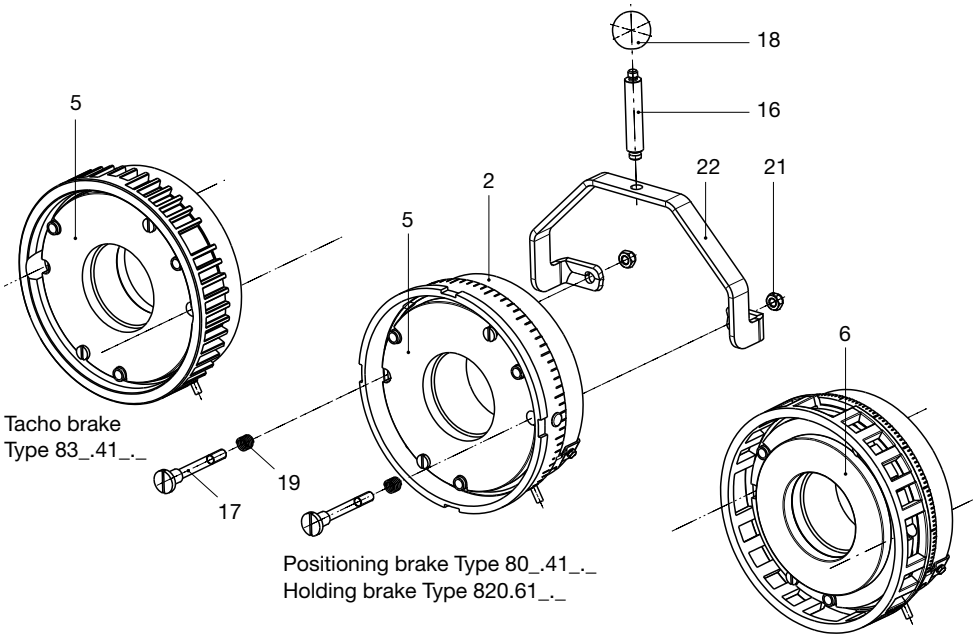


Fig. 1

Parts List

(Only use *mayr*® original parts)

1	Hub
2	Coil carrier
5	Armature disk
6	Fast-acting peak-load armature
11	Brake spring
13	Fixing screw
14	Set screw
29	Flange plate
30	Cover plate
31	Distance ring
35	Rotor
58	Lock washer

Hand release

16	Threaded bolt
17	Restoring bolt
18	Spherical button
19	Restoring spring
21	Locking nut
22	Hand release bracket

Installation Conditions

- The eccentricity of the shaft end in relation to the mounting pitch circle must not exceed 0,2 mm (on brakes sizes 3 – 6) and on larger brakes, 0,4 mm.
- The positional tolerance of the threads for the cap screws (13, Fig. 2) must not exceed 0,2 mm.
- The axial run-out deviation of the screw-on surface to the shaft must not exceed the permitted axial run-out tolerance acc. DIN 42955. The reference diameter is the pitch circle diameter for securement of the brakes.
  Larger deviations can lead to a drop in torque, to continuous grinding of the rotor and to overheating.
- The rotor and brake surfaces must be oil and grease-free.
- A suitable counter friction surface made of steel or grey cast iron must be provided for the rotor (35). Sharp-edged interruptions on the friction surfaces must be avoided.
  If no suitable counter friction surface is available, our flange plate (29, Fig. 2, lower half) can be used.

Short Description

Please find a detailed installation description in the Installation and Operational Instructions for the product (also on www.mayr.com).

ROBA-stop® brakes are particularly easy to install:

1. Mount the hub (1) onto the shaft and secure it axially (e.g. using a locking ring).
   – Recommended tolerance for the shaft-hub connection H7 / k6.
   – Avoid too tight hub-shaft connections (particularly on maximum bores). They lead to the rotor (35) jamming on the hub (1) and therefore to brake malfunctions.
2. Push the rotor (35) onto the toothed hub (1) by hand.
3. Attach the brake onto the motor bearing shield or the machine wall using the fixing screws (13) to the tightening torque T_A (acc. Table 1, page 25).

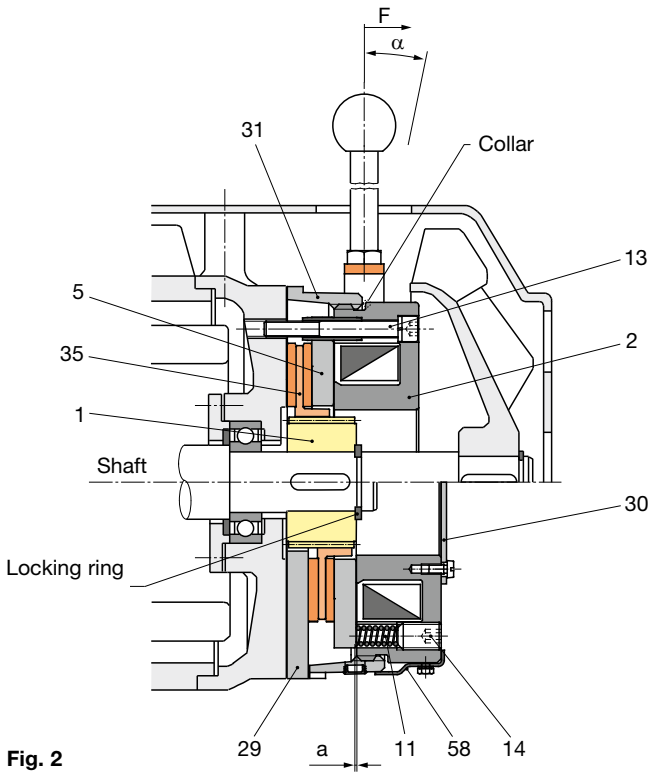


Fig. 2

Installation is possible vertically or horizontally.

In the design with a mounted cover plate (30, Fig. 2, lower half), the brake is completely enclosed and corresponds to Protection IP54.

ROBA-stop® – Short Description Installation

Braking Torque

Definition

The braking torque stated in the Technical Data is the torque effective in the shaft train on slipping brakes, with a sliding speed of 1 m/s referring to the mean friction radius (acc. DIN VDE 0580).

Please observe on using the brake for different applications that braking torque deviations of up to approx. + 40 % / - 20 % can occur (if necessary, please contact the manufacturers).

The load torque on the machine should be max. 50 % of the given braking torque.

Adjustment

The ROBA-stop® brakes are set manufacturer-side to the braking torque stipulated on order. By turning the set screws (14, Fig. 2, page 24) to the left, the braking torque is reduced. By turning them to the right, the braking torque is increased.

When adjusting the braking torque, all set screws (14, Fig. 2, page 24) must be adjusted evenly.

If the braking torque is to be decreased to a larger extent, some springs (11, Fig. 2, page 24) must be removed. To do this, it is necessary to remove two springs which lie opposite to each other, to guarantee an even load on the armature disk (5).

Please order the respective Adjustment Diagrams from the manufacturer if changing the braking torque customer-side.

Hand Release Installation

The hand release is to be installed and set according to the Instructions.

When adjusting the locking nuts (21, Fig. 3), please observe that the restoring bolts (17) limit the armature disk (5) stroke in the direction of the brake.

The restoring bolts (17) may only be tightened using the locking nuts (21) so much that at least the adjustment dimension “x” acc. Table 1 and Fig. 3 remains between the armature disk (5) and the coil carrier (2). While doing this, please adjust both restoring bolts (17) evenly!

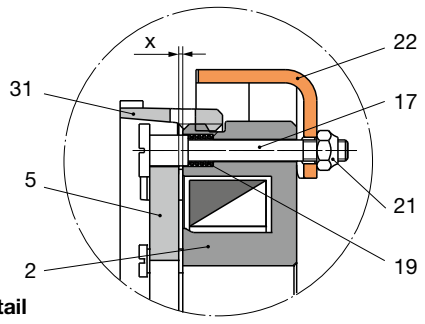


Fig. 3: Detail

Air Gap Adjustment

The working air gap between the armature disk (5) and the coil carrier (2) is set manufacturer-side to the nominal dimension “a”, Fig. 2, page 24 and Table 1, page 25.
However, as the rotor (35) wears down, the air gap “a” increases. The nominal air gap can be re-established by turning the threaded distance ring (31).

Re-adjustment

1. Remove a sealing plug of the threaded distance ring (31). Measure the air gap before adjustment in de-energised conditions using a feeler gauge. The difference from the measured air gap to the nominal air gap “a” acc. Table 1 must be re-adjusted.

2. Loosen the fixing screws (13) and the lock washer (58).

3. Turn the threaded distance ring (31) anti-clockwise (facing direction towards the rear side of the brake).
Turning the distance ring (31) **one graduation line** on the engraved scale equals:
- an air gap re-adjustment of **0,05 mm**
  on Sizes 3 to 6 for Types 80_.41_._ / 820.61_._ ,
  on Sizes 7 to 11 for Types 86_.41_._ ,
- an air gap re-adjustment of **0,1 mm**
  on Sizes 7 to 11 for Types 80_.41_._ / 820.61_._

4. Tighten the fixing screws (13) (tightening torques acc. Table 1) and attach the lock washer (58).

5. Check the air gap, nominal air gap “a” acc. Table 1 must be given.

Re-adjustment can be repeated until the threaded distance ring (31) lies against the coil carrier (2) collar, Fig. 2, page 24. This contact prevents unpermitted wear on the rotor (35). Replace the rotor (35) if re-adjustment is no longer possible.

Maintenance

At specific intervals, the air gap between the armature disk and the coil carrier must be inspected and re-adjusted.
When the rotor has reached the maximum permitted degree of wear, it must be replaced.
Please make sure that on replacement the friction surfaces and brake linings are oil and grease-free.
Apart from this, the brake is maintenance-free.

Technical Data – Installation			Size									
			2	3	4	5	6	7	8	9	10	11
Nominal air gap	a	[mm]	0,15	0,2	0,2	0,25	0,25	0,35	0,35	0,4	0,4	0,5
Adjustment dimension	x	[mm]	0,8	1,0	1,1	1,2	1,6	1,4	1,5	1,5	2,0	-
Actuation angle Hand release	α	[°]	10	15	15	11	11	8	7	7	15	-
Release force	F	[N]	10	17	30	50	80	160	200	350	350	-
Tightening torque Fixing screws item 13	T_A	[Nm]	3	3	3	6	8	8	10	10	10	40

Table 1

ROBA-stop® – Brake Dimensioning

Brake Size Selection

1. Brake selection

$$M_{NA} = \frac{9550 \times P}{n} \quad [Nm]$$

$$M_{erf.} = M_{NA} \times K \leq M_N \quad [Nm]$$

$$t_v = \frac{J \times n}{9{,}55 \times M_v} \quad [s]$$

$$J_1 = J_2 \times \left(\frac{n_2}{n_1}\right)^2 \quad [kgm^2]$$

$$M_v = M_N + (-)^* M_L \quad (M_L \leq 0{,}5 \times M_N) \quad [Nm]$$

2. Inspection of thermic load

$$Q_r = \frac{J \times n^2}{182{,}4} \times \frac{M_N}{M_v} \quad [J]$$

The permitted friction work (switching work) $Q_{r\ zul.}$ or $Q_{rs\ zul.}$ per braking for the specified switching frequency can be taken from the friction-power diagrams (pages 28 – 30).

If the friction work (switching work) per braking is known, the max. switching frequency can also be taken from the friction-power diagrams (pages 28 – 30).

3. Lifetime calculation

$$Z_{0,1} = \frac{Q_{r\ 0,1}}{Q_r} \quad [-]$$

$$Z_N = Z_{0,1} \times V_N \quad [-]$$

$$Z_g = Z_{0,1} \times V_g \quad [-]$$

Due to operating parameters such as sliding speed, pressing or temperature the **wear values** can only be considered **guideline values.**

Key:

J	[kgm²]	Mass moment of inertia
J_1	[kgm²]	Reduced mass moment of inertia
K	[-]	Safety factor (1 – 3 x according to conditions)
M_{NA}	[Nm]	Nominal torque on drive
$M_{erf.}$	[Nm]	Required braking torque
M_v	[Nm]	Deceleration torque
M_L	[Nm]	Load torque on system * sign in brackets (-) is valid if load is braked during downward
M_N	[Nm]	Nominal torque (Technical Data pages 7 – 22)
n	[rpm]	Speed
P	[kW]	Input power
t_v	[s]	Braking action
Q_r	[J]	Friction work present per braking
$Q_{r\ 0,1}$	[J]	Friction work per 0,1 mm wear (Table 2)
$Q_{r\ ges.}$	[J]	Friction work up to rotor replacement (Table 2)
$Q_{r\ zul.}$	[J]	Permitted friction work per braking (Diagrams 1, 3–6)
$Q_{rs\ zul.}$	[J]	Perm. friction work per braking on peak load (Diagram 2)
Q_N	[-]	Friction work up to re-adjustment (Table 2)
V_N	[-]	Wear factor up to re-adjustment (Table 2)
V_g	[-]	Wear factor for total wear (Table 2)
z	[braking/min.]	Number of brakings per minute
Z_N	[-]	Number of brakings up to re-adjustment
$Z_{0,1}$	[-]	Number of brakings up to 0,1 mm wear
Z_g	[-]	Total number of brakings

Friction Work / Wear Factor				Size									
				2	3	4	5	6	7	8	9	10	11
Friction Work **per 0,1 mm wear**	ROBA-stop®- positioning brake	$Q_{r\ 0,1}$	[10^6 J]	6,0	7,0	11,0	17,9	29,4	33,3	46,6	57,5	76,9	111
	ROBA-stop® - tacho brake	$Q_{r\ 0,1}$	[10^6 J]	-	7,0	11,0	17,9	29,4	33,3	46,6	57,5	76,9	111
	ROBA-stop® - peak load brake	$Q_{r\ 0,1}$	[10^6 J]	-	-	-	-	-	33,3	46,6	57,5	76,9	111
	ROBA-stop®-tacho peak load brake	$Q_{r\ 0,1}$	[10^6 J]	-	-	-	-	-	33,3	46,6	57,5	76,9	111
	ROBA-stop®-sealed	$Q_{r\ 0,1}$	[10^6 J]	-	7,0	11,0	17,9	29,4	-	-	-	-	-
	ROBA-stop®-S	$Q_{r\ 0,1}$	[10^6 J]	-	-	-	-	-	-	44	54,5	70	95
Wear factor V_N Friction work Q_N **up to re-adjustment**	ROBA-stop®- positioning brake	V_N	[-]	-	1,5	2	4,5	5	5	5	5	5	9
	ROBA-stop® - peak load brake	V_N	[-]	-	-	-	-	-	5	5	5	5	9
	ROBA-stop®-sealed	V_N	[-]	-	1,5	2	4,5	5	-	-	-	-	-
	ROBA-stop®-S	Q_N	[10^6 J]	-	-	-	-	-	-	132	272	420	475
Wear factor V_g Friction work $Q_{r\ ges.}$ **up to rotor replacement** (for total wear)	ROBA-stop®- positioning brake	V_g	[-]	2,5	15	16,5	18	19,54	21	22,5	30	36	39
	ROBA-stop® - tacho brake	V_g	[-]	-	2,5	3,5	4,5	5,5	6	6,5	9	12	13
	ROBA-stop® - peak load brake	V_g	[-]	-	-	-	-	-	21	22,5	30	36	39
	ROBA-stop®-tacho peak load brake	V_g	[-]	-	-	-	-	-	6	6,5	9	12	13
	ROBA-stop®-sealed	V_g	[-]	-	15	16,5	18	19,54	-	-	-	-	-
	ROBA-stop®-S	$Q_{r\ ges.}$	[10^6 J]	-	-	-	-	-	-	308	545	770	1900

Table 2: Wear values (guideline values for n = 1500 rpm and mean friction work)

ROBA-stop® – Calculation Example

Data

Electric motor

Input power	P	= 3 kW
Drive speed	n_1	= 1400 rpm
Mass moments of inertia:		
Motor	J_M	= 0,0068 kgm²
V-belt disk	J_K	= 0,0035 kgm²

Working machine

Load torque	$M_{L,2}$	= 50 Nm
Speed	n_2	= 370 rpm
Mass moment of inertia	J_2	= 0,3 kgm²
Number of brakings per minute	z	= 5 brakings / min

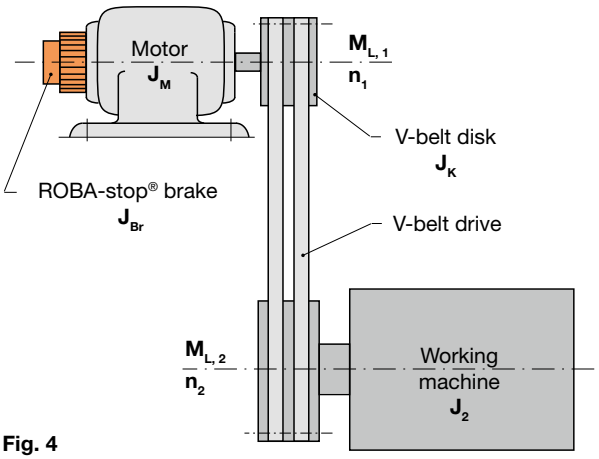


Fig. 4

1. Brake selection

Nominal torque on drive: $M_{NA} = \frac{9550 \times 3}{1400} = 20{,}5$ [Nm]

Required braking torque: $M_{erf.} = 20{,}5 \times K \leq M_N$ [Nm]

ROBA-stop®- positioning brake Size 6 with M_N = 26 Nm is selected. *M_N see Tech. Data, page 8*

Transmission: $i = \frac{n_1}{n_2} = \frac{1400}{370} = 3{,}8$ [-]

Calculation of the load torque $M_{L,1}$ referring to the motor shaft: $M_{L,1} = \frac{M_{L,2}}{i} = \frac{50}{3{,}8} = 13{,}1$ [Nm]

Deceleration torque: $M_V = M_N + (-)^* M_{L,1} = 26 - 13{,}1 = 12{,}9$ [Nm]

** The load torque $M_{L,1}$ has an accelerating effect*

The mass moment of inertia referring to the motor shaft: $J_{red.} = J_M + J_{Br} + J_K + J_2 \times (\frac{n_2}{n_1})^2$ [kgm²]

J_{Br} see Table 3, page 27

$J_{red.} = 0{,}0068 + 0{,}000199 + 0{,}0035 + 0{,}3 \times (\frac{370}{1400})^2 = 0{,}031$ [kgm²]

From this, the braking time can be calculated: $t_v = \frac{J \times n}{9{,}55 \times M_v} = \frac{0{,}031 \times 1400}{9{,}55 \times 12{,}9} = 0{,}35$ [s]

Please Observe: t_v [s] refers only to the friction time of the brake. The switching times are to be taken into consideration. *see Switching Times page 31, Table 4*

2. Inspection of thermic load

Friction work per braking: $Q_r = \frac{J \times n^2}{182{,}4} \times \frac{M_N}{M_v} = \frac{0{,}031 \times 1400^2}{182{,}4} \times \frac{26}{12{,}9} = 671$ [J]

$Q_{r\,zul.}$ see Diagram 1, page 28

$Q_r = 671$ [J] < $Q_{r\,zul.}$

$Q_{r\,zul.}$ = 1500 J with z = 5 brakings/min (switching frequency= 300/h)

The thermic load is permitted.

3. Lifetime calculation

$Z_{0,1} = \frac{Q_{r\,0,1}}{Q_r} = \frac{29{,}4 \times 10^6}{671} = 43\,815$ brakings up to 0,1 mm wear

$Q_{r\,0,1}$ see Table 2, page 26

$Z_N = Z_{0,1} \times V_N = 43\,815 \times 5 = 219\,075$ brakings up to re-adjustment

V_N see Table 2, page 26

$Z_g = Z_{0,1} \times V_g = 43\,815 \times 19{,}54 = 856\,145$ brakings up to total wear

V_g see Table 2, page 26

$\frac{856\,145 \text{ brakings}}{5 \text{ brakings / min}} = 171\,229$ min. = 2 854 hours

The rotor must be replaced after 2 854 operating hours.

Mass Moment of Inertia				**Size**									
Rotor + hub with d_{max}				**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
ROBA-stop®- positioning brake	Types 800.45_.0 / 80_.41_._	J_{R+H}	[10^{-4} kgm²]	0,045	0,077	0,23	0,68	1,99	4,02	13,2	24,2	56,4	242
ROBA-stop® - holding brake	Types 820.61_._	J_{R+H}	[10^{-4} kgm²]	-	0,077	0,23	0,68	1,99	4,02	13,2	24,2	56,4	242
ROBA-stop® - tacho brake	Types 83_.41_._	J_{R+H}	[10^{-4} kgm²]	-	0,077	0,23	0,68	1,99	4,02	13,2	24,2	56,4	242
ROBA-stop® - peak load brake	Types 863.41_._ / 866.41_._	J_{R+H}	[10^{-4} kgm²]	-	-	-	-	-	4,02	13,2	24,2	56,4	242
ROBA-stop®-tacho peak load brake	Types 883.41_._	J_{R+H}	[10^{-4} kgm²]	-	-	-	-	-	4,02	13,2	24,2	56,4	242
ROBA-stop®-sealed	Types 800.418.3	J_{R+H}	[10^{-4} kgm²]	-	0,077	0,23	0,68	1,99	-	-	-	-	-
ROBA-stop®-S	Types 856.41_._	J_{R+H}	[10^{-4} kgm²]	-	-	-	-	-	-	17,9	33,7	84,8	360,6

Table 3

ROBA-stop® – Friction Power Diagrams

ROBA-stop®-positioning brake / ROBA-stop®-tacho brake

ROBA-stop®
Type 800.45_.0,
Type 80^{0}_{2}.41_._,
Type 80^{0}_{2}.418.3
(positioning brake)
and
Type 83^{0}_{2}.41_._
(tacho brake)

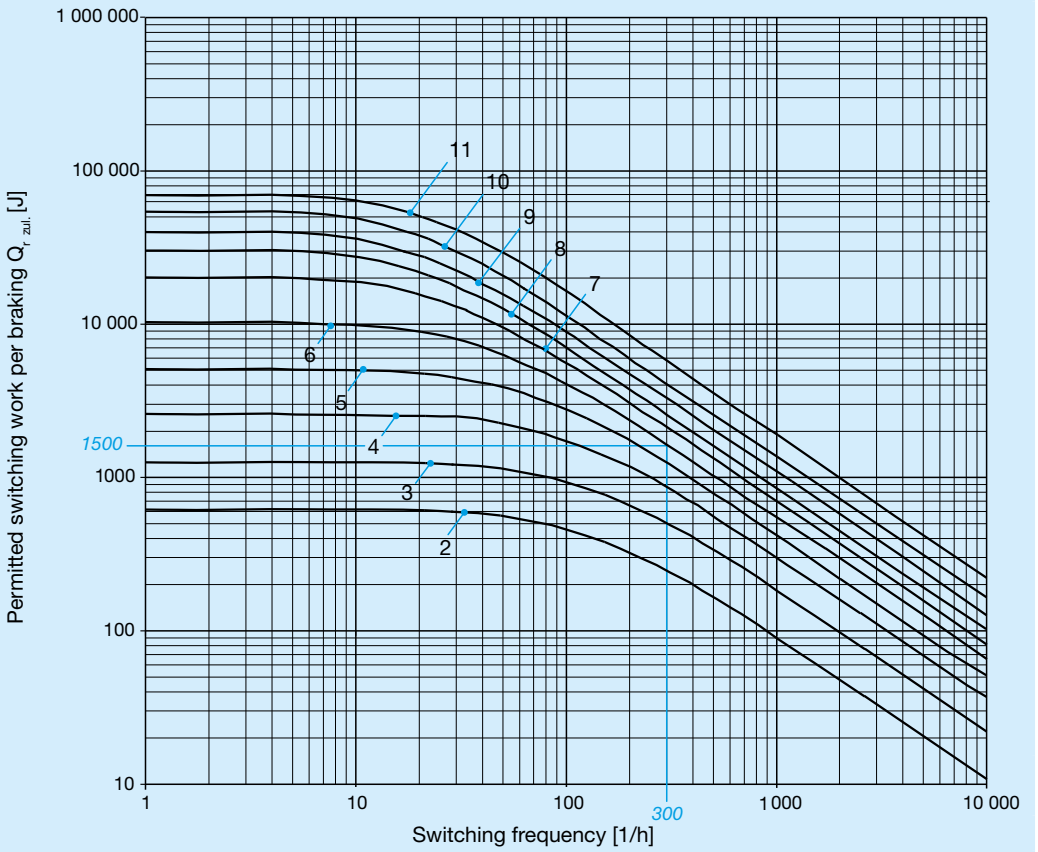


Diagram 1

ROBA-stop®-peak load brake / ROBA-stop®-tacho peak load brake

ROBA®-stop®
Type 86^{3}_{6}.41_._
(peak load brake)
and
Type 883.41_._
(tacho peak load brake)

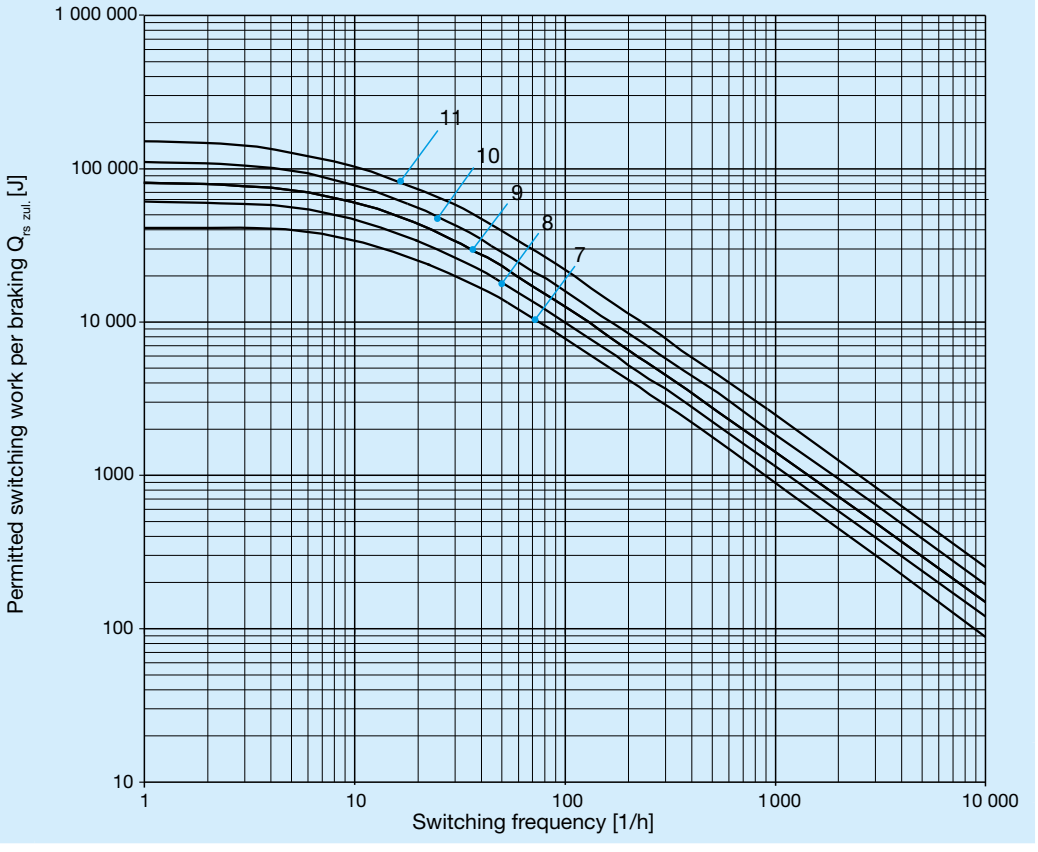


Diagram 2

ROBA-stop® – Friction Power Diagrams

ROBA-stop®-holding brake

ROBA®-stop®-S
Type 820.61_._

n = 1500 rpm
for Sizes 3 to 6

n = 750 rpm
for Sizes 7 to 11

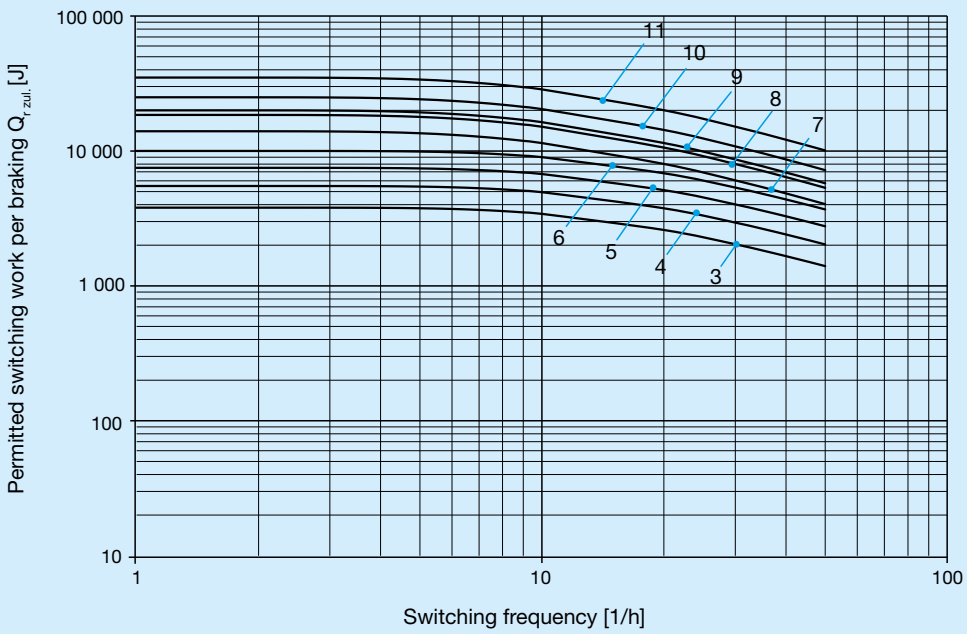


Diagram 3

ROBA-stop®-S Sizes 8 – 10

ROBA®-stop®-S
Type 856.417._

n = 1750 rpm
for Sizes 8 to 10

Brake: 100 % duty cycle

Mounting brake without heat dissipation

Ambient temperature: 60 °C

For higher speeds than 1750 rpm (Sizes 8 – 10):
Please contact the manufacturers for information on the permitted friction work $Q_{r\,zul.}$

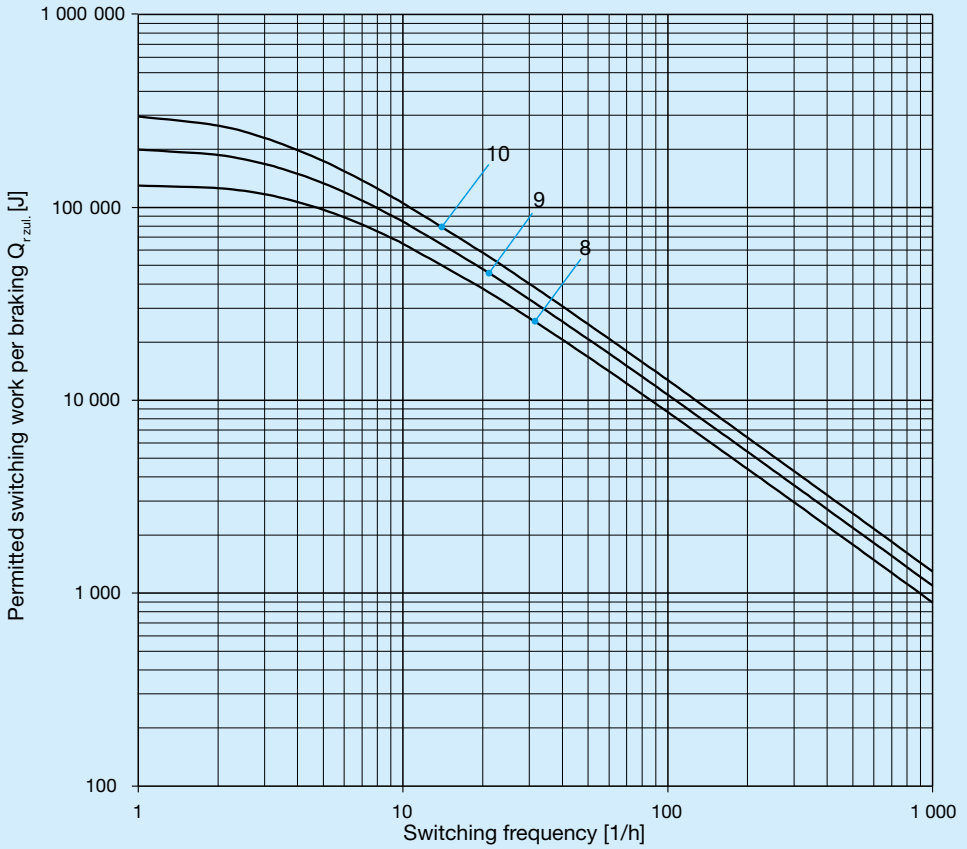


Diagram 4

ROBA-stop® – Friction Power Diagrams

ROBA-stop® - S Size 11

ROBA-stop®-S
Type 856.41_._

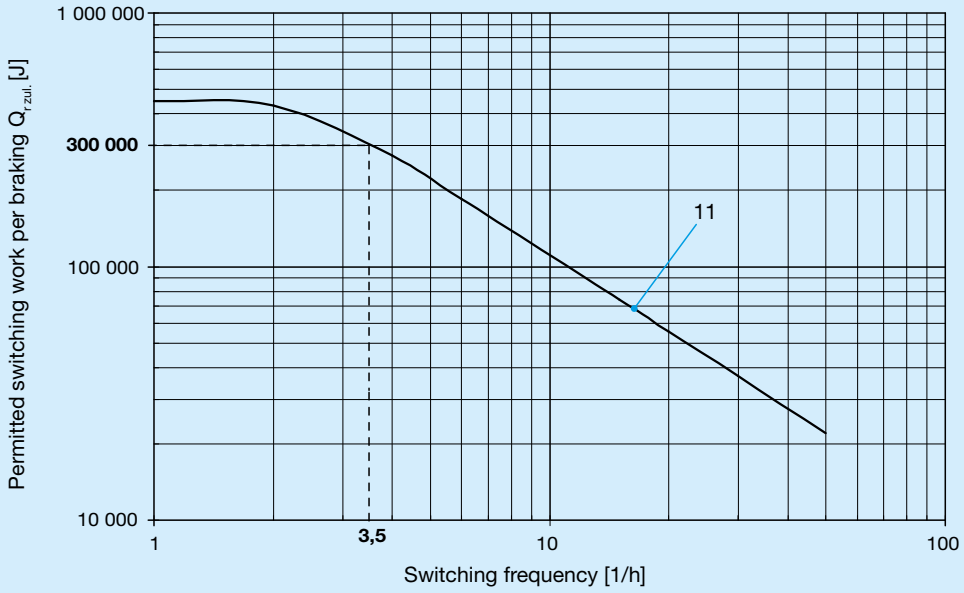
n = 1000 rpm
for Size 11

Brake: 100 % duty cycle

Mounting brake without heat dissipation

For higher speeds than 1000 rpm (Size 11):
At higher speeds, the friction work reduces acc. diagram 5 (see also design example, below).

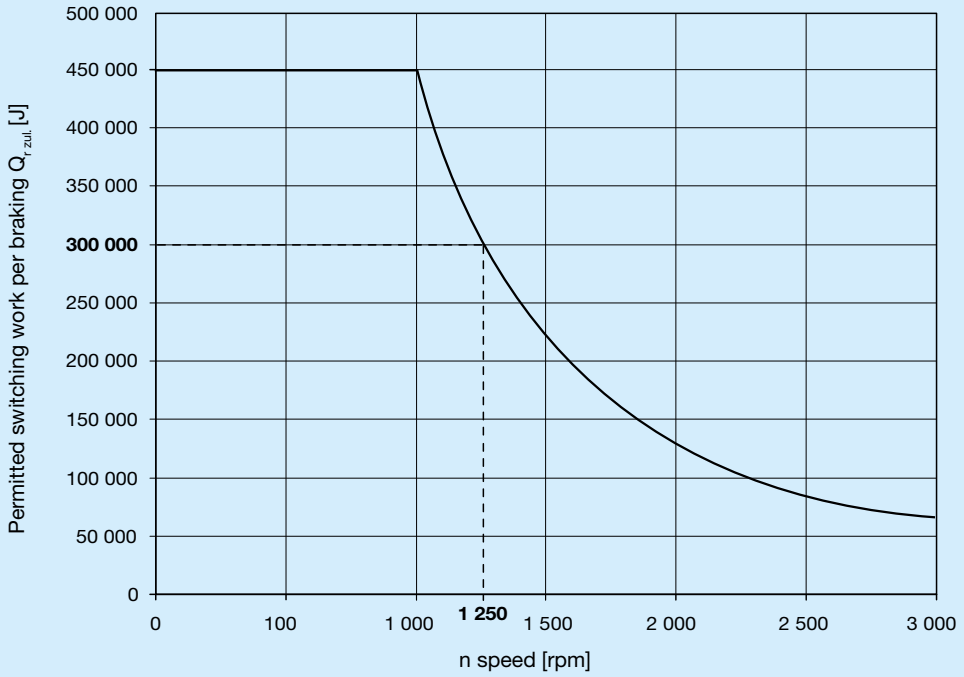
Diagram 4



ROBA-stop®-S
Type 856.41_._

Size 11

Diagram 5



Design example for a speed of 1250 rpm:

Permitted friction work $Q_{r\,zul.}$ for 1250 rpm from diagram 5: 300 000 J.
This value limits the permitted friction work $Q_{r\,zul.}$ acc. diagram 4 for low switching frequencies (here up to 3,5 switchings per hour).
The permitted friction work $Q_{r\,zul.}$ reduces acc. diagram 4 with higher switching frequencies.

ROBA-stop® – Switching Times / Electrical Connection

Switching Times

These values stated in the Tables 4 and 5 are mean values which refer to the nominal air gap and the nominal torque on a warm brake.
The brake switching times are influenced by the temperature, by the type of quenching circuit and by the air gap between the armature disk and the coil carrier, which depends on the wear status of the linings.

Switching Times	Brake with standard armature disk			Size									
				2	3	4	5	6	7	8	9	10	11
Nominal torque		M_N	[Nm]	1,1	3	6	12	26	50	100	200	400	800
Connection time	DC-side switching	t_1	[ms]	13	20	26	46	78	100	200	250	400	500
	AC-side switching	t_1	[ms]	80	120	200	260	650	700	1000	1300	3000	3100
Separation time		t_2	[ms]	20	25	30	40	60	80	100	150	200	300

Table 4

Switching Times	Brake with fast acting armature disk			Size									
				2	3	4	5	6	7	8	9	10	11
Nominal torque		M_N	[Nm]	-	3	6	12	26	50	100	200	400	800
Connection time	DC-side switching	t_1	[ms]	-	13	20	26	33	50	80	120	250	350
	AC-side switching	t_1	[ms]	-	90	100	200	330	310	600	800	1800	2000
Separation time		t_2	[ms]	-	30	35	50	70	85	110	170	230	350

Table 5

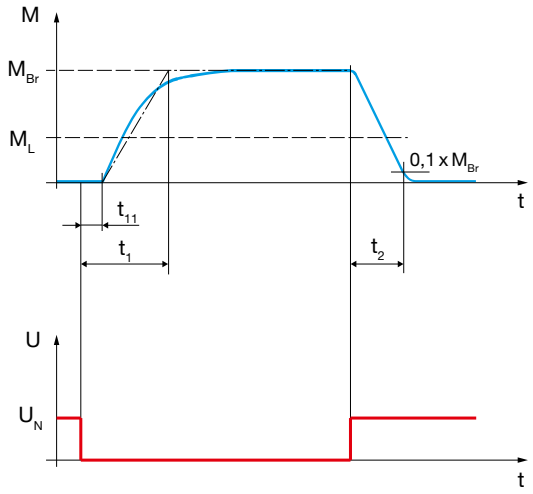


Diagram 7: Torque-Time Diagram

Key:

M_{Br} = Braking torque
M_L = Load torque
t_1 = Connection time
t_{11} = Response delay on connection
t_2 = Separation time
U_N = Coil nominal voltage

Explanation of terms:

The **braking torque** (switching torque) is the **torque effective** in the shaft train on slipping brakes, with a sliding speed of 1 m/s referring to the mean friction radius (acc. DIN VDE 0580).

The **transmittable torque** is the largest torque, with which the closed brake can be loaded without slipping occurring.

Electrical Connection and Wiring

DC current is necessary for operation of the brake. The coil voltage is indicated on the Type tag as well as on the brake body and is designed according to the DIN IEC 60038 (± 10 % tolerance). Operation can take place with alternating voltage using a rectifier or another suitable DC power supply. The connection possibilities can vary dependent on the brake equipment. Please follow the exact connections according to the Wiring Diagram.
The manufacturer and the user must observe the applicable regulations and standards (e.g. DIN EN 60204-1 and DIN VDE 0580). Their observance must be guaranteed and double-checked!

Earthing Connection

The brake is designed for Protection Class I. This protection covers not only the basic insulation, but also the connection of all conductive parts to the protective conductor (PE) on the fixed installation. If the basic insulation fails, no contact voltage will remain. Please carry out a standardised inspection of the protective conductor connections to all contactable metal parts!

Device Fuses

To protect against damage from short circuits, please add suitable device fuses to the mains cable.

Switching Behaviour

The reliable operational behaviour of a brake is to a large extent dependent on the switching mode used. Furthermore, the switching times are influenced by the temperature and the air gap between the armature disk and the coil carrier (dependent on the wear condition of the linings).

Magnetic Field Build-up

When the voltage is switched on, a magnetic field is built up in the brake coil, which attracts the armature disk to the coil carrier and releases the brake.

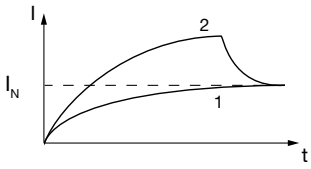
• Field Build-up with Normal Excitation

If the magnetic coil is energised with nominal voltage, the coil current does not immediately reach its nominal value. The coil inductivity causes the current to increase slowly as an exponential function. Accordingly, the build-up of the magnetic field takes place more slowly and the braking torque drop (curve 1, Fig. below) is also delayed.

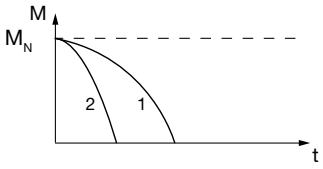
• Field Build-up with Overexcitation

A quicker drop in braking torque is achieved if the coil is temporarily placed under a higher voltage than the nominal voltage, as the current then increases more quickly. Once the brake is released, it needs to be switched over to the nominal voltage (curve 2, Fig. below). The relationship between overexcitation and separation time t_2 is roughly indirectly proportional. This means that, using overexcitation voltage U_O (= doubled nominal voltage U_N), the separation time t_2 for release of the brake is halved.
The ROBA®-switch fast acting rectifier works on this principle.

Current path



Braking torque path



Operation with overexcitation requires an inspection of :
- the required overexcitation time *
- as well as the RMS coil capacity ** with a cycle frequency higher than 1 cycle per minute.

*** Overexcitation time t_o**

Increased wear, and therefore an increasing air gap as well as coil heating lengthen the separation times t_2 for the brake. For this reason, at least double the separation time t_2 at nominal voltage must be selected as overexcitation time t_O on each brake size

**** RMS coil capacity P**

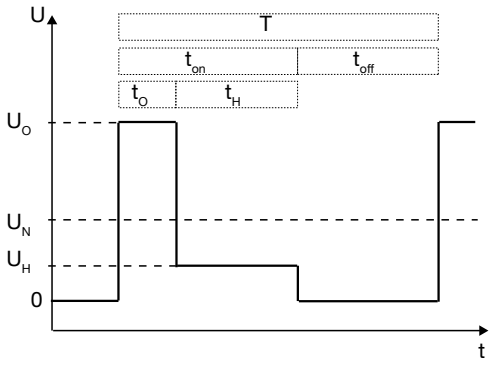
$P \leq P_N$

The coil capacity P must not be larger than P_N. Otherwise the coil may fail due to thermic overload.

Calculations:

P	[W]	RMS coil capacity dependent on switching frequency, overexcitation, reduction in capacity and duty cycle $P = \frac{P_O \times t_O + P_H \times t_H}{T}$
P_N	[W]	Coil nominal capacity (catalogue values, Type tag)
P_O	[W]	Coil capacity on overexcitation $P_O = \left(\frac{U_O}{U_N}\right)^2 \times P_N$
P_H	[W]	Coil capacity at reduced capacity $P_H = \left(\frac{U_H}{U_N}\right)^2 \times P_N$
t_O	[s]	Overexcitation time
t_H	[s]	Time of operation with reduction in capacity
t_{off}	[s]	Time without voltage
t_{on}	[s]	Time with voltage ($t_O + t_H$)
T	[s]	Total time ($t_O + t_H + t_{off}$)
U_O	[V]	Overexcitation voltage (bridge voltage)
U_H	[V]	Holding voltage (half-wave voltage)
U_N	[V]	Coil nominal voltage

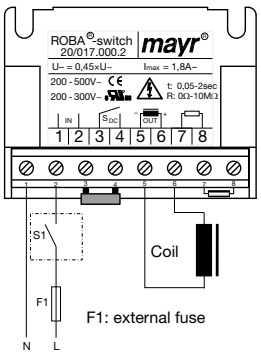
Time Diagram:



For brakes, which do not require overexcitation, the holding voltage U_H may be lower than the nominal voltage U_N, e.g. on power reduction to reduce the coil temperature.

Magnetic Field Removal

• AC-side Switching

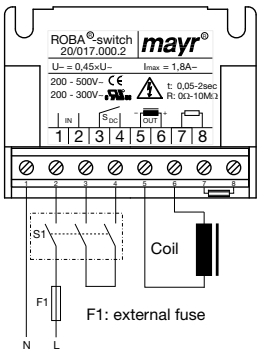


The power circuit is interrupted in front of the rectifier. The magnetic field slowly reduces. This delays the rise in braking torque.

When switching times are not important, please switch AC-side, as no protective measures are necessary for the coil and the switching contacts.

AC-side switching means **low-noise switching**; however, the brake engagement time is longer (approx. 6 – 10 times longer than with DC-side switching), use for non-critical braking times.

• DC-side Switching



The power circuit is interrupted between the rectifier and the coil as well as mains-side. The magnetic field reduces extremely quickly. This causes a quick rise in braking torque.

When switching DC-side, high voltage peaks are produced in the coil, which can lead to wear on the contacts from sparks and to destruction of the insulation.

DC-side switching means **short brake engagement times (e.g. for EMERGENCY STOP operation)**; however, louder switching noises.

• Protection Circuit

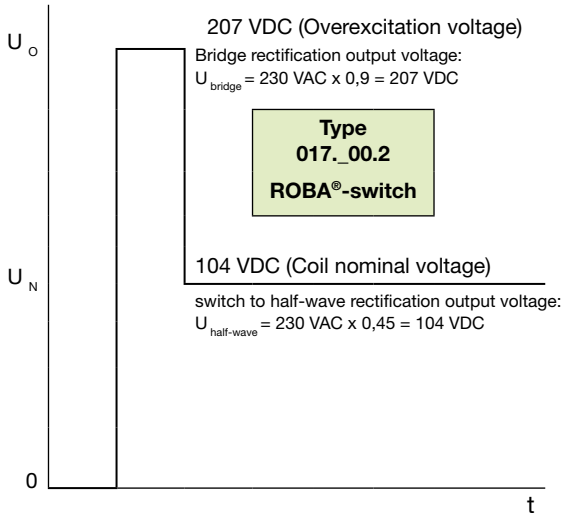
When using DC-side switching, the coil must be protected by a suitable protection circuit according to VDE 0580, which is integrated in *mayr*®-rectifiers. To protect the switching contact from consumption when using DC-side switching, additional protective measures are necessary (e.g. series connection of switching contacts). The switching contacts used should have a minimum contact opening of 3 mm and should be suitable for inductive load switching. Please make sure on selection that the rated voltage and the rated operating current are sufficient. Depending on the application, the switching contact can also be protected by other protection circuits (e.g. *mayr*®-spark quenching unit), although this may of course then alter the switching times.

Electrical Accessories – Functions of the DC Voltage Modules

no overexcitation and no power reduction		overexcitation (short separation time) and / or power reduction (reduction in coil capacity and temperature)			**Protection circuit**
		variable output voltage		fixed output voltage	
		without DC-side disconnection	integrated DC-side disconnection		
Type 024.000.6 Half-wave Rectifier Page 34	**Type 025.000.6 Bridge Rectifier Page 34**	**Type 017._00.2 ROBA®-switch Page 35**	**Type 017.110.2 ROBA®-switch Page 36**	**Type 019.100.2 ROBA®-multiswitch Page 37**	**Type 070.000.6 Spark Quenching Unit Page 38**
APPLICATION					
Standard application compact design	Standard application, preferred for noise-damped brakes compact design	Allows short separation time	Allows short separation time + short connection time no wear on contacts	Allows short separation time + consistently controlled output voltage with variable input voltage	Reductions in switch-off voltage and wear on contacts

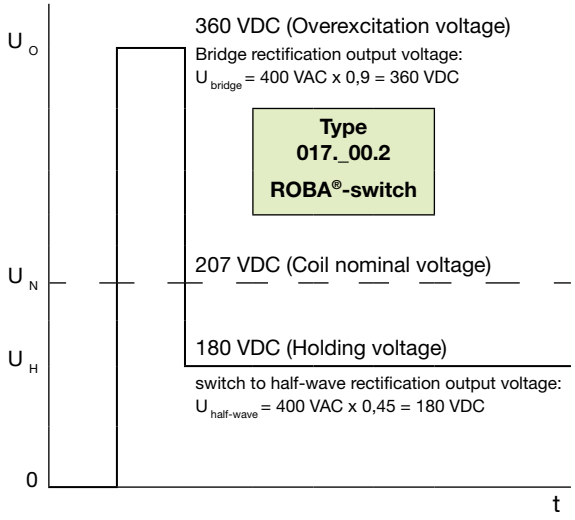
Example 1
Available: mains voltage 230 VAC
Wanted: short separation time (overexcitation)
Required: supply module / coil nominal voltage

Solution:
- The supply modules are available: Type 017._00.2 (example, below), Type 017.110.2 oder Type 019.100.2
- Coil nominal voltage: 104 VDC



Example 2
Available: mains voltage 400 VAC
Wanted: short separation time (overexcitation) and low coil temperature (reduction in capacity)
Required: supply module / coil nominal voltage

Solution:
- The supply modules are available: Type 017._00.2 (example, below), Type 017.110.2 oder Type 019.100.2
- Coil nominal voltage: 207 VDC



For detailed information on our DC voltage modules, please go to: www.mayr.com

Half-wave and bridge rectifiers Type 02_.000.6

E189728

Application

Rectifiers are used to connect DC consumers to alternating voltage supplies, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA-quick®, ROBATIC®), electromagnets, electrovalves, contactors, switch-on safe DC motors, etc.

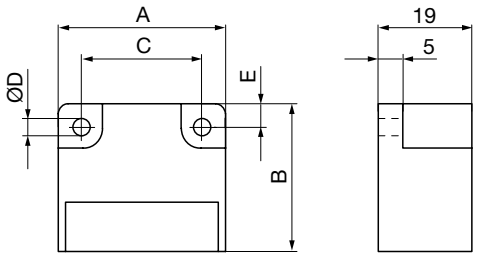
Function

The AC input voltage (VAC) is rectified (VDC) in order to operate DC voltage units. Also, voltage peaks, which occur when switching off inductive loads and which may cause damage to insulation and contacts, are limited and the contact load reduced.

Electrical Connection (Terminals)

1 + 2 Input voltage
3 + 4 Connection for an external switch for DC-side switching
5 + 6 Coil
7 – 10 Free nc terminals (only for Size 2)

Dimensions (mm)



Size	A	B	C	ØD	E
1	34	30	25	3,5	4,5
2	54	30	44	4,5	5,0
3/4	64	30	54	4,5	5,0

Accessories: Mounting bracket set for 35 mm rail acc. EN 60715: Artikel-Nr. 1803201.

Order Number

__ / 0 2 __ . 0 0 0 . 6

Sizes 1 to 4	**4** Half-wave rectifier **5** Bridge rectifier

Technical Data

				Bridge rectifier		Half-wave rectifier			
Calculation output voltage				VDC = VAC x 0,9		VDC = VAC x 0,45			
Type				**1/025**	**2/025**	**1/024**	**2/024**	**3/024**	**4/024**
Max. input voltage	± 10 %	U_{AC}	[VAC]	230	230	400	400	500	600
Max. output voltage		U_{DC}	[VDC]	207	207	180	180	225	270
Output current	≤ 50°C	I_{RMS}	[A]	2,5	2,5	3,0	4,0	4,0	4,0
	max. 85 °C	I_{RMS}	[A]	1,7	1,7	1,8	2,4	2,4	2,4
Max. coil nominal capacity at	U_{AC} = 115 VAC ≤ 50 °C	P_N	[W]	260	260	-	-	-	-
	U_{AC} = 115 VAC up to 85 °C	P_N	[W]	177	177	-	-	-	-
	U_{AC} = 230 VAC ≤ 50 °C	P_N	[W]	517	517	312	416	416	416
	U_{AC} = 230 VAC up to 85 °C	P_N	[W]	352	352	187	250	250	250
	U_{AC} = 400 VAC ≤ 50 °C	P_N	[W]	-	-	540	720	720	720
	U_{AC} = 400 VAC up to 85 °C	P_N	[W]	-	-	324	432	432	432
	U_{AC} = 500 VAC ≤ 50 °C	P_N	[W]	-	-	-	-	900	900
	U_{AC} = 500 VAC up to 85 °C	P_N	[W]	-	-	-	-	540	540
	U_{AC} = 600 VAC ≤ 50 °C	P_N	[W]	-	-	-	-	-	1080
	U_{AC} = 600 VAC up to 85 °C	P_N	[W]	-	-	-	-	-	648
Peak reverse voltage			[V]	1600	1600	2000	1600	2000	2000
Rated insulation voltage		U_{RMS}	[V_{RMS}]	320	320	500	500	630	630
Pollution degree (insulation coordination)				1	1	1	1	1	1
Device Fuses				To be included in the input voltage line.					
Recommended microfuse switching capacity H The microfuse corresponds to the max. possible connection capacity. If fuses are used corresponding to the actual capacities, the permitted limit integral I^2t must be observed on selection.				FF 3,15 A	FF 3,15 A	FF 4 A	FF 5 A	FF 5 A	FF 5 A
Permitted limit integral		I^2t	[A^2s]	40	40	50	100	50	50
Protection				IP65 components, encapsulated / IP20 terminals					
Terminals				Cross-section 0,14 – 1,5 mm^2 (AWG 26-14)					
Ambient temperature			[°C]	- 25 up to + 85					
Storage temperature			[°C]	- 40 up to + 85					
Conformity markings				UL, CE	UL, CE	UL, CE	UL, CE	UL, CE	CE
Installation conditions				The installation position can be user-defined. Please ensure sufficient heat dissipation and air convection! Do not install near to sources of intense heat!					

ROBA®-switch Type 017._00.2

E189728

Application

ROBA®-switch fast acting rectifiers are used to connect DC consumers to alternating voltage supplies, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA®-quick, ROBATIC®) as well as electromagnets, electrovalves, etc.

Fast acting rectifier ROBA®-switch 017._00.2

- Consumer operation with overexcitation or power reduction
- Input voltage: 100 – 500 VAC
- Maximum output current I_{RMS}: 3 A at 250 VAC
- UL-approved

Function

The ROBA®-switch units are used for operation at an input voltage of between 100 and 500 VAC, dependent on size. They can switch internally from bridge rectification output voltage to half-wave rectification output voltage. The bridge rectification time can be modified from 0,05 to 2 seconds by exchanging the external resistor (R_{ext}).

Electrical Connection (Terminals)

1 + 2	Input voltage (fitted protective varistor)
3 + 4	Connection for external contact for DC-side switch-off
5 + 6	Output voltage (fitted protective varistor)
7 + 8	R_{ext} for bridge rectification time adjustment

Technical Data

Input voltage	see Table 1
Output voltage	see Table 1
Protection	IP65 components, IP20 terminals, IP10 R_{ext}
Terminal nom. cross-section	1,5 mm² (AWG 22-14)
Ambient temperature	- 25 °C up to + 70 °C
Storage temperature	- 40 °C up to + 70 °C

ROBA®-switch Sizes, Table 1

			Size			
			Type 017.000.2		Type 017.100.2	
			10	20	10	20
Input voltage ± 10 %	U_{AC}	[VAC]	100–250	200–500	100–250	200–500
Output voltage	U_{bridge}	[VDC]	90–225	180–450	90–225	180–450
	$U_{half\text{-}wave}$	[VDC]	45–113	90–225	45–113	90–225
Output current						
at ≤ 45 °C	I_{RMS}	[A]	2,0	1,8	3,0	2,0
at max. 70 °C	I_{RMS}	[A]	1,0	0,9	1,5	1,0
Conformity markings			cULus CE	cULus up to 300 V CE	cULus CE	cULus CE

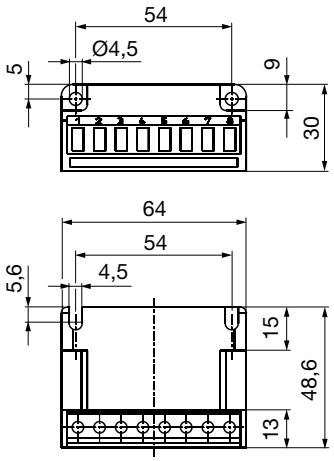
Order Number

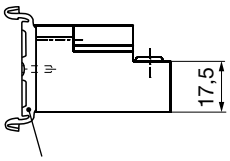
__ / 0 1 7 . __ 0 0 . 2

Size		UL-approved	
10		0	up to 300 V
20		1	up to 500 V

Dimensions (mm)

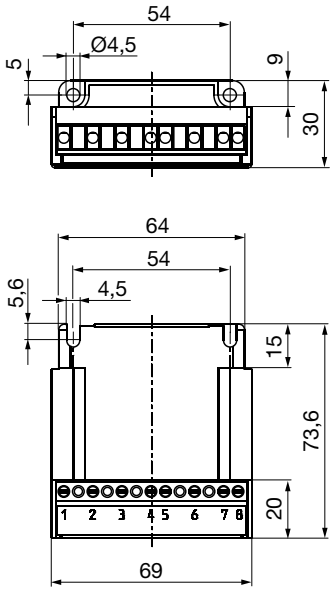
Type 017.000.2

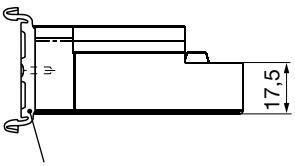




Accessories:
Mounting bracket set for 35 mm rail acc. EN 60715:
Article-No. 1802911

Type 017.100.2





Accessories:
Mounting bracket set for 35 mm rail acc. EN 60715:
Article-No. 1802911

ROBA®-switch Type 017.110.2

E189728

Application

ROBA®-switch fast acting rectifiers are used to connect DC consumers to alternating voltage supplies, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA®-quick, ROBATIC®) as well as electromagnets, electrovalves, etc.

Fast acting rectifier ROBA®-switch 017.110.2

- Integrated DC-side disconnection (shorter connection time t_1)
- Consumer operation with overexcitation or power reduction
- Input voltage: 100 – 500 VAC
- Maximum output current I_{RMS}: 1,5 A
- UL-approved

The ROBA®-switch with integrated DC-side disconnection is not suitable for being the only safety disconnection in applications!

Function

The ROBA®-switch units are used for operation at an input voltage of between 100 and 500 VAC, dependent on size. They can switch internally from bridge rectification output voltage to half-wave rectification output voltage. The bridge rectification time can be modified from 0,05 to 2 seconds by exchanging the external resistor (R_{ext}).

Apart from this, the ROBA®-switch has an integrated DC-side disconnection. In contrast to the usual DC-side disconnection, no further protective measures or external components are required. The DC-side disconnection is activated in standard mode (terminals 3 and 4 are not wired) and causes short switching times on the electromagnetic consumer.

The integrated DC-side disconnection is deactivated by fitting a bridge between the terminals 3 and 4. The coil is deenergised via the freewheeling diode. This has the advantages of softer braking and a lower switching noise. However, this substantially lengthens the switching times (approx. 6 – 10x).

Electrical Connection (Terminals)

1 + 2	Input voltage (fitted protective varistor)
3 + 4	Switching between DC- and AC-side disconnection
5 + 6	Output voltage (fitted protective varistor)
7 + 8	R_{ext} for bridge rectification time adjustment

Technical Data

Input voltage	see Table 1
Output voltage	see Table 1
Protection	IP65 components, IP20 terminals, IP10 R_{ext}
Terminal nom. cross-section	1,5 mm² (AWG 22-14)
Ambient temperature	- 25 °C up to + 70 °C
Storage temperature	- 40 °C up to + 70 °C

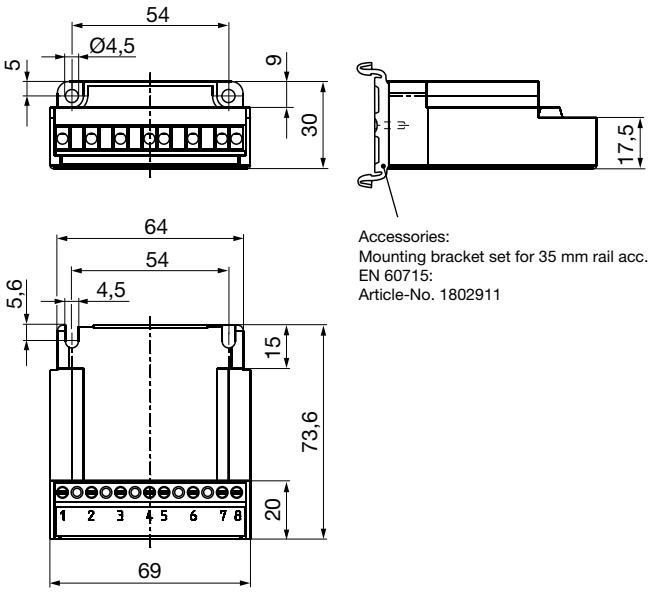
Order Number

__	/	0	1	7	.	1	1	0	. 2

△

Size
10
20

Dimensions (mm)



Accessories:
Mounting bracket set for 35 mm rail acc. EN 60715:
Article-No. 1802911

ROBA®-switch Sizes, Table 1

				Size 10	Size 20
Input voltage ± 10 %		U_{AC}	[VAC]	100 – 250	200 – 500
Output voltage		U_{bridge}	[VDC]	90 – 225	180 – 450
		$U_{half\text{-}wave}$	[VDC]	45 – 113	90 – 225
Output current	at ≤ 45 °C	I_{RMS}	[A]	1,5	1,5
	at max. 70 °C	I_{RMS}	[A]	0,75	0,75
Conformity markings				cULus CE	cULus CE

ROBA®-multiswitch Type 019.100.2

E189728

Application

ROBA®-multiswitch fast acting rectifiers are used to connect DC consumers to alternating voltage supplies, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA®-quick, ROBATIC®) as well as electromagnets, electrovalves, etc.

Fast acting rectifier ROBA®-multiswitch 019.100.2

- Consistently controlled output voltage in the entire input voltage range
- Consumer operation with overexcitation or power reduction
- Input voltage: 100 – 500 VAC
- Maximum output current I_{RMS}: 2 A
- UL-approved

ROBA®-multiswitch units are not suitable for all applications, e.g. use of the ROBA®-multiswitch when operating noise-damped brakes is not possible without taking additional measures. The product's suitability should be checked before use.

Function

The ROBA®-multiswitch units are used for operation at an input voltage of between 100 and 500 VAC, dependent on size. After switch-on, they emit the rectified bridge voltage for 50 ms and then control the 90 or 180 VDC overexcitation voltages. After the overexcitation time, they control the 52 or 104 VDC holding voltages. The overexcitation time can be adjusted via a DIP switch to 150 ms, 450 ms, 1 s, 1,5 s and 2 s.

On special designs, deviating values are possible for each design.

Electrical Connection (Terminals)

1 + 2 Input voltage (fitted protective varistor)
3 + 4 Connection for external contact for DC-side switch-off
5 + 6 Output voltage (fitted protective varistor)

Technical Data

Input voltage	see Table 1
Output voltage	see Table 1
Protection	IP65 components, IP20 terminals
Terminal nom. cross-section	1,5 mm² (AWG 22-14)
Ambient temperature	- 25 °C up to + 70 °C
Storage temperature	- 40 °C up to + 70 °C

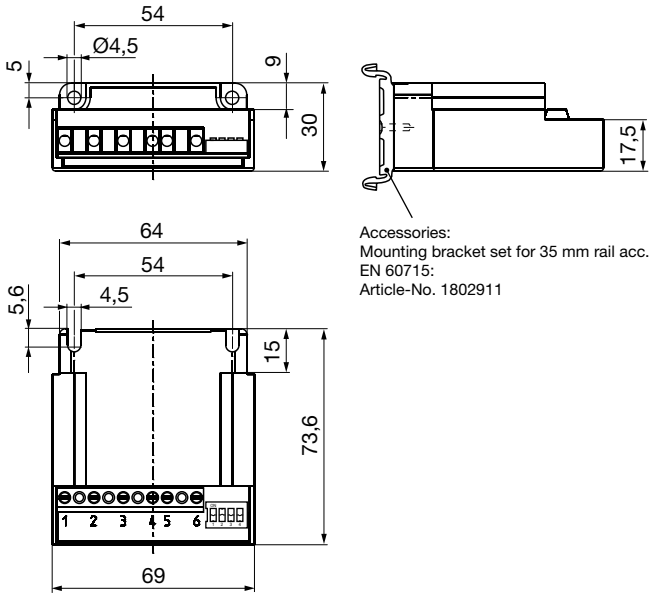
Order Number

__	/	0	1	9	.	1	0	0	.	2

△

Size
10
20

Dimensions (mm)



Accessories:
Mounting bracket set for 35 mm rail acc. EN 60715:
Article-No. 1802911

ROBA®-multiswitch Sizes, Table 1

				Size 10	Size 20
Input voltage *	± 10 % acc. EN 50160	U_I	[VAC]	100 – 275	200 – 500
	Frequency		[Hz]	50 – 60	50 – 60
Output voltage *	± 10 %	U_O	[VDC]	90	180
	± 10 %	U_H	[VDC]	52	104
Output current *	at ≤ 45 °C	I_{RMS}	[A]	2,0	2,0
	at max. 70 °C	I_{RMS}	[A]	1,0	1,0
Conformity markings				CE cULus	CE cULus

* On special designs, deviating values are possible. The values stated on the Type tag are decisive.

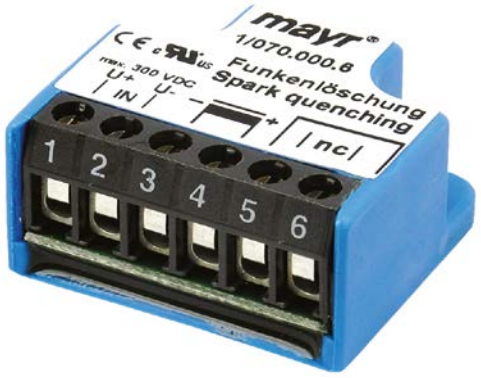
Spark Quenching Unit Type 070.000.6

E189728

Application

Reduces spark production on the switching contacts occurring during DC-side switch-off of inductive loads.

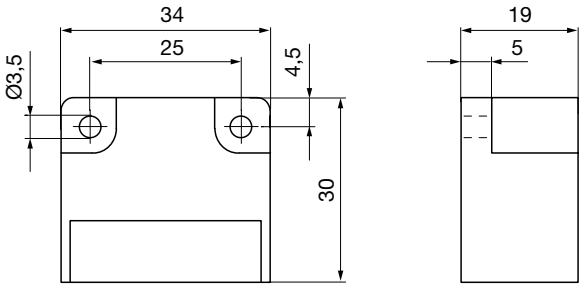
- Voltage limitation according to VDE 0580 2000-07, Item 4.6.
- Reduction of EMC-disturbance by voltage rise limitation, suppression of switching sparks.
- Reduction of brake engagement times by a factor of 2 – 4 compared to freewheeling diodes.



Function

The spark quenching unit will absorb voltage peaks resulting from inductive load switching, which can cause damage to insulation and contacts. It limits these to 70 V and reduces the contact load. Switching products with a contact opening distance of > 3 mm are suitable for this purpose.

Dimensions (mm)



Electrical Connection (Terminals)

1 (+)	Input voltage
2 (–)	Input voltage
3 (–)	Coil
4 (+)	Coil
5	Free nc terminal
6	Free nc terminal

Technical Data

Input voltage	max. 300 VDC, max. 615 V_{peak} (rectified voltage 400 VAC, 50 / 60 Hz)
Switch-off energy	max. 9 J / 2 ms
Power dissipation	max. 0,1 Watt
Rated voltage nc terminals	250 V
Protection	IP65 / IP20 terminals
Ambient temperature	- 25 °C up to + 85 °C
Storage temperature	- 40 °C up to + 85 °C
Max. conductor connection diameter	2,5 mm^2 / AWG 26-12
Max. terminal tightening torque	0,5 Nm

Accessories

Mounting bracket set for 35 mm rail acc. EN 60715:
Article-No. 1803201

Order Number

__	/	0	7	0	.	0	0	0	.	6

△

Size
1

ROBA-stop® – Guidelines

Guidelines on the Declaration of Conformity: A conformity evaluation has been carried out for the product (electromagnetic safety brake) in terms of the EC low voltage directive 2006/95/EC. The Declaration of Conformity is laid out in writing in a separate document and can be requested if required.

Guidelines on the EMC Directive (2004/108/EC): The product cannot be operated independently according to the EMC directive. Due to their passive state, brakes are also non-critical equipment according to the EMC. Only after integration of the product into an overall system can this be evaluated in terms of the EMC. For electronic equipment, the evaluation has been verified for the individual product in laboratory conditions, but not in the overall system.

Guidelines on the Machinery Directive (2006/42/EC): The product is a component for installation into machines according to the Machinery Directive 2006/42/EC. The brakes can fulfil the specifications for safety-related applications in coordination with other elements. The type and scope of the required measures result from the machine risk analysis. The brake then becomes a machine component and the machine manufacturer assesses the conformity of the safety device to the directive. It is forbidden to start use of the product until you have ensured that the machine accords with the regulations stated in the directive.

Guidelines on the ATEX Directive: Without a conformity evaluation, this product is not suitable for use in areas where there is a high danger of explosion. For application of this product in areas where there is a high danger of explosion, it must be classified and marked according to directive 94/9/EC.

Safety Regulations

Brakes may generate several risks, among others:

During the risk assessment required when designing the machine or system, the dangers involved must be evaluated and removed by taking appropriate protective measures.

To prevent injury or damage, only professionals and specialists are allowed to work on the devices. They must be familiar with the dimensioning, transport, installation, initial operation, maintenance and disposal according to the relevant standards and regulations.

Application Conditions

The catalogue values are guideline values which have been determined in test facilities. It may be necessary to carry out your own tests for the intended application.

When dimensioning the brakes, please remember that installation situations, braking torque fluctuations, permitted friction work, run-in behaviour and wear as well as general ambient conditions can all affect the given values. These factors should therefore be carefully assessed, and alignments made accordingly.

- ❒ Mounting dimensions and connection dimensions must be adjusted according to the size of the brake at the place of installation.
- ❒ The magnetic coils are designed for a relative duty cycle of 100%, if no other values are stated.
- ❒ The braking torque is dependent on the present run-in condition of the brake.
- ❒ The brakes are only designed for dry running. The torque is lost if the friction surfaces come into contact with oil, grease, water or similar substances or foreign bodies.
- ❒ Manufacturer-side corrosion protection of the metallic surfaces.
- ❒ The rotors may rust up and block in corrosive ambient conditions and/or after long periods of storage.

Ambient Temperature: -20 °C up to +40 °C

Protection

(mechanical) IP54: When installed, dust-proof and protected against contact as well as against water spray from any direction (dependent on customer-side mounting method).

(electrical) IP54: Dust-proof and protected against contact as well as against water spray from any direction.

IP67 (Type 856.41_._): Dust-proof and protected against contact as well as against temporary submersion under water.

Earthing Connection

The brake is designed for Protection Class I. This protection covers not only the basic insulation, but also the connection of all conductive parts to the protective conductor (PE) on the fixed installation. If the basic insulation fails, no contact voltage will remain. Please carry out a standardised inspection of the protective conductor connections to all contactable metal parts!

Intended Use

mayr ®-brakes have been developed, manufactured and tested in compliance with the VDE 0580 standard and in accordance with the EU Low Voltage Directive as electromagnetic components. During installation, operation and maintenance of the product, the requirements for the standard must be observed. *mayr*®-brakes are for use in machines and systems and must only be used in the situations for which they are ordered and confirmed. Using them for any other purpose is not allowed.

Guidelines for Electromagnetic Compatibility (EMC)

In accordance with the EMC directives 2004/108/EC, the individual components produce no emissions. However, functional components e.g. mains-side energisation of the brakes with rectifiers, phase demodulators, ROBA®-switch devices or similar controls can produce disturbance which lies above the allowed limit values.

For this reason it is important to read the Installation and Operational Instructions very carefully and to keep to the EMC directives.

Standards, Directives and Regulations Used

VDE 0580	Electromagnetic devices and components, general specifications
2006/95/EC	Low voltage directive
CSA C22.2 No. 14-2010	Industrial Control Equipment
UL 508 (Edition 17)	Industrial Control Equipment
EN ISO 12100	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN 61000-6-4	Interference emission
EN 61000-6-2	Interference immunity
EN 60204-1	Electrical equipment of machines

Liability

- The information, guidelines and technical data in these documents were up to date at the time of printing. Demands on previously delivered brakes are not valid.
- Liability for damage and operational malfunctions will not be taken if: the Installation and Operational Instructions are ignored or neglected, the brakes are used inappropriately, the brakes are modified, the brakes are worked on unprofessionally and the brakes are handled or operated incorrectly.

Guarantee

- The guarantee conditions correspond with the Chr. Mayr GmbH + Co. KG sales and delivery conditions.
- Mistakes or deficiencies are to be reported to *mayr*® at once!

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You can find the complete address for the representative responsible for your area under www.mayr.com in the internet.

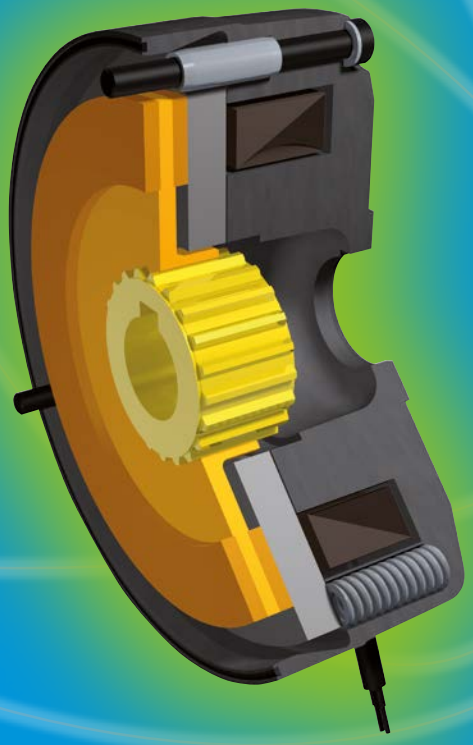
26/05/2014 SC/GC/SU

mayr®

your reliable partner

ROBA-stop®-M

Electromagnetic safety brakes



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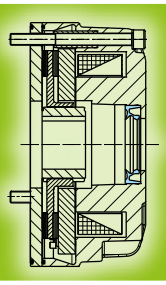

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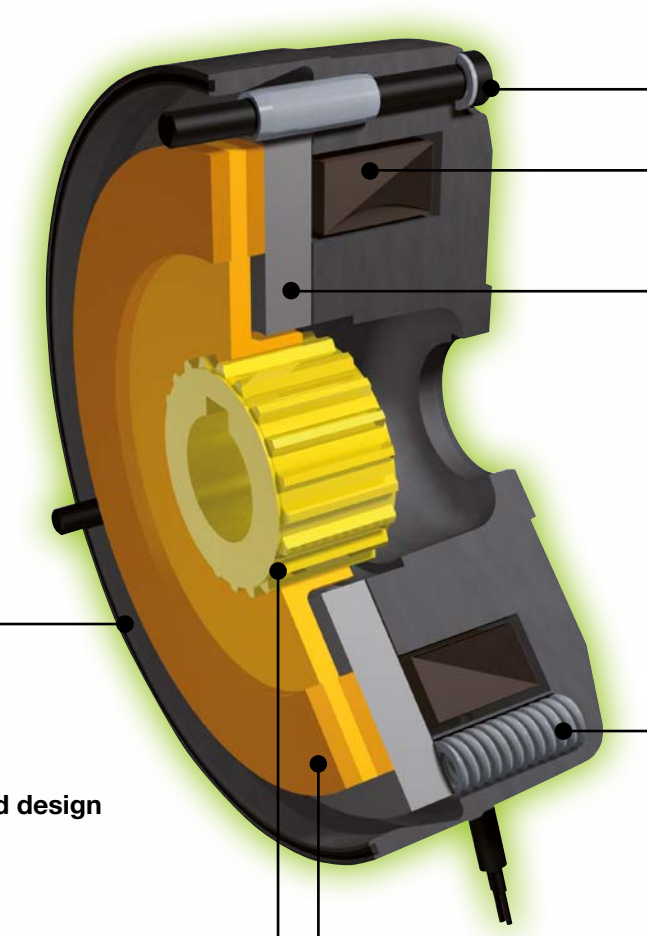
Your Reliable Brake



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Advantages for Your Applications

- ❑ Simple installation
- ❑ Brake outer diameter completely enclosed (higher protection can easily be realised)
- ❑ Magnetic coil is designed for a relative duty cycle of 100 %
- ❑ Magnetic coil and casting compound correspond to class of insulation F
- ❑ The nominal air gap is specified by design and inspected
- ❑ Short switching times
- ❑ Maintenance-free over the entire service lifetime of the rotor

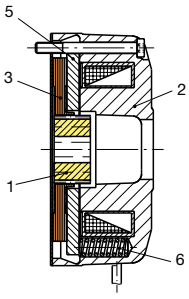
Certain ROBA-stop®-M brakes can be used for safety-relevant applications acc. ISO 13849-1 (for Permitted Types, see page 26).
For information on the safety parameters, please contact *mayr*® power transmission.

Function

ROBA-stop®-M brakes are spring applied, electromagnetic safety brakes.

Spring applied function:

In de-energised condition, helical springs (6) press against the armature disk (5). The rotor (3) is held between the armature disk (5) and the corresponding mounting surface of the machine. The shaft is braked via the toothed hub (1).



Electromagnetic:

When the power is switched on, a magnetic field is built up. The armature disk (5) is attracted to the coil carrier (2) against the spring pressure. The brake is released and the shaft is able to rotate freely.

Safety brakes:

The brake brakes reliably and safely in the event of a power switch-off, a power failure or an EMERGENCY STOP.

ROBA-stop®-M Page 4

Sizes 2 to 1000

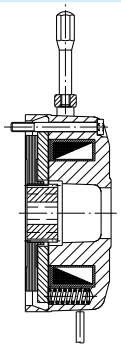
Braking torques

0.7 to 1400 Nm
(Standard design)

4 to 1600 Nm
(Holding brake)

Permitted shaft diameter

Ø 8 to 90



Type 891._ _1.0 Standard design

Page 5

Type 891._ _2.0 Standard design with friction disk

Type 891._ _4.1 IP65 design with flange plate

Type 891._ _4.2 Tacho attachment design with flange plate

Order Number

Nominal torque holding brake		0
100 %	Nominal torque standard	1
84 %	Nominal torque [6]	2
68 %	Nominal torque [6]	3
50 %	Nominal torque [6]	4
34 %	Nominal torque [6]	5
Nominal torque adjustable [2] [6]		6
112 %	Nominal torque [6]	7
125 %	Nominal torque [6]	8

0	Without additional parts
1	Hand release [1]
2	Friction disk [7]
3	Hand release/Friction disk [1] [7]
4	Flange plate [8]
5	Hand release/Flange plate [1] [8]

__ / 8 9 1 . __ __ __ . __ / __ / __ / __

Sizes							
2 to 1000	Standard brake metal rotor [3] Holding brake metal rotor Standard brake Friction lining rotor [4]	0 1 2	Standard [11] Enclosed design IP65 [5] Tacho design [5] Central torque adjustment [2]	0 1 2 3	Coil voltage [9] [VDC] 24 [10] 104 180 207	Bore Hub Ø d (please observe dimensions pages 4-5, Table 2, page 7)	Keyway acc. DIN 6885/1 or DIN 6885/3

Example: 16 / 891.211.0 / 24 / 16 / 6885/1

For Further Options, see page 10.

1) Hand release not installed on size 2 – size 500.
Size 1000: Hand release only available as emergency hand release.
Hand release for IP65 design only ex works.
2) On request
3) From size 60
4) Up to size 32 (for brake operation in hoisting device drives, please contact the manufacturer)
5) Not in combination with friction disk
6) See Technical Explanations pages 6 – 7
7) Sizes 2 – 60
8) Standard tacho brake flange plate
9) Brake operation only possible with overexcitation on size 500 from 700 Nm onwards and on size 1000.
10) Not possible on size 1000.
11) Standard and tacho design are identical on size 1000.
Order number for standard (tacho design) on size 1000:
1000 / 891._ _ _.2 / _ / _ / _

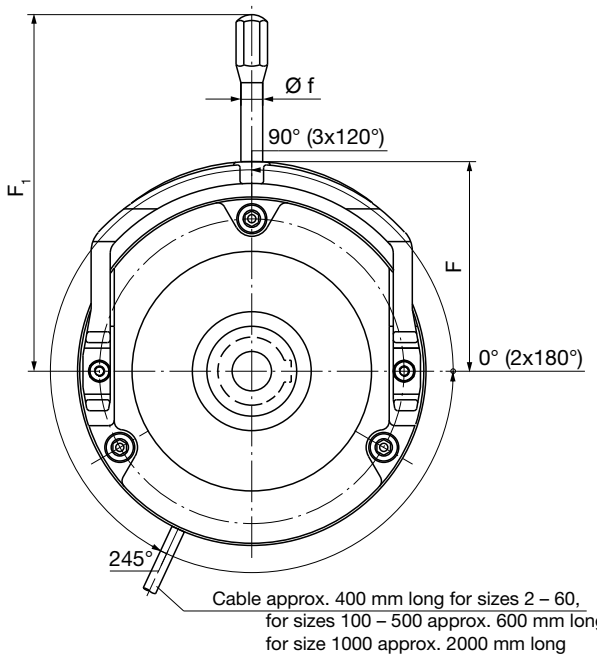
ROBA-stop®-M safety brakes are also available in ATEX design according to the directive 94/9 EC (ATEX 95). (Please contact the manufacturer separately for this).

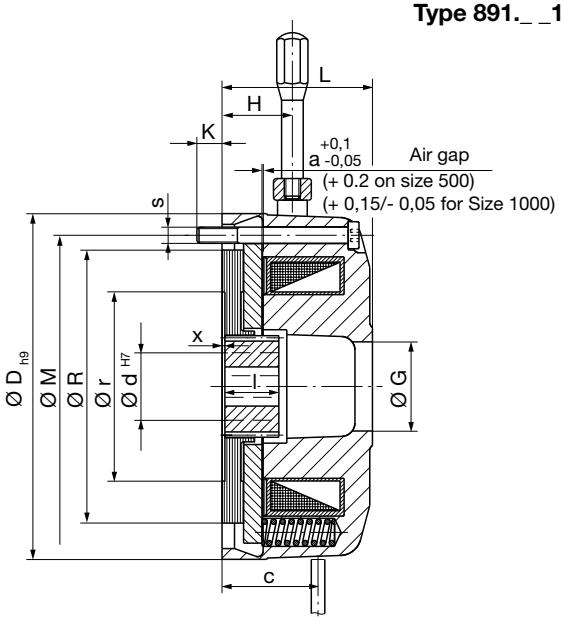
C UL US E189728

On request ROBA-stop® safety brakes can also be delivered with UL approval.

ROBA-stop®-M electromagnetic safety brakes

Type 891._ _1.0





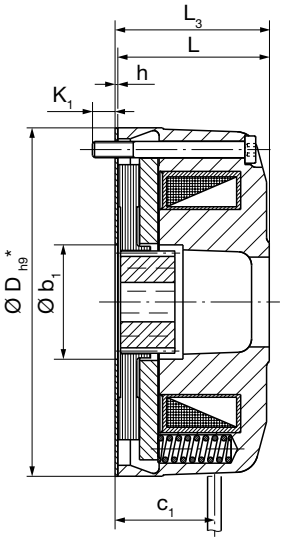
Technical Data				Size									
				2	4	8	16	32	60	100	150	250	500	1000
Braking Torque	Standard brake [1] Type 891.0_ _._ Type 891.2_ _._ [9]	M_N	[Nm]	2	4	8	16	32	60	100	150	250	500 [1.1]	1000 [1.1] [4]
	Holding brake [1.1] Type 891.1_ _._	M_N	[Nm]	4	8	16	32	64	100	180	250	450	800 [4]	1600 [4]
Electrical power		P_N	[W]	19	25	29	38	46	69	88	98	120	152	160
Maximum speed		n_{max}	[rpm]	6000	5000	4000	3500	3000	3000	3000	1500	1500	1500	1500
Weight	Standard brake Type 891.0_ _._ Type 891.2_ _._ [9]	m	[kg]	0.76	1.1	1.8	3.4	4.5	7.4	13.6	19.2	33.3	38	79
	Holding brake Type 891.1_ _._	m	[kg]	0.76	1.1	1.8	3.4	4.5	7.4	13.6	19.2	33.3	38	79

Bores				Size										
				2	4	8	16	32	60	100	150	250	500	1000
Bore Ø d^{H7} [2]	Standard brake Type 891.0_ _._ Type 891.2_ _._ [9]	min.	[mm]	8	10	11	14	19	22	24	30	40 [1.2]	50 [1.2]	75
		max.	[mm]	15	15	20	25	30	35	45	50	60	80	90
				Please observe Table 2, page 7										
	Holding brake Type 891.1_ _._	min.	[mm]	8	10	11	14	19	22	24	30	40	50	75
		max.	[mm]	15	15	20	25	30	35	45	50	55	75	90
				Please observe Table 2, page 7										

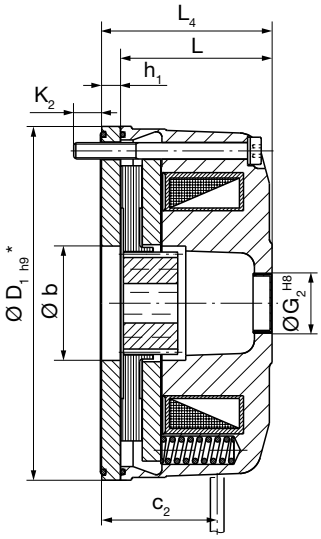
Dimensions [mm]	Size										
	2	4	8	16	32	60	100	150	250	500	1000
a	0.15	0.15	0.2	0.2	0.2	0.25	0.3	0.3	0.35	0.4	0.5
b	30	30	36	42	52	60	78	84	96	130	180
b_1	30	30	36	42	52	62	-	-	-	-	-
c	24	26.5	28.7	35.5	39.2	50.5	54	59	69	70	85
c_1	25	27.5	29.7	36.8	40.5	51.8	-	-	-	-	-
c_2	29	32.5	34.7	42.5	47.2	58.5	64	71	83	89	106
D	76	87	103	128	148	168	200	221	258	310	382
D_1	81	92	108	130	148	168	200	221	258	310	382
D_2	81	92	108	134	154	174	206	227	266	318	392
F	48.5	54	63.5	77	88	100.5	123	133	153	179	-
F_1	102.5	108	117.5	131	169	228.5	267	347	494	521	-
f	8	8	8	8	10	14	14	19	23	23	-

ROBA-stop®-M electromagnetic safety brakes

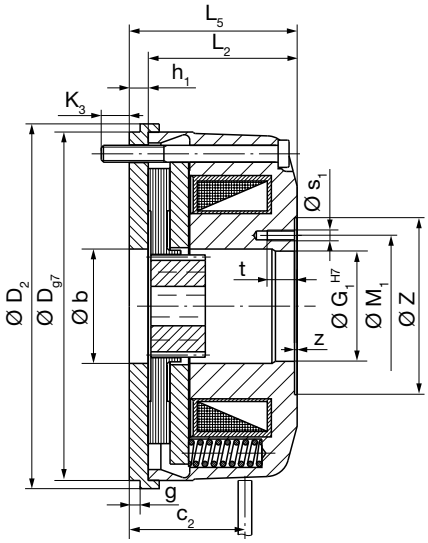
Type 891._ _2.0
Standard with friction disk



Type 891._ _4.1
Enclosed design (IP 65)
with flange plate



Type 891._ _ 4.2
Tacho attachment design
with flange plate



* Outer diameter friction disk: free size; outer diameter flange plate: -0.2

Missing dimensions are identical with Type 891.011.0 see page 4.

Dimensions [mm]	Size										
	2	4	8	16	32	60	100	150	250	500	1000
G	16.5	18	22	33	36	38	48	55	65	85	100
G_1	23.5	28.5	32.5	40.5	52.5	60	75.5	82.5	92	131	100
G_2 H8	-	-	22	22	28	32	42	48	52	62	100
g	4	4	4	4	4	4	5	6	7	7	7
H	16	14.5	17.5	26	27	26	34	41	46	54.5	-
h	1	1	1	1.25	1.25	1.25	-	-	-	-	-
h_1	5	6	6	7	8	8	10	12	14	19	21
K	10	10.8	12.5	12.3	8.3	12	12	20	20	22	18.5
K_1	9	9.8	11.5	11.1	7.1	10.8	-	-	-	-	-
K_2	10	8.8	11.5	10.3	10.3	14	12	18	25.5	21.5	17.5
K_3	10	9.8	11.5	10.3	10.3	14	12	18	26	23	19
L	39	41.5	45.2	55.7	61.7	72.5	84	97	116	114	135 5) 6)
L_2	38	40.5	44.2	54.7	60.7	71.5	83	96	115	113	135 6)
L_3	40	42.5	46.2	57	63	73.8	-	-	-	-	-
L_4	44	47.5	51.2	62.7	69.7	80.5	94	109	130	133	170 5)
L_5	43	46.5	50.2	61.7	68.7	79.5	93	108	129	132	156 6)
l	18	18	20	20	25	30	30	35	40	50 3)	70
	supporting length of the key										
M	66	72	90	112	132	145	170	196	230	278	325
M_1	29	35	41	52	61	75	88	100	112	145	115.5
R	57	65	81	101	121	130.5	154	178	206	253	300
r	45	45	53	70	83	94	106	122	140	161	190
s	3 x M4	3 x M4	3 x M5	3 x M6	3 x M6	3 x M8	3 x M8	3 x M8 8)	3 x M10 8)	6 x M10	6 x M12 7)
s_1	3 x M3	3 x M4	3 x M4	3 x M4	3 x M5	3 x M5	3 x M5	3 x M6	3 x M6	6 x M8	6 x M6
t	6	10	10	10	10	10	10	10	10	13	12
x	0	0	0	0 - 0.5	0 - 0.5	0 - 2	0 - 3	0 - 3	0 - 3	3 - 4	0 – 1.5
Z	36	45	55	65	75	90	100	115	130	175	-
z	1	1	1	1	1	1	1	1	1	1	-

Standard voltages 24; 104; 180; 207 V.
Permitted voltage tolerance acc. DIN IEC 60038 (±10 %).

1) Braking torque tolerance on size 2–250 = +30 %/-10 %, for other adjustments see Table 3, page 7 and type key page 3.
1.1) Braking torque tolerance = +40 %/-20 % (friction lining pairing conditioning necessary, see Operational Instructions B.8.1._).
1.2) Minimum bore not permitted for braking torque adjustment = 125 %.
2) The respective maximum bores are to be seen in relation to the corresponding keyways and their tolerances acc. Table 2 page 7.
3) Hub facing side (both sides) 3 mm deep, Ø 97 recessed.

We reserve the right to make dimensional and constructional alterations.

4) Brake operation only possible with overexcitation
5) The IP65 design is equipped with a sealing cover on size 1000: L = 149 mm, L_4 = 170 mm.
6) Projection screw plugs (emergency hand release): 8.5 mm
7) For flange plate securement: additional 2 x M12 screws
8) For flange plate securement: additional 3 x M8/M10 screws
9) Only up to Size 32

ROBA-stop®-M – Short Description Installation

Installation Conditions

- ❑ The eccentricity of the shaft end in relation to the mounting pitch circle must not exceed 0.2 mm.
- ❑ The positional tolerance of the threaded holes for the cap screws (Item 8, Fig. 2) must not exceed 0.2 mm.
- ❑ The axial run-out deviation of the screw-on surface to the shaft must not exceed the permitted axial run-out tolerance acc. DIN 42955 N. Larger deviations can lead to a drop in torque, to continuous grinding of the rotor and to overheating.

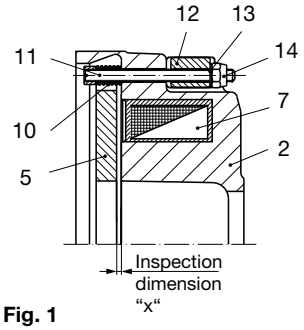


Fig. 1

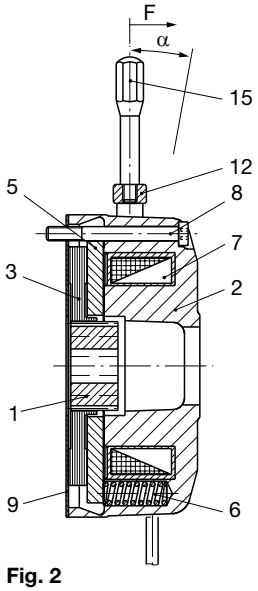


Fig. 2

Installation

1. Mount the hub (1) onto the shaft and secure it axially (e.g. using a locking ring).
   - – Recommended tolerance of hub-shaft connection H7/k6.
   - – Avoid too tight hub-shaft connections (particularly on max. bores).
   - – Keep the friction surfaces free of oil and grease.

   Attention!
   Please observe supporting length of the key acc. Dimensions on page 5.
2. If necessary (dependent on Type), move the friction disk or the flange plate over the shaft and attach it to the machine wall (or screw on for size 1000).
   - – If there are no suitable counter-friction surfaces made of grey cast or steel available, please use brake Types 891._ _2/3._ (with friction disk (9)) or 891._ _.4/5._ (with flange plate).

   When using a brake with a friction disk (Type 891._ _2/3._), please observe the stamp "friction side" on the friction disk.
3. Push the rotor (3) onto the hub (1) by hand.
4. If necessary, install the hand release (only on sizes 2 - 500/the emergency hand release is partly assembled on size 1000).
5. If necessary (dependent on Type, Type 891._ _ _.1), insert the O-ring into the axial recess of the coil carrier (2).
6. Push the rest of the brake over the hub (1) and the rotor collar (3).
7. Attach the brake onto the motor bearing shield or onto the machine wall evenly all around using the cap screws (8) - please observe the seal dependent on the type - with a torque wrench and tightening torque (acc. Table 1, page 7).

   Attention!
   Only use *mayr*® original screws (Table 1, page 7).

Braking Torque Adjustment

Different torque adjustments can be made using different spring configurations (6) in the coil carrier (2) (see Table 3, page 7).

Hand Release Installation (Sizes 2 – 500)

On Type 891._ _ _.1 installation of the hand release is only possible if a request for a hand release is stated on the brake order form (completely enclosed coil carrier (2)).

For hand release installation, the brake must be dismantled and de-energised.

Installation Procedure (Figs. 1 and 2):

1. Unscrew brake from the motor bearing shield or from the machine wall.
2. Remove the sealing plugs from the hand release bores in the coil carrier (2).
3. Put the thrust springs (10) onto the threaded bolts (11). The threaded bolts (11) come manufacturer-side assembled with a key as tension element and secured with adhesive up to Size M60. This connection must not be loosened.
4. Push the threaded bolts (11) with thrust springs (10) from the inside (you should be facing the magnetic coil (7)) into the hand release bores in the coil carrier (2).
5. Push the O-rings (only with sealed hand release, Type 891._ _ _.1) over the threaded bolts (11) and insert them into the recesses of the coil carrier (2).
6. Push intermediate plates (only with sealed hand release, Type 891._ _ _.1) over the threaded bolts (11).
7. Mount the switch bracket (12), add the washers (13) and lightly screw on the self-locking hexagon nuts (14).
8. Tighten both hexagon nuts (14) until the armature disk (5) lies evenly against the coil carrier (2).
9. Loosen both hexagon nuts (14) by "Y" turns (see Table 1, page 7), thereby creating an air gap between the armature disk (5) and the coil carrier (2) or the inspection dimension "x" (see Page 7, Table 1).
   Attention!
   An uneven adjustment dimension on the hand release can cause the brake to malfunction.
10. After installing the release cover, screw the hand release rod (15) into the switch bracket (12) and tighten it. The hand release rod (15) must be protected against loosening using a screw-securing product, e.g. Loctite 243.

Maintenance

ROBA-stop®-M brakes are mainly maintenance-free.
However, the rotor (3) is subject to operational wear.
The friction linings are robust and wear-resistant. This ensures a particularly long service lifetime.
If the rotor (3) does become worn due to the high total friction work, and the function of the brake can no longer be guaranteed, the brake can be re-set to its functional state by replacing the rotor. For this, the brake must be cleaned thoroughly.
The wear condition of the rotor (3) is determined by measuring the release voltage (this must not exceed max. 90 % of the nominal voltage on a warm brake), or by measuring the rotor thickness on a dismantled brake ("minimum rotor thickness" acc. Table in the currently valid Installation and Operational Instructions). On sizes 500 and 1000 there is an air gap inspection opening. This means that the brake does not have to be dismantled.

Attention!
The brake function cannot be guaranteed on brakes with a reduced braking torque and/or operation with a fast-acting rectifier if the friction linings are heavily worn.
Unpermittedly high wear relaxes the thrust springs (6), leading to a drop in torque.

ROBA-stop®-M – Short Description Installation

Technical Data – Installation				Size										
				2	4	8	16	32	60	100	150	250	500	1000
Inspection dimension		x	[mm]	0.9 $^{+0.1}$	0.9 $^{+0.1}$	1.1 $^{+0.1}$	1.6 $^{+0.1}$	1.8 $^{+0.1}$	2.2 $^{+0.1}$	2.2 $^{+0.1}$	2.2 $^{+0.1}$	2.4 $^{+0.1}$	2.4 $^{+0.1}$	-
Number of rotations		Y	[-]	1.7	1.7	1.5	2.0	2.0	2.0	1.6	1.6	1.5	1.5	-
Release force	Standard brake Type 891.0_ _._ Type 891.2_ _._	F	[N]	20	35	70	100	130	220	260	290	350	310	-
	Holding brake Type 891.10 _._	F	[N]	26	45	90	125	170	300	340	350	430	470	-
Release angle		α	[°]	6	7	7	7	8	10	12	13	10	10	-
Fixing screws (8) (Item 8, Fig. 2, Page 6)	Type 891._ _0._		[-]	3 x M4 x 45	3 x M4 x 45	3 x M5 x 50	3 x M6 x 60	3 x M6 x 60	3 x M8 x 75	3 x M8 x 80	3 x M8 x 100	3 x M10 x 110	6 x M10 x 110	6 x M12 x 130
			DIN	6912	6912	6912	6912	6912	6912	EN ISO 4762	EN ISO 4762	EN ISO 4762	EN ISO 4762	EN ISO 4762
	Type 891._ _4._		[-]	3 x M4 x 50	3 x M4 x 50	3 x M5 x 55	3 x M6 x 65	3 x M6 x 70	3 x M8 x 85	3 x M8 x 90	3 x M8 x 110	3 x M10 x 130	6 x M10 x 130	6 x M12 x 150
			DIN	EN ISO 4762	EN ISO 4762	6912	6912	EN ISO 4762	EN ISO 4762	EN ISO 4762	EN ISO 4762	EN ISO 4762	EN ISO 4762	EN ISO 4762
	Tightening torque	T_A	[Nm]	2.5	2.5	5.0	9.0	9.0	22	22	22	45	45	83
Rotor thickness "new condition"			[mm]	6.05	6.05	6.9	8	10.4	11.15	14	15.5	17	18.5	18.5

Table 1

Permitted Hub Bores Ø d_{max}				Size										
				2	4	8	16	32	60	100	150	250	500	1000
Type 891.0_ _._ Type 891.2_ _._	Keyway JS9	6885/1	[mm]	13	13	18	22	30	32	42	45	55	75	90
		6885/3	[mm]	15	15	20	25	-	35	45	50	60	80	-
	Keyway P9	6885/1	[mm]	13	13	18	20	28	32	42	45	50	75	90
		6885/3	[mm]	15	15	20	22	30	-	45	50	55	80	-
Type 891.1_ _._	Keyway JS9	6885/1	[mm]	13	13	18	22	30	32	42	45	55	75	90
		6885/3	[mm]	15	15	20	25	-	35	45	50	-	-	-
	Keyway P9	6885/1	[mm]	13	13	18	20	28	32	42	45	50	75	90
		6885/3	[mm]	15	15	20	22	30	-	45	50	55	-	-

Table 2

Braking Torque Adjustments				Size										
				2	4	8	16	32	60	100	150	250	500	1000 [1]
Holding brake			[Nm]	4	8	16	32	64	100	180	250	450	800 [1]	1600
Standard brake	Braking torque [2] in %	**125 %**	[Nm]	2.5	5	10	20	40	75	125	185	310	700 [1]	1400
		112 %	[Nm]	2.2	4.5	9	18	36	68	110	165	280	600	1200
		100 %	[Nm]	2	4	8	16	32	60	100	150	250	500	1000
		84 %	[Nm]	1.7	3.4	6.8	13.5	27	50	85	125	215	400	800
		68 %	[Nm]	1.4	2.8	5.5	11	22	41	70	100	180	350	700
		50 %	[Nm]	1	2	4	8	16	30	50	75	125	250	500
		34 %	[Nm]	0.7	1.4	2.8	5.5	11	21	-	-	-	200	400

Table 3

1) Brake operation only possible with overexcitation.
2) The braking torque (switching torque) is the torque effective in the shaft train of a slipping brake with a sliding speed of 1 m/s in relation to the mean friction radius (acc. VDE 0580/07.2000).

ROBA-stop®-M – Brake Dimensioning

Brake Size Selection

1. Brake selection

$$M_{erf.} = \frac{9550 \times P}{n} \times K \leq M_2 \quad [Nm]$$

$$t_v = \frac{J \times n}{9.55 \times M_v} \quad [sec]$$

$$M_v = M_N + (-)^* M_L \quad [Nm]$$

2. Inspection of thermic load

$$Q_r = \frac{J \times n^2}{182.4} \times \frac{M_2}{M_v} \quad [J/\text{ braking}]$$

The permitted friction work (switching work) $Q_{r\,zul.}$ per braking for the specified switching frequency can be taken from the friction-power diagrams (page 9).

If the friction work (switching work) per braking is known, the max. switching frequency can also be taken from the Friction-Power Diagrams (page 9).

Names:

J	[kgm²]	Mass moment of inertia
K	[-]	Safety factor (≥1.5–3 x according to conditions)
$M_{erf.}$	[Nm]	Required braking torque
M_L	[Nm]	Load torque * sign in brackets (-) is valid if load is braked during downward movement
M_N	[Nm]	Nominal torque (Technical Data page 4) Please observe the braking torque tolerance!
n	[rpm]	Speed
P	[kW]	Input power
t_v	[s]	Braking action
t_1	[s]	Connection time (Table 6 page 12)
Q_r	[J]	Friction work present per braking
$Q_{r\,0.1}$	[J]	Friction work per 0.1 mm wear (Table 4)
$Q_{r\,ges.}$	[J]	Friction work up to rotor replacement (Table 4)
$Q_{r\,zul.}$	[J]	Permitted friction work (switching work) per braking action

Due to operating parameters such as sliding speed, pressing or temperature the **wear values** can **only be considered guideline values**.

When using a brake with a friction disk (Type 891._ _2._), the max. friction work and friction power must be reduced by 30 % for Sizes 2 to 16 and by 50 % for Sizes 32 – 60. The wear values $Q_{r\,0.1}$ and $Q_{r\,ges.}$ are therefore not valid.

Friction Work				**Size**										
				2	**4**	**8**	**16**	**32**	**60**	**100**	**150**	**250**	**500**	**1000**
per 0.1 mm wear	Standard brake Type 891.0_ _._ Type 891.2_ _._	$Q_{r\,0.1}$	[10^6 J]	35	40	65	100	130	130	140	150	160	170	180
	Holding brake Type 891.1_ _._	$Q_{r\,0.1}$	[10^6 J]	7	8	13	20	30	65	70	75	80	85	90
up to rotor replacement	Standard brake Type 891.0_ _._ Type 891.2_ _._	$Q_{r\,ges.}$	[10^6 J]	95	100	162	500	600	700	840	950	1000	1700	2000
	Holding brake Type 891.1_ _._	$Q_{r\,ges.}$	[10^6 J]	7	8	13	20	45	130	170	300	350	425	540

Table 4

Mass Moment of Inertia **Rotor + hub with d_{max}**			**Size**									
			2	**4**	**8**	**16**	**32**	**60**	**100**	**150**	**250**	**500**	**1000**
Type 891.0_ _._ (Metal rotor) Type 891.1_ _._ (Metal rotor)	J_{R+H}	[10^{-4} kgm²]	0.12	0.21	0.67	1.74	4.48	6.74	16.54	31.68	61.82	222.6	424
Type 891.2_ _._ (Friction lining rotor)	J_{R+H}	[10^{-4} kgm²]	0.1	0.17	0.58	1.53	4.1	-	-	-	-	-	-

Table 5

ROBA-stop®-M – Friction-Power Diagrams

Type 891.01_._
and
Type 891.21_._
(Standard brake)
for 50 %
of the maximum speed n_{max}

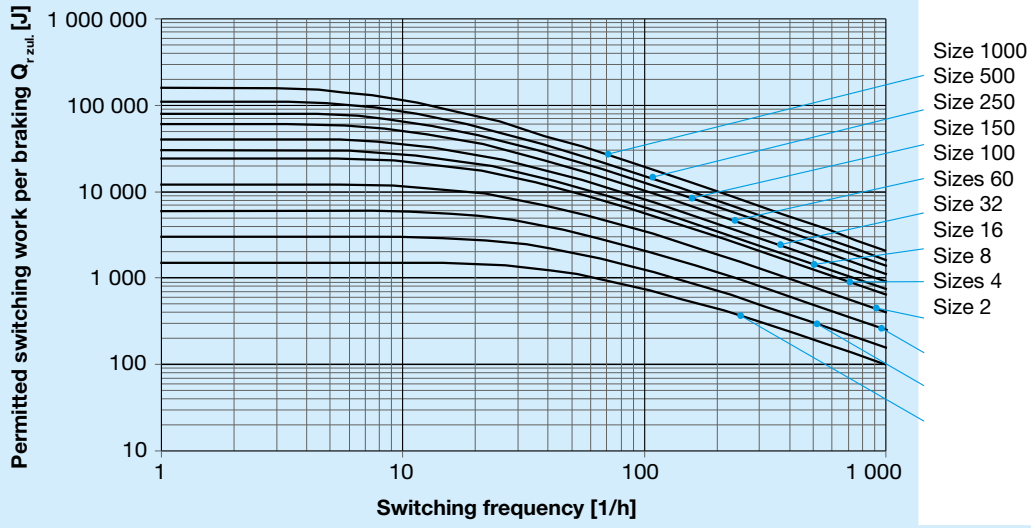


Diagram 1

Type 891.01_._
and
Type 891.21_._
(Standard brake)
for the
maximum speed n_{max}

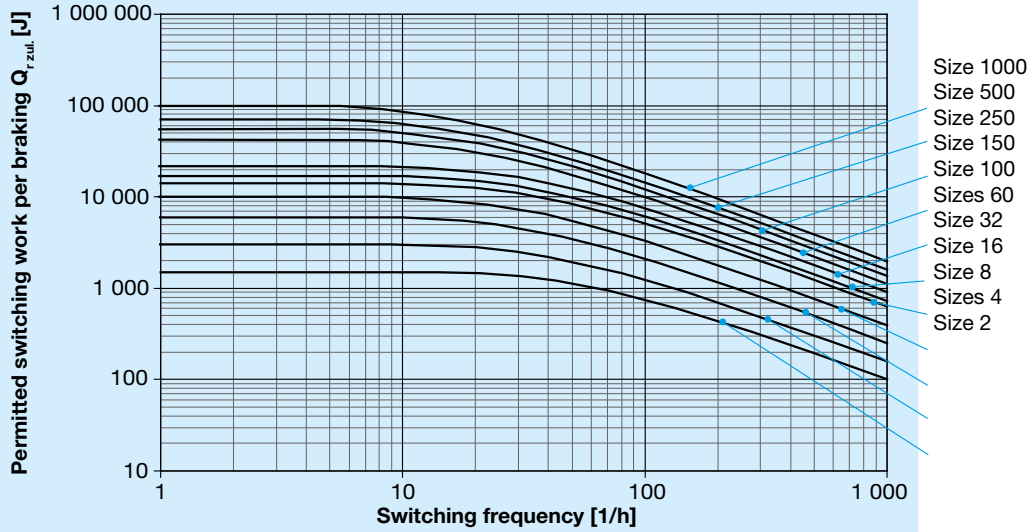


Diagram 2

Type 891.10_._ (Haltebremse)
bei 50 % der Maximaldrehzahl n_{max}

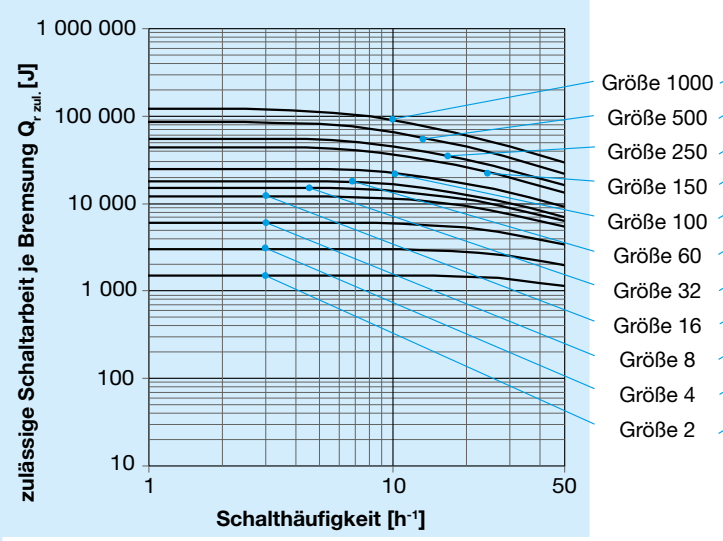


Diagramm 3

Type 891.10_._ (Haltebremse)
bei Maximaldrehzahl n_{max}

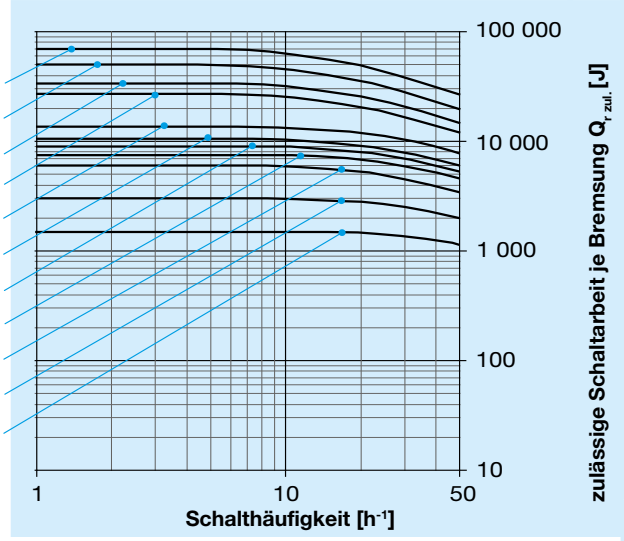


Diagramm 4

ROBA-stop®-M – Further Options

In addition to the standard brakes, *mayr*® power transmission provides a multitude of further designs, which cannot be described in detail in this catalogue.

Some of the most frequently requested options are:

- Microswitch / proximity switch for switching condition indication (release monitoring), Fig. 1
- Microswitch for wear indication (wear monitoring), Fig. 2
- Customer-specific flange plate, Fig. 3
- IP65 design for continuous shafts, Fig. 4
- Noise damping (O-ring damping between the gear hub and the rotor), Fig. 5
- ACH = Anti-Condensation heating, Fig. 6
- Lockable hand release
- Double rotor design, Fig. 8
- CCV-design, Fig. 9
- ATEX design
- Special friction material
- Backlash-free design
- Special coil voltages

Please contact *mayr*® power transmission for further information

Release monitoring

When the magnetic coil in the coil carrier (2) is energised, the armature disk (3) is pulled towards the coil carrier (2). The microswitch / proximity switch (1) emits a signal and the brake is released.

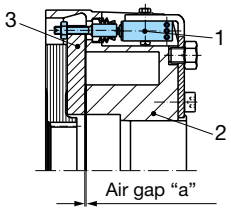


Fig. 1

Wear monitoring

Due to wear on the rotor (5), the nominal air gap “a” between the coil carrier (2) and the armature disk (3) increases. If the limit air gap (see table in the Installation and Operational Instructions) is reached, the microswitch contact (1) switches over and emits a signal. The rotor (5) must be replaced.

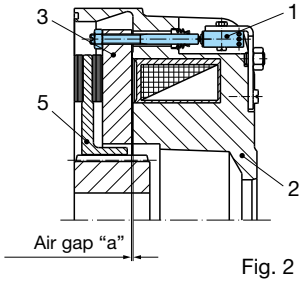


Fig. 2

Special flange plate

We offer a range of flange plates for customer-specific solutions, such as for example the special flange plate shown in Fig. 7 (1) with customer-tailored centering (8) and sealing (7).

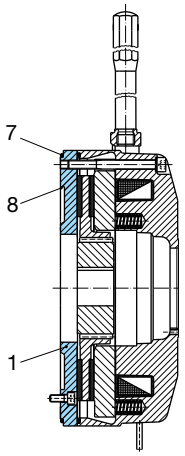


Fig. 3

Continuous shaft with IP65

The enclosed design (IP65) is equipped with a screw plug (sizes 8 to 500) or with a sealing cover (size 1000) (see Type 891._14.1, page 5) as part of the standard delivery.

A radial shaft sealing ring (1) is installed in the coil carrier (2) on continuous shafts.

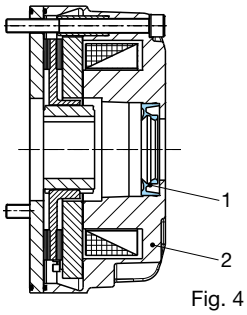


Fig. 4

Damping rotor / toothed hub

If vibrations in the drive line cannot be avoided, an O-ring (1) is used to damp backlash between the toothed hub (6) and the rotor (5).

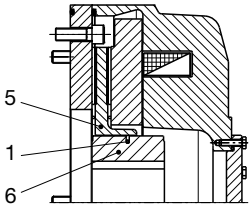


Fig. 5

Anti-condensation heating

The anti-condensation heating (1) is used to prevent condensation formation inside the brake.

Its usage is especially recommended at temperatures below 0 °C or in high air humidity.

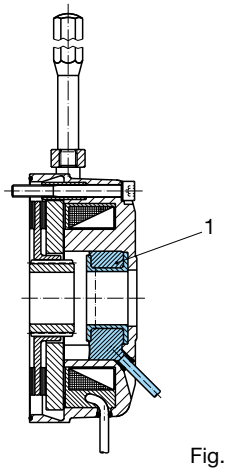


Fig. 6

ROBA-stop®-M – Further Options

Lockable hand release

In de-energised condition, the brake with lockable hand release can be released manually. By deflecting the hand release rod (1), the armature disk (3) is pushed against the thrust springs (4) onto the coil carrier (2) and the braking torque is removed, Figs. 7a and 7b.

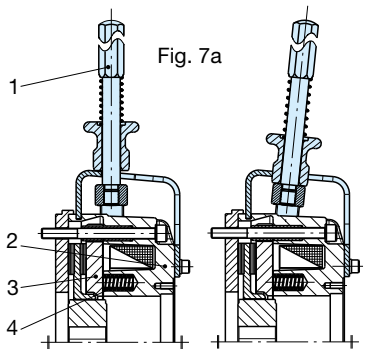


Fig. 7a

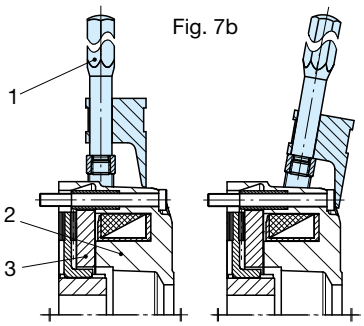


Fig. 7b

		Hand release in starting position	Hand release in engagement position	Hand release in starting position	Hand release in engagement position
Coil	de-energised	Shaft braked	Shaft runs free	Shaft braked	Shaft runs free
	energised	Shaft runs free	Shaft runs free	Shaft runs free	Shaft runs free

Double rotor design

Double rotor design for increased torque at small outside diameter.

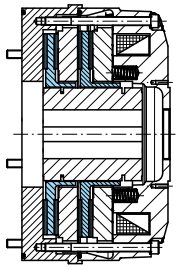


Fig. 8

CCV-design

Cold Climate safety brake Type 891.4__._ Sizes 16 - 150
GL-certified up to -40 °C.

For further information please see brochure: ROBA-stop®-M CCV P.891400.V

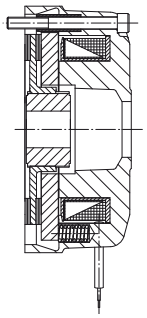


Fig. 9

ROBA-stop®-M – Switching Times

Switching Times

The values stated in the table are mean values which refer to the nominal air gap and the nominal torque on a warm brake.

Switching times [1]				Size										
				2	4	8	16	32	60	100	150	250	500	1000
Nominal torque (100 %)		M_2	[Nm]	2	4	8	16	32	60	100	150	250	500	1000
Connection time	DC-side switching	t_1	[ms]	10	18	20	30	50	55	68	80	100	100	180
	AC-side switching	t_1	[ms]	100	160	220	320	400	500	640	730	1100	1100	1200
Response delay on connection	DC-side switching	t_{11}	[ms]	6	12	16	25	35	35	38	40	50	30	70
	AC-side switching	t_{11}	[ms]	80	130	175	240	300	350	400	450	700	700	750
Separation [2]		t_2	[ms]	33	36	54	84	120	180	216	264	348	480	336 [3]
Nominal torque (84 %)		M_2	[Nm]	1.7	3.4	6.8	13.5	27	51	85	125	215	400	840
Connection time	DC-side switching	t_1	[ms]	16	29	32	48	80	88	109	128	160	160	288
	AC-side switching	t_1	[ms]	160	256	352	512	640	800	1024	1168	1760	1760	1920
Response delay on connection	DC-side switching	t_{11}	[ms]	9.6	19	26	40	56	56	61	64	80	48	112
	AC-side switching	t_{11}	[ms]	128	208	280	384	480	560	640	720	1120	1120	1200
Separation time		t_2	[ms]	24	26	39	61	87	130	157	191	252	348	235 [3]
Nominal torque (68 %)		M_2	[Nm]	1.4	2.8	5.5	11	22	42	70	100	180	350	680
Connection time	DC-side switching	t_1	[ms]	22	40	44	66	110	121	150	176	220	220	396
	AC-side switching	t_1	[ms]	220	352	484	704	880	1100	1408	1606	2420	2420	2640
Response delay on connection	DC-side switching	t_{11}	[ms]	13	26	35	55	77	77	84	88	110	66	154
	AC-side switching	t_{11}	[ms]	176	286	385	528	660	770	880	990	1540	1540	1650
Separation time		t_2	[ms]	21	23	34	53	75	113	135	165	218	300	203 [3]

Table 6

1) Standard brakes with a braking torque adjustment of 34% and 50 % have substantially longer connection times t_1 and must not be used for switching time-relevant applications.

2) The separation time t_2 of holding brakes is 1.4 times longer than the separation time of standard brakes (100 %).

3) Value for operation with overexcitation

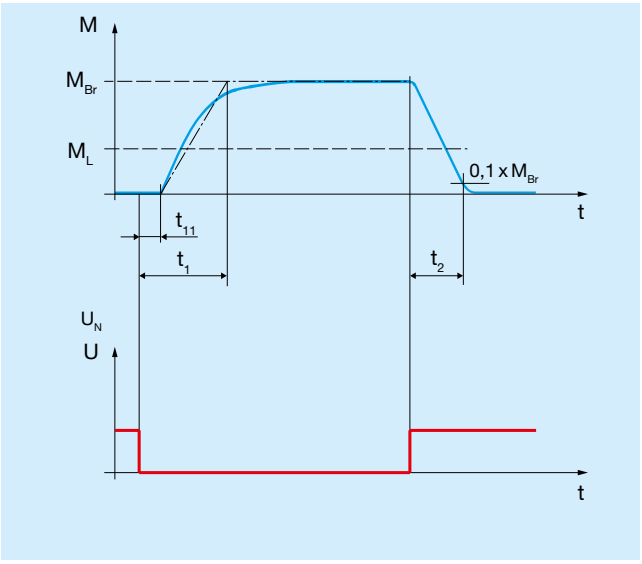


Diagram 5: Switching times for brake operation with **coil nominal voltage**

Names:

M_{Br} = Braking torque
M_L = Load torque
t_1 = Connection time
t_{11} = Response delay on connection
t_2 = Separation time
U_N = Coil nominal voltage

ROBA-stop®-M – Electrical Connection

Electrical Connection and Wiring

DC current is necessary for operation of the brake. The coil voltage is indicated on the Type tag as well as on the brake body and is designed according to the DIN IEC 60038 (±10 % tolerance). Operation can take place with alternating voltage using a *mayr*®-DC voltage module or another suitable DC power supply. The connection possibilities can vary dependent on the brake equipment. Please follow the exact connections according to the Wiring Diagram. The manufacturer and the user must observe the applicable regulations and standards (e.g. DIN EN 60204-1 and DIN VDE 0580). Their observance must be guaranteed and double-checked!

Earthing Connection

The brake is designed for Protection Class I. This protection covers not only the basic insulation, but also the connection of all conductive parts to the protective conductor (PE) on the fixed installation. If the basic insulation fails, no contact voltage will remain. Please carry out a standardised inspection of the protective conductor connections to all contactable metal parts!

Device Fuses

To protect against damage from short circuits, please add suitable device fuses to the mains cable.

Switching Behaviour

The reliable operational behaviour of a brake is to a large extent dependent on the switching mode used. Furthermore, the switching times are influenced by the braking torque adjustment, temperature and the air gap between the armature disk and the coil carrier (dependent on the wear condition of the linings).

Magnetic Field Build-up

When the voltage is switched on, a magnetic field is built up in the brake coil, which attracts the armature disk to the coil carrier and releases the brake.

• Field Build-up with Normal Excitation

If the magnetic coil is energised with nominal voltage, the coil current does not immediately reach its nominal value. The coil inductivity causes the current to increase slowly as an exponential function. Accordingly, the build-up of the magnetic field takes place more slowly and the braking torque drop (curve 1, diagram 6) is also delayed.

• Field Build-up with Overexcitation

A quicker drop in braking torque is achieved if the coil is temporarily placed under a higher voltage than the nominal voltage, as the current then increases more quickly.
Once the brake is released, it needs to be switched over to the nominal voltage (curve 2, diagram 6). The relationship between overexcitation and separation time t_2 is roughly indirectly proportional. This means that, using overexcitation voltage U_O (= doubled nominal voltage U_N), the separation time t_2 for release of the brake is halved. The ROBA®-switch fast acting rectifier works on this principle.

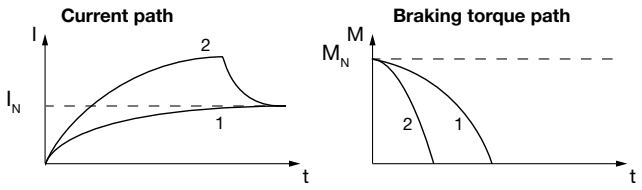


Diagram 6

Operation with overexcitation requires an inspection of :
- the required overexcitation time *
- as well as the RMS coil capacity ** with a cycle frequency higher than 1 cycle per minute (see page 14).

* **Overexcitation time t_o**

Increased wear, and therefore an increasing air gap as well as coil heating lengthen the separation times t_2 for the brake. For this reason, at least double the separation time t_2 at nominal voltage must be selected as overexcitation time t_O on each brake size

The spring forces also influence the brake separation times t_2: Higher spring forces increase the separation times t_2 and lower spring forces reduce the separation times t_2.

**** Coil capacity P**

$P \leq P_N$

The coil capacity P must not be larger than P_N. Otherwise the coil may fail due to thermic overload.

Calculations:

P [W] RMS coil capacity dependent on switching frequency, overexcitation, reduction in capacity and duty cycle

$$P = \frac{P_O \times t_O + P_H \times t_H}{T}$$

P_N [W] Coil nominal capacity (catalogue values, Type tag)

P_O [W] Coil capacity on overexcitation

$$P_O = \left(\frac{U_O}{U_N}\right)^2 \times P_N$$

P_H [W] Coil capacity at reduced capacity

$$P_H = \left(\frac{U_H}{U_N}\right)^2 \times P_N$$

t_O [s] Overexcitation time

t_H [s] Time of operation with reduction in capacity

t_{off} [s] Time without voltage

t_{on} [s] Time of operation ($t_O + t_H$)

T [s] Total time ($t_O + t_H + t_{off}$)

U_O [V] Overexcitation voltage (bridge voltage)

U_H [V] Holding voltage (half-wave voltage)

U_N [V] Coil nominal voltage

Time Diagram:

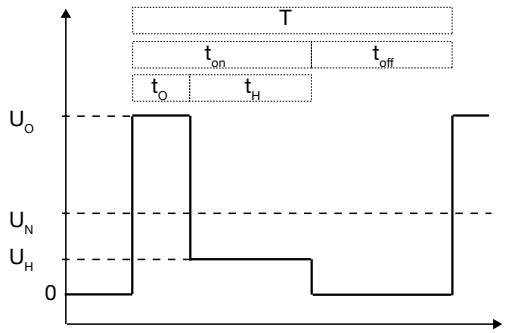
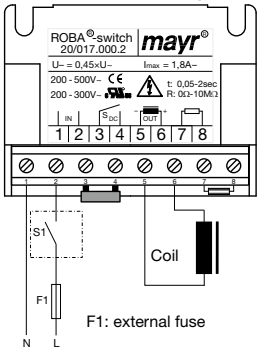


Diagram 7

For brakes, which do not require overexcitation, the holding voltage U_H may be lower than the nominal voltage U_N, e.g. on power reduction to reduce the coil temperature.

Magnetic Field Removal

• AC-side Switching



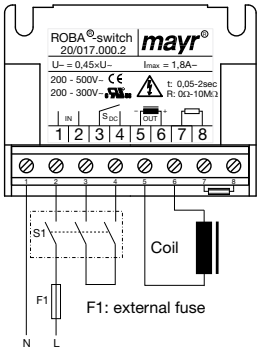
F1: external fuse

The power circuit is interrupted in front of the *mayr*®-DC voltage module. The magnetic field slowly reduces. This delays the rise in braking torque.

When switching times are not important, please switch AC-side, as no protective measures are necessary for the coil and the switching contacts.

AC-side switching means **low-noise switching**; however, the brake engagement time is longer (approx. 6 – 10 times longer than with DC-side switch-off), use for non-critical braking times.

• DC-side Switching



F1: external fuse

The power circuit is interrupted between the *mayr*®-DC voltage module and the coil as well as mains-side. The magnetic field reduces extremely quickly. This causes a quick rise in braking torque.

When switching DC-side, high voltage peaks are produced in the coil, which can lead to wear on the contacts from sparks and to destruction of the insulation.

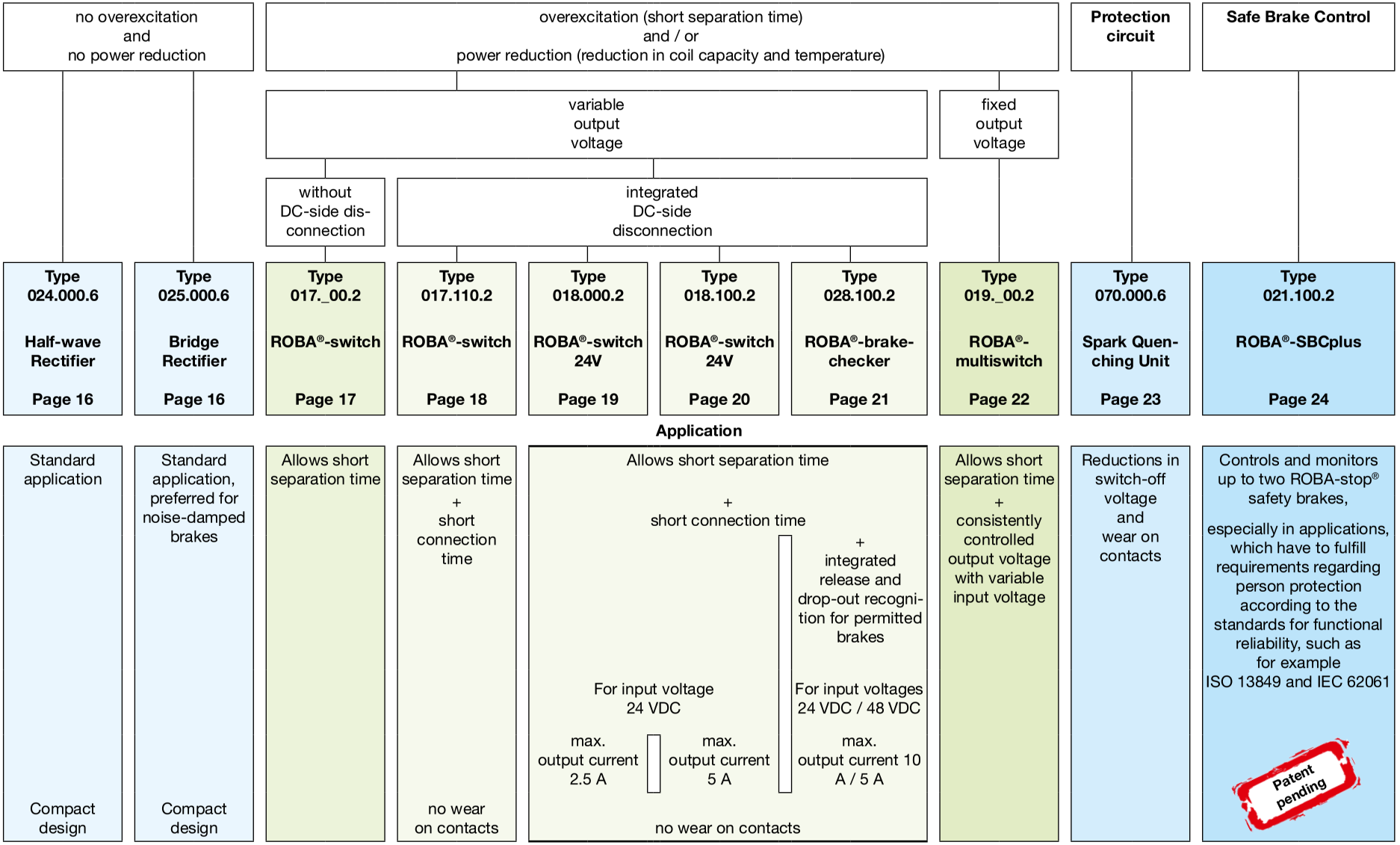
DC-side switching means **short brake engagement times (e.g. for EMERGENCY STOP operation)**; however, louder switching noises.

• Protection Circuit

When using DC-side switching, the coil must be protected by a suitable protection circuit according to VDE 0580, which is integrated in *mayr*®-DC voltage module. To protect the switching contact from consumption when using DC-side switching, additional protective measures may be necessary (e.g. series connection of switching contacts). The switching contacts used should have a minimum contact opening of 3 mm and should be suitable for inductive load switching. Please make sure on selection that the rated voltage and the rated operating current are sufficient. Depending on the application, the switching contact can also be protected by other protection circuits (e.g. *mayr*®-spark quenching unit), although this may of course then alter the switching times.

Electrical Accessories

Functions of the DC Voltage Modules



For detailed information on our DC voltage modules, please go to: www.mayr.com

Half-wave and bridge rectifiers Type 02_.000.6

Application

Rectifiers are used to connect DC consumers to alternating voltage supplies, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA-quick®, ROBATIC®), electromagnets, electrovalves, contactors, switch-on safe DC motors, etc.

Function

The AC input voltage U_I is rectified in order to operate consumers with DC voltage U_O. Also, voltage peaks, which occur when switching off inductive loads and which may cause damage to insulation and contacts, are limited and the contact load reduced.

Electrical Connection (Terminals)

1 + 2 Input voltage
3 + 4 Connection for an external switch for DC-side switching
5 + 6 Coil
7 – 10 Free nc terminals (only for Size 2)

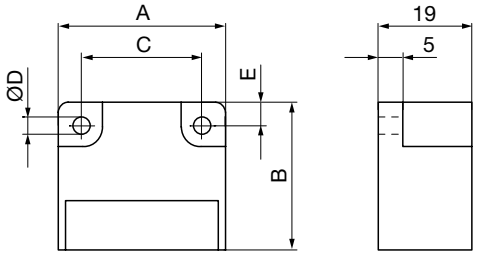
Order Number

__ / 0 2 __ . 0 0 0 . 6

Size		
1 up to 4	4	Half-wave rectifier
	5	Bridge rectifier

E189728

Dimensions (mm)



Size	A	B	C	ØD	E
1	34	30	25	3.5	4.5
2	54	30	44	4.5	5.0
3/4	64	30	54	4.5	5.0

Accessories: Mounting bracket set for 35 mm rail acc. EN 60715: Article No. 1803201

Technical Data

				Bridge rectifier		Half-wave rectifier			
Calculation output voltage				VDC = VAC x 0.9		VDC = VAC x 0.45			
Type				**1/025**	**2/025**	**1/024**	**2/024**	**3/024**	**4/024**
Max. input voltage	± 10 %	U_I	[VAC]	230	230	400	400	500	600
Max. output voltage		U_O	[VDC]	207	207	180	180	225	270
Output current	≤ 50°C	I_{RMS}	[A]	2.5	2.5	3.0	4.0	4.0	4.0
	at max. 85 °C	I_{RMS}	[A]	1.7	1.7	1.8	2.4	2.4	2.4
Max. coil nominal capacity at U_{AC} = 115 VAC	≤ 50 °C	P_N	[W]	260	260	-	-	-	-
	up to 85 °C	P_N	[W]	177	177	-	-	-	-
Max. coil nominal capacity at U_{AC} = 230 VAC	≤ 50 °C	P_N	[W]	517	517	312	416	416	416
	up to 85 °C	P_N	[W]	352	352	187	250	250	250
Max. coil nominal capacity at U_{AC} = 400 VAC	≤ 50 °C	P_N	[W]	-	-	540	720	720	720
	up to 85 °C	P_N	[W]	-	-	324	432	432	432
Max. coil nominal capacity at U_{AC} = 500 VAC	≤ 50 °C	P_N	[W]	-	-	-	-	900	900
	up to 85 °C	P_N	[W]	-	-	-	-	540	540
Max. coil nominal capacity at U_{AC} = 600 VAC	≤ 50 °C	P_N	[W]	-	-	-	-	-	1080
	up to 85 °C	P_N	[W]	-	-	-	-	-	648
Peak reverse voltage			[V]	1600	1600	2000	1600	2000	2000
Rated insulation voltage		U_{RMS}	[V_{RMS}]	320	320	500	500	630	630
Pollution degree (insulation coordination)				1	1	1	1	1	1
Device fuses				To be included in the input voltage line.					
Recommended microfuse switching capacity H The microfuse corresponds to the max. possible connection capacity. If fuses are used corresponding to the actual capacities, the permitted limit integral I²t must be observed on selection.				FF 3.15 A	FF 3.15 A	FF 4 A	FF 5 A	FF 5 A	FF 5 A
Permitted limit integral		I²t	[A²s]	40	40	50	100	50	50
Protection				IP65 components, encapsulated / IP20 terminals					
Terminals				Cross-section 0.14 – 1.5 mm² (AWG 26-14)					
Ambient temperature			[°C]	-25 to +85					
Storage temperature			[°C]	-40 to +85					
Conformity markings				UL, CE	UL, CE	UL, CE	UL, CE	UL, CE	CE
Installation conditions				The installation position can be user-defined. Please ensure sufficient heat dissipation and air convection! Do not install near to sources of intense heat!					

ROBA®-switch Type 017._00.2

E189728

Application

ROBA®-switch fast acting rectifiers are used to connect DC consumers to alternating voltage supplies, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA®-quick, ROBATIC®) as well as electromagnets, electrovalves, etc.

Fast acting rectifier ROBA®-switch 017._00.2

- Consumer operation with overexcitation or power reduction
- Input voltage: 100 – 500 VAC
- Maximum output current I_{RMS}: 3 A at 250 VAC
- UL-approved

Function

The ROBA®-switch is used for operation at an input voltage U_I of between 100 and 500 VAC, depending on the size. They can switch internally from bridge rectification U_O output voltage to half-wave rectification U_H output voltage. The bridge rectification time can be modified from 0.05 to 2 seconds by exchanging the external resistor (R_{ext}).

Electrical Connection (Terminals)

1 + 2	Input voltage (fitted protective varistor)
3 + 4	Connection for external contact for DC-side switch-off
5 + 6	Output voltage (fitted protective varistor)
7 + 8	R_{ext} for bridge rectification time adjustment

Technical Data

Input voltage	see Table 1
Output voltage	see Table 1
Protection	IP65 components, IP20 terminals, IP10 R_{ext}
Terminal nom. cross-section	1.5 mm² (AWG 22-14)
Ambient temperature	-25 °C bis +70 °C
Storage temperature	-40 °C up to +70 °C

ROBA®-switch Sizes, Table 1

			Size			
			Type 017.000.2		Type 017.100.2	
			10	20	10	20
Input voltage ± 10 %	U_I	[VAC]	100–250	200–500	100–250	200–500
Output voltage	U_O	[VDC]	90–225	180–450	90–225	180–450
	U_H	[VDC]	45–113	90–225	45–113	90–225
Output current						
at ≤ 45 °C	I_{RMS}	[A]	2.0	1.8	3.0	2.0
at max. 70 °C	I_{RMS}	[A]	1.0	0.9	1.5	1.0
Conformity markings			cULus CE	cULus up to 300 V CE	cULus CE	cULus CE

Order Number

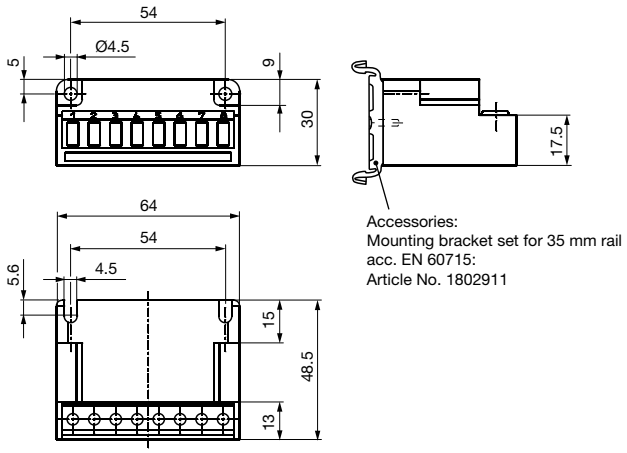
__ / 0 1 7 . __ 0 0 . 2

Size	
10	
20	

UL-approved	
0	up to 300 V
1	up to 500 V

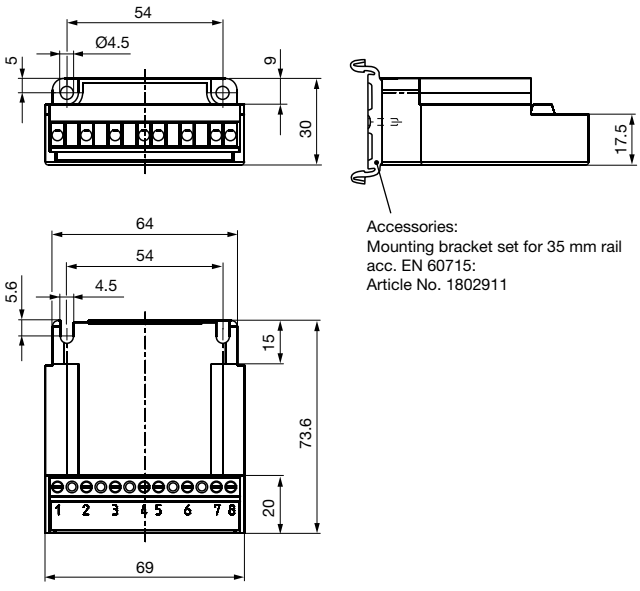
Dimensions (mm)

Type 017.000.2



Accessories:
Mounting bracket set for 35 mm rail acc. EN 60715:
Article No. 1802911

Type 017.100.2



Accessories:
Mounting bracket set for 35 mm rail acc. EN 60715:
Article No. 1802911

ROBA®-switch Type 017.110.2

E189728

Application

ROBA®-switch fast acting rectifiers are used to connect DC consumers to alternating voltage supplies, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA®-quick, ROBATIC®) as well as electromagnets, electrovalves, etc.

Fast acting rectifier ROBA®-switch 017.110.2

- Integrated DC-side disconnection (shorter connection time t_1)
- Consumer operation with overexcitation or power reduction
- Input voltage: 100 – 500 VAC
- Maximum output current I_{RMS}: 1.5 A
- UL-approved

The ROBA®-switch with integrated DC-side disconnection is not suitable for being the only safety disconnection in applications!

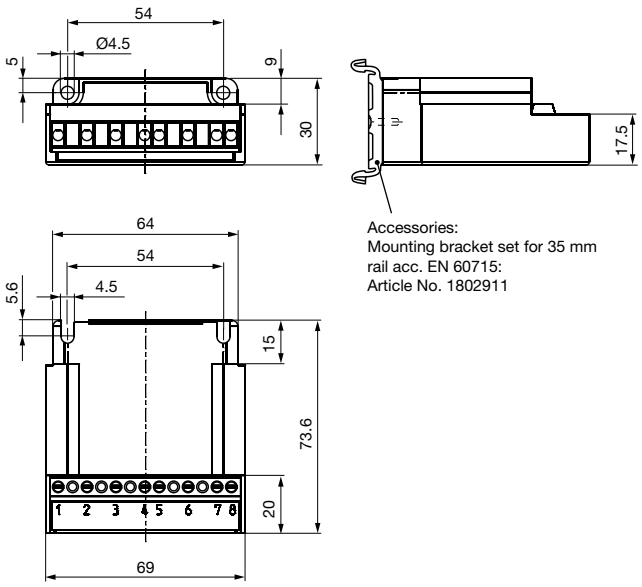
Function

The ROBA®-switch is used for operation at an input voltage of between 100 and 500 VAC, depending on the size. They can switch internally from bridge rectification U_O output voltage to half-wave rectification U_H output voltage. The bridge rectification time can be modified from 0.05 to 2 seconds by exchanging the external resistor (R_{ext}).

Apart from this, the ROBA®-switch has an integrated DC-side disconnection. In contrast to the usual DC-side disconnection, no further protective measures or external components are required. The DC-side disconnection is activated in standard mode (terminals 3 and 4 are not wired) and causes short switching times on the electromagnetic consumer.

The integrated DC-side disconnection is deactivated by fitting a bridge between the terminals 3 and 4. The coil is de-energised via the freewheeling diode. This has the advantages of softer braking and a lower switching noise. However, this substantially lengthens the switching times (approx. 6 – 10x).

Dimensions (mm)



Accessories:
Mounting bracket set for 35 mm rail acc. EN 60715:
Article No. 1802911

Electrical Connection (Terminals)

1 + 2	Input voltage (fitted protective varistor)
3 + 4	Switching between DC- and AC-side disconnection
5 + 6	Output voltage (fitted protective varistor)
7 + 8	R_{ext} for bridge rectification time adjustment

Technical Data

Input voltage	see Table 1
Output voltage	see Table 1
Protection	IP65 components, IP20 terminals, IP10 R_{ext}
Terminal nom. cross-section	1.5 mm² (AWG 22-14)
Ambient temperature	-25 °C up to +70 °C
Storage temperature	-40 °C up to +70 °C

ROBA®-switch Sizes, Table 1

				Size	
				10	20
Input voltage ± 10 %		U_I	[VAC]	100 – 250	200 – 500
Output voltage		U_O	[VDC]	90 – 225	180 – 450
		U_H	[VDC]	45 – 113	90 – 225
Output current	at ≤ 45 °C	I_{RMS}	[A]	1.5	1.5
	at max. 70 °C	I_{RMS}	[A]	0.75	0.75
Conformity markings				cULus CE	cULus CE

Order Number

__	/	0	1	7	.	1	1	0	.	2

△

Size
10
20

ROBA®-switch 24V Type 018.000.2

Application

ROBA®-switch 24V fast switching modules are used to operate DC consumers with overexcitation or power reduction, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA®-quick, ROBATIC®), electromagnets, electrovalves, etc.

Fast switching module ROBA®-switch 24V 018.000.2

- Consumer operation with overexcitation or power reduction
- Integrated DC-side disconnection (shorter connection time t_1)
- Input voltage: 24 VDC
- Max. output current I_{RMS}: 2.5 A

CAUTION

The ROBA®-switch 24V with integrated DC-side disconnection is not suitable for being the only safety disconnection in applications!

Function

The ROBA®-switch 24V units are used for an input voltage of 24 VDC. They can switch internally, meaning that the output voltage switches to holding voltage from the input voltage (= overexcitation voltage) via pulse-width modulation using 20 kHz. The overexcitation time and holding voltage can be switched.

Electrical Connection (Terminals)

1	Control input
2 + 3	Input voltage, ground
4 + 5	Input voltage +24V
6	Output voltage +
7	Output voltage -
8 + 9	Selection of overexcitation time
9 + 10	Selection ofholding voltage

Technical Data

Input voltage U_I	24 VDC (18 – 32 VDC) SELV/PELV
Output voltage U_O	Input voltage U_I
Output voltage U_H	see Table 1
Output current I_{RMS} at ≤ 45 °C	2.5 A
Output current I_{RMS} at max. 70 °C	1.25 A
Protection	IP65 components, IP20 terminals
Terminal nominal cross-section	1.5 mm² (AWG 22-14)
Ambient temperature	-25 °C up to +70 °C
Storage temperature	-40 °C up to +70 °C

Order Number

__ / 0 1 8 . 0 0 0 . 2

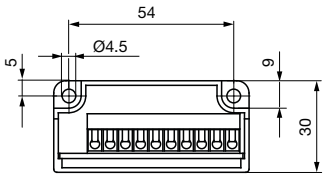
△

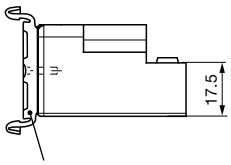
Size 1

Example:

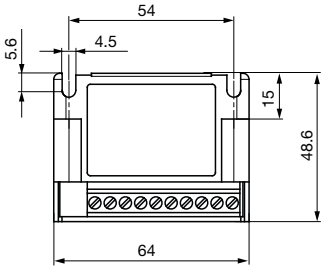
Order number 1 / 018.000.2 and article number 8237581

Dimensions (mm)





Accessories:
Mounting bracket set for 35 mm rail acc. EN 60715:
Article No. 1802911



ROBA®-switch 24V, Table 1

Article number	Overexcitation time t_O [ms]		Holding voltage U_H [VDC]	
	without	with	without	with
	Bridge 8+9		Bridge 9+10	
8237581	450	150	½ x U_I	⅔ x U_I

ROBA®-switch 24V Type 018.100.2

E189728

Application

ROBA®-switch 24V fast switching modules are used to operate DC consumers with overexcitation or power reduction, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA®-quick, ROBATIC®), electromagnets, electrovalves, etc.

Fast switching module ROBA®-switch 24V 018.100.2

- Consumer operation with overexcitation or power reduction
- Integrated DC-side disconnection (shorter connection time t_1)
- Input voltage: 24 VDC
- Max. output current I: 5 A
- UL-approved

CAUTION

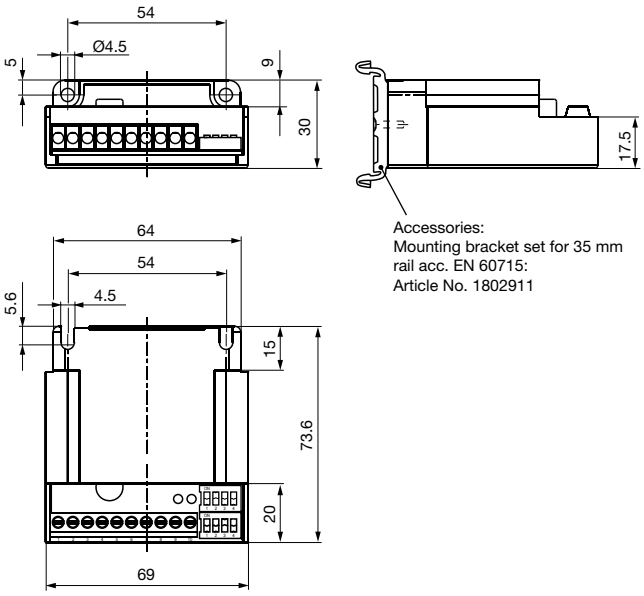
The ROBA®-switch 24V with integrated DC-side disconnection is not suitable for being the only safety disconnection in applications!

Function

The ROBA®-switch 24V units are used for an input voltage of 24 VDC. They can switch internally, meaning that the output voltage switches to holding voltage from the input voltage (=overexcitation voltage) via pulse-width modulation using 20 kHz. The overexcitation time can be adjusted via a DIP switch to 150 ms, 450 ms, 1 s, 1.5 s and 2.15 s. The holding voltage can be adjusted via a further DIP switch to ¼, ⅓, ½ and ⅔ of the input voltage (equals 6 V, 8 V, 12 V and 16 V at an input voltage of 24 V).

Apart from this, the ROBA®-switch 24V has an integrated DC-side disconnection. In contrast to the usual DC-side disconnection, no further protective measures or external components are required. The DC-side disconnection is activated in standard mode and causes short switching times on the electromagnetic consumer. This can, however, be deactivated by installing a bridge between terminals 7 and 8 in order to produce soft brakings and quieter switching noises. However, this substantially lengthens the switching times (approx. 6 – 10x).

Dimensions (mm)



Accessories:
Mounting bracket set for 35 mm rail acc. EN 60715:
Article No. 1802911

Electrical Connection (Terminals)

2 + 3	Input voltage, ground
4	Control input
5 – 7	Input voltage + 24 VDC
8 + 9	Output voltage +
10	Output voltage -

Technical Data

Input voltage U_I	24 VDC + 20 % / - 10 % SELV/PELV
Output voltage U_O	Input voltage U_I
Output voltage U_H	¼, ⅓, ½, ⅔ x U_I ± 20 % can be selected via a DIP switch
Output current I_{RMS} at ≤ 45 °C	5.0 A
Output current I_{RMS} at max. 70 °C	2.5 A
Protection	IP00
Terminal nominal cross-section	1.5 mm² (AWG 22-14)
Ambient temperature	-25 °C up to +70 °C
Storage temperature	-40 °C up to +70 °C

Order Number

__	/	0	1	8	.	1	0	0	.	2
△										
Size 1										

ROBA®-brake-checker Type 028.100.2

Application

ROBA®-brake-checker monitoring modules are used to operate safety brakes with overexcitation while at the same time monitoring the condition.

Monitoring module ROBA®-brake-checker 028.100.2

- Consumer operation with overexcitation or power reduction
- Controlled output voltage (on reduction)
- Simple adjustment of holding voltage and overexcitation time via a DIP switch
- Fast or slow switch off
- Brake condition recognition (release and drop-out recognition)
- Wear recognition and error recognition
- Wide input voltage range
- Maximum output current I_{RMS}: 10 A / 5 A
- Maximum overexcitation current I_O = 20 A / 10 A
- Automatic reduction of the holding voltage U_H

CAUTION

The ROBA®-brake-checker with integrated DC-side disconnection is not suitable for being the only safety disconnection in applications!

Function

The ROBA®-brake-checker monitoring module is intended for use with an input voltage of 24 or 48 VDC. The module monitors the switching condition of the brake and emits a signal to provide information on the respective switching condition.
Critical conditions (line breakages, wear) can be recognised and the respective signal can be emitted via the warning signal output.

Switching of the output voltage to a controlled holding voltage (see “Table 1“) is available as an option.

After a brake-specific overexcitation time period, the integrated automatic mode adjusts to the pre-set reduction voltage. The automatic mode can be switched off using a DIP switch.

Electrical Connection (Terminals)

Power Terminal

1 Supply voltage +24 VDC / +48 VDC
2 Output voltage +
3 Output voltage -
4 Supply voltage 0 VDC

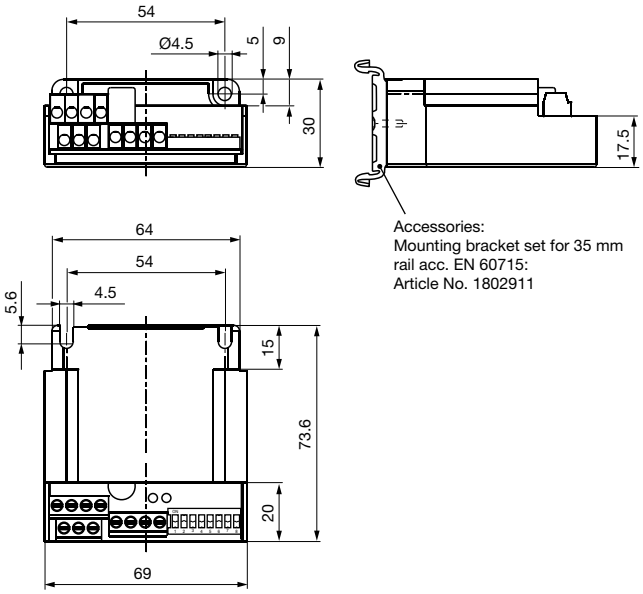
Signal Terminal

1 Supply voltage 0 VDC
2 Switch-off fast/slow (input)
3 Signal output (release monitoring)
4 24 V (auxiliary voltage for bridging)
5 Supply voltage +24 VDC
6 Start (input)
7 Error output max. 300 mA

Technical Data

Input voltage	see Table 1
Output voltage	see Table 1
Protection	IP65 components, IP20 terminals, IP20 DIP switch
Terminal nominal cross-section	
Power terminals	4 mm², (AWG 20-12)
Signal terminals	1.5 mm², (AWG 30-14)
Ambient temperature	-25 °C up to +70 °C
Storage temperature	-40 °C up to +105 °C

Dimensions (mm)



Accessories:
Mounting bracket set for 35 mm rail acc. EN 60715:
Article No. 1802911

ROBA®-brake-checker Sizes, Table 1

				Size 2 24 VDC	Size 4 48 VDC
Input voltage, power terminal	SELV/PELV	U_I	[VDC]	18 – 30	42 – 54
Input voltage, signal terminal		U_I	[VDC]	24 (19 – 28)	
Output voltage	± 5 %	U_O	[VDC]	Input voltage U_I	
	± 5 %	U_H	[VDC]	6 8 12 16 / 12 16 24 32	
Output current	at ≤ 45 °C	I_{RMS}	[ADC]	10.0	5.0
	at max. 70 °C	I_{RMS}	[ADC]	5.0	2.5
Conformity markings				CE	CE

Order Number

__ / 0 2 8 . 1 0 0 . 2

△

Size
2
4

ROBA®-multiswitch Type 019._00.2

c UL us E189728 CE

Application

ROBA®-multiswitch fast acting rectifiers are used to connect DC consumers to alternating voltage supplies, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA®-quick, ROBATIC®) as well as electromagnets, electrovalves, etc.

Fast acting rectifier ROBA®-multiswitch 019._00.2

- Consistently controlled output voltage in the entire input voltage range
- Consumer operation with overexcitation or power reduction
- Input voltage: 100 – 500 VAC
- Max. output current I_{RMS}: 2 A; 4.5 A
- UL-approved

ROBA®-multiswitch units are not suitable for all applications, e.g. use of the ROBA®-multiswitch when operating noise-damped brakes is not possible without taking additional measures. The product's suitability should be checked before use.

Function

The ROBA®-multiswitch is used for operation at an input voltage of between 100 and 500 VAC, depending on the size. After switch-on, it emits the rectified bridge voltage for 50 ms and then adjusts automatically to a pre-programmed overexcitation voltage. After the overexcitation time ends, it regulates to the permanently programmed holding voltage. For the overexcitation voltage and holding voltage values of the standard design, please see Table 1.
On special designs, deviating values are possible.
The overexcitation time can be adjusted via a DIP switch to 150 ms, 450 ms, 1 s, 1.5 s and 2 s.

Electrical Connection (Terminals)

1 + 2 Input voltage (fitted protective varistor)
3 + 4 Connection for external contact for DC-side switch-off
5 + 6 Output voltage (fitted protective varistor)

Technical Data

Input voltage	see Table 1
Frequency	50 – 60 Hz
Output voltage	see Table 1
Output current	
Type 019.100.2	2 A at ≤ 45 °C; 1 A at max. 70 °C
Type 019.200.2	4.5 A at ≤ 45 °C; 2.25 A at max. 70 °C
Protection	IP65 components, IP20 terminals, IP20 DIP switch
Terminal nominal cross-section	1.5 mm² (AWG 22-14)
Ambient temperature	-25 °C up to +70 °C
Storage temperature	-40 °C up to +70 °C

Order Number

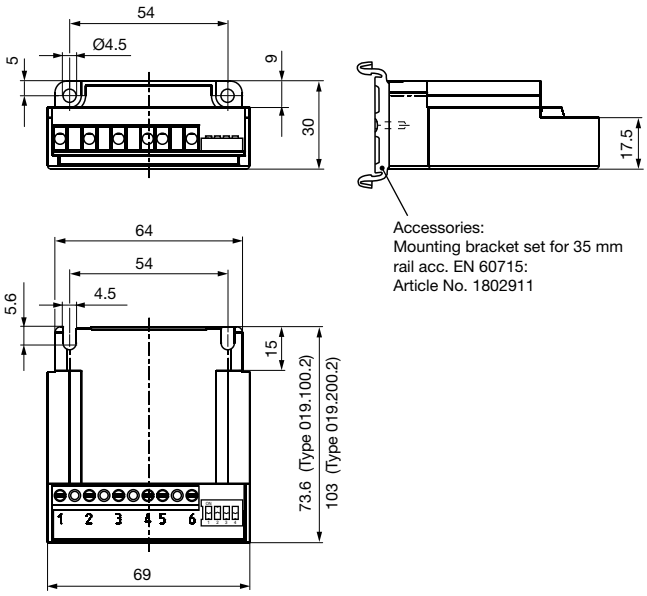
__	/	0	1	9	.	__	0	0	.	2

Size		
10	1	max. 2.0 A I_{RMS}
20	2	max. 4.5 A I_{RMS}

Example:

Order number 20 / 019.100.2 and article number 8225580

Dimensions (mm)



Accessories:
Mounting bracket set for 35 mm rail acc. EN 60715:
Article No. 1802911

ROBA®-multiswitch Sizes, Table 1

Size	Type	Input voltage * ± 10 % acc. EN 50160 [VAC]	Output voltage * ± 10 % U_O** [VDC]	U_H** [VDC]	Article number
10	019.100.2	100 – 275	90	52	8186586
20	019.100.2	200 – 500	180	104	8185591
	019.200.2	200 – 500	180	104	8242954
	019.100.2	230	207	30	8225580
	019.200.2	230	207	30	8237887
	019.100.2	300 – 500	240	52	8220914

* On special designs, deviating values are possible.
The values stated on the Type tag are decisive.

** U_O : overexcitation voltage; U_H : holding voltage

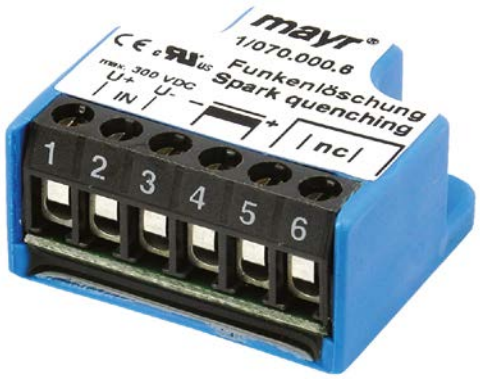
Spark Quenching Unit Type 070.000.6

E189728

Application

Reduces spark production on the switching contacts occurring during DC-side switch-off of inductive loads.

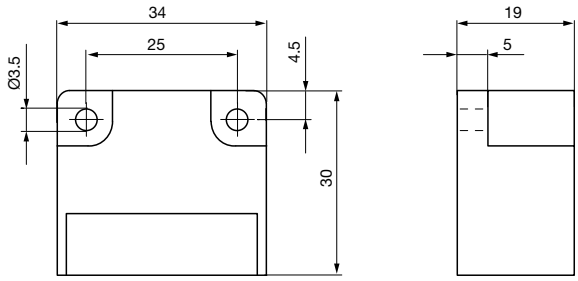
- Voltage limitation according to VDE 0580 2000-07, Item 4.6.
- Reduction of EMC-disturbance by voltage rise limitation, suppression of switching sparks.
- Reduction of brake engagement times by a factor of 2 – 4 compared to freewheeling diodes.



Function

The spark quenching unit will absorb voltage peaks resulting from inductive load switching, which can cause damage to insulation and contacts. It limits these to 70 V and reduces the contact load. Switching products with a contact opening distance of > 3 mm are suitable for this purpose.

Dimensions (mm)



Electrical Connection (Terminals)

1 (+)	Input voltage
2 (–)	Input voltage
3 (–)	Coil
4 (+)	Coil
5	Free nc terminal
6	Free nc terminal

Technical Data

Input voltage	max. 300 VDC, max. 615 V_{peak} (rectified voltage 400 VAC, 50/60 Hz)
Switch-off energy	max. 9 J / 2 ms
Power dissipation	max. 0.1 Watt
Rated voltage nc terminals	250 V
Protection	IP65 components, IP20 terminals
Ambient temperature	-25 °C up to +85 °C
Storage temperature	-40 °C up to +85 °C
Max. conductor connection diameter	2.5 mm² / AWG 26-12
Max. terminal tightening torque	0.5 Nm

Accessories

Mounting bracket set for 35 mm rail acc. EN 60715:
Article No. 1803201

Order Number

__ / 0 7 0 . 0 0 0 . 6
△
Size
1

ROBA®-SBCplus
The safe brake control - for use up to PLe and SIL CL3

Application

The safe brake control ROBA®-SBCplus is used to control and monitor two ROBA-stop® safety brakes, especially in applications, which have to fulfill requirements regarding person protection according to the standards for functional reliability, such as for example ISO 13849 and IEC 62061.

Characteristics:

- Safe electronic switching of two brakes
- Input voltage power circuit 24 - 48 VDC
- Connection for up to 2 brakes up to 4.5 A / 24 VDC or 2.25 A / 48 VDC (108 W)
- Output voltage (holding voltage) can be selected 6,8,12,24,48 VDC
  → Power reduction, temperature reduction, electricity costs reduction
- Overexcitation time configurable
- Feedback inputs release monitoring for proximity switch or microswitch
- Monitoring for plausibility of the feedback
  → Error diagnostics of the brake
- Status and error outputs for feedback to the control
- No mechanic contacts for controlling and monitoring
  → High reliability, no wear, independent of cycle frequency and cycle rate
- Fast (“DC-side”) or slow (“AC-side”) switch off possible
- Galvanic separation between the control part and the power part
  → Prevention of EMC issues
- Four integrated functions:
  Contactor, 24 VDC fast-acting rectifier, safety relay, spark quenching
- Safe holding voltage and overexcitation time
- Safety functions are programmed into the ROBA®-SBCplus and only have to be parameterised
  → Plausibility check integrated and must not be programmed and validated
- Applicable up to PLe and SIL CL3, Type examination TÜV Süd (German Technical Inspectorate)

Maximum switching reliability

The brake control must safely interrupt the current in the magnetic coil on switching off the brake. The ROBA®-SBCplus module works with wear-free electronic semiconductors and thus achieves almost unlimited switching frequencies and switching reliability.

Safe inner configuration

Amongst other things, the internal diagnostics inspections for short circuits, earth short-circuits and line breaks as well as safe overexcitation for releasing the brake and switching to reduced holding voltage when the brake is opened are the components required for “fail-safe” inner configuration.

Numerous safety functions

Numerous safety functions permit comprehensive error diagnostics. The brake voltage is monitored. An excessively high voltage could dangerously extend the drop-out time on switch-off, if, for example, this were to cause a vertical axis to drop to an unpermittedly low level. The monitoring of the switching times, which influence the braking distance, is therefore another component of error diagnostics.

Safe switching condition monitoring

The signal evaluation of the release monitoring with plausibility check permits a switching condition monitoring of the brake. The plausibility is controlled as follows: If voltage is applied, the brake must be opened after a defined time and vice versa. The switching condition monitoring can be used to reliably prevent the drive starting up against a closed brake. In this way, creeping errors, such as gradually increasing wear, which affects the switching times, can be detected.

ROBA®-torqcontrol

Adapted braking -
Intelligent braking torque control module

In contrast to car brakes, safety brakes can only distinguish between two operating conditions due to their design, namely “braking torque present” and “no braking torque present”. This is the reason why every braking procedure is carried out with the maximum braking torque available. Just as in a car, gradual, even deceleration is also often desired for devices and machine applications with dynamic braking actions. The new, intelligent braking torque control module **ROBA®-torqcontrol** by *mayr®* power transmission therefore offers an economically attractive solution to generate a variable braking torque for ROBA-stop® safety brakes, making it possible to decelerate machines evenly and gently.

Continuous braking torque changes when in operation

Up to now, brakes have been dimensioned with regard to the maximum load where devices with variable loads, for example forklift trucks, are concerned. In case of partial loads, a stronger deceleration than necessary with the full braking torque can lead to damage to the transported goods or even to sliding of the wheels. If, however, the system detects the operating conditions and converts this information into a default signal for the new, intelligent control module by mayr® power transmission, electronic braking torque regulation is possible. Using the new system, the brake specialists have succeeded in continuously changing the contact force on the brake linings and therefore also the braking torque during operation. In this way, machines can be decelerated smoothly, adapted to the respective system requirements. Using the new, intelligent control device by *mayr®* power transmission, the resulting clamping force for the brake rotor can be specified to 25%, 50% or 75% of the nominal spring force by means of two digital inputs. Alternatively, a continuous, analogue default signal from 0 to 10 V is possible. The switching device determines without using a sensor whether the armature disk is attracted or has dropped. This makes it possible to adjust the overexcitation time automatically as desired. With the new braking torque control module, *mayr®* power transmission provide the possibility to build up control circuits and brake movements intelligently – ideal prerequisites for application in the smart, interconnected machines of the future.

Technical Data	Intelligent braking torque control module ROBA®-torqcontrol
Supply voltage	24 V or 48 V
Output current	10 A or 5 A
Inputs	Start/Stop
	digital braking torque pre-selection 25%, 50%, 75%
	or analogue 0…10 V equals 25…100% torque
Outputs	release signal
Adjustable voltage reduction/overexcitation	√
Automatic overexcitation time or manually adjustable	√
Release and drop recognition for safety brakes	√
Dimensions L x W x H	103 x 69 x 30 mm

Additional Information

The catalogue contains basic information on pre-selection and dimensioning.

For detailed information on selection, brake dimensioning, electrical connection, installation and initial operation, please see the Installation and Operational Instructions B.8.1.

If you have any questions regarding the selection and dimensioning, please contact our headquarters.

Safety-relevant Applications

Brakes which are used in safety-related applications are to be selected in accordance with the risk assessment EN ISO 12100 and furthermore in accordance with EN ISO 13849-1 through identification of the safety function.

This is in principle the task of the system manufacturer.

Roba-stop®-M standard designs with safety parameters:

- Type 891.10_._ nominal torque holding brake
- Type 891.01_._ 100% nominal torque standard
- Type 891.02_._ 84% nominal torque
- Type 891.02_._ 68% nominal torque
- Type 891.01_._ 112% nominal torque standard
- Type 891.01_._ 125% nominal torque standard

Customer-specific designs on request.

Safety parameters can be requested if required.

In case of deviating designs, please consult with mayr® power transmission directly.

Secure Control acc. EN ISO 13849-1

For safe control, a brake control module specially developed for such applications, is available. According to SIL 3 Level, two brake circuits can be supplied. **For detailed information please see page 24**.

Additional Supply and Control Modules

For controlling the **Roba-stop®-M**, additional suitable supply and control modules are available.

For overview and functions, please see page 15.

The **Catalogue K.001.V_ _ "Reliable control of DC consumers"** features a detailed description of the different modules.

Available quickly as PDF download.

We would be happy to mail you a printed version of the Installation and Operational Instructions B.8.1 and catalogue K.001.V_ _._ _ on request.

These documents are also available as **PDF download** on our website **www.mayr.com**.

ROBA-stop®-M – Guidelines

Guidelines on the Declaration of Conformity: A conformity evaluation has been carried out for the product (electromagnetic safety brake) in terms of the EC Low Voltage Directive 2006/95/EC. The Declaration of Conformity is laid out in writing in a separate document and can be requested if required.

Guidelines on the EMC Directive (2004/108/EC): The product cannot be operated independently according to the EMC directive. Due to their passive state, brakes are also non-critical equipment according to the EMC. Only after integration of the product into an overall system can this be evaluated in terms of the EMC. For electronic equipment, the evaluation has been verified for the individual product in laboratory conditions, but not in the overall system.

Guidelines on the Machinery Directive (2006/42/EC): The product is a component for installation into machines according to the machinery directive 2006/42/EC. The brakes can fulfil the specifications for safety-related applications in coordination with other elements. The type and scope of the required measures result from the machine risk analysis. The brake then becomes a machine component and the machine manufacturer assesses the conformity of the safety device to the directive. It is forbidden to start use of the product until you have ensured that the machine accords with the regulations stated in the directive.

Guidelines on the ATEX Directive: Without a conformity evaluation, this product is not suitable for use in areas where there is a high danger of explosion. For application of this product in areas where there is a high danger of explosion, it must be classified and marked according to directive 94/9/EC.

Safety Regulations

Brakes may generate several risks, among others:

During the risk assessment required when designing the machine or system, the dangers involved must be evaluated and removed by taking appropriate protective measures.

To prevent injury or damage, only professionals and specialists are allowed to work on the devices. They must be familiar with the dimensioning, transport, installation, initial operation, maintenance and disposal according to the relevant standards and regulations.

Application Conditions

The catalogue values are guideline values which have been determined in test facilities. It may be necessary to carry out your own tests for the intended application.

When dimensioning the brakes, please remember that installation situations, braking torque fluctuations, permitted friction work, run-in behaviour and wear as well as general ambient conditions can all affect the given values. These factors should therefore be carefully assessed, and alignments made accordingly.

- ❒ Mounting dimensions and connection dimensions must be adjusted according to the size of the brake at the place of installation.
- ❒ The magnetic coils are designed for a relative duty cycle of 100%, if no other values are stated.
- ❒ The braking torque is dependent on the present run-in condition of the brake.
- ❒ The brakes are only designed for dry running. The torque is lost if the friction surfaces come into contact with oil, grease, water or similar substances or foreign bodies.
- ❒ Manufacturer-side corrosion protection of the metallic surfaces.
- ❒ The rotors may rust up and block in corrosive ambient conditions and/or after long periods of storage.

Ambient Temperature: –20 °C up to +40 °C

Protection

(mechanical) IP54: When installed, dust-proof and protected against contact as well as against water spray from any direction (dependent on customer-side mounting method).

(electrical) IP54: Dust-proof and protected against contact as well as against water spray from any direction.

IP65 (Type 891._ _.1): Dust-proof and protected against contact as well as against jet water from a nozzle coming from any direction.

Earthing Connection

The brake is designed for Protection Class I. This protection covers not only the basic insulation, but also the connection of all conductive parts to the protective conductor (PE) on the fixed installation. If the basic insulation fails, no contact voltage will remain. Please carry out a standardised inspection of the protective conductor connections to all contactable metal parts!

Intended Use

mayr®-brakes have been developed, manufactured and tested in compliance with the VDE 0580 standard and in accordance with the EU Low Voltage Directive as electromagnetic components. During installation, operation and maintenance of the product, the standard requirements must be observed. *mayr*®-brakes are for use in machines and systems and must only be used in the situations for which they are ordered and confirmed. Using them for any other purpose is not allowed.

Guidelines for Electromagnetic Compatibility (EMC)

In accordance with the EMC directives 2004/108/EC, the individual components produce no emissions. However, functional components e.g. mains-side energisation of the brakes with rectifiers, phase demodulators, ROBA®-switch devices or similar controls can produce disturbance which lies above the allowed limit values.
For this reason it is important to read the Installation and Operational Instructions very carefully and to keep to the EMC directives.

Standards, Directives and Regulations Used

VDE 0580	Electromagnetic devices and components, general specifications
2006/95/EC	Low Voltage Directive
CSA C22.2 No. 14-2010	Industrial Control Equipment
UL 508 (Edition 17)	Industrial Control Equipment
EN ISO 12100	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN 61000-6-4	Interference emission
EN 61000-6-2	Interference immunity
EN 60204-1	Electrical equipment of machines

Liability

- The information, guidelines and technical data in these documents were up to date at the time of printing. Demands on previously delivered brakes are not valid.
- Liability for damage and operational malfunctions will not be taken if: the Installation and Operational Instructions are ignored or neglected, the brakes are used inappropriately, the brakes are modified, the brakes are worked on unprofessionally and the brakes are handled or operated incorrectly.

Guarantee

- The guarantee conditions correspond with the Chr. Mayr GmbH + Co. KG sales and delivery conditions.
- Mistakes or deficiencies are to be reported to mayr® at once!

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You can find the complete address for the representative responsible for your area under www.mayr.com in the internet.

16/10/2015 GF/SC/SU