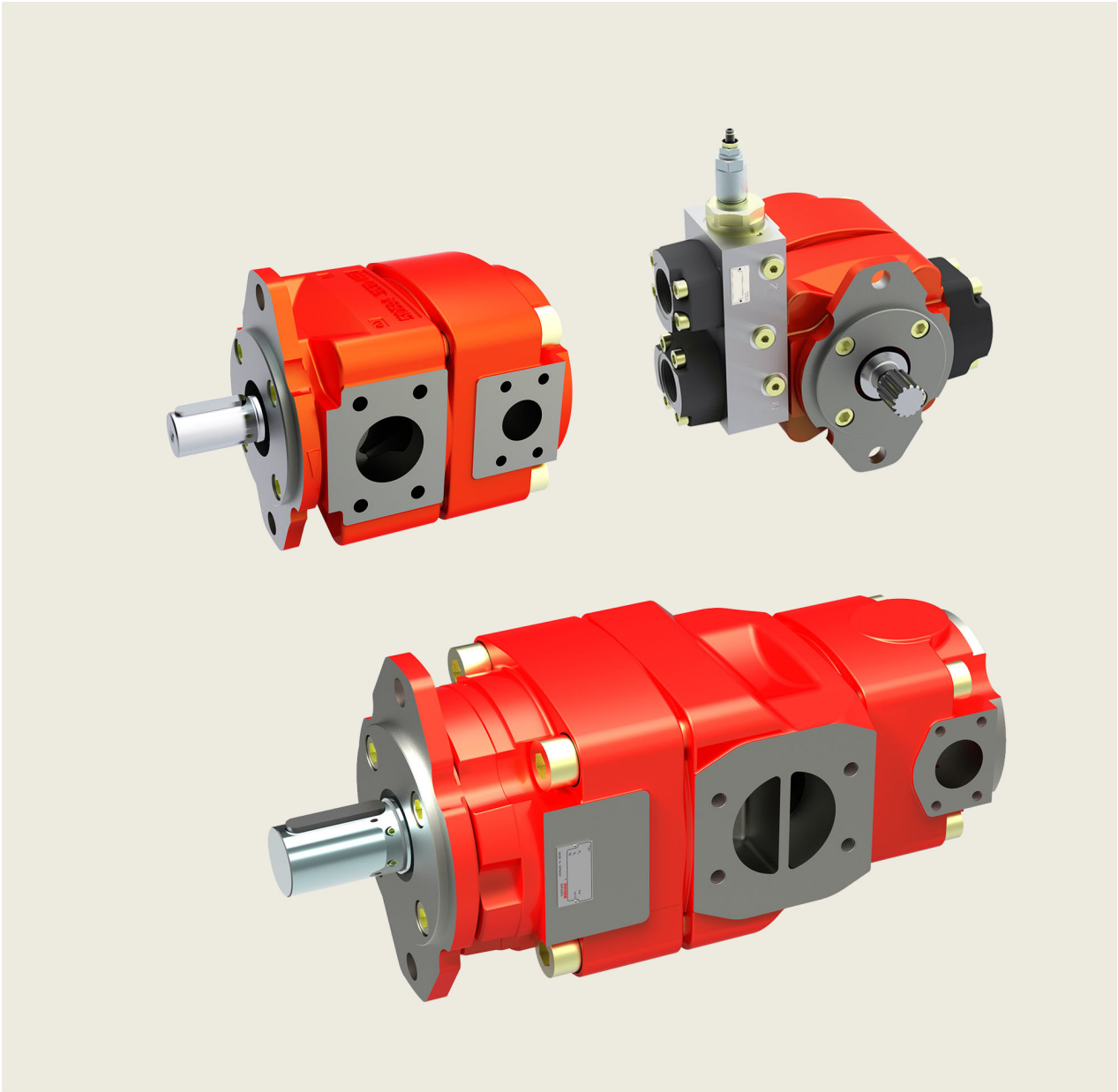
BUCHER hydraulics

Internal Gear Pumps

Series QX



BUCHER hydraulics

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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 ring gear is supported by a hydrodynamic/ hydrostatic lubrication 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 flow rates.

1.2 Advantages

- Extremely long service life
- 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

1.3 ATEX compliant explosion protection

The internal gear pumps QX are suitable for application in hazardous areas and complies with the following guidelines:

ATEX directive	2014/34/EU
group	II
equipment category	3
atmosphere	G
temperature class	T3 and T4



II 3 G EEx c II T4
-20℃<=Ta<=+40℃



II 3 G EEx c II T3
-20℃<=Ta<=+80℃

2 Technical data

2.1 General (deviating values according manufacturer's specification)

General characteristics	Unit	Description, Value
Installation attitude		unrestricted
Mounting method (standard)		oval 2-hole flange to ISO 3019/1 (SAE): QX 3-6 oval 2-hole flange to ISO 3019/2 (metric): QX 2+8
Direction of rotation		CW or CCW
Pump drive method		in-line, through a flexible coupling
Volumetric efficiency η_v		up to 98%
Fluids		HLP mineral oils to DIN 51524 Part 2, HFC fluids to VDMA 24317
Maximum admissible level of contamination of the hydraulic fluid		ISO 4406 code 20/18/15 (see section 9)
Operating viscosity Starting viscosity	mm^2/s	10 … 100 * 10 … 300 * *other values on request
Fluid temperature range	°C	HLP-mineral oils -20 min. / +80 max. / HFC +50 max. range for max. long life cycle +30 … +60 (considering viscosity field)
Inlet pressure maximum minimum	bar	1.5 absolute (without external drain connection) 0.5 … 0.98 absolute (dependent on pump frame size and speed, see example in section 3.3.2)
Startup against pressure	bar	max. 20 (other values on request)
Seal material		NBR = standard / FPM (Viton) = option 09

IMPORTANT: The main characteristics are valid for hydraulic oils DIN 51524 with a viscosity of 20 … 50mm^2/s.
The operating pressure at the pump outlet side is specified also for fire-resistant fluids (HFC).

2.2 Main characteristics for pressure range 1

Displacement effective [1] [cm^3/rev]	Flow rate [l/min] 1450 min^{-1} p=0 bar	Maximum speed [rpm]	Minimum speed [rpm]	Code	Max. operating pressure at the pump outlet side				Torque [3] [Nm]	Power consumption [4] [kW]
					continuous [bar]		intermittent [2] [bar]			
					Mineral oil	HFC	Mineral oil	HFC		
10,3	14,9			QX21-010	160	130	210	180	26	4,0
12,6	18,3	3600	1200	QX21-012	125	100	160	135	25	3,8
15,9	23,0			QX21-016	100	80	125	100	25	3,9
20,0	29,0			QX31-020	160	130	210	180	51	7,7
25,2	36,7	3000	900	QX31-025	125	100	160	135	50	7,7
31,1	45,2			QX31-032	100	80	125	100	50	7,5
40,6	59,0	3000		QX41-040	160	130	210	180	104	15,7
50,2	72,9	2600	800	QX41-050	125	100	160	135	100	15,2
64,5	93,8	2300		QX41-063	100	80	125	100	103	15,6
78,3	114,0	2300		QX51-080	160	130	210	180	200	30,4
100,6	146,0	2100	800	QX51-100	125	100	160	135	201	30,5
126,7	184,0	1800 [5]		QX51-125	100	80	125	100	203	30,8
159,7	232,0			QX61-160	160	130	210	180	409	62,0
201,1	293,0	1800 [6]	800	QX61-200	125	100	160	135	402	61,0
248,4	362,0			QX61-250	100	80	125	100	397	60,4
323,9	472,0			QX81-315	160	130	210	180	830	126,0
400,1	583,0	1750 [6]	800	QX81-400	125	100	160	135	801	121,6
495,4	722,0			QX81-500	100	80	125	100	793	120,5

1) Due to manufacturing tolerances, there may be slight variations in the displacement.

2) Max. 20 second and not more than 10% of the duty cycle.

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

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

5) For speeds > 1450 rpm, the inlet pressure of min. 0.95 bar absolute is required. For HFC application a second suction port is required.

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

6) Min. speed only for 40 cSt. Example for calculation of the min. speed see chapter 2.6.

2.2.1 Suction arrangements for pump types QX61 and QX81

IMPORTANT: Minimum inlet pressure is 0.95 bar absolute with viscosity 10 … 100 mm2/s
(other values on request).

Type	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

Displacement effective [1] [cm³/rev]	Flow rate [l/min] 1450 min⁻¹ p=0 bar	Maximum speed [rpm]	Minimum speed [rpm]	Code	Max. operating pressure at the pump outlet side				Torque [3] [Nm]	Power consumption [4] [kW]
					continuous [bar]		intermittent [2] [bar]			
					Mineral oil	HFC	Mineral oil	HFC		
5,1	7,4			QX22-005					17	2,6
6,3	9,1	3600	1500	QX22-006	210	180	250	210	21	3,2
7,9	11,5			QX22-008					27	4,0
10,0	14,5			QX32-010					34	5,1
12,6	18,3	3400	1400	QX32-012	210	180	250	210	42	6,4
15,6	22,6			QX32-016					52	7,9
20,3	29,5			QX42-020					68	10,4
25,1	36,4	3200	1200	QX42-025	210	180	250	210	84	12,7
32,3	46,8			QX42-032					108	16,5
39,1	56,9			QX52-040					132	19,9
50,3	73,2	2800	1000	QX52-050	210	180	250	210	170	25,7
63,4	92,1			QX52-063					213	32,3
79,8	116,0	2500 [5]		QX62-080					268	40,7
100,5	146,0	2300 [5]	800	QX62-100	210	180	250	210	338	51,2
124,2	181,0	2000 [5]		QX62-125					417	63,4
161,9	236,0	1800 [5]		QX82-160					544	82,7
200,0	291,0	1750 [5]	800	QX82-200	210	180	250	210	672	102,1
247,7	361,0	1500 [5]		QX82-250					833	126,5

2.4 Main characteristics for pressure range 3

Displacement effective [1] [cm³/rev]	Flow rate [l/min] 1450 min⁻¹ p = 0 bar	Maximum speed [rpm]	Minimum speed [rpm]	Code	Max. operating pressure at the pump outlet side				Torque [3] [Nm]	Power consumption [kW] [4]
					continuous [bar]		intermittent [2] [bar]			
					Mineral oil	HFC	Mineral oil	HFC		
5,1	7,4			QX23-005					26	4,0
6,3	9,1	3600	1400	QX23-006	320	280	400	350	32	4,9
7,9	11,5			QX23-008					41	6,2
10,0	14,5			QX33-010					51	7,7
12,6	18,3	3400	1100	QX33-012	320	280	400	350	64	9,7
15,6	22,6			QX33-016					80	12,1
20,3	29,5			QX43-020					104	15,8
25,1	36,4	3200	900	QX43-025	320	280	400	350	128	19,4
32,3	46,8			QX43-032					165	25,0
39,1	56,9			QX53-040					200	30,4
50,3	73,2	2800	800	QX53-050	320	280	400	350	258	39,1
63,4	92,1			QX53-063					321	49,3
79,8	116,0	2500 [5]		QX63-080					409	62,0
100,5	146,0	2300 [5]	800	QX63-100	320	280	400	350	514	78,1
124,2	181,0	2000 [5]		QX63-125					636	96,5
161,9	236,0	1800 [5]		QX83-160					830	126,0
200,0	291,0	1750 [5]	800	QX83-200	320	280	400	350	1025	155,7
247,7	361,0	1500 [5]		QX83-250					1270	192,7

1) Due to manufacturing tolerances, there may be slight variations in the displacement.
2) Max. 20 second 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 > 1450 rpm, the inlet pressure of min. 0.95 bar absolute is required. For HFC application a second suction port is required.
6) Min. speed only for 40 cSt. Example for calculation of the min. speed see chapter 2.6.

2.5 Main characteristics for pressure range 4

Displacement effective [1] [cm³/rev]	Flow rate [l/min] 1450 min⁻¹ p = 0 bar	Maximum speed [rpm]	Minimum speed [6] [rpm]	Code	Max. operating pressure at the pump outlet side				Torque [3] [Nm]	Power consumption [kW] [4]
					continuous [bar]		intermittent [2] [bar]			
					Mineral oil	HFC	Mineral oil	HFC		
3,2 4,2	4,8 6,2	3600	1500	QX24-003 QX24-004	320	280	400	350	17 21	2,6 3,2
5,1 6,3 7,9	7,4 9,1 11,5	3600	1400	QX24-005 QX24-006 QX24-008	360	320	400	350	29 36 46	4,4 5,5 7,0
10,0 12,6 15,6	14,5 18,3 22,6	3400	1100	QX34-010 QX34-012 QX34-016	360	320	400	350	57 72 89	8,7 11,0 13,6
20,3 25,1 32,3	29,5 36,4 46,8	3200	900	QX44-020 QX44-025 QX44-032	360	320	400	350	117 144 186	17,7 21,8 28,2
39,1 50,3 63,4	56,9 73,2 92,1	2800	800	QX54-040 QX54-050 QX54-063	340	280	400	350	213 274 345	32,3 41,6 52,3
79,8 100,5 124,2	116,0 146,0 181,0	2500 [5] 2300 [5] 2000 [5]	800	QX64-080 QX64-100 QX64-125	330	280	400	350	421 530 655	64,0 80,5 99,5
161,9 200,0 247,7	236,0 291,0 361,0	1800 [5] 1750 [5] 1500 [5]	800	QX84-160 QX84-200 QX84-250	330	280	400	350	856 1057 1309	130,0 160,5 198,7

1) Due to manufacturing tolerances, there may be slight variations in the displacement.

2) Max. 20 second 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 > 1450 rpm, the inlet pressure of min. 0.95 bar absolute is required.

6) Min. speed only for 40 cSt. Example for calculation of the min. speed see chapter 2.6.

2.6 Calculation formula of the minimum speed

$$n_{min} = n_{min\ at\ 40\ cSt}\ [^1/_{min}] \times \frac{\Delta p_{operating\ pressure}\ [bar]}{\Delta p_{max.\ continuous}\ [bar]} \times \frac{40\ cSt}{n_{operating\ viscosity}\ [cSt]}$$

Calculation of a QX44 with 250 bar and 30 cSt:

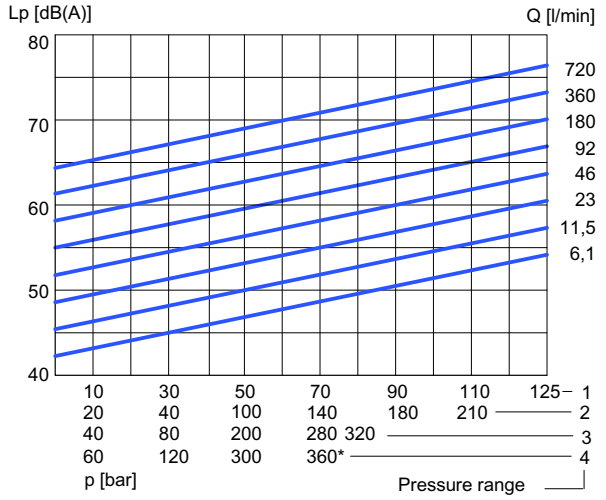
$$n_{min} = 900\ ^1/_{min} \times \frac{250\ bar}{360\ bar} \times \frac{40\ cSt}{30\ cSt} = 833\ ^1/_{min}$$

3 Performance graphs

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

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



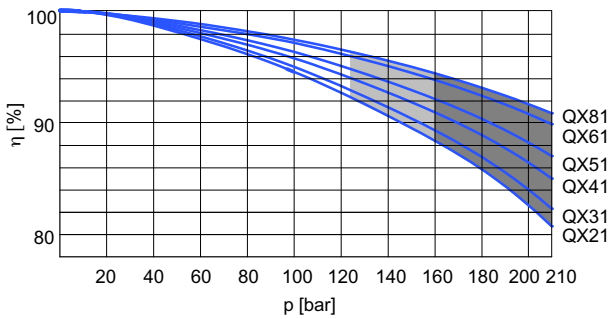
*Max. continuous operating pressure for pressure range 4 see section 2.5

3.2 Efficiency (η)

measured at speed 1450 rpm, viscosity 42 mm²/s

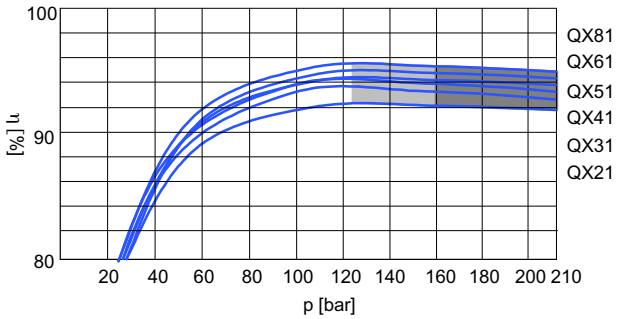
3.2.1 Pressure range 1

3.2.1.1 Volumetric efficiency



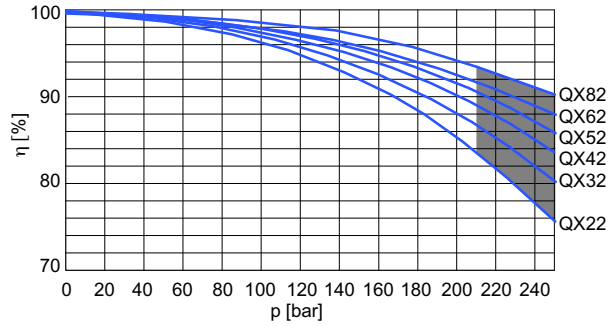
intermittent operating pressure as a function of displacement (see section 2.2)

3.2.1.2 Hydromechanical efficiency



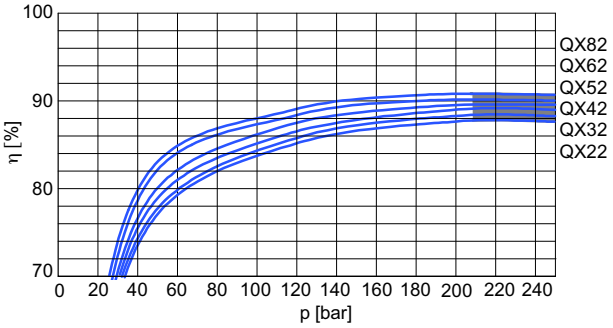
3.2.2 Pressure range 2

3.2.2.1 Volumetric efficiency



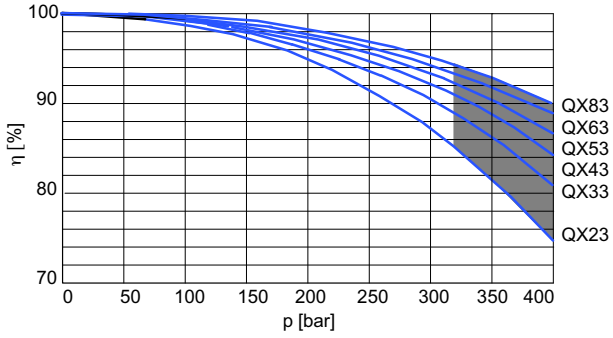
intermittent operating pressure

3.2.2.2 Hydromechanical efficiency



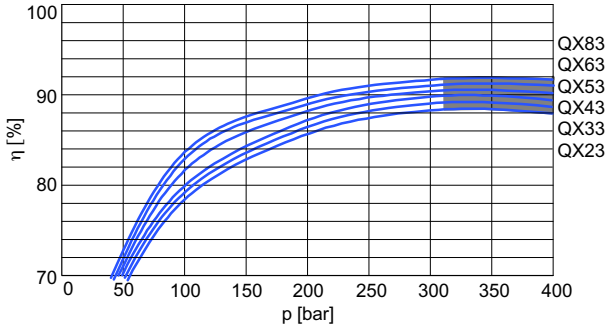
3.2.3 Pressure range 3

3.2.3.1 Volumetric efficiency



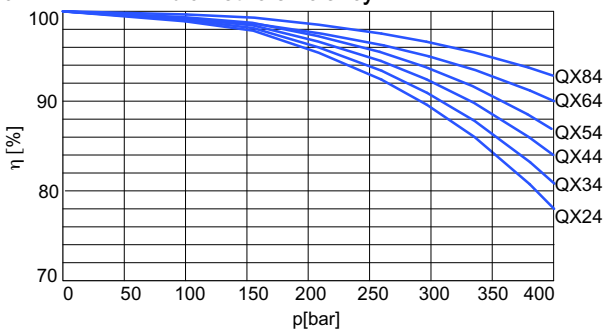
intermittent operating pressure

3.2.3.2 Hydromechanical efficiency

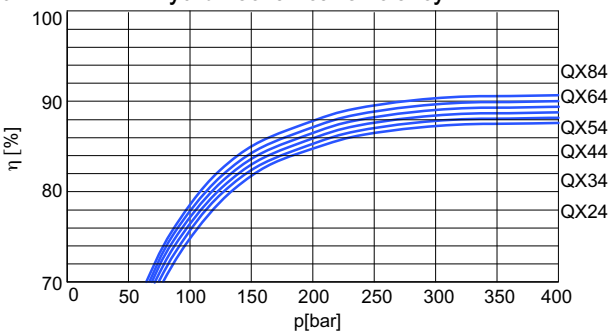


3.2.4 Pressure range 4

3.2.4.1 Volumetric efficiency



3.2.4.2 Hydromechanical efficiency

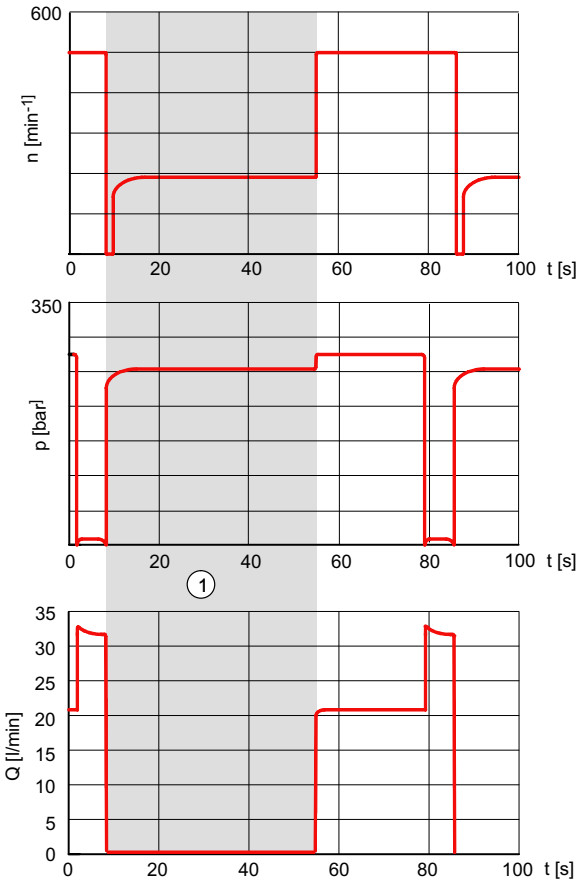


3.3 Operation with variable-speed drives

IMPORTANT: The following main characteristics are to be understood as examples only. They are valid only for the specified pump models and parameters. We would be very happy to advice you on the layout of your drive. QX pumps with variable-speed drive all contain an external drain port.

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

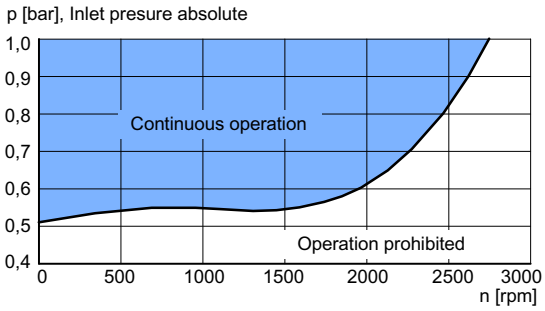
Pump QX53-063 with viscosity 20 mm^2/s



1	pressure-holding operation Q = 0 l/min for up to 60 s

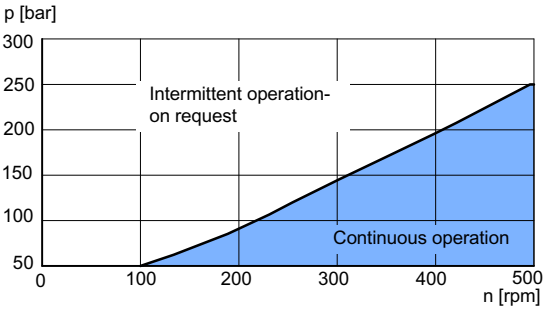
3.3.2 Minimum pressure at suction port as a function of speed

Pump QX53-063 measured: with viscosity 42 mm^2/s



3.3.3 Minimum speed as a function of pressure

Pump QX53-063 measured with viscosity 42 mm^2/s



4 Single pumps

4.1 Dimensions frame size 2 - 4

Frame size		2				3				4			
Pressure range		1	2	3	4 [5)6)]	1	2	3	4	1	2	3	4
Suction port: to SAE J518 [1)]	S	G1“ thread [3)]				G1¼” thread [3)]				1½“			
Pressure port: to SAE J518 [1)]	P	G½” thread [3)] optional SAE J518 [4)]				G¾” thread [3)] optional SAE J518 [4)]				1”			
Mounting: oval 2-hole flange to ISO 3019/1 (SAE) ISO 3019/2 (metric)	A	118				132				170			
	B (SAE)	-				106				146			
	B (Metr.)	100				109				140			
	C	9				11				14			
	N (SAE)	-				82,55 $_{-0,05}$				101,6 $_{-0,05}$			
	N (Metr.)	63 h8				80 h8				100 h8			
	O	8,5				8,5				10,5			
	V	6				6				7			
4-hole flange ISO 3019/2	X (Metr.)	9				9				12			
	Y (Metr.)	85				103				125			
Shaft end: parallel, to ISO/R775 [2)]	D	20 j6				25 j6				32 j6			
	E	36				42				58			
	F	6				8				10			
	G	22,5				28				35			
	I	45				50				68			
Housing	K	37,5				44				52,5			
	L	135	117	152	192	162	142,5	187,5	232,5	200	174	230	286
	M	-	55	90	125	-	69,5	114,5	159,5	-	87	143	199
	T1	43				55	53,5			67			
	T2	43				55	60			67	70		
	Z	100				120				125			
	W	80				100				136			
Weight	kg	6	6	7	8	10	10	13	15	20	18	22	27

1) Pipe flange dimensions, SAE J518 code 61 / ISO 6162-1.
High pressure type up to 420 bar (see section 12.2), low pressure type for up to 16 bar (see section 12.3).

2) For other shaft ends, contact Bucher Hydraulics GmbH.

3) Threaded ports to DIN 3852, Part 2.

4) Option 117: Pressure ports to SAE J518 code 61 / ISO 6162-1 can be supplied for pressure ranges 2 + 3 (see section 4.8.3).

5) The dimensions are not valid for low-flow capability pumps (3,3 cm^3/U and 4,2 cm^3/U, see chapter 4.7).

6) Internal gear pumps size 2 with low-flow capability (3,3 cm^3/U and 4,2 cm^3/U) are supplied with external drain port (option 06) as standard.

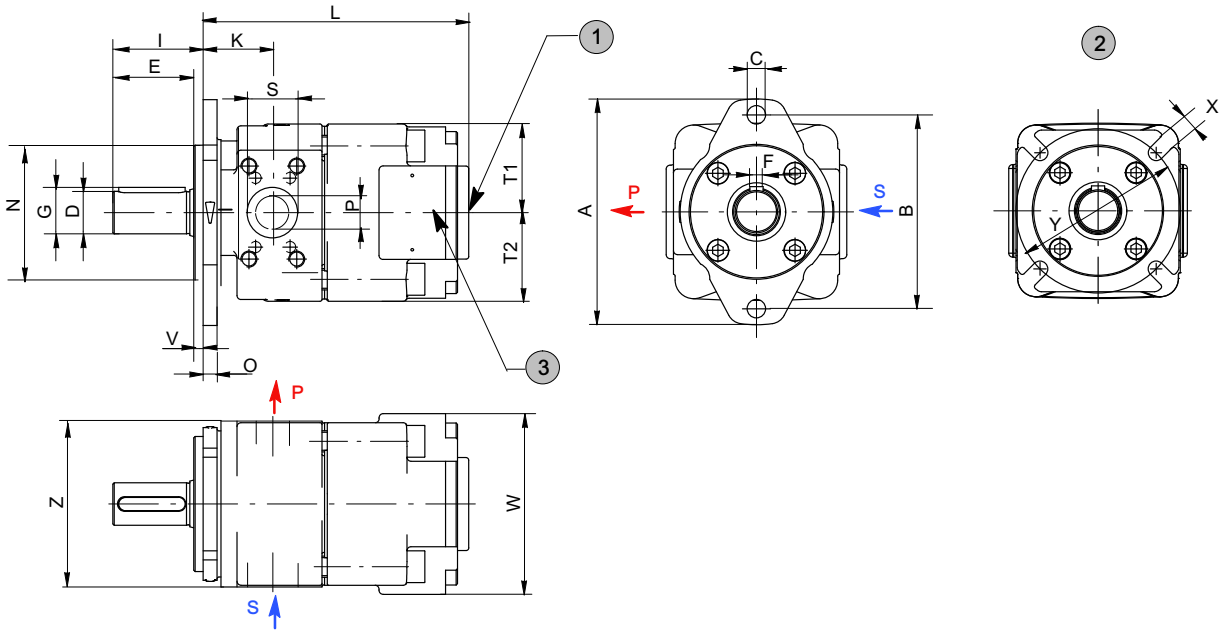
4.2 Dimensions frame size 5 - 8

Frame size		5				6				8			
Pressure range		1	2	3	4	1	2	3	4	1	2	3	4
Suction port: to SAE J518 [1]	S	2”				2½“				3”			
Pressure port: to SAE J518 [1]	P	1¼“				1½“				2”			
Mounting: oval 2-hole flange to ISO 3019/1 (SAE) ISO 3019/2 (metric)	A	212				267				330			
	B (SAE)	181				229				-			
	B (Metr.)	180				224				280			
Mounting: oval 2-hole flange to ISO 3019/1 (SAE) ISO 3019/2 (metric)	C	18				22				26			
	N (SAE)	127 $_{-0,05}$				152,4 $_{-0,05}$				-			
	N (Metr.)	125 h8				160 h8				200 h8			
	O	12,5				16,5				20			
	V	7				7				9			
4-hole flange ISO 3019/2	X (Metr.)	14				18				22			
	Y (Metr.)	160				200				250			
Shaft end: parallel, to ISO/R775 [2]	D	40 j6				50 j6				63 j6			
	E	82				82				105			
	F	12				14				18			
	G	43				53,5				67			
	I	92				92				117			
Housing	K	60,5				74				90			
	L	240,5	208,5	279,5	348,5	286	246	336	426	359	311	426	541
	M	-	102	172	242	-	119	209	299	-	151	266	381
	T1	90,5	89			107	110			137	138		
	T2	90,5	89			107	110			137	138		
	Z	156				195	197			250			
	W	165				203				256			
Weight	kg	36	32	41	50	64	57	77	90	130	118	160	200

1) Pipe flange dimensions, SAE J518 code 61 / ISO 6162-1.
- high pressure type up to 420 bar (see section 12.2)
- low pressure type for up to 16 bar (see section 12.3)

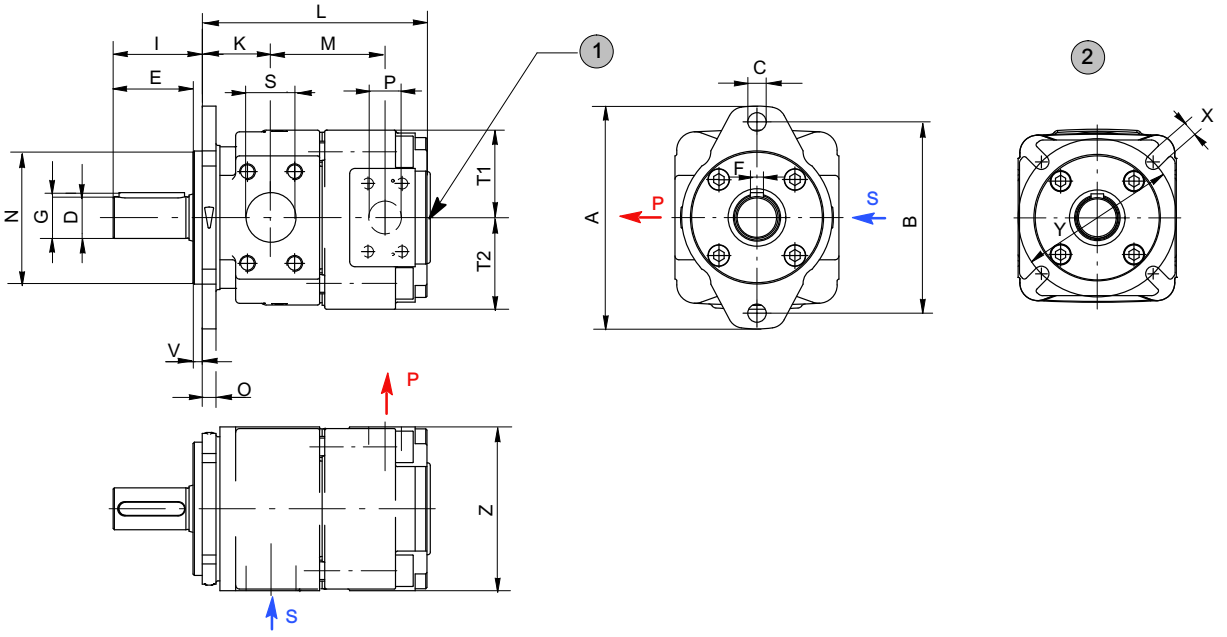
2) For other shaft ends, contact Bucher Hydraulics GmbH.

4.3 Pressure range 1



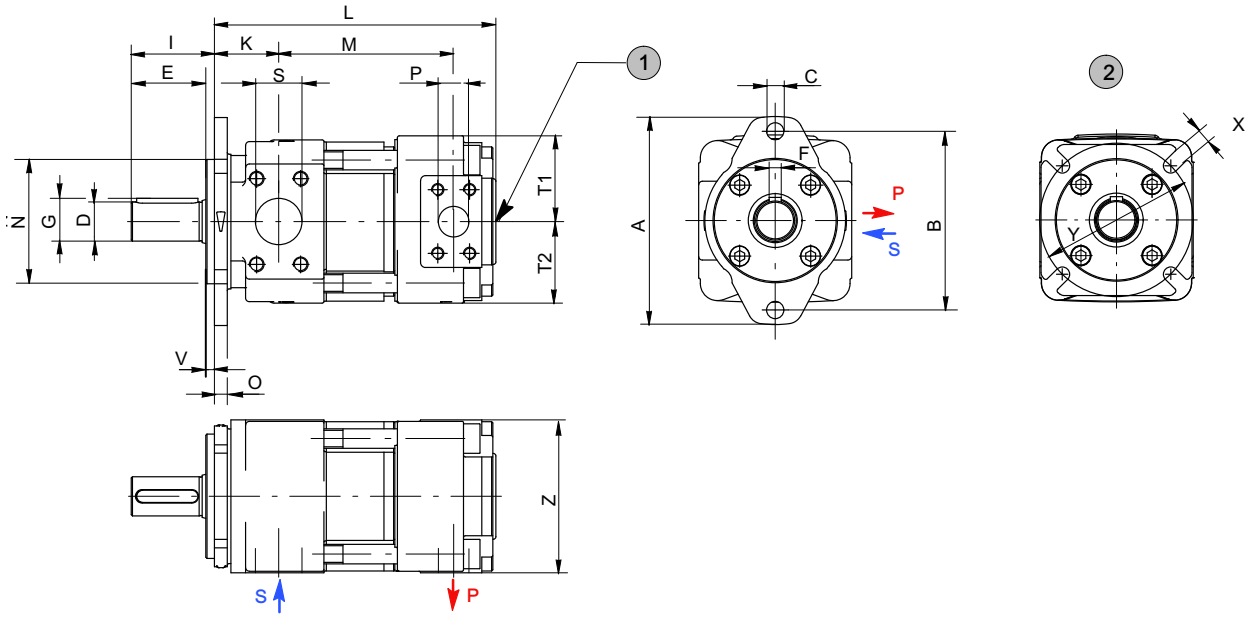
1	option 06 = external drain port
2	option 66 = special model 4-hole flange ISO 3019/2
3	option 83 = depending on operating conditions, a second suction port may be required on: QX51=SAE 1¼", QX61=SAE 2", QX81=SAE 2½" - see section 2.2.1

4.4 Pressure range 2



1	option 06 = external drain port
2	option 66 = special model 4-hole flange ISO 3019/2

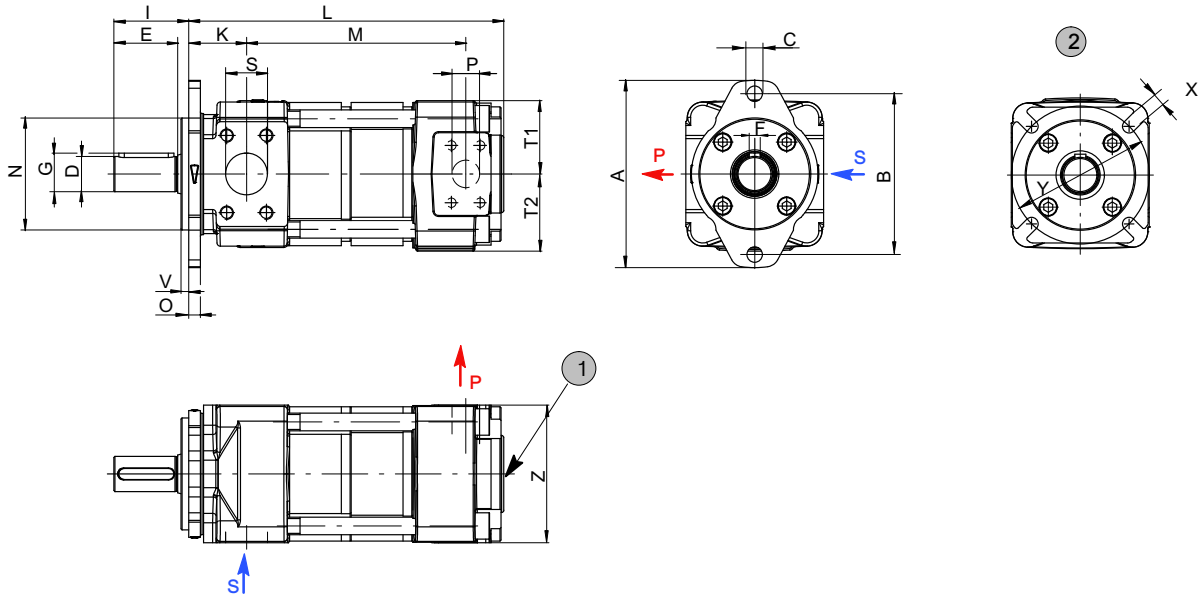
4.5 Pressure range 3



1	option 06 = external drain port

2	option 66 = special model 4-hole flange ISO 3019/2

4.6 Pressure range 4

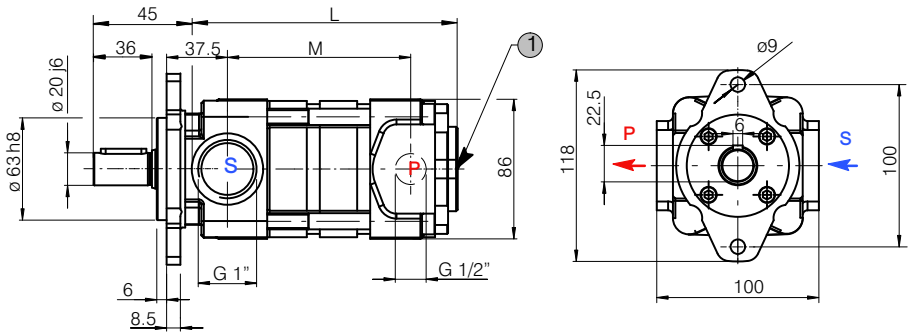


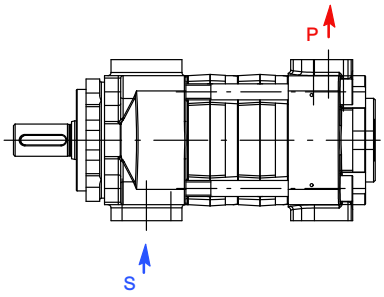
1	option 06 = external drain port

2	option 66 = special model 4-hole flange ISO 3019/2

4.7 Pressure range 4 with low-flow capability

QX24 with displacements from 3 and 4 cm^3/U.

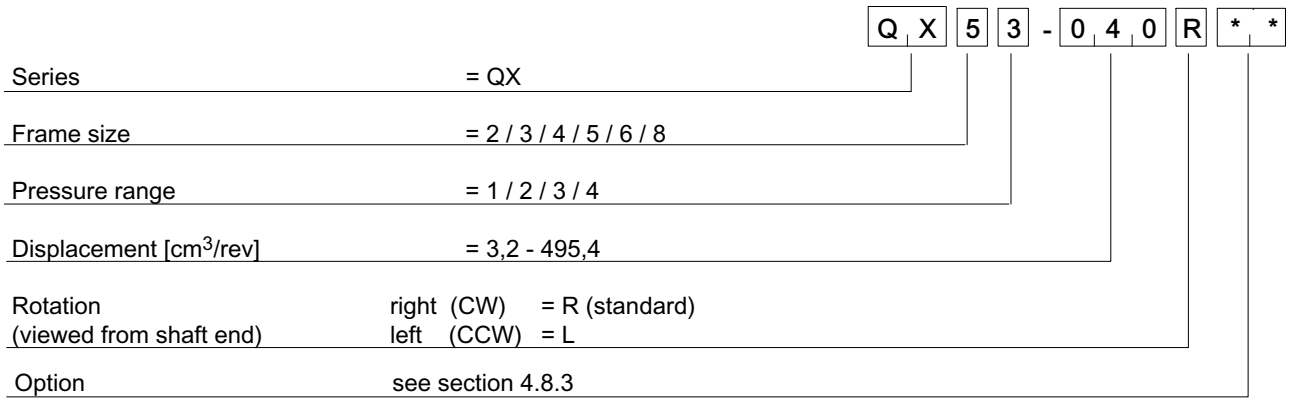




	L	M
3,3 & 4,2 cm³/U	179,5	113

1	Pump version only with option 06 (external drain port)

4.8 Ordering code for single pumps



4.8.1 Ordering example:

Required:	single pump
Displacement:	40 cm^3/rev
Continuous pressure:	300 bar
for use with mineral oil	
Ordering code:	**QX53-040R**

4.8.2 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
- cylindrical shaft end to ISO R775
- black priming, flange without priming

4.8.3 Option

-O = without priming
06 = external drain port in the pump rear cover
QX 2-5 = G¼”
QX 6 = G⅜”
QX 8 = G½”
09 = FPM (Viton) seals and without priming
12 = 2-hole mounting flange to ISO 3019/2 (metric): size QX 3-6
29 = for HFB and HFC fluids, frame sizes 2-5, without priming
66 = 4-hole mounting flange to ISO 3019/2 (metric)
83 = second suction port on:
QX51 = SAE 1¼”
QX61 = SAE 2”
QX81 = SAE 2½”
117 = pressure port to SAE J518 code 61 / ISO 6162-1 can be supplied for frame size 2+3 with pressure ranges 2+3

Further options on request.

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 1. 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.

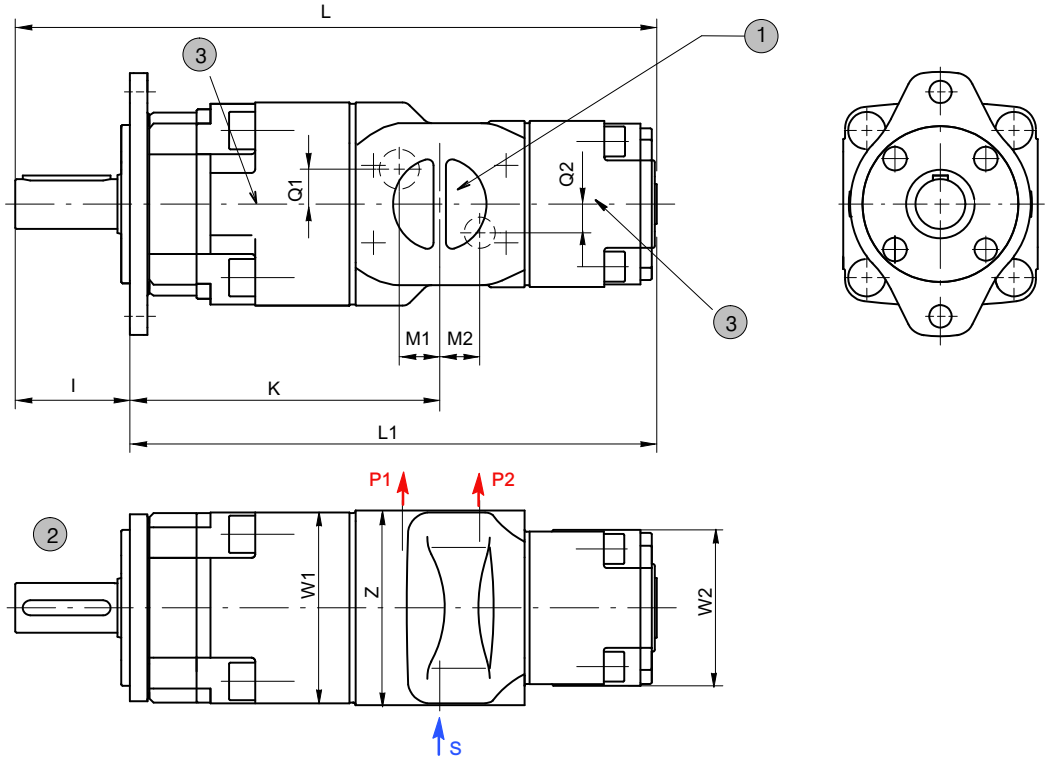
IMPORTANT: Double pumps with pressure range 4 on request.

5.1 Selection table

Pump 1					Pump 2																					
					Displacement [cm³/rev]																					
					5/6/8		10/12/16			20/25/32			40/50/63			80/100/125			160/200/250			315 400 500		Maximum permissible torque [Nm] drive side
					Maximum pressure [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	250	400	125 160 210		
					QX22...	QX23...	QX21...	QX32...	QX33...	QX31...	QX42...	QX43...	QX41...	QX52...	QX53...	QX51...	QX62...	QX63...	QX61...	QX82...	QX83...	QX81...		
Displacement [cm³/rev]	5/6/8	Maximum pressure [bar]	250	QX22..	E																			65
			400	QX23..	H	I																		
	10/12/16		125/160 210	QX21..	B	C	A																	
			250	QX32..	E	F	D	E																130
			400	QX33..	H	I	G	H	I															
	20/25/32		125/160 210	QX31..	B	C	A	B	C	A														
			250	QX42..	E	F	D	E	F	D	E													260
			400	QX43..	H	I	G	H	I	G	H	I												
	40/50/63		125/160 210	QX41..	B	C	A	B	C	A	B	C	A											
			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									
	80/100/125		125/160 210	QX51..	B	C	A	B	C	A	B	C	A	B	C	A								
			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						
	160/200/250		125/160 210	QX61..				B	C	A	B	C	A	B	C	A	B	C	A					
			250	QX82..							E	F	D	E	F	D	E	F	D	E				2100
			400	QX83..							H	I	G	H	I	G	H	I	G	H	I			
	315 400 500		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



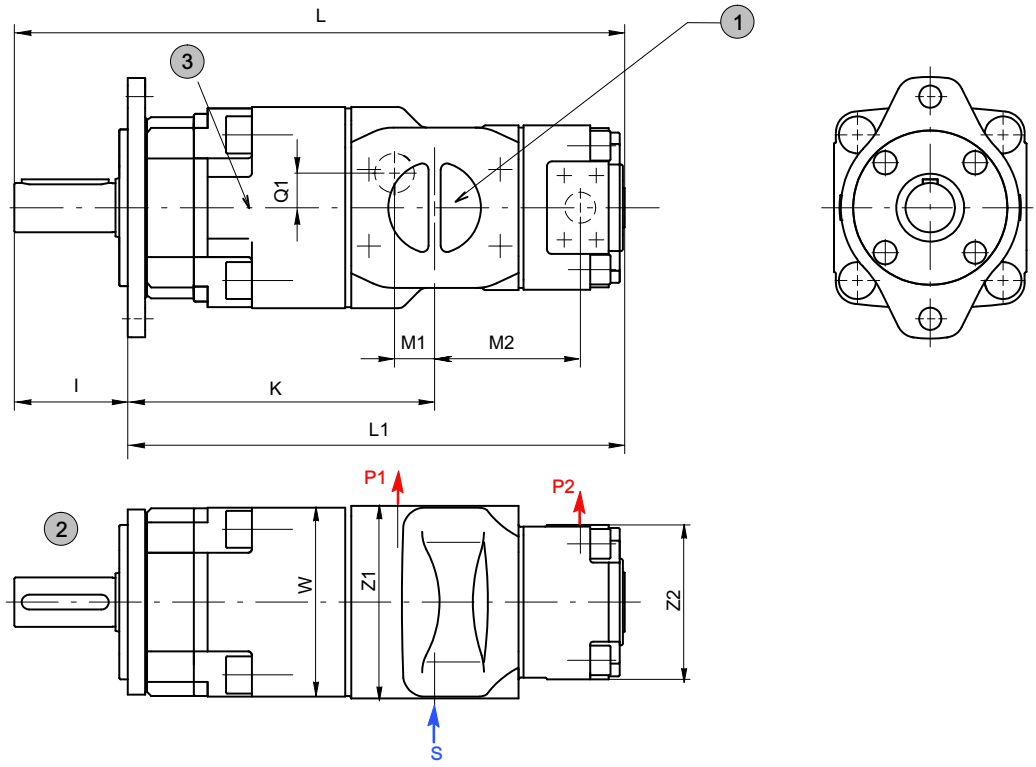
1	S = common suction port
2	shaft and mounting dimensions see section 4

3	option 83 = depending on operating conditions, a second suction port may be required - see section 2.2.1 QX51=SAE 1¼", QX61=SAE 2", QX81=SAE 2½"

Type	L	L1	K	M1	M2	Q1	Q2	I	Z	W1	W2	S	P1	P2
QX21/21	294,5	249,5	140,5	18	18	-	-	45	100	80	80	G1¼" 1)	G½" 1) 2)	G½" 1) 2)
QX31/21	342	292	170,5	26	30			50	120	100	80	G1½" 1)	G¾" 1) 2)	
QX31/31	356	306			26					100	100			G¾" 1) 2)
QX41/21	394,9	326,5	200,5	20	35	15		68	125	136	80	SAE 2"	SAE 1"	G½" 1) 2)
QX41/31	409	341			33		15			136	100			G¾" 1) 2)
QX41/41	447	379	208	27,5	27,5	23	23			136	136			SAE 1"
QX51/21	466,5	374,5	241	22,5	42,5	15	-	92	156	165	80	SAE 2½"	SAE 1¼"	G½" 1) 2)
QX51/31	481	389			38,5		15			165	100			G¾" 1) 2)
QX51/41	519	427	248,5	30	32	28	23			165	136	SAE 3"		SAE 1"
QX51/51	545,5	453,5			30		28			165	165			SAE 1¼"
QX61/31	539,5	447,5	287	24	47	17	14	92	195	203	100		SAE 1½"	G¾" 1) 2)
QX61/41	562,5	470,5		27	39	26	27			203	136			SAE 1"
QX61/51	599	507	292	32	40	35	28			203	165	SAE 3½"		SAE 1¼"
QX61/61	626	534			32		35			203	203			SAE 1½"
QX81/41	677	560	359	34,5	50,5	25	25	117	250	250	136		SAE 2"	SAE 1"
QX81/51	703,5	586,5		35,5	46,5		30			250	165			SAE 1¼"
QX81/61	730,5	613,5		37,5	44,5	40	35			250	203	SAE 4"		SAE 1½"
QX81/81	772,5	655,5			37,5		40			256	256			SAE 2"

1) Threaded port to DIN 3852 Part 2.
2) pressure port to SAE J518 code 61 / ISO 6162-1 can be supplied for pressure ranges 2+3.

B Double pumps QX.1/.2



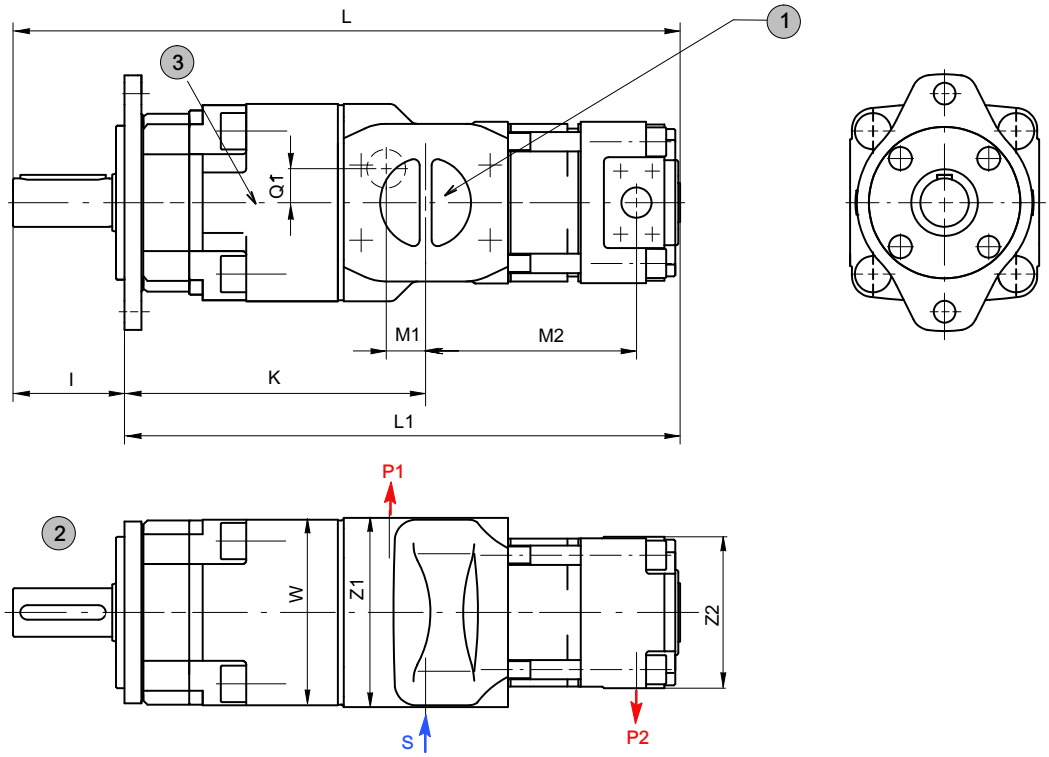
1	S = common suction port
2	shaft and mounting dimensions see section 4

3	option 83 = depending on operating conditions, a second suction port may be required - see section 2.2.1: QX51=SAE 1¼”, QX61=SAE 2”, QX81=SAE 2½”

Type	L	L1	K	M1	M2	Q1	I	Z1	Z2	W	S	P1	P2
QX21/22	276,5	231,5	140,5	18	67	-	45	100	100	80	G1¼“ 1)	G½“ 1) 2)	G½“ 1) 2)
QX31/22	324	274	170,5	26	79		50	120		100	G1½“ 1)	G¾“ 1) 2)	
QX31/32	336,5	286,5			87				120				G¾“ 1) 2)
QX41/22	376,5	308,5	200,5	20	84	15	68	125	100	136	SAE 2”	SAE 1”	G½“ 1) 2)
QX41/32	389,5	321,5			92				120				G¾“ 1) 2)
QX41/42	421	353	208	26	110,5	23			125				SAE 1”
QX51/22	448,5	356,5	241	22,5	91,5	15	92	156	100	165	SAE 2½“	SAE 1¼“	G½“ 1) 2)
QX51/32	462	370			99,5				120				G¾“ 1) 2)
QX51/42	493	401	248,5	30	118	28			125		SAE 3”		SAE 1”
QX51/52	513,5	421,5			127				156				SAE 1¼“
QX61/32	520	428	287	24	112	17	92	195	120	203		SAE 1½“	G¾“ 1) 2)
QX61/42	536,5	444,5		27	123	26			125				SAE 1”
QX61/52	567	475	292	32	137	35			156		SAE 3½“		SAE 1¼“
QX61/62	586	494			149				197				SAE 1½“
QX81/42	651	534	359	34,5	140,5	25	117	250	125	256		SAE 2”	SAE 1”
QX81/52	671	554			150				156				SAE 1¼“
QX81/62	690,5	573,5		37,5	161,5	40			197		SAE 4”		SAE 1½“
QX81/82	724,5	607,5			178,5				250				SAE 2”

1) Threaded port to DIN 3852, Part 2.
2) Pressure port to SAE J518 code 61 / ISO 6162-1 can be supplied for pressure ranges 2+3.

C Double pumps QX.1/.3



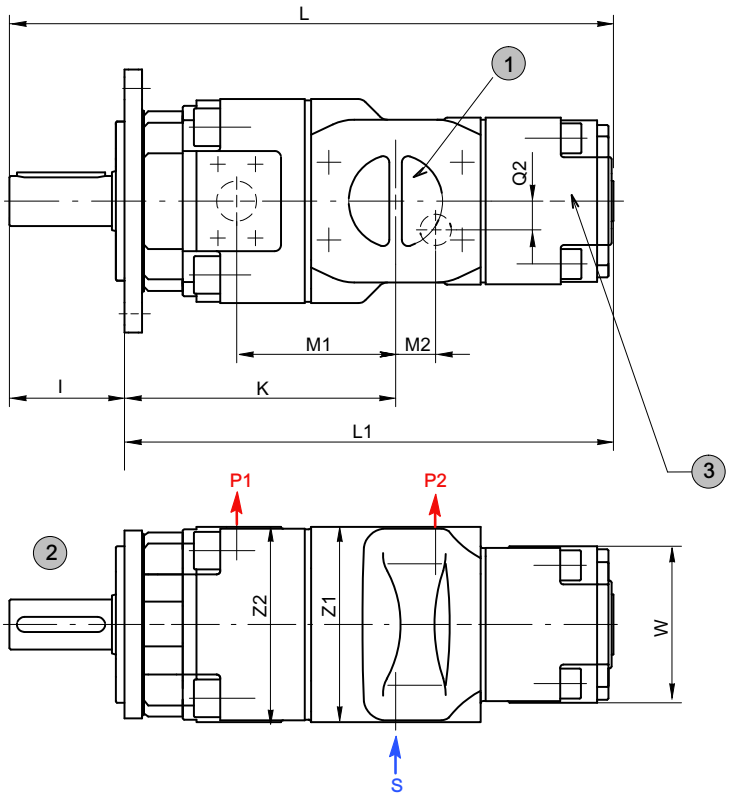
1	S = common suction port
2	shaft and mounting dimensions see section 4

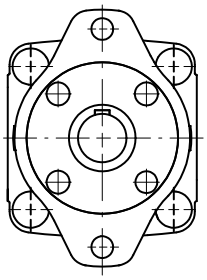
3	option 83 = depending on operating conditions, a second suction port may be required - see section 2.2.1: QX51=SAE 1¼", QX61=SAE 2", QX81=SAE 2½"

Type	L	L1	K	M1	M2	Q1	I	Z1	Z2	W	S	P1	P2
QX21/23	311,5	266,5	140,5	18	102	-	45	100	100	80	G1¼" 1)	G ½" 1) 2)	G½" 1) 2)
QX31/23	358,5	308,5	170,5	26	114		50	120		100	G1½" 1)	G ¾" 1) 2)	
QX31/33	382	332			132				120				G¾" 1) 2)
QX41/23	412	344	200,5	18,5	119	15	68	125	100	136	SAE 2"	SAE 1"	G½" 1) 2)
QX41/33	434,5	366,5			137				120				G¾" 1) 2)
QX41/43	477	409	208	26	166,5	23			125				SAE 1"
QX51/23	484	392	241	22,5	126,5	15	92	156	100	165	SAE 2½"	SAE 1¼"	G½" 1) 2)
QX51/33	506,5	414,5			144,5				120				G¾" 1) 2)
QX51/43	549	457	248,5	30	174	28			125		SAE 3"		SAE 1"
QX51/53	583,5	491,5			197				156				SAE 1¼"
QX61/33	565	473	287	24	157	17	92	195	120	203		SAE 1½"	G¾" 1) 2)
QX61/43	592,5	500,5		27	179	26			125				SAE 1"
QX61/53	637	545	292	32	207	35			156		SAE 3½"		SAE 1¼"
QX61/63	676	584			239				197				SAE 1½"
QX81/43	707	590	359	34,5	196,5	25	117	250	125	256		SAE 2"	SAE 1"
QX81/53	741,5	624,5		35,5	219,5				156				SAE 1¼"
QX81/63	780,5	663,5		37,5	251,5	40			197		SAE 4"		SAE 1½"
QX81/83	839,5	722,5			293,5				250				SAE 2"

1) Threaded port to DIN 3852, Part 2.
2) Pressure port to SAE J518 code 61 / ISO 6162-1 can be supplied for pressure ranges 2+3.

D Double pumps QX.2/.1





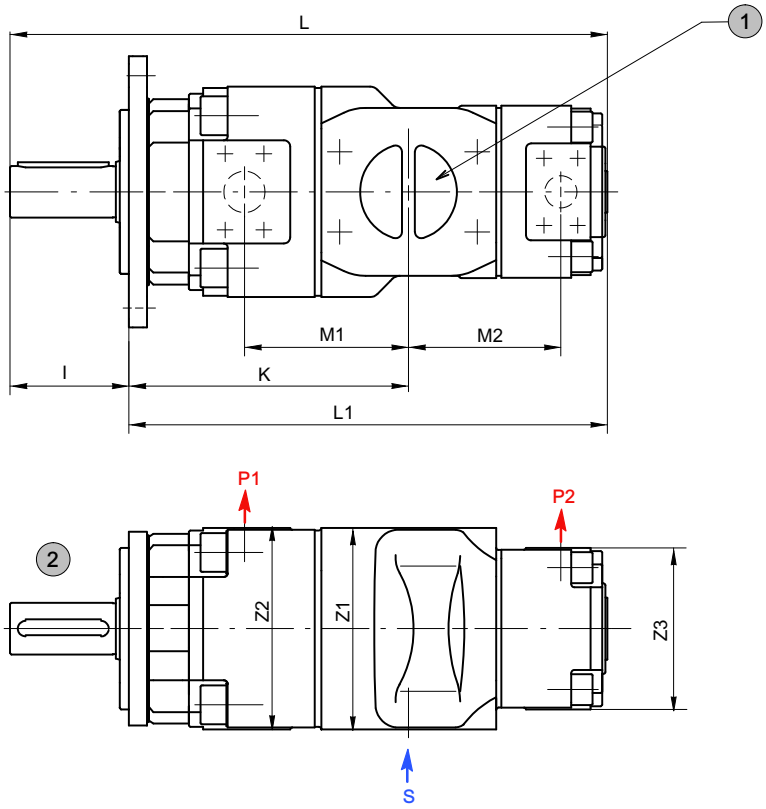
1	S = common suction port
2	shaft and mounting dimensions see section 4

3	option 83 = depending on operating conditions, a second suction port may be required - see section 2.2.1: QX51=SAE 1¼", QX61=SAE 2"

Type	L	L1	K	M1	M2	Q2	I	Z1	Z2	W	S	P1	P2
QX32/21	322	272	150,5	87	30	-	50	120	120	80	G1½" 1)	G¾" 1) 2)	G½" 1) 2)
QX42/21	369	301	174,5	103	35		68	125	125		SAE 2"	SAE 1"	
QX42/31	383	315			33	15				100			G¾" 1) 2)
QX52/21	434,5	342,5	209	119,5	43	-	92	156	156	80	SAE 2½"	SAE 1¼"	G½" 1) 2)
QX52/31	449	357			38,5	15				100			G¾" 1) 2)
QX52/41	487	395	216,5	127	32	23				136	SAE 3"		SAE 1"
QX62/31	499,5	407,5	247	144	47	14	92	195	197	100		SAE 1½"	G¾" 1) 2)
QX62/41	522,5	430,5			39	27				136			SAE 1"
QX62/51	559	467	252	149	40	28				165	SAE 3½"		SAE 1¼"
QX82/41	627	510	309	178,5	50,5	25	117	250	250	136		SAE 2"	SAE 1"
QX82/51	653,5	536,5			46,5	30				165			SAE 1¼"
QX82/61	680,5	563,5			44,5	35				203	SAE 4"		SAE 1½"

1) Threaded port to DIN 3852, Part 2.
2) Pressure port to SAE J518 code 61 / ISO 6162-1 can be supplied for pressure ranges 2+3.

E Double pumps QX.2/.2

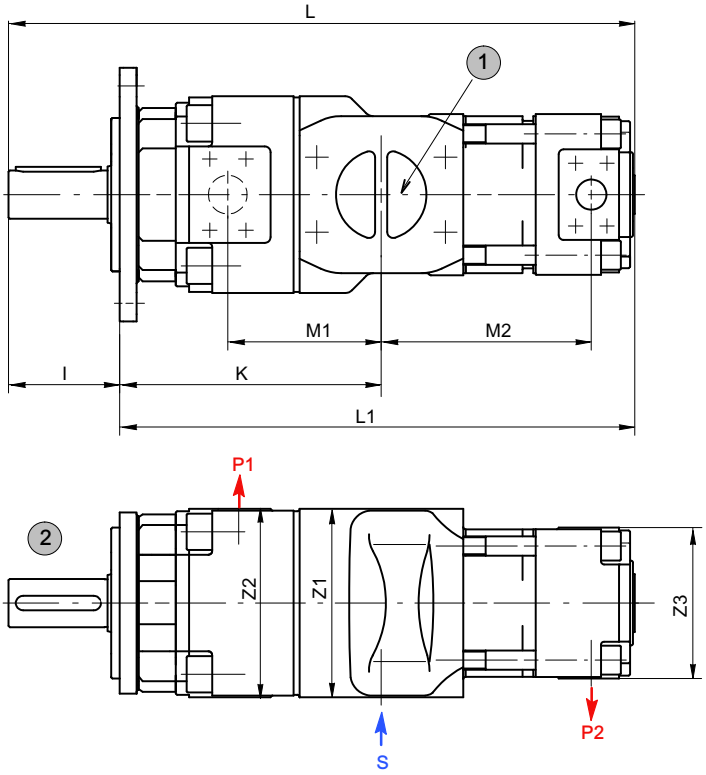


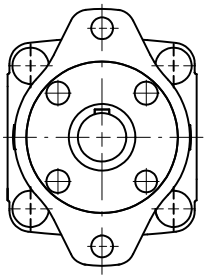
1	S = common suction port
2	shaft and mounting dimensions - see section 4

Type	L	L1	K	M1	M2	I	Z1	Z2	Z3	S	P1	P2
QX22/22	258,5	213,5	122,5	67	67	45	100		100	G1¼“ 1)	G ½“ 1) 2)	G½“ 1) 2)
QX32/22	304	254	150,5	87	79	50	120			G1½“ 1)	G ¾“ 1) 2)	
QX32/32	317	267			87				120			G¾“ 1) 2)
QX42/22	351	283	174,5	103	84	68	125		100	SAE 2”	SAE 1”	G½“ 1) 2)
QX42/32	363,5	295,5			92				120			G¾“ 1) 2)
QX42/42	395	327	182	110,5	110,5				125			SAE 1”
QX52/22	416,5	324,5	209	119,5	91,5	92	156		100	SAE 2½“	SAE 1¼“	G½“ 1) 2)
QX52/32	429,5	337,5			99,5				120			G¾“ 1) 2)
QX52/42	461	369	216,5	127	118				125	SAE 3”		SAE 1”
QX52/52	482	390			127				156			SAE 1¼“
QX62/32	480	388	247	144	112	92	195	197	120		SAE 1 ½“	G¾“ 1) 2)
QX62/42	496,5	404,5			123				125			SAE 1”
QX62/52	527	435	252	149	137				156	SAE 3½“		SAE 1¼“
QX62/62	546	454			149				197			SAE 1½“
QX82/42	601	484	309	178,5	140,5	117	250		125		SAE 2”	SAE 1”
QX82/52	621,5	504,5			149,5				156			SAE 1¼“
QX82/62	640,5	523,5			161,5				197	SAE 4”		SAE 1½“
QX82/82	674,5	557,5			178,5				250			SAE 2”

1) Threaded port to DIN 3852, Part 2.
2) Pressure port to SAE J518 code 61 / ISO 6162-1 can be supplied for pressure ranges 2+3.

F Double pumps QX.2/.3





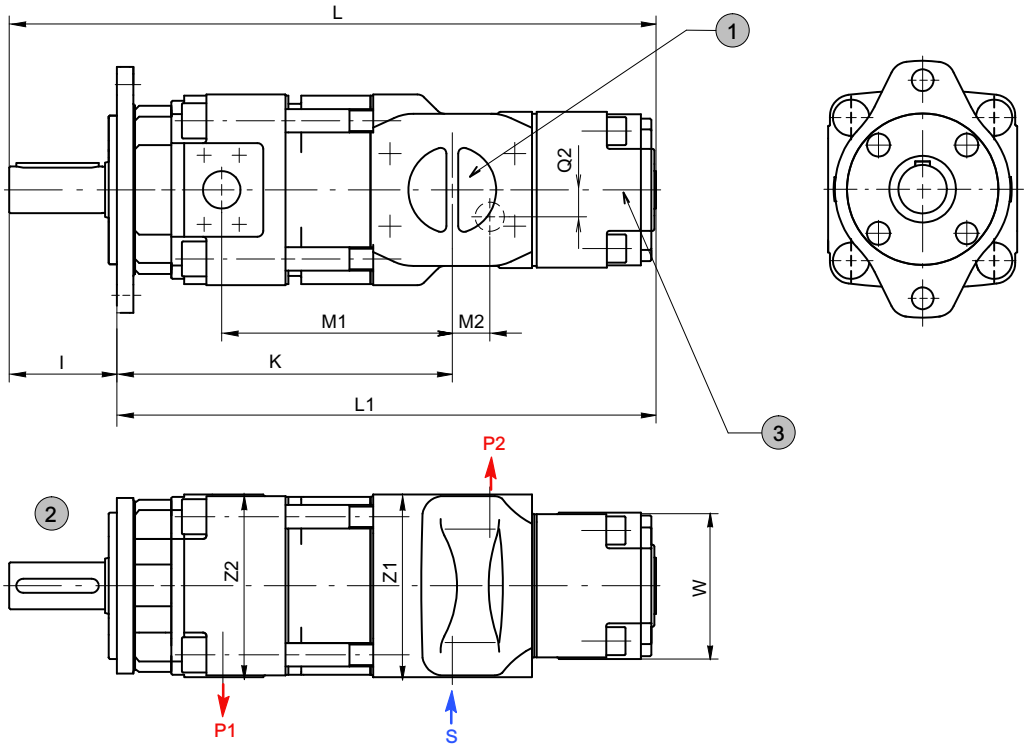
1	S = common suction port

2	shaft and mounting dimensions - see section 4

Type	L	L1	K	M1	M2	I	Z1	Z2	Z3	S	P1	P2
QX32/23	339	289	150,5	87	114	50	120		100	G1½“ 1)	G¾“ 1) 2)	G½“ 1) 2)
QX42/23	386	318	174,5	103	119	68	125			SAE 2”	SAE 1”	
QX42/33	410	342			137				120			G¾“ 1) 2)
QX52/23	452	360	209	119,5	126,5	92	156		100	SAE 2½“	SAE 1¼“	G½“ 1) 2)
QX52/33	474,5	382,5			144,5				120			G¾“ 1) 2)
QX52/43	517	425	216,5	127	174				125	SAE 3”		SAE 1”
QX62/33	525	433	247	144	157	92	195	197	120		SAE 1½“	G¾“ 1) 2)
QX62/43	552,5	460,5			179				125			SAE 1”
QX62/53	597	505	252	149	207				156	SAE 3½“		SAE 1¼“
QX82/43	657	540	309	178,5	196,5	117	250		125		SAE 2”	SAE 1”
QX82/53	691,5	574,5			219,5				156			SAE 1¼“
QX82/63	730,5	613,5			251,5				197	SAE 4”		SAE 1½“

1) Threaded port to DIN 3852, Part 2.
2) Pressure port to SAE J518 code 61 / ISO 6162-1 can be supplied for pressure ranges 2+3.

G Double pumps QX.3/.1



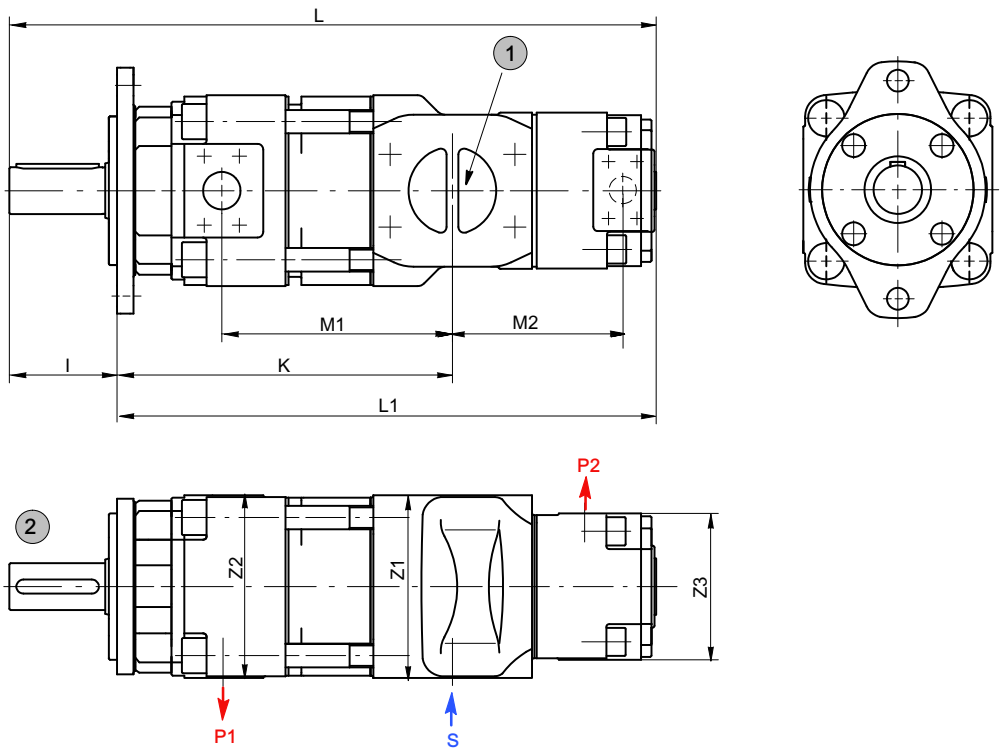
1	S = common suction port
2	shaft and mounting dimensions - see section 4

3	option 83 = depending on operating conditions, a second suction port may be required - see section 2.2.1 QX61=SAE 2”

Type	L	L1	K	M1	M2	Q2	I	Z1	Z2	W	S	P1	P2
QX33/21	366,5	316,5	195,5	132	30	-	50	120	120	80	G1½“ 1)	G ¾“ 1) 2)	G½“ 1) 2)
QX43/21	424,5	356,5	230,5	159	35		68	125	125		SAE 2”	SAE 1”	
QX43/31	439	371			33	15				100			G¾“ 1) 2)
QX53/21	504,5	412,5	279	189,5	43	-	92	156	156	80	SAE 2½“	SAE 1¼“	G½“ 1) 2)
QX53/31	519	427			38,5	15				100			G¾“ 1) 2)
QX53/41	557	465	286,5	197	32	23				136	SAE 3”		SAE 1”
QX63/31	589,5	497,5	337	234	47	14	92	195	197	100		SAE 1½“	G¾“ 1) 2)
QX63/41	612,5	520,5			39	27				136			SAE 1”
QX63/51	649	557	342	239	40	28				165	SAE 3½“		SAE 1¼“
QX83/41	742	625	424	293,5	50,5	25	117	250	250	136		SAE 2”	SAE 1”
QX83/51	768,5	651,5			46,5	30				165			SAE 1¼“
QX83/61	795,5	678,5			40,5	35				203	SAE 4”		SAE 1½“

1) Threaded port to DIN 3852, Part 2.
2) Pressure port to SAE J518 code 61 / ISO 6162-1 can be supplied for pressure ranges 2+3.

H Double pumps QX.3/.2



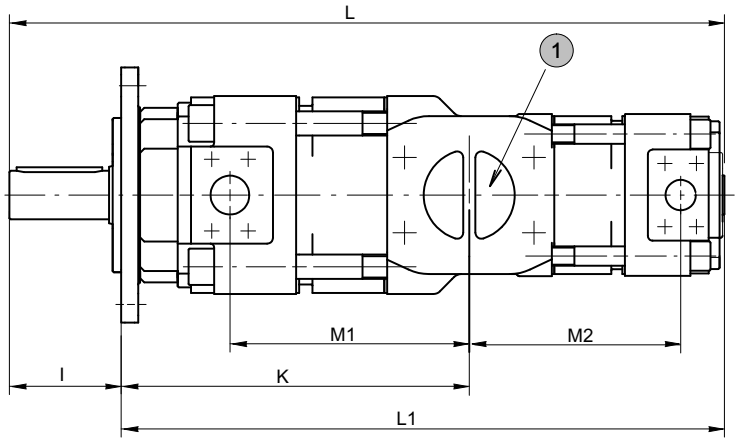
1	S = common suction port

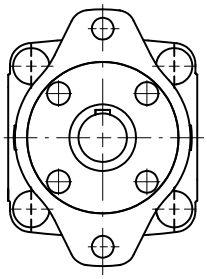
2	shaft and mounting dimensions - see section 4

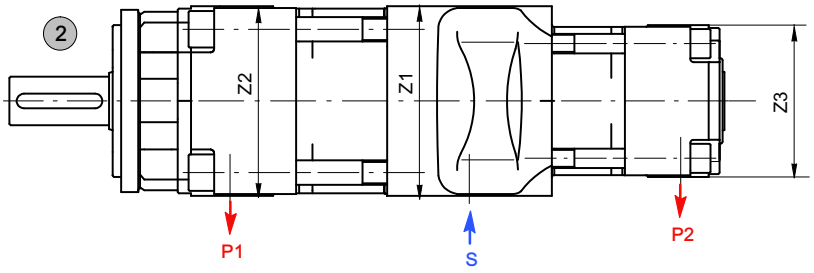
Type	L	L1	K	M1	M2	I	Z1	Z2	Z3	S	P1	P2
QX23/22	294	249	157,5	102	67	45	100		100	G1¼“ 1)	G½“ 1) 2)	G½“ 1) 2)
QX33/22	349	299	195,5	132	79	50	120			G1½“ 1)	G¾“ 1) 2)	
QX33/32	362	312			87				120			G¾“ 1) 2)
QX43/22	407	339	230,5	159	84	68	125		100	SAE 2”	SAE 1”	G½“ 1) 2)
QX43/32	420	352			92				120			G¾“ 1) 2)
QX43/42	451	383	238	166,5	110,5				125			SAE 1”
QX53/22	487	395	279	189,5	91,5	92	156		100	SAE 2½“	SAE 1¼“	G½“ 1) 2)
QX53/32	499,5	407,5			99,5				120			G¾“ 1) 2)
QX53/42	531	439	286,5	197	118				125	SAE 3”		SAE 1”
QX53/52	552	460			127				156			SAE 1¼“
QX63/32	571	479	337	234	112	92	195	197	120		SAE 1½“	G¾“ 1)
QX63/42	586,5	494,5			123				125			SAE 1”
QX63/52	617	525	342	239	137				156	SAE 3½“		SAE 1¼“
QX63/62	636	544			149				197			SAE 1½“
QX83/42	716	599	424	293,5	140,5	117	250		125		SAE 2”	SAE 1”
QX83/52	736,5	619,5			149,5				156			SAE 1¼“
QX83/62	756	639			161,5				197	SAE 4”		SAE 1½“
QX83/82	790	673			178,5				250			SAE 2”

1) Threaded port to DIN 3852, Part 2.
2) Pressure port to SAE J518 code 61 / ISO 6162-1 can be supplied for pressure ranges 2+3.

I Double pumps QX.3/.3







1	S = common suction port

2	shaft and mounting dimensions - see section 4

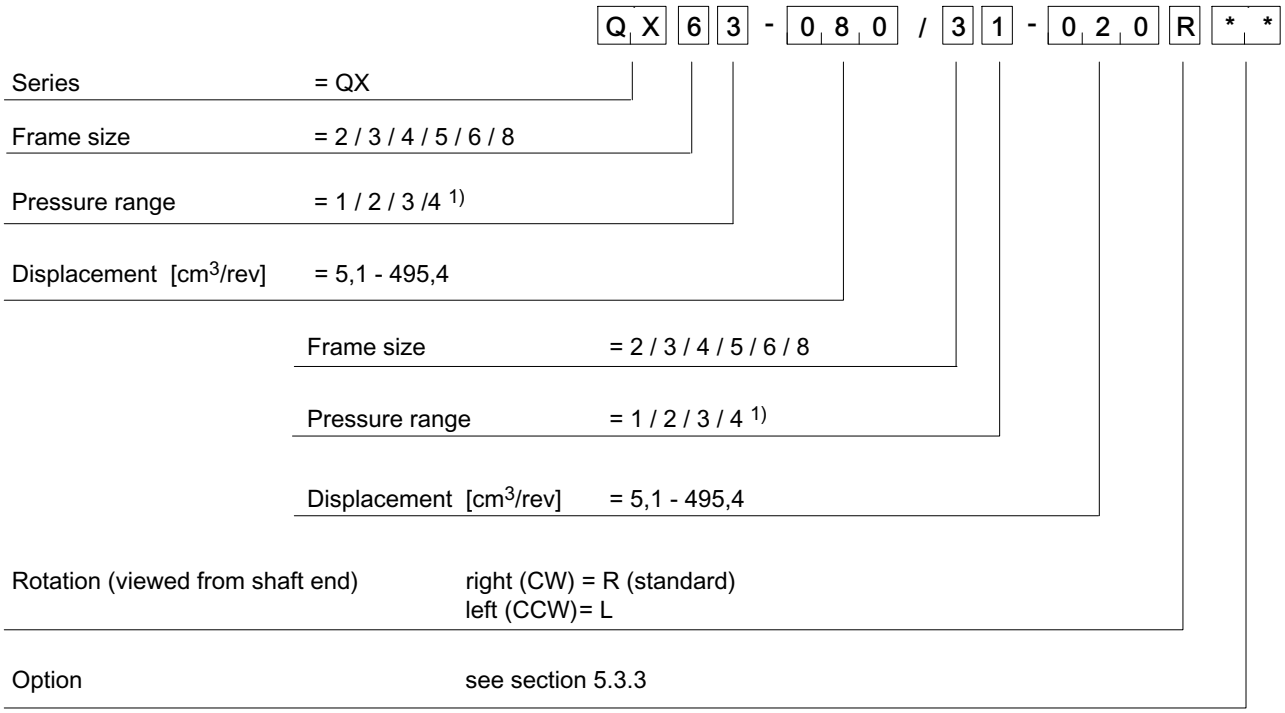
Type	L	L1	K	M1	M2	I	Z1	Z2	Z3	S	P1	P2
QX23/23	328,5	283,5	158	102	102	45	100		100	G1¼“ 1) 2)	G½“ 1) 2)	G½“ 1) 2)
QX33/23	383,5	333,5	195,5	132	114	50	120			G1½“ 1) 2)	G¾“ 1) 2)	
QX33/33	406,5	356,5			132				120			G¾“ 1) 2)
QX43/23	442	374	230,5	159	119	68	125		100	SAE 2”	SAE 1”	G½“ 1) 2)
QX43/33	464,5	396,5			137				120			G¾“ 1)
QX43/43	507	439	238	166,5	166,5				125			SAE 1”
QX53/23	522	430	279	190	126,5	92	156		100	SAE 2½“	SAE 1¼“	G½“ 1) 2)
QX53/33	544,5	452,5			145				120			G¾“ 1) 2)
QX53/43	587	495	286,5	197	174				125	SAE 3”		SAE 1”
QX53/53	622	530			197				156			SAE 1¼“
QX63/33	615	523	337	234	157	92	195	197	120		SAE 1½“	G¾“ 1) 2)
QX63/43	642,5	550,5			179				125			SAE 1”
QX63/53	687	595	342	239	207				156	SAE 3½“		SAE 1¼“
QX63/63	727	635			239				197			SAE 1½“
QX83/43	772	655	424	293,5	196,5	117	250		125		SAE 2”	SAE 1”
QX83/53	806,5	689,5			220				156			SAE 1¼“
QX83/63	846	729			253,5				197	SAE 4”		SAE 1½“
QX83/83	904,5	787,5			293,5				250			SAE 2”

1) Threaded port to DIN 3852, Part 2.

2) Pressure port to SAE J518 code 61 / ISO 6162-1 can be supplied for pressure ranges 2+3.

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5.3 Ordering code for double pumps



1) Pressure range 4 on request.

5.3.1 Ordering example:

Required: double pump

Pump 1		Pump 2	
Displacement:	80 cm^3/rev	Displacement:	20 cm^3/rev
Continuous pressure:	300 bar	Continuous pressure:	160 bar
Type:	63-080	Type:	31-020
for use with mineral oil			
Ordering code:	**QX63-080/31-020R**		

5.3.2 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
- black priming, flange without priming

5.3.3 Options

-O = without priming
06 = external drain port in the pump rear cover
QX 2-5 = G¼”
QX 6 = G⅜”
QX 8 = G½”
09 = FPM (Viton) seals and without priming
12 = 2-hole mounting flange to ISO 3019/2 (metric): size QX 3-6
29 = for HFB and HFC fluids, frame sizes 2-5, without priming
66 = 4-hole mounting flange to ISO 3019/2 (metric)
83 = second suction port on: QX51=SAE 1 ¼”, QX61=SAE 2”, QX81=SAE 2½”
117 = pressure port to SAE J518 code 61 / ISO 6162-1 can be supplied for frame size 2+3 with pressure ranges 2+3

Further options on request.

6 Triple pumps

The following table shows the triple-pump combinations that can be supplied (other triple-pumps on request). 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.

IMPORTANT: Triple pumps with pressure range 4 on request.

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
QX22/22/23	QX32/22/22	QX43/23/23	QX51/41/42	QX53/53/23	QX62/42/42	QX82/61/61
QX23/23/23	QX32/22/23	QX41/31/33	QX51/41/43	QX53/53/33	QX62/43/43	QX82/62/62
	QX32/23/23	QX41/33/22	QX51/42/22		QX63/43/22	QX82/63/31
	QX33/21/22	QX41/33/33	QX51/42/43		QX61/52/53	QX83/61/61
	QX33/21/23	QX42/31/32	QX51/43/21		QX61/53/23	QX83/63/43
	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

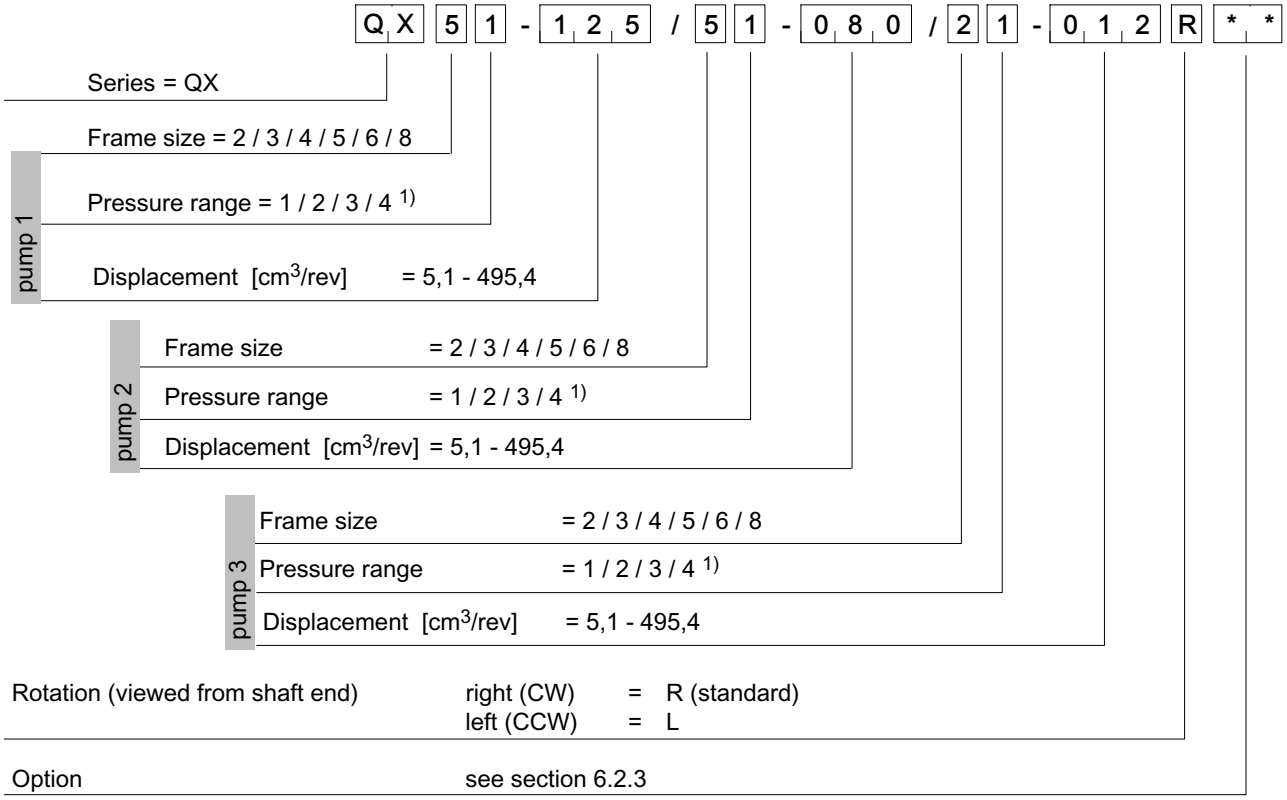
Max. permissible drive shaft torque [Nm]

* pump is used as the ordering example in section 6.2

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6.2 Ordering code for triple pumps

Triple pumps can only be supplied after consulting Bucher Hydraulics GmbH.



1) Pressure range 4 on request.

6.2.1 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

6.2.2 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
- black priming, flange without priming

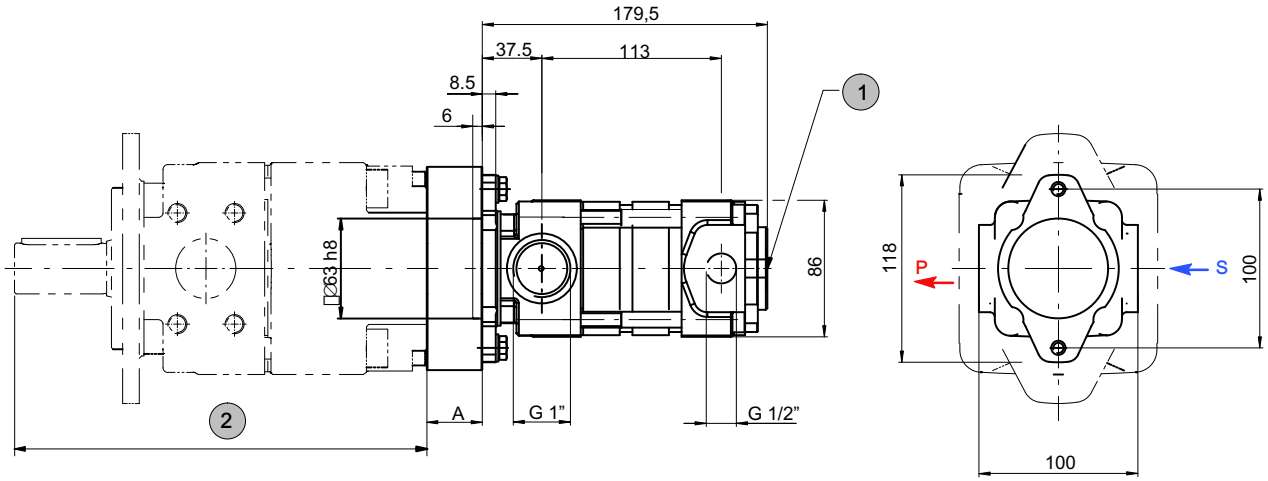
6.2.3 Options

-O = without priming
06 = external drain port in the pump rear cover QX 2-5 = G¼", QX 6 = G⅜", QX 8 = G½"
09 = FPM (Viton) seals and without priming
12 = 2-hole mounting flange to ISO 3019/2 (metric): size QX 3-6
29 = for HFB and HFC fluids, frame sizes 2-5, without priming
66 = 4-hole mounting flange to ISO 3019/2 (metric)
83 = second suction port on: QX51=SAE 1¼", QX61=SAE 2", QX81=SAE 2½"
117 = pressure port to SAE J518 code 61 / ISO 6162-1 can be supplied for frame size 2+3 with pressure ranges 2+3

Further options on request.

7 Low-flow capability pump in combination with other QX-single pumps

7.1 Dimensions



3

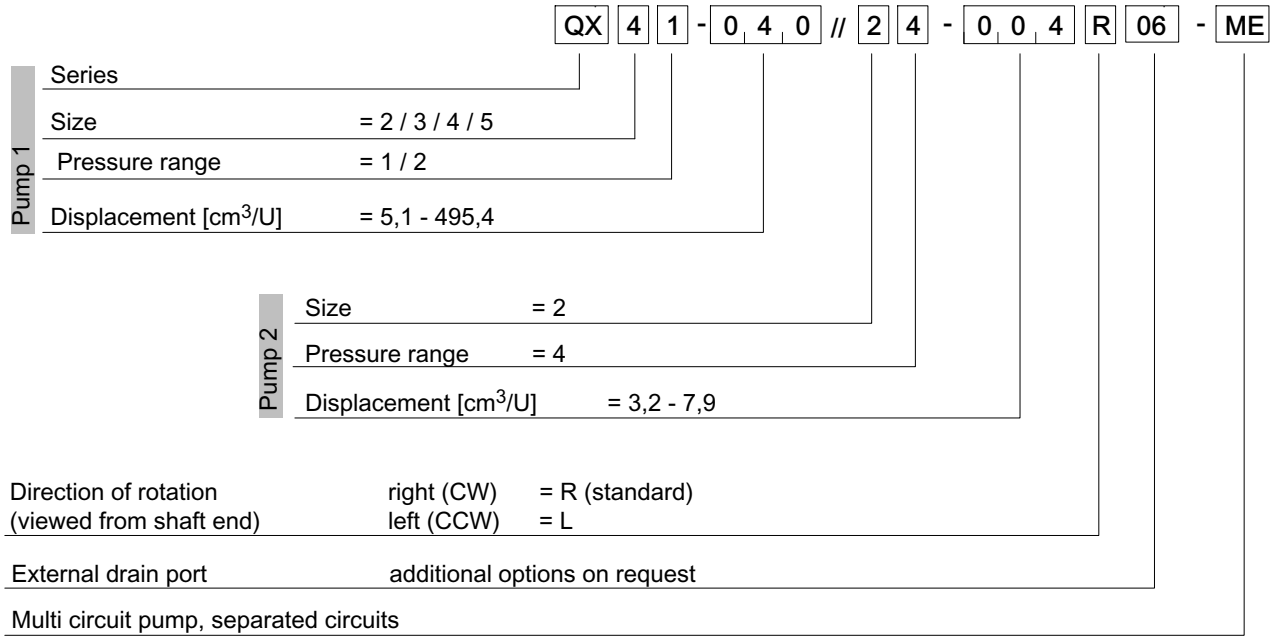
	A
QX21-...	33,5
QX22-...	26,5
QX31-...	35
QX32-...	26
QX41-...	35
QX42-...	28
QX52-...	26

1	external drain port G¼”
2	dimensions see section 4

3	dimension A depends on the driving QX pump model (2)

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7.2 Ordering code



7.2.1 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//24-004R06-ME

8 Fluid

QX pumps require fluid with a minimum cleanliness level of ISO 4406 code 20/18/15.

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.

9 Fluid cleanliness class

Cleanliness class (RK) onto ISO 4406

Code ISO 4406	Number of particles / 100 ml		
	≥ 4 µm	≥ 6 µm	≥ 14 µm
23/21/18	8000000	2000000	250000
22/20/18	4000000	1000000	250000
22/20/17	4000000	1000000	130000
22/20/16	4000000	1000000	64000
21/19/16	2000000	500000	64000
20/18/15	1000000	250000	32000
19/17/14	500000	130000	16000
18/16/13	250000	64000	8000
17/15/12	130000	32000	4000
16/14/12	64000	16000	4000
16/14/11	64000	16000	2000
15/13/10	32000	8000	1000
14/12/9	16000	4000	500
13/11/8	8000	2000	250

10 Operational reliability

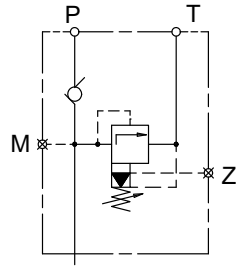
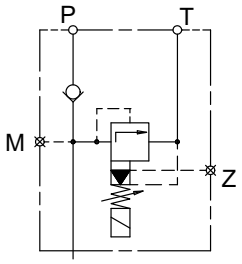
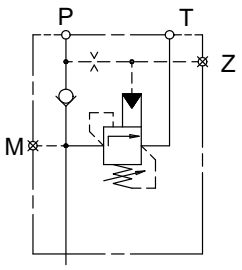
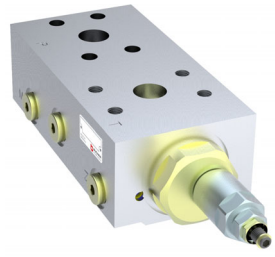
To guarantee the reliable operation and a long service life of the pump, a maintenance schedule must be prepared for the power unit, machine or system. The maintenance schedule must make sure that the provided or permissible operating conditions of the pump are adhered to over the period of use.
In particular, compliance with the following operating parameters must be ensured:
– required oil cleanliness
– operating temperature range
– fluid level
Moreover, the pump and the system must be inspected at regular intervals for changes in the following parameters:
– Vibration
– Noise
– Differential temperature of pump – fluid in the tank
– Foaming in the tank
– Leak tightness
Changes in these parameters indicate wear of components (e.g. drive motor, coupling, pump, etc.). The cause must be immediately pinpointed and eliminated.
To provide high operational reliability of the pump 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.
Make sure that the plastic components of the coupling will exchanged regulary (no later than 5 years). The manufacturer´s instructions must be given priority.

11 Note

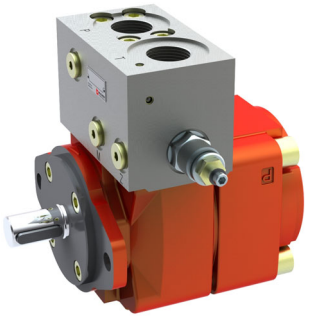
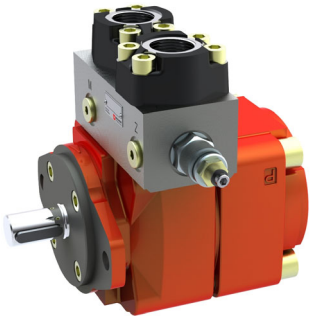
This catalogue is intended for users with specialist knowledge. The user must check the suitability of the equipment described here in in order to ensure that all of the conditions necessary for the safety and proper functioning of the system are fulfilled. If you have any doubts or questions concerning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

12 Accessories

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

Pressure relief valve A S/G DF	Pressure relief valve solenoid control A S/G DA	Accumulator charging valve AGSF
		
		
Technical data sheet 100-P-000123	Technical data sheet 100-P-000119	Technical data sheet 100-P-0000124

12.1.1 Examples for Bolt-on valves, mounted on QX Internal Gear Pumps

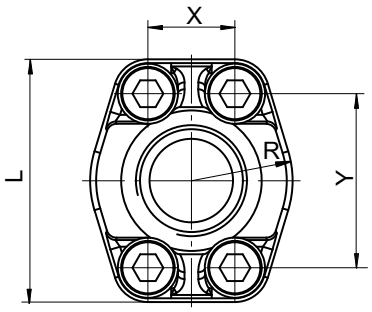
AGDF Bolt-on valve with threaded ports AGDF	ASDF+RF Bolt-on valves with pipe flanges SAE[1)] ASDF+RF	Bolt-on valve with pipe flanges SAE + RVSAE[2)] ASDF+RF+RVSAE+DPSAE+ZPSAE
		

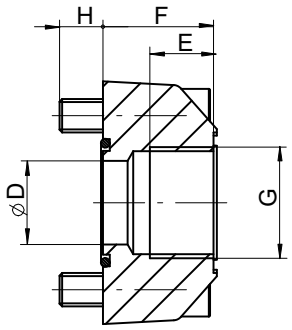
1) Pipe flange see section 12.2 and 12.3.

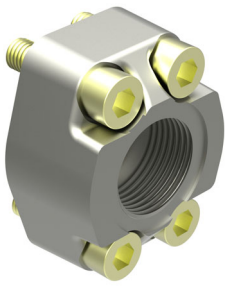
2) Please ask Bucher Hydraulics GmbH for check valves.

IMPORTANT: For detailed informations on Bolt-on valves see www.bucherhydraulics.com

12.2 Pipe flanges - high pressure type







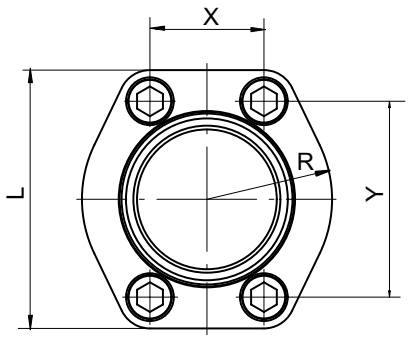
- Max. operating pressure 420 bar
- Flange size SAE J518 code 61 / ISO 6162-1

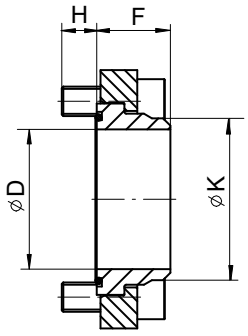
Threaded pipe flanges are spot-faced for DIN 2353 pipe fittings.
Material: ST37 / for FPM (Viton) seals, contact Bucher Hydraulics GmbH.

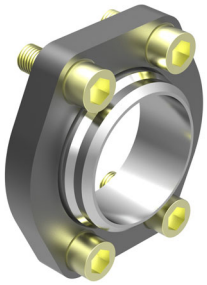
Ordering-number	Ordering code	Size	D∅	E	F	H	L	R	X	Y	Viton seal 90 Shore A	Retaining screws DIN912-12.9 / [Nm]	
100037000	RF 01-R08	G½“	12,5	16	27	13	54	23	17,5	38	20,24x2,62	M8x30	30
100037010	RF 02-R10	G¾“	20	18	30	12	65	26	22,2	47,6	26,65x2,62	M10x30	60
100037020	RF 03-R11	G1”	25	20	34	13	70	29	26,2	52,4	32,99x2,62	M10x35	60
100037030	RF 04-R12	G1¼“	32	22	38	14	80	36	30,2	58,6	40,86x3,53	M10x40	60
100037040	RF 05-R13	G1½“	38	24	41	19	94	41	35,7	70	44,04x3,53	M12x45	120
100037050	RF 06-R14	G2”	50	26	45	20	102	48	42,9	77,8	59,92x3,53	M12x50	120
100055470*	RF 07-R16	G2½“ *	63	30	50	18	114	57	50,8	89	72,62x3,53	M12x45	120

* at RF07 only to 210 bar be allowed

12.3 Pipe flanges - low pressure type







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

Material: HST37 / for FPM (Viton) seals, contact Bucher Hydraulics GmbH.

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.
100062450	RN 07-S	2½“	63	75	35	14	120	57	51	89	69,44x3,53	M12 x 30	70	75
100063880	RN 08-S	3”	76	88			140,5	68	62	106,5	85,32x3,53	M16 x 40	180	88
100063890	RN 09-S	3½“	89	100	40	19	158,5	73	70	120,3	98,02x3,53	M16 x 40	180	100
100063900	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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