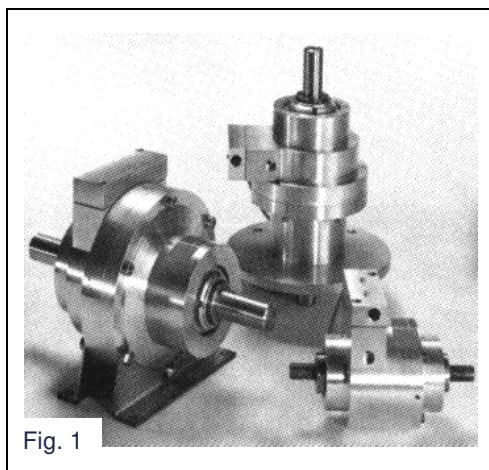


# RotaStep

## Clutch / Brake – Step unit

### Description



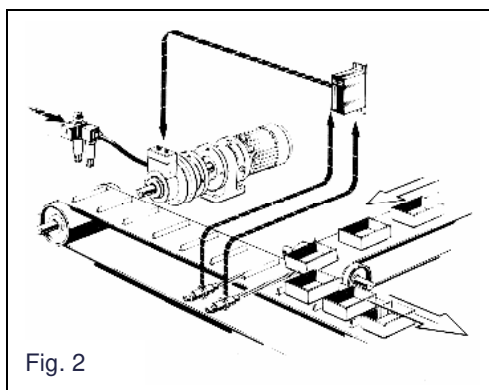
The RotaStep is the ideal solution for precise positioning stop-start applications where short reaction times and repeat accuracy are important.

Features of the RotaStep include:

- Wide torque range
- Adjustable torque of the individual unit
- Long service life, no adjustments necessary
- Solid or hollow input/output shaft to fit standard motors, gearboxes and pulleys
- Flexible family of electronic controls

Typical applications are :  
dosing, cutting, packing, thermoforming,  
printing, sorting, labelling, stamping.

### System construction

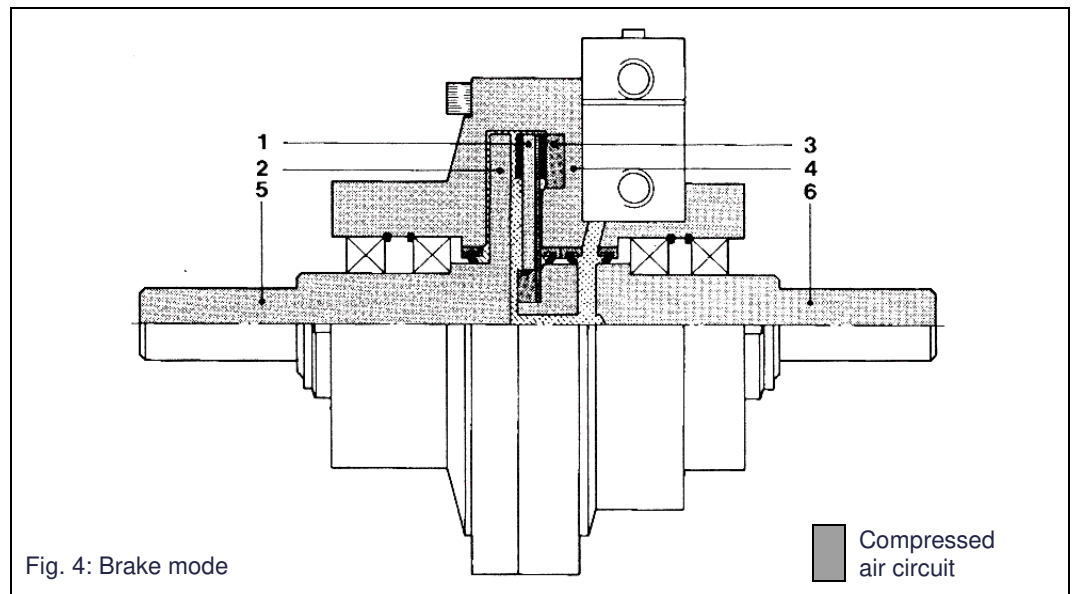
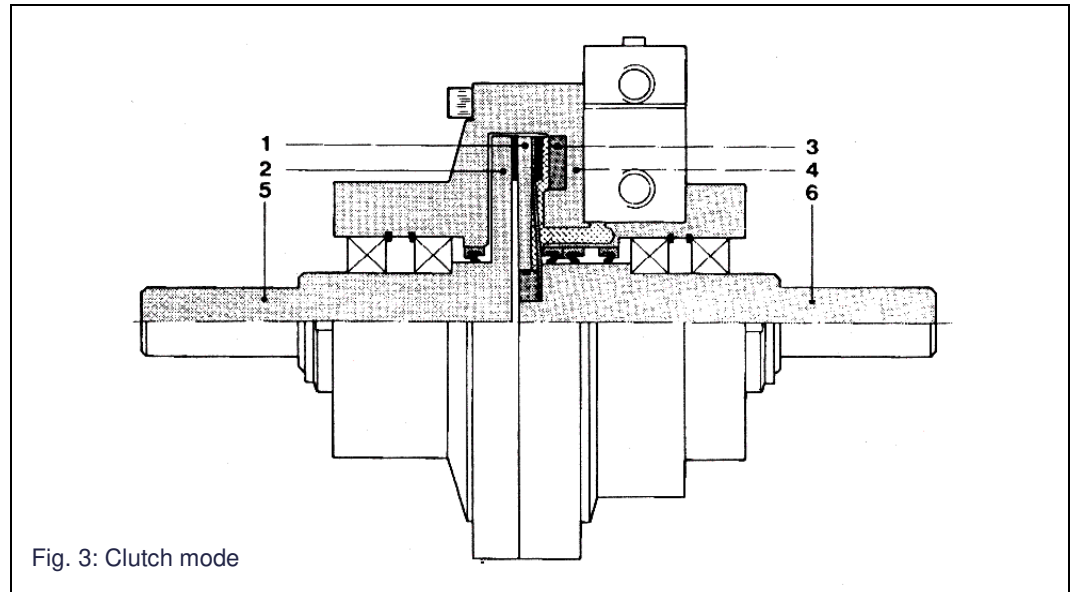


The RotaStep unit is part of the ATB Laurence Scott „Precision Step Systems“ which comprises:

- RotaStep & SRA clutch / brake units
- MCS02 & SRB electronic controls
- FLA short stroke cylinders

- Fig. 2 shows the Precision Step System being used to control a continuous flow packaging line.
- The RotaStep stops a conveyor belt when a photocell registers a "package missing" from the feed belt and it is held in this position until packages are registered on the feed belt.
- By using the compressed air actuated RotaStep the system is maintenance free throughout its long service life. (up to 300 million cycles can be obtained).
- External signal sources (proximity sensors, photocells, encoders) give Start and/or stop signals to electronic control units. These flexible control units are adaptable for various functions e.g. pulse counting, signal suppression, compensation of external influences etc.

Mode of  
Operation



1. Friction disc
2. Clutch disc
3. Brake ring
4. Housing
5. Input shaft (clutch side)
6. Output shaft (brake side)

The RotaStep unit is actuated by compressed air.

Two solenoid valves direct the compressed air to the clutch and brake side, respectively.

Fig. 3 shows RotaStep in clutch mode. Fig. 4 shows RotaStep in brake mode.

When neither of the solenoid valves are activated, normal pressure prevails on both the clutch and the brake side. The clutch shaft (item 5) and brake shaft (item 6) can rotate freely.

**RotaStep  
technical data**

RotaStep sizes	06	08	10	12	15
Static torque, $M_s$ [Nm] Compr. air $\Delta p$ 1 - 3 bar	$\geq M_k$	$\geq M_k$	$\geq M_k$	$\geq M_k$	$\geq M_k$
Dynamic torque, $M_k$ [Nm] Compr. air $\Delta p$ 1 - 3 bar	3 - 9	6 - 18	12 - 36	22 - 66	40 - 120
max. number of revolutions, $n_{max}$ , [rpm]	1,800	1,800	1,800	1,800	1,800
max. heat dissipation, $P_{max}$ [W] *	50	80	120	160	200
Inertia of RotaStep, $I_R$ [kgm <sup>2</sup> x 10 <sup>-3</sup> ]	0.10	0.36	0.85	1.56	2.9
Reaction time $t_{11}$ [s x 10 <sup>-3</sup> ]	10	13	15	17	20
Max. time taken to reach full dynamic torque $t_{12}$ [s x 10 <sup>-3</sup> ]	6	7	8	9	10
Nominal friction work, $W_R$ [J x 10 <sup>6</sup> ]	50	144	215	324	464
Internal volume, $V_R$ [10 <sup>-6</sup> m <sup>3</sup> ]	39	59	73	99	122
Ambient temperature [°C] **	0 - 40	0 - 40	0 - 40	0 - 40	0 - 40
Grade of enclosure [IP]	54	54	54	54	54
Weight [kg]	3.6	5.0	7.4	7.9	11.9

The repeatability is +/- 0.3 ms for all sizes and is constant during the entire service life.

**Note!**  $n \geq 1,200$  rpm requires

$$P \leq P_{max} \times \frac{1200}{n}$$

\*\* Up to 60 °C depending on heat dissipation. Surface temperature on RotaStep 100 °C max.

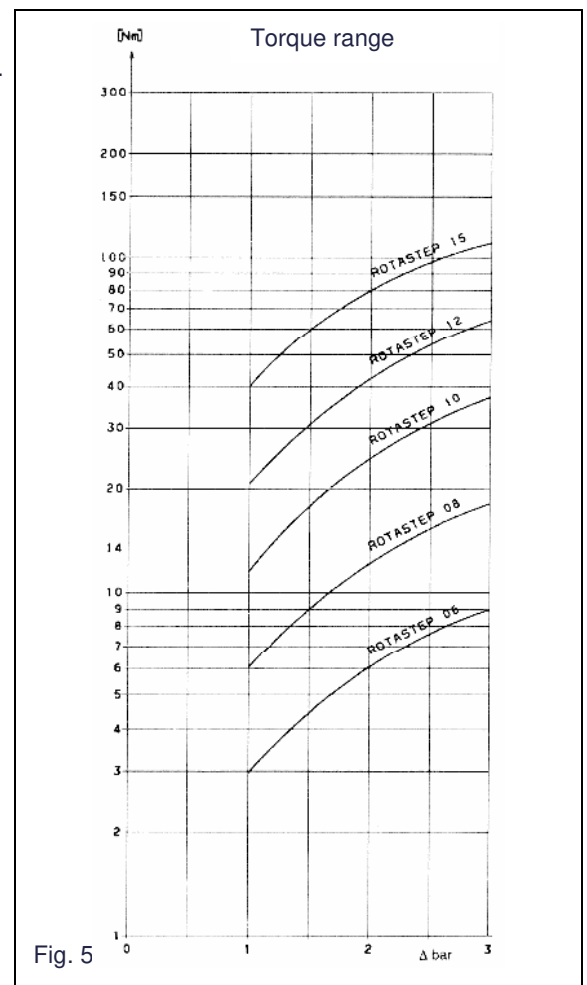
**Torque  
range**

The product range consists of 5 different RotaStep sizes: RotaStep 06/08/10/12/15.

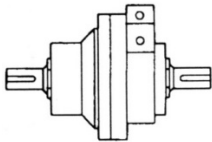
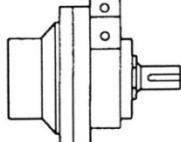
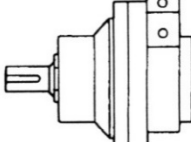
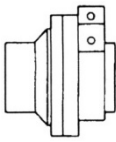
Combined, these cover a torque range (dynamic torque) of 3 to 120 Nm, see fig. 3. Activated by compressed air, the RotaStep requires an inlet differential pressure of 1.0 to 3.0 bar.

By adjusting the pressure, the torque can be varied. Thus various torque requirements can be covered within the same RotaStep size.

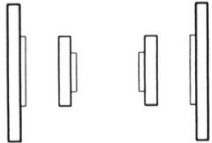
For details please contact  
**MSW Motion Control GmbH**




RotaStep types

RotaStep sizes 06 – 08 – 10 – 12 – 15			
Type 10	Type 20	Type 30	Type 40
Solid / Solid shaft	Hollow / Solid shaft	Solid / Hollow shaft	Hollow / Hollow shaft
			

Flanges

Type B5	internal / external	Form A flanges in accordance with DIN 42948	
Type B14	internal	Form C flanges in accordance with DIN 42948	

Bracket

Bracket for foot mounting	Shaft height in accordance with DIN 747	
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Ordering table

RotaStep size	Type	Code no.	RotaStep size	Type	Code no.
06	10	ND080H1111	10	30	ND080H3131
06	20	ND080H1121	10	40	ND080H3141
06	30	ND080H1131	12	10	ND080H4111
06	40	ND080H1141	12	20	ND080H4121
08	10	ND080H2111	12	30	ND080H4131
08	20	ND080H2121	12	40	ND080H4141
08	30	ND080H2131	15	10	ND080H5111
08	40	ND080H2141	15	20	ND080H5121
10	10	ND080H3111	15	30	ND080H5131
10	20	ND080H3121	15	40	ND080H5141

Dimension

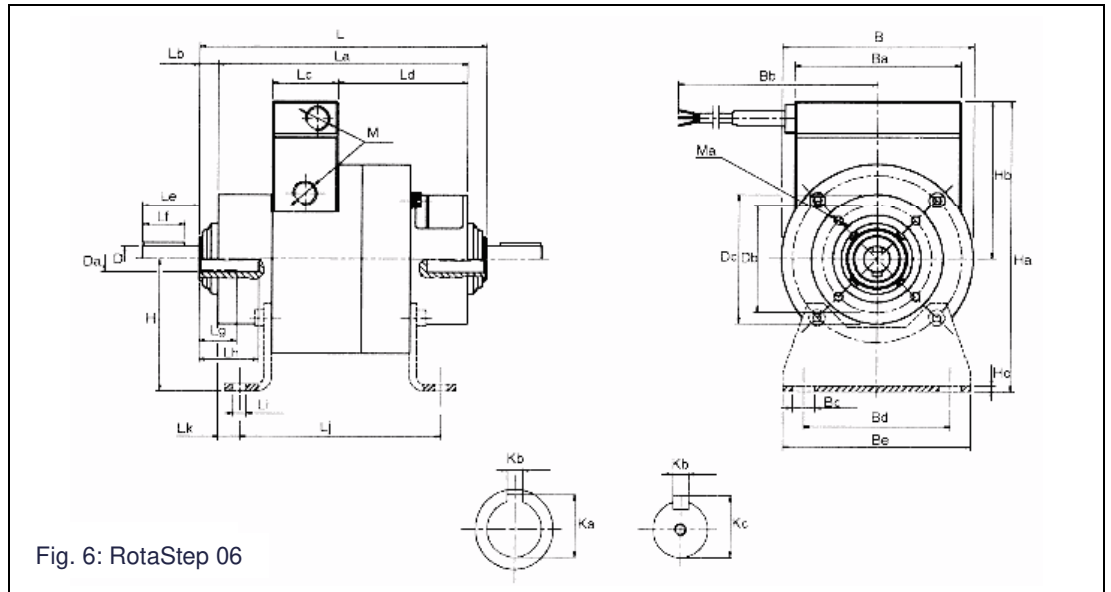


Fig. 6: RotaStep 06

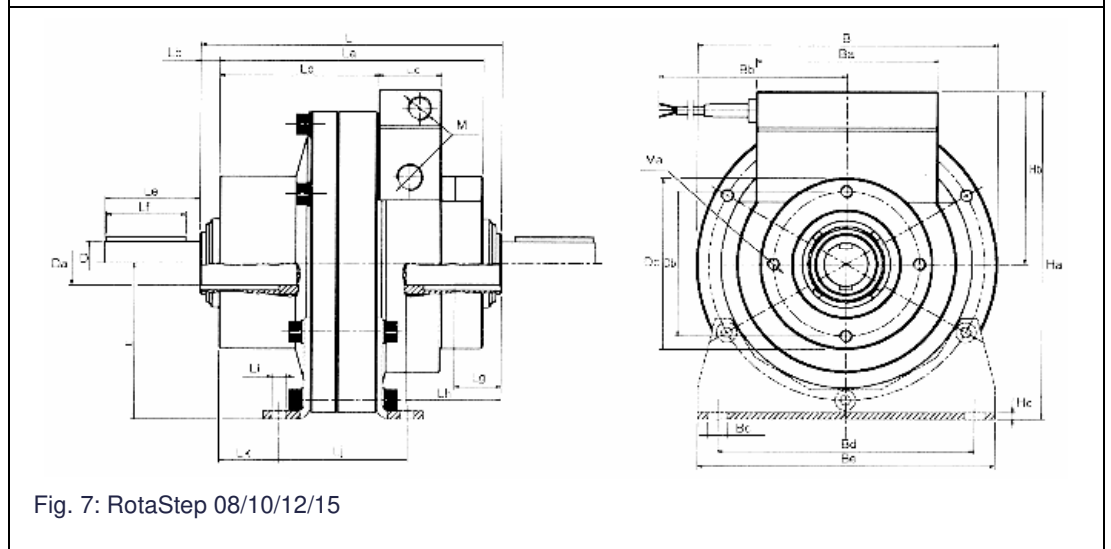


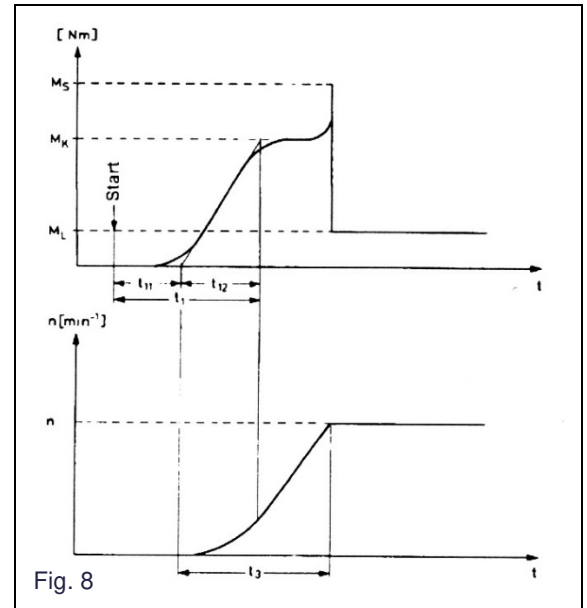
Fig. 7: RotaStep 08/10/12/15

Size	L	La	Lb	Lc	Ld	Le	Lf	Lg	Lh	Li	Lj	Lk	Ka	Kb	Kc
Rota 06	153	133	10	35	69.5	30	22	20	31.5	7	107	11.5	16	5	16.4
Rota 08	172	155	8.5	35	94.5	40	32	25	44	7	-	-	21.8	6	22
Rota 10	187.5	163.5	12	35	93.5	50	40	25	51	7	71	42	26.9	8	27.4
Rota 12	192	168	12	35	106	60	50	30	60	7	78	40	31	8	31.3
Rota 15	192	168	12	40	101	60	50	30	60	7	82	38	31	8	31.3

Size	D	Da	Db	De	B	Ba	Bb	Bc	Bd	Be	H	Ha	Hb	Hc	M	Ma
Rota 06	14	14	58	70	102	88.5	1500	12	78	100	71	155	84	4	G 1/4	4xM5
Rota 08	19	19	77	87	115	88.5	1500	12	-	-	80	176	96	4	G 1/4	4xM6
Rota 10	24	24	80	92	142	88.5	1500	12	118	140	90	188	98	4	G1/4	6xM5
Rota 12	28	28	93	110	170	88.5	1500	12	138	165	100	204	104	4	G 1/4	4XM8
Rota 15	28	28	93	110	192	116	1500	13.5	163.5	190	100	210	110	4	G 1/4	4xM8

**Dynamic torque**

- $t_{11}$  = Reaction time, time from start / stop signal to the beginning of the torque increase [s]
- $t_{12}$  = Maximum time taken to reach full dynamic torque (time to reach max. pressure) [s]
- $t_1 = t_{11} + t_{12}$
- $t_3$  = Acceleration time, time taken to reach full speed [s]
- $M_k$  = Dynamic torque of the RotaStep
- $M_s$  = Static torque of the RotaStep



**Selection**

To select the correct RotaStep size the following must be known :

- $n$  = revolutions per minute [rpm]
- $I$  = inertia torque, [kgm<sup>2</sup>]  
(Mass moment of inertia)
- $t_3$  = acceleration or deceleration time, [s] (max. 0.025 s when high repeat accuracy is required).
- $F$  = frictional force [N]
- $r$  = radius of feeding roller [m]

Calculation of this data is made on the basis of plant specifications such as measurements of feed rollers, chains etc., cycling frequency, max. feeding length or turning angle and time available per cycle.

The sizing is made according to the formula:

$$M = \frac{\sum I \times 2 \times \pi \times n}{60 \times (t_3 - t_{12} / 2)} + (F \times r) [Nm]$$

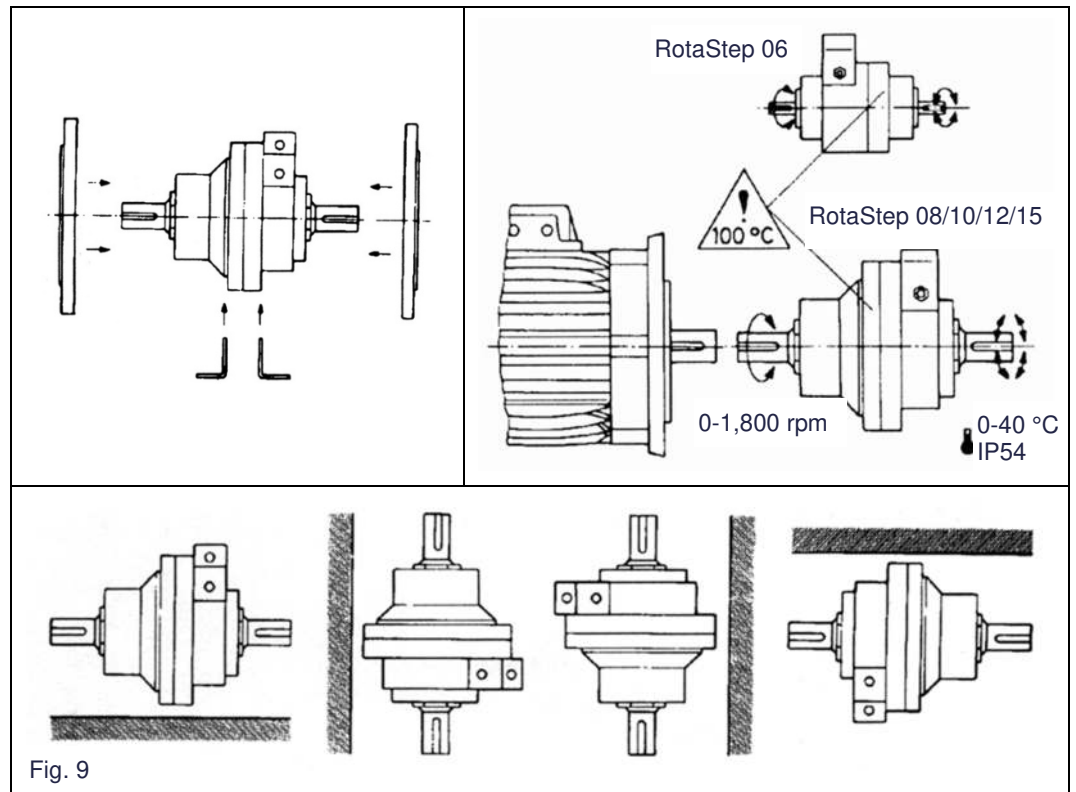
Repeat accuracy of the RotaStep is expressed by the time in ms. The tolerance of the required feeding length is the length to be reached in  $\pm 0.3$  ms

$$\begin{aligned} \Delta s &= v \times \Delta t \\ V &= 1 \text{ m/sec} \\ \Delta t &= \pm 0.0003 \text{ sec} \\ \Delta s &= (1 \times 0.0003) \text{ m} \\ &= 0.3 \text{ mm} \end{aligned}$$

External tolerance factors, such as encoder, motor recovery time etc., cannot be accommodated in the repeat accuracy calculation.

Sizing examples are available from MSW Motion Control GmbH and the MSW sales engineers are at your service with any required calculation as well as their application.

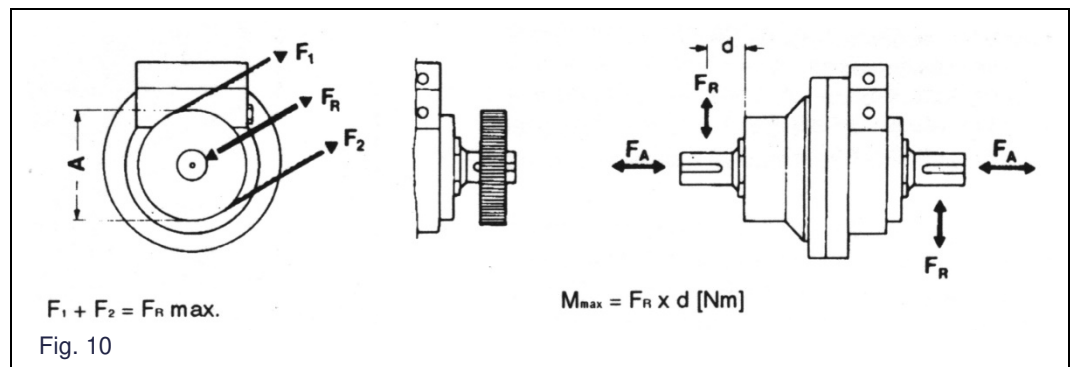
Mounting of RotaStep



The RotaStep is mounted on brackets or with the use of flanges. The clutch/brake unit can be mounted in any position on a flat surface.

**Note!** The valve housing of RotaStep 06 is on the input side where as the valve housing of RotaStep 08/10/12/15 is situated on the output side.

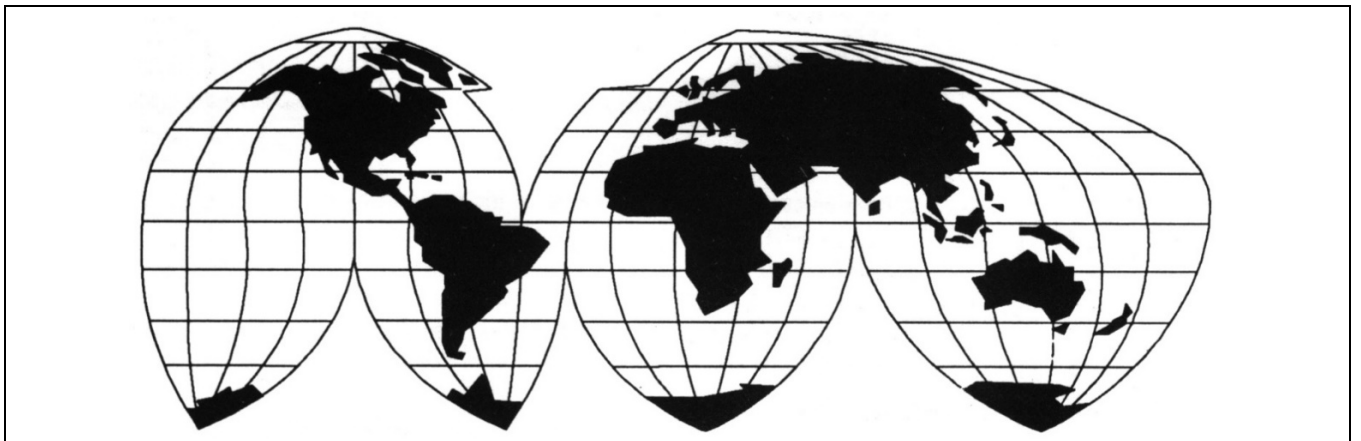
Permissible shaft loads



RotaStep	$F_A$ [N]	$F_{R \text{ max.}}$ [N]	$M_{\text{max}}$ [Nm]	$A_{\text{min}}$ [mm]
06	300	300	10	60
06	400	400	20	90
10	600	700	25	100
12	800	1000	40	130
15	600	1000	40	240



„Precision Step Systems“ is a line of products from  
ATB Laurence Scott



Worldwide Sale Organisation

**MSW Motion Control GmbH**

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Errors and technical changes excepted.

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