

ARGAL
CHEMICAL PUMPS



Route G2

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ARGAL, adjusting itself to the mutable and continuous demands of the market, has prepared the series of pumps called **ROUTE**; **“TMR”** for magnetic driven pumps, where new solutions have been introduced and **“ZMR”** for traditional version with mechanical seal.

In the innovations for the magnetic driven pumps we have reduced the friction in the highest degree controlling the impeller movements through magnetic fields. This solution has been named: **“two axial directions self-alignment system”**.

The purpose of ARGAL has been to extend this new safety to the top, eliminating the frontal frictions (both front and back) keeping only the radial attrition of rotation.

This has been possible thanks to an innovative use of the magnetic fields, sprung from researches of our R&D department and now object of patent. The new system moves the impeller in a central neutral position, without axial contacts, in presence of anomalies in the principal hydraulic flow. The tolerance of the dry running of the pump is therefore guaranteed! In the structure of **ROUTE “TMR”** the rotating parts have been designed to be lighter as much as possible, assuring always mechanical resistance and required value of the maximum torque of the magnetic coupling.

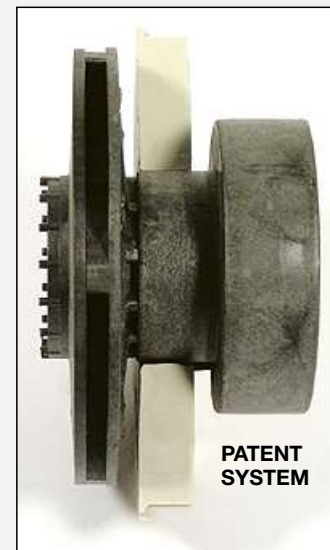


PATENT SYSTEM

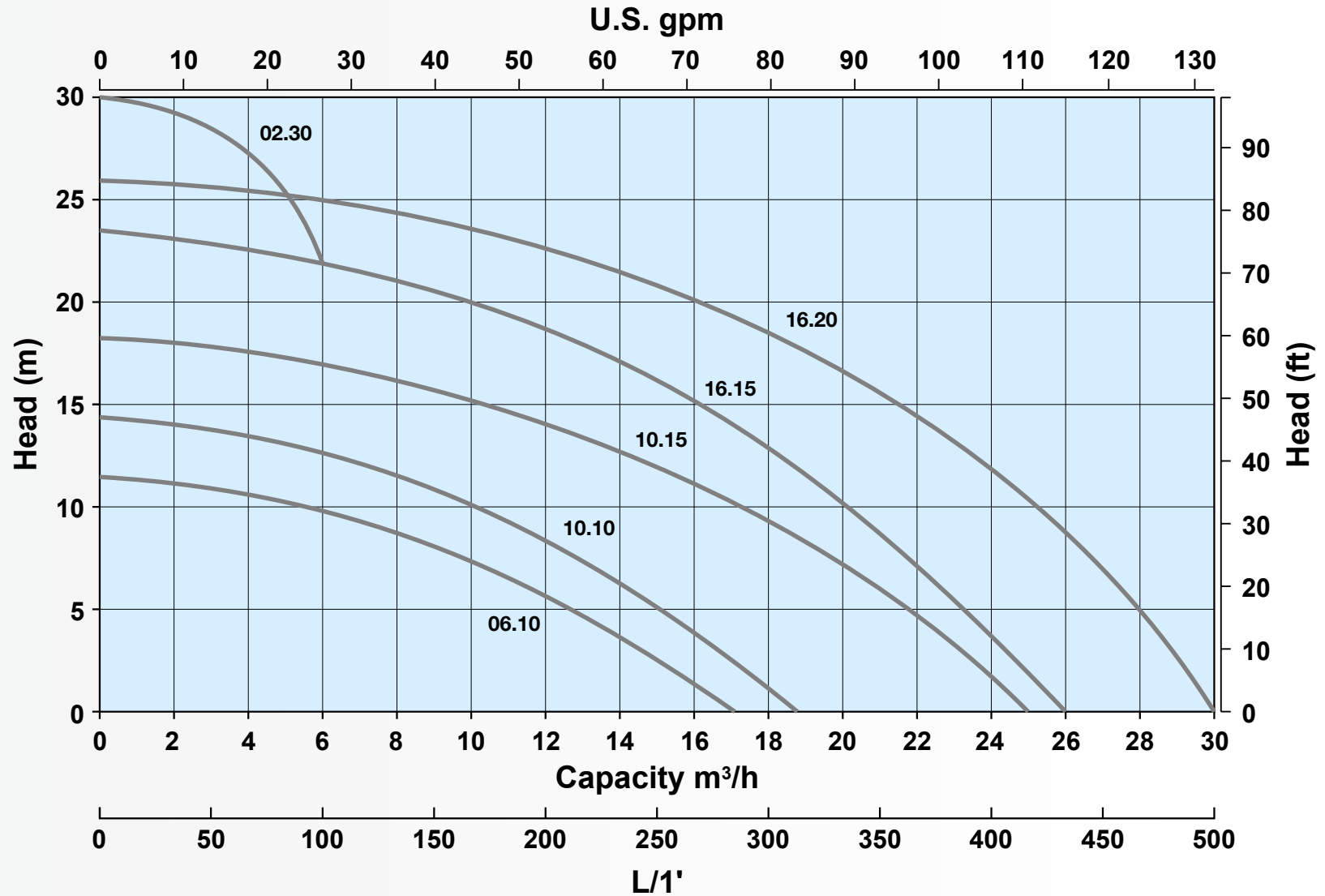
THE PRINCIPLE OF TWO AXIAL DIRECTIONS SELF-ALIGNMENT SYSTEM

In order to define a neutral position, without frictions, we have introduced an extra magnetic field and two work-areas (one anterior and the other one posterior) where the impeller can liberally choose to work referring to hydrodynamic loads which are determined by duty point (flow/head) on the performance curve. Two rings which are limiting device of axial excursion fix the work-space engaged by the impeller during the standard operation. In case of anomalies due to pressure loss in the dry running, the extra magnetic field (always active) contrasting the axial pushes, call back the impeller in the neutral position. This distinctive automatism precisely prevents the contact with the rings (limiting devices) and consequently avoids frictions and heat increase.

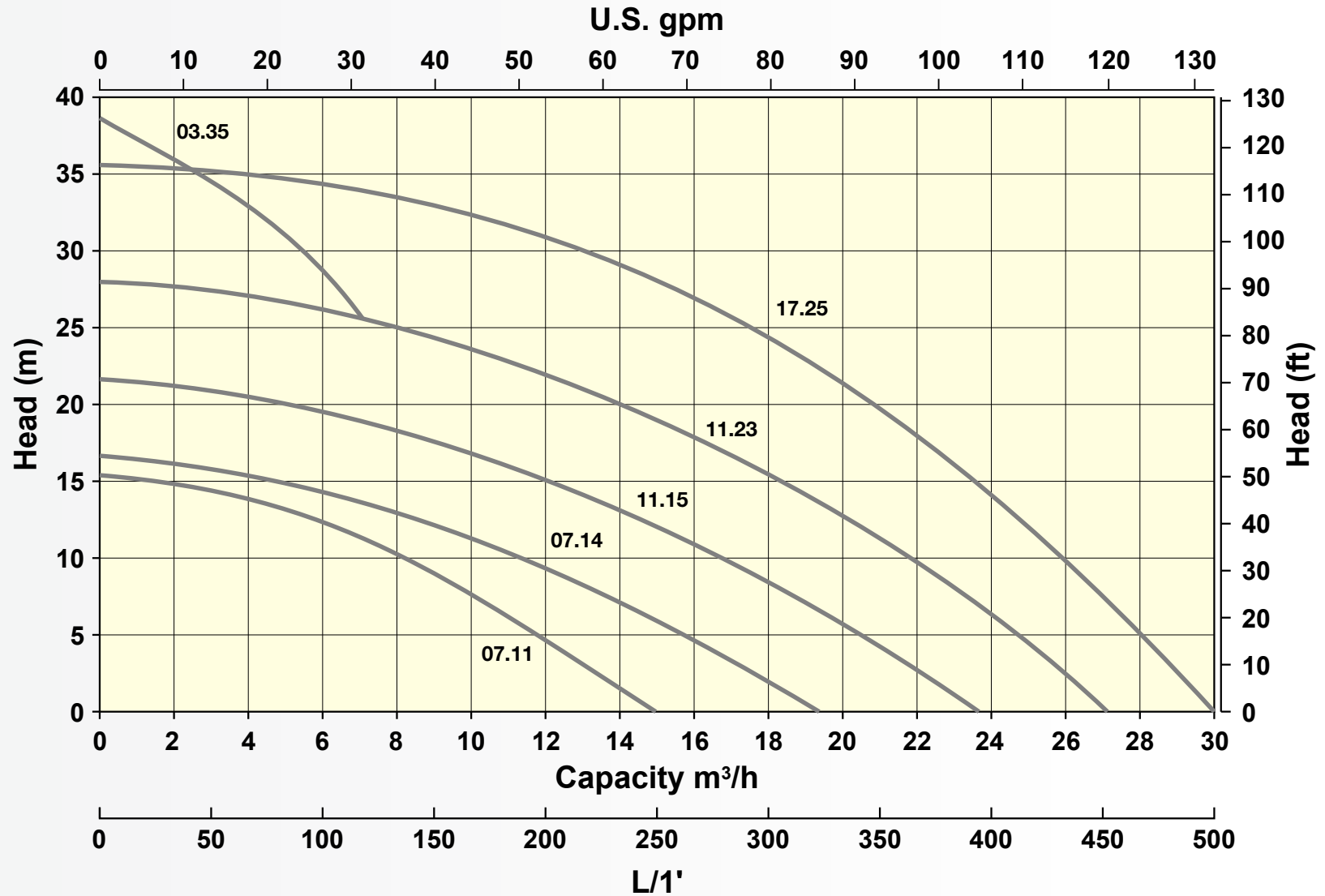
The shape of the magnets and the orientation of the fields are the key that shows the desired action.



GENERAL PERFORMANCE CURVES 2900 r.p.m. 50Hz



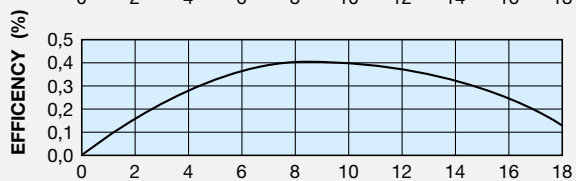
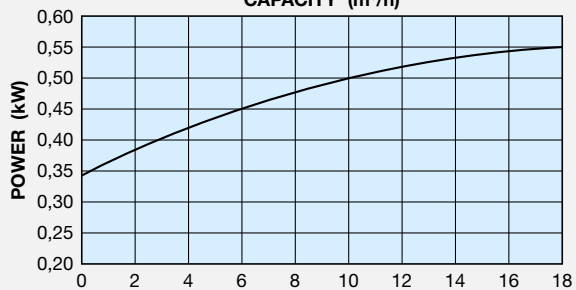
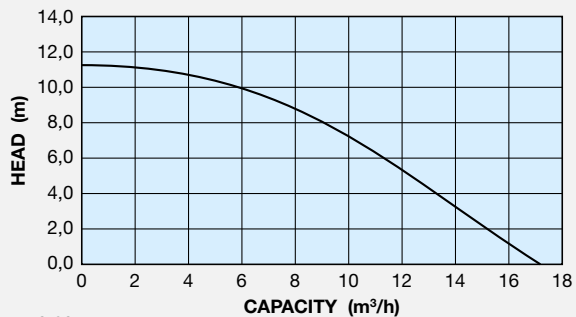
GENERAL PERFORMANCE CURVES 3500 r.p.m.60Hz



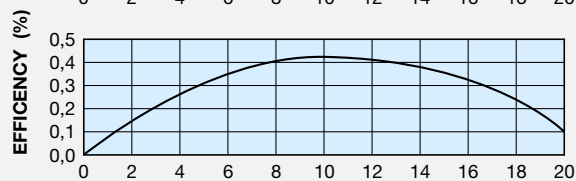
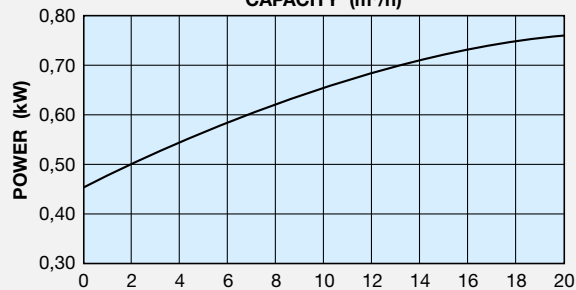
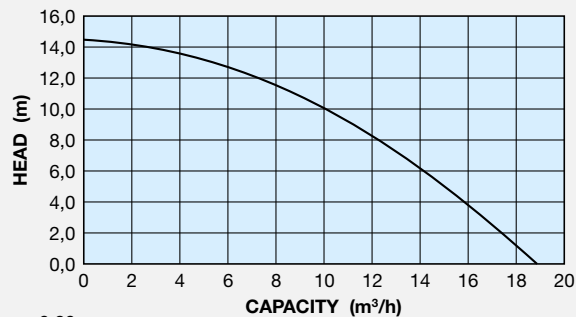
PRODUCTION PROGRAM

CURVES 2900 r.p.m.50Hz

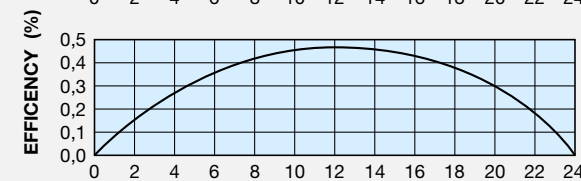
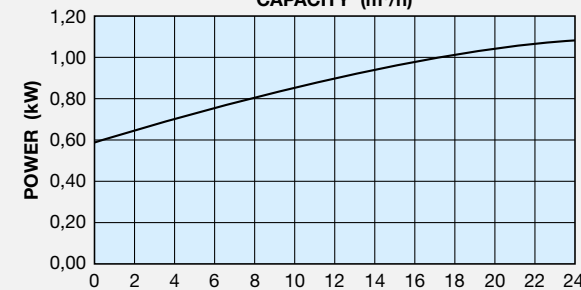
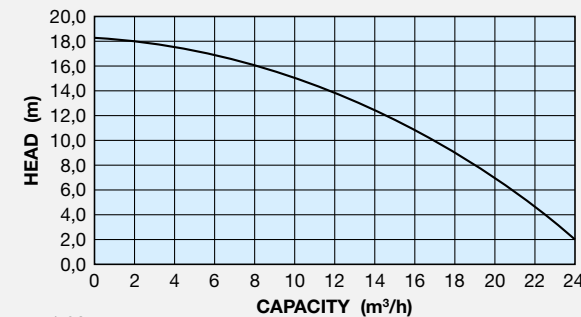
06.10



10.10

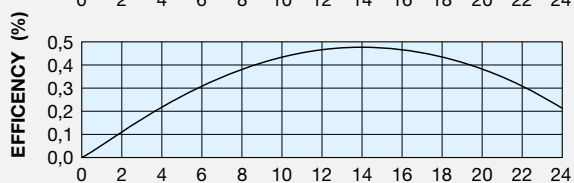
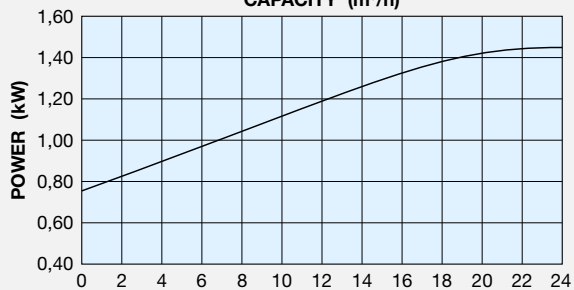
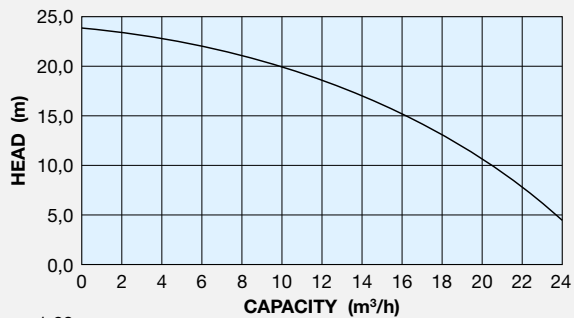


10.15

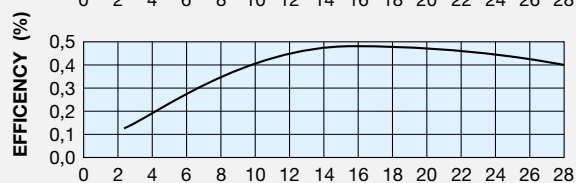
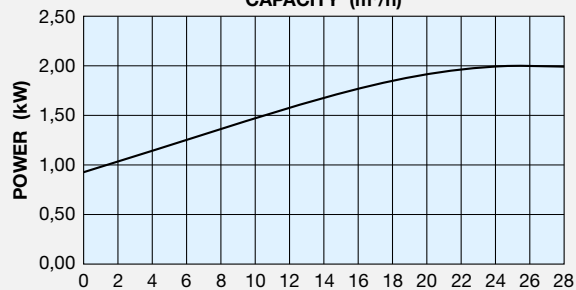
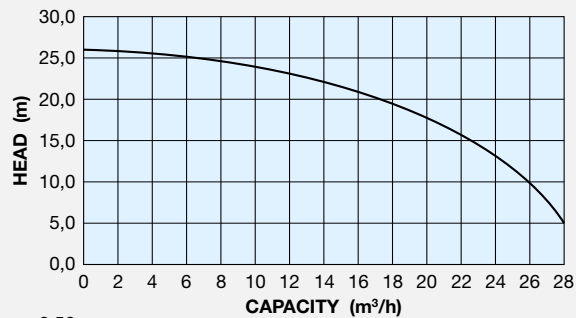


CURVES 2900 r.p.m.50Hz

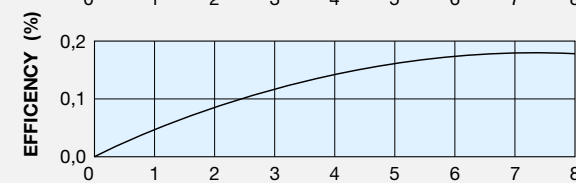
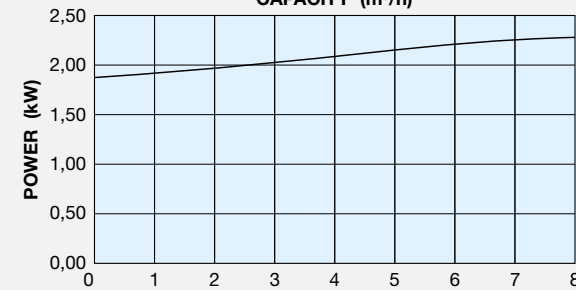
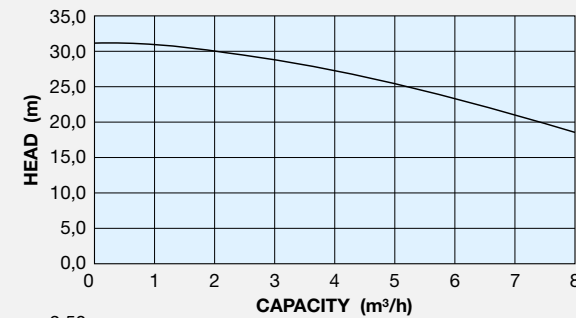
16.15



16.20

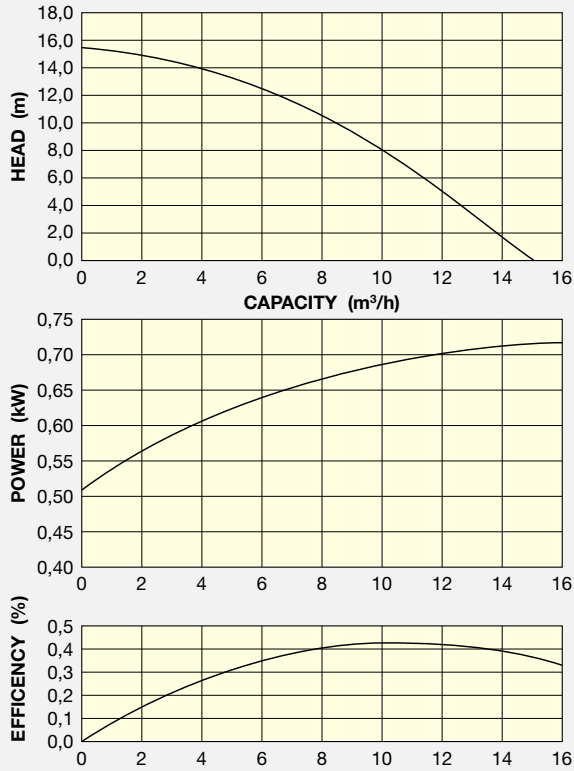


02.30

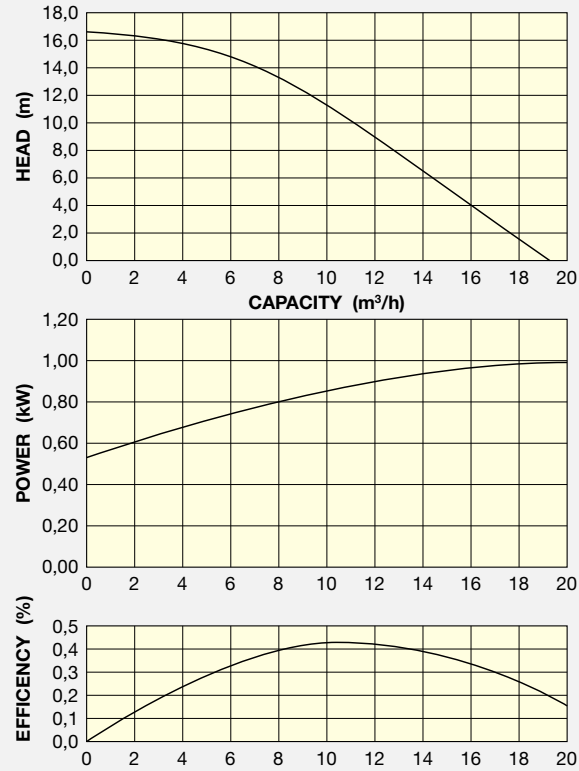


CURVES 3500 r.p.m. 60Hz

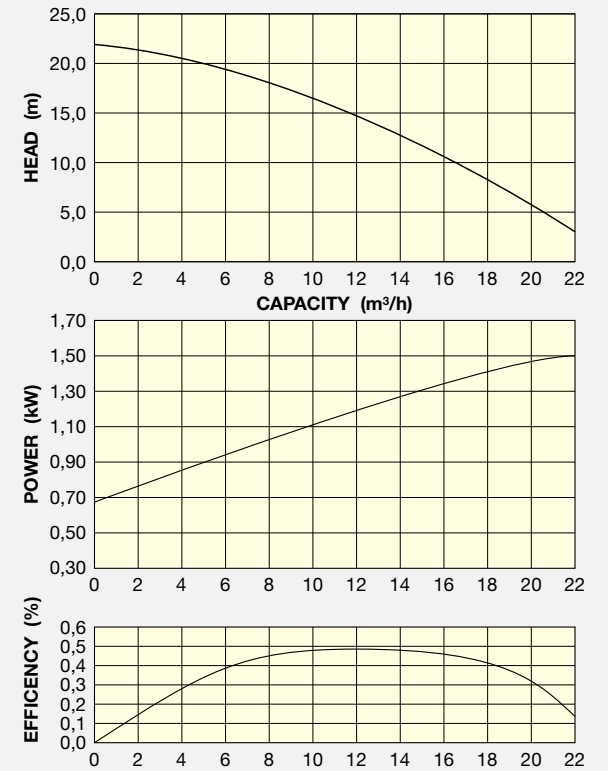
07.11



07.14

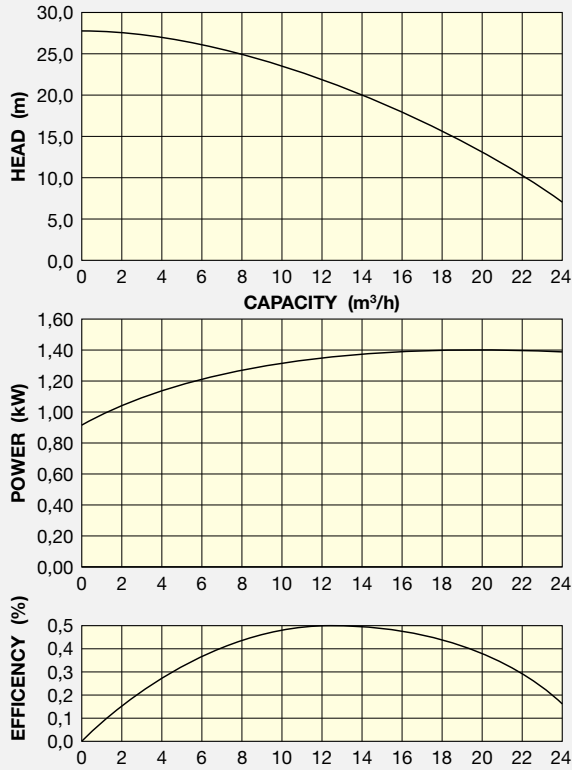


11.15

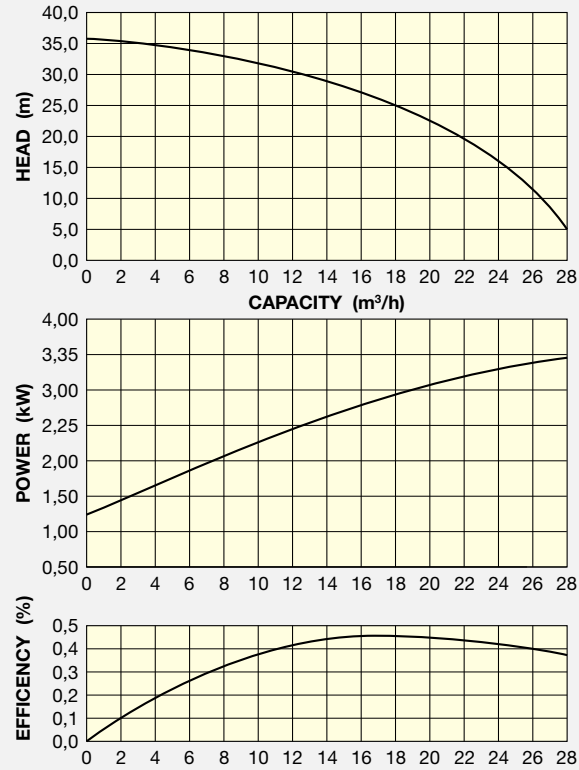


CURVES 3500 r.p.m. 60Hz

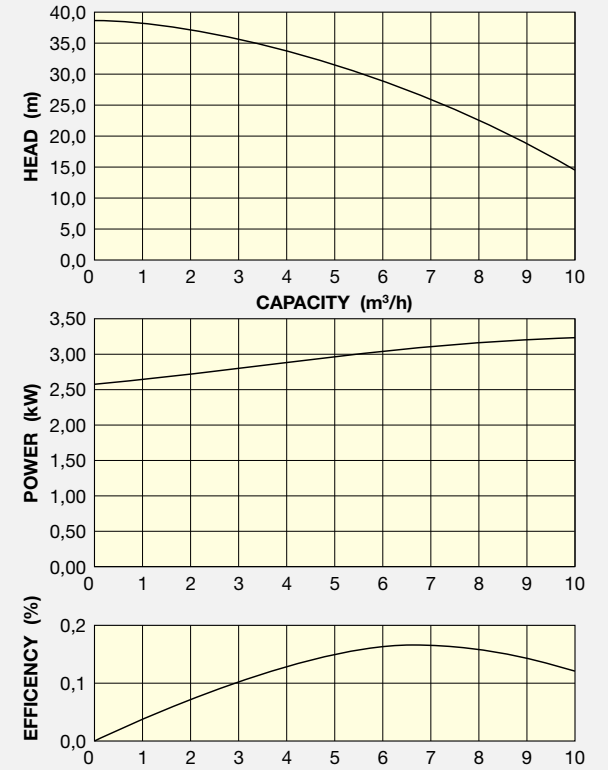
11.23



17.25



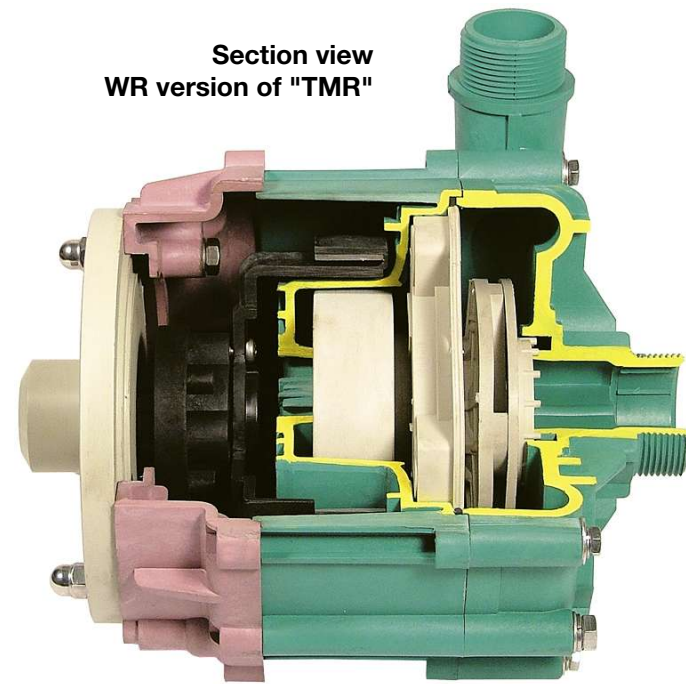
03.35



The employment of Polypropylene reinforced with glass fibre allows to use the ROUTE centrifugal pumps for all the liquids, also chemicals, compatible with the execution in manifold applications where you do not want to contaminate the external environment with liquid losses or also evaporations of the same. The reinforcement with glass fibres gives stability to the material as well as to the maximum temperatures of application.

The Etylene-ChloroTrifluoroEthylene carbon fibre filled, furthermore, thanks to the great chemical inactivity of the basic material and the reinforcement, allows the transfer of the highly aggressive liquids. The mechanical characteristics of the reinforced material allow the employment also with fluids containing solids with medium grade of abrasion (see table: 29).

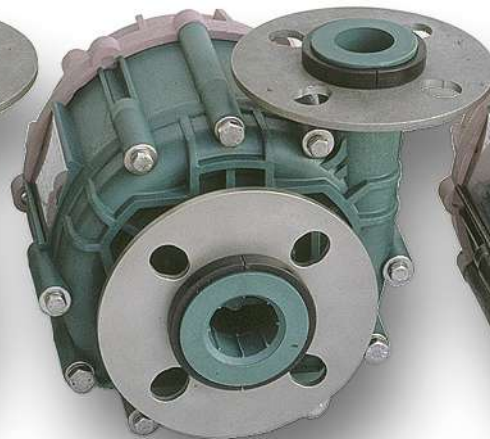
**Section view
WR version of "TMR"**



**Flanged version
with guard plate**



**Std flanged
version**



**Std threaded
version**



**Threaded version
with guard plate**



MAIN FEATURES OF MAGNETIC DRIVEN EXECUTION "TMR"

HERMETIC PUMPS

The magnetic driven pumps are defined "hermetic" because of the exclusion of any rotating component of seal. The only necessity of seal between the volute casing and the back casing is guaranteed from a static gasket: O-ring type.

FOR ALL CHEMICALS

You can practically pump all the chemicals at low and medium temperatures with all the bodies in GFR-PP (glass fibre reinforced polypropylene) or CFF-E-CTFE (Etylene-ChloroTrifluoroEtylene carbon fibre filled).

• LOADED FLUIDS, LIGHTLY ABRASIVE

The different internal configurations of the materials allow to pump both clean fluids and mediums with solids in suspensions or moderately abrasive

• HEAVY FLUIDS

Strong magnetic coupling made up of rare-earth materials (Neodimium Iron Boron) and "N" (standard), "P" (powered) or "S" (strong-powered) versions allow to pump, also at maximum flow, liquids with 1.05 - 1.35 - 1.8 specific gravity respectively.

DRY RUNNING OPERATION

The dry running for all the models with guide bushings in Carbon HD is guaranteed without damages thanks to the "two axial directions self-alignment" system.

The conformation of the industrial plant, the fluid presence or absence in the pump body and its nature, affect the lenght of the dry running phase without damages or anomalous wear. All these information are detailed in special time tables in the pumps manual.

POSSIBLE ROTATION OF VOLUTE CASING

Various shifts of the volute casing can be obtained thanks to rotation. These make easier the joint of the outlet connection of the pump with the tube of the plant

CENTRIFUGAL IMPELLER PROPERLY BALANCED

Thanks to particular hydraulic and structural changes, the impeller is effectively balanced in order to reduce the assistance for maintenance.

VARIOUS TYPOLOGIES OF CONNECTIONS

Connections with BSP cylindrical thread or NPT; flanges ISO, ANSI, JIS.

INDIPENDENT MOTOR APPLICATION

The motor can be installed and removed easily without dismantling or opening the volute casing. Standard motors are IEC or NEMA.

VOLUTE CASING DRAINING

Draining connection is arranged and it's available on request.

GUARD PLATE

It is available, as option, a customised stainless steel guard plate designed to protect the front casing from accidental mechanical shocks of various nature (e.g.: starts up with vacuum in inlet piping with possible piping excursions due to elastic brackets or thermal elongation).

BASE AVAILABILITY

The base for anchorage of the pump is in stainless steel with ground terminals in chemical-resistant thermoplastic materials. It is supplied on request



In the magnetical execution the motor is easily installed without disassembling the wet-end.



Detail of "BSP" outlet connection (cylindrical threaded).



Detail of outlet connection for ISO-ANSI-JIS flanges (direct connection to the plant flange).

PRODUCTION PROGRAM

INTERNAL STRUCTURES OF “TMR”

THE MATERIALS

table 10

VERSION	REINFORCED POLYMERS	MIN TEMP.	MAX TEMP.	ENVIRONMENT TEMP.
WR	GFR/PP	-5°C (23°F)	80°C (176°F)	0÷40°C (14÷104°F)
GF	CFF/E-CTFE	-30°C (-22°F)	110°C (230°F)	-20÷40°C (-4÷104°F)
GX*	CFF/E-CTFE	-30°C (-22°F)	110°C (230°F)	-20÷40°C (-4÷104°F)

Note: Maximum inlet pressure: 1,5 atm - * Compliant to ATEX 94/9/EC regulations

THE CONSTRUCTIONS

table 11

TMR VERSIONS	WR	GF	GX
Volute casing	GFR/PP	CFF/E-CTFE	CFF/E-CTFE
Rear casing			
Centrifugal impeller			
OR gasket	FKM (1)	FKM (1); (2)	FKM (1); (2)

GUIDE SYSTEMS (TMR)	R1	X1	N1	R2	X2	N2	R2
Guide bushing	Carbon HD	SiC	GFR/PTFE	Carbon HD	SiC	GFR/PTFE	Carbon HD
Thrust bush	CER			SiC			SiC
Shaft	CER			SiC			SiC

Upon request: (1) EPDM - (2) FFKM

Guide systems



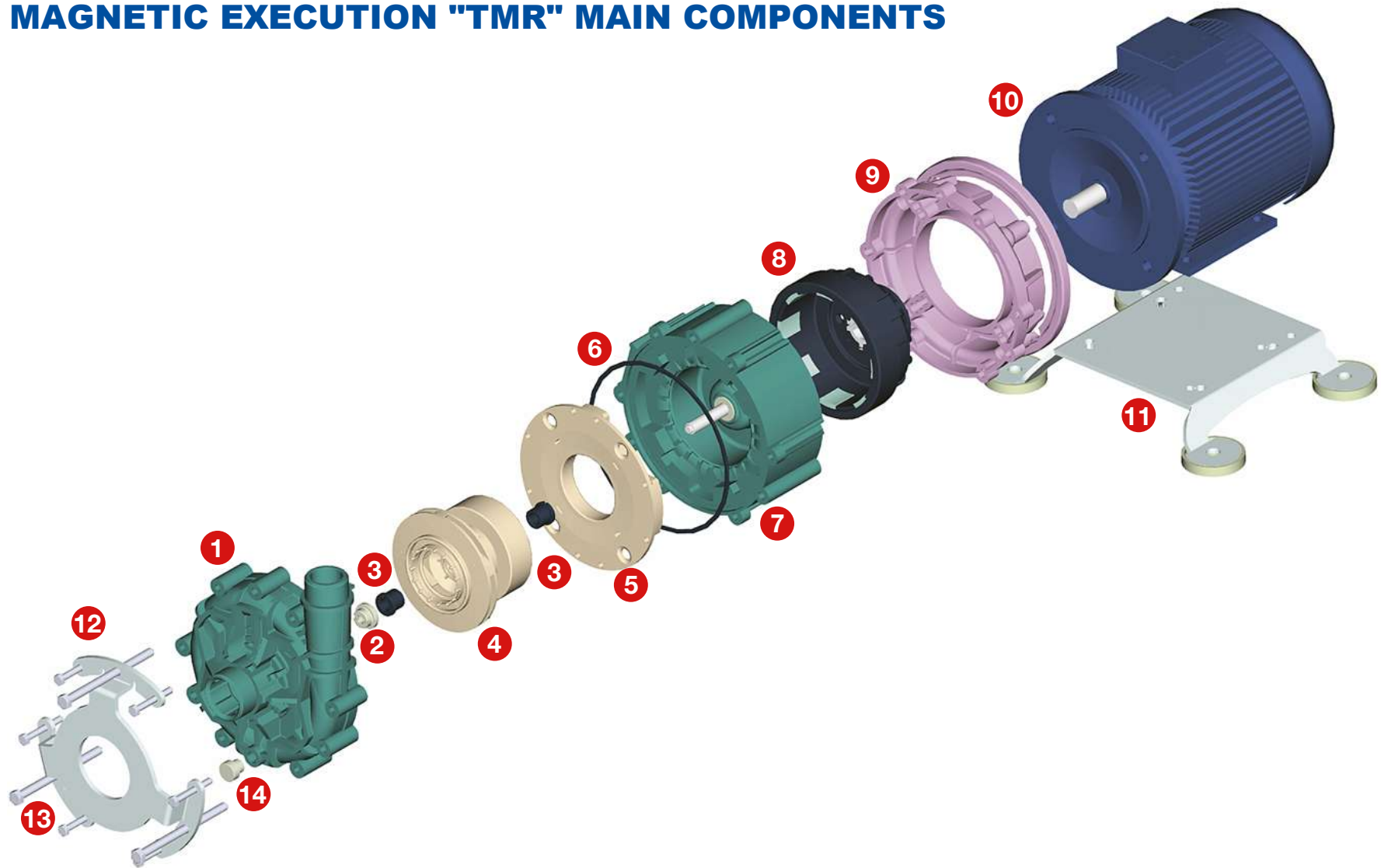
X2

R1

N1

PRODUCTION PROGRAM

MAGNETIC EXECUTION "TMR" MAIN COMPONENTS



- | | | | | |
|------------------------|-------------------------------|--------------------------------|-----------------------|-------------------------------------|
| 1 Volute casing | 3 Guide bushing | 6 OR gasket | 9 Bracket | 12 Guard plate (opt.) |
| 2 Thrust bush | 4 Centrifugal impeller | 7 Rear casing | 10 Motor | 13 Screws in stainless steel |
| | 5 Central disk | 8 Drive magnet assembly | 11 Base (opt.) | 14 Drain plug (opt.) |

PRODUCTION PROGRAM

MAIN FEATURES OF EXECUTION WITH MECHANICAL SEAL “ZMR”

VARIOUS TYPES OF MECHANICAL SEALS

Different types of mechanical seals are available, single lubricated by pumped liquid or with flushing systems with liquid from outside;

FOR ALL CHEMICALS

Thanks to bodies in GFR-PP (glass fibre-reinforced polypropylene) or in CFF-E-CTFE (Etylene-ChloroTrifluoroEtylene carbon fibre filled) all chemicals at low and medium temperatures can be pumped:

• LOADED FLUIDS, LIGHTLY ABRASIVE

The different combinations of materials of the sliding counter-face of the mechanical seal allow to pump liquids with solids in suspensions or abrasive;

HEAVY FLUIDS

Various electrical powers are available in the "N" (standard) "P" (powered) or "S" (strong-powered) versions. They allow to pump , also at maximum flow, liquids with 1,05 – 1,35 – 1,8 specific gravity respectively.

ELECTRICAL MOTORS

IEC or NEMA standard motors can be installed.

POSSIBLE ROTATION OF VOLUTE CASING

Various shifts of the volute casing can be obtained thanks to rotation. These make easier the joint of the outlet connection of the pump with the tube of the plant.

VARIOUS TYPOLOGIES OF CONNECTIONS

Connections with BSP cylindrical thread or NPT; flanges ISO, ANSI, JIS.

VOLUTE CASING DRAINING

Draining connection is arranged and it's available on request.

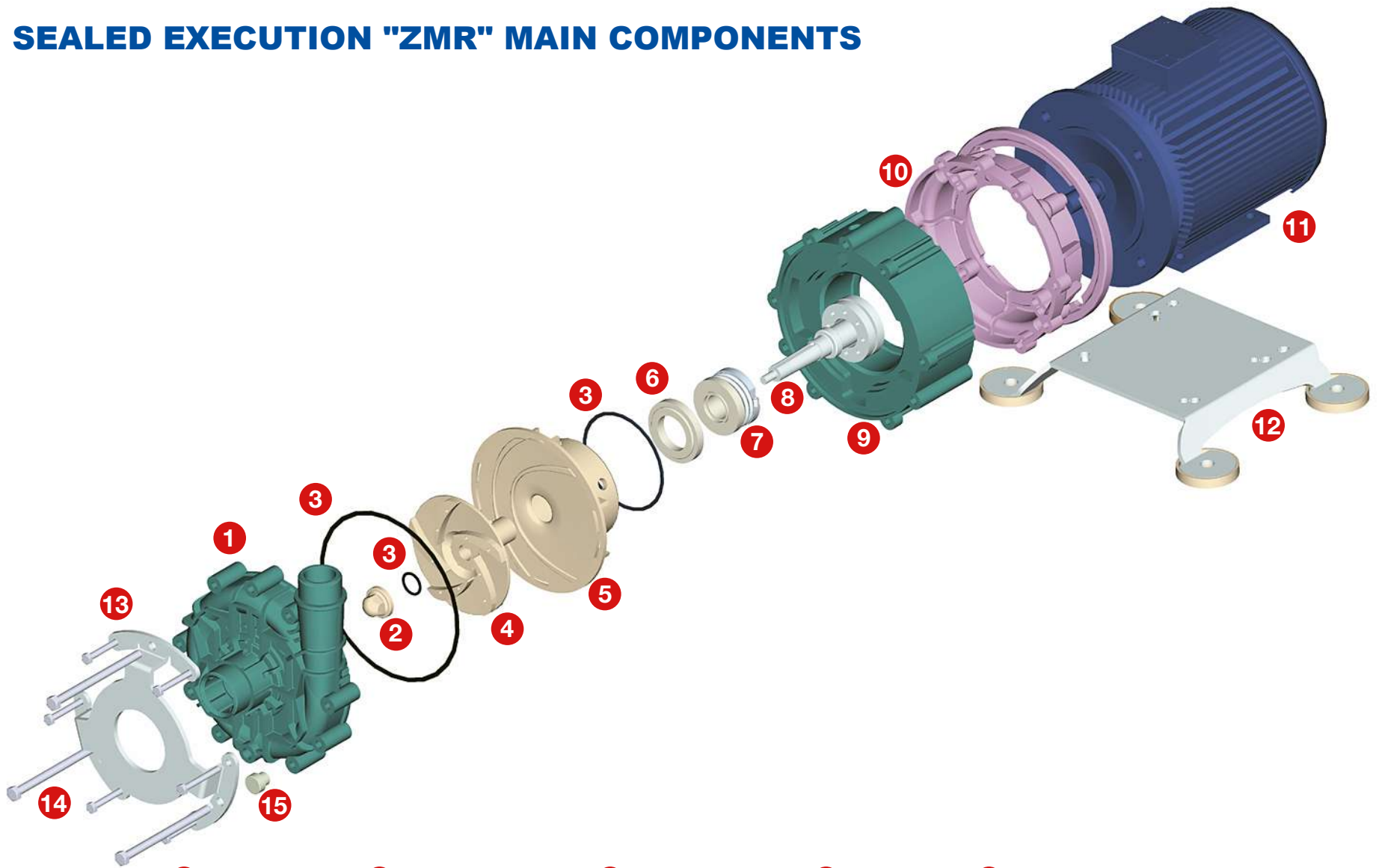
GUARD PLATE

It is available, as option, a customised stainless steel guard plate designed to protect the front casing from accidental mechanical shocks of various nature (e.g.: starts up with vacuum in inlet piping with possible piping excursions due to elastic brackets or thermal elongation).

BASE AVAILABILITY

The base for anchorage of the pump is in stainless steel with ground terminals in chemical-resistant thermoplastic materials. It is supplied on request.

SEALED EXECUTION "ZMR" MAIN COMPONENTS



- | | | | | |
|------------------------|-------------------------------|--------------------------|-----------------------|-------------------------------------|
| 1 Volute casing | 4 Centrifugal impeller | 7 Mechanical seal | 10 Bracket | 13 Guard plate (opt.) |
| 2 Ogive | 5 Central disk | 8 Shaft | 11 Motor | 14 Screws in stainless steel |
| 3 OR gasket | 6 Fixed seal ring | 9 Rear casing | 12 Base (opt.) | 15 Drain plug (opt.) |

PRODUCTION PROGRAM

MATERIALS OF CONSTRUCTION

THE CONSTRUCTIONS OF "ZMR" MODELS

table 12

VERSIONS	WR	GF	GX
Volute casing	GFR/PP	CFF/E-CTFE	CFF/E-CTFE
Rear casing			
Centrifugal impeller			
OR gasket	FKM (1)	FKM (1); (2)	FKM (1); (2)

THE CONSTRUCTIONS OF MECHANICAL SEALS

table 13

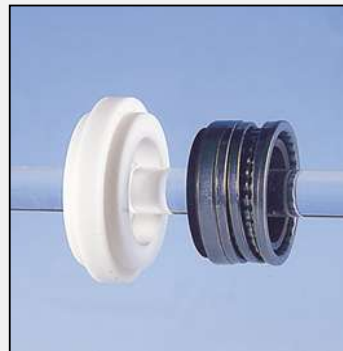
MECHANICAL SEALS	EXTERNAL - SINGLE			DOUBLE		
	SF1	TS5	TS6	MSFA	MTSC	MTSD
Seal model						
Rotating part	GFR/PTFE	Carbon	SiC	GFR/PTFE	Carbon	SiC
Fixed ring	CER	CER	SiC	CER	CER	CER
Bellows	PTFE	FKM	FKM	PTFE	FKM	FKM
2^ rotating part	/	/	/	Carbon	Carbon	Carbon
2^ fixed ring	/	/	/	CER	CER	CER

Upon request: (1) EPDM or (2) FFKM

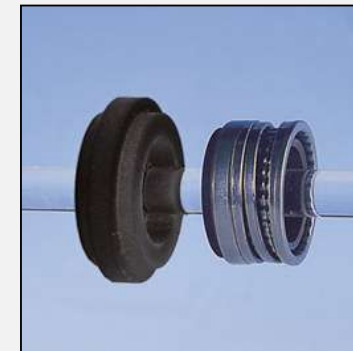
SF1



TS5



TS6



PUMP AND MOTOR SPECIFICATIONS

PUMP SPECIFICATIONS OF "TMR - ZMR" MODELS table 14

Pumps	50Hz	06.10			10.10			10.15			16.15			16.20			02.30		
	60Hz	07.11			07.14			11.15			11.23			17.25			03.35		
		N	P	S	N	P	S	N	P	S	N	P	S	N	P	S	N	P	S
Ø Inlet	BSP	1½"			1½"			1½"			1½"			1½"			1½"		
Ø Outlet	BSP	1¼"			1¼"			1¼"			1¼"			1¼"			1¼"		
Ø Inlet	NPT	1½"			1½"			1½"			1½"			1½"			1½"		
Ø Outlet	NPT	1¼"			1¼"			1¼"			1¼"			1¼"			1¼"		
ISO Flange	DNA	40			40			40			40			40			40		
	DNM	32 (40•)			32 (40•)			32 (40•)			32 (40•)			32 (40•)			32 (40•)		
ANSI Flange	DNA	1½"			1½"			1½"			1½"			1½"			1½"		
	DNM	1¼" (1½"•)			1¼" (1½"•)			1¼" (1½"•)			1¼" (1½"•)			1¼" (1½"•)			1¼" (1½"•)		
JIS Flange	DNA	1½"			1½"			1½"			1½"			1½"			1½"		
	DNM	1¼" (1½"•)			1¼" (1½"•)			1¼" (1½"•)			1¼" (1½"•)			1¼" (1½"•)			1¼" (1½"•)		

MOTOR SPECIFICATIONS

table 15

Power (IEC) 50 Hz	kW	0,55	0,75	1,1	0,75	1,1	1,5	1,1	1,5	2,2	1,5	2,2	3	2,2	3	4*	2,2	3	4*
Motor size	IEC	71	80A	80B	80A	80B	90S	80B	90S	90L	90S	90L	100	90L	100	112	90L	100	112
Power (IEC) 60 Hz	kW	0,75	1,1	1,5	1,1	1,5	2,2	1,5	2,2	3	2,2	3	-	4	-	-	4	-	-
Motor size	IEC	80A	80B	90S	80B	90S	90L	90S	90L	100	90L	100	-	112	-	-	112	-	-
Phases	N.	3phase (all models) - 1phase (< 3 kW)																	
Std. voltage (IEC)	V	400 ± 5% 50Hz																	
Motor protection	IP	55																	

WEIGHT

table 16

Pump weight (without motor)			Motor weight																	
WR	GF	GX	Version	IEC 3phase							IEC 3phase E-exd					IEC 1phase				
3	4	4	Frame	71	80A	80B	90S	90L	100L	71	80A	80B	90S	90L	100L	71	80A	80B	90S	90L
			Kg	7	8	10	13	17	22	15	20	20	30	31	41	9	11	14	17	24

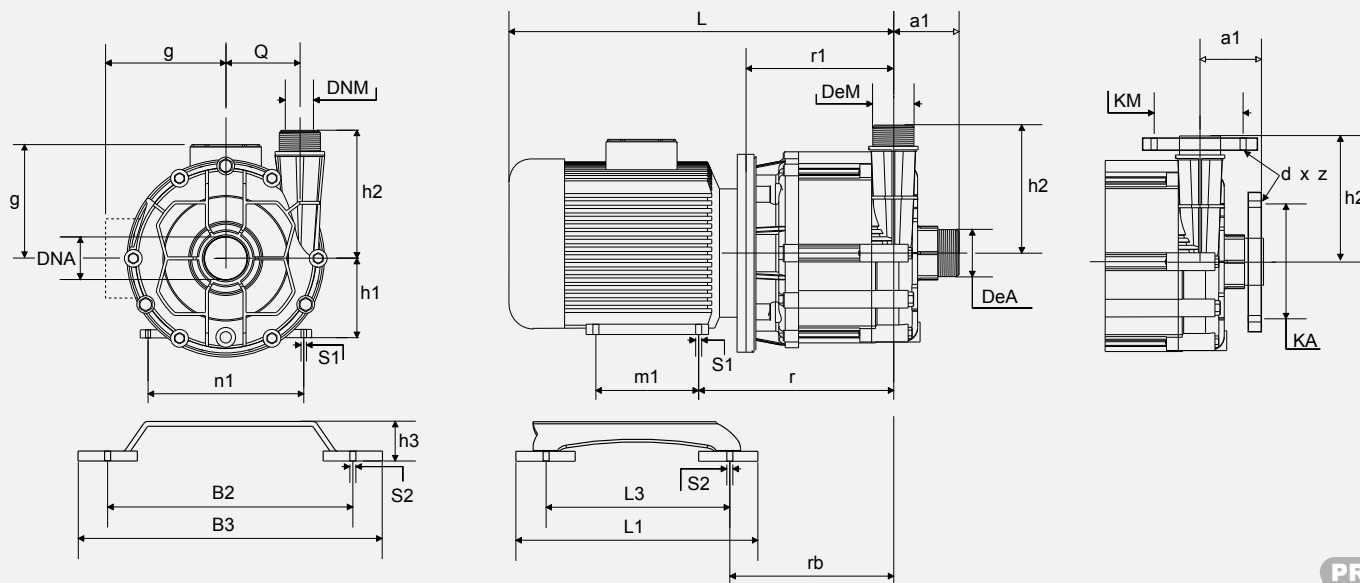
- Available on request
- * ZMR only

DIMENSIONS WITH IEC MOTORS - 50 Hz

table 17

TMR models	06.10			10.10			10.15			16.15			16.20			02,30		
Size motors	71	80A	80B	80A	80B	90S	80B	90S	90L	90S	90L	100	90L	100	112•	90L	100	112•
a1	67			67			67			67			67			67		
L	356	385		356	405		385	450	430	405	430	478	430	478	487	430	478	487
Q	75			75			75			75			75			75		
h1	71	80	80	80	90		80	90		90	100		90	100	112	90	100	112
h2	130			130			130			130			130			130		
r1	149			149			149			149	164	149	164	149	164	149	164	
Rb	161			161			161			161	176	161	176	161	176	161	176	
m1	90	100		100			100	125		100	125	140	125	140	140	125	140	140
n1	112	125		125	140		125	140		140	160		140	160		140	140	
s1	7	8	8			8			8	10	8	10		8	10		8	10
g	106	110		110	142		110	142		142	155	142			142			
L3	185			185			185			185	205	185	205		185	205		
B2	248			248			248			248	305	248	305		248	305		
S2	14			14			14			14			14			14		
L1	245			245			245			245	259	245	259		245	259		
B3	308			308			308			308	359	308	359		308	359		
h3	40			40			40			40			40			40		
KM (ISO) (*)	100			100			100			100			100			100		
KA (ISO)	110			110			110			110			110			110		
KM (ANSI) (*)	89			89			89			89			89			89		
KA (ANSI)	98			98			98			98			98			98		
KM (JIS) (*)	100			100			100			100			100			100		
KA (JIS)	105			105			105			105			105			105		
d x z (ISO)	18 x 4			18 x 4			18 x 4			18 x 4			18 x 4			18 x 4		
d x z (ANSI)	16 x 4			16 x 4			16 x 4			16 x 4			16 x 4			16 x 4		
d x z (JIS)	19 x 4			19 x 4			19 x 4			19 x 4			19 x 4			19 x 4		

(Dimensions in mm) • ZMR only - (*) See table 19 for "Y" connections

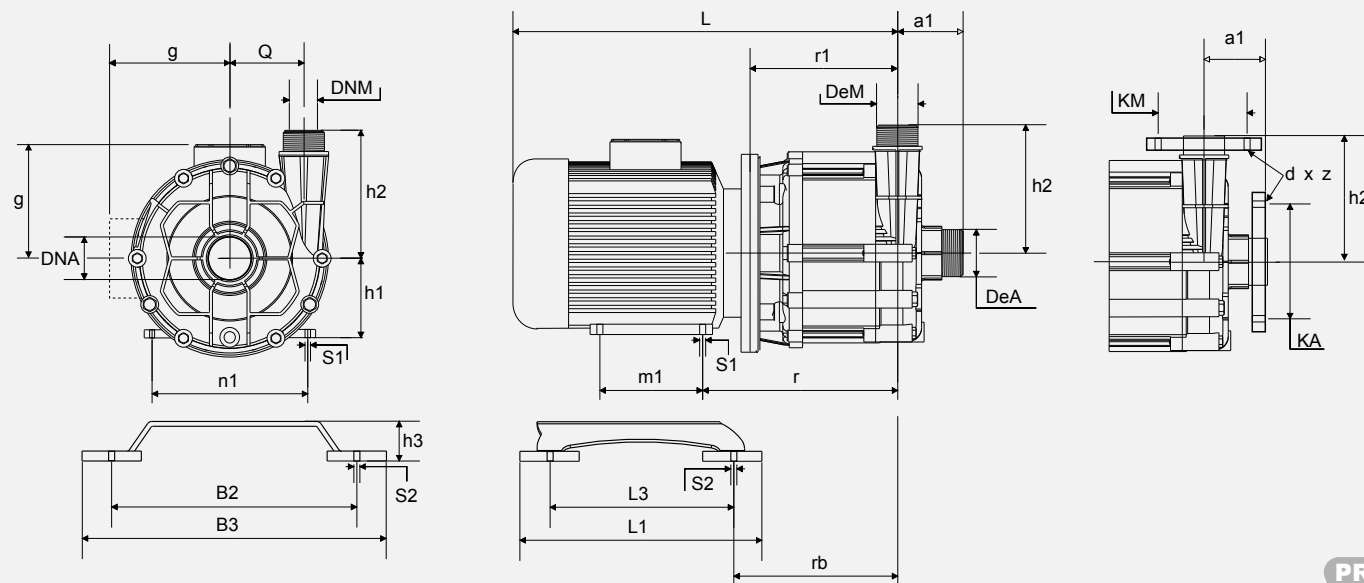


DIMENSIONS WITH IEC MOTORS - 60 Hz

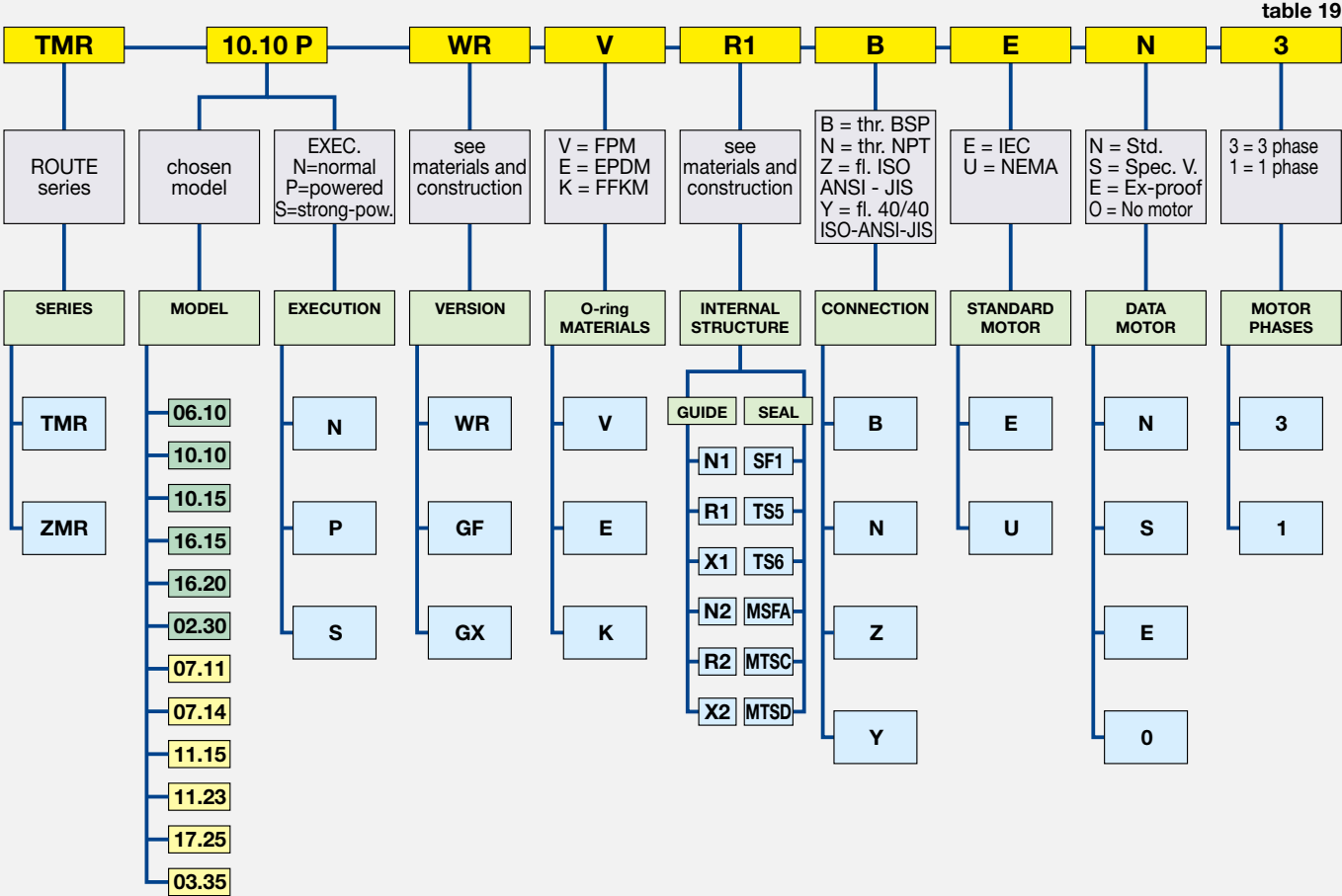
table 18

TMR models	07.11			07.14			11.15			11.23		17.25	03.35
Size motors	80A	80B	90S	80B	90S	90L	90S	90L	100	90L	100	112	112
a1	67			67			67			67		67	67
L	385	405	385	405	430	405	430	478	430	478	487	487	487
Q	75			75			75			75		75	75
h1	80	90	80	90			90	100		90	100	112	112
h2	130			130			130			130		130	130
r1	149			149			149	164	149	164	164	164	164
Rb	161			100	161		161	176	161	176	176	176	176
m1	100			125	125		100	125	140	125	140	140	140
n1	125	140		140			140	160		140	160	190	190
s1	8			110	8		8	10	8	10	10	10	10
g	110				142		142	155	142	155	168	168	168
L3	185			185			185	205	185	205	205	205	205
B2	248			248			248	305		305	305	305	305
S2	14			14			14		14		14	14	14
L1	245			245			245	259	245	259	259	259	259
B3	308			308			308	359	308	359	359	359	359
h3	40			40			40		40		40	40	40
KM (ISO) (*)	100			100			100		100		100	100	100
KA (ISO)	110			110			110		110		110	110	110
KM (ANSI) (*)	89			89			89		89		89	89	89
KA (ANSI)	98			98			98		98		98	98	98
KM (JIS) (*)	100			100			100		100		100	100	100
KA (JIS)	105			105			105		105		105	105	105
d x z (ISO)	18 x 4			18 x 4			18 x 4		18 x 4		18 x 4	18 x 4	18 x 4
d x z (ANSI)	16 x 4			16 x 4			16 x 4		16 x 4		16 x 4	16 x 4	16 x 4
d x z (JIS)	19 x 4			19 x 4			19 x 4		19 x 4		19 x 4	19 x 4	19 x 4

Dimensions in mm - (*) See table 19 for "Y" connections



PUMP IDENTIFICATION LABEL



Production program

K range (KG and KGS)
 Installed powers:
 kW 0,75÷37
 Bodies materials:
 GFR/PP - PVDF - PVC
 Lengths 400÷3000 mm



K range (KM and KMS)
 Installed powers:
 kW 0,75÷22
 Bodies materials:
 GFR/PP - PVDF - PVC
 Lengths 250÷2000 mm



FRONTIERA range
 Installed powers: kW 0,55÷15
 Bodies materials: PP - E-CTFE
 • Magnetic drive
 • Sealed

ZMA and ZGA range
 Installed powers: kW 0,75÷11
 Bodies materials: PP - PVDF - PVC
 • Self priming
 • Sealed



LINE range
 Installed powers:
 kW 0,35 - 7,5
 Bodies materials:
 PP - PVDF
 Lengths 275÷2000



ZGE range (ISO 2858)
 Installed powers: kW 0,55÷300
 Bodies materials: PP - PVDF - PVC - PE HMW
 • Sealed



ZME range
 Installed powers: kW 5,5÷15
 Bodies materials: PP - E-CTFE
 • Sealed



AM range
 Installed powers: kW 0,04÷0,55
 Bodies materials: GFR/PP - CFF/E-CTFE
 • Magnetic drive



ROUTE range
 Installed powers: kW 0,35÷7,5
 Bodies materials: GFR/PP - CFF/E-CTFE
 • Magnetic drive
 • Sealed

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IT - 25125 BRESCIA - Via Labirinto, 159
 Tel. +39 030 3507011 - Fax +39 030 3507077
 Export dpt. Tel. +39 030 3507033
 Web: www.argal.it - E-mail: export@argal.it



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