

Electromagnetic clutches and brakes
INTORQ 14.105 and INTORQ 14.115

7.5 – 480 Nm



INTORQ

setting the standard



Product information

INTORQ electromagnetic clutches and brakes transmit the drive torque or braking torque by friction in dry running conditions. When the DC voltage is applied, torque transmission is achieved free from torsional backlash. The prestressed annular spring on the armature assembly ensures release without residual torque on de-energisation.

The clutches and brakes can be used in any mounting position and are virtually maintenance-free. Depending on the friction energy used, the working air gap only needs to be checked (and corrected if necessary) at specific time intervals. Special machining of the friction surfaces ensures that the rated torques can be achieved after very few switching operations without a run-in period.

The various types of stator and armature assembly enable optimum adaptation to the prevailing operating conditions.

The catalogue will help you to select and order the electromagnetic brake and/or electromagnetic clutch you need.

This catalogue contains:

Electromagnetic clutches INTORQ 14.105

Electromagnetic brakes INTORQ 14.115,
transmitted torques 7.5 – 480 Nm

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*Electromagnetic clutch
INTORQ 14.105.□□.1.5*



*Electromagnetic brake
INTORQ 14.115.□□.1.2*



*Electromagnetic clutch
INTORQ 14.105.□□.3.1*



*Electromagnetic brake
INTORQ 14.115.□□.1.1*

Product key

INTORQ 14.105 electromagnetic clutches, 7.5 – 480 Nm

INTORQ 14.115 electromagnetic brakes, 7.5 – 480 Nm

	INTORQ 14.1□5.	□□.	□.	□	-	..V, Ø.., Ø..,
Type	_____	_____	_____	_____		_____
Size	_____		_____	_____		_____
Stator type	_____			_____		_____
Armature assembly type	_____					_____
Variants	_____					

Size

06, 08, 10, 12, 16, 20, 25

Stator type

1 – Flange-mounting type
3 – Type with bearings

Armature assembly type

1 – With external flange hub
2 – With internal flange hub (for brakes only)
3 – Without flange hub
5 – With flange hub on bearings (for clutches only)

Variants

Supply voltage
Rotor bore
Armature assembly bore

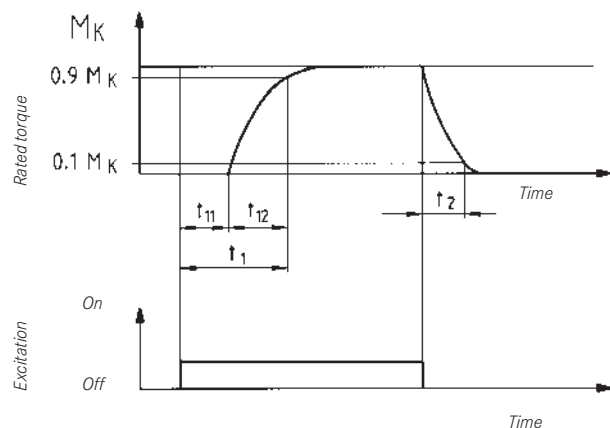
List of abbreviations

M_K	[Nm]	Rated clutch/brake torque
M_{load}	[Nm]	Load torque
M_a	[Nm]	Acceleration/deceleration torque
M_{req}	[Nm]	Required torque
P	[kW]	Drive power
$P_{20^\circ C}$	[W]	Coil power load clutch/brake at 20°C
n	[rpm]	Clutch/brake speed
J	[kg m ²]	Moment of inertia, reduced to clutch shaft/brake shaft
K		Safety factor (≥ 2)
Q	[J]	Switching energy per switching cycle
Q_E	[J]	Permissible switching energy for single switching cycle, see Technical data
Q_{perm}	[J]	Permissible switching energy dependent on S_h
Q_{NA}	[kWh]	Permissible switching energy until readjustment
S_h	[h ⁻¹]	Operating frequency (number of cycles distributed evenly during unit of time)
$S_{hü}$	[h ⁻¹]	Transition operating frequency (characteristic to calculate S_h or Q_{perm} , see Technical data)
S_{NA}		Number of switching operations until readjustment
DIN		Deutsches Institut für Normung (German Institute for Standardisation)
VDE		Verband deutscher Elektrotechniker (Association of German Electrotechnical Engineers)

Operating times

The operating times listed in the Technical data are valid for DC switching with the rated air gap and a warm coil. The times are mean values whose accuracy is dependent on the type of rectification and the air gap $S_{Lü}$, among other things.

t_1	[s]	Engagement time, $t_1 = t_{11} + t_{12}$
t_2	[s]	Disengagement time (time from the beginning of the torque reduction until 0.1 M_K) is reached. Approximately 6 times longer for AC switching than for DC switching.
t_3	[s]	Slipping time (time during which a relative motion occurs between the input and output, with clutch/brake engaged)
t_{11}	[s]	Response delay time (time between the voltage being connected and the torque starting to rise)
t_{12}	[s]	Rise time (time from the beginning of the torque rise until 0.9 M_K is reached)



Product information

Electromagnetic clutches and brakes are used wherever rapid acceleration or deceleration of masses in motion is required.

This document describes powerful and reliable mass-produced products which have already been tried and tested in numerous applications.

A complete range

- 7 sizes
- Clutch/braking torques from 7.5 – 480 Nm

Versatile

- Suitable for any mounting position
- Clutches can be supplied as flange-mounted or shaft-mounted versions
- Various armature assembly types for clutches and brakes can be supplied to suit any application case

Torque transmission

- Friction transmission in dry running
- Immediately ready for operation
- Special machining of the friction surfaces ensures that the rated torques are achieved after very few switching operations without a run-in period, even when the product is new.

Reliable

- The certified ISO 9001 and ISO 14001 quality system provides the basis for consistently high-quality products
- Manufacture and testing to VDE 0580

Low maintenance

- Working air gap only has to be checked in relation to the friction energy used
- Wear adjustment only required at 2.5 times the rated air gap
- Asbestos-free friction linings with a low rate of wear and nitride hardened armature plates ensure a long service life and constant torques

Release without detent torque

- The prestressed annular spring on the armature assembly ensures release without residual torque on de-energisation

Short and consistent operating times

- The prestressed, backlash-free annular spring on the armature assembly enables short and constant operating times to be achieved, even with larger working air gaps

Options

- Special voltages and bores are available on request

Product information

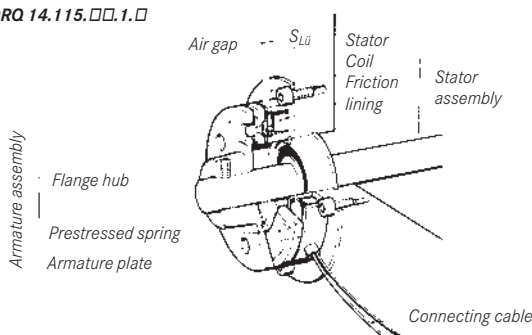
Principle of operation

To generate the drive torque or braking torque, the stator coil is supplied with DC voltage and a magnetic field is generated. The magnetic attraction force pulls the armature plate on the armature assembly against the force of the prestressed spring across the air gap and towards the friction surface of the brake armature or rotor, thereby making torque available.

If the voltage supply is interrupted, the magnetic field will collapse and the prestressed annular spring will pull the armature plate back to its initial position.

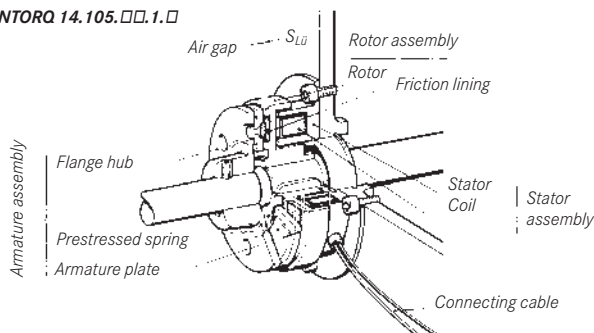
Flange-mounted brakes

INTORQ 14.115.□□.1.□



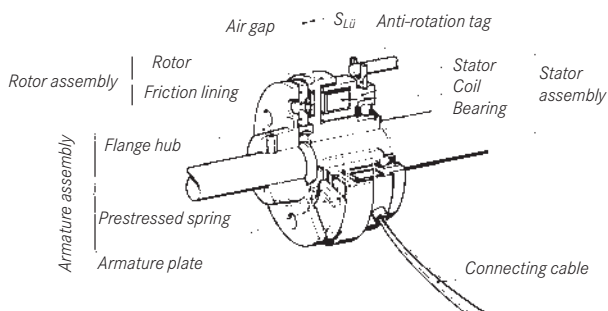
Flange-mounted clutches

INTORQ 14.105.□□.1.□



Shaft-mounted clutches

INTORQ 14.105.□□.3.□



Flange-mounted clutches and brakes

The stator and flange should be mounted centrally on the shaft. Two tolerated diameters are available for this purpose.

The clutch rotor is mounted on the shaft using a keyway connection and secured against axial movement. Mounting dimension "b" under "Dimensions" must be observed exactly.

Shaft-mounted clutches

If a suitable mounting surface for the flange stator is not available, a shaft-mounted clutch should be used. The stator is supported on the rotor. A pin, which engages in the anti-rotation tag with sufficient clearance, simply has to take up the bearing friction.

Torque is transmitted via a keyway connection as on flange-mounted clutches.

Armature assemblies

Type 1, 2 and 5 armature assemblies should be mounted on the shaft and secured against axial movement following precise setting of the working air gap $s_{Lü}$ (see Dimensions). Armature assembly type 3 should be screwed to the element to be decelerated or accelerated (e.g. belt pulley) using the annular spring. See page 22 for the screws and lock washers to be used. Please make sure that the clearing holes for the rivet heads on the armature assembly are sufficiently large, so that the axial movement of the armature assembly is not restricted.

Selection

Dimensioning

Only the power to be transmitted is known (estimate)

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

Dynamic load M_a
(negligible static load torque M_{load})

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

$$M_{\text{req}} = \frac{J \cdot n}{9.55 \cdot \left(t_3 - \frac{t_{12}}{2}\right)} \cdot K \leq M_K$$

Dynamic and static load M_a and M_{load}

$$M_{\text{req}} = (M_a \pm M_{\text{load}}) \cdot K \leq M_K$$

$$M_{\text{req}} \left(\frac{J \cdot n}{9.55 \cdot \left(t_3 - \frac{t_{12}}{2}\right)} \pm M_{\text{load}} \right) \cdot K \leq M_K$$

+ M_{load} = shift/accelerate
- M_{load} = brake/decelerate

Only when lowering a load
- M_{load} = shift/accelerate
+ M_{load} = brake/decelerate

Determining the size by specifying the required torque M_{req}

Parameters included in the calculation are moments of inertia, relative speeds and acceleration or deceleration times.

K is a safety factor to ensure transmission security even in extreme operating conditions.

K is dependent on the prevailing operating conditions.

K is always ≥ 2

Switching energy per switching cycle:

$$Q = \frac{J \cdot n^2}{182.5} \cdot \frac{M_K}{(M_K \pm M_{\text{load}})}$$

$$Q_{\text{perm}} = Q_E \cdot \left(1 - e^{\frac{-S_{h\ddot{u}}}{S_h}}\right)$$

- M_{load} = shift/accelerate
+ M_{load} = brake/decelerate

Only when lowering a load
+ M_{load} = shift/accelerate
- M_{load} = brake/decelerate

$$Q_{\text{perm}} < Q$$

Select a larger size

$$Q_{\text{perm}} \geq Q$$

Permissible operating frequency when switching energy per switching cycle is known

$$S_{\text{hperm}} = \frac{-S_{h\ddot{u}}}{I_n \cdot \left(1 - \frac{Q}{Q_E}\right)}$$

$$S_{\text{hperm}} < S_h$$

Select a larger size

$$S_{\text{hperm}} \geq S_h$$

Number of switching operations until readjustment

$$S_{\text{NA}} = \frac{Q_{\text{NA}} [\text{kWh}] \cdot 3.6 \cdot 10^6}{Q [\text{J}]}$$

Resulting acceleration or deceleration time t_3

$$t_3 = \frac{J \cdot n}{9.55 \cdot (M_K \pm M_{\text{load}})} + \frac{t_{12}}{2}$$

- M_{load} = shift/accelerate
+ M_{load} = brake/decelerate

Only when lowering a load
+ M_{load} = shift/accelerate
- M_{load} = brake/decelerate

Checking the thermal load

The switching energy per switching cycle Q and the operating frequency S_h determine the thermal load of the clutch or brake. The values calculated or plotted on a graph must not exceed the permissible values for the specific sizes.

Parameters Q_E and $S_{h\ddot{u}}$ are indicated in the Technical data (page 10).

Q_{perm} and S_{hperm} can also be taken from the diagram on page 9 for sizes 06 to 25.

Operating data calculation

Q_{NA} is indicated in the Technical data (page 11).

Selection

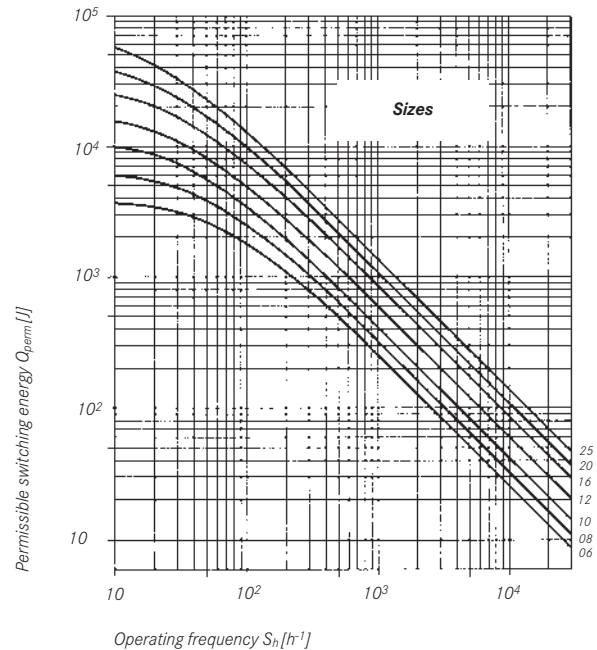
Permissible switching energy/operating frequency

Electromagnetic clutches

INTORQ 14.105 (7.5 – 480 Nm)

Electromagnetic brakes

INTORQ 14.115 (7.5 – 480 Nm)



Calculation example

Default parameters:

$$J = 0.01 \text{ kgm}^2$$

$$M_{load} = 6 \text{ Nm}$$

$$n = 700 \text{ rpm}$$

$$t_3 = 0.15 \text{ s}$$

$$\frac{t_{12}}{2} \text{ assumed to be } 0.03 \text{ s}$$

$$S_h = 5000 \text{ switching operations per hour}$$

Calculation of the switching energy per switching cycle:

$$Q = \frac{J \cdot n^2}{182.5} \cdot \frac{M_K}{M_K - M_{load}}$$

$$Q = \frac{0.01 \cdot 700^2}{182.5} \cdot \frac{30}{30 - 6}$$

$$Q = 33.6 \text{ J}$$

Calculation of the required torque:

$$M_a = \frac{J \cdot n}{9.55 \cdot \left(t_3 - \frac{t_{12}}{2}\right)} = \frac{0.01 \cdot 700}{9.55 \cdot (0.15 - 0.03)}$$

$$M_a = 6.1 \text{ Nm}$$

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

$$M_{req} = 24.2 \text{ Nm}$$

Electromagnetic clutch selected:

INTORQ 14.105.10.1.1 with

$$M_K = 30 \text{ Nm}$$

Check of the permissible operating frequency:

See the diagram (above) for S_{hperm} depending on the calculated switching energy.

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

Result:

The selected electromagnetic clutch (INTORQ 14.105.10.1.1, $M_K = 30 \text{ Nm}$) can be used for this application.

Technical data

Selection table

Electromagnetic clutches INTORQ 14.105.□□.□.□

Size	M _K ¹⁾	n _{max}	P ₂₀ °C	Operating times ²⁾				Q _E	Q _{NA}	S _{hü}	J [10 ⁻⁵ kgm ²]				
	[Nm]	[rpm]	[W]	[ms]				[J]	[kWh]	[h ⁻¹]	Rotor, types		Armature assembly, types		
				t ₁₁	t ₁₂	t ₁	t ₂				1	3	1/2	3	5
06	7.5	8000	15	15	30	45	10	3.6 × 10 ³	10	72	11.9	13.3	6	4.2	9.2
08	15	6000	20	20	55	75	15	6 × 10 ³	16.6	56	26.5	29.4	17.1	11.8	28.2
10	30	5000	28	25	85	110	25	10 × 10 ³	34.7	43	78	86.6	66.4	47.2	92
12	60	4000	35	35	105	140	40	16 × 10 ³	69.5	37	226	246	180	130	258
16	120	3000	50	45	125	170	50	25 × 10 ³	130.5	36	630	690	633.3	480	868
20	240	3000	68	60	140	200	60	40 × 10 ³	277.7	28	2050	2150	1900	1370	2580
25	480	2000	85	75	155	230	70	65 × 10 ³	555.5	22	5470	5660	4800	3580	7200

Electromagnetic brakes INTORQ 14.115.□□.□.□

Size	M _K ¹⁾	n _{max}	P ₂₀ °C	Operating times 2)				Q _E	Q _{NA}	S _{hü}	J [10 ⁻⁵ kgm ²]	
	[Nm]	[rpm]	[W]	[ms]				[J]	[kWh]	[h ⁻¹]	Armature assembly, types	
				t ₁₁	t ₁₂	t ₁	t ₂				1/2	3
06	7.5	8000	11.5	10	20	35	10	3.6 x 10 ³	10	72	6	4.2
08	15	6000	16	15	25	40	20	6 x 10 ³	16.6	56	17.1	11.8
10	30	5000	21	20	40	60	30	10 x 10 ³	34.7	43	66.4	47.2
12	60	4000	28	25	55	80	45	16 x 10 ³	69.5	37	180	130
16	120	3000	38	30	70	100	60	25 x 10 ³	130.5	36	633.3	480
20	240	3000	45	35	80	115	70	40 x 10 ³	277.7	28	1900	1370
25	480	2000	70	40	90	130	80	65 x 10 ³	555.5	22	4800	3580

■ ¹⁾ In relation to relative speed $n = 100$ rpm

■ ²⁾ Mean values for DC switching with rated air gap and warm coil.

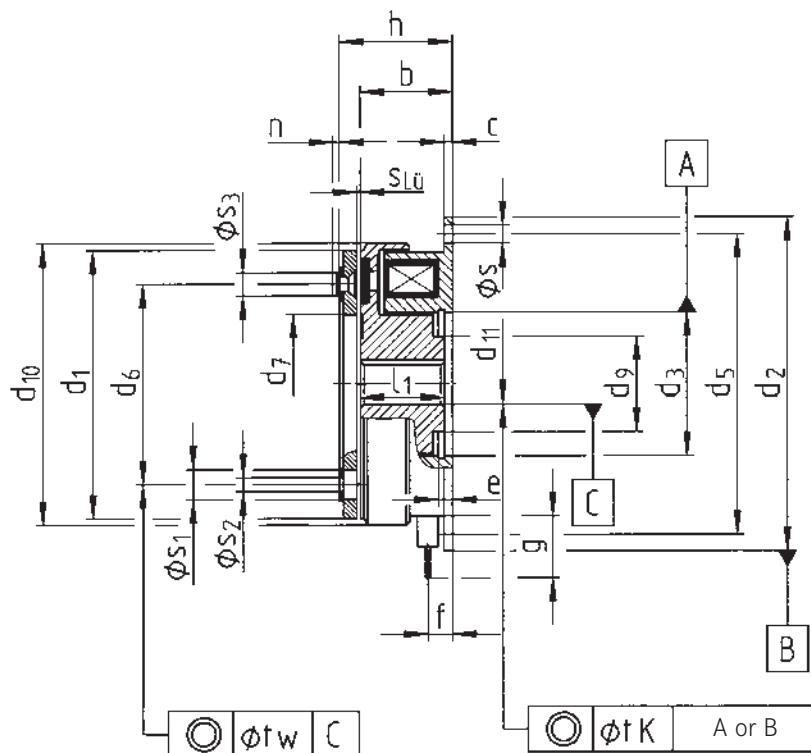
■ Standard voltage 24 V +5%/-10% to VDE 0580

■ Temperature class B (130°C)

Technical data

Flange-mounted clutches

INTORQ 14.105.□□.1.3



Size	M [Nm]	b	c	d ₁ h8	d ₂ h9	d ₃ H8	d ₅	d ₆	d ₇	d ₉	d ₁₀	d ₁₁ H7 min.	d ₁₁ H7 max.
06	7.5	24	2	63	80	35	72	46	34.5	23	68	10	10;12;14;15;17
08	15	26.5	2.5	80	100	42	90	60	41.7	28.5	85.5	12	12;14;15;17;19;20;25
10	30	30	3	100	125	52	112	76	51.5	40	107	15	15;19;20;24;25;28;30
12	60	33.5	3.5	125	150	62	137	95	61.5	45	134.3	20	20;24;25;28;30;35
16	120	37.5	4	160	190	80	175	120	79.5	62	170	25	25;28;30;35;38;40;45
20	240	44	5	200	230	100	215	158	99.5	77	214.3	25	5;38;40;42;45;50;55;60
25	480	51	6	250	290	125	270	210	124.5	100	266.5	30	40;45;50;55;60;65;70

Size	e	f	g	h	l1	n	s	s ₁	s ₂	s ₃	s _{Lü}	t _k	t _w	m [kg]
06	3.5	5.5	400	28	22	1.4	4 x 4.5	3 x 6.3	3 x 3.1	3 x 5.5	0.2	0.2	0.1	0.49
08	4.3	6.5	400	31	24	1.7	4 x 5.5	3 x 8	3 x 4.1	3 x 7	0.2	0.3	0.1	0.88
10	5	6.5	400	35.9	27	2.1	4 x 6.6	3 x 10.5	3 x 5.15	3 x 9	0.2	0.3	0.1	1.68
12	5.5	7.1	400	40.5	30	2.5	4 x 6.6	3 x 12	3 x 6.1	3 x 10	0.3	0.3	0.1	2.95
16	6	8.6	400	46.5	34	3	4 x 9	3 x 15	3 x 8.2	3 x 13	0.3	0.4	0.2	5.49
20	7	12.4	400	55.4	40	4	4 x 9	3 x 18	3 x 10.2	3 x 16	0.5	0.4	0.2	10.2
25	8	14.9	400	63.9	47	4.3	4 x 11	4 x 22	4 x 12.2	4 x 20	0.5	0.5	0.2	18.7

■ Dimensions in mm

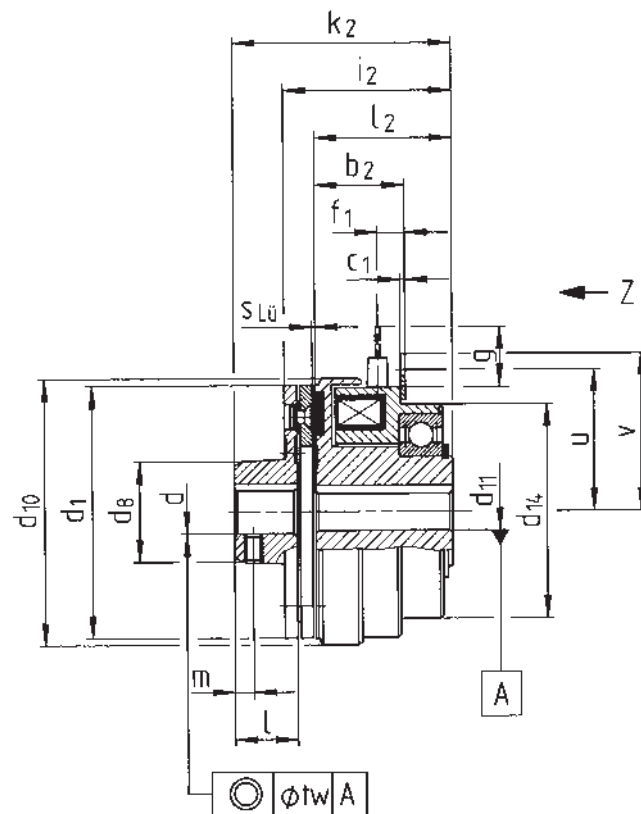
■ Keyway to DIN 6885/1-P9

■ Recommended ISO tolerances for shafts: Up to Ø 50 mm: k₆
Above Ø 50 mm: m₆

Technical data

INTORQ

Shaft-mounted clutches INTORQ 14.105.□□.3.1



Size	M	b ₂	c ₁	d H7	d H7	d ₁	d ₈	d ₁₀	d ₁₁ H7	d ₁₁ H7	d ₁₄	f ₁	g		
	[Nm]			min.	max.	h8			min.	max.					
06	7.5	26	1.5	10	10;12;14;15;17	17	63	27	68	10	10;12;14;15;17	20	64	7.7	400
08	15	28	1.5	10	12;14;15;17;19;20	20	80	32	85.5	12	12;14;15;17;19;20;25	25	68	8.2	400
10	30	32.5	2.5	14	15;19;20;24;25;28;30	30	100	42.5	107	15	15;19;20;24;25;28;30	30	85	9.2	400
12	60	36	2.5	14	20;24;25;28;30;35	35	125	52	134.3	20	20;24;25;28;30;35	40	100	9.8	400
16	120	41.7	3.5	20	25;28;30;35;38;40;45	45	160	73	170	25	25;28;30;35;38;40;50	50	127	15.2	400
20	240	48.1	3.5	25	35;38;40;42;45;50;55;60	60	200	87	214.3	25	35;38;40;42;45;50;55;60	60	152.4	16.5	400
25	480	55.2	3.5	25	40;45;50;55;60;65;70	80	250	110	266.5	30	40;45;50;55;60	70	152.4	19.2	400

Size	i ₂	k ₂	l	l ₂	m	sLü	t _w	u	v	x	y	m [kg]
06	47.5	59	15	40	5	0.2	0.1	36	41	10	4.1	0.83
08	52	68	20	43.5	6	0.2	0.1	45	50	10	4.1	1.28
10	60	80	25	49	6	0.2	0.1	56	60	10	4.1	2.4
12	68	92	30	55	10	0.3	0.1	68.5	72.5	10	4.1	4.15
16	77.5	108.5	38	61.5	10	0.3	0.2	87.5	93.5	20	8.1	7.3
20	93.4	132.4	48	73	15	0.5	0.2	107.5	113.5	20	8.1	14.5
25	103.9	147.9	55	80	20	0.5	0.2	135	141	20	8.1	22.9

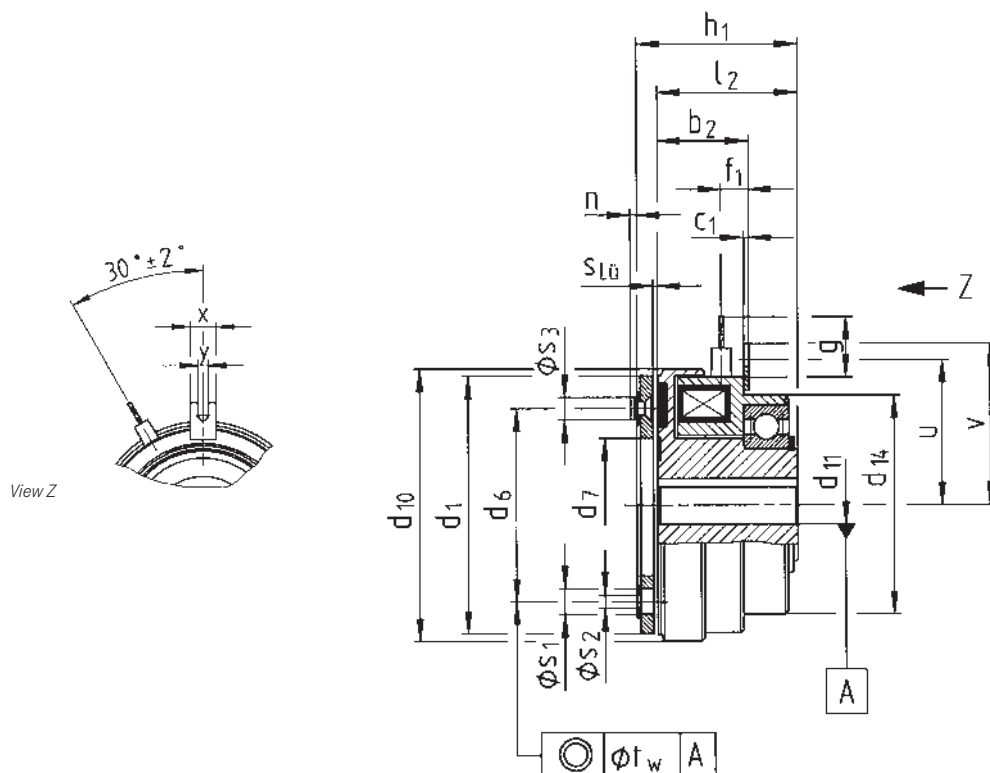
■ Dimensions in mm
■ Keyway to DIN 6885/1-P9

■ Recommended ISO tolerances for shafts: Up to Ø 50 mm: k₆
Above Ø 50 mm: m₆

Technical data

Shaft-mounted clutches

INTORQ 14.105.□□.3.3



Size	M	b2	c1	d ₁	d ₆	d ₇	d ₁₀	d ₁₁ H7	d ₁₁ H7		d ₁₄	f ₁	g
	[Nm]			h8				min.		max.			
06	7.5	26	1.5	63	46	34.5	68	10	10;12;14;15;17	20	64	7.7	400
08	15	28	1.5	80	60	41.7	85.5	12	12;14;15;17;19;20;25	25	68	8.2	400
10	30	32.5	2.5	100	76	51.5	107	15	15;19;20;24;25;28;30	30	85	9.2	400
12	60	36	2.5	125	95	61.5	134.3	20	20;24;25;28;30;35	40	100	9.8	400
16	120	41.7	3.5	160	120	79.5	170	25	25;28;30;35;38;40;50	50	127	15.2	400
20	240	48.1	3.5	200	158	99.5	214.3	25	35;38;40;42;45;50;55;60	60	152.4	16.5	400
25	480	55.2	3.5	250	210	124.5	266.5	30	40;45;50;55;60	70	152.4	19.2	400

Size	h1	l2	n	s1	s2	s3	sLü	tw	u	v	x	y	m [kg]
06	44	40	1.4	3 x 6.3	3 x 3.1	3 x 5.5	0.2	0.1	36	41	10	4.1	0.79
08	48	43.5	1.7	3 x 8	3 x 4.1	3 x 7	0.2	0.1	45	50	10	4.1	1.2
10	54.9	49	2.1	3 x 10.5	3 x 5.15	3 x 9	0.2	0.1	56	60	10	4.1	2.24
12	62	55	2.5	3 x 12	3 x 6.1	3 x 10	0.3	0.1	68.5	72.5	10	4.1	3.86
16	70.5	61.5	3	3 x 15	3 x 8.2	3 x 13	0.3	0.2	87.5	93.5	20	8.1	7
20	84.4	73	4	3 x 18	3 x 10.2	3 x 16	0.5	0.2	107.5	113.5	20	8.1	13.3
25	92.9	80	4.3	4 x 22	4 x 12.2	4 x 20	0.5	0.2	135	141	20	8.1	21.2

■ Dimensions in mm

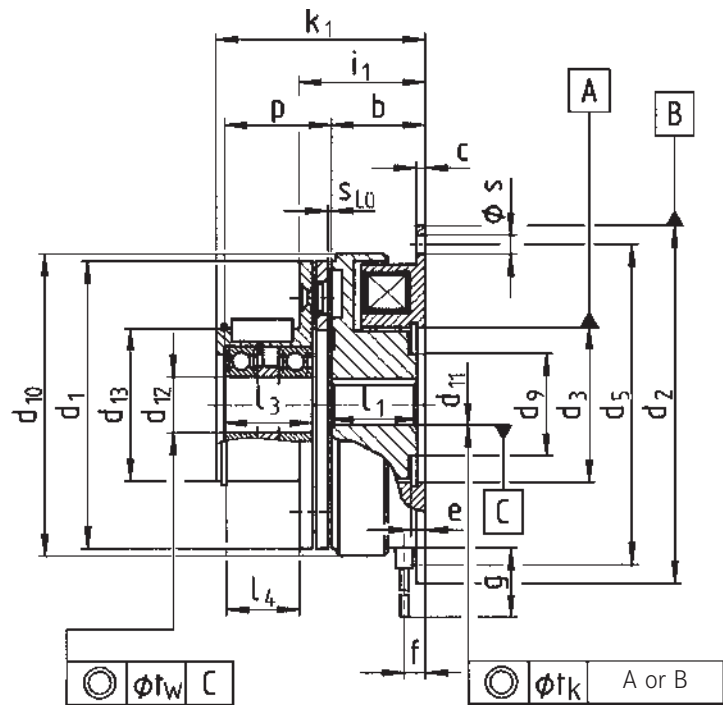
■ Keyway to DIN 6885/1-P9

■ Recommended ISO tolerances for shafts: Up to Ø 50 mm: k₆
Above Ø 50 mm: m₆

Technical data

INTORQ

Flange-mounted clutches with flange hub
on bearings INTORQ 14.105.□□.1.5



Size	M [Nm]	b	c	d ₁ h8	d ₂ h9	d ₃ H8	d ₅	d ₉	d ₁₀	d ₁₁ H7 min.	d ₁₁ H7, type 1.5 max.	d ₁₂
06	7.5	24	2	63	80	35	72	23	68	10	10;12;14;15;17	20
08	15	26.5	2.5	80	100	42	90	28.5	85.5	12	12;14;15;17;19;20;25	25
10	30	30	3	100	125	52	112	40	107	15	15;19;20;24;25;28;30	30
12	60	33.5	3.5	125	150	62	137	45	134.3	20	20;24;25;28;30;35	40
16	120	37.5	4	160	190	80	175	62	170	25	25;28;30;35;38;40;50	50
20	240	44	5	200	230	100	215	77	214.3	25	35;38;40;42;45;50;55;60	60
25	480	51	6	250	290	125	270	100	266.5	30	40;45;50;55;60;65;70	70

Size	d ₁₃ k6	e	f	g	i ₁	k ₁	l ₁	l ₃	l ₄	p	s	s _{L0}	t _k	t _w	m [kg]
06	38	3.5	5.5	400	31	51	22	18	17	22	4 x 4.5	0.2	0.2	0.1	0.69
08	45	4.3	6.5	400	35	60	24	25	22	30.5	4 x 5.5	0.2	0.3	0.1	1.24
10	55	5	6.5	400	40.9	70.9	27	31.5	26.5	37.9	4 x 6.6	0.2	0.3	0.1	2.29
12	64	5.5	7.1	400	46.5	86.5	30	43	36.5	50	4 x 6.6	0.3	0.3	0.1	3.99
16	75	6	8.6	400	53.5	103.5	34	54	44.5	63	4 x 9	0.3	0.4	0.2	7.29
20	90	7	12.4	400	65.4	125.4	40	64	53.5	78.4	4 x 9	0.5	0.4	0.2	13.9
25	115	8	14.9	400	74.9	144.9	47	76	64	88.9	4 x 11	0.5	0.5	0.2	25.3

■ Dimensions in mm

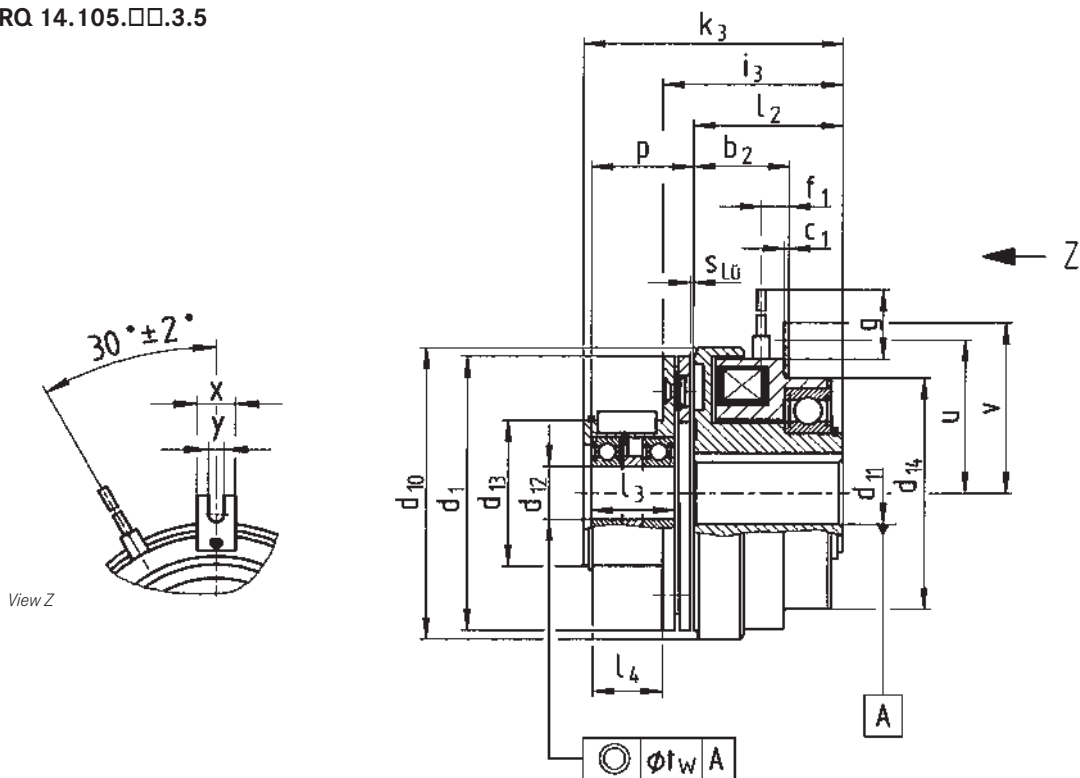
■ Rotor assembly: Keyway to DIN 6885/1-P9

■ Armature assembly: Keyway to DIN 6885/3-P9

■ Recommended ISO tolerances for shafts: Up to Ø 50 mm: k₆
Above Ø 50 mm: m₆

Technical data

Shaft-mounted clutches with flange hub
on bearings INTORQ 14.105.□□.3.5



Size	M [Nm]	b ₂	c ₁	d ₁ h8	d ₁₀	d ₁₁ H7 min.	d ₁₁ H7, type 3.5 max.	d ₁₂
06	7.5	26	1.5	63	68	10	10;12;14;15;17	12
08	15	28	1.5	80	85.5	12	12;14;15;17;19;20;25	15
10	30	32.5	2.5	100	107	15	15;19;20;24;25;28;30	20
12	60	36	2.5	125	134.3	20	20;24;25;28;30;35	25
16	120	41.7	3.5	160	170	25	25;28;30;35;38;40;50	30
20	240	48.1	3.5	200	214.3	25	35;38;40;42;45;50;55;60	40
25	480	55.2	3.5	250	266.5	30	40;45;50;55;60;65;70	45

Size	d ₁₃ k6	d ₁₄	f ₁	g	i ₃	k ₃	l ₂	l ₃	l ₄	p	s _{Lü}	t _w	u	v	x	y	m [kg]
06	38	64	7.7	400	47	67	40	18	17	22	0.2	0.1	36	41	10	4.1	0.99
08	45	68	8.2	400	52	77	43.5	25	22	30.5	0.2	0.1	45	50	10	4.1	1.56
10	55	85	9.2	400	60	90	49	31.5	26.5	37.9	0.2	0.1	56	60	10	4.1	2.85
12	64	100	9.8	400	68	108	55	43	36.5	50	0.3	0.1	68.5	72.5	10	4.1	3.9
16	75	127	15.2	400	77.5	127.5	61.5	54	44.5	63	0.3	0.2	87.5	93.5	20	8.1	8.8
20	90	152.4	16.5	400	94.4	154.4	73	64	53.5	78.4	0.5	0.2	107.5	113.5	20	8.1	17
25	115	152.4	19.2	400	103.9	173.9	80	76	64	88.9	0.5	0.2	135	141	20	8.1	27.8

■ Dimensions in mm

■ Rotor assembly: Keyway to DIN 6885/1-P9

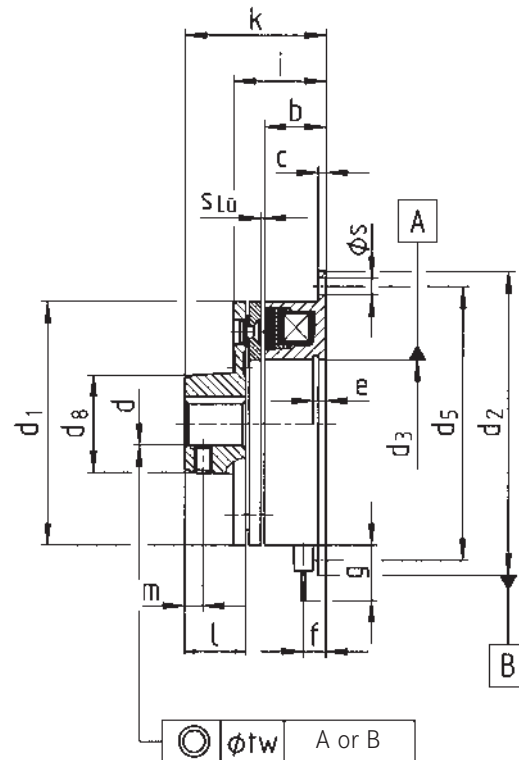
■ Armature assembly: Keyway to DIN 6885/3-P9

■ Recommended ISO tolerances for shafts: Up to Ø 50 mm: k₆
Above Ø 50 mm: m₆

Technical data

INTORQ

Electromagnetic brakes INTORQ 14.115.□□.1.1



Size	M	b	c	d H7	d H7	d ₁	d ₂	d ₃	d ₅	d ₈	e	
	[Nm]			min.		max.	h8	h9	H8			
06	7.5	18	2	10	10;12;14;15;17	17	63	80	35	72	27	3.5
08	15	20	2.5	10	12;14;15;17;19;20	20	80	100	42	90	32	4.3
10	30	22	3	14	15;19;20;24;25;28;30	30	100	125	52	112	42.5	5
12	60	24	3.5	14	20;24;25;28;30;35	35	125	150	62	137	52	5.5
16	120	26	4	20	25;28;30;35;38;40;45	45	160	190	80	175	73	6
20	240	30	5	25	35;38;40;42;45;50;55;60	60	200	230	100	215	87	7
25	480	35	6	25	40;45;50;55;60;65;70	80	250	290	125	270	110	8

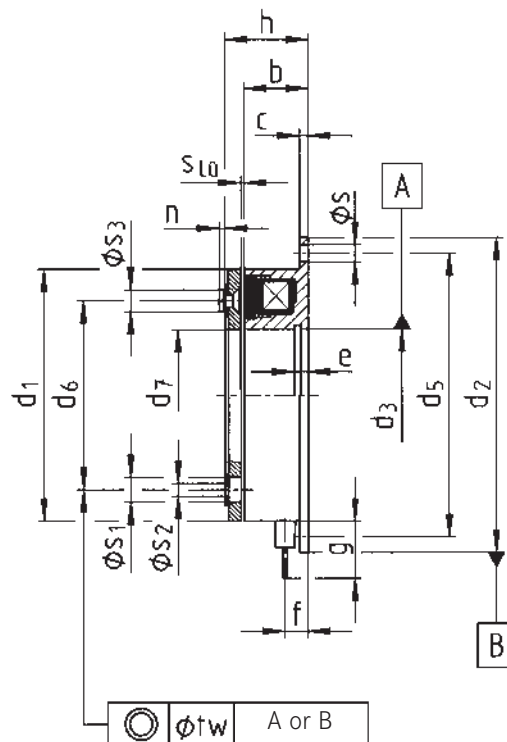
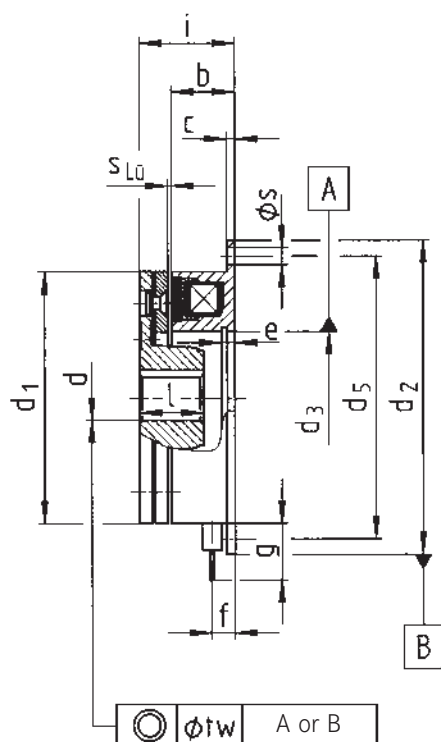
Size	f	g	i	k	l	m	s	sLü	t _w	m [kg]
06	5.5	400	25.5	37	15	5	4 x 4.5	0.2	0.16	0.32
08	6.5	400	28.5	44.5	20	6	4 x 5.5	0.2	0.16	0.59
10	6.5	400	32.9	52.9	25	6	4 x 6.6	0.2	0.16	1.11
12	7.1	400	37	61	30	10	4 x 6.6	0.3	0.2	2
16	8.6	400	42	73	38	10	4 x 9	0.3	0.2	3.5
20	12.4	400	50.4	89.4	48	15	4 x 9	0.5	0.2	7.05
25	14.9	400	58.9	102.9	55	20	4 x 11	0.5	0.3	12.7

■ Dimensions in mm
■ Keyway to DIN 6885/1-P9

■ Recommended ISO tolerances for shafts: Up to Ø 50 mm: k₆
Above Ø 50 mm: m₆

Technical data

Electromagnetic brakes INTORQ 14.115.□□.1.2 and INTORQ 14.115.□□.1.3



Size	M	b	c	d H7	d H7	d ₁	d ₂	d ₃	d ₅	d ₆	d ₇	e	
	[Nm]			min.	max.	h8	h9	H8					
06	7.5	18	2	10	10;12;14;15;17	17	63	80	35	72	46	34.5	3.5
08	15	20	2.5	10	12;14;15;17;19;20	20	80	100	42	90	60	41.7	4.3
10	30	22	3	14	15;19;20;24;25;28;30	30	100	125	52	112	76	51.5	5
12	60	24	3.5	14	20;24;25;28;30;35	35	125	150	62	137	95	61.5	5.5
16	120	26	4	20	25;28;30;35;38;40;45	45	160	190	80	175	120	79.5	6
20	240	30	5	25	35;38;40;42;45;50;55;60	60	200	230	100	215	158	99.5	7
25	480	35	6	25	40;45;50;55;60;65;70	70	250	290	125	270	210	124.5	8

Size	f	g	h	i	l	n	s	s1	s2	s3	sLü	t _w	m [kg]	
													1.2	1.3
06	5.5	400	22	25.5	15	1.4	4 x 4.5	3 x 6.3	3 x 3.1	3 x 5.5	0.2	0.16	0.32	0.28
08	6.5	400	24.5	28.5	20	1.7	4 x 5.5	3 x 8	3 x 4.1	3 x 7	0.2	0.16	0.59	0.51
10	6.5	400	27.9	32.9	25	2.1	4 x 6.6	3 x 10.5	3 x 5.15	3 x 9	0.2	0.16	1.11	0.95
12	7.1	400	31	37	30	2.5	4 x 6.6	3 x 12	3 x 6.1	3 x 10	0.3	0.2	2	1.71
16	8.6	400	35	42	38	3	4 x 9	3 x 15	3 x 8.2	3 x 13	0.3	0.2	3.5	3.2
20	12.4	400	41.4	50.4	48	4	4 x 9	3 x 18	3 x 10.2	3 x 16	0.5	0.2	7.05	5.85
25	14.9	400	47.9	58.9	55	4.3	4 x 11	4 x 22	4 x 12.2	4 x 20	0.5	0.3	12.7	11

■ Dimensions in mm

■ Keyway to DIN 6885/1-P9

■ Recommended ISO tolerances for shafts: Up to Ø 50 mm: k₆

Above Ø 50 mm: m₆

Accessories

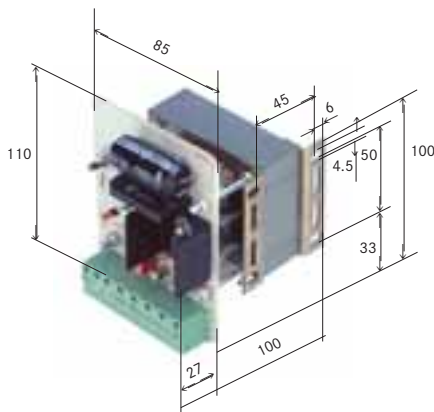
INTORQ

Transformer switch TS 48 INTORQ 14.610.11.048

Features

- Transformer switch TS 48 contains the entire current supply for a 24 V DC coil with transformer, rectifier and switching transistor with suppressor circuit
- A transistor is used for switching; there is no contact wear
- The high induced voltage enables the release times indicated in the catalogue for DC switching to be achieved.

Dimensions



Applications

- Current supply for 24 V coils on AC mains
- Normal excitation with rated coil voltage
- Switching of coil current via PLC, proximity switch, contacts, control voltage 5 – 24 V

Technical data

Normal excitation	24 V
Mains voltage	230 V, 50/60 Hz
Coil voltage	24 V =
Max. coil load	50 W

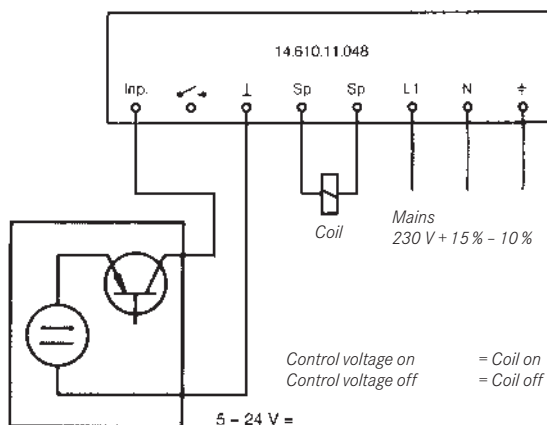
Max. operating frequency:

Up to 35 W	5 switching operations/s
Up to 50 W	2 switching operations/s

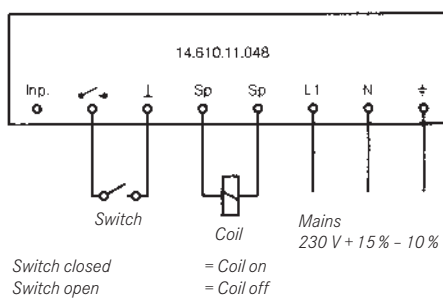
Connectable coils	1 x
Switching of coil current:	Transistor
The entire switching operation is potential-free.	
Control current at 24 V	Approx. 1 mA
Weight:	1.5 kg

Connection examples

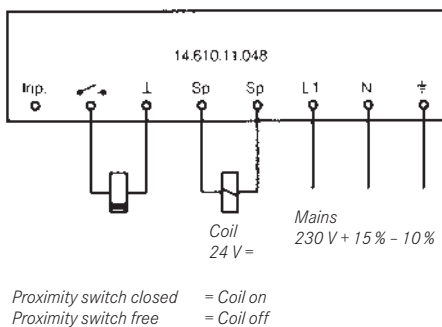
Control via PLC



Control via contact



Control via 2-wire proximity switch



Accessories

Spark suppressor INTORQ 14.198.00.01/02/03

Features

The INTORQ spark suppressor protects the coil and contact against impermissibly high induced voltages with DC switching. In the absence of a suppressor circuit, the induced voltage may exceed the permissible values specified in VDE 0580 and cause coils to fail.

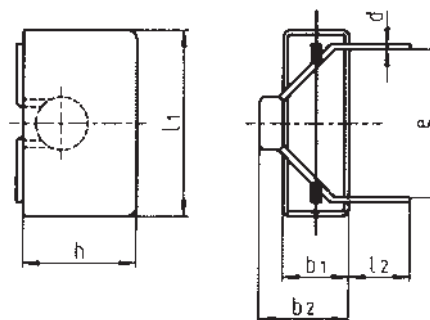
The spark suppressor comprises an induction-free pulse capacitor which takes up the high-speed current peaks which occur during switching. This significantly reduces the spark at the contact (contact wear).

Application

Suppressor circuit for coil and contact:

- Limitation of induced voltage at coils
- Spark suppression at switching contacts
- Increase in service life of coils and contacts

Dimensions

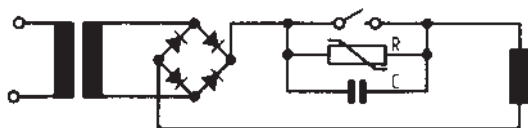


Technical data

INTORQ	Coil voltage	Max. mains voltage	Max. coil power	Capacitor voltage	b ₁	b ₂ approx.	d	e approx.	h	l ₁	l ₂ approx.	m [g]
14.198.00.01	24 V – 50 V	60 V~	110 W	250 V-	8.5	12.5	0.7	22.5	18.5	26.5	25	7
14.198.00.02	50 V – 120 V	250 V~	110 W	630 V-	15	21	0.7	37.5	26	41.5	20	22
14.198.00.03	120 V – 200 V	400 V~	110 W	1000 V-	13	20	0.7	37.5	24	41.5	15	17
14.198.00.04	200 V – 250 V	555 V~	110 W	1000 V-	13	20	0.7	37.5	24	41.5	15	10

Connection examples

Parallel to contact



Parallel to coil



Accessories

INTORQ

SEGC high-speed switchgear INTORQ 14.611

Features

INTORQ-SEGC high-speed switchgear is used for the high-speed excitation of DC voltage coils and reduces engagement times to as little as 10% of the values indicated in the Technical data.

Switching is wear-free via semiconductors. This makes simple activation with auxiliary contacts, control voltages or proximity switches possible. Following overexcitation, the coil operating voltage is automatically reduced to the holding voltage.

For more detailed technical information, see the "Electronic switchgear" manual.

Application

High-speed excitation of DC voltage coils with a rated voltage of 24 to 205 V.

You can use INTORQ-SEGC high-speed switchgear on electromagnetic clutches/electromagnetic brakes to achieve:

- Shorter acceleration/deceleration times
- Higher operating frequencies
- Improved operating accuracy
- Reduced wear
- Improved stopping accuracy

SEGC-Electronic INTORQ 14.611.12.□□□

- Structure: 220 x 150 mm PCB
- Connection via 10-pin terminal strip
- Max. connected load 100 W
- Required accessories: MP capacitor



SEGC-Europe INTORQ 14.611.14(16).□□□

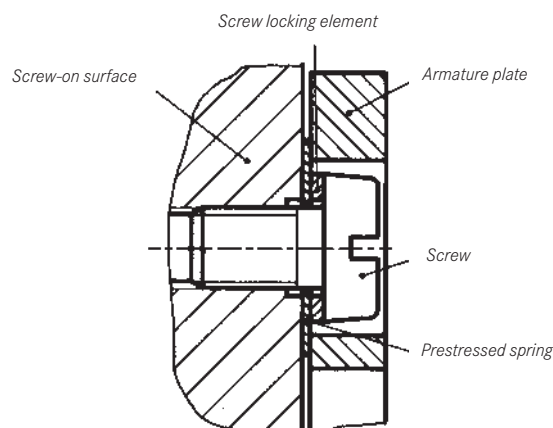
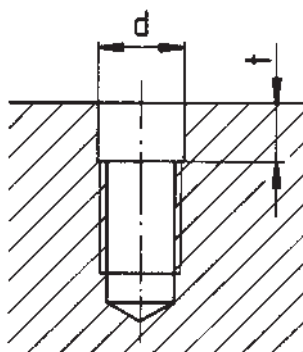
- In terms of electronics, design is identical to that of the SEGC-Electronic
- Constructed with European standard board dimensions 160 x 100 mm
- Connection via 31-pin DIN plug connector
- Max. connected load 40 W/100 W
- Required accessories: MP capacitor, plug-in rack



General information for assembly

- Assembly and maintenance work may only be carried out by specialist personnel with appropriate training, and only in accordance with the specifications in the Operating and Mounting Instructions.
- Grease or oil on friction surfaces reduces the drive/braking torque. For this reason, friction surfaces must be kept free of grease and oil.
- The regulations set out in the machine safety law for rotary drive elements must be observed.
- If units with large diameters are switched in at high speeds, the high relative speed at the friction surfaces can cause sparking. The use of a suitable cover is recommended.
- The air gap $S_{L\ddot{u}}$ must be checked at regular intervals and readjusted no later than $2.5 \times S_{L\ddot{u}}$ (see Technical data).

Screws, screw locking element and tapped hole for fastening type 3 armature assembly

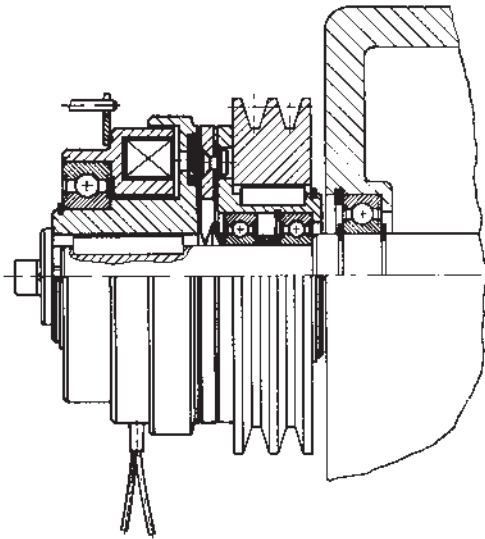


Size	Screws	DIN	Schnorr screw locking element *	Ø d [mm]	t [mm]
06	M 3 x 8	DIN 84	Schnorr lock washer 3.0	3.1	0.8
08	M 4 x 10	DIN 84	Schnorr lock washer 4.0	4.1	1.0
10	M 5 x 12	DIN 6912	Schnorr lock washer 5.0	5.1	3.5
12	M 6 x 16	DIN 7984	Schnorr lock washer 6.0	6.1	2.8
16	M 8 x 20	DIN 7984	Schnorr lock washer 8.0	8.2	3.5
20	M 10 x 25	DIN 7984	Schnorr lock washer 10	10.2	3.5
25	M 12 x 25	DIN 7984	Schnorr lock washer 12	12.2	3.8

*** Available from:**

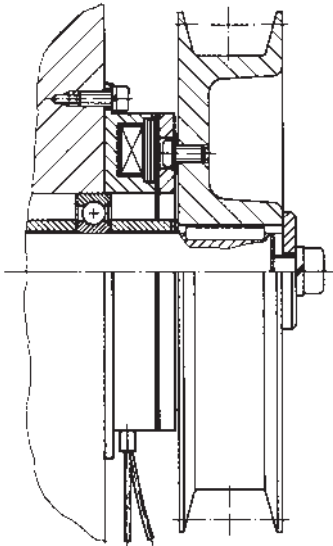
Adolf Schnorr GmbH & Co. KG
 PO Box 60 01 62 · 71050 Sindelfingen, Germany
 Tel. +49 (0) 70 31 30 20 · Fax +49 (0) 70 31 38 26 00

Installation examples



Electromagnetic clutch INTORQ 14.105.□□.3.5

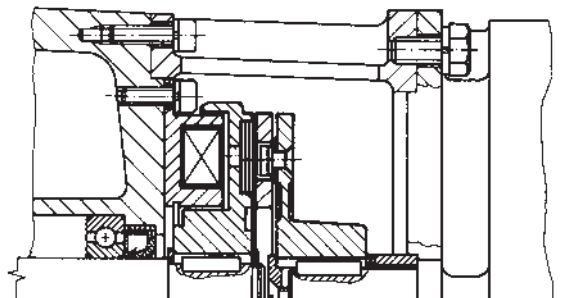
with a V-belt pulley attached to the armature assembly. The air gap is set using disc springs between the ball bearing and rotor. A pin in the lug on the stator prevents the stator from being turned as a result of friction in the ball bearing.



Electromagnetic brake INTORQ 14.115.□□.1.3

with flange-mounted belt pulley.

The stator is mounted centrally on the shaft using a ball bearing. The air gap is set using a spacer ring and shims between the ball bearing and belt pulley.



Electromagnetic clutch INTORQ 14.105.□□.1.1

to connect two aligned shafts.

Centring to shaft by means of toleranced outer diameter of stator. The rotor is mounted on the driving shaft using a keyway connection and secured against axial movement. A keyway connection is also used to mount and secure the armature assembly against axial movement on the shaft to be linked. Shims should be used to set the air gap.