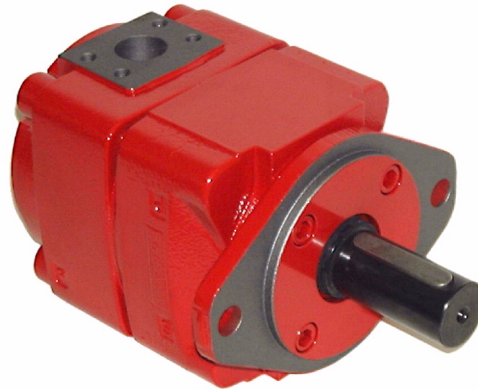


# Internal Gear Unit for motor/pump service Series QXM



## 1 General

### 1.1 Product description

The QXM drive unit can be used in open- and closed-loop hydrostatic drives, and can operate both as a pump and as a motor. This flexibility offers various application possibilities, one example being the raising and lowering of loads. The QXM works as a pump to lift the load and it can recover energy when the load is being lowered.

Used as a fully bi-directional pump/motor (four-quadrant operation), the unit can control the complete motion cycle of a cylinder. Rapid acceleration/

deceleration sequences can be achieved.

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

### 1.2 Advantages

- § very low noise levels
- § negligible pressure pulsations
- § 400 bar maximum pressure

§ hydrodynamic bearing support ensures long service life

§ suitable for special fluids such as HFB, HFC, HFD and bio-degradables

§ suitable for variable-speed operation

§ operation as motor enables energy recuperation

§ 4-quadrant (fully bi-directional pump/motor) or 2-quadrant operation is possible

§ optimised flow path cross-sections and special gear profile give low susceptibility to cavitation

## 2 Technical data

Installation attitude	unrestricted
Mounting method (standard)	oval 2-hole flange to ISO 3019/1 (SAE)
Direction of rotation	unrestricted
Drive method	in-line, by a flexible coupling
Fluids	HLP mineral oils to DIN 51524, Part 2 HFB, HFD and HFC fluids to VDMA 24317 other fluids - contact Bucher
Min. fluid cleanliness level	NAS 1638, Class 9 or ISO 4406, code 18/15 or better
Viscosity range	10 ... 300 cSt (mm <sup>2</sup> /s) (for values outside this range, contact Bucher)
Fluid temperature	HLP-mineral oils 80_C max. HFB, HFD and HFC 50_C max.
Max. pressure at drain port	1.5 bar absolute
Total pressure restriction	Port P1 + Port P2 ≤ continuous-/intermittent pressure
Min. inlet pressure	≥ 0,85 bar absolute

### 3 Main characteristics

#### 3.1 Pressure range 1

Displacement / consumption cm <sup>3</sup> /rev		Maximum speed rpm		Type	Cont.-/ Interm. pressure 1) bar	Torque 2)  Nm
nom.	eff.	as a pump	as a motor			
010	10,0	4000		QXM21-010	160/210	25
012	12,6	3600	5500	QXM21-012	125/160	
016	15,6	3200		QXM21-016	100/125	
020	20,3	3200		QXM31-020	160/210	50
025	25,1	3000	5000	QXM31-025	125/160	
032	32,3	2700		QXM31-032	100/125	
040	39,2	2700		QXM41-040	160/210	100
050	50,5	2350	4600	QXM41-050	125/160	
063	63,5	2050		QXM41-063	100/125	
080	80,1	2050		QXM51-080	160/210	200
100	100,9	1900	4000	QXM51-100	125/160	
125	124,6	1620		QXM51-125	100/125	
160	162,7	1500		QXM61-160	160/210	400
200	200,9	1350	3200	QXM61-200	125/160	
250	248,8	1200		QXM61-250	100/125	
315	326	1200		QXM81-315	160/210	800
400	402,6	1100	3000	QXM81-400	125/160	
500	498,5	1000		QXM81-500	100/125	

#### 3.2 Pressure ranges 2 and 3

Pressure range				2			3		
Displacement / consumption cm <sup>3</sup> /rev		Maximum speed rpm		Type	Cont.-/ Interm. pressure 1) bar	Torque 2)  Nm	Type	Cont.-/ Interm. pressure 1) bar	Torque 2)  Nm
nom.	eff.	as a pump	as a motor						
005	5,1	4500	6000	QXM22-005	210/250	17	QXM23-005	320/400	26,0
006	6,3			QXM22-006		21	QXM23-006		32,0
008	8,0			QXM22-008		26,5	QXM23-008		40,7
010	10,0	3900	5500	QXM32-010	210/250	33,5	QXM33-010	320/400	51,0
012	12,6			QXM32-012		42,0	QXM33-012		64,0
016	15,6			QXM32-016		52,0	QXM33-016		80,0
020	20,3	3200	5000	QXM42-020	210/250	68,0	QXM43-020	320/400	103,0
025	25,1			QXM42-025		84,0	QXM43-025		128,0
032	32,3			QXM42-032		108,0	QXM43-032		164,0
040	39,2	2700	4500	QXM52-040	210/250	131,0	QXM53-040	320/400	200,0
050	50,5			QXM52-050		169,0	QXM53-050		257,0
063	63,5			QXM52-063		212,0	QXM53-063		323,0
080	80,1	2050	4000	QXM62-080	210/250	268,0	QXM63-080	320/400	408,0
100	100,9			QXM62-100		337,0	QXM63-100		514,0
125	124,6			QXM62-125		416,0	QXM63-125		635,0
160	162,7	1500	3500	QXM82-160	210/250	544,0	QXM83-160	320/400	828,0
200	200,9			QXM82-200		671,0	QXM83-200		1023,0
250	248,8			QXM82-250		832,0	QXM83-250		1267,0

These operating data are valid for mineral oils only

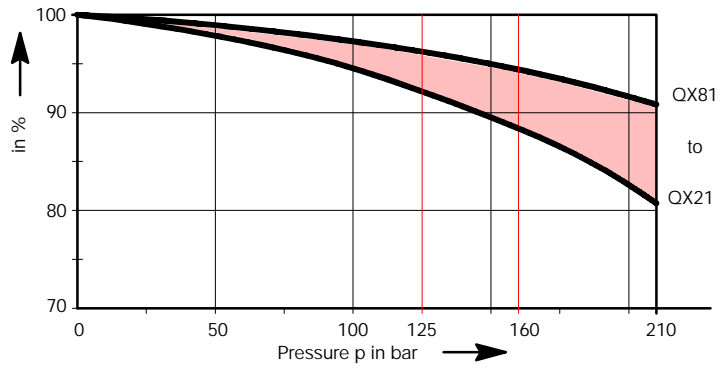
- 1) Intermittent pressure for max. 20 sec/min but not more than 10% of the duty cycle
- 2) Theoretical value at the maximum permitted continuous pressure. For starting torques, see section 5.

## 4 Performance characteristics

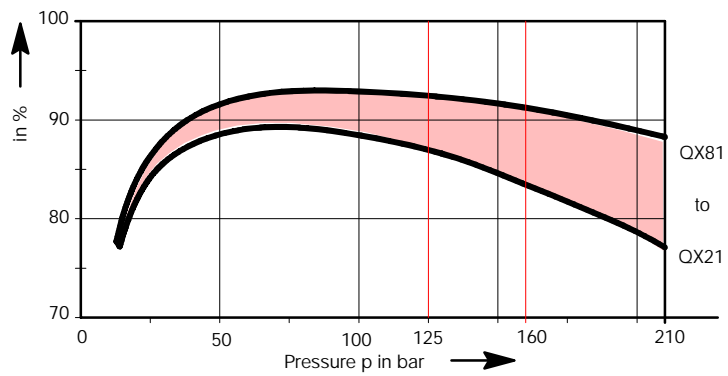
### 4.1 Pressure range 1

measured with viscosity 42 mm<sup>2</sup>/s

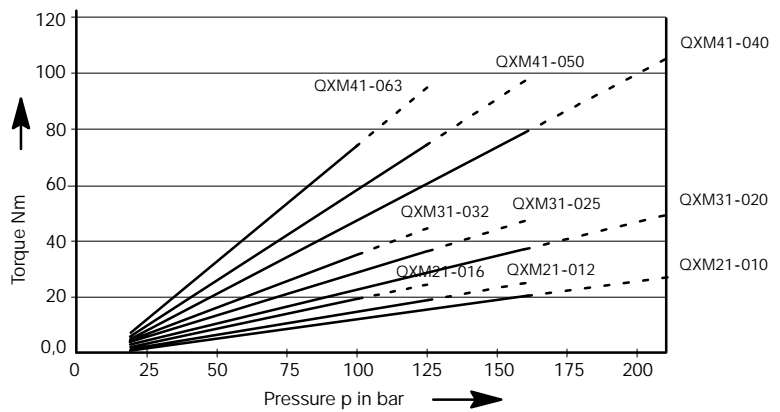
Volumetric efficiency  
speed - 1450 rpm



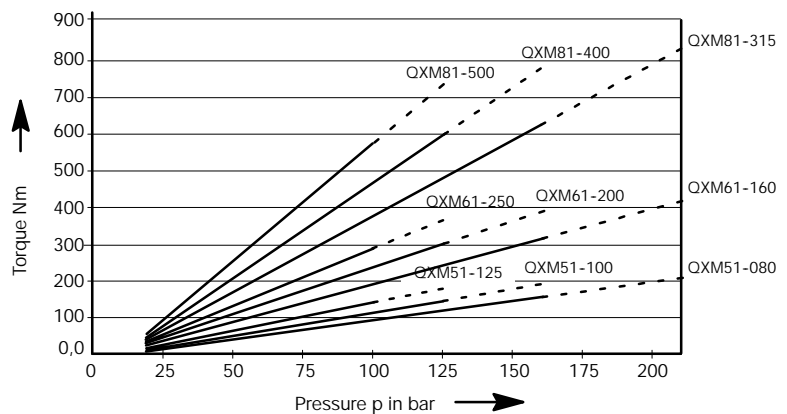
Overall efficiency  
speed - 1450 rpm



Starting torque



Starting torque

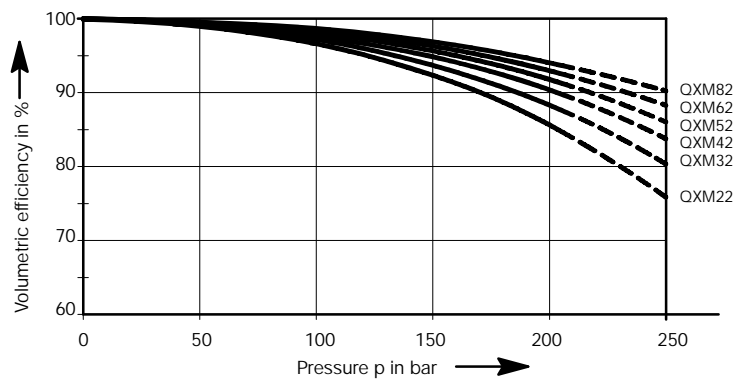


## 4.2 Pressure range 2

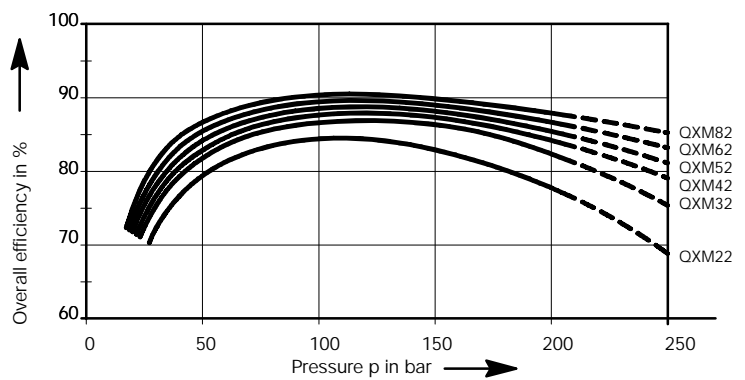
measured with viscosity 42 mm<sup>2</sup>/s

Solid line = continuous pressure / dashed line = max. intermittent pressure

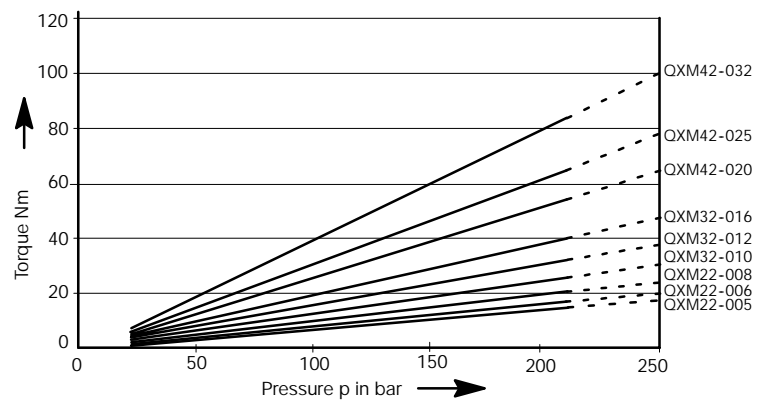
Volumetric efficiency  
speed - 1450 rpm



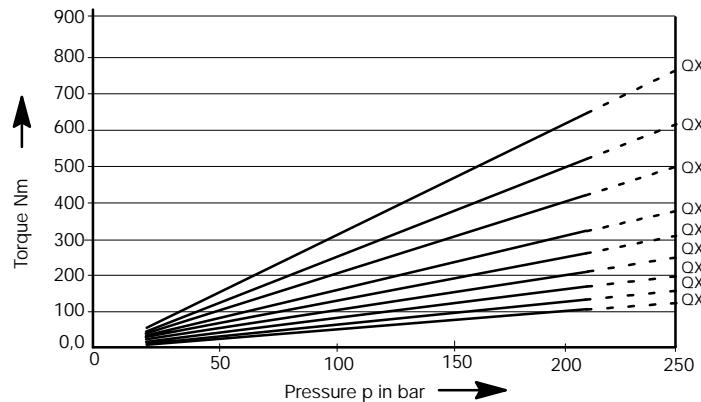
Overall efficiency  
speed - 1450 rpm



Starting torque



Starting torque

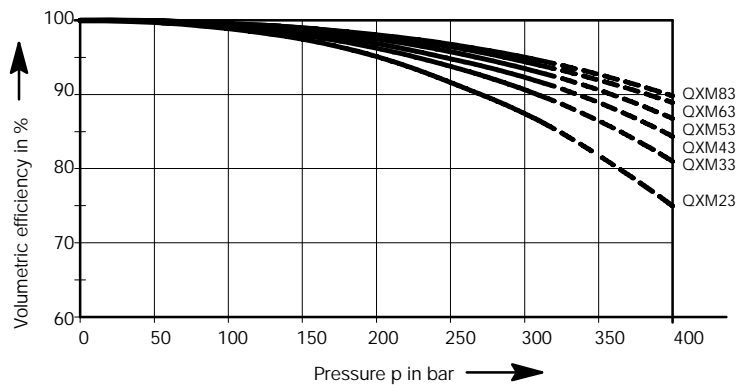


### 4.3 Pressure range 3

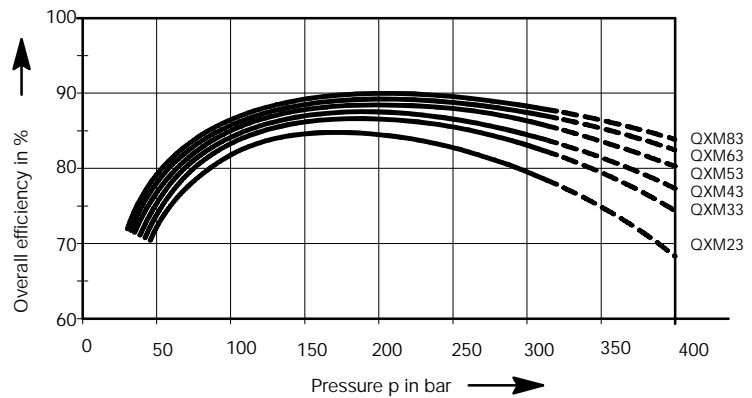
measured with viscosity 42 mm<sup>2</sup>/s

Solid line = continuous pressure / dashed line = max. intermittent pressure

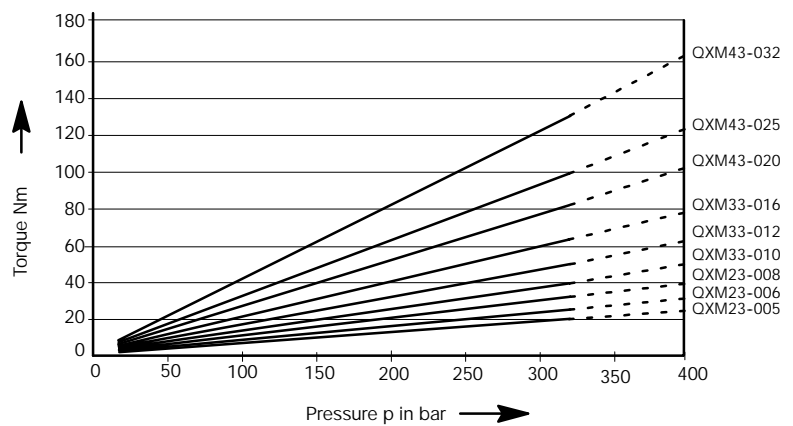
Volumetric efficiency  
speed - 1450 rpm



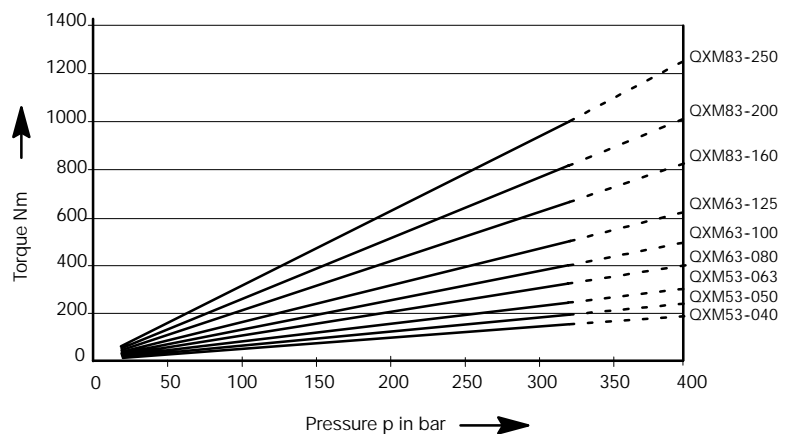
Overall efficiency  
speed - 1450 rpm



Starting torque



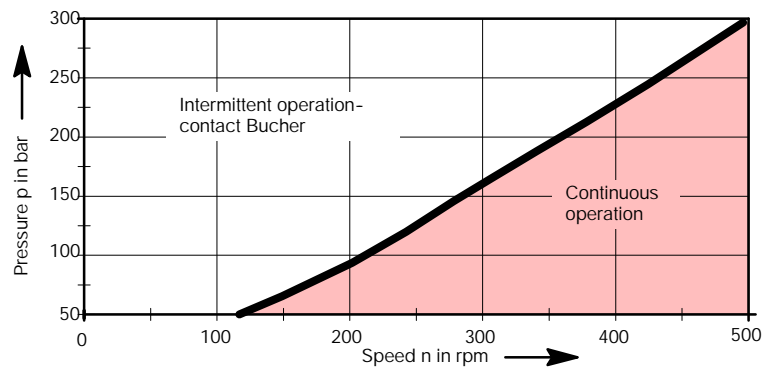
Starting torque



## 5 Performance curves

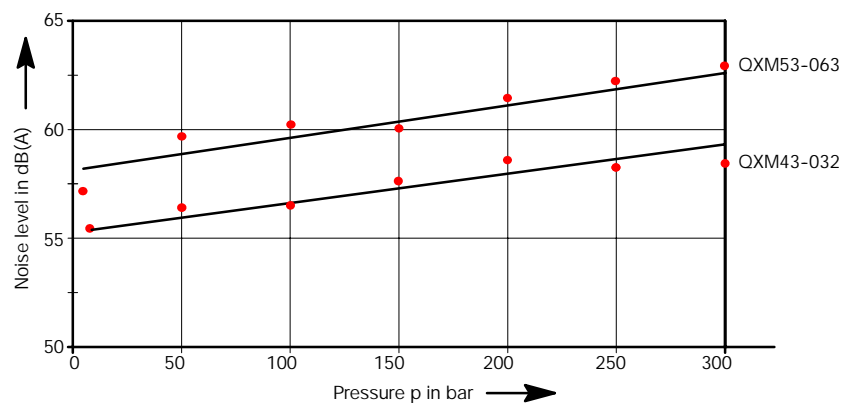
### 5.1 Minimum speed v. pressure

Drive unit QXM52-063  
measured with viscosity 42 mm<sup>2</sup>/s



### 5.2 Noise level

Internal gear drive units  
QXM 43-032 and QXM 53-063  
Values to DIN 45635, Part 26 in a  
low-echo noise measurement chamber;  
measurement distance 1 m;  
viscosity = 42 mm<sup>2</sup>/s and  
speed 1500 rpm



## 6 Dimensions

Frame size		2			3			4			5			6			8		
Pressure range		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Service ports to SAE J518 <sup>1) 4)</sup>	P <sub>1</sub> , P <sub>2</sub>	G1/2" <sup>3)</sup> thread			G 3/4" <sup>3)</sup> thread			1"			1 1/4"			1 1/2"			2"		
Drain port to: DIN 3852 Part 2	P <sub>L</sub>	G1/4"			G1/4"			G1/4"			G1/4"			G 3/8"			G1/2"		
Mounting: oval 2-hole flange to ISO 3019/1 (SAE - sizes 3-6) ISO 3019/2 (Metr. - sizes 2+8)	A	118			132			170			212			267			330		
	B	100 (metr.)			106 (SAE)			146 (SAE)			181 (SAE)			229 (SAE)			280 (metr.)		
	C	9			11			14			18			22			26		
	N	63 h8 (metr.)			82,55-0,05 (SAE)			101,6 - 0,05 (SAE)			127 - 0,05 (SAE)			152,4-0,05 (SAE)			200 h8 (metr.)		
	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 <sup>2)</sup>	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	136	118	153	164	144	189	202	176	232	242	210	280	288	248	338	361	331	426
	M	-	55	90	-	69,5	114	-	87	143	-	102	172	-	119	209	-	151	266
	T	85			107			133			177			214			273		
	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

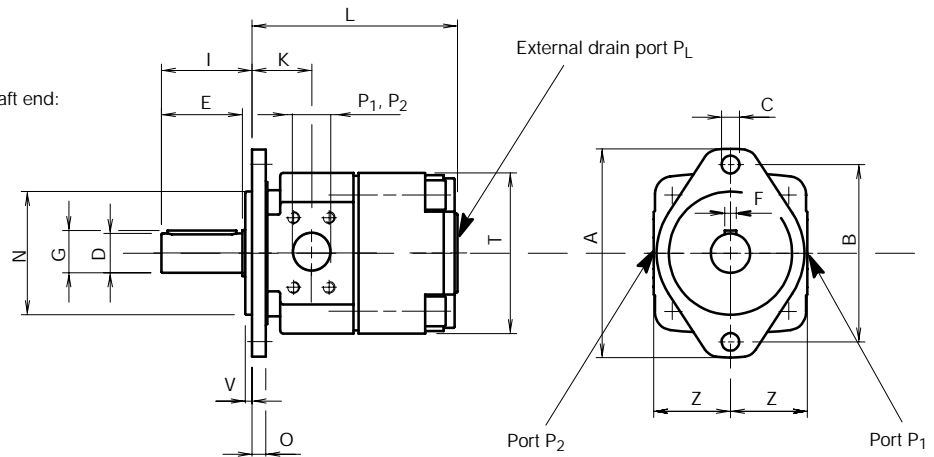
1) for 3000 psi pipe flange dimensions see brochure P00049

2) for other shaft ends, contact Bucher

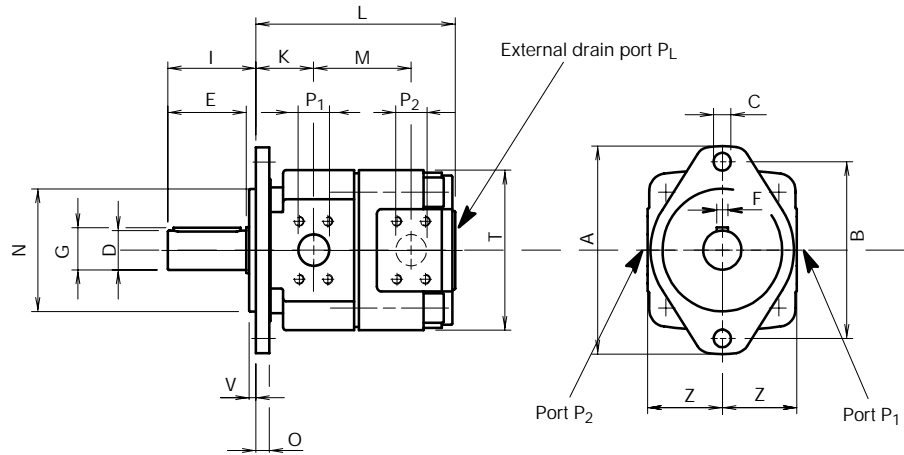
3) threaded ports to DIN 3852, Part 2

### 6.1 Pressure range 1

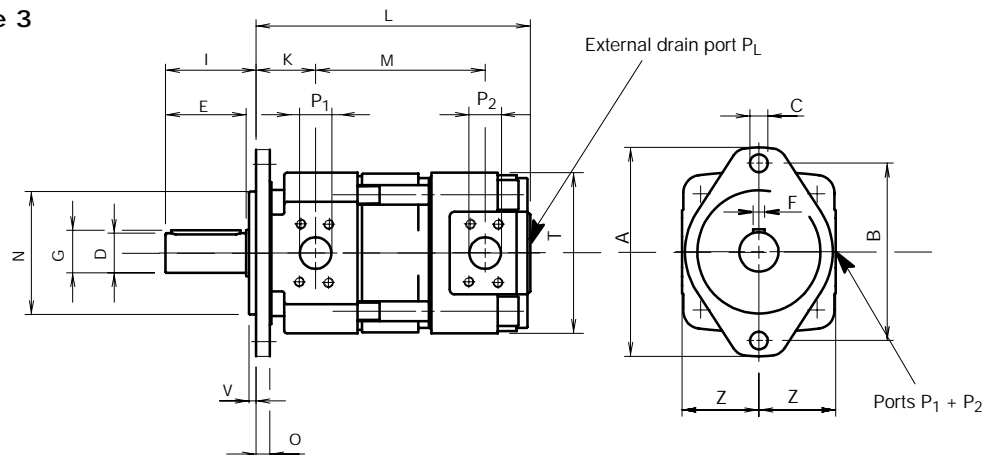
Direction of rotation, viewed from shaft end:  
pressure inlet at port P<sub>2</sub>; right (CW)  
pressure inlet at port P<sub>1</sub>; left (ACW)



### 6.2 Pressure range 2



### 6.3 Pressure range 3



## 7 Ordering details

		Q	X	M	5	3	-	0	4	0	N		
Internal gear unit	QXM												
Frame size	2 / 3 / 4 / 5 / 6 / 8												
Pressure range	1 / 2 / 3												
Geom. Displ./Consump. in cm <sup>3</sup> /rev	005 - 500												
Direction of rotation, unrestricted	= N												
Variants / special features (to be inserted by the factory, see section 7.3 for a selection)													

### 7.1 Ordering example

Required: internal gear drive unit QXM  
 Displ./Consump.: 40 cm<sup>3</sup>/rev  
 Continuous pressure: 300 bar  
 For use with mineral oil:

Ordering code: QXM 53-040 N

### 7.2 Standard configuration

- S direction of rotation - unrestricted
- S 2-hole mounting flange to ISO 3019/1; Frame size QXV 3-6  
 2-hole mounting flange to ISO 3019/2; Frame size QXV 2+4
- S Nitrile seals
- S parallel shaft end to ISO R775
- S separate drain port in rear cover of the drive unit
- S ports P1 + P2 both the same size

### 7.3 Special features

- 09 = Viton seals
- 12 = 2-hole mounting flange to ISO 3019/2 (metric): Frame size QXV 3-6
- 29 = for HFB and HFC fluids, frame sizes 2 - 5
- 66 = 4-hole mounting flange to ISO 3019/2 (metric)
- 86 = for HFB and HFC fluids, frame sizes 6 - 8
- 130 = for use as pump in one specified direction of rotation  
 and as motor in the opposite direction.  
 Service port dimensions as per QX pumps

For other special features, contact Bucher

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