

INTORQ

setting the standard



Electromagnetic clutch-brake combinations

INTORQ 14.800

7.5 – 120 Nm

www.intorq.com

We set the standards

The INTORQ brand stands for reliable brake solutions with the highest product standards. INTORQ products are used in a very diverse range of applications, from brake motors and industrial trucks to hoists, cranes and wind turbines. We can create the right solution for you and your drive – individually and reliably.

The INTORQ module system offers numerous variants that can be used in many motors and geared motors, setting standards worldwide. We have been increasing our international presence step by step, establishing sites in Shanghai, Atlanta and Pune. So our network of sales and service staff is close at hand all over the world, ready to support you.



INTORQ at a glance

- Electromagnetic brakes and clutches
- Flexibility with standard options as well as customised solutions
- Centralised product development and production located in aerzen
- Fast response and delivery times globally thanks to production and warehousing in Shanghai, Atlanta and Pune.
- Over 50 million euros a year sales volume
- 800,000 units a year
- 13,000 square metres production area
- 250 employees
- Market leader with 63 sales partners in 49 countries



The solution – reliable and even economic

Electromagnetic clutch-brake combinations have been enjoying market success for a number of years. They are used in all areas of mechanical engineering when a production sequence has to be synchronised. As the drive runs continuously with the clutch rotor, the energy from the upstream drive can be used to accelerate the output.

INTORQ 14.105/115 series electromagnetic clutches and brakes are used in these clutch-brake combinations. They are switched alternately in order to accelerate or decelerate the output shaft. Torque transmission is achieved using friction.

The drives can be used in either a horizontal or vertical mounting position. Using preassembled units significantly reduces design costs for new developments and the time spent on mounting. Friction clutches and brakes are subject to a certain amount of wear which is dependent on the switching energy used. Automatic adjusting devices (which are susceptible to faults) are no longer required, thanks to the wear resistant, asbestos-free friction linings used.

Air gap compensation can be carried out quickly and without disassembling the clutch-brake combination thanks to patented wear adjustment. The low moments of inertia of the wear-resistant armature plates permit high switching frequencies and good positioning accuracy which can be increased still further if required, using the high-speed switchgear that is available.

Features

- Five frame sizes from 7.5 – 120 Nm
- Asbestos-free friction lining
- Patented air gap adjustment can be performed externally without disassembling the combination.
- Operating times of the clutch and brake do not overlap.
- A backlash-free version can be supplied on request.
- Two shaft and two hollow shaft diameters (except size 10) as well as two flange diameters in IEC dimensions are available for each size.
- Two axis heights are available for each size.
- Insulation material class B
- Dimensioned for 100% duty
- Rated voltage 24 V DC, other voltages on request
- Variable terminal box position; standard position is on left when looking at the drive end.
- VDE 0580



Automation technology



Bottling plant

Contents

Clutch-brake combinations

Type code	5
Product information	6
Design selection	7
Overview of types	8
Dimensioning	10
Selection table	14
Shaft loads	15
Dimensions	16

Clutch-brake combinations with helical and worm gearboxes

Product information	28
Type code	28
Technical data	28
Dimensions	29

Accessories

Electronic dual switch	30
Spark suppressor	33
High-speed switchgear	34



Clutch-brake combinations
Free drive and output shafts



Clutch-brake combinations
Drive, hollow shaft, B5 flange –
output, free shaft



Clutch-brake combinations
Drive, hollow shaft, B14 flange –
output, free shaft



Clutch-brake combinations
Drive, free shaft, hollow shaft



Clutch-brake combinations
Drive, hollow shaft, B5 flange –
output, hollow shaft

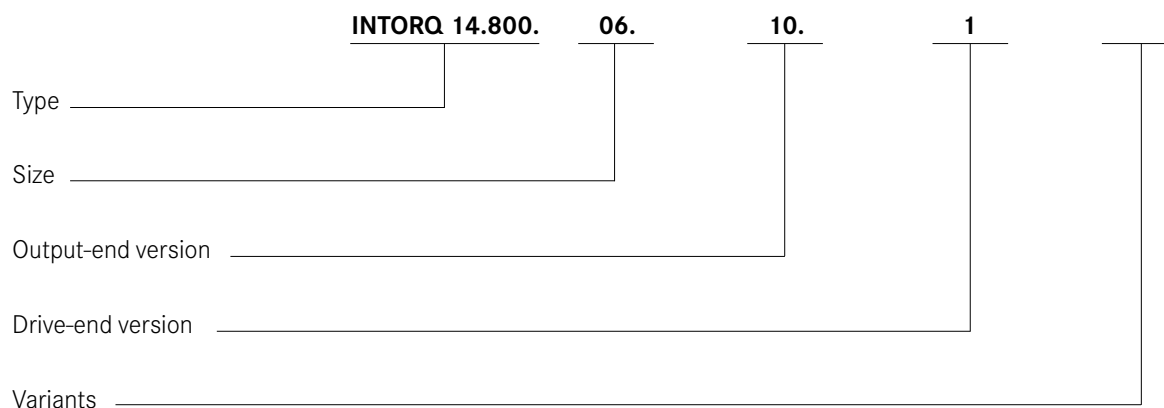


Clutch-brake combinations
Drive, hollow shaft, B14 flange –
output, hollow shaft

Clutch-brake combinations

Type code

INTORQ 14.800



Type

INTORQ 14.800 – clutch-brake combinations
without motor

Output-end version

- 10 – free output shaft, without foot, without flange
- 11 – free output shaft, with foot, without flange
- 12 – free output shaft, without foot, with flange
- 13 – free output shaft, with foot, with flange
- 20 – with hollow shaft, without foot, without flange
- 21 – with hollow shaft, without foot, with flange
- 22 – with hollow shaft, with foot, without flange
- 23 – with hollow shaft, with foot, with flange

Drive-end version

- 1 – splined armature plate, free drive shaft
- 2 – splined armature plate, free drive shaft and flange
- 3 – splined armature plate, hollow shaft, B5 flange
- 4 – splined armature plate, hollow shaft, B14 flange
- 6 – backlash-free diaphragm armature plate,
free drive shaft
- 7 – backlash-free diaphragm armature plate,
free drive shaft and flange
- 8 – backlash-free diaphragm armature plate, hollow shaft,
B5 flange
- 9 – backlash-free diaphragm armature plate, hollow shaft,
B14 flange

Variants

- Clutch/brake voltage
- Shaft diameter/bore diameter/flange diameter/foot
height/terminal box position

Product informationen

Patented adjusting device

INTORQ 14.800 – 867

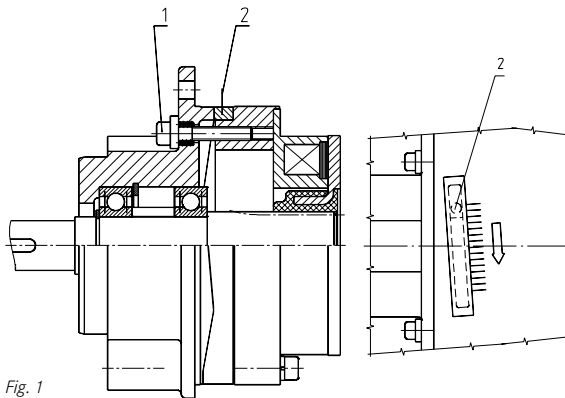


Fig. 1

Output cover with adjusting device and splined armature plate (Fig. 1)

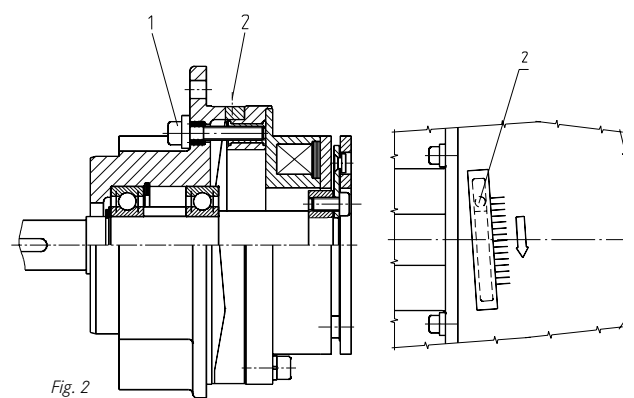


Fig. 2

Output cover with adjusting device and backlash-free diaphragm armature plate (Fig. 2)

The same air gap adjusting device is provided for each output cover. The sequence of functions is described below.

The description of the patented adjusting device applies to both versions. If required, the air gap can be compensated as follows:

- Loosen the four screws (1) in the housing cover at the output end until the pressure on the compression springs beneath it is relieved but do not remove them completely.
- Remove the cover from the slot in the housing. Insert a cylindrical pin into the bore which then becomes visible. This pin must be capable of radially twisting the ring (2).

- Turn the ring in the direction of the arrow. When you feel resistance, turn it back by one scale marking (equal to the rated air gap).

After adjusting the air gap, retighten the screws (1) and insert the cover into the housing.

This simple way of adjusting an air gap can be also be performed easily on built-in combinations.



Clutch-brake combinations

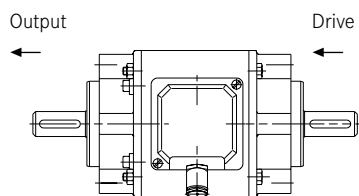
Design selection

INTORQ 14.800

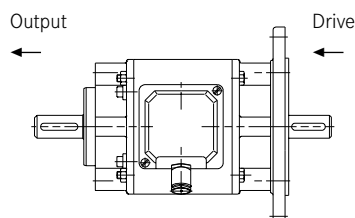
Version	Versions with splined armature plate				Versions with backlash-free diaphragm armature plate			
	10.1	10.2	10.3	10.4	10.6	10.7	10.8	10.9
Drive	Free shaft	Free shaft and B5 flange	Hollow shaft and B5 flange	Hollow shaft and B14 flange	As	As	As	As
Output	Free shaft	Free shaft	Free shaft	Free shaft	10.1	10.2	10.3	10.4
Foot mounting	–	–	–	–				
Version	11.1	11.2	–	11.4	11.6	11.7	–	11.9
Drive	Free shaft	Free shaft and B5 flange	–	Hollow shaft and B14 flange	As	As	–	As
Output	Free shaft	Free shaft	–	Free shaft	11.1	11.2	–	11.4
Foot mounting	With feet	With feet	–	With feet				
Version	12.1	12.2	12.3	12.4	12.6	12.7	12.8	12.9
Drive	Free shaft	Free shaft and B5 flange	Hollow shaft and B5 flange	Hollow shaft and B14 flange	As	As	As	As
Output	Free shaft and B5 flange	Free shaft and B5 flange	Free shaft and B5 flange	Free shaft and B5 flange	12.1	12.2	12.3	12.4
Foot mounting	–	–	–	–				
Version	13.1	13.2	–	13.4	13.6	13.7	–	13.9
Drive	Free shaft	Free shaft and B5 flange	–	Hollow shaft and B14 flange	As	As	–	As
Output	Free shaft and B5 flange	Free shaft and B5 flange	–	Free shaft and B5 flange	13.1	13.2	–	13.4
Foot mounting	With feet	With feet	–	With feet				
Version	20.1	20.2	20.3	20.4	20.6	20.7	20.8	20.9
Drive	Free shaft	Free shaft and B5 flange	Hollow shaft and B5 flange	Hollow shaft and B14 flange	As	As	As	As
Output	Hollow shaft	Hollow shaft	Hollow shaft	Hollow shaft	20.1	20.2	20.3	20.4
Foot mounting	–	–	–	–				
Version	21.1	21.2	21.3	21.4	21.6	21.7	21.8	21.9
Drive	Free shaft	Free shaft and B5 flange	Hollow shaft and B5 flange	Hollow shaft and B14 flange	As	As	As	As
Output	Hollow shaft and B5 flange	Hollow shaft and B5 flange	Hollow shaft and B5 flange	Hollow shaft and B5 flange	21.1	21.2	21.3	21.4
Foot mounting	–	–	–	–				
Version	22.1	22.2	–	22.4	22.6	22.7	–	22.9
Drive	Free shaft	Free shaft and B5 flange	–	Hollow shaft and B14 flange	As	As	–	As
Output	Hollow shaft	Hollow shaft	–	Hollow shaft	22.1	22.2	–	22.4
Foot mounting	With feet	With feet	–	With feet				
Version	23.1	23.2	–	23.4	23.6	23.7	–	23.9
Drive	Free shaft	Free shaft and B5 flange	–	Hollow shaft and B14 flange	As	As	–	As
Output	Hollow shaft and B5 flange	Hollow shaft and B5 flange	–	Hollow shaft and B5 flange	23.1	23.2	–	23.4
Foot mounting	With feet	With feet	–	With feet				

Clutch-brake combinations

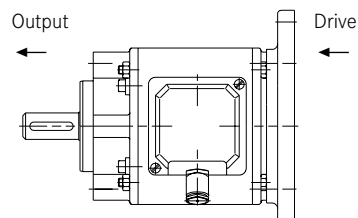
Overview of types



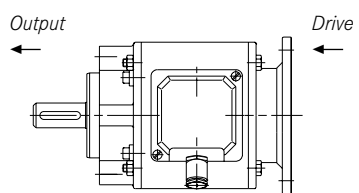
INTORQ 14.800.□□.10.1(6) Page 17



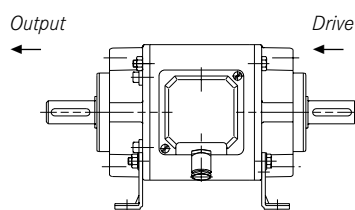
INTORQ 14.800.□□.10.2(7) Page 17



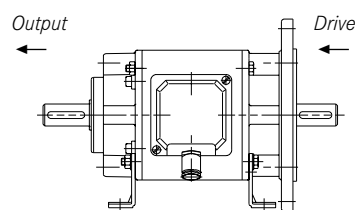
INTORQ 14.800.□□.10.3(8) Page 19



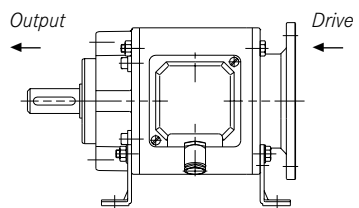
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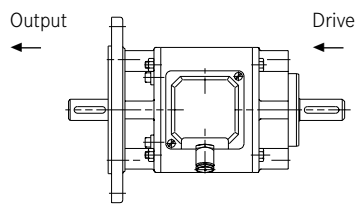
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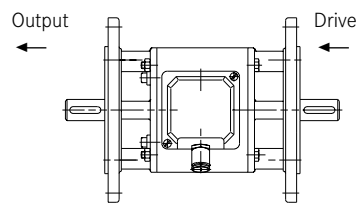
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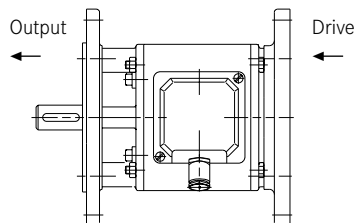
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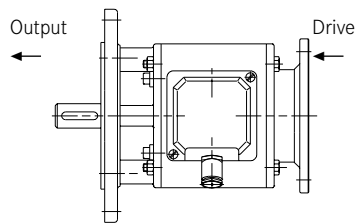
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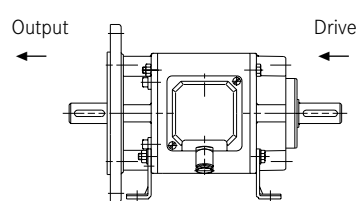
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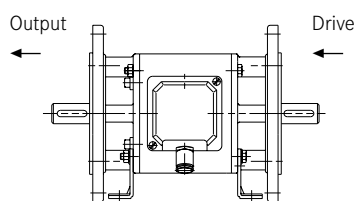
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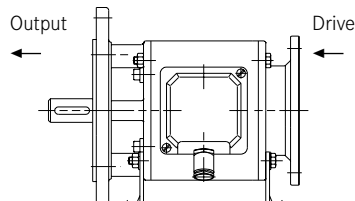
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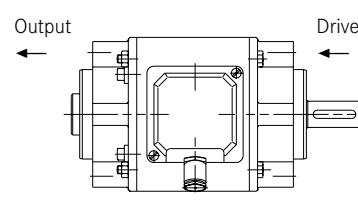
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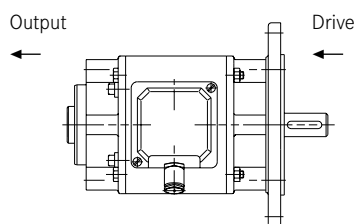
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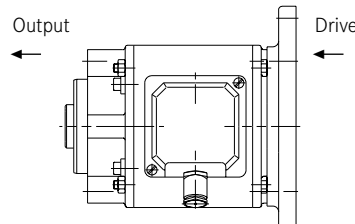
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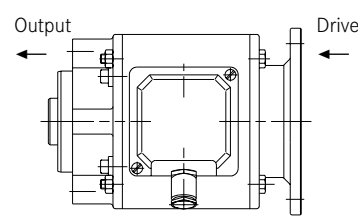
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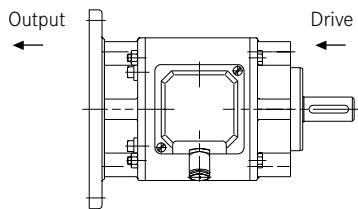
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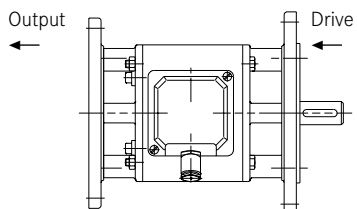
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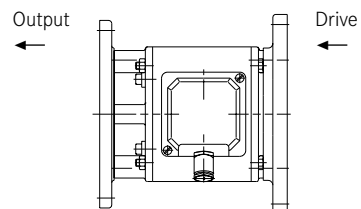
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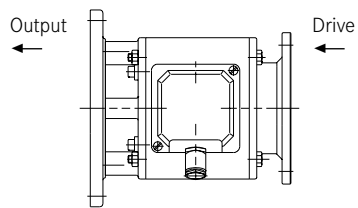
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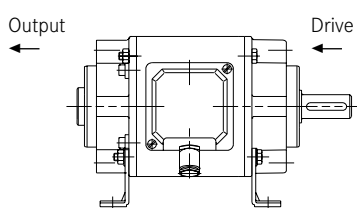
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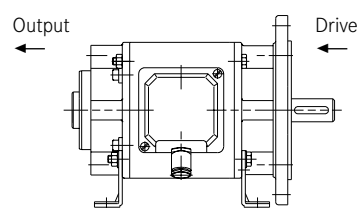
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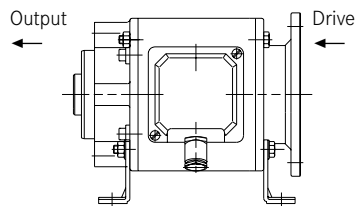
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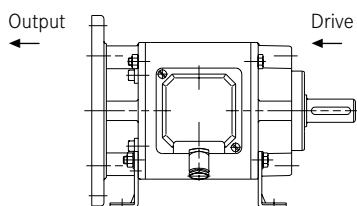
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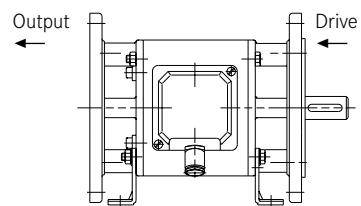
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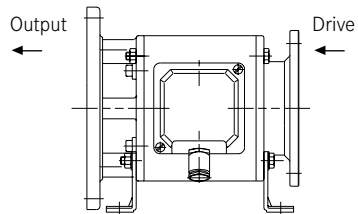
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INTORQ 14.800.□□.23.1(6) Page 23



INTORQ 14.800.□□.23.2(7) Page 23



INTORQ 14.800.□□.23.4(9) Page 27

Dimensioning

Selecting the size

Dimensioning is carried out in accordance with VDI Guideline 2241.

The required size is dimensioned essentially in accordance with the required torques or braking torques. The inertias to be accelerated or braked (moments of inertia), the relative speeds, the acceleration or deceleration times, the required operating frequencies and the desired service life should all be included in the calculation. The ambient conditions for the site of use of housed clutches should be known.

Such conditions could include, for example, extraordinary ambient temperatures, extremely high air humidity and dust accumulation.

Friction surfaces must always be kept free of oil and grease.

List of abbreviations

P	[W]	power	S_{hmax}	[1/h]	Maximum permissible operating frequency, depending on the friction work per operation
P_N	[W]	Rated coil power at rated voltage and 20°C	S_{hue}	[1/h]	transitional operating frequency, thermal rating of the brake/clutch
J_{Lres}	[kgm ²]	moment of inertia of the load referred to the brake shaft	s_{LN}	[mm]	Rated air gap
U_N	[V DC]	Rated coil voltage	t₁	[s]	Engagement time, the total of the reaction delay and torque rise time $t_1 = t_{11} + t_{12}$
M_a	[Nm]	deceleration torque	t₂	[s]	Disengagement time, time from switching the stator until the torque has reduced to 0.1 M _K
M_{erf}	[Nm]	required braking torque	t₃	[s]	Slipping time to standstill (after t ₁₁)
M_K	[Nm]	Rated torque of the brake at a relative speed of 100 r/min	t₁₁	[s]	Delay time when connecting, time from disconnecting the voltage until the torque begins to rise
M_L	[Nm]	Load torque, torque that the static load produces at the motor shaft	t₁₂	[s]	Rise time of braking torque, time from beginning of rise of torque until braking torque is reached
Δn₀	[r/min]	Initial relative speed of the brake			
Q	[J]	Heat/energy			
Q_E	[J]	Maximum permissible friction work per switching cycle, thermal rating of the brake			
Q_{smax}	[J]	maximum permissible friction work during cyclic switching, depending on the operating frequency			
S_h	[1/h]	Operating frequency, the number of repeated operations per unit time			

Dimensioning

Selecting the size

Safety factor

In order to achieve the required transmission security even in extreme operating conditions, the calculated torque is multiplied by safety factor K. The value of K is determined by the operating conditions.

$$K \leq 2$$

Load types

In practice, the following load types mainly occur:

Purely dynamic load

A purely dynamic load is present when flywheels, rolls or similar are to be accelerated or decelerated and the static

load torque is negligible.

$$M_{\text{erf}} = M_a \cdot K \leq M_K$$

$$M_a = \frac{J_L \cdot \Delta n_0}{9,55 \cdot \left(t_3 - \frac{t_{12}}{2} \right)}$$

$$M_{\text{erf}} = \frac{J_L \cdot \Delta n_0}{9,55 \cdot \left(t_3 - \frac{t_{12}}{2} \right)} \cdot K$$

Dynamic and static load

The majority of applications belong to this mixed category, as a dynamic load is present in addition to a static load torque in most cases.

The required size is usually calculated using the clutch or acceleration process.

$$M_{\text{erf}} = (M_a \pm M_L) \cdot K \leq M_K$$

$$M_{\text{erf}} = \left[\frac{J_L \cdot \Delta n_0}{9,55 \cdot \left(t_3 - \frac{t_{12}}{2} \right)} \pm M_L \right] \cdot K$$

+M_L = to engage clutch and accelerate load

-M_L = to engage brake and decelerate load

Estimated required torque or size

If only the drive power to be transmitted is known, the required torque or braking torque can be determined as follows:

$$M_{\text{erf}} = 9550 \frac{P}{n} \cdot K \leq M_K$$

Acceleration and delay time

If the rated torque is specified and the moment of inertia and load torque are both known, the acceleration or delay time can be determined as follows:

$$t_3 = \frac{J_L \cdot \Delta n_0}{9,55 \cdot (M_K \pm M_L)} + \frac{t_{12}}{2}$$

-M_L = to engage clutch and accelerate load

+M_L = to engage brake and decelerate load

Dimensioning

Selecting the size

Thermal load

When dimensioning clutches and brakes, other important factors to be taken into account are the switching energy per switching cycle and the operating frequency. The available switching energy per switching cycle (engaging the clutch and braking) is calculated using the formula below:

The permissible friction energy per switching cycle at a given operating frequency can be taken from the diagram on page 16. If the friction energy per switching cycle is known, the permissible operating frequency can also be taken from the diagram.

$$Q = \frac{J_L \cdot \Delta n_0^2}{182,5} \cdot \left(\frac{M_K}{M_K - M_L} + \frac{M_K}{M_K + M_L} \right)$$

Example

The following technical data is known for a packaging machine's positioning mode:

$$\begin{aligned} J_L &= 0,01 \text{ kgm}^2 \text{ total} \\ M_L &= 6 \text{ Nm} \\ \Delta n_0 &= 700 \text{ min}^{-1} \\ t_3 &= 0,15 \text{ s} \\ S_h &= 4000 \text{ switching operations per hour} \end{aligned}$$

$$M_a = \frac{J_L \cdot \Delta n_0^2}{9,55 \cdot \left(t_3 - \frac{t_{12}}{2} \right)} = \frac{0,01 \cdot 700}{9,55 \cdot (0,15 - 0,03)}$$

$\frac{t_{12}}{2}$ assumed as 0.03 s

$$M_a = 6,1 \text{ Nm} \quad M_{\text{erf}} = (M_a + M_L) \cdot K = (6,1 + 6) \cdot 2 \quad M_{\text{erf}} = 24,2 \text{ Nm}$$

Selected clutch-brake combination:

INTORQ 14.800.10.11.1

With $M_K = 30 \text{ Nm}$

Calculation of the available switching energy per switching cycle:

$$Q = \frac{J_L \cdot \Delta n_0^2}{182,5} \cdot \left(\frac{M_K}{M_K - M_L} + \frac{M_K}{M_K + M_L} \right) \quad Q = \frac{0,01 \cdot 700^2}{182,5} \cdot \left(\frac{30}{30 - 6} + \frac{30}{30 + 6} \right) \quad Q = 55,9 \text{ J}$$

See the diagram (page 16) for S_{zul} depending on the calculated switching energy.

The required operating frequency is permissible at the calculated switching energy for the selected size (10).

Ordering example

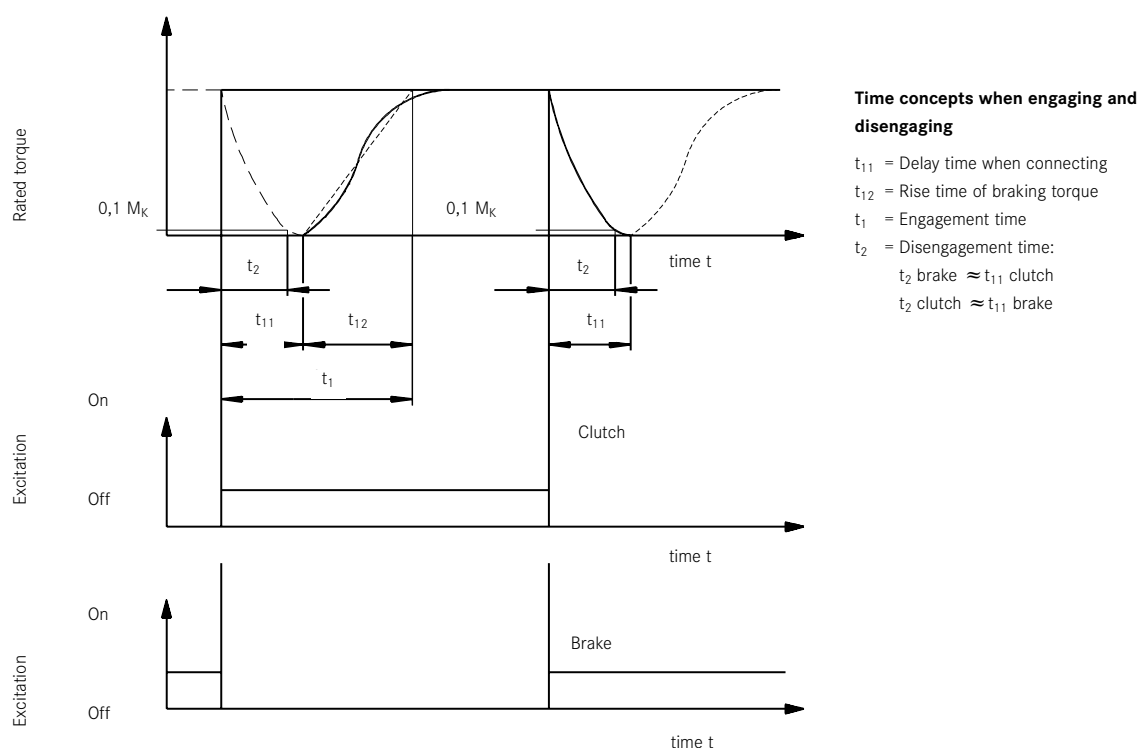
INTORQ 14.800.10.11.1

24 V DC, shaft Ø 19 mm/19 mm

Dimensioning

Operating times

The operating times listed in the tables apply to switching on the DC side with a rated air gap and warm coil. These are mean values whose variation depends on, amongst other things, the rectification type and the air gap S_{LN} .



Operating times in milliseconds

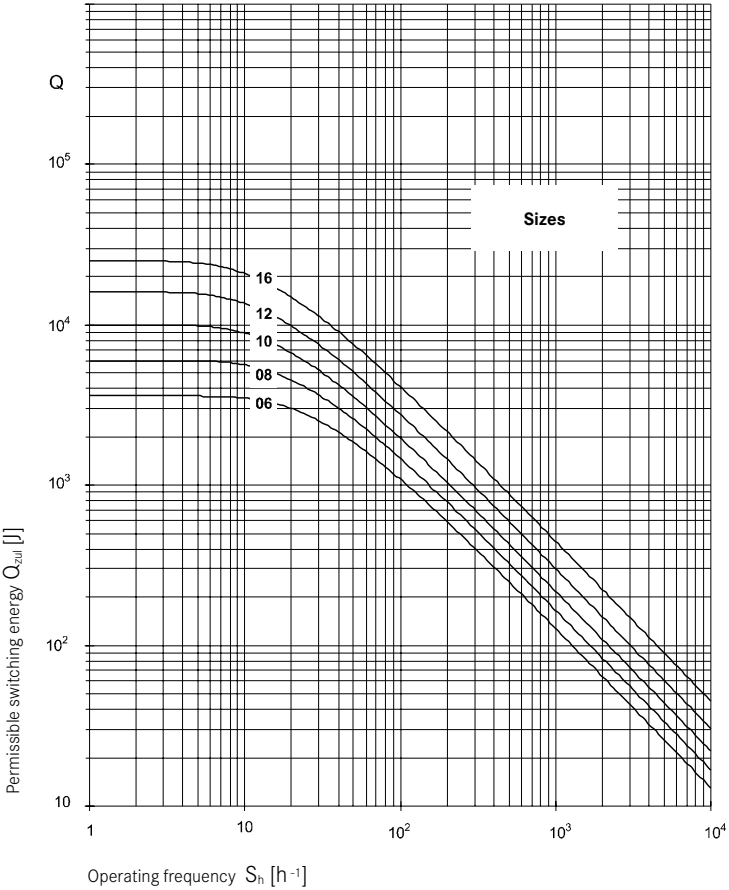
Size	INTORQ 14.800 and 14.137				
	$t_{11} \approx t_2$	E clutch		E brake	
		t_{12}	t_1	t_{12}	t_1
06	20	35	55	25	45
08	25	70	95	30	55
10	35	85	120	50	85
12	50	120	170	75	125
16	65	145	210	85	150

Selection table

INTORQ 14.800 – 867	Size	$M_K^{1)}$ [Nm]	$P_{20}^{2)}$ [W]		n_{max} [min ⁻¹]	Q_E [J]	Moments of inertia $J \times 10^{-5}$, [kgm ²]		
		14.105 14.115	Clutch	Brake			Rotor	Armature plate	Output shaft
Armature plate version	06	7.5	15	11.5	3000	3.6×10^3	11.9	4.2	0.7
	08	15	20	16	3000	6×10^3	26.6	13.9	2.4
	10	30	28	21	3000	10×10^3	78	41.4	6.5
	12	60	35	28	3000	16×10^3	226	120	15.8
	16	120	50	38	3000	25×10^3	630	378	64
With splined armature plate	06	7.5	15	11.5	3000	3.6×10^3	11.9	6.5	1.2
	08	15	20	16	3000	6×10^3	26.6	25.3	3.7
	10	30	28	21	3000	10×10^3	78	82.1	10.2
	12	60	35	28	3000	16×10^3	226	241	23.3
	16	120	50	38	3000	25×10^3	630	800	85

■ Standard voltage 24 V DC
■ ¹⁾ M_K in relation to $n = 100$ rpm
■ ²⁾ At 20°C

INTORQ 14.800 and 14.137



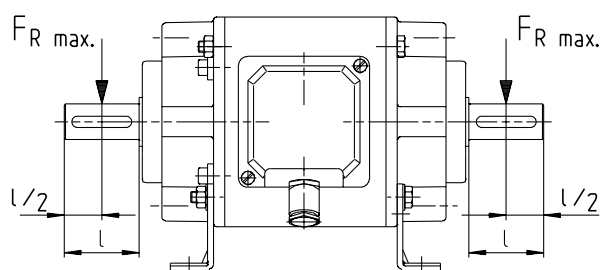
Shaft loads

The radial forces specified in the table relate to the centre of the shaft ends. F_{Rmax} is the maximum permissible radial force in relation to the shaft strength.

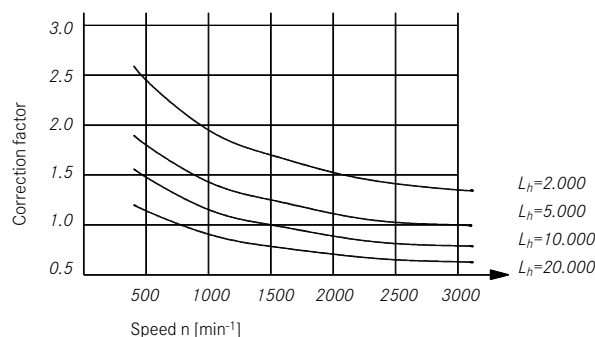
Force F_{rated} underlies a bearing service life of $L_h = 10,000$ hours at $n = 1500$ rpm.

These values can be converted to other service lives and speeds with the aid of the diagram. However, you should ensure that force F_{max} is not exceeded. If additional axial forces are present, please inform us of them so that we can perform a recalculation.

INTORQ 14.800



Size	Force F_{Rmax} [N]	Force F_{rated} [N]
06	600	325
08	900	425
10	1300	590
12	1900	870
16	2300	1350



$$F = F_N \cdot k \leq F_{R max.}$$

- F** Permissible radial force in N
- F_{Rmax}** Max. permissible radial force in N, in relation to shaft strength
- F_N** Permissible radial force in N for $L_h = 10,000$ h and $n = 1500$ rpm
- k** Correction factor from diagram

Example:

Size 08

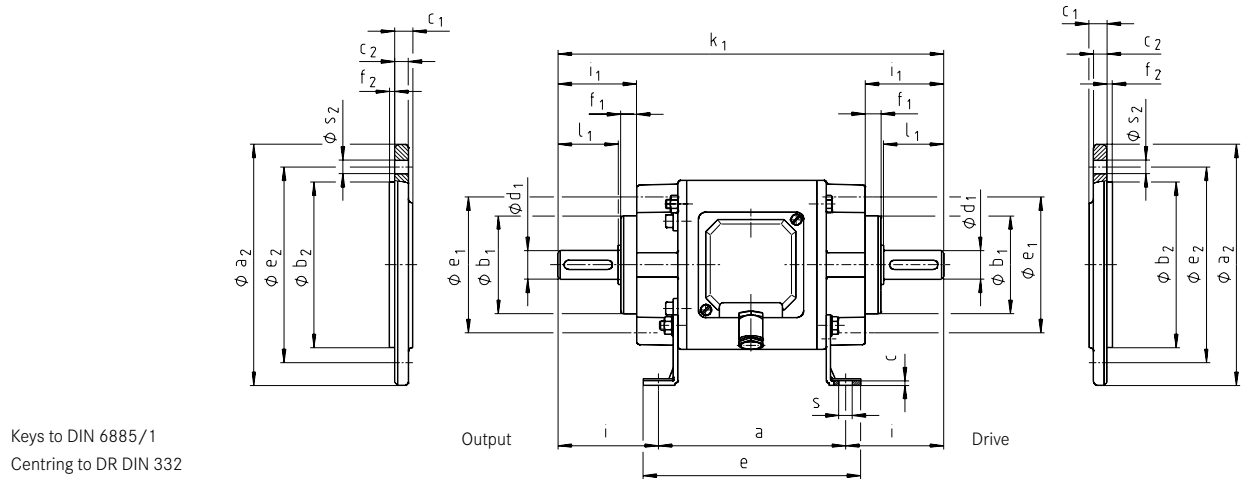
Speed $n = 500 \text{ min}^{-1}$

Service life $L_h = 5000$ hours

$$F = 425 \cdot 1.8 = 765 \text{ N} < F_{Rmax} = 900 \text{ N}$$

Dimensions

Free drive and output shafts



INTORQ 14.800.□□.11.1(6) basic version

Size	M _K [Nm]	Clutch P ₂₀ [W]	Brake P ₂₀ [W]	b ₁ h8	e ₁	d ₁ k6	f ₁	g ₁	g ₂	h	i ₁	k ₁	l ₁	s ₁	m [kg]
06	7,5	15	11,5	52	67	11	10	90	89	63	35	183	23	M6	3
						14				71	42	197	30		
08	15	20	16	65	90	14	10	112	95	71	42	230	30	M8	4,5
						19				80	52	250	40		
10	30	28	21	78	115	19	19	140	110	80	62	280	40	M10	8
						24				90	72	300	50		
12	60	35	28	78	115	24	20	167	136	100	72	324	50	M10	13
						28				112	82	344	60		
16	120	50	38	98	145	28	20	210	158	112	82	380	60	M12	25
						38				132	102	420	80		

Feet

Size	a	b	b ₃	c	e	f	i	s	m [kg]
06	100	80	85	3	115	100	41,5	7	0,2
							48,5		
08	120	105	110	3	140	130	55	9	0,3
							65		
10	140	130	140	4	165	160	70	9	0,4
							80		
12	160	150	160	5	184	180	82	11	0,7
							92		
16	185	185	195	6	215	223	97,5	13	1,2
							117,5		

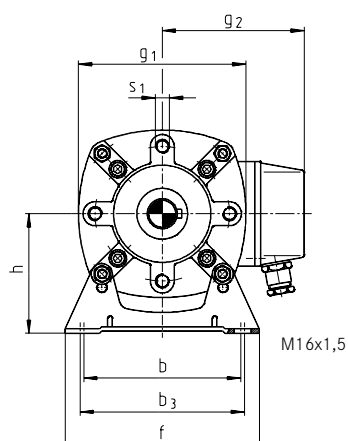
Flange

Size	a ₂	b ₂ j7	c ₁	c ₂	e ₂	f ₂	s ₂	m [kg]
06	140	95	12	10	115	3	9	0,4
	160	110			130	3,5		0,5
08	160	110	12	9	130	3,5	9	0,5
	200	130			165	3,5		0,7
10	200	130	22	15	165	3,5	11	0,8
	250	180			215	4		1,1
12	200	130	22	15	165	3,5	11	0,8
	250	180			215	4		1,1
16	250	180	22	15	215	4	13,5	1,3
	300	230			265	4		2,0

■ All dimensions in mm

Dimensions

Free drive and output shafts



INTORQ	Feet	Drive B5 flange	Output B5 flange
14.800.□□.10.1[6]	-	-	-
14.800.□□.10.2[7]	-	●	-
14.800.□□.11.1[6]	●	-	-
14.800.□□.11.2[7]	●	●	-
14.800.□□.12.1[6]	-	-	●
14.800.□□.12.2[7]	-	●	●
14.800.□□.13.1[6]	●	-	●
14.800.□□.13.2[7]	●	●	●

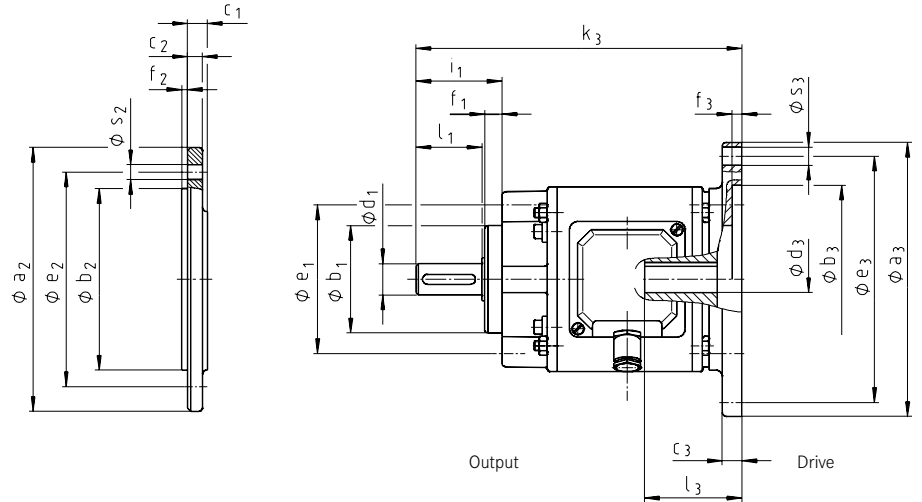
Order data

- General – Type designation with specification of size and rated voltage
Diameters of drive and output shafts
- If required – Diameters of drive and output flanges
Foot height
Backlash-free diaphragm armature plate
[value in brackets in the type designation]

Dimensions

Drive, hollow shaft, B5 flange – output, free shaft

Keys to DIN 6885/1
Keyways to DIN 6885/1JS9
Centring to DR DIN 332



INTORQ 14.800.□□.10.3[8] basic version

Size	M _K [Nm]	Clutch P ₂₀ [W]	Brake P ₂₀ [W]	a ₃	b ₁ h8	b ₃ H9	c ₃	d ₁ k6	d ₃ G7	e ₁	e ₃	f ₁	f ₃	g ₁	g ₂	i ₁	k ₃	l ₁	l ₃	s ₁	s ₃	m [kg]
06	7,5	15	11,5	140	52	95,2	10	11	11	67	115	10	4	90	89	35	146	23	40	M6	M8	2,5
				160		110,2		14	14		130										9	
08	15	20	16	160	65	110,2	14	14	14	90	130	10	4	112	95	42	184	30	50	M8	M8	4,5
				200		130,2		19	19		165										11,5	
10	30	28	21	200	78	130,2	13	19	19	115	165	19	5	140	110	62	217	40	60	M10	M10	7,5
				250		180,2		24	24		215										13,5	
12	60	35	28	200	78	130,2	16	24	24	115	165	20	5	167	136	72	251	50	70	M10	M10	12
				250		180,2		28	28		215										M12	
16	120	50	38	250	98	180,2	20	28	28	145	215	20	5	210	158	82	294	60	80	M12	M12	22
				300		230,2		38	38		265											

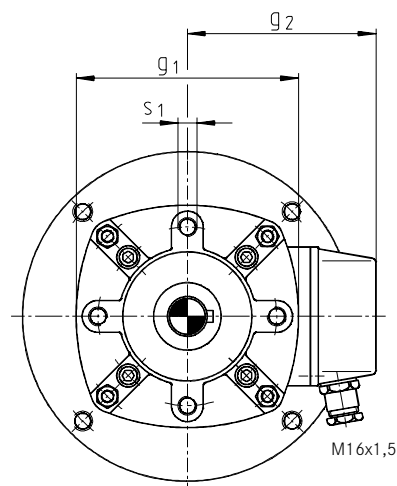
Output flange

Size	a ₂	b ₂ j7	c ₁	c ₂	e ₂	f ₂	s ₂	m [kg]
06	140	95	12	10	115	3	9	0,4
	160	110			130	3,5		0,5
08	160	110	12	9	130	3,5	9	0,5
	200	130			165	11,5		0,7
10	200	130	22	15	165	3,5	11	0,8
	250	180			215	4		1,1
12	200	130	22	15	165	3,5	11	0,8
	250	180			215	4		1,1
16	250	180	22	15	215	4	13,5	1,3
	300	230			265			2,0

■ All dimensions in mm

Dimensions

Drive, hollow shaft, B5 flange – output, free shaft



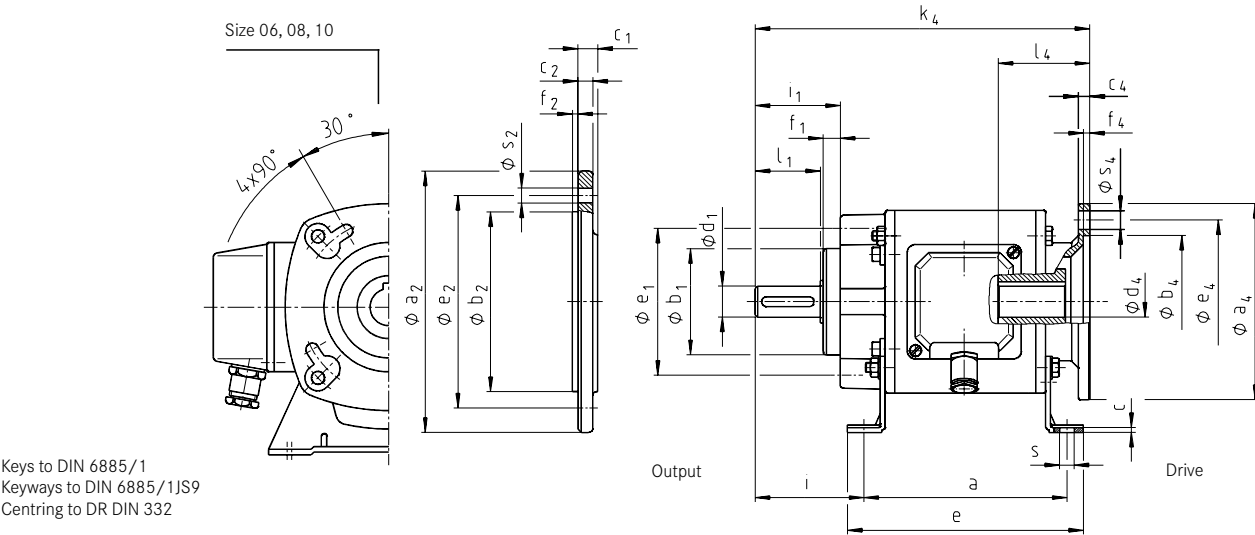
INTORQ	Drive B5 flange	Output B5 flange
14.800.□□.10.3[8]	●	-
14.800.□□.12.3[8]	●	●

Order data

- General – Type designation with specification of size and rated voltage
Diameter of drive hollow shaft
Diameter of drive flange
Diameter of output shaft
- If required – Diameter of output flange
Backlash-free diaphragm armature plate
[value in brackets in the type designation]

Dimensions

Drive, hollow shaft, B14 flange – output, free shaft



INTORQ 14.800.□□.11.4[9] basic version

Size	M _K [Nm]	Clutch P ₂₀ [W]	Brake P ₂₀ [W]	a ₄	b ₁ h8	b ₄ H9	c ₄	d ₁ k6	d ₄ G7	e ₁	e ₄	f ₁	f ₄	g ₁	g ₂	h	i ₁	k ₄	l ₁	l ₄	s ₁	s ₄	m [kg]
06	7,5	15	11,5	105	52	70,2	5,5	11	11	67	85	10	3	90	89	63	35	152	23	50	M6	7	3
								14	14							71	42	159	30				
08	15	20	16	120	65	80,2	7	14	14	90	100	10	4	112	95	71	42	186	30	58	M8	7	4,5
								19	19							80	52	196	40				
10	30	28	21	140	78	95,2	8	19	19	115	115	19	4	140	110	80	62	225	40	70	M10	9	8
								24	24							90	72	235	50				
12	60	35	28	160	78	110,2	8	24	24	115	130	20	4	167	136	100	72	261	50	80	M10	9	13
								28	28							112	82	271	60				
16	120	50	38	200	98	130,2	10	28	28	145	165	20	5	210	158	112	82	309	60	97	M12	12	24
								38	38							132	102	329	80				

feet

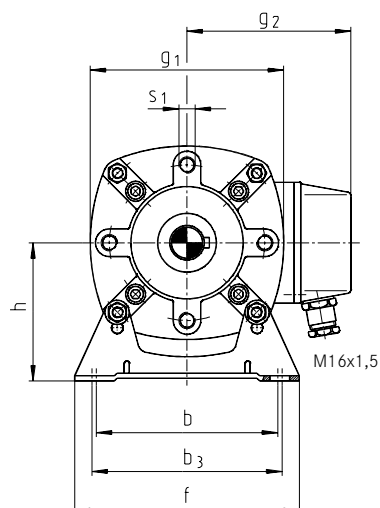
Size	a	b	b ₃	c	e	f	i	s	m [kg]
06	100	80	85	3	115	100	41,5	7	0,2
							48,5		
08	120	105	110	3	140	130	55	9	0,3
							65		
10	140	130	140	4	165	160	70	9	0,4
							80		
12	160	150	160	5	184	180	82	11	0,7
							92		
16	185	185	195	6	215	223	97,5	13	1,2
							117,5		

output flange

Size	a ₂	b ₂ j7	c ₁	c ₂	e ₂	f ₂	s ₂	m [kg]
06	140	95	12	10	115	3	9	0,4
	160	110			130	3,5		0,5
08	160	110	12	9	130	3,5	9	0,5
	200	130			165	3,5		0,7
10	200	130	22	15	165	3,5	11	0,8
	250	180			215	4		1,1
12	200	130	22	15	165	3,5	11	0,8
	250	180			215	4		1,1
16	250	180	22	15	215	4	13,5	1,3
	300	230			265	4		2,0

Dimensions

Drive, hollow shaft, B14 flange – output, free shaft



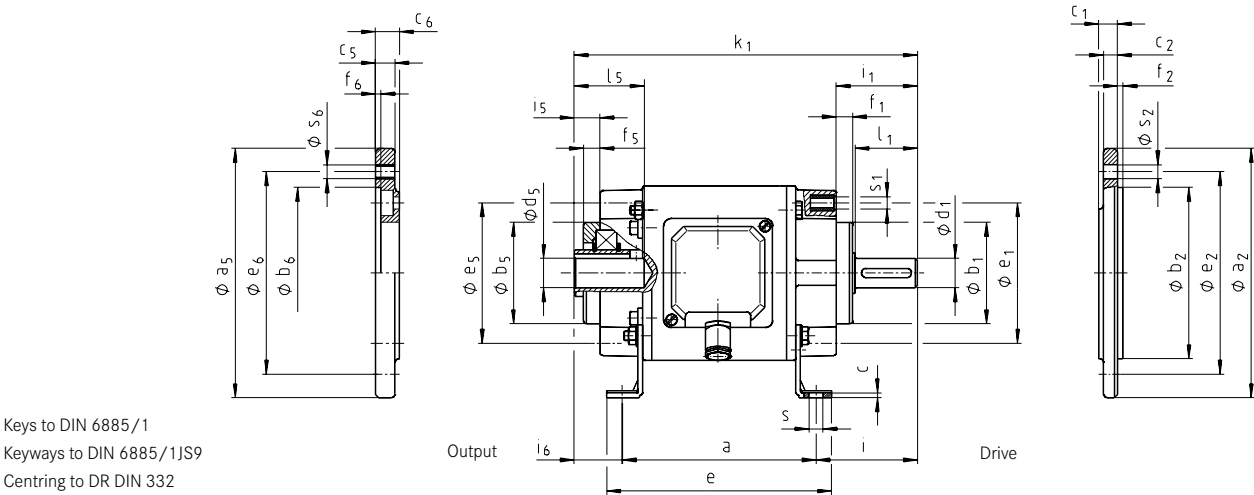
INTORQ	Feet	Output B5 flange
14.800.□□.10.4[9]	-	-
14.800.□□.11.4[9]	●	-
14.800.□□.12.4[9]	-	●
14.800.□□.13.4[9]	●	●

Order data

- General – Type designation with specification of size and rated voltage
Diameter of drive hollow shaft
Diameter of output shaft
- If required – Diameter of output flange
Foot height
Backlash-free diaphragm armature plate
[value in brackets in the type designation]

Dimensions

Drive, free shaft – output, hollow shaft



Keys to DIN 6885/1
Keyways to DIN 6885/1JS9
Centring to DR DIN 332

INTORQ 14.800.□□.22.1[6] basic version

Size	M _K [Nm]	Clutch P ₂₀ [W]	Brake P ₂₀ [W]	b ₁ h ₈	b ₅ h ₈	d ₁ k ₆	d ₅ G ₇	e ₁	e ₅	f ₁	f ₅	g ₁	g ₂	h	i ₁	i ₅	k ₁	l ₁	l ₅	s ₁	s ₅	m [kg]
06	7,5	15	11,5	52	52	11	11	67	67	10	10	90	89	63	35	14	162	23	23	M6	M6	2,8
						14	14							71	42		169	30	30			
08	15	20	16	65	65	14	14	90	90	10	10	112	95	71	42	17	205	30	30	M8	M8	4,5
						19	19							80	52		216	40	40			
12	60	35	28	78	98	24	24	115	115	20	20	167	136	100	72	20	273	50	50	M10	M10	13
						28	28							112	82		283	60	60			
16	120	50	38	98	120	28	28	145	145	20	21	210	158	112	82	25,5	324	60	60	M12	M12	25
						38	38							132	102		344	80	80			

Feet

Size	a	b	b ₃	c	e	f	i	i ₆	s	m [kg]
06	100	80	85	3	115	100	41,5 48,5	20,5	7	0,2
08	120	105	110	3	140	130	55 65	30	9	0,3
12	160	150	160	5	184	180	82 92	31	11	0,7
16	185	185	195	6	215	223	97,5 117,5	41,5	13	1,2

drive flange

Size	a ₂	b ₂ j ₇	c ₁	c ₂	e ₂	f ₂	s ₂	m [kg]
06	140 160	95 110	12	10	115 130	3 3,5	9	0,4 0,5
08	160 200	110 130	12	9	130 165	3,5	9 11,5	0,5 0,7
12	200 250	130 180	22	15	165 215	3,5 4	11 13,5	0,8 1,1
16	250 300	180 230	22	15	215 265	4	13,5	1,3 2,0

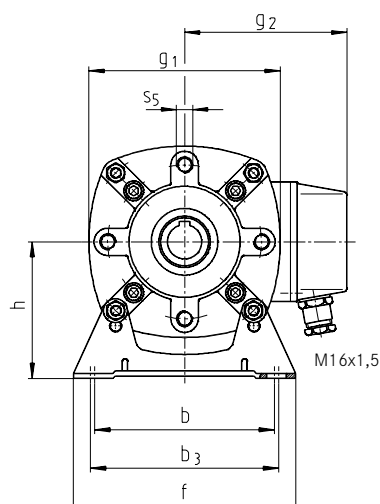
output flange

Size	a ₅	b ₆ H ₉	c ₅	c ₆	e ₆	f ₆	s ₆	m [kg]
06	140 160	95,2 110,2	13	15	115 130	4	9	0,4 0,5
08	160 200	110,2 130,2	14	18	130 165	4	M8 11,5	0,5 0,7
12	200 250	130,2 180,2	16	21	165 215	4 5	M10 M12	0,8 1,1
16	250 300	180,2 230,2	20	27	215 265	5	M12	1,3 2,0

■ All dimensions in mm

Dimensions

Drive, free shaft – output, hollow shaft



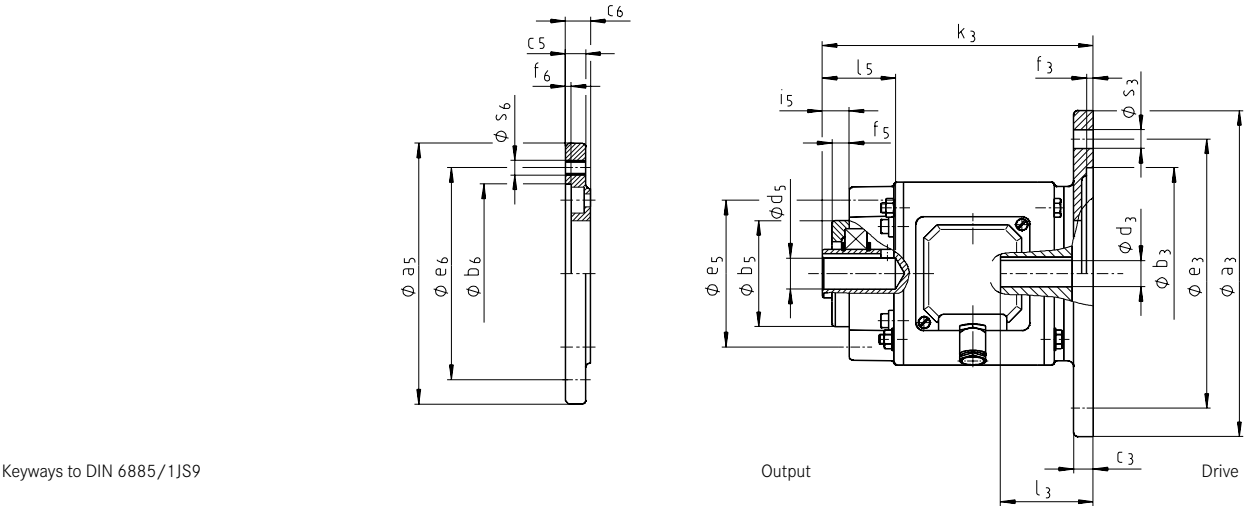
INTORQ	Feet	Drive B5 flange	Output B5 flange
14.800.□□.20.1[6]	-	-	-
14.800.□□.20.2[7]	-	●	-
14.800.□□.21.1[6]	-	-	●
14.800.□□.21.2[7]	-	●	●
14.800.□□.22.1[6]	●	-	-
14.800.□□.22.2[7]	●	●	-
14.800.□□.23.1[6]	●	-	●
14.800.□□.23.2[7]	●	●	●

Order data

- General – Type designation with specification of size and rated voltage
Diameters of drive shaft and output hollow shaft
- If required – Diameters of drive and output flanges
Foot height
Backlash-free diaphragm armature plate
[value in brackets in the type designation]

Dimensions

Drive, hollow shaft, B5 flange – output, hollow shaft



INTORQ 14.800.□□.20.3[8] basic version

Size	M _K [Nm]	Clutch P ₂₀ [W]	Brake P ₂₀ [W]	a ₃	b ₃ H9	b ₅ h8	c ₃	d ₃ G7	d ₅ G7	e ₃	e ₅	f ₃	f ₅	g ₁	g ₂	i ₅	k ₃	l ₃	l ₅	s ₃	s ₅	m [kg]
06	7,5	15	11,5	140	95,2	52	10	11	11	115	67	5	10	90	89	14	125	40	23	M8	M6	2,5
				160	110,2			14	14	130									30	10		
08	15	20	16	160	110,2	65	14	14	14	130	90	4	10	112	95	17	159	50	30	M8	M8	4,5
				200	130,2			19	19	165									40	11,5		
12	60	35	28	200	130,2	98	16	24	24	165	115	4	20	167	136	20	201	70	50	M10	M10	12
				250	180,2			28	28	215									60	M12		
16	120	50	38	250	180,2	120	20	28	28	215	145	5	21	210	158	25,5	238	80	60		M12	22
				300	230,2			38	38	265									80	M12		

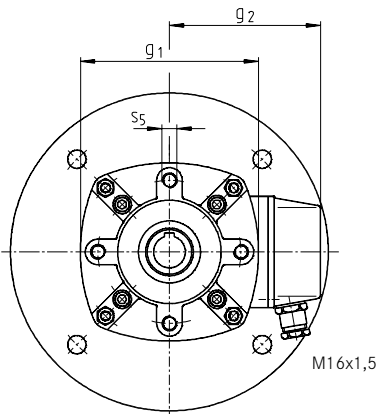
Output flange

Size	a ₅	b ₆ H9	c ₅	c ₆	e ₆	f ₆	s ₆	m [kg]
06	140	95,2	13	15	115	4	9	0,4
	160	110,2			130			0,5
08	160	110,2	14	18	130	4	M8	0,5
	200	130,2			165		11,5	0,7
12	200	130,2	16	21	165	4	M10	0,8
	250	180,2			215		M12	1,1
16	250	180,2	20	27	215	5	M12	1,3
	300	230,2			265			2,0

■ All dimensions in mm

Dimensions

Drive, hollow shaft, B5 flange – output, hollow shaft



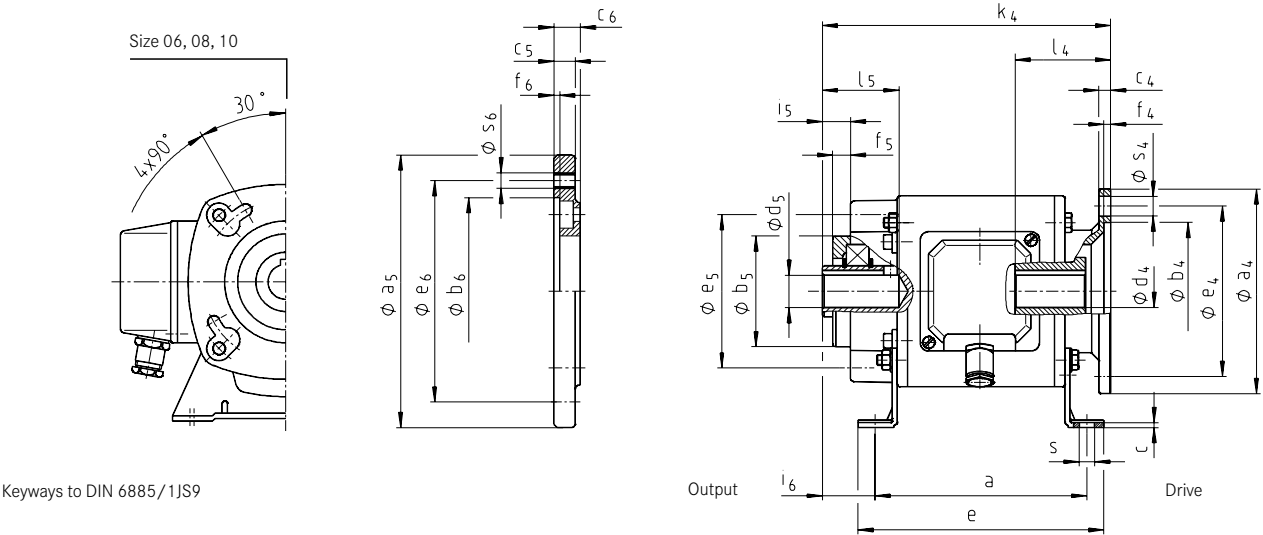
INTORQ	Drive B5 flange	Output B5 flange
14.800.□□.20.3[8]	●	-
14.800.□□.21.3[8]	●	●

Order data

- General – Type designation with specification of size and rated voltage
Diameter of drive hollow shaft
Diameter of drive flange
Diameter of output hollow shaft
- If required – Diameter of output flange
Backlash-free diaphragm armature plate [value in brackets in the type designation]

Dimensions

Drive, hollow shaft, B14 flange – output, hollow shaft



Keyways to DIN 6885/1JS9

INTORQ 14.800.□□.22.4[9] basic version

Size	M_K [Nm]	Clutch P_{20} [W]	Brake P_{20} [W]	a_4	b_4 H9	b_5 h8	c_4	d_4 G7	d_5 G7	e_4	e_5	f_4	f_5	g_1	g_2	h	i_5	k_4	l_4	l_5	s_4	s_5	m [kg]
06	7,5	15	11,5	105	70,5	52	5,5	11	11	85	67	3	10	90	89	63	14	131	50	23	7	M6	2,8
								14	14							71				30			
08	15	20	16	120	80,2	65	7	14	14	100	90	4	10	112	95	71	17	161	58	30	7	M8	4,5
								19	19							80				40			
12	60	35	28	160	110,2	98	8	24	24	130	115	4	20	167	136	100	20	211	80	50	9	M10	13
								28	28							112				60			
16	120	50	38	200	130,2	120	10	28	28	165	145	5	21	210	158	112	25,5	253	97	60	12	M12	24
								38	38							132				80			

Feet

Size	a	b	b_3	c	e	f	i_6	s	m [kg]
06	100	80	85	3	115	100	20,5	7	0,2
08	120	105	110	3	140	130	30	9	0,3
12	160	150	160	5	184	180	31	11	0,7
16	185	185	195	6	215	223	41,5	13	1,2

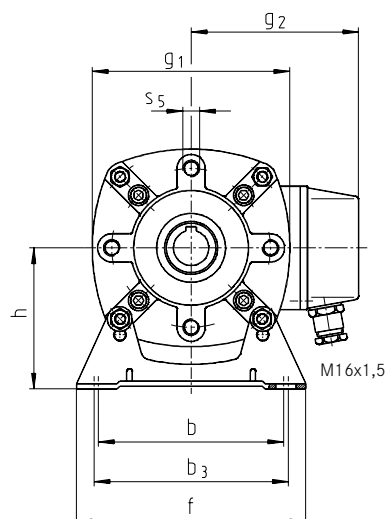
All dimensions in mm

Output flange

Size	a_5	b_6 H9	c_5	c_6	e_6	f_6	s_6	m [kg]
06	140	95,2	13	15	115	4	9	0,4
	160	110,2			130			0,5
08	160	110,2	14	18	130	4	M8 11,5	0,5
	200	130,2			165			0,7
12	200	130,2	16	21	165	4	M10 M12	0,8
	250	180,2			215			1,1
16	250	180,2	20	27	215	5	M12	1,3
	300	230,2			265			2,0

Dimensions

Drive, hollow shaft, B14 flange – output, hollow shaft



INTORQ	Feet	Output B5 flange
14.800.□□.20.4[9]	-	-
14.800.□□.21.4[9]	-	●
14.800.□□.22.4[9]	●	-
14.800.□□.23.4[9]	●	●

Order data

- General – Type designation with specification of size and rated voltage
Diameter of drive hollow shaft
Diameter of output hollow shaft
- If required – Diameter of output flange
Foot height
Backlash-free diaphragm armature plate
[value in brackets in the type designation]

Single elements without housing

Product information

INTORQ 14.137.□.1.3

This type is a clutch-brake combination without a housing.

The use of these single elements is preferred if they are to be integrated directly in a machine structure and there is not enough space available to use complete drive units.

The INTORQ 14.137 is supplied with a backlash-free diaphragm armature plate assembly. A low braking torque remains present even if the voltage is disconnected.

Type code

INTORQ 14.137.□□.1.3.

Type _____

Size 06, 08, 10, 12, 16 _____

Mounting _____

Variants _____

Clutch/brake voltage _____

Rotor bore _____

Armature plate bore _____

Technical data

INTORQ	M _k ¹⁾ [Nm]	P ₂₀ ²⁾ [W]		n _{max.} [min ⁻¹]	Q _E [J]	Moments of inertia J x 10 ⁻⁵ [kgm ²]	
		Clutch	Brake			Rotor	Armature plate
14.137.06	7,5	15	11,5	8000	3,6 x 10 ³	11,9	10,2
14.137.08	15	20	16	6000	6,6 x 10 ³	26,6	29
14.137.10	30	28	21	5000	10,5 x 10 ³	78	113,6
14.137.12	60	35	28	4000	16,5 x 10 ³	226	310
14.137.16	120	50	38	3000	20,6 x 10 ³	630	1113

Standard voltage 24 V DC

¹⁾ M_k in relation to = 100 min⁻¹

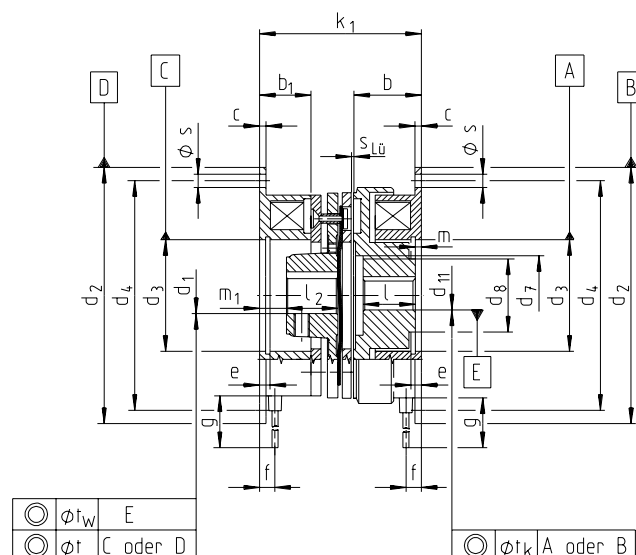
²⁾ At 20 °C

The operating times should be taken from the table on page 15.

Single elements without housing

Dimensions

Type 14.137.06 [...16] 1.3



Type		Clutch	Brake	b	b ₁	c	d ₁				d ₂	d ₃	d ₄	d ₇	d ₈
	M _k	P	P				H7			H9	H8				
	[Nm]	[W]	[W]				min.	standard	max.						
14.137.06.1.3	7,5	15	11,5	24	18	2	10	10	15	17	80	35	72	24,5	23
14.137.08.1.3	15	20	16	26,5	20	3	10	17	20	20	100	42	90	31	28,5
14.137.10.1.3	30	28	21	30	22	3	14	20	25	30	125	52	112	40	40
14.137.12.1.3	60	35	28	33,5	24	4	14	25	30	35	150	62	137	50	45
14.137.16.1.3	120	50	38	37,5	26	4	20	30	40	45	190	80	175	65	62

Type	d ₁₁					e	f	g	k ₁	l	l ₂	m	m ₁	s	s _{LN}	t _k	t _w	t	m [kg]
	H7													4x					
	min.	standard			max.														
14.137.06.1.3	10	10	–	15	17	3,5	6,3	400	55,1	18,5	15	2	11	4,5	0,2	0,2	0,1	0,16	0,8
14.137.08.1.3	12	17	–	20	22	4,3	7,8	400	61,3	20,5	20	2,5	9,4	5,5	0,2	0,3	0,1	0,16	1,5
14.137.10.1.3	15	20	25	30	30	5	8,8	400	70,8	22,5	25	3	8,9	6,6	0,2	0,3	0,1	0,16	2,8
14.137.12.1.3	20	20	25	30	40	5,5	9,3	400	79,6	25	30	3,5	8,1	6,6	0,3	0,3	0,1	0,2	5
14.137.16.1.3	25	25	30	40	50	6	10,7	400	89,8	28	38	3,5	4,3	9	0,3	0,4	0,2	0,2	9

Recommended ISO fits for shafts: k6

All dimensions in mm

Accessories

INTORQ 14.640.10.048 EDS 48 electronic dual switch

Application area

Using 24 V standard excitation to switch:

- Clutch-brake combinations
- Other coils which are to be switched on the DC side in alternating or parallel operation

The EDS 48 electronic dual switch is ideal for controlling two coils.

Features

The EDS 48 electronic dual switch contains the complete power supply for a 24 V DC voltage coil and can be operated using control voltages (e. g. from a PLC) or pulses. A pulse at the START input switches the clutch on until a pulse at the STOP input switches the clutch off and the brake on. A program switch can be used to preselect the type of brake to be controlled (electromagnetic or spring-applied brake).

Note:

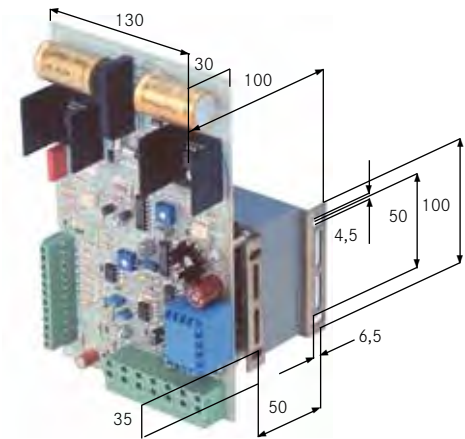
When using spring-applied brakes, the transformer power must be dimensioned for the sum of the clutch and braking powers.

Delay times can be set on two potentiometers to prevent clutches and brakes that do not have a common armature plate working in opposition. The input electronics are potential-free and isolated from the power section by an optocoupler.

For safety reasons, the clutch is always set to "off" and the brake to "on" following mains connection or the closing of switch a1. The device is able to execute the first start command (clutch ON) approximately one second later. If a start command is already present at the input before the mains connection is made, the brake remains switched on until a new start command is sent.

If required, switch a1 can serve as an "emergency-off" switch.

EDS 48 dimensions



Technical data

Standard excitation	24 V
Input voltage	230 V, 50/60 Hz
Coil voltage	24 V
Max. coil power: With EDS 48 type 14.640.10.048	50 W
Max. operating frequency:	
Up to 35 W	Five switching operations/s
Up to 50 W	Two switching operations/s
Connectable coils	Two units
Max. control current at 24 V	10 mA approx.
Auxiliary supply at terminals 30 and 31	15 V
Max. current of the auxiliary supply	30 mA
Max. delay time	250 ms
Control pulses	≥ 3 ms
EDS 48 weight	1.8 kg

Control options

- PLC (programmable logic controller)
- Contacts
- NPN (PNP) proximity switches
- NPN (PNP) photoelectric barriers

Accessories

INTORQ 14.640.10.048 EDS 48 electronic dual switch

Connection examples

Control via continuous signals

Switching via contact

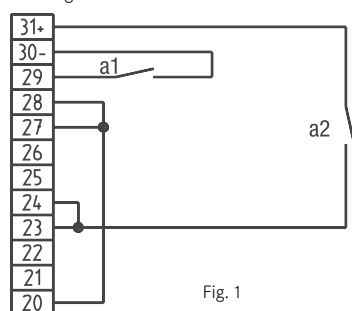


Fig. 1

Pressing the a2 switch turns the brake "off" and the clutch "on" (start), if a1 is not closed. If a2 is opened, the clutch switches "off" and the brake "on" (stop). The first start command is executed no earlier than approximately 1 second after the mains voltage is switched on or after a1 is opened.

Switching via optocoupler

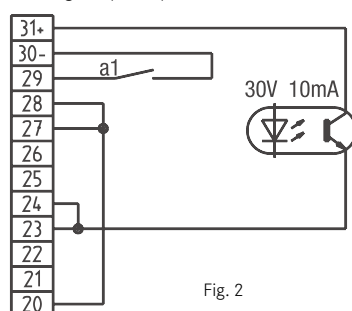


Fig. 2

This example is as Fig. 1, but an optocoupler or a transistor is used instead of a contact.

Switching via proximity switch

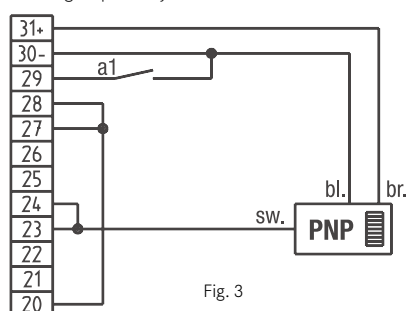


Fig. 3

This example is as Fig. 1, but a PNP proximity switch is used instead of a contact.

Colours: bk. = black/bl. = blue/br. = brown

Proximity switch damped = clutch "on"/brake "off"

Proximity switch free = brake "on"/clutch "off"

Switching via PLC

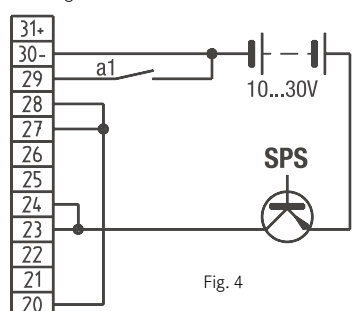


Fig. 4

In this example, a PLC with a control voltage of 10 to 30 V is used for control.

Control voltage "on" = clutch "on"/brake "off"

Control voltage "off" = brake "on"/clutch "off"

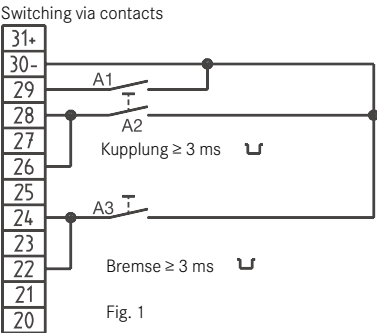
Caution

The cables to the coil must not short-circuit or have a conductive connection to earth (electrical bonding), the PEN conductor or other coils.

Accessories

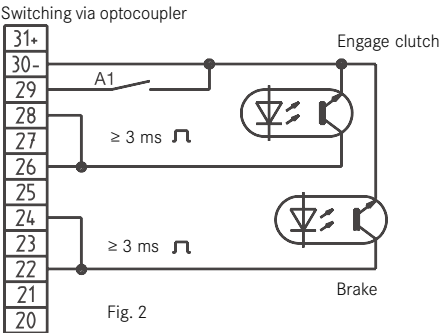
INTORQ 14.640.10.048 EDS 48 electronic dual switch

Connection examples Control via pulses



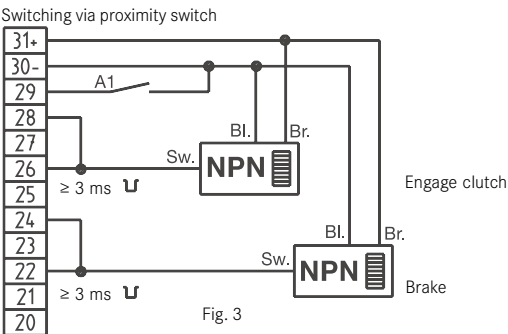
Pressing switch a2 switches the clutch "on" (start), if a1 is not closed. The pulse must be ≥ 3 ms and is saved until switch a3 is closed for at least 3 ms (stop). If a3 remains closed and switch a2 gives the start command, the brake switches "off" and the clutch "on".

This example is as Fig. 1, but an optocoupler or transistors are used instead of contacts.

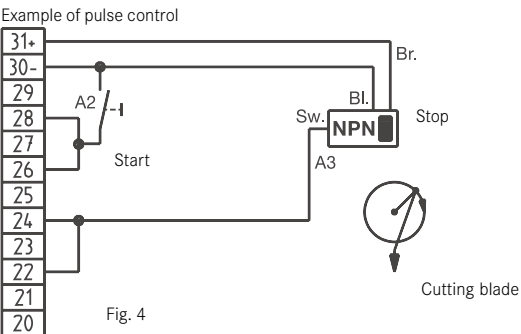


This example is as Fig. 1, but NPN proximity switches (e.g. type 14.666.03.001, three wire version) are used instead of contacts.

Colours: bk. = black/bl. = blue/br. = brown



A cutting blade is driven by a cam. Proximity switch a3 (type 14.666.03.001) should cause it to stop automatically after one revolution following the start pulse. The start command is issued via switch a2.

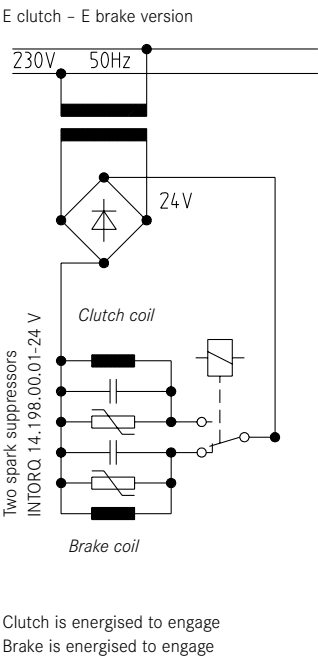


Accessories

DC switching

The performance of both the clutch and brake coils must be taken into account when dimensioning a transformer rectifier.

DC switching means short switch-on and switch-off times, but requires a spark suppressor to protect the contacts against high induced voltages during switch-off.



INTORQ 14.198.00.0 universal spark suppressor

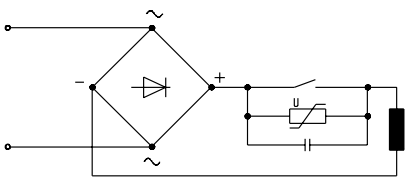
The universal spark suppressor limits the induced voltages which occur when switching off all clutches and brakes on the DC side to safe values. Otherwise, these induced voltages might damage coils and switches. Therefore, VDE 0580 requires appropriate protective measures to avoid

excessive switch-off surges and overvoltages. Four versions of the universal spark suppressor are available for the following voltage ranges:

Type	Coil voltage U	Coil power P _{max}
INTORQ 14.198.00.01	24 V - 50 V	110 W
INTORQ 14.198.00.02	50 V - 120 V	110 W
INTORQ 14.198.00.03	120 V - 200 V	110 W
INTORQ 14.198.00.04	200 V - 250 V	110 W

DC switching

Connection example



Accessories

DEG and DOSS high-speed switchgear

High-speed operation with INTORQ 14.621.14.(16)

□□□ DEG double European device

Working in conjunction with DEG high-speed switchgear, the clutch-brake combinations achieve excellent positioning accuracy.

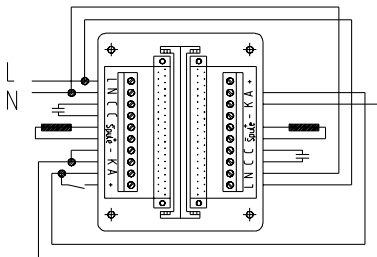
The 24 V coils on the housing clutches can be connected to the DEG device on a 220 V/240 V mains.

The coil current (two coils up to a maximum of 100 W) is switched by semiconductors and is free of wear; DEG devices are controlled via auxiliary contacts, control voltages or proximity sensors.

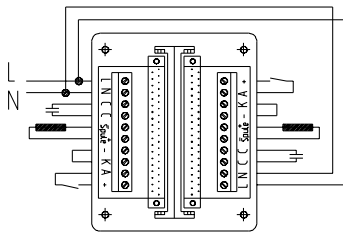
DEG high-speed switchgear is dimensioned as a constant current source. The rated current flows in the solenoids regardless of whether the coil is cold or warm. The torque remains the same whether the operating status is cold or warm.

We supply DEG high-speed switchgear as built-in units.

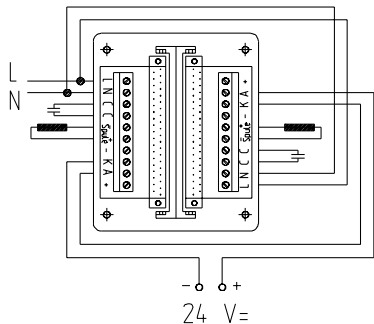
Connection examples



Control with one contact



Control with two contacts



Control with PLC or control voltage

DOSS double high-speed switchgear

INTORQ 14.621.13.□□□

We recommend the DOSS double high-speed switchgear for applications in which start/stop pulses are used for control.

The switchgear mentioned above can be found in our "Electronic Switchgear and Accessories" catalogue which is available on request.



INTORQ 14.621.14.(16)□□□



INTORQ 14.621.13.□□□