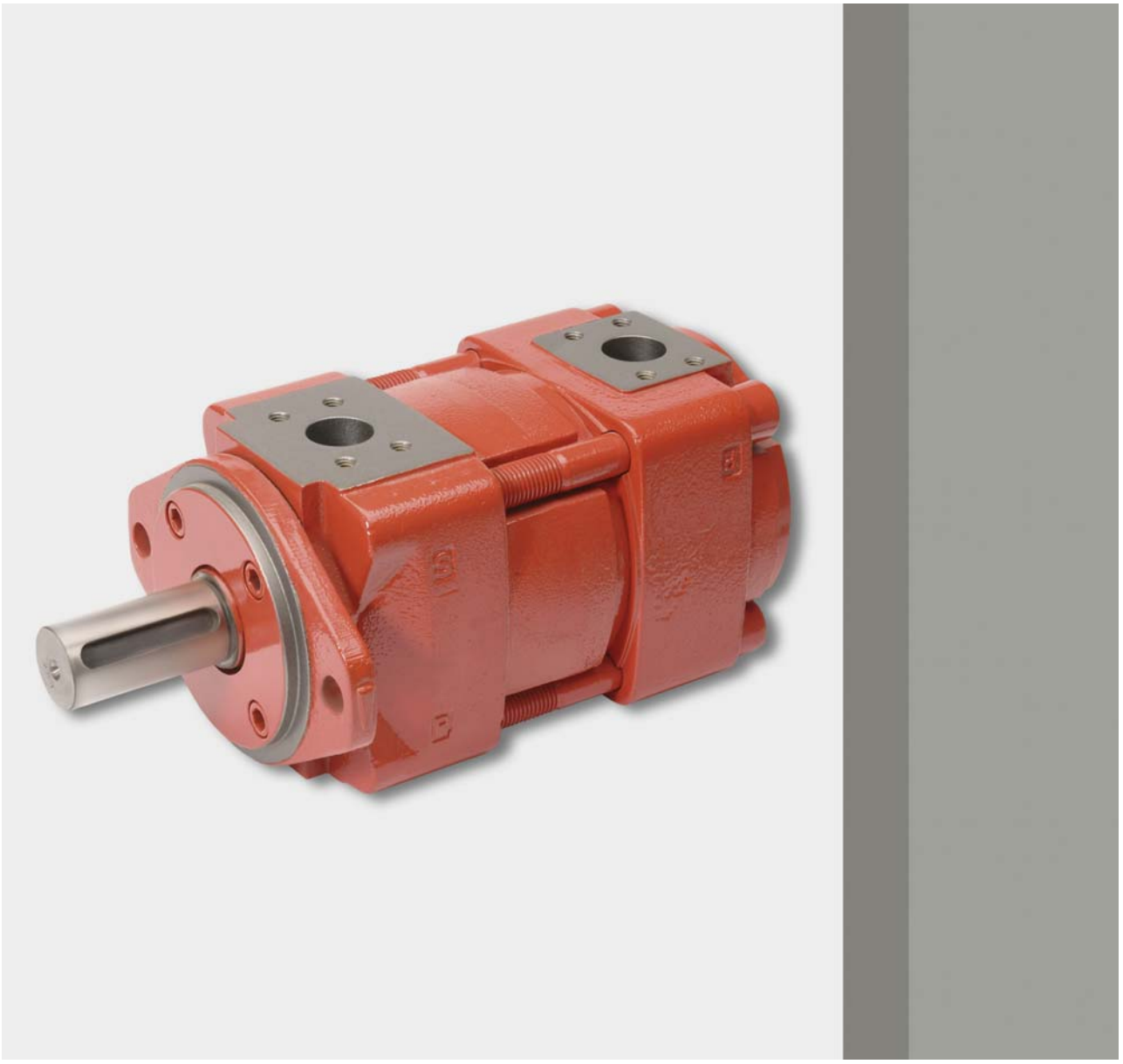
BUCHER HYDRAULICS

Internal Gear Unit

for motor/pump service
Series QXM



motion and progress

Reference: 100-P-000063-US-05

1 General

1.1 Product description

The QXM drive unit can be used in open- and closed-loop hydrostatic drives, and can operate both as a pump and as a motor.

This flexibility offers possibilities for various applications, one example being the raising and lowering of loads. The QXM works as a pump to lift the load and recovers energy when the load is being lowered.

Used as a fully bi-directional pump/motor (four-quadrant operation), the unit controls a complete motion cycle of a cylinder. Fast acceleration/deceleration sequences can be achieved.
The unit is based on the well-known QX internal gear pump, which is distinguished by its very low noise levels and almost imperceptible pressure pulsations. The large number of closely spaced sizes ensures that the right size is always available for every application.

1.2 Advantages

- very low noise levels
- negligible pressure pulsations
- 400 bar maximum pressure
- hydrodynamic bearing support ensures long service life
- suitable for special fluids such as HFB, HFC, HFD and bio-degradables
- suitable for variable-speed operation
- 2- and 4-quadrant operation is possible
- optimised flow path cross-sections and special gear profile give low susceptibility to cavitation

1.3 Application

- Injection molding machines
- Hydraulic presses
- Flight simulators
- Wind-power plants
- Lift/elevator drives
- Winches

2 Technical data

2.1 General

Characteristics	Description, value, unit
Installation attitude	unrestricted
Mounting method (standard)	oval 2-hole flange to ISO 3019/1 (SAE): QXM 3-6 oval 2-hole flange to ISO 3019/2 (metric) QXM 2+8
Direction of rotation	unrestricted
Drive method	in-line, by a flexible coupling
Hydraulic fluid	HLP mineral oils to DIN 51524, Part 2 HFB, HFD and HFC fluids to VDMA 24317 other fluids - contact Bucher Hydraulics
Min. fluid cleanliness level	ISO 4406 class 20/18/15, or NAS 1638 class 9
Operating viscosity Starting viscosity	50 - 750 S.U.S (10 to 100 mm^2/s) 50 - 1500 S:U:S (10 to 300 mm^2/s) (higher values, contact Bucher Hydraulics)
Hydraulic fluid temperature	HLP mineral oil -176 °F (80°C) max. HFB, HFD and HFC 122 °F (50°C) max.
Max. pressure at drain port	22 PSI (1,5 bar) absolute (higher values, contact Bucher Hydraulics)
Accumulated pressure restriction	Port P1 + Port P2 ≤ continuous-/intermittent pressure

2.2 Pressure range 1

Type	Displacement	Minimum Motor Speed 5) RPM (min^{-1})		Max. Speed 3) RPM (min^{-1})		Operating ressure on outlet side 1) PSI (bar)		Torque 2)
	effective in^3/Rev (cm^3/U)	... 50% cont. pressure	... 100% cont. pressure	pump 4)	motor	Cont. pressure	Interm. pres-sure	lb-in (Nm)
QXM21-010 QXM21-012 QXM21-016	0.63 (10,0) 0.78 (12,6) 0.97 (15,6)	1000	2500	4000 3600 3200	5500	2321 (160) 1813 (125) 1450 (100)	3045 (210) 2320 (160) 1813 (125)	221 (25)
QXM31-020 QXM31-025 QXM31-032	1.25 (20,0) 1.59 (25,1) 2.00 (32,3)	800	2000	3200 3000 2700	5000	2321 (160) 1813 (125) 1450 (100)	3045 (210) 2320 (160) 1813 (125)	443 (50)
QXM41-040 QXM41-050 QXM41-063	2.45 (39,2) 3.15 (50,5) 3.96 (63,5)	600	1500	2700 2350 2050	4600	2321 (160) 1813 (125) 1450 (100)	3045 (210) 2320 (160) 1813 (125)	885 (100)
QXM51-080 QXM51-100 QXM51-125	5.00 (80,1) 6.31 (100,9) 7.78 (124,6)	600	1500	2050 1900 1620	4000	2321 (160) 1813 (125) 1450 (100)	3045 (210) 2320 (160) 1813 (125)	1770 (200)
QXM61-160 QXM61-200 QXM61-250	10.17 (162,7) 12.56 (200,9) 15.55 (248,8)	600	1500	1500 1350 1200	3200	2321 (160) 1813 (125) 1450 (100)	3045 (210) 2320 (160) 1813 (125)	3540 (400)
QXM81-315 QXM81-400 QXM81-500	20.37 (326) 25.16 (402,6) 31,16 (498,5)	600	1200	1200 1100 1000	3000	2321 (160) 1813 (125) 1450 (100)	3045 (210) 2320 (160) 1813 (125)	7081 (800)

These operating data are valid for mineral oils with 42 mm^2/s

1) Intermittent pressure for max. 20 sec/min but not more than 10% of the duty cycle

2) Theoretical value at the maximum permitted continuous pressure. For starting torques, see section 3.

3) For higher speed contact us

4) Min. inlet pressure 1 bar absolute

5) Recommended speed. For less speed the pressure must be reducing (linear rate).
For customized working cycle contact Bucher Hydraulics.

2.3 Pressure range 2

Type	Displacement	Minimum Motor Speed 5) RPM (min^{-1})		Max. Speed 3) RPM (min^{-1})		Operating ressure on outlet side 1) PSI (bar)		Torque 2)
	effective in^3/Rev (cm^3/U)	... 50% cont. pressure	... 100% cont. pressure	pump 4)	motor	Cont. pressure	Interm. pres-sure	lb-in (Nm)
QXM22-005 QXM22-006 QXM22-008	0.32 (5,1) 0.39 (6,3) 0.50 (8,0)	1650	3000	3250	6000	3046 (210)	3626 (250)	151 (17) 186 (21) 235 (26,5)
QXM32-010 QXM32-012 QXM32-016	0.63 (10,0) 0.79 (12,6) 0.98 (15,6)	1400	2500	3050	5500	3046 (210)	3626 (250)	297 (33,5) 372 (42) 460 (52)
QXM42-020 QXM42-025 QXM42-032	1.27 (20,3) 1.57 (25,1) 2.02 (32,3)	1000	1800	2900	5000	3046 (210)	3626 (250)	602 (68) 744 (84) 956 (108)
QXM52-040 QXM52-050 QXM52-063	2.45 (39,2) 3.16 (50,5) 3.97 (63,5)	1000	1800	2500	4500	3046 (210)	3626 (250)	1160 (131) 1496 (169) 1876 (212)
QXM62-080 QXM62-100 QXM62-125	5.00 (80,1) 6.31 (100,9) 7.79 (124,6)	1000	1800	2250 2050 1800	4000	3046 (210)	3626 (250)	2732 (268) 2983 (337) 3682 (416)
QXM82-160 QXM82-200 QXM82-250	10.17 (162,7) 12.56 (200,9) 15.55 (248,8)	1000	1800	1600 1500 1350	3500	3046 (210)	3626 (250)	4815 (544) 5939 (671) 7364 (832)

These operating data are valid for mineral oils with 42 mm^2/s

1) Intermittent pressure for max. 20 sec/min but not more than 10% of the duty cycle

2) Theoretical value at the maximum permitted continuous pressure. For starting torques, see section 3.

3) For higher speed contact us

4) Min. inlet pressure 1 bar absolute

5) Recommended speed. For less speed the pressure must be reducing (linear rate).
For customized working cycle contact Bucher Hydraulics.

2.4 Pressure range 3

Type	Displacement	Minimum Motor Speed 5) RPM (min^{-1})		Max. Speed 3) RPM (min^{-1})		Operating ressure on outlet side 1) PSI (bar)		Torque 2)
	effective in^3/Rev (cm^3/U)	... 50% cont. pressure	... 100% cont. pressure	pump 4)	motor	Cont. pressure	Interm. pres-sure	lb-in (Nm)
QXM23-005 QXM23-006 QXM23-008	0.32 (5,1) 0.39 (6,3) 0.50 (8,0)	1200	2500	3250	6000	4641 (320)	5802 (400)	230 (26) 283 (32) 360 (41)
QXM33-010 QXM33-012 QXM33-016	0.63 (10,0) 0.79 (12,6) 0.98 (15,6)	1000	2000	3050	5500	4641 (320)	5802 (400)	451 (51) 567 (64) 708 (80)
QXM43-020 QXM43-025 QXM43-032	1.27 (20,3) 1.57 (25,1) 2.02 (32,3)	750	1500	2900	5000	4641 (320)	5802 (400)	912 (103) 1133 (128) 1452 (164)
QXM53-040 QXM53-050 QXM53-063	2.45 (39,2) 3.16 (50,5) 3.97 (63,5)	750	1500	2500	4500	4641 (320)	5802 (400)	1770 (200) 1175 (257) 2859 (323)
QXM63-080 QXM63-100 QXM63-125	5.00 (80,1) 6.31 (100,9) 7.79 (124,6)	750	1500	2250 2050 1800	4000	4641 (320)	5802 (400)	3611 (408) 4549 (514) 5620 (635)
QXM83-160 QXM83-200 QXM83-250	10.17 (162,7) 12.56 (200,9) 15.55 (248,8)	750	1500	1600 1500 1350	3500	4641 (320)	5802 (400)	7329 (828) 9055 (1023) 11214 (1267)

These operating data are valid for mineral oils with 42 mm^2/s

1) Intermittent pressure for max. 20 sec/min but not more than 10% of the duty cycle

2) Theoretical value at the maximum permitted continuous pressure. For starting torques, see section 3.

3) For higher speed contact us

4) Min. inlet pressure 1 bar absolute

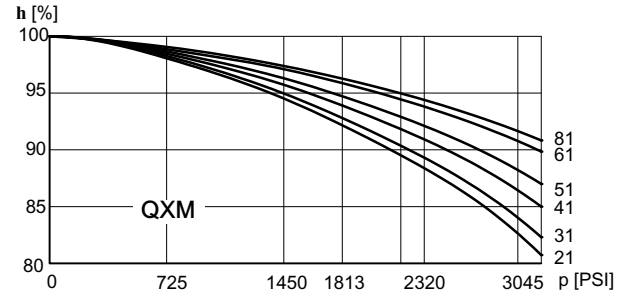
5) Recommended speed. For less speed the pressure must be reducing (linear rate).
For customized working cycle contact Bucher Hydraulics.

3 Performance graphs

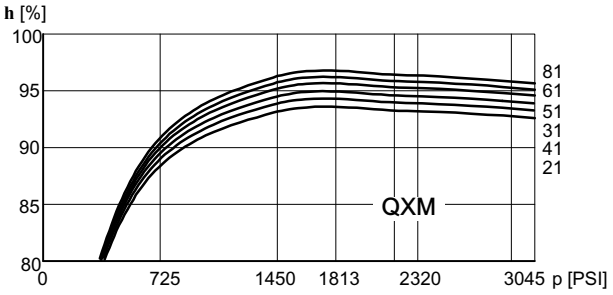
3.1 Pressure range 1

3.1.1 Volumetric efficiency

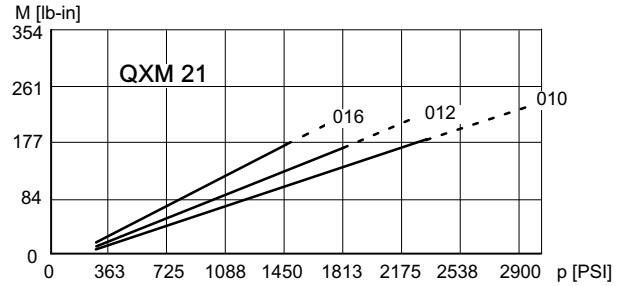
Measured with n = 1450 RPM (min$^{-1)}$
Viscosity 210 S.U.S (42 mm^2/s)

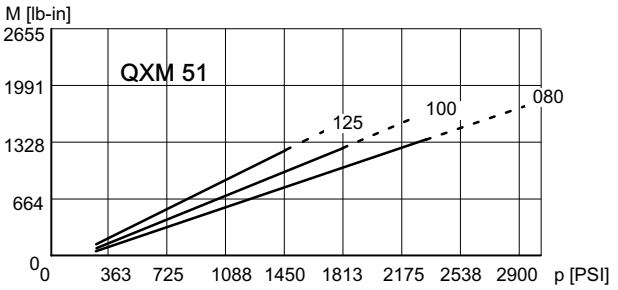


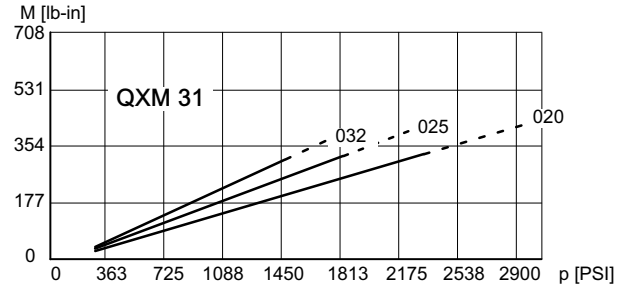
3.1.2 Hydro-mechanical efficiency

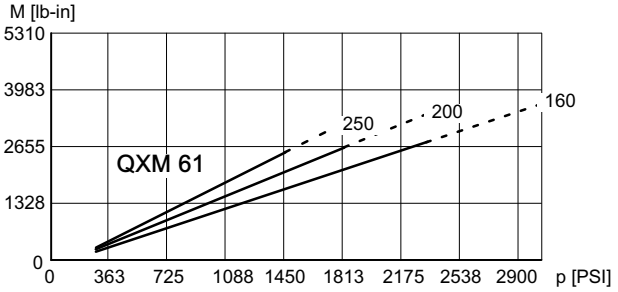


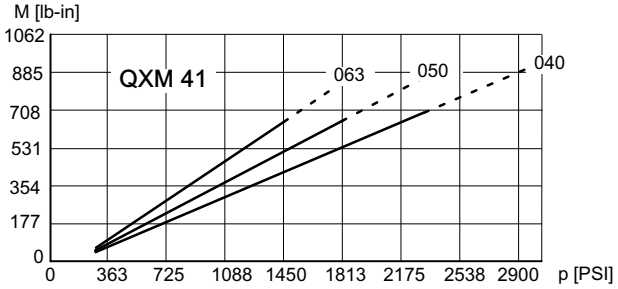
3.1.3 Starting torque

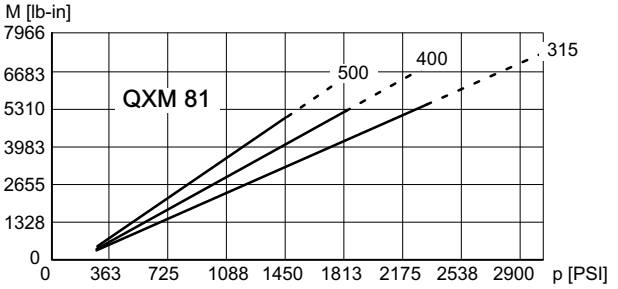




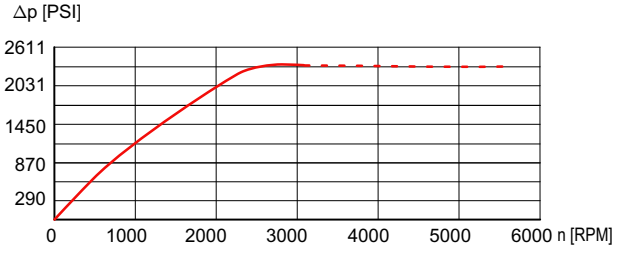








3.1.4 Maximum pressure accumulation at $P_1 + P_2$

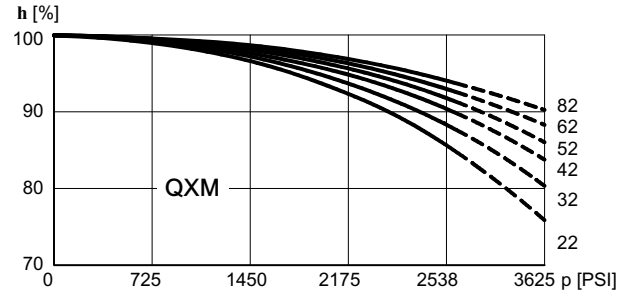


= Dependent on frame size (see 2.2)

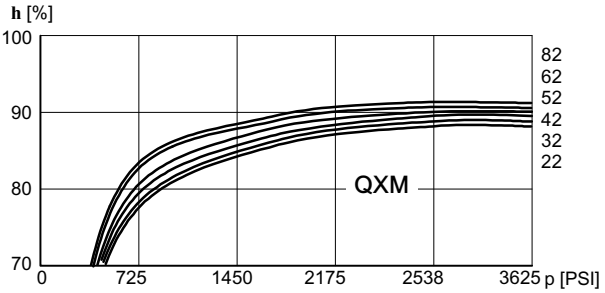
3.2 Pressure range 2

3.2.1 Volumetric efficiency

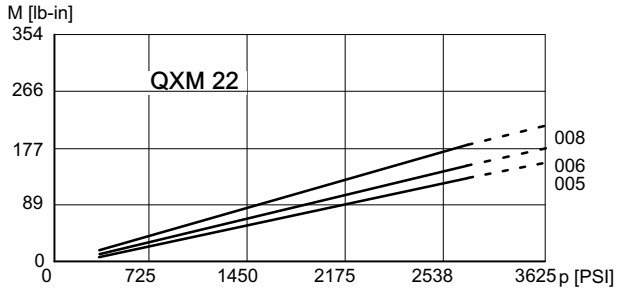
Measured with viscosity 42 mm^2/s, speed 1450 RPM (min^{-1})
Solid line = continous pressure / dashed line = max. intermittent pressure

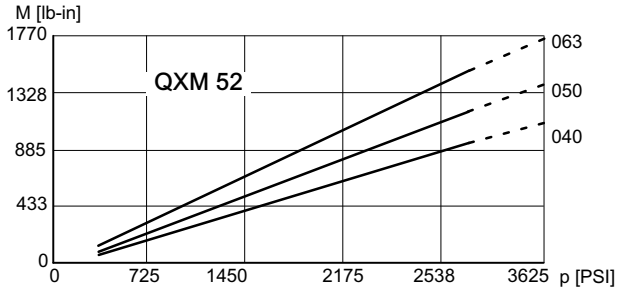


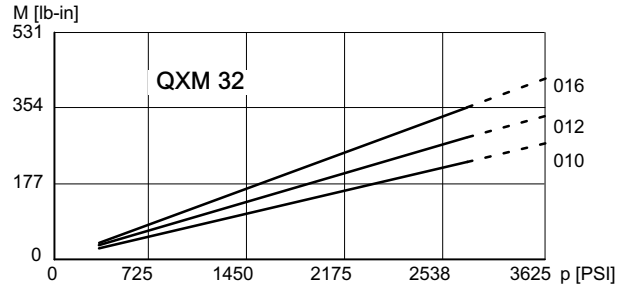
3.2.2 Hydro-mechanical efficiency

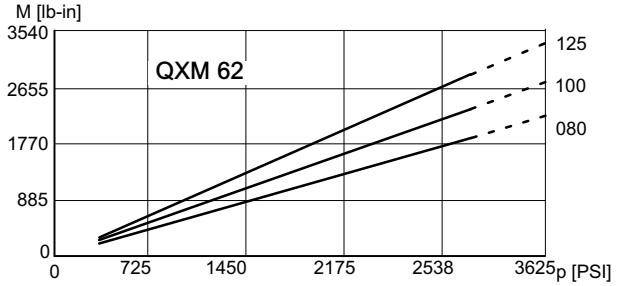


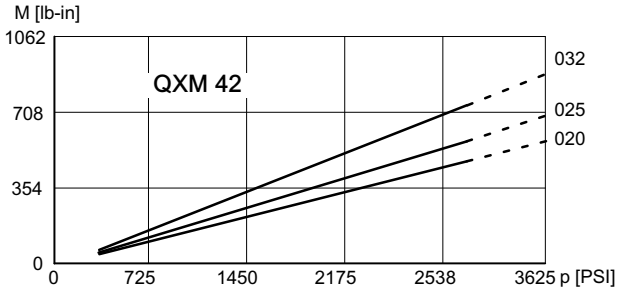
3.2.3 Starting torque

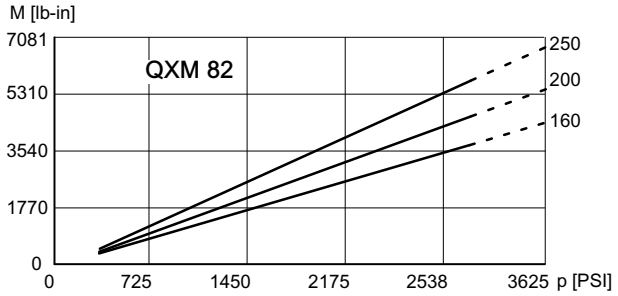




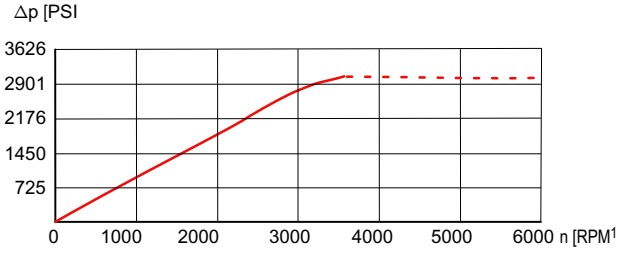








3.2.4 Maximum pressure accumulation at $P_1 + P_2$

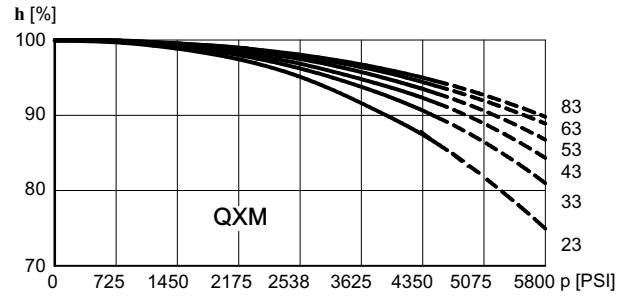


= Dependent on frame size (see 2.3)

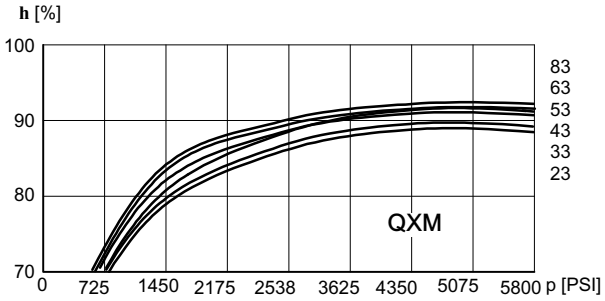
3.3 Pressure range 3

3.3.1 Volumetric efficiency

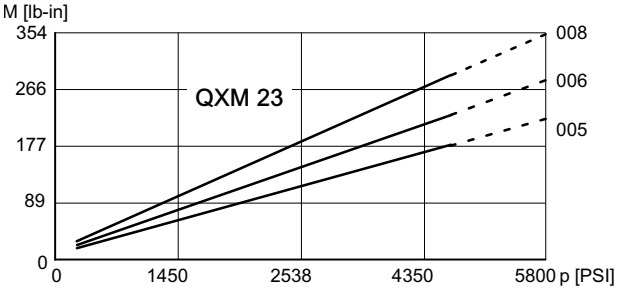
Measured with viscosity 42 mm²/s, speed 1450 RPM (min-1)
Solid line = continous pressure / dashed line = max. intermittend pressure

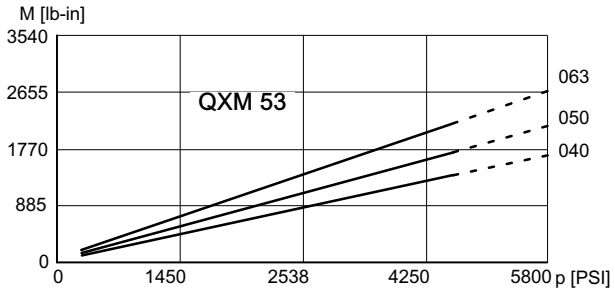


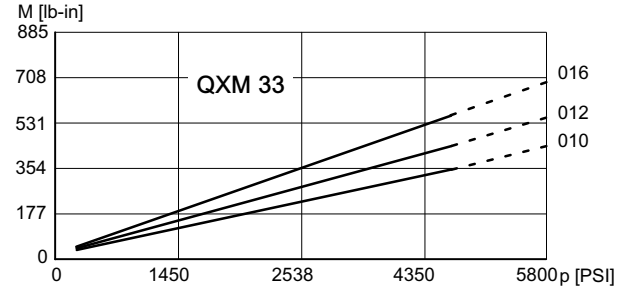
3.3.2 Hydro-mechanical efficiency

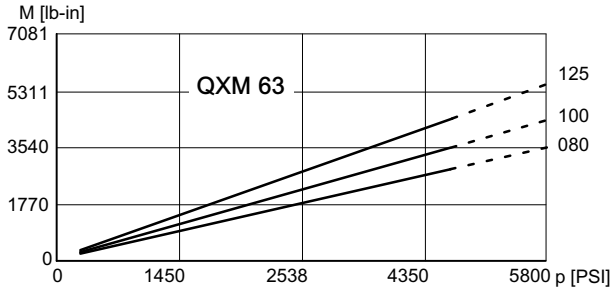


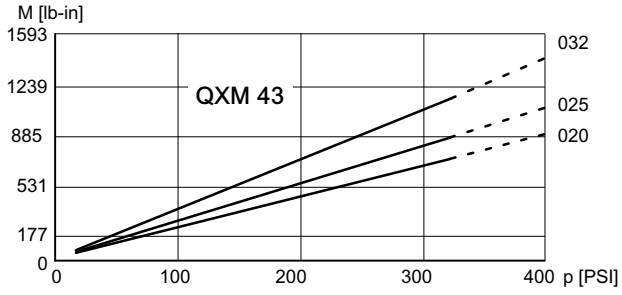
3.3.3 Starting torque

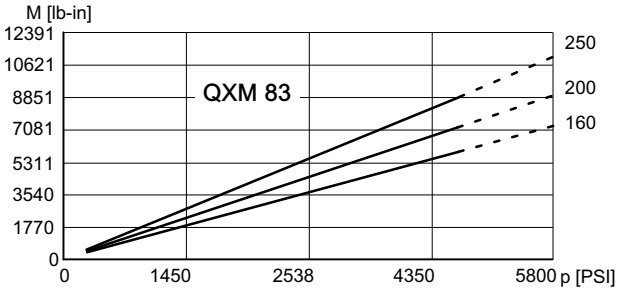




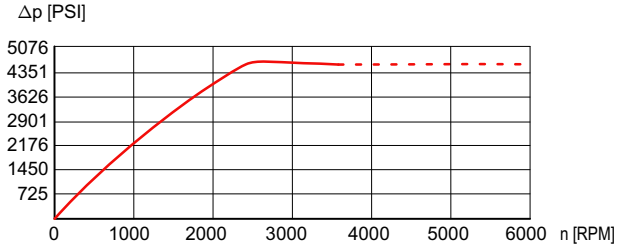








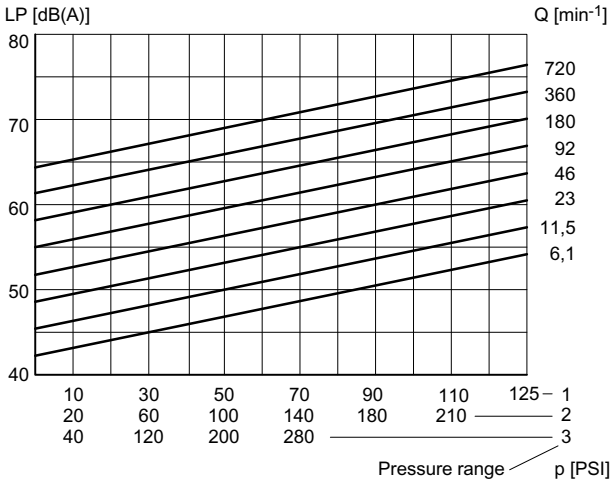
3.3.4 Maximum pressure accumulation at $P_1 + P_2$



= Dependent on frame size (see 2.4)

3.4 Noise level (L_p)

Measured to DIN 45635, Part 26, in Stuttgart University's low-echo noise Measurement chamber;
Measurement distance 1 m; speed n = 1500 rpm; viscosity = 210 S.U.S (42 mm^2/s)



4 Dimensions

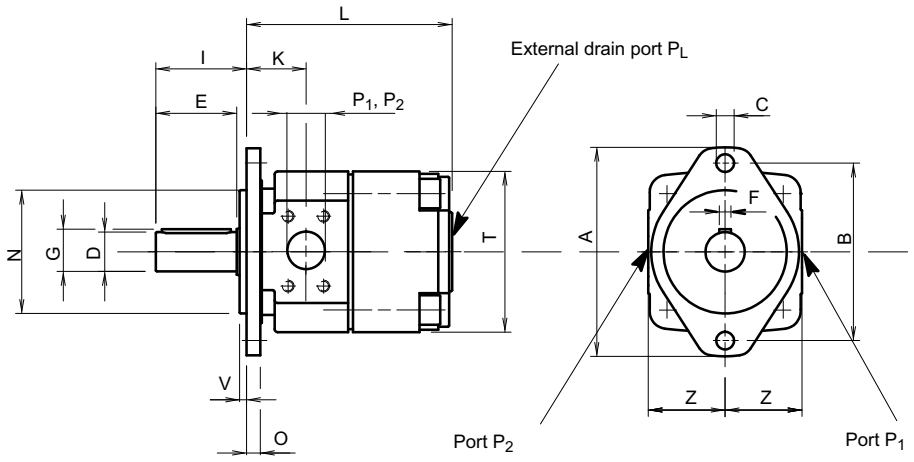
Frame size		2			3			4			5			6			8		
Pressure range		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Service ports to SAE J518 [1]	P_1, P_2	G1/2" [3] thread			G 3/4" [3] thread			1"			1 1/4"			1 1/2"			2"		
Drain port to DIN 3852 Teil 2 Part 2	P_L	G1/4"			G1/4"			G1/4"			G1/4"			G 3/8"			G1/2"		
Mounting: oval 2-hole flange to ISO 3019/1 (SAE - size 3-6) ISO 3019/2 (Metr. - sizes 2+8)	A	7.15 (118)			5.20 (132)			6.70 (170)			8.35 (212)			10.51 (267)			12.99 (330)		
	$B_{(SAE)}$	-			4.17 (106)			5.75 (146)			7.13 (181)			9.02 (229)			-		
	$B_{(Metr.)}$	3.93 (100)			4.29 (109)			5.51 (140)			7.09 (180)			8.82 (224)			11.02 (280)		
	C	0.35 (9)			0.43 (11)			0.55 (14)			0.71 (18)			0.87 (22)			1.02 (26)		
	$N_{(SAE)}$	-			3.25 - 0.002 (82,55 - 0,05)			4 - 0.002 (101,6 - 0,05)			5 - 0.002 (127 - 0,05)			6 - 0.002 (152,4 - 0,05)			-		
	$N_{(Metr.)}$	2.48 h8 (63 h8)			3.15 h8 (80 h8)			3.93 h8 (100 - h8)			4.92 h8 (125 h8)			6.30 h8 (160 - h8)			7.87 h8 (200 h8)		
	O	0.33 (8,5)			0.33 (8,5)			0.41 (10,5)			0.49 (12,5)			0.65 (16,5)			0.79 (20)		
	V	0.24 (6)			0.24 (6)			0.28 (7)			0.28 (7)			0.28 (7)			0.35 (9)		
Shaft end: parallel, to ISO/R775 [2]	D	0.79 j6 (20 j6)			0.98 j6 (25 j6)			1.26 j6 (32 j6)			1.57 j6 (40 j6)			1.97 j6 (50 j6)			2.48 j6 (63 j6)		
	E	1.42 (36)			1.65 (42)			2.28 (58)			3.23 (82)			3.23 (82)			4.13 (105)		
	F	0.24 (6)			0.31 (8)			0.39 (10)			0.47 (12)			0.55 (14)			0.71 (18)		
	G	0.89 (22,5)			1.10 (28)			1.38 (35)			1.69 (43)			2.10 (53,5)			2.64 (67)		
	I	1.77 (45)			1.97 (50)			2.68 (68)			3.62 (92)			3.62 (92)			4.61 (117)		
Housing	K	1.48 (37,5)			1.73 (44)			2.07 (52,5)			2.38 (60,5)			2.91 (74)			3.54 (90)		
	L	5.5 (140)	4.8 (122)	6.2 (157)	6.5 (166)	5.7 (146)	7.5 (191)	8.0 (204)	6.8 (178)	9.2 (234)	9.6 (244)	8.3 (212)	11.1 (282)	11.4 (289)	9.8 (249)	13.3 (339)	14.3 (364)	12.4 (314)	16.9 (429)
	M	-	2.2 (55)	3.4 (90)	-	2.7 (69,5)	4.5 (114)	-	3.4 (87)	5.6 (143)	-	4.0 (102)	6.8 (172)	-	4.7 (119)	8.2 (209)	-	5.9 (151)	10 (266)
	T	3.36 (86)			4.2 (107)			5.2 (133)			6.9 (177)			8.4 (214)	8.7 (220)		10 (273)	11 (275)	
	Z	2 (50)			2.4 (60)			2.5 (62,5)			3.1 (78)			3.8 (97,5)			4.9 (125)		
Weight	lbs (kg)	11 (5)	11 (5)	14 (6,5)	22 (10)	21 (9,5)	27.6 (12,5)	40 (18)	37 (17)	48 (22)	73 (33)	68 (31)	88 (40)	141 (64)	132 (60)	168 (76)	287 (130)	265 (120)	353 (160)

1) For SAE J518 code 61 bzw. ISO6162-1 pipe flange dimensions see section 9

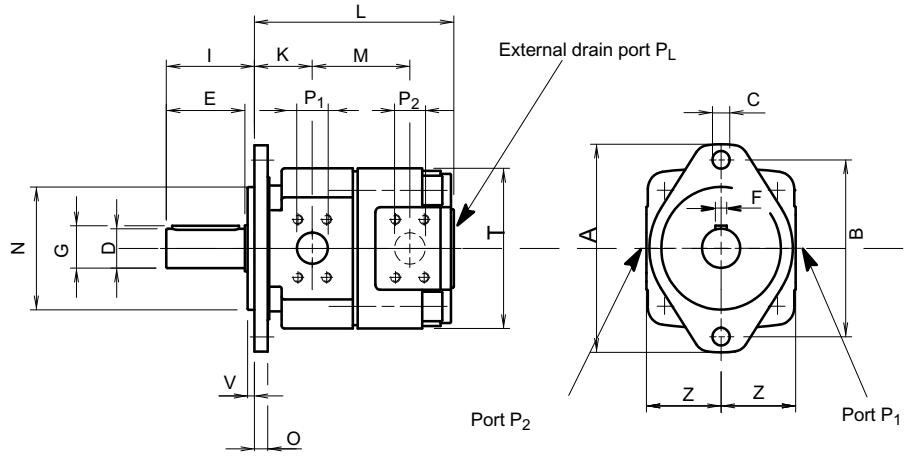
2) For other shaft ends, contact Bucher Hydraulics

3) Threaded ports to DIN 3852 Part 2

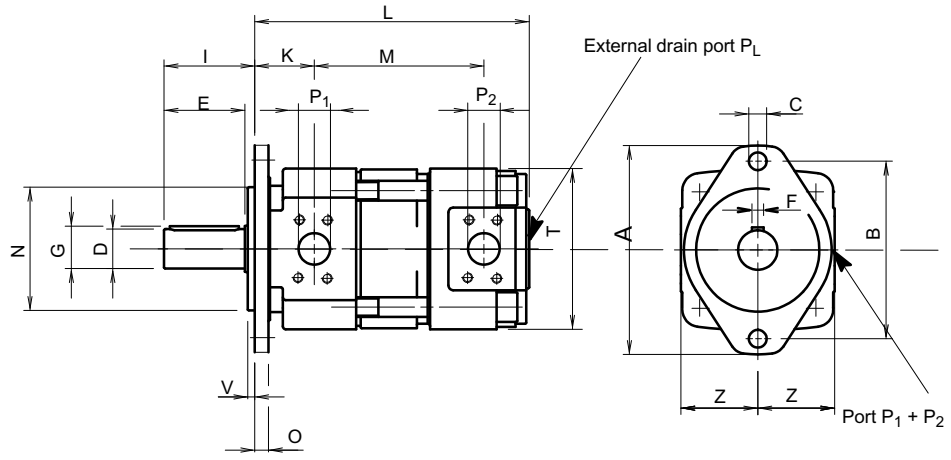
4.1 Pressure range 1



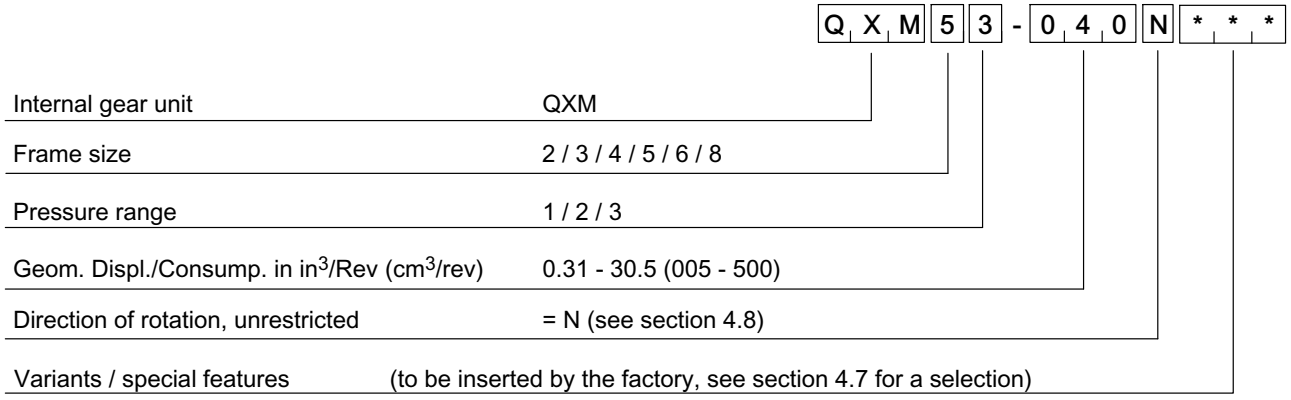
4.2 Pressure range 2



4.3 Pressure range 3



4.4 Ordering details



4.5 Ordering example

Required:	internal gear drive unit QXM
Displ./Consump.:	2.40 in^3/rev (40 cm^3/rev)
Continuous pressure:	4350 PSI (300 bar)
For use with mineral oil:	HLP
Ordering code:	QXM 53-040 N

4.6 Standard configuration

- Direction of rotation - unrestricted
- 2-hole mounting flange to ISO 3019/1; Frame size QXV 3-6
  2-hole mounting flange to ISO 3019/2; Frame size QXV 2+8
- Nitrile seals
- Cylindrical shaft end to ISO R775
- Separate drain port in rear cover of the drive unit
- Ports P1 + P2 both the same size
- Compression proof shaft seal

4.7 Special features

09 = Viton seals
130 = 2-quadrant operation, service port dimensions as per QX pumps
2-hole mounting flange to ISO 3019/2 (metric)
For other special features, contact Bucher
Commissioning see Operating Instructions 100-I-000014

4.8 Direction of rotation

Direction of rotation: right
(clockwise, viewed from the shaft end) = oil flows from P_1 to P_2

Direction of rotation: left
(counterclockwise , viewed from the shaft end) = oil flows from P_2 to P_1

5 Fluid cleanliness

QXM internal gear units require a fluid with a minimum cleanliness level of NAS 1638, Class 9 or ISO 4406, code 20/18/15.
HLP hydraulic oils to DIN 51524, Part 2, can be used without any special restriction as long as they remain within the specified temperature and viscosity ranges. HFC fire-resistant fluids to DIN 51502 can be used. Note that all fire-resistant fluids require special versions of the pumps or motors and must be approved by Bucher Hydraulics. We recommend the use of fluids that contain anti-wear additives for mixed-friction operating conditions. Fluids without appropriate additives can reduce the service life of pumps and motors. The user is responsible for maintaining, and regularly checking, the fluid quality. Bucher Hydraulics recommends a load capacity of $\geq$ 30 N/mm^2 to Brugger DIN 51347-2.

6 Note

This catalogue is intended for users with specialist knowledge. The user must check the suitability of the equipment described herein in order to ensure that all of the conditions necessary for the safety and proper functioning of the system are fulfilled. If you have any doubts or questions concerning the use of these pumps, please consult Bucher Hydraulics.

7 Fluid cleanliness

Cleanliness class (RK) as per ISO 4406 and NAS 1638

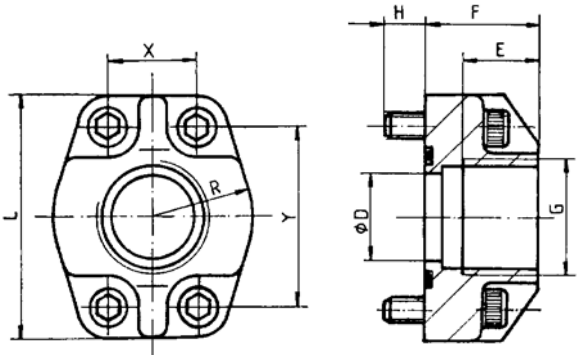
Code ISO 4406	Dirt particle number / 100 ml			
	$\leq$ 4 µm	$\leq$ 6 µm	$\leq$ 14 µm	NAS 1638
23/21/18	8000000	2000000	250000	12
22/20/18	4000000	1000000	250000	-
22/20/17	4000000	1000000	130000	11
22/20/16	4000000	1000000	64000	-
21/19/16	2000000	500000	64000	10
20/18/15	1000000	250000	32000	9
19/17/14	500000	1300000	16000	8
18/16/13	250000	64000	8000	7
17/15/12	130000	32000	4000	6
16/14/12	64000	16000	4000	-
16/14/11	64000	16000	2000	5
15/13/10	32000	8000	1000	4
14/12/9	16000	4000	500	3
13/11/8	8000	2000	250	2

8 Operational reliability

To ensure a reliable operation and a long service life of the QXM internal gear units, a maintenance schedule must be prepared for the power unit, machine or system. The maintenance schedule must make sure that the provided or permissible operating conditions of the QXM internal gear units are adhered to over the period of use.
In particular, compliance with the following operating parameters must be ensured:
– The required oil cleanliness
– The operating temperature range
– The fluid level
Moreover, the QXM internal gear units and the system must be inspected at regular intervals for changes in the following parameters:
– Vibration
– Noise
– Differential temperature of internal gear unit – fluid in the tank
– Foaming in the tank
– Freedom from leakage
Changes in these parameters indicate wear of components (e.g. drive motor, coupling, internal gear unit, etc.). The cause must be immediately pinpointed and eliminated.
To provide high operational reliability of the QXM internal gear unit in the machine or system, we recommend continuous, automatic checks of the above parameters and an automatic shutdown in the case of changes that exceed the usual fluctuations within the provided operating range.

9 Accessories

9.1 Pipe flanges - high pressure type



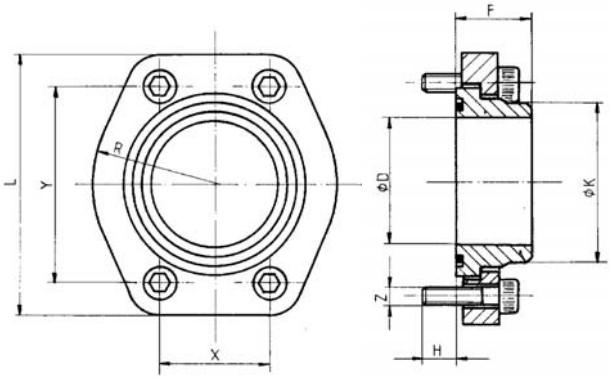
- Max. operating pressure 420 bar
- Flange size SAE J518 code 61 / ISO 6162-1

Threaded pipe flanges are spot-faced for DIN 2353 pipe fittings
Material: ST37 / For Viton seals, contact Bucher Hydraulics

Order-ingnum-ber	Ordering code	Size	DØ	E	F	H	L	R	X	Y	Viton seal 90 Shore 'A'	Retaining screws DIN912-12.9 / Torque lb-in (Nm)	
037000	RF 01-R08	G 1/2”	0.5 (12,5)	0.6 (16)	1.1 (27)	0.5 (13)	2.1 (54)	0.9 (23)	0.69 (17,5)	1.49 (38)	0.79x0.10 (20,24x2,62)	M8x30	266 30
037010	RF 02-R10	G 3/4”	0.8 (20)	0.7 (18)	1.2 (30)	0.47 (12)	2.6 (65)	1.0 (26)	0.87 (22,2)	1.87 (47,6)	1.05x0.10 (26,65x2,62)	M10x30	531 (60)
037020	RF 03-R11	G 1”	1.0 (25)	0.8 (20)	1.3 (34)	0.5 (13)	2.7 (70)	1.1 (29)	1.03 (26,2)	2.06 (52,4)	1.29x0.10 (32,99x2,62)	M10x35	531 (60)
037030	RF 04-R12	G 1 1/4”	1.3 (32)	1.0 (22)	1.5 (38)	0.6 (14)	3.1 (80)	1.4 (36)	1.19 (30,2)	2.31 (58,6)	1.61x0.14 (40,86x3,53)	M10x40	531 (60)
037040	RF 05-R13	G 1 1/2”	1.5 (38)	0.9 (24)	1.6 (41)	0.7 (19)	3.7 (94)	1.6 (41)	1.41 (35,7)	2.76 (70)	1.73x0.14 (44,04x3,53)	M12x45	1062 (120)
037050	RF 06-R14	G 2”	1.9 (50)	1.1 (26)	1.8 (45)	0.8 (20)	4.0 (102)	1.9 (48)	1.69 (42,9)	3.06 (77,8)	2.36x0.14 (59,92x3,53)	M12x50	1062 (120)
055470*	RF 07-R16	G 2 1/2” *	2.5 (63)	1.2 (30)	1.9 (50)	0.7 (18)	4.5 (114)	2.2 (57)	1.99 (50,8)	3.50 (89)	2.86x0.14 (72,62x3,53)	M12x45	1062 (120)

* At RF07 only to 3045 PSI (210 bar) be allowed

9.2 Low pressure type



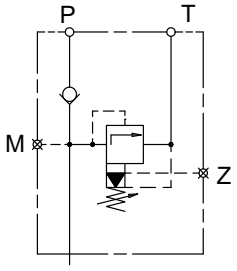
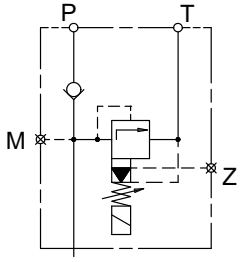
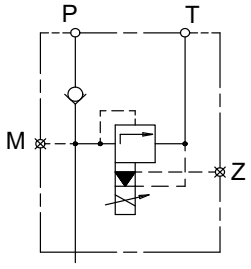
- Max. operating pressure 16 bar
- Flange size SAE J518 code 61 / ISO 6162-1

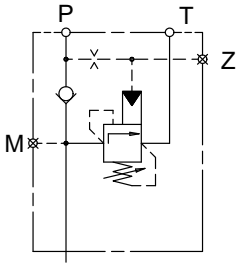
Material: ST37 / For Viton seals, contact Bucher Hydraulics

Order-ing number	Order-ing code	SAE flang e Size	D	K	F	H	L	R	X	Y	Viton seal 90 Shore 'A'	Retaining screws DIN 912-8.8 Torque Nm		Pipe [1] O/di-aap-prox.
062450	RN 07-S	2 1/2”	2.5 (63)	2.9 (75)	1.3 (35)	0.6 (14)	4.7 (120)	2.5 (57)	2.0 (51)	3.5 (89)	2.73 x 0.14 (69,44x3,53)	M12 x 30	620 (70)	2.95 (75)
063880	RN 08-S	3”	3.0 (76)	3.5 (88)			5.53 (140,5)	2.7 (68)	2.4 (62)	4.19 (106,5)	3.36 x 0.14 (85,32x3,53)	M16 x 40	1593 (180)	3.46 (88)
063890	RN 09-S	3 1/2”	3.5 (89)	3.9 (100)	1.6 (40)	0.7 (19)	6.23 (158,5)	2.9 (73)	2.8 (70)	4.74 (120,3)	3.86 x 0.14 (98,02x3,53)	M16 x 40	1593 (180)	3.93 (100)
063900	RN 10-S	4”	4.1 (103)	4.5 (115)			6.6 (168)	3.1 (79)	3.1 (78)	5.1 (130)	4.36 x 0.14 (110,72x3,53)	M16 x 40	1593 (180)	4.53 (115)

1) We recommend the use of seamless precision steel tube to DIN 2391 with-wallthick. max 0.24 in (6 mm)

9.3 Bolt-on valves - SAE J518 code 61 / ISO 6162-1 pattern

Ordering de-tails	Pressure relief A S G DF / A S G DH	Pressure relief solenoid control A S G DA / ASDM	Pressure relief proportional solenoid control A S G DP
Symbols			

Ordering de-tails	Unloading valve Accumulator charging allve A S G AF A S G SF
Symbols	

S = For pipe flange SAE J518 code 61 pattern (all size)

G = With threaded port, G 1” (size QX2, 3)

For other informations on Bolt-on valves see data sheet 100-P-000119

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