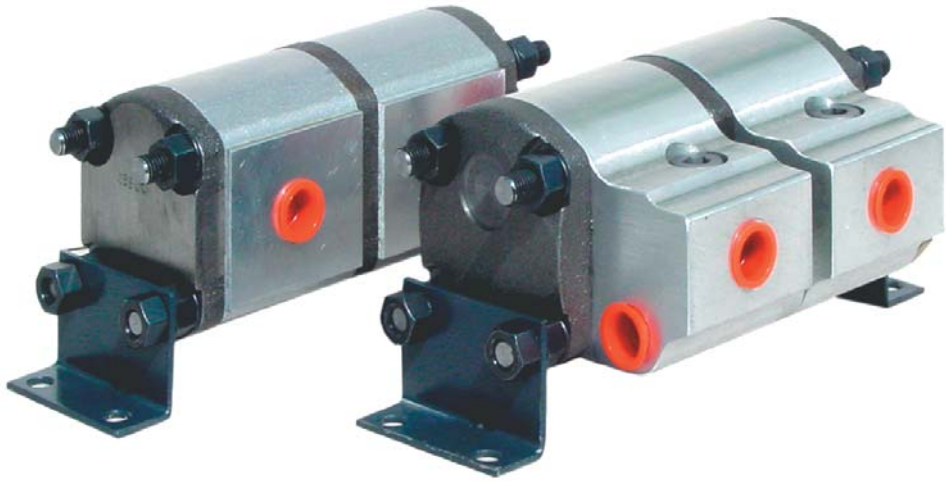
JAHNS
HYDRAULIK

Operating instructions
spare parts list
gear-flow-divider **MTO**

8th edition March 2007



Jahns-Regulatoren GmbH

D 63069 Offenbach
D 63009 Offenbach
http://www.jahns-hydraulik.de

Sprendlinger Landstraße 150
Postbox 10 09 52

Telephon +49 (0)69 848477-0
Telefax +49 (0)69 84847725
info@jahns-hydraulik.de

Inhaltsverzeichnis

Installation instructions for gear-flow-divider

When installing flow-dividers MTO...,please take care for the following:

Technical datas are given in our data-leaflets. Tubes should be clean like in every hydraulic-system. Any pollution can lead to lifetime-abreviation and leads to poorer synchronisation of the divided flowrates, specially, if any pollution would be held in the check-valve-cones.

It doesn't play any roll, which side of the flow-divider is used as input and which-one as output. It's only important that all input lie on one side of the flow-divider and all outputs on the opposite side.

Oil-choise is not a question of the used MTO... but of the total hydraulic unit. HLP-oil with viscosity of 68 cSt at 40 degrees centigrade is recommended.

It's not necessary to fill flow-dividers with oil before using them for the first time.

Flow-dividers are working automatically as pressure-multipliers, if some outputs need only low pressure and the rest of outputs has to overwhelme a greater resistance. If the max. pressure, forced by worst-case pressure-multiplication,can reach max.allowed pressure of the flow-divider, the outputs must have relief-valves to protect the circuits. Normally it's recommended to have these relief-valves generally.

To get rid of any synchronisation-faults in the stroke-end of the cylinders, you should bring valves in your outputs as shown in hydraulic-schemes of our leaflet.We recommend 1 bar check-valves and a pressure-resistance 5 bars in the source-line.Check-valves with less than 1 bar or without spring can lead to small flows in the wrong direction, that would trouble the synchro-nisation.

The relief-valves should be without any leakage, if installed pressure isn't reached. We see from time to time, that low quality of these valves leads to poor synchronisation.

Pressure-setting of the relief-valves should be about 20 bars higher than really needed to over-whelme the charge of the cylinder.

System-pressure of the pump: If all the cylinders have the same load, you can say, that pump-pressure ps = pressure for the load + 25 bar + Δp (Δp = pressure drop in the flow-divider, normally 10 - 15 bar, it's better to calculate with 20 bars).

To avoid great oil-compression-faults,it's recommended to set flow-divider nearest to the cylinders.

If the cylinders have always the same differences in load, the flow-divider with it's pressure-multiplication can lead to lower pressures of the pumpsystem.

According to our MTO-leaflets we recommend to use out-let-blocs **A** with inline-mounted valves.These blocs lead to low space-need and are often more leakproof than tubing. These blocs are mounted on MTO ...GB.

Outlet-blocs

Blocs with serial-standard 3 or higher are standard now, because 90% of the customers favourite them. Every outlet has it own pressure-relief-valve and no connection by check-valves to other outlets.

Pressure-setting:

Bring cylinders to max.stroke-end.Caused by technical-difficulties, you don't find any special threads to connect manometers. So you must bring manometer in the connection-tube between flow-divider-outlet and cylinder. Then you set pump-pressure so high, that it would be pos-sible to have the desired outlet-pressure.

Thread **T,NS** must be connected with source-connection, brought on a pressure-level of 5 bars at a minimum.

Integral pressure valves in the MTO

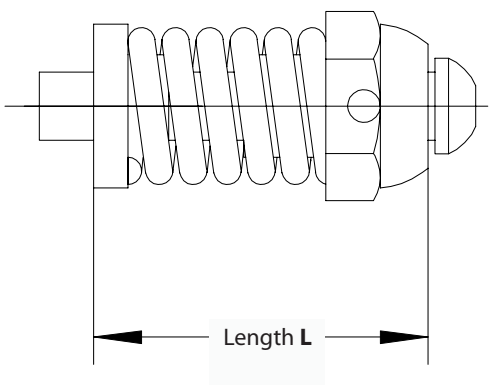
The pressure valves were a key issue in the past. In the MTZ we had adjustable devices. This did not meet with the approval of a lot of customers, since the valves had to be adjusted on-site when installed on machines and often it was something that customers could have done without ("make it adjustable and it needs adjusting!"). Consequently, the subsequent MTC was fitted with pressure valves, which were permanently set. This proved an elegant and simple solution, particularly as we offered 12 different fixed values between 50 and 260 bar.

The new pressure valves for the MTO represent a healthy compromise between the easily adjustable valves of the MTZ series and the non-adjustable valves of the MTC range.

The drilled seating for the pressure valves in the MTC is the same as that for the new MTO valves. As a consequence it is still possible to pay extra in order to obtain devices with a fixed value setting.

The pressure control valves are set to these values.

The fact that the pressure valves are counter-sunk means that it is not possible to adjust them, whilst at the same time looking at the pressure manometer. In order to set the valves it is necessary to remove the pressure cartridge from the block. Since the safety valves need not be set to a great degree of precision and can easily accommodate a tolerance of 3 bar, it is possible to set the valve by simply measuring the distance 'L' using a calliper rule. In the diagrams (left) you can read off the values for pressure = f(L) for the different springs. These tables indicate the pressure levels and the corresponding spring lengths. After installing the pressure control valves again, the adjustment is completed.



Standardspring, colour red, standard, preset to approx. 180 bar

pressure (bar)	Length **L** (mm)	pressure (bar)	Length **L** (mm)
130	27,50	220	26,15
140	27,35	230	26,05
150	27,20	240	25,90
160	27,05	250	25,80
170	26,90	260	25,65
180	26,75	270	25,55
190	26,60	280	25,40
200	26,45	290	25,25
210	26,30	300	25,15

Specialspring, colour green, preset to approx. 120 bar

pressure (bar)	Length **L** (mm)	pressure (bar)	Length **L** (mm)
90	26,80	150	25,70
100	26,60	160	25,55
110	26,40	170	25,35
120	26,25	180	25,20
130	26,05	190	25,00
140	25,90	200	24,80

Specialspring, colour blue, preset to approx. 100 bar

pressure (bar)	Length **L** (mm)	pressure (bar)	Length **L** (mm)
60	26,6	120	25,0
70	26,3	130	24,8
80	26,0	140	24,5
90	25,8	150	24,2
100	25,6	160	24,0
110	25,3		

Specialspring, colour black, preset to approx. 50 bar

pressure (bar)	Length **L** (mm)	pressure (bar)	Length **L** (mm)
30	26,2	60	25,3
40	25,9	70	25,0
50	25,6	80	24,7

Compensating synchronisation

As the low divider is an independent flow control mechanism without any direct means of measuring the synchronisations errors that will always occur, any corrections have to take place as the cylinders reach the end of their stroke.

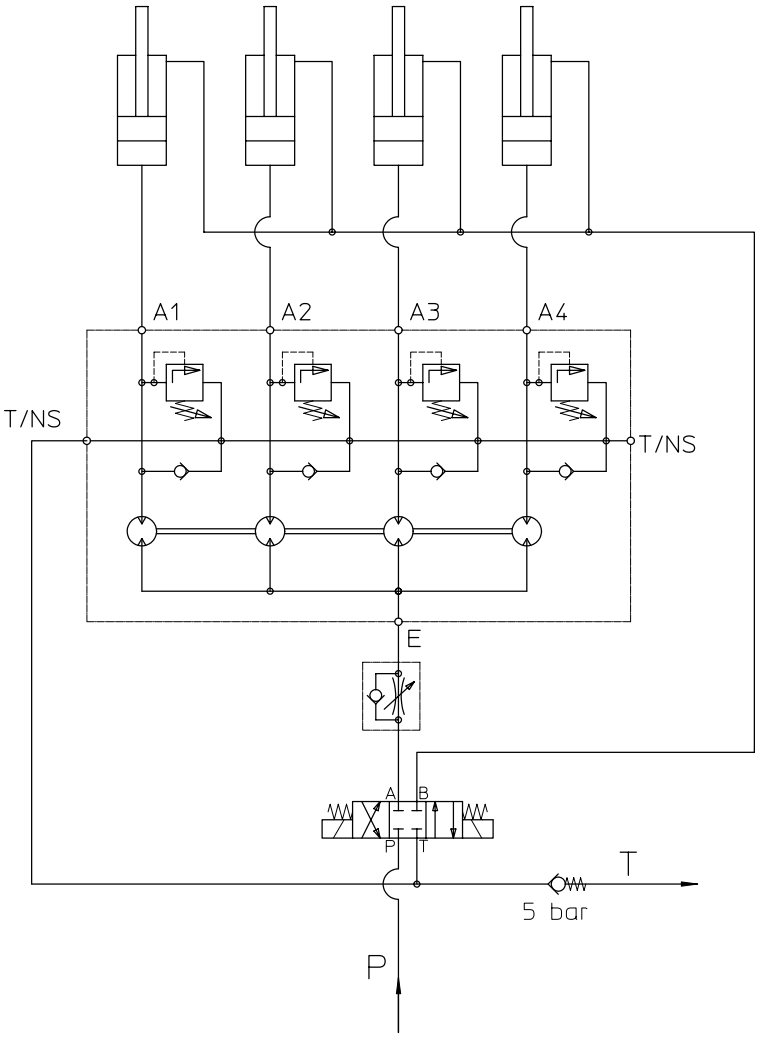
The diagramm below shows an example of such a circuit.

The valves in the circuit have the following functions: The pressure relief valves **1** serve as protection against excess pressure in the cylinder outlet lines as may be caused by the pressure multiplier effect. In this way all cylinders are able to complete their strokes even if one of them has reached the stroke-end. Valves **2** and **3** maintain a minimum pressure of approx. 4 bar in each of the flow divider sections. The difference of 1 bar from the opening tension of valve **3** is due to the opening tension of valves **2** of 1 bar.

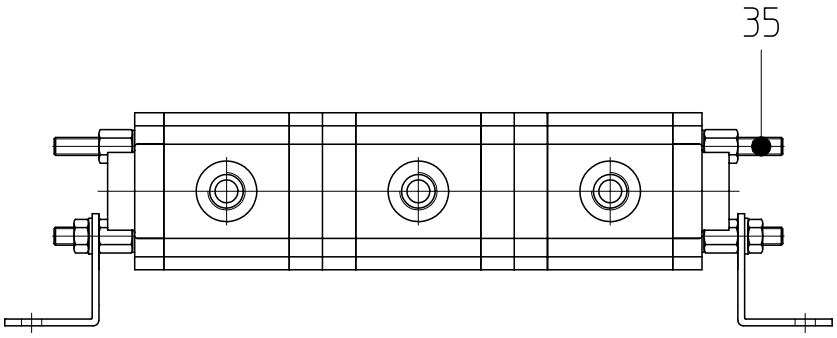
The minimum pressure feed is important, for example, when one of the cylinder has reached its end stroke, but the flow divider continues running due to the slower cylinders. The pressure feed then prevents suction occuring in the line connecting the fastest cylinder. Valve **4** has an important function which is often ignored on flow dividers: If the oil flow from the pump reaches the cylinders and the flow divider has the task of collection the returnline oil in order to perform an equalisation of the flows, valve **4** ensures that the flow divider is not made to run at the speed of the fastest cylinder then the other cylinders do not follow due to friction, loading, pinching etc.: the flow divider can only operate as a collector if all the cylinders operate at the same speed.

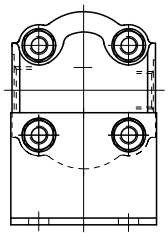
A pressure relief valve or an over-centre valve could be used instead of the throttle valve **4**.

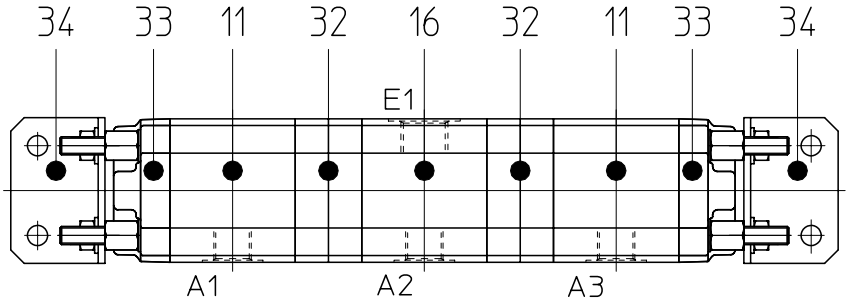
The use of such a valve in the circuit becomes particularly important when the cylinder return strokes occur whitout a controlling pump flow, eg. under action of their own weight.

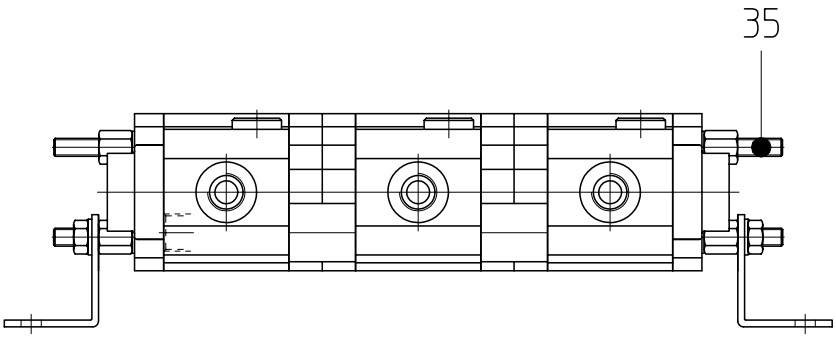


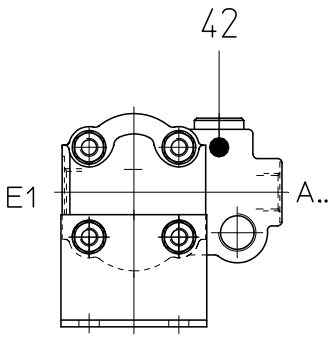
Spare parts list MTO Size 1

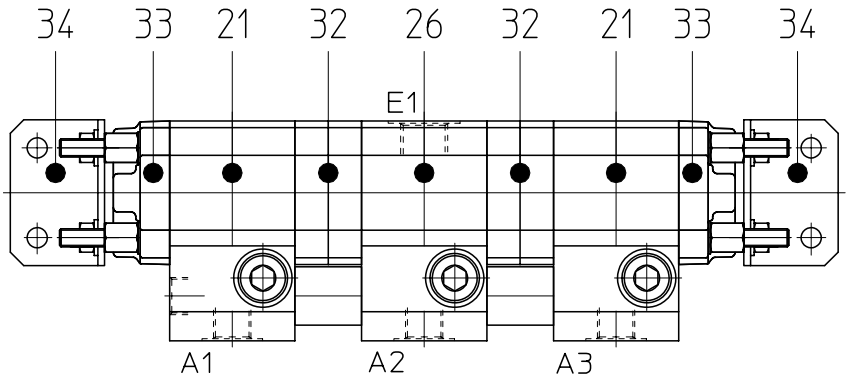








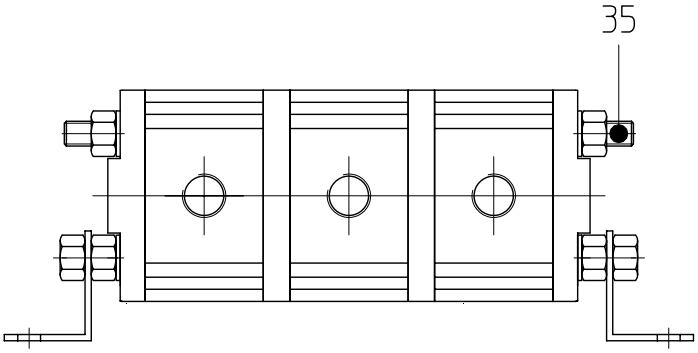


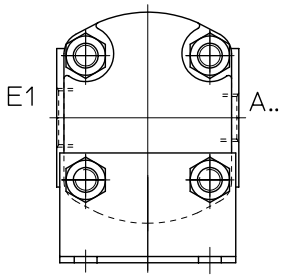


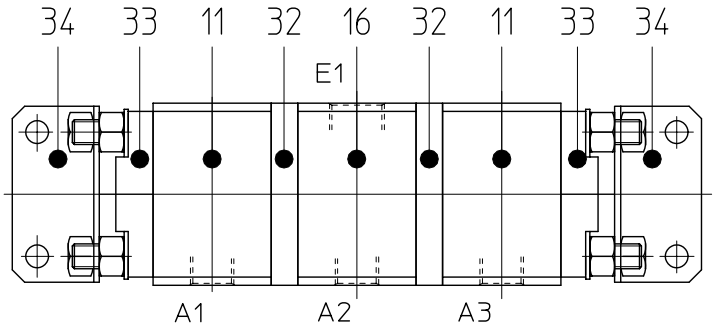
Spare parts list MTO Size 1

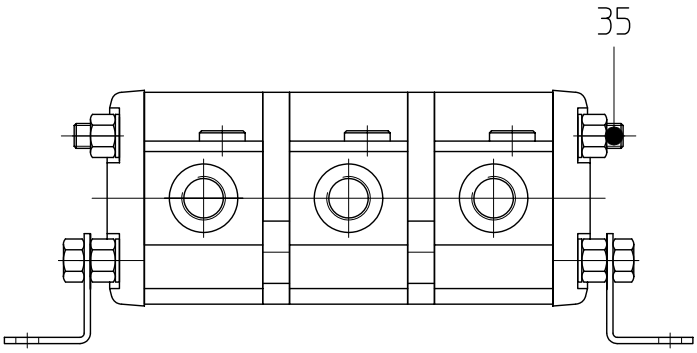
Pos	Naming, parts with NBR-Seals		Part-No
1	Sealkit MTO-..-..-G, per section		MTO-Bg1-GD
2	Sealkit MTO-..-..-A, per section		MTO-Bg1-AD
11	Segment G	MTO-..-4-G	MTO-Bg1-4-G
		MTO-..-5-G	MTO-Bg1-5-G
16	Segment G, with inletport	MTO-..-4-G	MTO-Bg1-4-GE
		MTO-..-5-G	MTO-Bg1-5-GE
21	Segment A	MTO-..-4-A...	MTO-Bg1-4-A
		MTO-..-5-A...	MTO-Bg1-5-A
26	Segment A, with inletport	MTO-..-4-A...	MTO-Bg1-4-AE
		MTO-..-5-A...	MTO-Bg1-5-AE
Pos	**Naming, parts with FKM-Seals**		**Part-No**
1	Sealkit MTO-..-..-G, per section		MTO-Bg1-GD-V
2	Sealkit MTO-..-..-A, per section		MTO-Bg1-AD-V
11	Segment G	MTO-..-4-G	MTO-Bg1-4-G-V
		MTO-..-5-G	MTO-Bg1-5-G-V
16	Segment G, with inletport	MTO-..-4-G	MTO-Bg1-4-GE-V
		MTO-..-5-G	MTO-Bg1-5-GE-V
21	Segment A	MTO-..-4-A...	MTO-Bg1-4-A-V
		MTO-..-5-A...	MTO-Bg1-5-A-V
26	Segment A, with inletport	MTO-..-4-A...	MTO-Bg1-4-AE-V
		MTO-..-5-A...	MTO-Bg1-5-AE-V
Pos	**Naming**		**Part-No**
31	Intermediary plate G	MTO-..-..-G	MTO-Bg1-ZG
32	Intermediary plate A	MTO-..-..-A...	MTO-Bg1-ZA
33	End cap		MTO-Bg1-D
34	Feet for mounting		MTO-Bg1-F
35	Threaded rods		MTO-Bg1-G8
42	Control valves, adjustable (130 - 300 bar)		MTO-DBV-Rot
42	Control valves, adjustable (90 - 200 bar)		MTO-DBV-Grün
42	Control valves, adjustable (60 - 160 bar)		MTO-DBV-Blau
42	Control valves, adjustable (30 - 80 bar)		MTO-DBV-Schwarz

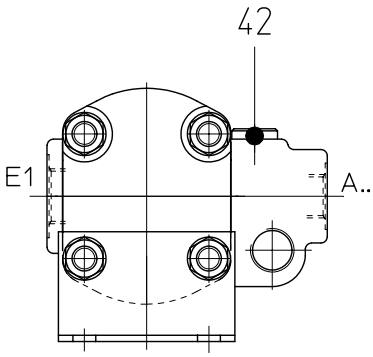
Spare parts list MTO Size 2

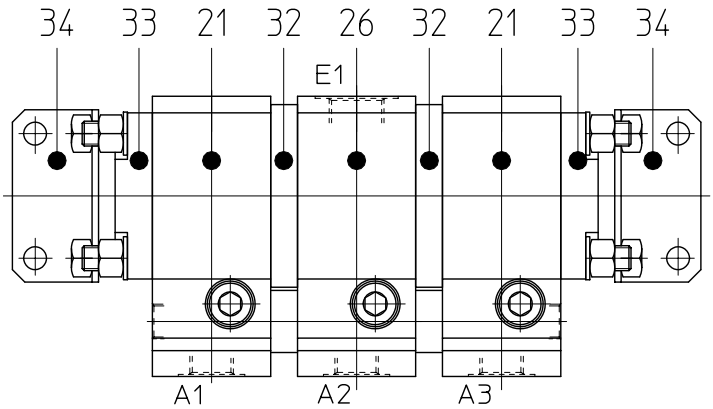








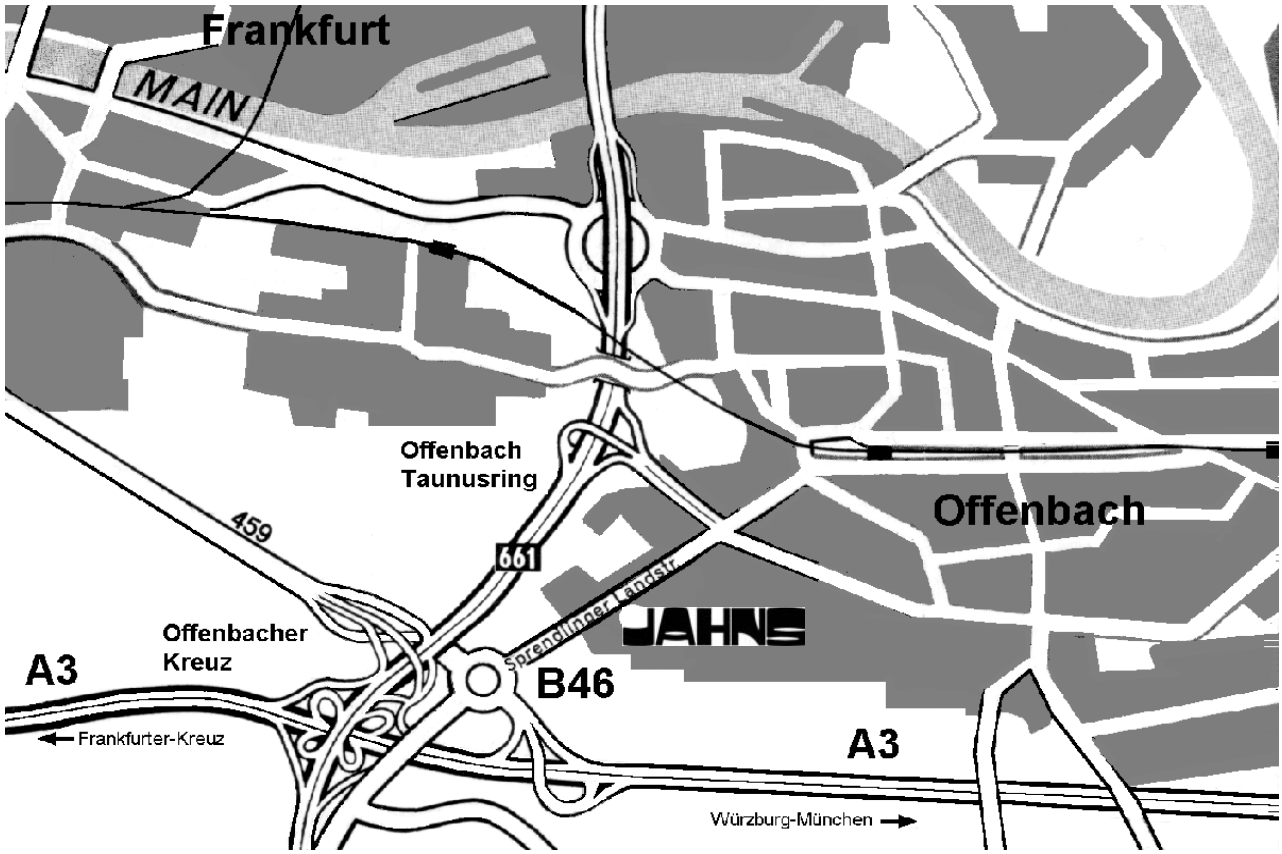




Spare parts list MTO Size 2

Pos	Naming, parts with NBR-Seals		Part-No
1	Sealkit MTO-..-..-G, per section		MTO-Bg2-GD
2	Sealkit MTO-..-..-A, per section		MTO-Bg2-AD
11	Segment G	MTO-..-8-G	MTO-Bg2-8-G
		MTO-..-14-G	MTO-Bg2-14-G
		MTO-..-31-G	MTO-Bg2-31-G
16	Segment G, with inletport	MTO-..-8-G	MTO-Bg2-8-GE
		MTO-..-14-G	MTO-Bg2-14-GE
		MTO-..-31-G	MTO-Bg2-31-GE
21	Segment A	MTO-..-8-A...	MTO-Bg2-8-A
		MTO-..-14-A...	MTO-Bg2-14-A
		MTO-..-31-A...	MTO-Bg2-31-A
26	Segment A, with inletport	MTO-..-8-A...	MTO-Bg2-8-AE
		MTO-..-14-A...	MTO-Bg2-14-AE
		MTO-..-31-A...	MTO-Bg2-31-AE
Pos	**Naming, parts with FKM-Seals**		**Part-No**
1	Sealkit MTO-..-..-G, per section		MTO-Bg2-GD-V
2	Sealkit MTO-..-..-A, per section		MTO-Bg2-AD-V
11	Segment G	MTO-..-8-G	MTO-Bg2-8-G-V
		MTO-..-14-G	MTO-Bg2-14-G-V
		MTO-..-31-G	MTO-Bg2-31-G-V
16	Segment G, with inletport	MTO-..-8-G	MTO-Bg2-8-GE-V
		MTO-..-14-G	MTO-Bg2-14-GE-V
		MTO-..-31-G	MTO-Bg2-31-GE-V
21	Segment A	MTO-..-8-A...	MTO-Bg2-8-A-V
		MTO-..-14-A...	MTO-Bg2-14-A-V
		MTO-..-31-A...	MTO-Bg2-31-A-V
26	Segment A, with inletport	MTO-..-8-A...	MTO-Bg2-8-AE-V
		MTO-..-14-A...	MTO-Bg2-14-AE-V
		MTO-..-31-A...	MTO-Bg2-31-AE-V
Pos	**Naming**		**Part-No**
31	Intermediary plate G	MTO-..-..-G	MTO-Bg2-ZG
32	Intermediary plate A	MTO-..-..-A...	MTO-Bg2-ZA
33	End cap		MTO-Bg2-D
34	Feet for mounting		MTO-Bg2-F
35	Threaded rods		MTO-Bg2-G12
42	Control valves, adjustable (130 - 300 bar)		MTO-DBV-Rot
42	Control valves, adjustable (90 - 200 bar)		MTO-DBV-Grün
42	Control valves, adjustable (60 - 160 bar)		MTO-DBV-Blau
42	Control valves, adjustable (30 - 80 bar)		MTO-DBV-Schwarz

Components for hydraulics and process technology



Jahns-Regulatoren GmbH
Postbox 10 09 52
D 63009 Offenbach
telephon +49/(0)69/84 84 77-0

home adress
Sprendlinger Landstraße 150
D 63069 Offenbach
telefax +49/(0)69/84 84 77 25

http://www.jahns-hydraulik.de
info@jahns-hydraulik.de