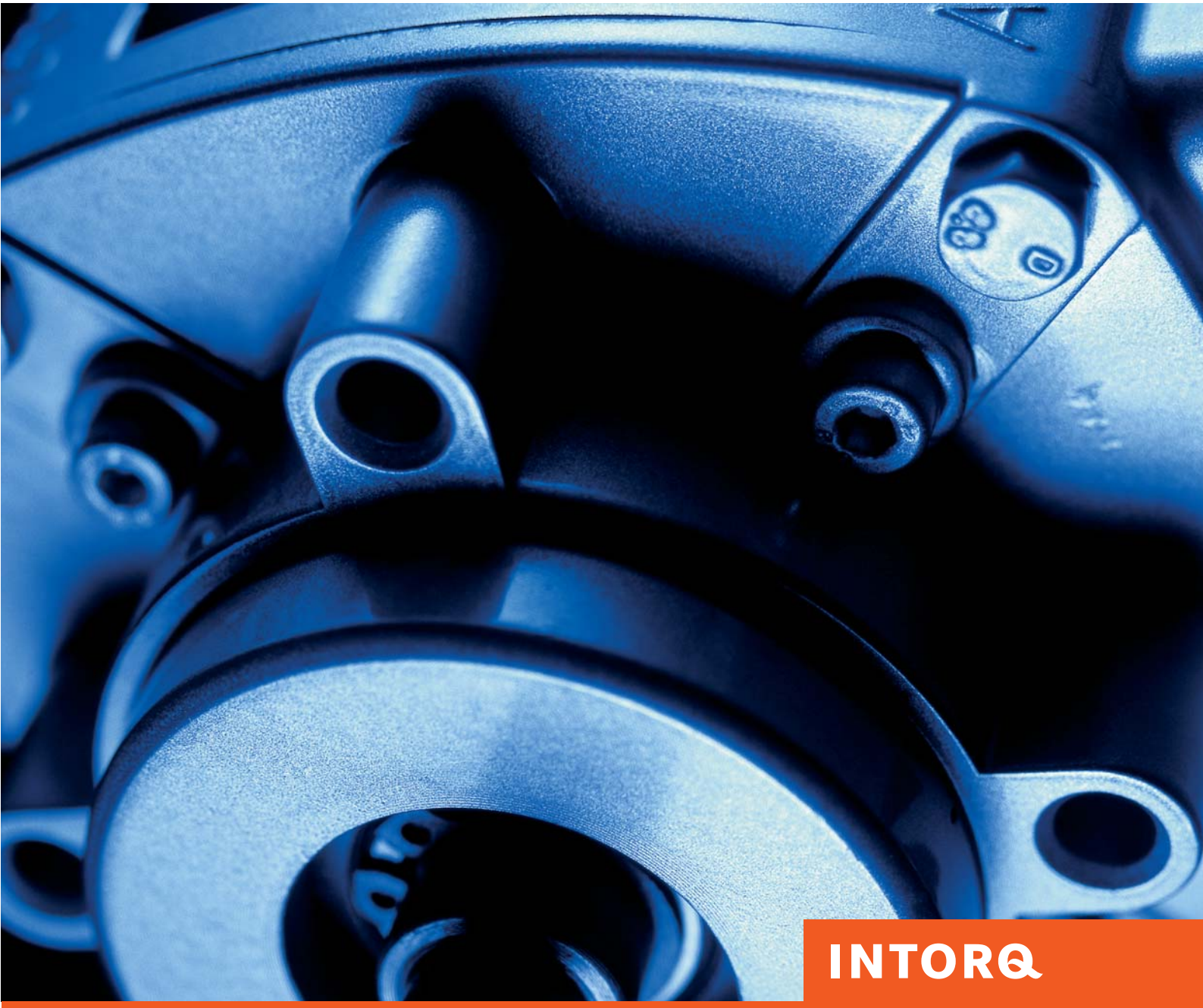
Electromagnetic clutch-brake combinations

INTORQ 14.800 – 14.867

7.5 – 120 Nm



INTORQ

setting the standard

Clutch-brake combinations

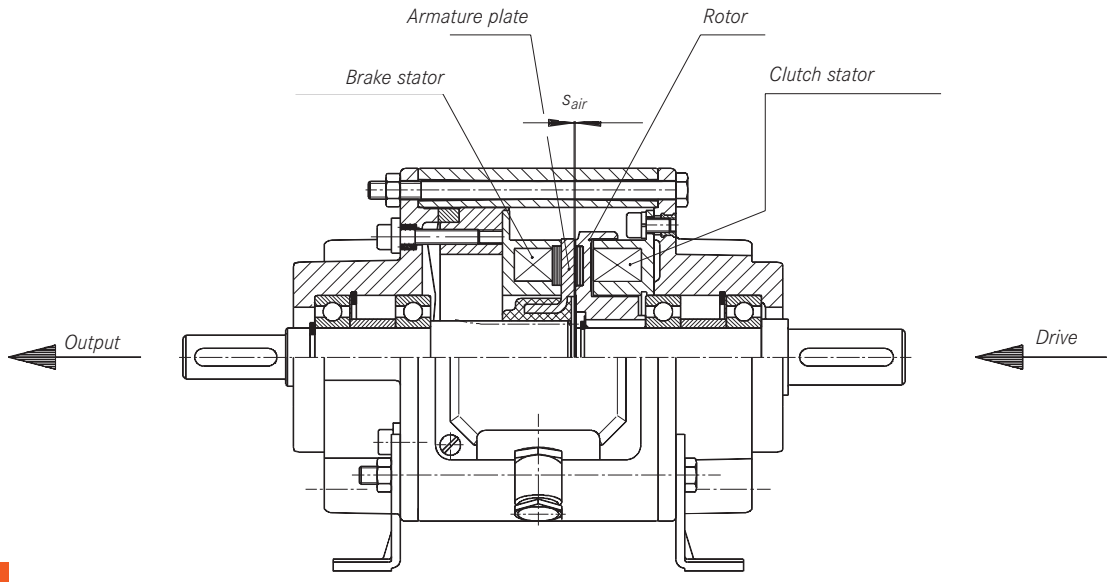
Product information

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.
As well as the basic versions with free drive and output shafts and hollow shafts, clutch-brake combinations are also available with built-on three-phase AC motors and with helical or worm gearboxes mounted at the output end. 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 elements 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 to 120 Nm
- Asbestos-free friction linings
- Patented air gap adjustment can be performed externally without disassembling the combination
- Operating times of the clutch and the brake do not overlap
- A backlash-free version can be supplied on request
- Two shaft and two hollow shaft diameters as well as two flange diameters in IEC dimensions are available for each frame size
- Two axis heights are available for each frame size
- Insulation class B
- Dimensioned for 100% duty
- IP 44 enclosure, higher degrees of protection on request
- 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 (Association of German Electrotechnical Engineers) 0580



Clutch-brake combinations

Product information

INTORQ 14.800 – 867 patented air gap adjusting device

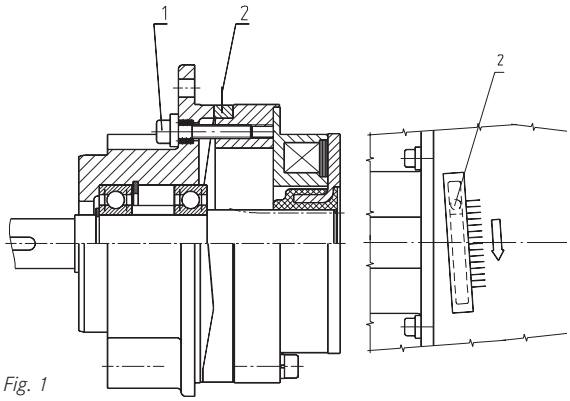


Fig. 1

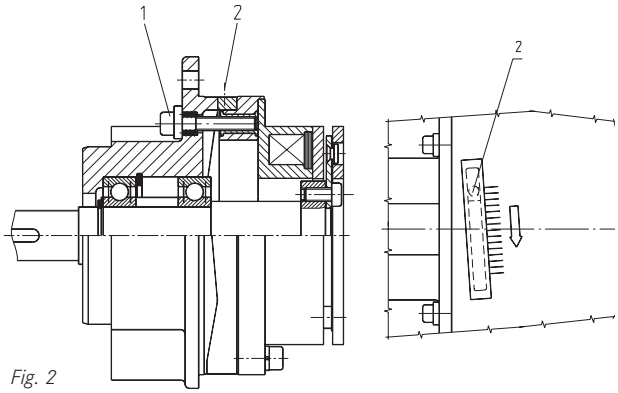


Fig. 2

Output cover with adjusting device and splined armature plate (Fig. 1)
Output cover with adjusting device and backlash-free armature plate (Fig. 2)

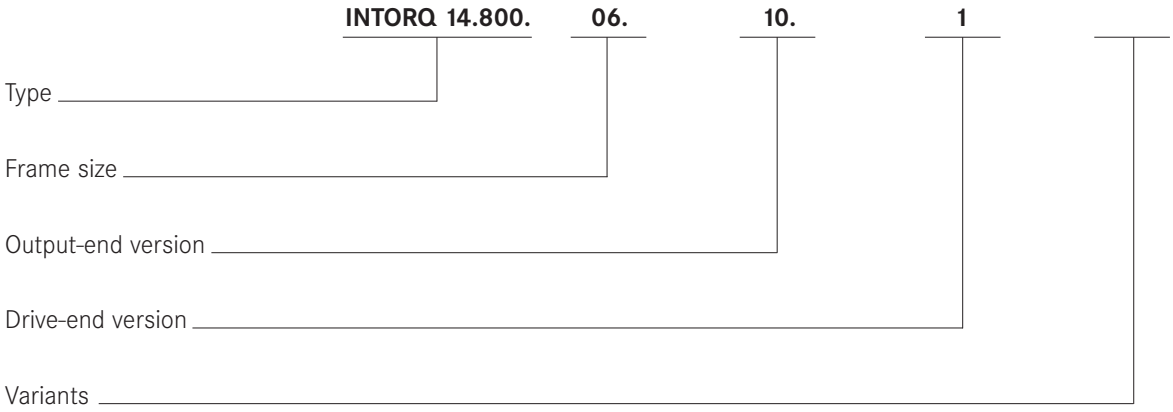
The same air gap adjusting device is provided for each output cover. The sequence of functions is described below.
The description of the patented adjusting device applies to both versions. If required, the air gap can be compensated as follows:

- 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 hole 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 a 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

Type code
INTORQ 14.800 – 14.810



Type

INTORQ 14.800 – clutch-brake combinations without motor

INTORQ 14.810 – clutch-brake combinations with 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
Motor:
Power – voltage
Speed – frequency
Degree of protection
For available motor frame sizes, see page 11.

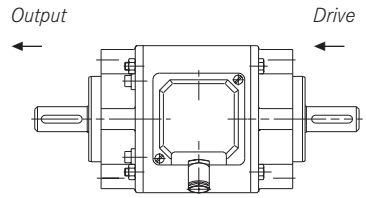
Clutch-brake combinations

Design selection
INTORQ 14.800

	Versions with splined armature plate				Versions with diaphragm armature plate (backlash-free)			
Version	**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 andB14 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 B14 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



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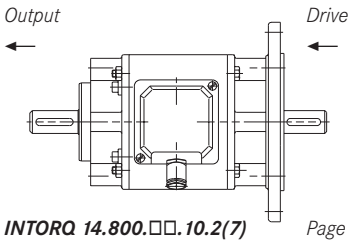
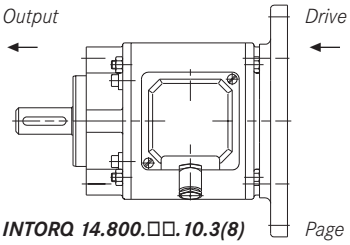


INTORQ 14.800.□□.10.2(7) *Page 18*



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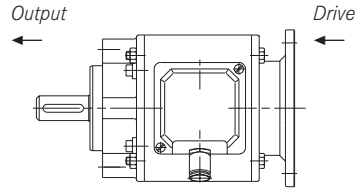

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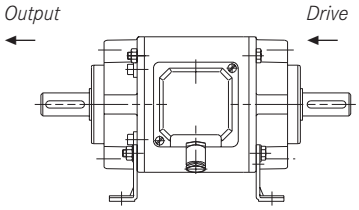

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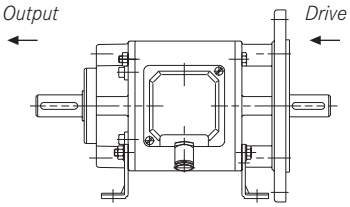

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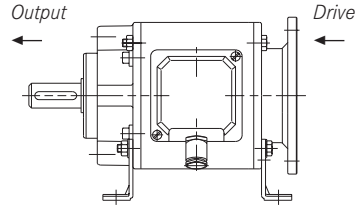

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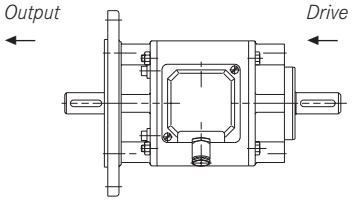

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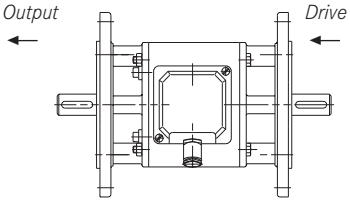

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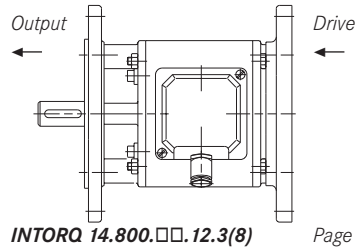

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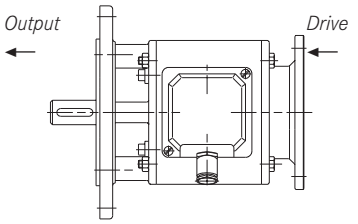

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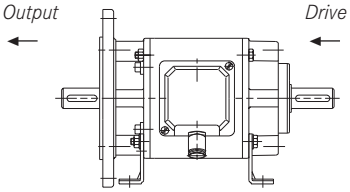

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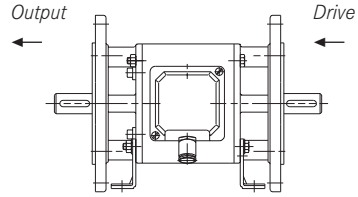

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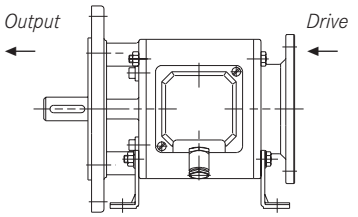

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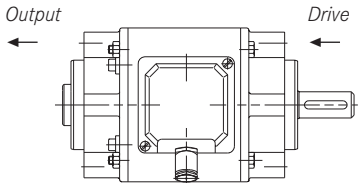

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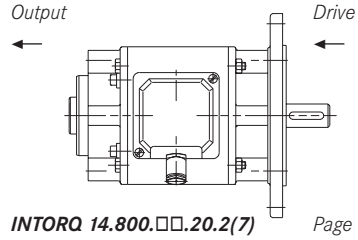

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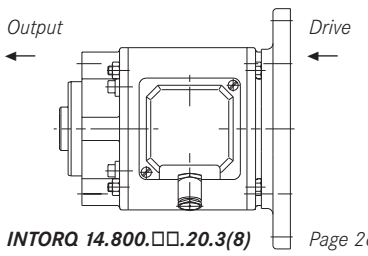

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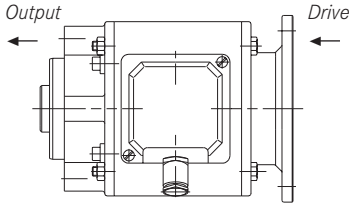
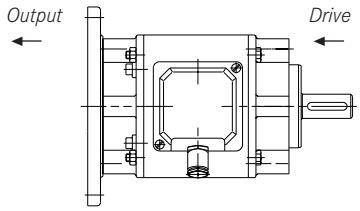


INTORQ 14.800.□□.20.4(9) *Page 28*

Clutch-brake combinations

Overview of types



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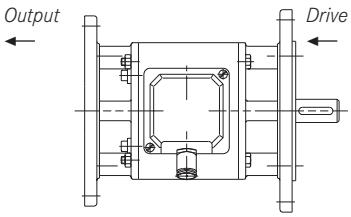

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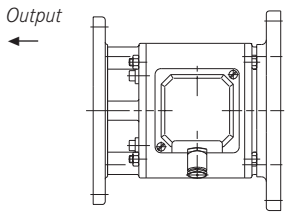

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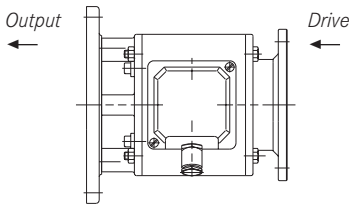

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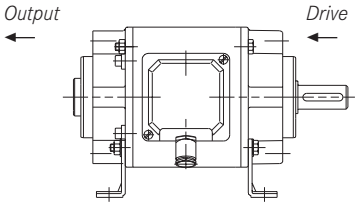

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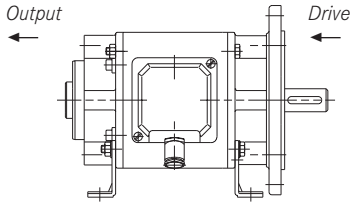

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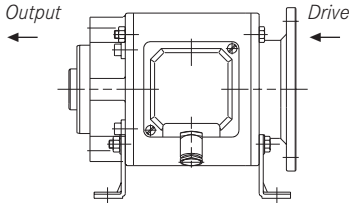

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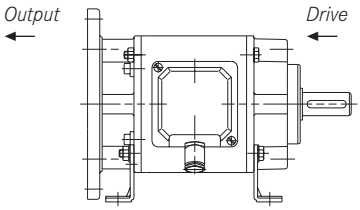

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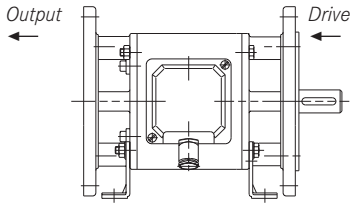

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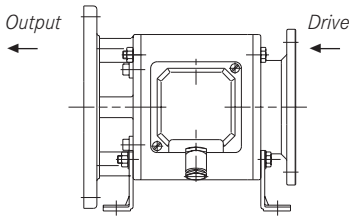

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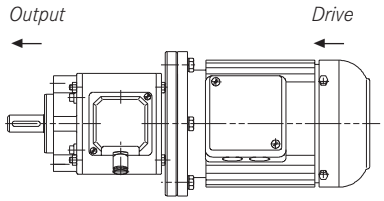

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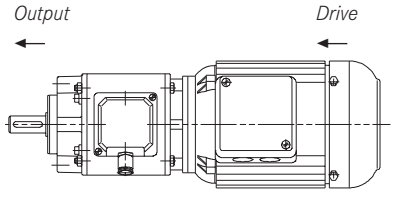

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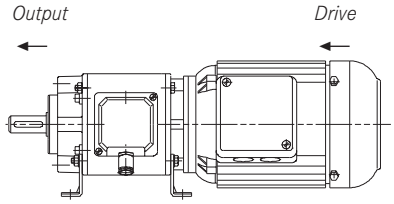

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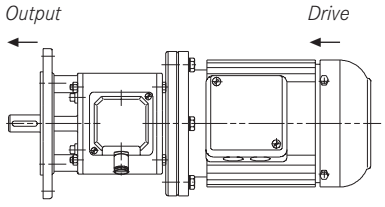

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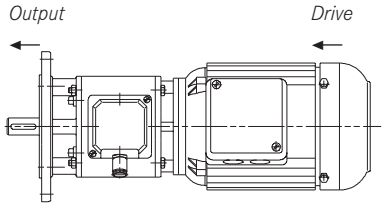
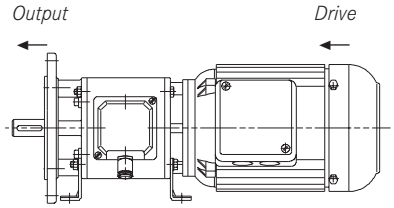


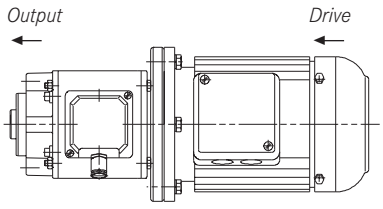
INTORQ 14.810.□□.12.4(9) *Page 22*



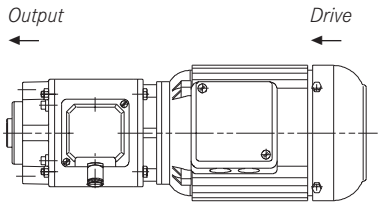
INTORQ 14.810.□□.13.4(9) *Page 22*

Clutch-brake combinations

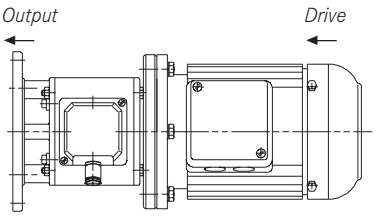
Overview of types



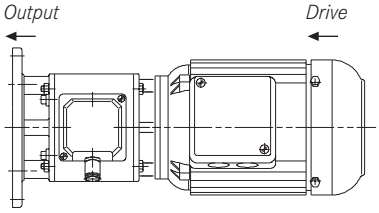
INTORQ 14.810.□□.20.3(8) *Page 26*



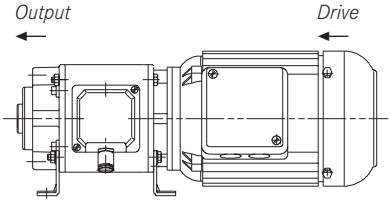
INTORQ 14.810.□□.20.4(9) *Page 28*



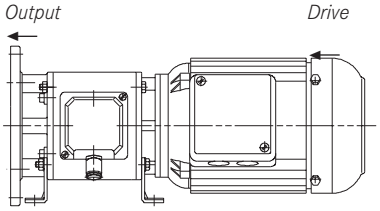
INTORQ 14.810.□□.21.3(8) *Page 26*



INTORQ 14.810.□□.21.4(9) *Page 28*



INTORQ 14.810.□□.22.4(9) *Page 28*



INTORQ 14.810.□□.23.4(9) *Page 28*

The INTORQ 14.810 is supplied complete with a built-on three-phase AC motor but it is not shown in separate dimension drawings. The dimensions of this clutch-brake combination can be found in the 14.800 dimension tables. For example, the dimensions for the 14.810.06.12.4 version should be taken from the 14.800.06.12.4 dimension table on pages 22/23.

The assignment of the available motor frame sizes and designs can be seen in the table below.

INTORQ	Frame size	Motor design	Flange
14.810.06.□□.3(8)	71	B5	160
14.810.06.□□.4(9)	71	B14	C105
14.810.08.□□.3(8)	80	B5	200
14.810.08.□□.4(9)	80	B14	C120
14.810.10.□□.3(8)	90	B5	200
14.810.10.□□.4(9)	90	B14	C140
14.810.12.□□.3(8)	100	B5	250
14.810.12.□□.4(9)	100	B14	C160
14.810.16.□□.3(8)	132	B5	300
14.810.16.□□.4(9)	132	B14	C200

Clutch-brake combinations

Dimensioning

Selecting the frame size

Dimensioning is carried out in accordance with VDI Guideline 2241.
Symbols used in calculations:

M_K	Rated torque of the clutch or brake in Nm
M_{load}	Load torque in Nm
M_a	Acceleration or deceleration torque in Nm
M_{req}	Required torque in Nm
P	Drive power in kW
Δn_o	Initial relative speed of the clutch or brake in rpm
J_{load}	Moment of inertia of all output components reduced to the clutch shaft in kgm^2
t_3	Slipping time in seconds during which there is a relative movement between the drive and output if the clutch or brake is closed
t_{11}	Engagement delay time in seconds, i.e. the time from switching the voltage on to experiencing an increase in torque
t_{12}	Torque rise time in seconds, i.e. the time from the start of the torque increase until rated torque M_K is reached
t_1	Engagement time in seconds, i.e. the sum of $t_{11} + t_{12}$
t_2	Disengagement time in seconds, i.e. the time from switch-off until 10% of characteristic torque M_K is reached
K	Safety factor $\geqq 2$
Q	Calculated switching energy per switching cycle in J
Q_E	Max. permissible switching energy for one switching operation in J, in accordance with the table on page 18
Q_{perm}	Max. permissible switching energy in J
S_h	Operating frequency in rph, i.e. the number of working cycles distributed evenly over the time period
Z_{N_A}	Number of switching operations until readjustment

The required frame 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 housing clutches should be known. Such conditions would include, for example, extraordinary ambient temperatures, extremely high air humidity and dust accumulation.

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

Clutch-brake combinations

Dimensioning

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.

$$K \geqq 2$$

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.

$$M_{req} = M_a \cdot K \leqq M_K$$

$$M_a = \frac{J_{load} \cdot \Delta n_0}{9.55 \cdot \left(t_3 - \frac{t_{12}}{2}\right)}$$

$$M_{req} = \frac{J_{load} \cdot \Delta n_0}{9.55 \cdot \left(t_3 - \frac{t_{12}}{2}\right)} \cdot K$$

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 frame size is usually calculated using the clutch or acceleration process.

$$M_{req.} = (M_a \pm M_{load}) \cdot K \leqq M_K$$

$$M_{req} = \left[\frac{J_{load} \cdot \Delta n_0}{9.55 \cdot \left(t_3 - \frac{t_{12}}{2}\right)} \pm M_{load}\right] \cdot K$$

$+M_{load}$ = engage clutch or accelerate
$-M_{load}$ = brake or decelerate

Estimated required torque or frame size

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

$$M_{req} = 9550 \frac{P}{n} \cdot K \leqq M_K$$

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:

$$t_3 = \frac{J_{load} \cdot \Delta n_0}{9.55 \cdot (M_K \pm M_{load})} + \frac{t_{12}}{2}$$

$-M_{load}$ = engage clutch or accelerate
$+M_{load}$ = brake or decelerate

Clutch-brake combinations

Dimensioning

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.

$$Q = \frac{J_{load} \cdot \Delta n_0^2}{182.5} \cdot \left(\frac{M_K}{M_K - M_{load}} + \frac{M_K}{M_K + M_{load}} \right)$$

Example

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

J_{load} = 0.01 kgm² total
M_{load} = 6 Nm
Δn_o = 700 rpm
t_3 =0.15 s
S_h = 4000 switching operations per hour

$$M_a = \frac{J_{load} \cdot \Delta n_0^2}{9.55 \cdot \left(t_3 - \frac{t_{12}}{2} \right)} = \frac{0.01 \cdot 700}{9.55 \cdot (0.15 - 0.03)}$$

$\frac{t_{12}}{2}$ assuming 0.03 s

$$M_a = 6.1 \text{ Nm} \quad M_{req} = (M_a + M_{load}) \cdot K = (6.1 + 6) \cdot 2 \quad M_{req} = 24.2 \text{ Nm}$$

Selected clutch-brake combination:
INTORQ 14.800.10.11.1
With M_K = 30 Nm
Calculation of the available switching energy per switching cycle:

$$Q = \frac{J_{load} \cdot \Delta n_0^2}{182.5} \cdot \left(\frac{M_K}{M_K - M_{load}} + \frac{M_K}{M_K + M_{load}} \right) \qquad Q = \frac{0.01 \cdot 700^2}{182.5} \cdot \left(\frac{30}{30 - 6} + \frac{30}{30 + 6} \right) \qquad Q = 55.9 \text{ J}$$

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

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

Ordering example

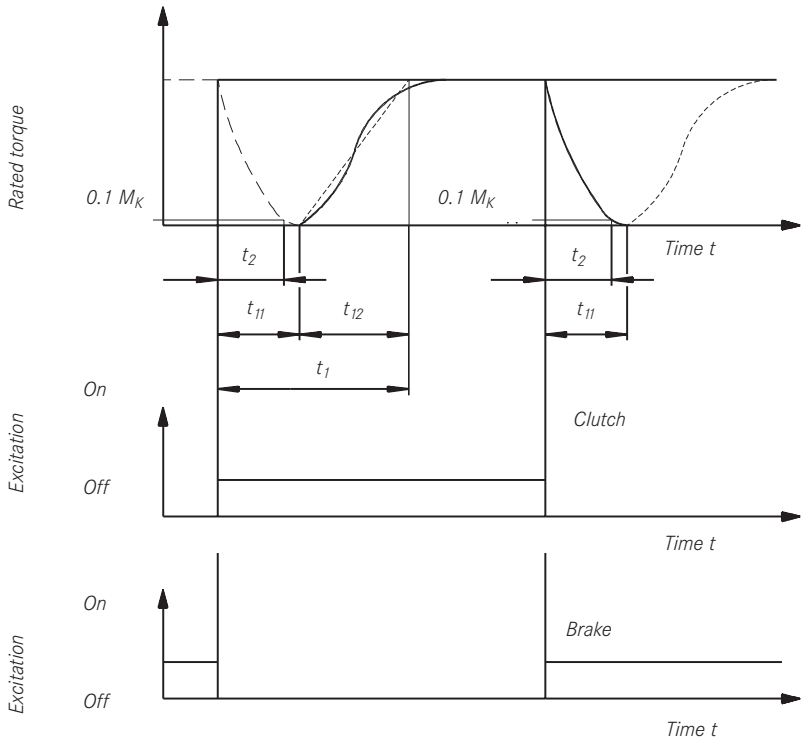
INTORQ 14.800.10.11.1
24 V DC, shaft Ø 19 mm/19 mm

Clutch-brake combinations

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 leakage depends on the rectification type and the air gap S_{air}.



Time concepts when engaging and disengaging
t_{11} = Delay time
t_{12} = Rise time of torque
t_1 = Engagement time
t_2 = Disengagement time:
t_2 brake ≈ t_{11} clutch
t_2 clutch ≈ t_{11} brake

Operating times in milliseconds

Frame size	INTORQ 14.800/810/852 to 867 and 14.137/138				
		E clutch		E brake	
	$t_{11} \approx t_2$	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

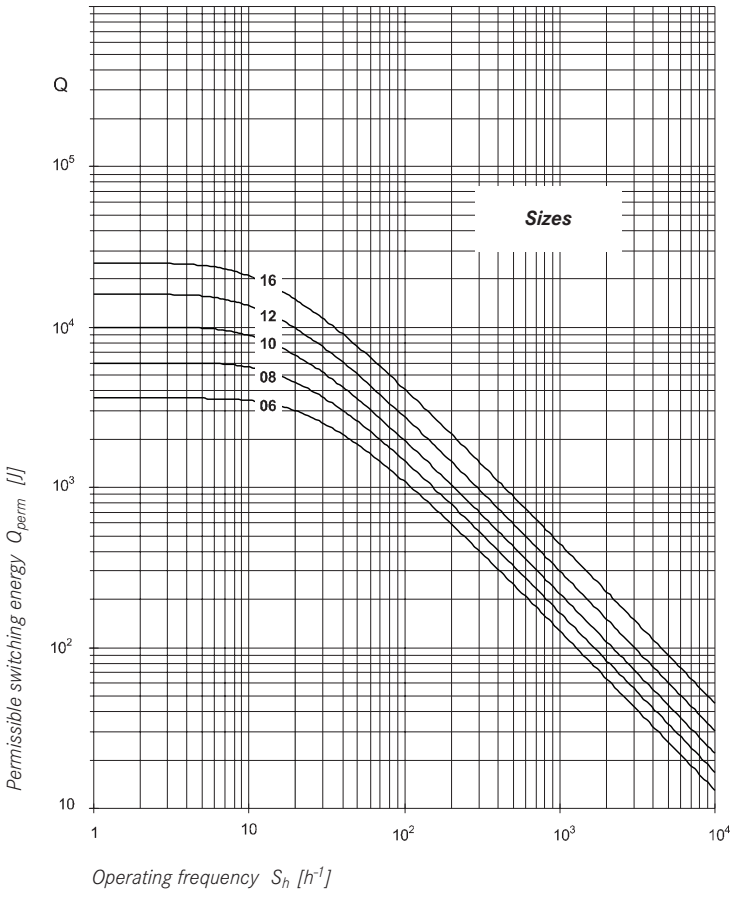
Clutch-brake combinations

Selection table

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

- Standard voltage 24 V DC
- [1] M_K, in relation to = 100 rpm
- [2] At 20 °C

INTORQ 14.800/810/852 ÷ 867 and 14.137/138



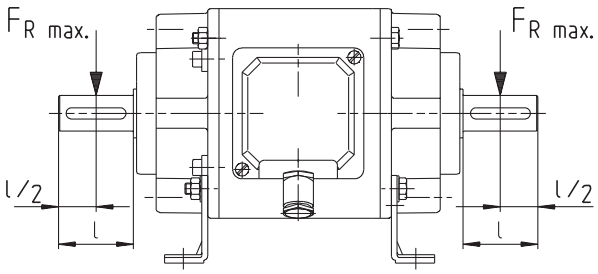
Clutch-brake combinations

Shaft loads

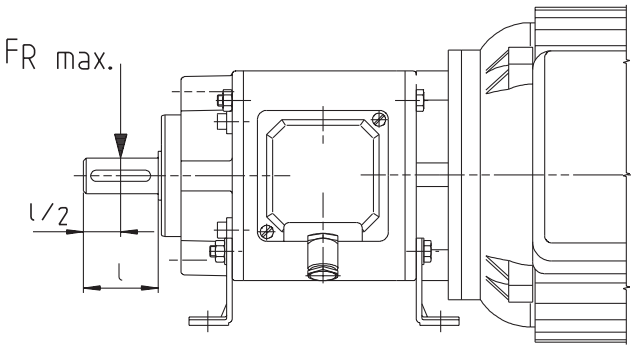
The radial forces specified in the table relate to the centre of the shaft ends. $F_{r\ max}$ is the maximum permissible radial force in relation to the shaft strength.
Force F_{rated} underlies a bearing service life of L_h = 10,000 hours at n = 1500 rpm.

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

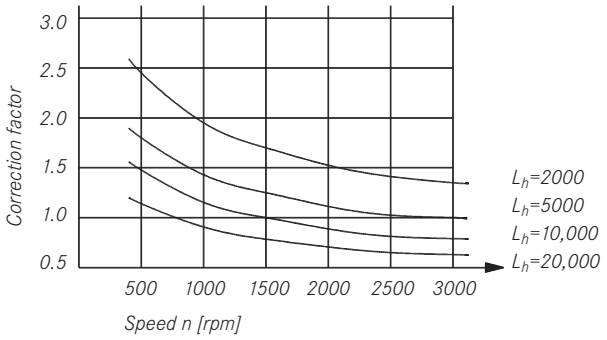
INTORQ 14.800



INTORQ 14.810



Frame size	Force $F_{r\ max.}$ [N]	Force F_{rated} [N]
06	600	325
08	900	425
10	1300	590
12	1900	870
16	2300	1350



$$F = F_{rated} \cdot k \leqq F_{r\ max.}$$

F Permissible radial force in N

$F_{r\ max.}$ Max. permissible radial force in N, in relation to shaft strength

F_{rated} Permissible radial force in N for L_h = 10,000 h and n = 1500 rpm

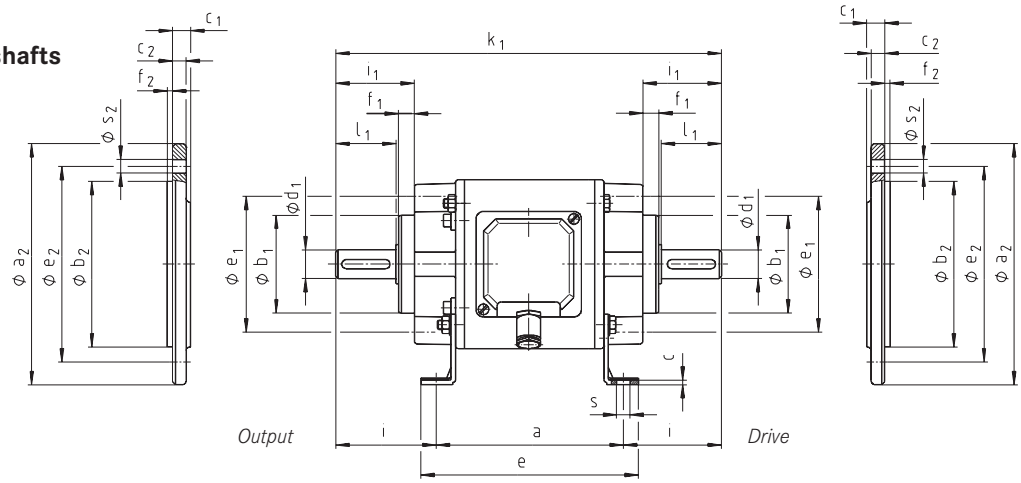
k Correction factor from diagram

Example:
Frame size 08
Speed n = 500 rpm
Service life L_h = 5000 hours
$F = 425 \cdot 1.8 = 765\ N < F_{r\ max.} = 900\ N$

Clutch-brake combinations

Dimensions

Free drive and output shafts



Keyways to DIN 6885/1
Centring to DR DIN 332

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

Frame 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

Frame 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		

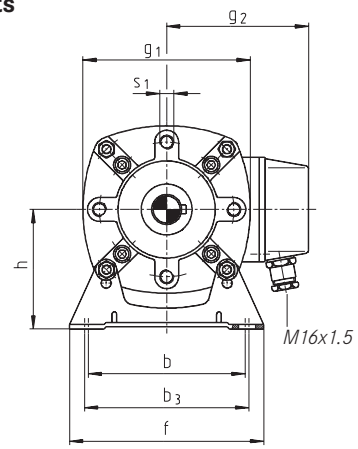
Flange

Frame 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	13.5	1.1
12	200	130	22	15	165	3.5	11	0.8
	250	180			215	4	13.5	1.1
16	250	180	22	15	215	4	13.5	1.3
	300	230			265			2.0

Clutch-brake combinations

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

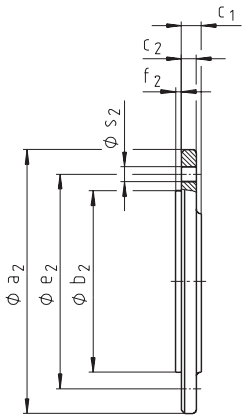
General – Type designation with specification of frame size and rated voltage
Diameters of drive and output shafts

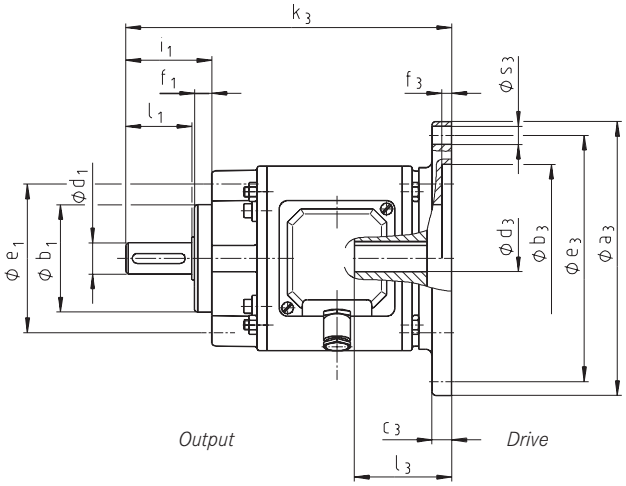
If required – Diameters of drive and output flanges
Foot height
Backlash-free armature plate
[value in brackets in the type designation]

Clutch-brake combinations

Dimensions

Drive, hollow shaft, B5 flange – free output shaft





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

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

Frame size	M_K	Clutch	Brake	a_3	b_1	b_3	c_3	d_1	d_3	e_1	e_3	f_1	f_3	g_1	g_2	i_1	k_3	l_1	l_3	s_1	s_3	g	m
		P_{20}																					
	Nm	W	W		h8	H9		k6	G7														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	9	2.5
				160		110.2		14	14		130					42	153	30			10		
08	15	20	16	160	65	110.2	14	14	14	90	130	10	4	112	95	42	184	30	50	M8	M8	9	4.5
				200		130.2		19	19		165					52	194	40			11.5		
10	30	28	21	200	78	130.2	13	19	19	115	165	19	4	140	110	62	217	40	60	M10	M10	9	7.5
				250		180.2		24	24		215		5			72	227	50			13.5		
12	60	35	28	200	78	130.2	16	24	24	115	165	20	4	167	136	72	251	50	70	M10	M10	11	12
				250		180.2		28	28		215		5			82	261	60			M12		
16	120	50	38	250	98	180.2	20	28	28	145	215	20	5	210	158	82	294	60	80	M12	M12	11	22
				300		230.2		38	38		265					102	314	80					

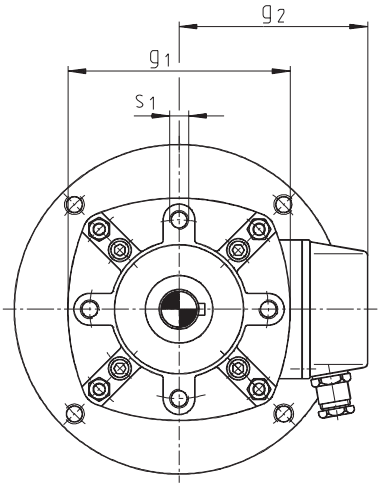
Output flange

Frame 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	13.5	1.1
12	200	130	22	15	165	3.5	11	0.8
	250	180			215	4	13.5	1.1
16	250	180	22	15	215	4	13.5	1.3
	300	230			265			2.0

Clutch-brake combinations

Dimensions

Drive, hollow shaft, B5 flange – free output 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 frame size and rated voltage
Diameter of drive hollow shaft
Diameter of drive flange
Diameter of output shaft

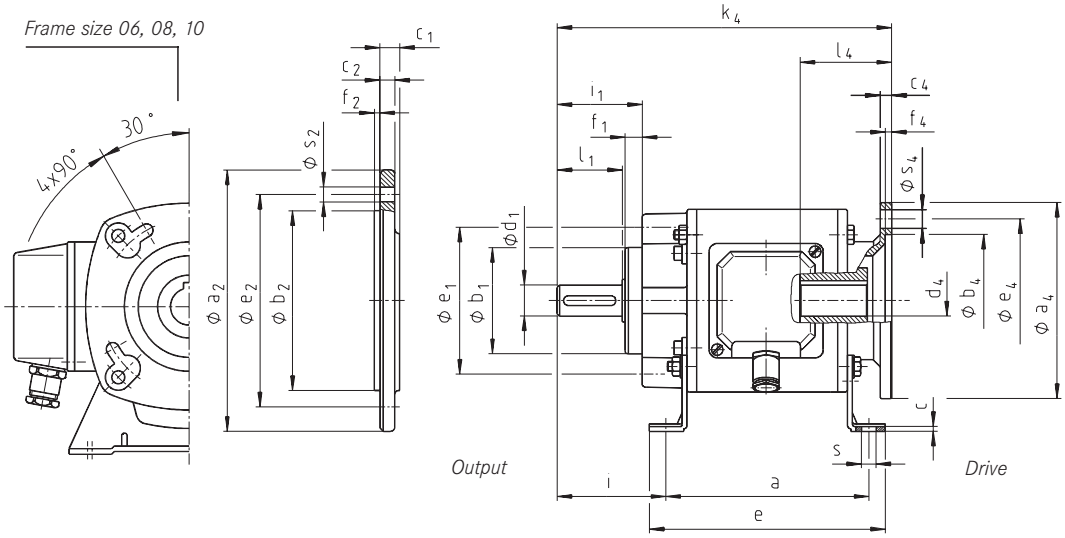
If required – Diameter of output flange
Backlash-free armature plate
[value in brackets in the type designation]

Clutch-brake combinations

Dimensions

Drive, hollow shaft, B14 flange – free output shaft

Frame size 06, 08, 10



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

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

Frame size	M_K	Clutch	Brake	a_4	b_1	b_4	c_4	d_1	d_4	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	g	m
		P_{20}																						
	Nm	W	W		h8	H9		k6	G7															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	9	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	9	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	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	11	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	11	24
								38	38							132	102	329	80					

Feet

Frame 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		

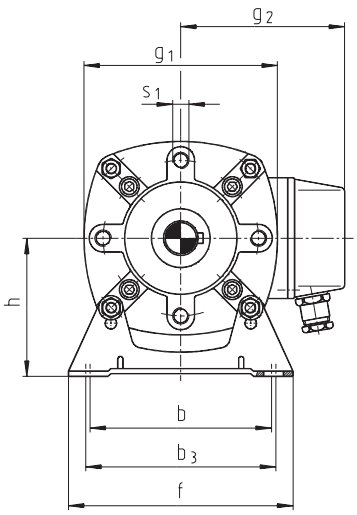
Output flange

Frame 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	13.5	1.1
12	200	130	22	15	165	3.5	11	0.8
	250	180			215	4	13.5	1.1
16	250	180	22	15	215	4	13.5	1.3
	300	230			265			2.0

Clutch-brake combinations

Dimensions

Drive, hollow shaft, B 14 flange – free output 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

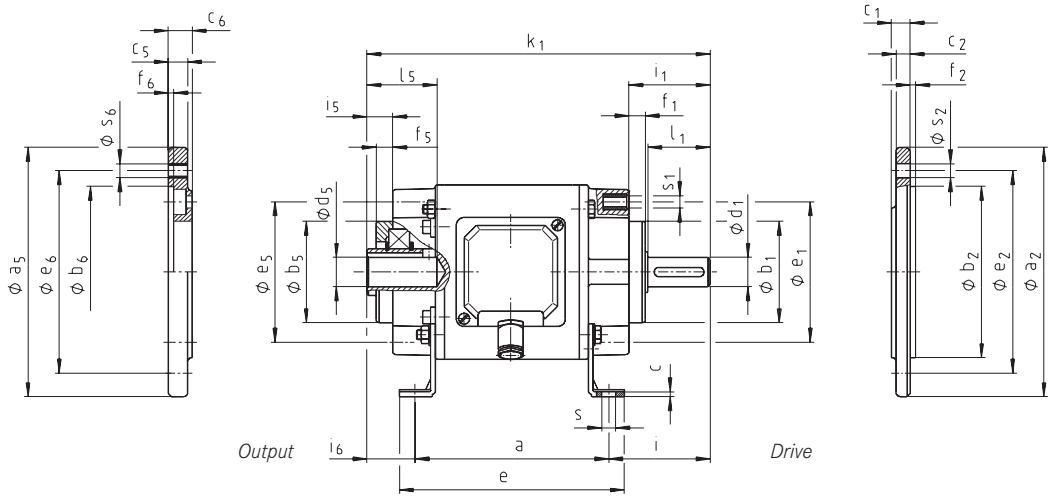
General – Type designation with specification of frame size and rated voltage
Diameter of drive hollow shaft
Diameter of output shaft

If required – Diameter of output flange
Foot height
Backlash-free armature plate
[value in brackets in the type designation]

Clutch-brake combinations

Dimensions

Drive, free shaft – output, hollow shaft



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

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

Frame size	M_K	Clutch	Brake	b_1	b_5	d_1	d_5	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
		P_{20}																				
	Nm	W	W	h8	h8	k6	G7															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			
10	30	28	21	78	86	19	19	115	115	19	17	140	110	80	62	17	237	40	40	M10	M10	8
						24	24							90	72		247	50	50			
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

Frame 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		7	0.2
08	120	105	110	3	140	130	55 65		9	0.3
10	140	130	140	4	165	160	70 80		9	0.4
12	160	150	160	5	184	180	82 92		11	0.7
16	185	185	195	6	215	223	97.5 117.5		13	1.2

Drive flange

Frame size	a_2	b_2 j7	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
10	200 250	130 180	22	15	165 215	3.5 4	11 13.5	0.8 1.1
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

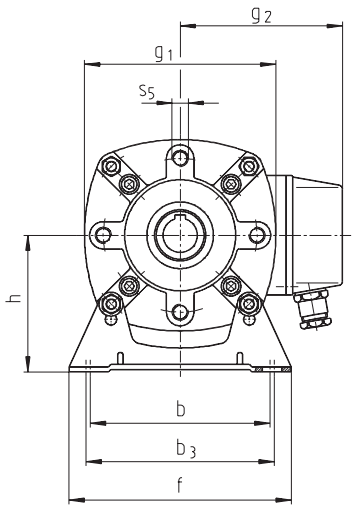
Output flange

Frame size	a_5	b_6 H9	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
10	200 250	130.2 180.2	13	18	165 215	4 5	M10 13.5	0.8 1.1
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

Clutch-brake combinations

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

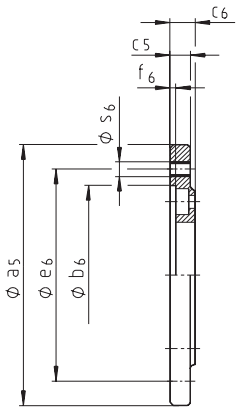
General – Type designation with specification of frame size and rated voltage
Diameters of drive shaft and output hollow shaft

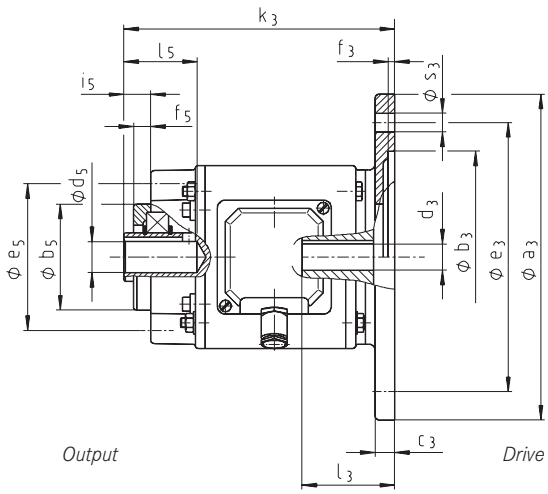
If required – Diameters of drive and output flanges
Foot height
Backlash-free armature plate
[value in brackets in the type designation]

Clutch-brake combinations

Dimensions

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





Keyways to DIN 6885/1JS9

Output *Drive*

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

Frame size	M_K	Clutch	Brake	a_3	b_3	b_5	c_3	d_3	d_5	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
		P_{20}																				
	Nm	W	W		H9	h8		G7	G7													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		
10	30	28	21	200	130.2	86	13	19	19	165	115	4	17	140	110	17	174	60	40	M10	M10	7.5
				250	180.2			24	24	215		5							50	13.5		
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		5							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	M12	22
				300	230.2			38	38	265									80			

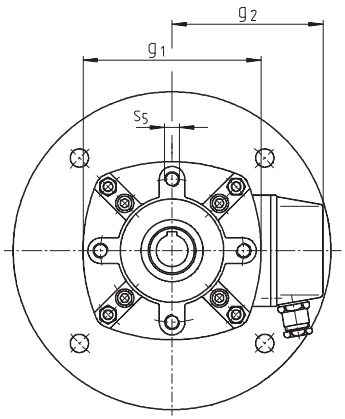
Output flange

Frame size	a_5	b_6 H9	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
10	200 250	130.2 180.2	13	18	165 215	4 5	M10 13.5	0.8 1.1
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

Clutch-brake combinations

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

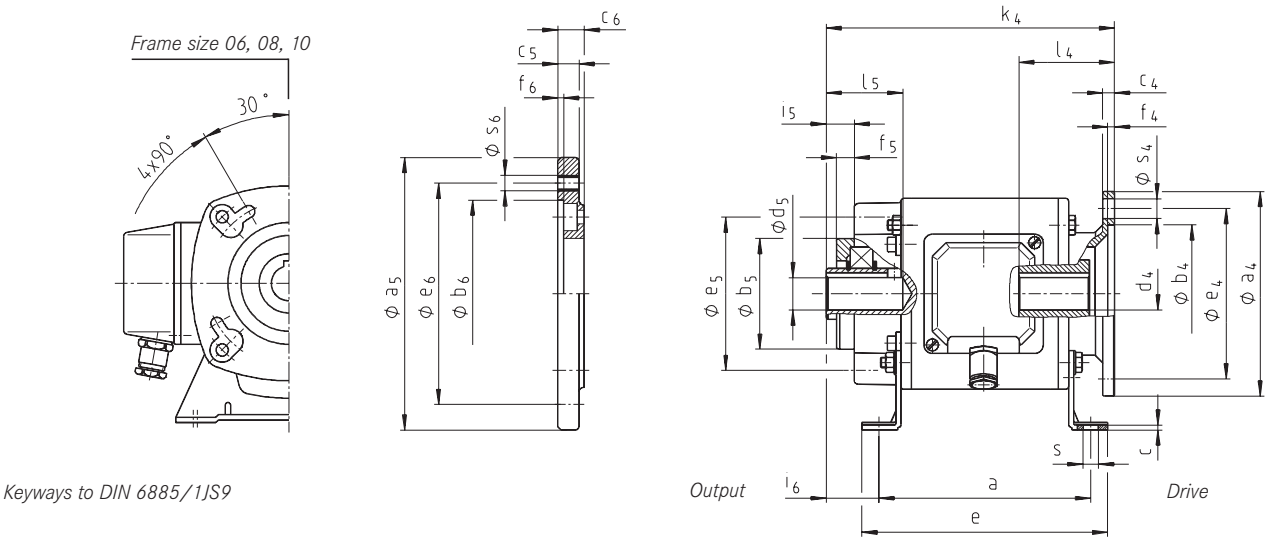
General – Type designation with specification of frame size and rated voltage
Diameter of drive hollow shaft
Diameter of drive flange
Diameter of output hollow shaft

If required – Diameter of output flange
Backlash-free armature plate
[value in brackets in the type designation]

Clutch-brake combinations

Dimensions

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



Keyways to DIN 6885/1JS9

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

Frame size	M_K	Clutch	Brake	a_4	b_4	b_5	c_4	d_4	d_5	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
		P_{20}																					
	Nm	W	W		H9	h8		G7	G7														kg
06	7.5	15	11.5	105	70.5	52	5.5	11 14	11 14	85	67	3	10	90	89	63 71	14	131	50	23 30	7	M6	2.8
08	15	20	16	120	80.2	65	7	14 19	14 19	100	90	4	10	112	95	71 80	17	161	58	30 40	7	M8	4.5
10	30	28	21	140	95.2	86	8	19 24	19 24	115	115	4	17	140	110	80 90	17	182	70	40 50	9	M10	8
12	60	35	28	160	110.2	98	8	24 28	24 28	130	115	4	20	167	136	100 112	20	211	80	50 60	9	M10	13
16	120	50	38	200	130.2	120	10	28 38	28 38	165	145	5	21	210	158	112 132	25.5	253	97	60 80	12	M12	24

Feet

Frame 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
10	140	130	140	4	165	160	27	9	0.4
12	160	150	160	5	184	180	31	11	0.7
16	185	185	195	6	215	223	41.5	13	1.2

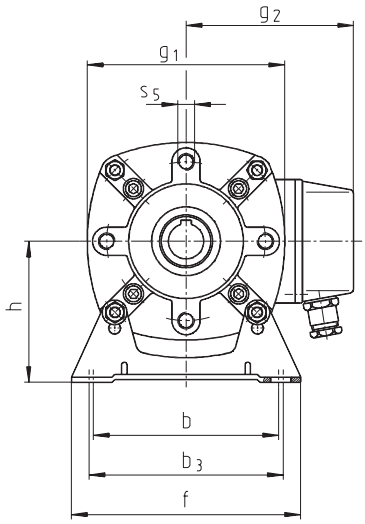
Output flange

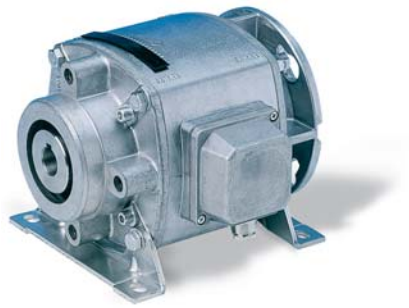
Frame size	a_5	b_6 H9	c_5	c_6	e_6	f_6	s_6	m
								kg
06	140 160	95.2 110.2	13	15	115 130	4	9	0.4 0.5
08	160 200	110.2 130.2	14	18	130 165	4	M8 11.5	0.5 0.7
10	200 250	130.2 180.2	13	18	165 215	4 5	M10 13.5	0.8 1.1
12	200 250	130.2 180.2	16	21	165 215	4 5	M10 M12	0.8 1.1
16	250 300	180.2 230.2	20	27	215 265	5	M12	1.3 2.0

Clutch-brake combinations

Dimensions

Drive, hollow shaft, B 14 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 frame size and rated voltage
Diameter of drive hollow shaft
Diameter of output hollow shaft

If required – Diameter of output flange
Foot height
Backlash-free armature plate
[value in brackets in the type designation]

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 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:

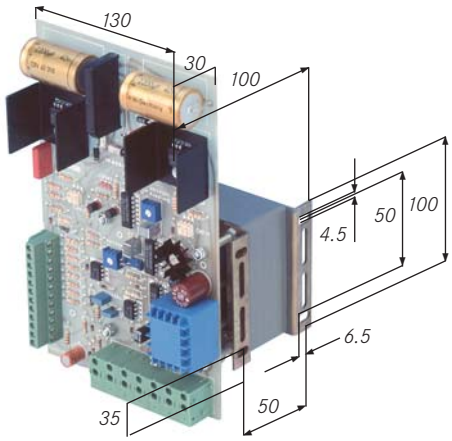
When using spring-applied brakes, the transformer power must be dimensioned for the sum of the clutch and braking powers.

Delay times can be set on two potentiometers to prevent clutches and brakes that do not have a common armature element 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 to35 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 switch
- NPN (PNP) photoelectric barriers

Accessories

INTORQ 14.640.10.048 EDS 48 electronic dual switch

Connection examples

Control via continuous signals

Switching via contact

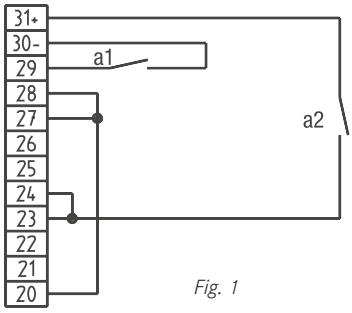


Fig. 1

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

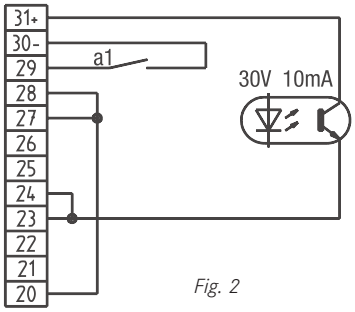


Fig. 2

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

Switching via proximity switch

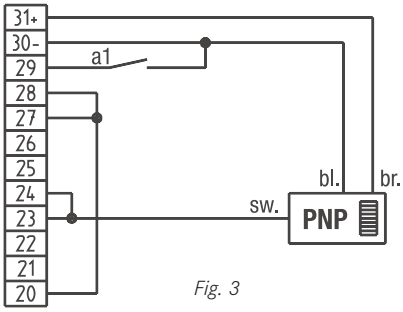


Fig. 3

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

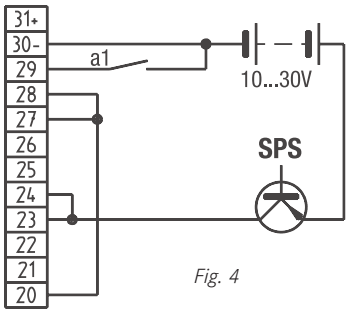


Fig. 4

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

Switching via contacts

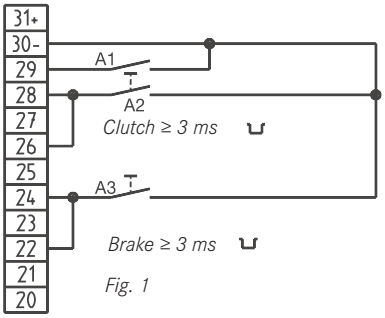


Fig. 1

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”.

Switching via optocoupler

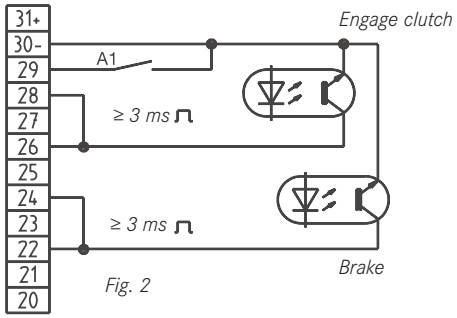


Fig. 2

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

Switching via proximity switch

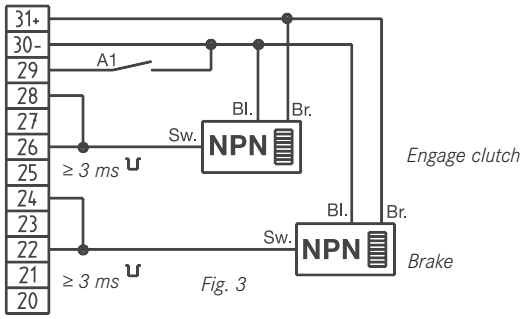


Fig. 3

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

Example of pulse control

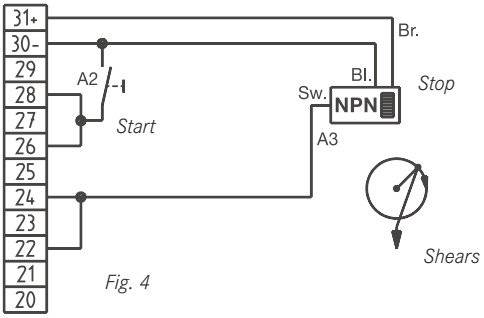


Fig. 4

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.

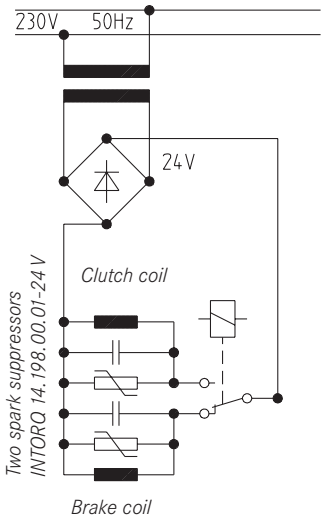
Accessories

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.

E clutch – E brake version



Clutch is energised to engage
Brake is energised to engage

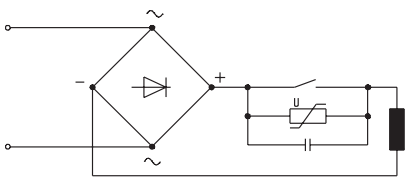
INTORQ 14.198.00.0☐ universal spark suppressor

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.

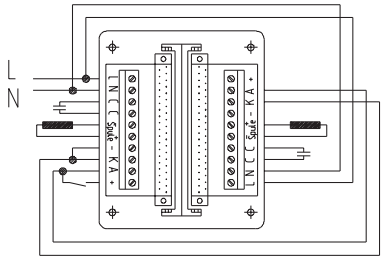
The 24 V coils on the housed clutches can be connected to the DEG device on a 220 V/240 V mains.

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.

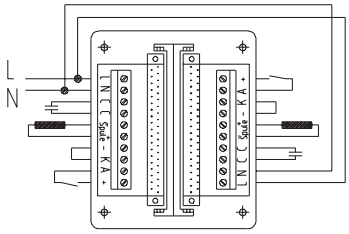
DEG high-speed switchgear is dimensioned as a constant current source. The rated current flows in the solenoids regardless of whether the coil is cold or warm. The torque remains the same whether the operating status is cold or warm.

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

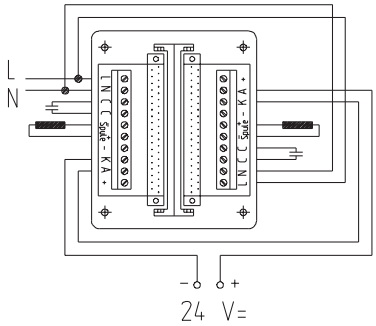
Connection examples



Control with one contact



Control with two contacts



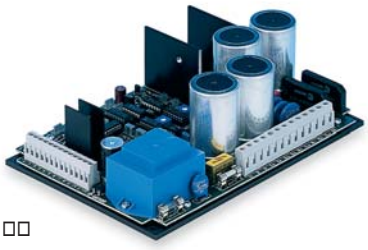
Control with PLC or control voltage

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.□□□

INTORQ – Sales and service around the world

Our customers can reach us at any time from anywhere in the world. We work with Lenze's network of worldwide sales offices and Service Centres.
Our helpline (008000 24 46877) will provide you with expert advice, 24 hours a day, 365 days a year.

Information about our products, catalogues and Operating Instructions can be found at **www.intorq.de**.

Contact Lenze Service Centres and sales partners via the Lenze website at **www.Lenze.com**.

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