

High Pressure Multistage Centrifugal Pumps



TECHNICAL MANUAL



KDM Series

High Pressure Multistage Centrifugal Pumps

General Specifications



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Fields of Applications

For pumping of clear and slightly contaminated liquids in:

- Boiler feed and condensate transfer,
- Central heating systems,
- Water supply systems,
- Booster sets in high rise buildings and industry,
- Water treatment,
- Industrial washdown systems,
- Fire extinguishing plants,
- Sanitary and cleaning installations,
- For industrial applications and public services,
- Water distribution services,
- Industrial applications,
- Shipbuilding, Mining, Power Stations, Filter Units,
- Irrigation plants.

Pumped Liquids

Thin, clean, non-aggressive and non-explosive liquids free from solid particles and fibres.

For special applications, please consult to MAS DAF Makine A.Ş.

Design

- KDM series pump horizontal radially split ring section pump with modular design.
- Impellers are between bearings, single entry, closed type and dynamically balanced. Impeller diameter will be corrected for optimal adherence to the required duty point.
- For balancing the axial thrust, there is a balancing drum at discharge side.
- The pump series consists of two sizes. KDM 50 and KDM 65.
- Pump and motor are fitted on a common base plate and connected to each other via flexible coupling.
- Normally, discharge part is at motor side on the top and suction part is at dead end side on the left viewed from driver.

Suction and discharge nozzles may be a choice of three 90° positions. By special request, it is possible to put the suction nozzle at the motor side. In this arrangement pump and motor rotation must be counter clockwise.

Please see the possible arrangements at "Different Mounting Arrangements" section.

Shaft

Chromium steel (AISI 420) fine grained shafts are used on KDM pumps. There is no big diameter difference along the shaft and it is possible and very easy to dismantling the pump beginning from suction or discharge ends.

Bearings

- On the discharge side, angular contact ball bearings are used (7300 Series).
- At the suction side, there are cylindrical roller bearings (NU 300 Series).

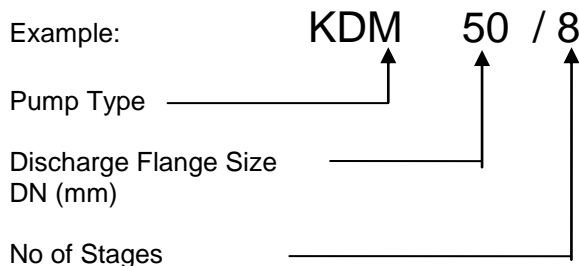
Shaft Seal

- Soft packing and mechanical seal applications are possible.
- Since the pressure is high for these pumps, the type of the mechanical seals is balanced.

Technical Data

- Suction Flanges..... : DN 65 – 80
- Discharge Flanges..... : DN 50 – 65
- Operating Pressure..... : 90 Bar
- Speed..... : 2900 rpm
- Operating Temperature..... : Up to 150 °C
- Capacity Range..... : 0 – 100 m³/h
- Head Range..... : Up to 900 mwc

Identification Code for Pump



***IMPORTANT NOTE

If this pump is used as boiler feed pump, pump should be assembled with minimum flow valve.

For this type of applications, please consult MAS DAF Makine A.Ş. representative.

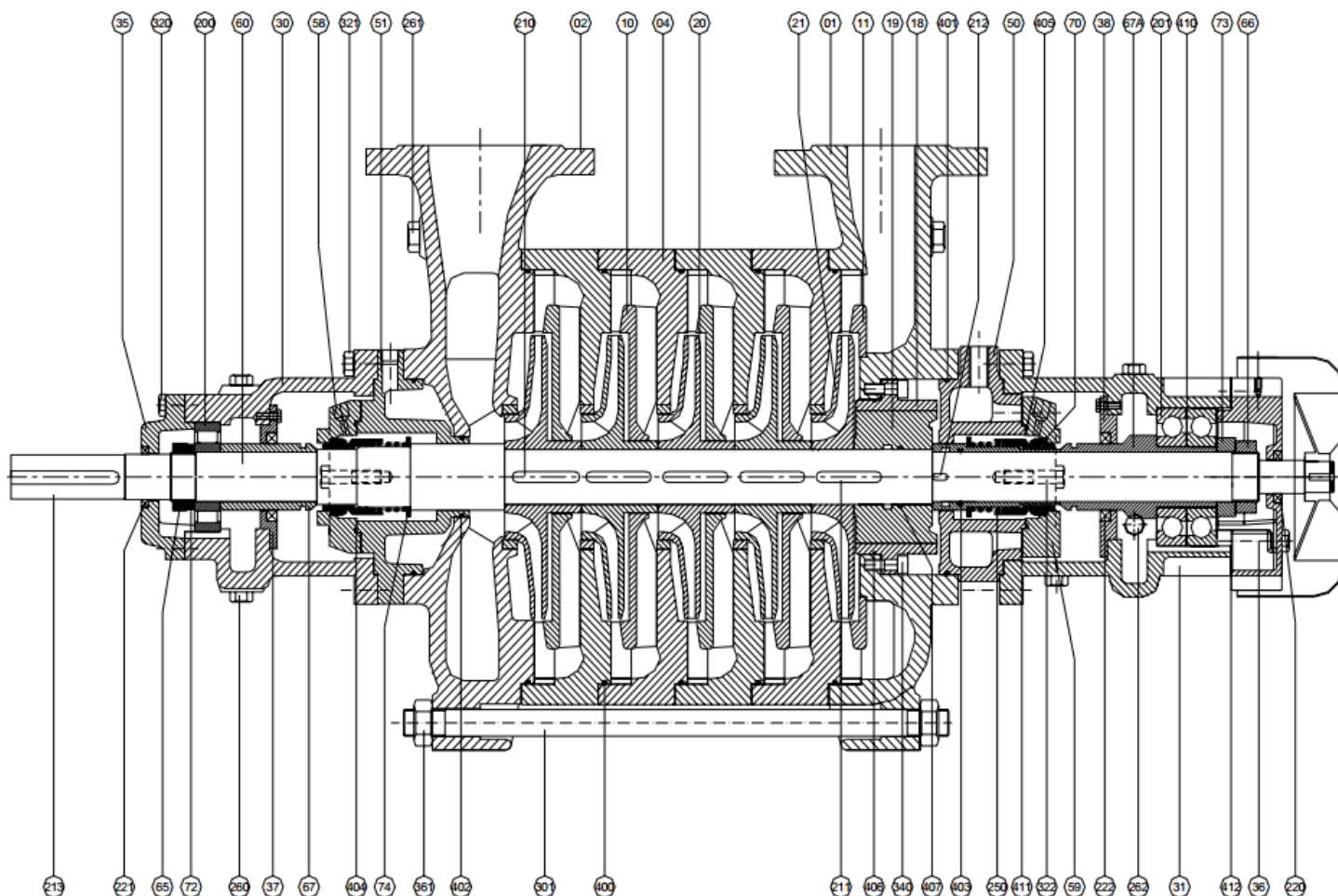
KDM Series

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Cross – Sectional Drawing For KDM



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| Part No | Part Name | Part No | Part Name | Part No | Part Name |
|---------|-----------------------------|---------|-----------------------------|----------|--------------------------------------|
| 340 | Bolt | 402 | O-Ring (Suc. Stuffing Box) | 406 | O-Ring (Balancing Drum Outside Part) |
| 361 | Casing Stud Nut | 403 | O-Ring (Seal Sleeve) | 407 | O-Ring (Balancing Drum House) |
| 400 | O-Ring (Stage Casing) | 404 | O-Ring (Suc. Stuffing Box) | 410 | Paper |
| 401 | O-Ring (Disc. Stuffing Box) | 405 | O-Ring (Disc. Stuffing Box) | 411, 412 | Gasket |

| Part No | Part Name |
|---------|------------------------------|
| 01 | Discharge Casing |
| 02 | Suction Casing |
| 04 | Stage Casing |
| 05 | Wear Ring |
| 10 | Diffuser |
| 11 | Last Stage Diffuser |
| 18 | Balancing Drum Outside Part |
| 19 | Balancing Drum House |
| 20 | Impeller |
| 21 | Last Stage Impeller |
| 30 | Bearing Housing (Suc. Side) |
| 31 | Bearing Housing (Disc. Side) |
| 35 | Bearing Cover (Suc.) |
| 36 | Bearing Cover (Disc.) |
| 37 | Oil Seal Cover (Suc.) |
| 38 | Oil Seal Cover (Disc.) |
| 50 | Stuffing Box (Disc.) |
| 51 | Stuffing Box (Suc.) |
| 58 | Mech. Seal Cover (Suc.) |
| 59 | Mech. Seal Cover (Disc.) |
| 60 | Shaft |
| 65 | Shaft Nut (Suc.) |
| 66 | Shaft Nut (Disc.) |
| 67 | Space Sleeve (Suc.) |
| 67A | Space Sleeve (Disc.) |
| 70 | Seal Sleeve (Disc.) |
| 72 | Bearing Sleeve (Suc.) |
| 73 | Bearing Sleeve (Disc.) |
| 74 | Mech. Seal Front Sleeve |
| 201 | Angular Contact Ball Bearing |
| 210 | Impeller Key |
| 211 | Balancing Drum Key |
| 212 | Special Key |
| 213 | Coupling Key |
| 220 | Oil Seal |
| 221 | Oil Seal |
| 222 | Oil Seal |
| 250 | Mechanical Seal |
| 260 | Pipe Plug |
| 261 | Pipe Plug |
| 262 | Side Gauge |
| 301 | Casing Stud |
| 320 | Hex. Bolt |
| 321 | Hex. Bolt |
| 322 | Hex. Bolt |

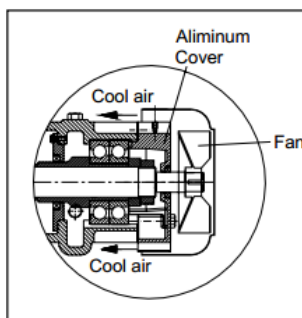
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High Pressure Multistage Centrifugal Pumps

Design Features



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Fan

Since these pumps are used mostly boiler feed pump and condensate pump, the fan gives extra cooling to the bearing house. Also, the cover is made of Al material so the heat transfer coefficient for Al higher and it help cooling the system.

Large Branch Size

Ideal flow pattern by positioning tie bolts externally at suction branch.
Low flow velocities, reduced noise levels. Higher allowable forces and moments.

Casing Sealing By Confined O-Ring

Casing sealing is unaffected even in high temperatures and pressures.

Sealing

Packing or mechanical seal is possible.
Cooled or uncooled design.

Radial Bearing

Oil lubricated anti-friction bearing.

Replaceable Wear Rings

Assist stabilization of pump rotor.
Smooth running even in part load or overload.
Maintain high efficiency during pump life.
Low maintenance cost, saving essential repairs and spare parts.
High availability and short down times.

Robust Shaft

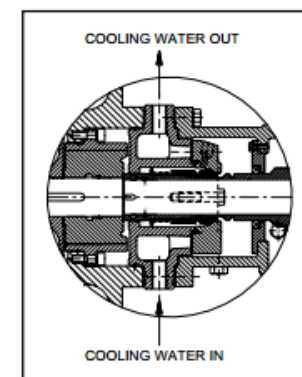
Critical speed > operation speed.
Small shaft deflection.
Areas subjected to wear are protected.

Impeller

High efficiency over a wide range.
Low operation cost.

Stuffing Box

Cooled design, it gives a chamber for cooling and by transferring cool water inside the cooling chamber, the extra heat from casings towards to the bearings are limited.
Easily accesible cooling chamber. Clearly arranged connections. Intensive and uniform cooling

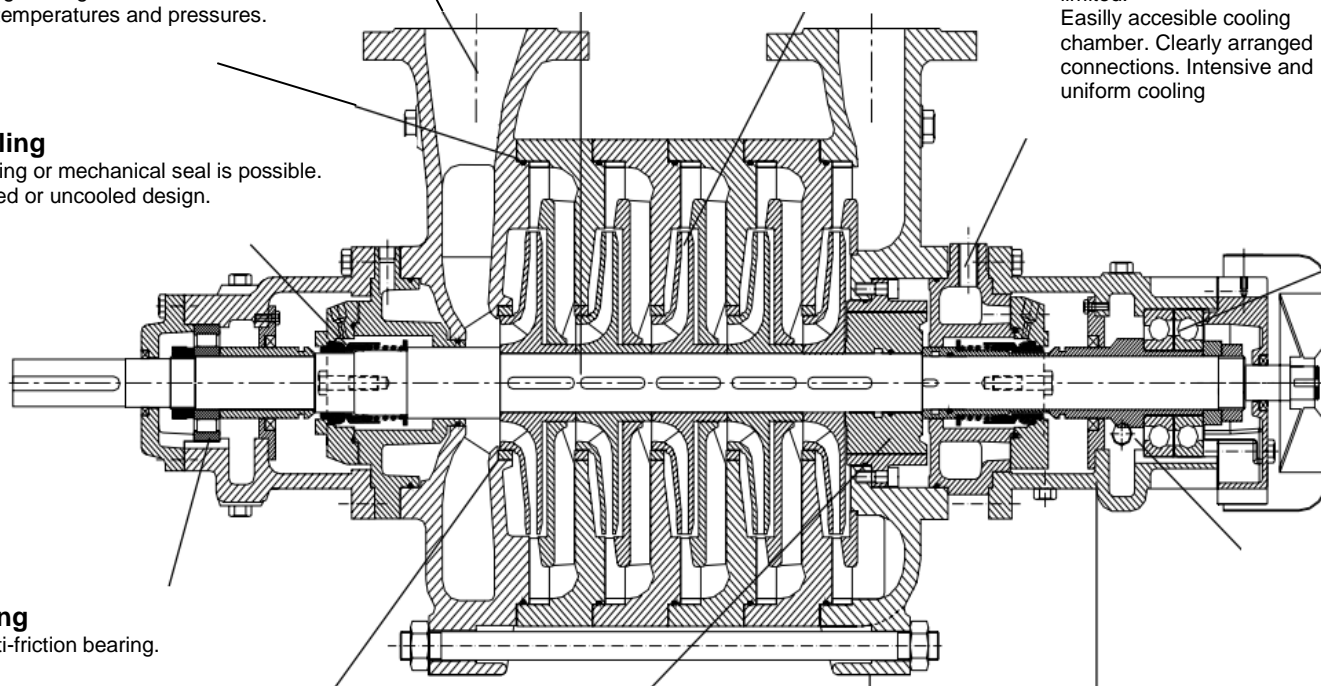


Angular Contact Bearing

Long bearing lives even under extreme operation times. Paired and fan cooled.

Gauges

Side gauge for seeing the level of the oil in bearing house.
Thermometer to see the temperature of oil while running.
Immediate precaution both for oil level and temperature level.



Efficient Axial Balance

By balance drum.
The pressure on sealing is lowered.
Low residual force due to balance drum design.

Casing Support

There is a slot type base plate connection hole.
Due to this, it operates safely even in high temperatures for expansions.

Heavy Bearing Housing

Oil lubricated anti-friction bearing.

KDM Series

High Pressure Multistage Centrifugal Pumps

Technical Data



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Material List and Options

| Components \ Material No: | 0.6025 GG 25 | 0.7040 GGG 40 | 2.1050.01 Bronze | 1.4021 AISI 420 | 1.4301 AISI 304 | 1.4401 AISI 316 | Al |
|--|-----------------|------------------|---------------------|--------------------|--------------------|--------------------|----|
| Suction & Discharge Casing | | • | | | | | |
| Stage Casing | | • | | | | | |
| Impeller | • | o | o | | o | o | |
| Diffuser | • | o | o | | o | o | |
| Balancing Drum Outside Part | | • | o | | | | |
| Balancing Drum House | | • | o | | | | |
| Pump Shaft | | | | • | o | o | |
| Sleeves (Space, Seal, Bearing, Mech. Seal Front) | | | | • | o | o | |
| Stuffing Box | • | o | | | | | |
| Bearing Housing | • | o | | | | | |
| Bearing Cover (Suc.) | • | o | | | | | |
| Bearing Cover (Disc.) | | | | | | | • |

• – Standard Manufacturing
o – Optional

Material Equivalent

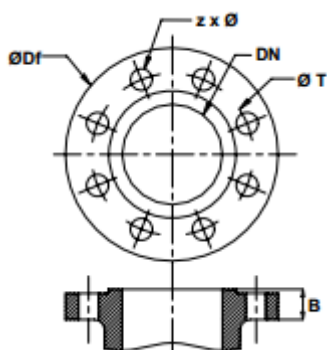
| Description | DIN 17007 | EN-DIN | ASTM |
|--------------------------------|-----------|--------------------|-------------------|
| Cast Iron | 0.6025 | GJL-250 (GG25) | A 48 Class 40-B |
| Nodular Cast Iron | 0.7040 | GJS-400-15 (GGG40) | A 536 Gr.60-40-18 |
| Cast Bronze | 2.1050.01 | G-Cu Sn 10 | B 584 C 90700 |
| Chrome Steel | 1.4021 | X20 Cr 13 | A 276 Type 420 |
| Chrome Nickel Steel | 1.4301 | X5 Cr Ni 18.9 | A 276 Type 304 |
| Chrome Nickel Molybdenum Steel | 1.4401 | X5 Cr Ni Mo 18.10 | A 276 Type 316 |

Max. and Min. Number of Stages

| 2900 RPM | | |
|-------------------|----------------------|----------------------|
| Model Designation | Min Number of Stages | Max Number of Stages |
| KDM 50 | 6 | 18 |
| KDM 65 | 7 | 10 |

Flange Dimensions

- Discharge Flanges : DIN 2533
- Suction Flanges : DIN 2533



| PN 64 | | |
|-----------|----------------|------------------|
| Pump Type | Suction Flange | Discharge Flange |
| KDM 50 | DIN 65 | DIN 50 |
| KDM 65 | DIN 80 | DIN 65 |

KDM Series

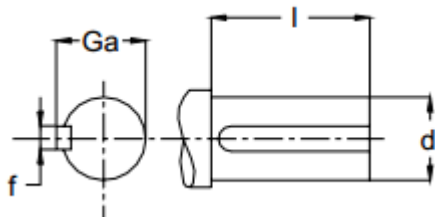
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Technical Data



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Shaft End & Key Way Dimensions



| Pump Size | d mm ø | l mm | f mm | Ga mm |
|-----------|-----------|---------|---------|----------|
| KDM 50 | 38 | 80 | 10 | 43 |
| KDM 65 | 40 | 110 | 12 | 45 |

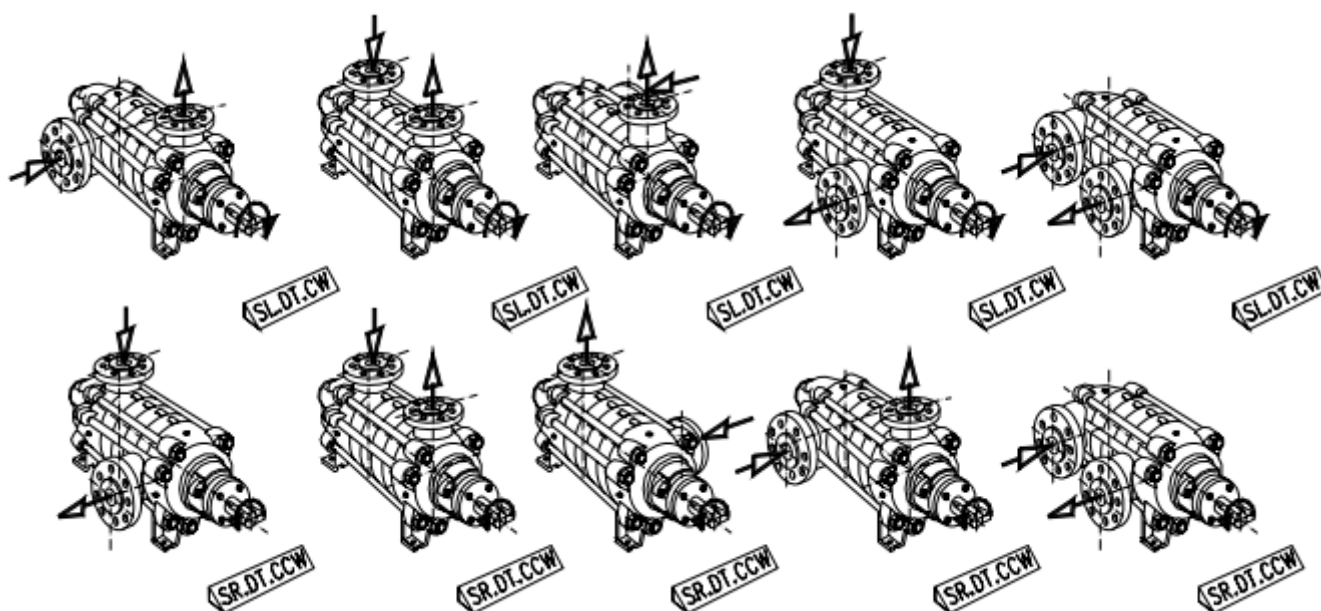
Casing Stud Dimensions

| Pump Size | Qty. | Dimension |
|-----------|------|-----------|
| KDM 50 | 4 | M27 |
| KDM 65 | 8 | M24 |

Bearing Properties

| Pump Type | Bearing (Motor Side) | Bearing (Dead Side) |
|-----------|-------------------------|------------------------|
| KDM 50 | NU 308 / 1 Qty. | SKF 7308 / 2 Qty. |
| KDM 65 | NU 309 / 1 Qty. | 7311 / 2 Qty. |

Different Mounting Arrangements for KDM



Example: **SL – DT – CW**

(**SL**: Suction Left – **DT**: Discharge Top – **CW**: Rotation Clock Wise)

***For counter – clockwise motor rotation, please consult to MAS DAF Makine A.Ş. representative.

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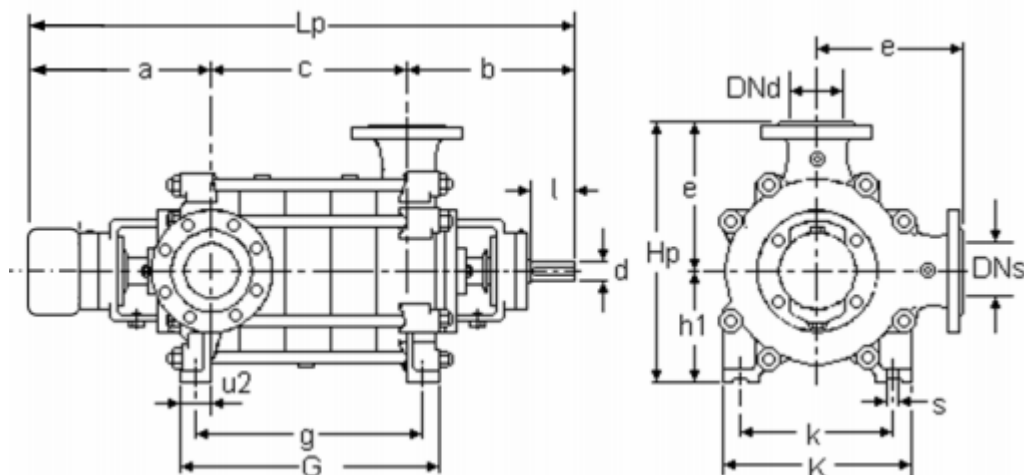
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Technical Data



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Pump Dimensions



| Pump Size | DNs mm Ø | DNd mm Ø | a | b | Lp | g | G | u2 | h1 | e | hp | d | l | k | K | s |
|-----------|----------|----------|-----|-----|-------|------|-------|----|-----|-----|-----|----|-----|-----|-----|----|
| KDM 50 | 65 | 50 | 395 | 356 | C+751 | C | C+80 | 80 | 180 | 210 | 390 | 38 | 80 | 360 | 440 | 18 |
| KDM 65 | 80 | 65 | 453 | 453 | C+906 | C+88 | C+148 | 74 | 247 | 300 | 547 | 40 | 110 | 315 | 395 | 20 |

Dimension “C” according to the number of stages.

| Pump Size | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| KDM 50 | 201 | 253 | 305 | 357 | 409 | 461 | 513 | 565 | 617 | 669 | 721 | 773 | 825 | 877 | 929 | 981 | 1033 |
| KDM 65 | 165 | 239 | 313 | 387 | 461 | 535 | 609 | 683 | 757 | - | - | - | - | - | - | - | - |



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