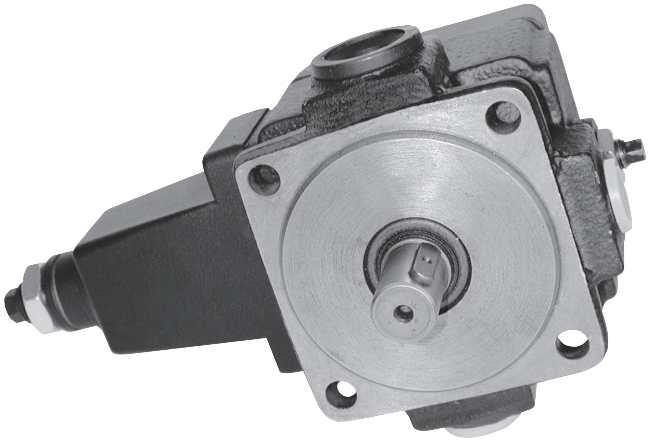
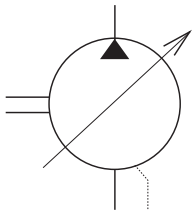
VARIABLE VANE PUMPS
V3 (series 30 and 40)

KE 1015 | 11/02 | replaces 07/97

Nominal sizes 12; 25; 40; 63 | up to p_n 100 bar | V_g 8.5; 19; 32; 47 cm^3/rev





- easy commissioning due to automatic bleed facility
- low noise level
- high bearing life because of hydrodynamically lubricated plain bearings
- bronze-faced starting and control plates, giving low friction characteristics during marginal lubrication conditions.

USAGE

Hydraulic pumps type V3 are rotating vane pumps with simple vanes and adjustable displacement.

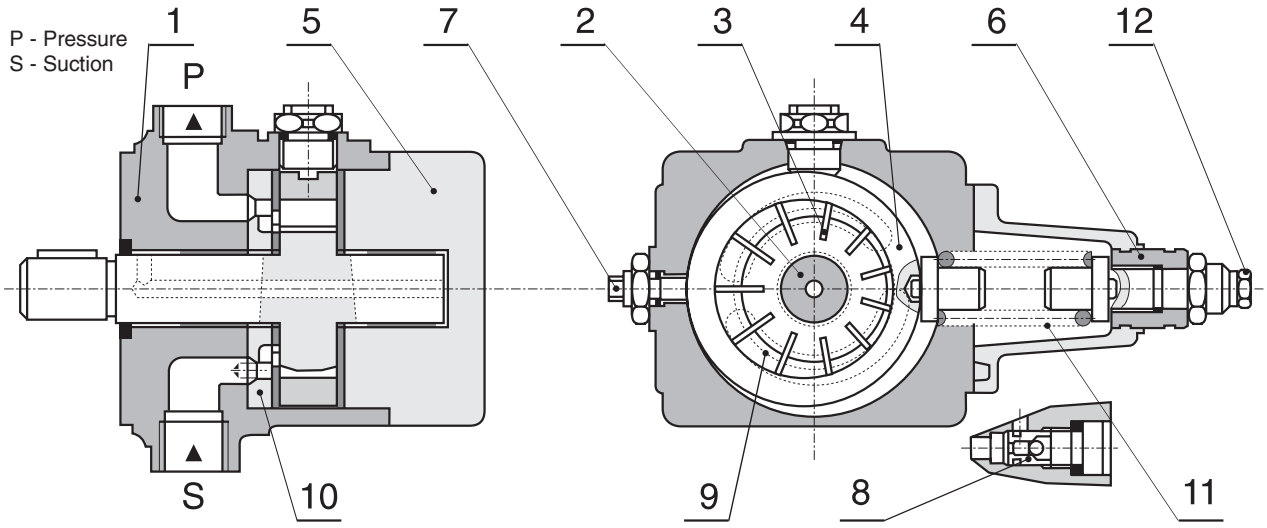
ORDERING CODE

1 P V 2 V 3 - ☐ / ☐ R A 0 1 M C ☐ A 1 *

- One-flow pump with variable geometrical displacement **1 P V**
- Flange mounting **2**
- Vane pump type V3 **V3**
- Series 30; nominal size 40; 63 **30**
  Series 40; nominal size 12; 25 **40**
- Nominal size 12 – 8.5 cm^3/rev **12**
  Nominal size 25 – 19 cm^3/rev **25**
  Nominal size 40 – 32 cm^3/rev **40**
  Nominal size 63 – 47 cm^3/rev **63**
- Clockwise rotation (viewing at the shaft) **R**
- One cylindrical shaft end **A**
- ***** Further details
- **1** With air bleed valve
- **A** Geometrical displacement adjustment by the adjusting screw with external hexagonal
- Pressure at zero stroke
  100 100 bar
  63 63 bar
  40 40 bar
  25 25 bar
- **C** Adjustment of operating pressure by adjusting screw with external hexagonal
- **M** Operating fluid mineral oil (DIN 51 524)
- **01** Connection both suction and displacement through pipe cylindrical threads

Description of function

Pumps of this type basically consist of a housing **1**, rotor **2** with simple vanes **3**, stator **4**, cover **5**, pressure regulator **6**, volume adjustment screw **7** and the valve for automatic air bleed **8**. The chambers **9** for the transport of the fluid are each formed by two vanes **3**, the rotor **2**, the stator **4**, the control plates **10** and the cover **5**. These chambers **9** are rotated with the rotation of the rotor **2**, and as they become larger are filled with fluid from the suction channel. On reaching the maximum volume; the chambers **9** are separated from the suction side. Further rotation of the rotor **2** causes them to connect to the pressure side, and as they reduce in volume they cause fluid to flow into the pressure port P and into the system. Maximum setting volume screw **7** is used to limit the maximum flow of the pump.



Pressure regulation

The stator ring **4** is circular in form, and is held in an eccentric position by spring **11**. The maximum working pressure of the system is set by the spring **11**. Any resistance to flow in the system creates a pressure within the pressure side of the pump, and thereby on to the internal running surface of the stator against the force of spring **11**. As soon as the pressure force reaches the set spring force, the stator ring **4** is moved out of its eccentric position in the direction of zero flow. The output flow then adjusts itself to a value which just maintains this condition. If the spring reaches its highest set pressure, the pump output becomes practically zero. The working pressure is maintained, and only the leakage oil is replaced. By this means, power loss and heat input to the fluid is kept as low as possible.

Installation, duty rules and maintenance

The pump can be installed in any desired position. The shaft ends of both pump and motor must be in line. Please note that no longitudinal or radial load may be applied to the pump shaft. The drive must therefore be transmitted via a flexible coupling. Couplings like Bowex KB or Rotex KD are recommended.

Oil tank

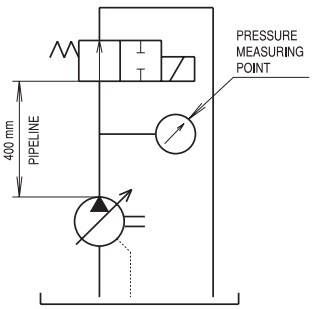
The contents of the tank must accomplish the drive requirements, so that the working temperature must not exceed recommended level. If necessary a cooler must be fitted.

Filtration

Usage of a pressure oil filter or a filter in return channel T is recommended. If a suction filter is used then an underpressure switch must be fitted.

Pipelines and Connections

The suction line should be fitted so that the given values are not exceeded. A maximum speed in pipes is 0.5 m/s. A permissible underpressure level must not be exceeded in case of long pipes or when the suction filters are used. All return and leakage lines should be arranged so that return oil may not, under any conditions, be immediately sucked back into the pump. All lines must finish sufficiently far bellow the minimum oil level in the tank (approx. 5 cm) in order to avoid the build-up of foam. The pipe end should be cut at 45° angle, and should not come within 5 cm of the tank bottom, so that any dirt lying there does not get sucked up. The case drain line should be arranged approx.100 mm higher than the suction line, and should be turned through 90° so that the case drain oil cannot come in direct contact with the suction stream. If possible, both pipe openings should be at least 200 mm apart. Furthermore the leakage line must be drained to the tank without pressure. When the pump is reducing towards zero stroke position, pressure peaks can occur.
For the circuit illustrated, the following values were measured.



Stall pressure	Pressure peaks			
	V3/12	V3/25	V3/40	V3/63
100 Bar	175 Bar	180 Bar	190 Bar	210 Bar
63 Bar	125 Bar	130 Bar	140 Bar	130 Bar
40 Bar	105 Bar	110 Bar	120 Bar	120 Bar
25 Bar	65 Bar	70 Bar	80 Bar	80 Bar

HYDRAULIC MEDIUM

High quality oil is recommended (see technical data). Oil should not be mixed with other types. It would result in their decomposing and reducing lubricating capabilities. In certain periods it is necessary to change oil and clean up the tank from deposits.

BEFORE FIRST OPERATION

Make sure the equipment is clean and properly assembled. Hydraulic medium must be put into the tank only through a filter. Mind a direction of rotation. Start the pump unloaded and let it work several seconds in this state to secure sufficient lubrication. If the pump delivers foamed oil with bubbles after 20 seconds, it is necessary to check up whole system, especially suction line.

AIR BLEEDING

It is necessary to bleed the hydraulic system at first pump starting, especially when the outlet pipe system is closed. This is reached by an automatic bleed valve mounted by a standard way. Closing pressure of the valve is 5 bar, opening 1 bar. If the pressure in outlet port falls under 5 bar then part of oil flows through the bleed valve to leakage pipe. Then the valve must be replaced by a plug.

ATTENTION!

In case that difference of temperature of the hydraulic oil is more than 20°C during a start the pump, it is recommended to start the pump by short pulses (switch on approx. 1 sec. and switch off approx. 5 sec.) to prevent of seizure.
In the case that hydraulic oil is heated by meaning of heater it is necessary to switch on the pump in the same time.

DELIVERY, MATERIAL, SURFACE TREATMENT

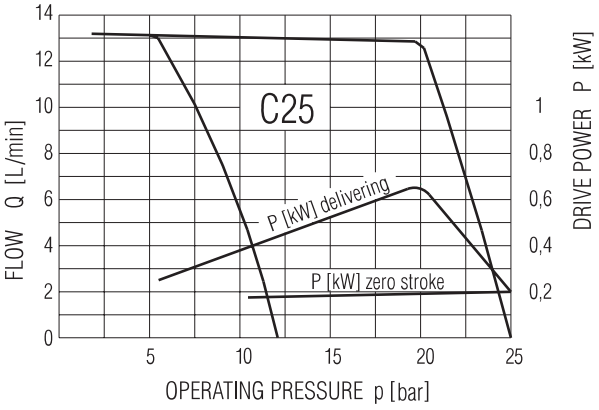
The pumps are delivered in the assemble state, primed. The pump top coat can be carried out in agreement with the producer. The spare parts, fastening bolts and connections are not parts of delivery. Instruction manual is delivered with each pump. Production matrials used are caste iron, steel and non-ferrous metals.

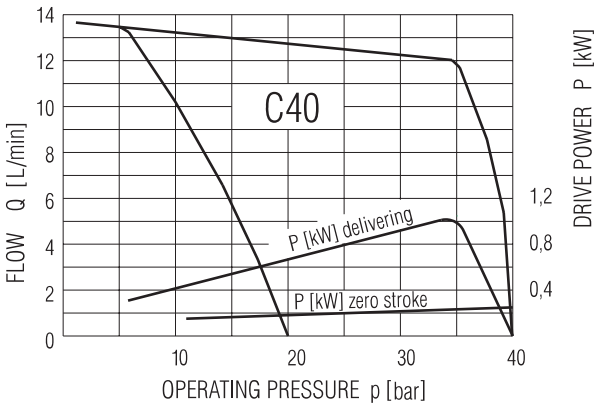
TECHNICAL DATA

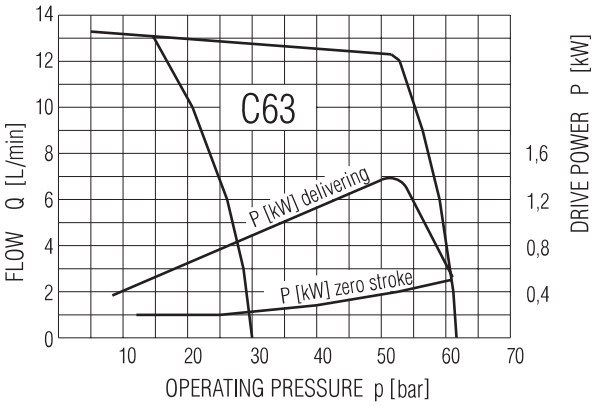
Technical data	Symbol	Units	Nominal sizes			
			V3/12	V3/25	V3/40	V3/63
Nominal displacement	V_g	cm^3/rev	8.5	19	32	47
Nominal output flow at n = 1450 rpm, p = 1 MPa	Q_n	L/min	13	27.5	47	67
Speed range	n	min^{-1}	950 up to 1800			
Spring type			C25, C40, C63, C100			
Pressure range	p	bar	12 ... 25	20 ... 40	30 ... 63	50 ... 100
Operating pressure: input outlet	p p	bar bar	0.2 (underpressure) up to 5 (overpressure) max. 100 – continuous op. pressure			
Leakage port	p	bar	max. 2			
Max. torque (drive shaft)	M_k	Nm	54	61.8	235	353
Hydraulic medium			mineral oils HLP DIN 51 524 part 2			
Temperature range	t_{po}	°C	–10 up to +70			
Fluid filtration		µm	25 absolute ($ß_{20} \geq 100$) We recommend 10 µm in order to achieve long working life, with heavy loading, high duty and low viscosity			
Oil viscosity range	ν	m^2/s	$16 \cdot 10^{-6}$ up to $160 \cdot 10^{-6}$ at operation temperature and zero stroke pressure < 63 bar $25 \cdot 10^{-6}$ up to $160 \cdot 10^{-6}$ at operation temperature and zero stroke pressure > 63 bar max. $800 \cdot 10^{-6}$ when starting up and oil delivering max. $200 \cdot 10^{-6}$ when starting up at zero stroke			
Efficiency			see curves			
Weight	m	kg	6.25	11.1	26.5	29.5

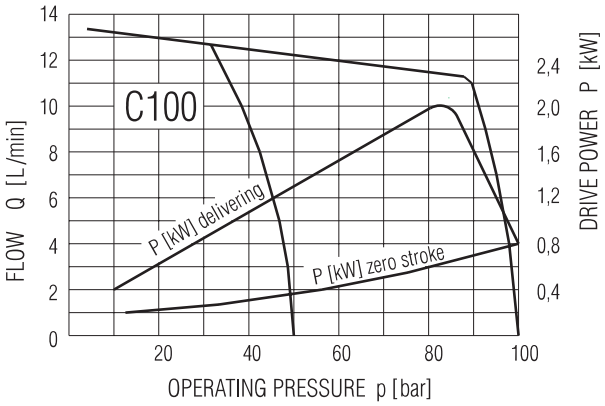
PERFORMANCE CURVES V3/12

measured at n = 1450 rpm, ν = 36 mm²/s, t = 50°C



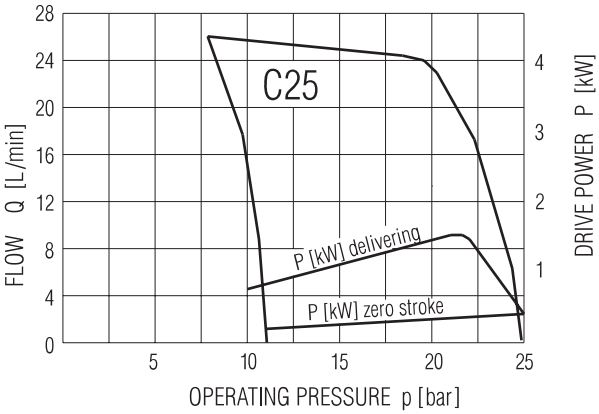


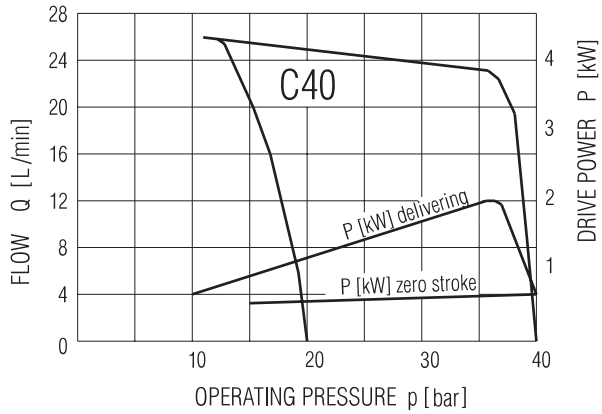


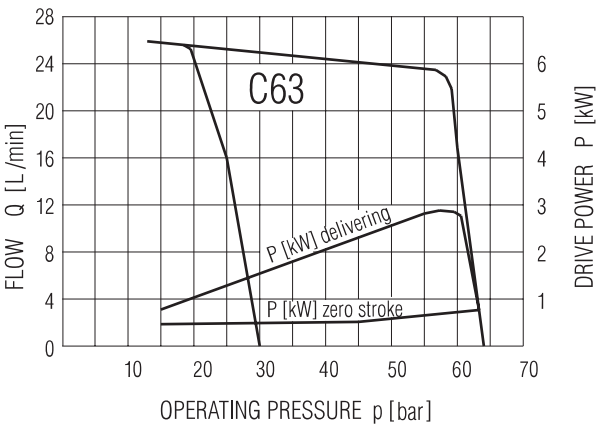


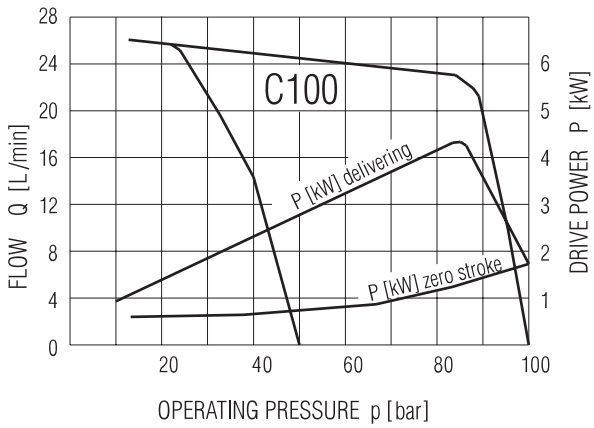
PERFORMANCE CURVES V3/25

measured at n = 1450 rpm, ν = 36 mm²/s, t = 50°C

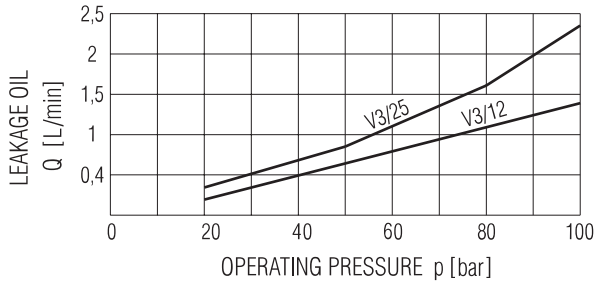




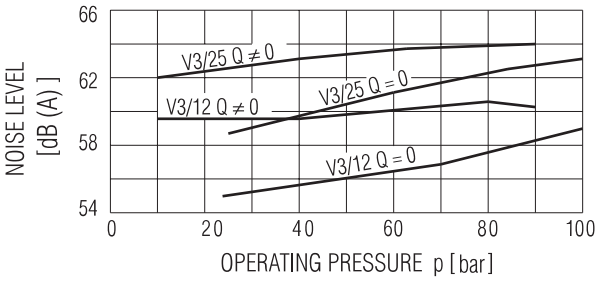




measured after 10 min. at zero stroke



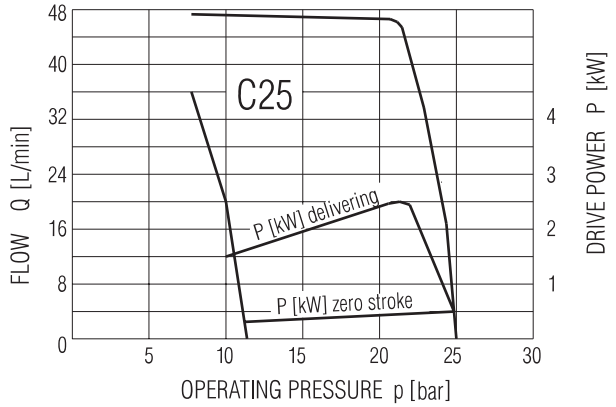
measured in noise measurement chamber DIN 45 635 sheet 1

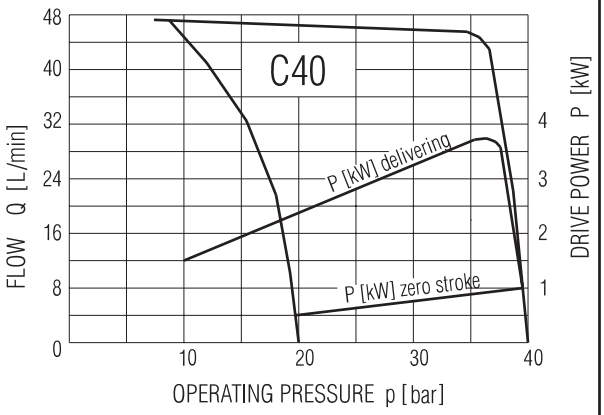


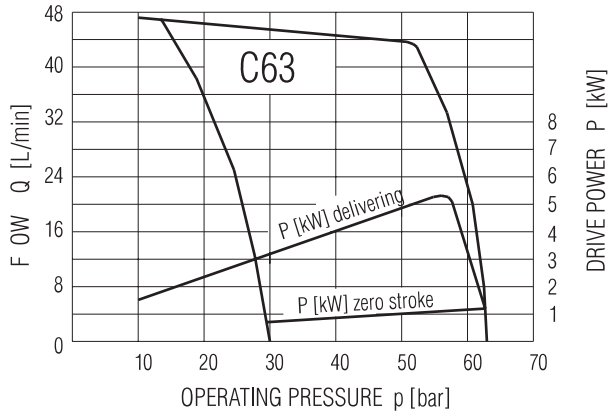
measured at distance of 1 m from the pump

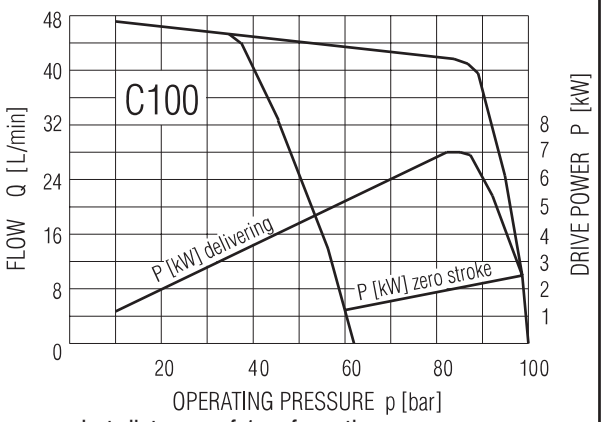
PERFORMANCE CURVES V3/40

measured at n = 1450 rpm, ν = 36 mm^2/s, t = 50°C

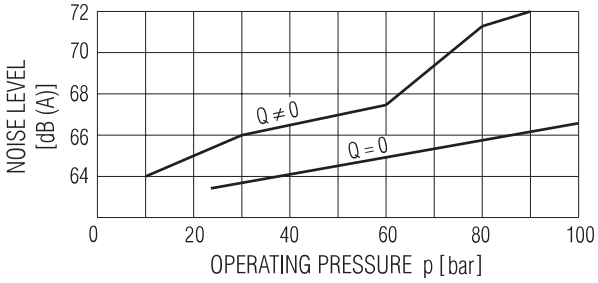




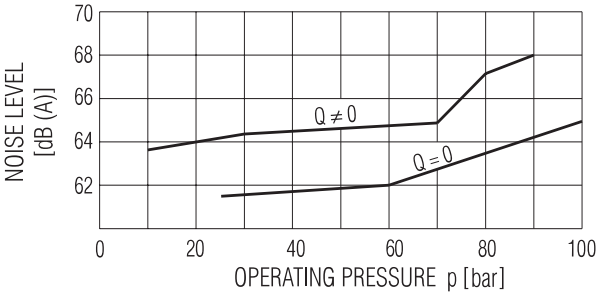




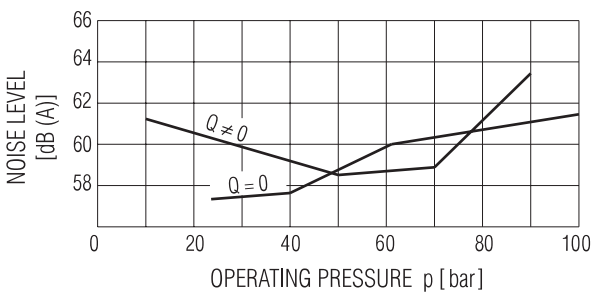
measured in noise measurement chamber DIN 45 635 sheet 1 at n - 1800 rpm



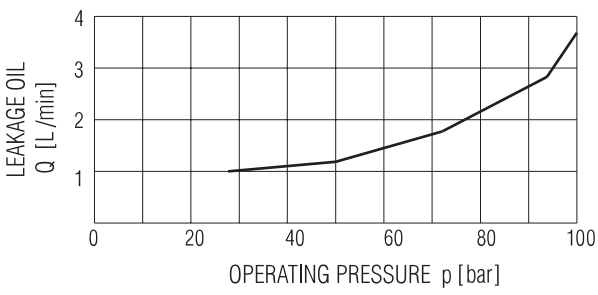
measured at distance of 1 m from the pump at n = 1450 rpm



at n = 1000 rpm

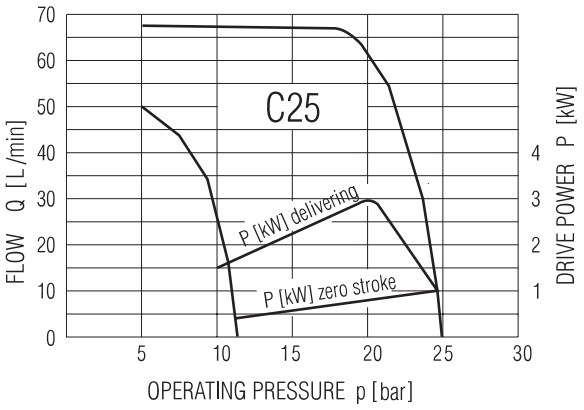


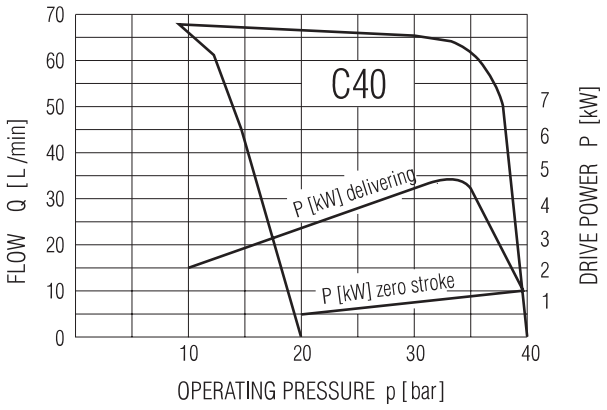
measured after 10 minutes at zero stroke

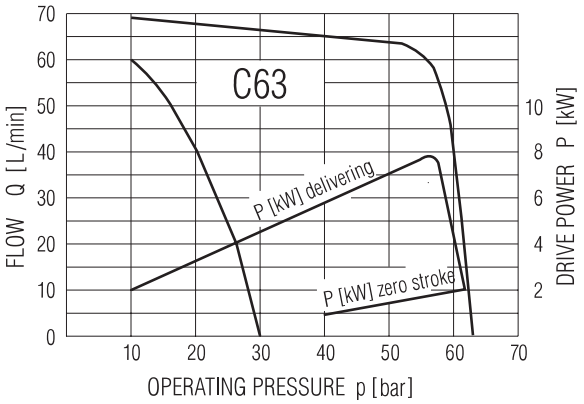


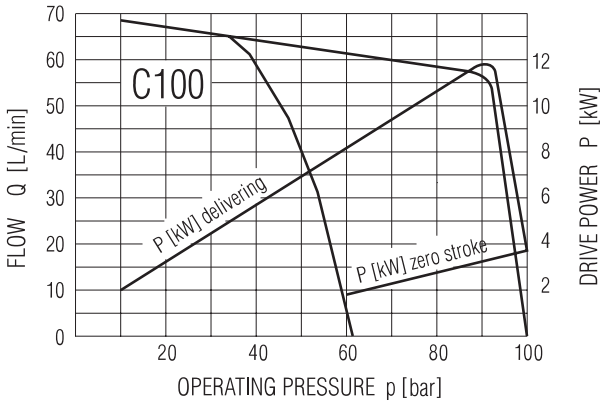
PERFORMANCE CURVES V3/63

measured at n = 1450 rpm, ν = 36 mm²/s, t = 50°C



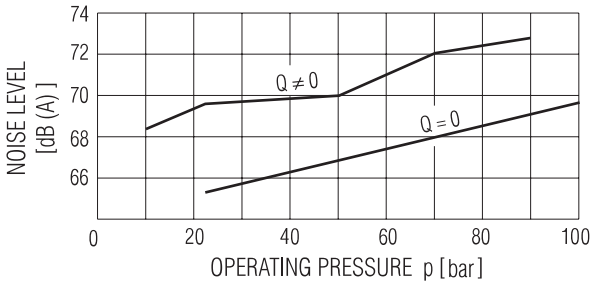




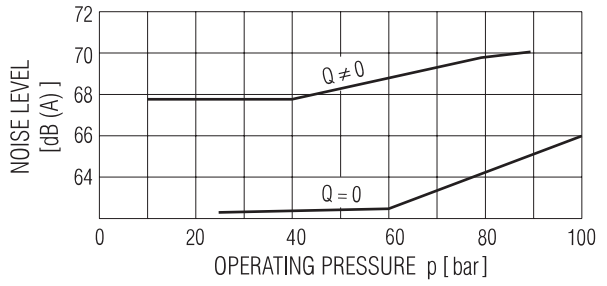


measured in noise measurement chamber DIN 45 635 sheet 1
measured at distance of 1 m from the pump

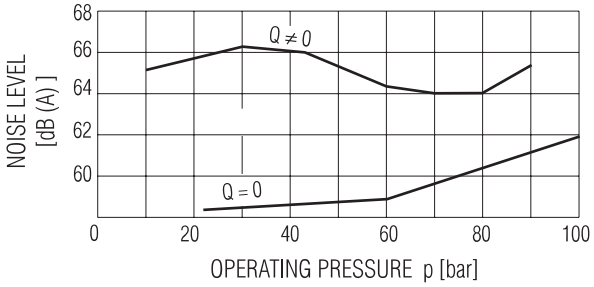
at n = 1800 rpm



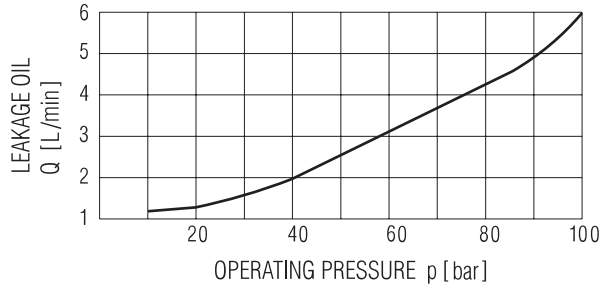
at n = 1450 rpm



at n = 1000 rpm



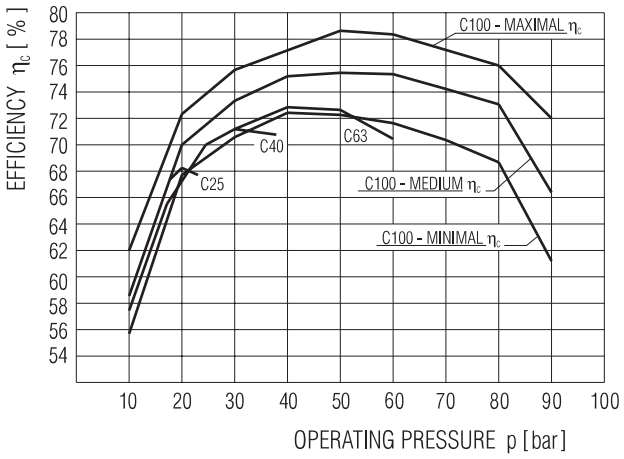
measured after 10 minutes at zero stroke



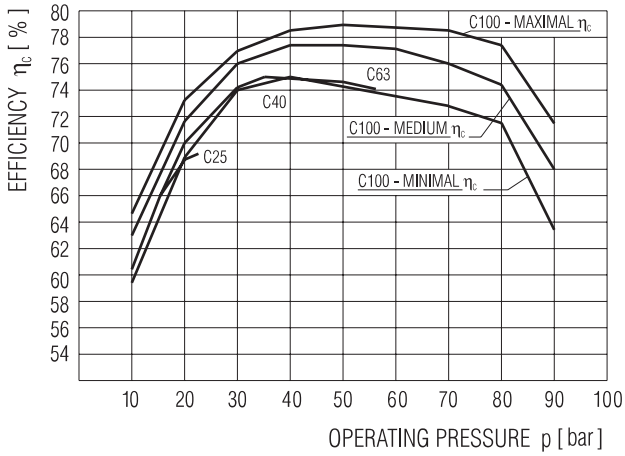
EFFICIENCY CURVES

(n = 1500 rpm, t = 50°C)

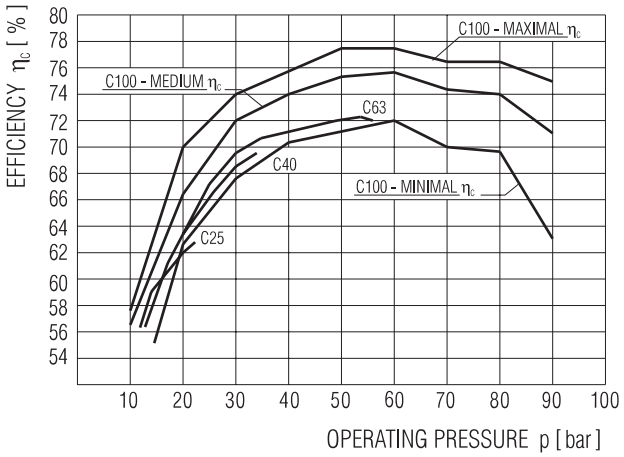
V3/12



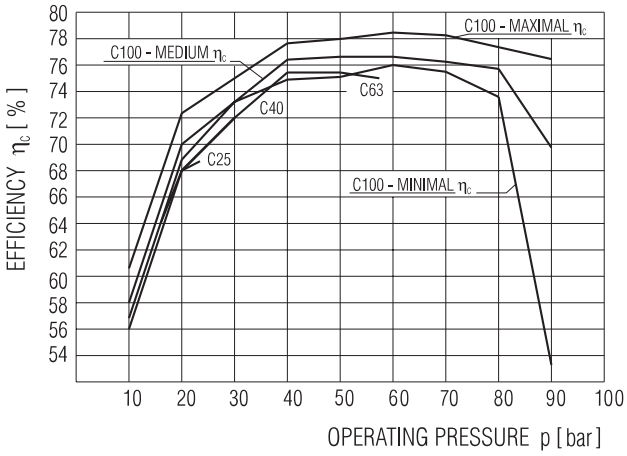
V3/25



V3/40

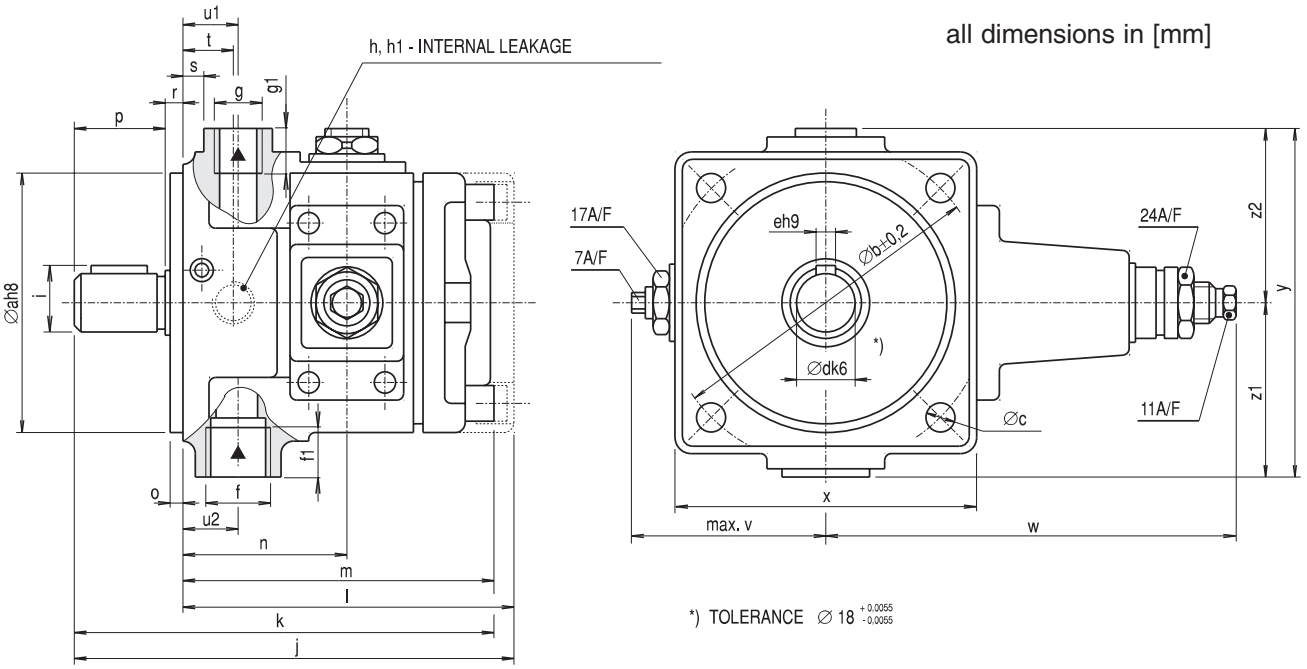


V3/63



INSTALLATION DIMENSIONS

all dimensions in [mm]



Pump type	Dimension [mm]													
	a	b	c	d*	e	f	g	h	i	j	k	l	m	n
1PV2V3-40/12	80	100	9	18*	6	G1/2"	G3/8"	G1/4"	20.5	136.5	-	102	-	50.5
1PV2V3-40/25	100	125	11	19	6	G3/4"	G1/2"	G1/4"	21.5	168.5	158.8	134	124	65
1PV2V3-30/40	125	160	14	28	8	G1 1/4"	G3/4"	G3/8"	31	218	211	166	159	81
1PV2V3-30/63	125	160	14	32	10	G1 1/2"	G1"	G3/8"	35	249	242	181	174	91

Dimension [mm]													Thread depth [mm]			Weight
o	p	r	s	t	u1	u2	v	w	x	y	z1	z2	f1	g1	h1	[kg]
4	28	6.5	8	15.5	17	20.5	68.5	156	93	113	56.5	56.5	14	12	12	6.25
4	28	6.5	10	20	25	25	78	164	115	130	65	65	16	14	12	11.1
4	42	10	8.5	27	32	32	95	201	148	188	94	94	20	16	12	26.5
4	58	10	12	27	34	34	95	201	148	191	97	94	22	18	12	29.5