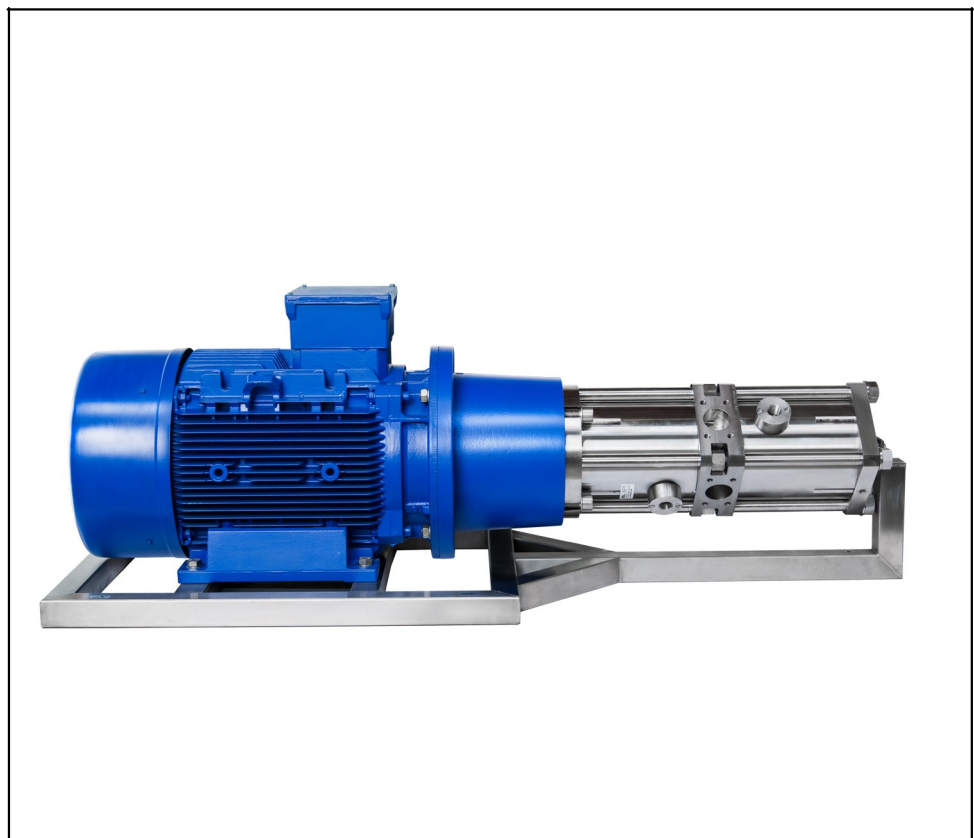


Seawater Desalination Module

# SALINO Pressure Center

## Type Series Booklet



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Type Series Booklet SALINO Pressure Center

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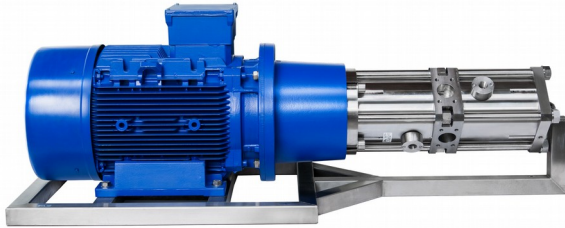
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Water: Water Treatment

Seawater desalination module

SALINO Pressure Center



Main applications

- Seawater desalination by reverse osmosis (RO) for small and medium-sized systems

Operating data

Operating properties

Characteristic Salino 250		Value
Flow rate	Q [m <sup>3</sup> /h]	8,1 - 23
Fluid temperature	T [°C]	2 - 50
Operating pressure	p [bar]	30 - 70 <sup>1)</sup>

Designation

Example: SALINO PC-23-40-D

Key to the designation

Code	Description
SALINO	Type series
PC	Design PC   Pressure Center
23	Flow rate [m <sup>3</sup> /h] (size) 14, 20, 23
40	Drinking water yield [%]
D	Material (⇒ Page 7) D   Duplex stainless steel

Design details

Design

- Hydraulic unit comprising axial piston pump and integrated axial piston motor
- Swash plate design with non-adjustable swash plates
- Number of pistons
  - Axial piston pump: 9
  - Axial piston motor: 9
- Horizontal installation

Shaft seal

- Mechanical seal

Static sealing elements

- The elastomer type used for the static seals is NBR.

Bearings

- Product-lubricated plain bearings
- The bearings' service life depends on the operating conditions and the fluid's level of purity.

Automation

- Automation equipment is fitted at the place of use and will be tailored to the individual system requirements by the engineering contractor.

Connections Salino 250

- Main connections: 2" SAE Flange, 3000 psi
- Drain G 3/4

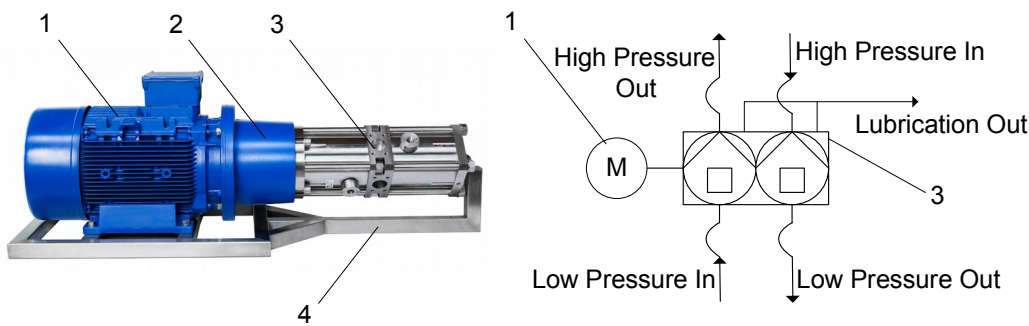
Connections Salino 500

- Main connections: 3" SAE Flange, 3000 psi
- Drain G 1 1/2

Characteristic SALINO 500		Value
Flow rate	Q [m <sup>3</sup> /h]	38 - 68
Fluid temperature	T [°C]	2 - 50
Operating pressure	p [bar]	30 - 85 <sup>1)</sup>

1) Higher operating pressures on request

Configuration and function



SALINO

1	Electric motor	2	Bell housing
3	SALINO	4	Mounting frame

Design

The pump with integrated energy recovery is designed with radial fluid inlets and outlets. The hydraulic system is connected to the motor by a coupling. The motor is controlled by a frequency inverter. The pump including motor is fitted to a mounting frame.

Function

The axial piston pump transmits the electric motor's mechanical energy to the feed water/seawater which is pumped through the RO membrane, separating the drinking water and leaving the feed water as concentrated brine. The high energy content of this concentrated brine is then re-converted into mechanical energy by the axial piston motor which serves as an integrated energy recovery device. Unlike in most other systems using isobaric energy recovery, a mixing of concentrated brine and feed water is avoided.

Sealing

The pump is sealed by a mechanical seal.

Example for PID

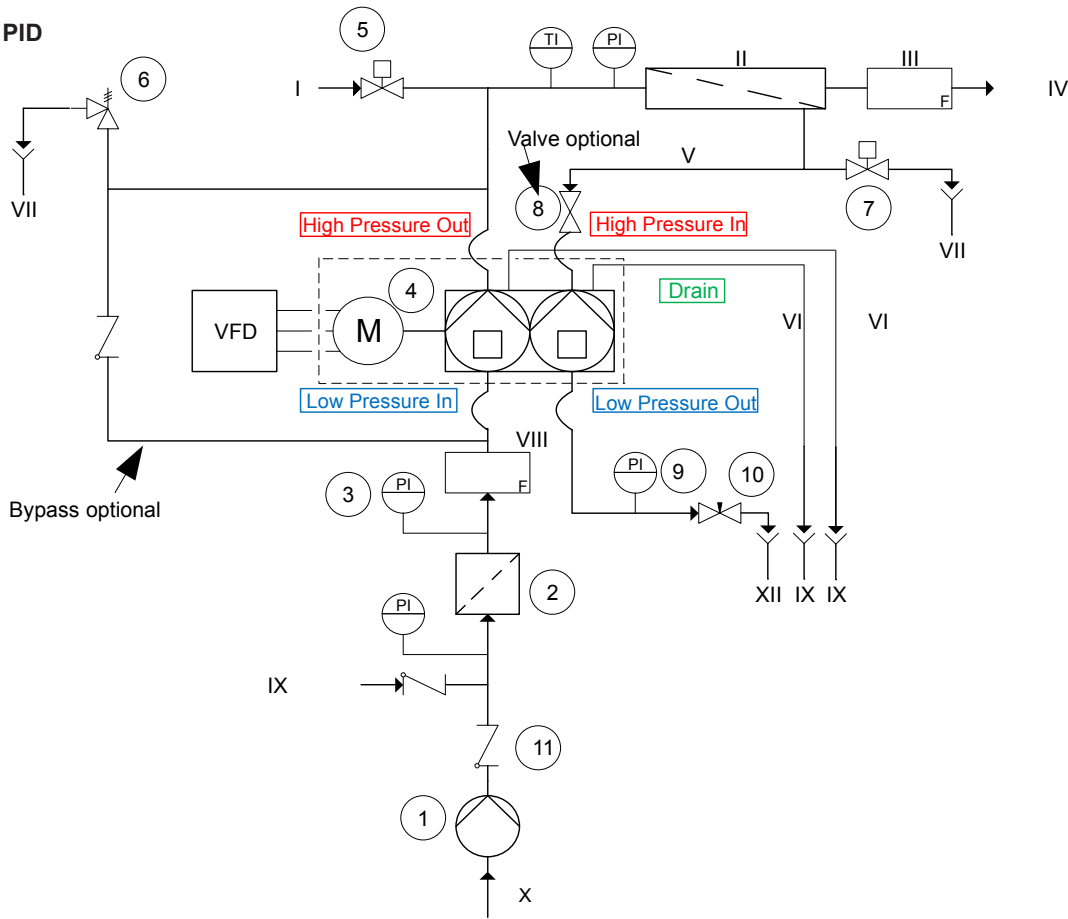


Fig. 4: Example of a flow diagram

I	Chemical cleaning	II	Membrane
III	Flow meter	IV	Permeate
V	Concentrated salt water / Brine	VI	Lubricant drain
VII	Drain	VII	Flow meter
IX	Permeate flushing	X	Pretreated and cleaned feed water

Table 5: Explanation of the flow chart

Item	Component	Task
①	Booster pump	Ensures the inlet pressure supply to the pump's "Low Pressure In" connection.
②	Filter	Ensures minimum pump filtration requirements.
③	Suction pressure gauge pump in SALINO Pressure Center	Continuous inlet pressure monitoring avoids pump damage.
④	SALINO Pressure Center	Pressure boosting and energy recovery
⑤	Inlet valve for chemical cleaning	Cleaning fluid inlet for the membranes, drainage via bypass valve.
⑥	Pressure relief valve	Serves as a protection device against excess pressure
⑦	Bypass valve	Relevant for permeate flushing, chemical membrane cleaning, start-up if venting is required, and shut-down procedures.
⑧	Optional: isolation valve	Optional: if SALINO is subject for isolation
⑨	Back pressure gauge ERD out	Continuous back pressure monitoring, back pressure must 3 – 5 bar During operation of SALINO
⑩	Back pressure valve (springloaded self adjusting check valve)	Continuous back pressure monitoring at back pressure gauge In order to adjust back pressure to 3 – 5 bar; mandatory for Operation of SALINO
⑪	Check valve	ensures permeate flushing w/o losses caused by feed pump

Materials

Overview of available materials

Description	Material variant
	D
Bell housing	EN-GJL
Mounting frame	1.4571
Coupling	EN-GJL / ST
Screw/bolt	V4A
Nut	V4A
Spring lock washer	V4A

Codes used

Code	Material	
D	Duplex stainless steel	1.4462
EN-GJL	Grey cast iron	-
Steel	Steel	-
V4A	Stainless steel	1.4401

Coating and preservation

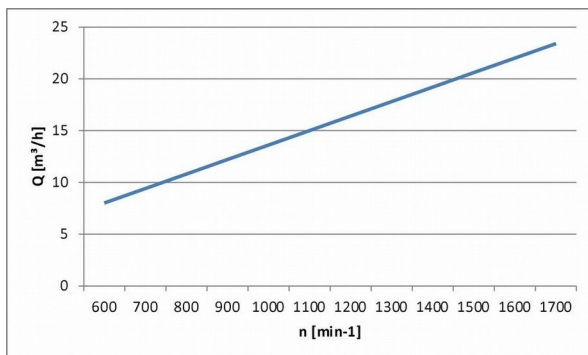
- Coating and preservation to KSB standard

Product benefits

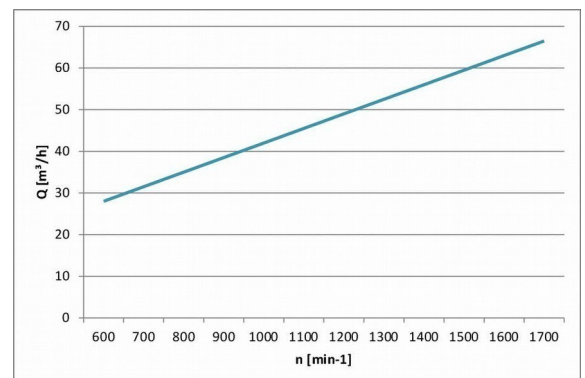
- Economically efficient
  - Low investment and maintenance costs thanks to 4-in-1 technology
  - Low operating costs thanks to maximum energy efficiency (potential energy savings of up to 75%)
  - Plug & Desalt: the system's compact design allows straightforward handling
- Environment-friendly and clean thanks to lubrication by the fluid handled
- Reliable and safe thanks to tried and tested axial piston technology

Characteristic curves

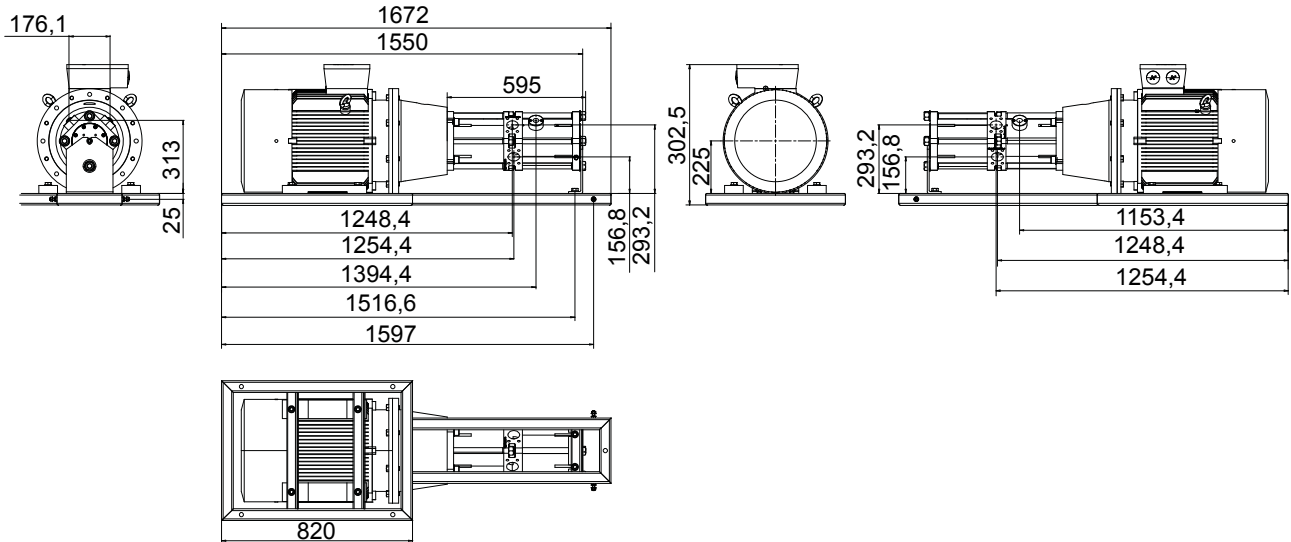
SALINO, 250, n = 600-1750 rpm



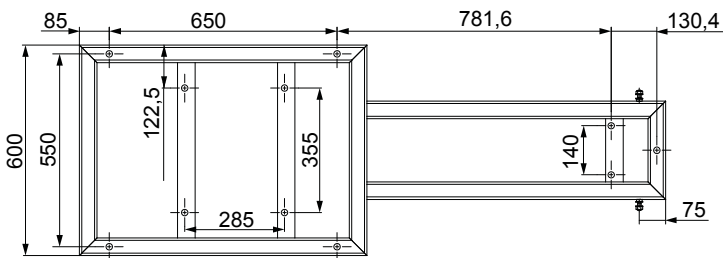
SALINO, 500, n = 600-1750 rpm



Dimensions and connections Salino 250

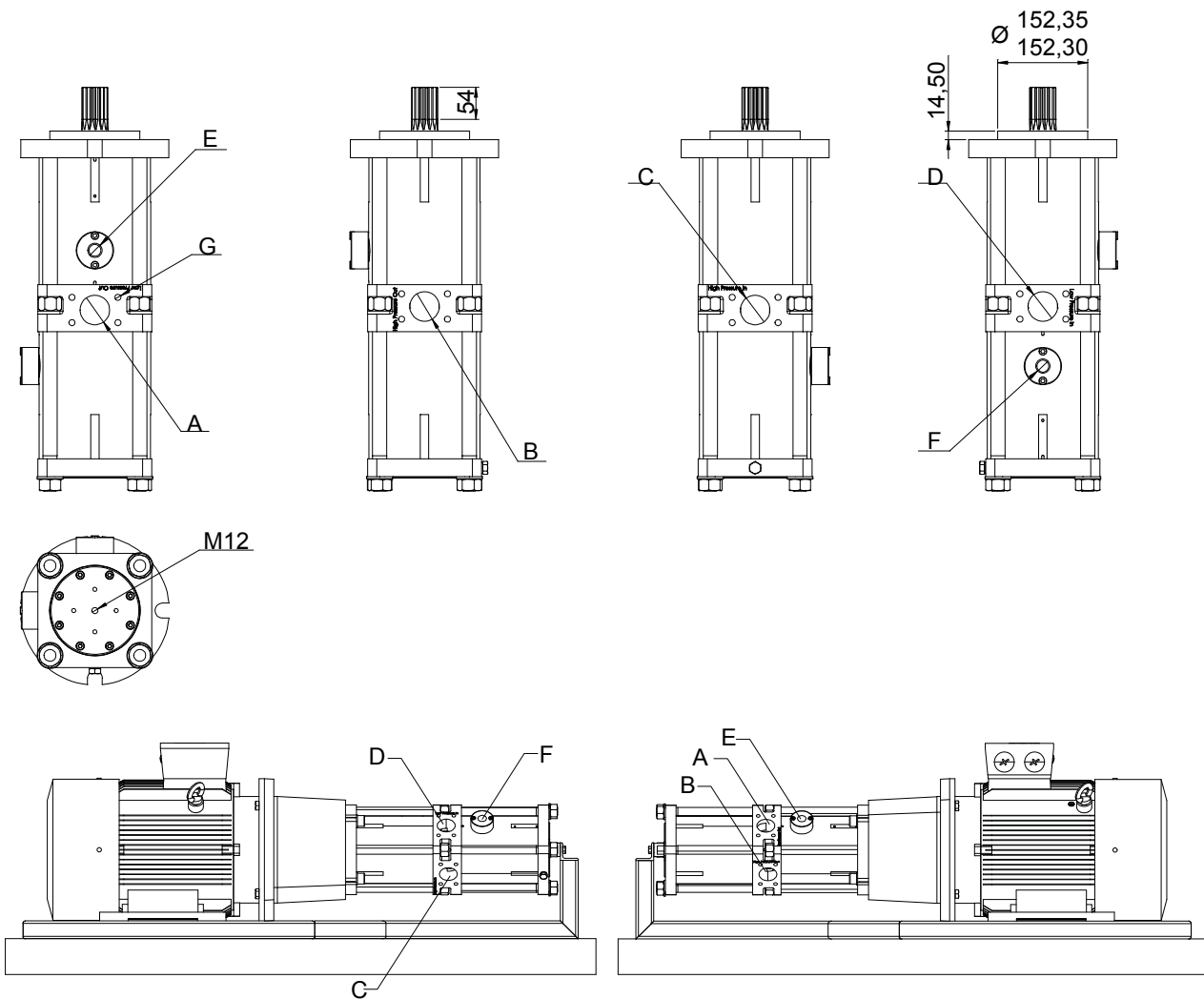


Dimensions of SALINO 250



Dimensions of mounting frame





Connections

A	"Low Pressure Out" connection of energy recovery device, 2 " SAE Flange
B	"High Pressure Out" connection of pump, 2 " SAE Flange
C	"High Pressure In" connection of energy recovery device, 2 " SAE Flange
D	"Low Pressure In" connection of pump, 2 " SAE Flange
E	Drain connection of pump, G 3/4
F	Drain connection of energy recovery device, G 3/4
G	Connections A, B, C, D: M12 × 1.75; depth 13; 4 holes

Filtration

To ensure that the pump's service life is as long as possible, the fluid handled must be filtered before it flows through the pump. This requires filters with a minimum filtration ratio of  $\beta_{10} > 1000$  which means that 100 of 100,000 particles sized 10  $\mu\text{m}$  will pass through the filter (absolute rating).

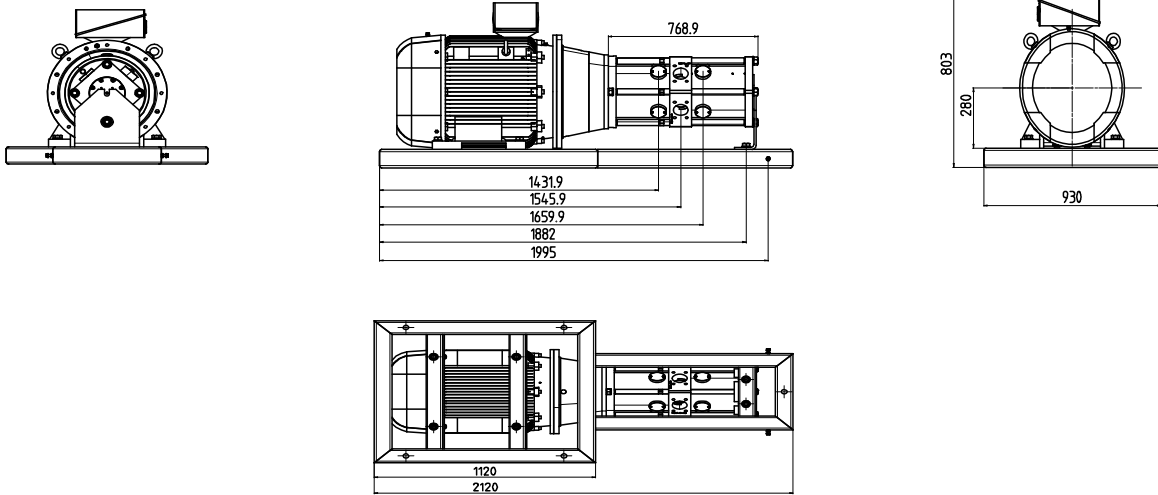
- Shaft coupling
- Bell housing
- Mounting frame
  - Welded with V4A stainless steel

Scope of supply

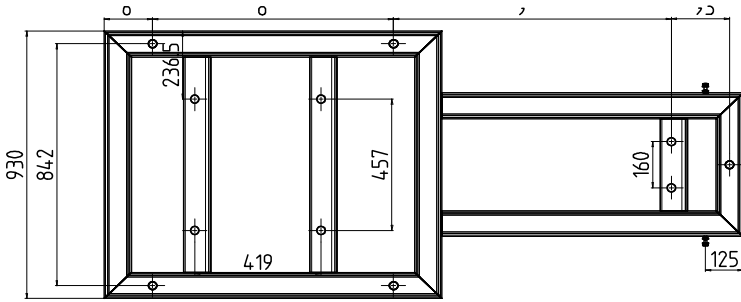
Depending on the model, the following items are included in the scope of supply:

- High-pressure component  
SALINO
- Drive
  - Electric motor
  - Frequency inverter

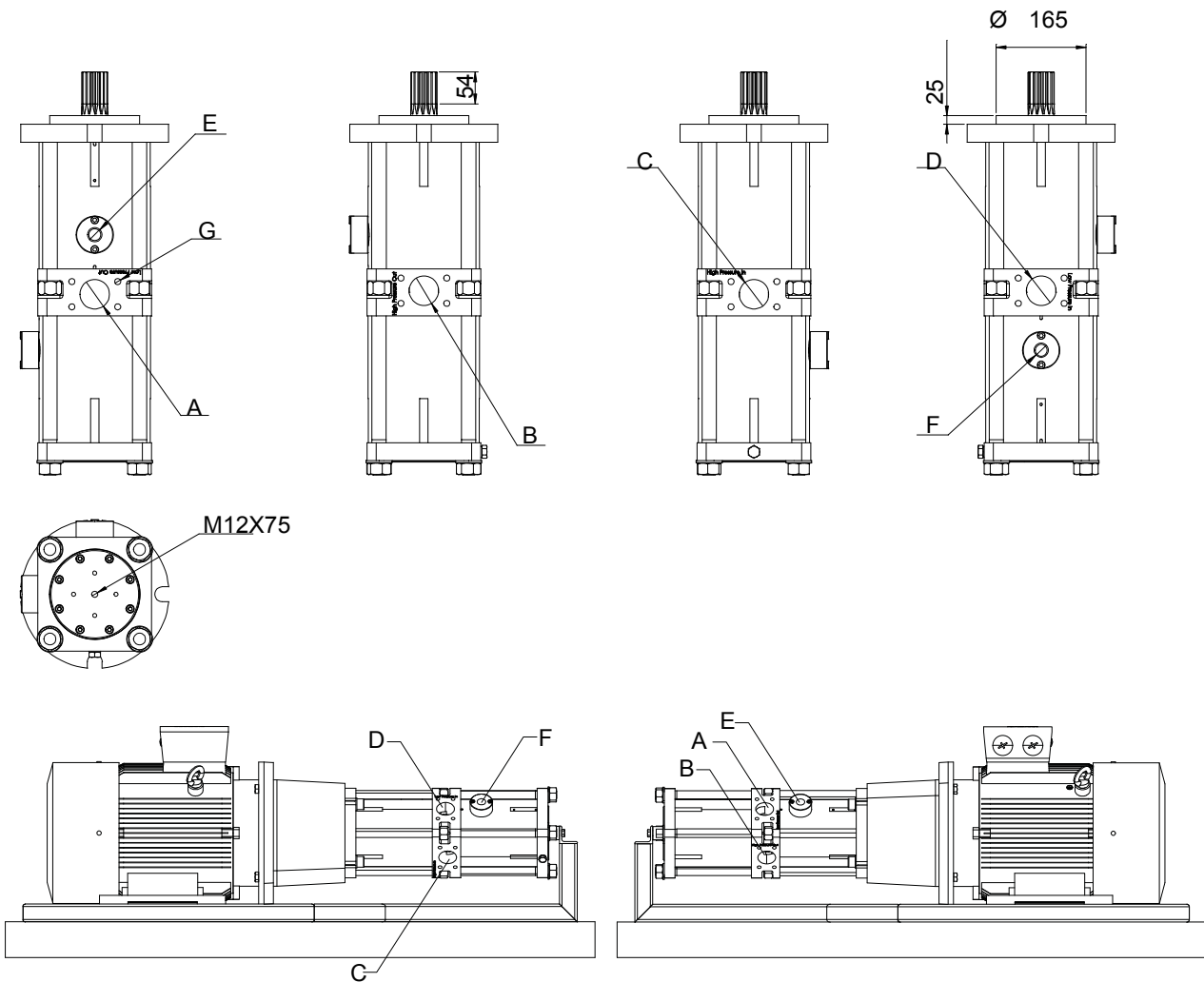
Dimensions and connections Salino 500



Dimensions of SALINO500



Dimensions of mounting frame



#### Connections

A	"Low Pressure Out" connection of energy recovery device, 3 " SAE Flange
B	"High Pressure Out" connection of pump, 3 " SAE Flange
C	"High Pressure In" connection of energy recovery device, 3 " SAE Flange
D	"Low Pressure In" connection of pump, 3 " SAE Flange
E	Drain connection of pump, G 1 – 1/2
F	Drain connection of energy recovery device, G 1 – 1/2
G	Connections A, B, C, D: M16 × 2; depth 32; 4 holes

#### Filtration

To ensure that the pump's service life is as long as possible, the fluid handled must be filtered before it flows through the pump. This requires filters with a minimum filtration ratio of  $\beta_{10} > 1000$  which means that 100 of 100,000 particles sized 10  $\mu\text{m}$  will pass through the filter (absolute rating).

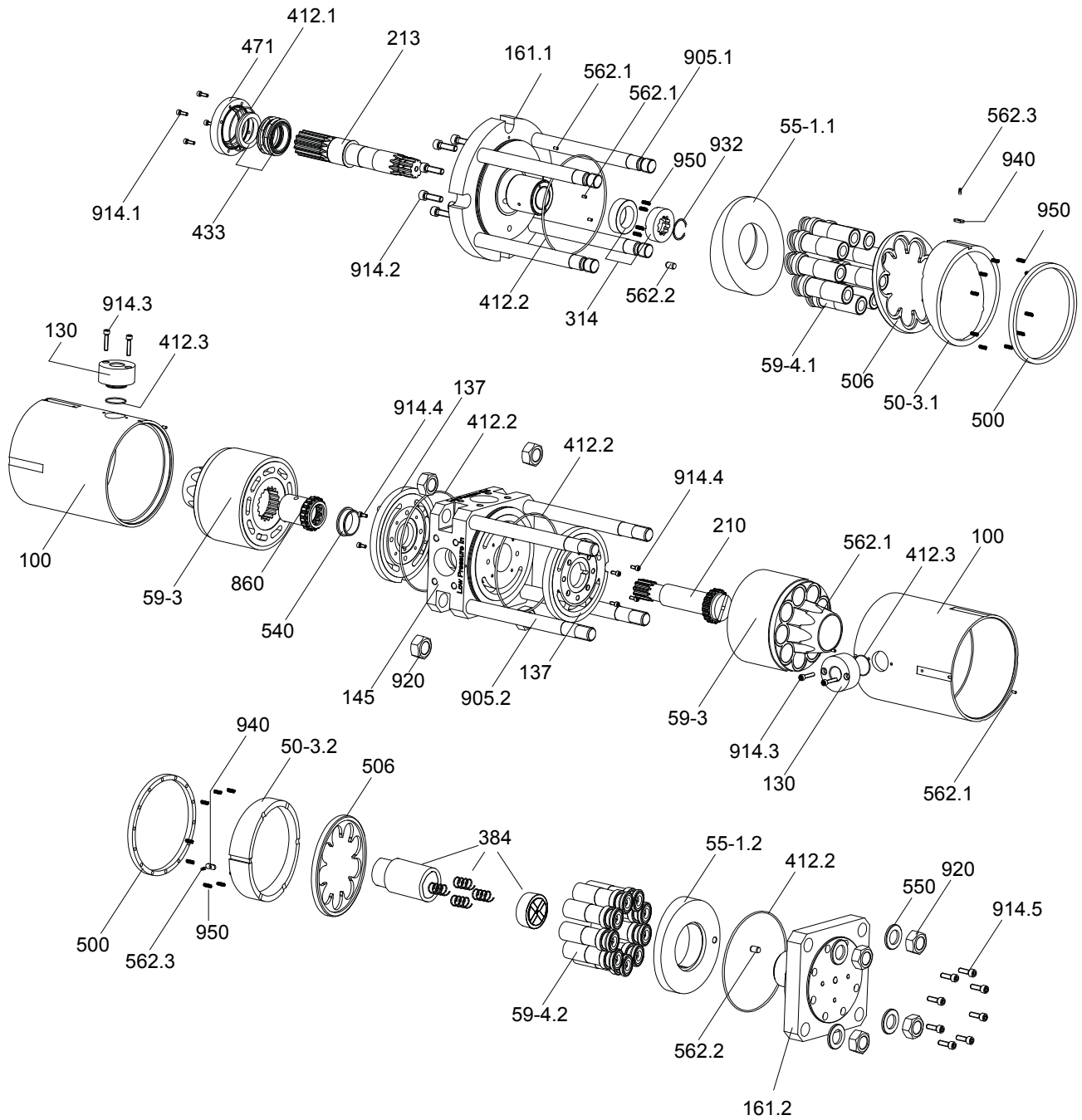
- Shaft coupling
- Bell housing
- Mounting frame
  - Welded with V4A stainless steel

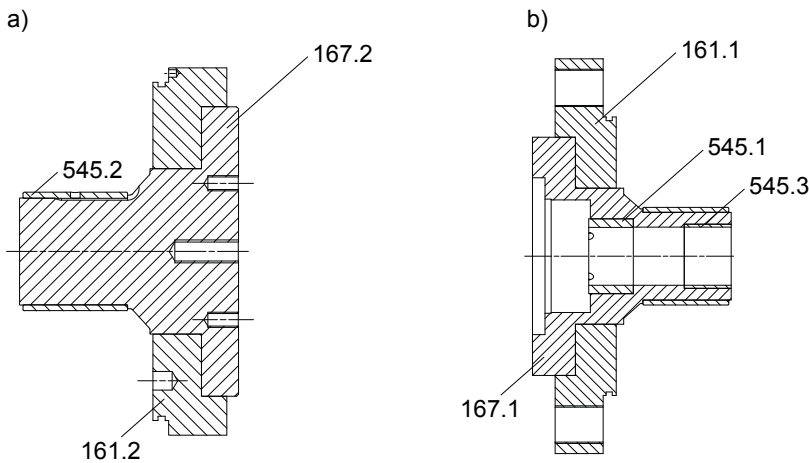
#### Scope of supply

Depending on the model, the following items are included in the scope of supply:

- High-pressure component  
SALINO
- Drive
  - Electric motor
  - Frequency inverter

Exploded view and list of components





Detailed view: a) Motor end cover b) Pump flange

List of components

Part No.	Description	Part No.	Description
100	Casing	540	Bush
130	Casing part	545.1/.2/.3	Bearing bush
137	Control plate	55-1.1/.2	Guide plate
145	Adapter	550	Disc
161.1/.2	Casing cover	562.1/.2/.3	Parallel pin
167.1/.2	Cover insert	59-3	Cylinder
210	Shaft	59-4.1/59-4.2	Piston pump / Piston motor
213	Drive shaft	860	Coupling part
314	Thrust bearing with springs	905.1/.2	Tie bolt
384	Thrust bearing unit	914.1/.2/.3/.4/.5	Hexagon socket head cap screw
412.1/.2/.3	O-ring		
433	Mechanical seal	920	Nut
471	Seal cover	932	Circlip
50-3.1/.2	Backing ring	940	Key
500	Ring	950	Spring
506	Retaining ring		



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