



Zertifiziertes  
QM-System  
DIN EN ISO 9001  
Zertifikat-Nr. 01017

## Gear Wheel Flow Meter for Viscous Fluids



measuring  
•  
monitoring  
•  
analysing



- Measuring range:  
0.02-2 to 1-250 L/min
- Measuring accuracy:  
 $\pm 0.3$  up to  $\pm 1$  % of actual flow
- $p_{\max}$ : 400 bar
- $t_{\max}$ : 150 °C
- Process connection:  
G $\frac{1}{8}$ , G $\frac{3}{8}$ , G $\frac{1}{2}$ , G 1 female thread
- Material:  
Cast iron or stainless steel
- EEx ia II C T4



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Model:  
DZR



**Description**

The KOBOLD Gear Wheel Flow Meter series DZR have been designed for a cost effective flow measurement for viscous fluids. The measuring unit consists of a pair of gear wheels which is moved by the flow according to the principle of gear wheel motor. The bearings are – according to the material combination – either ball bearings or gliding bearings. The different versions vary through different housing materials, lubrication properties, through the medium being used and the accuracy.

**Version**

- DZR-1 Flow measurement, Hydraulic test rigs for: Oil, Brake fluid, Diesel, Skydrol lubricating, low viscous
- DZR-2 Oil batching, Batching installations Gear Box Oil, lubricating, mid viscous
- DZR-3 Consumption measurement Printing machines, Offset colour, lubricating, high viscous
- DZR-4 Ratio control, 2-Component plant, Polyol, Isocyanate, Glue, Resin, Silicone, low lubricating, mid viscous
- DZR-5 Batch control, painting plant, clear paint, Clearance volume sealing, low lubricating, mid viscous
- DZR-6 Flow measurement, painting plant, Solvent, lubricating, mid viscous

**Technical data**

Accuracy: see specifications table  
 Repeatability: < 0.1% of measured value  
 Max. Pressure: 400 bar (DZR-x001 up to DZR-x010) 315 bar (DZR-x011 up to DZR-x015)  
 Media temperature: -30...+120°C (standard) -30...+150°C (option)  
 Ambient temperature: -30...+80°C  
 Viscosity range: see specifications table

**Materials**

Housing:  
 DZR-1/2/3/4: GGG 40  
 DZR-5/6: st.st. 1.4404  
 Gear wheels:  
 DZR-1/2/3/4: steel 1.7139  
 DZR-5/6: st.st. 1.4462  
 Bearings: see specifications table  
 Seals: FPM, EPDM or PTFE/FEP  
 Output signal: 2 pulse output signals 90° ± 30° phase shift  
 Pulse form: rectangular duty cycle 1:1 (±15%) short circuit proof  
 Pulse amplitude: ≥ 0.8 U<sub>B</sub>  
 Power supply: 12-30 V<sub>DC</sub> (Polarity reversal protected) 8-12 V<sub>DC</sub> (option K/T)  
 Max. power consumption: 0.6 W  
 Max. output capacity: 0.3 W  
 Electr. connection: plug acc. DIN 43650  
 Explosion protection: EEx ia II C T4 (option) c/w pre amplifier DZR-K130/3E10  
 Protection: IP 65  
 Weight: see dimensions table

Model	Resolution pulses/L
DZR-x001/-x002	40 000
DZR-x003	25 000
DZR-x005	4082
DZR-x006/-x007	2500
DZR-x008/-x009/-x010	965
DZR-x011/-x012	333
DZR-x013/-x014/-x015	191



**Specifications**

	DZR-1	DZR-2	DZR-3	DZR-4	DZR-5	DZR-6
<b>Media viscosity</b>	low	medium	high	medium	medium	low
<b>Lubrication properties of media</b>	good	good	good	bad	bad	good
<b>Bearing</b>	ball bearing	ball bearing	bronze gliding bearing	tungsten c.gl. bearing	tungsten c.gl. bearing	ball bearing
<b>Material</b>	cast iron	cast iron	cast iron	Guss	stainless steel	stainless steel
<b>Accuracy of measured value</b>	± 0.3%	± 0.5%	± 1%	± 0.5%	± 0.5%	± 0.3%
	from 20 mm <sup>2</sup> /s	from 50 mm <sup>2</sup> /s	from 100 mm <sup>2</sup> /s	from 100 mm <sup>2</sup> /s	from 100 mm <sup>2</sup> /s	from 20 mm <sup>2</sup> /s
<b>Range Code</b>						
<b>001</b>	0.008...2 L/min	-	-	-	-	0.008...2 L/min
<b>002</b>	-	-	-	-	0.02...2 L/min*	-
<b>003</b>	0.02...4 L/min	-	-	-	-	-
<b>005</b>	0.16...16 L/min	0.16...16 L/min	-	0.16...16 L/min	0.16...16 L/min	0.16...16 L/min
<b>006</b>	-	-	-	0.2...30 L/min	-	-
<b>007</b>	0.2...40 L/min	-	-	-	-	-
<b>008</b>	-	-	0.6...40 L/min	-	-	-
<b>009</b>	-	-	-	0.3...60 L/min	0.3...60 L/min	-
<b>010</b>	0.4...80 L/min	0.4...80 L/min	-	-	-	0.4...80 L/min
<b>011</b>	-	-	-	0.6...100 L/min	0.6...100 L/min	-
<b>012</b>	0.6...160 L/min	-	-	-	-	0.6...160 L/min
<b>013</b>	-	-	1.2...80 L/min	-	-	-
<b>014</b>	-	-	-	1...160 L/min	1...160 L/min	-
<b>015</b>	1...250 L/min	1...250 L/min	-	-	-	1...250 L/min

\*Accuracy: ± 3%

**Oder Details** (example: DZR-1 001 S10 F S 0)

Model	Range*	Mech. connection (female thread)	Seal	Electronics	Electr. connection (c/w plug)
DZR-1 DZR-2 DZR-3 DZR-4	001 003 005	S10 = G 3/8 side H10 = G 3/8 backward	F = FPM E = EPDM P = PTFE/FEP	S = up to 120°C/ 24 V <sub>DC</sub> R = up to 120°C/ 12 V <sub>DC</sub> H = up to 150°C T = up to 150°C/ 12 V <sub>DC</sub> X = intrinsically safe c/w switching amplifier	0 = without cable 1 = 5 m cable (4-wire) 2 = 10 m cable (4-wire) 8 = 3 m EX cable 9 = 5 m EX cable
	006 007 008 009 010	S15 = G 1/2 side H15 = G 1/2 backward			
	011 012 013 014 015	S25 = G 1 side H25 = G 1 backward			
DZR-5 DZR-6	001 002	R06 = G 1/8 side			
	005	R10 = G 3/8 side			
	008 009 010	R15 = G 1/2 side			
	011 012 013 014 015	R25 = G 1 side			

\*The range of the corresponding model can be taken from the schedule »specifications«



**Technical data**

**Switching amplifier unit DZR-K130/3E10**

Power supply: 24 V<sub>DC</sub> ± 20 %  
 Ripple: < 10 %  
**Inputs (intrinsically safe)**  
 Open circuit voltage U<sub>A0</sub>: approx. 9.6 V<sub>DC</sub>  
 Short circuit current I<sub>AK</sub>: approx. 72 mA  
 Switch point I<sub>S</sub>: 10 mA...12 mA  
 Switching hysteresis I<sub>H</sub>: approx. 2 mA  
 Wire break / short circuit control: ≤ 45 µA / < 35 mA

**Data according to certificate of conformance**

**Max. values**

PTB Nr. EX-96.D.2028 X

Max. voltage U<sub>0</sub>: 10 V  
 Max. current I<sub>k</sub>: 75 mA  
 Max. capacity P<sub>MAX</sub>: 188 mW

**Permissible connection values**

Explosion protection category: EEx ia EEx ib  
 Explosion group: IIB / IIC IIB / IIC  
 Max. capacity: 475 nF 4 µF  
 Max. inductivity: 3 mH 6.7 mH

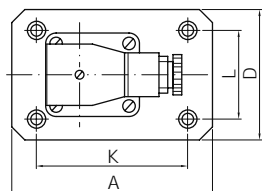
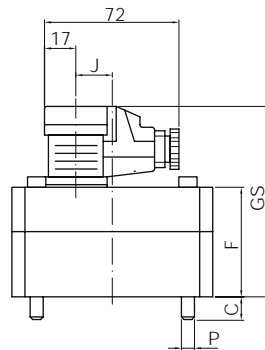
**Outputs (not intrinsically safe)**

Electronic output: galvanically separated via optocoupler  
 Short circuit current: approx. 25 mA  
 Signal level 1-signal: 0.8 x supply current at RL > 2 kΩ  
 Signal level 0-signal: output blocked cutoff current < 10 µA  
 Max. switching frequency: approx. 2 kHz  
 Housing: DIN rail housing  
 Electr. connection: screw terminal  
 Dimensions: 107.5 x 92 x 22 mm  
 Ambient temperature: -25...+60 °C  
 Weight: approx. 150 g

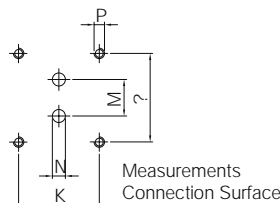
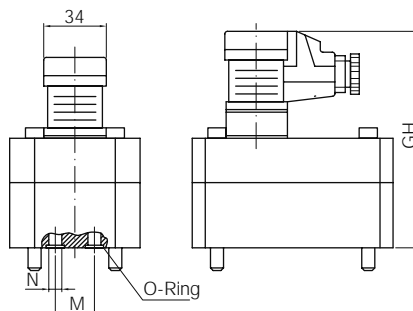
**Dimensions** DZR-1, DZR-2, DZR-3, DZR-4 W/O connecting plate

Measuring range-code	Weight kg	Dimensions (mm)											
		A	C	D	F	G <sub>S</sub>	G <sub>H</sub>	J	K*	L*	M*	N*	P*
001/002	1.8	85	10	60	50	101	114	-	70	40	20	6,5	M 6
003	2	85	9	60	56	107	120	-	70	40	20	6,5	M 6
005	2	85	13	60	57	108	121	-	70	40	20	9	M 6
006/007	3.7	100	17	90	63	114	127	-	80	38	34	16	M 8
008/009/010	5.2	120	13	95	72	123	136	15.5	84	72	35	16	M 8
011/012	9	170	18	120	89	140	153	46.5	46	95	50	25	M 12
013/014/015	13	170	22	120	105	156	169	46.5	46	95	50	25	M 12

**DZR-...SO/DZR-...XO**



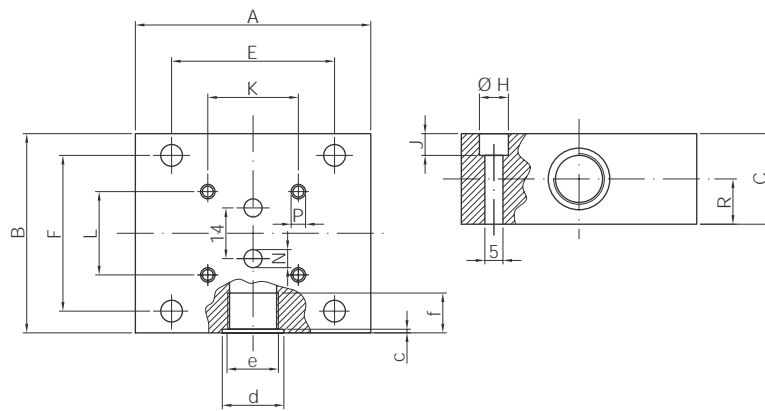
**DZR-...HO**



**Dimensions** connection plate for DZR-1, DZR-2, DZR-3, DZR-4

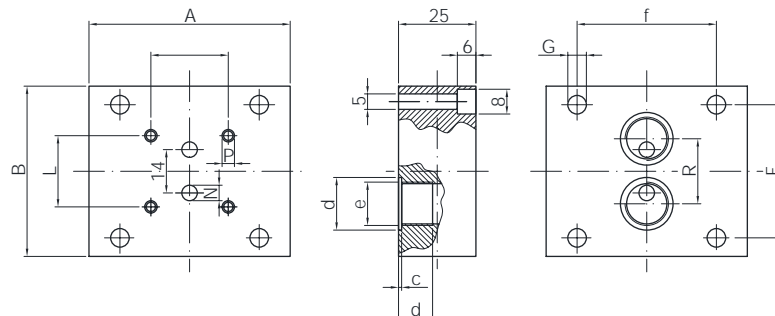
**Connection side ports**

Meas. range	Weight kg	Dimensions (mm)																	
		A	B	C	E	F	G	H	J	K	L	M	N	P	R	c	d	e	f
001-005	1.8	85	90	35	65	76	7	11	7	70	40	20	6,5	M6	17	0.7	25	G3/8	13
006-007	2.7	100	110	37	86	96	7	11	7	80	38	34	16	M8	18.5	0.7	29	G1/2	15
008-010	2.9	100	120	37	80	106	7	11	7	84	72	35	12	M8	17.5	0.7	29	G1/2	15
011-015	14	160	165	80	140	145	9	15	9	46	95	50	25	M12	28	1	42	G1	19



**Connection bottom ports**

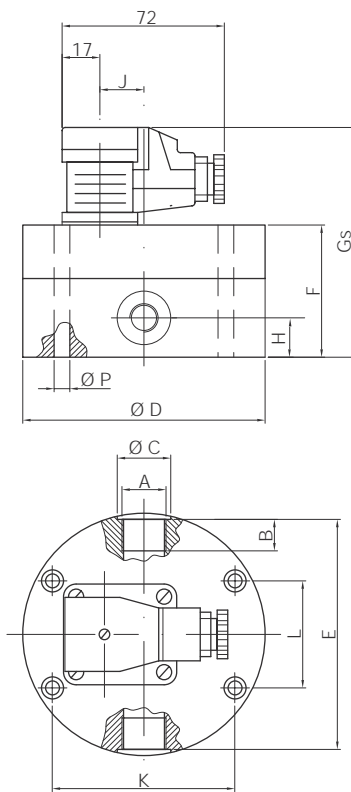
Meas. range	Weight kg	Dimensions (mm)																	
		A	B	C	E	F	G	H	J	K	L	M	N	P	R	c	d	e	f
001-005	1.6	85	90	35	65	76	7	-	-	70	40	20	6,5	M6	28	0.7	25	G3/8	12
006-007	2.7	100	110	37	86	96	7	11	7	80	38	34	16	M8	46	0.7	29	G1/2	15
008-010	2.9	100	120	37	80	106	7	-	-	84	72	35	12	M8	50	0.7	29	G1/2	14
011-015	9.6	160	165	55	140	145	9	15	9	46	95	50	25	M12	55	1	42	G1	18



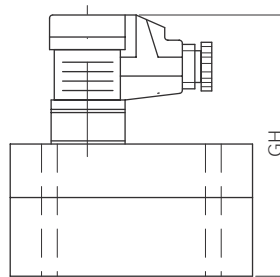
**Dimensions** DZR-5, DZR-6

Meas. range	Weight kg	Dimensions (mm)												
		A	B	C	D	E	F	G <sub>s</sub>	G <sub>H</sub>	H	J	K	L	P
001-002	3	G 1/8	9	17	94	86	55	106	119	15	-	70	40	6.7
005	3.1	G 3/8	13	25	94	90	57	108	121	16	-	70	40	6.7
008-010	7	G 1/2	15	29	124	120	72	123	136	22	15.5	84	72	9
011-012	15.9	G 1	19	42	170	162	89	140	153	30	46.5	46	50	13
013-015	18.7	G 1	19	42	170	162	105	156	169	30	46.5	46	50	13

**DZR-...SO/DZR-...XO**

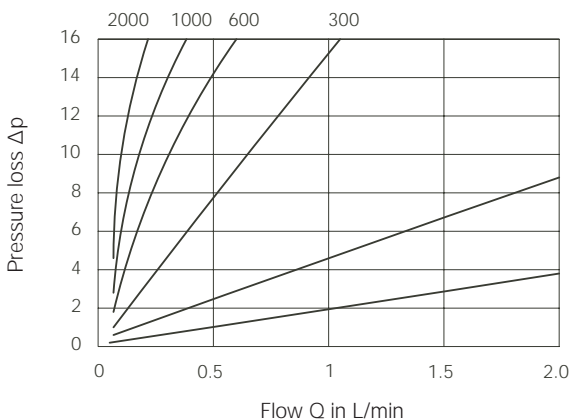


**DZR-...HO**

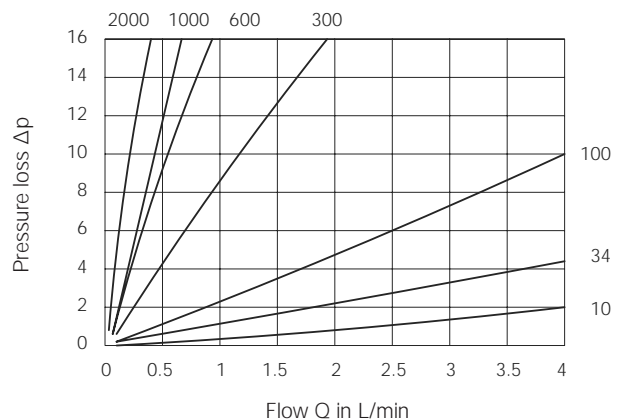


**Pressure loss diagrams**

**DZR-1001, DZR-6001**

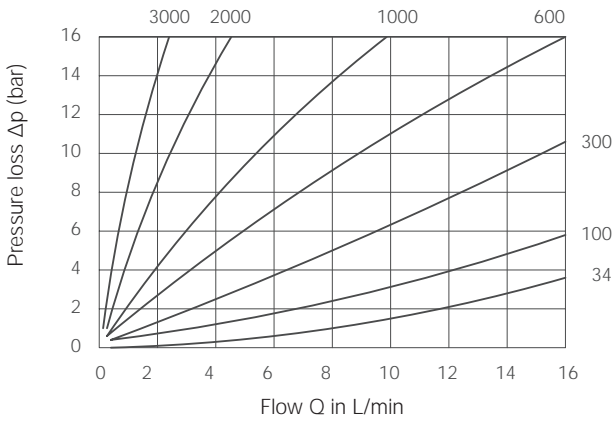


**DZR-1003**

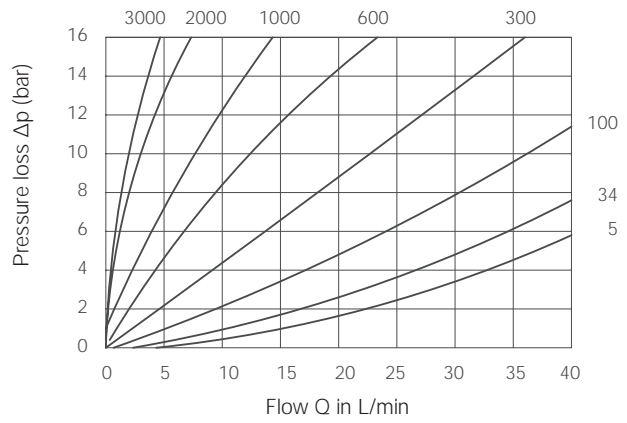




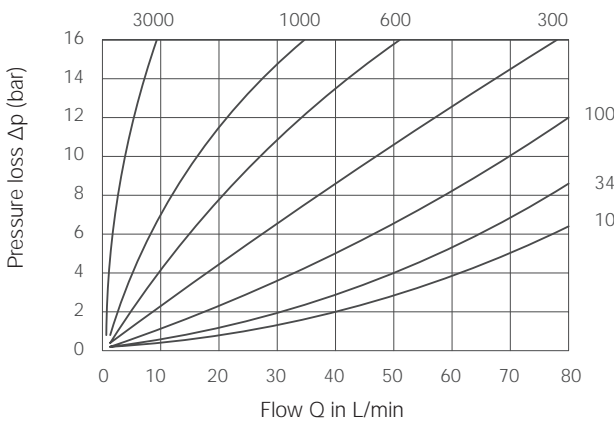
DZR-1005, DZR-2005, DZR-6005



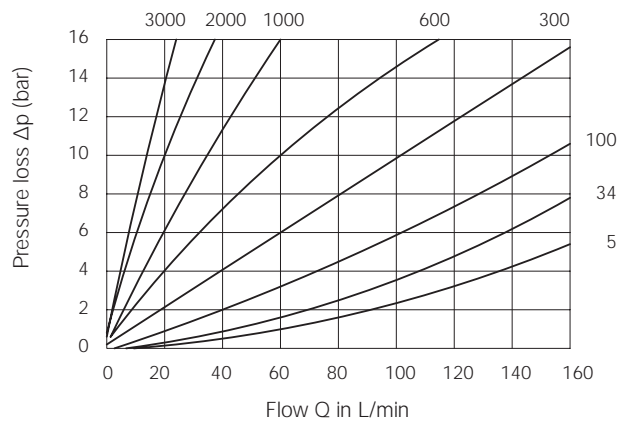
DZR-1007



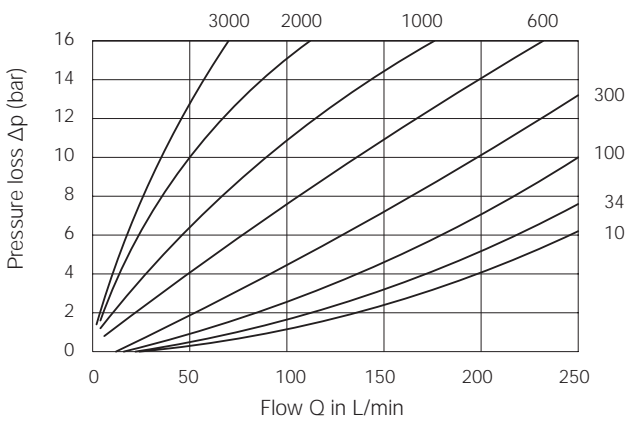
DZR-1010, DZR-2010, DZR-6010



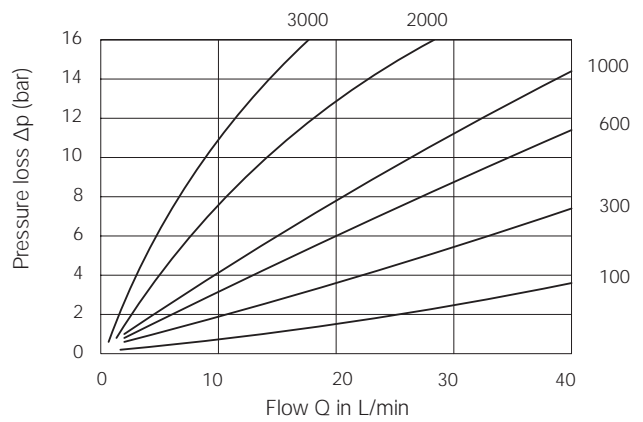
DZR-1012, DZR-6012



DZR-1015, DZR-2015, DZR-6015

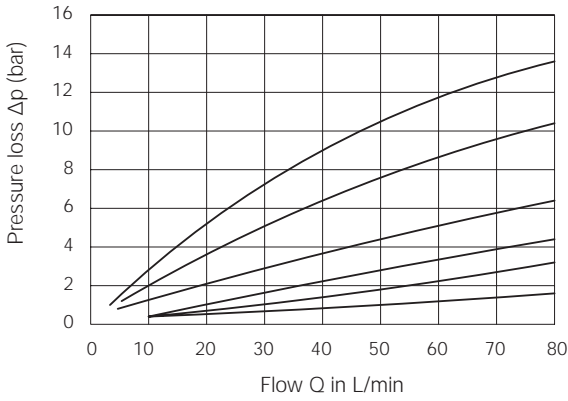


DZR-3008

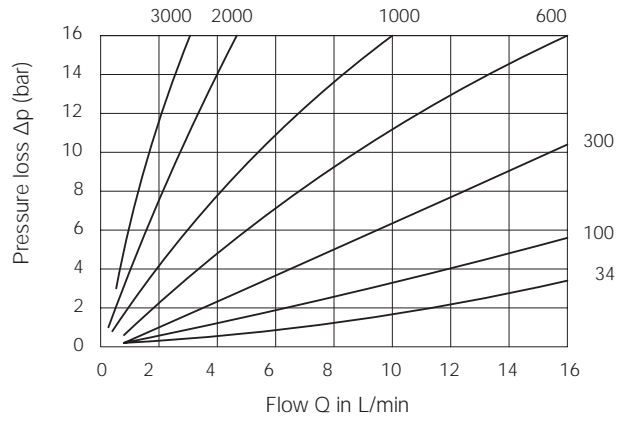




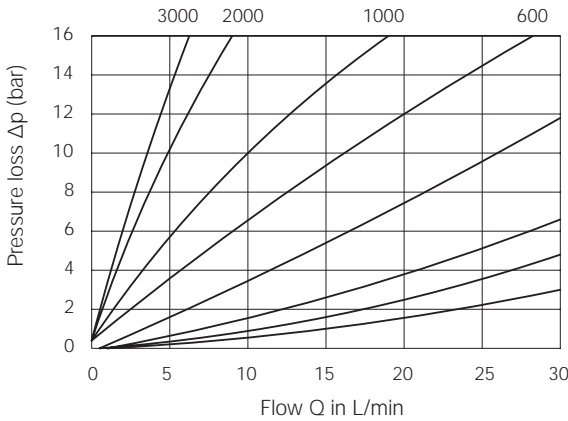
DZR-3013



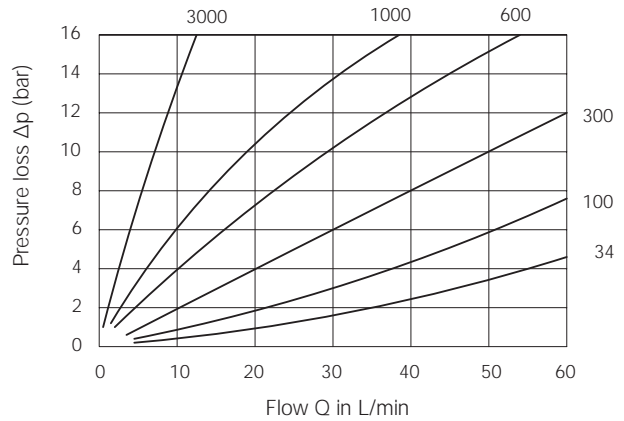
DZR-4005, DZR-5005



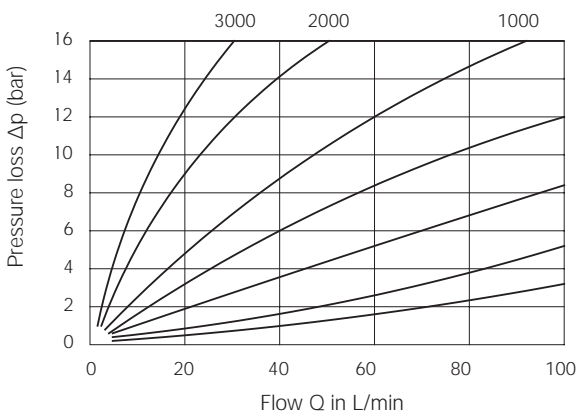
DZR-4006



DZR-4009, DZR-5009



DZR-4011, DZR-5011



DZR-4014, DZR-5014

