

Internal Gear Pumps

Series QX



motion and progress

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1 General

1.1 Product description

The QX pumps are the 5th generation of Bucher internal gear pumps, which have proven themselves in thirty years of service around the world. Numerous improvements have been made to the straightforward and robust design.

Advances in the manufacturing process have made it possible without making higher demands on individual components to build pumps that are considerably lighter and more compact.

A new tooth profile, conceived and optimised with the help of CAE, has yielded another significant reduction in noise levels. Large sealing areas result in higher efficiencies.

The internal gear ring is supported by a hydrodynamic/ hydrostatic lubricating film, which allows operation at low viscosities or low and high speeds. QX pumps are therefore suitable for use with variable speed drives, where they can provide variable deliveries.

1.2 Advantages

- service life > 20000 hours
- sound pressure level < 57 dB (A)
- volumetric efficiency up to 98%
- suitable for use with variable speed drivers
- can be used with fire-resistant fluids (HFB, HFC and HFD = QXV), fuels, biodegradable and low-viscosity fluids
- certifications by ATEX 2, ABS, DNV, GL, LR, NK, ...
- low flow and pressure pulsations

2 Technical data

2.1 General (deviating values according manufacturer's specification)

Installation attitude	unrestricted
Mounting method (standard)	oval 2-hole flange to ISO 3019/1 (SAE): QX 3 to 6 oval 2-hole flange to ISO 3019/2 (metric) QX 2 and 8
Direction of rotation	CW, alternatively CCW (but not reversible)
Pump drive method	in-line, through a flexible coupling
Volumetric efficiency η_v	better than 95%
Fluids	HLP mineral oils to DIN 51524, Part 2 HFC fluids to VDMA 24317
Minimum fluid cleanliness	NAS 1638, Class 9 or ISO 4406, code 20/18/15
Operating viscosity Starting viscosity	10 to 150 mm ² /s (cSt) 10 to 300 mm ² /s (cSt)
Fluid temperature range	HLP-mineral oils - 80°C max. HFC 50°C max.
Inlet pressure maximum minimum	1.5 bar absolute (without external drain connection) 0.5 to 0.98 bar absolute (dependent on pump frame size and speed, see example in section 3.3.2)
Approach against pressure	maximum 20 bar (higher values, contact Bucher Hydraulics)

2.2 Main characteristics for pressure range 1

Effective displacement	Flow rate ¹⁾	Maximum speed	Type	Mineral oil to DIN 51524		HFC to VDMA 24317	Torque ³⁾	Power requirement ⁴⁾
				Continuous/Max. interm. press. ²⁾				
cm ³ /rev	l/min	rpm		bar	bar	bar	Nm	KW
10,3	14,9	3600	QX21-010	160/210	130/180	26	4,0	
12,6	18,3	3600	QX21-012	125/160	100/135	25	3,8	
15,9	23,0	3600	QX21-016	100/125	80/100	25	3,9	
20,0	29,0	3000	QX31-020	160/210	130/180	51	7,7	
25,3	36,7	3000	QX31-025	125/160	100/135	50	7,7	
31,2	45,2	3000	QX31-032	100/125	80/100	50	7,5	
40,7	59,0	3000	QX41-040	160/210	130/180	104	15,7	
50,3	72,9	2600	QX41-050	125/160	100/135	100	15,2	
64,7	93,8	2300	QX41-063	100/125	80/100	103	15,6	
78,6	114	2300	QX51-080	160/210	130/180	200	30,4	
101,1	146	2100	QX51-100	125/160	100/135	201	30,5	
127,3	184	1800 ⁵⁾	QX51-125	100/125	80/100	203	30,8	
160,5	232	1800 ⁶⁾	QX61-160	160/210	130/180	409	62,0	
202,1	293	1800 ⁶⁾	QX61-200	125/160	100/135	402	61,0	
249,7	362	1800 ⁶⁾	QX61-250	100/125	80/100	397	60,4	
326,0	472	1750 ⁶⁾	QX81-315	160/210	130/180	830	126,0	
402,6	583	1750 ⁶⁾	QX81-400	125/160	100/135	801	121,6	
498,5	722	1500 ⁶⁾	QX81-500	100/125	80/100	793	120,5	

2.2.1 Suction arrangements for pump types QX61 and QX81

Minimum inlet pressure is 0.95 bar absolute with viscosity 10... 100 mm²/s (other values, contact Bucher Hydraulics)

	Speed 1500 rpm Suction height		Speed 1800 rpm Suction height	
	up to 150 mm	over 150 mm	up to 150 mm	over 150 mm
QX61-160	I	I	I	II
QX61-200	I	I	I	II
QX61-250	I	II	II	II
QX81-315	I	II	II	II
QX81-400	II	II	II	-
QX81-500	II	II	-	-

I = standard pump with one suction port

II = model with two suction ports

All pump types coded II can be used without the second suction port up to 1200 rpm

2.3 Main characteristics for pressure range 2

Effective displacement	Flow rate ¹⁾	Maximum speed	Type	Mineral oil to DIN 51524 Continuous/Max. interm. press. ²⁾	HFC to VDMA 24317 interm. press. ²⁾	Torque ³⁾	Power requirement ⁴⁾
cm ³ /rev	l/min	rpm		bar	bar	Nm	KW
5,1	7,4	3600	QX22-005	210 / 250	180 / 210	17	2,6
6,3	9,1	3600	QX22-006			21	3,2
8,0	11,5	3600	QX22-008			27	4,0
10,0	14,5	3400	QX32-010	210 / 250	180 / 210	34	5,1
12,6	18,3	3400	QX32-012			42	6,4
15,6	22,6	3400	QX32-016			52	7,9
20,4	29,5	3200	QX42-020	210 / 250	180 / 210	68	10,4
25,1	36,4	3200	QX42-025			84	12,7
32,4	46,8	3200	QX42-032			108	16,5
39,3	56,9	2800	QX52-040	210 / 250	180 / 210	132	19,9
50,6	73,2	2800	QX52-050			170	25,7
63,7	92,1	2800	QX52-063			213	32,3
80,2	116	2500 ⁷⁾	QX62-080	210 / 250	180 / 210	268	40,7
101,0	146	2300 ⁷⁾	QX62-100			338	51,2
124,8	181	2000 ⁷⁾	QX62-125			417	63,4
163,0	236	1800 ⁷⁾	QX82-160	210 / 250	180 / 210	544	82,7
201,3	291	1750 ⁷⁾	QX82-200			672	102,1
249,2	361	1500 ⁷⁾	QX82-250			833	126,5

2.4 Main characteristics for pressure range 3

Effective displacement	Flow rate ¹⁾	Maximum speed	Type	Mineral oil to DIN 51524 Continuous/Max. interm. press. ²⁾	HFC to VDMA 24317 interm. press. ²⁾	Torque ³⁾	Power requirement ⁴⁾
cm ³ /rev	l/min	rpm		bar	bar	Nm	KW
5,1	7,4	3600	QX23-005	320 / 400	280 / 350	26	4,0
6,3	9,1		QX23-006			32	4,9
8,0	11,5		QX23-008			41	6,2
10,0	14,5	3400	QX33-010	320 / 400	280 / 350	51	7,7
12,6	18,3		QX33-012			64	9,7
15,6	22,6		QX33-016			80	12,1
20,4	29,5	3200	QX43-020	320 / 400	280 / 350	104	15,8
25,1	36,4		QX43-025			128	19,4
32,4	46,8		QX43-032			165	25,0
39,3	56,9	3000	QX53-040	320 / 400	280 / 350	200	30,4
50,6	73,2		QX53-050			258	39,1
63,7	92,1		QX53-063			321	49,3
80,2	116	2500 ⁷⁾	QX63-080	320 / 400	280 / 350	409	62,0
101,0	146	2300 ⁷⁾	QX63-100			514	78,1
124,8	181	2000 ⁷⁾	QX63-125			636	96,5
163,0	236	1800 ⁷⁾	QX83-160	320 / 400	280 / 350	830	126,0
201,3	291	1750 ⁷⁾	QX83-200			1025	155,7
249,2	361	1500 ⁷⁾	QX83-250			1270	192,7

The main characteristics are valid for hydraulic oils as well as fire-resistant and environmentally-friendly fluids with a viscosity of 20 to 50 mm²/s

1) at speed n = 1450 rpm

2) maximum intermittent pressure for max. 20 sec. and not more than 10% of the duty cycle

3) theoretical value at the max. permitted continuous pressure for mineral oil

4) theoretical value at the max. permitted continuous pressures for mineral oil at n = 1450 rpm

5) for speeds higher than 1500 rpm, the min. permissible inlet pressure is 0.95 bar absolute, und bei HFC Anwendung 2. Sauganschluss erforderlich

6) max. speed only possible with second suction port, see section 2.2.1

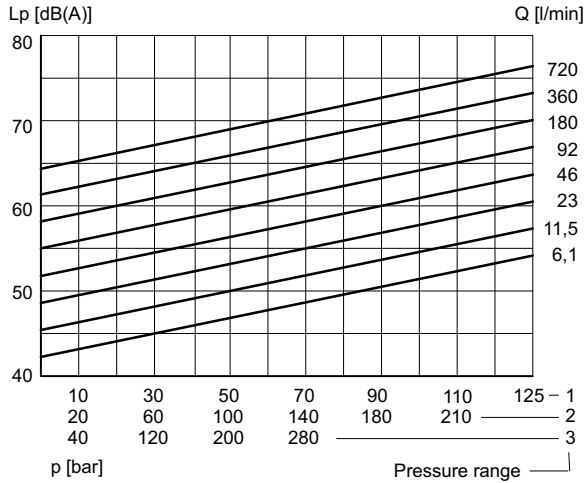
7) for max. speed minimum permissible inlet pressure is 0.95 bar absolute, for speeds higher contact Bucher Hydraulics

3 Performance graphs

The performance graphs shown are valid for the specified pump models.
For other pump sizes, contact Bucher Hydraulics.

3.1 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 = 42 mm²/s

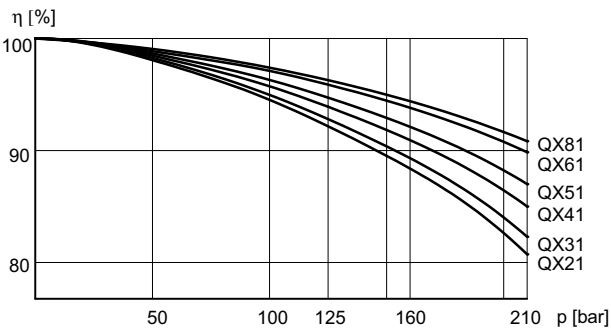


3.2 Efficiency (η)

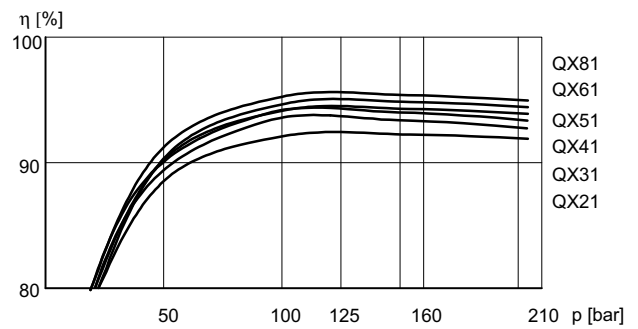
Measured at speed 1450 rpm, viscosity 42 mm²/s

3.2.1 Pressure range 1

Volumetric efficiency

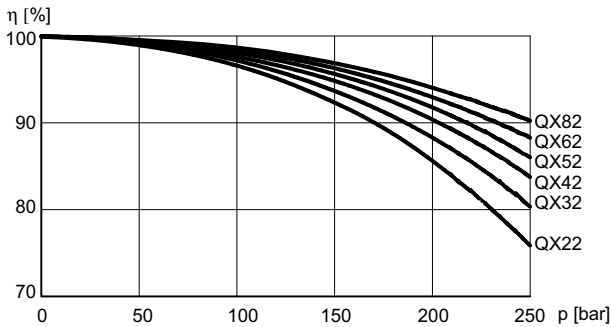


Overall efficiency

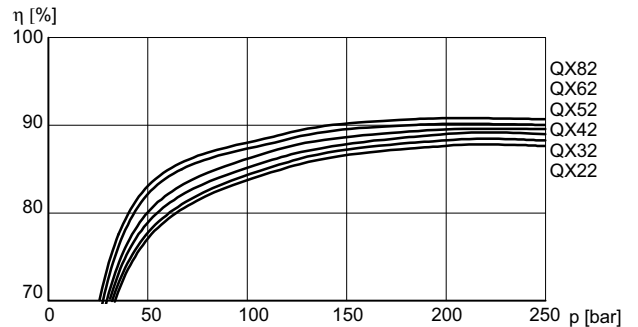


3.2.2 Pressure range 2

Volumetric efficiency

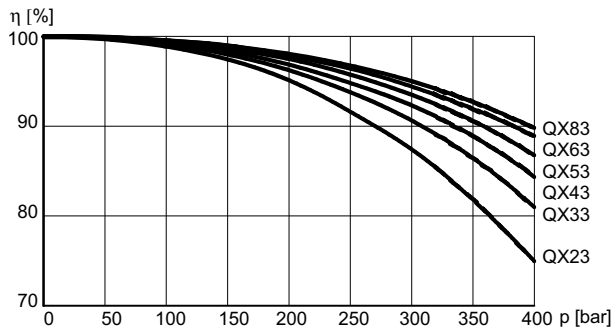


Overall efficiency

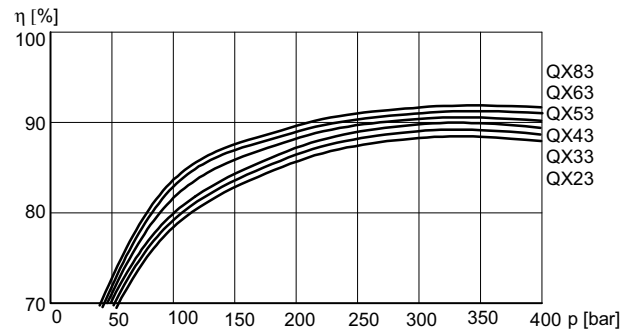


3.2.3 Pressure range 3

Volumetric efficiency



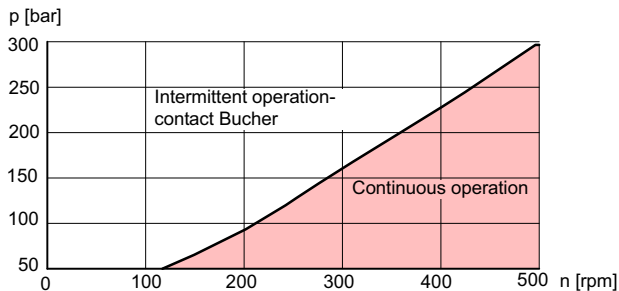
Overall efficiency



3.3 Operation with variable-speed drives

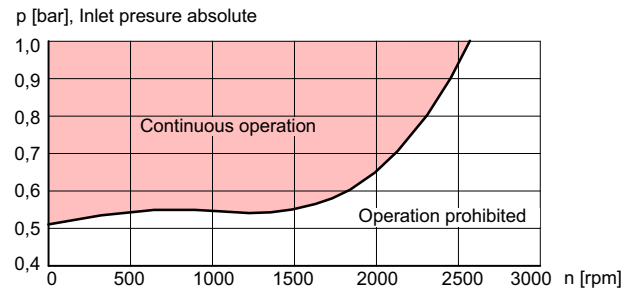
3.3.1 Minimum speed as a function of pressure

Pump QX52-063 measured: with viscosity 42 mm²/s



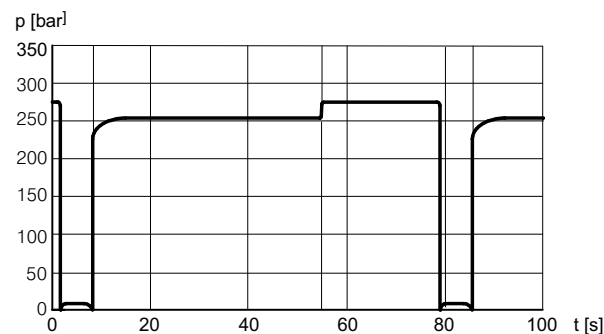
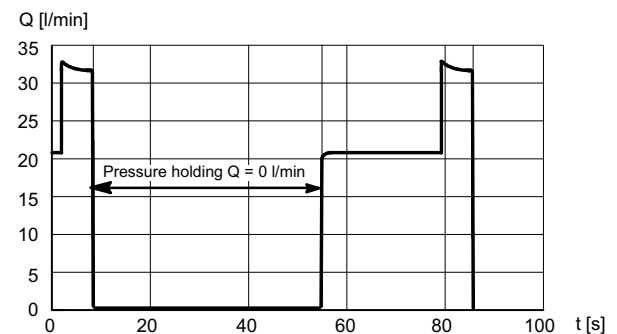
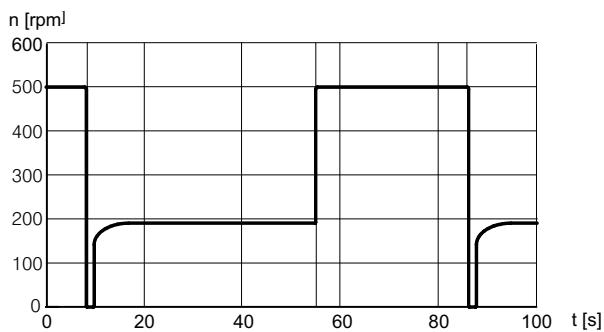
3.3.2 Minimum pressure at suction port as a function of Speed

Pump QX52-063 measured with viscosity 42 mm²/s



3.3.3 Typical loading cycle for a QX pump with variable-speed drive

Pump QX53-063 with separate drain connection measured with: viscosity 20 mm²/s



4 Single pumps

4.1 Dimensions

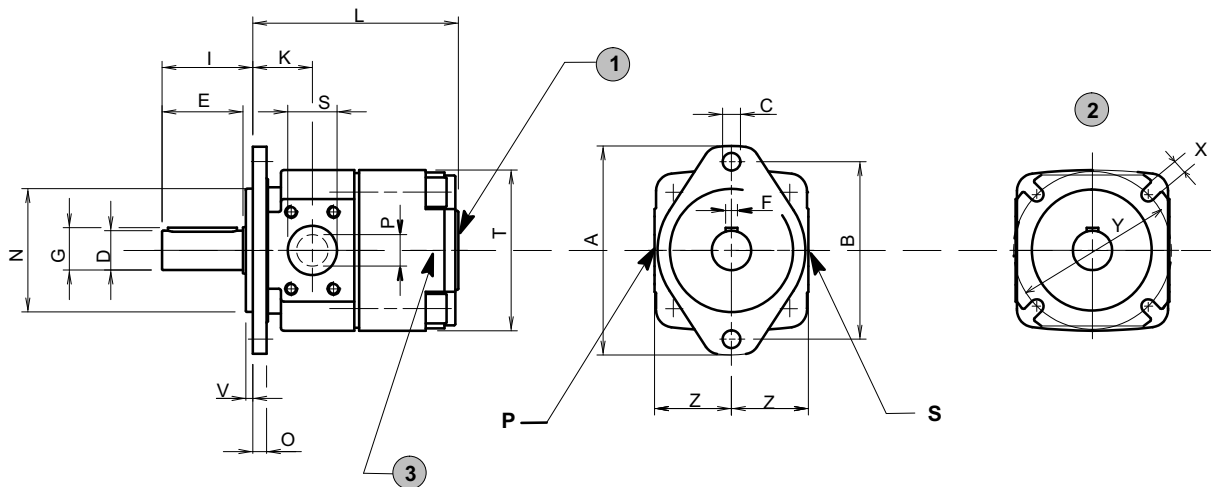
Frame size	2			3			4			5			6			8			
Pressure range	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Suction port: to standard SAE J518 ¹⁾	S	G1 ³⁾ thread			G1 1/4 ³⁾ thread			1 1/2"			2"			2 1/2"			3"		
Pressure port: to standard SAE J518 ¹⁾	P	G1/2 ³⁾ 4) thread			G3/4 ³⁾ 4) thread			1"			1 1/4"			1 1/2"			2"		
Mounting: oval 2-hole- flange to ISO 3019/1 (SAE) ISO 3019/2 (metric)	A	118			132			170			212			267			330		
	B (SAE)	-			106			146			181			229			-		
	B (Metr.)	100			109			140			180			224			280		
	C	9			11			14			18			22			26		
	N (SAE)	-			82,55 - 0,05			101,6 - 0,05			127 - 0,05			152,4 - 0,05			-		
	N (Metr.)	63 h8			80 h8			100 h8			125 h8			160 h8			200 h8		
	O	8,5			8,5			10,5			12,5			16,5			20		
V	6			6			7			7			7			9			
4-hole flange ISO 3019/2	X (Metr.)	9			9			12			14			18			22		
	Y (Metr.)	85			103			125			160			200			250		
Shaft end: parallel, to ISO/R775 ²⁾	D	20 j6			25 j6			32 j6			40 j6			50 j6			63 j6		
	E	36			42			58			82			82			105		
	F	6			8			10			12			14			18		
	G	22,5			28			35			43			53,5			67		
	I	45			50			68			92			92			117		
Housing	K	37,5			44			52,5			60,5			74			90		
	L	13 6	118	153	164	144	189	202	176	232	242	210	280	288	248	338	361	331	446
	M	-	55	90	-	69,5	114	-	87	14 3	-	10 2	17 2	-	119	209	-	151	266
	T	85			107			133			177			214	220	220	273	275	275
	Z	50			60			62,5			78			97,5			125		
Weight	kg	5	5	6,5	10	9,5	12,5	18	17	22	33	31	40	64	60	76	130	120	160

1) for SAE 3000 pipe flange dimensions,
high pressure type up to 420 bar (see section 10.2)
low pressure type for up to 16 bar (see section 10.3)

2) for other shaft ends, contact Bucher Hydraulics
3) threaded port to DIN 3852, Part 2

4) pressure port to SAE J 518 can be supplied for pressure ranges 2 and 3

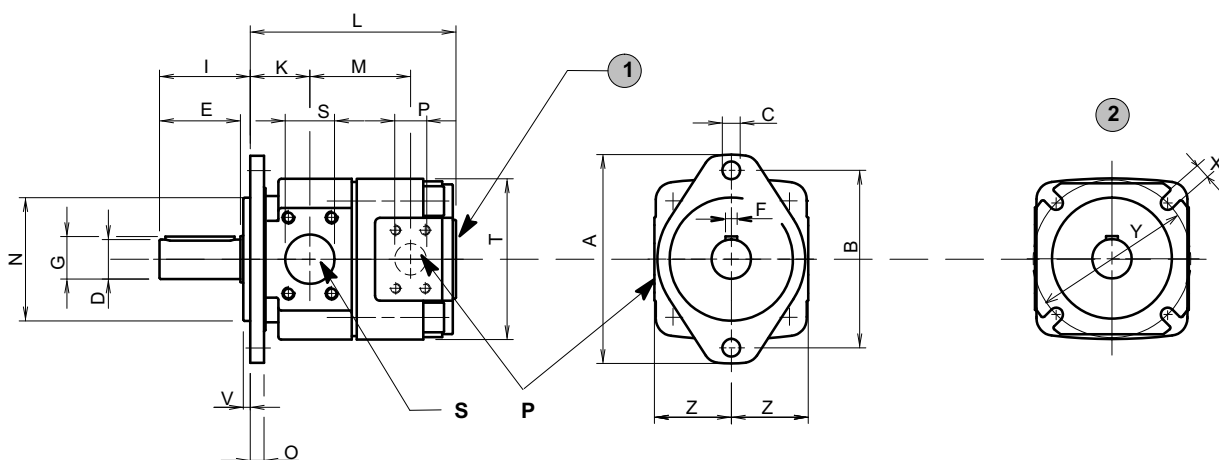
4.2 Pressure range 1



1	external drain port - see special feature 06
2	Special model: 4-hole flange ISO 3019/2

3	Depending on operating conditions, a second suction port may be required on QX61 (SAE 2") and QX81 (SAE 2 1/2") - see section 2.2.1, page 4
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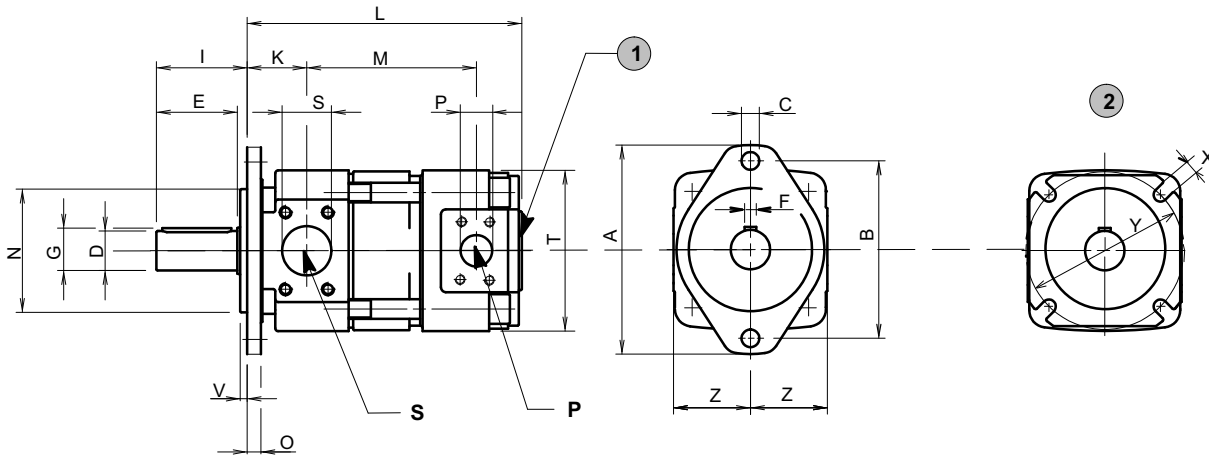
4.3 Pressure range 2



1	external drain port - see special feature 06
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2	Special model: 4-hole flange ISO 3019/2
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4.4 Pressure range 3



1 external drain port - see special feature 06

2 Special model: 4-hole flange ISO 3019/2

4.5 Ordering code for single pumps

Series	= QX	Q	X																	
Frame size	= 2 / 3 / 4 / 5 / 6 / 8																			
Pressure range	= 1 / 2 / 3																			
Displacement in cm ³ /rev	= 005 - 500																			
Rotation (viewed from shaft end)	right (CW) = R left (CCW) = L																			
Variants / special features (to be inserted by the factory, see section 4.7 for a selection)																				

Ordering example:

Required: single pump
Displacement: 40 cm³/rev
Continuous pressure: 300 bar
for use with mineral oil
Ordering code: QX53-040R

4.6 Standard configuration

- direction of rotation - right (CW)
- 2-hole mounting flange to ISO 3019/1 (SAE): sizes QX 3-6
- 2-hole mounting flange to ISO 3019/2 (metr.): sizes QX 2+8
- Nitrile seals
- parallel shaft end to ISO/R775

4.7 Special features

- 06 = separate drain port in the pump rear cover
QX 2-5 G1/4"
QX 6 G3/8"
QX 8 G1/2"
- 09 = Viton seals
- 12 = 2-hole mounting flange to ISO 3019/2 (metric): size QX3-6
- 66 = 4-hole mounting flange to ISO 3019/2 (metric)
29 = for HFB and HFC fluids, frame sizes 2 to 5
86 = for HFB and HFC fluids, frame sizes 6 and 8
- 83 = second suction port on:
QX61 = SAE 2"
QX81 = SAE 2 1/2"

5 Double pumps

QX double pumps consist of two single pumps mounted on a common drive shaft. Hydraulically, the two pumps operate independently of one another but they share a common suction port in the pump's centre section. The larger pump of the combination is situated at the shaft end (the drive side) and is referred to as Pump I. With equal frame sizes, the pump with the larger displacement is situated at the drive side.

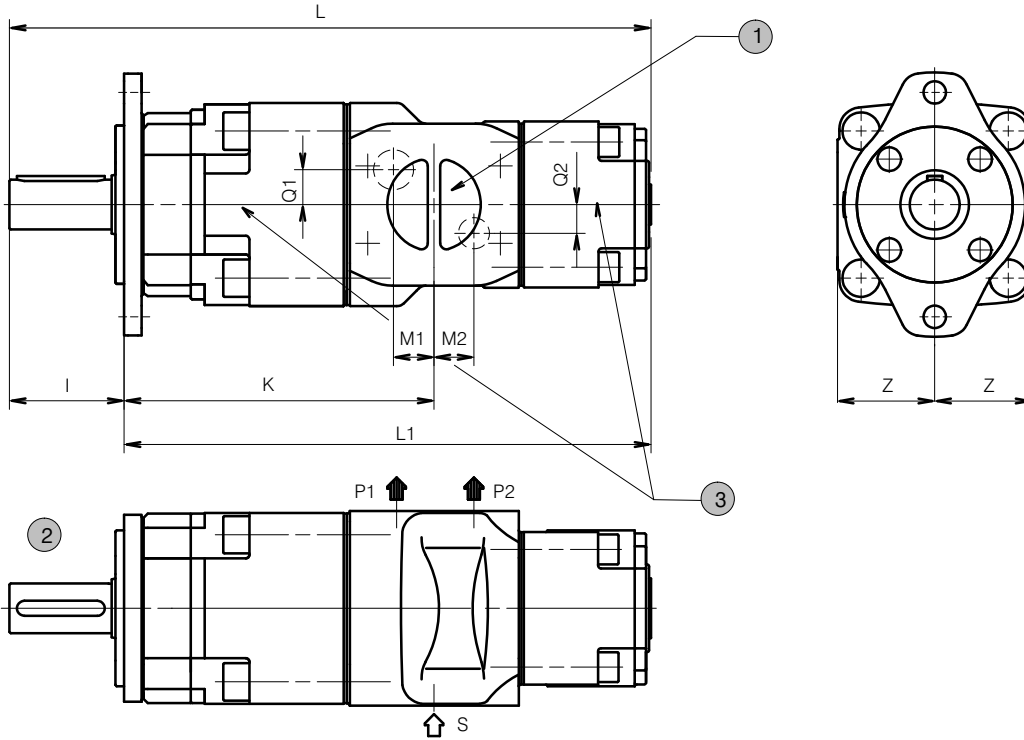
Double pumps can be combined as shown in the following table. If a letter is shown at the intersection point of the two pumps, the letter identifies the page in section 5.2 that contains the relevant dimensional drawing. If there is no letter at the intersection point, then that pump combination is not possible.

5.1 Selection table

Pump 1			Pump 2																	Maximum permissible drive shaft torque (Nm)				
			Displacement in cm ³ /rev																					
			5/6/8		10/12/16		20/25/32		40/50/63		80/100/125		160/200/250		315	400	500							
Displacement in cm ³ /rev			Maximum intermittent pressure in bar																					
			250	400	125 160 210	250	400	125 160 210	250	400	125 160 210	250	400	125 160 210	250	400	125 160 210							
Maximum intermittent pressure in bar			QX22...	QX23...	QX21...	QX32...	QX33...	QX31...	QX42...	QX43...	QX41...	QX52...	QX53...	QX51...	QX62...	QX63...	QX61...	QX82...	QX83...	QX81...				
			Pump 1	40/50/63	250	QX22..	E																	65
400	QX23..	H			I																			
125/160 210	QX21..	B			C	A																		
250	QX32..	E			F	D	E																130	
400	QX33..	H			I	G	H	I																
125/160 210	QX31..	B			C	A	B	C	A															
80/100/125	250	QX42..		E	F	D	E	F	D	E													260	
	400	QX43..		H	I	G	H	I	G	H	I													
	125/160 210	QX41..		B	C	A	B	C	A	B	C	A												
	160/200/250	250		QX52..	E	F	D	E	F	D	E	F	D	E										520
		400		QX53..	H	I	G	H	I	G	H	I	G	H	I									
		125/160 210		QX51..	B	C	A	B	C	A	B	C	A	B	C	A								
315 400 500		250		QX62..				E	F	D	E	F	D	E	F	D	E							1050
		400		QX63..				H	I	G	H	I	G	H	I	G	H	I						
		125/160 210		QX61..				B	C	A	B	C	A	B	C	A	B	C	A					
	2100	250		QX82..							E	F	D	E	F	D	E	F	D	E				
		400		QX83..							H	I	G	H	I	G	H	I	G	H	I			
		125/160 210		QX81..							B	C	A	B	C	A	B	C	A	B	C	A		

5.2 Dimensions

A Double pumps QX.1/1



1	S = common suction port
2	shaft and mounting dimensions see section 4

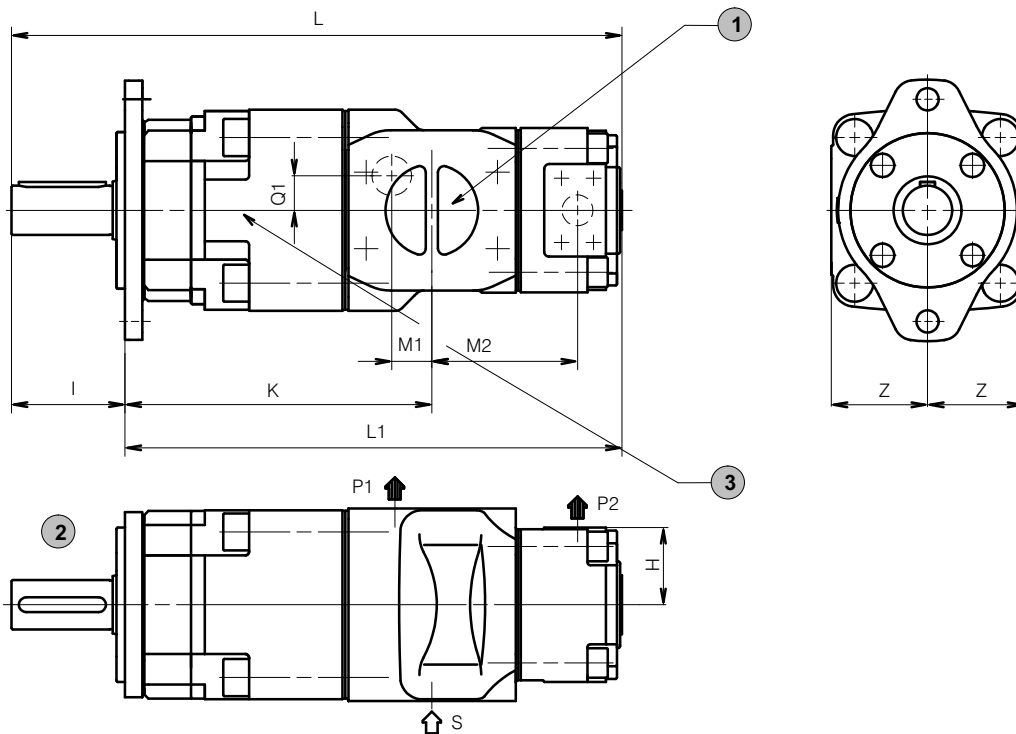
3	depending on operating conditions, a second suction port may be required - see section 2.2.1, QX61 SAE 2", QX81 SAE 2 1/2"
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Typ	L	L1	K	M1	M2	Q1	Q2	I	Z	S	P1	P2
QX21/21	296	251	141	18	18	-	-	45	50	G 1 1/4" 1)	G 1/2" 1) 2)	G 1/2" 1) 2)
QX31/21	343	293	171	26	30			50	60	G 1 1/2" 1)	G 3/4" 1) 2)	G 3/4" 1) 2)
QX31/31	358	308			201	19	26	15	68	63	SAE 2"	SAE 1"
QX41/21	396	328	208	26	26	23	23	92	78	SAE 2 1/2"	SAE 1 1/4"	G 3/4" 1) 2)
QX41/31	411	343										24
QX41/41	449	381	241	23	39	15	15	92	78	SAE 2 1/2"	SAE 1 1/4"	G 3/4" 1) 2)
QX51/21	468	376										24
QX51/31	483	391	249	30	30	28	28	92	78	SAE 3"	SAE 1 1/4"	SAE 1"
QX51/41	521	429										24
QX51/51	547	455	287	24	47	17	14	92	98	SAE 3 1/2"	SAE 1 1/2"	G 3/4" 1) 2)
QX61/31	541	449										27
QX61/41	564	472	292	32	32	35	35	92	98	SAE 3 1/2"	SAE 1 1/2"	SAE 1 1/4"
QX61/51	601	509										24
QX61/61	628	536	359	35	51	25	25	117	125	SAE 4"	SAE 2"	SAE 1"
QX81/41	679	562										35
QX81/51	705	588	38	45	40	40	40	117	125	SAE 4"	SAE 2"	SAE 1 1/2"
QX81/61	732	615										38
QX81/81	774	657										SAE 2"

1) threaded port to DIN 3852, Part 2

2) pressure port to SAE J 518 can be supplied for pressure ranges 2 and 3

B Double pumps QX.1/2



1 S = common suction port

2 shaft and mounting dimensions see section 4

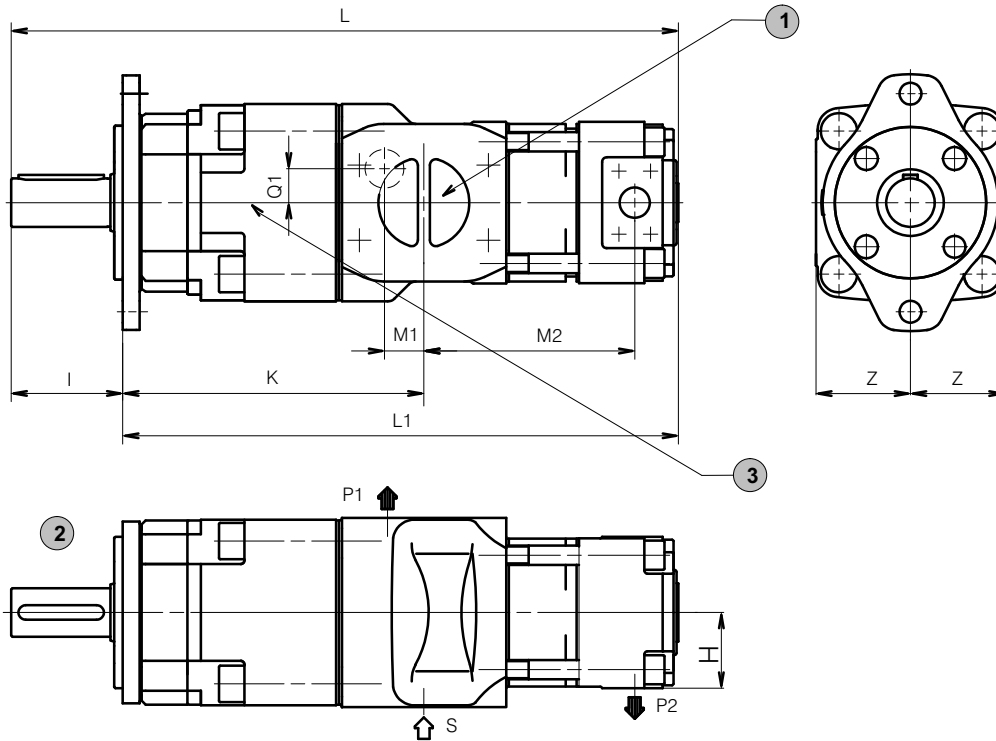
3 depending on operating conditions, a second suction port may be required - see section 2.2.1, QX61 SAE 2", QX81 SAE 2 1/2"

Typ	L	L1	K	M1	M2	Q1	I	Z	H	S	P1	P2	
QX21/22	278	233	141	18	67	-	45	50	50	G 1 1/4" 1)	G 1/2" 1) 2)	G 1/2" 1) 2)	
QX31/22	325	275	171	26	79		50	60	60	G 1 1/2" 1)	G 3/4" 1) 2)		
QX31/32	338	288			87								
QX41/22	378	310	201	19	84	15	68	63	50	SAE 2"	SAE 1"	G 1/2" 1) 2)	
QX41/32	391	323			92				60			G 3/4" 1) 2)	
QX41/42	423	355			208				26			111	23
QX51/22	450	358	241	23	92	15	92	78	50	SAE 2 1/2"	SAE 1 1/4"	G 1/2" 1) 2)	
QX51/32	463	371			100				60			G 3/4" 1) 2)	
QX51/42	495	403	249	30	118	28	92	78	63	SAE 3"	SAE 1 1/4"	SAE 1"	
QX51/52	515	423			127				78			SAE 1 1/4"	
QX61/32	521	429			287				24			112	17
QX61/42	538	446	27	123		26	63	SAE 1"					
QX61/52	569	477	292	32	137	35	92	98	78	SAE 3 1/2"	SAE 1 1/2"	SAE 1 1/4"	
QX61/62	588	496			149				98			SAE 1 1/2"	
QX81/42	653	536			359				35			141	25
QX81/52	673	556	150	78		SAE 1 1/4"							
QX81/62	692	575	38	162		179	40	98	SAE 1 1/2"				
QX81/82	724	607						125	SAE 4"	SAE 2"			

1) threaded port to DIN 3852, Part 2

2) pressure port to SAE J 518 can be supplied for pressure ranges 2 and 3

C Double pumps QX.1/3



1	S = common suction port
2	shaft and mounting dimensions see section 4

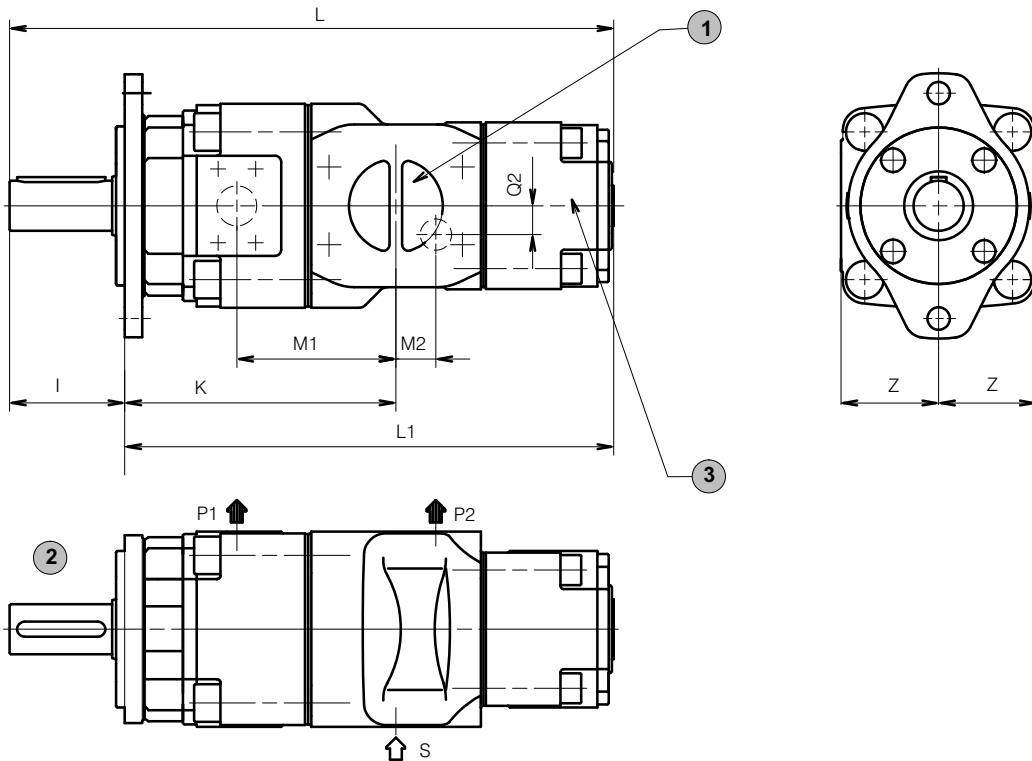
3	depending on operating conditions, a second suction port may be required - see section 2.2.1, QX61 SAE 2", QX81 SAE 2 1/2"
----------	--

Typ	L	L1	K	M1	M2	Q1	I	Z	H	S	P1	P2	
QX21/23	313	268	141	18	102	-	45	50	50	G 1 1/4" 1)	G 1/2" 1) 2)	G 1/2" 1) 2)	
QX31/23	360	310	171	26	114		50	60	60	G 1 1/2" 1)	G 3/4" 1) 2)		
QX31/33	383	333			132								
QX41/23	413	345	201	19	119	15	68	63	50	SAE 2"	SAE 1"	G 1/2" 1) 2)	
QX41/33	436	368			137							G 3/4" 1) 2)	
QX41/43	479	411			208							26	167
QX51/23	485	393	241	23	127	15	92	78	50	SAE 2 1/2"	SAE 1 1/4"	G 1/2" 1) 2)	
QX51/33	508	416			145				60			G 3/4" 1) 2)	
QX51/43	551	459			174				63			SAE 1"	
QX51/53	585	493	249	30	197	28	92	98	78	SAE 3"	SAE 1 1/4"	SAE 1 1/4"	
QX61/33	566	474			24				157			17	60
QX61/43	594	502	287	27	179	26	92	98	63	SAE 3 1/2"	SAE 1 1/2"	SAE 1"	
QX61/53	637	545			207				35			78	SAE 1 1/4"
QX61/63	678	586			239				98			SAE 1 1/2"	
QX81/43	709	592	359	35	197	25	117	125	63	SAE 2"	SAE 2"	SAE 1"	
QX81/53	743	626			220				78			SAE 1 1/4"	
QX81/63	782	665			252				98			SAE 1 1/2"	
QX81/83	839	722		38	294	40			125			SAE 4"	SAE 2"

1) threaded port to DIN 3852, Part 2

2) pressure port to SAE J 518 can be supplied for pressure ranges 2 and 3

D Double pumps QX.2/1



1	S = common suction port
2	shaft and mounting dimensions see section 4

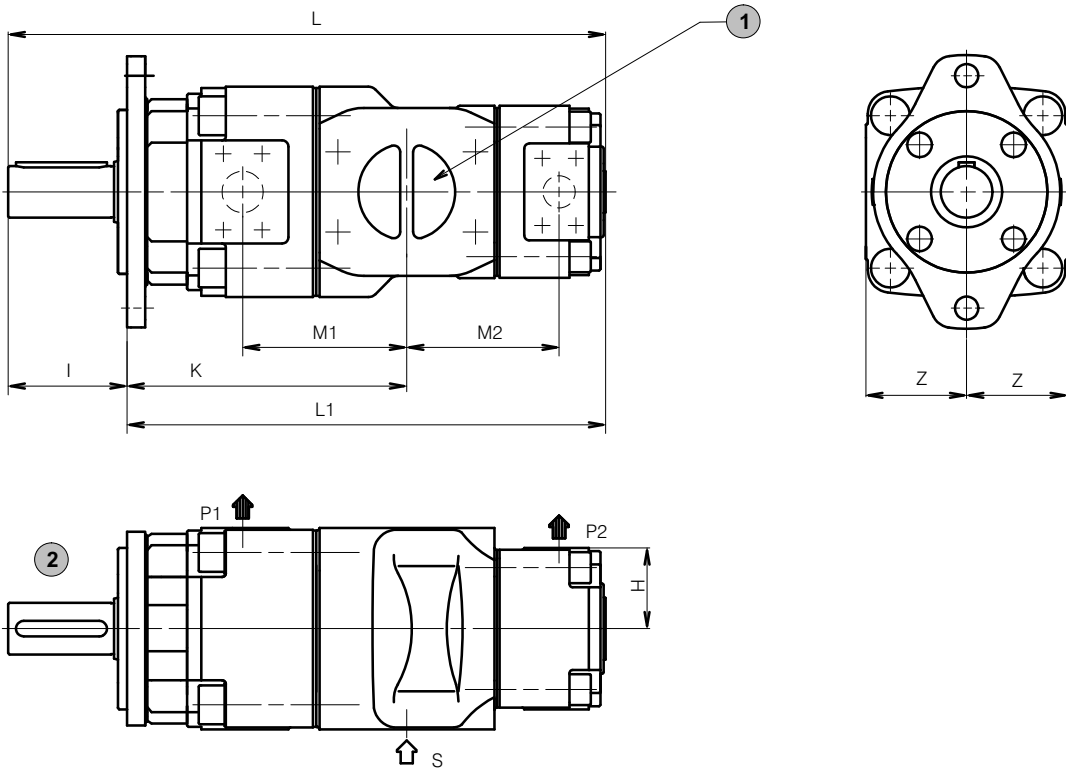
3	depending on operating conditions, a second suction port may be required - see section 2.2.1, QX61 SAE 2"
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Typ	L	L1	K	M1	M2	Q2	I	Z	S	P1	P2
QX32/21	323	273	151	87	30	-	50	60	G 1 1/2" ¹⁾	G 3/4" ^{1) 2)}	G 1/2" ^{1) 2)}
QX42/21	370	302	175	103	35		68	63	SAE 2"	SAE 1"	
QX42/31	385	317			33	15					92
QX52/21	436	344	209	120	43	-	-	-	-	G 1/2" ^{1) 2)}	
QX52/31	451	359			39					15	92
QX52/41	489	397	217	127	32	23	SAE 1 1/2"	SAE 1"			
QX62/31	501	409	247	144	47	14			92	98	SAE 3 1/2"
QX62/41	524	432			39	27	117	125			
QX62/51	561	469	252	149	40	28			SAE 1 1/2"	SAE 1"	
QX82/41	629	512	309	179	51	25	SAE 2"	SAE 1"			
QX82/51	655	538			47	30			117	125	SAE 1 1/4"
QX82/61	682	565	45	35	SAE 4"	SAE 1 1/2"					

1) threaded port to DIN 3852, Part 2

2) pressure port to SAE J 518 can be supplied for pressure ranges 2 and 3

E Double pumps QX.2/2



1 S = common suction port

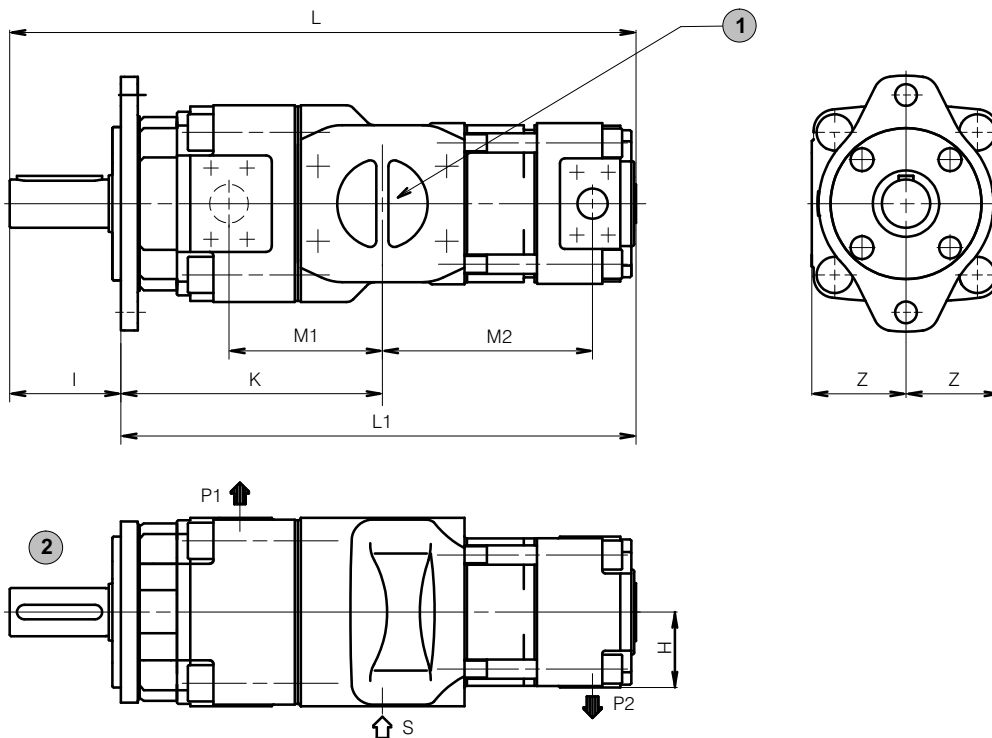
2 Shaft and mounting dimensions - see section 4

Typ	L	L1	K	M1	M2	I	Z	H	S	P1	P2
QX22/22	260	215	123	67	67	45	50	50	G 1 1/4" 1)	G 1/2" 1) 2)	G 1/2" 1) 2)
QX32/22	305	255	151	87	79	50	60		G 1 1/2" 1)	G 3/4" 1) 2)	
QX32/32	318	268			87			68			63
QX42/22	352	284	175	103	84	68	63		SAE 2"	SAE 1"	
QX42/32	365	297			92			92			78
QX42/42	397	329	182	111	111	92	78		SAE 3"	SAE 1 1/4"	
QX52/22	418	326	209	120	92			92			78
QX52/32	431	339			100	217	127		92	78	
QX52/42	463	371	118	252	149			92			98
QX52/52	483	391	127			309	179		117	98	
QX62/32	481	389	247	144	123			92			98
QX62/42	498	406	252			149	149		92	98	
QX62/52	529	437		309	179			141			117
QX62/62	548	456	309			179	149		117	125	
QX82/42	603	486		309	179			141			117
QX82/52	623	506	309			179	150		117	125	
QX82/62	642	525		309	179			162			117
QX82/82	674	557	309			179	179		117	125	

1) threaded port to DIN 3852, Part 2

2) pressure port to SAE J 518 can be supplied for pressure ranges 2 and 3

F Double pumps QX.2/3



1 S = common suction port

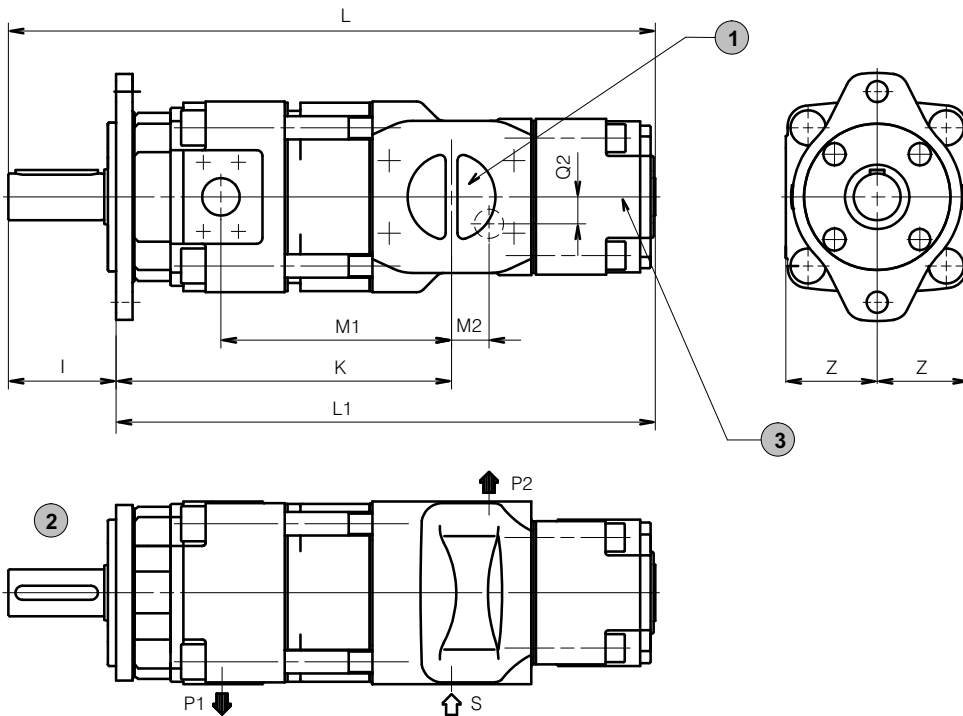
2 Shaft and mounting dimensions - see section 4

Typ	L	L1	K	M1	M2	I	Z	H	S	P1	P2
QX32/23	340	290	151	87	114	50	60	50	G 1 1/2" ¹⁾	G 3/4" ^{1) 2)}	G 1/2" ^{1) 2)}
QX42/23	387	319	175	103	119	68	63		SAE 2"	SAE 1"	
QX42/33	410	342			137			92			78
QX52/23	453	361	209	120	127	92	78		SAE 2 1/2"	SAE 1 1/4"	
QX52/33	476	384			145			174			92
QX52/43	519	427	247	127	174	92	98		SAE 3"	SAE 1 1/2"	
QX62/33	526	434			247			144			157
QX62/43	554	462	179	207		92	125		63	SAE 3 1/2"	SAE 2"
QX62/53	599	507	252		149			207			
QX82/43	659	542		309		179	197	125	63	SAE 3 1/2"	SAE 2"
QX82/53	693	576	220		252		125				
QX82/63	732	615	252	SAE 1 1/2"							

1) threaded port to DIN 3852, Part 2

2) pressure port to SAE J 518 can be supplied for pressure ranges 2 and 3

G Double pumps QX.3/1



1	S = common suction port
2	dimensions see section 4

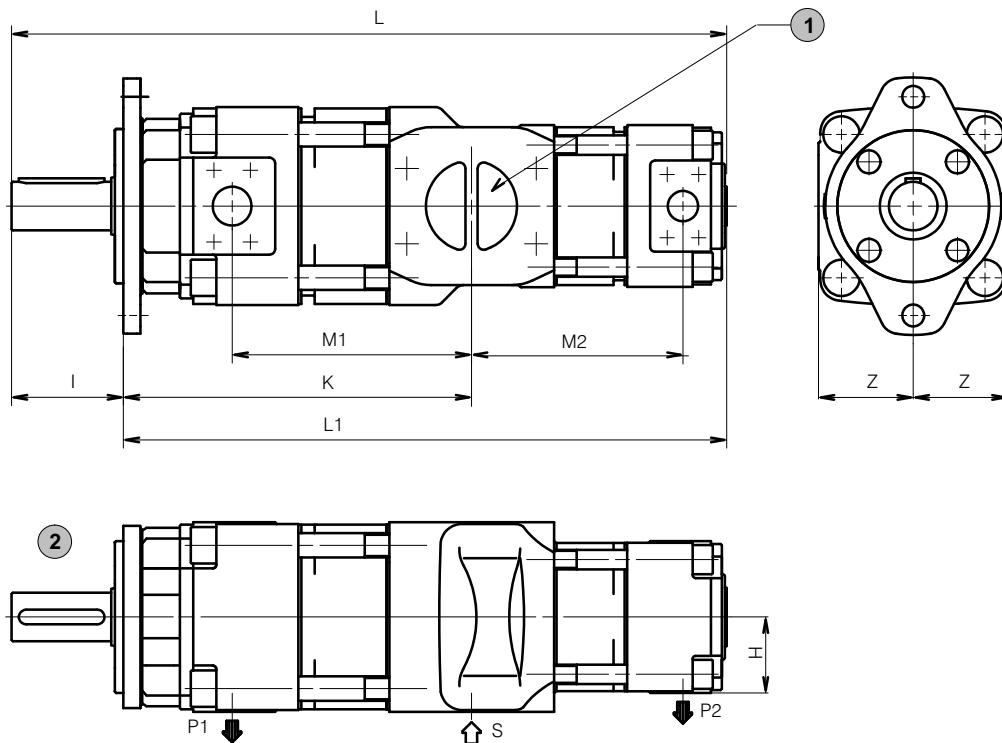
3	depending on operating conditions, a second suction port may be required - see section 2.2.1 QX61 SAE 2"
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Typ	L	L1	K	M1	M2	Q2	I	Z	S	P1	P2
QX33/21	368	318	196	132	30	-	50	60	G 1 1/2" 1)	G 3/4" 1) 2)	G 1/2" 1) 2)
QX43/21	426	358	231	159	35	15	68	63	SAE 2"	SAE 1"	
QX43/31	441	373			33						G 3/4" 1) 2)
QX53/21	506	414	279	190	43	-	92	78	SAE 2 1/2"	SAE 1 1/4"	G 1/2" 1) 2)
QX53/31	521	429			39						15
QX53/41	559	467	287	197	32	23	92	98	SAE 3"	SAE 1 1/2"	SAE 1"
QX63/31	591	499	337	234	47	14					G 3/4" 1) 2)
QX63/41	614	522			39	27	SAE 1"				
QX63/51	651	559	342	239	40	28	117	125	SAE 3 1/2"	SAE 2"	SAE 1 1/4"
QX83/41	744	627	424	294	51	25					SAE 1"
QX83/51	770	653			47	30	SAE 1 1/4"				
QX83/61	797	680			45	35			SAE 4"		SAE 1 1/2"

1) threaded port to DIN 3852, Part 2

2) pressure port to SAE J 518 can be supplied for pressure ranges 2 and 3

H Double pumps QX.3/2



1 S = common suction port

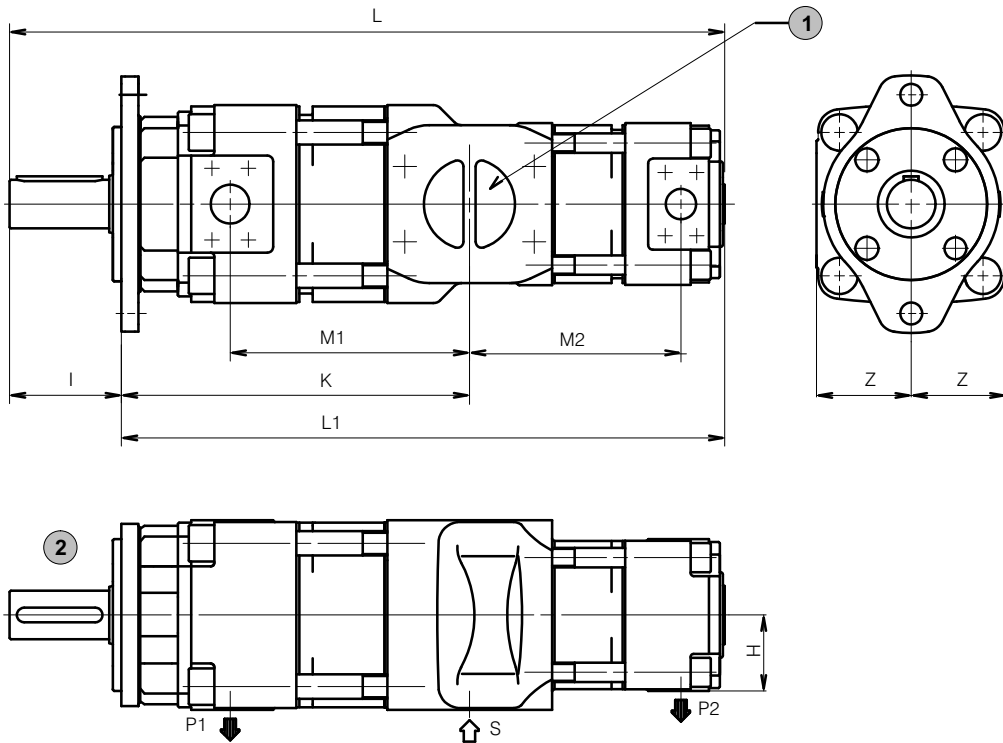
2 Shaft and mounting dimensions - see section 4

Typ	L	L1	K	M1	M2	I	Z	H	S	P1	P2
QX23/22	295	250	158	102	67	45	50	50	G 1 1/4" ¹⁾	G 1/2" ^{1) 2)}	G 1/2" ^{1) 2)}
QX33/22	350	300	196	132	79	50	60	60	G 1 1/2" ¹⁾	G 3/4" ^{1) 2)}	
QX33/32	363	313			87						
QX43/22	408	340	231	159	84	68	63	50	SAE 2"	SAE 1"	G 1/2" ^{1) 2)}
QX43/32	421	353			92			60			G 3/4" ^{1) 2)}
QX43/42	453	385			111			63			SAE 1"
QX53/22	488	396	279	190	92	92	78	50	SAE 2 1/2"	SAE 1 1/4"	G 1/2" ^{1) 2)}
QX53/32	500	408			100			60			G 3/4" ^{1) 2)}
QX53/42	533	441	287	197	118	92	98	63	SAE 3"	SAE 1 1/2"	SAE 1"
QX53/52	553	461			127			78			SAE 1 1/4"
QX63/32	571	479			337			234			112
QX63/42	588	496	123	63		SAE 1"					
QX63/52	619	527	342	239	137	92	98	78	SAE 3 1/2"	SAE 2"	SAE 1 1/4"
QX63/62	638	546			149			98			SAE 1 1/2"
QX83/42	718	601	424	294	141	117	125	63	SAE 4"	SAE 2"	SAE 1"
QX83/52	738	621			150			78			SAE 1 1/4"
QX83/62	757	640			162			98			SAE 1 1/2"
QX83/82	789	672			179			125			SAE 2"

1) threaded port to DIN 3852, Part 2

2) pressure port to SAE J 518 can be supplied for pressure ranges 2 and 3

I Double pumps QX.3/3



1 S = common suction port

2 Shaft and mounting dimensions - see section 4

Typ	L	L1	K	M1	M2	I	Z	H	S	P1	P2
QX23/23	330	285	158	102	102	45	50	50	G 1 1/4" 1) 2)	G 1/2" 1) 2)	G 1/2" 1) 2)
QX33/23	385	335	196	132	114	50	60		G 1 1/2" 1) 2)	G 3/4" 1) 2)	
QX33/33	408	358			132			68			63
QX43/23	442	374	231	159	119	60	63		SAE 2"	SAE 1"	
QX43/33	466	398			137			509			441
QX43/43	509	441	279	190	127	92	78		50	SAE 2 1/2"	
QX53/23	523	431			145			589			497
QX53/33	546	454	174	623	531	287	197		78	SAE 3"	
QX53/43	589	497	197					616			524
QX53/53	623	531	342	239	157	92	98		63	SAE 3 1/2"	
QX63/33	616	524			179			644			552
QX63/43	644	552	207	689	597	342	239		98	SAE 3 1/2"	
QX63/53	689	597	239					774			657
QX63/63	728	636	197	774	657	424	294		78	SAE 4"	
QX83/43	774	657						220			808
QX83/53	808	691	252	847	730	424	294		125	SAE 4"	
QX83/63	847	730	294					904			787
QX83/83	904	787									

1) threaded port to DIN 3852, Part 2

2) pressure port to SAE J 518 can be supplied for pressure ranges 2+3

5.3 Ordering code for double pumps

		Q	X	6	3	-	0	8	0	/	3	1	-	0	2	0	R	*	*
Series	= QX																		
Frame size	= 2 / 3 / 4 / 5 / 6 / 8																		
Pressure range	= 1 / 2 / 3																		
Displacement in cm ³ /rev	= 005 - 500																		
	Frame size	= 2 / 3 / 4 / 5 / 6 / 8																	
	Pressure range	= 1 / 2 / 3																	
	Displacement in cm ³ /rev	= 005 - 500																	
Rotation (viewed from shaft end)	right (CW) = R left (CCW) = L																		
Variants / special features (to be inserted by the factory, see section 4.7 for a selection)																			

Ordering example:

Required: double pump

Pump 1
 Displacement: 80 cm³/rev
 Continuous pressure: 300 bar
 Type: 63-080

Pump 2
 Displacement: 20 cm³/rev
 Continuous pressure: 160 bar
 Type: 31-020

for use with mineral oil

Ordering code: QX63-080/31-020R

6 Triple pumps

The following table shows the triple-pump combinations that can be supplied. Other triple-pump combinations can be assembled after consultation with the factory. The individual pumps 1, 2 and 3 must be specified in accordance with the main characteristics shown in section 2.

The largest pump of the combination is situated at the shaft end and is referred to as Pump 1. For equal frame sizes, the pump with the larger displacement is situated at the drive side. Pumps 2 and 3 have a common suction port.

6.1 Selection table

Frame size of Pump 1

QX2.	QX3.	QX4.	QX5.	QX5.	QX6.	QX8.
QX21/21/21	QX31/21/21	QX41/21/21	QX51/22/23	QX52/52/31	QX61/31/33	QX81/42/23
QX21/21/22	QX31/21/22	QX41/21/23	QX51/23/23	QX52/52/42	QX61/41/21	QX82/42/43
QX21/21/23	QX31/21/23	QX41/22/22	QX52/23/23	QX52/52/43	QX61/41/42	QX82/51/53
QX21/22/22	QX31/22/22	QX41/23/23	QX53/22/22	QX52/52/52	QX61/42/23	QX83/51/53
QX21/22/23	QX31/22/23	QX42/22/22	QX51/31/33	QX52/52/53	QX61/42/43	QX81/61/61
QX21/23/23	QX31/23/22	QX43/22/22	QX51/33/33	QX52/53/31	QX61/43/43	QX81/62/63
QX22/22/22	QX31/23/23	QX43/23/22	QX51/41/23	QX52/53/53	QX62/41/22	QX81/63/33
QX23/23/23	QX32/22/22	QX43/23/23	QX51/41/42	QX53/53/23	QX62/42/42	QX82/61/61
	QX32/22/23	QX41/31/33	QX51/41/43	QX53/53/33	QX62/43/43	QX82/62/52
	QX32/23/23	QX41/33/22	QX51/42/22		QX63/43/22	QX82/62/62
	QX33/21/22	QX41/33/33	QX51/42/43		QX61/52/53	QX82/63/31
	QX33/21/23	QX42/31/32	QX51/43/21		QX61/53/23	QX83/61/61
	QX33/23/23	QX42/32/32	QX51/43/22		QX61/53/31	QX83/63/61
	QX31/31/21	QX42/33/32	QX51/43/23		QX62/52/32	QX81/81/61
	QX31/31/22	QX43/31/31	QX51/43/43		QX62/52/52	QX81/81/81
	QX31/31/23	QX43/33/33	QX52/42/23		QX62/53/22	QX82/82/52
	QX31/31/31	QX41/41/33	QX52/42/42		QX62/53/23	QX82/82/62
	QX31/31/33	QX41/42/21	QX52/43/22		QX62/53/31	QX82/82/63
	QX31/32/22	QX41/42/23	QX52/43/23		QX62/53/33	QX83/83/53
	QX31/33/33	QX41/42/42	QX52/43/43		QX63/51/51	
	QX32/32/22	QX41/43/21	QX53/41/22		QX63/53/53	
	QX32/32/23	QX41/43/22	QX53/41/23		QX61/61/31	
	QX32/32/32	QX41/43/23	QX53/42/22		QX61/61/33	
	QX32/32/33	QX42/42/22	QX53/42/43		QX61/61/41	
	QX33/33/23	QX42/42/23	QX53/43/23		QX61/61/53	
	QX33/33/33	QX42/42/31	QX51/51/21*		QX61/62/42	
		QX42/42/32	QX51/51/32		QX61/62/63	
		QX42/42/33	QX51/51/33		QX61/63/32	
		QX42/42/42	QX51/52/32		QX61/63/33	
		QX42/42/43	QX51/52/33		QX61/63/41	
		QX43/43/43	QX51/52/42		QX61/63/42	
			QX51/52/43		QX62/62/33	
			QX51/53/22		QX62/62/43	
			QX51/53/23		QX62/62/53	
			QX51/53/31		QX62/62/62	
			QX51/53/33		QX62/62/63	
			QX51/53/41		QX62/63/63	
			QX51/53/43		QX63/63/32	
			QX51/53/52		QX63/63/43	
			QX52/52/23		QX63/63/53	
65	130	260	520	520	1050	2100

Maximum permissible drive shaft torque in Nm

* this pump is used as the ordering example in section 6.2

6.2 Ordering code for triple pumps

Triple pumps can only be supplied after consultation with the factory.

	Q	X	5	1	-	1	2	5	/	5	1	-	0	8	0	/	2	1	-	0	1	2	R	*	*	
Series	= QX																									
Frame size	= 2 / 3 / 4 / 5 / 6 / 8																									
Pressure range	= 1 / 2 / 3																									
Displacement in cm ³ /rev	= 005 - 500																									
Frame size	= 2 / 3 / 4 / 5 / 6 / 8																									
Pressure range	= 1 / 2 / 3																									
Displacement in cm ³ /rev	= 005 - 500																									
Rotation (viewed from shaft end)	right (CW) = R left (CCW) = L																									
Variants / special features (to be inserted by the factory, see section 4.7 for a selection)																										

Ordering example:

Required: triple pump
 Pump 1
 Displacement: 125 cm³/rev
 Continuous pressure: 80 bar
 Type: 51-125

Pump 2
 Displacement: 80 cm³/rev
 Continuous pressure: 150 bar
 Type: 51-080

Pump 3
 Displacement: 12 cm³/rev
 Continuous pressure: 125 bar
 Type: 21-012

For use with mineral oil

Referring to the selection table in sect. 6.1, QX51/51/21 is an obtainable combination.

Ordering code: QX51-125/51-080/21-012R

7 Pressure-holding pumps

7.1 Generals

The QX high pressure internal gear pump is a further development of the Bucher internal gear pump, which has proven itself in more than 30 years of service around the world. With

displacements from 3,3 to 5,1 cm³/rev, it extends the low-flow capability of the QX range.

7.2 Technical data

Mounting attitude	unrestricted
Mounting method (standard)	oval 2-hole flange to ISO 3019/2 (metric)
Direction of rotation	right, alternatively left (but not reversible)
Pump drive method	in-line, by flexible coupling
Fluids	HLP mineral oils to DIN 51524, Part 2 HFC fluids to VDMA 24317 other fluids - consult Bucher Hydraulics
Minimum fluid cleanliness	NAS 1638, class 9 or ISO 4406, code 20/18/15
Operating viscosity Starting viscosity	20 - 150 mm ² /s 20 - 300 mm ² /s (for values outside this range, consult Bucher Hydraulics)
Fluid temperature	HLP mineral oils 80 °C max. HFC 50 °C max.
Minimum inlet pressure Maximum pressure at drain port External drain port	0.85 bar absolute 1.5 bar absolute is always provided

7.3 Main characteristics

Effective displacement effectif	Flow rate ¹⁾	Maximum speed	Type	Mineral oil to DIN 51524 Cont./Max. interm. pressure ²⁾	HFC to VDMA 24317	Torque ³⁾	Power requirement ⁴⁾
cm ³ /rev	l/min	rpm		bar	bar	Nm	KW
3,3	4,8	3600	QX24-003	320/400	280/350	17	2,6
4,2	6,2	3600	QX24-004	320/400	280/350	21	3,2
5,1	7,4	3600	QX24-005	320/400	280/350	26	4,0

This main characteristics is valid for hydraulic oils as well as fire-resistant and environmentally-friendly fluids with a viscosity of 20 to 50 mm²/s

1) At speed n = 1450 rpm (theoretical)

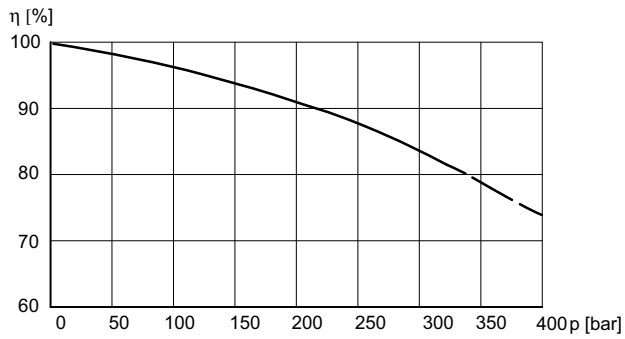
2) Maximum intermittent pressure for max. 20 sec. but not more than 10% of the duty cycle

3) Theoretical value at the max. permitted continuous pressure for mineral oil

4) Theoretical value at the max. permitted continuous pressure for mineral oil at n = 1450 rpm

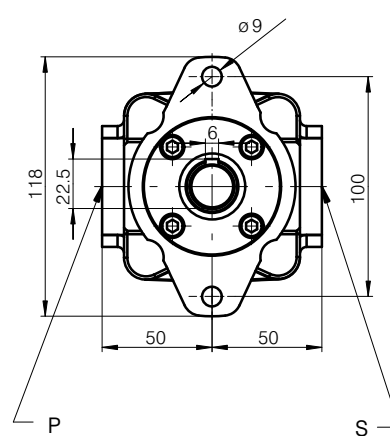
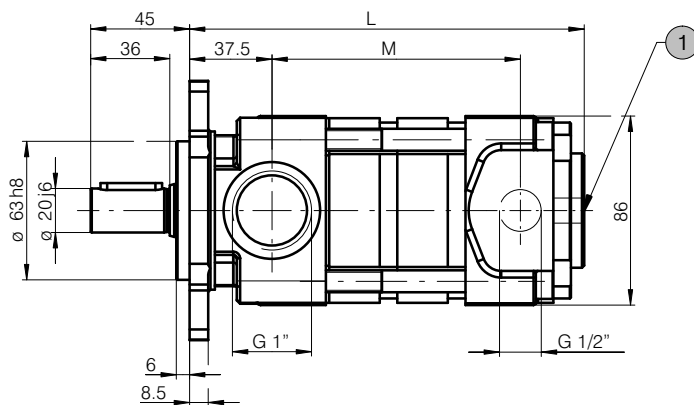
7.4 Volumetric efficiency (η)

measured at speed 1450 rpm; viscosity 42 mm²/s



7.5 Single pumps

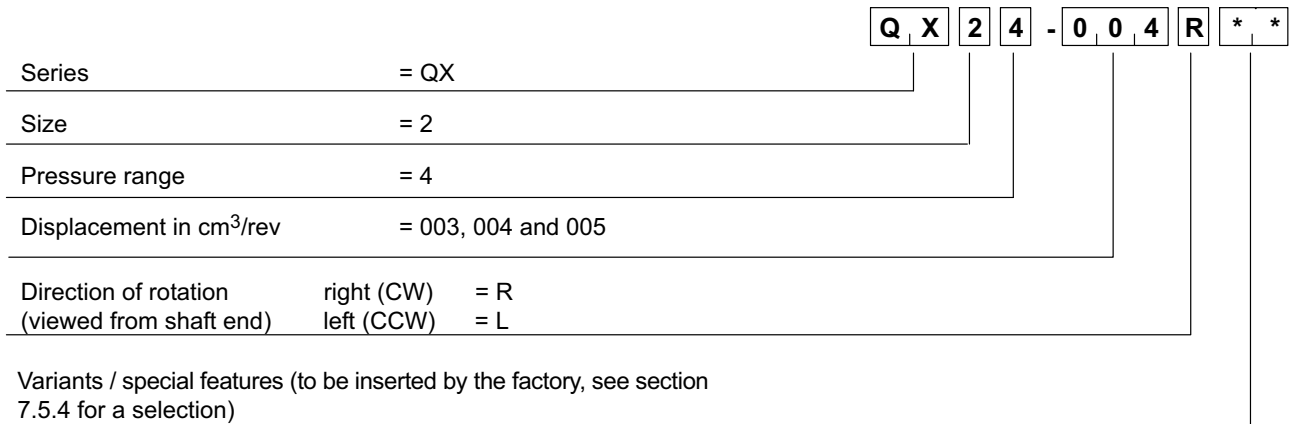
7.5.1 Dimensions



	L	M
QX24-003	179,5	113
QX24-004	179,5	113
QX24-005	191,5	125

1 external drain port G 1/4"

7.5.2 Ordering codes



7.5.3 Standard configuration

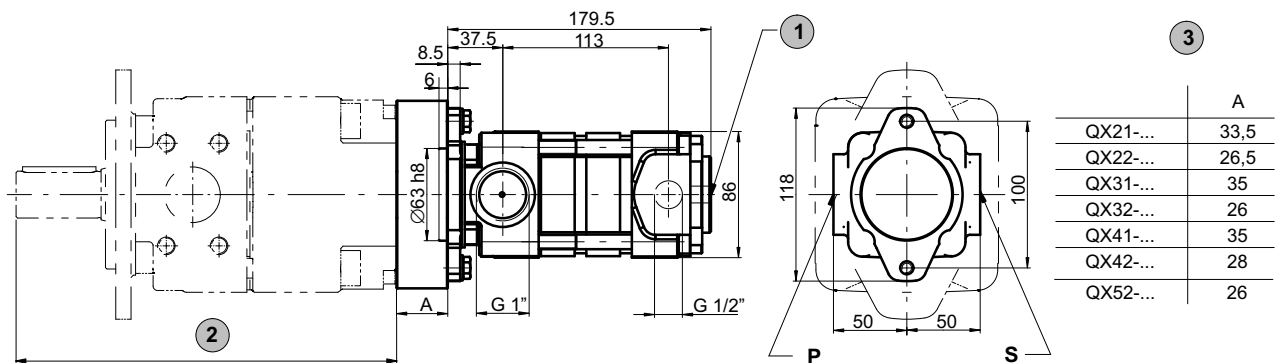
- direction of rotation “right”
- 2- hole mounting flange to ISO 3019/2 (metric)
- Nitrile seals
- cylindrical shaft end to ISO R775
- separate drain port G 1/4 in rear cover of the pump

7.5.4 Special features

09 = Viton seals

7.6 Pressure-holding pumps combined also QX-pumps

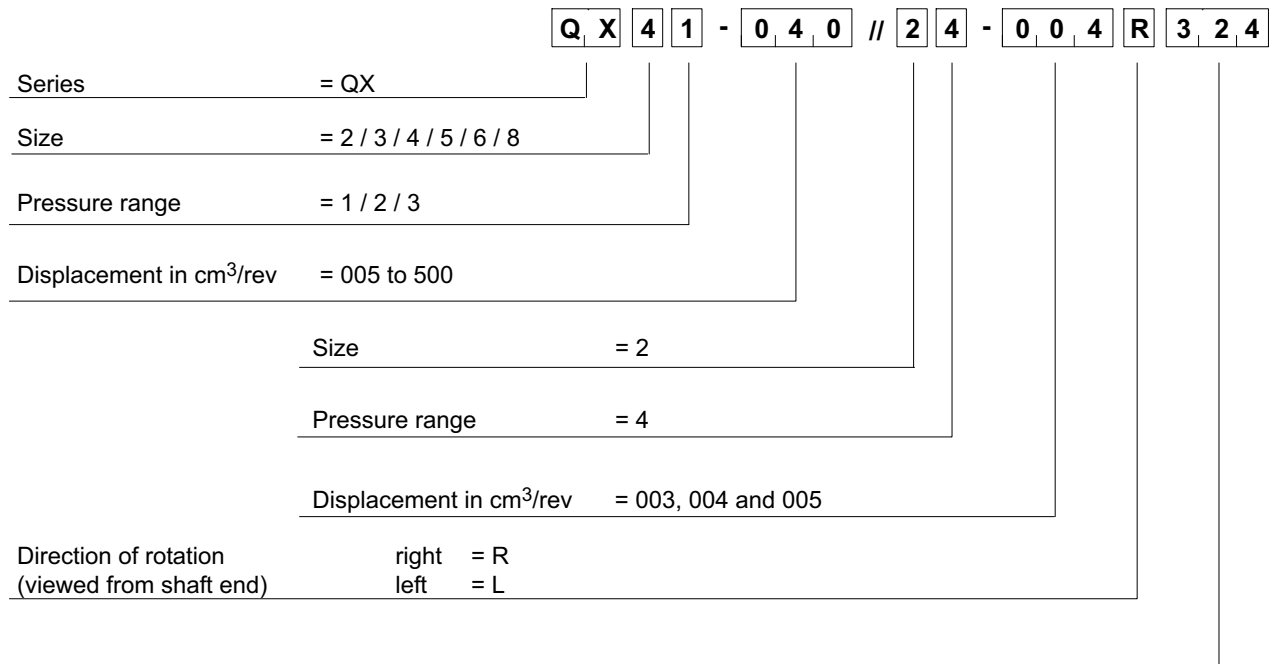
7.6.1 Dimensions



1	external drain port G 1/4"
2	dimensions see section 4

3	dimension A depends on the driving QX pump model
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7.6.2 Ordering code



Ordering example:

Required:	Double pump		
Pump 1		Pump 2	
Displacement:	40 cm ³ /rev	Displacement:	4 cm ³ /rev
Continuous pressure:	160 bar	Continuous pressure:	250 bar
Type:	41 - 040	Type:	24 - 004
		For use with mineral oil:	
		Ordering code:	QX41-040//24-004R 324

8 Fluid cleanliness

QX pumps require 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 with the QR, QT, QX and QXM series. 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 ≥ 30 N/mm² to Brügger DIN 51347-2.

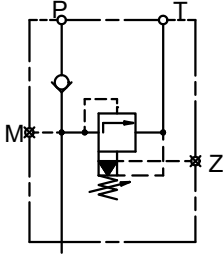
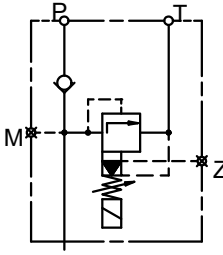
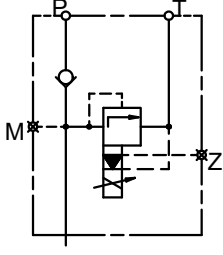
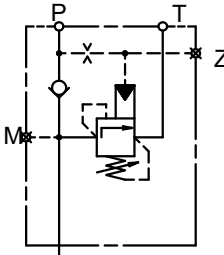
9 Note

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 sys-

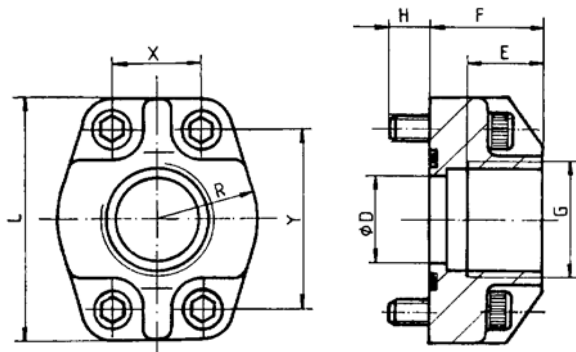
tem are fulfilled. If you have any doubts or questions concerning the use of these pumps, please consult Bucher Hydraulics.

10 Accessories

10.1 Bolt-on valves - SAE 3000 pattern

Ordering details	Pressure relief A_G DF / A_G DH	Pressure relief solenoid control A_G DA / ASDM	Pressure relief proportional solenoid control A_G DP
Symbols			
Ordering details	Unloading valve Accumulator charging valve A_G AF A_G SF		S = for pipe flange SAE 3000 pattern (all size) G = with threaded port, G 1" (size QX2, 3 and 4)
Symbols			

10.2 Pipe flanges - high pressure type



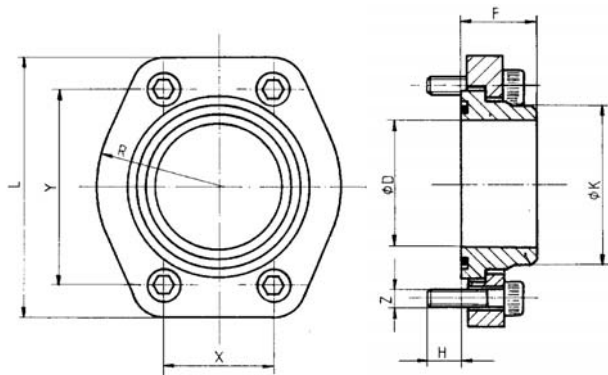
- Max. operating pressure 420 bar
- SAE flange size, PSI 3000

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

Ordering-number	Ordering code	Size	DØ	E	F	H	L	R	X	Y	Viton seal 90 Shore 'A'	Retaining screws DIN912-12.9 / Torque Nm	
037000	RF 01-R08	G 1/2"	12,5	16	27	13	54	23	17,5	38	20,24x2,62	M8x30	30
037010	RF 02-R10	G 3/4"	20	18	30	12	65	26	22,2	47,6	26,65x2,62	M10x30	60
037020	RF 03-R11	G 1"	25	20	34	13	70	29	26,2	52,4	32,99x2,62	M10x35	60
037030	RF 04-R12	G 1 1/4"	32	22	38	14	80	36	30,2	58,6	40,86x3,53	M10x40	60
037040	RF 05-R13	G 1 1/2"	38	24	41	19	94	41	35,7	70	44,04x3,53	M12x45	120
037050	RF 06-R14	G 2"	50	26	45	20	102	48	42,9	77,8	59,92x3,53	M12x50	120
055470*	RF 07-R16	G 2 1/2" *	63	30	50	18	114	57	50,8	89	72,62x3,53	M12x45	120

* at RF07 only to 210 bar be allowed

10.3 Low pressure type



- Max. operating pressure 16 bar
- SAE flange size, PSI 3000

Material: ST37 / For Viton seals, contact Bucher Hydraulics

Ordering number	Ordering code	SAE flange 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/dia. ap- prox.	
062450	RN 07-S	2 1/2"	63	75	35	14	120	57	51	89	69,44x3,53	M12 x 30	70	75
063880	RN 08-S	3"	76	88			140,5	68	62	106,5	85,32x3,53	M16 x 40	180	88
063890	RN 09-S	3 1/2"	89	100	40	19	158,5	73	70	120,3	98,02x3,53	M16 x 40	180	100
063900	RN 10-S	4"	103	115			168	79	78	130	110,72x3,53	M16 x 40	180	115

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

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