

# Operating Manual **DELTA DKRT2**

Double - Seat Ball Valve with Cleaning Connection  
Tank Outlet Valve



Read and understand this manual prior to operating or servicing this product.





## **Declaration of Conformity for Valves and Valve Manifolds**

APV Rosista GmbH, Zechenstr. 49, D-59425 Unna-Königsborn  
as manufacturer with sole responsibility declares that the

**double seat valves of the series D2, SD4, SDT4, SDM4, SWcip4, DSV,  
DA3, DE3, DEU3, DET3, DKR2, DKRT2, DKRH2**  
in the nominal diameters DN 25 - 150, 1" - 6" and 1 Sh5 - 6 Sh5

**butterfly valves of the series SV1 and SVS 1 F**  
in the nominal diameters DN 25 - 100, DN 125 - 250 and 1" - 4"

**ball cocks of the series KH, KHV**  
in the nominal diameters DN 15 - 100

**single seat, diaphragm and spring loaded valves of the series  
S2, SW4, SWmini4, SWT4, M3, MF3, M4, MF4, MP4, MS4, AP1, APT1, CPV, RG4,  
RGM4, RGE4, RGEM4, PR2, PR3, PR4, SI2, UF3, VRA, VRAH**  
in the nominal diameters DN 10 - 150, 1/2" - 4" and 1 Sh5 - 6 Sh5


and the valve manifolds installed thereof

meet the requirements of the Directives 89/392/EEC (amendment 93/44/EEC),  
replaced by 98/37/EC and GSG - 9.GSGV.

For official inspections, APV Rosista GmbH presents  
a technical documentation according to appendix V of the Machinery Directive,  
this documentation consisting of documents of the development and construction,  
description of measures taken to meet the conformity and to correspond with  
the basic requirements on safety and health, incl. an analysis of the remaining risks  
as well as an operating manual with safety instructions.

The conformity of the valves and valve manifolds is guaranteed.

D-59425 Unna-Königsborn, June 04, 2008  
APV Rosista GmbH

  
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Manager Research and Development



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**DKRT - DN50, 80, 100 RN - 01.078**



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## 1. General Terms

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This operating manual should be read carefully by the competent operating and maintenance personnel.

We point out that we will not accept any liability for damage or malfunctions resulting from the non-compliance with this operating manual.

Descriptions and data given herein are subject to technical changes.

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## 2. Safety Instructions

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### **Danger!**

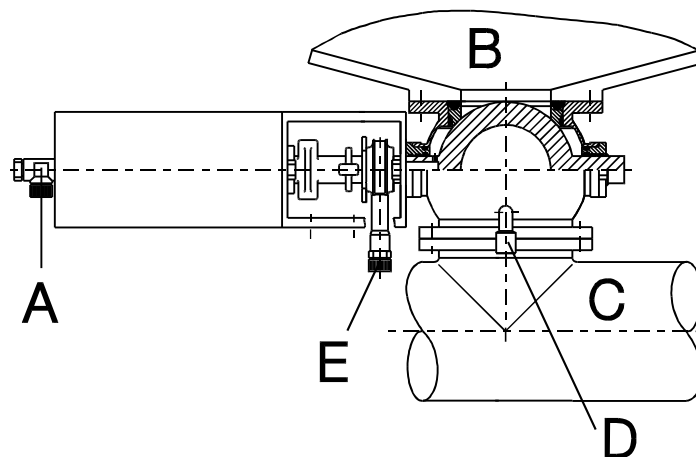
- The line and cleaning system must be depressurized before any maintenance of the valve.
- Electric and pneumatic connections must be separated.
- **Do not reach into the open valve ball!**  
**Risk of injury by sudden valve operation!**
- Observe service instructions to ensure a safe maintenance of the valve.
- Dismantle the actuator before the exchange of seals.
- During valve operation, operating leakages spirt out the drain pipe to the bottom.
- If the cleaning connection is not used, it must be sealed by a plug or operating leakages must be discharged.

### 3. Mode of operation

The DKRT 2 double-seat ball valve was particularly developed for the use in applications in which product safety against intermixing is of highest priority.

Low tank outlet heights through compact constructions, unreduced flow capacities through pipe diameter - sized balls and double-seat technology guarantee a safe and product-gentle function.

- Actuation of the pneumatic turning actuator with air connection at **(A)** drives the valve into the position "open". Reset into the limit position "closed" by spring force.
- In closed position two line sections with different liquids **(B and C)** are separated by two independently acting seals. The intervening leakage chamber is open to the atmosphere through the free drain **(D)**.
- In open position the liquid flows through the free opening cross section of the smooth valve passage. No inversion of the liquid flow in the valve area.
- In closed and open operating position cleaning liquid can be injected at the CIP connection at **(E)** to clean the leakage chamber.
- During the operating process, operating leakages bleed from the leakage drain **(D)** downwards. If a cleaning line is not connected, the cleaning connection **(E)** must be sealed by a plug or operating leakages must be discharged.
- The cleaning connection **(E)** can be used to vent the leakage chamber for a faster emptying or to sterilize the leakage chamber with steam.





## 4. Auxiliary Equipment

### Valve position indication

- Switches to signal the limit position of the valve ball can be installed in the yoke if requested.

We recommend our APV standard proximity switches.

**Type:** three-wire proximity switch  
(ref.-No. 08-60-011/93)

**Operating distance:** 4 mm / diameter : 11 mm / length: 30 mm

Feedback complete with support and proximity switch  
(ref.-No. 15-33-023/93) for a limit position.

If the user decides to apply valve position indicators other than APV type, we cannot take over the liability for any malfunctions resulting therefrom.

### - Control Unit

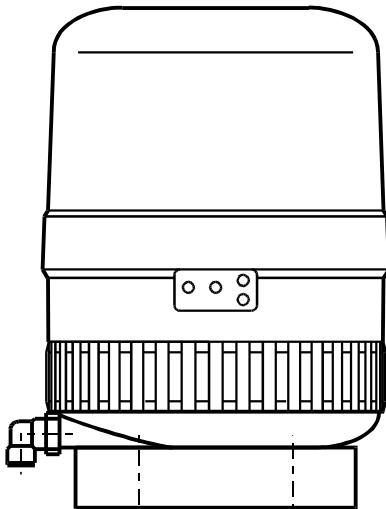
Units with feedback switches and solenoid valves to be assembled on the actuator, for the pneumatic control of the valve are also available in fieldbus technology.

The Control Unit CU3 can be installed on the turning actuator.

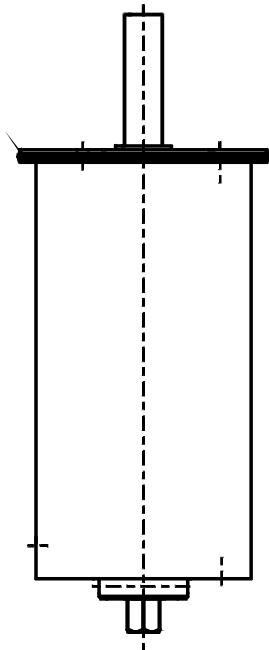
Different types are available:

designation :	ref.-No.:
<b>CU 31 Direct Connect</b>	<b>322 000 804 629</b>
<b>CU 21 Profibus</b>	<b>322 000 804 437</b>
<b>CU 31 Device Net</b>	<b>322 000 804 611</b>
<b>CU 31 AS - Interface</b>	<b>322 000 804 701</b>

control unit  
with adapter



turning actuator for  
Control - Unit

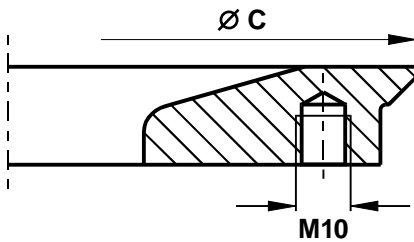


- For the installation of a control unit on the DKR2 valve a special turning actuator and an adapter are required. The standard actuator must be replaced.

turning actuators and corresponding adapters for control units	
	ref.-No.:
turning actuator K 080 DN 50 adapter CU 2 adapter SV1 / SVS1F / DKR2	000 - 15 - 37 - 070/17  322 000 801 194
turning actuator K 125 DN 80 - 100 adapter CU 2 adapter SV1 / SVS1F / DKR2	000 - 15 - 37 - 106/17  322 000 801 195

## 4. Auxiliary Equipment

tank bottom welding flange



The tank bottom welding flange for the DKRT2 valve does not form part of the scope of supply.

Order reference numbers for the tank bottom welding flange:

DN	ref.-No.:
50	31B 31 - 08 - 030/47
80	31B 31 - 08 - 032/47
100	31B 31 - 08 - 034/47

## 5. Cleaning

**Cleaning recommendation for the DKR valve in the beverage industry**

cleaning step	CIP - spraying
pre - flushing	2 x 10 sec.
caustic flushing 80° C	3 x 10 sec.
intermediate flushing	2 x 10 sec.
acid flushing	3 x 10 sec.
subsequent flushing	2 x 10 sec.

- The flushing times refer to a cleaning pressure of  $p = 3 - 5$  bar.
- The flushing times indicated for the individual cleaning steps are standard values. In specific applications these times must be adjusted depending on the product, the pressure ratio and the degree of soiling.
- The flushing quantity per CIP spraying cycle amounts to about 1 litre at a cleaning pressure of 3 - 5 bar.

## 6. Installation

- The valve must be installed in horizontal position at the tank bottom. Fluids and operating leakages are, therefore, freely drainable to the bottom and the leakage chamber drains off.
- With several valves being parallelly connected with one pipeline, a passage of the operating leakage to the cleaning connection of adjacent valves must be avoided. Installation of a shut-off device or a check valve in front of the cleaning connection is required.
- Cleaning connection with hose 8 x 1.
- **Attention: Observe welding instructions.**

## 6.1 Welding Instructions

### DKRT

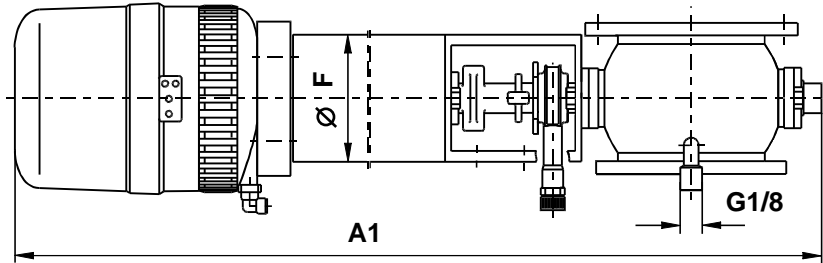
- Before welding of the valve, the welding flanges must be dismantled from the housing. Tacking or adjustment of the valves should only be undertaken with screwed down welding flanges.
- The welding of the mating flanges must be undertaken in such a way that deformation does not occur.
- Welding should only be carried out by certified welders (EN 287-1). (Seam quality EN 25817 "B").
- TIG orbital welding is best!
- The preparation of the weld seam up to 3 mm thickness can be carried out as a square butt joint without air. (Consider shrinkage!)
- After welding of the mating flanges and after work at the pipelines, the corresponding parts of the installation or pipelines must be cleaned from welding residues and soiling. If these cleaning instructions are not observed, welding residues and dirt particles can settle in the valve and cause damage or can be transferred to other parts of the installation.
- Any damage resulting from the non-observance of these welding instructions is not subject to our guarantee.

## 7. Materials

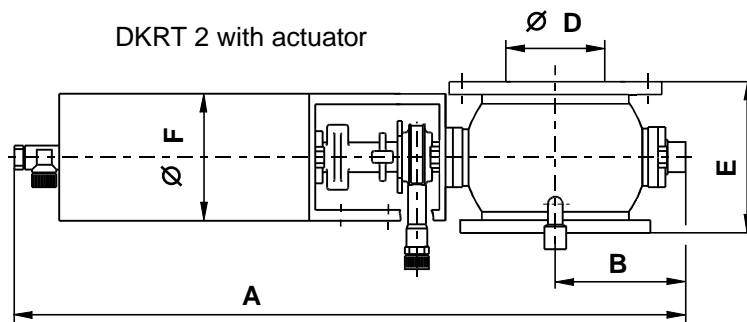
- housing, valve ball, shafts	<b>1.4404</b>
- yoke, actuator	<b>1.4301</b>
- coupling	<b>1.4057</b>
- ball seal	PTFE
- housing seal	<b>EPDM, FPM</b>
- flange seal	<b>EPDM, FPM</b>
- O-rings	<b>EPDM</b>
- indicator	<b>PE-solid</b>
<b>plastic parts in actuator</b>	
- spindle bearing	Vestamid L 1901
- air connection	PA 6.6
- piston	Hostaform C 9021

## 8. Dimensions and Weights

DKRT 2 with Control Unit CU3



DKRT 2 with actuator



Dimensions in mm

DN	A	A1	B	Ø D	E	Ø F	weight in kg
50	427	563	75	50,0	79,0	85	6,0
80	543	678	102,5	81,0	123,0	130	16,0
100	574	707	117	100,0	150,0	130	19,0

## 9. Technical Data

- max. line pressure : **10 bar**
  - max. operating temperature : **135° C EPDM, HNBR**  
\*FPM, \*VMQ
  - short-term load : **140° C EPDM, HNBR**  
\*FPM, \*VMQ
  - \* **no steam**
  - throughput cleaning  
at 3 bar admission pressure : **about 5 - 10 l/min.**
  - actuator
    - max. control pressure : **10 bar**
    - min. control pressure : **6 bar**
    - turning angle : **90°**
  - leakage connection : **G1/8**
  - cleaning connection (for hose ) : **8 x 1mm**
  - air connection (for hose) : **6 x 1mm**
- (Use dry and clean air, only.)**

	DN	50	80	100
<b>max. tightening torque in Nm</b>	( M )	22	40	65
<b>operating leakage at about 5 bar in L ( opening and closing operation )</b>	( Qs )	1,4	4,0	4,2
<b>pneumatic air consumption at 6 bar in NL</b>	( V )	1,8	5,5	5,5

## 10. Maintenance

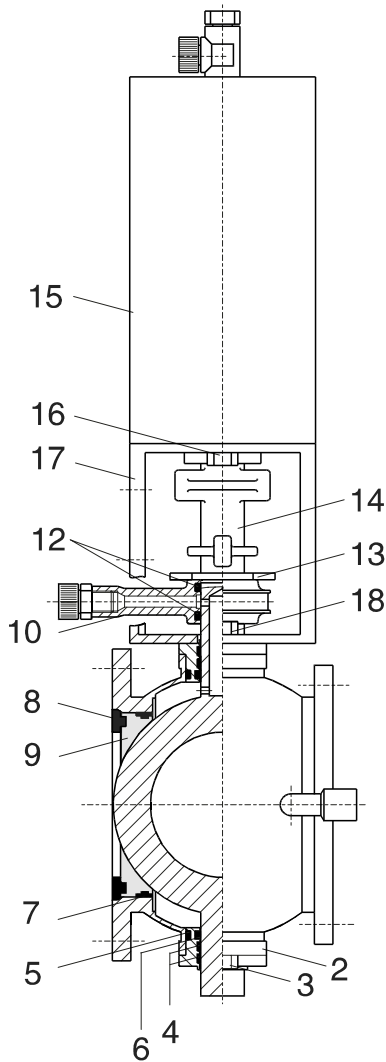
- Dismantling and installation of seals according to service instructions.
  - Assembly and adjustment of turning actuator according to service instructions.
  - Slightly grease all seals.  
Recommendation:  
APV food-grade-grease for **EPDM** and **FPM**  
(750 g/tin - ref.-No. 000 70-01-019/93)  
(60 g/tube - ref.-No. 000 70-01-018/93)  
or  
APV food-grade-grease for **VMQ** and **Perbunan**  
(600 g/tin - ref.-No. 000 70-01-017/93)  
(60 g/tube - ref.-No. 000 70-01-016/93)
- ! Do not use grease containing mineral oil with EPDM seals !  
! Do not use Silicone-based grease with VMQ seals !

## 11. Service Instructions

The item numbers refer to the spare parts drawing  
(DIN design: RN 01.078)

### 11.1 Dismantling from the line system

- a. Shut off connecting lines, lower line pressure and discharge if possible.
- b. Disconnect pneumatic and electric connections
- c. Dismantle cleaning line.
- d. Screw off valve position indicator.
- e. Remove flange screws.
- f. Detach ball valve from the flanges.



### 11.2 Dismantling of seals and guide bands

- a. Detach flange seals (8).
- b. Take off turning actuator (15) after removal of screws (16).
- c. Release screws (18) and yoke (17), coupling (14), indicator (13) and spray connection (10).



**Danger!** Do not replace seals before removal of turning actuator from the valve.

- d. Pull out PTFE ball seals (9) with appertaining housing seals (7).

To pull the ball seals out, half open the ball by hand and grasp alternately behind the seal!

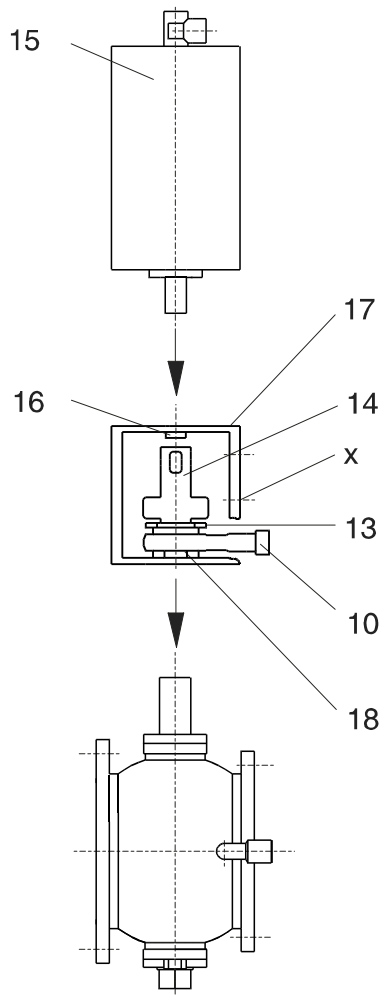
**Attention!** Ball and ball seal are sensitive to mechanical damage, the surfaces must not be touched by tools.

- e. Having released the screws (3), pull both shaft bearings (2) out of the housing and replace O-rings (5) and (6) and guide bands (4).

**Attention!** With dismantled shaft bearings and seals, the housing with ball must not be subject to vibrations.

## 11. Service Instructions

### 11.3 Installation of seals and guide bands



- a. Slightly grease O-rings (5, 6) and guide bands (4) before their installation in the shaft bearings (2).
- b. Push upper and lower shaft bearing (2) with a little grease in the housing, insert screws (3), but do not tighten them.
- c. Slightly grease housing seals (7) before their installation on the PTFE ball seals (9).
- d. Turn valve ball into open position by hand and install ball seals with a little grease at both sides.
- e. Slightly grease O-rings (12) and insert them in the spray connection (10).

### 11.4 Assembly of valve

- a. To ensure a safe handling of the valve, clamp the lower bearing flange into a vice with protective cheeks. Turn the ball into "open position". Place yoke (17), spray connection (10), indicator (13) and coupling (14) on the ball housing. The lower coupling cam must point to the lower yoke bore (x) and the indicator must point into flow direction.
- b. Screw in screws (18), but do not tighten them.

## 11. Service Instructions

### 11.5 Adjustment of operating position

**Attention!** For a safe, perfect and fast adjustment of the operating position, we recommend to use two separate FG flanges.

#### 11.5.1 Adjustment of operating position with FG flanges (flanges see RN 268.22-1)

Install the ball seals as described in 11.3. Assemble the valve as described in 11.4.

Turn the ball into its exact open position.

a. Control actuator (15) with pneumatic air (min. 6 bar) and place it on the yoke (17).

b. Screw in screws item 16, but do not tighten them.



**Danger!** Do not reach into the open valve after installation of the actuator. Risk of injury by sudden operation of the valve.

c. Screw down FG flanges at the housing. The ball must be in its exact open position during this procedure.

d. Release both screws item 3 of the shaft bearing (ball centers between the seals) and retighten them.

e. Slightly turn the actuator in anticlockwise direction to adjust the play in the connecting parts.

**!!! The ball must keep its exact open position during this procedure !!!**



**Danger!** Do not reach into the open valve. Risk of injury by sudden operation of the valve.

f. At first, tighten the screws item 18 and then item 16. Operate the turning actuator several times to check the operating accuracy of the ball.

g. Shut off the air supply to the turning actuator and dismantle the FG flanges.

h. Insert the valve in closed position between the flanges into the pipeline and fasten it with the screws.

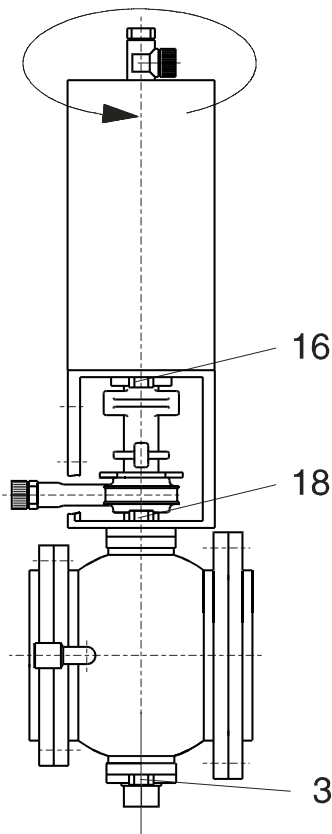
**Tightening torque:**

<b>M8</b>	<b>Md = 16 Nm</b>
<b>M10</b>	<b>Md = 40 Nm.</b>

i. Connect pneumatic air line with turning actuator.

j. Connect cleaning line.

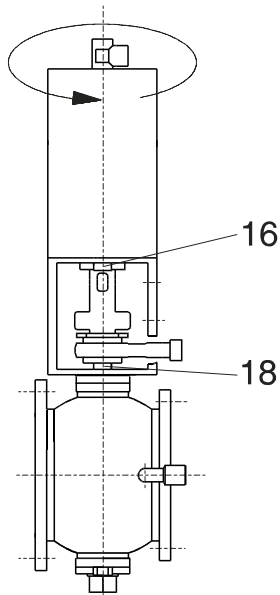
k. Attach valve position indicators.





## 11. Service Instructions

### 11.5.2 Adjustment of operating position without FG flanges



If FG flanges are not available, the ball can, in exceptional cases, be adjusted as follows.

**(Attention!** Failure of adjustment is possible.):

Install the ball seals as described in 11.3. Assemble the valve as described in 11.4. Turn the ball into its exact open position.

- a. Control actuator (15) with pneumatic air (**min. 6 bar**) and place it on the yoke (17).
- b. Screw in screws item 16, but do not tighten them.



**Danger!**

Do not reach into the open valve after installation of the actuator. Risk of injury by sudden operation of the valve.

**! The ball must be in its exact open position !**

- c. Slightly turn the actuator in anticlockwise direction to adjust the play in the connecting parts.

**!!! The ball must not move during this procedure !!!**  
**(exact open position)**

At first, tighten the screws item 18 and then item 16. Operate the turning actuator several times to check the operating accuracy of the ball.

- d. Shut off the air supply to the turning actuator and insert the valve in closed position into the line system. Fasten it with the screws.

**e. Centering of ball (absolutely necessary)**

To center the ball between the seal rings, proceed as follows:

1. Release screws item 3 by about ¼ turn.
2. Release one screw item 18 by about ¼ turn.
3. Release second screw item 18 by about ¼ turn and retighten it immediately.



**Attention!**

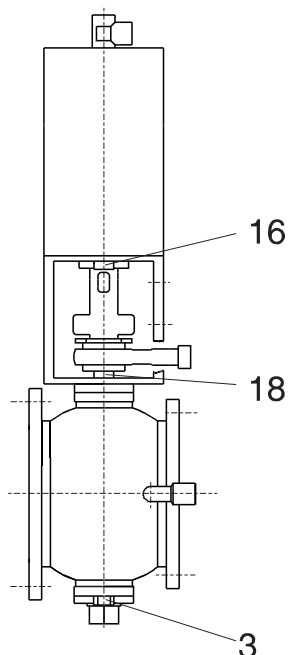
Hold the turning actuator fast during this process. Bring up holding moment in clockwise direction (top view of actuator).

4. Tighten screw 18 and, then, screw 3.

**f. Tightening torque:**

<b>Md = 16 Nm</b>	<b>M8</b>
<b>Md = 40 Nm</b>	<b>M10</b>

- g. Connect pneumatic air line with turning actuator.
- h. Connect cleaning line.
- i. Attach valve position indicators.



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## 12. Detection of Seal Wear

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The replacement of seals is undertaken as described in the Service Instructions 11.

### **Valve is closed and pressure from the valve ball**

- Leakage at upper and lower housing flange  
→ replace seal **(8)**.
- Leakage at the leakage bore  
→ replace seals **(8, 9, 7)**.

### **Valve is closed and leakage during cleaning via the spray connection**

- Leakage at spray connection  
→ replace O-rings **(12)**.
- Leakage at shaft bearing  
→ replace seals **(4, 5, 6)**.

### **Valve is open**

- Leakage at the leakage bore  
→ replace seals **(8, 9, 7)**.

If damaged seals are replaced, generally all seals should be changed. Set of seals for the valve service are available. The corresponding part numbers can be drawn from the spare parts lists.

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## 13. Spare Parts Lists

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(see annex)



BA DKRT2 00002  
ID-No.: H 1 7 0 7 5 8  
Translation of original manual



rev. 4



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02/94

Ersatzteilliste: spare parts list:  
 Ventil DKRT-Tankauslauf-FZ 1+2S DN 50,80,100  
 DKRT tank outlet valve-FZ 1+2S DN 50,80,100

Besteht aus <u>3</u> Blatt		Blatt <u>1</u>	
Datum	4/93	9/97	12/01
Name	Tryiko	Tryiko	Tryiko
Gezeichnet	15.4.93	07/02	03/03
Geprüft	27.4.93	Tryiko	Tryiko
Normgepr.	27.4.93	Plümpel	Tryiko
Name		Name	
Tryiko		Tryiko	
RN 01.078		RN 01.078	



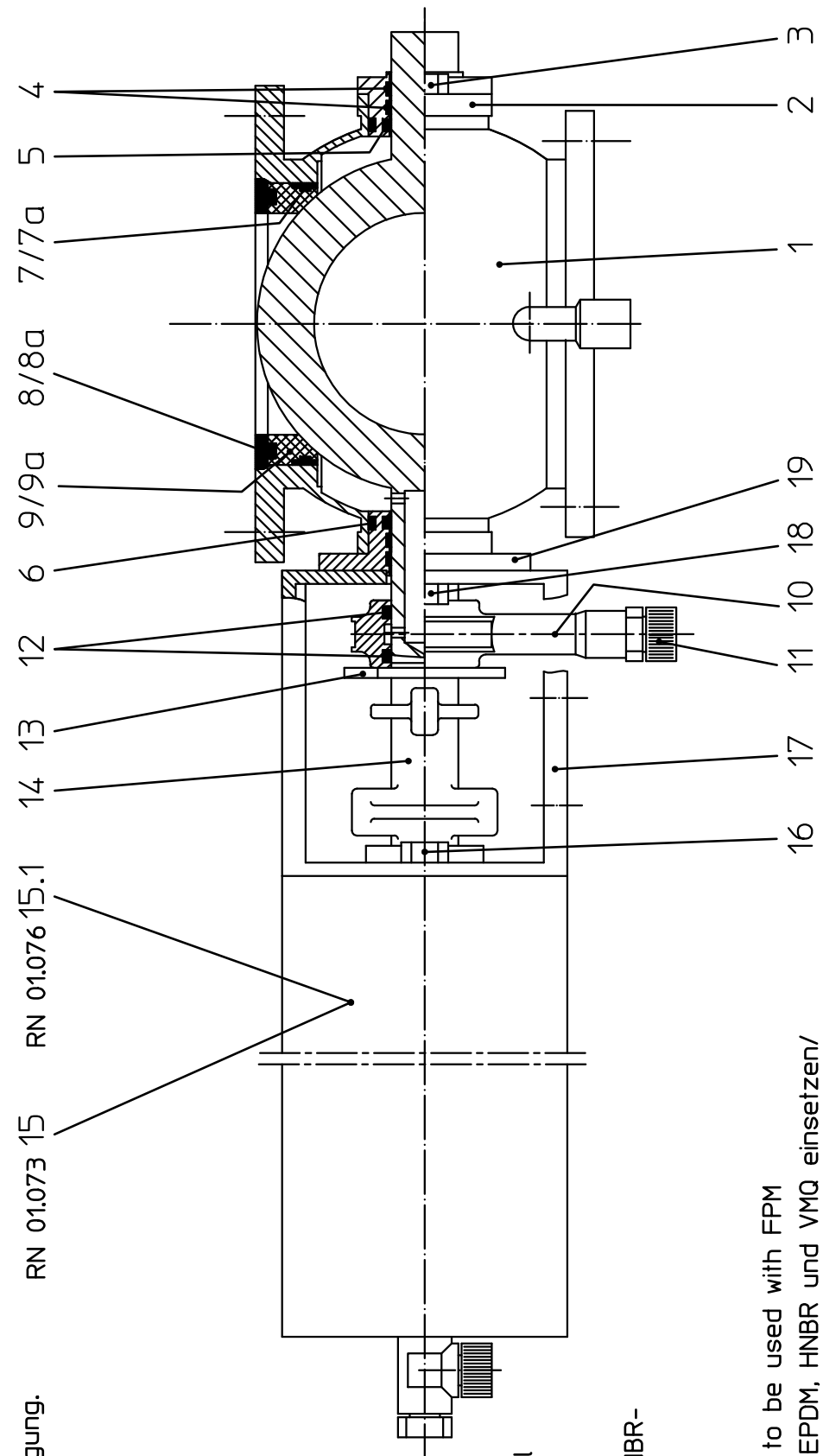
Es stehen verschiedene Dichtungswerkstoffe zur Verfügung. Bitte WS-Nr. ergänzen

The following seal materials are available (fill in last two digits of ref.-no.)

- \* Dichtungswerkstoff: material seals:
- ../13-VMQ/Silicone
  - ../33-HNBR
  - ../73-FPM
  - ../93-EPDM

Gehäusedichtung /housing seal  
 Bei VMQ wird die HNBR-Gehäusedichtung eingesetzt.  
 For VMQ (Silicone) take the HNBR-housing seal.

- \*\*O-Ring:
- ../73-FPM -bei FPM einsetzen/ to be used with FPM
  - ../83-NBR 70-75 Shore A -bei EPDM, HNBR und VMQ einsetzen/ to be used with EPDM, HNBR and VMQ



ACHTUNG !!! ATTENTION !!!  
 Pos.7a, 8a, 9a nur für DN80  
 item 7a, 8a, 9a only for DN80













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Ersatzteilliste: spare parts list:

Drehantrieb K-80, K-125, K-180 F/L

Actuator K-80, K-125, K-180 spring/air

Besteht aus 2 Blatt Blatt 1

Gezeichnet	4.3.98	Name	Tryiko
Geprüft			
Normgepr.			

APV Rosista GmbH  
D-59425 Urra  
Germany

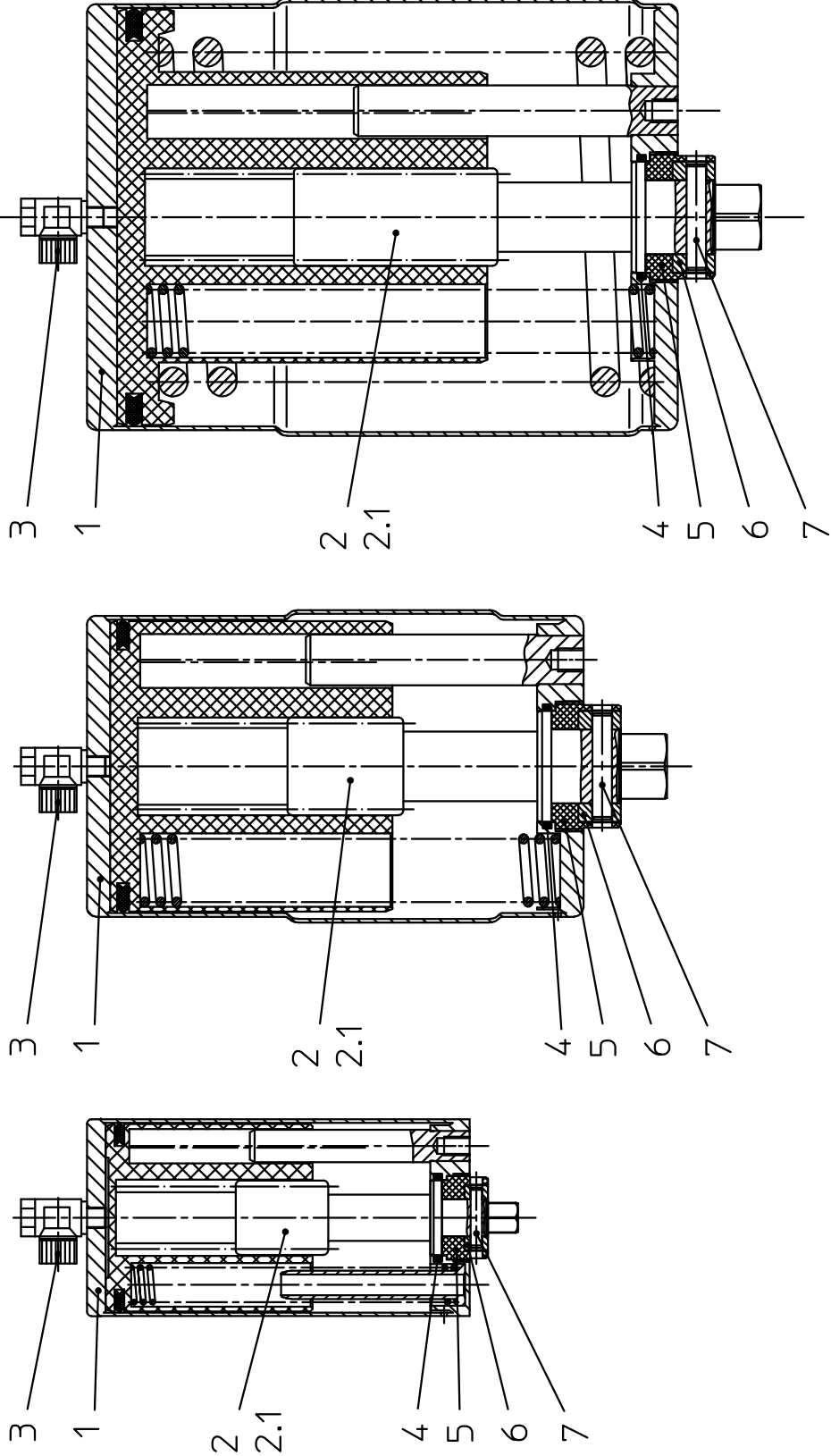
RN 01.073

Datum	3/98
Name	Tryiko

Es stehen verschiedene Werkstoffe zur Verfügung. Bitte WS-Nr. ergänzen

The following materials are available (fill in last two digits of ref.-no.)

- \*werkstoff metallisch/  
material metallic
- ../13-1.4.301 poliert/polished
- ../17-1.4.301 matt-gl./satin finish









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Ersatzteilliste: spare parts list:

Drehantrieb F/L für Rückmeldeeinheit

Actuator spring/air prepared for control unit

Besteht aus 2 Blatt Blatt 1

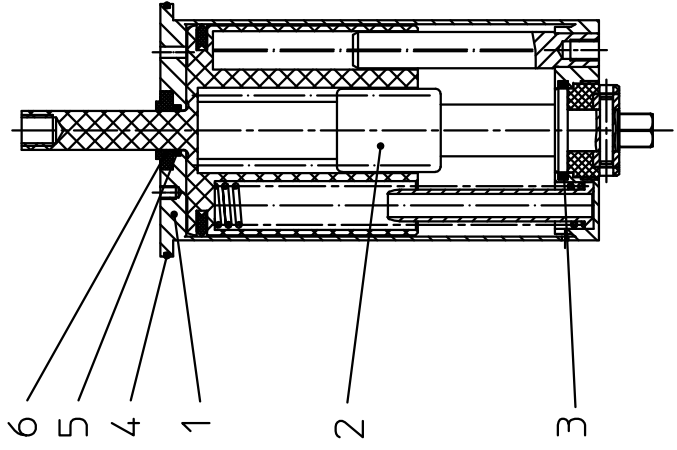
Datum	06/93	10/01
Name	Trytko	Trytko

Gezeichnet	21.06.93	Trytko
Geprüft	25.06.93	Spliehoff
Normgepr.	06.07.93	Plümper

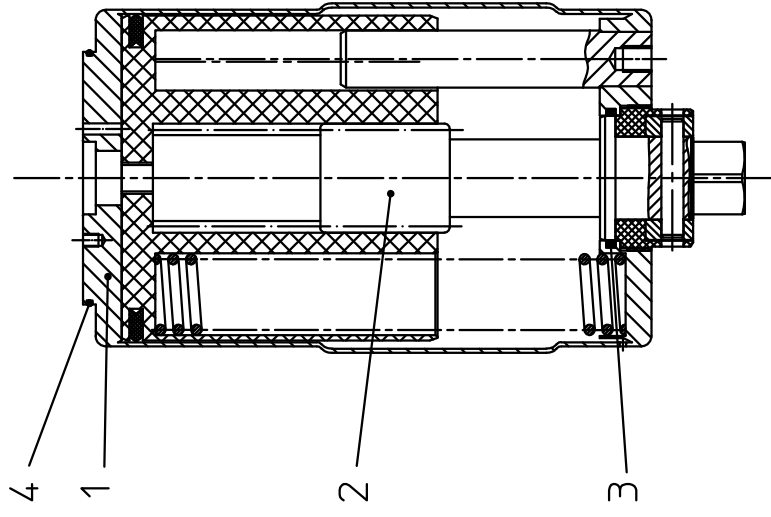
RN 01.076

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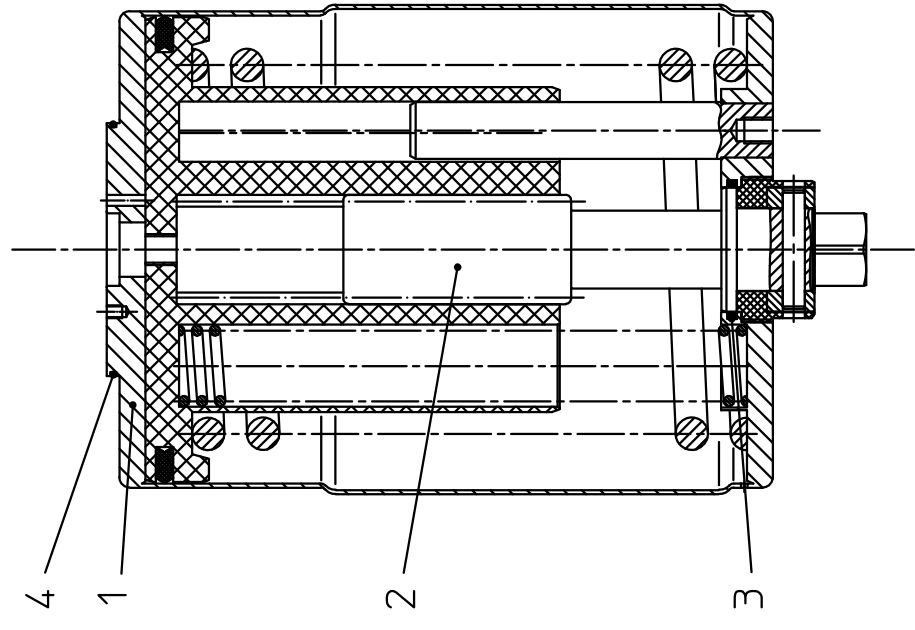
**APV** Rosista GmbH  
D-59425 Urra  
Germany



DRAT K080-RM



DRAT K125-RM



DRAT K180-RM





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Blatt 2

Gezeichnet	21.06.93	Trytko
Geprüft	25.06.93	Spliethoff
Normgepr.	06.07.93	Plümper

Datum	06/93	10/01
Name	Trytko	Trytko



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Ersatzteilliste: spare parts list:

Drehantrieb F/L für Rückmeldeeinheit

Pos item	Benennung description	Ausführung		WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.
		K080 WS-Nr. ref.-no.	K125 WS-Nr. ref.-no.						
1	Drehantrieb-komplett *	15-37-070/17	15-37-106/17	15-37-103/17					
1	Actuator-complexe *	15-37-071/17	15-37-105/17	15-37-104/17					
2	Spindel komplett mit Lager Shaft complete with bearing	15-24-021/13	15-24-031/13	15-24-033/13					
3	O-Ring	OR 32,2x3 NBR 70-75 Shore A	OR 49,5x3 NBR 70-75 Shore A						
4	O-Ring	OR 90x2 NBR 70-75 Shore A							
5	O-Ring	OR 15,3x2,4 NBR 70-75 Shore A							
6	Druckstück Drehantrieb K080 Spacer for actuator K080	08-48-117/53							