

Internal Gear Pumps for low-viscosity fluids Series QXV



1 General

1.1 Product description

The QXV unit is an internal gear pump for low-viscosity fluids. By using several pump stages connected in series, pressures to 250 bar can be developed with high efficiency at viscosities of around 1 mm²/s (cSt).

The QXV is being used with great success to pump aviation jet fuel, automotive fuels, paraffin oil/kerosene, brake fluids, Pentosin and HFA fluids. Depending on the requirements of the application, up to five pump stages can be connected in series.

The unit is based on the well-known QX internal gear pump, which is distinguished by its very low noise levels and almost imperceptible pressure pulsations. The large number of closely spaced sizes ensures that the right size is always available for every application.

1.2 Advantages

- Very low noise levels
- Negligible pressure pulsations
- to 250 bar can be developed at viscosities around 1 mm²/s (cSt)

- Multi-stage principle ensures low pressure loading on each stage, giving outstanding efficiencies
- Hydrodynamic bearing support ensures long service life
- Low pump wear since, from moment of start-up, gear ring is also supported hydrostatically
- Bucher has application experience with aviation jet fuel, diesel fuel, brake fluids, Pentosin and HFA
- Optimised flow path cross-sections and special gear profile give low susceptibility to cavitation
- Long service life, since the ball bearing is outside the working fluid envelope
- Cast parts are phosphated for good emergency running properties and for corrosion protection

2 Technical data

2.1 General

Installation attitude	unrestricted
Mounting method (standard)	oval 2-hole flange to ISO 3019/1 (SAE): QXM 3-6 oval 2-hole flange to ISO 3019/2 (metric) QXM 2+8
Direction of rotation	right, alternatively left (but not reversible)
Pump drive method	in-line, through a flexible coupling
Minimum fluid cleanliness	NAS 1638, class 8 or ISO 4406, code 19/17/14
Viscosity range	0.8...10 mm ² /s (cSt) (for values outside this range, consult Bucher Hydraulics)
Fluid temperature	80 °C max. (for other temperature ranges, consult Bucher Hydraulics) HFA 50 °C max.
Minimum inlet pressure Maximum pressure at drain port	0,85 - 1 bar absolute (dependet on pump size and speed. Beyond these values please contact Bucher Hydraulics)

2.2 Main characteristics

Pressure range	1	2	3	4	5	6	1	2-6
Oper. pressure ³⁾	25	50	100	150	200	250		
Displacement cm ³ /rev	Type	Type	Type	Type	Type	Type	Speed range rpm ¹⁾	
005		QXV 22-005	QXV 23-005	QXV 24-005	QXV 25-005	QXV 26-005		3000 to 3600
006		QXV 22-006	QXV 23-006	QXV 24-006	QXV 25-006	QXV 26-006		
008		QXV 22-008	QXV 23-008	QXV 24-008	QXV 25-008	QXV 26-008		
010	QXV 21-010	QXV 32-010	QXV 33-010	QXV 34-010	QXV 35-010	QXV 36-010	3000 to 3600	3000 to 3600
012	QXV 21-012	QXV 32-012	QXV 33-012	QXV 34-012	QXV 35-012	QXV 36-012		
016	QXV 21-016	QXV 32-016	QXV 33-016	QXV 34-016	QXV 35-016	QXV 36-016		
020	QXV 31-020	QXV 42-020	QXV 43-020	QXV 44-020	QXV 45-020	QXV 46-020	1800 to 3000	3000 to 3600
025	QXV 31-025	QXV 42-025	QXV 43-025	QXV 44-025	QXV 45-025	QXV 46-025		
032	QXV 31-032	QXV 42-032	QXV 43-032	QXV 44-032	QXV 45-032	QXV 46-032		
040	QXV 41-040	QXV 52-040	QXV 53-040	QXV 54-040	QXV 55-040	QXV 56-040	1500 to 1800	1800 to 3000
050	QXV 41-050	QXV 52-050	QXV 53-050	QXV 54-050	QXV 55-050	QXV 56-050		
063	QXV 41-063	QXV 52-063	QXV 53-063	QXV 54-063	QXV 55-063	QXV 56-063		
080	QXV 51-080	QXV 62-080	QXV 63-080	QXV 64-080	QXV 65-080	QXV 66-080	1500 to 1800	1500 to 1800
100	QXV 51-100	QXV 62-100	QXV 63-100	QXV 64-100	QXV 65-100	QXV 66-100		
125	QXV 51-125	QXV 62-125	QXV 63-125	QXV 64-125	QXV 65-125	QXV 66-125		
160	QXV 61-160	QXV 82-160	QXV 83-160	QXV 84-160	QXV 85-160	QXV 86-160	1200 to 1500	1200 to 1800
200	QXV 61-200	QXV 82-200	QXV 83-200	QXV 84-200	QXV 85-200	QXV 86-200		1200 to 1500
250	QXV 61-250 ²⁾	QXV 85-250	QXV 83-250	QXV 84-250	QXV 85-250	QXV 86-250		
315	QXV 81-315 ²⁾						1200 to 1500	
400	QXV 81-400 ²⁾							
500	QXV 81-500 ²⁾							

- 1) Recommended speeds:
- The lower the speed, the smaller the ΔP /stage (linear relationship)
 - Speeds for 50 and 60 Hz

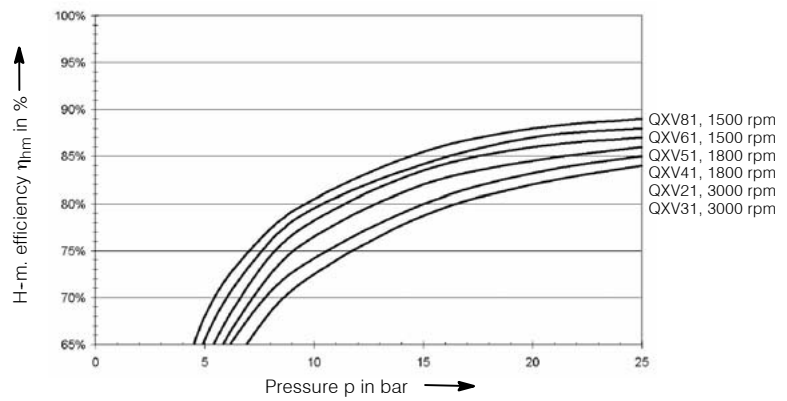
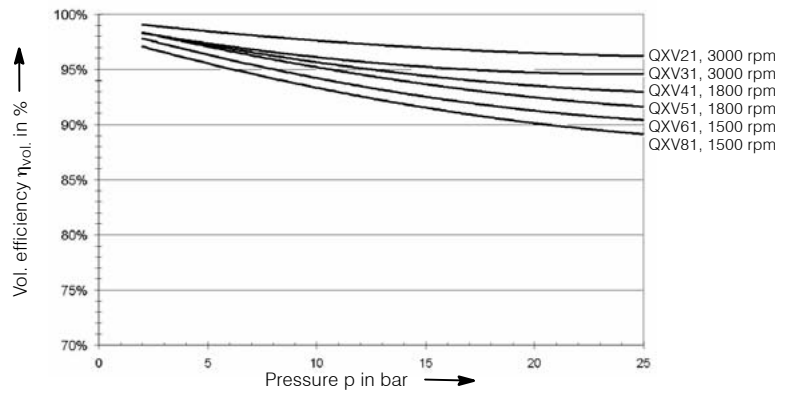
- 2) Second suction port is necessary for $n > 1200$ rpm (see section 5.3, Special features)

- 3) Do not run up pump against pressures higher than 20 bar

3 Performance graphs

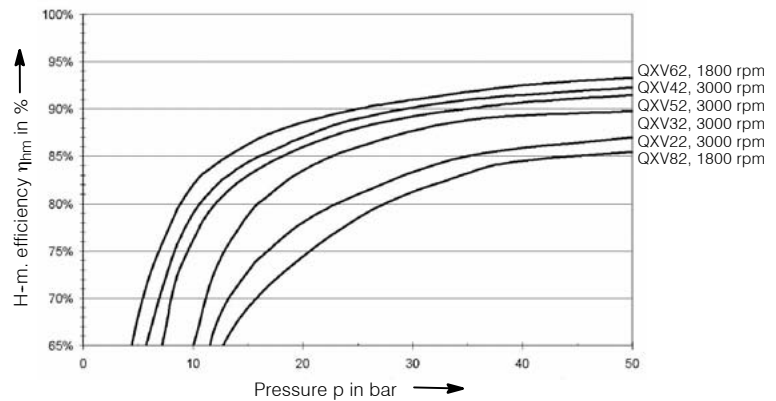
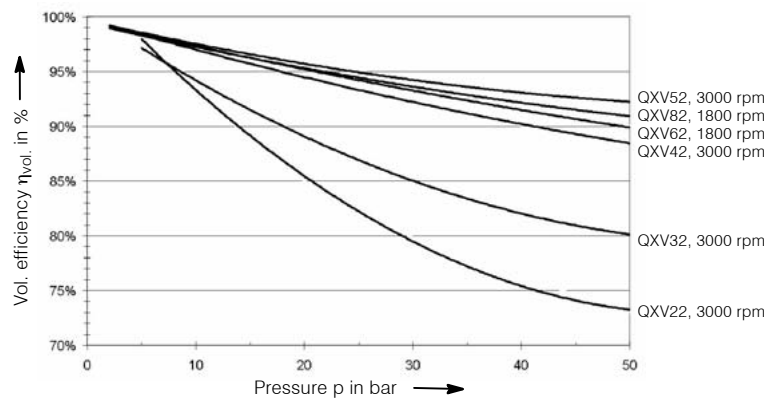
3.1 Pressure range 1

Volumetric and hydro-mechanical efficiencies, measured at a viscosity of 2.3 mm²/s (cSt)



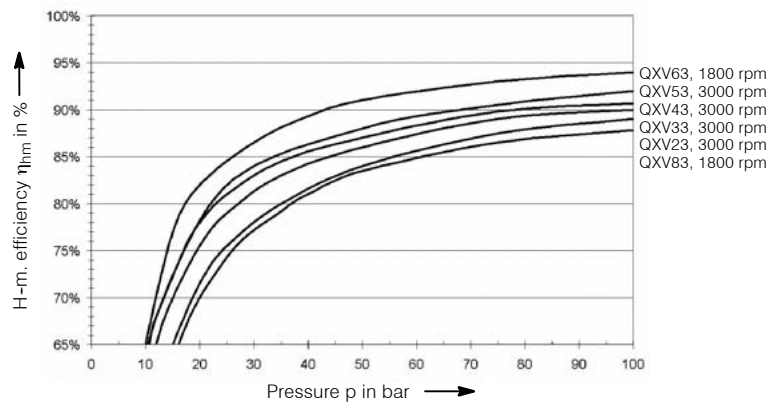
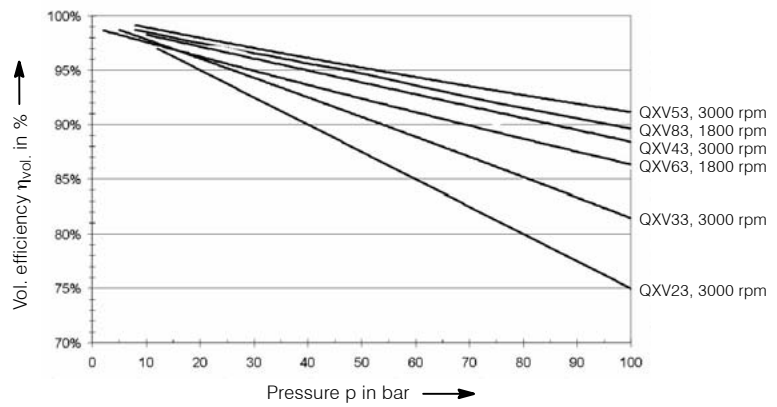
3.2 Pressure range 2

Volumetric and hydro-mechanical efficiencies, measured at a viscosity of 2.3 mm²/s (cSt)



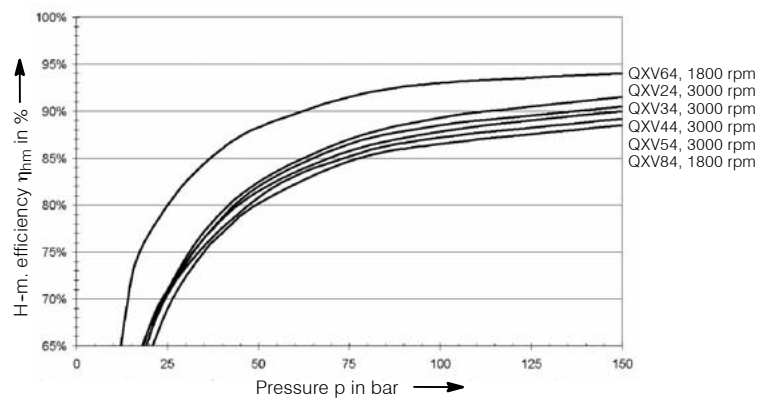
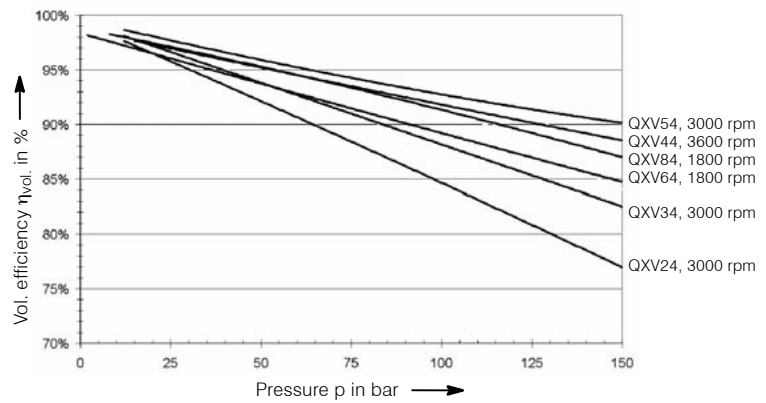
3.3 Pressure range 3

Volumetric and hydro-mechanical efficiencies, measured at a viscosity of 2.3 mm²/s (cSt)



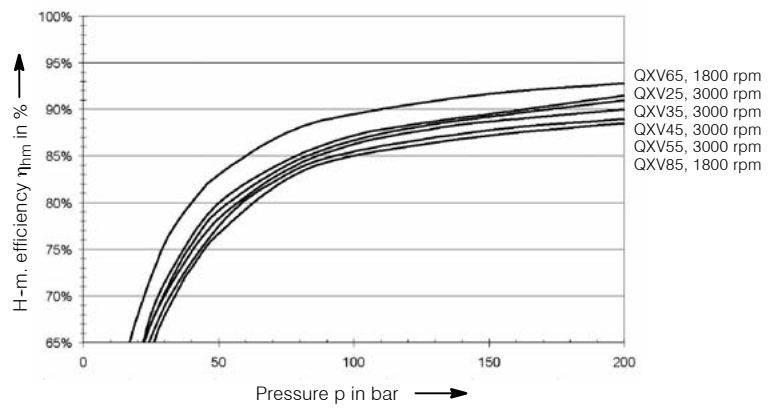
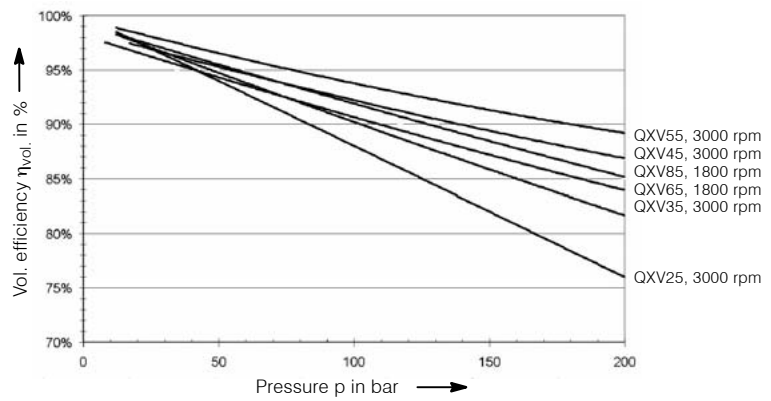
3.4 Pressure range 4

Volumetric and hydro-mechanical efficiencies, measured at a viscosity of 2.3 mm²/s (cSt)



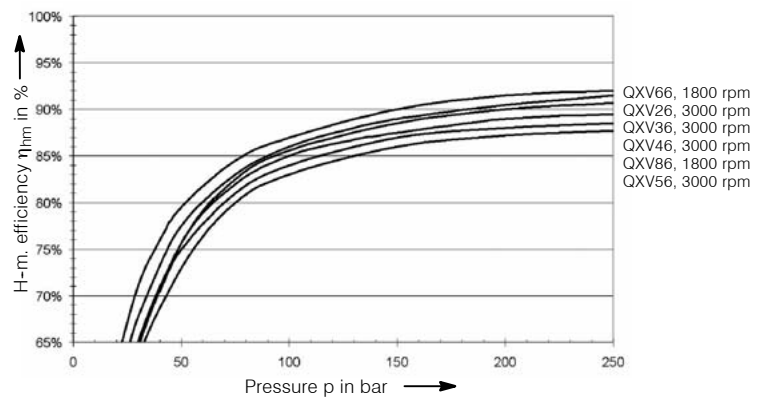
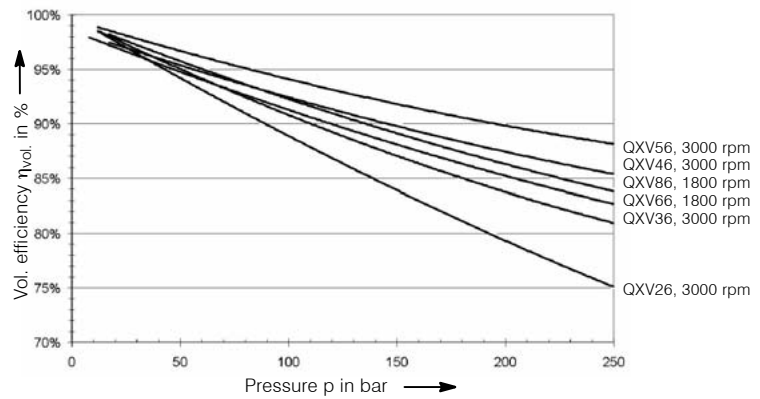
3.5 Pressure range 5

Volumetric and hydro-mechanical efficiencies, measured at a viscosity of 2.3 mm²/s (cSt)



3.6 Pressure range 6

Volumetric and hydro-mechanical efficiencies, measured at a viscosity of 2.3 mm²/s (cSt)



4 Dimensions

4.1 Pressure ranges 1 / 2 / 3

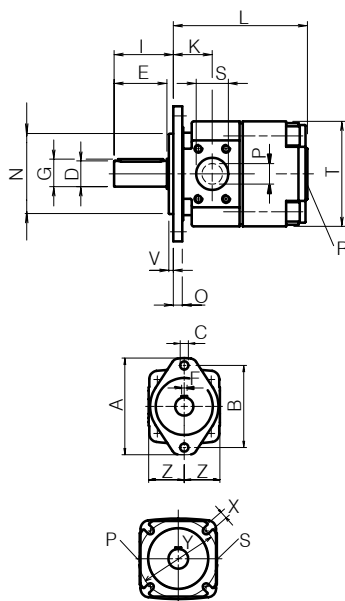
Frame size		2			3			4			5			6			8								
Pressure range		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3						
Suction port: to standard SAE J518 ¹⁾	S	G1" ³⁾ thread			G1 1/4" ³⁾ thread			1 1/2"			2"			2 1/2"			3"								
Pressure port: to standard SAE J518 ¹⁾	P	G1/2" ³⁾ ⁴⁾ thread			G3/4" ³⁾ ⁴⁾ thread			1"			1 1/4"			1 1/2"			2"								
Drain port	R	G 1/4"			G 1/4"			G 1/4"			G 1/4"			G 3/8"			G 1/2"								
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 (metric)	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 (metric)	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 (metric)	9			9			12			14			18			22								
	Y (metric)	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	140	122	157	166	146	191	204	178	234	244	212	282	289	249	339	364	314	429						
	M	-	55	90	-	69,5	114,5	-	87	143	-	102	172	-	119	209	-	151	266						
	T	86			107			133			177			214			220			273			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 pipe flange dimensions, see brochure P00049

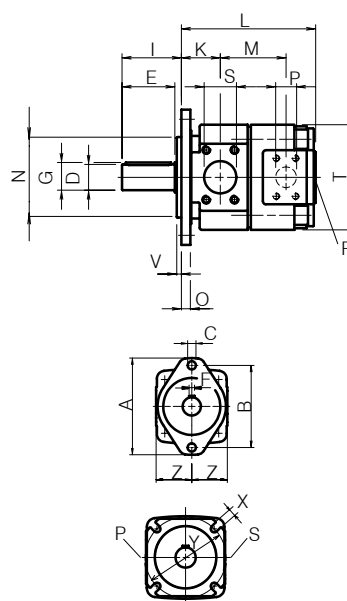
2) For other shaft ends, consult Bucher
3) Threaded port to DIN 3852, Part 2

4) Pressure port to SAE J518 can be supplied
for pressure ranges 2+3

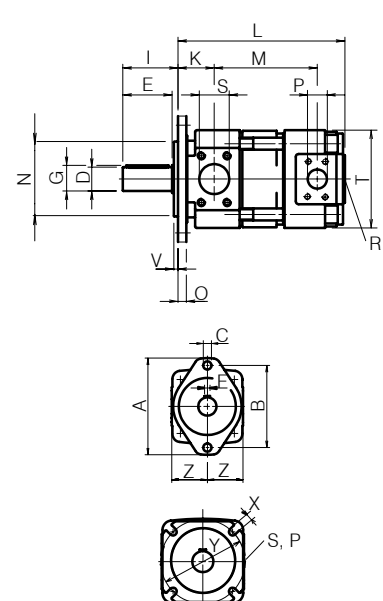
Pressure range 1



Pressure range 2



Pressure range 3



4.2 Pressure ranges 4 / 5 / 6

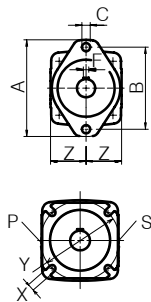
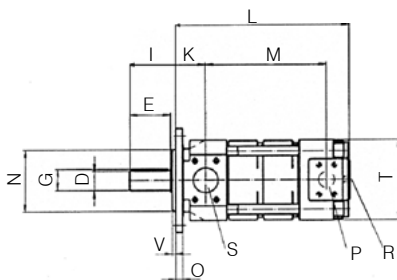
Frame size		2			3			4			5			6			8		
Pressure range		4	5	6	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6
Suction port: to standard SAE J518 ¹⁾	S	G1" ³⁾ thread			G1 1/4" ³⁾ thread			1 1/2"			2"			2 1/2"			3"		
Pressure port: to standard SAE J518 ¹⁾	P	G1/2" ³⁾ ⁴⁾ thread			G3/4" ³⁾ ⁴⁾ thread			1"			1 1/4"			1 1/2"			2"		
Drain port	R	G 1/4"			G 1/4"			G 1/4"			G 1/4"			G 3/8"			G 1/2"		
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 (metric)	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 (metric)	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 (metric)	9			9			12			14			18			22		
	Y (metric)	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	192	227	262	236	281	326	290	346	402	352	422	492	429	519	609	544	659	774
	M	125	160	195	159,5	204,5	249,5	199	255	311	242	312	382	299	389	479	381	496	611
	T	86			107			133			177			220			273		
	Z	50			60			62,5			78			97,5			125		
Weight	kg	8	9,5	11	15,5	18,5	21,5	27	32	37	49	58	67	92	108	124	200	240	280

1) For pipe flange dimensions, see brochure P00049

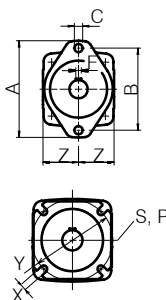
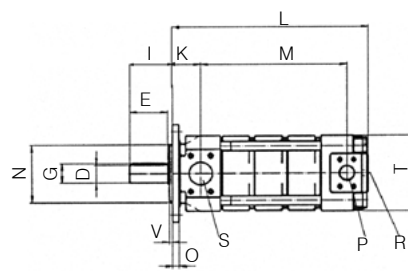
2) For other shaft ends, consult Bucher
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4) Pressure port to SAE J518 can be supplied
for pressure ranges 2+3

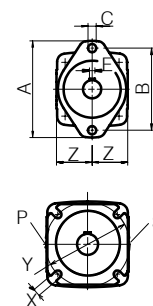
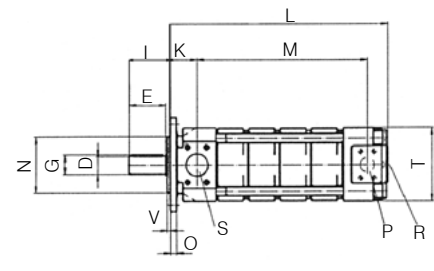
Pressure range 4



Pressure range 5



Pressure range 6



5 Ordering code

	Q	X	V	3	6	-	0	1	2	R	*	*	*
Series: internal gear pumps for low-viscosity fluids	QXV			36			012			R	***		
Frame size				2 / 3 / 4 / 5 / 6 / 8									
Pressure range				1 / 2 / 3 / 4 / 5 / 6									
Geom. displacement in cm ³ /rev				005 - 500									
Direction of rotation				right = R left = L									
Variants / special features to be inserted by the factory - see section 5.3 for a selection													

5.1 Ordering example

Required: internal gear pump, type QXV
 Displacement: 12 cm³/rev
 Continuous pressure 250 bar
 For use with diesel fuel oil.
 Ordering code: QXV 36-012 R

5.2 Standard configuration

- Direction of rotation - right, alternatively left
- 2-hole mounting flange to ISO 3019/1 (SAE): sizes QXV 3-6
2-hole mounting flange to ISO 3019/2 (metric): sizes QXV 2+8
- Viton seals
- cylindrical shaft end to ISO R775
- separate drain port in pump rear cover

5.3 Special features

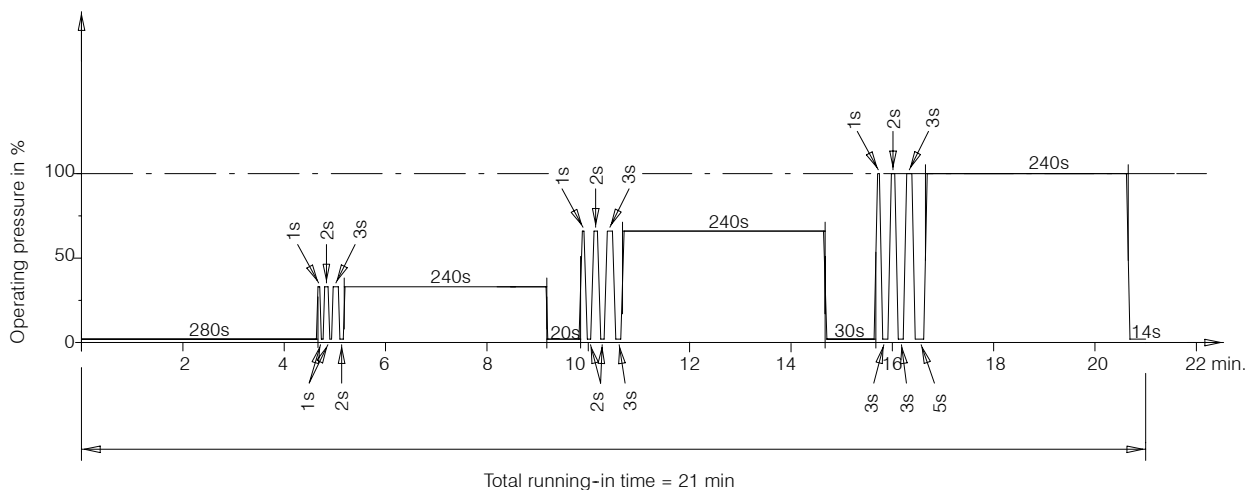
- 12 2-hole mounting flange to ISO 3019/2 (metric) for frame sizes QXV 3-6
- 66 4-hole mounting flange to ISO 3019/2 (metric) for frame sizes QXV 3-6
- 83 Second suction port on QXV 61, size SAE 2"
Second suction port on QXV 81, size SAE 2 1/2"
- 179 For applications with higher fluid temperatures - maximum 160°C

For other special features, consult Bucher Hydraulics

6 Recommendations for use

- Good filtration is extremely important with low viscosity fluids. We recommend a fluid cleanliness level of NAS 1638, class 8 or better
- QXV pumps are operated at higher speeds than their QX equivalents
- We recommend that the fluid level in the reservoir should be above the centre line of the pump
- Pumps must be driven by means of a flexible coupling
- The temperature difference between a pump and the fluid entering it must not exceed 20 °C
- When commissioning QXV pumps, they must be started under no-load conditions. It is beneficial to pre-fill a pump before its first start-up
- Pumps must not be run under pressure until the fluid is free of air bubbles
- We recommend the running-in cycle shown below for a pump's first operation under pressure

7 QXV internal gear pumps - running-in cycle for the first operation under pressure



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