

Technical Product Information No. 560 EN

Hydraulically engaged clutch Series 0 021

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About this Technical Product Information (TPI)

Who is this TPI directed at?

This TPI is directed at qualified personnel who

- are entrusted with the assembly, commissioning and operation of the product and who
- have obtained the necessary qualifications by reading and understanding the instructions by training or instruction

It is intended for

- Fitters at the manufacturer of the machine / plant
- Maintenance fitters at the machine users.

What will you find in the TPI?

The TPI provides all the necessary information for the assembly and maintenance of the product described on the title page

Notes on the symbols used in the text

On the pages which follow, important sections of text are highlighted with the following symbols.



This symbol means:

There is a risk of injury during the activity described or in operational running!



This symbol means:

There is a risk of material damage during the activity described or in operational running!



This symbol indicates sections of text to which particular attention must be paid.

The Ortlinghaus numbering system

Example: 0 111 - 222 - 33 - 444 555

0 = Code for products	_____		_____		_____		_____		_____
Code number for the model range	_____		_____		_____		_____		_____
Code number for design features	_____		_____		_____		_____		_____
Size	_____		_____		_____		_____		_____
Sequential number	_____		_____		_____		_____		_____
Other design features	_____		_____		_____		_____		_____



Pass this TPI on to your customers ! You can either order further copies of this TPI from us or you are free to make copies, for use by your customers.

About the product

Application and mode of functioning of the clutch

Hydraulically-engaged clutches are characterised by the low amount of space they take up, by their low moment of inertia and by the high rates at which they may be engaged and disengaged. In the main they require no or only very little maintenance provided the internal oiling is adequate. In addition their multi-plate form of construction enables them to transmit high torques and -provided the internal oil cooling system is adequate- to cope with the production of a large amount of heat.

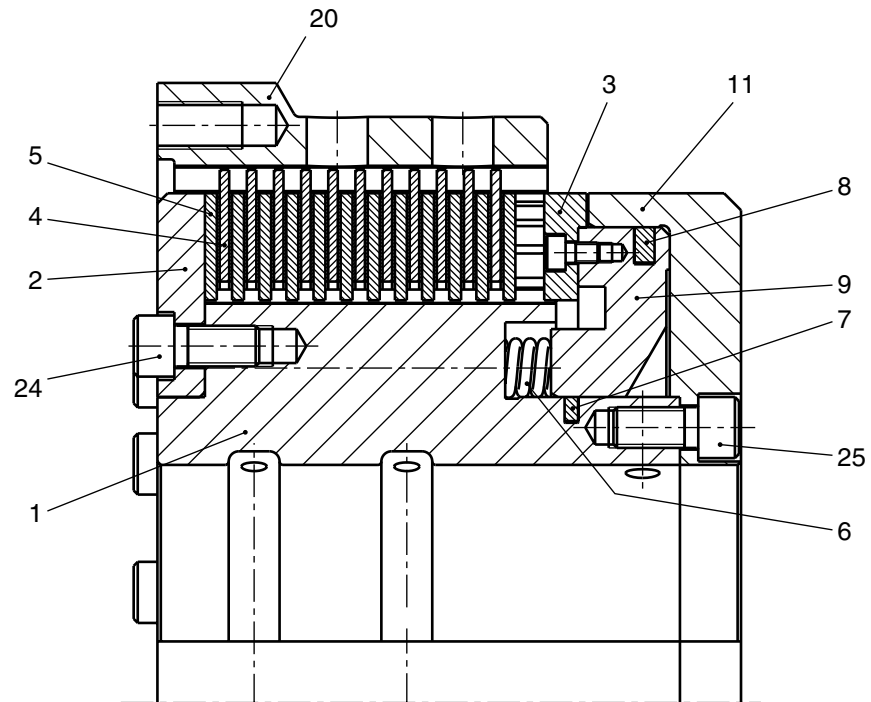


Fig. 1: Function of the clutch

Engaging: Hydraulic oil pushes the piston (9) back against the force of the springs (6). The set of plates consisting of the outer plates (4) and the inner plates (5) is pressed together so that the hub (1) and housing (19-22) become frictionally connected.

Disengaging: When the piston (9) is depressurized, it is pushed back by the springs (6) into its initial position. For this to take place properly, the oil must be able to flow freely out of the cylinder (11).

Maximum speed: When the cylinder is rotating, the residual oil left in it exercises - by reason of centrifugal force - an axial force on the piston. If this force is greater than the counterforce exerted by the springs, the clutch engages **automatically**. To prevent this happening, there is a maximum permissible shaft speed (see general drawing).



The normal operating pressure is

Size	15 - 23	27 - 55	63 - 96
Operating pressure	18 bar	20 bar	25 bar
max. perm. pressure	27 bar	30 bar	38 bar



Never operate the clutch at a **higher pressure** since otherwise there is the risk of bolts shearing.

Form of delivery of the clutch

The clutch is supplied in two parts:

- plate hub with stop plate, set of plates, piston and cylinder assembled ready for use,
- and the housing.

Variant forms of execution

Clutch with emergency engagement system

An emergency engagement system (see Fig. 2a, 2b) is provided only with certain variants, e.g. clutches for marine use, or on special request.

N.B.! We must point out that after operation of the clutch has been carried out in emergency engagement mode, the plates must be inspected for possible damage and if necessary replaced.

Operation of the clutch utilising the emergency engagement system is thus to be used exclusively in emergencies, i.e. if the pressurised oil supply to the clutch can no longer be ensured. The emergency engagement system is in no event to be used for continuous operation. The actuation of the emergency engagement system is carried out with the drive shaft and take-off shaft stationary, you can get the required torque loadings for the emergency engagement bolts from the clutch drawing.

Clutch with emergency engagement system - Variant 1

The emergency engagement system is not integrated into the clutch.

- Remove the screw plugs (17) on the cylinder (11) and replace them with longer hexagon head screws in accordance with the general drawing.
- Tighten up the screws to the torque given in the general drawing.
- The screws press the piston (9) and the piston pushes the set of plates together.
- Hub (1) and housing (20) are connected together frictionally.

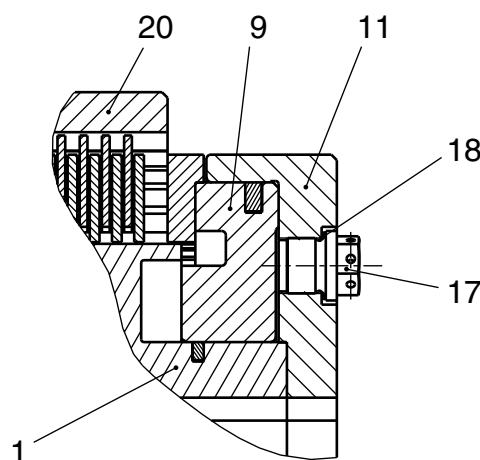


Fig. 2a: Variant 1 - Clutch with emergency engagement system

Clutch with permanently integrated emergency engagement system - Variant 2

- If the hydraulics fail, tighten the emergency running bolts (17) on the cylinder (11) to a torque loading in accordance with the assembly drawing.
- The screws press the piston (9) and the piston pushes the set of plates together.
- Hub (1) and housing (20) are connected together frictionally.

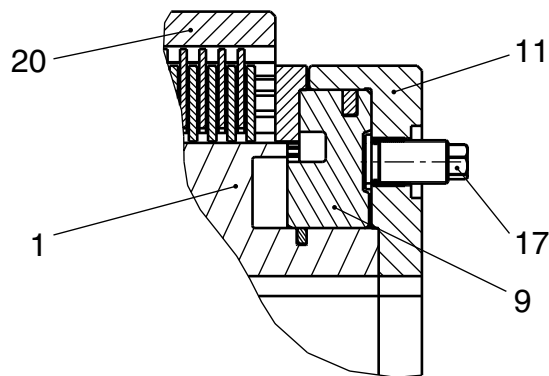


Abb. 2b: Variant 2 - Clutch with integral emergency engagement system

Clutch with external oil inlet

With the clutches with an external oil inlet (see Fig. 3), the oil inlet ring (14) is fastened to the clutch with a shaft nut.

The oil inlet (15) must be prevented from turning by means of a holder or pin inserted in the hole provided for this purpose. The connecting oil line must be a flexible hose so that no twisting and thus damaging of the guiding running surfaces can take place.

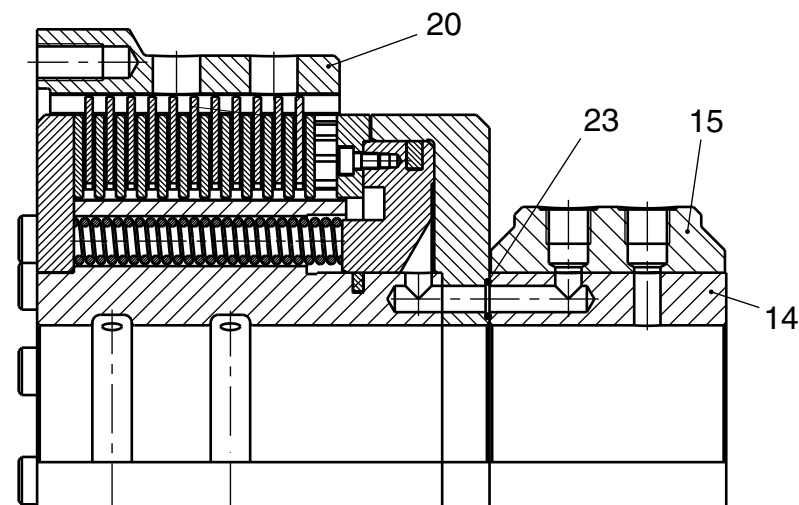


Fig. 3: Clutch with external oil inlet

Initial mounting

- Check first of all the position of the keyway, oil inlet bore and cooling oil bores on the shaft. (One or more annular slots are provided in the bore of the hub for the cooling oil.)
- Slide the clutch unit (bore H6 or H7) without the housing on to the shaft (h6 or k6) and lock the clutch unit in the position which is right for the oil inlet.
- **Important:** The fit between shaft and bore may not be greater than h6/H7 since otherwise oil leaks are possible.
- Now slide the housing carefully without damaging the teeth of the plates over the clutch unit up to the centering seat on the relevant machine element.
- Bolt and pin housing and machine elements together.



If the particular circumstances should make it necessary for the housing to be connected to the machine element first, **particular care** must be taken when sliding the clutch unit on to the shaft and into the housing in one operation since the plates can be easily damaged when this is being done.

Maintenance

Under normal operating conditions and providing the internal oiling is adequate, no wear of any great extent should take place on the friction linings of the outer plates beyond that which takes place in the short running-in period. However the plates must be replaced should the friction linings become worn following an extended period of service or as a result of the clutch having been allowed to slip a lot. Information on the play between the plates (air gap) and on the maximum permissible wear is to be found in the general drawing that has been already mentioned on page 2.



As a result of the danger resulting from the tension under which the springs are in the clutch and in the interests of the functional safety of the clutch, the clutch plates should be replaced and repairs to the clutch carried out **only by customer service**.

Fault finding

Fault	Reason	Remedy
Clutch slips	Oil pressure too low	Increase operating pressure (page 3)
	Fault in the hydraulic system (dirt, leaks ...)	Repair hydraulic system
	Friction linings worn down (maximum permissible size of air gap reached)	Get customer service to change the plates
	Reason cannot be established Machine-damage	Obtain technical service

Complete assembly - only for customer service

Dismantling

- Remove the two or three bolts on the stop plate (2) or depending on the fitting position-cylinder (11) .
- Screw in the stud for the drawing-off device.
- Draw off the clutch from the shaft.

Changing the set of plates and/or the springs

- Slacken the bolts (24) on the stop plate (2) uniformly.
Important:The stop plate is under spring pressure!
- Lift off the stop plate (2). You can now replace the plates (4, 5) and/or springs (6).
- Carry out reassembly in the reverse order. Tighten up the bolts (24) to the torque given in the following table. Secure the bolts with Loctite type 262 (as a rule with in addition wire from size 55).

Size	15	23	27	32	39	43	47
Bolt (24)	M4	M4	M5	M5	M5	M6	M8
M _A [Nm]	4,5	4,5	8,9	8,9	8,9	15,5	37

Size	55	59	63	66	72	75	78
Bolt (24)	M10	M8	M10	M12	M14	M14	M16
M _A [Nm]	75	37	75	130	205	205	310

Size	79	81	85	89	91	94	96
Bolt (24)	M20	M20	M24	M24	M24	M27	M30
M _A [Nm]	620	620	1060	1060	1060	1550	2100

Bolt quality 10.9

Tightening torques M_A in accordance with VDI 2230, Page 1

Changing the seals (piston rings)

If the seals (piston rings **7, 8**) need to be changed, make marks on the hub (**1**) and cylinder (**11**) to give the relative positions of these one to another before commencing dismantling

- Remove the bolts (**25**) on the cylinder (**11**) .
- Draw off the cylinder (**11**).
- Replace the piston rings (**7, 8**).
- Clean and rinse out all parts carefully before commencing reassembly.
- Compress the piston rings (**7, 8**) with piston ring pincers or pins one after the other and slide them into the cylinder (**11**).
- Replace existing dowel pins by new ones.
- Carry out reassembly in the reverse order. Tighten up the bolts (**25**) to the torque given in the following table. Secure the bolts with Loctite Typ 262.

Size	15	23	27	32	39	43	47
Bolt (25)	M4	M5	M5	M6	M6	M8	M8
M _A [Nm]	4,5	8,9	8,9	15,5	15,5	37	37

Size	55	59	63	66	72	75	78
Bolt (25)	M10	M8	M10	M12	M14	M14	M16
M _A [Nm]	75	37	75	130	205	205	310

Size	79	81	85	89	91	94	96
Bolt (25)	M20	M20	M24	M24	M24	M27	M30
M _A [Nm]	620	620	1060	1060	1060	1550	2100

Bolt quality 10.9

Tightening torques M_A in accordance with VDI 2230, Page 1

Approved oils

We approve the oils listed below for the operating of the clutch. These have all been tested by us and enable the clutch to perform optimally.

	Hydraulically engaged multi-plate clutches operated at average speeds (v ₁) » 5 bis 12 m/s)		Hydraulically engaged multi-plate clutches operated at high speeds (v ₁) > 12 m/s)	
	Home country	Foreign country	Home country	Foreign country
ARAL	Kosmol TL 68 64 mm ² /s	Kosmol TL 68 64 mm ² /s	Kosmol TL 46 44 mm ² /s	Oel CMS 22 mm ² /s
BP	Energol HL 46 46 mm ² /s	Energol THB 46 46 mm ² /s	Energol HL 32 32 mm ² /s	Energol THB 32 32 mm ² /s
CASTROL	HYSPIN VG 46 46 mm ² /s	PERFECTO T 46 46 mm ² /s	HYSPIN VG 32 32 mm ² /s	PERFECTO T 32 32 mm ² /s
CHEVRON	GST Oil 46 46 mm ² /s	GST Oil 46 46 mm ² /s	GST Oil 32 32 mm ² /s	GST Oil 32 32 mm ² /s
DEA	Astron HL 46 46 mm ² /s	Etema LTD 46 46 mm ² /s	Astron HL 32 32 mm ² /s	Etema LTD 32 32 mm ² /s
ELF	POLYTELIS 46 46 mm ² /s	POLYTELIS 46 46 mm ² /s	POLYTELIS 32 31 mm ² /s	POLYTELIS 32 31 mm ² /s
ESSO	TERESSO 68 (until 52) 64 mm ² /s	ESSTIC 68 (until 50) 64 mm ² /s	TERESSO 32 (until 43) 30 mm ² /s	ESSTIC 32 (until 42) 34 mm ² /s
FINA	CIRKAN 68 ISO 62 mm ² /s	BAKOLA 68 64 mm ² /s	CIRKAN 38 F 39 mm ² /s	CIRKAN 38 F 42 mm ² /s
FUCHS	RENOLIN MR 15 49,6 mm ² /s	RENOLIN MR 15 49,6 mm ² /s	RENOLIN MR 10 34 mm ² /s	RENOLIN MR 10 34 mm ² /s
MOBIL OIL	D.T.E. Oil Medium 43,4 mm ² /s	D.T.E. Oil Medium 43,4 mm ² /s	D.T.E. Oil Light 29,6 mm ² /s	D.T.E. Oil Light 29,6 mm ² /s
SHELL	Morlina 46 46 mm ² /s	Morlina 68 68 mm ² /s	Morlina 32 32 mm ² /s	Morlina 32 32mm ² /s
TEXACO	Rando Oil C 65 mm ² /s	Regal Oil R&O 68 63 mm ² /s	Rando Oil B 43 mm ² /s	Regal Oil R&O 46 42 mm ² /s

v₁) = peripheral speed at the circumference of the clutch/brake.

Viscosity at 40° C; 1 mm²/s ≈ 1 cSt.

The above statements are not binding and should be checked on a case to case basis. The products are listed in alphabetic order and no order of merit is implied.

Spare parts

Our guarantee for our products only applies when you use original Ortlinghaus spare parts. Please order spare parts only in writing.

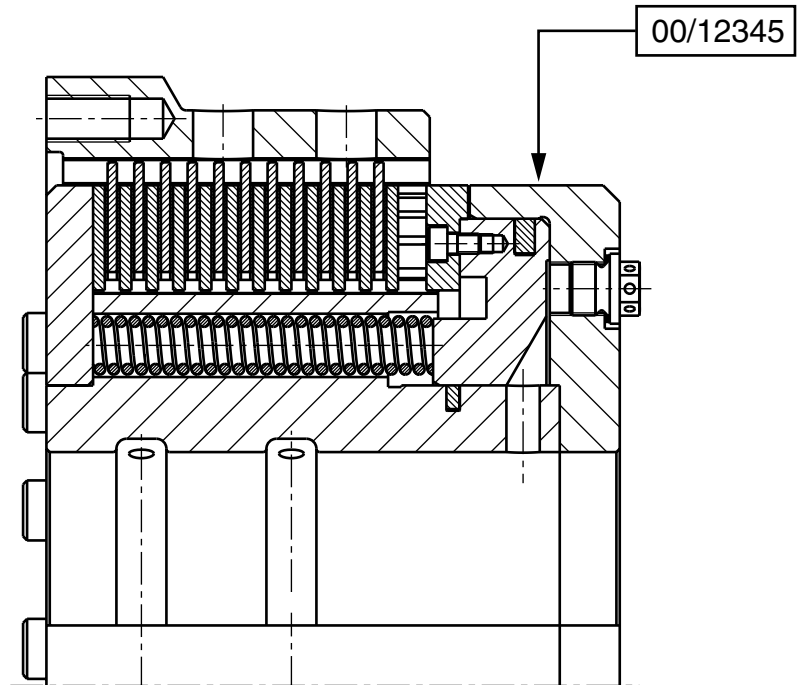


Fig. 4: Fabrication number

You will find the fabrication number, under which your clutch was manufactured, on the outside of the cylinder. Please always state this number. It is made up of two digits for the year and a consecutive number, e.g. 00/12345. In addition state if possible the article number of your clutch.

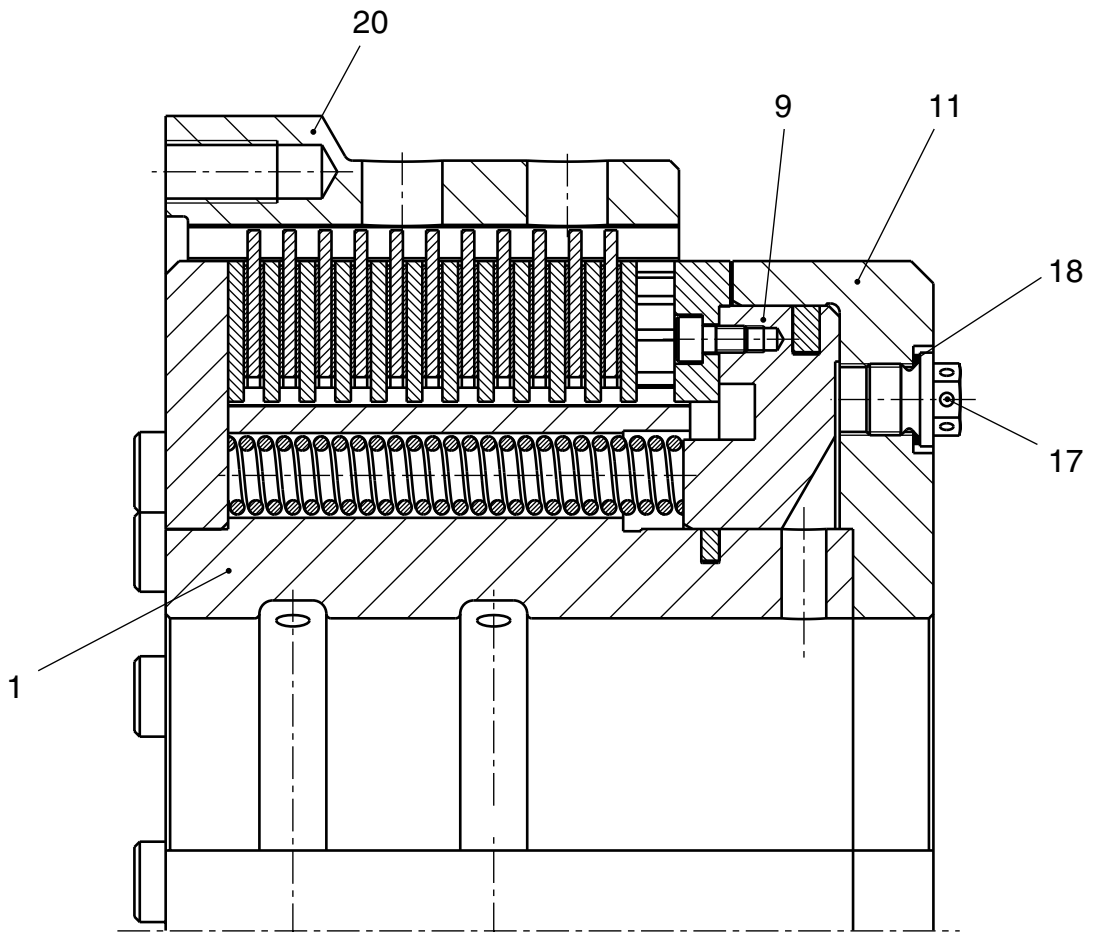
List of parts

(see sectional drawings)

Item	Part
1	Hub (plate carrier)
2	Stop plate
3	Thrust disk
4	Outer plate
5	Inner plate
6	Spring
7	Piston ring (inner)
8	Piston ring (outer)
9	Piston
11	Cylinder
14	Oil inlet ring (with external oil inlet)
15	Oil inlet ring (with external oil inlet)
17	Screw plug
18	Seal
20	Shoulder housing (alternative)
22	Cup housing (alternative)
23	O-ring (with external oil inlet)
24	Bolt
25	Bolt

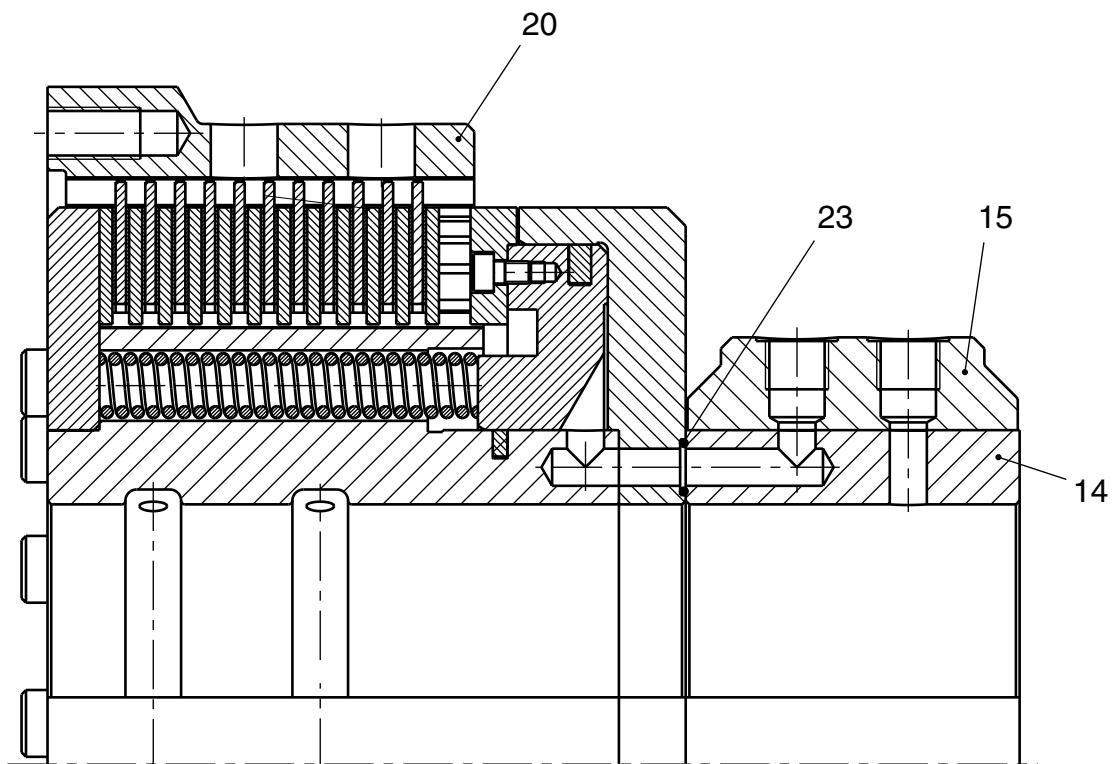
Sectional drawing

Clutch with shoulder housing 0 021- ... 3- ... -



Sectional drawing

Clutch with cup housing 0 021- . 6



Kupplung mit Topfgehäuse 0 021-0 . 7-

