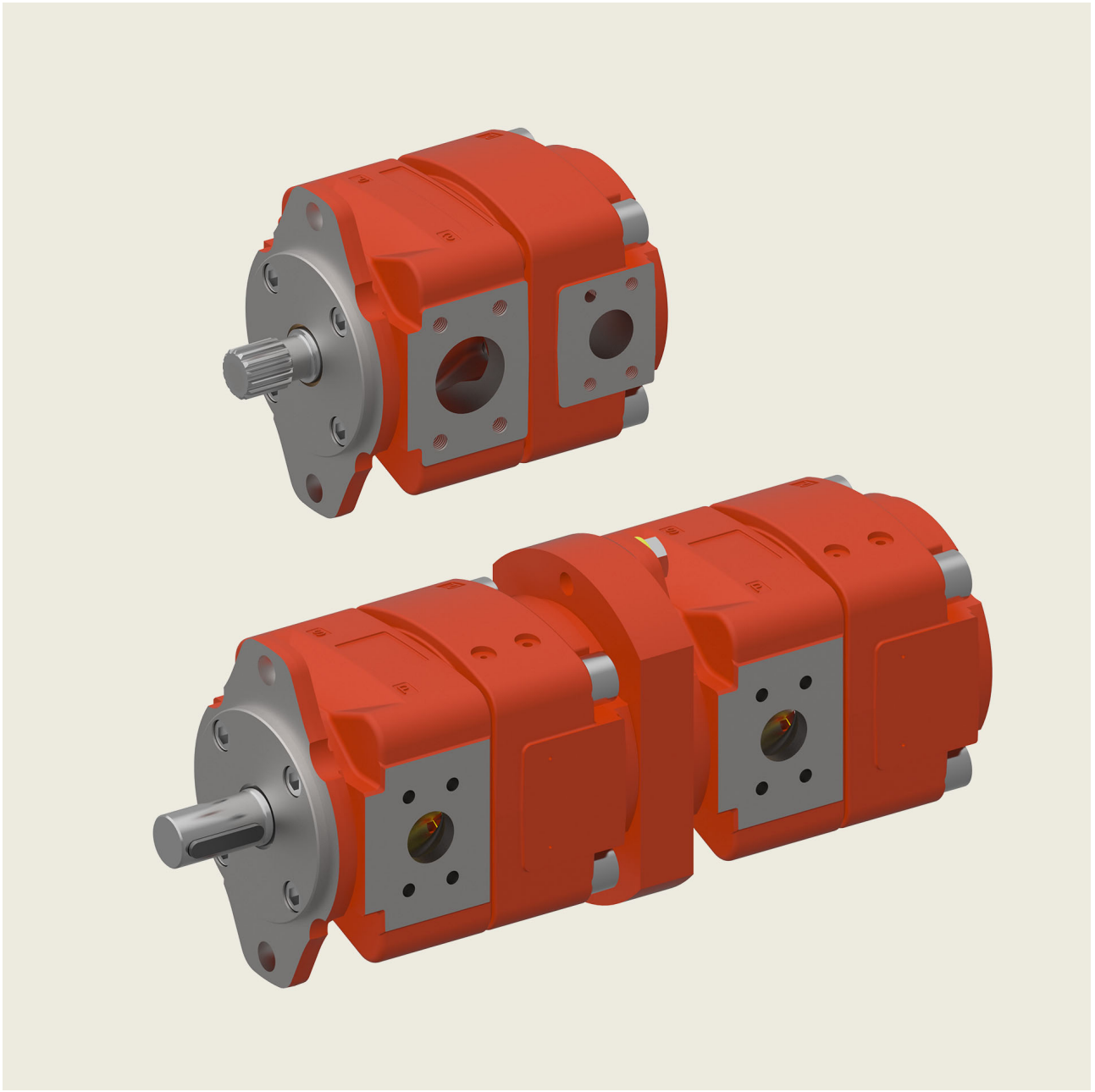
BUCHER hydraulics

# Internal Gear Pump

## Series QYEH



BUCHER hydraulics

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# 1 General

## 1.1 Product description

The design of the internal gear pumps, series QYEH, is completely focused on high customer benefits. The pumps are ideal for use with variable speed drives over a very wide speed range and for operation in reverse mode. They work with just one gear stage, and thanks to their compact design they can be incorporated in machines in a particularly space-saving manner. The QYEH range displays further advantages in difficult environments with high cyclic loading: the rugged design provides high reliability throughout the long service life and enables the pumps to be used with various pressure media, because even with critical fluids they resist cavitation.

The minimised number of moving parts and the special tooth geometry ensure maximum acceleration values. This shortens the cycle time, which raises the productivity of the machine. Compared to other drives, including gap-compensated internal gear pumps, the QYEH range offers distinct advantages in this area.



## 1.2 Advantages

- Generates high pressures in just one stage
- Simple and compact construction
- Resists cavitation with critical fluids
- Very low noise levels
- Maximum reliability, also for reverse mode
- Pressure and flow pulsations are minimal
- Ideally suited for use with variable-speed drives

## 1.3 Application examples

- Hydraulic presses
- Machine tools
- Waste compactors
- Lift/elevator drives
- Pressure diecasting machines
- Hydraulic power units

# 2 Technical data

## 2.1 General

Deviating values are possible on request.

| General characteristics | Unit | Description, value |
|---|---|---|
| Installation attitude | | unrestricted |
| Mounting method (standard) | | oval 2-hole flange to ISO 3019/1 (SAE): QYEH 3-6 |
| Direction of rotation | | cw and ccw |
| Reverse mode | | for pressure control / pressure relief, concerning the application limits please contact Bucher Hydraulics |
| Pump drive method | | in-line, through a flexible coupling or direct connection with SAE tooth spline |
| Fluids | | HLP mineral oils to DIN 51524, Part 2<br>HFC fluids to VDMA 24317 |
| Maximum admissible level of contamination of the hydraulic fluid | | ISO 4406 code 20/18/15 |
| Operating viscosity<br>Start-up viscosity | $mm^2/s$ | 10 … 100<br>10 … 300 |

| | | |
|---|---|---|
| Hydraulic fluid temperature range | °C | HLP-mineral oils: -20 min. … +80 max.<br>HFC: -20 min. … +50 max.<br>range for max. long life cycle: +30 … +60 (considering viscosity field) |
| Inlet pressure: suction port | bar | max 1.5 absolute (without external drain connection)<br>min 0.5 … 0.98 absolute (dependent on displacement and speed).<br>option 06 (external drain port): inlet pressure up to 100 bar |
| Start-up under load | bar | max. 20 |
| Seal material | | NBR (Nitrile) = standard, FPM (Viton) = option |

## 2.2 Main characteristics

**IMPORTANT:** The main characteristics are valid for mineral oils DIN 51524 with a viscosity of 20 … 50 $mm^2/s$.

| Displacement 1) | Flow rate | Maximum speed 5) | | Code | Max. operating pressure at the pump outlet side | | | | Torque 3) | Power consumption 4) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mineral oil | HFC | Mineral oil | HFC | | |
| effective | 1450 rpm p = 0 bar | Mineral oil | HFC | | continuous | | Intermittent 2) | | | |
| [$cm^3$/rev] | [l/min] | [rpm] | [rpm] | | [bar] | [bar] | [bar] | [bar] | [Nm] | [kW] |
| 10,0 | 14,5 | 5500 | 5000 | QYEH32-010 | 250 | 220 | 280 | 240 | 39,8 | 6,0 |
| 12,6 | 18,3 | 5100 | 4500 | QYEH32-012 | 250 | 220 | 280 | 240 | 50,1 | 7,6 |
| 15,6 | 22,6 | 4300 | 3800 | QYEH32-016 | 250 | 220 | 280 | 240 | 62,1 | 9,4 |
| 20,3 | 29,5 | 4000 | 3600 | QYEH42-020 | 250 | 220 | 280 | 240 | 80,8 | 12,3 |
| 25,1 | 36,4 | 3700 | 3200 | QYEH42-025 | 250 | 220 | 280 | 240 | 99,9 | 15,2 |
| 32,3 | 46,8 | 3400 | 2800 | QYEH42-032 | 250 | 220 | 280 | 240 | 128,5 | 19,5 |
| 39,1 | 56,9 | 3200 | 2700 | QYEH52-040 | 250 | 220 | 280 | 240 | 155,6 | 23,6 |
| 50,3 | 73,2 | 3000 | 2600 | QYEH52-050 | 250 | 220 | 280 | 240 | 200,1 | 30,4 |
| 63,4 | 92,1 | 2800 | 2400 | QYEH52-063 | 250 | 220 | 280 | 240 | 252,3 | 38,3 |
| 79,8 | 116 | 2700 | 2300 | QYEH62-080 | 250 | 220 | 280 | 240 | 317,5 | 48,2 |
| 100,5 | 146 | 2500 | 2200 | QYEH62-100 | 250 | 220 | 280 | 240 | 399,9 | 60,7 |
| 124,2 | 181 | 2300 | 2000 | QYEH62-125 | 250 | 220 | 280 | 240 | 494,2 | 75,0 |

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

2) Maximum 20 seconds, but not for more than 40% of the duty cycle.

3) Theoretical value without taking into account the efficiencies at the maximum permissible continuous pressure for mineral oil at the pump outlet.

4) Theoretical value without taking into account the efficiencies at the maximum permissible continuous pressure for mineral oil at the pump outlet at n = 1450 rpm.

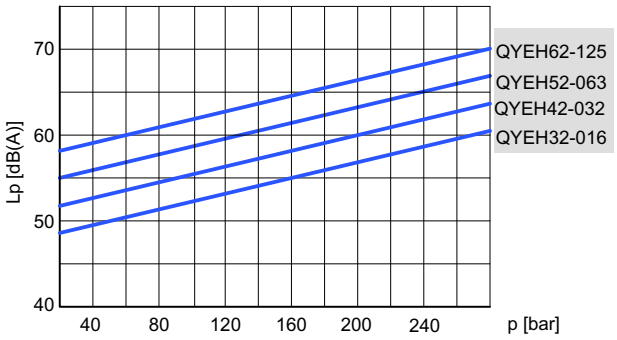
5) Maximum rated speeds for inlet pressure > 0.95 bar (abs.) and outlet pressure > 100 bar. For operation with higher speed contact Bucher Hydraulics.

# 3 Performance graphs

IMPORTANT: The performance graphs shown are valid for the specified pump models. For other pump models 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 $mm^2/s$

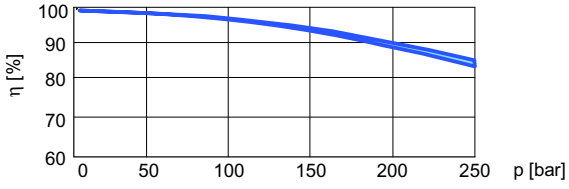



## 3.2 Efficiencies (η)

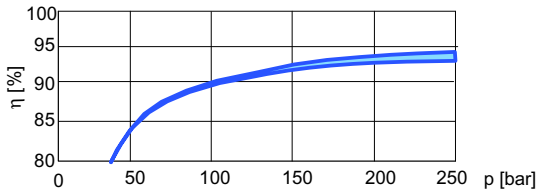
Measured at viscosity 42 $mm^2/s$, speed 1450 rpm.

### 3. 2. 1 QYEH32

Volumetric efficiency

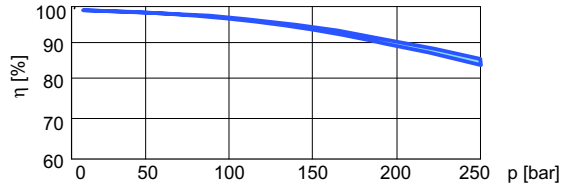



Hydromechanical efficiency

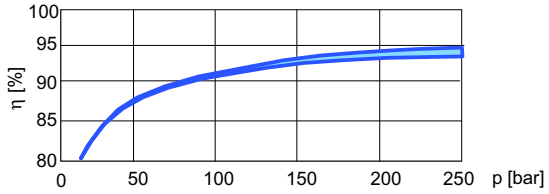



### 3.2.2 QYEH42

Volumetric efficiency

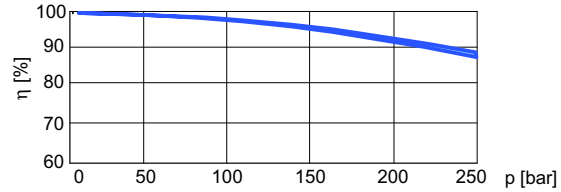



Hydromechanical efficiency

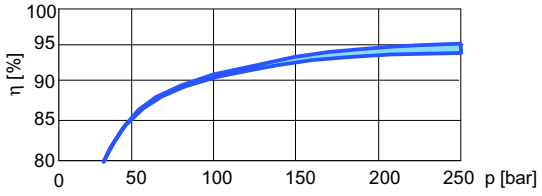



### 3.2.3 QYEH52

Volumetric efficiency

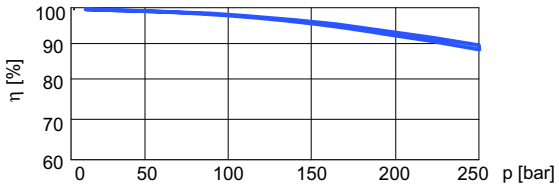



Hydromechanical efficiency

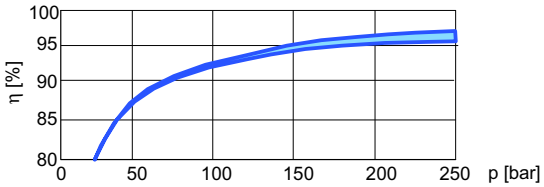


### 3.2.4 QYEH62

Volumetric efficiency



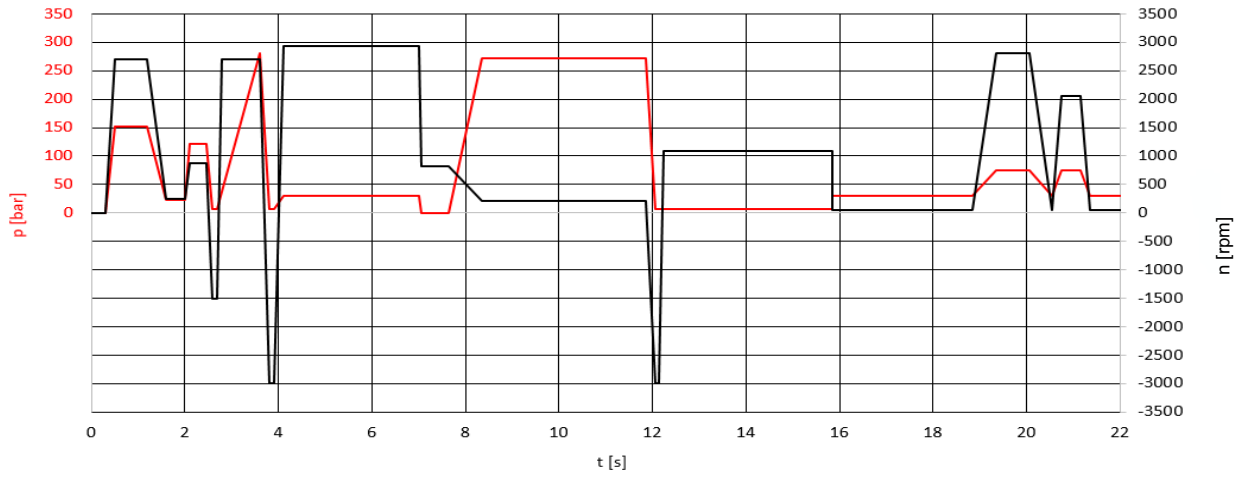

Hydromechanical efficiency



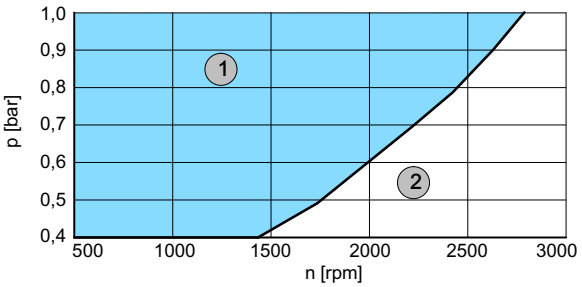

## 3.3 Operation with variable-speed drives

IMPORTANT: The following main characteristics are to be understood as examples only. They are valid only for QYEH52-063R06 with a viscosity of 42 $mm^2/s$. We would be very happy to advice you on the layout of your drive. All QYEH pumps with variable-speed drive contain an external drain port (option 06).

### 3.3.1 Loading example for use in injection moulding machines

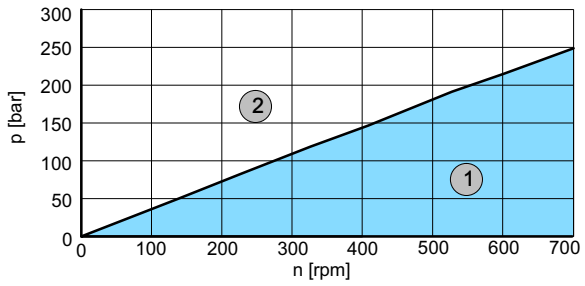



### 3.3.2 Minimum pressure (absolut) at pump inlet as a function of speed




| | |
|---|---|
| 1 | continuous operation |
| 2 | no operation |

### 3.3.3 Minimum speed as a function of pressure




| | |
|---|---|
| 1 | continuous operation |
| 2 | Operation with time restrictions. Detailed operating limits after discussion with Bucher Hydraulics. |

# 4 Single pumps

## 4.1 Dimensions

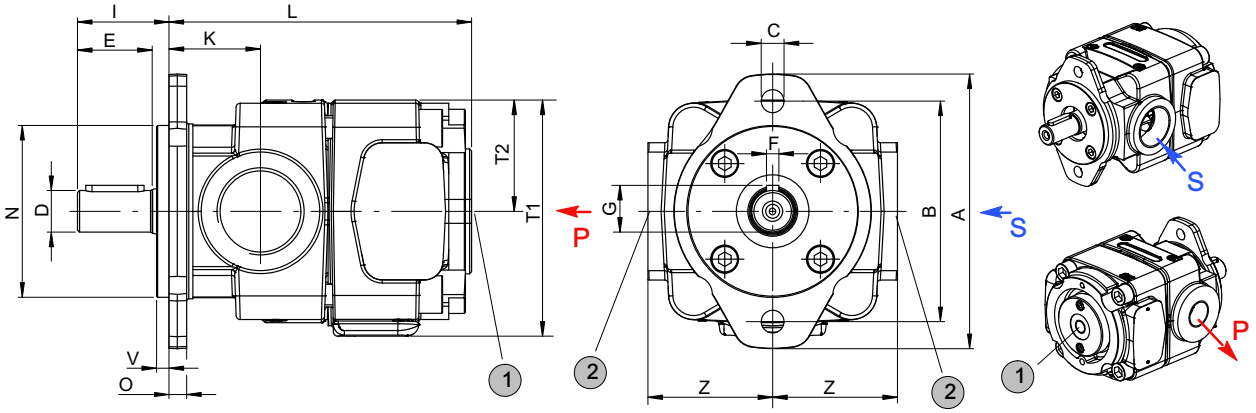
| Frame size | | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Suction port | S | G1¼" 3) thread | 1½" 1) | 2" 1) | 2½" 1) |
| Pressure port | P | G¾" 3) thread | 1" 1) | 1¼" 1) | 1½" 1) |
| External drain port (option) | ① | G¼" | G¼" | G¼" | G⅜" |
| Mounting method: oval 2-hole flange to ISO 3019/1 (SAE) ISO 3019/2 (Metr.) | A | 132 | 170 | 212 | 267 |
| | B (SAE) | 106 | 146 | 181 | 229 |
| | B (Metr.) | - | - | - | - |
| | C | 11 | 14 | 18 | 22 |
| | N (SAE) | 82,55 - 0,05 | 101,6 - 0,05 | 127 - 0,05 | 152,4 - 0,05 |
| | N (Metr.) | - | - | - | - |
| | O | 8,5 | 10,5 | 12,5 | 16,5 |
| | V | 6 | 7 | 7 | 7 |
| Shaft end: parallel, to ISO/R775 2) | D | 20 j6 | 25 j6 | 32 j6 | 40 j6 |
| | E | 36 | 42 | 58 | 82 |
| | F | 6 | 8 | 10 | 12 |
| | G | 22,5 | 28 | 35 | 43 |
| | I | 44 | 51 | 68 | 92 |
| Body | K | 44 | 52,5 | 60,5 | 74 |
| | L | 142,5 | 176 | 210 | 249 |
| | T1 | 114 | 137 | 177 | 220 |
| | T2 | 54 | 67 | 88,5 | 110 |
| | Z | 60 | 62,5 | 78 | 98,5 |
| Weight | kg | 9,5 | 17 | 31 | 60 |

1) Pipe flange dimensions, SAE J518 code 61 bzw. ISO 6162-1
- high-pressure type for up to 420 bar (see section 9.1)
- low-pressure type for up to 16 bar (see section 9.2)

2) For other shaft ends please consult Bucher Hydraulics.

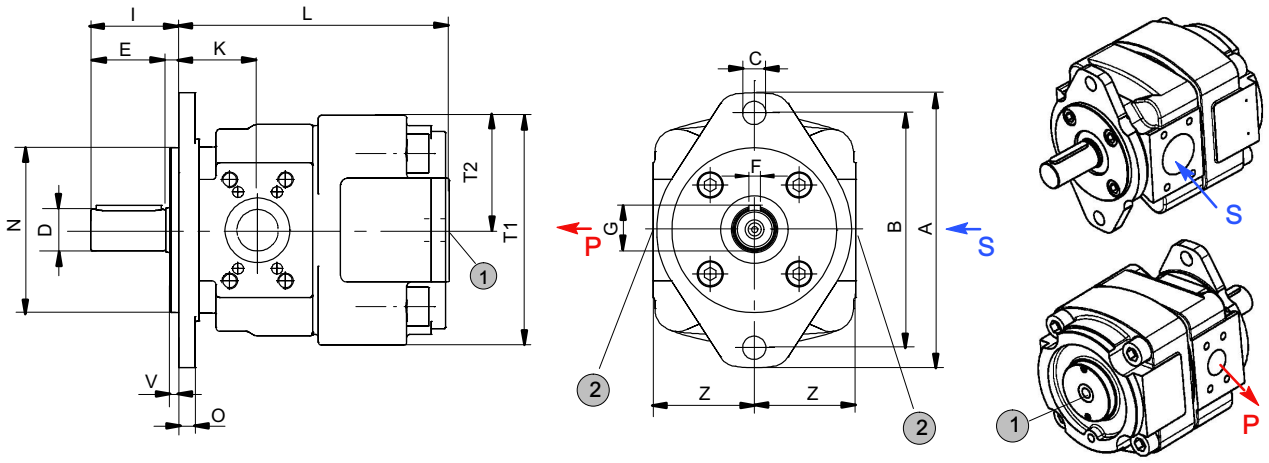
3) Threaded port to DIN 3852, Part 2.

### 4.1.1 Frame size 3




| | | | |
|---|---|---|---|
| 1 | external drain port on models with option 06 | 2 | threaded port to DIN 3852 Part 2 |

### 4.1.2 Frame size 4 - 6




| | | | |
|---|---|---|---|
| 1 | external drain port on models with option 06 | 2 | threaded port to DIN 3852 Part 2 |

## 4.2 Ordering code

| Q | Y | E | H | 5 | 2 | - | 0 | 4 | 0 | R | 0 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | | |
|---|---|---|
| Series | = | QYEH |
| Frame size | = | 32, 42, 52, 62 |
| Displacement in $cm^3$/rev | = | 010 - 124,2 |
| Direction of rotation (viewed from the shaft end) | | |
| right / cw (standard) | = | R |
| left / ccw | = | L |
| Option | | see section 4.2.3 |

### 4.2.1 Ordering example:

Required: single pump
Displacement: 40 $cm^3$/rev
Continuous pressure: 250 bar
Seal material: FPM (Viton)
For use with mineral oil
**Ordering Code: QYEH52-040R09**

### 4.2.2 Standard configuration

- direction of rotation - right (cw)
- 2-hole mounting flange to ISO 3019/1 (SAE): sizes QYEH 3-6
- Nitrile seals
- cylindrical shaft end to ISO R775
- black priming RAL 9004, flange without priming

### 4.2.3 Options

-O = pump without priming
06 = external drain port
QYEH 3-5 = G¼”
QYEH 6 = G⅜”
09 = seal material FPM (Viton), without priming
11 = shaft end with spline shaft SAE ANSI B92.1, DIN ISO 3019-1
11-6 = combination of option 11 and 06
29 = for HFB and HFC fluids, pump without priming
29-6 = combination of option 29 and option 06

# 5 Double pumps

QYEH pumps of the same size or of different sizes can be combined to form double pumps.
This double pump consists of two hydraulically separated single pumps driven by one motor unit.
An internal coupling connects the two pinion shafts, both of which are a one-piece design. The two single pumps each have a suction and a pressure port.

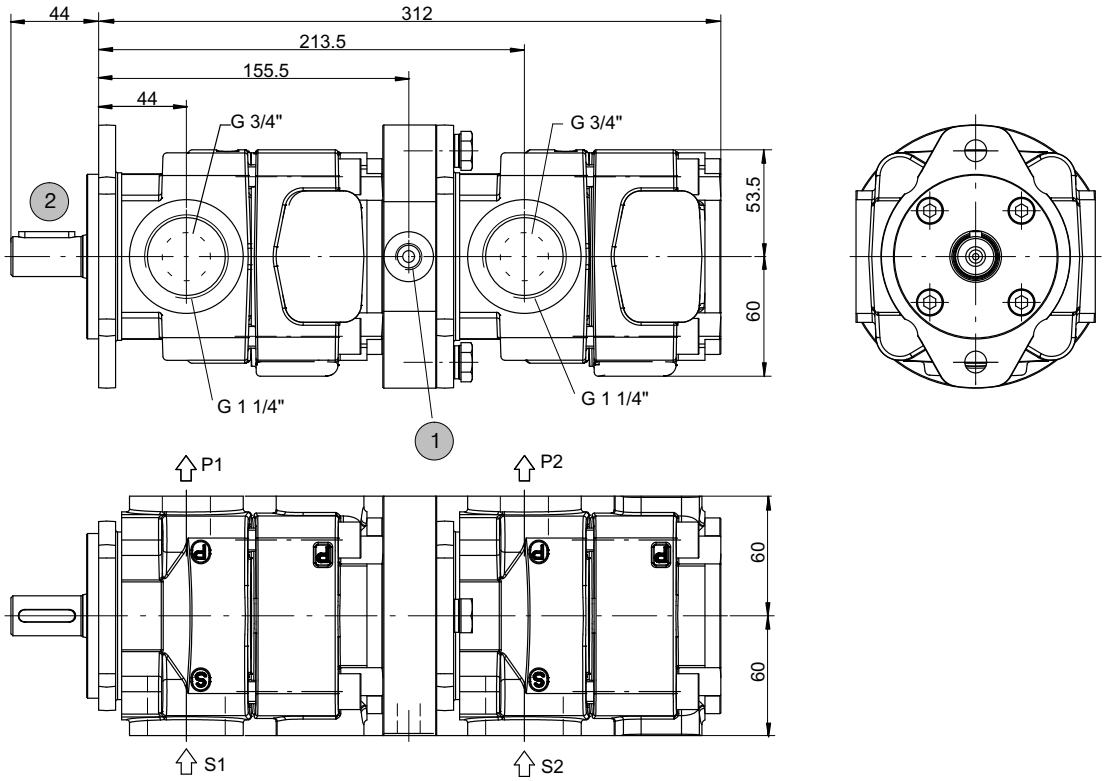
The larger pump of a combination is located on the shaft-end side (the drive side) and is referred to as pump 1. Where both pumps have the same frame size, the pump with the larger displacement is on the drive side. Combinations are available with the same frame size and with the next-larger/ smaller size (see Section 5.1). The relevant dimension pages for the combinations can be found in Section 5.2.

## 5.1 Selection table

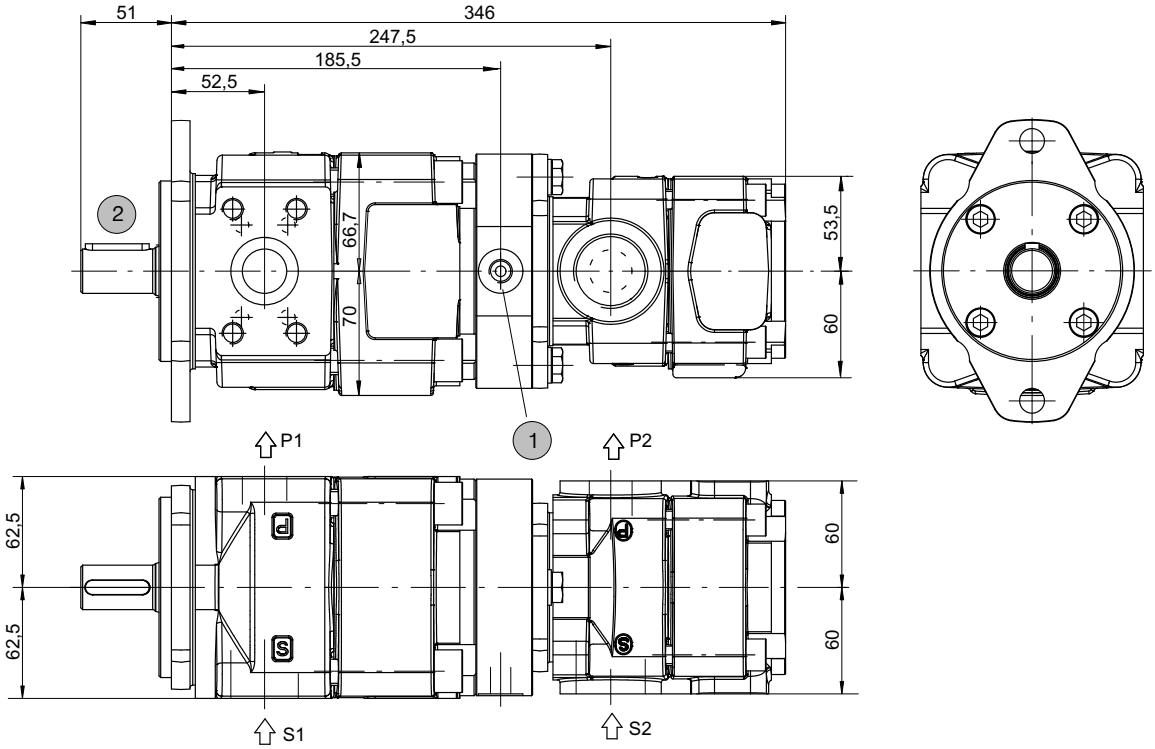
| Pump 1 | | | | Pump 2 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Size | | | | | | | | | | | |
| | | | | QYEH32 | | | QYEH42 | | | QYEH52 | | | QYEH62 | | |
| | | | | Displacement [cm³/rev] | | | | | | | | | | | |
| | | | | 10 | 12 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 |
| Maximum admissible torque [Nm] at the drive end | 190 Nm | Size QYEH32 | Displacement [cm³/U] 10 | X | | | | | | | | | | | |
| | | | 12 | X | X | | | | | | | | | | |
| | | | 16 | X | X | X | | | | | | | | | |
| | 350 Nm | QYEH42 | 20 | X | X | X | X | | | | | | | | |
| | | | 25 | X | X | X | X | X | | | | | | | |
| | | | 32 | X | X | X | X | X | X | | | | | | |
| | 750 Nm | QYEH52 | 40 | | | | X | X | X | X | | | | | |
| | | | 50 | | | | X | X | X | X | X | | | | |
| | | | 63 | | | | X | X | X | X | X | X | | | |
| | 1370 Nm | QYEH62 | 80 | | | | | | | X | X | X | X | | |
| | | | 100 | | | | | | | X | X | X | X | X | |
| | | | 125 | | | | | | | X | X | X | X | X | X |

## 5.2 Dimensions

### 5.2.1 QYEH32-…//32-…

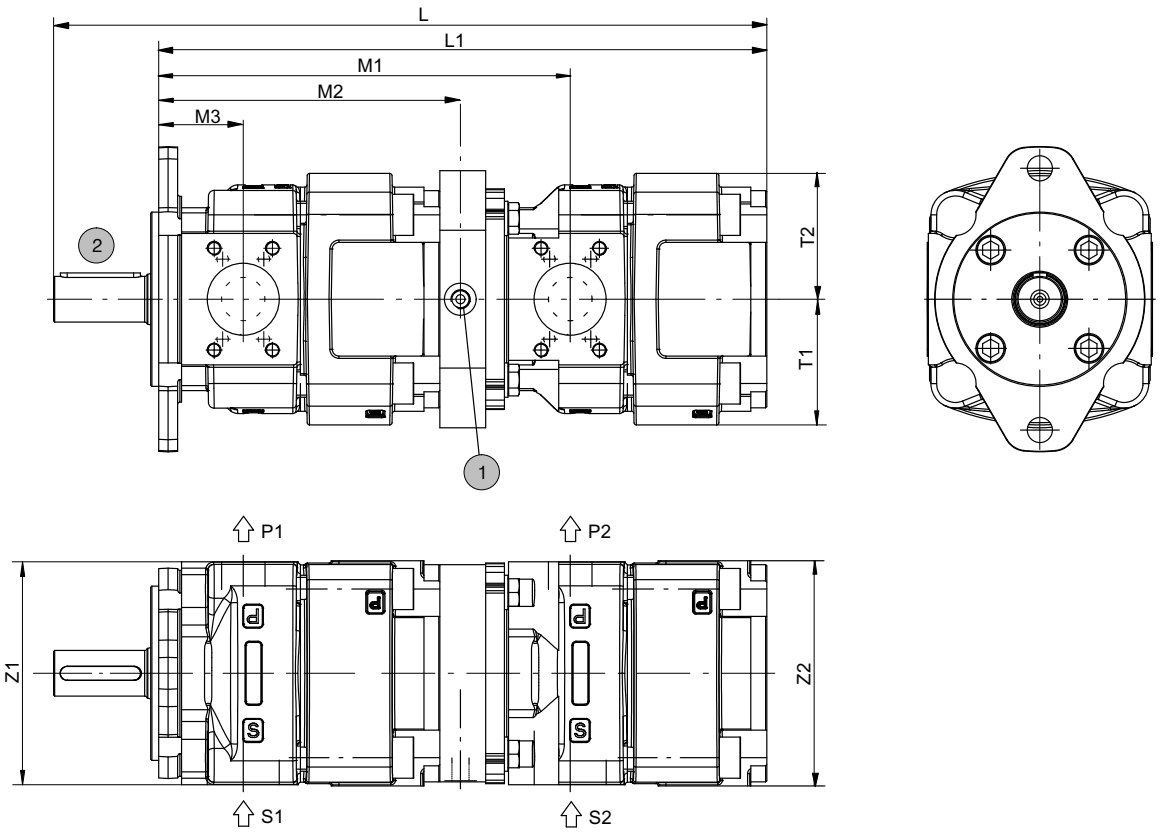



### 5.2.2 QYEH42-…//32-…




| | | | |
|---|---|---|---|
| 1 | external drain port G¼” | 2 | shaft and mounting dimensions see section 4 |

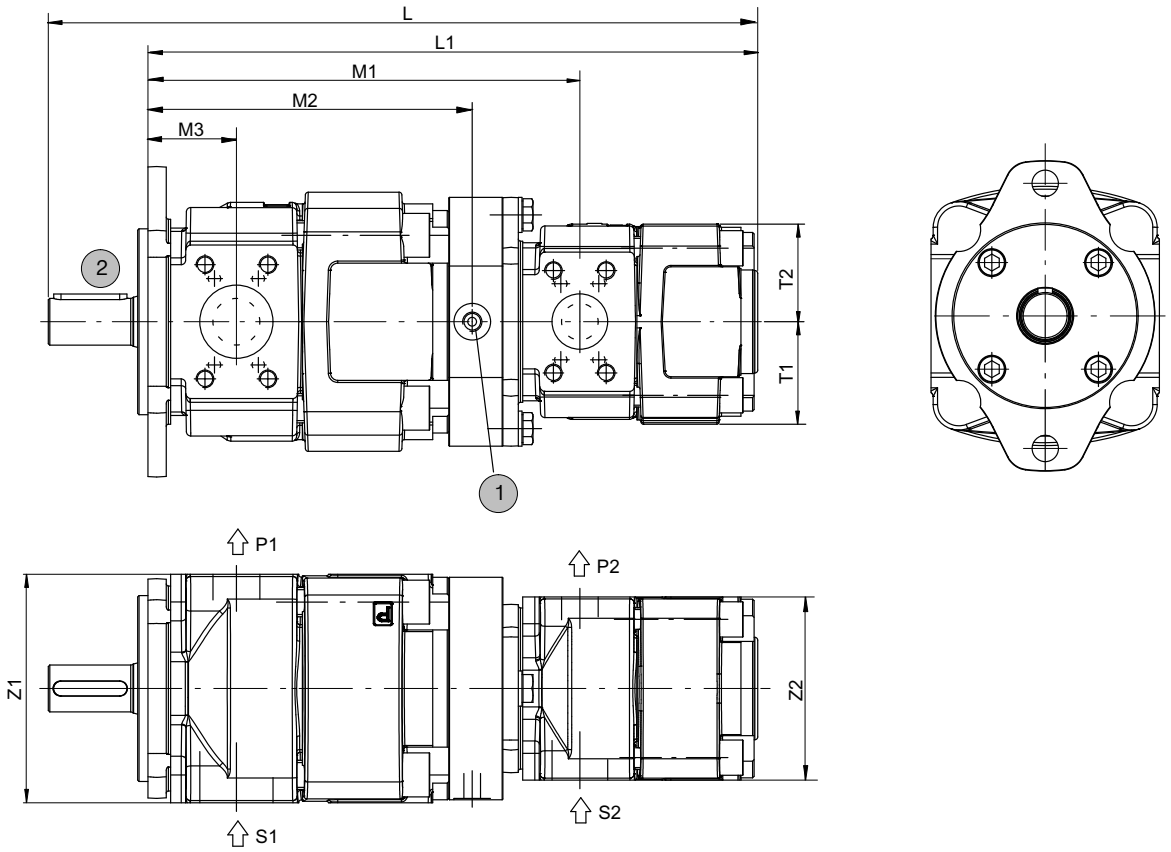
## 5.2.3 QYEH42-…//42-…
## QYEH52-…//52-…
## QYEH62-…//62-…




| | | | |
|---|---|---|---|
| 1 | external drain port | 2 | shaft and mounting dimensions see section 4 |

| Type | L | L1 | M1 | M2 | M3 | T1 | T2 | Z1 | Z2 | S1 | S2 | P1 | P2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QYEH42//42 | 435,5 | 384,5 | 263 | 190,5 | 52,5 | 70 | 66,7 | 125 | 125 | SAE 1½“ | SAE 1½“ | SAE 1“ | SAE 1“ |
| QYEH52//52 | 518,5 | 450,5 | 302,5 | 224 | 60,5 | 88,5 | 88,5 | 156 | 156 | SAE 2“ | SAE 2“ | SAE 1¼“ | SAE 1¼“ |
| QYEH62//62 | 624 | 532 | 360 | 264 | 74 | 110 | 110 | 195 | 195 | SAE 2½“ | SAE 2½“ | SAE 1½“ | SAE 1½“ |

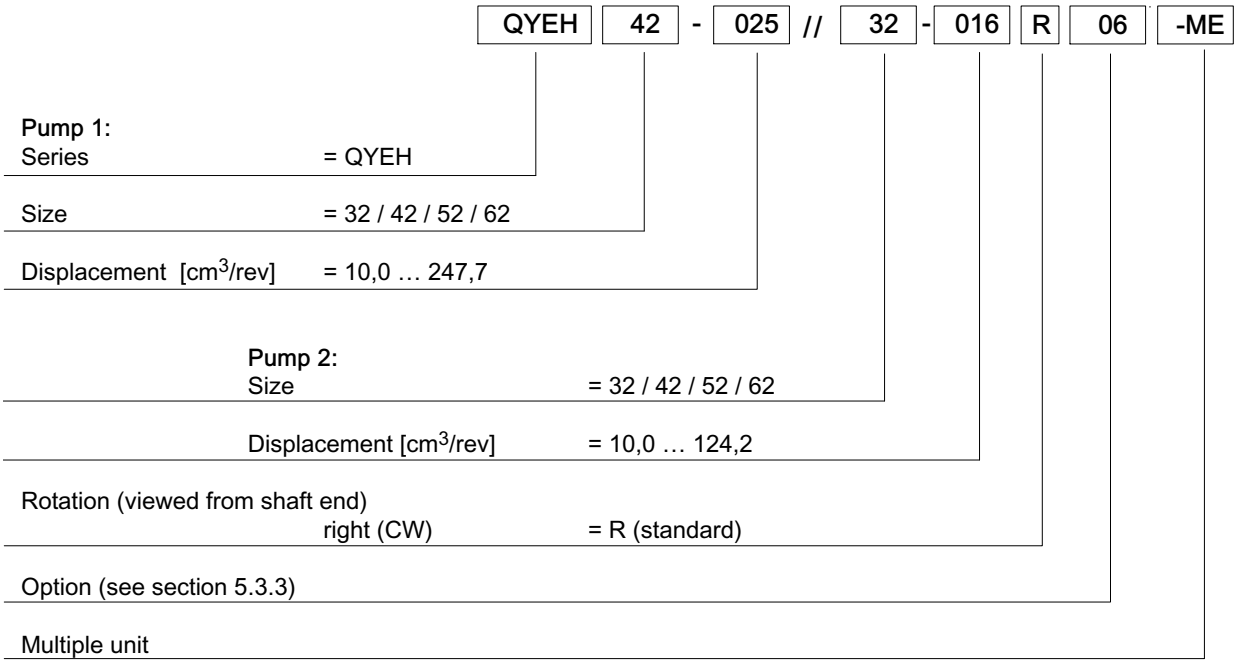
## 5.2.4 QYEH52-…//42-…
## QYEH62-…//52-…




| | | | |
|---|---|---|---|
| 1 | external drain port | 2 | shaft and mounting dimensions see section 4 |

| Type | L | L1 | M1 | M2 | M3 | T1 | T2 | Z1 | Z2 | S1 | S2 | P1 | P2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QYEH52//42 | 484,5 | 416,5 | 295 | 221,5 | 60,5 | 70 | 66,7 | 156 | 125 | SAE 2“ | SAE 1½“ | SAE 1¼“ | SAE 1“ |
| QYEH62//52 | 586 | 494 | 346 | 266 | 74 | 110 | 110 | 197 | 156 | SAE 2½“ | SAE 2“ | SAE 1½“ | SAE 1¼“ |

## 5.3 Ordering code




### 5.3.1 Ordering example:

Required: double pump

**Pump 1**

| | |
|---|---|
| Displacement: | 25 $cm^3$/U |
| Continuous pressure: | 250 bar |
| Type: | QYEH42-025 |

**Pump 2**

| | |
|---|---|
| Displacement : | 16 $cm^3$/U |
| Continuous pressure: | 250 bar |
| Type: | QYEH32-016 |

For use with mineral oil

Ordering code: **QYEH42-025//32-016R06-ME**

### 5.3.2 Standard configuration

- direction of rotation - right (CW)
- 2-hole mounting flange to ISO 3019/1 (SAE): sizes QYEH 3-6
- nitrile seals
- parallel shaft end to ISO R775
- black priming RAL 9004, flange without priming
- external drain port (option 06)
  QYEH 3-5 = G¼“
  QYEH 6 = G⅜“

### 5.3.3 Options

| | | |
|---|---|---|
| -O | = | pump without priming |
| 18 | = | FPM (Viton) seals, pump without priming |
| 11-6 | = | shaft end with spline shaft SAE ANSI B92.1, ISO 3019-1 |
| 29-6 | = | for HFB and HFC fluids, pump without priming |

Further options on request.

## 6 Fluid

QYEH 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 operation with boundary lubrication. Fluids without appropriate additives 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. This is particularly important in applications with variable-speed drives and speeds < 1000 rpm.

## 7 Operational reliability

To guarantee the reliable operation and a long service life of the QYEH, 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:
– the required oil cleanliness
– the operating temperature range
– the 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
– freedom from leakage
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 QYEH 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.

## 8 Note

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

info.kl@bucherhydraulics.com www.bucherhydraulics.com

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Data is provided for the purpose of product description only, and must not be construed as warranted characteristics in the legal sense. The information does not relieve users from the duty of conducting their own evaluations and tests. Because the products are subject to continual improvement, we reserve the right to amend the product specifications contained in this catalogue.

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