# Vane pumps
# Single & triple
# T6*R industrial and mobile applications

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DENISON Hydraulics

# CONTENTS - T6*R SERIES INDUSTRIAL & MOBILE APPLICATIONS


**GENERAL**

Features ..... 3
Instructions ..... 3
Minimum & maximum speeds ..... 4
Pressure ratings ..... 4
Priming at starting ..... 4
Minimum allowable inlet pressure ..... 5
General characteristics ..... 5
Pump selection : Routine and example ..... 6
Intermittent pressure rating ..... 6

**INDUSTRIAL VERSION T6*R GENERAL**

Description ..... 7
Application advantages ..... 7
Shafts and hydraulic fluids ..... 8

**T6CR**

Ordering code & Technical data ..... 10
Dimensions & Operating characteristics ..... 11

**T6DR**

Ordering code & Technical data ..... 12
Dimensions & Operating characteristics ..... 13

**T6ER**

Ordering code & Technical data ..... 14
Dimensions & Operating characteristics ..... 15

**T6DCCR**

Ordering code & Operating characteristics ..... 16
Technical data ..... 17
Dimensions ..... 18
Porting diagrams ..... 22 - 23

**T6EDCR**

Ordering code & Operating characteristics ..... 20
Technical data ..... 21
Dimensions ..... 19
Porting diagrams ..... 22 - 23

**MOBILE VERSION T6*RM GENERAL**

Description ..... 24
Application advantages ..... 24
Shafts and hydraulic fluids ..... 25

**T6CRM**

Ordering code & Technical data ..... 26
Dimensions & Operating characteristics ..... 27

**T6DRM**

Ordering code & Technical data ..... 28
Dimensions & Operating characteristics ..... 29

**T6ERM**

Ordering code & Technical data ..... 30
Dimensions & Operating characteristics ..... 31

Ordering code ..... 32
Porting definition VV ..... 32
Porting definition VP, VH & VG ..... 33
Adaptator & coupling selection ..... 34
Example ..... 34





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**GREATER FLOW**

Greater flow for the envelope size is achieved by increased displacement cam rings : at high permissible speeds with atmospheric inlet
C → 3 to 31 GPM, 10 to 100 ml/rev.
D → 14 to 50 GPM, 48 to 158 ml/rev.
E → 42 to 72 GPM, 132 to 227 ml/rev.

**HIGHER PRESSURE**

Pressure ratings up to 275 bar, whichs allows to reduce the size and cost of the actuators, valves and lines.

**BETTER EFFICIENCY**

Better efficiency under load which increases the productivity and reduces the heating and operating costs.

**MOUNTING FLEXIBILITY**

Simple pumps : 4 positions + 4 on rear drive.
Triple pumps : 128 positions + 2 on rear drive.

**REAR DRIVE**

Mounting pads and couplings are fully conformable to SAE J744c and ISO 3019-1.
Simple pumps SAE A/B/C rear adaptors.
SAE A/B/BB/C couplings
Triple pumps SAE A adaptor and coupling.

**LOWER NOISE LEVELS**

Increase the operator's safety and acceptance.

**COMPLETE CONFORMITY**

To SAE - J744c 2-bolt standards and to ISO 3019-1 in the various keyed and splined shaft options offered.

**CARTRIDGE DESIGN**

Provides for drop-in assemblies. This design permits an easy conversion or renewal of serviceable elements in minutes at minimum expense and risk of contamination. Pump rotation is easy to change by changing the position of the cam ring on the port plate dowel pin hole.

**WIDER RANGE OF ACCEPTABLE VISCOSITIES**

Viscosities from 860 to 10 cSt, (2000 to 10 cSt for Mobile), permit colder starts and hotter running. The balanced design compensates for wear and temperature changes. At high viscosity or cold temperature, the rotor to side plates gap is well lubricated and improves the mechanical efficiency.

**FIRE RESISTANT FLUIDS**

Including phosphate esters, chlorinated hydrocarbons, water glycols and invert emulsions. They may be pumped at higher pressures and with longer service life by these pumps.

**GENERAL APPLICATIONS INSTRUCTIONS**

1. Check the speed range, pressure, temperature, fluid quality, viscosity and pump rotation.
2. Check the inlet conditions of the pump, if it can accept application requirement.
3. Type of shaft : check if it can support the system's operating torque.
4. Coupling must be chosen to minimize the pump shaft load (weight, misalignment).
5. Filtration : must be adequate for lowest contamination level.
6. Environment of pump : to avoid the noise reflection, pollution and shocks.



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| Size | Series | Theoretical Displacement Vi | Minimum Speed | Maximum Speed | | Maximum Pressure | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | HF-0,HF-1 HF-2 | HF-3, HF-4 HF-5 | HF-0, HF-2 | | HF-1, HF-4, HF-5 | | HF-3 | |
| | | | | | | Int. | Cont. | Int. | Cont. | Int. | Cont. |
| | | ml/rev. | RPM | RPM | RPM | bar | bar | bar | bar | bar | bar |
| CR CRM | *03 | 10,8 | 600 / 400 | 2800 | 1800 | 275 | 240 | 210 | 175 | 175 | 140 |
| | *05 | 17,2 | | | | | | | | | |
| | *06 | 21,3 | | | | | | | | | |
| | *08 | 26,4 | | | | | | | | | |
| | *10 | 34,1 | | | | | | | | | |
| | *12 | 37,1 | | | | | | | | | |
| | *14 | 46,0 | | | | | | | | | |
| | *17 | 58,3 | | | | | | | | | |
| | *20 | 63,8 | | | | | | | | | |
| | *22 | 70,3 | | | | | | | | | |
| | *25 | 79,3 | | 2500 | | 210 | 160 | | 160 | | |
| | *28 | 88,8 | | | | | | | | | |
| | *31 | 100,0 | | | | | | | | | |
| DR DRM | *14 | 47,6 | 600 / 400 | 2500 | 1800 | 240 | 210 | 210 | 175 | 175 | 140 |
| | *17 | 58,2 | | | | | | | | | |
| | *20 | 66,0 | | | | | | | | | |
| | *24 | 79,5 | | | | | | | | | |
| | *28 | 89,7 | | | | | | | | | |
| | *31 | 98,3 | | | | | | | | | |
| | *35 | 111,0 | | | | | | | | | |
| | *38 | 120,3 | | | | | | | | | |
| | *42 | 136,0 | | 2200 | | | | | | | |
| | *45 | 145,7 | | | | | | | | | |
| | *50 | 158,0 | | | | 210 | 160 | | 160 | | |
| ER ERM | 042 | 132,3 | 600 / 400 | 2200 | 1800 | 240 | 210 | 210 | 175 | 175 | 140 |
| | 045 | 142,4 | | | | | | | | | |
| | 050 | 158,5 | | | | | | | | | |
| | 052 | 164,8 | | | | | | | | | |
| | 062 | 196,7 | | | | | | | | | |
| | 066 | 213,3 | | | | | | | | | |
| | 072 | 227,1 | | | | | | | | | |
| T6DCCR | | Same as | | Same as | | Same as | | | | | |
| P1 | | T6DR | 600 | T6DR | | T6DR | | | | | |
| P2 | | T6CR | | | | T6CR | | | | | |
| P3 | | T6CR | | | | T6CR | | | | | |
| T6EDCR | | Same as | | | | Same as | | | | | |
| P1 | | T6ER | 600 | T6ER | | T6ER | | | | | |
| P2 | | T6DR | | | | T6DR | | | | | |
| P3 | | T6CR | | | | T6CR | | | | | |

* = 0 : Industrial version
* = B : Mobile version

HF-0, HF2 = Antiwear Petroleum Base
HF-1 = Non Antiwear Petroleum Base
HF-5 = Synthetic Fluids
HF-3 = Water in oil Emulsions
HF-4 = Water Glycols

For further information or if the performance characteristics outlined above do not meet your own particular requirements, please consult your local DENISON Hydraulics office.

**PRIMING AT STARTING**

When the pump is set into operation for the first time, it must be primed at the lowest possible speed and pressure. When a pressure relief valve is used at the outlet, it should be backed off to minimize return pressure.
When possible, an air bleed off should be provided in the circuit to facilitate purging of system air.
Never operate the pump at maximum speed and pressure without making sure that the pump priming is completed and that the fluid is correctly deaerated (no aeration).



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| Cartridge | | Speed RPM | | | | | | | | Displacement |
|---|---|---|---|---|---|---|---|---|---|---|
| Size | Displacement | 1200 | 1500 | 1800 | 2100 | 2200 | 2300 | 2500 | 2800 | |
| C | *03 | 0,80 | 0,80 | 0,80 | 0,80 | 0,80 | 0,80 | 0,90 | 1,00 | *03 |
| | *05 | | | | | | | | | *05 |
| | *06 | | | | | | | | | *06 |
| | *08 | | | | | | | | | *08 |
| | *10 | | | | | | | | | *10 |
| | *12 | | | | | | 0,85 | 0,92 | | *12 |
| | *14 | | | | | | | 0,95 | | *14 |
| | *17 | | | | | 0,85 | 0,90 | | 1,03 | *17 |
| | *20 | | | | | | | | | *20 |
| | *22 | | | | 0,85 | 0,90 | | 0,98 | 1,05 | *22 |
| | *25 | | | | 0,90 | 0,95 | 0,95 | 1,05 | | *25 |
| | *28 | | | | | 0,98 | 0,98 | 1,08 | | *28 |
| | *31 | | | | 0,85 | 0,90 | 1,00 | 1,11 | | *31 |
| D | *14 | 0,80 | 0,80 | 0,80 | 0,80 | 0,88 | 0,95 | 1,00 | | *14 |
| | *17 | | | | | | | | | *17 |
| | *20 | | | | | | | | | *20 |
| | *24 | | | | 0,82 | | | 1,10 | | *25 |
| | *28 | | | | 0,85 | 0,92 | 1,00 | 1,18 | | *28 |
| | *31 | | | | 0,90 | 0,95 | | 1,23 | | *31 |
| | *35 | | | | 0,92 | 0,98 | 1,02 | 1,29 | | *35 |
| | *38 | | | | 0,95 | 1,00 | 1,05 | | | *38 |
| | *42 | | | | | 1,02 | 1,08 | | | *42 |
| | *45 | | | 0,85 | 0,98 | 1,05 | | | | *45 |
| | *50 | | | | 1,02 | 1,09 | | | | *50 |
| E | 042 | 0,80 | 0,80 | 0,80 | 0,88 | 1,00 | | | | 042 |
| | 045 | | | | 0,90 | | | | | 045 |
| | 050 | | | | | | | | | 050 |
| | 052 | | | | | | | | | 052 |
| | 062 | | | 0,85 | 0,95 | | | | | 062 |
| | 066 | 0,85 | 0,85 | 0,95 | 1,00 | 1,09 | | | | 066 |
| | 072 | | | 0,85 | | 1,05 | | | | 072 |

Inlet pressure is measured at inlet flange with petroleum base fluids at a viscosity between 10 and 65 cSt. The difference between inlet pressure at the pump flange and atmospheric pressure must not exceed 0,2 bar to prevent aeration.

Multiply absolute pressure by 1,25 for HF-3, HF-4 fluids.
by 1,35 for HF-5 fluid.
by 1,10 for ester or rapeseed base.

Use highest cartridge absolute pressure for triple pumps.

## GENERAL CHARACTERISTICS

| | Mounting standard | Weight without connector and bracket - kg | Moment of inertia $km^2 \times 10^{-4}$ | SAE 4 bolts J518c - ISO/DIS 6162-1 | | | |
|---|---|---|---|---|---|---|---|
| | | | | Suction | Pressure | | |
| T6CR/ T6CRM | SAE J744c ISO/3019-1 SAE B | 17,1 | 7,6 | 1"1/2 | 1" | | |
| T6DR/ T6DRM | SAE J744c ISO/3019-1 SAE C | 29,0 | 23,4 | 2" | 1"1/4 | | |
| T6ER/ T6ERM | | 39,2 | 51,6 | 3" | 1"1/2 | | |
| T6DCCR | | 62,0 | 37,4 | 4" | **P1** | **P2** | **P3** |
| | | | | | 1"1/4 | 1" | 1" or 3/4" |
| T6EDCR | 250 B4HW ISO/3019-2 | 100,0 | 80,3 | 4" | 1"1/2 | 1"1/4 | 1" or 3/4" |



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## CALCULATION

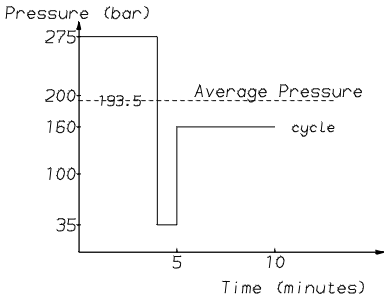
| *To resolve* | | | Performances required | | | |
|---|---|---|---|---|---|---|
| Volumetric displacement | Vi | [ml/rev.] | Requested flow | qv | [l/min] | 60 |
| Available flow | qv | [l/min] | Speed | n | [R.P.M.] | 1500 |
| Input power | P | [kW] | Pressure | p | [bar] | 150 |

## ROUTINE AND EXAMPLE

| *Routine :* | Example : |
|---|---|
| *1. First calculation* $Vi = \frac{1000\ Q}{n}$ | $Vi = \frac{1000\ x\ 60}{1500} = 40$ ml/rev. |
| *2. Choose Vi of pump immediately greater (see tabulation)* | T6CR 014 Vi = 46 ml/rev. |
| *3. Theoretical flow of this pump* $q_{Vi} = \frac{Vp\ x\ n}{1000}$ | $q_{VI} = \frac{46\ x\ 1500}{1000} = 69$ l/min |
| *4. Find* $q_{Vs}$ *leakage function of pressure* $q_{Vs} = f(p)$ *on curve at 10 or 24 cSt* | T6CR (page 10) : $q_{VS}$ = 5 l/min at 150 bar, 24 cSt |
| *5. Available flow* $q_{Ve} = q_{Vi} - q_{Vs}$ | $q_{Ve}$ = 69 - 5 = 64 l/min |
| *6. Theoretical input power* $Pi = \frac{qvi\ x\ p}{600}$ | $Pi = \frac{69\ x\ 150}{600} = 17{,}3$ kW |
| *7. Find ps hydrodynamic power loss on curve* | T6CR (page 10) : Ps at 1500 R.P.M., 150 bar = 1,5 kW |
| *8. Calculation of necessary input power* $P = Pi + Ps$ | P = 17,3 + 1,5 = 18,8 kW |
| *9. Results* | Vi = 46,0 ml/rev<br>$q_{Ve}$ = 64,0 l/min<br>P = 18,8 kW } T6CR 014 |

*These calculation steps must be followed for each application.*

## INTERMITTENT PRESSURE RATING




T6 units may be operated intermittently at pressures higher than the recommended continuous rating when the time weighted average of pressure is less than or equal to the continuous duty pressure rating.
This intermittent pressure rating calculation is only valid if other parameters : speed, fluid, viscosity and contamination level are respected.
For total cycle time higher than 15 minutes, please consult your DENISON Hydraulics representative.

Example : T6CR - 014
Duty cycle 4 min. at 275 bar
1 min. at 35 bar
5 min. at 160 bar

$$\frac{(4\ x\ 275) + (1\ x\ 35) + (5\ x\ 160)}{10} = 193{,}5 \text{ bar}$$

193,5 bar is lower than 240 bar allowed as continuous pressure for T6CR - 014 with HF-0 fluid.



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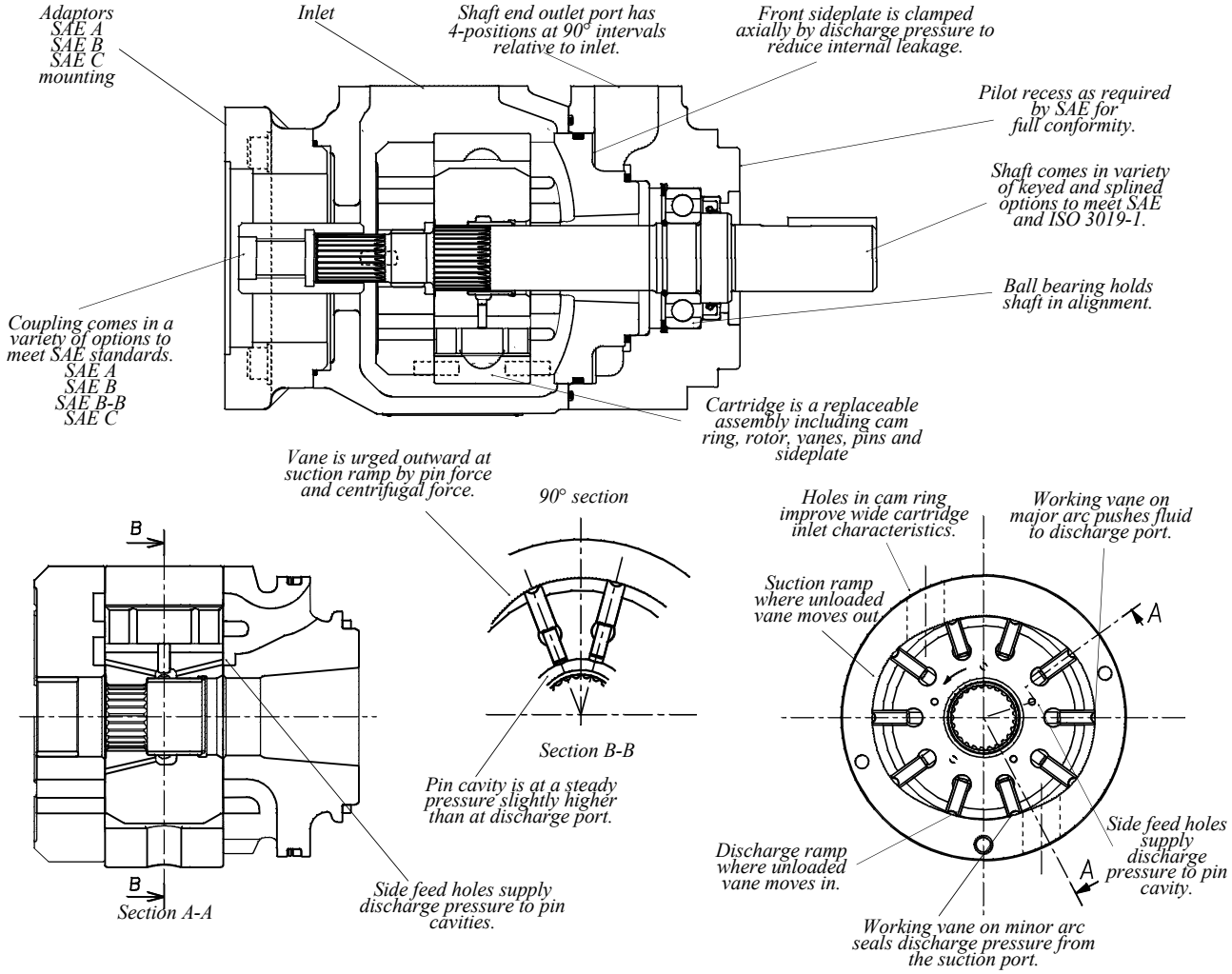


## APPLICATION ADVANTAGES

- The high pressure capability up to 275 bar, in the small envelope, reduces the installation costs and provides an extended life at reduced pressure.
- The high volumetric efficiency, typically 94%, reduces the heat generation, and allows speeds down to 600 RPM at full pressure.
- The high mechanical efficiency, typically 94%, reduces the energy consumption.
- The wide speed range from 600 RPM to 2800 RPM, combined with large size cartridge displacements, will optimize operation for the lowest noise level in the smallest envelope.
- Operating the pump at a high viscosity (up to 860 cSt) and/or at alow speed (down to 600 RPM) allows applications in cold environments with minimum energy consumption and without seizure risk.
- The low ripple pressure ± 2 bar reduces the piping noise and increases the life time of other components in the circuit.
- The high resistance to particle contamination because of the double lip vane increases the pump life.
- The large variety of options (cam displacement, shaft, porting) allows customized installation.

## RECOMMENDED FLUIDS

Petroleum based antiwear R & O fluids.
These fluids are the recommended fluids for T6 series pumps. Maximum catalog ratings and performance data are based on operation with these fluids. These fluids are covered by DENISON Hydraulics HF-0 and HF-2 specification.

## ACCEPTABLE ALTERNATIVE FLUIDS

The use of fluids other than petroleum based antiwear R & O fluids requires that the maximum ratings of the pumps will be reduced. In somes cases the minimum replenishment pressures must be increased. Consult specific sections for more details.

## VISCOSITY

| | |
|---|---|
| Max. (cold start, low speed & pressure) | 860 $mm^2/s$ (cSt) |
| Max. (full speed & pressure) | 108 $mm^2/s$ (cSt) |
| Optimum (max. life) | 30 $mm^2/s$ (cSt) |
| Min. (full speed & pressure for HF-1, HF-3, HF-4 & HF-5 fluids) | 18 $mm^2/s$ (cSt) |
| Min. (full speed & pressure for HF-0 & HF-2 fluids) | 10 $mm^2/s$ (cSt) |

## VISCOSITY INDEX

90° min. higher values extend the range of operating temperatures.

Maximum fluid temperature (θ) °K

| | |
|---|---|
| HF-0, HF-1, HF-2 | 373 (+ 100° C) |
| HF-3, HF-4 | 323 (+ 50° C) |
| HF-5 | 343 (+ 70° C) |
| Biodegradable fluids (esters & rapeseed base) | 338 (+ 65° C) |

Minimum fluid temperature (θ) °K

| | |
|---|---|
| HF-0, HF-1, HF-2, HF-5 | 255 (- 18° C) |
| HF-3, HF-4 | 283 (+ 10° C) |
| Biodegradable fluids (esters & rapeseed base) | 253 (- 20° C) |

## FLUID CLEANLINESS

The fluid must be cleaned before and during operation to maintain the contamination level of NAS 1638 class 8 (or ISO 18/14) or better. Filters with 25 micron (or better, ß10 ≥ 100) nominal ratings may be adequate but do not guarantee the required cleanliness levels.
Suction strainers must be of adequate size to provide the minimum inlet pressure specified. 100 mesh (149 micron) is the finest mesh recommended. Use oversize strainers or omit them altogether on applications which require cold starts or use fire resistant fluids.

## OPERATING TEMPERATURES AND VISCOSITIES

Operating temperatures are a function of fluid viscosities, fluid type, and the pump. Fluid viscosity should be selected to provide the optimum viscosity at normal operating temperatures. For cold starts, the pumps should be operated at low speed and pressure until the fluid warms up to an acceptable viscosity for full power operation.

## WATER CONTAMINATION IN THE FLUID

Maximum acceptable content of water.
ù 0,10 % for mineral base fluids.
ù 0,05 % for synthetic fluids, crankcase oils, biodegradable fluids.
If amount of water is higher, then it should be drained off the circuit.

## COUPLINGS AND FEMALE SPLINES
## SPLINES

- The mating female spline should be free to float and find its own center. If both members are rigidly supported, they must be aligned within 0,15 TIR or less to reduce fretting. The angular alignment of two spline axes must be less than ± 0,05 per 25,4 radius.
- The coupling spline must be lubricated with a lithium molydisulfide grease or a similar lubricant.
- The coupling must be hardened to a hardness between 27 and 45 R.C.
- The female spline must be made to conform to the Class 1 fit as described in SAE-J498b (1971). This is described as a Flat Root Side Fit.

## KEYED SHAFTS

DENISON Hydraulics supplies the T6 series keyed shaft pumps with high strength heat-treated keys. Therefore, when installing or replacing these pumps, the heat-treated keys must be used in order to insure maximum life in the application. If the key is replaced, it must be a heat-treated key between 27 and 34 R.C. hardness. The corners of the keys must be chamfered from 0,76 to 1,02 at 45° to clear the radii in the key way.

The alignment of keyed shafts must be within the tolerances given for splined shafts.

## NOTE

## SHAFT LOADS

These products are primarily designed for coaxial drives which do not impose axial or side loading on the shaft. Consult specific sections for more details.

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**Model No.** **T6CR - 022 - 1 R 00 - A 1 0 - A 1 ..**

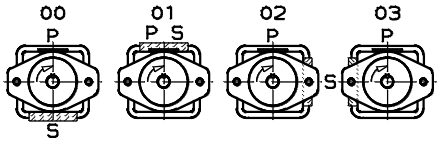
**Series**

**Cam ring**
(Delivery at 0 bar & 1500 r.p.m.)
003 = 16,2 l/min
005 = 25,8 l/min
006 = 31,9 l/min
008 = 39,6 l/min
010 = 51,1 l/min
012 = 55,6 l/min
014 = 69,0 l/min
017 = 87,4 l/min
020 = 95,7 l/min
022 = 105,4 l/min
025 = 118,9 l/min
028 = 133,2 l/min
031 = 150,0 l/min

**Type of shaft**
1 = keyed (SAE BB)
2 = keyed (non SAE)
3 = splined (SAE B)
4 = splined (SAE BB)
5 = keyed (non SAE)

**Direct. of rotation (view on shaft end)**
R = clockwise
L = counter-clockwise

**Porting combination**
00 = standard




**Modification**

**Seal class**
1 = S1 (for mineral oil)
4 = S4 (for the resistant fluids)
5 = S5 (for mineral oil and fire resistant fluids)

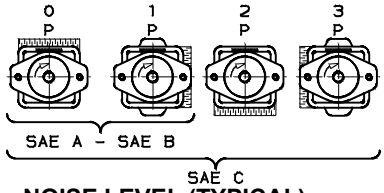
**Design letter**

**Porting adaptor**

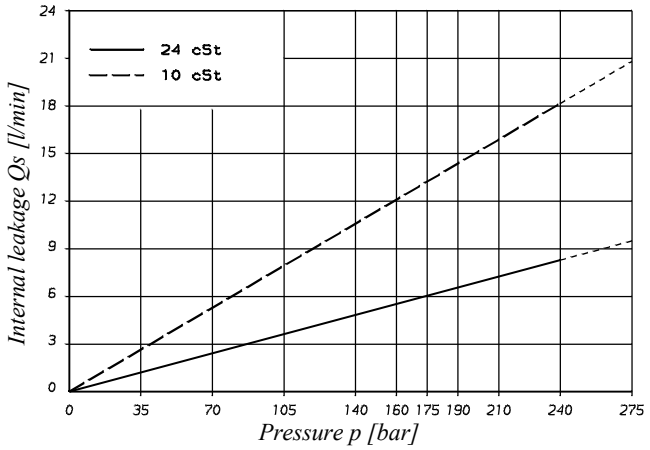
**Coupling**
1 = SAE A
2 = SAE B
3 = SAE BB
4 = SAE C
5 = SAE J498b
16/32 - 11 teeth

**Adaptor**
0 = None
A = SAE A
B = SAE B
C = SAE C

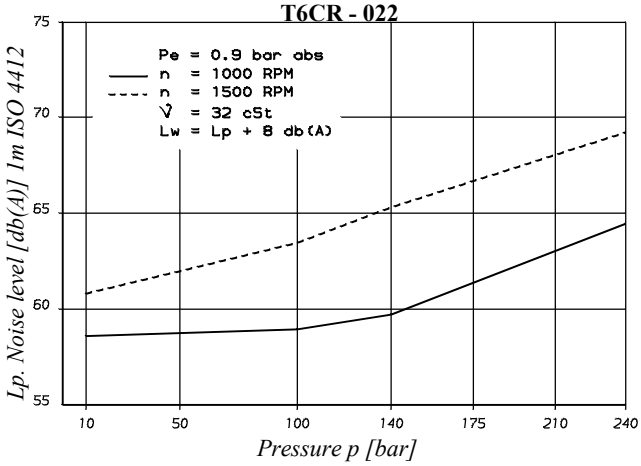
*Porting adaptor*




## INTERNAL LEAKAGE (TYPICAL)

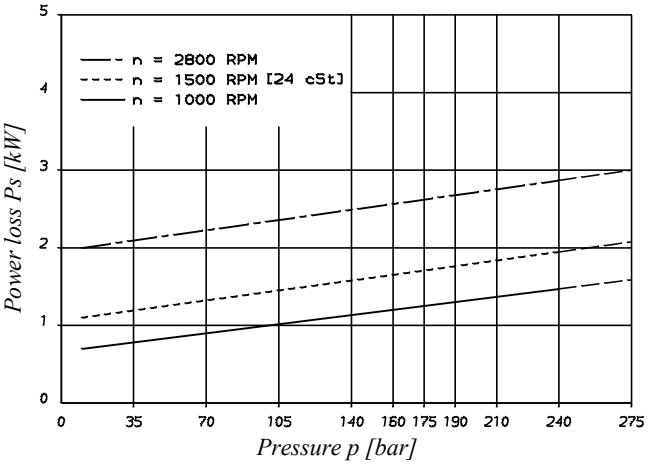



## NOISE LEVEL (TYPICAL)
**T6CR - 022**

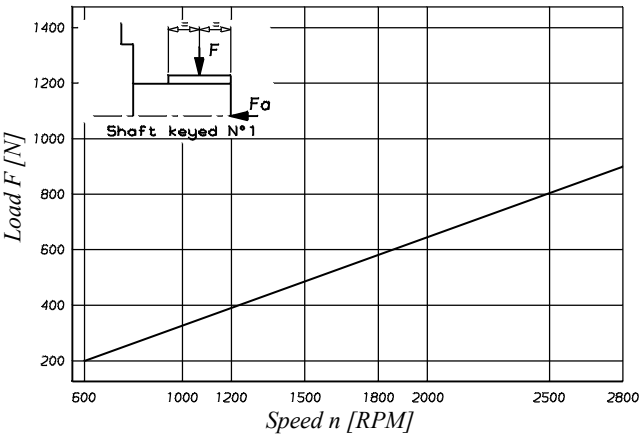



*Do not operate the pump more than 5 seconds at any speed or viscosity if internal leakage is more than 50% of theoretical flow.*

## POWER LOSS HYDROMECHANICAL (TYPICAL)




## PERMISSIBLE RADIAL LOAD




*Maximum permissible axial load Fa = 800 N*



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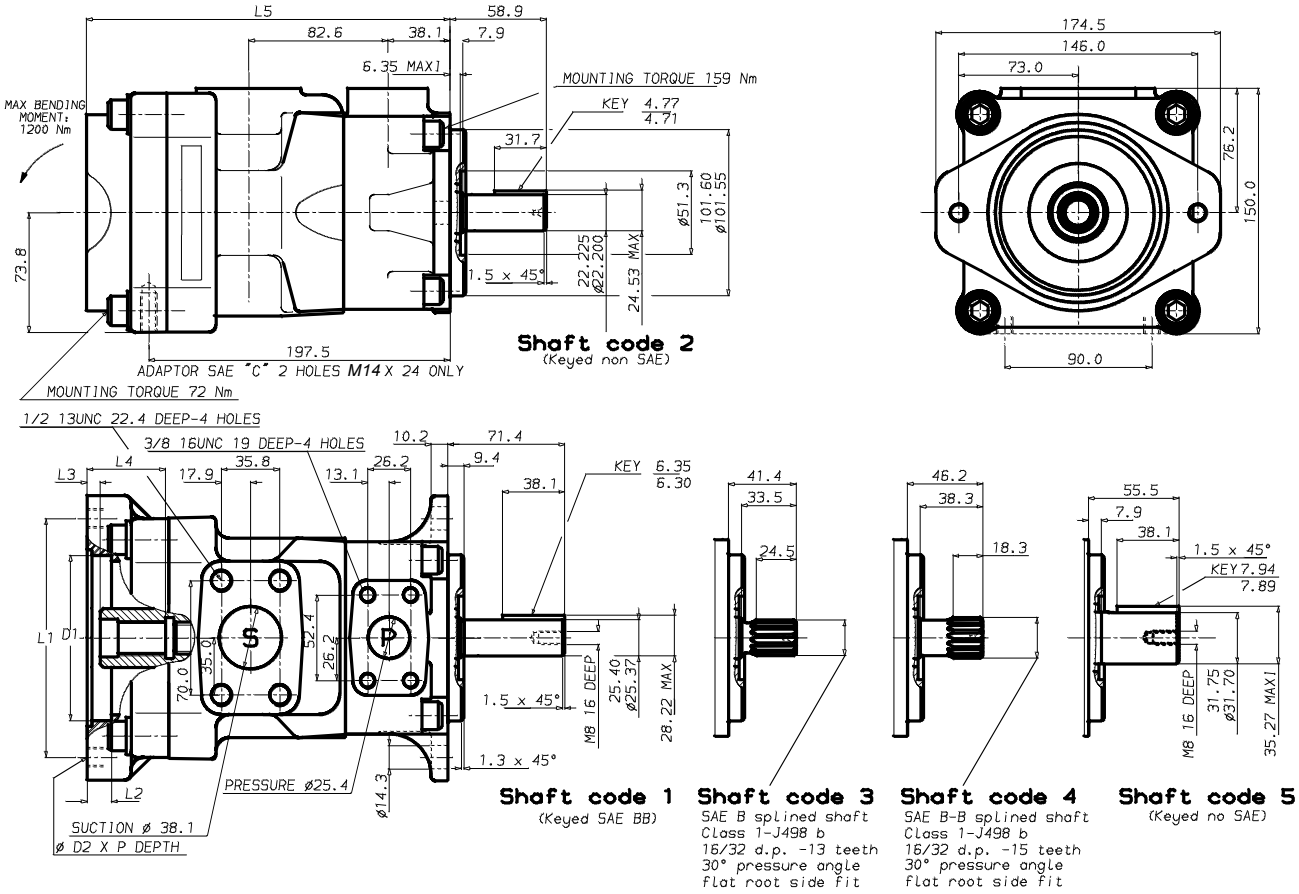
Vierzon - France

## DIMENSIONS & OPERATING CHARACTERISTICS - Weight : 20,4 kg - T6CR SERIES INDUSTRIAL APPLICATION




| Adaptor | D1 | D2 | P | L1 | L2 | L3 | L4 | L5 |
|---|---|---|---|---|---|---|---|---|
| SAE A | 82,65/82,60 | M10 | 24 | 106,4 | 11,0 | 8,0 | 32,0 | 209,0 |
| SAE B | 101,70/101,65 | M12 | 28 | 146,0 | 16,0 | 8,0 | 46,0 | 223,0 |
| SAE C | 127,10/127,05 | M16 | - | 181,0 | 16,0 | 8,0 | 56,0 | 233,0 |

| Adaptor | SAE A | | | SAE B | | SAE C |
|---|---|---|---|---|---|---|
| Coupling drive | SAE A | SAE 11 teeth | SAE B | SAE B | SAE BB | SAE C |
| Number of teeth | 9 | 11 | 13 | 13 | 15 | 14 |
| Pitch | 16/32 | 16/32 | 16/32 | 16/32 | 16/32 | 12/24 |
| Pressure angle | 30° | 30° | 30° | 30° | 30° | 30° |
| Major dia. (min) | 15,875 | 19,05 | 22,225 | 22,225 | 25,400 | 31,750 |
| Minor dia. (min) | 12,700 | 16,017 | 19,134 | 19,134 | 22,268 | 27,589 |

Shaft torque limits [ml/rev x bar]

| Shaft | V x p max. | Coupling drive | V x p max. |
|---|---|---|---|
| 1 | 21420 | SAE A | 11000 |
| 2 | 14300 | SAE B | 20600 |
| 3 | 20600 | SAE BB | 22050 |
| 4 | 32670 | SAE C | 22050 |
| 5 | 34180 | SAE - 11 teeth | 15850 |

### OPERATING CHARACTERISTICS - TYPICAL [24 cSt]

| Series | Volumetric Displacement Vp | Flow Q [l/min] & n = 1500 RPM | | | Input power P [kW] & n = 1500 RPM | | |
|---|---|---|---|---|---|---|---|
| | | p = 0 bar | p = 140 bar | p = 240 bar | p = 7 bar | p = 140 bar | p = 240 bar |
| 003 | 10,8 ml/rev | 16,2 | 11,2 | 7,7 | 1,3 | 5,3 | 8,4 |
| 005 | 17,2 ml/rev | 25,8 | 20,8 | 17,3 | 1,4 | 7,5 | 12,2 |
| 006 | 21,3 ml/rev | 31,9 | 26,9 | 23,4 | 1,5 | 8,9 | 14,7 |
| 008 | 26,4 ml/rev | 39,6 | 34,6 | 31,1 | 1,6 | 10,7 | 17,7 |
| 010 | 34,1 ml/rev | 51,1 | 46,1 | 42,6 | 1,7 | 13,4 | 22,3 |
| 012 | 37,1 ml/rev | 55,6 | 50,6 | 47,1 | 1,7 | 14,4 | 24,1 |
| 014 | 46,0 ml/rev | 69,0 | 64,0 | 60,5 | 1,9 | 17,6 | 29,5 |
| 017 | 58,3 ml/rev | 87,4 | 82,4 | 78,9 | 2,1 | 21,9 | 36,9 |
| 020 | 63,8 ml/rev | 95,7 | 90,7 | 87,2 | 2,2 | 23,8 | 40,2 |
| 022 | 70,3 ml/rev | 105,4 | 100,4 | 96,9 | 2,3 | 26,1 | 44,1 |
| 025[1)] | 79,3 ml/rev | 118,9 | 113,9 | 110,4 | 2,5 | 29,2 | 49,5 |
| 028[1)] | 88,8 ml/rev | 133,2 | 128,2 | 125,8[2)] | 2,8 | 32,7 | 48,5[2)] |
| 031[1)] | 100,0 ml/rev | 150,0 | 145,0 | 142,6[2)] | 2,8 | 36,5 | 54,4[2)] |

*1) 025 - 028 - 031 = 2500 R.P.M. max.* *2) 028 - 031 = 210 bar max. int.* *Port connection can be furnished with metric threads.*



**Parker Hannifin**
Denison Vane Pump Division
Vierzon - France

**Model No.** **T6DR - 045 - 1 R 00 - A 1 0 - A 1 ..**

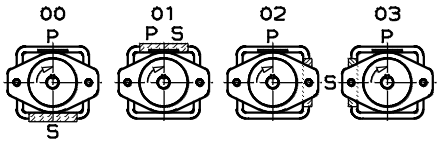
**Series**

**Cam ring**
(Delivery at 0 bar & 1500 r.p.m.)
014 = 71,4 l/min
017 = 87,3 l/min
020 = 99,0 l/min
024 = 119,3 l/min
028 = 134,5 l/min
031 = 147,4 l/min
035 = 166,5 l/min
038 = 180,4 l/min
042 = 204,0 l/min
045 = 218,5 l/min
050 = 237,0 l/min

**Type of shaft**
1 = keyed (SAE C)
2 = keyed (SAE CC)
3 = splined (SAE C)
5 = keyed (non SAE)

**Direct. of rotation (view on shaft end)**
R = clockwise
L = counter-clockwise

**Porting combination**




**Modification**

**Seal class**
1 = S1 (for mineral oil)
4 = S4 (for the resistant fluids)
5 = S5 (for mineral oil and fire resistant fluids)

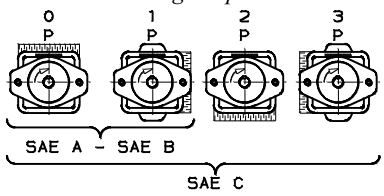
**Design letter**

**Porting adaptor**

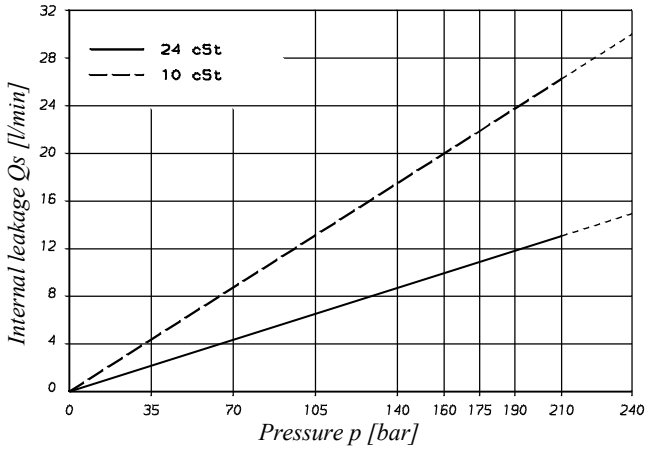
**Coupling**
1 = SAE A
2 = SAE B
3 = SAE BB
4 = SAE C
5 = SAE J498b
16/32 - 11 teeth

**Adaptor**
0 = None
A = SAE A
B = SAE B
C = SAE C

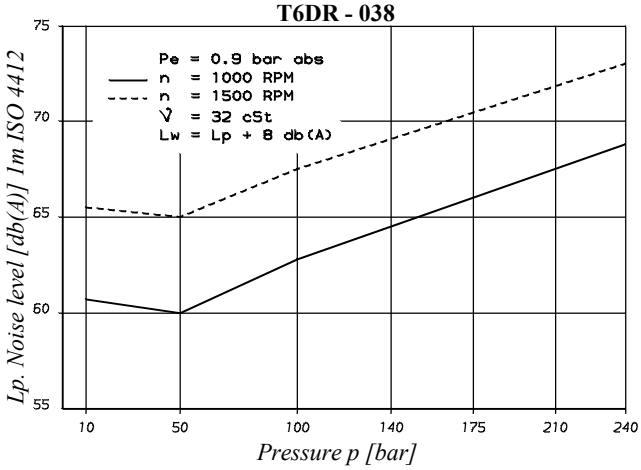
*Porting adaptor*




## INTERNAL LEAKAGE (TYPICAL)

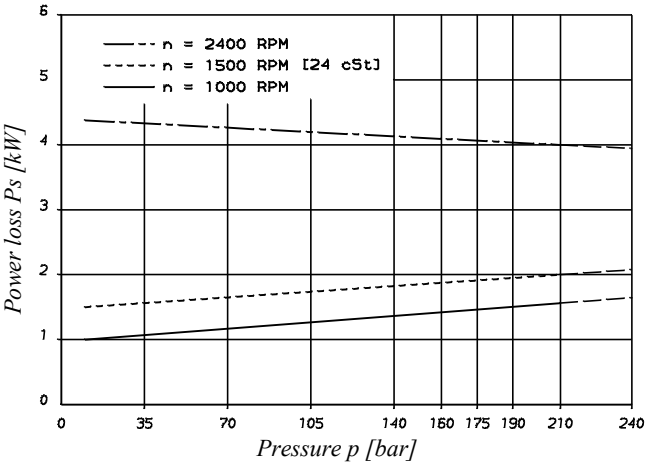



## NOISE LEVEL (TYPICAL)
**T6DR - 038**

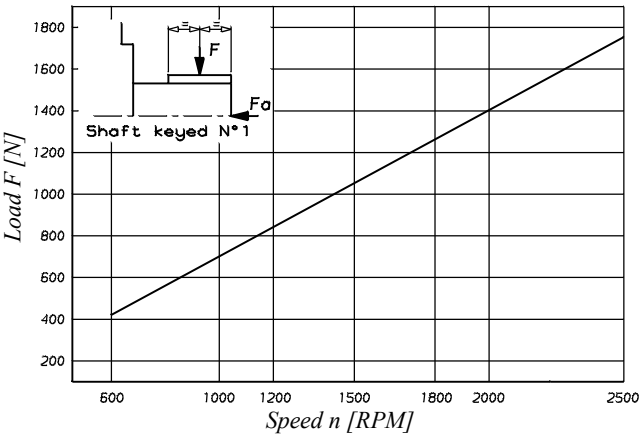



*Do not operate the pump more than 5 seconds at any speed or viscosity if internal leakage is more than 50% of theoretical flow.*

## POWER LOSS HYDROMECHANICAL (TYPICAL)



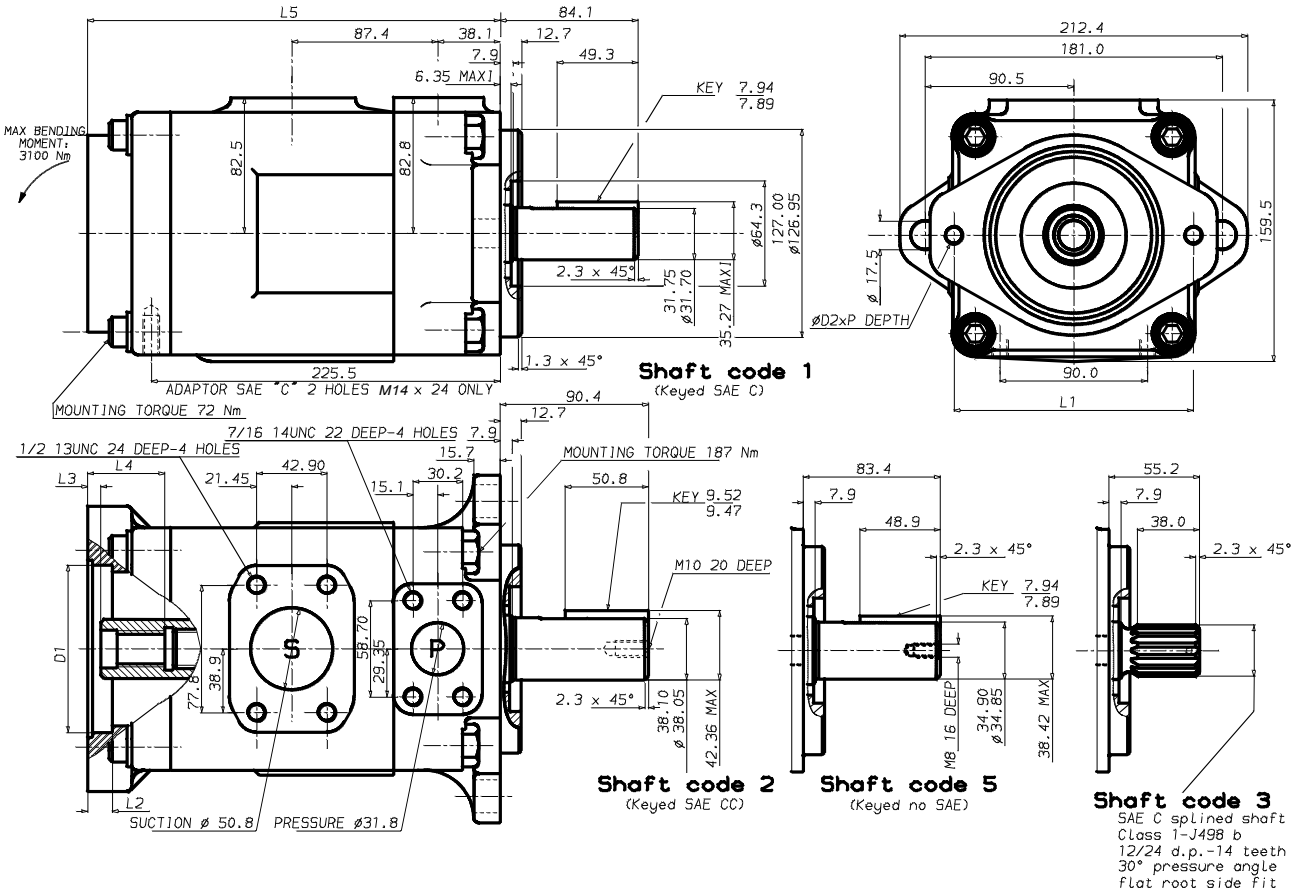

## PERMISSIBLE RADIAL LOAD




*Maximum permissible axial load Fa = 1200 N*



**Parker Hannifin**
Denison Vane Pump Division
Vierzon - France




| Adaptor | D1 | D2 | P | L1 | L2 | L3 | L4 | L5 |
|---|---|---|---|---|---|---|---|---|
| SAE A | 82,65/82,60 | M10 | 24 | 106,4 | 11,0 | 8,0 | 32,0 | 237,0 |
| SAE B | 101,70/101,65 | M12 | 28 | 146,0 | 16,0 | 8,0 | 46,0 | 251,0 |
| SAE C | 127,10/127,05 | M16 | - | 181,0 | 16,0 | 8,0 | 56,0 | 261,0 |

| Adaptor | SAE A | | | SAE B | | SAE C |
|---|---|---|---|---|---|---|
| Coupling drive | SAE A | SAE 11 teeth | SAE B | SAE B | SAE BB | SAE C |
| Number of teeth | 9 | 11 | 13 | 13 | 15 | 14 |
| Pitch | 16/32 | 16/32 | 16/32 | 16/32 | 16/32 | 12/24 |
| Pressure angle | 30° | 30° | 30° | 30° | 30° | 30° |
| Major dia. (min) | 15,875 | 19,05 | 22,225 | 22,225 | 25,400 | 31,750 |
| Minor dia. (min) | 12,700 | 16,017 | 19,134 | 19,134 | 22,268 | 27,589 |

| Shaft torque limits [ml/rev x bar] | | | |
|---|---|---|---|
| Shaft | V x p max. | Coupling drive | V x p max. |
| 1 | 43240 | SAE A | 11000 |
| 2 | 66036 | SAE B | 20600 |
| 3 | 61200 | SAE BB | 32670 |
| 5 | 55600 | SAE C | 37390 |
| | | SAE - 11 teeth | 15850 |

## OPERATING CHARACTERISTICS - TYPICAL [24 cSt]

| Series | Volumetric Displacement Vp | Flow Q [l/min] & n = 1500 RPM | | | Input power P [kW] & n = 1500 RPM | | |
|---|---|---|---|---|---|---|---|
| | | p = 0 bar | p = 140 bar | p = 240 bar | p = 7 bar | p = 140 bar | p = 240 bar |
| 014 | 47,6 ml/rev | 71,4 | 62,1 | 55,9 | 2,3 | 18,5 | 30,6 |
| 017 | 58,2 ml/rev | 87,3 | 78,0 | 71,8 | 2,5 | 22,2 | 37,0 |
| 020 | 66,0 ml/rev | 99,0 | 89,7 | 83,5 | 2,8 | 24,9 | 41,7 |
| 024 | 79,5 ml/rev | 119,3 | 110,0 | 103,8 | 3,0 | 29,6 | 49,8 |
| 028 | 89,7 ml/rev | 134,5 | 125,2 | 119,0 | 3,2 | 33,2 | 55,9 |
| 031 | 98,3 ml/rev | 147,4 | 138,1 | 131,9 | 3,3 | 36,2 | 61,0 |
| 035 | 111,0 ml/rev | 166,5 | 157,2 | 151,0 | 3,5 | 40,7 | 68,7 |
| 038 | 120,3 ml/rev | 180,4 | 171,1 | 164,9 | 3,7 | 43,9 | 74,3 |
| 042[1)] | 136,0 ml/rev | 204,0 | 194,7 | 188,5 | 4,0 | 49,4 | 83,7 |
| 045[1)] | 145,7 ml/rev | 218,5 | 209,2 | 203,0 | 4,1 | 52,8 | 89,5 |
| 050[1)] | 158,0 ml/rev | 237,0 | 227,7 | 224,0[2)] | 4,4 | 57,0 | 85,0[2)] |

*1) 042 - 045 - 050 = 2200 R.P.M. max.* *2) 050 = 210 bar max. int.* *Port connection can be furnished with metric threads.*



**Parker Hannifin**
Denison Vane Pump Division
Vierzon - France

**Model No.** **T6ER - 066 - 1 R 00 - A 1 0 - A 1 ..**

**Series**

**Cam ring**
(Delivery at 0 bar & 1500 r.p.m.)
042 = 198,5 l/min
045 = 213,6 l/min
050 = 237,7 l/min
052 = 247,2 l/min
062 = 295,0 l/min
066 = 319,9 l/min
072 = 340,6 l/min

**Type of shaft**
1 = keyed (SAE CC)
3 = splined (SAE C)
4 = splined (SAE CC)

**Direct. of rotation (view on shaft end)**
R = clockwise
L = counter-clockwise

**Porting combination**

**Modification**

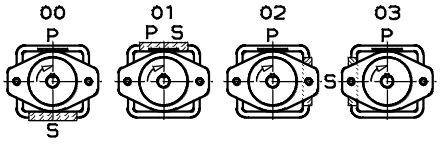
**Seal class**
1 = S1 (for mineral oil)
4 = S4 (for the resistant fluids)
5 = S5 (for mineral oil and fire resistant fluids)

**Design letter**

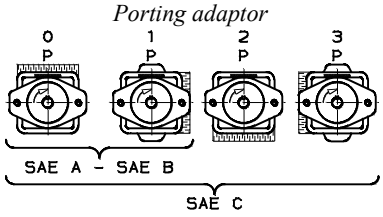
**Porting adaptor**

**Coupling**
1 = SAE A
2 = SAE B
3 = SAE BB
4 = SAE C
5 = SAE J498b
16/32 - 11 teeth

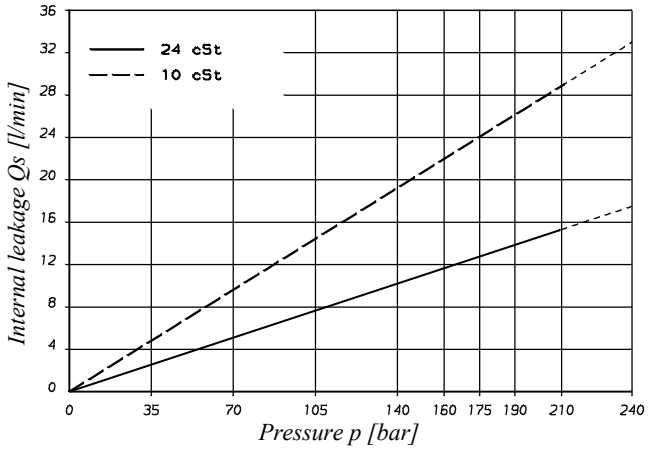
**Adaptor**
0 = None
A = SAE A
B = SAE B
C = SAE C



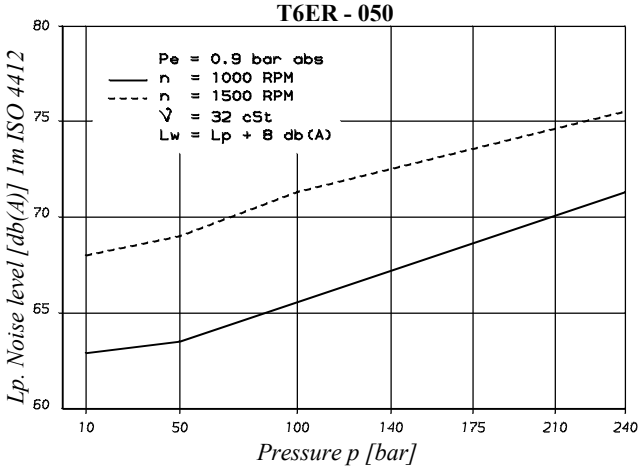

*Porting adaptor*



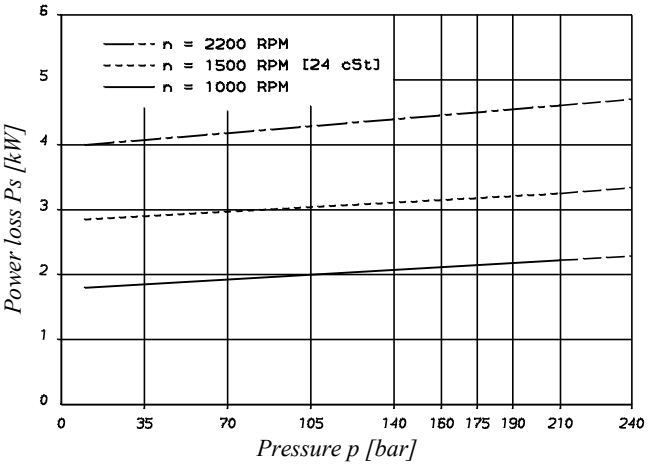

## INTERNAL LEAKAGE (TYPICAL)



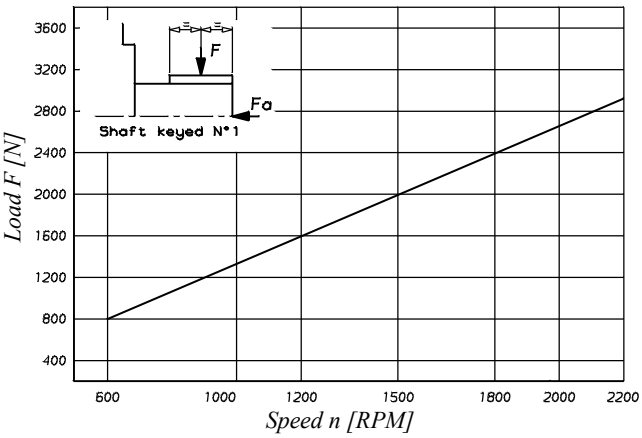

## NOISE LEVEL (TYPICAL)
**T6ER - 050**




## POWER LOSS HYDROMECHANICAL (TYPICAL)




## PERMISSIBLE RADIAL LOAD




*Maximum permissible axial load Fa = 2000 N*



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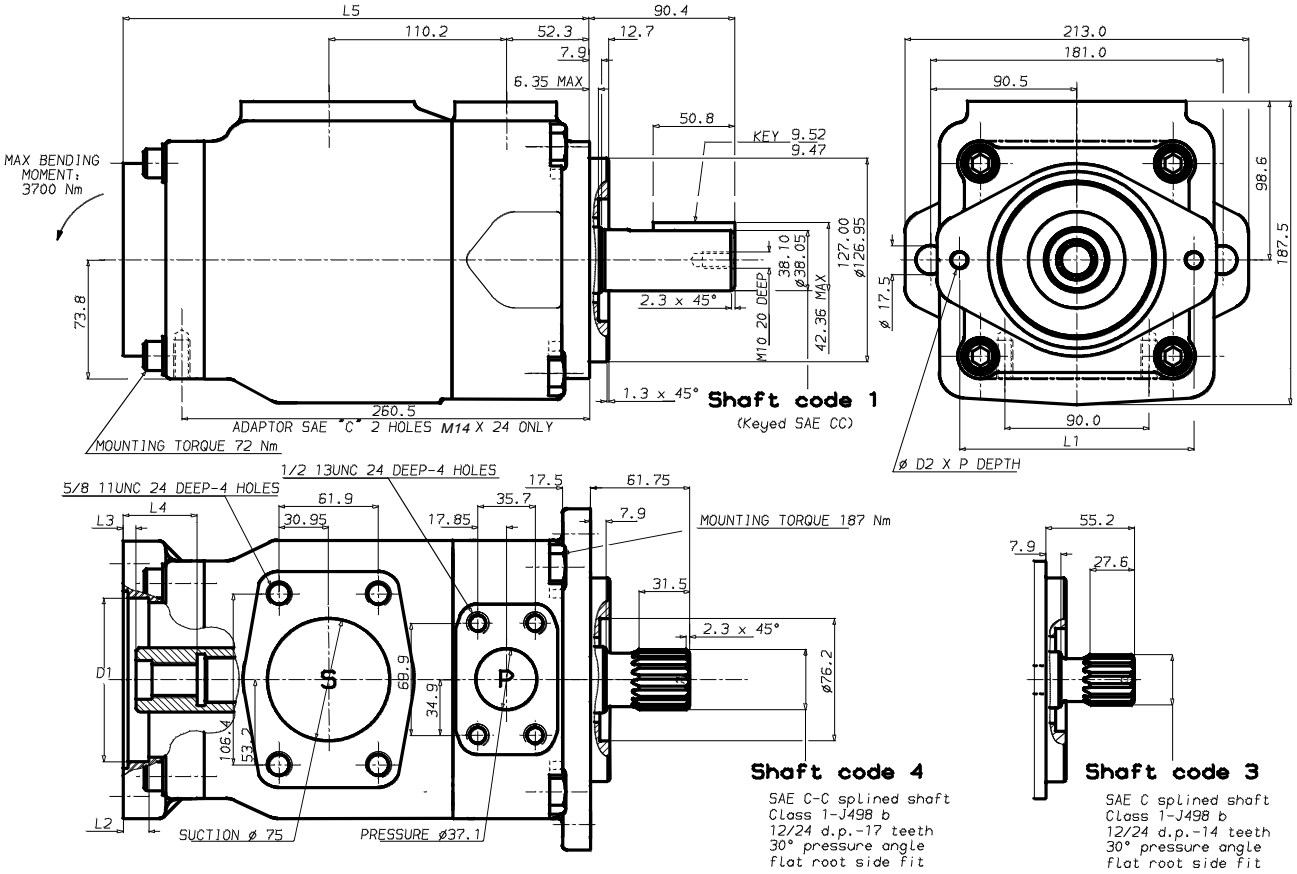



| Adaptor | D1 | D2 | P | L1 | L2 | L3 | L4 | L5 |
|---|---|---|---|---|---|---|---|---|
| **SAE A** | 82,65/82,60 | M10 | 24 | 106,4 | 11,0 | 8,0 | 32,0 | 272,0 |
| **SAE B** | 101,70/101,65 | M12 | 28 | 146,0 | 16,0 | 8,0 | 46,0 | 286,0 |
| **SAE C** | 127,10/127,05 | M16 | - | 181,0 | 16,0 | 8,0 | 56,0 | 296,0 |

| **Adaptor** | **SAE A** | | | **SAE B** | | **SAE C** |
|---|---|---|---|---|---|---|
| Coupling drive | SAE A | SAE 11 teeth | SAE B | SAE B | SAE BB | SAE C |
| Number of teeth | 9 | 11 | 13 | 13 | 15 | 14 |
| Pitch | 16/32 | 16/32 | 16/32 | 16/32 | 16/32 | 12/24 |
| Pressure angle | 30° | 30° | 30° | 30° | 30° | 30° |
| Major dia. (min) | 15,875 | 19,05 | 22,225 | 22,225 | 25,400 | 31,750 |
| Minor dia. (min) | 12,700 | 16,017 | 19,134 | 19,134 | 22,268 | 27,589 |

| Shaft torque limits [ml/rev x bar] | | | |
|---|---|---|---|
| **Shaft** | **V x p max.** | **Coupling drive** | **V x p max.** |
| 1 | 80560 | SAE A | 11000 |
| 3 | 61200 | SAE B | 20600 |
| 4 | 120210 | SAE BB | 32670 |
| | | SAE C | 66480 |
| | | SAE - 11 teeth | 15850 |

## OPERATING CHARACTERISTICS - TYPICAL [24 cSt]

| **Series** | **Volumetric Displacement Vp** | **Flow Q [l/min] & n = 1500 RPM** | | | **Input power P [kW] & n = 1500 RPM** | | |
|---|---|---|---|---|---|---|---|
| | | **p = 0 bar** | **p = 140 bar** | **p = 240 bar** | **p = 7 bar** | **p = 140 bar** | **p = 240 bar** |
| 042 | 132,3 ml/rev | 198,5 | 188,5 | 181,3 | 5,2 | 49,4 | 82,6 |
| 045 | 142,4 ml/rev | 213,6 | 203,6 | 196,5 | 5,4 | 52,9 | 88,7 |
| 050 | 158,5 ml/rev | 237,7 | 227,7 | 220,6 | 5,7 | 58,5 | 98,3 |
| 052 | 164,8 ml/rev | 247,2 | 237,2 | 230,1 | 5,8 | 60,8 | 102,1 |
| 062 | 196,7 ml/rev | 295,0 | 285,0 | 277,9 | 6,4 | 71,9 | 121,3 |
| 066 | 213,3 ml/rev | 319,9 | 309,9 | 302,8 | 6,7 | 77,7 | 131,2 |
| 072 | 227,1 ml/rev | 340,6 | 330,6 | 323,5 | 6,9 | 82,6 | 139,5 |

*Port connection can be furnished with metric threads.*



**Parker Hannifin**
Denison Vane Pump Division
Vierzon - France

**Model No.** **T6DCCR - 038 - 028 - 008 - 2 R 00 - A 1 - 00 ..**

**Series**

**Rear cap end for mounting SAE A auxiliary pump coupling adaptor SAE A - 9 teeth**

**Cam ring for "P1"**
(Delivery at 0 bar & 1500 r.p.m.)

| | |
|---|---|
| 014 = 71,4 l/min | 035 = 166,5 l/min |
| 017 = 87,3 l/min | 038 = 180,4 l/min |
| 020 = 99,0 l/min | 042 = 204,0 l/min |
| 024 = 119,3 l/min | 045 = 218,5 l/min |
| 028 = 134,5 l/min | 050 = 237,0 l/min |
| 031 = 147,4 l/min | |

**Cam ring for "P2" & "P3"**
(Delivery at 0 bar & 1500 r.p.m.)

| | |
|---|---|
| 003 = 16,2 l/min | 017 = 87,4 l/min |
| 005 = 25,8 l/min | 020 = 95,7 l/min |
| 006 = 31,9 l/min | 022 = 105,4 l/min |
| 008 = 39,6 l/min | 025 = 118,9 l/min |
| 010 = 51,1 l/min | 028 = 133,2 l/min |
| 012 = 55,6 l/min | 031 = 150,0 l/min |
| 014 = 69,0 l/min | |

P1 P2 P3

**Modification**

**Mounting W/connection variables**
4 bolts SAE flange (J518c)

| Type | UNC | | Metric | |
|---|---|---|---|---|
| P3 | 1" | 3/4" | 1" | 3/4" |
| Code | 00 | 01 | M0 | M1 |

**Seal class**
1 = S1 (for mineral oil)
4 = S4 (for the resistant fluids)
5 = S5 (for mineral oil and fire resistant fluids)

**Design letter**

**Porting combination (see pages )**
00 = standard

**Direct. of rotation (view on shaft end)**
R = clockwise
L = counter-clockwise

**Type of shaft**
2 = keyed (SAE CC)
3 = splined (SAE D & E)

## OPERATING CHARACTERISTICS - TYPICAL [24 cSt]

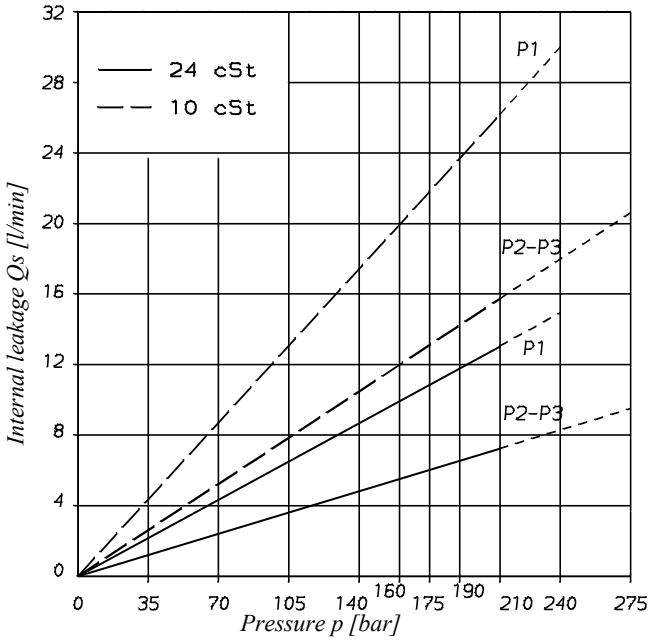
| Pressure port | Series | Volumetric Displacement Vp | Flow Q [l/min] & n = 1500 RPM | | | Input power P [kW] & n = 1500 RPM | | |
|---|---|---|---|---|---|---|---|---|
| | | | p = 0 bar | p = 140 bar | p = 240 bar | p = 7 bar | p = 140 bar | p = 240 bar |
| P1 | 014 | 47,6 ml/rev | 71,4 | 62,1 | 55,9 | 2,3 | 18,5 | 30,6 |
| | 017 | 58,2 ml/rev | 87,3 | 78,0 | 71,8 | 2,5 | 22,2 | 37,0 |
| | 020 | 66,0 ml/rev | 99,0 | 89,7 | 83,5 | 2,8 | 24,9 | 41,7 |
| | 024 | 79,5 ml/rev | 119,3 | 110,0 | 103,8 | 3,0 | 29,6 | 49,8 |
| | 028 | 89,7 ml/rev | 134,5 | 125,2 | 119,0 | 3,2 | 33,2 | 55,9 |
| | 031 | 98,3 ml/rev | 147,4 | 138,1 | 131,9 | 3,3 | 36,2 | 61,0 |
| | 035 | 111,0 ml/rev | 166,5 | 157,2 | 151,0 | 3,5 | 40,7 | 68,7 |
| | 038 | 120,3 ml/rev | 180,4 | 171,1 | 164,9 | 3,7 | 43,9 | 74,3 |
| | 042[2)] | 136,0 ml/rev | 204,0 | 194,7 | 188,5 | 4,0 | 49,4 | 83,7 |
| | 045[2)] | 145,7 ml/rev | 218,5 | 209,2 | 203,0 | 4,1 | 52,8 | 89,5 |
| | 050[2)] | 158,0 ml/rev | 237,0 | 227,7 | 224,0[1)] | 4,4 | 57,0 | 85,0[1)] |
| P2 & P3 | 003 | 10,8 ml/rev | 16,2 | 11,2 | 7,7 | 1,3 | 5,3 | 8,4 |
| | 005 | 17,2 ml/rev | 25,8 | 20,8 | 17,3 | 1,4 | 7,5 | 12,2 |
| | 006 | 21,3 ml/rev | 31,9 | 26,9 | 23,4 | 1,5 | 8,9 | 14,7 |
| | 008 | 26,4 ml/rev | 39,6 | 34,6 | 31,1 | 1,6 | 10,7 | 17,7 |
| | 010 | 34,1 ml/rev | 51,1 | 46,1 | 42,6 | 1,7 | 13,4 | 22,3 |
| | 012 | 37,1 ml/rev | 55,6 | 50,6 | 47,1 | 1,7 | 14,4 | 24,1 |
| | 014 | 46,0 ml/rev | 69,0 | 64,0 | 60,5 | 1,9 | 17,6 | 29,5 |
| | 017 | 58,3 ml/rev | 87,4 | 82,4 | 78,9 | 2,1 | 21,9 | 36,9 |
| | 020 | 63,8 ml/rev | 95,7 | 90,7 | 87,2 | 2,2 | 23,8 | 40,2 |
| | 022 | 70,3 ml/rev | 105,4 | 100,4 | 96,9 | 2,3 | 26,1 | 44,1 |
| | 025 | 79,3 ml/rev | 118,9 | 113,9 | 110,4 | 2,5 | 29,2 | 49,5 |
| | 028 | 88,8 ml/rev | 133,2 | 128,2 | 125,8[1)] | 2,8 | 32,7 | 48,5[1)] |
| | 031 | 100,0 ml/rev | 150,0 | 145,0 | 142,6[1)] | 2,8 | 36,5 | 54,4[1)] |

*1) 028 - 031 - 050 = 210 bar max. int.* *2) 042 - 045 - 050 = 2200 R.P.M. max*



**Parker Hannifin**
Denison Vane Pump Division
Vierzon - France

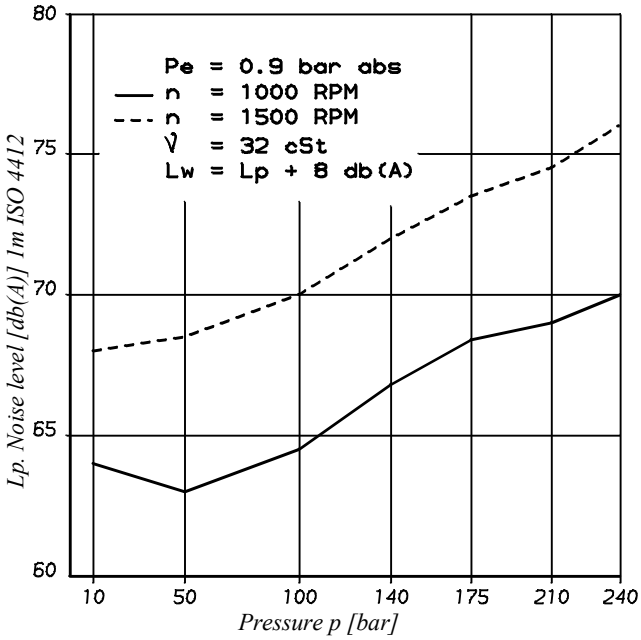
## INTERNAL LEAKAGE (TYPICAL)




*Total leakage is the sum of each section loss at its operating conditions.*

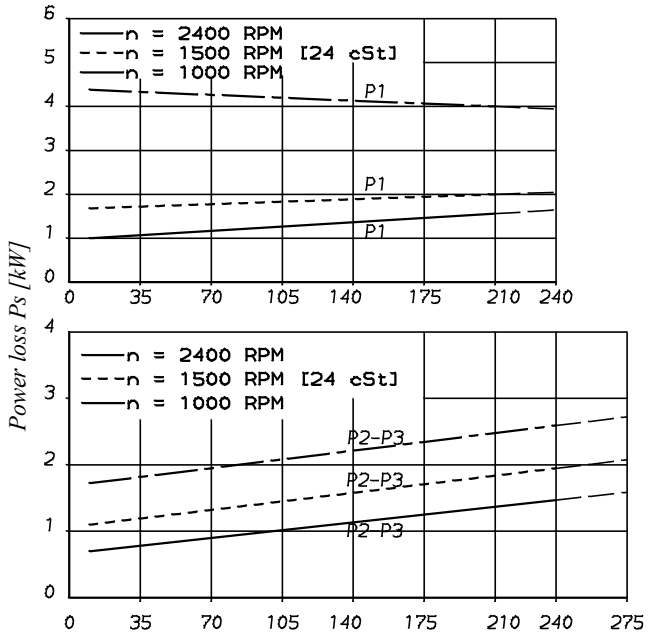
## NOISE LEVEL (TYPICAL)

**T6DCC - 038 - 022 - 022**




*Triple pump noise level is given with each section discharging at the pressure noted on the curve.*

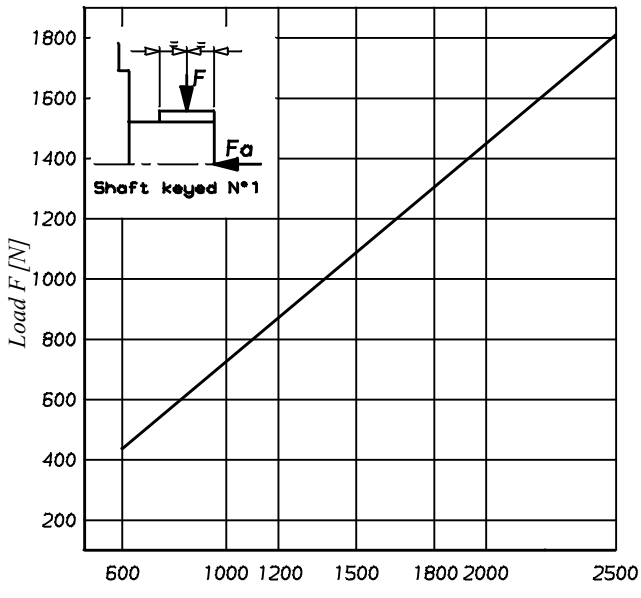
## POWER LOSS HYDROMECHANICAL (TYPICAL)




*Pressure p [bar]*

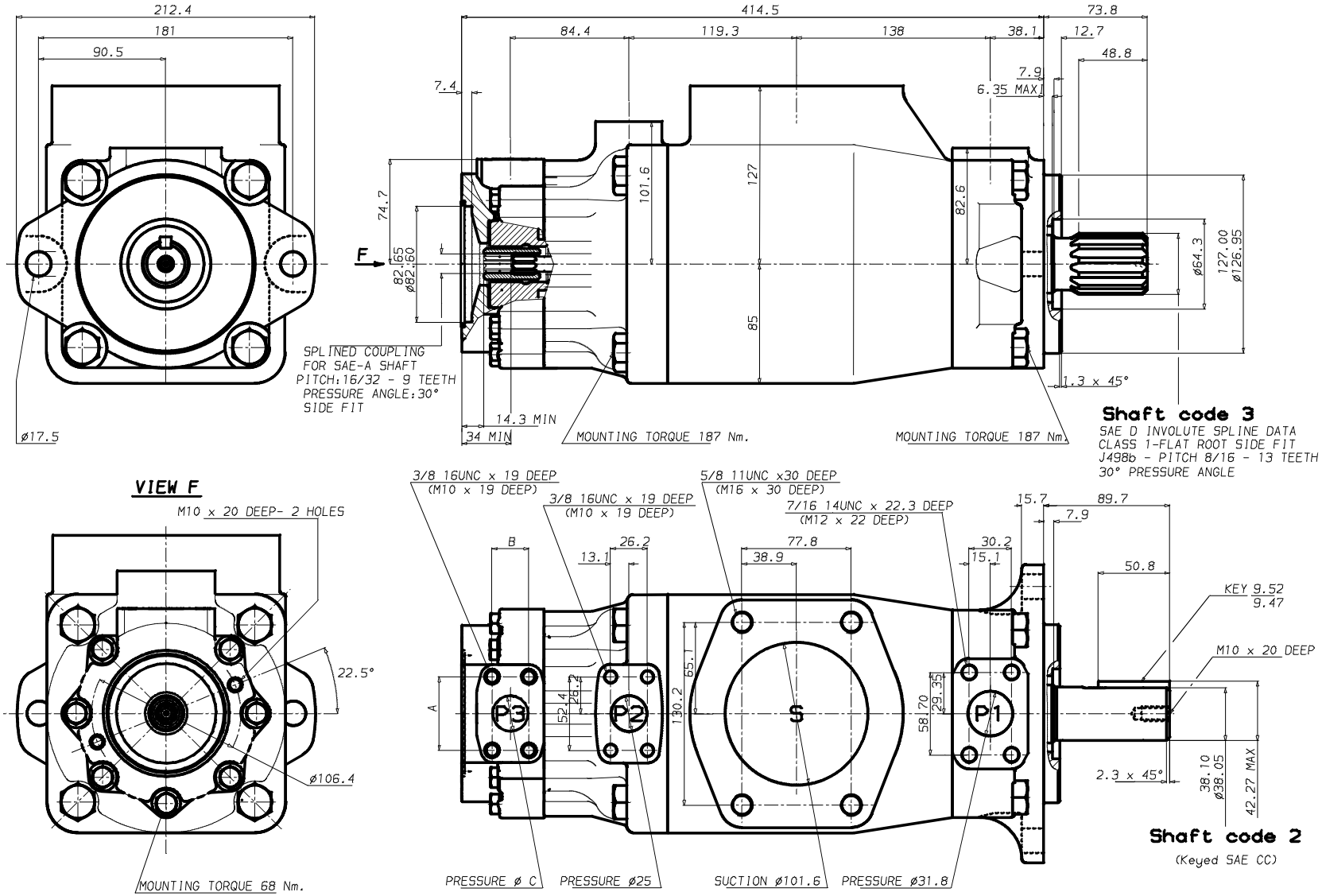
*Total hydrodynamic power loss is the sum of each section at its operating conditions.*

## PERMISSIBLE RADIAL LOAD



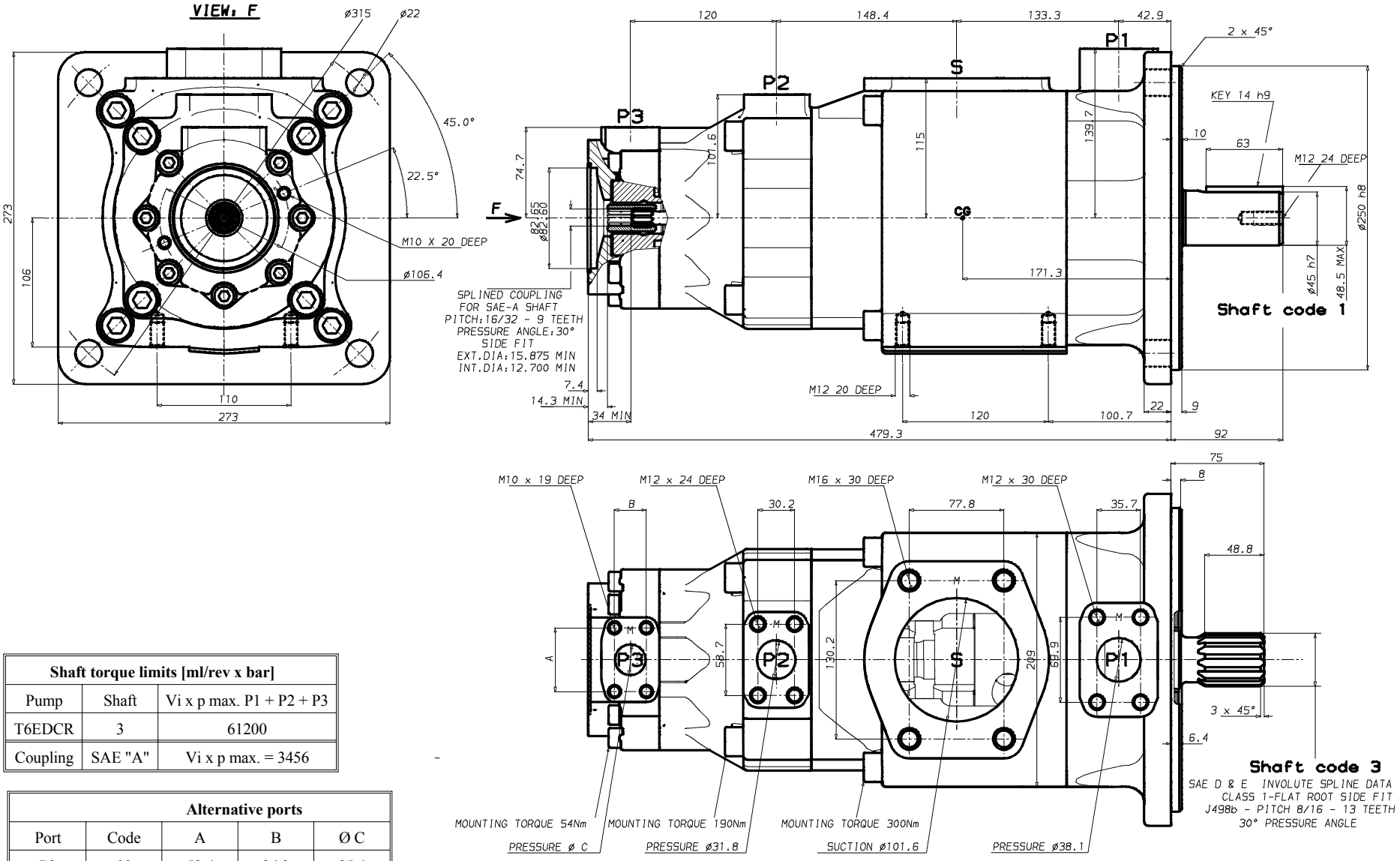

*Speed n [RPM]*

*Maximum permissible axial load Fa = 1200 N*




| Shaft torque limits [ml/rev x bar] | | | | |
|---|---|---|---|---|
| Pump | Shaft | Vi x p max. P1 + P2 + P3 | Coupling | Vi x p max. |
| T6DCCR | 2 | 66500 | SAE "A" | 3456 |
| | 3 | 61200 | | |

| Alternative ports | | | | |
|---|---|---|---|---|
| Port | Code | A | B | Ø C |
| P3 | 00 | 52,4 | 26,2 | 25,4 |
| P3 | 01 | 47,6 | 22,2 | 19,0 |




| Shaft torque limits [ml/rev x bar] | | |
|---|---|---|
| Pump | Shaft | Vi x p max. P1 + P2 + P3 |
| T6EDCR | 3 | 61200 |
| Coupling | SAE "A" | Vi x p max. = 3456 |

| Alternative ports | | | | |
|---|---|---|---|---|
| Port | Code | A | B | Ø C |
| P3 | 00 | 52,4 | 26,2 | 25,4 |
| P3 | 01 | 47,6 | 22,2 | 19,0 |

**Model No.** T6EDCR - 062 - 035 - 017 - 1 R 00 - A 1 - P 0 - ..

**Series**

**Rear cap end for mounting**
**SAE A auxiliary pump**
**coupling adaptor**
**SAE A - 9 teeth**

**Cam ring for "P1"** (P1)
(Delivery at 0 bar & 1500 r.p.m.)
042 = 198,5 l/min
045 = 213,6 l/min
050 = 237,7 l/min
052 = 247,2 l/min
062 = 295,0 l/min
066 = 319,9 l/min
072 = 340,6 l/min

**Cam ring for "P2"** (P2)
(Delivery at 0 bar & 1500 r.p.m.)
014 = 71,4 l/min
017 = 87,3 l/min
020 = 99,0 l/min
024 = 119,3 l/min
028 = 134,5 l/min
031 = 147,4 l/min
035 = 166,5 l/min
038 = 180,4 l/min
042 = 204,0 l/min
045 = 218,5 l/min
050 = 237,0 l/min

**Cam ring for "P3"** (P3)
(Delivery at 0 bar & 1500 r.p.m.)
003 = 16,2 l/min
005 = 25,8 l/min
006 = 31,9 l/min
008 = 39,6 l/min
010 = 51,1 l/min
012 = 55,6 l/min
014 = 69,0 l/min
017 = 87,4 l/min
020 = 95,7 l/min
022 = 105,4 l/min
025 = 118,9 l/min
028 = 133,2 l/min
031 = 150,0 l/min

**Type of shaft**
1 = keyed (G45N - ISO 3019-2)
3 = splined (SAE D & E)

**Direct. of rotation (view on shaft end)**
R = clockwise
L = counter-clockwise

**Porting combination (see pages )**
00 = standard

**Design letter**

**Seal class**
1 = S1 (for mineral oil)
4 = S4 (for the resistant fluids)
5 = S5 (for mineral oil and fire resistant fluids)

**Options**
F = Standard
P = 4 holes for external support

**Mounting W/connection variables**
0 = P3 = 1" SAE
1 = P3 = 3/4" SAE

**Modification**

## OPERATING CHARACTERISTICS - TYPICAL [24 cSt]

| Pressure port | Series | Volumetric Displacement Vp | Flow Q [l/min] & n = 1500 RPM | | | Input power P [kW] & n = 1500 RPM | | |
|---|---|---|---|---|---|---|---|---|
| | | | p = 0 bar | p = 140 bar | p = 240 bar | p = 7 bar | p = 140 bar | p = 240 bar |
| P1 | 042 | 132,3 ml/rev | 198,5 | 188,5 | 181,3 | 5,2 | 49,4 | 82,6 |
| | 045 | 142,4 ml/rev | 213,6 | 203,6 | 196,5 | 5,4 | 52,9 | 88,7 |
| | 050 | 158,5 ml/rev | 237,7 | 227,7 | 220,6 | 5,7 | 58,5 | 98,3 |
| | 052 | 164,8 ml/rev | 247,2 | 237,2 | 230,1 | 5,8 | 60,8 | 102,1 |
| | 062 | 196,7 ml/rev | 295,0 | 285,0 | 277,9 | 6,4 | 71,9 | 121,3 |
| | 066 | 213,3 ml/rev | 319,9 | 309,9 | 302,8 | 6,7 | 77,7 | 131,2 |
| | 072 | 227,1 ml/rev | 340,6 | 330,6 | 323,5 | 6,9 | 82,6 | 139,5 |
| P2 | 014 | 47,6 ml/rev | 71,4 | 62,1 | 55,9 | 2,3 | 18,5 | 30,6 |
| | 017 | 58,2 ml/rev | 87,3 | 78,0 | 71,8 | 2,5 | 22,2 | 37,0 |
| | 020 | 66,0 ml/rev | 99,0 | 89,7 | 83,5 | 2,8 | 24,9 | 41,7 |
| | 024 | 79,5 ml/rev | 119,3 | 110,0 | 103,8 | 3,0 | 29,6 | 49,8 |
| | 028 | 89,7 ml/rev | 134,5 | 125,2 | 119,0 | 3,2 | 33,2 | 55,9 |
| | 031 | 98,3 ml/rev | 147,4 | 138,1 | 131,9 | 3,3 | 36,2 | 61,0 |
| | 035 | 111,0 ml/rev | 166,5 | 157,2 | 151,0 | 3,5 | 40,7 | 68,7 |
| | 038 | 120,3 ml/rev | 180,4 | 171,1 | 164,9 | 3,7 | 43,9 | 74,3 |
| | 042[2)] | 136,0 ml/rev | 204,0 | 194,7 | 188,5 | 4,0 | 49,4 | 83,7 |
| | 045[2)] | 145,7 ml/rev | 218,5 | 209,2 | 203,0 | 4,1 | 52,8 | 89,5 |
| | 050[2)] | 158,0 ml/rev | 237,0 | 227,7 | 224,0[1)] | 4,4 | 57,0 | 85,0[1)] |
| P3 | 003 | 10,8 ml/rev | 16,2 | 11,2 | 7,7 | 1,3 | 5,3 | 8,4 |
| | 005 | 17,2 ml/rev | 25,8 | 20,8 | 17,3 | 1,4 | 7,5 | 12,2 |
| | 006 | 21,3 ml/rev | 31,9 | 26,9 | 23,4 | 1,5 | 8,9 | 14,7 |
| | 008 | 26,4 ml/rev | 39,6 | 34,6 | 31,1 | 1,6 | 10,7 | 17,7 |
| | 010 | 34,1 ml/rev | 51,1 | 46,1 | 42,6 | 1,7 | 13,4 | 22,3 |
| | 012 | 37,1 ml/rev | 55,6 | 50,6 | 47,1 | 1,7 | 14,4 | 24,1 |
| | 014 | 46,0 ml/rev | 69,0 | 64,0 | 60,5 | 1,9 | 17,6 | 29,5 |
| | 017 | 58,3 ml/rev | 87,4 | 82,4 | 78,9 | 2,1 | 21,9 | 36,9 |
| | 020 | 63,8 ml/rev | 95,7 | 90,7 | 87,2 | 2,2 | 23,8 | 40,2 |
| | 022 | 70,3 ml/rev | 105,4 | 100,4 | 96,9 | 2,3 | 26,1 | 44,1 |
| | 025 | 79,3 ml/rev | 118,9 | 113,9 | 110,4 | 2,5 | 29,2 | 49,5 |
| | 028 | 88,8 ml/rev | 133,2 | 128,2 | 125,8[1)] | 2,8 | 32,7 | 48,5[1)] |
| | 031 | 100,0 ml/rev | 150,0 | 145,0 | 142,6[1)] | 2,8 | 36,5 | 54,4[1)] |

*1) 028 - 031 - 050 = 210 bar max. int.* *2) 042 - 045 - 050 = 2200 R.P.M. max*



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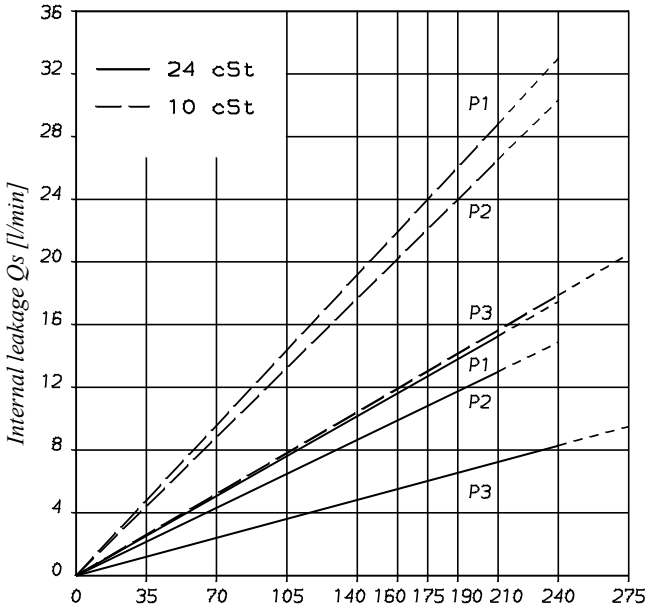
Denison Vane Pump Division
Vierzon - France

## INTERNAL LEAKAGE (TYPICAL)

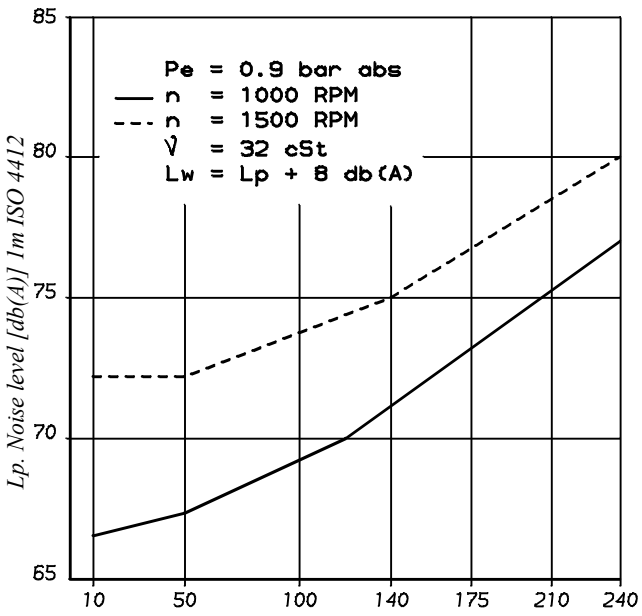



*Pressure p [bar]*

*Total leakage is the sum of each section loss at its operating conditions.*

## NOISE LEVEL (TYPICAL)

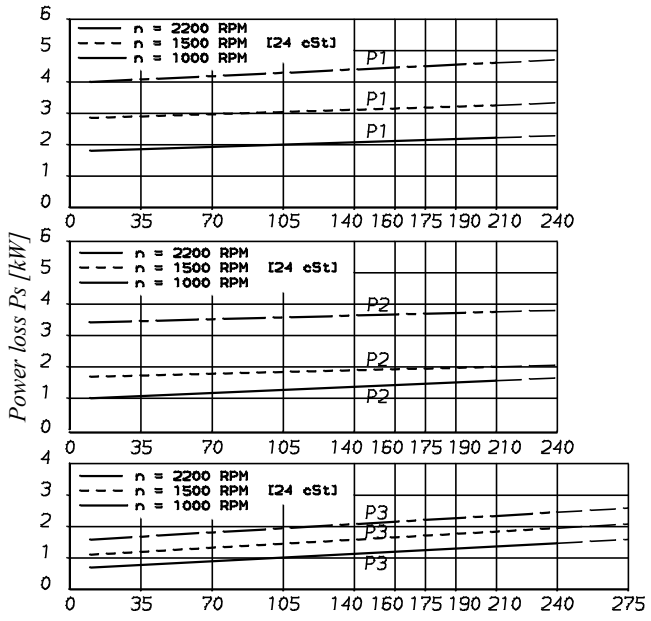
**T6EDCR - 062 - 035 - 017**




*Pressure p [bar]*

*Triple pump noise level is given with each section discharging at the pressure noted on the curve.*

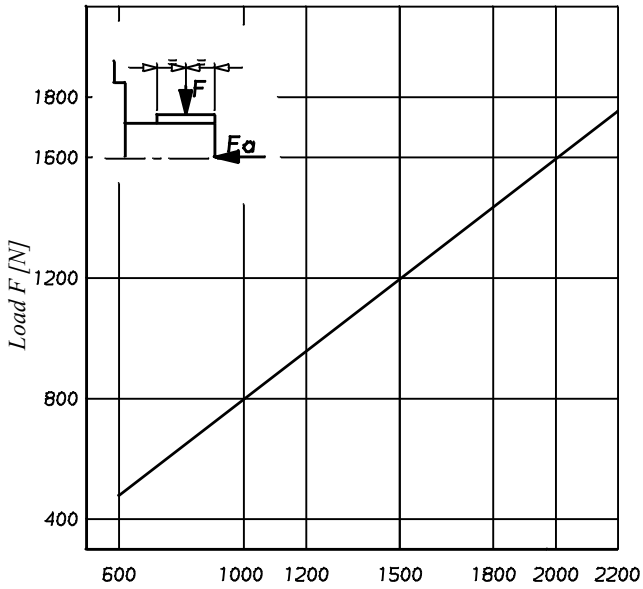
## POWER LOSS HYDROMECHANICAL (TYPICAL)




*Pressure p [bar]*

*Total hydrodynamic power loss is the sum of each section at its operating conditions.*

## PERMISSIBLE RADIAL LOAD




*Speed n [RPM]*

*Maximum permissible axial load Fa = 2000 N*



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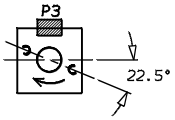
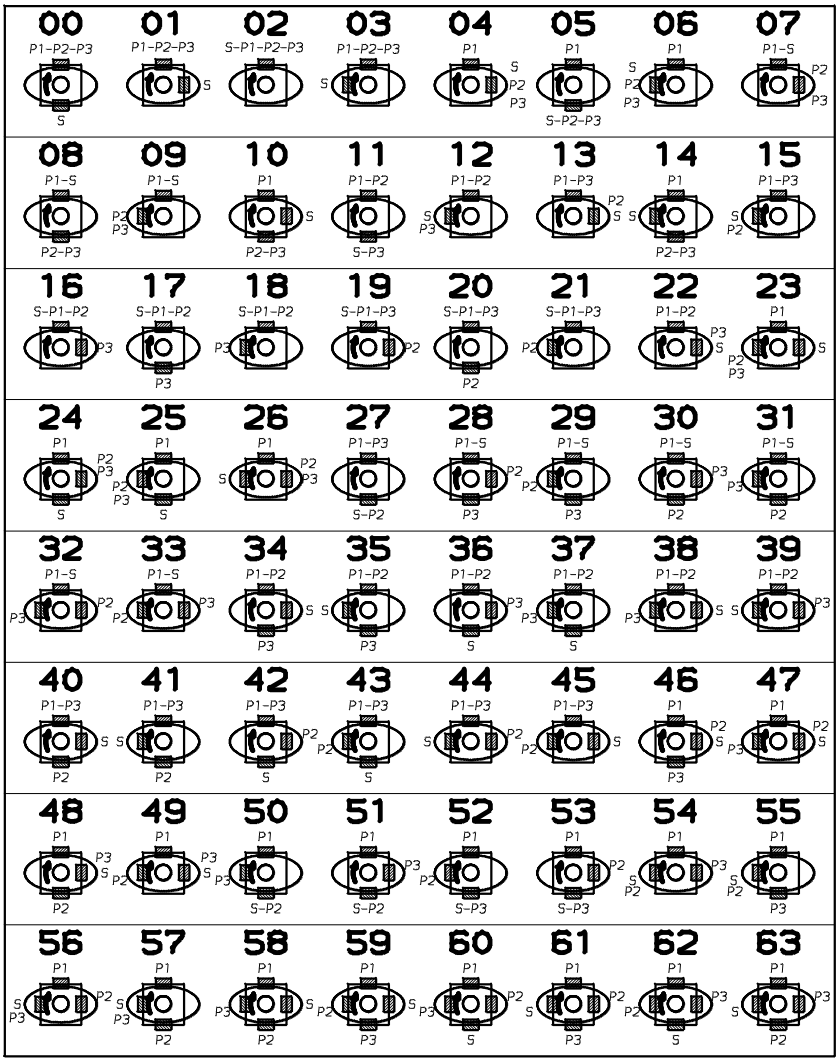
**T6DCCR - T6EDCR**
(View from shaft end)



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**T6DCCR - T6EDCR**
(View from shaft end)

P1

| S | P2 | P3 | | | | P2 | P3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 02 | 16 | 17 | 18 | | 20 | 30 | 08 | 31 |
| | | 19 | 07 | 28 | 32 | | 21 | 33 | 29 | 09 |
| | | 01 | 22 | 34 | 38 | | 40 | 48 | 10 | 58 |
| | | 13 | 04 | 46 | 47 | | 45 | 49 | 59 | 23 |
| | | 00 | 36 | 11 | 37 | | 27 | 51 | 05 | 50 |
| | | 42 | 24 | 53 | 60 | | 43 | 62 | 52 | 25 |
| | | 03 | 39 | 35 | 12 | | 41 | 63 | 14 | 57 |
| | | 44 | 26 | 61 | 56 | | 15 | 54 | 55 | 06 |



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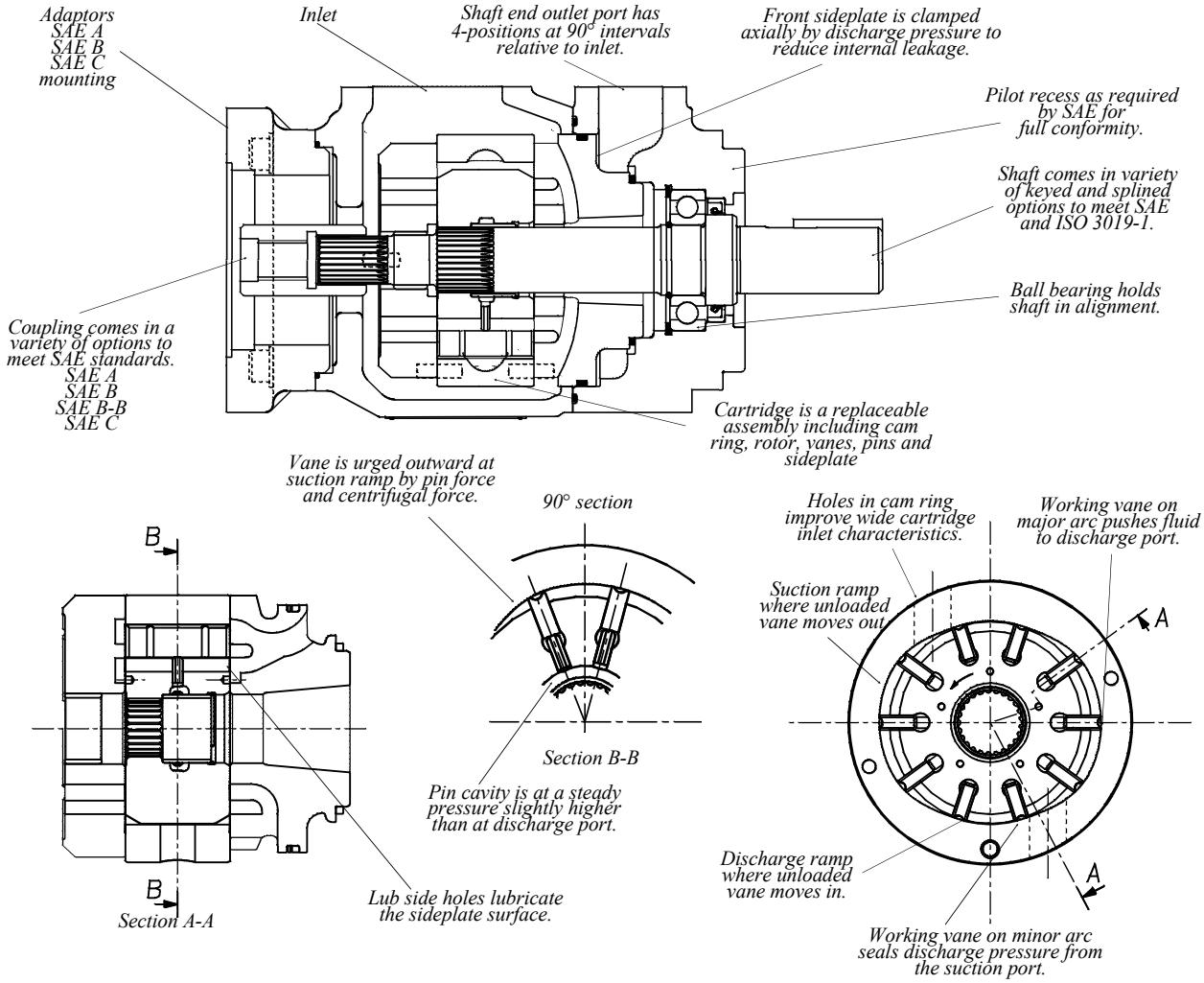



## APPLICATION ADVANTAGES

- The high pressure capability up to 275 bar, in the small envelope, reduces the installation costs and provides an extended a life at reduced pressure.
- The high volumetric efficiency, typically 94%, reduces the heat generation, and allows speeds down to 400 RPM at full pressure.
- The high mechanical efficiency, typically 94%, reduces the energy consumption.
- The wide speed range from 400 RPM to 2800 RPM, combined with large size cartridge displacements, will optimize operation for the lowest noise level in the smallest envelope.
- The low speed 400 RPM, low pressure, high viscosity 2000 cSt allow applications in cold environments with minimum energy consumption and without seizure risk.
- The low ripple pressure ± 2 bar reduces the piping noise and increases the life time of other components in the circuit.
- The high resistance to particle contamination because of the double lip vane increases the pump life.
- The large variety of options (cam displacement, shaft, porting) allows customized installation.

**RECOMMENDED FLUIDS**

Petroleum based antiwear R & O fluids.
These fluids are the recommended fluids for T6 series pumps. Maximum catalog ratings and performance data are based on operation with these fluids. These fluids are covered by DENISON Hydraulics HF-0 and HF-2 specification.

**ACCEPTABLE ALTERNATIVE FLUIDS**

The use of fluids other than petroleum based antiwear R & O fluids requires that the maximum ratings of the pumps will be reduced. In somes cases the minimum replenishment pressures must be increased. Consult specific sections for more details.

**VISCOSITY**

| | |
|---|---|
| Max. (cold start, low speed & pressure) | 2000 $mm^2/s$ (cSt) |
| Max. (full speed & pressure) | 108 $mm^2/s$ (cSt) |
| Optimum (max. life) | 30 $mm^2/s$ (cSt) |
| Min. (full speed & pressure for HF-1, HF-3, HF-4 & HF-5 fluids) | 18 $mm^2/s$ (cSt) |
| Min. (full speed & pressure for HF-0 & HF-2 fluids) | 10 $mm^2/s$ (cSt) |

**VISCOSITY INDEX**

90° min. higher values extend the range of operating temperatures.

Maximum fluid temperature (θ) °K

| | |
|---|---|
| HF-0, HF-1, HF-2 | 373 (+ 100° C) |
| HF-3, HF-4 | 323 (+ 50° C) |
| HF-5 | 343 (+ 70° C) |
| Biodegradable fluids (esters & rapeseed base) | 338 (+ 65° C) |

Minimum fluid temperature (θ) °K

| | |
|---|---|
| HF-0, HF-1, HF-2, HF-5 | 255 (- 18° C) |
| HF-3, HF-4 | 283 (+ 10° C) |
| Biodegradable fluids (esters & rapeseed base) | 253 (- 20° C) |

**FLUID CLEANLINESS**

The fluid must be cleaned before and during operation to maintain the contamination level of NAS 1638 class 8 (or ISO 18/14) or better. Filters with 25 micron (or better, ß10 ≥ 100) nominal ratings may be adequate but do not guarantee the required cleanliness levels. Suction strainers must be of adequate size to provide the minimum inlet pressure specified. 100 mesh (149 micron) is the finest mesh recommended. Use oversize strainers or omit them altogether on applications which require cold starts or use fire resistant fluids.

**OPERATING TEMPERATURES AND VISCOSITIES**

Operating temperatures are a function of fluid viscosities, fluid type, and the pump. Fluid viscosity should be selected to provide the optimum viscosity at normal operating temperatures. For cold starts, the pumps should be operated at low speed and pressure until the fluid warms up to an acceptable viscosity for full power operation.

**WATER CONTAMINATION IN THE FLUID**

Maximum acceptable content of water.
ù 0,10 % for mineral base fluids.
ù 0,05 % for synthetic fluids, crankcase oils, biodegradable fluids.
If amount of water is higher, then it should be drained off the circuit.

**COUPLINGS AND FEMALE SPLINES**
**SPLINES**

- The mating female spline should be free to float and find its own center. If both members are rigidly supported, they must be aligned within 0,15 TIR or less to reduce fretting. The angular alignment of two spline axes must be less than ± 0,05 per 25,4 radius.
- The coupling spline must be lubricated with a lithium molydisulfide grease or a similar lubricant.
- The coupling must be hardened to a hardness between 27 and 45 R.C.
- The female spline must be made to conform to the Class 1 fit as described in SAE-J498b (1971). This is described as a Flat Root Side Fit.

**KEYED SHAFTS**

DENISON Hydraulics supplies the T6 series keyed shaft pumps with high strength heat-treated keys. Therefore, when installing or replacing these pumps, the heat-treated keys must be used in order to insure maximum life in the application. If the key is replaced, it must be a heat-treated key between 27 and 34 R.C. hardness. The corners of the keys must be chamfered from 0,76 to 1,02 at 45° to clear the radii in the key way.

**NOTE**

The alignment of keyed shafts must be within the tolerances given for splined shafts.

**SHAFT LOADS**

These products are primarily designed for coaxial drives which do not impose axial or side loading on the shaft. Consult specific sections for more details.

**Model No.** **T6CRM - B22 - 1 R 00 - A 1 0 - A 1 ..**

**Series**

**Cam ring**
(Delivery at 0 bar & 1500 r.p.m.)
B03 = 16,2 l/min
B05 = 25,8 l/min
B06 = 31,9 l/min
B08 = 39,6 l/min
B10 = 51,1 l/min
B12 = 55,6 l/min
B14 = 69,0 l/min
B17 = 87,4 l/min
B20 = 95,7 l/min
B22 = 105,4 l/min
B25 = 118,9 l/min
B28 = 133,2 l/min
B31 = 150,0 l/min

**Type of shaft**
1 = keyed (SAE BB)
2 = keyed (non SAE)
3 = splined (SAE B)
4 = splined (SAE BB)
5 = keyed (non SAE)

**Direct. of rotation (view on shaft end)**
R = clockwise
L = counter-clockwise

**Porting combination**
00 = standard

**Modification**

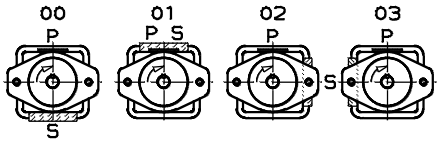
**Seal class**
1 = S1 (for mineral oil)
4 = S4 (for the resistant fluids)
5 = S5 (for mineral oil and fire resistant fluids)

**Design letter**

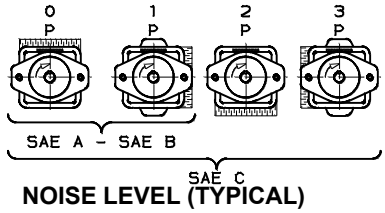
**Porting adaptor**

**Coupling**
1 = SAE A
2 = SAE B
3 = SAE BB
4 = SAE C
5 = SAE J498b
16/32 - 11 teeth

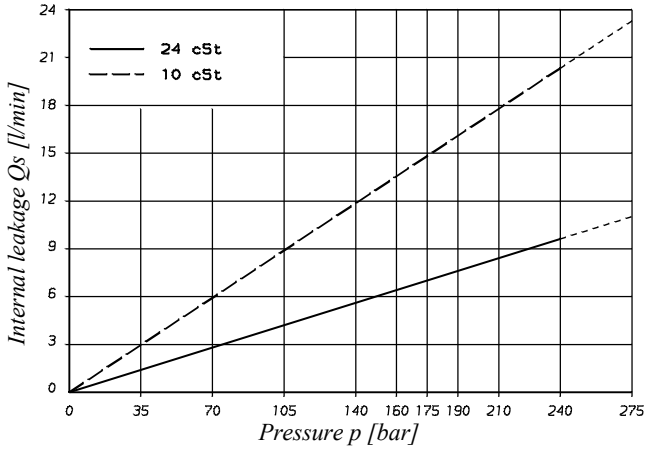
**Adaptor**
0 = None
A = SAE A
B = SAE B
C = SAE C




*Porting adaptor*

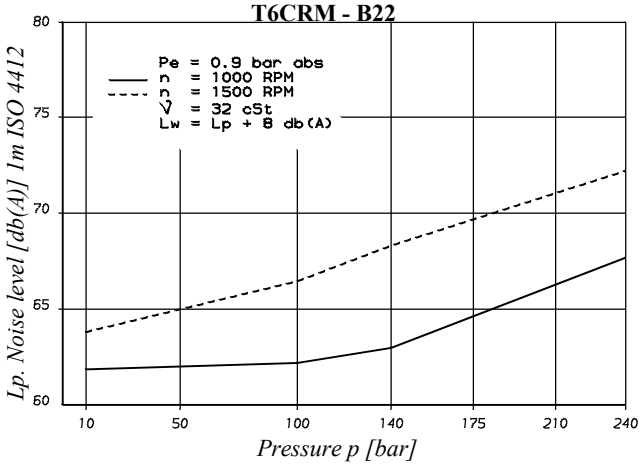



## INTERNAL LEAKAGE (TYPICAL)

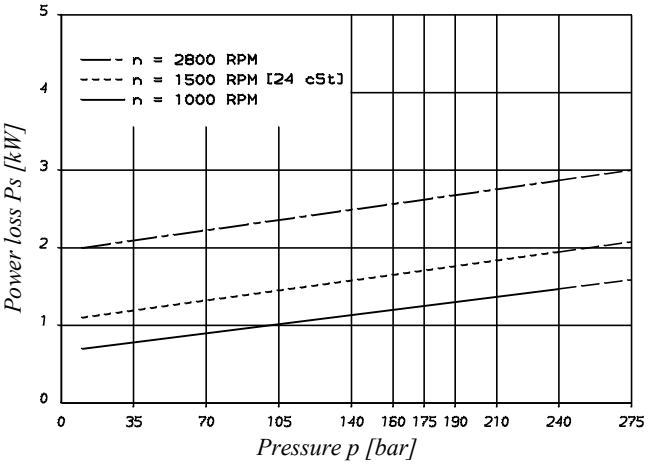



*Do not operate the pump more than 5 seconds at any speed or viscosity if internal leakage is more than 50% of theoretical flow.*

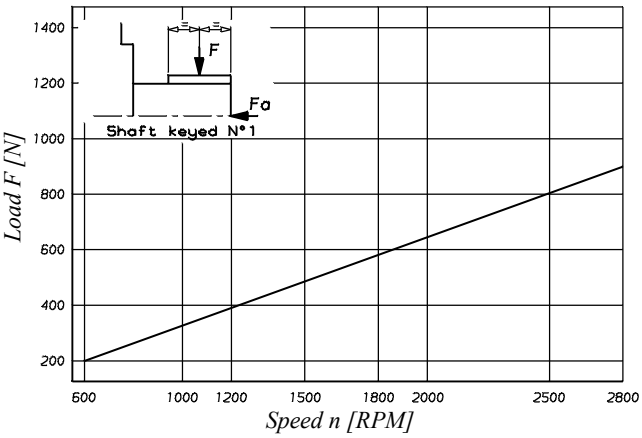
## NOISE LEVEL (TYPICAL)
**T6CRM - B22**




## POWER LOSS HYDROMECHANICAL (TYPICAL)




## PERMISSIBLE RADIAL LOAD




*Maximum permissible axial load Fa = 800 N*



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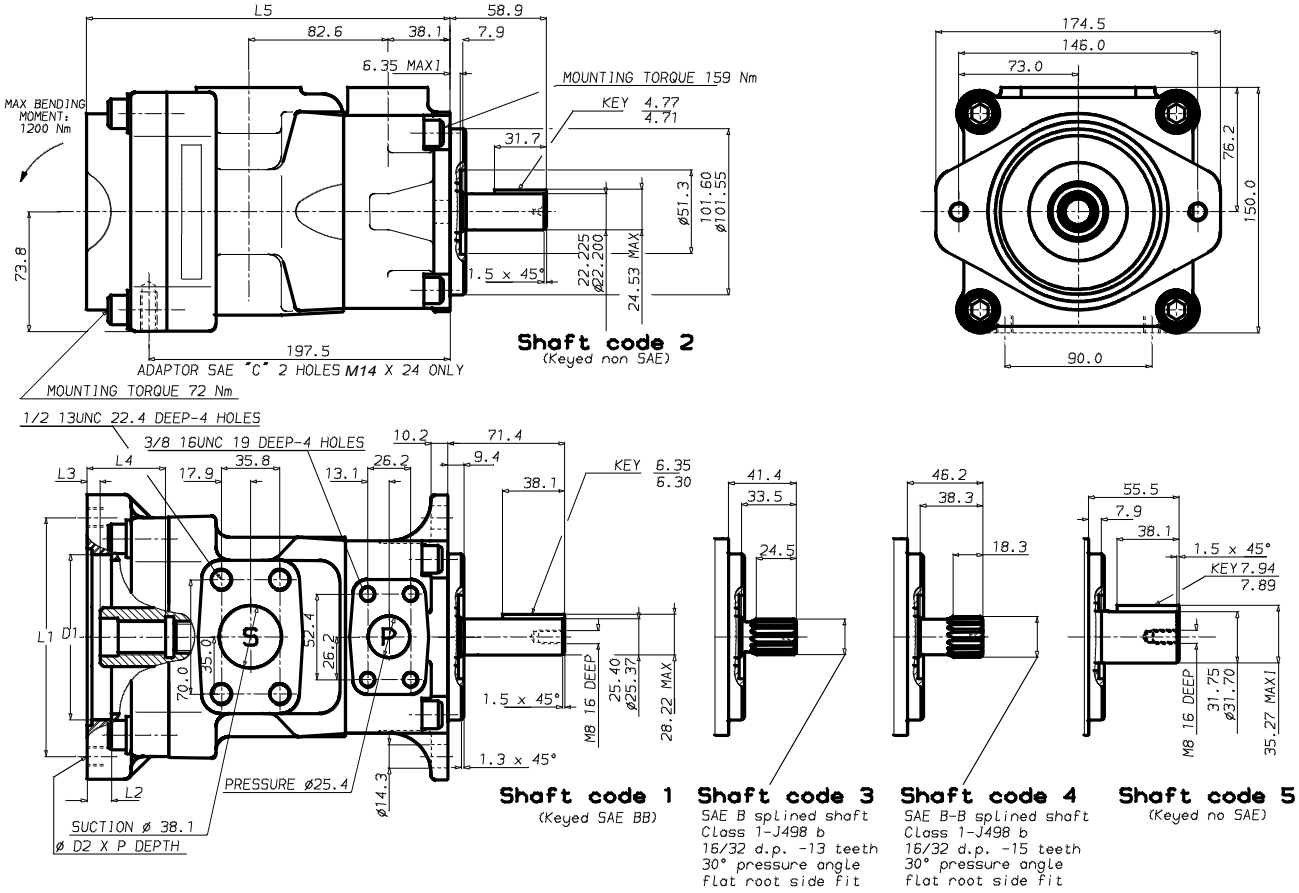



| Adaptor | D1 | D2 | P | L1 | L2 | L3 | L4 | L5 |
|---|---|---|---|---|---|---|---|---|
| SAE A | 82,65/82,60 | M10 | 24 | 106,4 | 11,0 | 8,0 | 32,0 | 209,0 |
| SAE B | 101,70/101,65 | M12 | 28 | 146,0 | 16,0 | 8,0 | 46,0 | 223,0 |
| SAE C | 127,10/127,05 | M16 | - | 181,0 | 16,0 | 8,0 | 56,0 | 233,0 |

| Adaptor | SAE A | | | SAE B | | SAE C |
|---|---|---|---|---|---|---|
| Coupling drive | SAE A | SAE 11 teeth | SAE B | SAE B | SAE BB | SAE C |
| Number of teeth | 9 | 11 | 13 | 13 | 15 | 14 |
| Pitch | 16/32 | 16/32 | 16/32 | 16/32 | 16/32 | 12/24 |
| Pressure angle | 30° | 30° | 30° | 30° | 30° | 30° |
| Major dia. (min) | 15,875 | 19,05 | 22,225 | 22,225 | 25,400 | 31,750 |
| Minor dia. (min) | 12,700 | 16,017 | 19,134 | 19,134 | 22,268 | 27,589 |

| Shaft torque limits [ml/rev x bar] | | | |
|---|---|---|---|
| Shaft | V x p max. | Coupling drive | V x p max. |
| 1 | 21420 | SAE A | 11000 |
| 2 | 14300 | SAE B | 20600 |
| 3 | 20600 | SAE BB | 22050 |
| 4 | 32670 | SAE C | 22050 |
| 5 | 34180 | SAE - 11 teeth | 15850 |

## OPERATING CHARACTERISTICS - TYPICAL [24 cSt]

| Series | Volumetric Displacement Vp | Flow Q [l/min] & n = 1500 RPM | | | Input power P [kW] & n = 1500 RPM | | |
|---|---|---|---|---|---|---|---|
| | | p = 0 bar | p = 140 bar | p = 240 bar | p = 7 bar | p = 140 bar | p = 240 bar |
| B03 | 10,8 ml/rev | 16,2 | 11,2 | 7,7 | 1,3 | 5,3 | 8,4 |
| B05 | 17,2 ml/rev | 25,8 | 20,8 | 17,3 | 1,4 | 7,5 | 12,2 |
| B06 | 21,3 ml/rev | 31,9 | 26,9 | 23,4 | 1,5 | 8,9 | 14,7 |
| B08 | 26,4 ml/rev | 39,6 | 34,6 | 31,1 | 1,6 | 10,7 | 17,7 |
| B10 | 34,1 ml/rev | 51,1 | 46,1 | 42,6 | 1,7 | 13,4 | 22,3 |
| B12 | 37,1 ml/rev | 55,6 | 50,6 | 47,1 | 1,7 | 14,4 | 24,1 |
| B14 | 46,0 ml/rev | 69,0 | 64,0 | 60,5 | 1,9 | 17,6 | 29,5 |
| B17 | 58,3 ml/rev | 87,4 | 82,4 | 78,9 | 2,1 | 21,9 | 36,9 |
| B20 | 63,8 ml/rev | 95,7 | 90,7 | 87,2 | 2,2 | 23,8 | 40,2 |
| B22 | 70,3 ml/rev | 105,4 | 100,4 | 96,9 | 2,3 | 26,1 | 44,1 |
| B25[1)] | 79,3 ml/rev | 118,9 | 113,9 | 110,4 | 2,5 | 29,2 | 49,5 |
| B28[1)] | 88,8 ml/rev | 133,2 | 128,2 | 125,8[2)] | 2,8 | 32,7 | 48,5[2)] |
| B31[1)] | 100,0 ml/rev | 150,0 | 145,0 | 142,6[2)] | 2,8 | 36,5 | 54,4[2)] |

*1) B25 - B28 - B31 = 2500 R.P.M. max.* *2) B28 - B31 = 210 bar max. int.* *Port connection can be furnished with metric threads.*



**Parker Hannifin**
Denison Vane Pump Division
Vierzon - France

**Model No.** **T6DRM - B45 - 1 R 00 - A 1 0 - A 1 ..**

**Series**

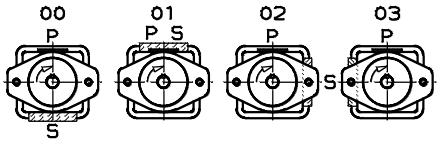
**Cam ring**
(Delivery at 0 bar & 1500 r.p.m.)

| | |
|---|---|
| B14 = 71,4 l/min | B35 = 166,5 l/min |
| B17 = 87,3 l/min | B38 = 180,4 l/min |
| B20 = 99,0 l/min | B42 = 204,0 l/min |
| B24 = 119,3 l/min | B45 = 218,5 l/min |
| B28 = 134,5 l/min | B50 = 237,0 l/min |
| B31 = 147,4 l/min | |

**Type of shaft**
1 = keyed (SAE C)
2 = keyed (SAE CC)
3 = splined (SAE C)
5 = keyed (non SAE)

**Direct. of rotation (view on shaft end)**
R = clockwise
L = counter-clockwise

**Porting combination**




**Modification**

**Seal class**
1 = S1 (for mineral oil)
4 = S4 (for the resistant fluids)
5 = S5 (for mineral oil and fire resistant fluids)

**Design letter**

**Porting adaptor**

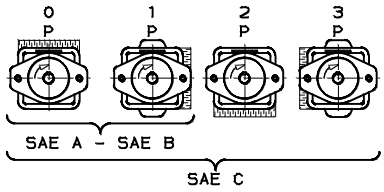
**Coupling**

| | |
|---|---|
| 1 = SAE A | 4 = SAE C |
| 2 = SAE B | 5 = SAE J498b |
| 3 = SAE BB | 16/32 - 11 teeth |

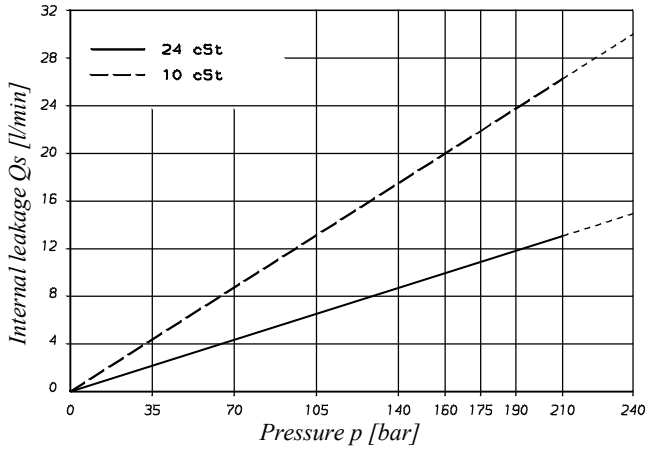
**Adaptor**

| | |
|---|---|
| 0 = None | B = SAE B |
| A = SAE A | C = SAE C |

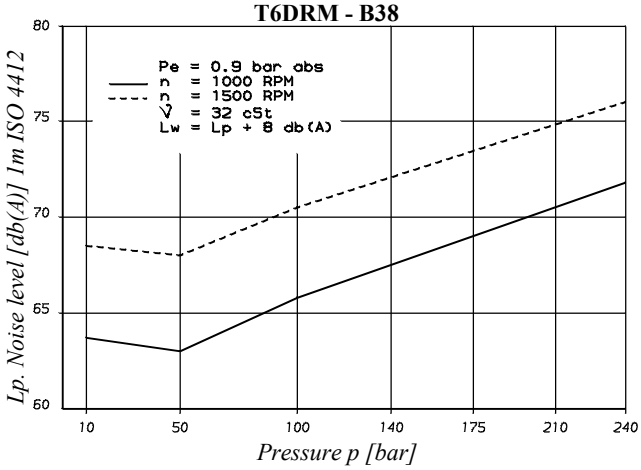
*Porting adaptor*




## INTERNAL LEAKAGE (TYPICAL)

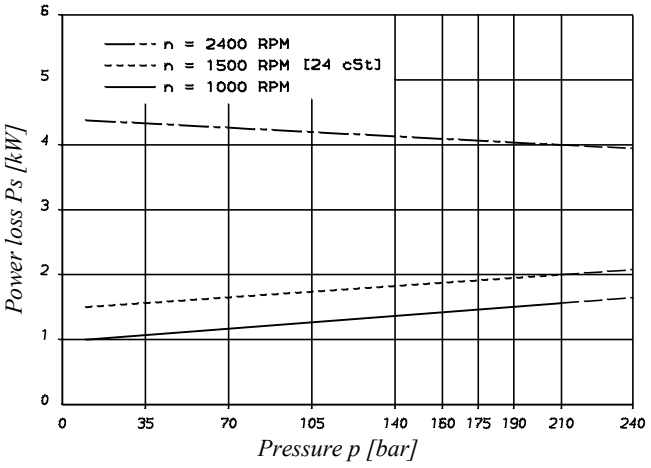



## NOISE LEVEL (TYPICAL)
**T6DRM - B38**

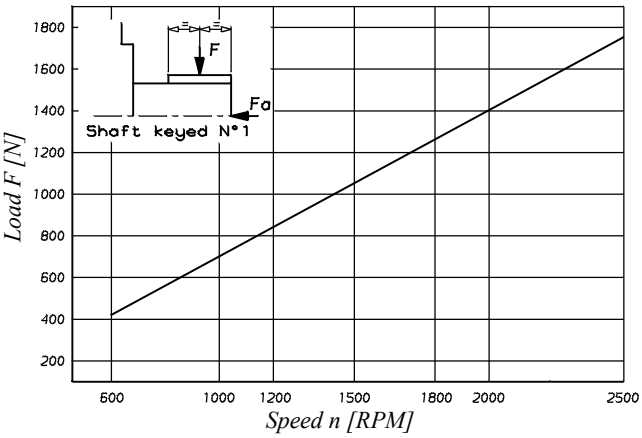



*Do not operate the pump more than 5 seconds at any speed or viscosity if internal leakage is more than 50% of theoretical flow.*

## POWER LOSS HYDROMECHANICAL (TYPICAL)




## PERMISSIBLE RADIAL LOAD




*Maximum permissible axial load Fa = 1200 N*



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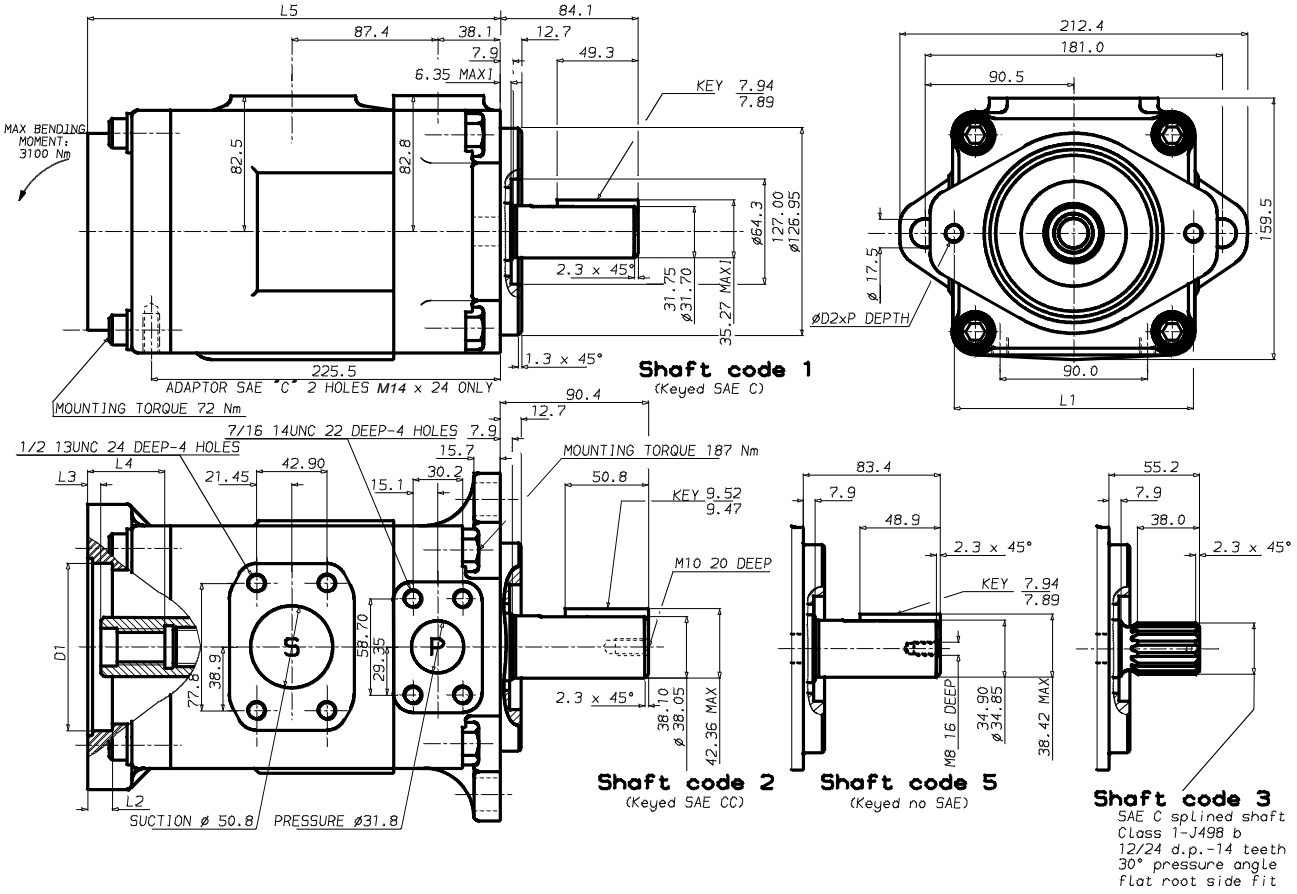
Vierzon - France




| Adaptor | D1 | D2 | P | L1 | L2 | L3 | L4 | L5 |
|---|---|---|---|---|---|---|---|---|
| SAE A | 82,65/82,60 | M10 | 24 | 106,4 | 11,0 | 8,0 | 32,0 | 237,0 |
| SAE B | 101,70/101,65 | M12 | 28 | 146,0 | 16,0 | 8,0 | 46,0 | 251,0 |
| SAE C | 127,10/127,05 | M16 | - | 181,0 | 16,0 | 8,0 | 56,0 | 261,0 |

| Adaptor | SAE A | | | SAE B | | SAE C |
|---|---|---|---|---|---|---|
| Coupling drive | SAE A | SAE 11 teeth | SAE B | SAE B | SAE BB | SAE C |
| Number of teeth | 9 | 11 | 13 | 13 | 15 | 14 |
| Pitch | 16/32 | 16/32 | 16/32 | 16/32 | 16/32 | 12/24 |
| Pressure angle | 30° | 30° | 30° | 30° | 30° | 30° |
| Major dia. (min) | 15,875 | 19,05 | 22,225 | 22,225 | 25,400 | 31,750 |
| Minor dia. (min) | 12,700 | 16,017 | 19,134 | 19,134 | 22,268 | 27,589 |

| Shaft torque limits [ml/rev x bar] | | | |
|---|---|---|---|
| Shaft | V x p max. | Coupling drive | V x p max. |
| 1 | 43240 | SAE A | 11000 |
| 2 | 66036 | SAE B | 20600 |
| 3 | 61200 | SAE BB | 32670 |
| 5 | 55600 | SAE C | 37390 |
| | | SAE - 11 teeth | 15850 |

## OPERATING CHARACTERISTICS - TYPICAL [24 cSt]

| Series | Volumetric Displacement Vp | Flow Q [l/min] & n = 1500 RPM | | | Input power P [kW] & n = 1500 RPM | | |
|---|---|---|---|---|---|---|---|
| | | p = 0 bar | p = 140 bar | p = 240 bar | p = 7 bar | p = 140 bar | p = 240 bar |
| B14 | 47,6 ml/rev | 71,4 | 62,1 | 55,9 | 2,3 | 18,5 | 30,6 |
| B17 | 58,2 ml/rev | 87,3 | 78,0 | 71,8 | 2,5 | 22,2 | 37,0 |
| B20 | 66,0 ml/rev | 99,0 | 89,7 | 83,5 | 2,8 | 24,9 | 41,7 |
| B24 | 79,5 ml/rev | 119,3 | 110,0 | 103,8 | 3,0 | 29,6 | 49,8 |
| B28 | 89,7 ml/rev | 134,5 | 125,2 | 119,0 | 3,2 | 33,2 | 55,9 |
| B31 | 98,3 ml/rev | 147,4 | 138,1 | 131,9 | 3,3 | 36,2 | 61,0 |
| B35 | 111,0 ml/rev | 166,5 | 157,2 | 151,0 | 3,5 | 40,7 | 68,7 |
| B38 | 120,3 ml/rev | 180,4 | 171,1 | 164,9 | 3,7 | 43,9 | 74,3 |
| B42[1)] | 136,0 ml/rev | 204,0 | 194,7 | 188,5 | 4,0 | 49,4 | 83,7 |
| B45[1)] | 145,7 ml/rev | 218,5 | 209,2 | 203,0 | 4,1 | 52,8 | 89,5 |
| B50[1)] | 158,0 ml/rev | 237,0 | 227,7 | 224,0[2)] | 4,4 | 57,0 | 85,0[2)] |

*1) B42 - B45 - B50 = 2200 R.P.M. max.* *2) B50 = 210 bar max. int.* *Port connection can be furnished with metric threads.*



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**Model No.** **T6ERM - 066 - 1 R 00 - A 1 0 - A 1 ..**

**Series**

**Cam ring**
(Delivery at 0 bar & 1500 r.p.m.)
042 = 198,5 l/min
045 = 213,6 l/min
050 = 237,7 l/min
052 = 247,2 l/min
062 = 295,0 l/min
066 = 319,9 l/min
072 = 340,6 l/min

**Type of shaft**
1 = keyed (SAE CC)
3 = splined (SAE C)
4 = splined (SAE CC)

**Direct. of rotation (view on shaft end)**
R = clockwise
L = counter-clockwise

**Porting combination**

**Modification**

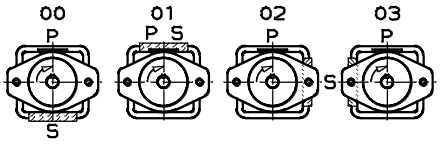
**Seal class**
1 = S1 (for mineral oil)
4 = S4 (for the resistant fluids)
5 = S5 (for mineral oil and fire resistant fluids)

**Design letter**

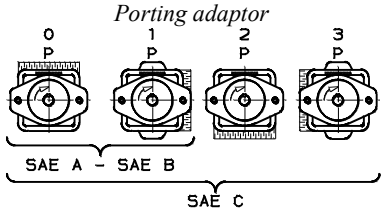
**Porting adaptor**

**Coupling**
1 = SAE A
2 = SAE B
3 = SAE BB
4 = SAE C
5 = SAE J498b
16/32 - 11 teeth

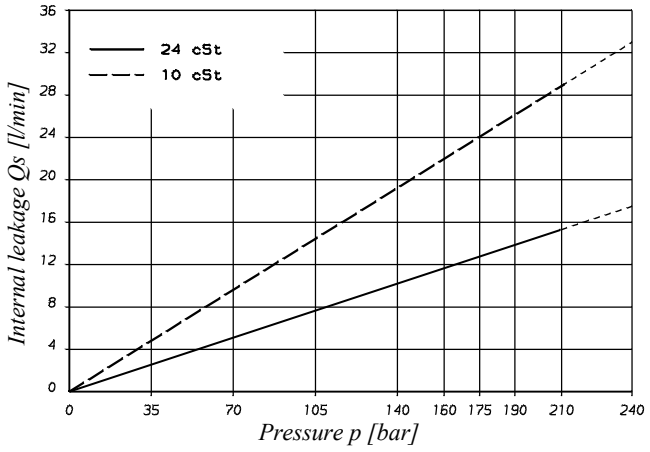
**Adaptor**
0 = None
A = SAE A
B = SAE B
C = SAE C



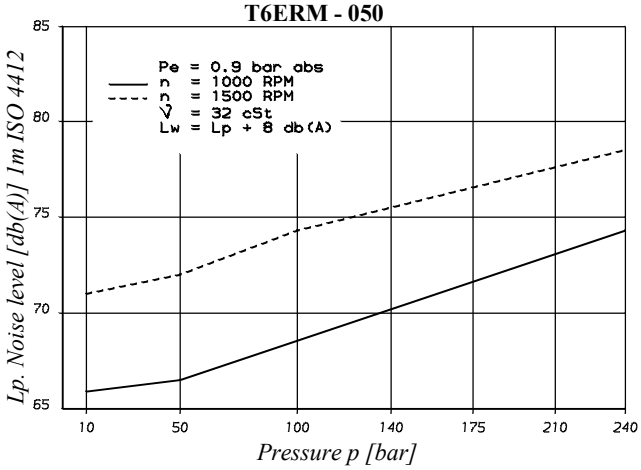

*Porting adaptor*



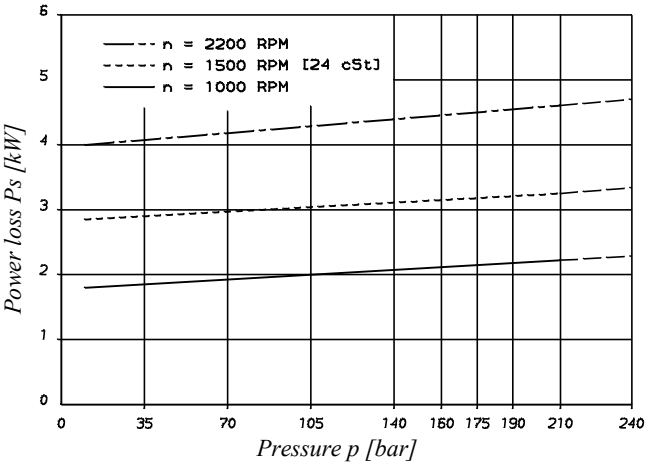

## INTERNAL LEAKAGE (TYPICAL)



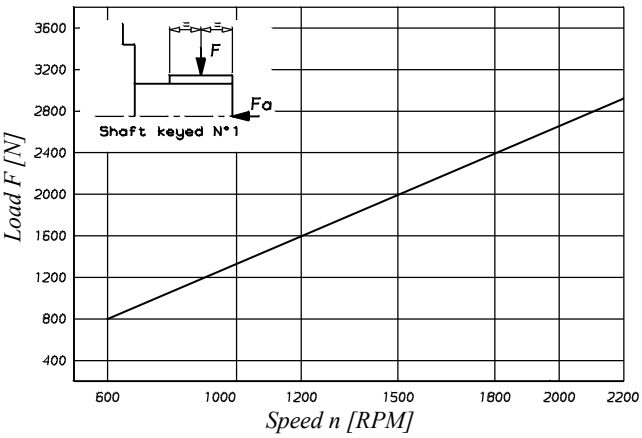

## NOISE LEVEL (TYPICAL)
**T6ERM - 050**




## POWER LOSS HYDROMECHANICAL (TYPICAL)




## PERMISSIBLE RADIAL LOAD




*Maximum permissible axial load Fa = 2000 N*



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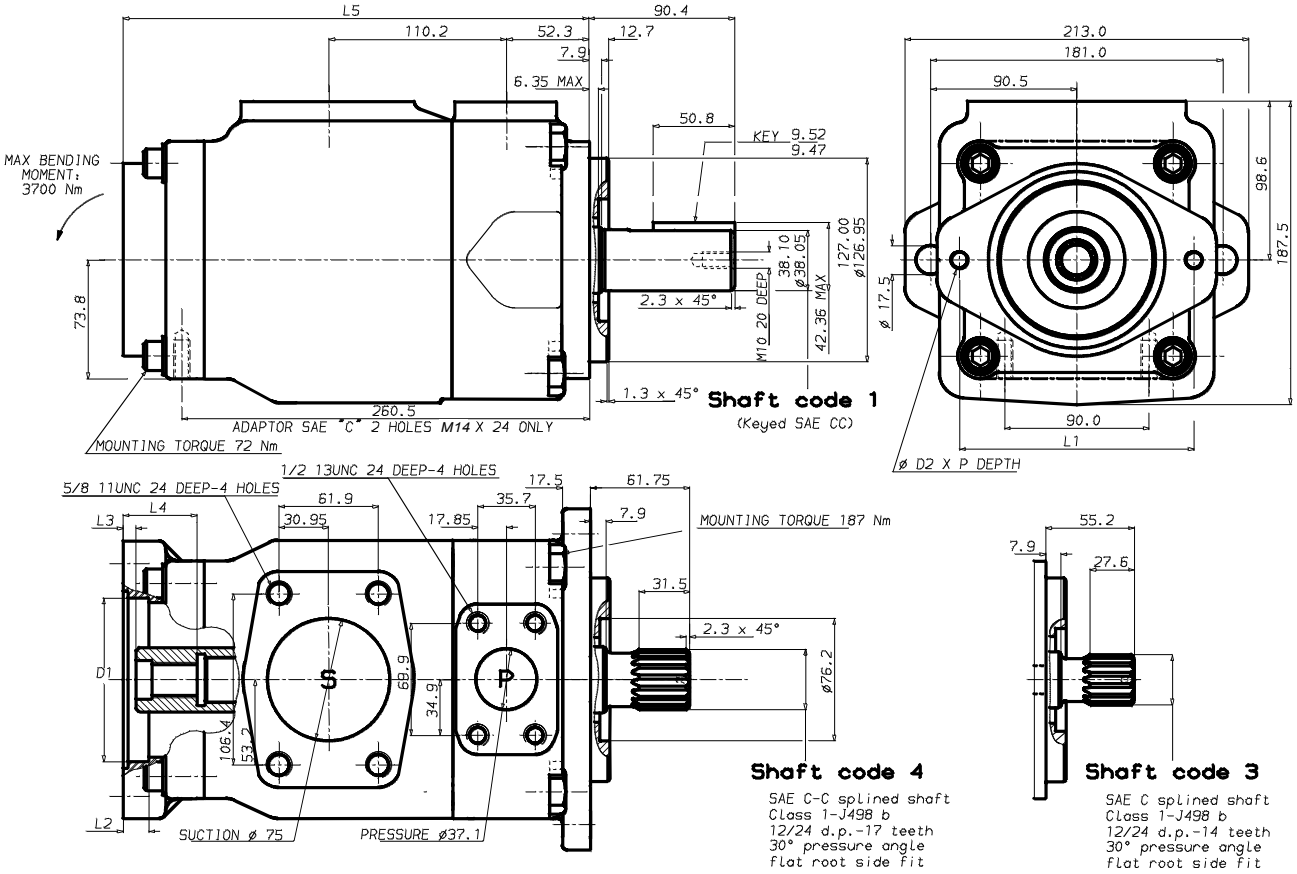


| Adaptor | D1 | D2 | P | L1 | L2 | L3 | L4 | L5 |
|---|---|---|---|---|---|---|---|---|
| **SAE A** | 82,65/82,60 | M10 | 24 | 106,4 | 11,0 | 8,0 | 32,0 | 272,0 |
| **SAE B** | 101,70/101,65 | M12 | 28 | 146,0 | 16,0 | 8,0 | 46,0 | 286,0 |
| **SAE C** | 127,10/127,05 | M16 | - | 181,0 | 16,0 | 8,0 | 56,0 | 296,0 |

| **Adaptor** | **SAE A** | | | **SAE B** | | **SAE C** |
|---|---|---|---|---|---|---|
| Coupling drive | SAE A | SAE 11 teeth | SAE B | SAE B | SAE BB | SAE C |
| Number of teeth | 9 | 11 | 13 | 13 | 15 | 14 |
| Pitch | 16/32 | 16/32 | 16/32 | 16/32 | 16/32 | 12/24 |
| Pressure angle | 30° | 30° | 30° | 30° | 30° | 30° |
| Major dia. (min) | 15,875 | 19,05 | 22,225 | 22,225 | 25,400 | 31,750 |
| Minor dia. (min) | 12,700 | 16,017 | 19,134 | 19,134 | 22,268 | 27,589 |

| Shaft torque limits [ml/rev x bar] | | | |
|---|---|---|---|
| **Shaft** | **V x p max.** | **Coupling drive** | **V x p max.** |
| 1 | 80560 | SAE A | 11000 |
| 3 | 61200 | SAE B | 20600 |
| 4 | 120210 | SAE BB | 32670 |
| | | SAE C | 66480 |
| | | SAE - 11 teeth | 15850 |

## OPERATING CHARACTERISTICS - TYPICAL [24 cSt]

| **Series** | **Volumetric Displacement Vp** | **Flow Q [l/min] & n = 1500 RPM** | | | **Input power P [kW] & n = 1500 RPM** | | |
|---|---|---|---|---|---|---|---|
| | | **p = 0 bar** | **p = 140 bar** | **p = 240 bar** | **p = 7 bar** | **p = 140 bar** | **p = 240 bar** |
| 042 | 132,3 ml/rev | 198,5 | 188,5 | 181,3 | 5,2 | 49,4 | 82,6 |
| 045 | 142,4 ml/rev | 213,6 | 203,6 | 196,5 | 5,4 | 52,9 | 88,7 |
| 050 | 158,5 ml/rev | 237,7 | 227,7 | 220,6 | 5,7 | 58,5 | 98,3 |
| 052 | 164,8 ml/rev | 247,2 | 237,2 | 230,1 | 5,8 | 60,8 | 102,1 |
| 062 | 196,7 ml/rev | 295,0 | 285,0 | 277,9 | 6,4 | 71,9 | 121,3 |
| 066 | 213,3 ml/rev | 319,9 | 309,9 | 302,8 | 6,7 | 77,7 | 131,2 |
| 072 | 227,1 ml/rev | 340,6 | 330,6 | 323,5 | 6,9 | 82,6 | 139,5 |

*Port connection can be furnished with metric threads.*



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**Ass'y Tandem VV - ..**

**VV = Vane pump + vane pump**
**VP = Vane pump + Piston pump (PV)**
**VG = Vane pump + Gear pump (GP)**
**VH = Vane pump + Hybrid pump (T6H*)**

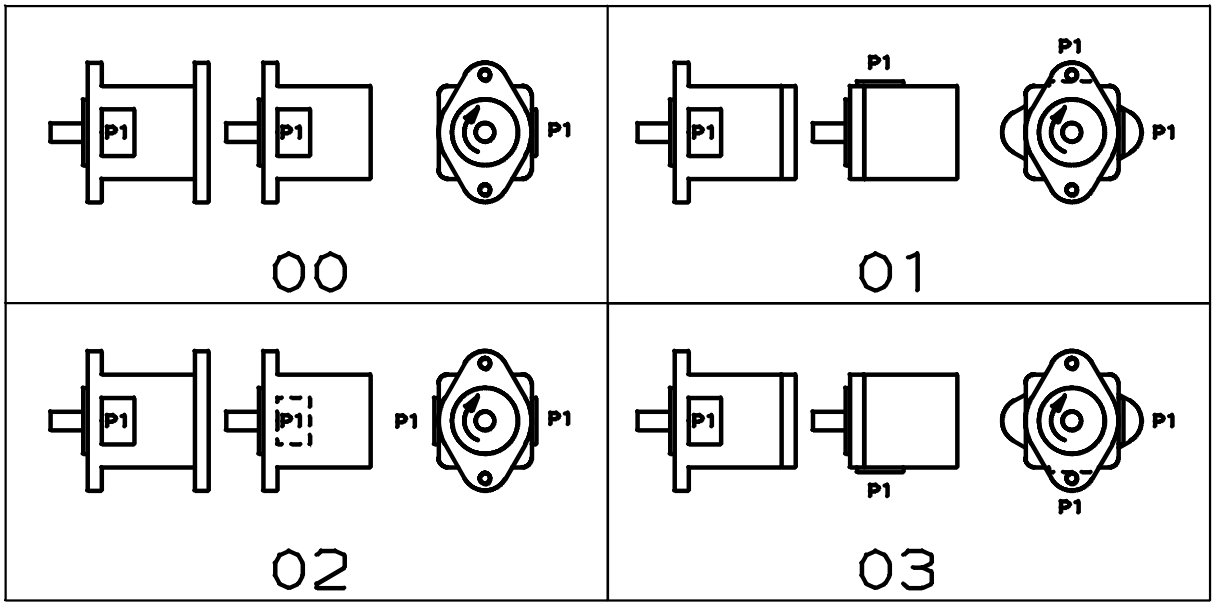
**Porting combination**
**00**
**01**
**02**
**03**

### Assembly screws

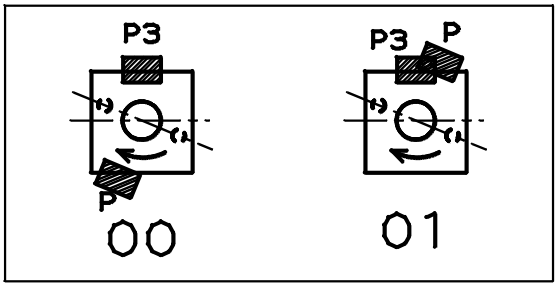
- SAE A rear mounting adaptor : 2 screws M10 x 30 (Mounting torque = 49 Nm.)
- SAE B rear mounting adaptor : 2 screws M12 x 35 (Mounting torque = 88 Nm.)
- SAE C rear mounting adaptor : 2 screws M16 x 40 (Mounting torque = 190 Nm.)

### ASSEMBLY PORTING DEFINITION

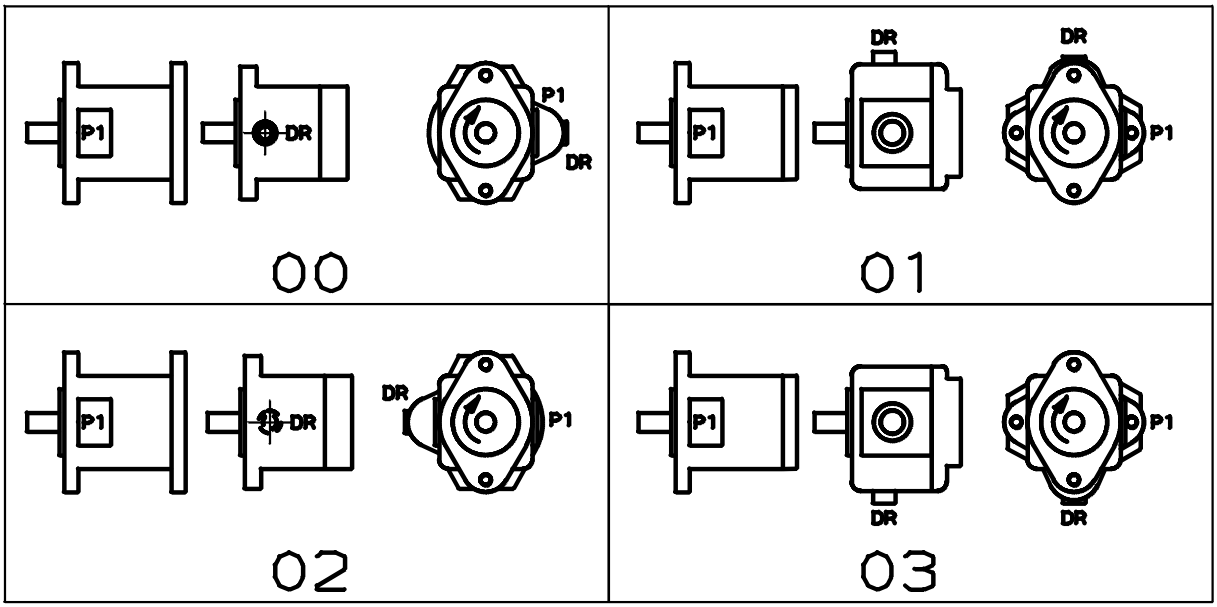
- VV type = Front single vane pump (view from shaft end).



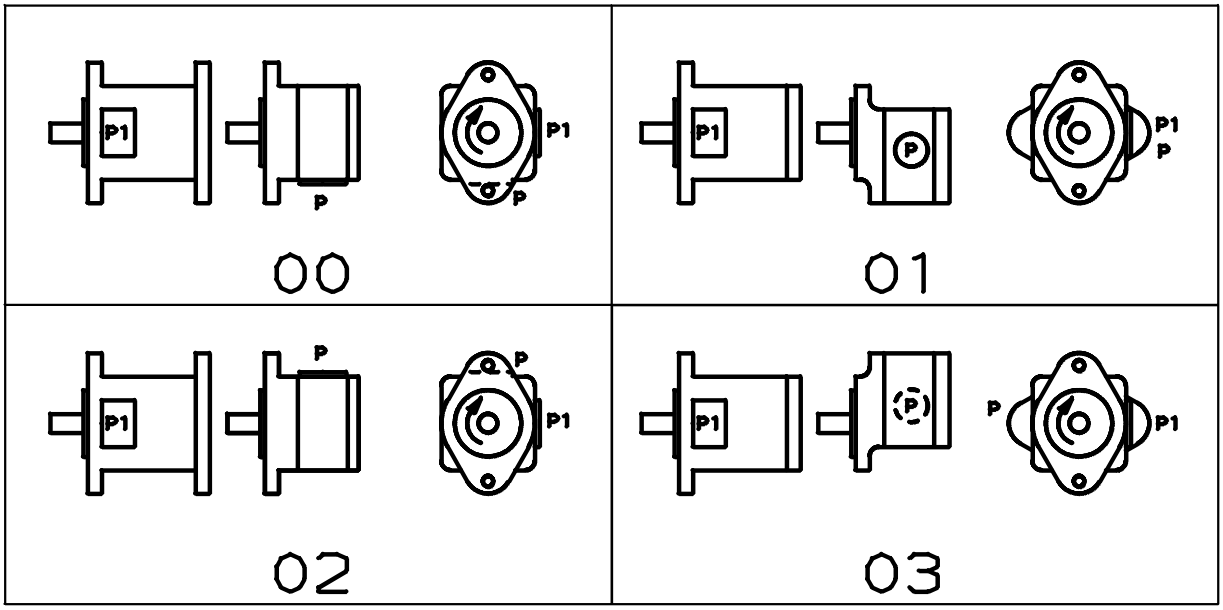

- VV type = For triple vane pump (view from shaft end).



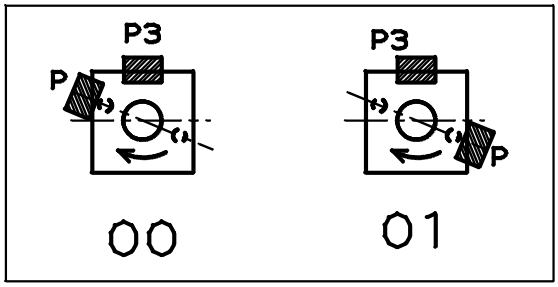
- VP &VH type = For the second pump the reference is the DR drain port on piston pump (view from shaft end).




- VG type = For single vane pump (view from shaft end).




- VG type = For triple vane pump (view from shaft end).



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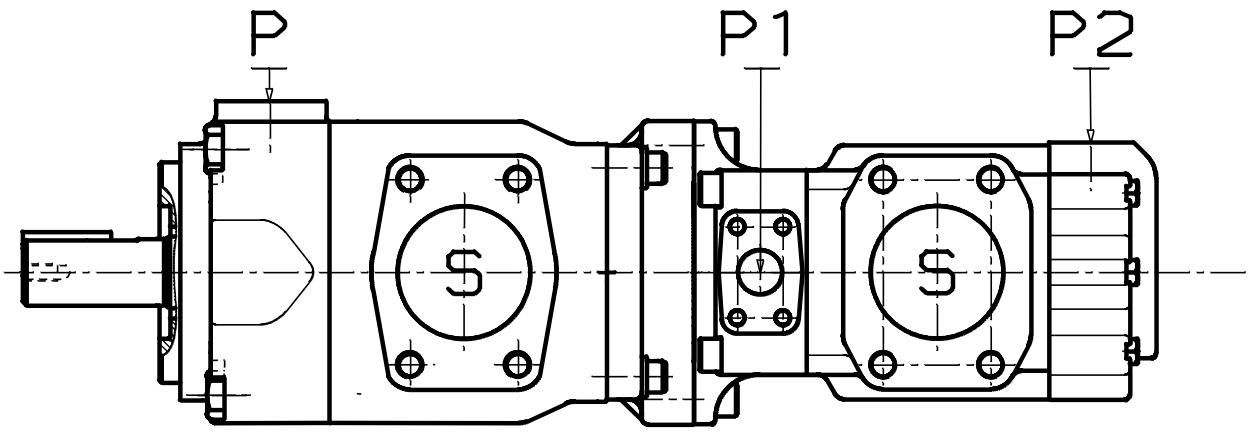
| Rear pump | | Drive train vane pump | | | |
|---|---|---|---|---|---|
| | | T6*R (single pumps) | | T6***R (triple pumps) | |
| Serie | Shaft | Coupling | Adaptor | Coupling | Adaptor |
| T6C*<br>T6CR*<br>T6CSH | 3<br>4 | 2<br>3 | B<br>B | Not available | |
| T6CC* | 3<br>5 | 3<br>2 | B<br>B | Not available | |
| T6D*<br>T6DR*<br>T6DC*<br>T6DCC* | 3 | 4 | C | Not available | |
| T6E*<br>T6ER*<br>T6EC*<br>T6ED* | 3 | 4 | C | Not available | |
| TB | 4<br>3 | 1<br>5 | A<br>A | Available | |
| T7B | 3<br>4 | 2<br>3 | B<br>B | Not available | |
| T6H*** | 4 | 3 | B | Not available | |
| PV6 | 1 | 2 | A | Available with special coupling | |
| PV10<br>PV15 | 1 | 2 | B | Not available | |
| PV20<br>PV29 | 1 | 4 | C | Not available | |
| GP1D | 3 | 1 | A | Available | |
| GP2D | 3 | 1 | A | Available up to 12 $cm^3$/rev. | |
| GP2A | 3 | 1 | A | Available | |
| GP3A | 3 | 2 | B | Not available | |

**For additional information on Piston or Gear pumps, see the specific bulletins.**

**EXAMPLE**




**T6ER + T6CC**

- 1. Define front pump
  T6ER - *** - 1 R 02 - B21 - A 1
- 2. Define rear pump
  T6CC - *** - *** - 5 R 01 - C 100
- 3. Define mounting
  Ass'y tandem VV03



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