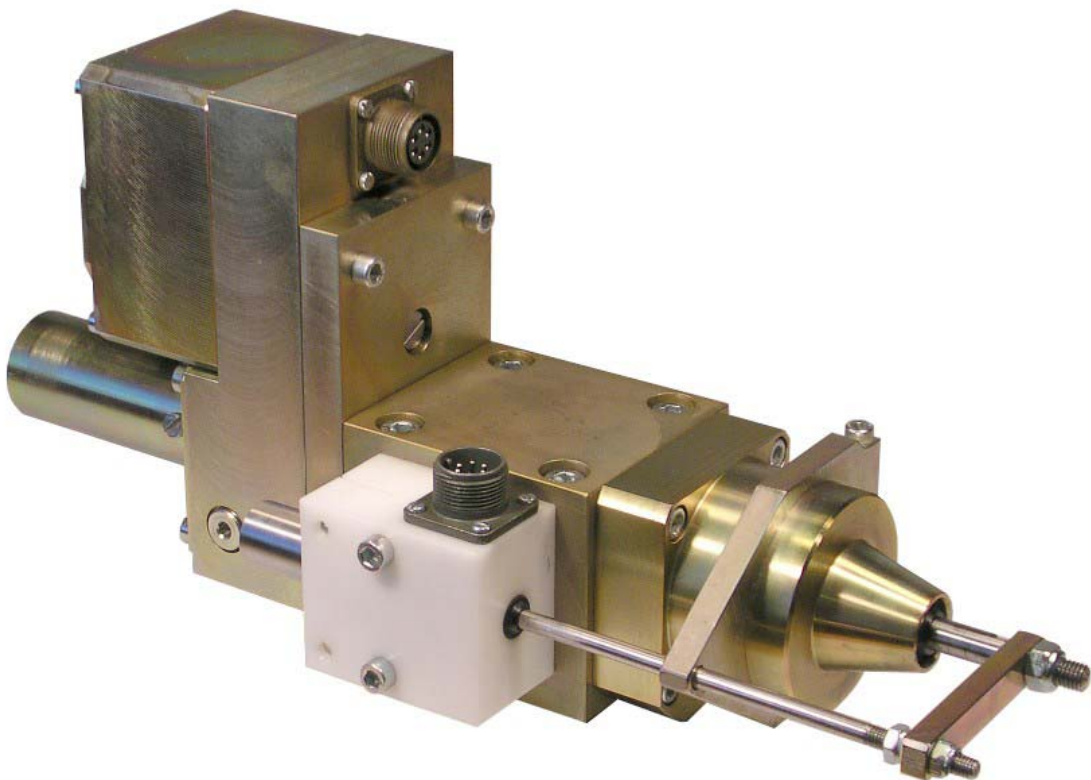


Tracer valve Stepper motor controlled



Description – Function – Data

The stepper motor controlled tracer valve from Vishay Nobel is a mechanic-hydraulic valve working in 4-way mode.

It has been developed for control of the disc gap in disc refiners. Thus it meets high demands on accuracy, repeatability, reliability, and dirt-resistance.

Together with the electronic unit DGC-2 from Vishay Nobel it features a complete remote-controlled servo system.



Function description

Working principle

The working principle and the function of the tracer valve and the controlled hydraulic cylinder is shown in the figure below.

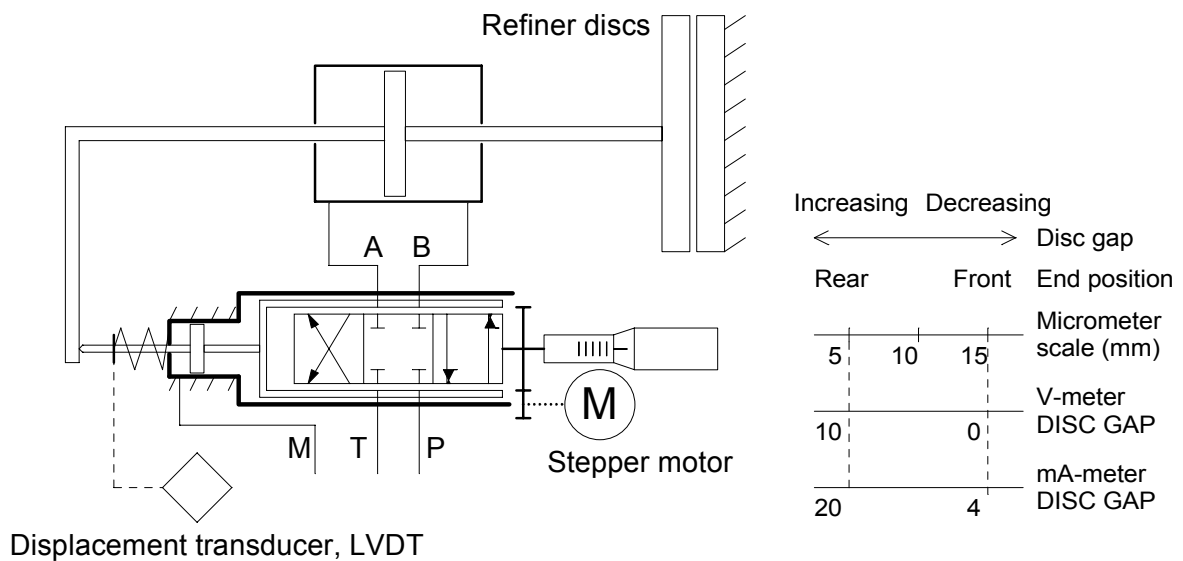
The tracer valve features a spool, connected to a micrometer screw, and a movable bushing, spring loaded in one direction and connected to a sensory rod, constituting the mechanical feed-back from the controlled component.

The micrometer screw that controls the spool position can be operated manually or by means of a stepper motor. In both cases the position is indicated by the micrometer scale.

As the tracer valve spool and bushing are balanced (0-position) the spool covers the slots in the bushing, preventing an oil flow through the valve. As the spool is moved by the micrometer screw, slots are opened and an oil flow is obtained through P-A and B-T or through P-B and A-T, depending on the direction of spool movement. The oil flow displaces the piston in the controlled hydraulic cylinder, the piston displaces the sensory rod and the bushing in the same direction as the spool, and the slots are closed. As the bushing moves, the slot openings are gradually decreasing the oil flow, giving a soft retardation to a halt at the position of the spool.

The set position for the hydraulic piston is maintained, independent of variations in load on the piston. If the load is big enough to displace the piston, slots in the valve are opened by the sensory rod action and the hydraulic pressure will bring the piston back to the set position.

The position of the hydraulic piston can be continuously supervised by means of a position transducer, connected to the sensory rod.



Tracer valve working principle.

Security function

In addition to the operating functions, the tracer valve also has a security function, rapidly opening the refiner disc gap as pressure is connected to inlet M.

The pressure applies an axial force on the bushing, overriding the spring load and bringing the bushing to a position where P-B and A-T are fully opened. This makes the piston move to its rear end position, giving a maximum disc gap. (The mechanical feed-back to the tracer valve is opened). As the pressure at M is disconnected the tracer valve and the piston of the controlled hydraulic cylinder returns to the position set by the micrometer screw.

The control pressure for the security function must be at least 35 bar, but not over 100 bar. If the system pressure is higher a throttling insert can be mounted in the adapter, limiting the control pressure to 100 bar.

Adapter

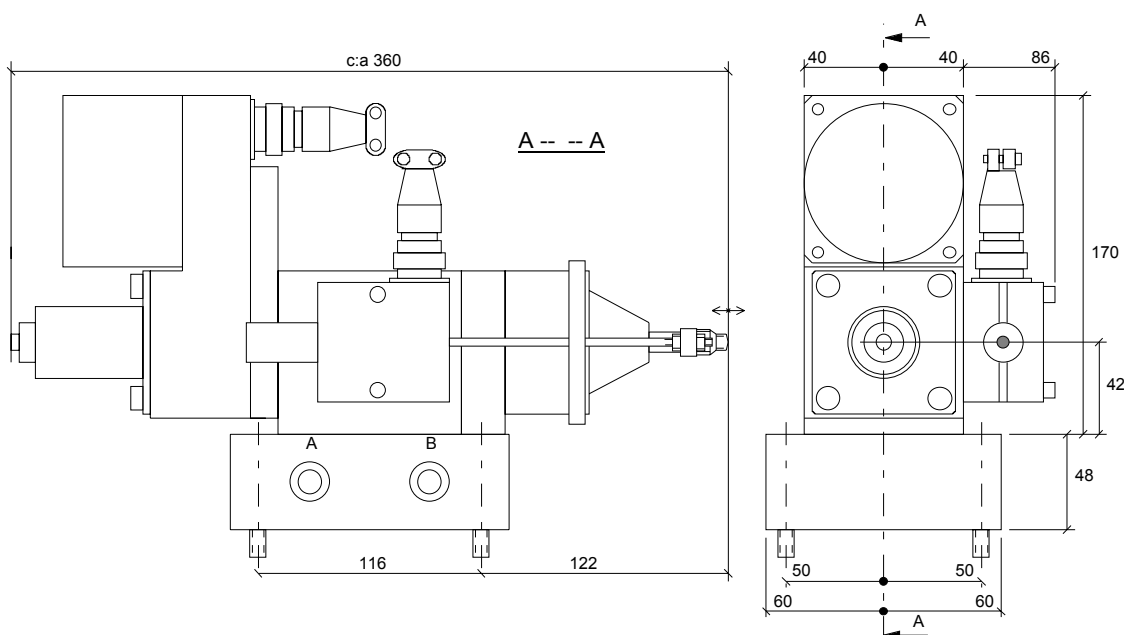
The tracer valve is fixed on an adapter and all hydraulic connections are made to inlets at the adapter. From the inlets, marked A, B, P, T and M, bored holes in the adapter conduct the oil to the tracer valve.

In the adapter, an extra hole connects inlet M, controlling the security function, with inlet T, return flow to the hydraulic tank. Throttling inserts and plugs are used to utilise this hole in different ways.

For control pressures below 100 bar the hole is closed with a throttling insert in inlet M, article number is 6 316 239, possibly also a screw, mounted in the inlet T.

For control pressures above 100 bar a throttling insert with article number 6 320 037 is inserted in inlet M, and the screw in inlet T must be removed.

If the security function is not used, the adapter inlet M must be closed with a plug, article number 6 300 726, and the screw in inlet T must be removed.



Tracer valve and adapter dimensions.

Technical data

Tracer valve with position transducer

Article number	1 157 659	
Max. spool displacement	± 7 mm	
Max. stepping rate	100 steps/sec	
Displacement per step	0.00312 mm	
Sensory rod force	c:a 150 N	
Max. rated flow	49 l/min	
Pressure gain at 7 Mpa	c:a 0.05 Mpa/μm	
Adapter for hydraulic connections	4 066 293	
Throttling insert	< 100 bar	6 316 239
Throttling insert	> 100 bar	6 320 037
Closing plug		6 300 726

Hydraulic supply demands

Min. supply pressure	1.5 Mpa (15 bar)
Max. supply pressure	30 Mpa (300 bar)
Min. control pressure at M	3.5 Mpa (35 bar)
Filtering	10 μm

Installation

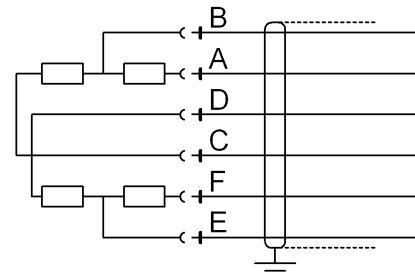
Stepper motor

The windings of the stepper motor are connected to the 6-way connector as shown in the diagram. Use shielded cable to connect the stepper motor to suitable control electronics.

Article numbers:

Stepper motor: 6 373 715.

Cable connector: 6 374 408.



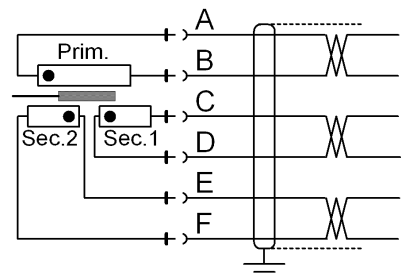
Position transducer

The windings of the transducer are connected to the 6-way connector as shown in the diagram. Use shielded cable with twisted pairs to connect the position transducer to suitable measurement electronics.

Article numbers:

Position transducer: 1 132 329.

Cable connector: 6 343 678.



Description – Function – Data

BREMEN

The design and use of the device is the responsibility of the user. The user must ensure that the device is used in accordance with the instructions for use and that the user is qualified to do so. The user must also ensure that the device is maintained in accordance with the instructions for maintenance and that the device is used in accordance with the instructions for safety. The user must also ensure that the device is used in accordance with the instructions for disposal.

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Art.no. 1157659

Part No.	Description	Part No.	Description
N2-8-58-513	Mantelgehäuse	N2-10-38	Welle
N2-57-9	Welle	N2-10-38	Welle
G 316 233	Baugewinde	N2-35-8-12 (2x2)	Wellenschutzhülse
5 161 955	Wellenschutzhülse	G 379 706	Mutter
N2-2102-1032 078	Lagergehäuse	N2-24-592-3	Wellenschutzhülse
N2-2102-1032 078	Lagergehäuse	G 085 295	Wellenschutzhülse
W 33 11	Lagergehäuse	N2-76-578 (2x)	Wellenschutzhülse
N2-34-38-24	Lagergehäuse	N2-8-272-3	Wellenschutzhülse
G 316 233	Baugewinde	N2-8-272-3	Wellenschutzhülse
G 373 208	Mutter	N2-8-272-3	Wellenschutzhülse
N2-4-8-38	Wellenschutzhülse	N2-8-272-3	Wellenschutzhülse
N2-4-8-38	Wellenschutzhülse	N2-8-272-3	Wellenschutzhülse
N2-4-8-38	Wellenschutzhülse	N2-8-272-3	Wellenschutzhülse
N2-4-8-38	Wellenschutzhülse	N2-8-272-3	Wellenschutzhülse
N2-4-8-38	Wellenschutzhülse	N2-8-272-3	Wellenschutzhülse
N2-4-8-38	Wellenschutzhülse	N2-8-272-3	Wellenschutzhülse
N2-4-8-38	Wellenschutzhülse	N2-8-272-3	Wellenschutzhülse
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N2-4-8-38	Wellenschutzhülse	N2-8-272-3	Wellenschutzhülse
N2-4-8-38	Wellenschutzhülse	N2-8-272-3	Wellenschutzhülse

Technische Zeichnung	
Titel	
Projekt-Nr.	
Zeichnungs-Nr.	
Maßstab	
Gezeichnet von	
Geprüft von	
Freigegeben am	
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Zusätzliche Informationen	
Material	
Werkstoff	
Technische Zeichnung	
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Vishay Nobel	
3065331	

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Vishay Nobel AB
Box 423, SE-691 27 Karlskoga, Sweden
Phone +46 586 63000 · Fax +46 586 63099
info.se@vishaynobel.com · www.vishaynobel.com