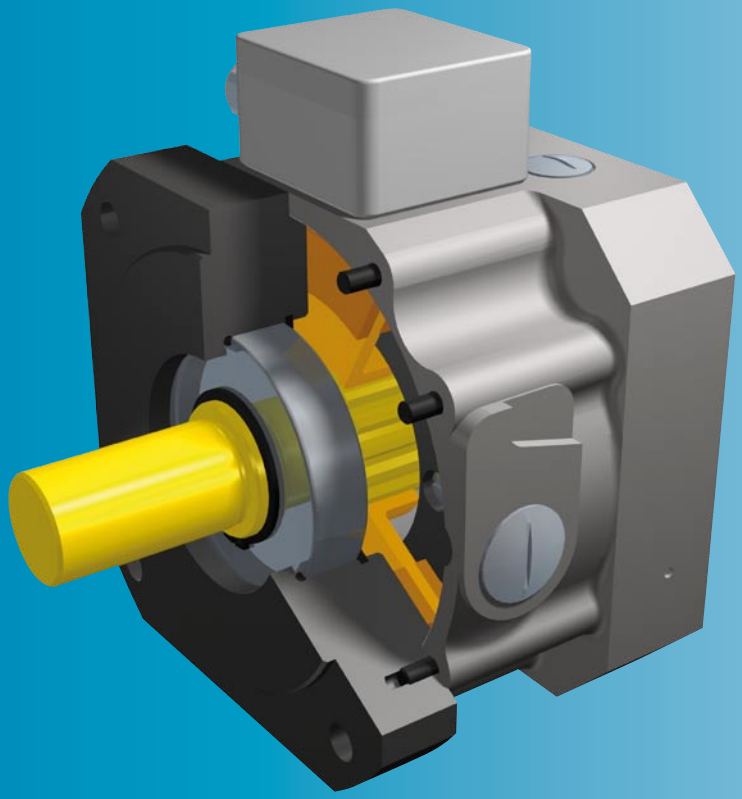
ROBA®-topstop®

Brake systems for gravity loaded axes



ROBA-stop®
The best choice for safe brakes

- ***Reliable protection in all operating modes***
- ***Maximum safety due to redundant systems and integrated function monitoring***
- ***Easy way to retrofit existing axes***
- ***Patent pending***

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K.899.V06.GB

mayr®
your reliable partner

Safe brake systems for gravity loaded axes

mayr® ROBA-stop® brakes prevent unintentional vertical axes drops or crashes!

- ❒ **Reliable safety protecting people in all operating modes**
- ❒ **Maximum safety via redundancy and diversity is achieved when using two different brake systems**
- ❒ **Controlled operational safety due to an integrated brake function monitoring system**
- ❒ **Minimal braking distances due to short reaction times and high brake performance density**
- ❒ **Optimum adaptation for individual axes construction due to different brake concepts**
- ❒ **Economic and problem-free to retrofit pre-existing axes**

Additional measures are required to minimise the potential risk of a falling load on vertical axes in areas where personnel might be endangered. These measures have been demanded by the Technical Committee for Mechanical Engineering, Production Systems and Steel Construction in their Information sheet "gravity loaded axes". *mayr*® power transmission has developed various new brake systems which guard against all critical danger situations which can occur during operation of vertical axes.

The operation of vertical axes represents a particular problem. Switching off the drive energy due to an error in the machine control or a power failure can lead to an axis crash. Unpredictable mechanical wear as a result of the design, due for example to EMERGENCY STOP brakings or to contamination of the friction linings caused by oil, drastically reduce the braking torque. Often, motor-integrated brakes are equipped with insufficient braking torque reserves.

The possibility of brake failure can therefore not be excluded. On linear motors, braking in EMERGENCY STOP situations or in the event of power failure is not possible, as no brake is integrated. In order to avoid critical situations, further measures must be taken to minimise any risks.

Dependent on the risk analysis with the risk parameters "Severity of injury", "Frequency and/or time duration of exposure to danger" and "Possibility of danger prevention or damage limitation", different demands result on the selection of the safety components for protecting the machine operator during dangerous movement of the machine.

In DIN EN ISO 13849 "Machine safety" the respective solution approaches are specified via descriptions of the system structure (category) and the additional demands on reliability parameters (DC, CCF...) . The safety-related quality of the SPR/CS (safety-related control components) is indicated as the Performance Level (PL).

For this reason, *mayr*® power transmission has developed different new brake systems, which increase the safety-related quality as part of the SPR/CS.

The safety brake product range
ROBA®-topstop®,
ROBA®-alphastop®,
ROBA®-pinionstop,
ROBA®-linearstop and
ROBA-stop®-M fulfils the requirements for a safe holding and braking system and minimises the endangerment of people and machines. These brakes are used both as secure single brakes and in combination with a second brake as two-channel or redundant systems for protection against high risks.
Maximum safety via redundancy and diversity is achieved when using two different brake systems.

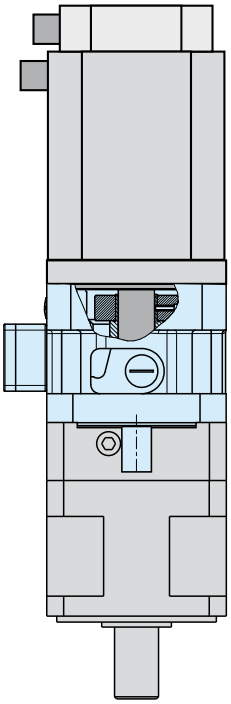
Please Observe:

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

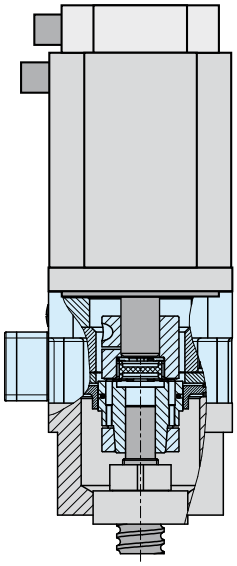
ROBA®-topstop®
Modular safety brake system for a mounted servo motor on the A-bearing side

Characteristics and advantages

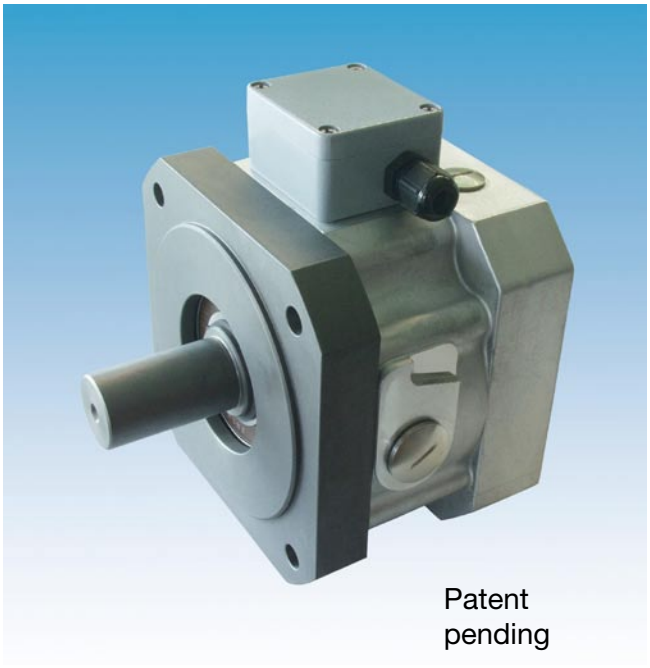
- ❒ The leading system on the market for vertical axes with rotatory drives
- ❒ The axis is held safely in any position, even with a dismantled servomotor, e.g. during machine maintenance
- ❒ Safe braking on EMERGENCY STOP and power failure
- ❒ Long lifetime even after frequent EMERGENCY STOP brakings
- ❒ Highest reliability due to decades of experience and a *mayr*® construction which has been tried and tested millions of times
- ❒ Indication of the operating condition (released/ braked) via an integrated switch
- ❒ Short, compact design
- ❒ Low weight
- ❒ Low self-induced heat production even at 100 % duty cycle



ROBA®-topstop® with output shaft for direct mounting onto a gearbox with a hollow shaft.



Brake system with integrated, plug-in shaft coupling. Separate coupling and coupling housing are no longer necessary. Very short design.



Patent pending

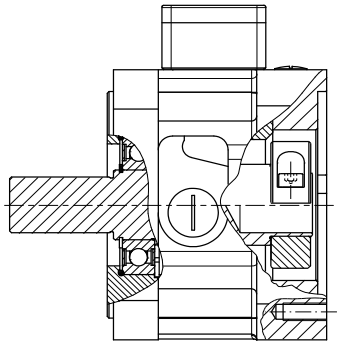
Brake designs:

- ❒ Single circuit brake with a bearing-supported output shaft: i.e. suitable for toothed belt drives
- ❒ Single circuit brake with an integrated plug-in shaft coupling
- ❒ Single circuit brake with a shaft coupling and an installed EAS®-smartic® safety clutch
- ❒ Redundant dual circuit brake system with a bearing-supported output shaft
- ❒ Basic brake module for special brake configurations

Due to their adaptable flange dimensions, ROBA®-topstop® safety brakes can easily be integrated into pre-existing constructions between the servomotor and the counterflange. If necessary, the design can be easily adapted to any installation situation by changing the standard flange.
Three standard sizes for braking torques of 12 to 160 Nm are available for delivery at short notice.

Structural Shapes

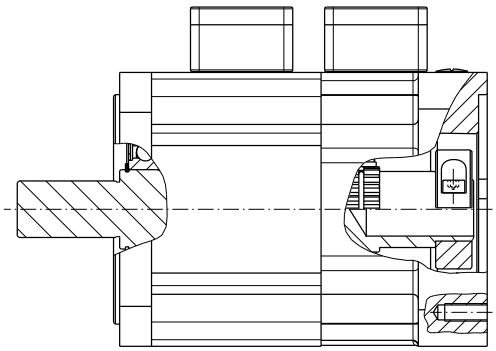
ROBA®-topstop® with shaft design



Type 899.000.0_
Single circuit brake with bearing-supported clamping hub shaft

Type 899.000.0_

This brake type can be integrated into existing drives without any additional constructive work, or can be retrofitted. The output-side brake flange connection dimensions and the shaft dimensions equal the servomotor connection dimensions.
A bore positioned above the terminal box allows access to the clamping screw on the motor-side clamping hub construction. Radial forces can be absorbed by the ball bearing brake shaft, so that mounting belt pulleys and therefore operation in belt pulley drive systems is easily possible.



Type 899.200.01
Dual circuit brake with bearing-supported clamping hub shaft

Type 899.200.01

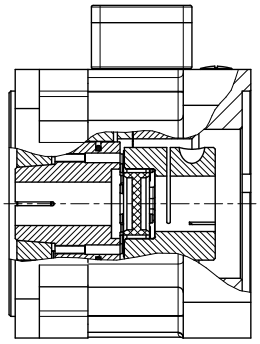
This dual circuit brake with bearing-supported clamping hub shaft is equipped with two independent brake circuits. Each braking circuit is individually electrically controllable. In accordance with the single brake circuit system, the operating condition of each brake circuit is scanned and signalled. Using this redundant brake system and the respective control, an even higher Performance Level acc. DIN EN ISO 13849 is possible.

Application Example

Due to its adapted flange dimensions, it was possible to integrate the ROBA®-topstop® with a minimum of effort into the pre-existing Z-axis of a handling system (see photo) between the servomotor and gearbox, thereby ensuring increased safety.
Often, the integrated permanent magnet brakes integrated into servomotors are unable to provide sufficient safety. Wear or lubrication can mean that the nominal holding torque on the brakes falls below the permitted level. In EMERGENCY STOP situations, the brakes must take on very high friction work. High operating temperatures – not unusual in servomotors – can also lead to brake malfunctions or can reduce the braking torque.
ROBA®-topstop® safety brakes protect against all critical danger situations which can occur during operation of vertical axes. They guarantee full security, even when the servomotor is dismantled e.g. during maintenance work.

Structural Shapes

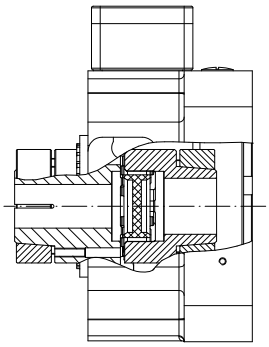
ROBA®-topstop® with plug-in coupling for mounting directly onto ball screw spindles



Type 899.01_._ _
Single circuit brake (with standard output flange)

Types 899.011._ _ and 899.012._ _

The brake Types 899.01_._ _ are specially conceived for direct mounting onto ball screw spindles. A backlash-free, plug-in ROBA®-ES Type series shaft coupling is integrated into the brake housing to compensate for axial, radial and angular shaft misalignment. This makes separate coupling housing and shaft couplings unnecessary.
The coupling hub to be mounted motor-side is offered in standard design as a ROBA®-ES clamping hub and as a ROBA®-ES shrink disk hub. The output-side coupling hub is connected securely to the spindle shaft via a shrink disk-clamping connection.
The short brake construction length requires very little more space than the usual clutch housing designs (see Fig. below). For safety reasons, the braking torque is transferred directly via the shrink disk-clamping connection onto the spindle instead of via the coupling.

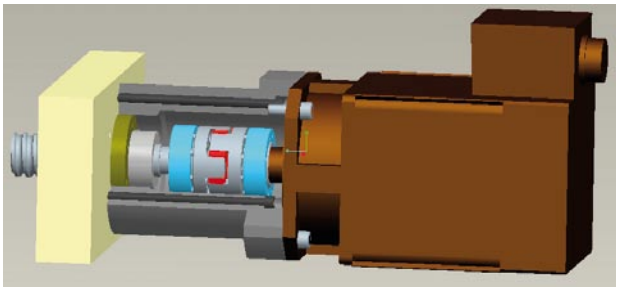


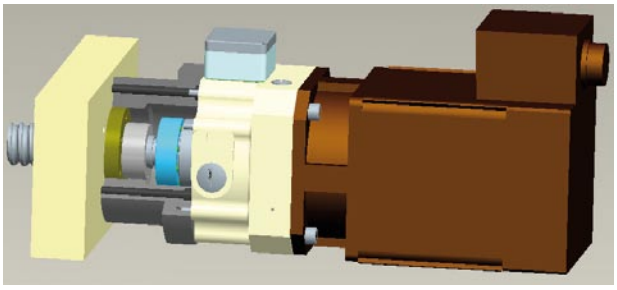
Type 899.1_ _._ _
Single circuit brake module (without output flange)

Type 899.3_ _._ _
Single circuit module (with special output flange)
Example on page 11

Types 899.11_._ _ and 899.31_._ _

The brake module Type series 899.1_ _._ _ and the brake Type 899.3_ _._ _ were conceived for specific customer-tailored mounting situations.
Depending on the individual mounting conditions, these brakes can be mounted directly onto a pre-existing friction flange (Type 899.11_._ _) or can be delivered with a mounting flange specially adapted for the application (Type 899.31_._ _). On Type 899.11_._ _, the friction flange is not included in standard delivery.
On Type 899.31_._ _, the mounting flange is included in delivery. The brake module can be equipped with the standard clamping hub shaft and ROBA®-ES shaft couplings or with special coupling constructions which can be optimally adapted for individual mounting conditions.





Upper Illustration: a typical servomotor attachment with a shaft coupling on an axis with a ball screw drive. The coupling housing ensures the necessary distance between machine and servomotor.

Lower Illustration: the same design; but this time with an additional brake. The ROBA®-topstop® single circuit brake with integrated ROBA®-ES shaft coupling is especially conceived for mounting on a ball screw spindle. The coupling housing is much shorter, meaning that the total construction increases only minimally in length. The shaft coupling becomes a brake component.
The brake function also maintains its effect if the servo-motor is dismantled. The axis dynamic remains, because the total mass moments of inertia increase minimally on this integrated construction. The coupling housing can be ordered as part of the delivery Type 899.31_._ _ and produced according to the customer's request, or just the brake module can be delivered Type 899.11_._ _.

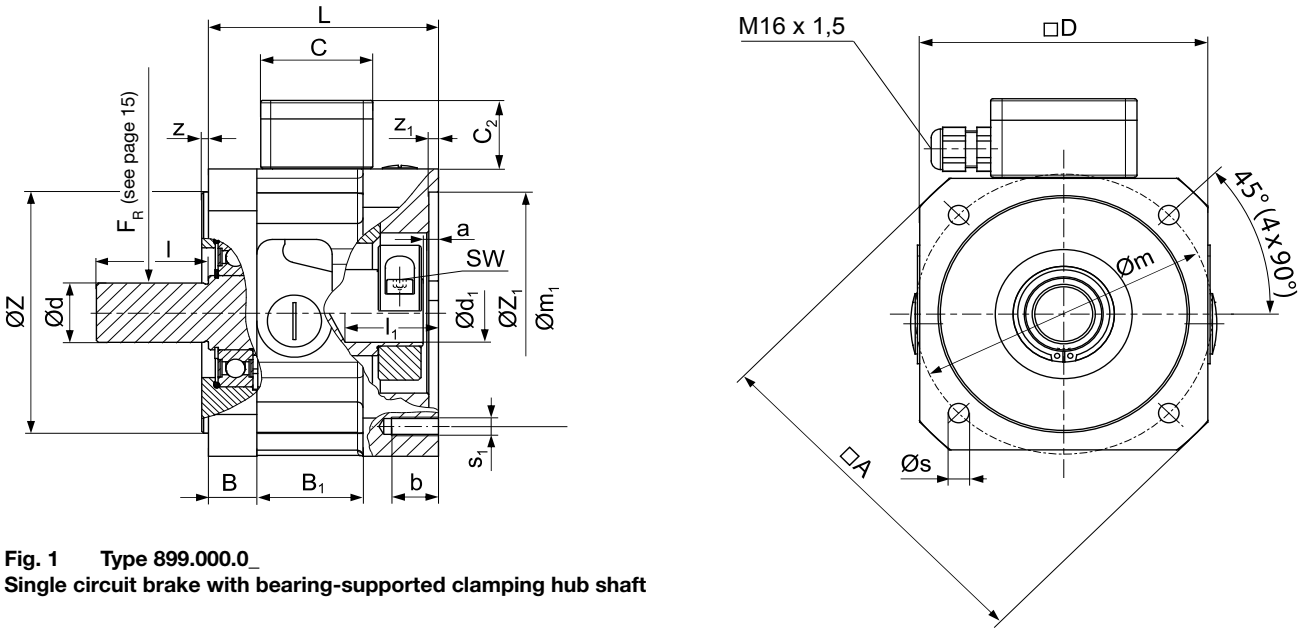


Fig. 1 Type 899.000.0_
Single circuit brake with bearing-supported clamping hub shaft

Technical Data

Size	Braking torque 1)		Input power			Max. speed n	Mass moment of inertia J	Mass m
	Type 899.000.01 [Nm]	Type 899.000.02 4) [Nm]	Type 899.000.01 [W]	Type 899.000.02 A2) [W]	Type 899.000.02 B3) [W]	Type 899.000.0 _ [rpm]	Type 899.000.0_ [kgm²]	Type 899.000.0 _ [kg]
120	12	30	31,5	102	26	5000	0,00055	7,5
150	45	90	44	125	32	4000	0,0013	13
200	100	160	60	148	38	3000	0,0043	24

1) Braking torque tolerance +40 % / -20 %
2) Coil capacity on overexcitation
3) Coil capacity for holding voltage
4) Max. braking torque only with overexcitation (see pages 16, 19, 20 and 21)

Correlation of bore diameter d_1, dependent on respective transmittable torques (without key)

Size	Preferred bores d_1 and associated frictional locking transmittable torques [Nm]			
	Ø 19	Ø 24	Ø 32	Ø 38
120	64	81	-	-
150	-	150	199	-
200	-	-	199	237

The transmittable torques for the clamping connection allow for the max. tolerance backlash on a solid shaft: tolerance k6/bore (d_1): tolerance F7.
If the tolerance backlash is larger, the torque decreases.

Dimensions

Size	A	a	B	B_1	b	C	C_2	D	L	Shaft Ø d_{k6} x l		(Shaft) bore 5) Ø d_1 F7 x l_1	
120	160	5	20	52	20	58	37	126	104	19 x 40	24 x 50	19 x 55	24 x 55
150	190	6,5	25	55	24	58	37	155	119	24 x 50	32 x 58	24 x 68	32 x 68
200	246	10	20	71	28	58	37	194	138,5	32 x 58	38 x 80	32 x 90	38 x 90

5) The transmittable torques in bore d_1 are dependent on the diameter, see Table above.

Size	m	m_1	s	s_1	SW	Z_{j6}		Z_1 F8		z	z_1
120	130	130 (115*)	9	4 x M8	5	110	95	110	95	3	5
150	165	165	11	4 x M10	6	130	110	130	110	3,5	5
200	215	215	13,5	4 x M12	8	180	130	180	130	4	6

*) Optionally available with pitch circle m_1 = 115

We reserve the right to make dimensional and constructional alterations

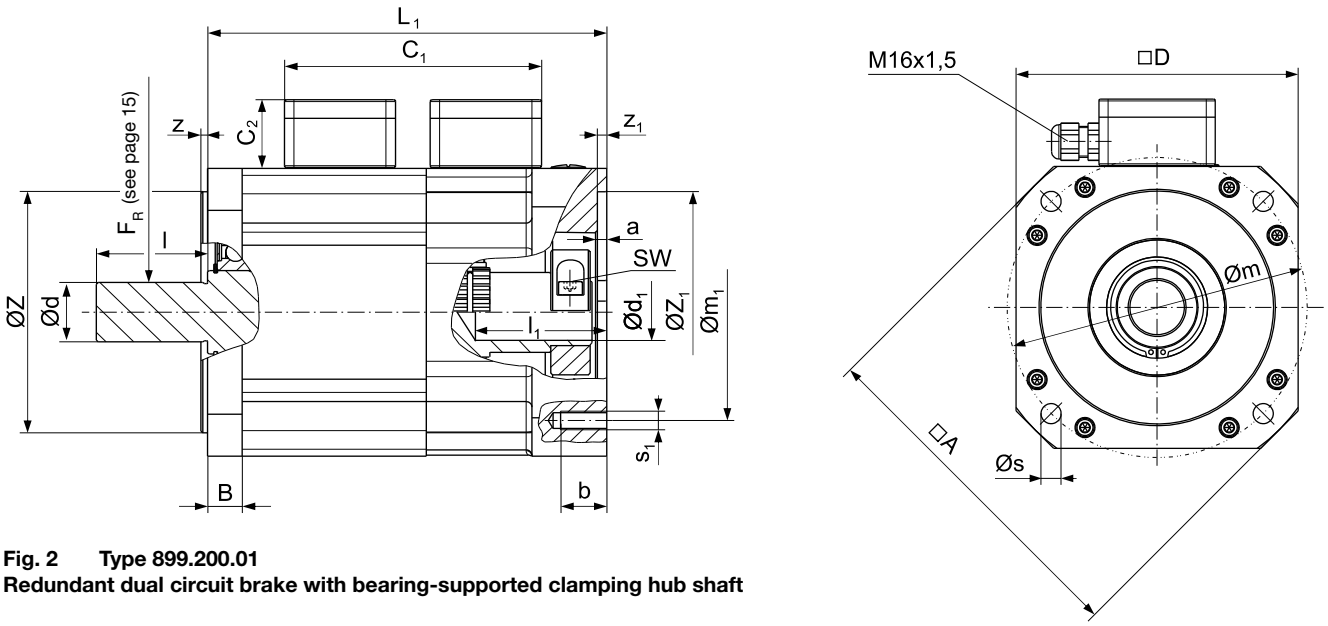


Fig. 2 Type 899.200.01
Redundant dual circuit brake with bearing-supported clamping hub shaft

Technical Data

Size	Braking torque [1] Type 899.200.01 [Nm]	Input power Type 899.200.01 [W]	Max. speed n_{maxi} Type 899.200.01 [rpm]	Mass moment of inertia J Type 899.200.01 [kgm²]	Mass m Type 899.200.01 [kg]
120	2 x 12	2 x 31,5	5000	0,0009	12
150	2 x 45	2 x 44	4000	0,0022	24
200	2 x 100	2 x 60	3000	0,0085	39

1) Braking torque tolerance +40 % / -20 %

Correlation of bore diameter d_1 dependent on respective transmittable torques (without key)

Size	Preferred bores d_1 and associated frictional locking transmittable torques [Nm]			
	Ø 19	Ø 24	Ø 32	Ø 38
120	64	81	-	-
150	-	150	199	-
200	-	-	199	237

The transmittable torques for the clamping connection allow for the max. tolerance backlash on a solid shaft: tolerance k6/bore (d_1): tolerance F7.
If the tolerance backlash is larger, the torque decreases.

Dimensions

Size	A	a	B	b	C_1	C_2	D	L_1	Shaft Ø d_{k6} x l		(Shaft) bore [2] Ø d_1 F7 x l_1	
120	160	5	20	20	118	37	126	164	19 x 40	24 x 50	19 x 55	24 x 55
150	190	6,5	25	24	134	37	155	195	24 x 50	32 x 58	24 x 68	32 x 68
200	246	10	20	28	144	37	194	225	32 x 58	38 x 80	32 x 90	38 x 90

2) The transmittable torques in bore d_1 are dependent on the diameter, see Table above.

Size	m	m_1	s	s_1	SW	Z_{j6}		Z_1 F8		z	z_1
120	130	130 (115*)	9	4 x M8	5	110	95	110	95	3	5
150	165	165	11	4 x M10	6	130	110	130	110	3.5	5
200	215	215	13,5	4 x M12	8	180	130	180	130	4	6

*) Optionally available with pitch circle m_1 = 115

We reserve the right to make dimensional and constructional alterations

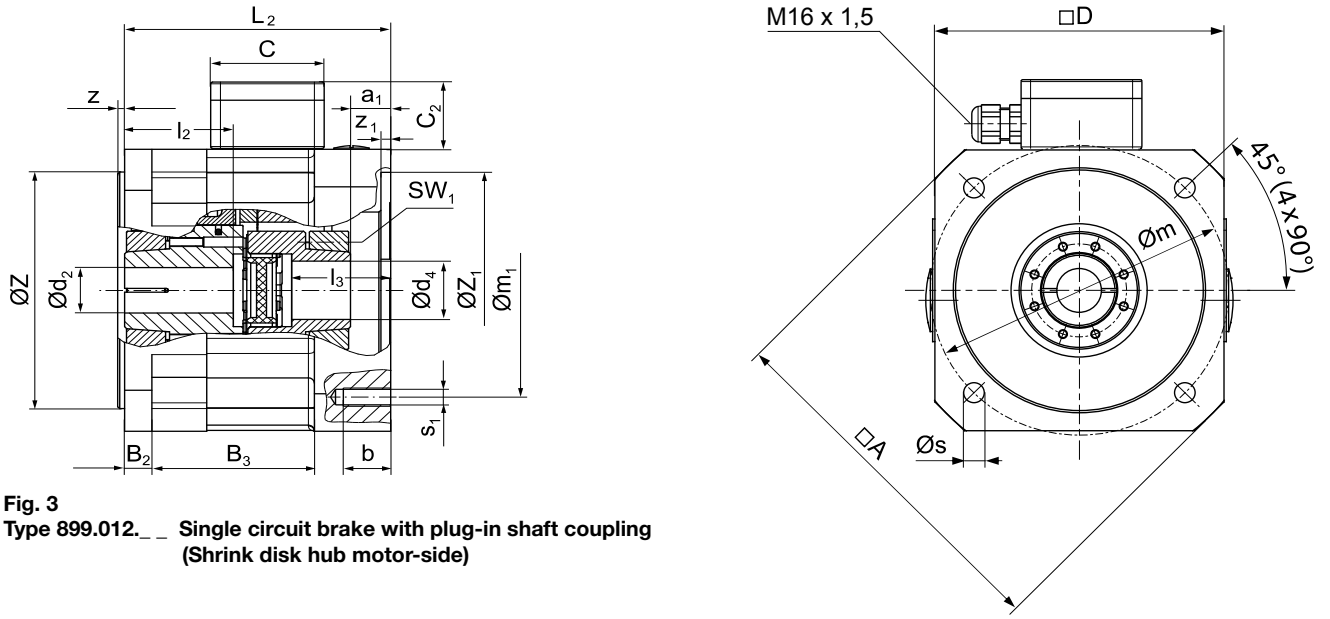


Fig. 3
Type 899.012._ _ Single circuit brake with plug-in shaft coupling (Shrink disk hub motor-side)

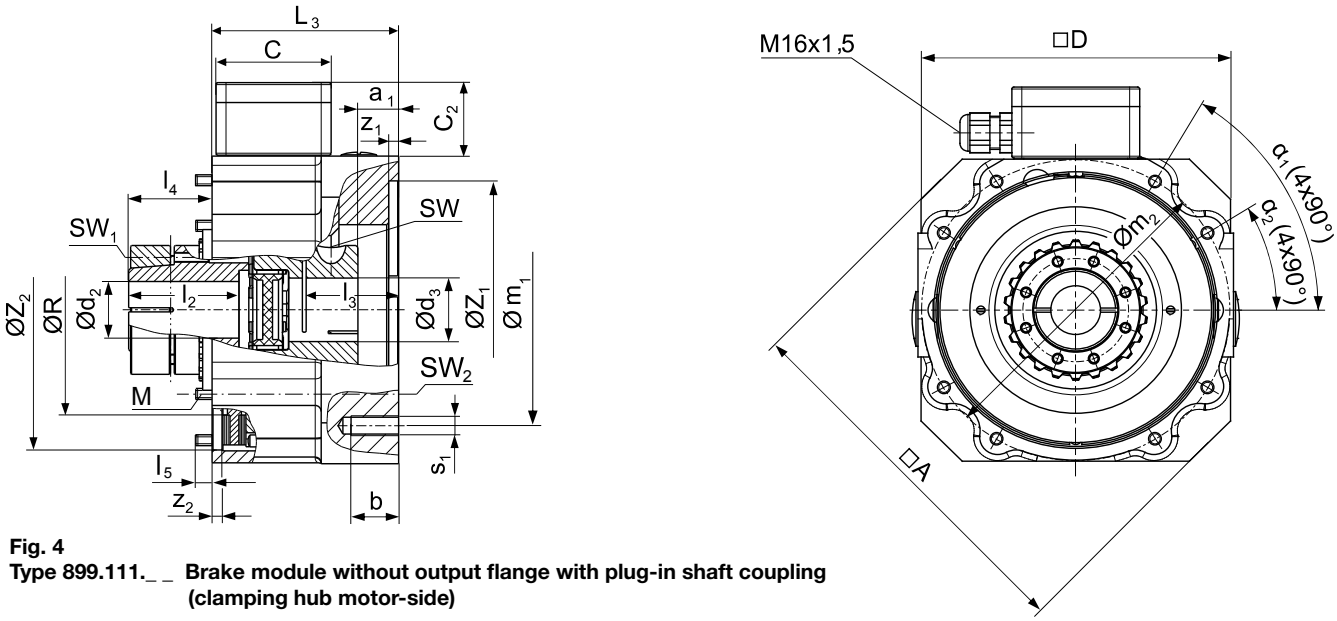


Fig. 4
Type 899.111._ _ Brake module without output flange with plug-in shaft coupling (clamping hub motor-side)

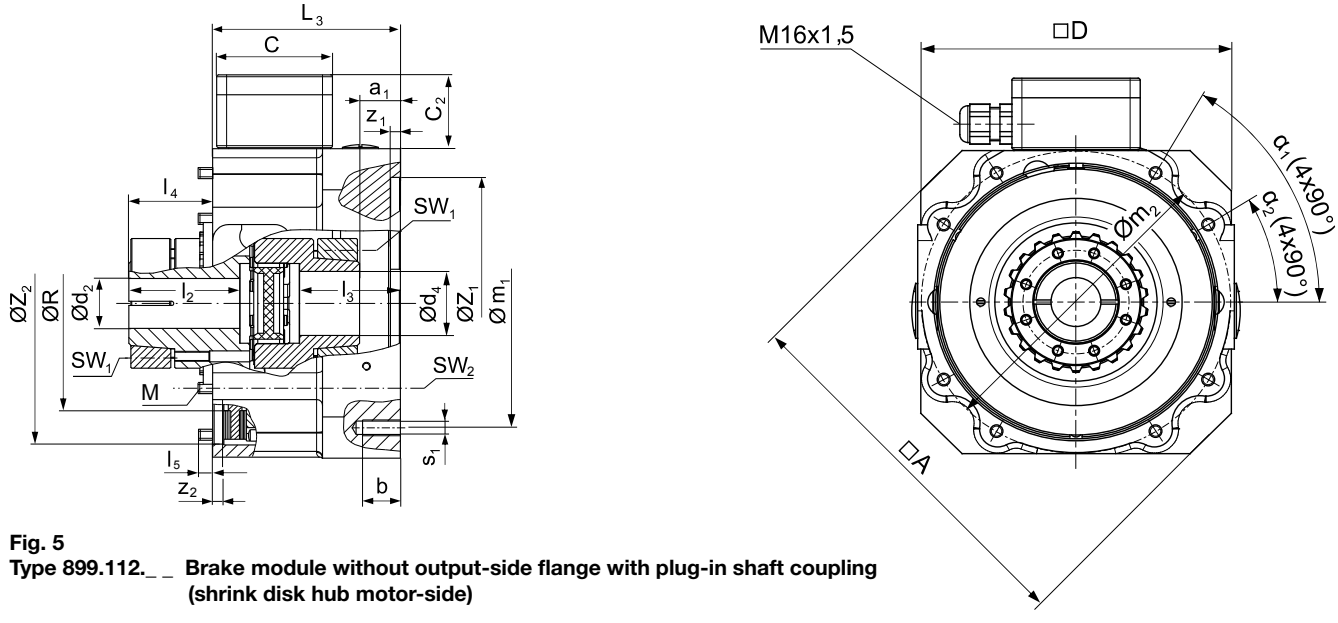


Fig. 5
Type 899.112._ _ Brake module without output-side flange with plug-in shaft coupling (shrink disk hub motor-side)

Technical Data

Size	Brake torque [1] Type 899.01_._1 899.11_._1 [Nm]	Brake torque [1] Type 899.01_._2 [4] 899.11_._2 [4] [Nm]	Input power Type 899.01 _._1 899.11 _._1 [W]	Input power Type 899.01_._2 899.11_._2 A [2] [W]	Input power Type 899.01_._2 899.11_._2 B [3] [W]	Max. speed n Type 899.01_._ _ 899.11_._ _ [rpm]
120	12	30	31,5	102	26	5000
150	45	90	44	125	32	4000
200	100	160	60	148	38	3000

1) Braking torque tolerance +40 % / -20 %
2) Coil capacity on overexcitation
3) Coil capacity for holding voltage
4) Max. braking torque only with overexcitation (see pages 16, 19, 20 and 21)

Size	Mass moment of inertia J [kgm²] Type 899.011._ _ and 899.111._ _	Mass moment of inertia J [kgm²] Type 899.012._ _ and 899.112._ _	Mass m [kg] Type 899.011._ _	Mass m [kg] Type 899.012._ _	Mass m [kg] Type 899.111._ _	Mass m [kg] Type 899.112._ _
120	0,00075	0,00085	7,2	7,5	4,2	4,5
150	0,00189	0,00213	13,5	14	8	8,5
200	0,00676	0,00768	24,5	25,5	13,5	14,5

Size	Flexible coupling torque (ROBA®-ES [5]) [Nm] Type 899._1_.3_ 92 Sh A M_{nom}	M_{max}	Type 899._1 _.2_ 98 Sh A M_{nom}	M_{max}	Type 899._1 _.1_ 64 Sh D M_{nom}	M_{max}	Size of flexible coupling (ROBA®-ES [5])
120	35	70	60	120	75	150	24
150	95	190	160	320	200	400	28
200	190	380	325	650	405	810	38

5) For further information on flexible coupling e.g. angle misalignments, spring stiffness or temperature resistance please see ROBA®-ES Catalogue K.940.V__._

Correlation of bore diameters d_2, d_3, d_4 dependent on respective transmittable torques (without key)

Size	Preferred bores Ø d_2 / Ø d_4 (shrink disk hub) and associated frictional locking transmittable torques [Nm] Ø 15	Ø 16	Ø 19	Ø 20	Ø 22	Ø 24	Ø 25	Ø 28	Ø 30	Ø 32	Ø 35	Ø 38	Ø 40	Ø 42	Ø 45
120	56	62	81	87	100	112	118	135	-	-	-	-	-	-	-
150	-	-	141	153	177	203	216	256	282	308	343	373	-	-	-
200	-	-	-	197	228	261	279	332	368	405	460	513	547	577	617

The transmittable torques for the clamping connection allow for the max. tolerance backlash on a solid shaft: tolerance k6 / bore (d_2/d_4): tolerance H6.
If the tolerance backlash is larger, the torque decreases.

Size	Preferred bores Ø d_3 (clamping hub) and associated frictional locking transmittable torques [Nm] Ø 15	Ø 16	Ø 19	Ø 20	Ø 22	Ø 24	Ø 25	Ø 28	Ø 30	Ø 32	Ø 35	Ø 38	Ø 40	Ø 42	Ø 45
120	34	36	43	45	50	54	57	63	-	-	-	-	-	-	-
150	-	-	79	83	91	100	104	116	124	133	145	-	-	-	-
200	-	-	-	83	91	100	104	116	124	133	145	158	166	174	187

The transmittable torques for the clamping connection allow for the max. tolerance backlash on a solid shaft: tolerance k6 / bore (d_3): tolerance F7.
If the tolerance backlash is larger, the torque decreases.

Dimensions

We reserve the right to make dimensional and constructional alterations

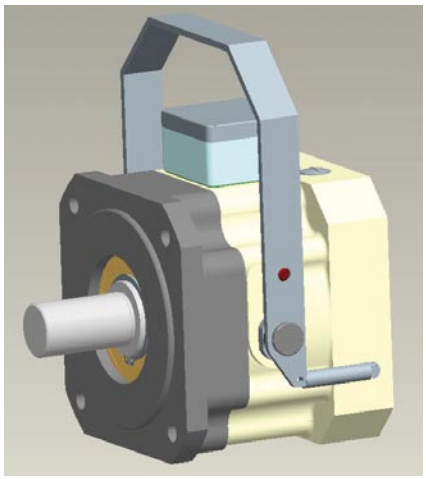
Size	A	a_1	B_2	B_3	b	C	C_2	D	L_2	L_3	Ø Bores [6] d_2 H6 from – to	Ø Bores [6] d_3 F7 from – to	Ø Bores [6] d_4 H7 from – to	l_2 Required shaft length	l_3 Required shaft length	l_4	l_5	M
120	160	20	12	76	20	58	37	126	120	84	15 - 28	15 - 28	15 - 28	25 - 52	40 - 50	36	7	8 x M5
150	190	20,5	14	83	24	58	37	155	136	94	19 - 38	19 - 35	19 - 38	30 - 60	50 - 85	42	10	8 x M6
200	246	16	20	92,5	28	58	37	194	160	107,5	20 - 45	20 - 45 *	20 - 45 *	32 - 75	32 - 80**	52,5	12	8 x M8

Size	m	m_1	m_2	R	s	s_1	SW	SW_1	SW_2	Z_{j6}		Z_1 F8		Z_2 H7	z	z_1	$z_{2-0,03}$	α_1	α_2
120	130	130 (115***)	122	75	9	4 x M8	5	4	4	110	95	110	95	111	3	5	5,5	30°	60°
150	165	165	154	95	11	4 x M10	6	4	5	130	110	130	110	141	3,5	5	5,5	31°	59°
200	215	215	200	130	13,5	4 x M12	6	5	6	180	130	180	130	186	4	6	6	30°	60°

6) The transmittable torques in bores d_2, d_3, d_4 are dependent on the diameter, see Table above.
*) On shaft lengths of over 60 mm; max. bore 38 mm / up to shaft length 60 mm; max. permitted bore 45 mm! (Due to the max. through hole of Ø 38 mm in the elastomeric element).
**) Over a shaft length of 60 mm, only possible with a bored special elastomeric element, on a max. shaft diameter of 38 mm.
***) Optionally available with pitch circle m_1 = 115

Examples: Further Options

ROBA®-topstop® single circuit brake with a bearing-supported output shaft and a hand release lever as special accessory



A hand release lever is available for the ROBA®-topstop® single circuit brake standard design as a special accessory. Please note that the hand release prevents the safety brake from functioning during operation.

Voltage: 104 V

Output-side: Ød = 24 / ØZ = 130

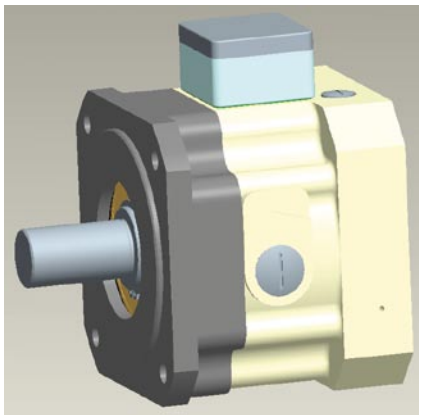
Motor-side: $Ød_1$ = 24 / $ØZ_1$ = 130

Electrical connection: standard configuration

Further details: hand release lever

Fig. 6: Special Type 899.000.01 SO / 104 V / Ø Z = 130 / $ØZ_1$ = 130 / Ød = 24 / $Ød_1$ = 130

ROBA®-topstop® single circuit brake with a bearing-supported output shaft output-side and an integrated ROBA®-ES shaft coupling



On the ROBA®-topstop® single circuit brake with bearing-supported output shaft and integrated, plug-in ROBA®-ES shaft coupling, the servomotor can be mounted or dismantled in any shaft position. The shaft coupling compensates for shaft misalignment. To install this Type, a second bearing machine-side is necessary.

Voltage: 104 V

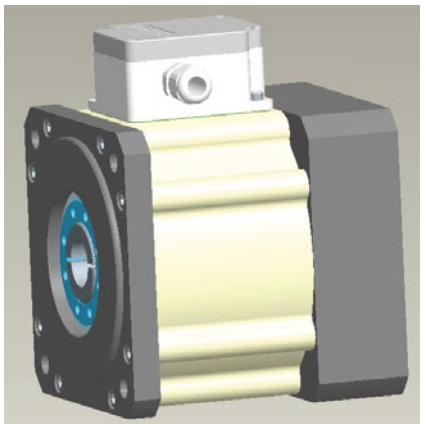
Output-side: Ød = 24 / ØZ = 130

Motor-side: $Ød_4$ = 24 / $ØZ_1$ = 130

Electrical connection: standard configuration

Fig. 7: Special Type 899.002.21 SO / 104 V / ØZ = 130 / $ØZ_1$ = 130 / Ød = 24 / $Ød_4$ = 24

ROBA®-topstop® single circuit brake with integrated ROBA®-ES shaft coupling and EAS®-smartic® safety clutch



This ROBA®-topstop® single circuit brake has an integrated ROBA®-ES shaft coupling and additionally an EAS®-smartic® safety clutch. If the set limit torque is exceeded, the EAS®-smartic® clutch disengages and the drive torque drops immediately.
The overload must be recognised machine-side, so that the brake can be switched and the axis can be held safely. Reliable overload protection and a securely-held axis offer maximum protection for people and machines.

Voltage: 104 V

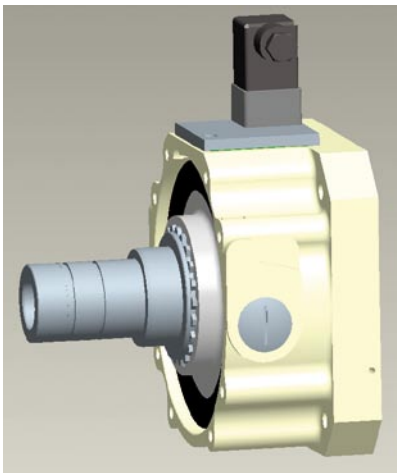
Output-side: $Ød_2$ = 15 / ØZ = 130

Motor-side: $Ød_5$ = 24 / $ØZ_1$ = 130

Electrical connection: standard configuration

Fig. 8: Special Type 899.013.21 SO / 104 V / ØZ = 130 / $ØZ_1$ = 130 / $Ød_2$ = 15 / $Ød_5$ = 24

ROBA®-topstop® single circuit brake with integrated ROBA®-ES shaft coupling and shaft connection



This ROBA®-topstop® single circuit brake module is mounted directly onto a gearbox. The gearbox input side is adapted to the brake module interface. The special shaft bearing is located in the gearbox and carries the input pinion. The ROBA®-ES shaft coupling is integrated into the brake module. The respective centering diameter and screw-on pitch circles for the servomotor are mounted in the housing flange.

Voltage: 24 V

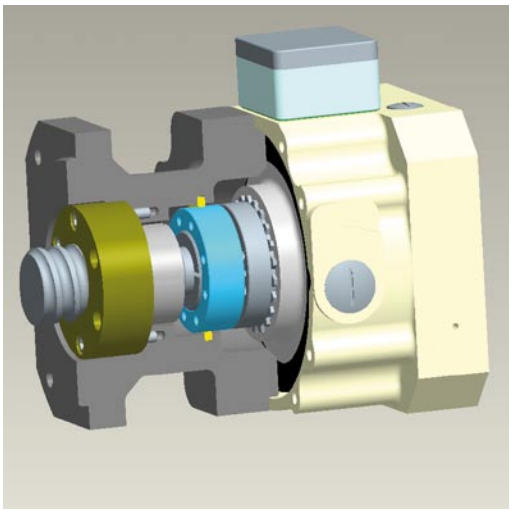
Output-side: Ød = 20

Motor-side: $Ød_4$ = 24 / $ØZ_1$ =110

Electrical connection: special configuration, without terminal box, without release monitoring, with mounted plug

Fig. 9: Special Type 899.102.21 SO / 24 V / $ØZ_1$ = 110 / Ød = 20 / $Ød_4$ = 24

ROBA®-topstop® single circuit brake with integrated ROBA®-ES shaft coupling and special friction flange



The ROBA®-topstop® single circuit brake with integrated ROBA®-ES shaft coupling is conceived for mounting onto a ball screw spindle. The special friction flange is adapted to the machine tool. The ball screw spindle bearing is integrated into this special flange, and at the same time serves as the friction surface for the brake. This compact construction is only minimally longer than a construction without the brake.
The friction flange can be included in the delivery on request and is produced according to customer specifications. The brake can however also be delivered without a friction flange (Type 899.112.22 SO).

Voltage: 104 V

Output-side: $Ød_2$ = 15 / ØZ = 130

Motor-side: $Ød_4$ = 24 / $ØZ_1$ = 130

Electrical connection: standard configuration

Fig. 10: Special Type 899.312.22 SO / 104 V / ØZ = 130 / $ØZ_1$ = 130 / $Ød_2$ = 15 / $Ød_4$ = 24

Order Number

Size	Output-side		Motor-side	Coil voltage** [VDC]	Centering-bore ØZ / $ØZ_1$	Output-side Ød / $Ød_2$
120	Shaft design	**0**	**0** Shaft bore with clamping	12	According to catalogue, special dimensions available on request.	According to catalogue, special dimensions available on request.
150	Shrink disk hub	**1**	**1** ROBA®-ES clamping hub	24		
200			**2** ROBA®-ES shrink disk huh	104		
				180		
				207		

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Single circuit brake (with standard output flange)	0
Single circuit brake module (without output flange)	1
Dual circuit brake (only with nominal torque: 899.2_ _._*1*)	2
Single circuit brake module* (with special output flange)	3

Without elastomeric element	0
Elastic element hardness 64 Sh D (green)	1
Elastic element hardness 98 Sh A (red)	2
Elastic element hardness 92 Sh A (yellow)	3

1	**Nominal torque**	
2	**Maximum torque**, only possible with overexcitation (see pages 16, 19, 20 and 21)	

Motor-side

$Ød_1$ / $Ød_3$ / $Ød_4$
According to catalogue, special dimensions available on request.

Please Observe:
Only for coil voltages **12V** and **104V**:
- Coil voltage 12 VDC
  => Overexcitation voltage 24 VDC
  => Supply voltage 24 VDC (ROBA®-switch 24V Type 018.100.2)
- Coil voltage 104 VDC
  => Overexcitation voltage 207 VDC
  => Supply voltage 230 VAC (ROBA®-switch Type 017.000.2)

Further coil voltages for overexcitation on demand.

* Type 899.3_ _._ _ is the basic Type 899.1_ _._ _ with special output flange according to the customer's request. This special output flange is included in delivery.

** Permitted voltage tolerance according to DIN IEC 60038: ± 10 %

Electrical connection:

- Terminal box
- Release monitoring
- Terminal

Special configurations SO:

Please contact our field service e. g.:

- Hand release
- Spark quenching unit
- Plug without terminal box
- Without release monitoring
- etc.

Examples

- ROBA®-topstop® single circuit brake with shaft design – Nominal torque
  Order Number: 120 / 899.000.01 / 24 V / ØZ = 110 / $ØZ_1$ = 110 / Ød = 24 / $Ød_1$ = 24

- ROBA®-topstop® single circuit brake module with shrink disk hub – max. braking torque
  Order Number: 150 / 899.112.22 / 104 V / $ØZ_1$ = 130 / $Ød_2$ = 25 / $Ød_4$ = 32

Technical Application

- Must only be used as a holding brake for EMERGENCY STOP braking actions. Not suitable for periodic STOP braking actions in cycle operation. Please observe the switching frequency for designs with microswitch.
- Please observe the correct dimensioning of speed, braking torque, friction work and switching frequency in EMERGENCY STOP situations for safe holding of the load torque and certain compliance with the required braking distance.
- The switching times stated in the catalogue (page 13) can only be achieved with the corresponding correct electrical wiring. This also applies to the protective wiring for brake control and the response delay times of all control elements.
- Temperatures over 90 °C on the brake housing during machine application can influence the switching times and the braking torque level.
- Application in clean surroundings (penetration of liquids such as oils and coarse dust can influence the braking function).
- Application in closed buildings (In tropical climates, in high humidity with long downtimes and in sea climates only with special measures).

Please Observe!

Guaranteeing the necessary brake distances with all control and braking times in case of danger due to gravity-loaded axes must be checked via a test. A cyclic braking torque and toothing backlash inspection of the brake rotor during operation provides additional safety. Please observe the respective Guidelines and Directives applicable to the danger situation.

Switching Times

The switching times are only valid for the braking torques stated in the catalogue.
According to directive VDI 2241, the switching times are measured with a sliding speed of 1 m/s with reference to a mean friction radius.
The brake switching times are influenced by the temperature, by the air gap between the armature disk and the coil carrier, which depends on the wear status of the linings, and by the type of quenching circuit. The values stated in the Table are mean values which refer to the nominal air gap and the nominal torque on a warm brake.
Typical switching time tolerances are ± 20 %.

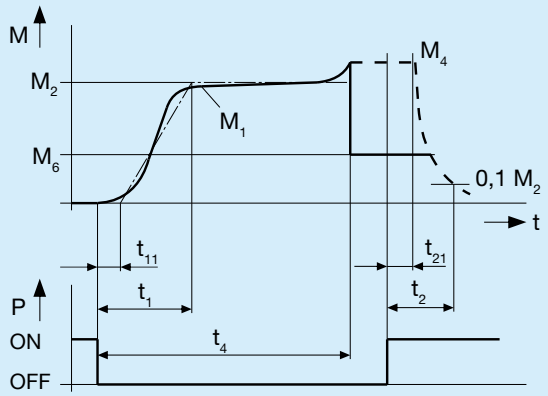
Please Observe: DC-side switching
When measuring the DC-side switching times (t_{11} – time), the inductive switch-off peaks are according to VDE 0580 limited to values smaller than 1200 volts. If other quenching circuits and constructional elements are installed, this switching time t_{11} and therefore also switching time t_1 increase**.**

Size	Type 899. _ _ _ . _1 (Brake operation with nominal torque)				
	Connection time t_1 (DC-switching) [ms]	Response delay t_{11} on connection (DC-switching) [ms]	Connection time t_1 (AC-switching) [ms]	Response delay t_{11} on connection (AC-switching) [ms]	Separation time t_2 [ms]
120	55	40	300	250	70
150	80	50	400	350	100
200	90	55	600	500	140

Table 1: Switching times Type 899. _ _ _ . _1

Size	Type 899. _ _ _ . _2 (Brake operation with maximum torque and overexcitation)				
	Connection time t_1 (DC-switching) [ms]	Response delay t_{11} on connection (DC-switching) [ms]	Connection time t_1 (AC-switching) [ms]	Response delay t_{11} on connection (AC-switching) [ms]	Separation time t_2 [ms]
120	40	20	160	125	50
150	50	25	250	200	80
200	60	30	300	250	130

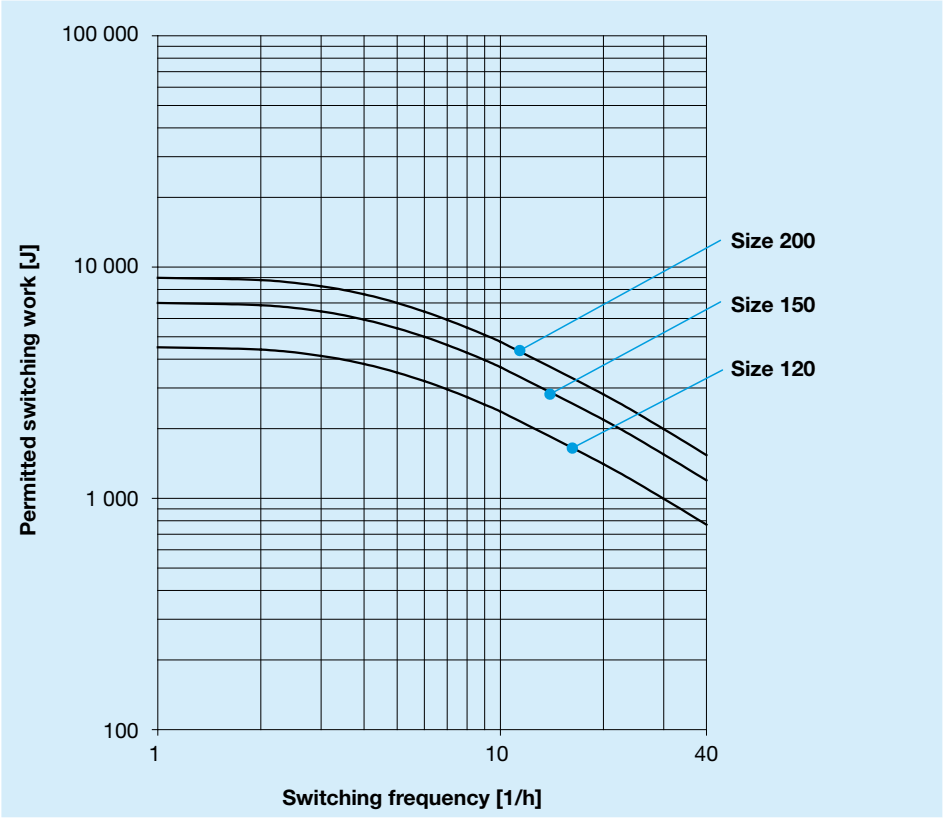
Table 2: Switching times Type 899. _ _ _ . _2



Key:
M_1 = Switching torque
M_2 = Nominal torque (characteristic torque)
M_4 = Transmittable torque
M_6 = Load torque
P = Input power
t_1 = Connection time
t_{11} = Response delay on connection
t_2 = Separation time
t_{21} = Response delay on separation
t_4 = Total switch-on time + t_{11}

Diagram 1: Torque - Time

Friction-Power Diagrams

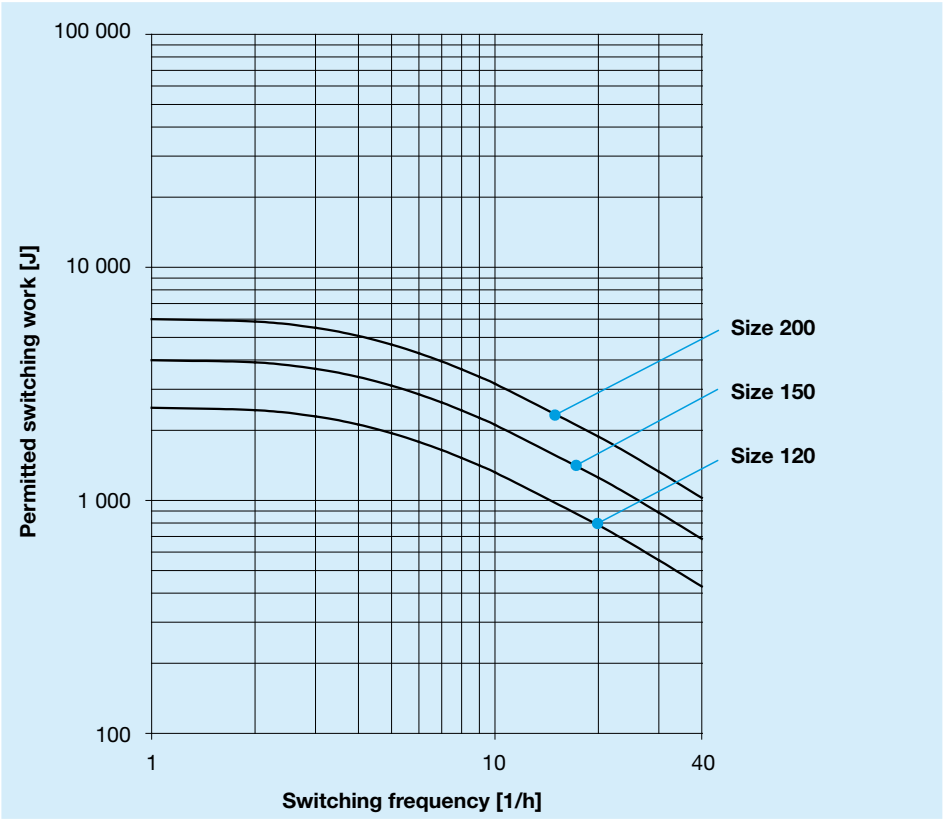


Type 899. _ _ _. _ 1
(Nominal torque)

n = 3000 rpm

Permitted friction powers at higher speeds on request.

Diagram 2



Type 899. _ _ _. _ 2
(Maximum torque)

n = 3000 rpm

Permitted friction powers at higher speeds on request.

Diagram 3

Permitted motor attachments/Max. permitted breakdown torque

The permitted components of the motor screwed onto the brake module include the static and dynamic loads “F” of motor weight, mass acceleration and vibrations, multiplied by the motor centre of gravity clearance “l_s”.

$\mathbf{M_k = F \times l_s \leq M_{k\ perm.}}$

Permitted breakdown torque		Size 120	150	200
$M_{k\ perm.}$	[Nm]	65	150	400

Table 3

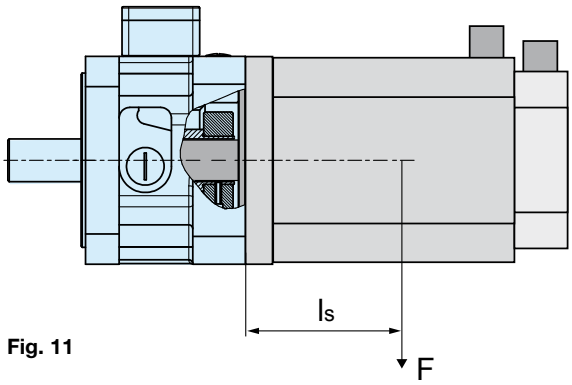


Fig. 11

Permitted outer acceleration and deceleration torques on the brake

		Types	Size 120	150	200
1	Max. permitted acceleration and deceleration torque by the servomotor on the brake	all Types	M_{accel} = 45 Nm	M_{accell} = 120 Nm	M_{accel} = 280 Nm
2	*I) Max. dynamic braking torque by the motor on the brake (servomotor with holding brake)	all Types except 899.200.01 899.___._2	$M_{braking}$ = 22 Nm	$M_{braking}$ = 60 Nm	$M_{braking}$ = 140 Nm
3	Max. dynamic braking torque by the motor on the brake (servomotor with holding brake)	899.200.01 899.___._2	*II) No other braking torque permitted		

Table 4

*I) This restriction applies when the ROBA®-topstop® brake and all further braking torques, such as for as example the motor during brake operation (eddy current operation) and/or the motor brake engage at the same time. The brake times overlap each other and the braking torque adds together. If it is certain that the brake times do not overlap, a braking torque via the holding brake in the servomotor (see Point 1 in the Table) can be permitted.

*II) No other braking torque is permitted.
If it is certain that the brake times do not overlap, a braking torque via the holding brake in the servomotor (see Point 1 in the Table) can be permitted.

Shaft load capacity

Max. radial forces on the bearing applicable for:
Type **899.000.0**_ and Type **899.200.01**

ROBA®-topstop® brake		Size 120	150	200
Distance “l_R” (Fig. 12)	[mm]	22,5	25	30
Max. permitted radial force “F_R” on system l_R	[N]	600	1000	1750

Table 5

The permitted forces are applicable for shaft dimensions according to the catalogue, with a force of application for radial forces in the centre of the output shaft.
The values for the permitted forces refer to speeds of n < 3000 rpm.

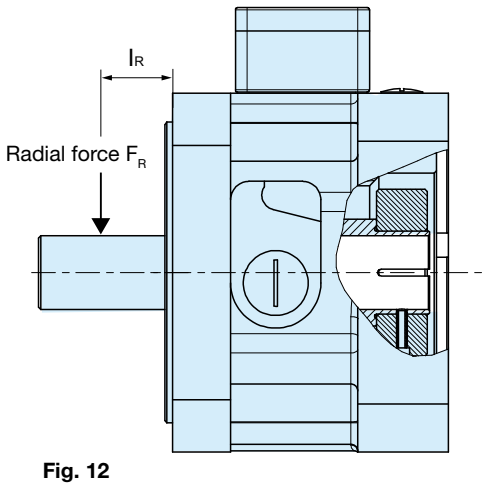


Fig. 12

Electrical Connection and Wiring

DC current is necessary for the 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 is possible both via alternating voltage in connection with a rectifier or with another suitable DC supply. Dependent on the brake equipment, the connection possibilities can vary. Please follow the exact connections according to the Wiring Diagram. The manufacturer and the user must observe the applicable directives 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 PE conductor on the fixed installation. If the basic insulation fails, no contact voltage will remain. Please carry out a standardized inspection of the PE 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 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.

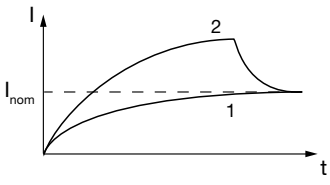
Field Build-up with Normal Excitation

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

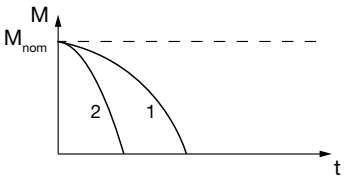
Field Build-up with Overexcitation

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, switch to the nominal voltage (curve 2, below). The relationship between overexcitation and separation time t_2 is approximately indirectly proportional. This means that, using doubled nominal voltage, it is possible to halve the separation time t_2 in order to release the brake. The ROBA®-(multi)switch fast acting rectifier and phase demodulator work on this principle.

Current path



Braking torque path



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

*** Overexcitation time t_{over}**

Increased wear and therefore an enlarged air gap as well as coil heat-up lengthen the separation time t_2 of the brake. Therefore, as overexcitation time t_{over}, please select at least double the separation time t_2 with nominal power on each brake size.

**** RMS coil capacity P_{RMS}**

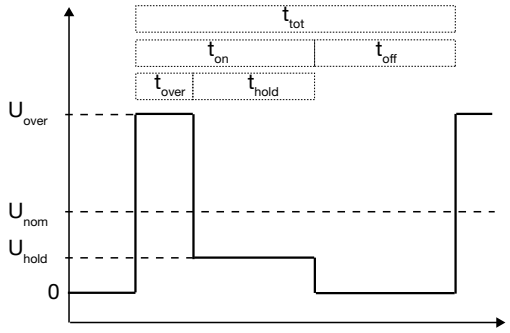
$P_{RMS} \leq P_{nom}$

The coil capacity P_{RMS} may not be larger than P_{nom}. Otherwise, the coil may fail due to thermic overload.

Calculations:

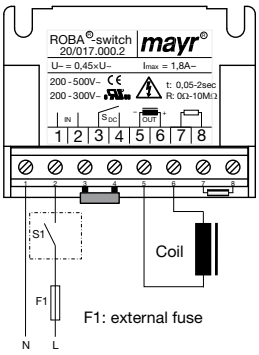
P_{RMS}	[W]	RMS coil capacity, dependent on switching frequency, overexcitation, power reduction and switch-on time duration $P_{RMS} = \frac{P_{over} \times t_{over} + P_{hold} \times t_{hold}}{t_{tot}}$
P_{nom}	[W]	Coil nominal capacity (Catalogue value, Type tag)
P_{over}	[W]	Coil capacity on overexcitation $P_{over} = \left(\frac{U_{over}}{U_{nom}}\right)^2 \times P_{nom}$
P_{hold}	[W]	Coil capacity on power reduction $P_{hold} = \left(\frac{U_{hold}}{U_{nom}}\right)^2 \times P_{nom}$
t_{over}	[s]	Overexcitation time
t_{hold}	[s]	Time of operation with power reduction
t_{off}	[s]	Time without voltage
t_{tot}	[s]	Total time ($t_{over} + t_{hold} + t_{off}$)
U_{over}	[V]	Overexcitation voltage (bridge voltage)
U_{hold}	[V]	Holding voltage (half-wave voltage)
U_{nom}	[V]	Coil nominal voltage

Time Diagram:



Magnetic Field Removal

AC-side Switching



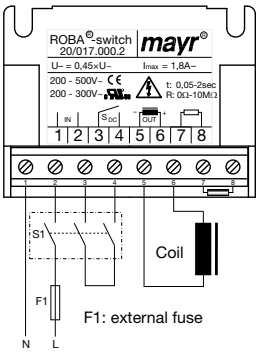
F1: external fuse

The power circuit is interrupted before 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 coil and switching contacts.

AC-side switching means **low-noise switching**; however, the brake engagement time is longer (c. 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 rectifier and the coil as well as mains-side. The magnetic field is removed very quickly, resulting in a rapid rise in braking torque.

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

DC-side switching means **short brake engagement time (e.g. for EMERGENCY STOP operation)**. However, this produces louder switching noises.

Protective Circuit

When using DC-side switching, the coil must be protected by a suitable protective 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 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 operation current are sufficient. Depending on the application, the switching contact can also be protected by other protective circuits (e.g. *mayr*® spark quencher, half-wave rectifier and bridge rectifier), although this may of course then alter the switching time.

Half-wave Rectifiers and Bridge Rectifiers Type 02_.000.6

Application

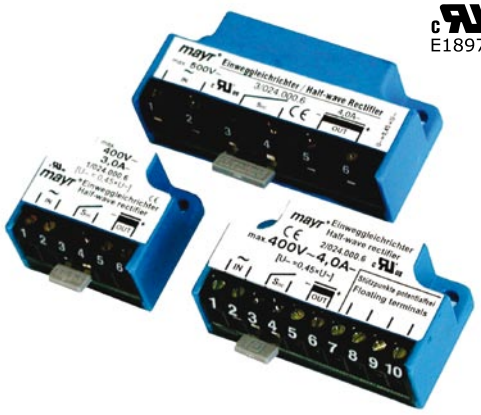
Rectifiers are used to connect DC units to alternating voltage supplies, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA-quick®, ROBATIC®), electromagnets, electrovalves, contactors, switch-on safe DC motors, etc.

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)



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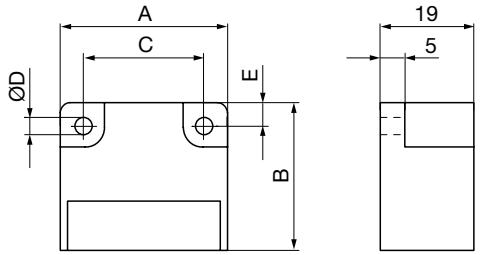
Dimensions (mm)



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. to EN 50022: Article-No. 1803201

Order Number

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Size	
1	
up 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	230 VAC	230 VAC	400 VAC	400 VAC	500 VAC	600 VAC
Max. output voltage	207 VDC	207 VDC	180 VDC	180 VDC	225 VDC	270 VDC
Output current at ≤ 50°C	2,5 A	2,5 A	3,0 A	4,0 A	4,0 A	4,0 A
Output current at max. 85 °C	1,7 A	1,7 A	1,8 A	2,4 A	2,4 A	2,4 A
Max. coil capacity at 115 VAC ≤ 50 °C	260 W	260 W	-	-	-	-
Max. coil capacity at 115 VAC up to 85 °C	177 W	177 W	-	-	-	-
Max. coil capacity at 230 VAC ≤ 50 °C	517 W	517 W	312 W	416 W	416 W	416 W
Max. coil capacity at 230 VAC up to 85 °C	352 W	352 W	187 W	250 W	250 W	250 W
Max. coil capacity at 400 VAC ≤ 50 °C	-	-	540 W	720 W	720 W	720 W
Max. coil capacity at 400 VAC up to 85 °C	-	-	324 W	432 W	432 W	432 W
Max. coil capacity at 500 VAC ≤ 50 °C	-	-	-	-	900 W	900 W
Max. coil capacity at 500 VAC up to 85 °C	-	-	-	-	540 W	540 W
Max. coil capacity at 600 VAC ≤ 50 °C	-	-	-	-	-	1080 W
Max. coil capacity at 600 VAC up to 85 °C	-	-	-	-	-	648 W
Peak reverse voltage	1600 V	1600 V	2000 V	1600 V	2000 V	2000 V
Rated insulation voltage	250 V_{RMS}	320 V_{RMS}	500 V_{RMS}	500 V_{RMS}	630 V_{RMS}	630 V_{RMS}
Pollution degree (insulation coordination)	2	2	2	1	2	2
Protection fuse	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 3,15A	FF 3,15A	FF 4A	FF 5A	FF 5A	FF 5A
Permitted limit integral I^2t	40 A^2s	40 A^2s	50 A^2s	100 A^2s	50 A^2s	50 A^2s
Protection	IP65 components, encapsulated / IP20 terminals					
Terminals	Cross-section 0,14 - 1,5 mm^2 (AWG 26-14)					
Ambient temperature	- 25 °C up to + 85 °C					
Storage temperature	- 25 °C up to + 105 °C					
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!					

Application

ROBA®-switch fast acting rectifiers are used to connect DC consumers to alternating voltage supplies, for example electromagnetic brakes and couplings (ROBA-stop®, ROBA®-quick, ROBATIC®) as well as electromagnets and 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 rectifier timing 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 +105 °C

ROBA®-switch Sizes, Table 1

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

Order Number

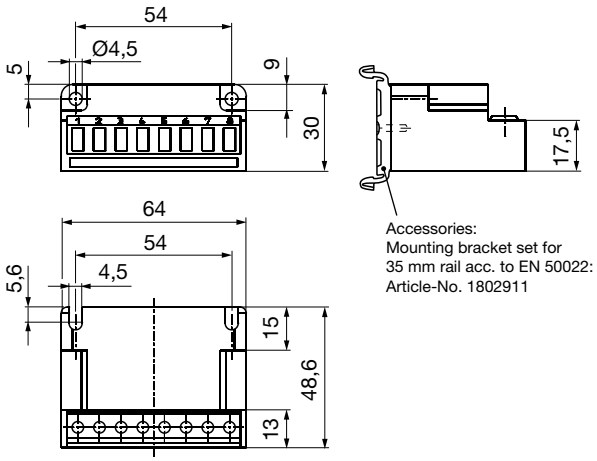
__ / 0 1 7 . __ 0 0 . 2

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

cULus E189728 CE

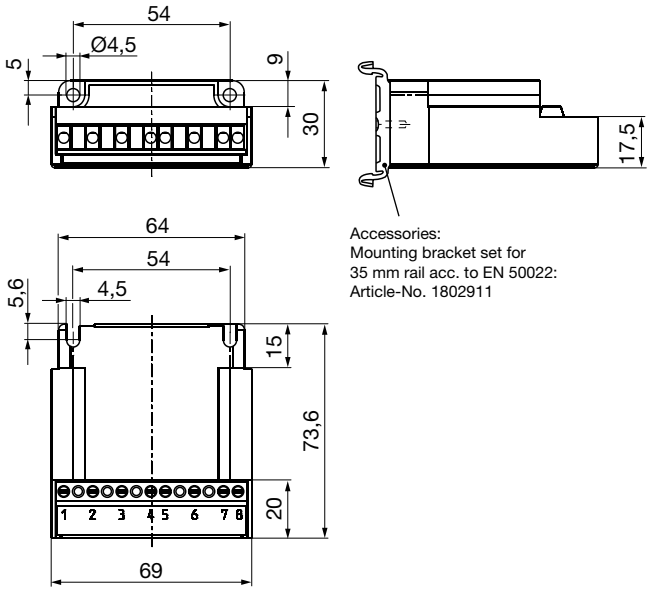
Dimensions (mm)

Type 017.000.2



Accessories:
Mounting bracket set for
35 mm rail acc. to EN 50022:
Article-No. 1802911

Type 017.100.2



Accessories:
Mounting bracket set for
35 mm rail acc. to EN 50022:
Article-No. 1802911

Application

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

Fast acting rectifier ROBA®-switch 24V 018.100.2

- consumer operation with overexcitation or power reduction
- integrated automatic DC-side switch-off (shorter connection time t_1)
- input voltage: 24 VDC
- max. output current: 5 A

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

Function

The ROBA®-switch 24V units are used for an input voltage of 24 VDC. They can switch internally automatically, meaning that the output voltage switches to holding voltage from the input voltage (=overexcitation voltage). 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 automatic DC-side switch-off. In contrast to the usual DC-side switch-off, no further protective measures or external components are required. The DC-side switch-off 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 (c. 6 – 10x).

Electrical Connection (Terminals)

2 + 3	Input voltage, earth
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/PELF
Output voltage U_{over}	Input voltage U_I
Output voltage U_{hold}	¼, ⅓, ½, ⅔ x U_I ± 20 %
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 +105 °C

Order Number

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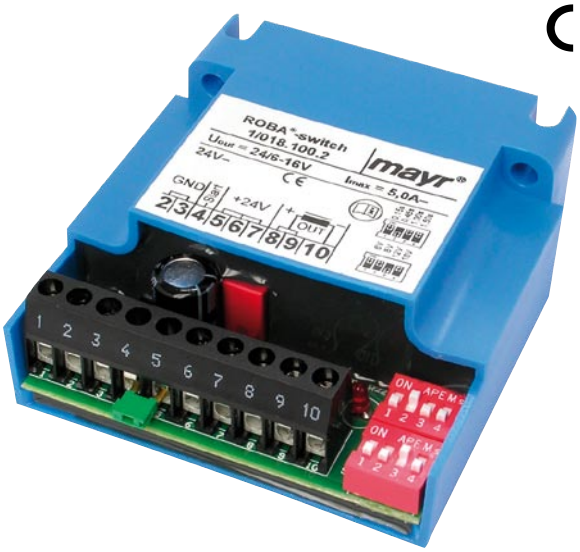
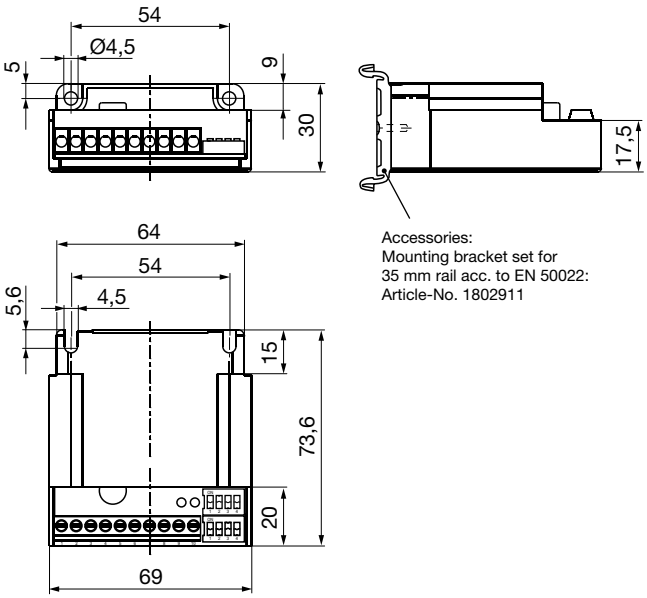
△
Size **1**



Dimensions (mm)



Accessories:
Mounting bracket set for 35 mm rail acc. to EN 50022:
Article-No. 1802911

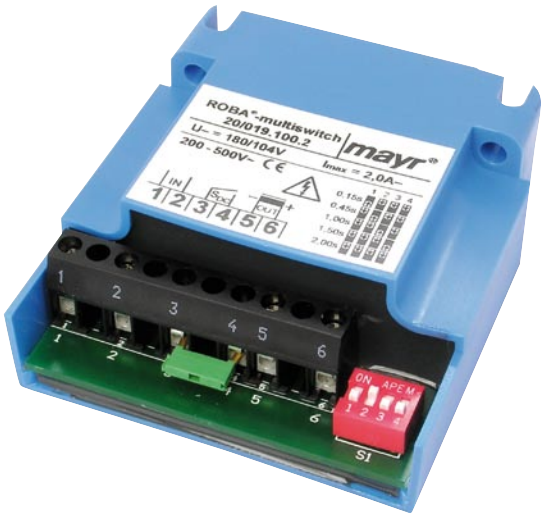
Application

ROBA®-multiswitch fast acting rectifiers are used to connect DC units to alternating voltage supplies, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA®-quick, ROBATIC®), 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
- Max. output current: 2 A

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 (dependent on size) used for an input voltage of between 100 and 500. 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 period, they control the 52 or 104 VDC holding voltages. The overexcitation period can be adjusted via a DIP-switch to 150 ms, 450 ms, 1 s, 1,5 s and 2 s.

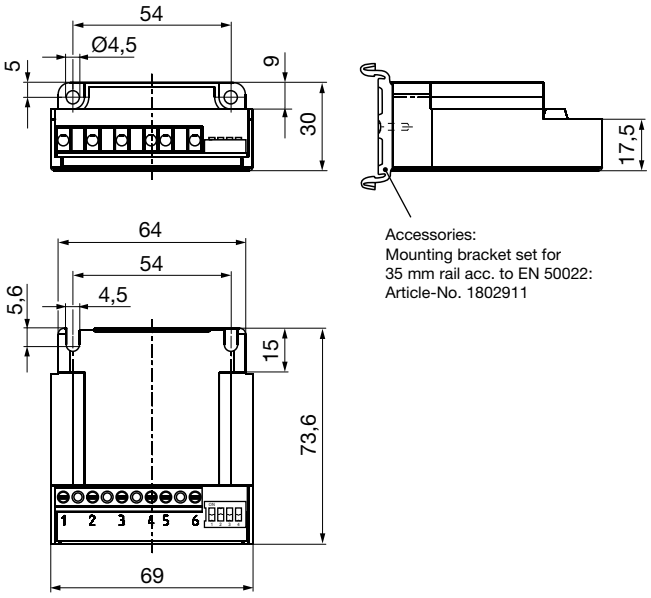
Electrical Connection (Terminals)

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
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 +105 °C

Dimensions (mm)



Accessories:
Mounting bracket set for 35 mm rail acc. to EN 50022:
Article-No. 1802911

ROBA®-multiswitch Sizes, Table 1

	Size	
	10	20
Input voltage VAC ± 10 % acc. to EN 50160	100 - 275	200 - 500
Frequency input voltage Hz	50 - 60	50 - 60
Output voltage U_{over} VDC ± 10 %	90	180
Output voltage U_{hold} VDC ± 10 %	52	104
Output current I_{RMS} at ≤ 45 °C ADC	2,0	2,0
Output current I_{RMS} at max. 70 °C ADC	1,0	1,0
Conformity markings	CE	CE

Order Number

__	/	0	1	9	.	1	0	0	.	2
△										

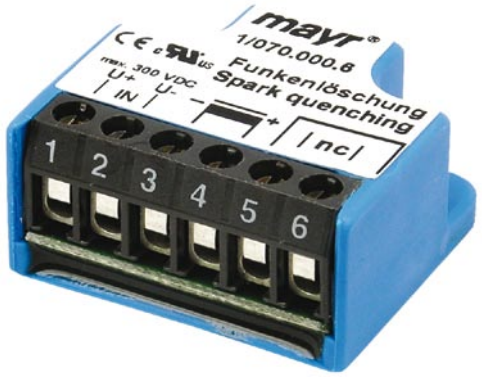
Size
10
20

Application

Reduces spark production on the switching contacts occurring during VDC inductive load switching.

- Voltage limitation according to VDE0580 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 free-wheeling diodes.

c UL us E189728 CE



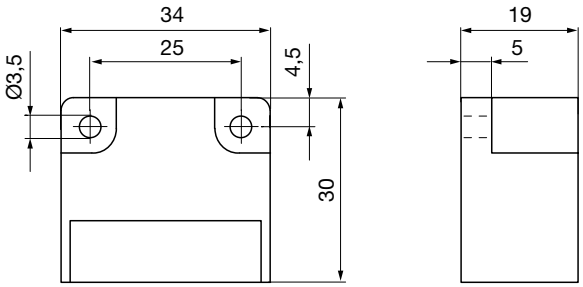
Function

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.

Electrical Connection (Terminals)

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

Dimensions (mm)



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
Max. voltage nc terminals	250 V
Protection	IP65 / IP20 terminals
Ambient temperature	-25 °C up to +85 °C
Storage temperature	-25 °C up to +105 °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. to EN50022
Article-No. 1803201

Order Number

__ / 0 7 0 . 0 0 0 . 6
△
Size
1

Manufacturer's Declaration

This product is intended for installation in a machine or system, based on the machine directive 98/37/EC. It is forbidden to start use of the product until the machine or system into which is should be built is operating in accordance with the EC directives. The product corresponds to the low voltage directive 2006/95/EC.

The customer is responsible for compliance with the EMC directive 89/336/EEC.

Safety Regulations

Danger!
Danger of death! Do not touch voltage-carrying cables and components.

Danger!
This warning applies if:

- the safety brake is used incorrectly.
- the safety brake is modified.
- the relevant standards for safety and/or installation conditions are ignored.

To prevent injury or damage, only professionals and specialists should work on the devices.

Warning!
Before product installation and initial operation, please read the Installation and Operational Instructions carefully and observe the Safety Regulations. Incorrect operation can cause injury or damage. The safety brakes have been developed in accordance with the latest technology regulations and are, at the point of delivery, operationally safe. Safety brakes are not suitable for application in areas when there is a danger of explosion or in aggressive atmospheres.

Please Observe!

- Only specialists who are trained in the transport, installation, operation, maintenance and general operation of these device and who are aware of the relevant standards should be allowed to carry out this work.
- Technical data and specifications (Type tags and documentation) must be followed.
- The correct connection voltage must be connected according to the Type tag.
- Never loosen electrical connections or carry out installations, maintenance or repairs while the voltage connection is energised.
- Cable connections must not be placed under mechanical strain.
- Check electrical components for signs of damages before putting them into operation. Never bring them into contact with water or other fluids.
- The braking torque is lost if the friction lining and the friction surface come into contact with oil or grease.

Use-implemented Protective Measures:

- Please cover moving parts to protect against injury through seizure and catapulted objects.
- Place a cover on the magnetic part to protect against injury through high temperatures.
- Protect against electric shocks by installing a conductive connection between the magnetic component an the PE conductor on the permanent installation (Protection Class I) and by carrying out a standardised inspection of the continuous PE conductor connection to all contactable metal parts.
- Protect against highly inductive switch-off peaks by installing varistors, spark quenching units or similar devices according to VDE 0580/2000-07, Paragraph 4.6, to prevent damage to the coil insulation switch contact consumption in extreme conditions (this protection is contained in *mayr*® rectifiers).
- Install additional protective measures against corrosion if the brake is subject to extreme ambient conditions or is installed in open-air conditions, unprotected from the weather.

Guidelines for Electromagnetic Compatibility (EMC)
In accordance with the EMC directives 89/336/EEC, the individual components produce no emissions. However, functional components for mains-side energisation of the brakes, e.g. 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.

Protection Class I
This protection can only be guaranteed if the basic insulation is intact and if all conductive parts are connected to the PE conductor of the permanent installation. Should the basic insulation fail, the contact voltage cannot remain (VDE 0580).

Protection (mechanical) IP 54
When installed, protected against dust, contact and splashing water form all directions (dependent on the customer-side provided friction flange).

Protection (electrical) IP 54
Dust-proof and protected against contact al well as against splashing water from all directions.

Ambient Temperature -20 °C up to +40 °C
At temperatures of around or under freezing point, condensation can strongly reduce the torque or the rotors can freeze up. The user is responsible for taking appropriate counter measures. In high humidity or sea climate and during longer downtimes, the linings may rust and seize up.

Thermic Class F (+155 °C)
The magnetic coil and the casting compound are suitable for use up to a maximum operating temperature of +155 °C.

Device Conditions
The catalogue values are standards which can, in certain cases, vary. 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. The factors should therefore be carefully assessed, and alignments made accordingly.

Please Observe!

- Mounting dimensions and connecting 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 %.
- The brakes are only designed for dry running. The torque is lost if the friction surface come into contact with oil, grease, water or similar substances.
- The braking torque is dependent on the present run-in condition of the brakes.
- Manufacturer-side corrosion protection of the metal surface is provided.

Application

As a holding brake with EMERGENCY STOP braking actions

- **in closed buildings (in tropical climates, in high humidity with long downtimes and in sea climates only with special measures)**
- **with dry running**
- **installation position horizontal and vertical**
- **in clean surroundings (coarse dust as well as liquids of all kinds have a negative effect on the braking function => provide a cover).**

The necessary braking distances with hazards caused by gravity loaded axes must be ensured by conducting tests.

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16/06/2009 SC

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