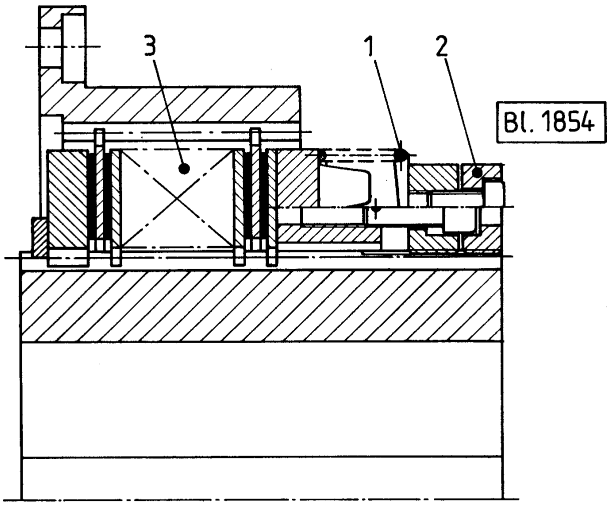
Contents

Operation



Frictional connection is brought about by springs (**1**). The setting/adjustment device (**2**) allows the driving or slipping torque to be varied within certain limits in order to meet the requirements of the particular case of application.

The plates (**3**) of the clutches are supplied with the friction combinations steel/organic lining for dry running or steel/sintered lining for wet-running.

The permissible period during which slipping may take place depends on the amount of friction heat produced (slipping torque and the relative speed at which the plates slip past each other) and the capacity of the clutch to absorb heat.
When using these clutches for starting purposes, it must be taken into consideration that - despite the presence of the slipping clutch - the maximum output torque will be greater than the slipping torque set on the clutch.

Properties and areas of application

The safe operation of machines, mechanical plant and their drives depends, to a large extent, on the forces and torques not exceeding the values on which the strength calculations for the particular clutch were based.
However, experience has shown that it is very difficult or impossible to calculate the exact loading for a particular application precisely in advance. In addition there is the risk of unwanted overloading occurring, for example, if stalling takes place. Ortlinghaus slipping and starting clutches have proved themselves to be excellent safety elements throughout the whole area of mechanical engineering for the elimination and dissipation of torque peaks. They provide protection against fracture for gears, gear wheels, shafts and other mechanical elements.

Recommendations for design and installation

When a clutch slips, mechanical energy is converted into heat, which requires to be dissipated either by means of radiation or, where clutches are installed in gearbox housings, by means of cooling oil.

Friction combination

The friction combination in the standard form of execution is steel/organic lining for dry-running. It is essential that the frictional surfaces are kept free of lubricants!
Steel/sintered lining for wet running on request.

Tolerances

For the tolerances for bores and keyways see section 1 "Technical information".

Fig. 1 makes clear the benefits provided by a slipping clutch. If the amplitude of the torque peak to be expected without a slipping clutch M_O and also the ratio of this to the slipping torque M_R are known, the ratio of the maximum torque M_{max} to M_R for a given value of α can be read from the graph. If, for example, $\alpha = 0.02$ and if the torque peak (without slipping clutch) M_O is six times the slipping torque M_R, fitting the slipping clutch will reduce the torque peak to just 1.8 times the slipping torque M_R.

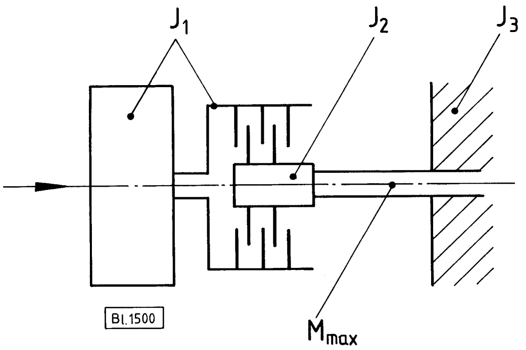
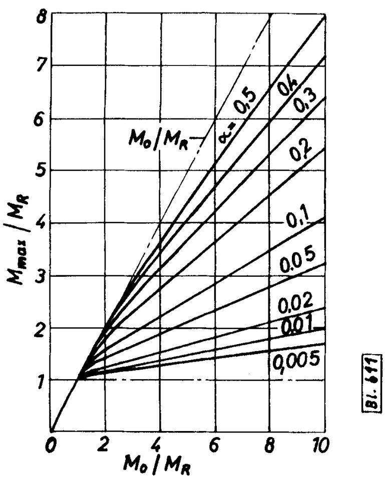


Fig. 1



M_{max} = Maximum torque at driven shaft
M_O = Torque peak to be anticipated if no slipping clutch is used
M_R = Slipping torque

$$\alpha = \frac{J_2}{J_1 + J_2}$$

J_1 = Moment of inertia of driving machine and drive side of slipping clutch
J_2 = Moment of inertia of driven side of slipping clutch
J_3 = Moment of inertia of the driven side assumed to be inifinitely large

The figure shows that the driven side of the slipping clutch should have a low moment of inertia if the torque peaks to be expected are to be dissipated efficiently.

Slipping control

Multi-plate safety clutches are not recommended for high speed applications unless slip control is provided, since they can quickly overheat. The relative motion between the clutch halves that arises with overload slipping can be used to protect the unit by tripping out the prime mover. This can be done in various ways.

1. Monitoring arrangement with cam and microswitch.

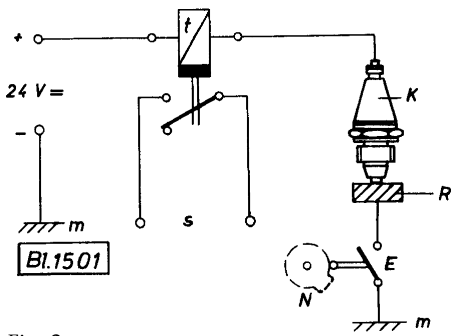


Fig. 2

K = Plug-type brush
R = Slipring
E = Microswitch on inner clutch member
N = Cam on outer clutch member
m = Earth
S = Drive cut-out
t = Time relay

This arrangement within the clutch has the disadvantage that small slipping movements can lead to undesired actuation of the microswitch and thus to the drive being cut out.

2. Slipping control via solenoid switch signal

A safety arrangement which can be applied at an external point relative to the clutch is shown in Fig. 3. This uses signals from a solenoid switch to control a time relay. The arrangement permits slippage control from approx. 5 to 3,000 min^{-1}.

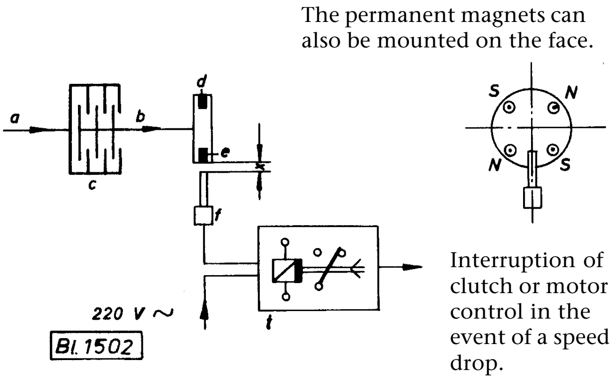


Fig. 3

a = Input
b = Output
c = Slipping clutch
x = Clearance approx. 10 - 15 mm
d = Permanent magnet, north pole
e = Permanent magnet, south pole
f = Solenoid switch
t = Time relay

Permanent magnets - north and south poles - are attached to the shaft being monitored in such a way that they pass the solenoid switch with a clearance of 10 to 15 mm. The solenoid switch is actuated on each revolution thereby transmitting pulses to a time relay. The time relay remains energized as long as the period of time between two consecutive pulses remains less than the delay time preset on the relay. As this is about 1 s, the number of north and south poles must be chosen so that the time between consecutive pulses lies within this time as otherwise the relay will de-energize prematurely. If the time relay deenergizes, a hold line to the control contactor is interrupted and the drive is stopped.

In the standard version of the device, the drive will be cut out when the driven side comes to a complete or near complete standstill.

For applications where the driving speed changes, monitoring of the slippage by capturing the input and output side speeds of the clutch provides the greatest safety. Devices with electronic circuits have been developed for this purpose. With these, proximity-type pulse generators measure the speeds of the input and output sides of the clutch. The two speeds are compared electronically. The pulses are triggered by markers fitted on each of the two sides. The markers may be in the form of cams, vanes, screwheads or holes, it is important that there are equal numbers of these on each side. The system is shown schematically in Fig. 4.

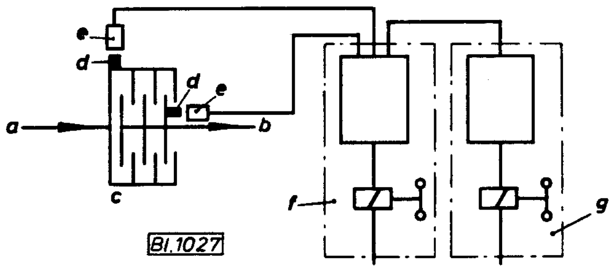


Fig. 4

a = Input
b = Output
c = Slipping clutch
d = Marker
e = Sensor
f = Electronic module 1 for warning
f = Electronic module 2 for cut-out

If the clutch starts slipping so that a difference in the two speeds arises, electronic module 1 triggers first, causing an acoustic or optical warning signal to be given.

Electronic module 2 cuts out the drive if the period of time set on a time element is exceeded.

A time-controlled bridge is arranged to permit slipping while the machine is being started up.

Application examples

Fig. 1: Slipping clutch, series **0600-474**, fitted between motor and gearbox on separate shafts. The bearings should be positioned as close as possible to the clutch.

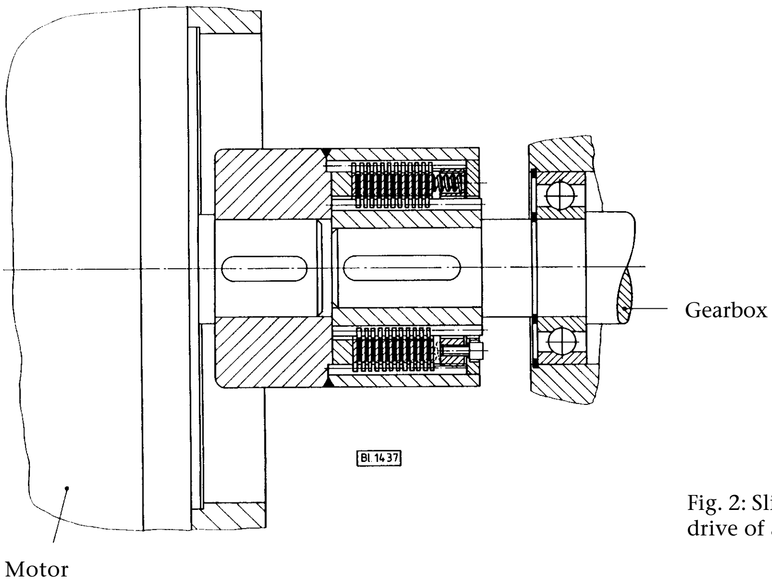


Fig. 2: Slipping clutch, series **0600-474**, fitted in the feed drive of a boring and milling machine.

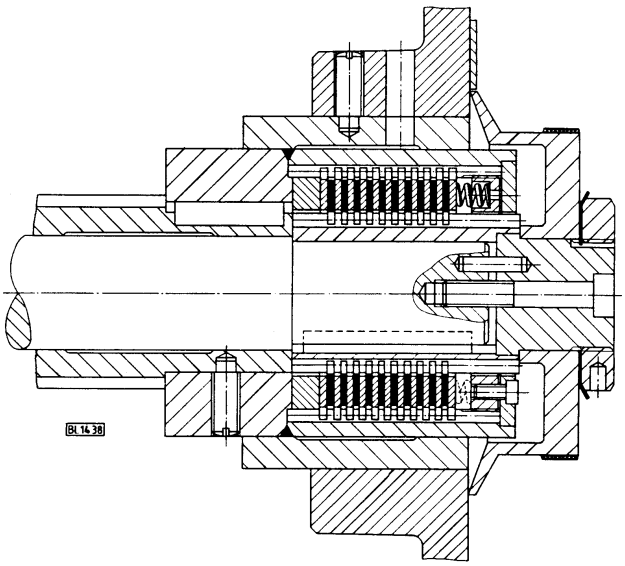
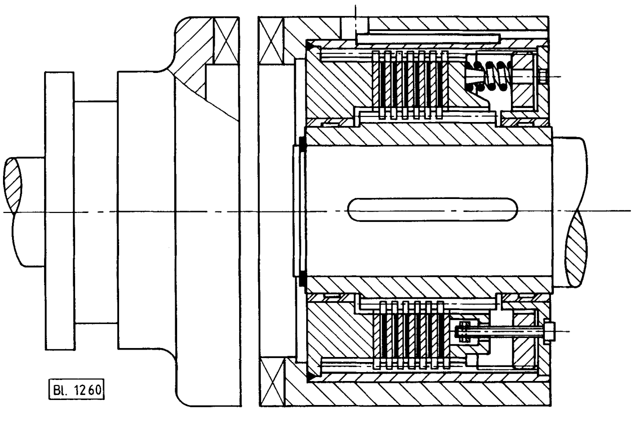


Fig. 3: Starting clutch, series **0700-070**, used in conjunction with a dog clutch.



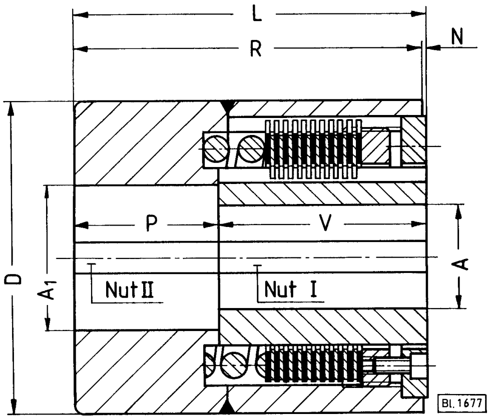


Fig. 1

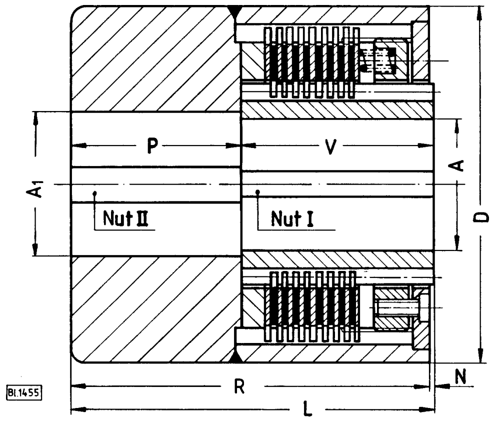


Fig. 2

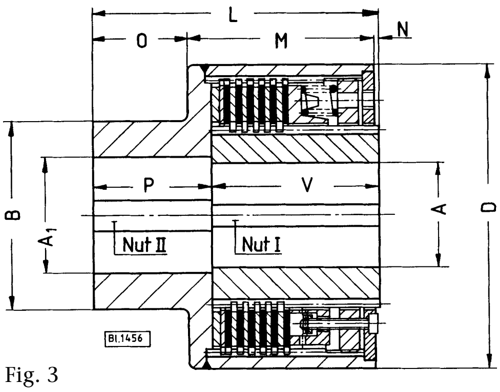


Fig. 3

Nut = Keyway
Bore A_1 to customer requirements Keyway II to DIN 6885

Series / Figure / Size-version		0600-424-Size-0.009.			0600-474-Size-0.0091			
Figure		1	1	1	2	3	3	**3**
Size-version		**07-0.0-092**	**11-0.0-091**	**15-0.0-091**	**23**	**31**	**39**	**47**
Mstat[1)]	-000-09. approx. Nm	30	60	100	200	500	1000	1600
	-010-09. approx. Nm	20	40	70	140	350	700	1100
	-020-09. approx. Nm	10	20	35	70	180	350	550
Mstat min	-020-09. approx. Nm	9	10	28	0	75	130	180
J	internal kgcm²	3	5	8	20	50	150	350
	external kgcm²	3	25	50	200	250	500	1350
Weight	approx. kg	2,4	4	5,5	9,8	10,5	18,5	31
ØA	prebored	10	10	15	18	18	28	30
Recommended bores[2)]	A max H7	**20**	**30**	40	48	60	70	80
	Keyway I DIN 6885	**6x2,8**	**8x3,3**	12x3,3	14x2,1	18x2,3	20x2,7	22x5,4
	A H7	**18**	**28**	**38**	**45**	**45**	**50**	**55**
	Keyway I DIN 6885	**6x2,8**	**8x3,3**	**10x3,3**	**14x3,8**	**14x3,8**	**14x3,8**	**16x4,3**
	A H7	**16**	**25**	**35**	**40**	**40**	**45**	**50**
	Keyway I DIN 6885	**5x2,3**	**8x3,3**	**10x3,3**	**12x3,3**	**12x3,3**	**14x3,8**	**14x3,8**
	A H7	**15**	**22**	**30**	**35**	**35**		**45**
	Keyway I DIN 6885	**5x2,3**	**6x2,8**	**8x3,3**	**10x3,3**	**10x3,3**		**14x3,8**
	A H7	**12**	**20**	**25**	**30**			
	Keyway I DIN 6885	**4x1,8**	**6x2,8**	**8x3,3**	**8x3,3**			
Diameters	B	–	–	–	–	80	120	130
	D	70	90	100	125	150	170	210
Length dimensions	L	90	105	110	125	130	170	195
	M	–	–	–	–	88	108	128
	N	0,5	1	1	1,5	2	2	2
	O	–	–	–	–	40	60	65
	P	35	45	45	55	50	70	80
	R	89,5	104	109	123,5	–	–	–
	V	55	60	65	70	80	100	115

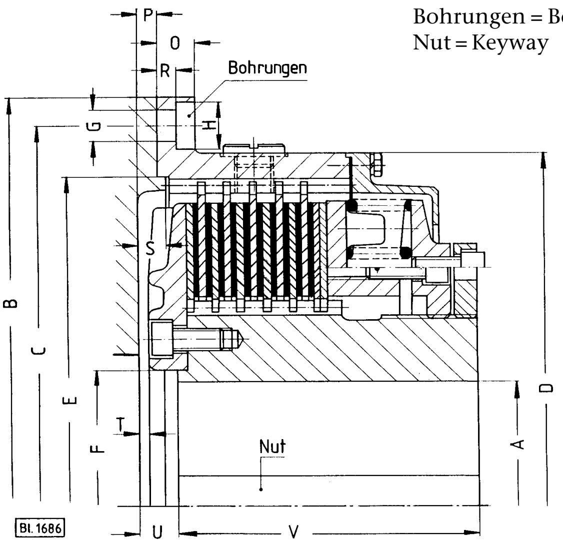
1) Mstat decreases to approx. 2/3 of the stated values with wet-running.
2) Bore diameters in bold print are available ex stock.

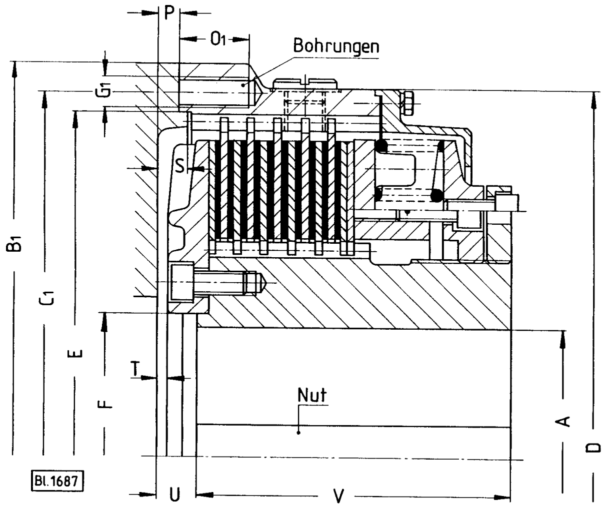
Adequate clearance for a hexagonal socket key must be provided on the clutch face to permit adjustment (see page 3b.06.00, Fig. 1)

Multi-plate slipping clutches
with flange or shoulder housing

SEIT 1898
DIE TECHNIK DER KONTROLLIERTEN MOMENTE

Bohrungen = Bores
Nut = Keyway





Series 0600-070
with flange housing, closed version
Available for delivery in open version on request, without case cover and closure plug but with peripheral holes: series **0600-071**

Series 0600-072
with shoulder housing, closed version
Available for delivery in open version on request, without case cover and closure plug but with peripheral holes: series **0600-073**

Series		0600-070-Size-0.0091 0600-072-Size-0.0091				0600-070-Size-0.0095 0600-072-Size-0.0095		
Size		**47**	**55**	**63**	**69**	**75**	**78**	**84**
Mstat[1)]	-000-09. approx. Nm	1600	2800	6000	10000	18000	23000	30000
	-010-09. approx. Nm	1100	2000	4000	7000	12000	16000	20000
	-020-09. approx. Nm	550	1000	2000	3500	6000	8000	10000
Mstat min	-020-09. approx. Nm	90	700	1200	500	0	0	0
J	internal kgm^2	0,055	0,158	0,34	0,75	1,975	3,5	12,75
	0600-070 external kgm^2	0,08	0,21	0,458	1,05	2,075	3,425	11,5
	0}}600-072 external kgm^2	0,075	0,195	0,425	0,975	1,925	3,2	10,625
Weight	approx. kg	22	39	61	99	165	224	454
ØA	prebored	30	32	48	48	60	60	100
Recommended bores[2)]	A max H7	80	80	110	130	170	190	220
	Keyway DIN 6885	22x5,4	22x5,4	28x6,4	32x7,4	40x9,4	45x10,4	50x11,4
	A H7	**60**						
	Keyway DIN 6885	**18x4,4**						
	A H7	**55**						
	Keyway DIN 6885	**16x4,3**						
Diameters	B	250	310	370	430	500	550	750
	B1	225	285	335	395	460	515	700
	C	230	285	340	400	470	520	705
	C1	205	260	310	365	430	485	655
	D	210	260	315	370	435	490	650
	E H7	195	245	295	345	410	465	620
	F	–	90	125	142	200	220	300
	G	10,5	13	15	17	17	17	26
	G1	M8	M12	M12	M14	M14	M16	M24
	H	17	19,5	23,5	25,5	25,5	25,5	–
	Number of bores	6	6	6	6	6	6	12
Length dimensions	O	12	15	15	20	20	20	25
	O1	20	25	25	35	35	45	45
	P	5	10	10	10	10	10	15
	R	6	7,5	7,5	10	10	10	-
	S	10	15	15	15	15	15	20
	T	–	2	2	5	5	5	5
	U	–	12	15	20	18	20	20
	V	120	128	135	155	185	195	205

1) Mstat decreases to approx. 2/3 of the stated values with wet- running.
2) Bore diameters in bold print are available ex stock.

Adequate clearance for a hexagonal socket key must be provided on the clutch face to permit adjustment (see page 3b.06.00, Fig. 1)

Multi-plate starting clutches

Ortlinghaus SEIT 1898
DIE TECHNIK DER KONTROLLIERTEN MOMENTE

Nut = Keyway

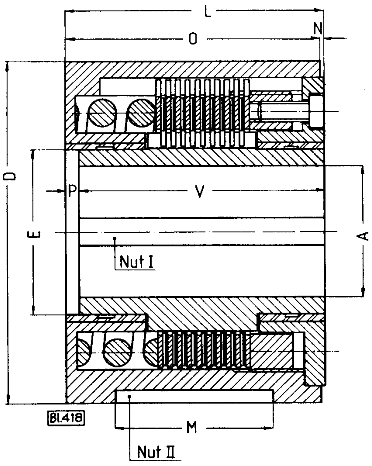


Fig. 1

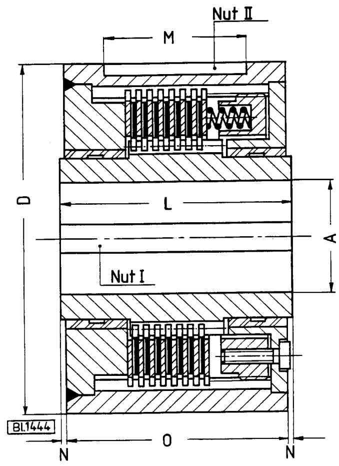


Fig. 2

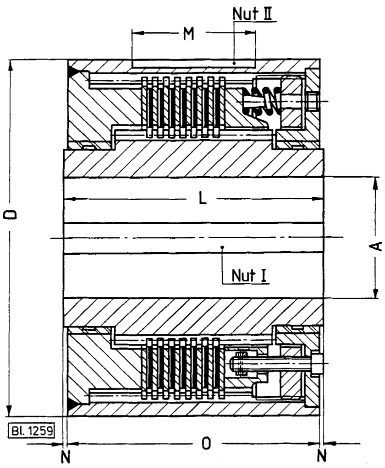


Fig. 3

Series			0700-000-Size-0.109.			0700-070-Size-0.1091				
Figure			1	1	1	2	2	3	3	3
Size-version			**07-0.1-092**	**11-0.1-091**	**15-0.1-091**	**23**	**25**	**31**	**39**	**47**
Mstat[1]	-001-09.	approx. Nm	30	60	100	160	250	500	1000	1600
	-011-09.	approx. Nm	20	40	70	100	180	350	700	1100
	-021-09.	approx. Nm	10	20	35	50	90	180	350	550
$M_{stat\ min}$	-021-09.	approx. Nm	9	11	30	28	0	130	130	150
J	internal	$kgcm^2$	3	5	8	20	23	50	150	350
	external	$kgcm^2$	3	25	40	100	150	350	450	1175
Weight		approx. kg	1,5	2,8	4	6	6,5	12	16	30
ØA	prebored		10	10	15	18	18	18	22	30
Recommended bores[2]	A max	H7	**20**	**30**	**38**	**48**	**48**	**55**	**65**	**80**
	Keyway I	DIN 6885	**6x1,6**	**8x2**	**10x3,3**	**14x2,1**	**14x2,1**	**16x2,4**	**18x2,3**	**22x5,4**
	A	H7	**18**	**28**	**35**	**45**	**45**	**50**	**50**	
	Keyway I	DIN 6885	**6x2,8**	**8x3,3**	**10x3,3**	**14x3,8**	**14x3,8**	**14x3,8**	**14x3,8**	
	A	H7	**18**	**25**	**32**	**40**	**40**	**45**	**45**	
	Keyway I	DIN 6885	**6x1,6**	**8x3,3**	**10x3,3**	**12x3,3**	**12x3,3**	**14x3,8**	**14x3,8**	
	A	H7	**16**	**24**	**30**	**35**	**35**			
	Keyway I	DIN 6885	**5x2,3**	**8x3,3**	**8x3,3**	**10x3,3**	**10x3,3**			
	A	H7	**14**	**20**	**28**	**30**	**30**			
	Keyway I	DIN 6885	**5x2,3**	**6x2,8**	**8x3,3**	**8x3,3**	**8x3,3**			
Keyway II			8 wide, 4 deep			12 breit, 4,5 tief				
Diameters	D n6		70	90	100	125	135	150	170	210
	E		–	38	48	–	–	–	–	–
Length dimensions	L		60	68	74	80	80	105	125	150
	M		30	45	45	50	50	50	50	70
	N		0,5	1	1	1,5	1,5	0,5	0,5	1
	O		59,5	67	73	77	77	104	124	148
	P		–	4,5	4	–	–	–	–	–
	V		–	63	70	–	–	–	–	–
			Version without keyway II; dimensions as above plus dimension D_{max}							
Series			**0700-400-Size-0.109.**			**0700-470-Size-0.1091**				
J	internal	$kgcm^2$	3	5	8	20	23	50	150	350
	external	$kgcm^2$	38	125	200	350	450	1225	1875	4500
Weight	approx.	kg	3,4	6,4	8,3	10,7	11,5	23,5	30	52
Ø D_{max}			100	130	140	160	170	200	220	270

1) M_{stat} decreases to approx. $^2/_3$ of the stated values with wet-running.
2) Bore diameters in bold print are available ex stock.

Adequate clearance for a hexagonal socket key must be provided on the clutch face to permit adjustment (see page 3b.06.00, Fig. 1)