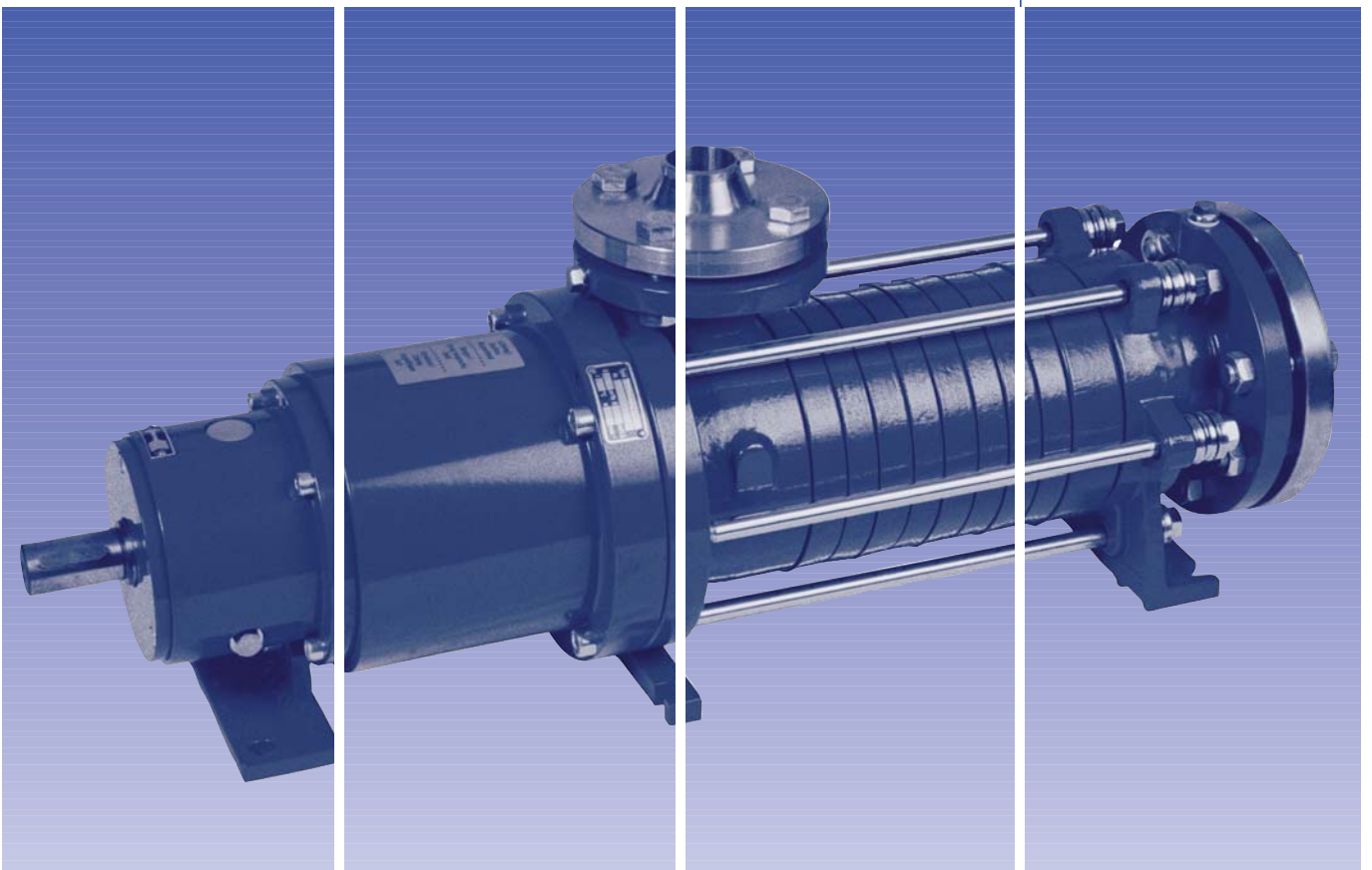


**SEMA<sup>®</sup>**  
**Side channel pumps PN 25 (40)**  
Glandless because of magnetic drive

**SEMA-S** for extremely low NPSH values  
**SEMA-L** with reference to DIN EN 734  
**SEMA-Z** with reference to DIN EN 734  
**SEMA-Block** in closed-coupled design



**Technical description**

## Design

Horizontal, self priming, handling areated liquids, single- or multi-stage execution, glandless with magnetic drive. The hydraulic of the SEMA consists of interchangeable standardized components of our standard programme.

## Advantages

of the glandless, self priming side channel pumps of multistage element housing design for the transport of solid-free media:

- they are maintenance free
- they produce vacuum in the pipeline and are therefore selfpriming.  
For reasons of safety and accessibility they can be installed above the fluid container
- they have the ability to transport fluids with up to 50% gas or vapour content i.e. low-boiling substances like liquified gas
- they are insensitive to cavitation caused by variable vapour pressure (in the case of partial degassing the output is not interrupted)
- they are available at favourable prices bec. of small output quantities (up to about 12m<sup>3</sup>/h) and relatively high pressures (above 15 Mlc up to about 250 Mlc)
- robust, compact casting execution
- extremely low NPSH values and low pressure fluctuation
- a standard modular system providing:
  - good replaceability because few spare parts
  - easy to assemble
  - minimum dead space
  - use of identical parts for different construction sizes and shapes

## Technical data

Q: up to 20m<sup>3</sup>/h  
H: up to 250 Mlc  
t: from -40 to +200 °C  
p: up to PN 25 (40)  
Viscosity: > 0.3 m.Pas up to 200 m.Pas  
n: 1450 1/min (50 Hz)  
1750 1/min (60 Hz)  
direction of rotation: left (counter clockwise)  
Static breaking moment at room temp.: up to 168 Nm

## Description of the magnetic drive

The permanent magnetic coupling of the SEMA guarantees that the whole pumping system is completely sealed and serves to provide contact-free torque transmission between the pump and drive. The correct choice of magnetic coupling for the moments of inertia of all rotating parts of the unit guarantees a safe start of the SEMA without the danger of breakdown. The unavoidable eddy current losses and hydraulic losses occurring in operation are relatively small. For safe operation circulation of the product is necessary which is provided for the SEMA internal to the pressure casing of the pump in the region of the magnetic coupling.

### The SEMA must never be run in a dry state!

When conveying low-boiling liquids, the operating pressure and temperature must be chosen so that material cannot vaporise.

The inner and outer rotors of the magnetic coupling always run synchronously. In the case of a possible breakdown, the pump is switched off and after successful synchronisation (only possible in a stationary state) the SEMA can be started again.

Spinning the coupling does not cause demagnetisation of the magnet.

## Applications

### Conveying environmentally polluting substances such as:

- Acids
- Alkaline solutions
- Hydrocarbons
- Solvents
- Liquid gases
- Refrigerants

### Deployment:

- Chemical industry
- Refrigeration
- Liquid gas installations
- Electroplating
- Tank installation building
- Vacuum technology
- Extraction plants

Special safety requirements are demanded of pumps which convey dangerous substances. The SEMA gives this safety. Our pumps can handle without leakage:

- all clear and turbid liquids
- substances containing gas or giving off vapour quickly
- corrosive and toxic substances

Increasing environmental awareness and more stringent requirements concerning the integrity of pumps demand technology of high quality. Our pumps are installed everywhere where it is important that the substances being transported should not contact the environment.

## Construction

### 1. Casings

Suction and discharge casings as well as suction and discharge stage casings have a transverse spacing. The sealing of the casings occurs by means of stage gaskets.

### 2. Impellers

Open, star-shaped impellers with axial thrust compensation through balancing boreholes. For SEMA-S an additional radial centrifugal pump impeller for achieving low NPSH values.

### 3. Shaft

The pump is equipped with a special shaft resistant to bending, that provide for a trouble free run at all load phases.

### 4. Bearing and lubrication

Die outlying deep-groove ball

bearings are filled with an endurance grease filling and are therefore free of maintenance.

A relubrication of the closed bearings is not intended.

Alternative an execution with oil lubrication is available.

### 5. Drive

The pumps are driven by an electric motor acc. to IEC-standard.

### 6. Separation Chamber

It separates the product space from the atmosphere. Through it the torque is transmitted throughout by means of the action of the magnetic force.

### 7. Inner Rotor

The magnets are fixed firmly to the support and as a protection against chemical attack are hermetically sealed (MPPT: micro plasma pulse technique)

### 8. Outer Rotor

The number of magnetic pieces varies according to the force to be transmitted. An economical use of the magnetic volume is guaranteed.

### 9. The Magnets

are made of high grade Neodym.

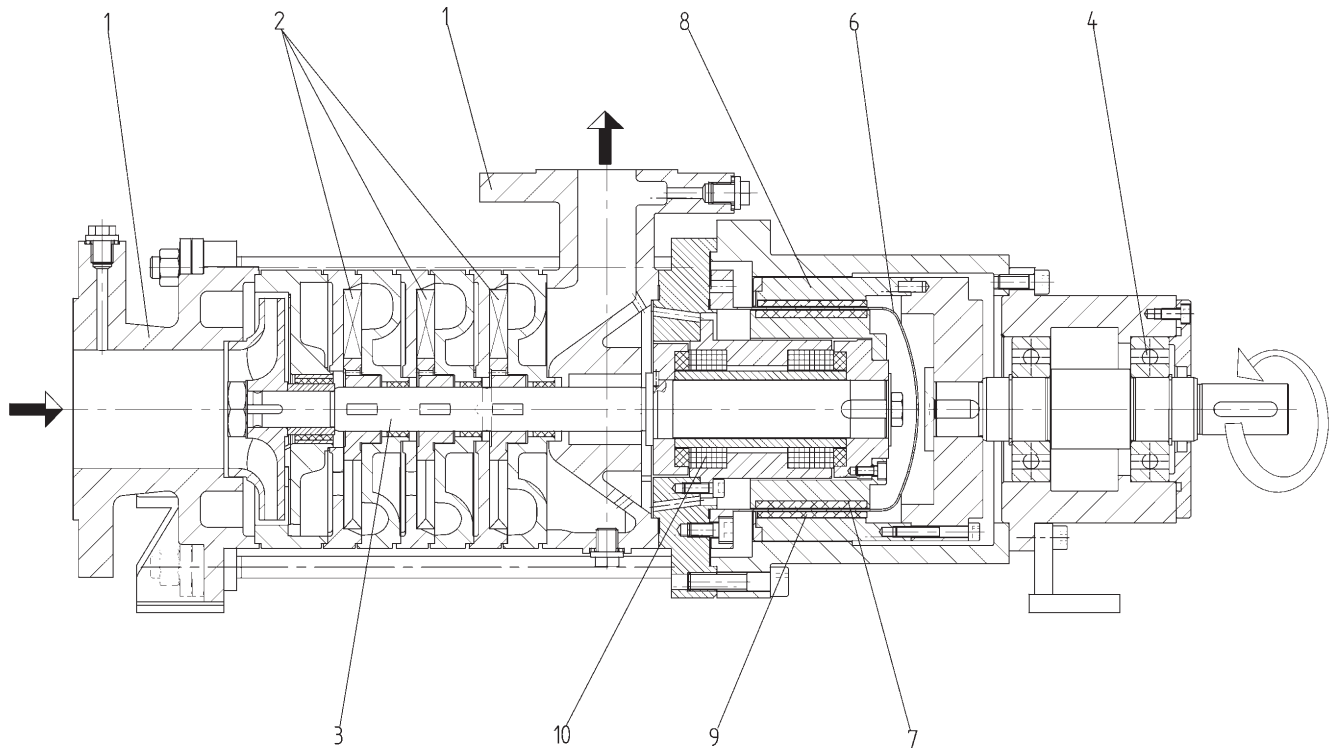
### 10. Slide Bearing

It is formed from a combination of axial and radial bearings. It is hydrodynamically relieved and medium lubricated. For this reason it is provided with oiling grooves.

The slide bearing is manufactured from wear-resistant, solid silicon carbide or from graphite. Mechanical safety is guaranteed by shrinking the silicon carbide parts into metal bearing housings.

Should it nevertheless fall, this construction holds the bigger broken pieces together and therefore remains operational to a limited extent. Additional slide bearings in the intermediate stage made from graphite

loaded PTFE material, provide for the absorption of the radial forces and guarantees the trouble-free insertion of the pumps in the region of the characteristic.



## Materials

material	material code		
	12	62	32
casing	GG-25	GGG-40.3	1.4408
stage casing	GG-25	GGG-40	1.4470
side channel casing	GG-25	GGG-40	1.4470
foot	GGG-40	GGG-40	GGG-40
shaft	1.4021	1.4021	1.4571
impeller	1.4059	1.4059	1.4581
suction impeller	1.4581	1.4581	1.4581
sleeve bearing (magnetic drive)	1.4462 / SiSiC	1.4462 / SiSiC	1.4462 / SiSiC
bearing bracket	C 35	C 35	C 35
bearing yoke	St 52	St 52	St 52
gasket	PTFE	PTFE	PTFE
shaft sleeve	SiSiC	SiSiC	SiSiC
bearing bush	carbon	carbon	carbon
separation chamber / flange	1.4571/1.4571*)	1.4571/1.4571*)	1.4571/1.4571*)
tie bolt	St 60 k	St 60 k	St 60 k

\*) also in 2.4610 / 1.4571 or 2.4610 / 2.4610 available

## SEMA-S:

Glandless side channel pump with connected impeller and axial supports for the achievement of extremely low NPSH values with permanent magnetic drive

## Explanation of the most important material code numbers

material code number	designation acc. to standard
0.6025	GG-25 (cast iron)
0.7043	GGG-40.3 (ductile iron)
1.4021	X 20 Cr 13
1.4059	G - X 22 CrNi 17
1.4470	G - X 2 CrNiMoN 22 53
1.4408	G - X 6 CrNiMo 18 10
1.4571	X 6 CrNiMoTi 17 12 2
1.4581	G - X 5 CrNiMoNb 19 11 2

**The special characteristic of the SEMA glandless, selfpriming, lateral channel pump is the permanent magnet synchronous coupling. The magnetic coupling ensures that dangerous materials are able to remain where they belong: inside the circulation system.**

**Feature :**

suction impeller for the production of extremely low NPSH values

**Benefits :**

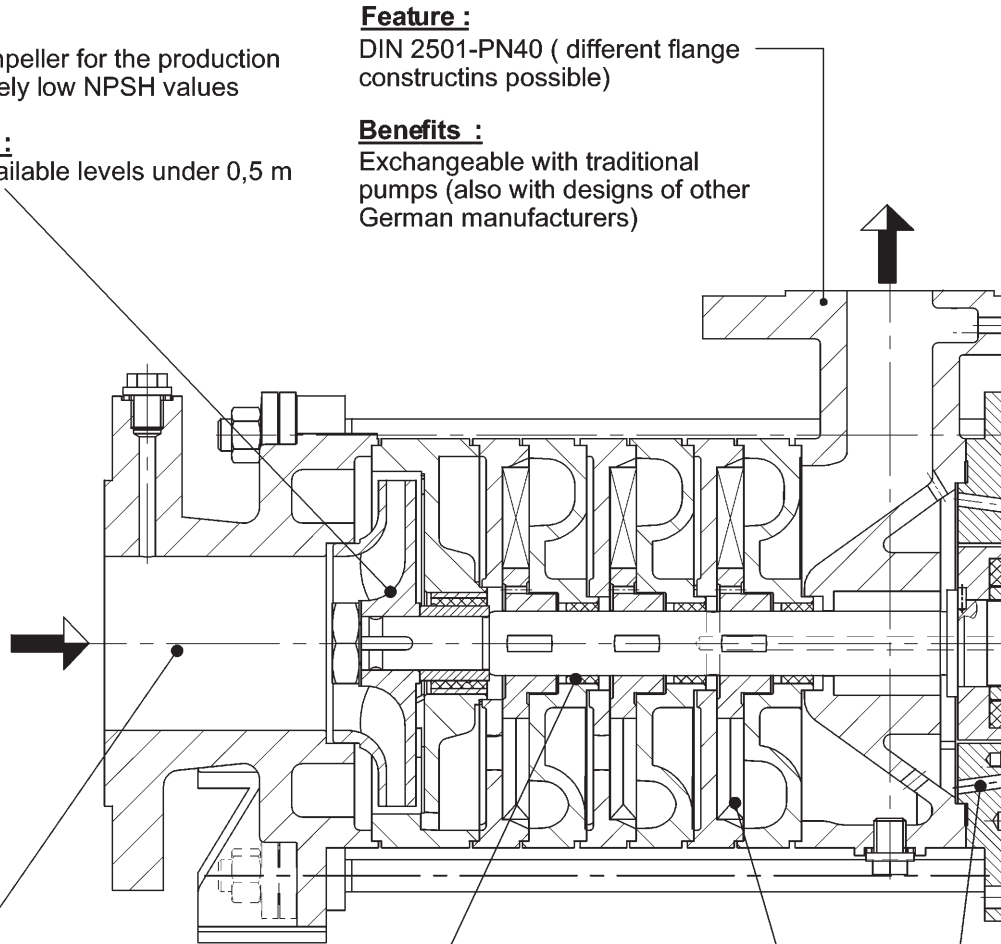
NPSH available levels under 0,5 m

**Feature :**

DIN 2501-PN40 ( different flange constructins possible)

**Benefits :**

Exchangeable with traditional pumps (also with designs of other German manufacturers)



**Feature :**

Bigger entrance cross section for the production of small flow velocities

**Benefits :**

Cavitation-resistant in conveying liquids close to boiling point

**Feature :**

Open star wheels guarantee the highest absorbtivity - hydraulic axial thrust qualisation

**Benefits :**

For poor suction rates and for materials with low vapour pressures

**Feature :**

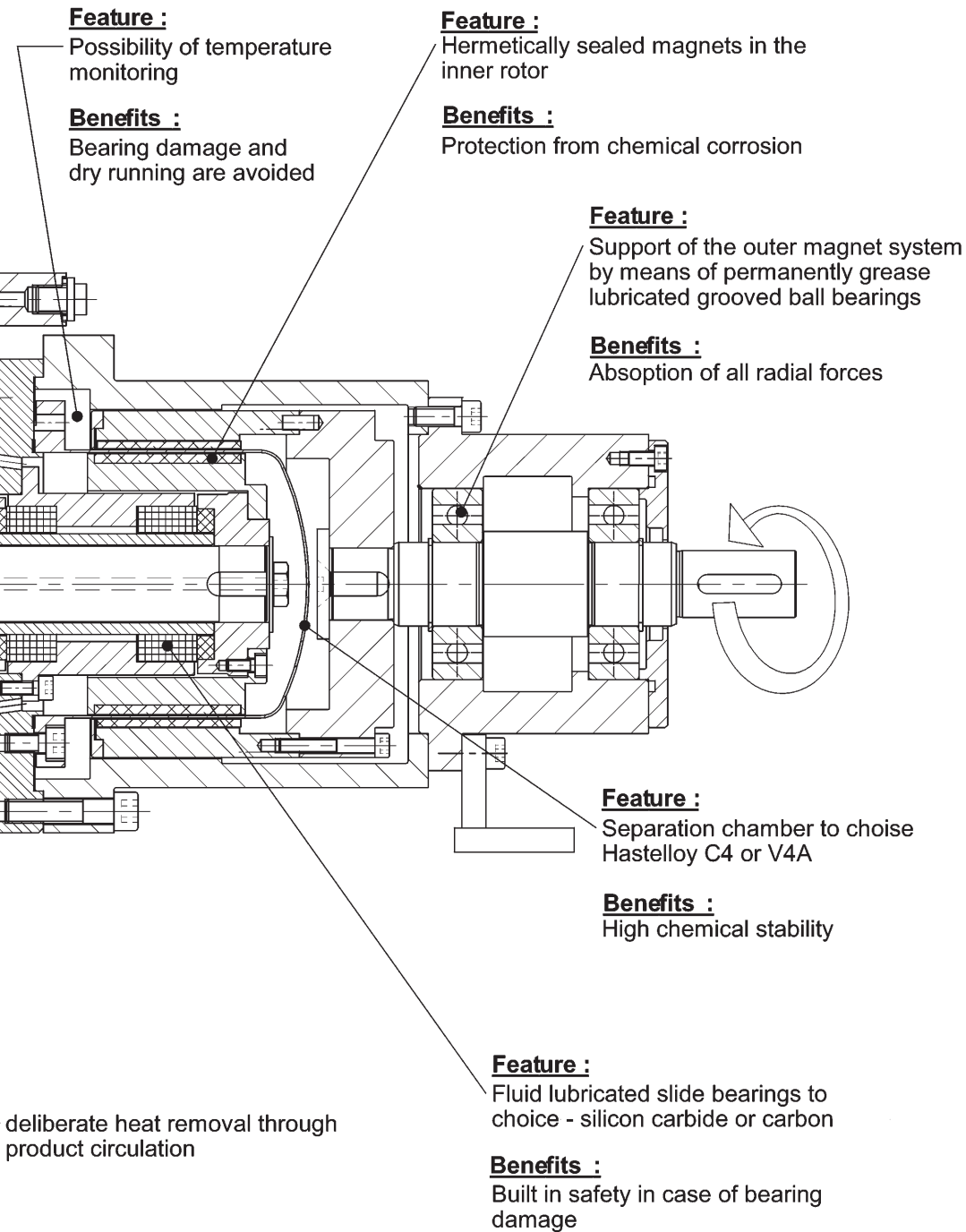
Additional fluid lubricated carbon slide bearings in every stage

**Benefits :**

Long life span

Its advantage is the high operational safety of the SEMA since:

- the lateral channel pump copes with a possible two phase flow (fluid-gas mixture)
- magnetic coupling presents a simple overload protection system for the drive



**SEMA® - remains completely sealed**

## Pump description

<b>SEMA</b>	<b>-S</b>	<b>11</b>	<b>2.</b>	<b>S 2</b>	<b>F.</b>	<b>H.</b>	<b>75-2</b>	<b>N</b> /	<b>32</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>

**1 side channel pump PN 25**, self priming, glandless because of magnetic drive

**2** L = standard pump body in accordance with DIN EN 734, left handed, pressure connection at the driving side.  
 S = with NPSH preliminary stage, axial pump intake, left handed, pressure connection at the driving side.  
 Z = standard pump body in accordance with DIN EN 734, right handed, pressure connection at the suction side.  
 Block = as SEMA-S, -L or -Z in closed coupled design (in size 110-330, 1-8 stages)

### 3 Size range

Size range	SEMA-Z SEMA-L	Nominal width SEMA-S		Performance region		
	DN	DN <sub>A</sub>	DN <sub>R</sub>	m <sup>3</sup> /h	Mlc	kW
110	20	40	20	2,4	215	4,0
220	32	65	32	4,5	315	7,0
330	32	65	32	7,5	350	10,0
440	40	80	40	12,0	270	17,5
550	50	100	50	20,0	300	24,0

**4 number of stages** (1-8 regular , the last figure states the side channel number of stages; SEMA-S has a radial impeller in addition)

### 5 Bearing

	Inside the pump	inside the separation chamber
S 2	carbon	SiC / SiC (SiC pressureless sintered)

**6 execution of antifriction bearing** O = oil / F = grease

### 7 Separation Chamber

	Material combination flange separation chamber	size coupling	max. working pressure in bar at t				
			20°	100°	150°	200°	
V	1.4571	1.4571	75 110	32,4 20,9	29,5 19,1	27,7 17,9	25,9 16,7
H	1.4462	2.4610	75 110 135	40,0 29,0 29,1	40,0 27,0 27,3	39,7 25,7 26,3	37,6 24,3 25,4

**8 Magnet size** MAK 75, MAK 110, MAK 135 - size of the magnetic pieces

### 9 Cooling / Heating

N: < 120° C

K: ≥ 120° C up to 200° C

X: additional heating / cooling

● at the separation chamber

● in the suction casing

● through intermediate stage

(not available for 550 series in 32)

Because of casing-, separation chamber- and intermediate stage heating a full heating of the pump is given. The three heating systems can be used singly or in combination. As heating medium steam, thermal fluid or other media can be used. In the same way the heating arrangements can also be used for cooling.

### 10 Materials

12: grey iron casting GG 25 (0.6025) 32: high grade steel (1.4408) 62: spheroidal casting GGG 40.3 (0.7043)

Other materials on request



## Combination of magnetic drives

permanent magnet coupling	75-2	75-4	75-6	110-2	110-4	110-6	135-6	135-8
$P_{MA}^{1)}$ kW	1,7	4,2	7	4,7	10,8	17,4	25,8	35,5
$P_{JMA}$ kW	0,17	0,26	0,35	0,32	0,58	0,85	1,2	1,65
$P_M$ kW	1,35	3	5,5	3,6	7,5	13,5	17,5	24
$P_{max. zul.}$ kW	1	2,2	4,5	2,8	7	10,8	16	21,5
<b>pump sizes</b>								
111-118	●	●	●					
221-228, 331-338	●	●	●	●	●	●		
441-448				●	●	●	●	●
551-558				●	●	●	●	●

<sup>1)</sup> For working  $t_A \leq 25^\circ \text{C}$ , for viscosity  $v \leq 1 \text{ m Pas}$ , for rotation  $n = 1450 \text{ 1 / min}$ , and separation chamber made from 1.4571. Ask us about transmission power for higher temperatures, viscosities and rotation speeds.

### Explanation of Symbols

$P_{MA}$  = maximum transmission power of permanent magnet couplings;  $P_{JMA}$  = power dissipation of permanent magnet couplings;  $P_M$  = maximum power input;  $P_{max. adm.}$  = maximum allowable power demand of pump.

## Safety system - Special designs

### Double skinned separation chamber

For a higher degree of safety and with the possibility of monitoring the pump can be provided with a double skinned separation chamber.

This double skinned separation chambers consists of two separation chambers lying one inside the other.

The space between the two separation chambers can either be used for circulation (cooling/heating) or for pressure monitoring. It is thus guaranteed that in the case of possible damage to the inner or outer separation chambers an alarm will be operated before a leakage can take place.

Both separation chambers are suitably dimensioned with respect to the outside pressure offering altogether a higher degree of safety.

### Temperature Monitoring

Monitoring of the separation chamber during operation can be effected relatively simply by means of temperature sensors (PT 100) or pressure monitoring instruments. The signal analysis can be provided locally or at a central control point whereby an alarm and / or a shut down of the SEMA can be triggered.

### Dry-run and overload detector

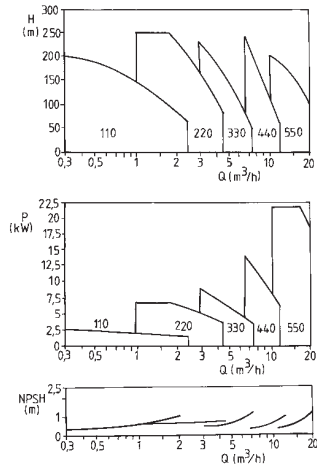
The dry-run and overload detector monitors the system by means of the phase angel method. The detector is switched directly into the motor circuit and measures the angel of phase difference between motor current and voltage, that is used for the determination of the motor load.

At a reduction of the motor load for example through dry-run or closed suction pipe or at a motor load increase for example through exceeding the man, head or closed discharge pipe - a relay is picked up, that may serve for switching off the pump or trigger an alarm.

**Further special designs on request.**

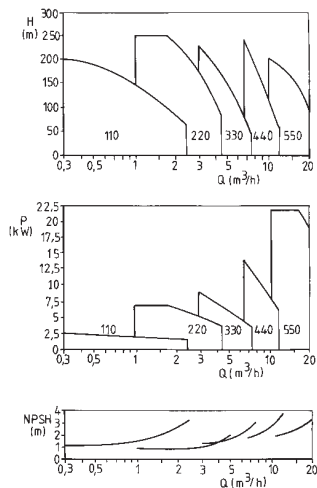
Performance characteristics  
n = 1450 1/min.

### SEMA-S



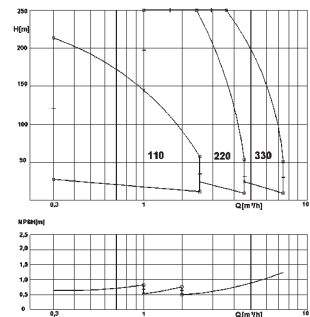
Performance characteristics  
n = 1450 1/min.

### SEMA-L, -Z



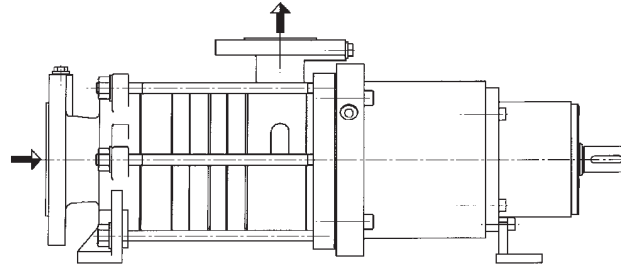
Performance characteristics  
n = 1450 1/min.

### SEMA-Block



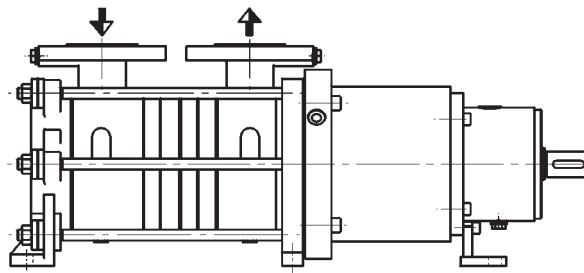
### SEMA-S

for extremely low NPSH values



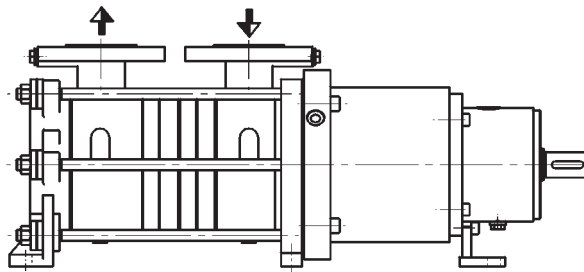
### SEMA-L

pump body with reference to DIN EN 734 left handed



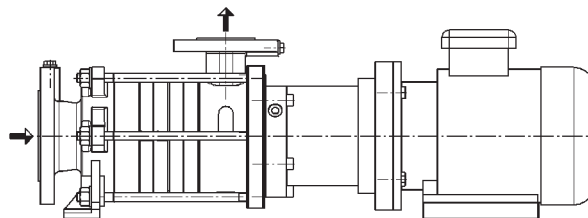
### SEMA-Z

pump body with reference to DIN EN 734 right handed



### SEMA-Block

in closed coupled design. Also available with pump body with reference to DIN EN 734



**address:**  
**SERO PumpSystems GmbH**  
Industriestraße 31  
74909 Meckesheim near Heidelberg  
Germany

**contact:**  
Phone + 49 (62 26) 92 01-0  
Fax + 49 (62 26) 92 01-40  
info@seroweb.de  
sales@seroweb.de  
service@seroweb.de

**information:**  
www.seroweb.de