Internal Gear Pump

for low-viscosity fluids
Series QXV

- very low noise levels
- negligible pressure pulsations
- to 250 bar can be developed at viscosities around 1 mm^2/s [cSt]
- multi-stage principle ensures low pressure loading on each stage, giving outstanding efficiencies
- hydrodynamic bearing support ensures long service life
- used successfully to pump kerosene, diesel fuel, brake fluids, Pentosin and HFA.

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 mm^2/s . The QXV is being used with great success to pump aviation jet fuel, automotive fuels, paraffin oil/kerosene, brake fluids, Pentosin and HFA fluids. Dependent 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 Application examples

- Test rigs for diesel injection nozzles
- Test rigs for testing Jet A1/fuel controllers for aircraft turbines
- Rolling mills
- Fuel pumps for gasturbines
- Welding machines
- Lubrication pump for spindle bearings

2 Technical data

General characteristics	Unit	Description, value
Installation attitude		unrestricted
Mounting method (standard)		oval 2-hole flange to ISO 3019/1 (SAE): QXV 3 … 6 oval 2-hole flange to ISO 3019/2 (metric): QXV 2 + 8
Direction of rotation		right
Pump drive method		flexible shaft coupling
Max. admissible level of contamination of the hydraulic fluid		NAS 1638, class 8 or ISO 4406, code 19/17/14
Viscosity range		0,8 … 10 (other values on request)
Fluid temperature (Observe viscosity limits for respective fluids)	°C	min. -20, max. +80 HFA … +50 max. Optimal range: +30 … +60
Minimum inlet pressure	bar	0,85 … 1 absolute (dependent on pump size and speed, (other values on request)
Maximum pressure at drain port	bar	< 1,5 absolute

2.1 Main characteristics

Pressure range	1	2	3	4	5	6	1	2-6
Oper. pressure 3) [bar]	25	50	100	150	200	250		
Displacement [cm³/rev]	Type	Type	Type	Type	Type	Type	Speed range [rpm] 1)	
5,1		QXV22-005R	QXV23-005R	QXV24-005R	QXV25-005R	QXV26-005R		3000 - 3600
6,3		QXV22-006R	QXV23-006R	QXV24-006R	QXV25-006R	QXV26-006R		
8,0		QXV22-008R	QXV23-008R	QXV24-008R	QXV25-008R	QXV26-008R		
10,0	QXV 21-010R	QXV32-010R	QXV33-010R	QXV34-010R	QXV35-010R	QXV36-010R	3000 - 3600	3000 - 3600
12,6	QXV 21-012R	QXV32-012R	QXV33-012R	QXV34-012R	QXV35-012R	QXV36-012R		
15,6	QXV 21-016R	QXV32-016R	QXV33-016R	QXV34-016R	QXV35-016R	QXV36-016R		
20,4	QXV 31-020R	QXV42-020R	QXV43-020R	QXV44-020R	QXV45-020R	QXV46-020R	1800 - 3000	3000 - 3600
25,1	QXV 31-025R	QXV42-025R	QXV43-025R	QXV44-025R	QXV45-025R	QXV46-025R		
32,4	QXV 31-032R	QXV42-032R	QXV43-032R	QXV44-032R	QXV45-032R	QXV46-032R		
39,3	QXV 41-040R	QXV52-040R	QXV53-040R	QXV54-040R	QXV55-040R	QXV56-040R	1500 - 1800	1800 - 3000
50,6	QXV 41-050R	QXV52-050R	QXV53-050R	QXV54-050R	QXV55-050R	QXV56-050R		
63,7	QXV 41-063R	QXV52-063R	QXV53-063R	QXV54-063R	QXV55-063R	QXV56-063R		
80,2	QXV 51-080R	QXV62-080R	QXV63-080R	QXV64-080R	QXV65-080R	QXV66-080R	1500 - 1800	1500 - 1800
101,0	QXV 51-100R	QXV62-100R	QXV63-100R	QXV64-100R	QXV65-100R	QXV66-100R		
124,4	QXV 51-125R	QXV62-125R	QXV63-125R	QXV64-125R	QXV65-125R	QXV66-125R		
163,0	QXV 61-160R	QXV82-160R	QXV83-160R	QXV84-160R	QXV85-160R	QXV86-160R	1200 - 1500	1200 - 1800
201,3	QXV 61-200R	QXV82-200R	QXV83-200R	QXV84-200R	QXV85-200R	QXV86-200R		1200 - 1500
249,2	QXV 61-250R2)	QXV82-250R	QXV83-250R	QXV84-250R	QXV85-250R	QXV86-250R		
326,0	QXV 81-315R2)						1200 - 1500	
402,6	QXV 81-400R2)							
498,5	QXV 81-500R2)							

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)

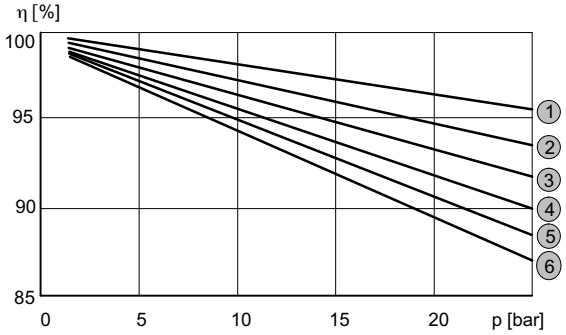
3) Do not run up pump against pressures higher than 20 bar

3 Performance graphs

Measured at a viscosity of 2.3 mm^2/s [cSt]

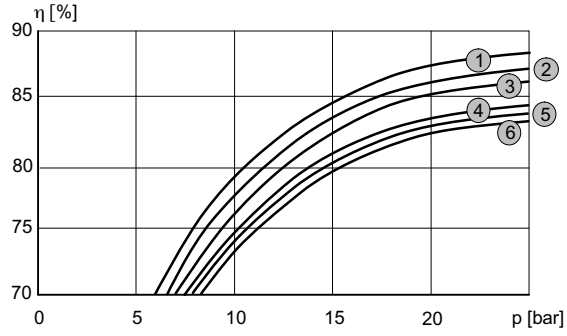
3.1 Pressure range 1

3.1.1 Volumetric efficiency



1	QXV31, 3000 min^{-1}	4	QXV41, 1800 min^{-1}
2	QXV21, 3000 min^{-1}	5	QXV81, 1500 min^{-1}
3	QXV51, 1800 min^{-1}	6	QXV61, 1500 min^{-1}

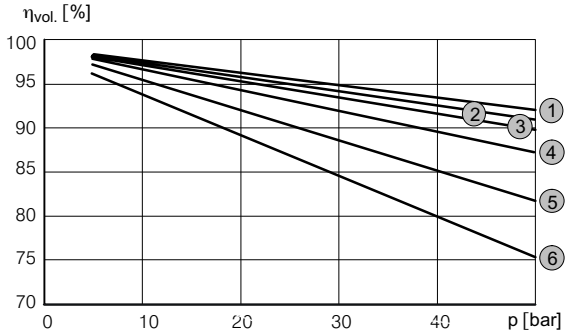
3.1.2 Hydro-mechanical efficiency



1	QXV81, 1500 min^{-1}	4	QXV41, 1800 min^{-1}
2	QXV61, 1500 min^{-1}	5	QXV21, 3000 min^{-1}
3	QXV51, 1800 min^{-1}	6	QXV31, 3000 min^{-1}

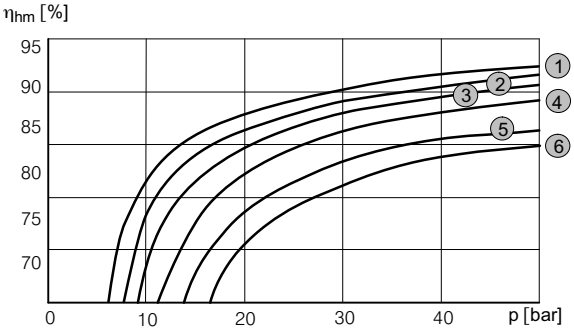
3.2 Pressure range 2

3.2.1 Volumetric efficiency



1	QXV52, 3000 min^{-1}	4	QXV42, 3000 min^{-1}
2	QXV82, 1800 min^{-1}	5	QXV32, 3000 min^{-1}
3	QXV62, 1800 min^{-1}	6	QXV22, 3000 min^{-1}

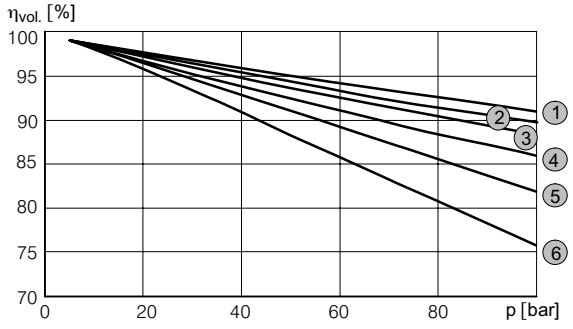
3.2.2 Hydro-mechanical efficiency



1	QXV62, 1800 min^{-1}	4	QXV32, 3000 min^{-1}
2	QXV42, 3000 min^{-1}	5	QXV22, 3000 min^{-1}
3	QXV52, 3000 min^{-1}	6	QXV82, 1800 min^{-1}

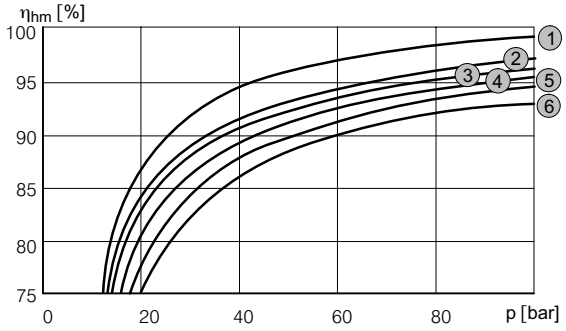
3.3 Pressure range 3

3.3.1 Volumetric efficiency



1	QXV53, 3000 min^{-1}	4	QXV63, 1800 min^{-1}
2	QXV83, 1800 min^{-1}	5	QXV33, 3000 min^{-1}
3	QXV43, 3000 min^{-1}	6	QXV23, 3000 min^{-1}

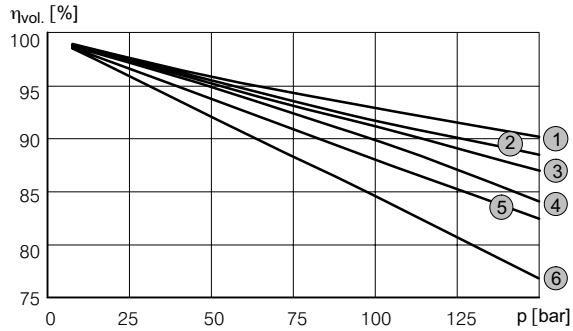
3.3.2 Hydro-mechanical efficiency



1	QXV63, 1800 min^{-1}	4	QXV33, 3000 min^{-1}
2	QXV53, 3000 min^{-1}	5	QXV23, 3000 min^{-1}
3	QXV43, 3000 min^{-1}	6	QXV83, 1800 min^{-1}

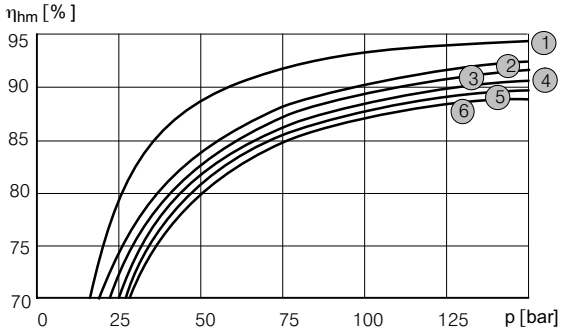
3.4 Pressure range 4

3.4.1 Volumetric efficiency



1	QXV54, 3000 min^{-1}	4	QXV64, 1800 min^{-1}
2	QXV44, 3600 min^{-1}	5	QXV34, 3000 min^{-1}
3	QXV84, 1800 min^{-1}	6	QXV24, 3000 min^{-1}

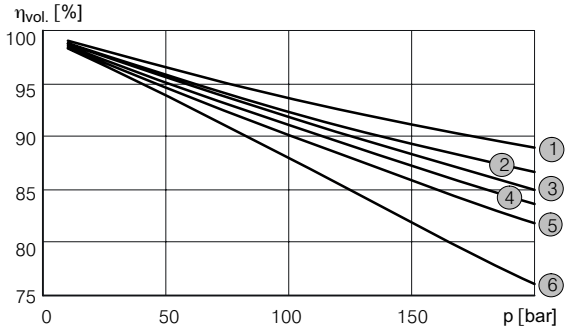
3.4.2 Hydro-mechanical efficiency



1	QXV64, 1800 min^{-1}	4	QXV44, 3000 min^{-1}
2	QXV24, 3000 min^{-1}	5	QXV54, 3000 min^{-1}
3	QXV34, 3000 min^{-1}	6	QXV84, 1800 min^{-1}

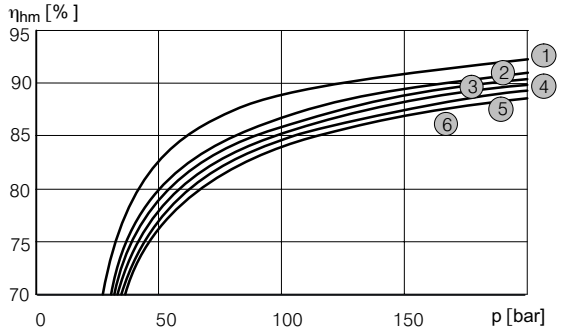
3.5 Pressure range 5

3.5.1 Volumetric efficiency



1	QXV55, 3000 min^{-1}	4	QXV65, 1800 min^{-1}
2	QXV45, 3000 min^{-1}	5	QXV35, 3000 min^{-1}
3	QXV85, 1800 min^{-1}	6	QXV25, 3000 min^{-1}

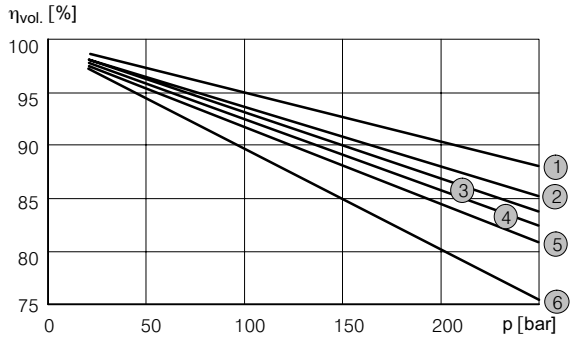
3.5.2 Hydro-mechanical efficiency



1	QXV65, 1800 min^{-1}	4	QXV45, 3000 min^{-1}
2	QXV25, 3000 min^{-1}	5	QXV55, 3000 min^{-1}
3	QXV35, 3000 min^{-1}	6	QXV85, 1800 min^{-1}

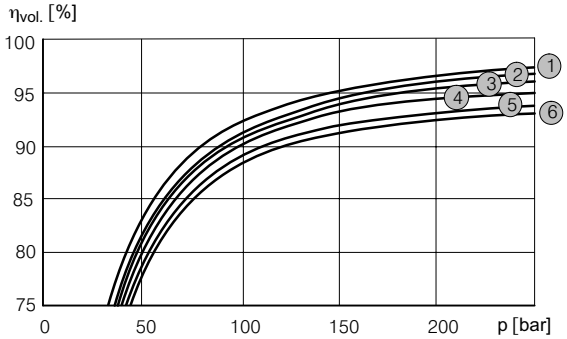
3.6 Pressure range 6

3.6.1 Volumetric efficiency



1	QXV56, 3000 min^{-1}	4	QXV66, 1800 min^{-1}
2	QXV46, 3600 min^{-1}	5	QXV36, 3000 min^{-1}
3	QXV86, 1800 min^{-1}	6	QXV26, 3000 min^{-1}

3.6.2 Hydro-mechanical efficiency



1	QXV56, 3000 min^{-1}	4	QXV66, 1800 min^{-1}
2	QXV46, 3600 min^{-1}	5	QXV36, 3000 min^{-1}
3	QXV86, 1800 min^{-1}	6	QXV26, 3000 min^{-1}

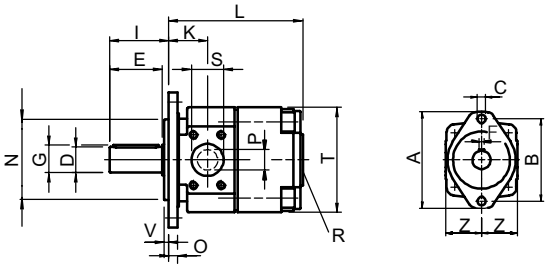
4 Dimensions

4.1 Pressure ranges 1 / 2 / 3

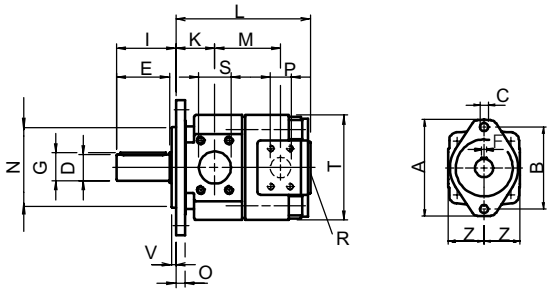
Frame size		2			3			4			5			6			8		
Presure range		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Suction port: to standard	S	G 1" DIN 3852 / 2			G 1 1/4" DIN 3852 / 2			1 1/2" SAE J518			2" SAE J518			2 1/2" SAE J518			3" SAE J518		
Pressure port: to standard	P	G 1/2" 2) DIN 3852 / 2			G 3/4" 2) DIN 3852 / 2			1" SAE J518			1 1/4" SAE J518			1 1/2" SAE J518			2" SAE J518		
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 (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		
Shaft end: parallel, to ISO/R775 1)	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 other shaft ends, consult Bucher Hydraulics GmbH
2) Pressure port to SAE J518 can be supplied for pressure ranges 2+3

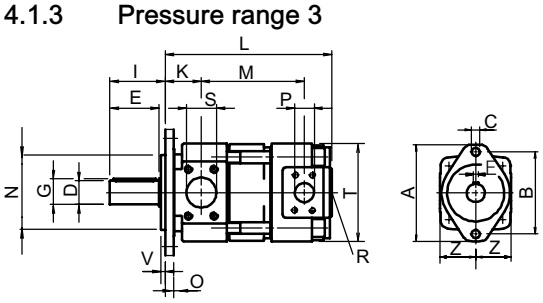
4.1.1 Pressure range 1



4.1.2 Pressure range 2



4.1.3 Pressure range 3

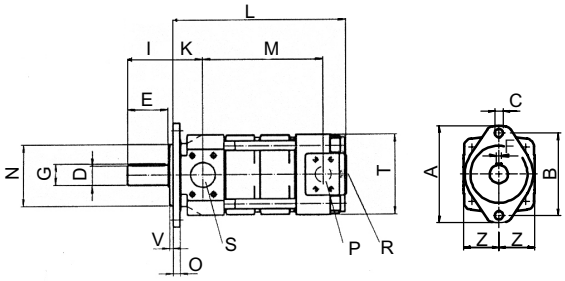


4.2 Pressure ranges 4 / 5 / 6

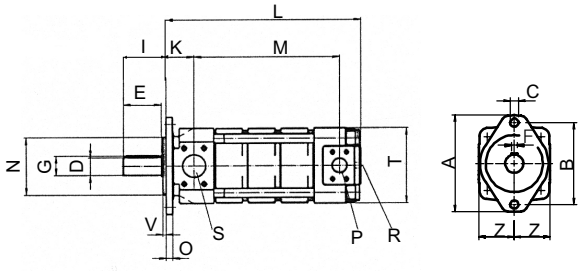
Frame size		2			3			4			5			6			8		
Pressure range		4	5	6	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6
Suction port: to standard	S	G 1" DIN 3852 / 2			G 1 1/4" DIN 3852 / 2			1 1/2" SAE J518			2" SAE J518			2 1/2" SAE J518			3" SAE J518		
Pressure port: to standard	P	G 1/2" [2] DIN 3852 / 2			G 3/4" [2] DIN 3852 / 2			1" SAE J518			1 1/4" SAE J518			1 1/2" SAE J518			2" SAE J518		
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 (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		
Shaft end: parallel, to ISO/R775 [1]	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	275	
	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 other shaft ends, consult Bucher Hydraulics GmbH
2) Pressure port to SAE J518 can be supplied for pressure ranges 2+3

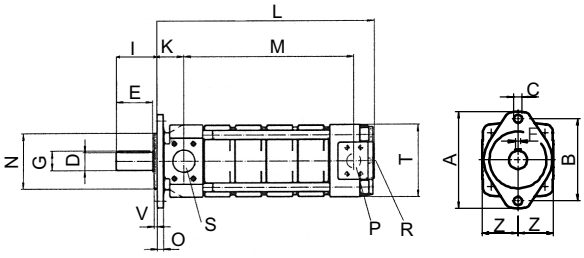
4.2.1 Pressure range 4



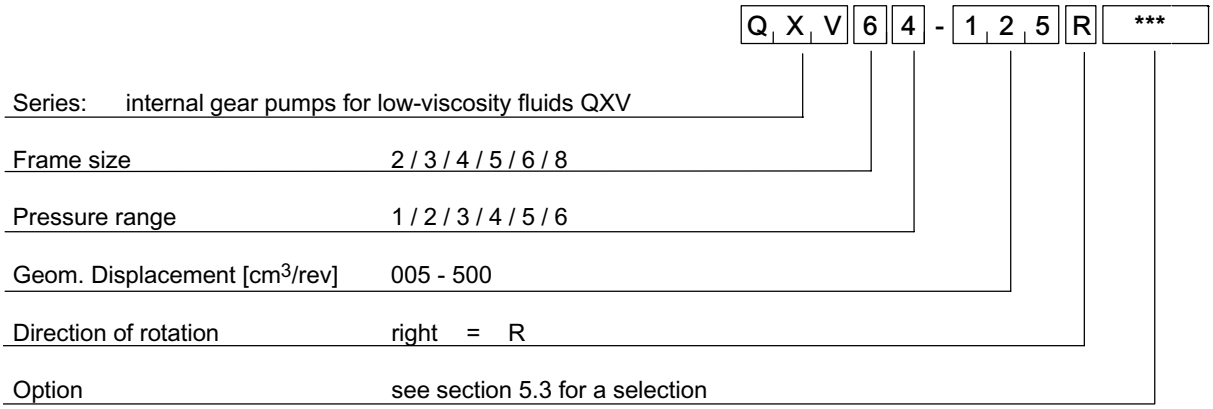
4.2.2 Pressure range 5



4.2.3 Pressure range 6



5 Ordering code



5.1 Ordering example

Required:	internal gear pump, type QXV
Displacement:	12 cm^3/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
- 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
- External drain port R in pump end cover

5.3 Option

12	2-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 options, consult Bucher Hydraulics GmbH.

5.4 ATEX compliant explosion protection

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

ATEX directive	94/9/EC
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℃

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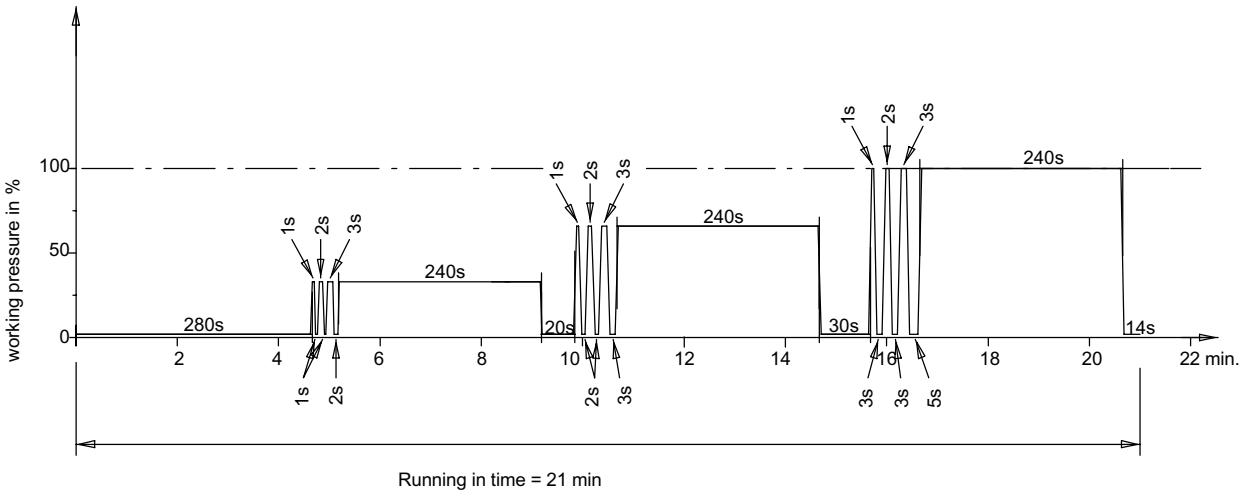
6 Recommendations for use

- Good filtration is extremely important with low viscosity fluids. Maximum fluid cleanliness 19/17/14 of ISO4406. Level of NAS 1638, class 8
- Only use QXV pumps within the specified speed range.
- 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
- Before the initial start-up, fill the pump by hand (via the drain line). When starting the system for the first time, switch to vented-bypass mode so that the pump and hydraulic lines can fill, and air can escape, as quickly as possible. Do not build up pressure until all air has been purged from the system.
- Attention: check the motor's direction of rotation!
- For details, see Operating Manual 100-I-000014
- When running the pump under pressure for the first time, use the running-in cycle shown below.

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



Running in time = 21 min

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Classification: 410.100.