

Energy efficiency and productivity for fixed- and variable-speed drives

## Internal Gear Units QXEH

Pinion-shaft technology

## For Fixed and Variable-Speed Drives

### Product description

Compact,  
non-compensated design

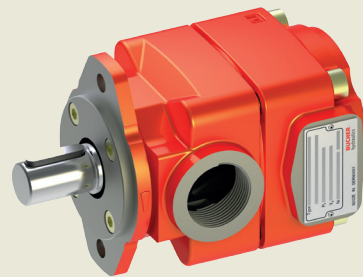
The QXEH series consists of single-stage pumps for both fixed and variable speeds. Thanks to the use of high-precision gear parts with a pinion shaft (pinion and shaft as one component), extremely low pulsation levels are produced even at low speeds. The QXEH internal gear pump is produced in sizes 3, 4, 5 and 6, with each size available from pressure range 2 up to maximum operating pressures of 250 bar (continuous) and 280 bar (intermittent).

### Application examples

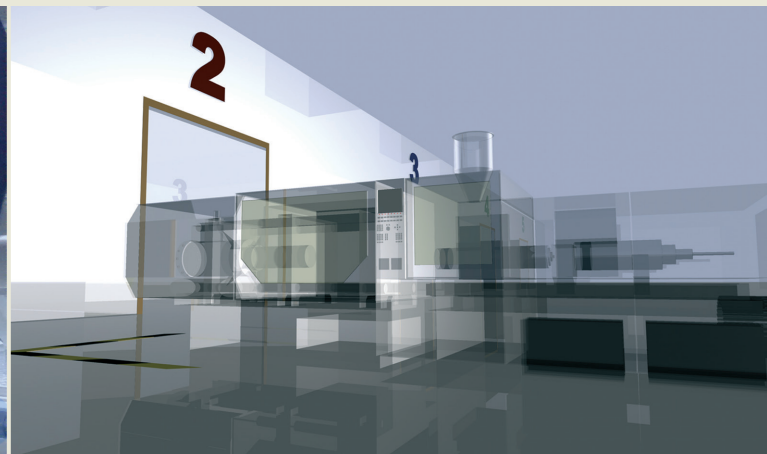
- Hydraulic power units
- Plastics-processing machines
- Die casting machines
- Metal forming machine
- Wind power turbines

### Benefit

- Increase of productivity
- Up to 70 % energy saving
- Up to 20 dB (A) more quiet
- Maximum operational safety
- Reduced maintenance and operating costs

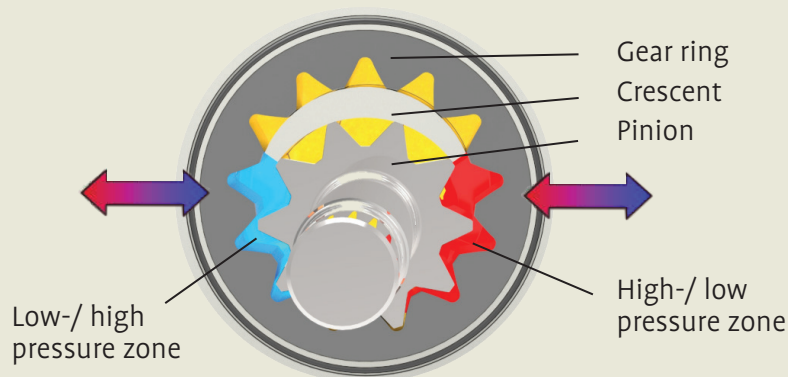


QXEH32 Unit



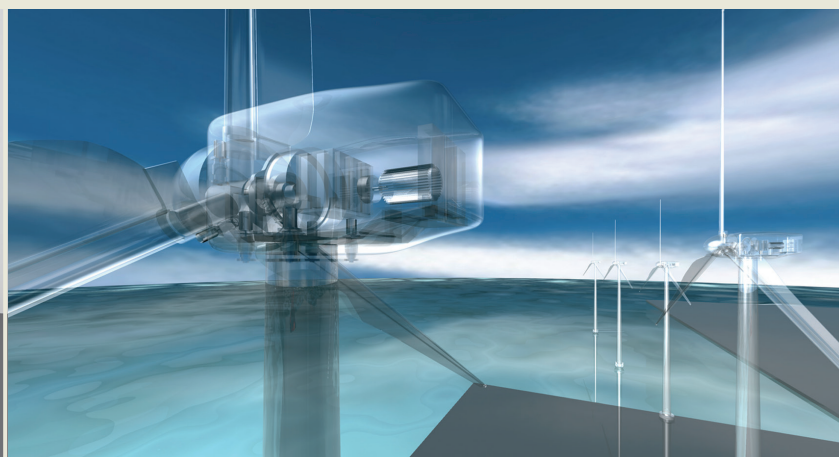
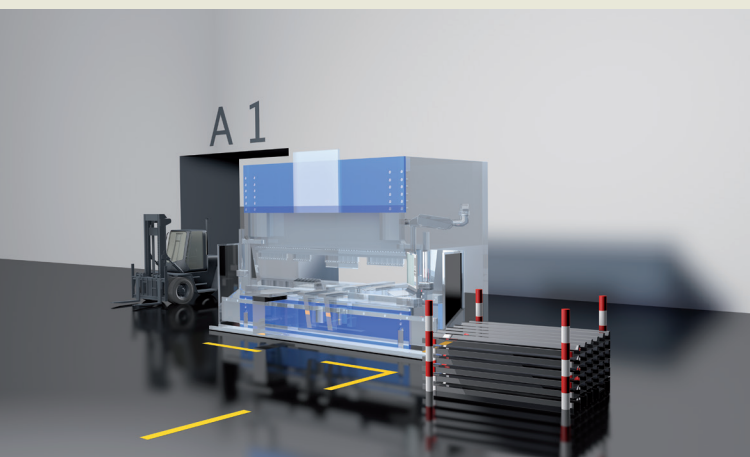
## Features

- Compact, non-compensated design
- Pressure and flow pulsations are minimal, thanks to pinion-shaft technology
- First-rate reliability at both high and low speeds and in reversing operation
- Field-proven in both fixed- and variable-speed drive
- Long service life even under highly cyclical loading



## Function

- The pumps in the new QXEH range are single-stage units that use just one pair of gear wheels. They use a symmetrical design, have a fixed crescent and do not require any sealing elements between ring gear, pinion and crescent.
- The improved dimensional stability of all rotating components results in higher overall rigidity levels, and this in turn decisively enhances the performance ratings of the QXEH pumps.
- In addition, a vital improvement to the hydrodynamic lubrication of the ring gear has been implemented by regulating the flow profiles in the critical bearing areas by means of selective oil supply. The good inlet characteristics and the extremely low noise emissions are ensured by our tried and tested special gear-tooth technology.
- The QXEM internal gear drive unit features identically designed suction and pressure zones, and it is therefore ideal for use in multi-quadrant operation.



Approaches based on Ecodesign Standard EN 50598-2

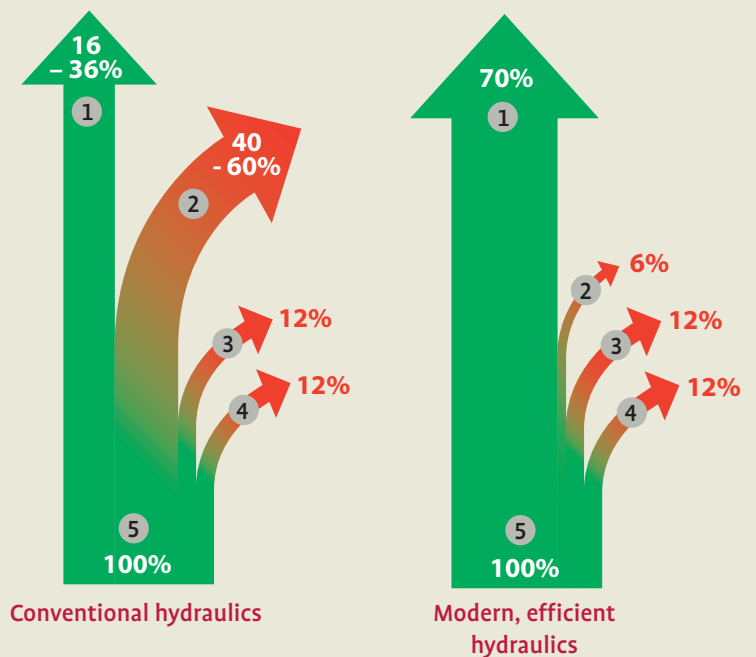
# Increasing Energy Efficiency

## The challenge

### Minimum 70 % effective power

A great deal of energy is lost in the drive system: the effective output is sometimes less than 20% of the energy fed in!  
The new European Standard “Ecodesign for power drive systems – DIN EN 50598-2” considers the extended system.

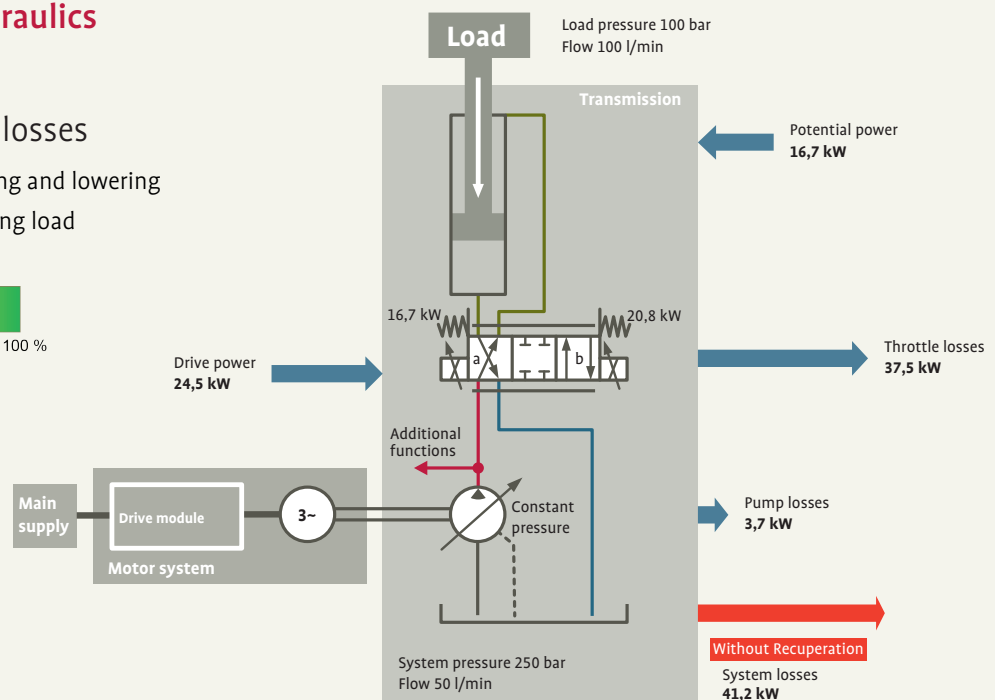
- 1 Effective Power
- 2 Throttle losses in valves
- 3 Hydraulic pump
- 4 Electric motor system
- 5 Main supply



## Conventional hydraulics

### Up to 84 % power losses

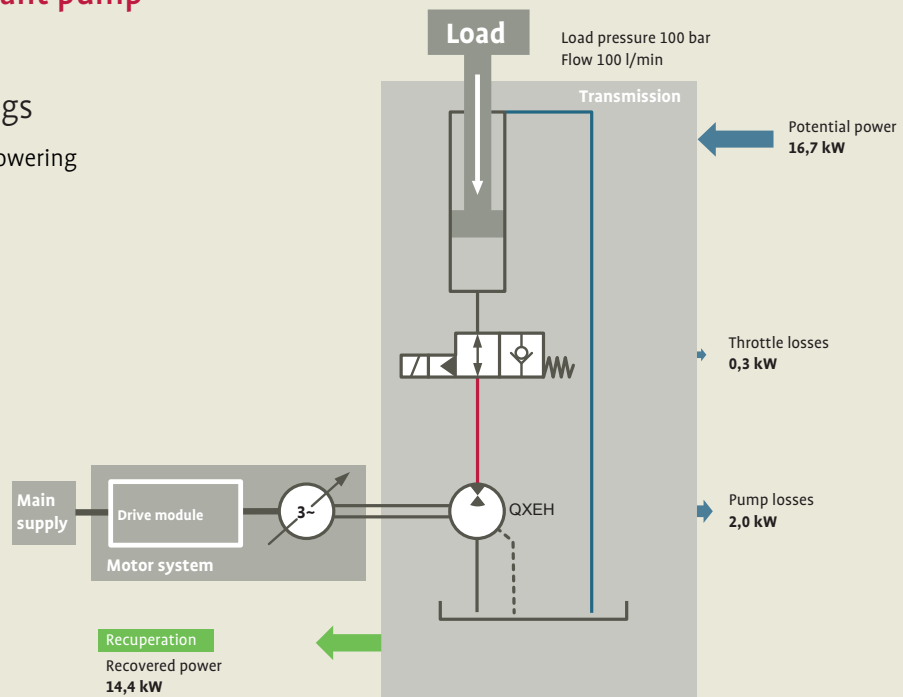
- System: hoisting and lowering
- Analyzed here: lowering load
- Effective power:



## Variable-speed 2-quadrant pump open loop

Up to 70 % energy savings

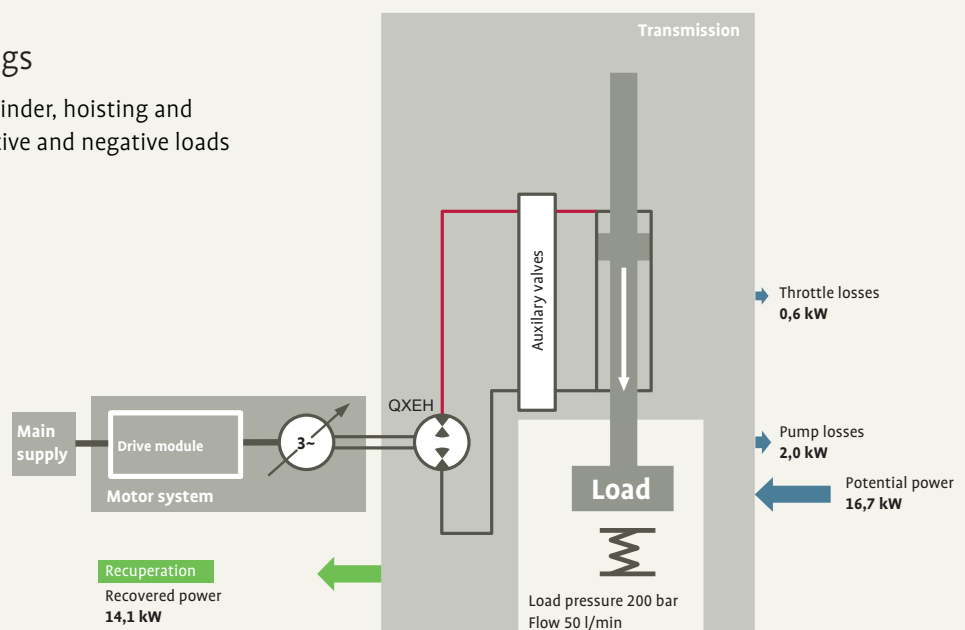
- System: hoisting and lowering
- Analyzed here: lowering load
- Effective power:



## Variable-speed 4-quadrant pump closed loop

Up to 70 % energy savings

- System: Double rod cylinder, hoisting and lowering positive and negative loads
- Analysed here: lowering load
- Effective power:



Trend-setting drive systems

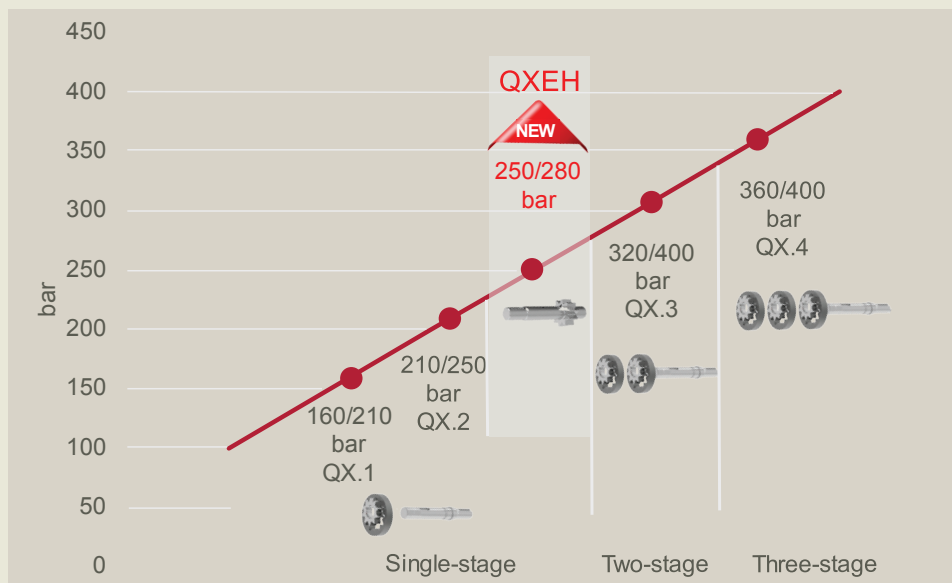
# Variable-Speed Drives with QXEH/M

## Operating area

The perfect addition to the QX range of internal gear units

Thanks to their supreme reliability, QXEH pumps have particularly proven themselves in highly dynamic servo drives with reversing operation. In the overall product portfolio of QX internal gear units, the QXEH – as a single-stage pump with a maximum operating pressure of 280 bar – is positioned between pressure ranges 2 and 3 of the QX internal gear pumps.

Maximum operating pressure (bar)



## Technical data

Type	Max. operating pressure at the pump outlet side (bar)		Displacement cm <sup>3</sup> /rev	Max. torque rpm
	continuous	intermittent		
QXEH32	250	280	10,0 - 15,6	3800 - 4600
QXEH42	250	280	20,4 - 32,4	3400 - 4000
QXEH52	250	280	39,3 - 63,7	2800 - 3200
QXEH62	250	280	80,2- 160,5	2300 - 2700

## Energy efficiency and productivity

### High efficiency

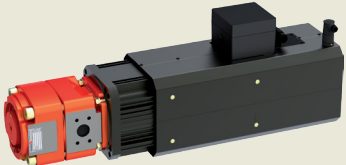
The QXEH series offers an economic basis for implementing key projects in all fields of application. Energy efficiency and increase in productivity. When it comes to energy, the drive unit scores with its high hydraulic-mechanical efficiency. The non-compensated system features very low mechanical friction. Moreover, medium is fed into the pump through internal cast-metal suction and pressure channels to produce low flow turbulence. Both of these technical features lower energy consumption.

### Higher machine productivity

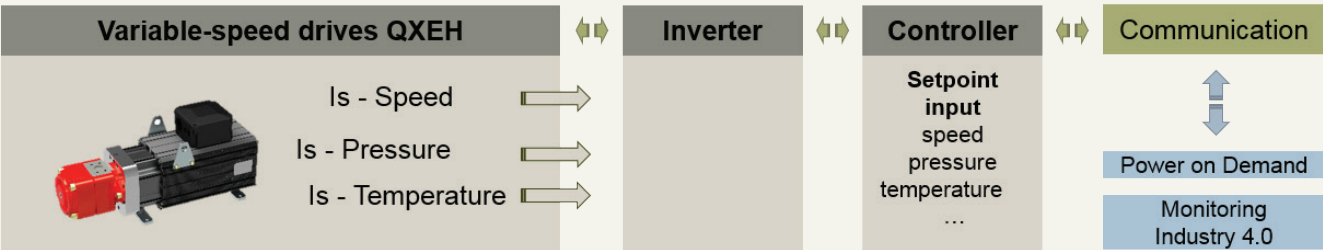
The symmetric construction with a fixed crescent without sealing elements ensures maximum operational reliability of the QXEH series which allows the users to benefit from a high machine productivity. This is particularly true in the case of highly dynamic servo drives, where the pump briefly switches over to reversing mode to avoid pressure peaks. Enclosed in a precisely manufactured chamber, the QXEH series units contain a free-running gear and do not have sealing elements in the crescent, thus requiring no special back-pressure at the pump outlet. So even in reverse mode, the pump runs perfectly well with pressures of around 1 bar at the outlet. This not only pays off through the drive unit reliability but also saves costs and energy for the auxiliary valves required by other pumps as a means of protection against failure in reverse operation.

### Multi-quadrant mode

For operation in a multi-quadrant mode, Bucher Hydraulics has developed a special design: The QXEM internal gear drive unit. One of the central points in the QXEM series is its symmetric construction, with identical high and low pressure areas. With special metering grooves and lubrication systems as well as two same-size pressure-tight connections, the design is specially optimised for 2 and 4 quadrant modes and is thus ideally suited to both directions of rotation at high and low pressures.



Variable-speed drive with QXEH



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