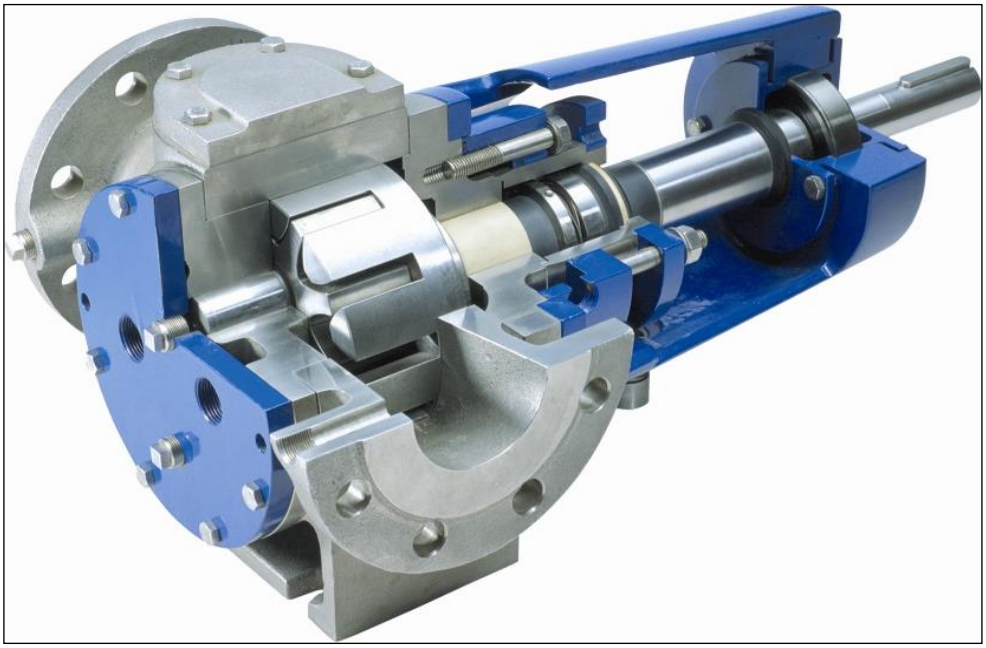
User Manual – incl. ATEX/English

ROTAN PUMP

Types GP – HD - PD - CD - CC - ED*



DESMI PUMPING TECHNOLOGY A/S

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Pump sizes:

The ROTAN pump is supplied in various pump sizes.
The pump size is defined on the basis of the pump's inlet/outlet.

By measuring the internal diameter of the pump's inlet/outlet, you can find the pump size in the table below.

Pump size		
Pump sizes	**Nominal diameter i mm.**	**Internal diameter in inches**
26	25	1"
33	32	11/4"
41	40	11/2"
51	50	2"
66	65	21/2"
81	80	3"
101	100	4"
126	125	5"
151*	150	6"
152*	150	6"
201*	200	8"
202*	200	8"

Figure 5: A list of pump sizes based on the internal diameter of the pump's inlet/outlet in inches and millimetres.

*Pump sizes 151 and 152, 201 and 202 are pumps of different displacements, but with the same size inlet/outlet.

The various pump types are available in the pump sizes listed in Figure 6:A list of the various pump sizes together with the pump types available in the various pump sizes.
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Pump types/sizes						
Pump size	**Pump types**					
	GP	**HD**	**PD**	**CD**	**ED**	**CC**
26						
33						
41						
51						
66						
81						
101						
126						
151						
152						
201						
202						

Figure 6:A list of the various pump sizes together with the pump types available in the various pump sizes.
Fields that are shaded grey indicate the sizes available in the pump types listed.
The pump's inlet/outlet can be supplied with internal threads or flanges.

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Pump weight excl. /incl. valve					
Pump size	Pump type				
	GP/CC	HD	PD	CD	ED
26	11 (13)	5,5 (7,5)	7 (9)	7 (9)	29 (31)
33	12 (14)	6 (8)	10 (12)	10 (12)	30 (32)
41	20 (22)	14 (16)	18 (20)	18 (20)	40 (42)
51	50 (56)	35 (41)	36 (42)	36 (42)	90 (96)
66	55 (61)	40 (46)	43 (49)	43 (49)	95 (101)
81	80 (90)	65 (75)	70 (80)	70 (80)	180 (190)
101	105 (115)	90 (100)	96 (106)	96 (106)	200 (210)
126	-	140 (160)	152 (172)	152 (172)	350 (370)
151	-	190 (210)	205 (225)	205 (225)	400 (420)
152	-	280 (340)	335 (395)	335 (395)	-
201	-	460 (520)	500 (560)	500 (560)	-
202	-	900(1172)	960 (1060)	960 (1060)	-

Figure 9:Table showing the weight in kg of the various pump types in the various pump sizes.
Weights are excl. valve – the figures in brackets are incl. valve.
Weights are excl. motor/gear and base frame (if any).

Lift the pump mechanically, if the pump's weight is more than the permitted number of kilos that people may lift.

Do not place fingers in the pump's ports when lifting or handling the pump.

Motors fitted with lifting eyes must not be used to lift the whole pump, but only to lifting the motor separately.

Lift of the pump should be performed in stable suspension points so that the pump is balanced and the lifting straps are not placed over sharp edges

Lift of the pump shall be performed in conformity with the lifting instructions in Figure 10 – Figure 16

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Max. external force and torque loads				
Pump size	Forces		Torque	
	$F_{(x,y,z)}$ N	$F_{(Total)}$ N	$M_{(x,y,z)}$ Nm	$M_{(Total)}$ Nm
26	190	270	85	125
33	220	310	100	145
41	255	360	115	170
51	295	420	145	210
66	360	510	175	260
81	425	600	215	315
101	505	720	260	385
126	610	870	325	480
151 / 152	720	1020	385	565
201	930	1320	500	735
202	1722	2982	926	1603

Figure 21:The maximum permitted external forces and torque that may be applied to pump flanges for the various pump sizes.
x, y and z appear from Figure 20: The location of forces and torque the pump casing.

The forces F (Total) in N and torque M (Total) in Nm are calculated as follows:

$$F_{(total)} = \sqrt{F_x^2 + F_y^2 + F_z^2}$$

$$M_{(total)} = \sqrt{M_x^2 + M_y^2 + M_z^2}$$

- on the condition that the x, y and z components cannot all have the maximum value at the same time.

If the maximum permitted force and torque loads specified cannot be observed, compensators must be built into the pipe system.
When pumping hot liquids, the pipes must always be fitted with compensators so that the pipes and the pump are able to expand.

If a ROTAN pump with belt drive is required, the permitted power on the outlet shaft is provided on request.

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10.7.2 Flange coupling

Flange couplings must always be undertaken by skilled professionals.

Achieve parallelism between the flanges and observe the maximum tightening torque to prevent tension in the pump casing

1. Before connecting the flange, check that the flanges are parallel, as any variance in parallelism will create tension in the pump casing. Parallelism is achieved by aligning the pipe system or fitting compensators.

2. Select the bolt size for the flanges on the basis of the pump size in the table in Figure 22. You should not use bolts with a yield stress of more than 240 N/mm^2, corresponding to quality 4.8 – for pumps manufactured in grey cast iron, material code “1”.

3. Find the maximum tightening torque in the table in Figure 22.
   Please note that the table contains the maximum tightening torque.
   The necessary tightening torque depends on: packing, form, material and the pump liquid’s temperature.
   The values in column A are valid for pumps manufactured in grey cast iron – material code “1”.
   The values in column B are valid for pumps manufactured in steel – material codes “3” or “4”.

3. Cross-tighten the bolts using the uniform tightening torque shown in the table below.

Bolt size / max. tightening torque			
Pump size	Bolt *	Max. tightening torque A	B
26	M12	30 Nm	80 Nm
33-126	M16	75 Nm	200 Nm
151-202	M20	145 Nm	385 Nm

Figure 22:The bolt sizes available for connecting flanges, together with the maximum tightening torque depending on the pump size and material stated.

Column A contains the maximum tightening torque for pumps manufactured in grey/nodular cast iron – material code “1”/”5”.

Column B contains the maximum tightening torque for pumps manufactured in steel – material codes “3” or “4”.
*You should not use bolts with a yield stress of more than 240 N/mm^2, corresponding to quality 4.8, for pumps manufactured in grey cast iron – material code “1”.

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Extra shielding may be purchased from DESMI

14.2 Foods

ROTAN pumps must not be used to pump foods requiring FDA or 3A approval.

15. Noise

The noise level of ROTAN pumps depends on various parameters.
The different parameters that can influence the sound pressure level are:
differential pressure, viscosity, installation conditions, pump size and flow.

The curves shown in Figure 33 denote standard units with ROTAN pumps' A-weighted sound pressure levels, in relation to pump size and flow.

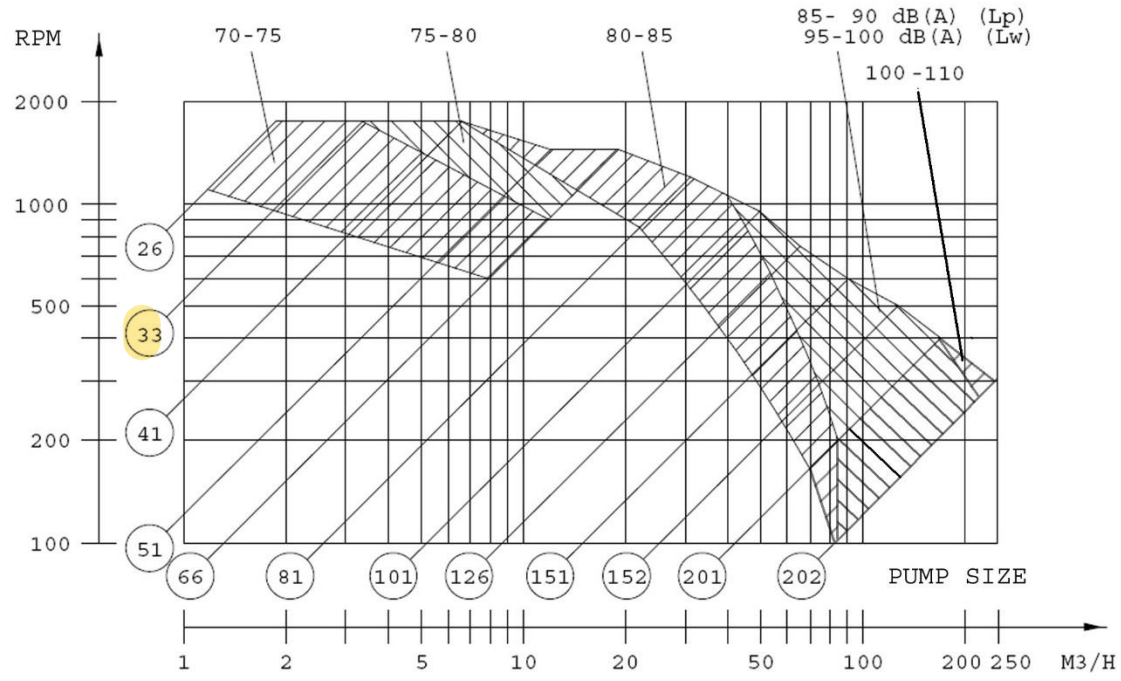

Figure 33:The maximum A-weighted sound pressure level in dB(A)(Lp) for the various pump sizes in relation to the pumps' flow. The range above 85 dB(A) is also expressed as sound power level (Lw).

The sound pressure curves shown are measured at a distance of 1 metre from the pump's surface and at a height of 1.60 metres above the floor. The dB(A) curves shown are calculated on the basis of measurements taken when pumping mineral oil with a viscosity of 70 cSt at a differential pressure of 5 bar. The curves are based on normal industrial use, and not on laboratory conditions.

Lubrication of slide bearings			
		Fat quantity in grams	
Pump type: HD, GP, CD, PD, ED, CC	Relubrication interval in hours	Main bearing	Idler bearing
26	8 hours	1	1
33		1	1
41		1	1
51		1.5	1.5
66		1.5	1.5
81		2	2
101		2	2.5
126		2.5	4
151		2.5	6
152		4	10
201		8	14
202		14	17

Figure 40:Re-lubrication intervals and amounts of grease in grams for lubrication of slide bearings – main bearing and idler bearing.

25. Technical specifications

Because of the ROTAN pump's large number of possible combinations and the many pump liquids used, the following values should be viewed as guideline maximum values, as an individual ROTAN pump may have further limitations due to the pump liquid, the shaft seal selected and in particular the motor selected.
If the pump was bought in Denmark, we therefore refer to DESMI's service centres at the back of this manual.
If the pump was bought outside Denmark, we refer to the relevant distributor.
The technical specifications of the motor are contained in the manual supplied by the motor manufacturer.

25.1 Capacity

Pump type	Max.Capacity (m^3/h)
GP	50
ED	90
HD/PD/CD	260
CC	6,8

Figure 50:The maximum capacity in m3/h for the various pump types.

25.2 Speed

Pump size	Max. Speed (rpm)
26 / 33 / 41	1,750
51 / 66	1,450
81	1,200
101*	950
126	750
151	600
152	500
201	400
202	300

Figure 51:The maximal speed per minute for the various pump sizes – for pump liquids with viscosities under 400 cSt. Reduce the speed in the event of higher viscosities in order to avoid cavitation.
*For HD101, when differential pressure is above 10 bar and viscosity is above 3500 cSt, reduce more speed in order to avoid damage of pump.

The table applies to all pump types: GP/HD/PD/CD/ED/CC.

25.3 Operational pressure

Pump type/size	Operat. pressure – pump casing	Operat. press. – heating
GP*/HD/PD/CD/ED 26 / 33 / 41 / 51 / 66 / 81	Max. 16 bar (max. 25 bar*)	Max. 10 bar
GP*/PD/CD/ED 101 / 126 / 151 / 152 / 201	Max. 10 bar (max. 25 bar*)	Max. 10 bar
HD 101 / 126 / 151 / 152 / 201	Max. 12 bar**	Max. 10 bar
HD202	Max. 14 bar***	Max. 10 bar
CC	Max. 10 bar	

Figure 52:Maximum operational pressure in bar for the various pump types.

The stated max. operational pressure depends on the inlet pressure to the pump and the pump size.

* Pump type GP is also supplied in a special high-pressure version which manages a max. of 25 bar.

The high-pressure version is available in pump sizes: 27 / 34 / 42 / 52 / 67 / 82/ 102.
It appears from the pump size on the name plate if the pump can manage max. 25 bar.

System pressure + differential pressure must not exceed 25 bar, and the differential pressure must not exceed 4 bar.

** For HD101, when differential pressure is above 10 bar, the max. viscosity is 10000cSt. For HD126 to HD201, when differential pressure is above 10 bar, the max. viscosity is 17000cSt.

Attention to the speed of HD101, when differential pressure is above 10 bar.

*** Max allowed differential pressure for HD202 with cast iron bushing (material code 1) is 6 bars.

25.4 Suction height

Pump type	Suction height
GP/HD/PD/CD/ED/CC	Max. 0.5 bar priming vacuum Max. 0.8 bar vacuum in operation

Figure 53:The max. suction height in bar for priming vacuum and operational vacuum.

25.5 Viscosity

Pump type	Viscosity
GP	Max. 7,500 cSt
ED	Max. 10,000 cSt
HD/PD/CD	Max. 250,000 cSt
CC	Max. 1,000 cSt

Figure 54:States the max. allowed viscosity in cSt. of the pump liquid – for standard versions of the various pump types.

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25.6 Temperature

Pump type	Temperature
GP	Max. 150°C
HD/PD/CD*	Max. 250°C
ED	Max. 130°C (Magnetic material: Neodym-Iron-Bor)
	Max. 250°C (Magnetic material: Samarium-Cobalt)
CC	Max. 80°C

Figure 55:The pump liquid's minimum/maximum temperature limits for the various pump types.

For pumps with bypass valve the temperature is limited to 150°C on account of the valve spring.The valve may however be supplied with another spring so that the temperature span of the pump can be utilised fully.

As or additional temperature limits, see the section: "Hot liquids".
* Pump types HD, CD and PD – designed with special tolerances – may in certain cases be use dup to 300°C.

ED pump		
Elastomer type	**Elastomer brand**	**Temperature**
FPM	Viton®	Ca. –20°C / +200°C
FEP	Teflon® med Viton core	Ca. –60°C / +205°C
EPDM	Ethylene-propylene	Ca. –65°C / +120°C
FFKM	Kalrez®	Ca. –50°C / +316°C

Figure 56:The pump liquid's minimum/maximum temperature limits for the various elastomers used in an ED pump.

26. Installation of ATEX pumps with PT100 sensor

To ensure that a ROTAN ATEX pump is safe to use in an ATEX-defined area the following instructions must be followed.

ED pumps and pumps with soft shaft seal, must always be installed with a PT100 sensor according to DESMI PUMPING TECHNOLOGY A/S instructions.

If the ROTAN ATEX pump is fitted with a bypass valve, a PT100 sensor has to be mounted on the bypass valve.

If a ROTAN ATEX pump is ordered with PT100 sensor, the PT100 sensor is not mounted from the factory, due to the risk of damaging it during transport.
Before the first startup of the pump the PT100 sensor must be mounted in accordance with DESMI PUMPING TECHNOLOGY A/S instructions.