

Close Coupled Centrifugal Pumps

NMM SERIES (50 Hz.)



TECHNICAL MANUAL



NMM Series

Close Coupled Centrifugal Pump

General Information



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Fields of Application

- Water supply and booster stations.
- Irrigation, overhead irrigation and draining.
- Filling and emptying of tanks and containers.
- Circulating of hot and cold water in central heating and air-conditioning installations.
- Pumping of condensate.
- Water circulating for swimming pools.
- Sanitary and cleaning installations.
- For industrial applications and public services.
- Fresh water supply on ships.

Pumped Liquids

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

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

Design

- NMM series pumps are volute casing, single stage, end suction, close-coupled centrifugal pumps with closed impeller and mechanical seal.
- Main dimensions and the nominal flow rates of the pumps comply with the DIN 24 255 and EN 733 standards.
- Pump flanges sizes according to ISO 7005-2, DIN 2533 and PN 16.
- Single entry, closed impeller is hydraulically thrust compensated and dynamically balanced.
- A drain plug is fitted in the bottom of pump housing.
- Pump and motor are separate components. Motor shaft is passed into the pump shaft for coupling. After a certain motor power, a coupling system is used between the motor shaft and pump shaft.
- Maintenance is very much easier, the impeller shaft and other rotating parts being removable with no need to disconnect the suction and delivery pipes, due to back pull-out design.
- Maximum interchangeability of components, identical parts can be used along various pumps of the NMM series, which greatly simplifies and reduces stock of spare parts in addition to reduced delivery times.
- Single-stage centrifugal pump coupled by means of a support, to a standard asynchronous motor, closed type, with external ventilation.
- NMM series are fitted with mechanical shaft seal and pump shaft is supported by motor bearings.

Shaft Seal

Single mechanical seal, flushed by pumped liquid, uncooled, unbalanced, heavy duty and rubber bellows mechanical seals are used for sealing.

On the series production, BURGMANN MG1 type mech. seals are used for operation pressures up to 10 bar and for clean, non-aggressive liquids. Different types are available for harder operation conditions. Please refer to MAS DAF MAKİNA SAN. A.Ş.

Technical Data

- | | |
|-----------------------------------|------------------------------|
| • Suction Flange | : DN 50... DN 150 |
| • Discharge Flange | : DN 32...DN 125 |
| • Operating Pressure | : 10 Bar |
| • Casing Test Pressure | : 13 Bar |
| • Operating Temperature | : -25 – 120°C |
| • Impeller Diameter $\varnothing$ | : 123...428 mm $\varnothing$ |
| • Speed Range | : 1450 – 2900 RPM |
| • Capacity Range | : 5 – 400 m ³ / h |
| • Head Range | : 4 - 110 m |

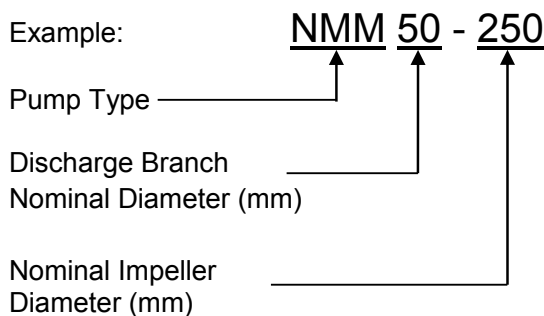
Flanges

- Discharge Flanges : DIN 2533 – PN 16
- Suction Flanges : DIN 2533 – PN 16

Driver

B5 flanged, IP 55 and according to IEC electric motors are used for NMM series pumps. 50 Hz and 60 Hz can be used.

Identification Code



NMM Series

Close Coupled Centrifugal Pump

ATEX Description



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ATEX Codification

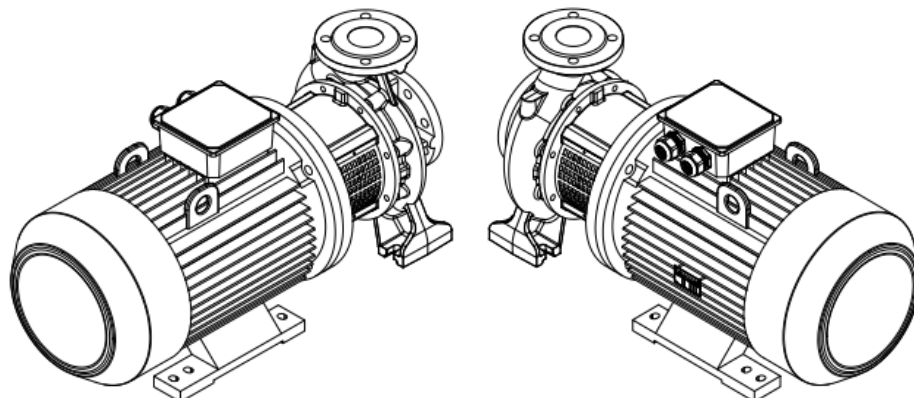
ATEX -95

 /D c Tx (85 °C – 200 °C)

Equipment Groups (Annex I of Directive 94/9/EC)							
Group I (mines, mine gas and dust)		Group II (other explosive atmospheres gas/dust)					
Category M 1	Category M 2	Category 1		Category 2		Category 3	
		G (gas) (Zone 0)	D (dust) (Zone 20)	G (gas) (Zone 1)	D (dust) (Zone 21)	G (gas) (Zone 2)	D (dust) (Zone 22)
For equipment providing a very high level of protection when endangered by an explosive atmosphere	For equipment providing a high level of protection when likely to be endangered by an explosive atmosphere	For equipment providing a very high level of protection when used in areas where an explosive atmosphere is very likely to occur		For equipment providing a high level of protection when used in areas where an explosive atmosphere is likely to occur		For equipment providing a normal level of protection when used in areas where an explosive atmosphere is less likely to occur	

TEMPERATURE CLASS		
Temperature class required by the area classification	Ignition temperature of gas or vapor	Allowable temperature classes of equipment
T1	> 450 °C	T1 - T6
T2	> 300 °C	T2 - T6
T3	> 200 °C	T3 - T6
T4	> 135 °C	T4 - T6
T5	> 100 °C	T5 - T6
T6	> 85 °C	T6

Code	Description
II	The Usage in other non-mining explosive atmospheres
2	2. Category: High level of protection
G	For potentially explosive environments due to gases or vapors
T	Temperature class
X	ATEX Marking of the motor manufacturer



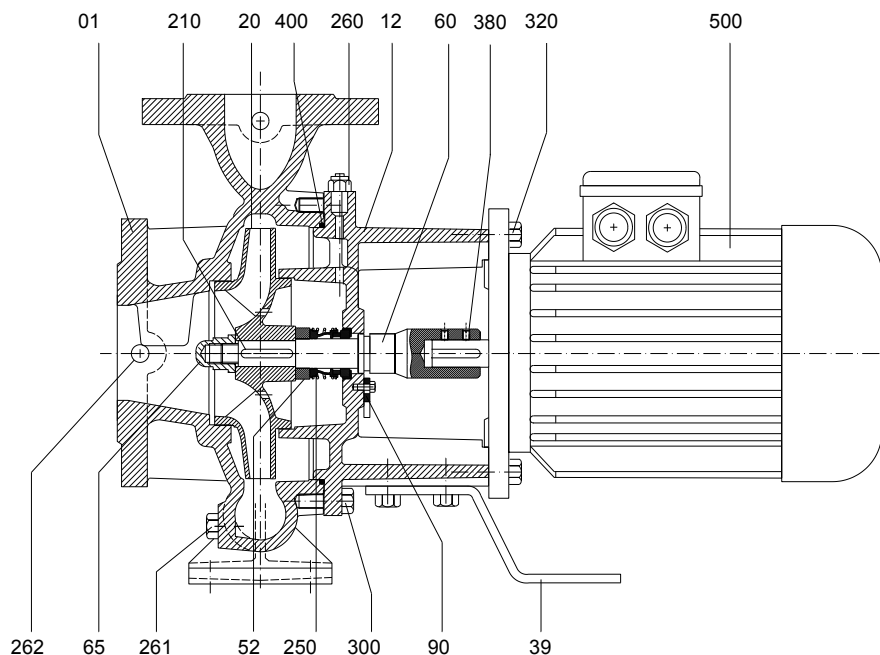
NMM Series

Close Coupled Centrifugal Pump

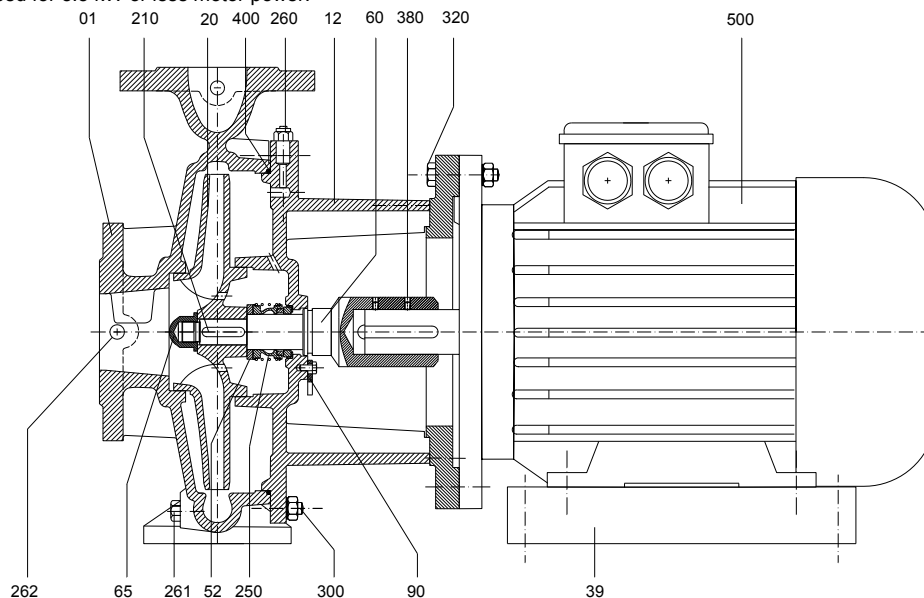
Cross-Sectional View and Part List (Without Coupling)



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Note: This system is used for 5.5 kW or less motor power.



Note: This system is used for motor power above 5.5 kW.

PART NO	PART NAME	PART NO	PART NAME
01	Pump Casing	250	Mechanical Seal
12	Adapter	260	Plug
20	Impeller	261	Drain Plug
39	Supporting Foot	262	Plug (Casing)
52	Mechanical Seal Sleeve	300	Stud, Casing
60	Pump Shaft	320	Hexagonal Bolt
65	Impeller Nut	380	Setscrew
90	Shaft Fixing Device	400	O-Ring
210	Impeller Key	500	Motor

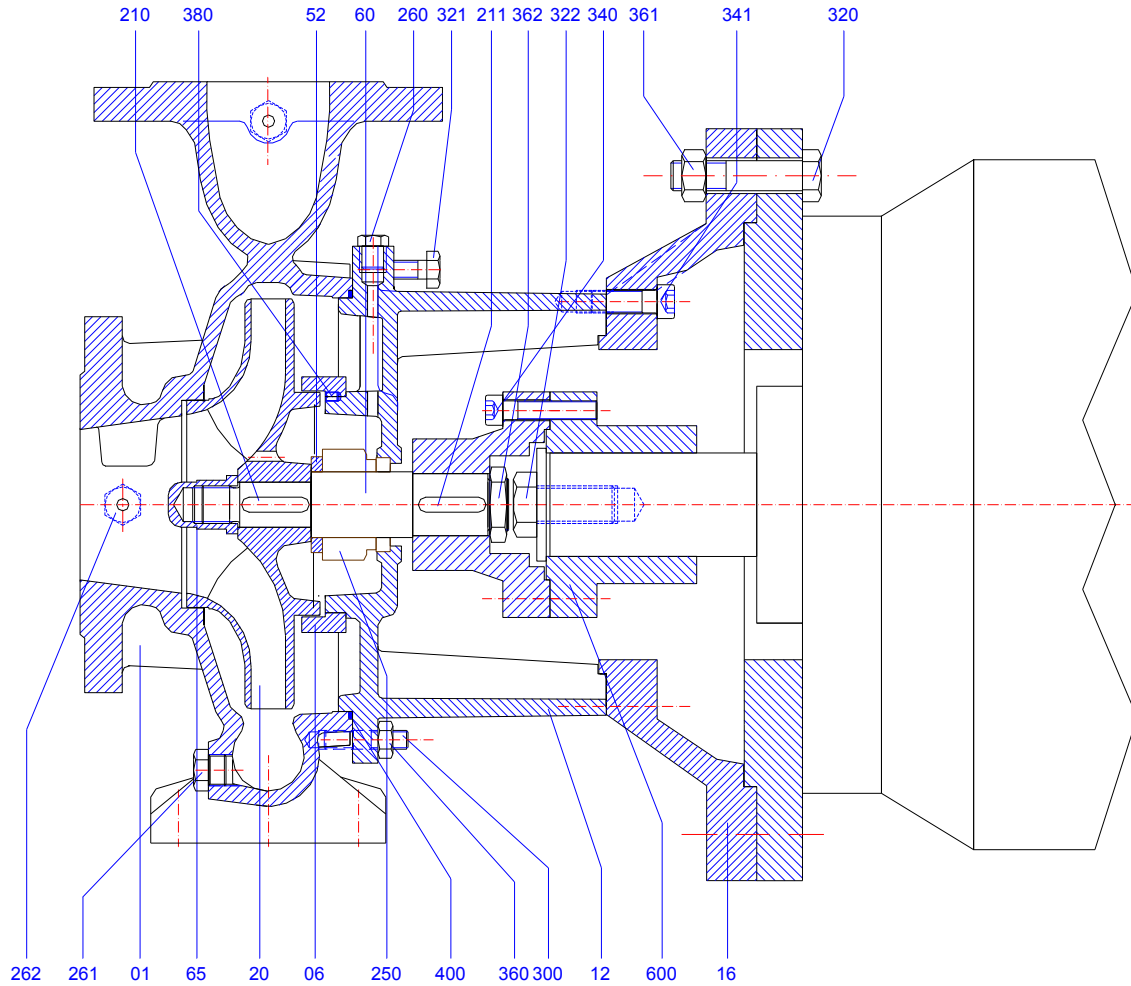
NMM Series

Close Coupled Centrifugal Pump

Cross-Sectional View and Part List (With Coupling)



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PART NO	PART NAME	PART NO	PART NAME
01	Pump Casing	262	Plug, Pump Casing
06	Wearing Ring	300	Stud, Pump Casing
12	Adapter	320	Hexagonal Bolt
16	Motor Flange	321	Hexagonal Bolt
20	Impeller	322	Hexagonal Bolt
52	Mech. Seal Ring	340	Imbus Bolt
60	Pump Shaft	341	Imbus Bolt
65	Impeller Nut	360	Nut
210	Impeller Key	361	Nut
211	Coupling Key	362	Nut
250	Mechanical Seal	380	Setscrew
260	Plug	400	O-Ring
261	Drain Plug	600	Coupling

Note: This coupling system is applied with a motor power 30 KW and over.

NMM Series

Close Coupled Centrifugal Pump

Technical Data



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Material Options

Components \ Material. No	0.6025	0.7040	2.1050.01	1.4021	1.4301	1.4401
Pump Casing	●	○	○		○	○
Impeller	●	○	○		○	○
Wearing Ring	○	●	○		○	○
Shaft				●	○	○
Adapter	●	○	○		○	○
Adapter (Motor)	●	○				

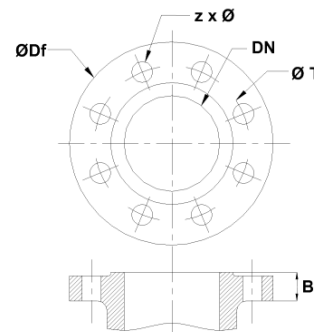
- - Standard Manufacturing
- - Optional

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

Flange Dimensions

Suction and Discharge Flange Dimensions								
DNs DNd	PN	ØD	Øk	Ød4	Ød2	b	f	Number of holes
32	16	140	100	78	18	18	2	4
40		150	110	88	18	18	3	4
50		165	125	102	18	20	3	4
65		185	145	122	18	20	3	4
80		200	160	138	18	22	3	8
100		220	180	158	18	24	3	8
125		250	210	188	18	26	3	8
150		285	240	212	22	26	3	8



No	Pump Type	Flange			
		DNs (mm) Suction		DNs (mm) Discharge	
1	32–160	50	PN 16	32	PN 16
2	32–200				
3	32–250				
4	40–160	65		40	
5	40–200				
6	40–250				
7	50–160	65		50	
8	50–200				
9	50–250				
10	50–315	80		50	
11	65–160				
12	65–200			65	
13	65–250				
14	65–315				
15	65–400	100			

No	Pump Type	Flange			
		DNs (mm) Suction		DNs (mm) Discharge	
16	80–160	100	PN 16	80	PN 16
17	80–200				
18	80–250				
19	80–315				
20	80–400				
21	100–160	125		100	
22	100–200				
23	100–250				
24	100–315				
25	100–400				
26	125–200	150	125		
27	125–250				
28	125–315				
29	125–400				

NMM Series

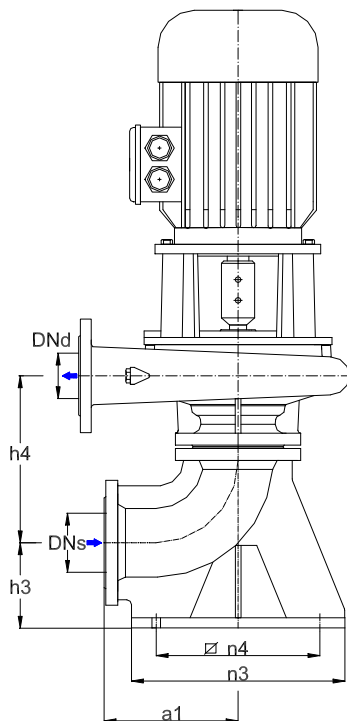
Close Coupled Centrifugal Pump

Technical Data



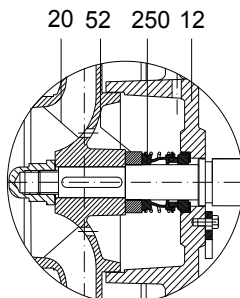
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Elbow Flange Dimensions for Vertical NMM Pumps



Pump Type	DNs	DNd	a1	n3	n4	h3	h4
NMM 32–160	50	32	140	200	150	90	170
NMM 32–200			140	200	150	90	170
NMM 32–250			140	200	150	90	190
NMM 40–160	65	40	160	235	180	105	185
NMM 40–200			160	235	180	105	205
NMM 40–250			160	235	180	105	205
NMM 50–160	65	50	160	235	180	105	205
NMM 50–200			160	235	180	105	205
NMM 50–250			160	235	180	105	185
NMM 50–315	80	65	190	290	215	115	230
NMM 65–160	80		190	290	215	115	230
NMM 65–200			190	290	215	115	230
NMM 65–250			190	290	215	115	230
NMM 65–315			190	290	215	115	255
NMM 65–400	100		225	360	375	145	285
NMM 80–160	100	80	225	360	275	145	285
NMM 80–200			225	360	275	145	285
NMM 80–250			225	360	275	145	285
NMM 80–315			225	360	275	145	285
NMM 80–400			225	360	275	145	285
NMM 100–160	125	100					
NMM 100–200			280	450	350	180	325
NMM 100–250			280	450	350	180	340
NMM 100–315			280	450	350	180	340
NMM 100–400	150	125	280	450	350	180	340
NMM 125–200			315	500	400	200	380
NMM 125–250			315	500	400	200	380
NMM 125–315			315	500	400	200	380
NMM 125–400			315	500	400	200	380

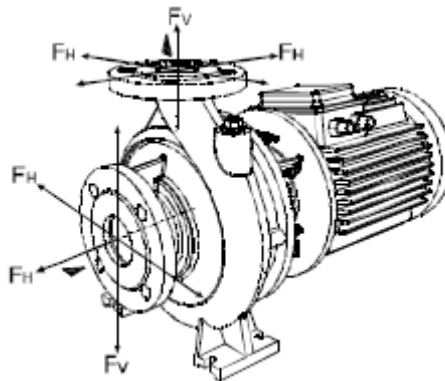
Mechanical Seal Application



Part No	PartName
12	Adapter
20	Impeller
52	Mech. Seal Sleeve
250	Mechanical Seal

Burgmann MG1-G60 – Up to 12 Bar
(Independent of direction of rotation)

Permissible Forces and Moments at the Pump Flanges



The following condition must be satisfied;

$$\left[\frac{\sum (F_V)}{(F_V)_{\max}} \right]^2 + \left[\frac{\sum (F_H)}{(F_H)_{\max}} \right]^2 + \left[\frac{\sum (M_t)}{(M_t)_{\max}} \right]^2 \leq 1$$

$\sum (F_V)$, $\sum (F_H)$ and $\sum (M_t)$ are the sums of the absolute amounts of the corresponding loads applied to the supports.

Neither the direction of the loads nor their distributions across the supports are taken into account in these sums.

No	Pump Type	Flanges		Forces		Moments
		DNs (mm) Suction	DNd (mm) Discharge	F _v (N)	F _H (N)	M _t (Nm)
1	32–160	50	32	2255	1485	385
2	32–200					
3	32–250					
4	40–160	65	40	2420	1620	440
5	40–200					
6	40–250					
7	50–160	65	50	2490	1700	530
8	50–200					
9	50–200					
10	50–315	80	65	2550	1900	650
11	65–160					
12	65–200					
13	65–250					
14	65–315					
15	65–400	100	80	3170	2400	1060
16	80–160					
17	80–200					
18	80–250					
19	80–315					
20	80–400	125	100	4400	3480	1740
21	100–160					
22	100–200					
23	100–250					
24	100–315					
25	100–400	150	125	5580	4620	2565
26	125–200					
27	125–250					
28	125–315					
29	125–400					

NMM Series

Close Coupled Centrifugal Pump

General Information About Minimum Efficiency Index Implementing



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Product Information as per Regulation No. 547/2012 (for Water Pumps with a Maximum Shaft Power of 150 kW)
Implementing "Ecodesign" Directive 2009/125/EC

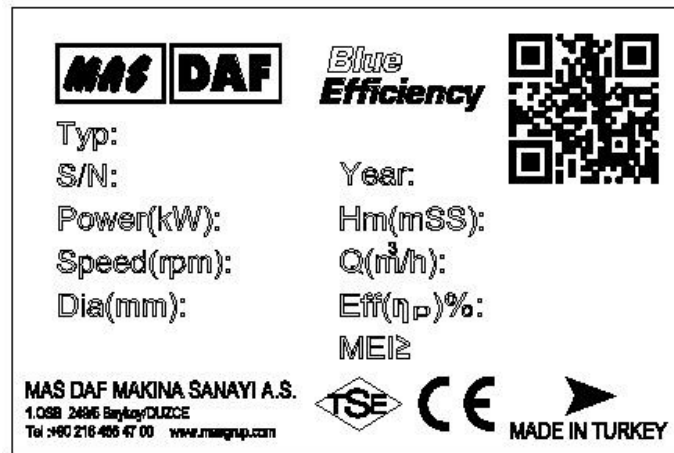
Minimum Efficiency Index for MAS NMM Pump Series is shown on the pump label.

MEI values of MAS NMM Pump Series are shown on the pump characteristic curves.

Minimum Efficiency Index for MAS NMM Pump Series; Minimum 0.4. (MEI $\geq$ 0,4)

Efficiency values of the pump characteristic curves, which are cut diameter, are expressed in %.

NMM Series water pumps, the pump efficiency can be achieved more than fix speed in case of variable speed control.



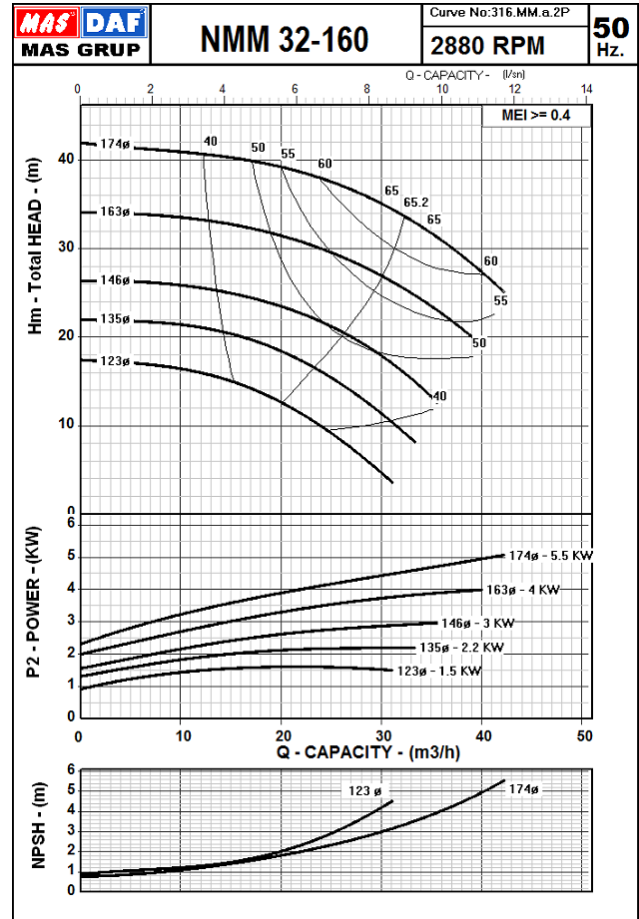
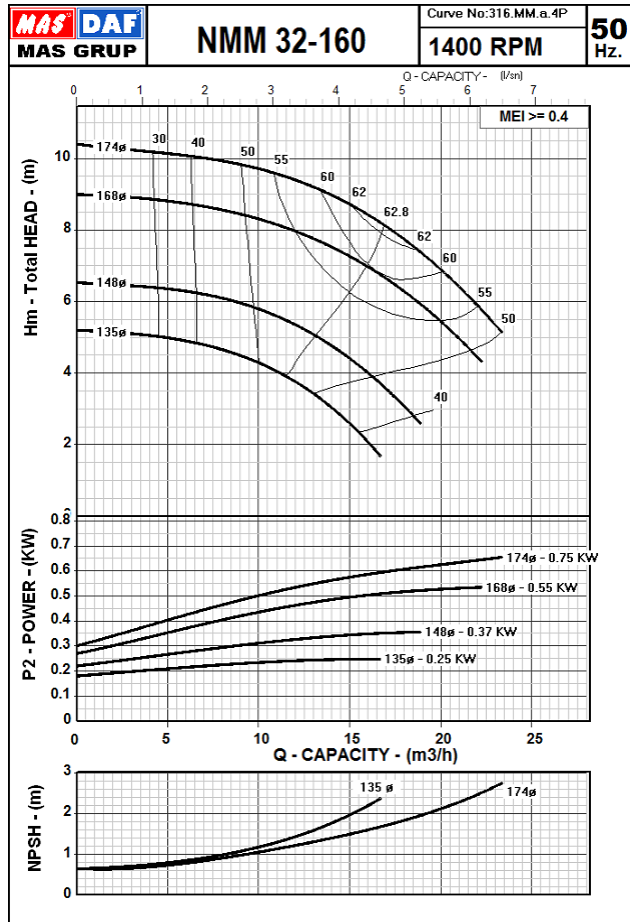
Pump Label

NMM Series
Close Coupled Centrifugal Pump
Performance Curves

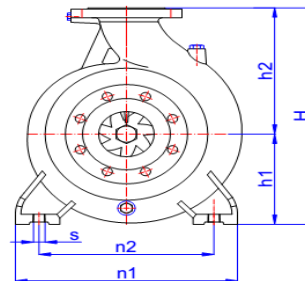
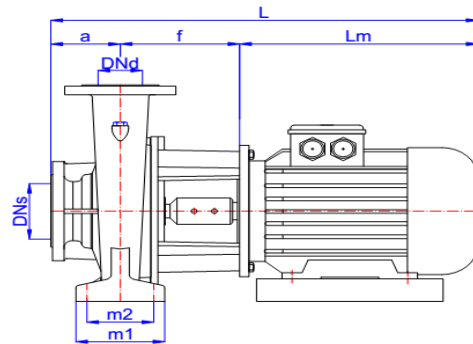


NMM 32-160

Mas Grup



The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR		FLANGES		GENERAL	PUMP										Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
32-160	4 poles	0.25	71	222.5	32	50	461.5	80	159	132	160	240	190	100	70	12	20
		0.37	71	222.5			461.5		159								
		0.55	80	243.5			482.5		159								
		0.75	80	243.5			482.5		159								
	2 poles	1.5	90L	266.5	32	50	506.5	80	160	132	160	240	190	100	70	12	20
		2.2	90L	266.5			506.5		160								
		3	100L	292			552		180								
		4	112M	335.5			595.5		180								
		5.5	132S	360.5			640.5		200								30

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NMM Series

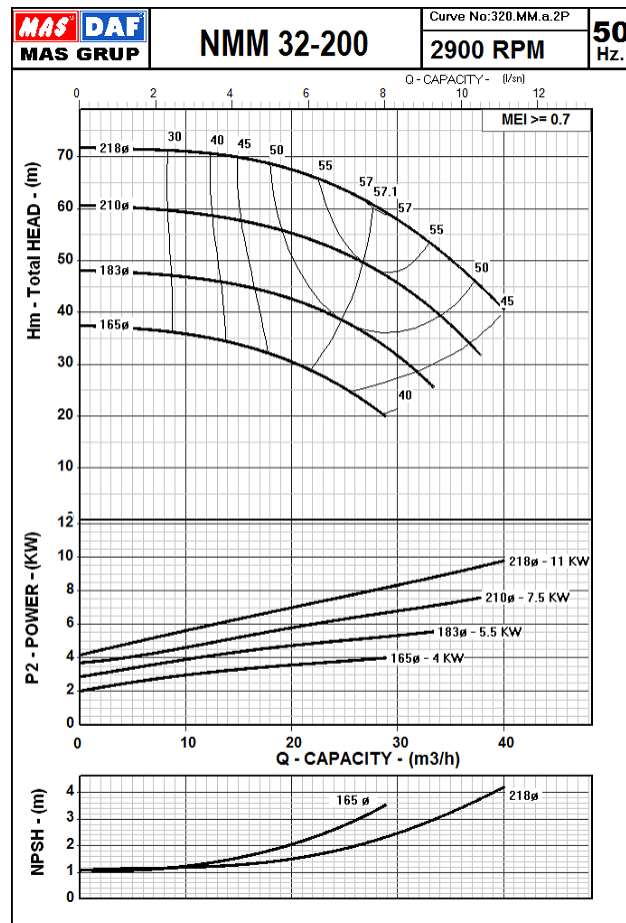
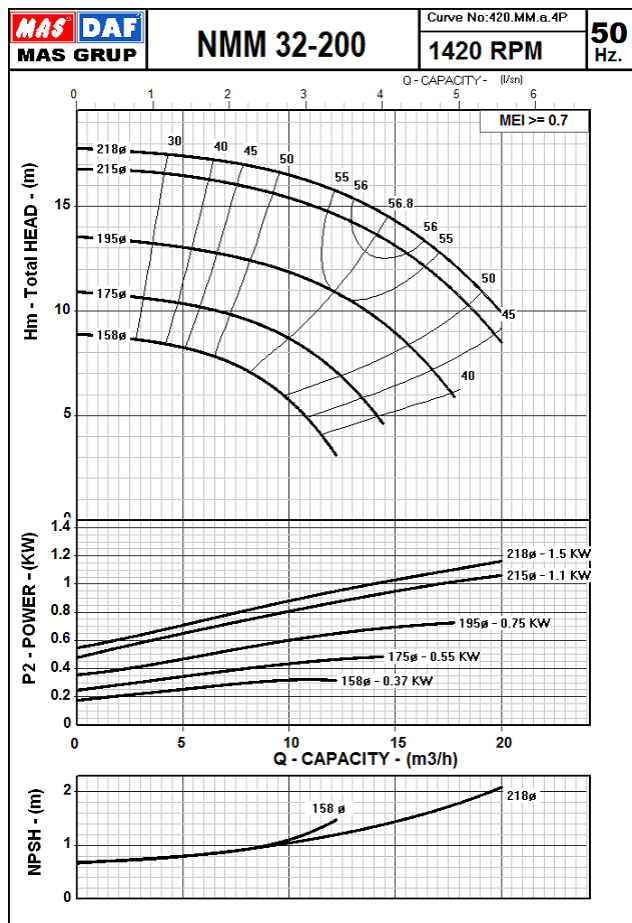
Close Coupled Centrifugal Pump

Performance Curves

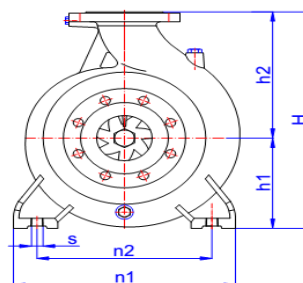
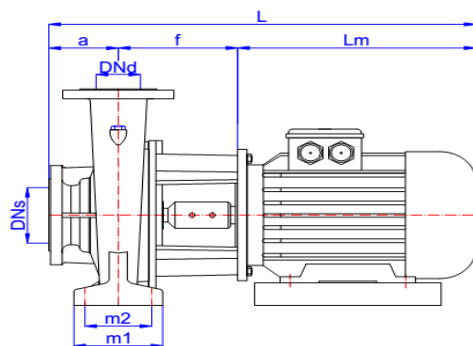


NMM 32-200

Mas Grup



The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR			FLANGES		GENERAL	PUMP									Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
32-200	4 poles	0.37	71	222.5	32	50	462.5	80	160	160	180	240	190	100	70	12	20
		0.55	80	243.5			483.5		160								
		0.75	80	243.5			483.5		160								
		1.1	90L	266.5			506.5		160								
		1.5	90L	266.5			506.5		160								
	2 poles	4	112M	335.5	32	50	595.5	80	180	160	180	240	190	100	70	12	20
		5.5	132S	360.5			645.5		205								30
		7.5	132M	395.5			680.5		205								
		11	160M	666			976		230								

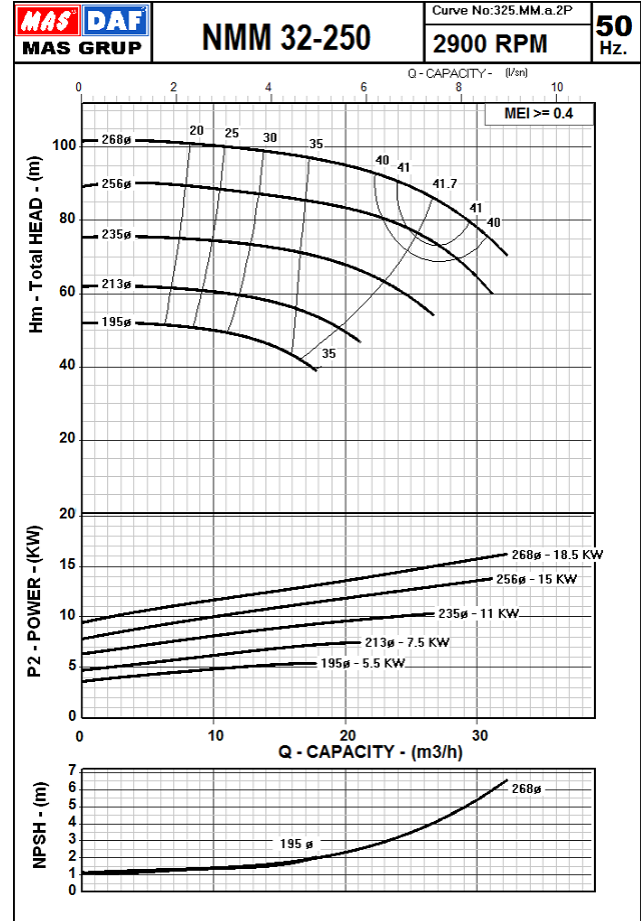
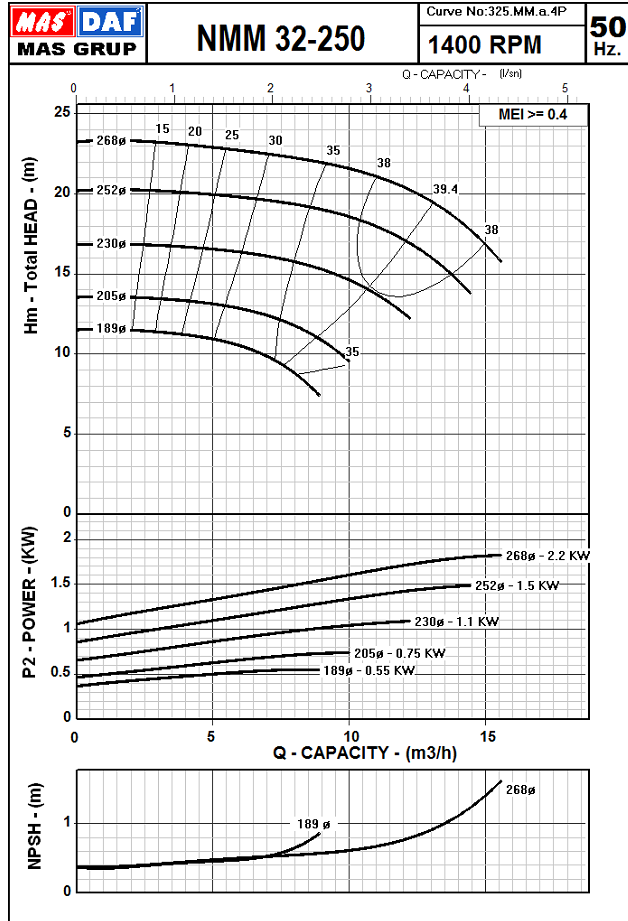
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NMM Series
Close Coupled Centrifugal Pump
Performance Curves

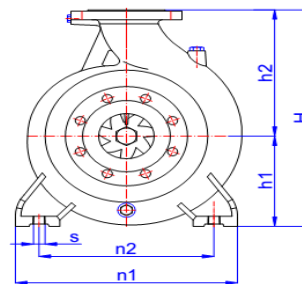
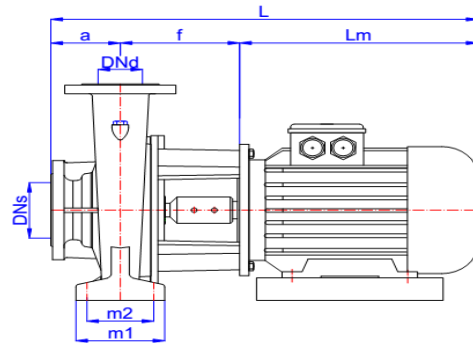


NMM 32-250

Mas Grup



The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR		FLANGES		GENERAL	PUMP										Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
32-250	4 poles	0.55	80	243.5	32	50	513.5	100	170	180	225	320	250	125	95	12	20
		0.75	80	243.5			513.5										
		1.1	90L	266.5			536.5										
		1.5	90L	266.5			536.5										
		2.2	100L	292			582										
	2 poles	5.5	132S	360.5	32	50	675.5	100	215	180	225	320	250	125	95	12	30
		7.5	132M	395.5			710.5										
		11	160M	666			1006										
		15	160L	666			1006										
		18.5	160L	666			1006										

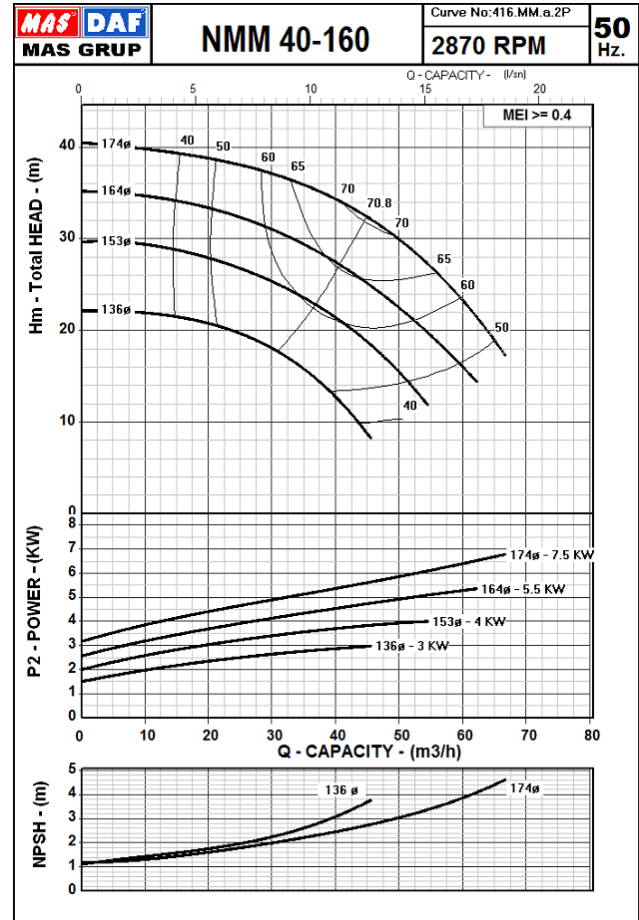
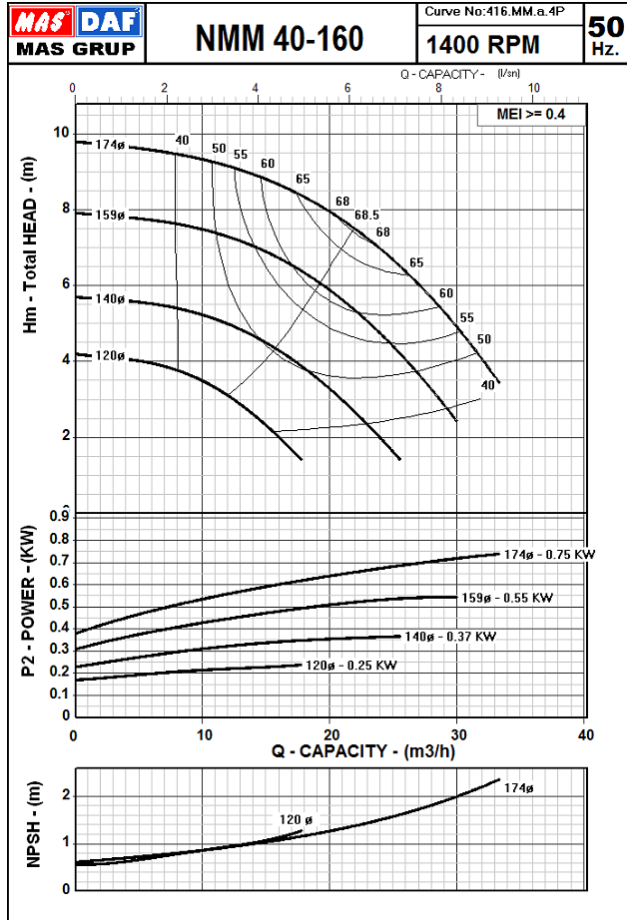
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NMM Series
Close Coupled Centrifugal Pump
Performance Curves

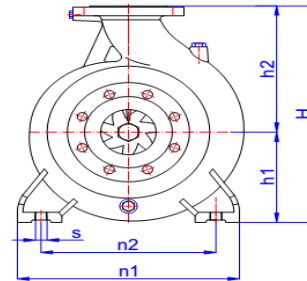
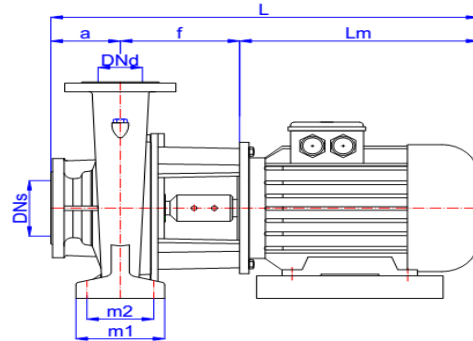


NMM 40-160

Mas Grup



The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR		FLANGES		GENERAL	PUMP										Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
40-160	4 poles	0.25	71	222.5	40	65	462.5	80	160	132	160	240	190	100	70	12	20
		0.37	71	222.5			462.5										
		0.55	80	243.5			483.5										
		0.75	80	243.5			483.5										
	2 poles	3	100L	292	40	65	552	80	180	132	160	240	190	100	70	12	20
		4	112M	335.5			595.5										
		5.5	132S	360.5			640.5										30
		7.5	132M	395.5			675.5										

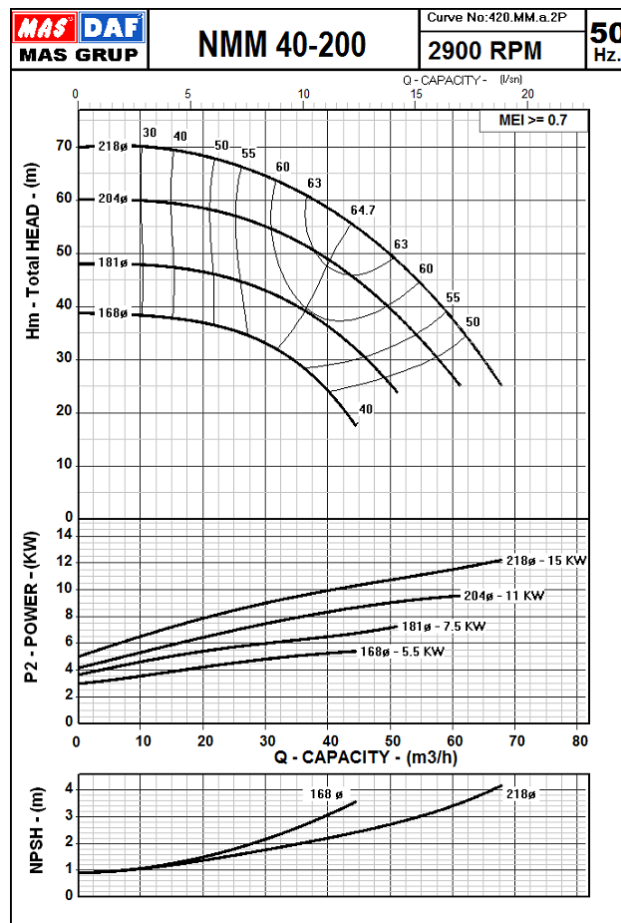
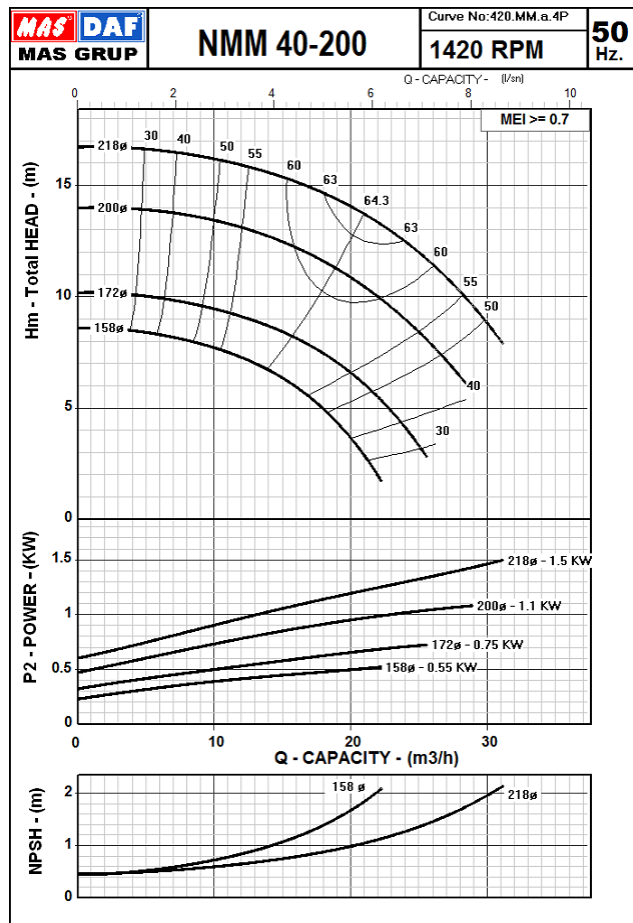
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NMM Series
Close Coupled Centrifugal Pump
Performance Curves

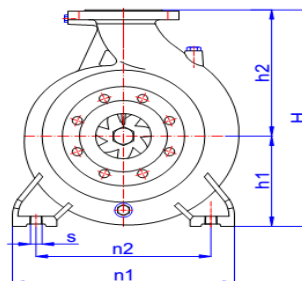
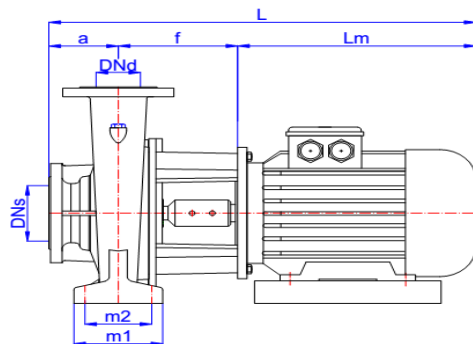


NMM 40-200

Mas Grup



The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR		FLANGES		GENERAL	PUMP										Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
40-200	4 poles	0.55	80	243.5	40	65	503.5	100	160	160	180	265	212	100	70	12	20
		0.75	80	243.5			503.5		160								
		1.1	90L	266.5			526.5		160								
		1.5	90L	266.5			526.5		160								
	2 poles	5.5	132S	360.5	40	65	665.5	100	205	160	180	265	212	100	70	12	30
		7.5	132M	395.5			700.5		205								
		11	160M	666			996		230								
		15	160L	666			996		230								

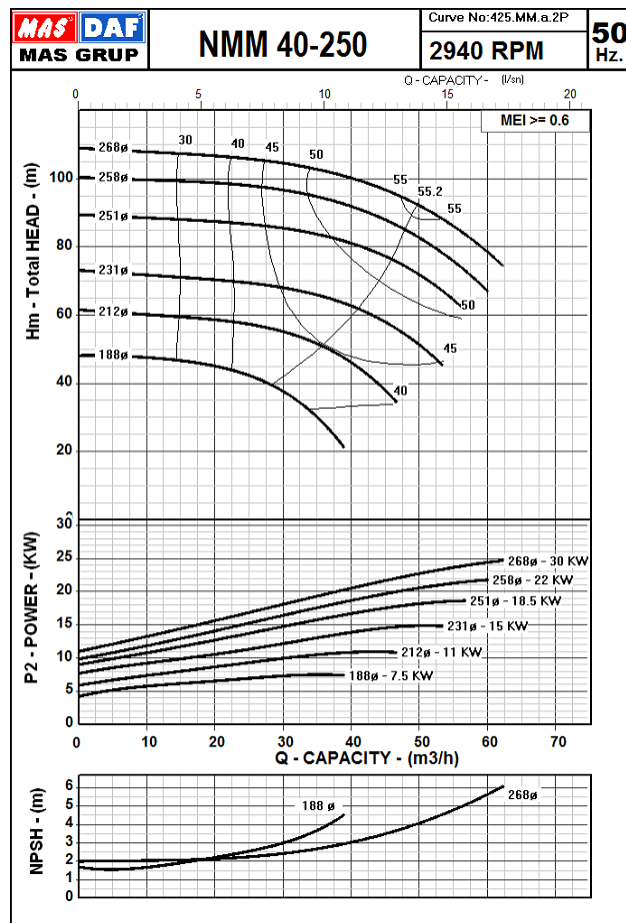
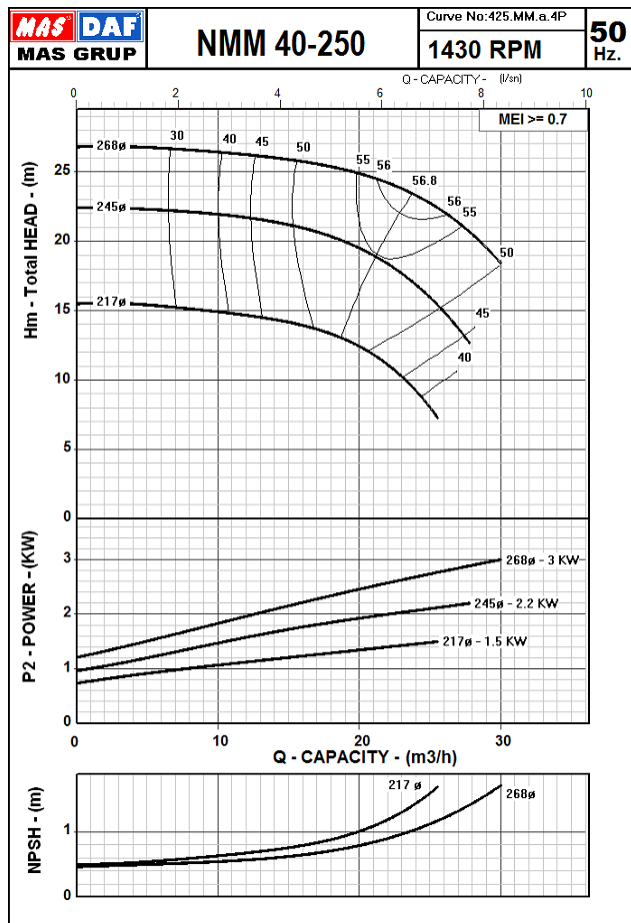
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NMM Series
Close Coupled Centrifugal Pump
Performance Curves

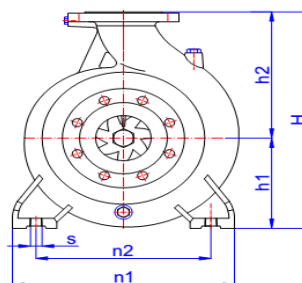
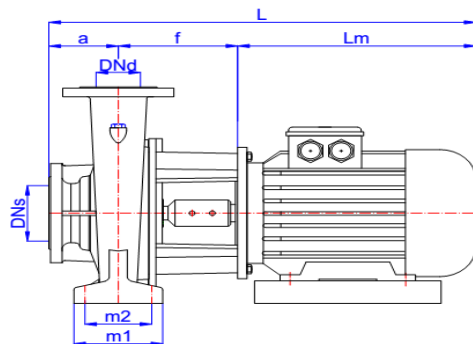
NMM 40-250



Mas Group



The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR			FLANGES		GENERAL	PUMP									Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
40-250	4 poles	1.5	90L	266.5	40	65	526.5	100		180	225	320	250	125	95	12	20
		2.2	100L	292			572		180								
		3	100L	292			572		180								
	2 poles	7.5	132M	395.5	40	65	725.5	100	230	180	225	320	250	125	95	12	30
		11	160M	666			996		230								
		15	160L	666			996		230								
		18.5	160L	666			996		230								
		22	180M	519			849		230								
		30	200L	555			885		230								

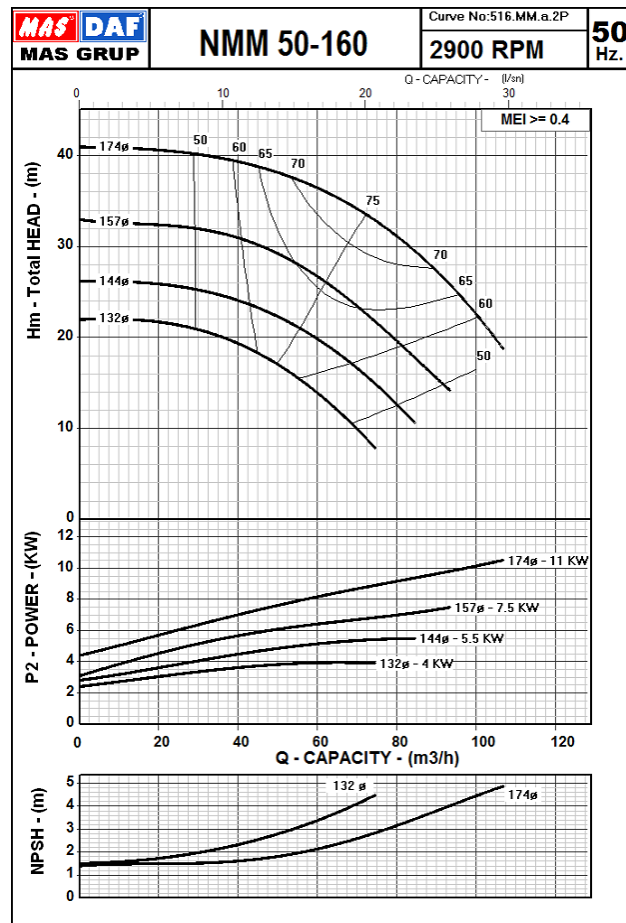
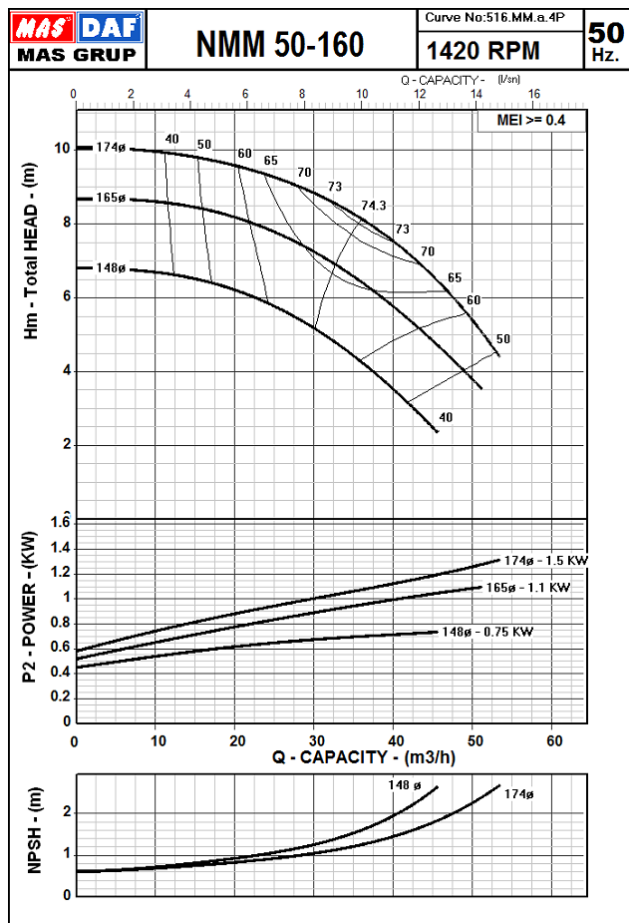
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NMM Series
Close Coupled Centrifugal Pump
Performance Curves

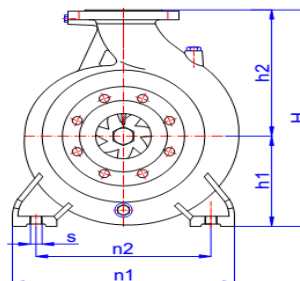
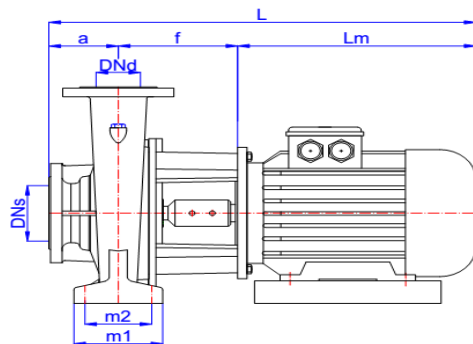


NMM 50-160

Mas Group



The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR		FLANGES		GENERAL	PUMP										Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
50-160	4 poles	0.75	80	243.5	50	65	503.5	100	160	160	180	265	212	100	70	12	20
		1.1	90L	266.5			526.5		160								
		1.5	90L	266.5			526.5		160								
	2 poles	4	112M	335.5	50	65	615.5	100	180	160	180	265	212	100	70	12	20
		5.5	132S	360.5			660.5		200								30
		7.5	132M	395.5			695.5		200								
		11	160M	666			966		200								

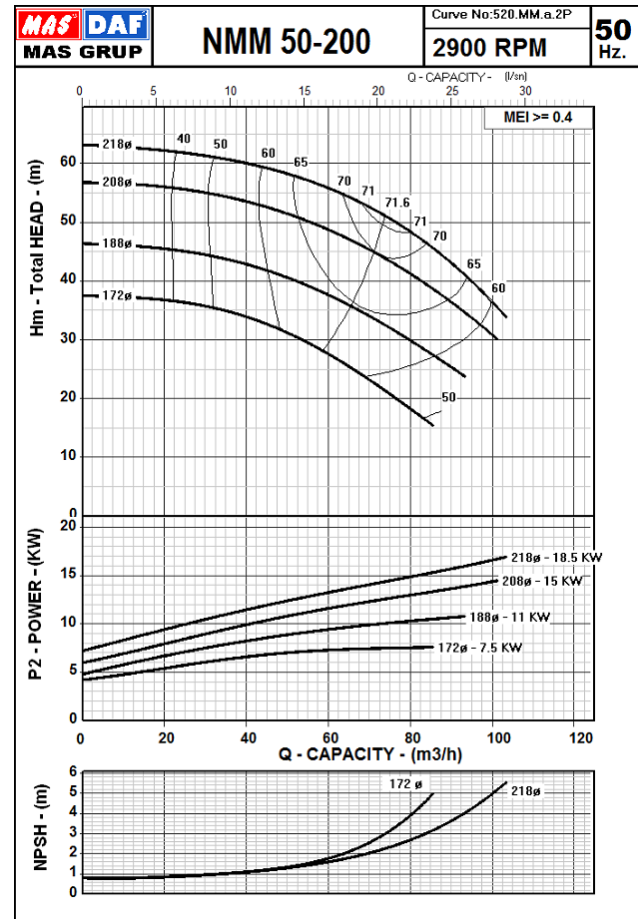
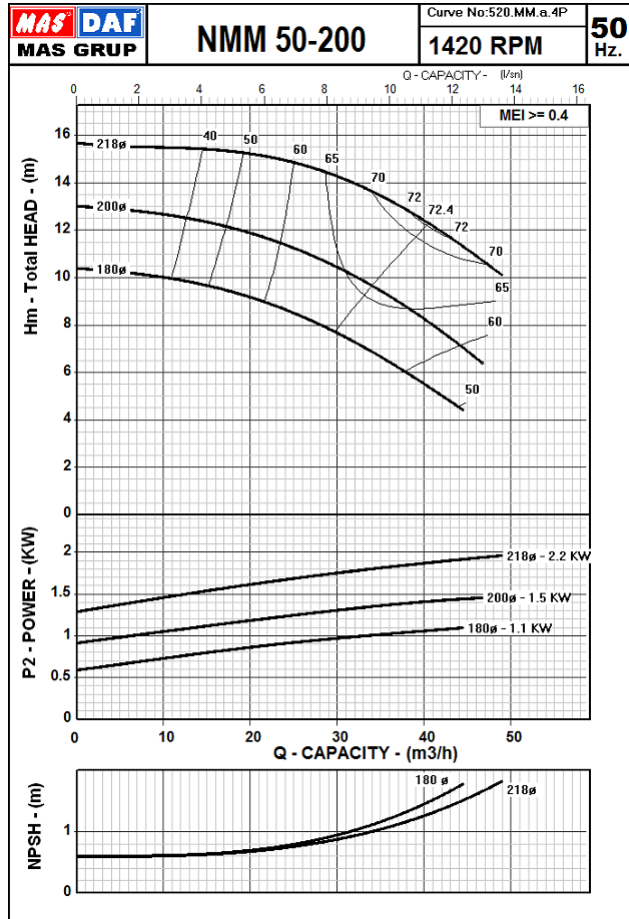
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NMM Series
Close Coupled Centrifugal Pump
Performance Curves

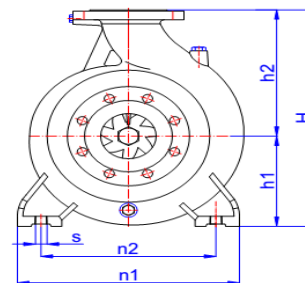
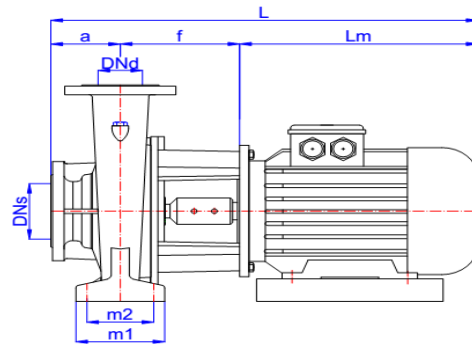
NMM 50-200



Mas Group



The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR			FLANGES		GENERAL	PUMP									Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
50-200	4 poles	1.1	90L	266.5	50	65	526.5	100	160	160	200	265	212	100	70	12	20
		1.5	90L	266.5			526.5		160								
		2.2	100L	292			572		180								
	2 poles	7.5	132M	395.5	50	65	700.5	100	205	160	200	265	212	100	70	12	30
		11	160M	666			996		230								
		15	160L	666			996		230								
		18.5	160L	666			996		230								

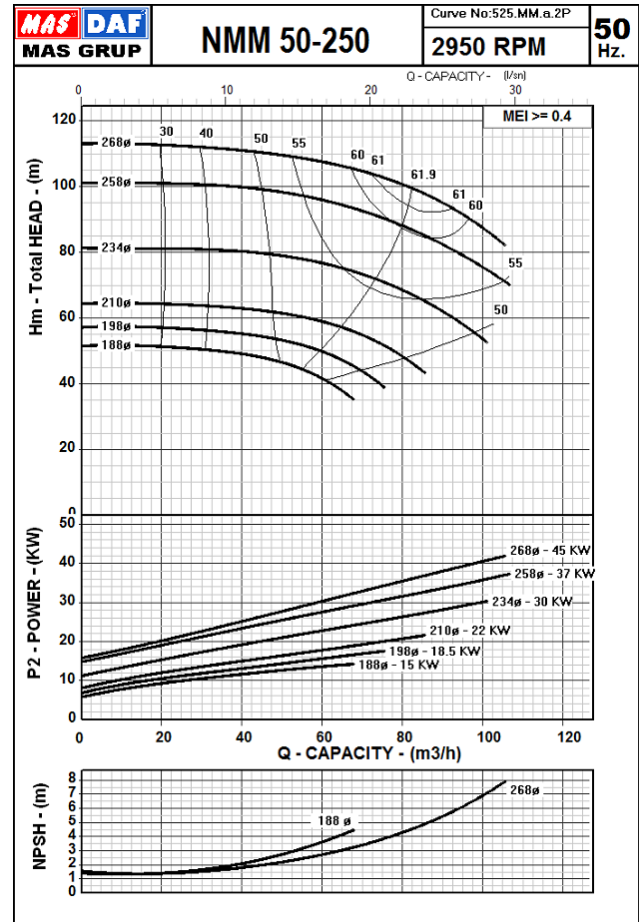
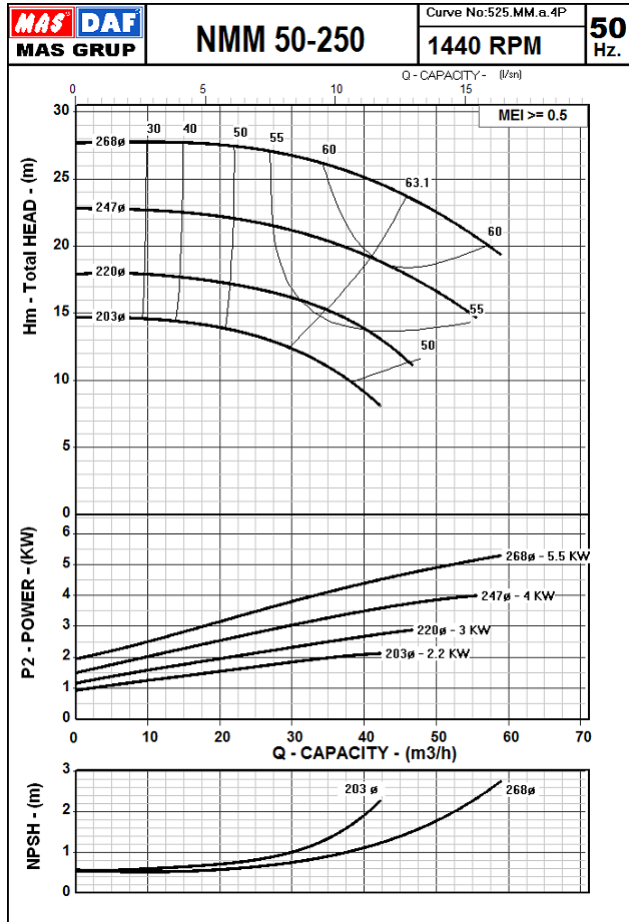
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NMM Series
Close Coupled Centrifugal Pump
Performance Curves

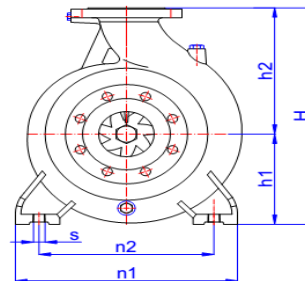
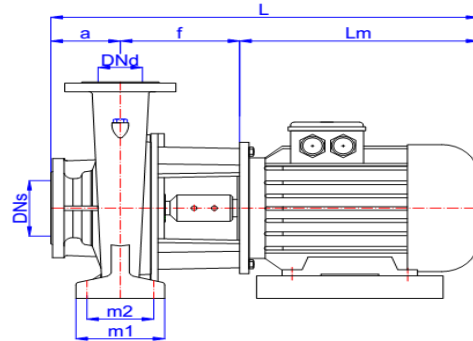


NMM 50-250

Mas Grup

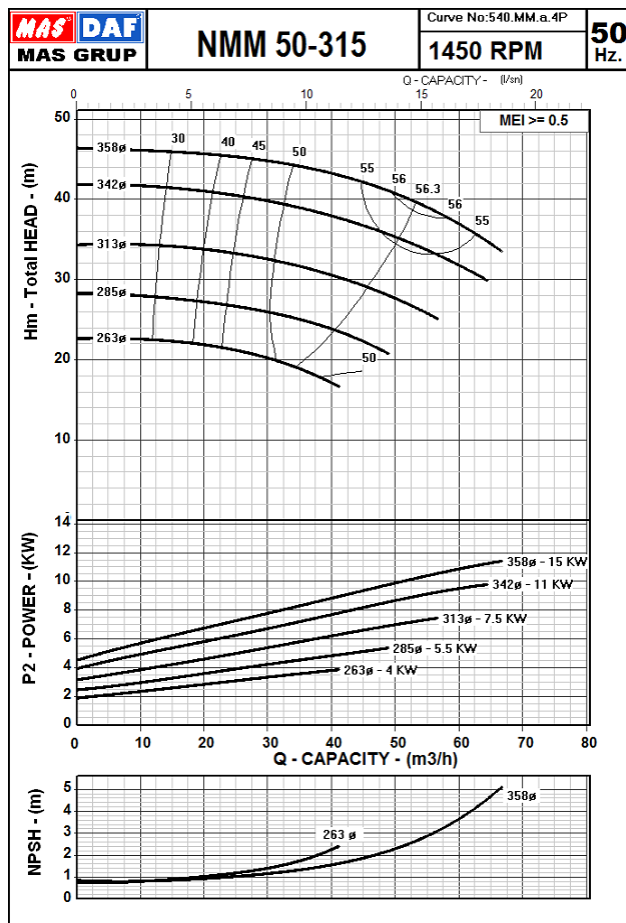


The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.

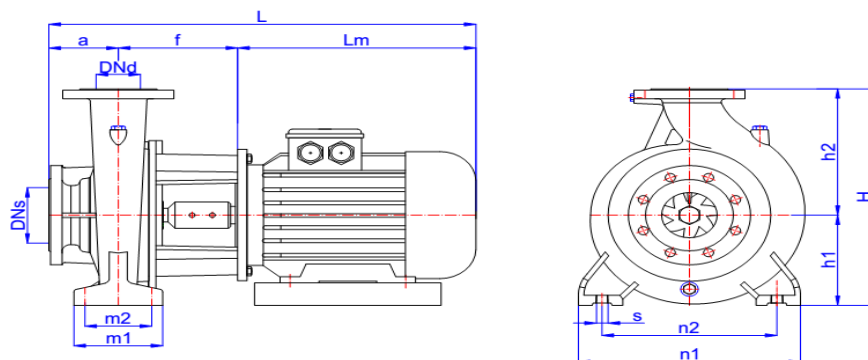


		MOTOR			FLANGES		GENERAL	PUMP									Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
50-250	4 poles	2.2	100L	292	50	65	572	100	180	180	225	320	250	125	95	12	20
		3	100L	292			572		180								
		4	112M	335.5			615.5		180								
		5.5	132M	395.5			700.5		205								30
	2 poles	15	160L	666	50	65	996	100	230	180	225	320	250	125	95	12	30
		18.5	160L	666			996		230								
		22	180M	519			849		230								
		30	200L	555			885		230								
		37	200L	555			885		230								
45		225M	625	955			230		35								

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The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR			FLANGES		GENERAL	PUMP								Mechanical Seal	
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
50-315	4 poles	4	112M	335.5	50	80	625.5	100	190	225	280	360	280	160	120	12	30
		5.5	132M	395.5			710.5		215								
		7.5	132M	395.5			710.5		215								
		11	160M	666			1006		240								
		15	160L	666			1006		240								

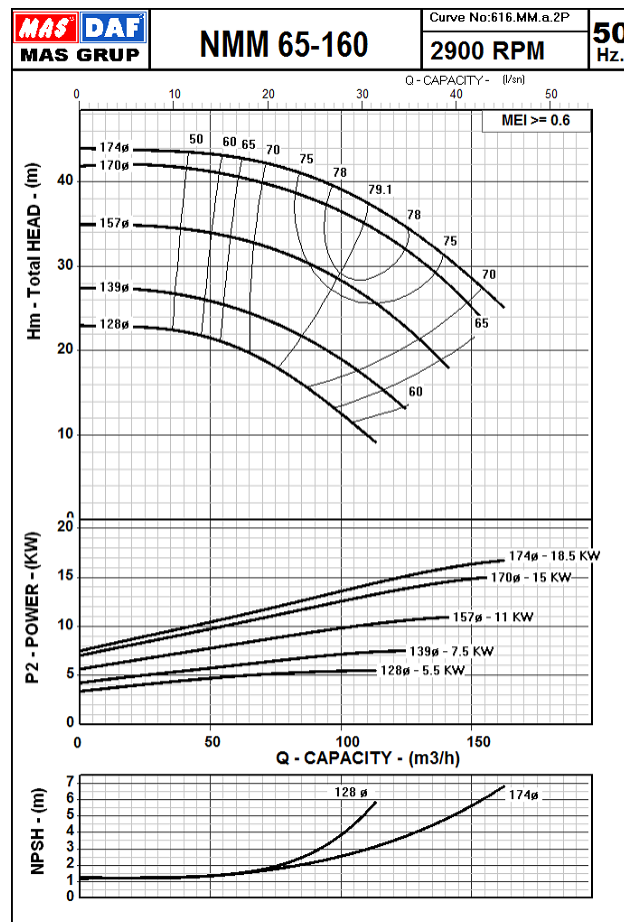
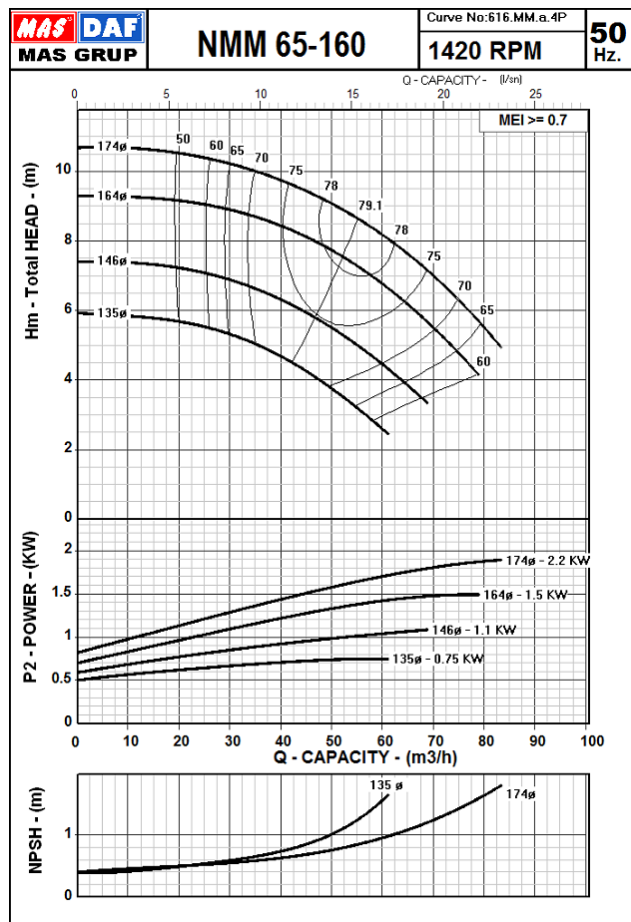
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NMM Series
Close Coupled Centrifugal Pump
Performance Curves

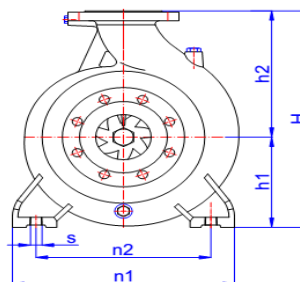
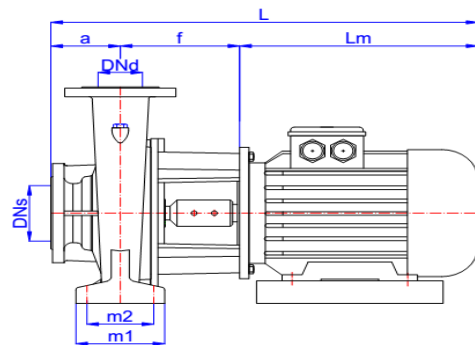


NMM 65-160

Mas Grup



The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR		FLANGES		GENERAL	PUMP										Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
65-160	4 poles	0.75	80	243.5	65	80	503.5	100	160	160	200	280	212	125	95	12	20
		1.1	90L	266.5			526.5										
		1.5	90L	266.5			526.5										
		2.2	100L	292			572										
	2 poles	5.5	132M	395.5	65	80	695.5	100	200	160	200	280	212	125	95	12	30
		7.5	132M	395.5			695.5		200								
		11	160M	666			996		230								
		15	160L	666			996		230								
		18.5	160L	666			996		230								

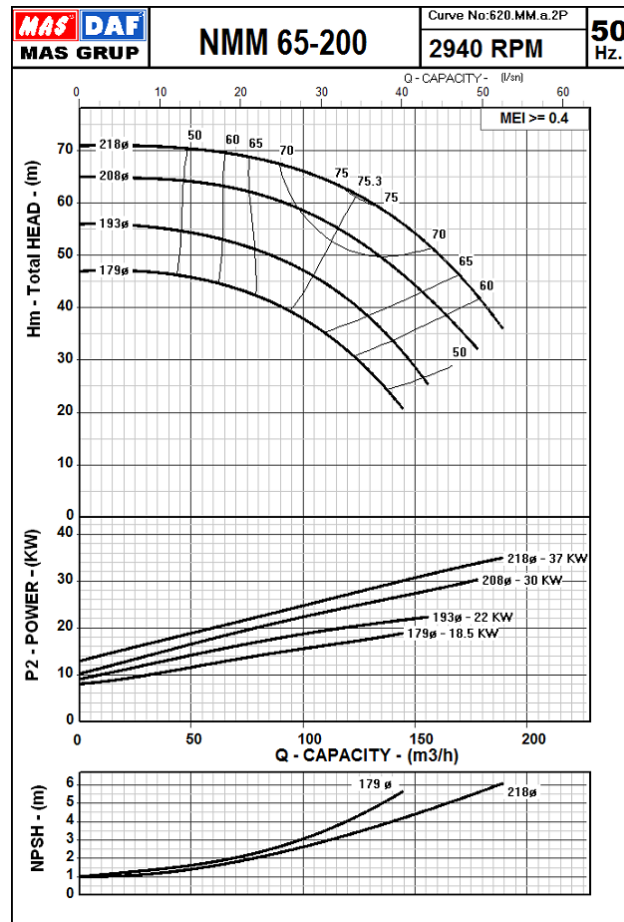
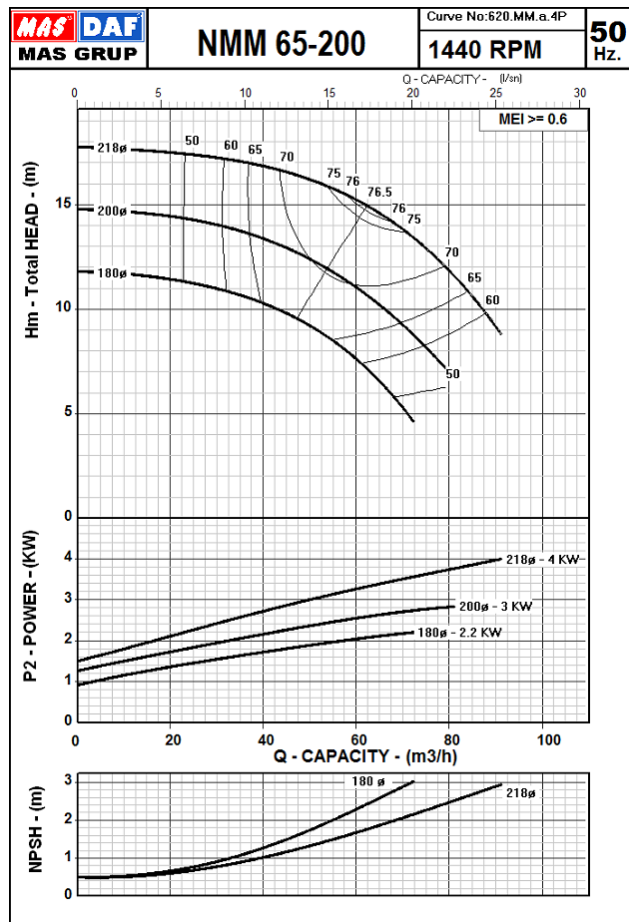
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NMM Series
Close Coupled Centrifugal Pump
Performance Curves

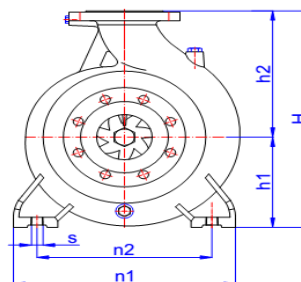
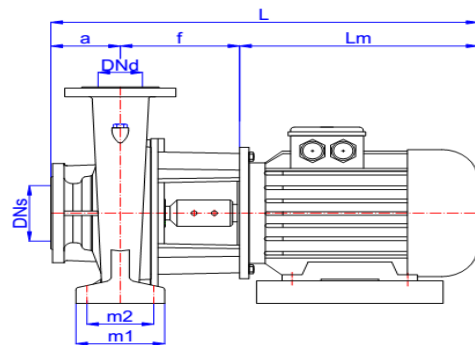


NMM 65-200

Mas Grup



The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR			FLANGES		GENERAL	PUMP								Mechanical Seal	
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
65-200	4 poles	2.2	100L	292	65	80	572	100	180	180	225	320	250	125	95	12	20
		3	100L	292			572		180								
		4	112M	335.5			615.5		180								
	2 poles	18.5	160L	666	65	80	996	100	230	180	225	320	250	125	95	12	30
		22	180M	519			849		230								
		30	200L	555			915		260								
		37	200L	555			915		260								

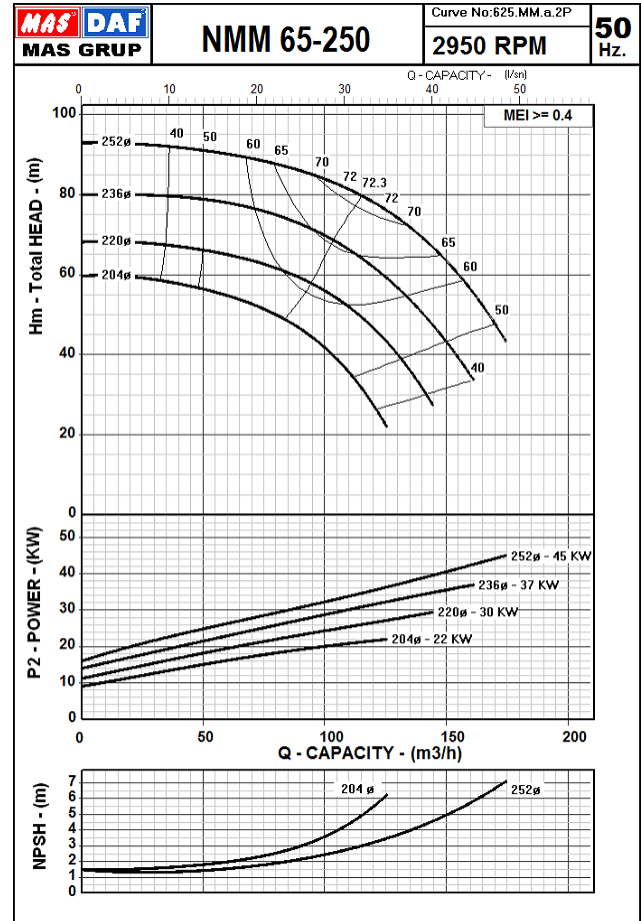
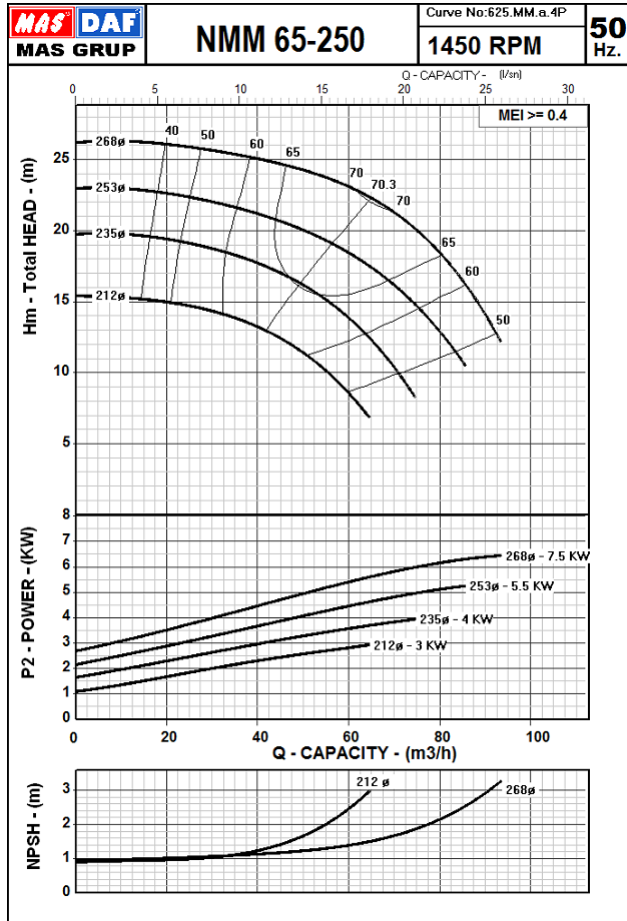
MAS DAF MAKINA SAN. A.Ş. reserves the right to change specifications without prior notice.

NMM Series
Close Coupled Centrifugal Pump
Performance Curves

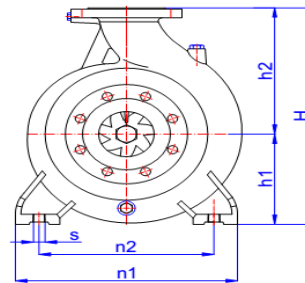
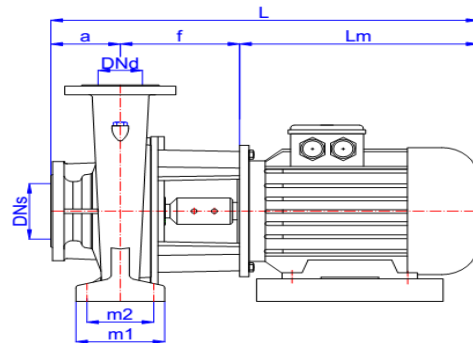


NMM 65-250

Mas Grup

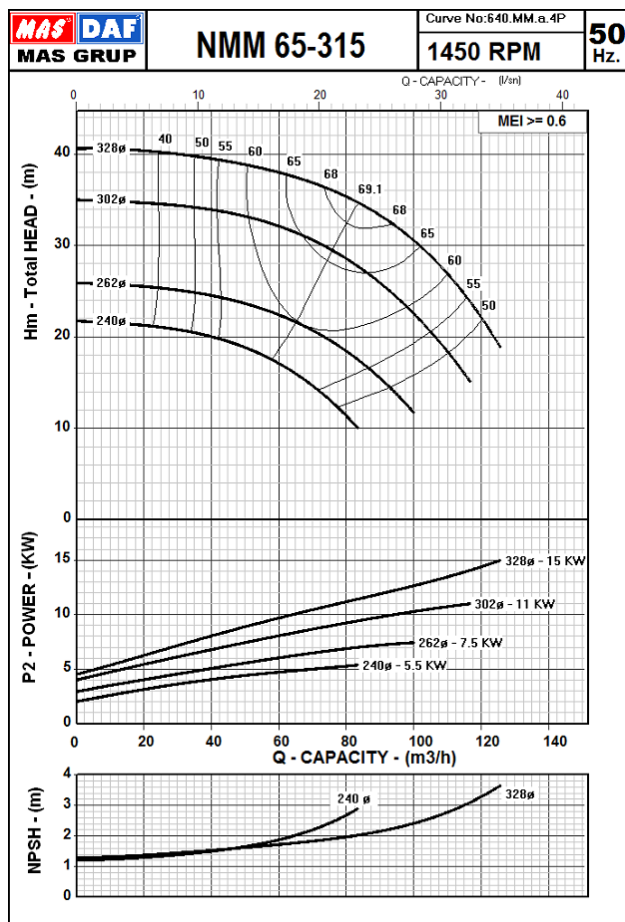


The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.

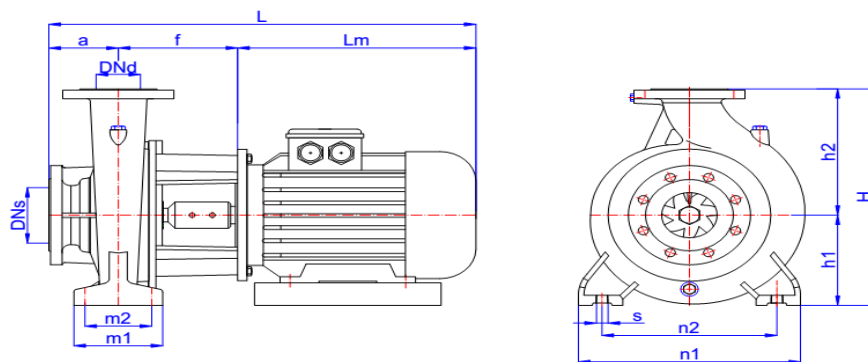


		MOTOR			FLANGES		GENERAL	PUMP									Mechanical Seal
		KW	IEC	Lm	DNd	DNf	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
65-250	4 poles	3	100L	292	65	80	582	100	190	200	250	360	280	160	120	16	20
		4	112M	335.5			625.5										30
		5.5	132M	395.5			710.5										
		7.5	132M	395.5			710.5										
	2 poles	22	180M	519	65	80	859	100	240	200	250	360	280	160	120	16	30
		30	200L	555			925										35
		37	200L	555			925										
		45	225M	625			995										

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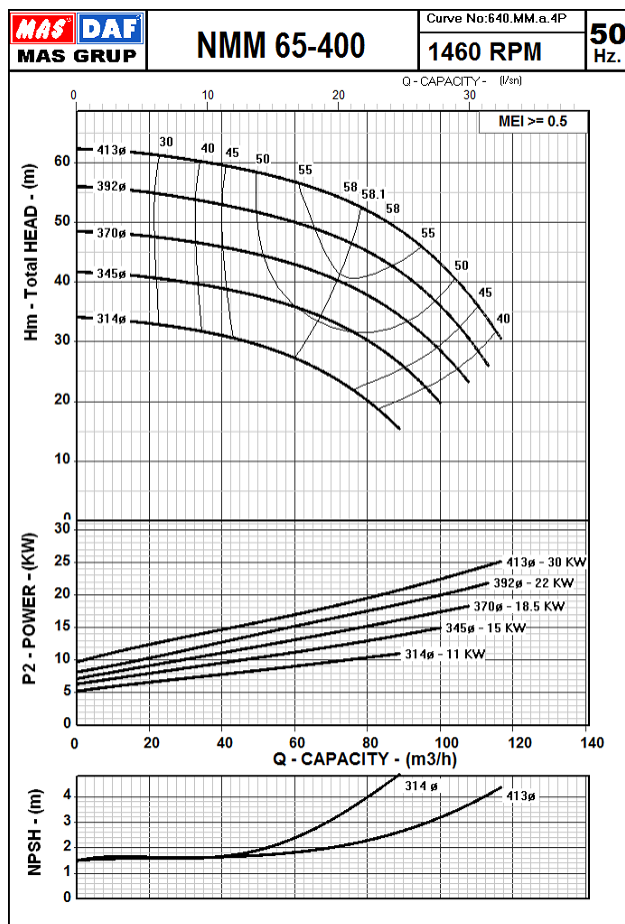


The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.

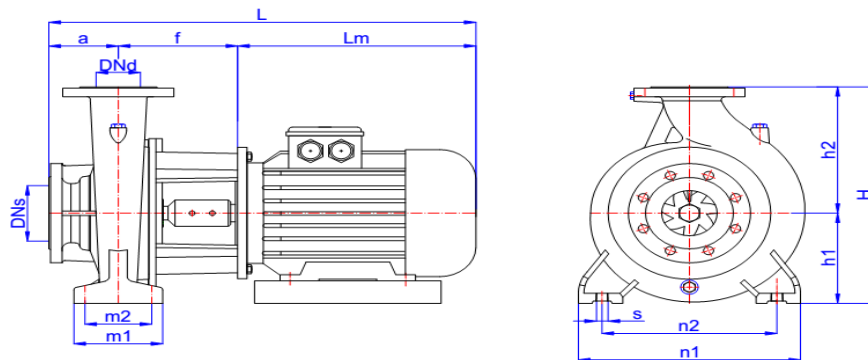


		MOTOR			FLANGES		GENERAL	PUMP									Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
65-315	4 poles	5.5	132M	395.5	65	80	735.5	125	215	224	280	400	315	160	120	16	30
		7.5	132M	395.5			735.5		215								
		11	160M	666			1031		240								
		15	160L	666			1031		240								

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The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR			FLANGES		GENERAL	PUMP									Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
65-400	4 poles	11	160M	666	65	100	1031	125	240	250	355	400	315	160	120	16	30
		15	160L	666			1031										
		18.5	180M	519			884										
		22	180L	519			884										
		30	200L	555			950										35

MAS DAF MAKINA SAN. A.Ş. reserves the right to change specifications without prior notice.

NMM Series

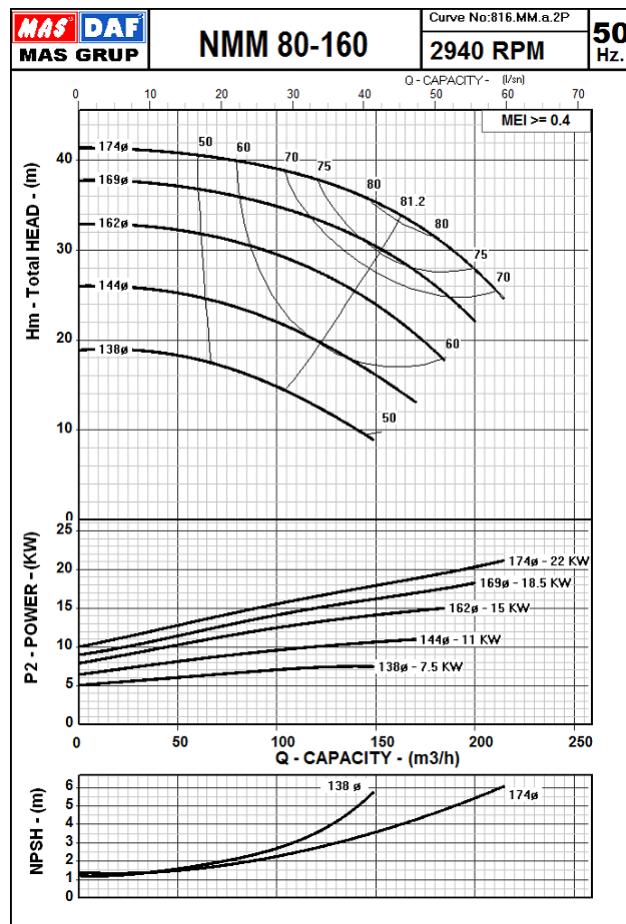
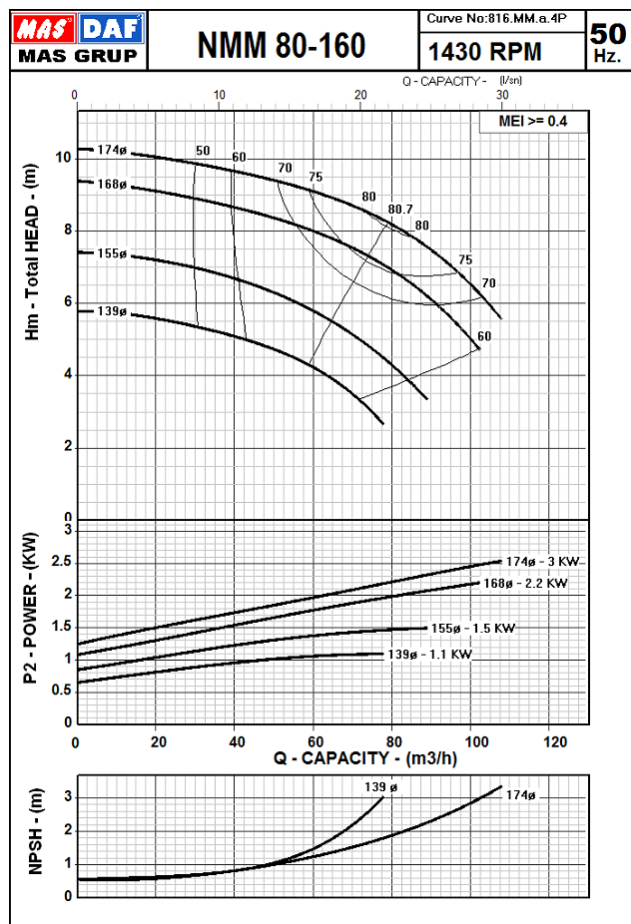
Close Coupled Centrifugal Pump

Performance Curves

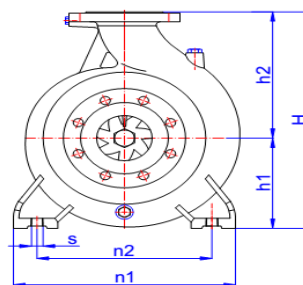
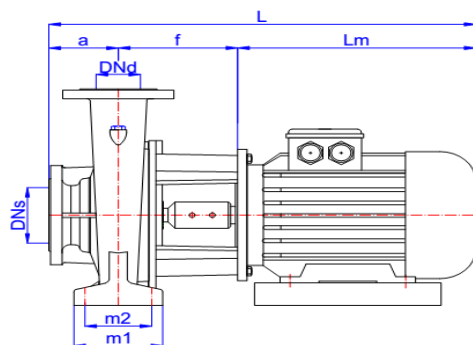


NMM 80-160

Mas Grup



The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR			FLANGES		GENERAL	PUMP									Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
80-160	4 poles	1.1	90L	266.5	80	100	551.5	125	160	180	225	320	250	125	95	12	20
		1.5	90L	266.5			551.5										
		2.2	100L	292			597										
		3	100L	292			597										
	2 poles	7.5	132M	395.5	80	100	720.5	125	200	180	225	320	250	125	95	12	30
		11	160M	666			1021										
		15	160L	666			1021										
		18.5	160L	666			1021										
		22	180M	519			874										

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NMM Series

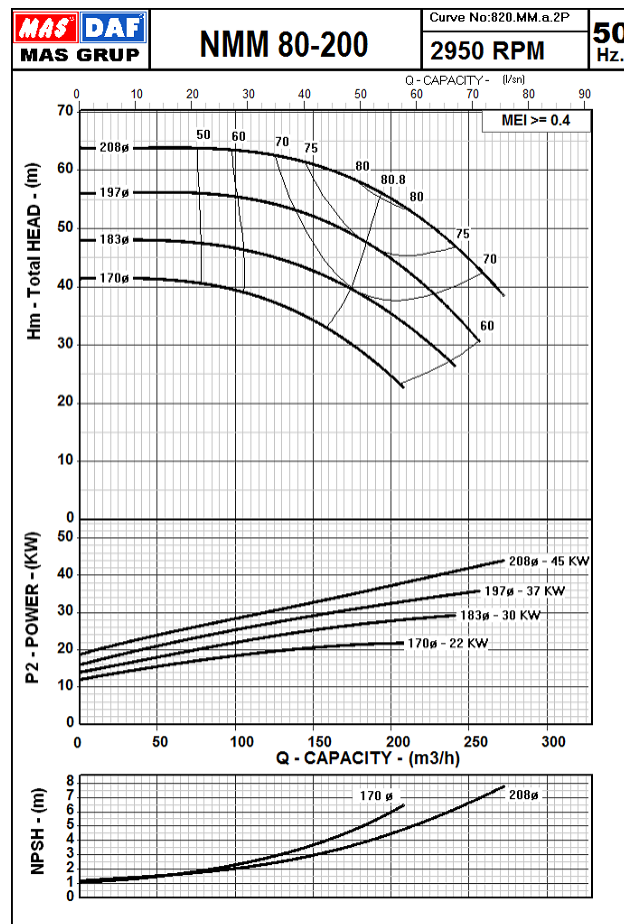
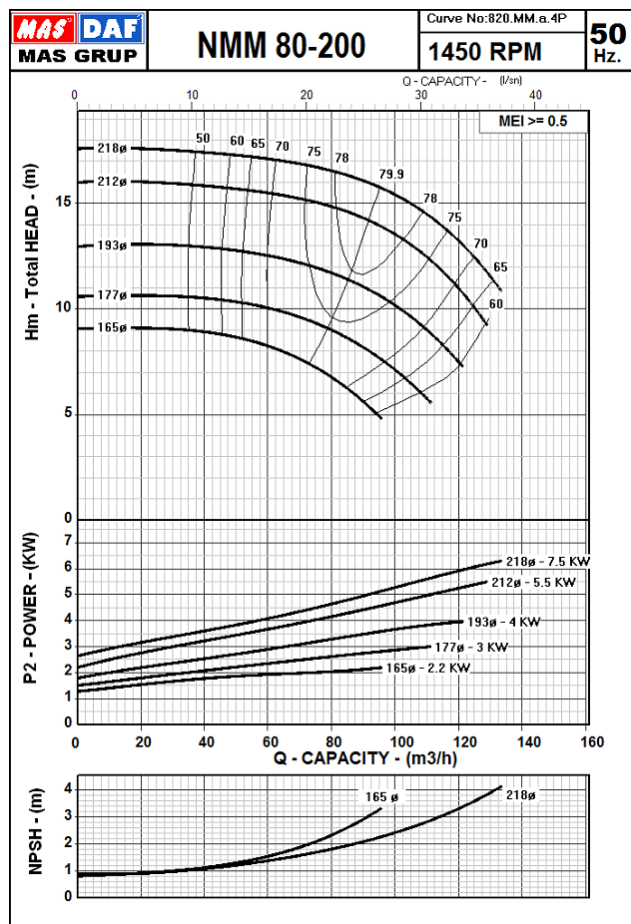
Close Coupled Centrifugal Pump

Performance Curves

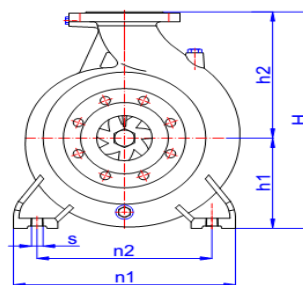
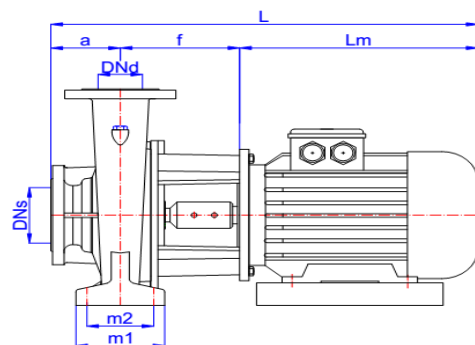
NMM 80-200



Mas Grup

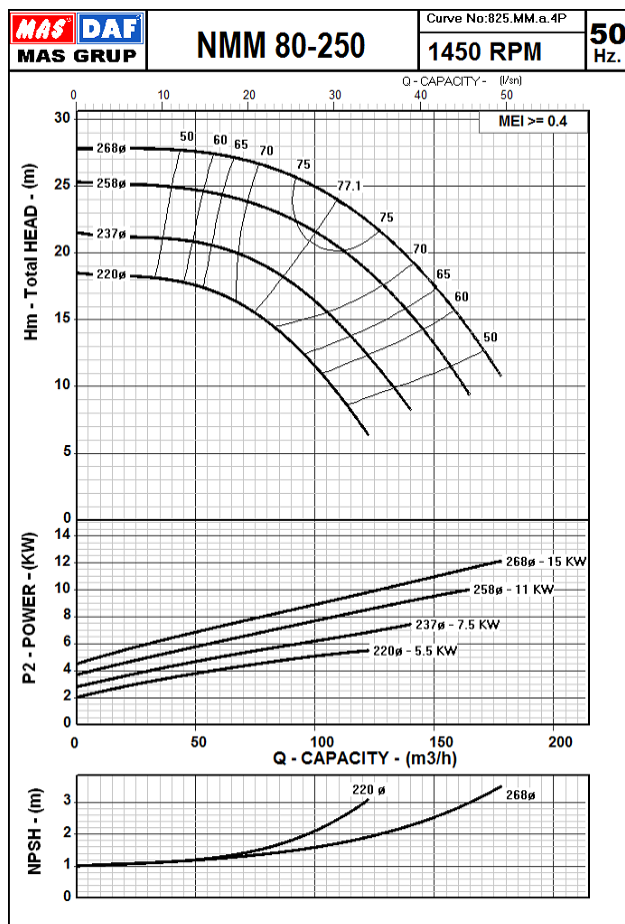


The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.

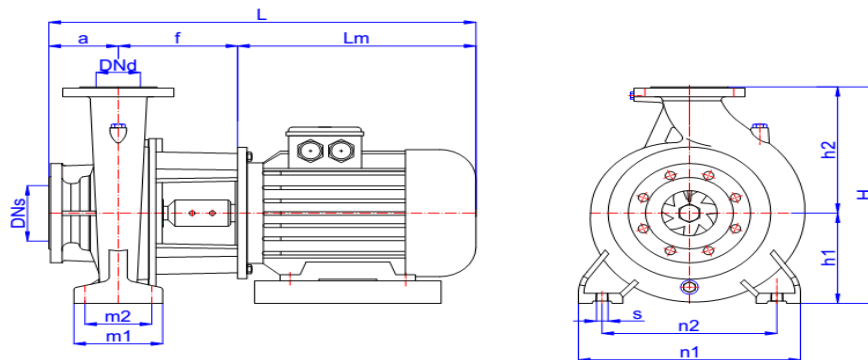


		MOTOR			FLANGES		GENERAL	PUMP								Mechanical Seal	
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
80-200	4 poles	2.2	100L	292	80	100	607	125	190	180	250	345	280	125	95	12	30
		3	100L	292			607		190								
		4	112M	335.5			650.5		190								
		5.5	132M	395.5			735.5		215								
		7.5	132M	395.5			735.5		215								
	2 poles	22	180M	519	80	100	884	125	240	180	250	345	280	125	95	12	30
		30	200L	555			950		270								35
		37	200L	555			950		270								
		45	225M	625			1020		270								

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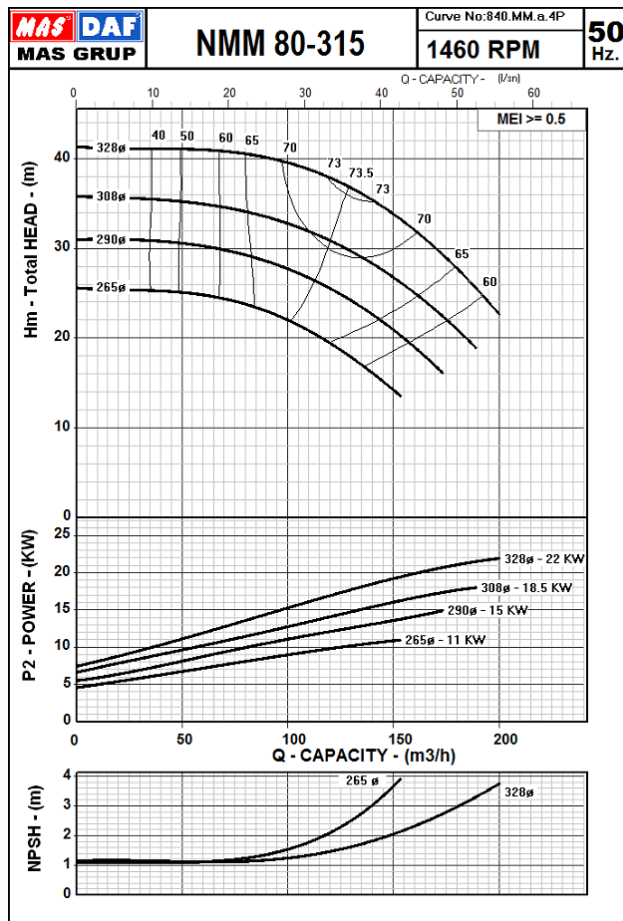


The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.

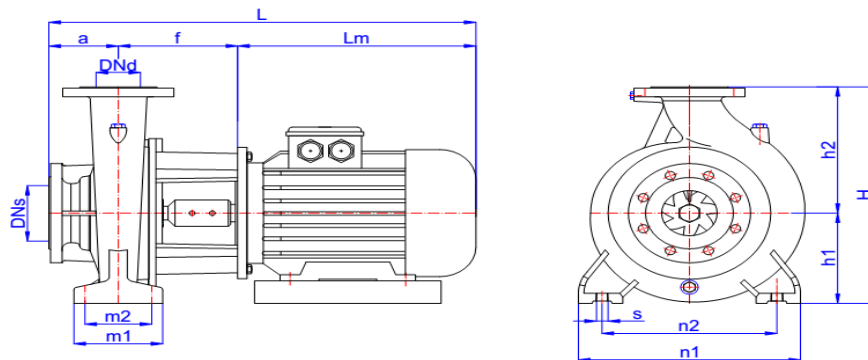


		MOTOR			FLANGES		GENERAL	PUMP									Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
80-250	4 poles	5.5	132M	395.5	80	100	735.5	125	215	200	280	400	315	160	120	16	30
		7.5	132M	395.5			735.5		215								
		11	160M	666			1031		240								
		15	160L	666			1031		240								

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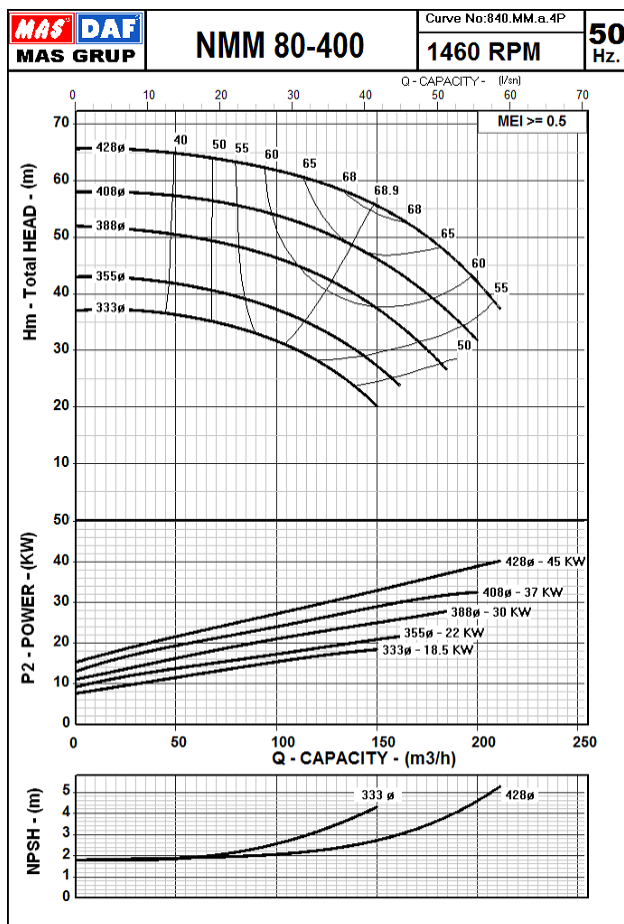


The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.

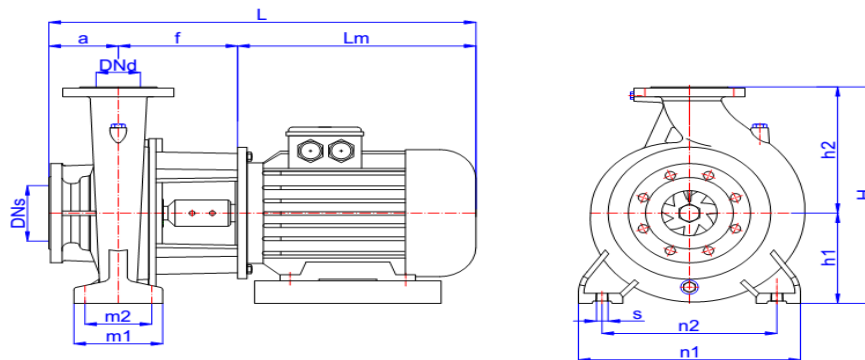


		MOTOR			FLANGES		GENERAL	PUMP									Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
80-315	4 poles	11	160M	666	80	100	1031	125	240	250	315	400	315	160	120	16	30
		15	160L	666			1031										
		18.5	180M	519			884										
		22	180L	519			884										

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The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR			FLANGES		GENERAL	PUMP								Mechanical Seal	
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
80-400	4 poles	18.5	180M	519	80	100	894	125	250	280	355	500	400	200	150	20	45
		22	180L	519			894		250								
		30	200L	555			960		280								
		37	225M	625			1030		280								
		45	225M	625			1030		280								

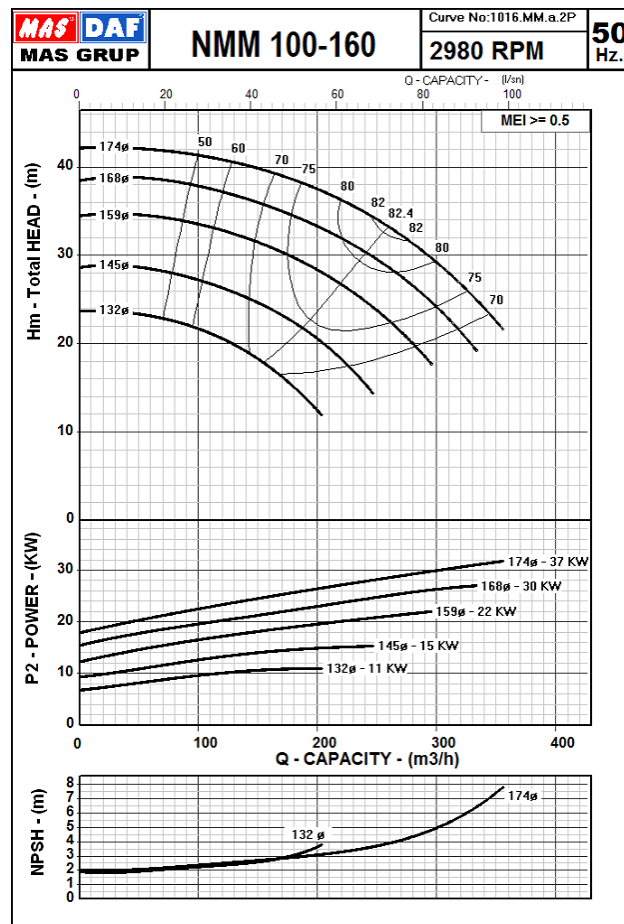
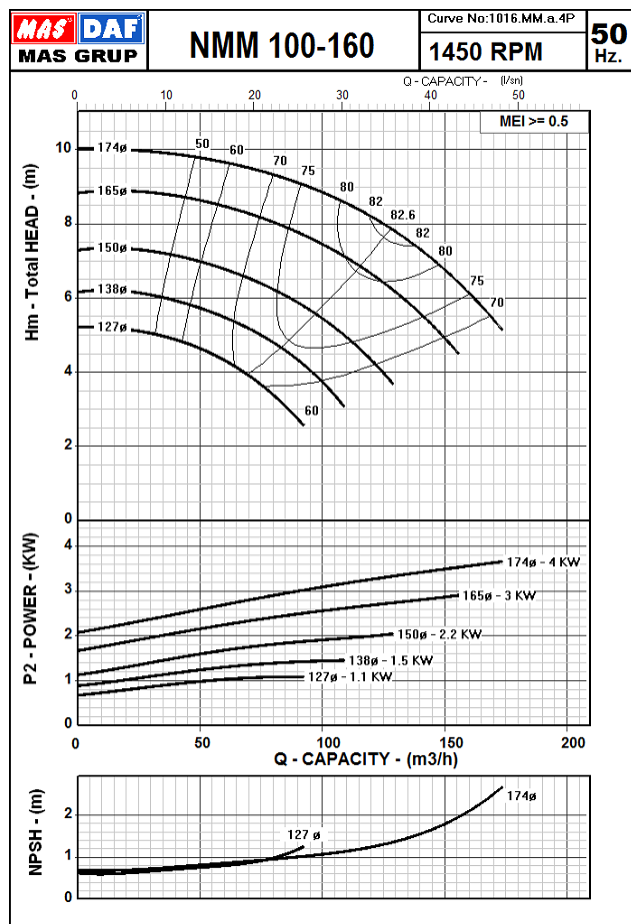
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NMM Series
Close Coupled Centrifugal Pump
Performance Curves

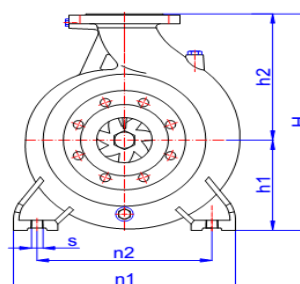
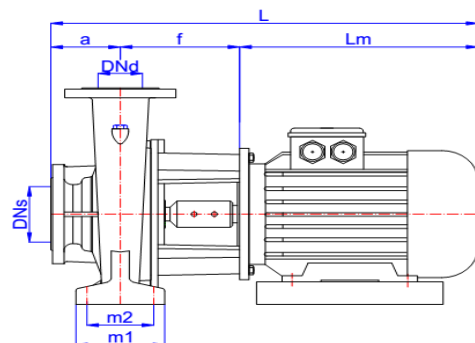


NMM 100-160

Mas Group



The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR			FLANGES		GENERAL	PUMP									Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
100-160	4 poles	1.1	90L	266.5	100	125	551.5	125	160	200	280	360	280	160	120	16	20
		1.5	90L	266.5			551.5		160								
		2.2	100L	292			597		180								
		3	100L	292			597		180								
		4	112M	335.5			640.5		180								
	2 poles	11	160M	666	100	125	1021	125	230	200	280	360	280	160	120	16	30
		15	160L	666			1021		230								
		22	180M	519			874		230								
		30	200L	555			940		260								35
		37	200L	555			940		260								

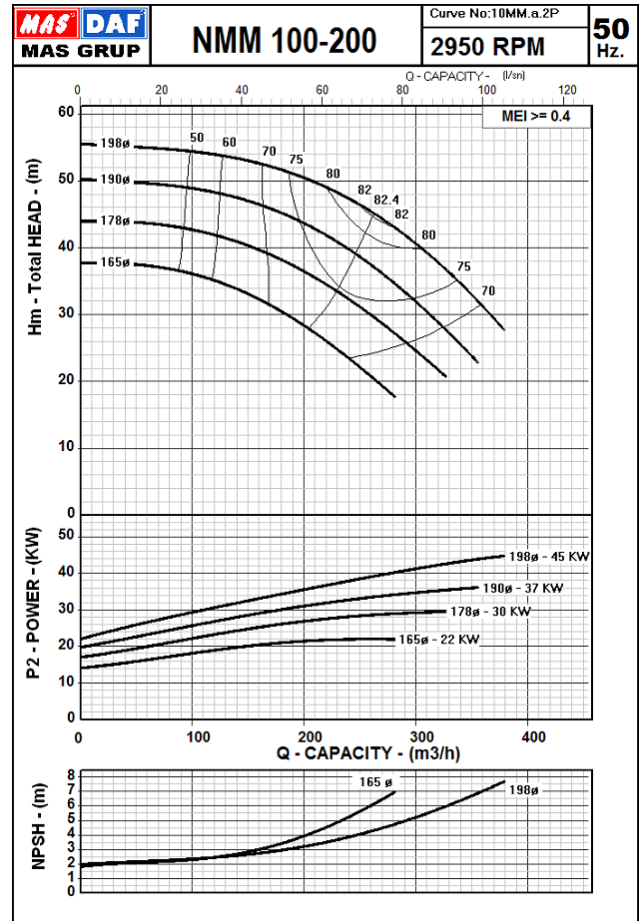
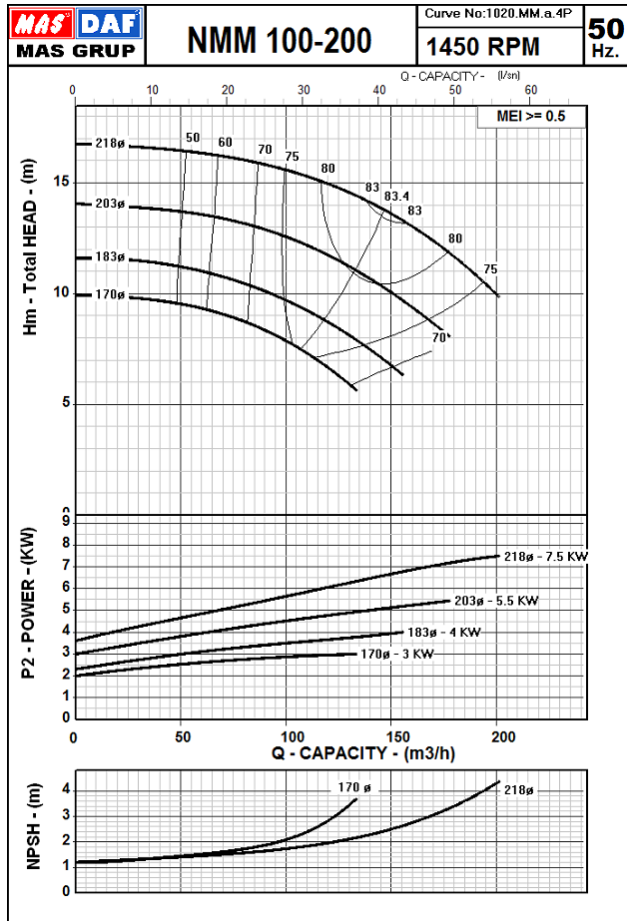
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NMM Series
Close Coupled Centrifugal Pump
Performance Curves

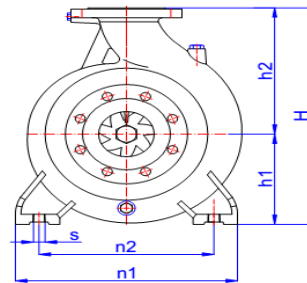
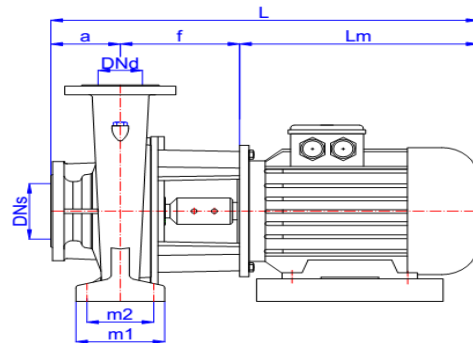


NMM 100-200

Mas Grup

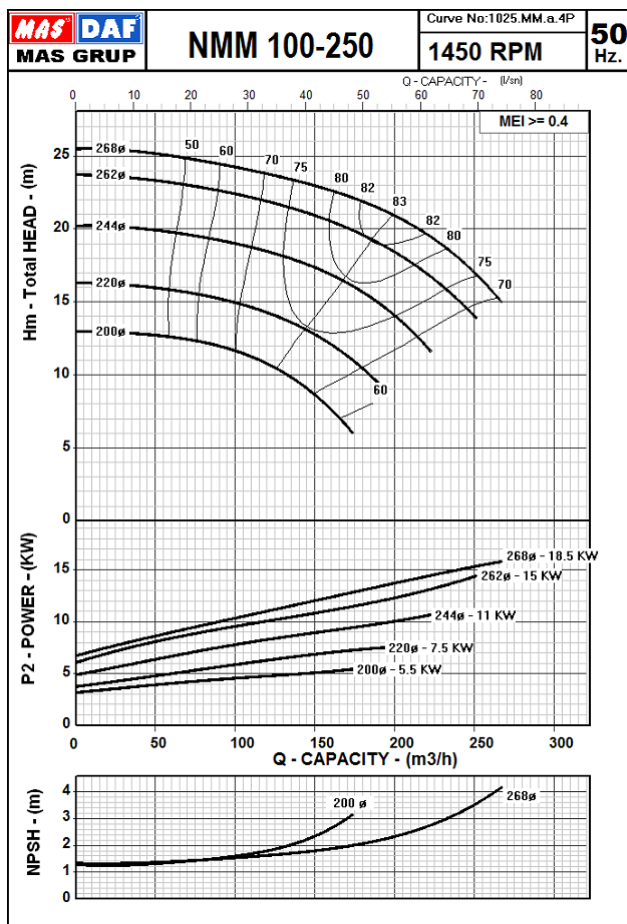


The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.

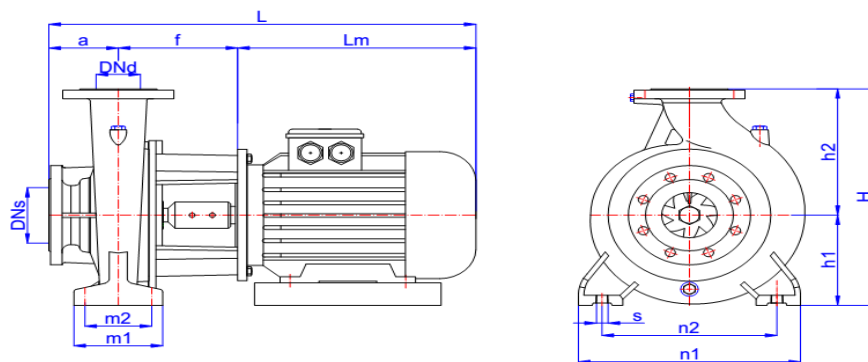


		MOTOR			FLANGES		GENERAL	PUMP									Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
100-200	4 poles	3	100L	292	100	125	607	125	190	200	280	360	280	160	120	16	30
		4	112M	335.5			650.5										
		5.5	132M	395.5			760.5										
		7.5	132M	395.5			760.5										
	2 poles	22	180M	519	100	125	884	125	240	200	280	360	280	160	120	16	35
		30	200L	555			950										
		37	200L	555			950										
		45	225M	625			1020										

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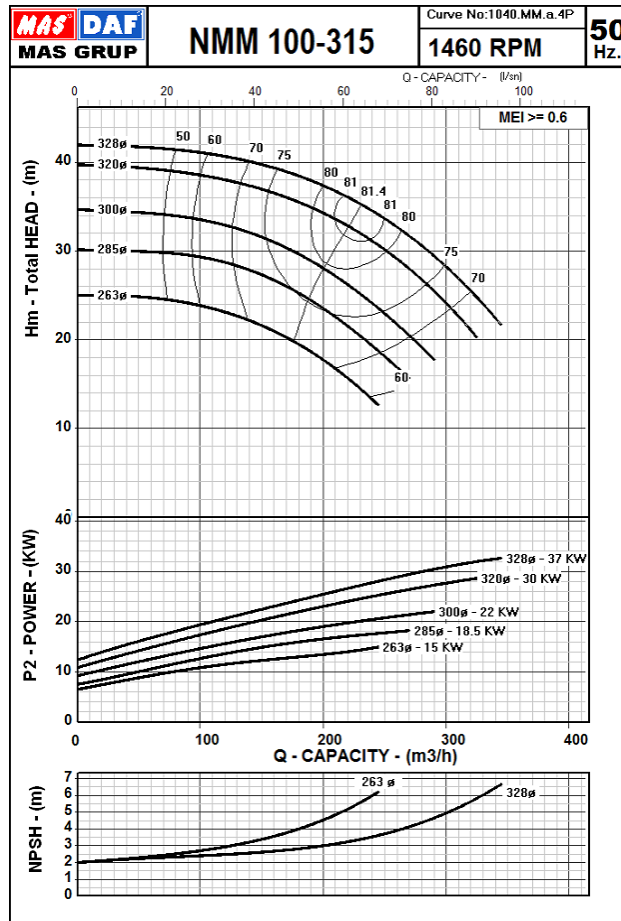


The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.

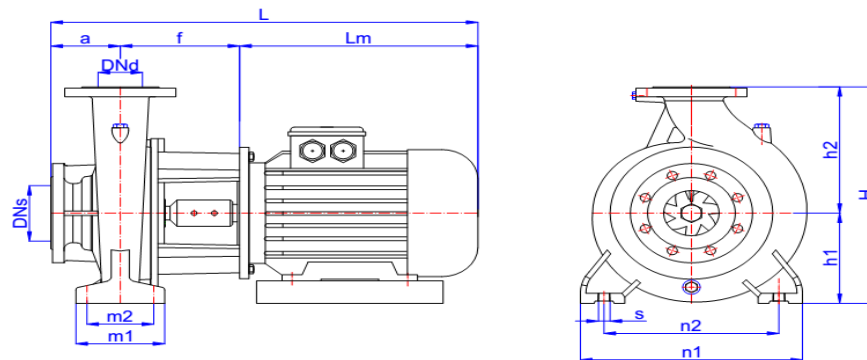


		MOTOR			FLANGES		GENERAL	PUMP								Mechanical Seal	
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
100-250	4 poles	5.5	132M	395.5	100	125	735.5	125	215	225	280	400	315	160	120	16	30
		7.5	132M	395.5			735.5		215								
		11	160M	666			1031		240								
		15	160L	666			1031		240								
		18.5	180M	519			884		240								

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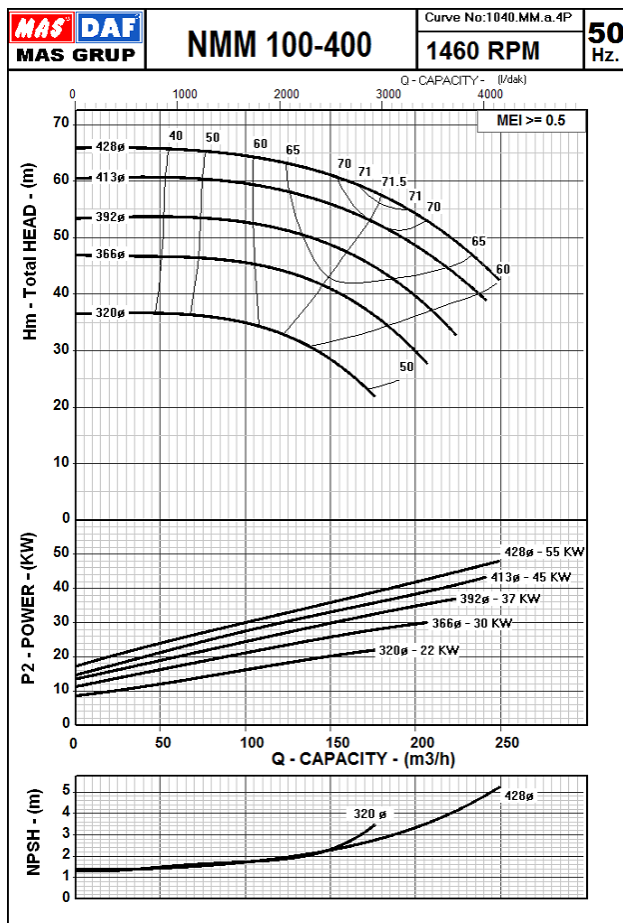


The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.

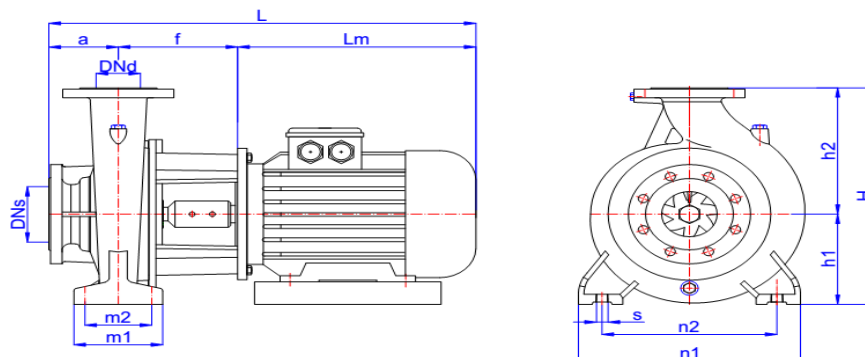


		MOTOR			FLANGES		GENERAL	PUMP								Mechanical Seal	
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm													
100-315	4 poles	15	160L	666	100	125	1046	140	240	250	315	400	315	160	120	16	30
		18.5	180M	519			899		240								
		22	180L	519			899		240								
		30	200L	555			965		270								35
		37	225M	625			1035		270								

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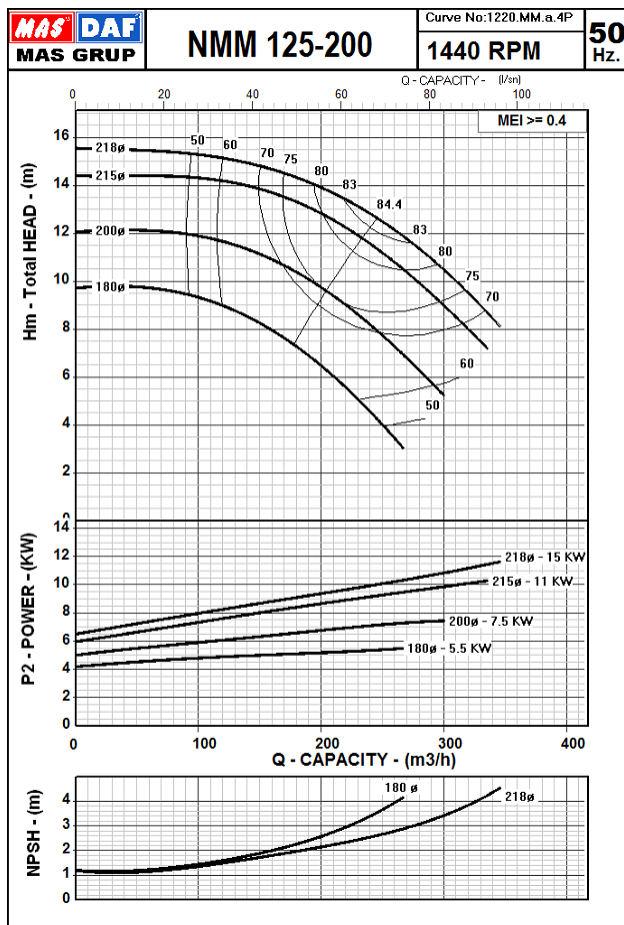


The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.

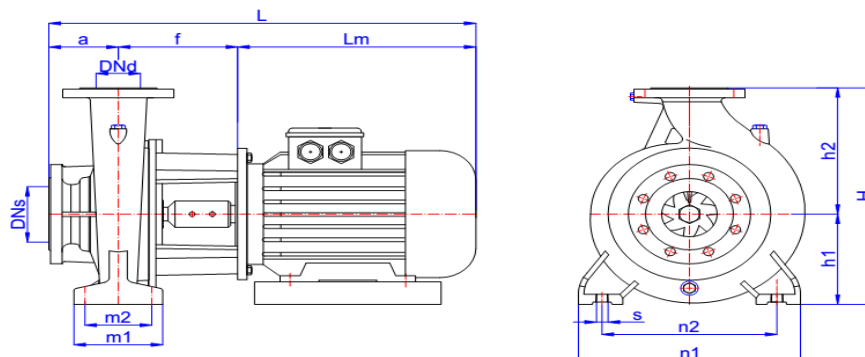


		MOTOR			FLANGES		GENERAL	PUMP								Mechanical Seal	
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
100-400	4 poles	22	180L	519	100	125	909	140	250	280	355	500	400	200	150	20	45
		30	200L	555			975		280								
		37	225M	625			1095		330								
		45	225M	625			1095		330								
		55	250M	746			1216		330								

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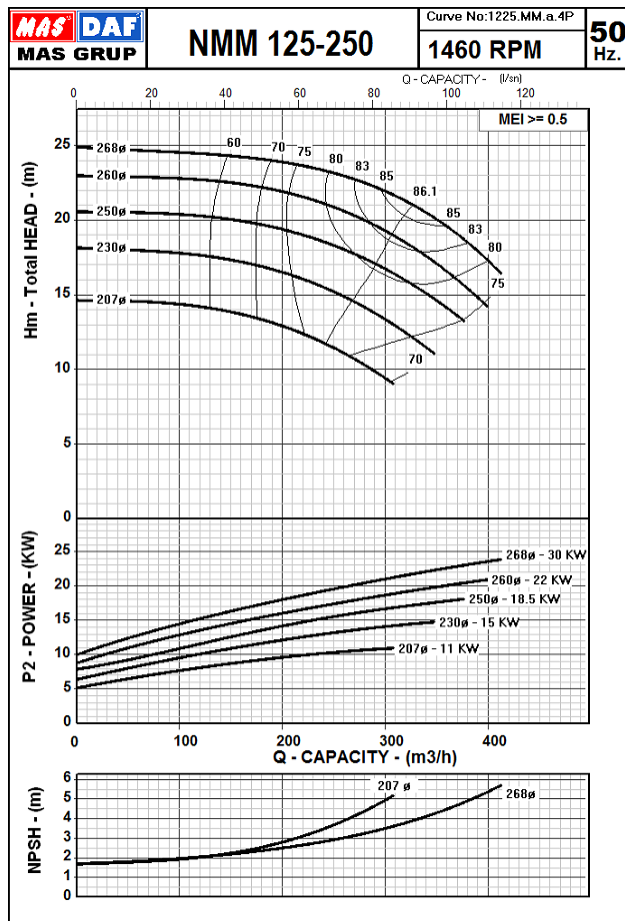


The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.

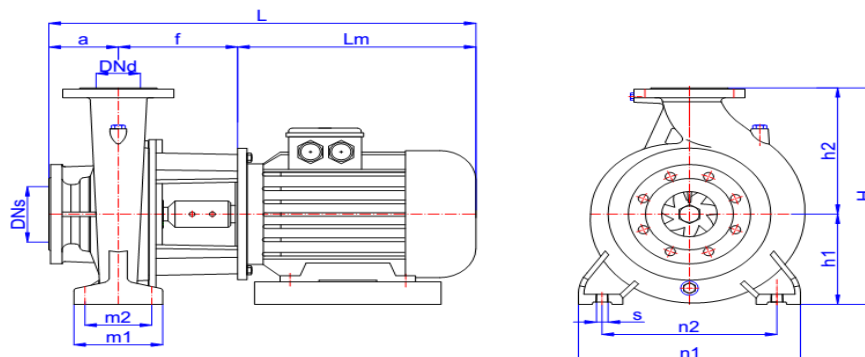


		MOTOR			FLANGES		GENERAL	PUMP									Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
125-200	4 poles	5.5	132M	395.5	125	150	750.5	140	215	250	315	400	315	160	120	16	30
		7.5	132M	395.5			750.5		215								
		11	160M	666			1046		240								
		15	160L	666			1046		240								

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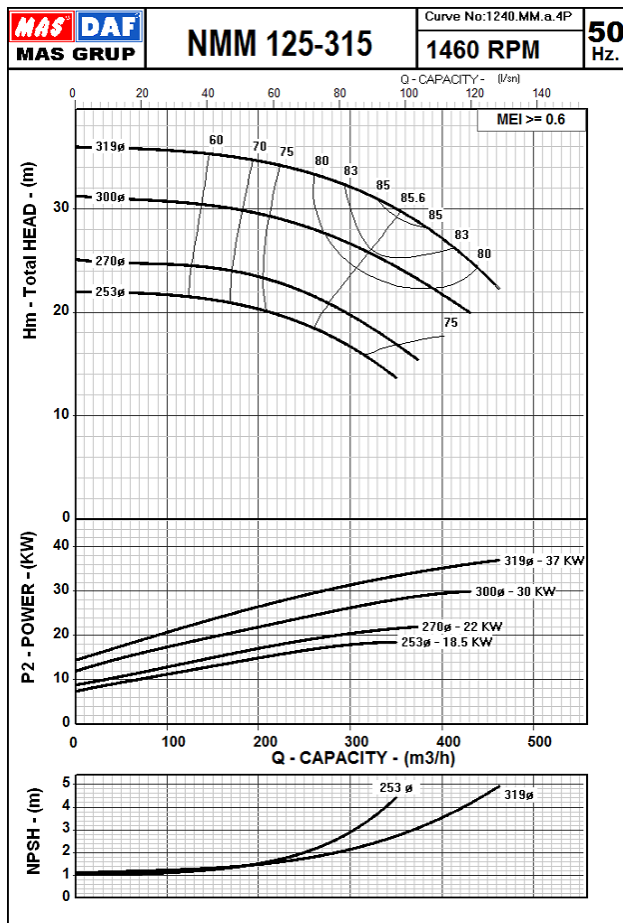


The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.

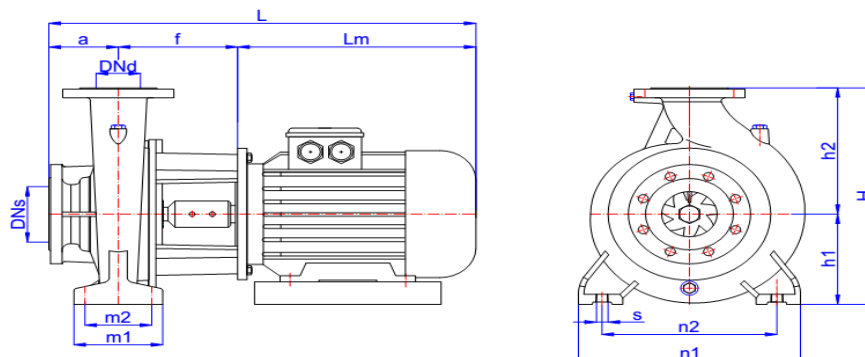


		MOTOR			FLANGES		GENERAL	PUMP									Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
125-250	4 poles	11	160M	666	125	150	1056	140	250	250	355	400	315	160	120	16	30
		15	160L	666			1056		250								
		18.5	180M	519			909		250								
		22	180L	519			909		250								
		30	200L	555			975		280								35

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The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR			FLANGES		GENERAL	PUMP									Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
125-315	4 poles	18.5	180M	519	125	150	914	140	255	280	355	500	400	200	150	20	35
		22	180L	519			914		255								
		30	200L	555			980		285								
		37	225M	625			1080		315								

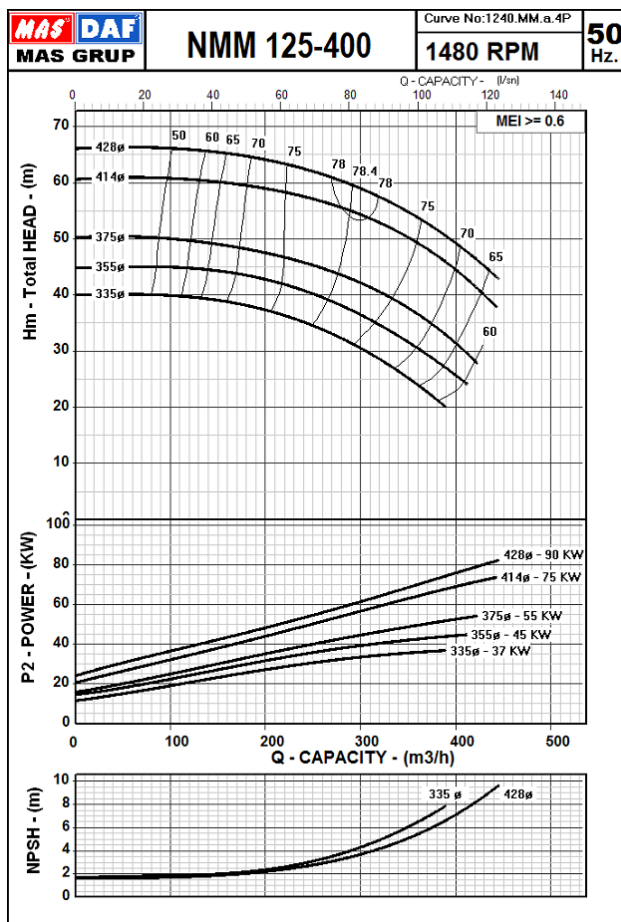
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NMM Series
Close Coupled Centrifugal Pump
Performance Curves

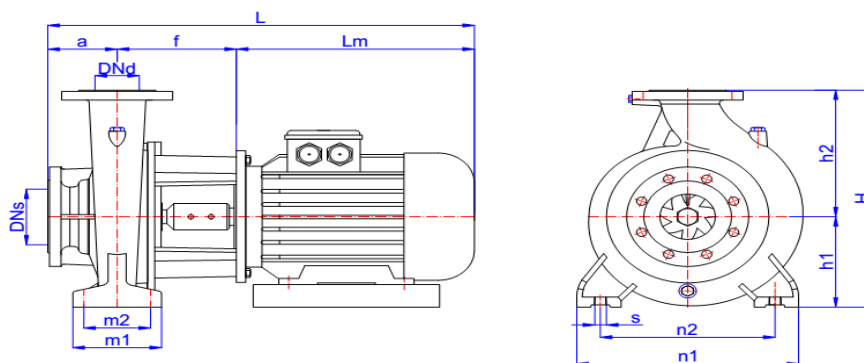
NMM 125-400



Mas Grup



The Performance Curves 50 Hz are based on the kinematic viscosity 1 mm²/s and density 1g/cm³. Tolerances are acc. to ISO 9906 Annex A.



		MOTOR		FLANGES		GENERAL	PUMP										Mechanical Seal
		KW	IEC	Lm	DNd	DNs	L	a	f	h1	h2	n1	n2	m1	m2	s	Nominal Impeller Diameter
				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
125-400	4 poles	37	225M	625	125	150	1095	140	330	315	400	500	400	200	150	20	45
		45	225M	625			1095										
		55	250M	746			1216										
		75	280S	767			1237										
		90	280M	818			1288										

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NMM Series

Close Coupled Centrifugal Pump

Exploded View (Without Coupling)



Mas Grup

PUMP TYPE	MOMENT OF INERTIA I [kgm ²]					
	Impeller GG 25 ($\rho=7,3 \text{ kg/dm}^3$)		Impeller Bronze ($\rho=8,7 \text{ kg/dm}^3$)		Impeller Cast Steel ($\rho=7,8 \text{ kg/dm}^3$)	
	Without Water	With Water	Without Water	With Water	Without Water	With Water
NMM 32-160	0,0062	0,0072	0,0074	0,0084	0,0066	0,0076
NMM 32-200	0,0123	0,0142	0,0147	0,0166	0,0131	0,0150
NMM 32-250	0,0212	0,0272	0,0309	0,0381	0,293	0,345
NMM 40-160	0,0065	0,0072	0,0078	0,0085	0,0070	0,0077
NMM 40-200	0,0124	0,0145	0,0148	0,0169	0,0132	0,0153
NMM 40-250	0,0293	0,0355	0,0349	0,0411	0,0313	0,0375
NMM 50-160	0,0075	0,0087	0,0219	0,0231	0,0080	0,0092
NMM 50-200	0,0136	0,0160	0,0142	0,0186	0,0125	0,0169
NMM 50-250	0,0318	0,0380	0,0379	0,0441	0,0340	0,0402
NMM 50-315	0,0645	0,0800	0,0788	0,0943	0,0696	0,0941
NMM 65-160	0,0077	0,0100	0,0092	0,0115	0,0082	0,0105
NMM 65-200	0,0150	0,0192	0,0179	0,0221	0,0160	0,0202
NMM 65-250	0,0375	0,0465	0,0447	0,0537	0,0401	0,0491
NMM 65-315	0,0745	0,0900	0,0888	0,1043	0,0796	0,0951
NMM 65-400	0,2100	0,2575	0,2522	0,2997	0,2251	0,2726
NMM 80-160	0,0098	0,0127	0,0117	0,0146	0,0105	0,0134
NMM 80-200	0,0195	0,0255	0,0232	0,0292	0,0208	0,0268
NMM 80-250	0,0400	0,0525	0,0477	0,0602	0,0427	0,0552
NMM 80-315	0,0845	0,1077	0,1007	0,1239	0,0903	0,1135
NMM 80-400	0,2200	0,2675	0,2622	0,3097	0,2351	0,2826
NMM 100-160	0,0127	0,0165	0,0145	0,0188	0,0135	0,0175
NMM 100-200	0,0253	0,0327	0,0302	0,0376	0,0270	0,0344
NMM 100-250	0,0448	0,0625	0,0534	0,0711	0,0479	0,0656
NMM 100-315	0,0895	0,1205	0,1067	0,1377	0,0956	0,1266
NMM 100-400	0,2108	0,2650	0,2512	0,3054	0,2252	0,2794
NMM 125-200	0,0375	0,0545	0,0447	0,0617	0,0401	0,0571
NMM 125-250	0,0520	0,0740	0,0556	0,0776	0,0620	0,0840
NMM 125-315	0,1058	0,1480	0,1261	0,1683	0,1130	0,1552
NMM 125-400	0,2358	0,3098	0,2810	0,3550	0,2520	0,3260

For the water filling $\rho=1 \text{ kg/dm}^3$ is used. In case the handled liquid has a different density or the impeller is made of other materials having also a different density, calculate moment of inertia according to the following examples.

Example: Pump Size NMM 100-250

Handled liquid density $\rho=1.25 \text{ kg/dm}^3$, impeller cast iron GG $\rho=7.3 \text{ kg/dm}^3$

$$I = (0.0625 - 0.0448) \times 1.25 + 0.0448 = 0.0669 \text{ kgm}^2$$

Handled liquid density $\rho=1 \text{ kg/dm}^3$, impeller $\rho=8 \text{ kg/dm}^3$ (conversion from GG $\rho=7.3 \text{ kg/dm}^3$)

$$I = 0.0448 \times 8 / 7.3 + (0.0625 - 0.0448) = 0.0668 \text{ kgm}^2$$

Handled liquid density $\rho=1.25 \text{ kg/dm}^3$, impeller $\rho=8 \text{ kg/dm}^3$

(Conversion from GG $\rho=7.3 \text{ kg/dm}^3$ and water $\rho=1 \text{ kg/dm}^3$)

$$I = 0.0448 \times 8 / 7.3 + (0.0625 - 0.0448) \times 1.25 = 0.0712 \text{ kgm}^2$$

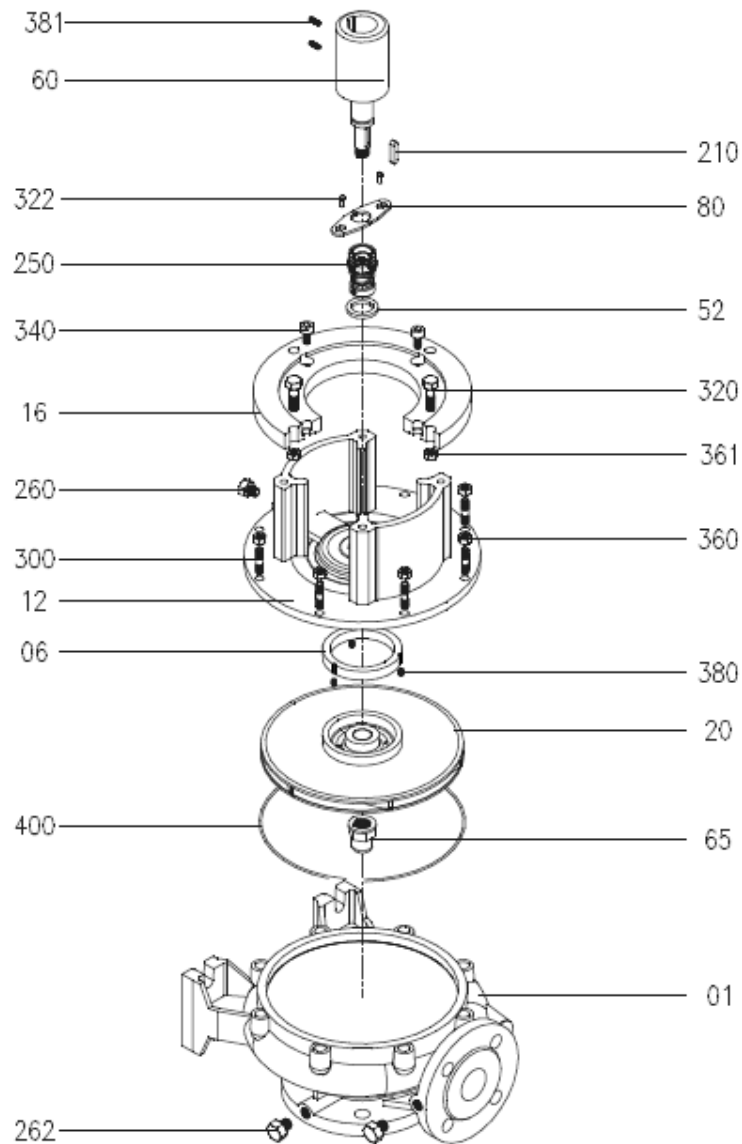
NMM Series

Close Coupled Centrifugal Pump

Exploded View (Without Coupling)



Mas Grup

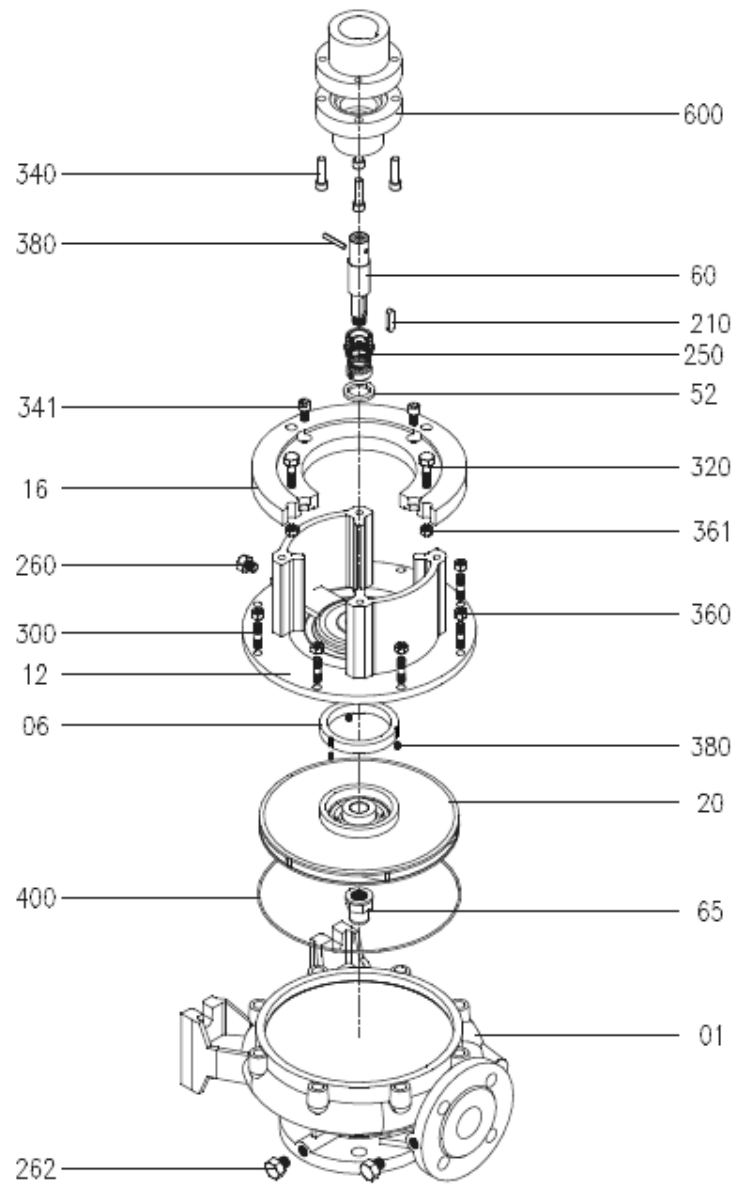


PART NO	PART NAME	PART NO	PART NAME
01	Volute Casing	260	Plug, Adapter
06	Wear Ring	262	Plug, Volute Casing
12	Adapter	300	Stud, Volute Casing
16	Adapter Flange	320	Hex Bolt
20	Impeller	322	Hex Bolt
52	Mechanical Seal Ring	340	Cap Screw
60	Pump Shaft	360	Nut
65	Impeller Nut	361	Nut
80	Shackle	380	Setscrew
210	Impeller Key	381	Setscrew
250	Mechanical Seal	400	O-Ring

NMM Series
Close Coupled Centrifugal Pump
Exploded View (With Coupling)



Mas Grup



PART NO	PART NAME	PART NO	PART NAME
01	Volute Casing	262	Plug, Volute Casing
06	Wear Ring	300	Stud, Volute Casing
12	Adapter	320	Hex Bolt
16	Adapter Flange	340	Cap Screw
20	Impeller	341	Cap Screw
52	Mechanical Seal Ring	360	Nut
60	Pump Shaft	361	Nut
65	Impeller Nut	380	Setscrew
210	Impeller Key	381	Setscrew
250	Mechanical Seal	400	O-Ring
260	Plug, Adapter	600	Rigid Coupling



Mas Grup