

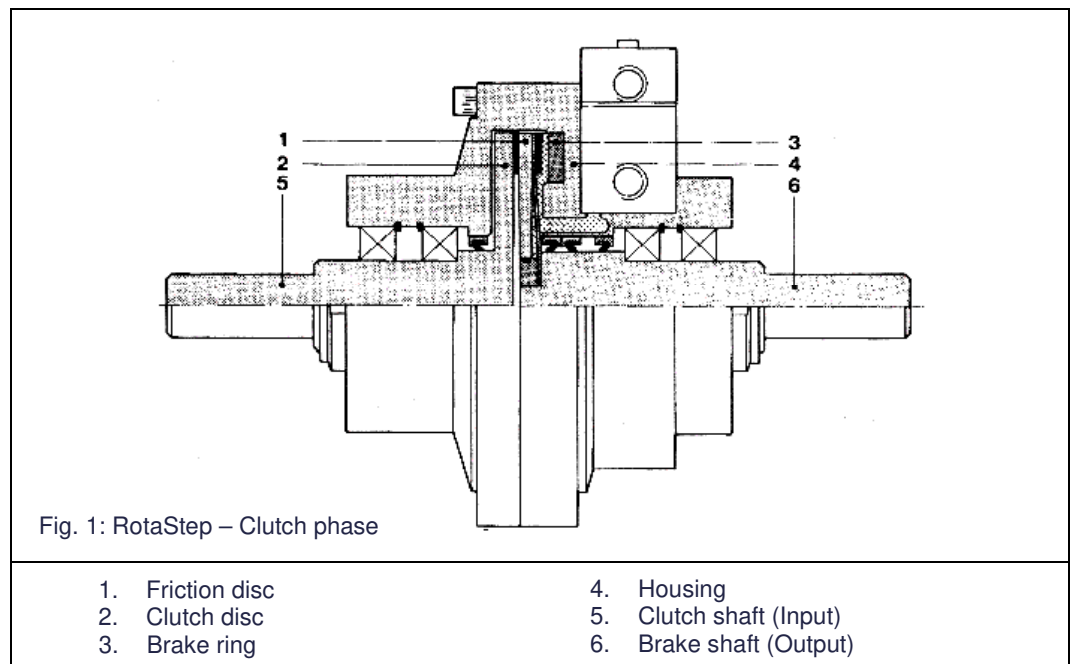
RotaStep

Service Manual

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1.0 Discription of function



The RotaStep unit is activated by compressed air (differential pressure 0.5 to 3.0 bar).

The pressure-relieved solenoid valves direct the compressed air to the clutch and brake side respectively. RotaStep in clutch mode is shown in fig. 1.

When neither of the solenoid valves is activated, atmospheric pressure is applied at both clutch and brake side. The clutch shaft (pos. 5) and brake shaft (pos. 6) can rotate freely.

The RotaStep unit can also be activated by vacuum (differential pressure 0.7 bar). The mode of operation is the same.



2.0 Trouble shooting

Before starting the trouble shooting procedure, it is recommended to ensure that specified limits of speed, cycling frequency and load are not exceeded. Please refer to dimensioning sheet.

2.1 Max. operating limits

Values for all RotaStep units	
Air pressure A_p , [bar]	3
Revolutions n_{max} [rpm]	1,800
Ambient temperature [°C] *	40
Surface temperature on RotaStep [°C]	100

* Higher ambient temperatures are permissible if the surface temperature is less than 100 °C.

2.2 Initial tests

In order to reduce the possibilities of failure it is recommended that a number of checks be made:

2.2.1 Electrical connections

Power supply to control unit must be properly connected and switched on.

Power supply to motor must likewise be connected correctly.

The Signal source connections on the control unit must be properly tightened and connected.

It is advisable to check the function of the solenoid valve unit by disconnecting it from the RotaStep body and supply the solenoid valve unit with the proper electronic signal. By the tip of a finger through the hexagon shaped holes, it is possible to detect if the valve plates are moving accordingly.

2.2.2 Mechanical connections

If the motor is connected to the output shaft of the RotaStep, the motor will be blocked, and this might cause fatal overheating of the motor.

Misalignment could be the cause of too rapid wear of bearings and the consequent decreasing of repeatability.

It is essential that the output shaft of the RotaStep can rotate freely after mounting the RotaStep clutch/brake unit, so that no obstructions disable the function.

2.2.3 Air supply

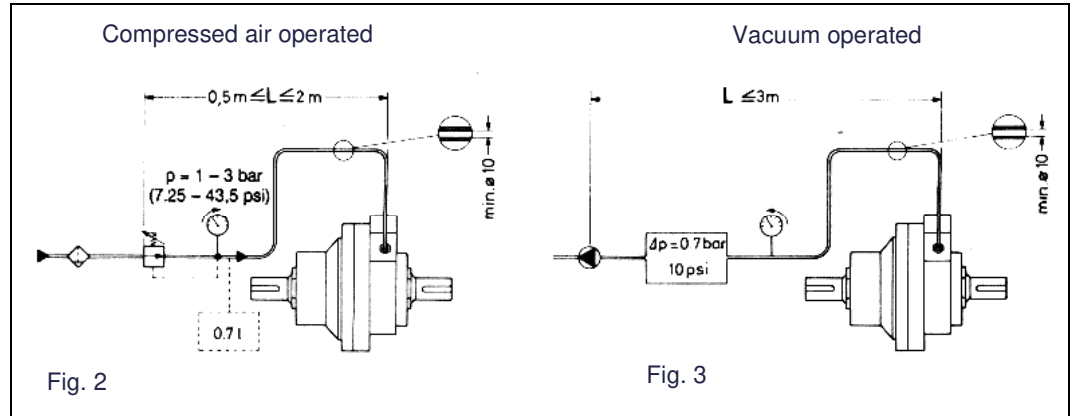
Before dismantling the unit, please check that the proper air pressure is supplied at the air input bushing.

The filter element could be clogged or the hose sucked flat.

3.0 Trouble shooting flow chart

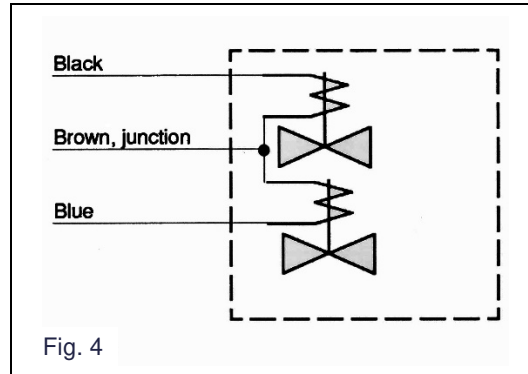


3.1 No air pressure



Symptom	Possible cause	Repair
Compressed air operated No air pressure	Compressed air connection not correct	Check connection fig. 2.
	Air outlet on valve unit blocked.	Remove obstruction.
	Pressure regulator not set or incorrectly set.	Pressure regulator to be set between 0.5 and 3.0 bar, depending on load. Refer to dimensioning sheet.
Vacuum operated No vacuum pressure	Wrong rotating direction of vacuum pump motor.	Check the direction of rotation, if wrong, interchange two phases on vacuum motor.
	Vacuum pump not connected correctly: - to RotaStep - to vacuum pump	Check connection, fig. 3.
	Vacuum supply to valve unit blocked.	Remove obstruction.
	Hose between vacuum pump and RotaStep defective, (sucked flat).	Check hose and renew if defective (or replace with correct type).
	Vacuum pump setting not correct.	To be set at Ap 0.7 bar
	Vanes in vacuum pump worn.	Check and renew.

3.2 No valve function



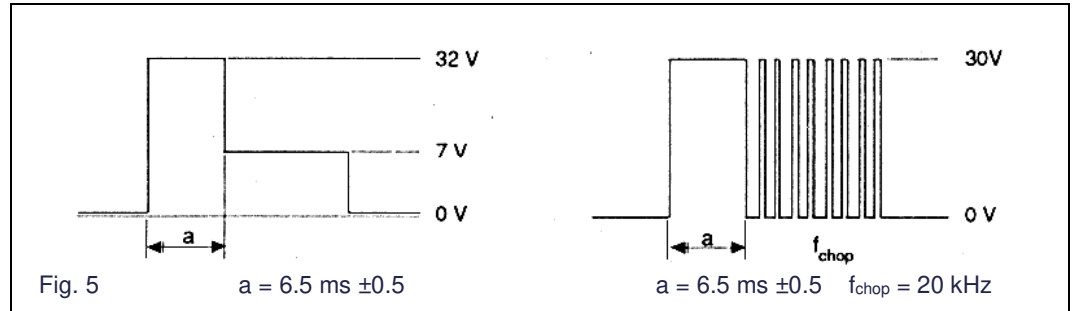
	Vacuum operated	Compressed air operated
Black	Clutch	Brake
Blue	Brake	Clutch

Symptom	Possible cause	Repair
Air pressure - OK No valve function	No voltage supply to electronic control.	Connect supply.
	Valve connections to electronic control not correct.	Check connection fig. 4.
	Driver signal to valves incorrect or missing.	Driver Signal must be as described in fig. 5 for correct function.
	Valve coils defective.	Check coil resistance according to fig. 9. If exceeding limits, renew valve unit.
	Lead resistance between electronic control and valves too high.	Check lead resistance. max. 0.25 Ω per lead.
	Air filter clogged.	Renew filter.

3.3 No clutch mode or no brake mode

No clutch mode	Incorrect connection of clutch valve.	Check connection fig. 4.
	Clutch valve coil is defective.	Check coil resistance according to fig. 9. If exceeding limits, renew valve unit.
No clutch mode, airflow through brake valve	Clutch valve mechanically defective.	Renew valve unit – see page 7.
	Friction disc lining worn.	Renew friction disc – see page 6.
No brake mode	Incorrect connection of brake valve.	Check connection fig. 4.
	Brake valve coil defective.	Check coil resistance according to fig. 9. If exceeding limits, renew valve unit.
	Brake valve mechanically defective.	Renew valve unit – see page 7.
No brake mode airflow through clutch valve	Friction disc lining worn.	Renew friction disc – see page 6.
Air leakage from valve unit	Valves obstructed by dust.	Clean with compressed air.
	Valves defective or worn.	Renew friction disc – see page 6.
Air leakage at shaft bearings	Sealing rings worn or defective.	Renew RotaStep.

3.4 Repeat accuracy poor



Symptom	Possible cause	Repair
Repeat accuracy poor <i>Accuracies higher than specified for RotaStep cannot be expected. Timings must be within the limits given in the dimensioning sheet. Please refer to specifications.</i>	Load variation.	The repeat accuracy depends on the load. If the load varies from step to step, variation in repeatability is unavoidable.
	Slack or wear in the mechanical parts between brake shaft and load.	Set RotaStep in brake mode and disconnect the clutch valve for safety reasons. Check all connections for wear and slack. Replace worn parts and tighten loose parts.
	Rotation speed at input shaft on RotaStep varies.	Increase flywheel mass on input shaft. Increase size of motor.
	Compressed air supply insufficient.	The hose between filter/regulator and RotaStep must be at least $\varnothing 10 \text{ mm}$ and max. 2 m long. To optimize the airflow, a 0.5 to 1 litre compressed air tank can be inserted between regulator and RotaStep. Check filter and renew if clogged.
	Oil or water from compressed air has contaminated friction disc.	Dismantle RotaStep to check contamination, see page 6. Renew friction disc as described. Also replace air filter and hose.
	Worn or defective friction disc.	Dismantle RotaStep for checking. Renew friction disc. See page 6.
	Sealing rings worn.	RotaStep must be renewed.
	Valve pick-up voltage too low.	Check pick-up voltage must be as illustrated, fig. 5.
	Brake valve leaks.	Clean valve unit with compressed air, or renew valve unit.
Stop signal transmitter defective.	Check to ensure that stop signal transmitter is: - connected correctly - mounted correctly - protected against mechanical and electronic interference - adjusted correctly	

3.5 RotaStep warm

RotaStep warm	The RotaStep unit is overloaded.	The surface temperature must not exceed 100°C. Influence on the temperature have: - Speed - Clock frequency - Load - Ambient temperature Do all data match the calculation? Reduction of one or more of the above data.
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4.0 Measuring friction lining wear

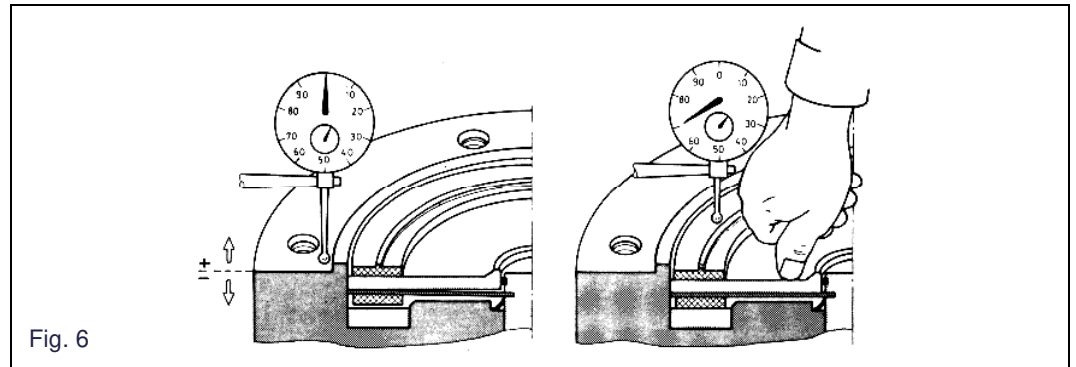


Fig. 6

Measure	Rota 06	Rota 08	Rota 10	Rota 12	Rota 15
New [mm]	0.06	0.5	0.8	1.8	1.3
Worn [mm]	0.9	0.6	1.9	2.9	2.4

With brake end removed it is possible to measure wear on the friction lining using a measuring dial on a magnetic foot fastened on the vice. See fig. 6.

Please note: It is not the actual thickness that is measured, but the distance from the facing of the housing to the upper lining.

Place the RotaStep unit with the clutch end downwards in a vice with aluminium jaws. Unscrew the hexagon socket head screws that retain the two parts. See fig. 6.

4.1 Friction disc renewal

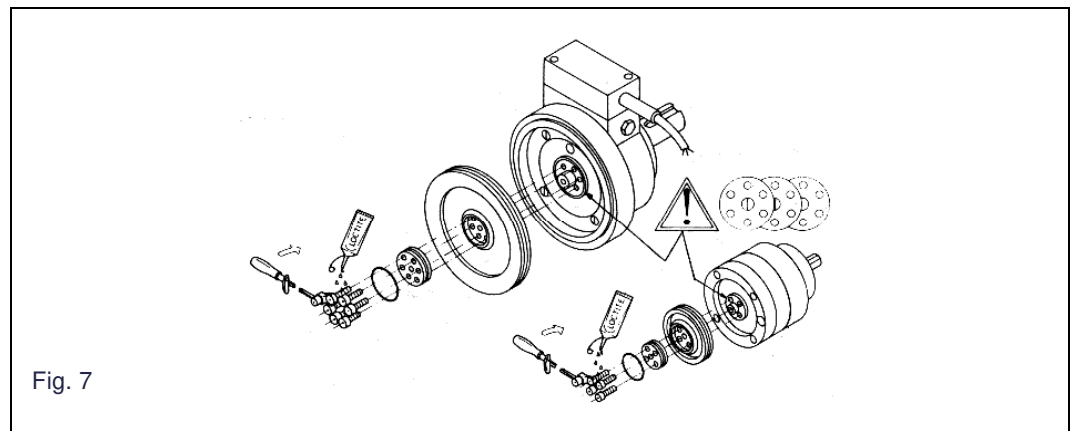


Fig. 7

Torque	Rota 06	Rota 08	Rota 10	Rota 12	Rota 15
A Shaft [Nm]	2.2-2.5	4-4	4-5	10-12	10-12
B Housing [Nm]	6-8	6-8	10-12	10-12	18-22

Be careful not to contaminate the friction disc with grease or oil. Small patches of grease can be cleaned off with acetone on a piece of clean cloth.

Renew the rubber sealing ring on the shaft end and insert the shaft end through the hole in the solid side of the friction disc. Add locking adhesive to the thread on the new screws and tighten the screws to the specified torque A. Assemble the two halves of the RotaStep unit, and tighten the screws to the specified torque B.

For ordering service kit, refer to paragraph 7.0 page 7.

Unscrew the screws that retain both shaft end and the friction disc. Please note the spacing washers. With the washers out of the housing, blow the two halves clean with compressed air.

Replace the washers and locate the new friction disc with spring steel downwards and solid side up.

5.0 Valve unit renewal

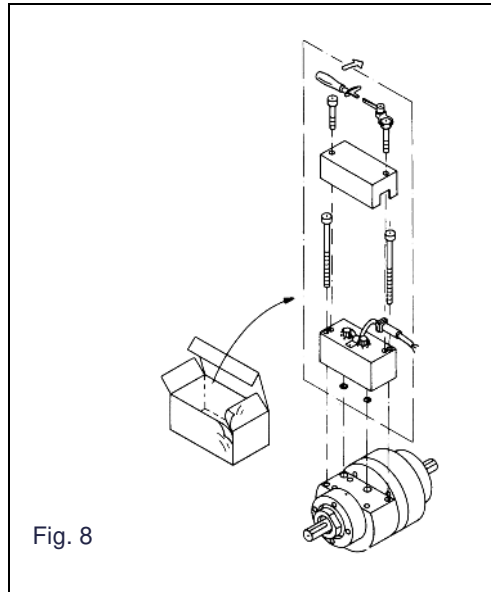


Fig. 8

The valve unit can be replaced without removing the RotaStep unit from the machine. Disconnect the electronics and loosen the two hexagon socket cap screws.

Remove the top cover. After loosening the two black hexagon socket cap screws, the valve unit can be moved. Blow the RotaStep unit clean with compressed air, place the rubber sealing rings as indicated on fig. 8, and mount the valve unit on the RotaStep unit using the new hexagon socket cap screws.

Tighten screws to the specified torque. The cables must be connected to the electronic control unit as required.

For ordering service kit, refer to paragraph 7.0 page 7.

Torque: 5-7 Nm

6.0 Resistance in valve coils

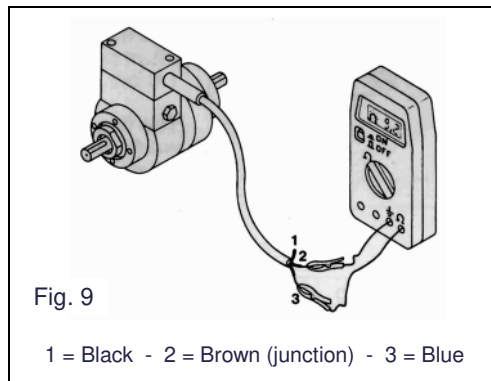


Fig. 9

1 = Black - 2 = Brown (junction) - 3 = Blue

The resistance in each valve must be measured between wire no. 1 and 2, and between 2 and 3. The resistance must not exceed:

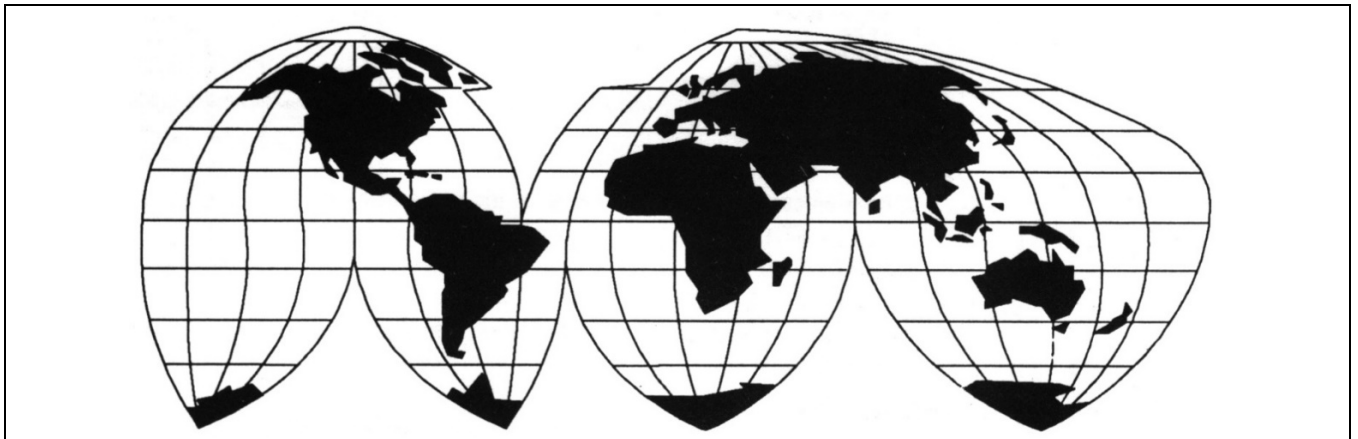
RotaStep 06/08/10	9.4 Ω ±0.35
RotaStep 12/15	10.4 Ω ±0.35

7.0 Service kit

	RotaStep 06	RotaStep 08	RotaStep 10	RotaStep 12	RotaStep 15
Friction disc	080H0150	080H0151	080H0152	080H0153	080H0154
Valve unit	080H0118	080H0118	080H0118	080H0118	080H0119



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