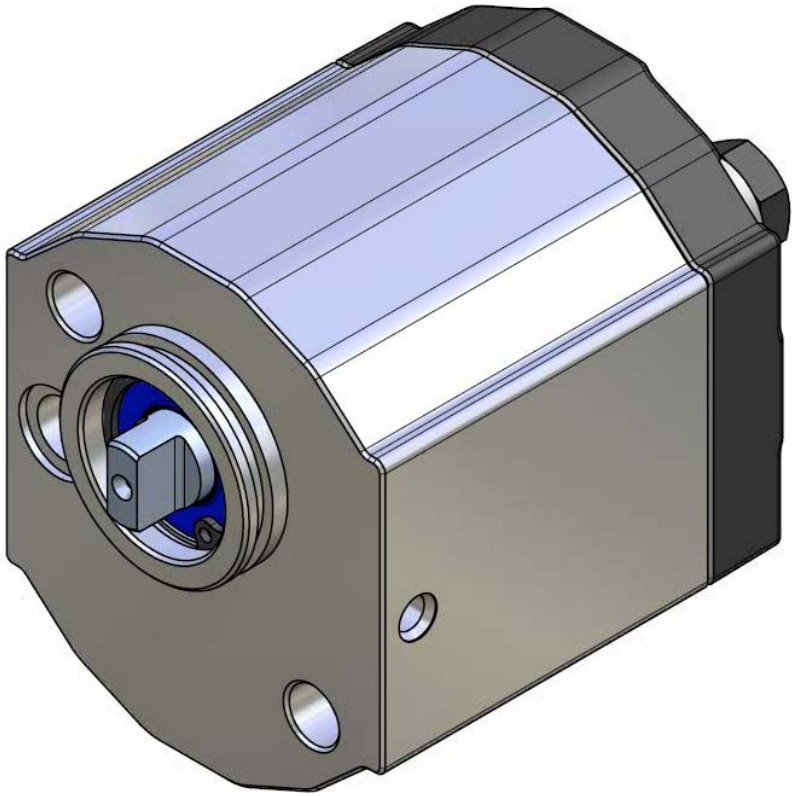
SETTIMA flow mechanisms

Continuum ® pumps

Helical rotor pumps for high pressure low noise applications

Patents Approved in EU, US and Canada



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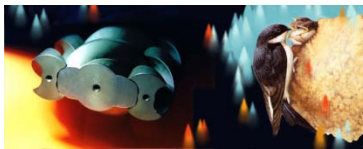


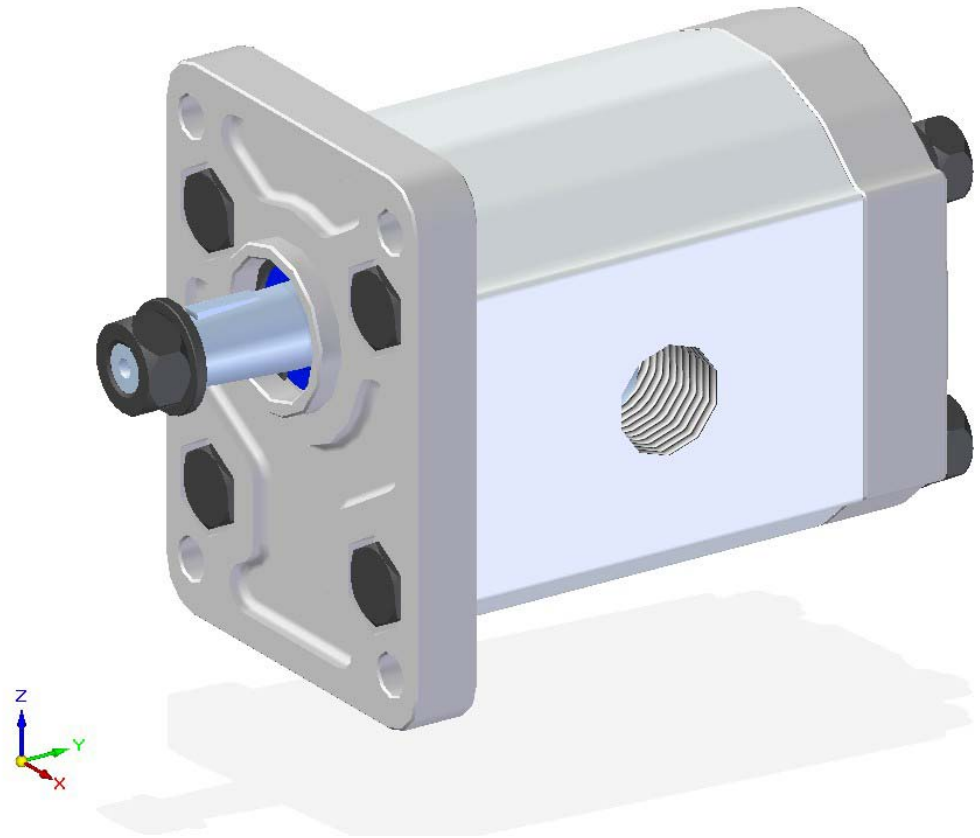
The Innovation Behind

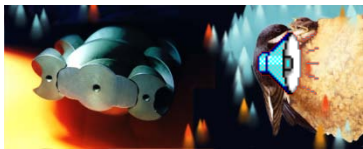
PATENTS:

the **rotors profile**

the **screw step**

the inner **force balancing**





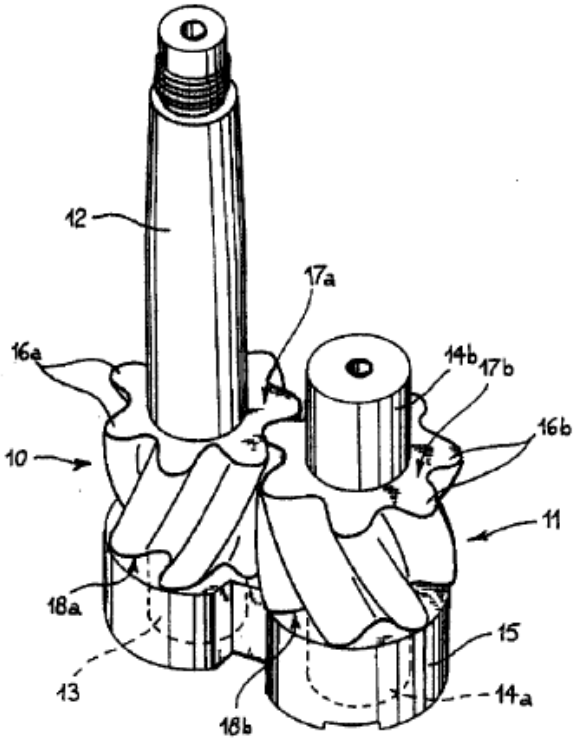
The Innovation Behind

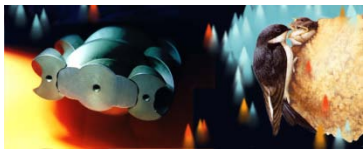
FACE THE NOISE:

the **rotors profile and allows for continuous contact between the rotors.**

No encapsulation chambers.

Rolling contact





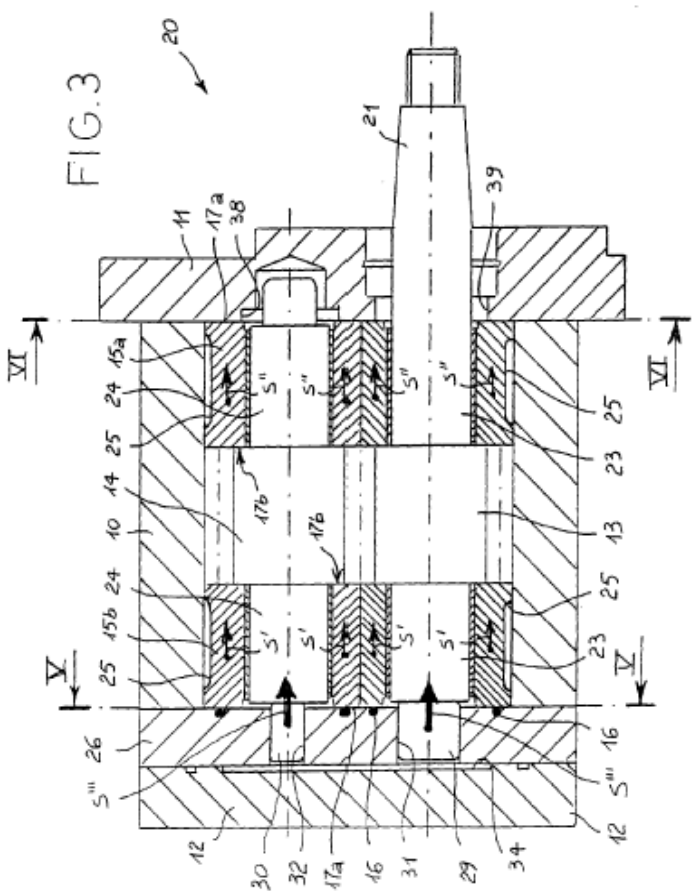
The Innovation Behind

SETTIMA flow mechanisms

BALANCE THE FORCES:

the inner forces are under control.

Helical Rotor pumps suffer of unpredicted axial forces within the body. Internal hydrostatic mechanisms are put in place in order to avoid trade-off with efficiency.



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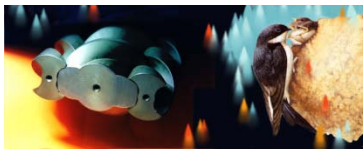


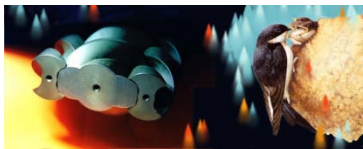
Normative Changes

Standard OSHA (Occupational Safety and Health Administration) Standard 1910.1000

Compulsary < 90dB(A) for 8 hours in a week of 40 hours. Examples: Pneumatic Systems < 115dB(A) only at most for 15min in 8 hours and 90dB(A) if for continuously 8 hours

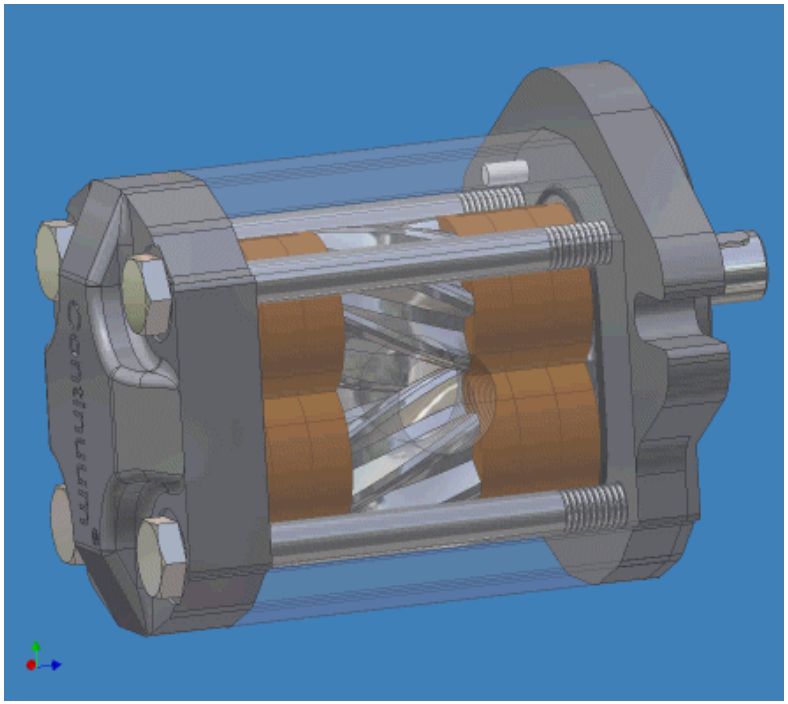
In Europe it is normed by 2003/10/CE of European Parlament and by the Counsel report of Feb the 6th 2003.

Limit of 87dB(A) for shift of 8 hours, but already with measures of 85dB(A) special measures for noise containment for environmental and individual care.



Competitive edges

- European noise standards compliant
- Near to zero pulsations improving overall hydraulic systems life time



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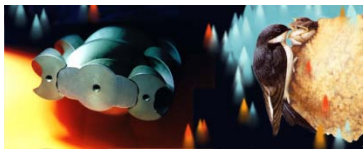
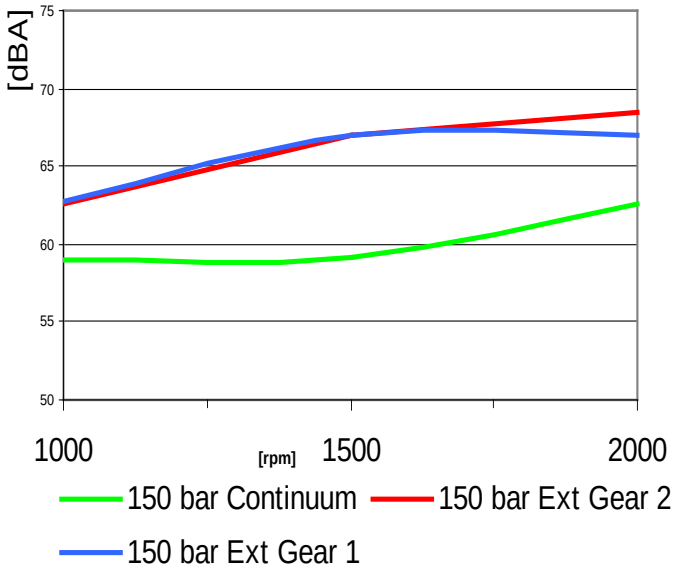
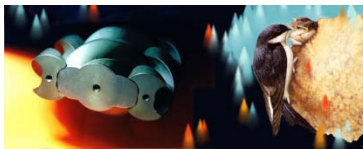


Sustainable Power

- In a ever increasing demand for power, designers and manufacturers of hydraulic devices have explored all opportunities to contain noise and reduce ripple.

- When System Life Cycle, Environmental Conditions, Energy Consumption, Performances are paramount the ultimate solution is to cut the problem at its root.

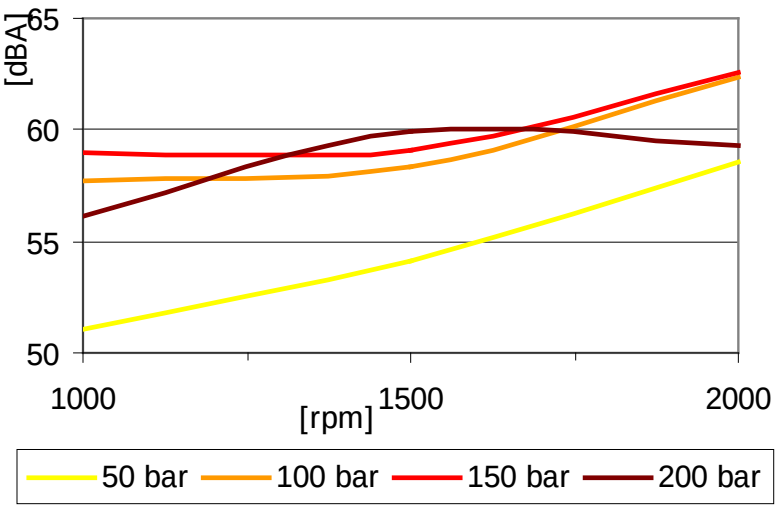


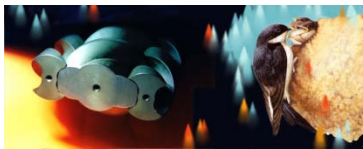


Noise is Expensive

- From the small steering system to the large municipal equipment, from the lubrication system to the forklift.

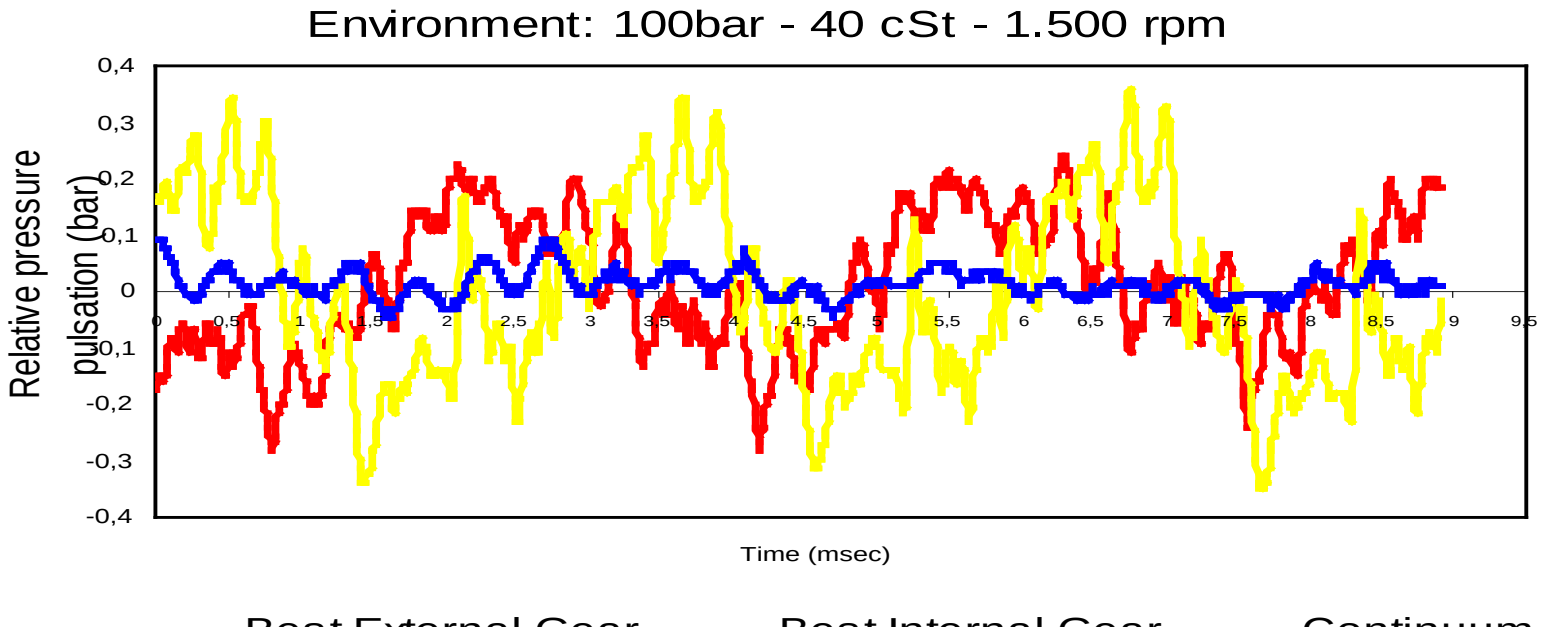
- Even in the most demanding condition Continuum enables the system designer to **focus on functions and features**, not only on reducing customer frustration by mean of expensive enclosures, hoses and attenuators. Noise is relieved at the root.





Pulsation is Harmful

- In Hose and Pipe design is paramount pressure pulsation; in fact pressure pulsation is affects the hydraulic system lifetime;
- Noise not only is generated by the pumps but in most cases the systems generated noise by amplifying the ripple. Consequent pressure drops are a noticeable energy consumption and reducing overall efficiency.



Competitive Analysis

- External Gears
- Internal Gears
- Vane Pumps
- Market Split&Positioning

SETTIMA
flow mechanisms

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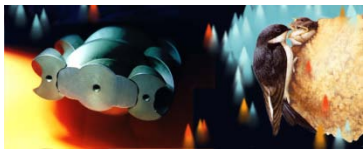
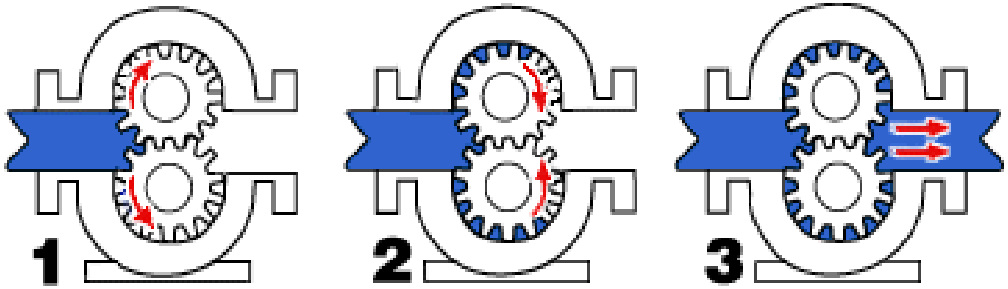


Competition: Ext Gears



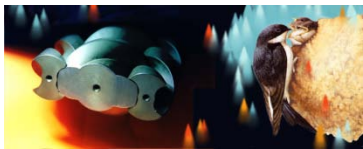
As the gears leave the overlapping area a volume of oil is created and expands on the inlet port.

Fluids travel in the inner rooms of the teeth encapsulated without changing room till the output port.

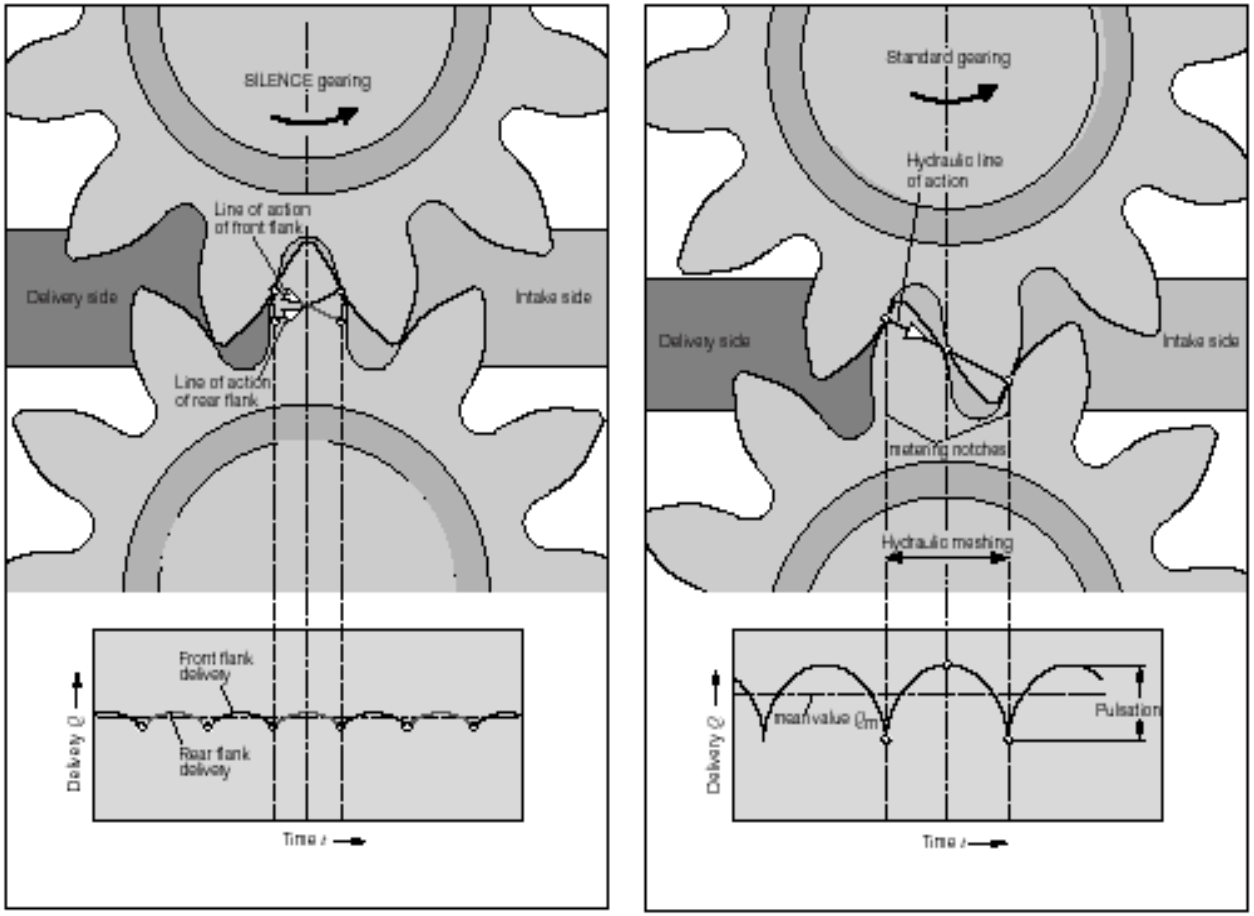
At this point the overlap of the gear forcing the fluid out.

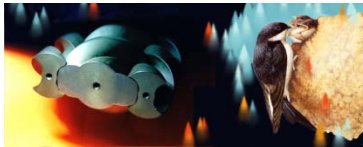
Because of the gear bushels supporting the inflection of the gear the pressure can be high.

- Industrial and mobile applications
- Fuel and lubrication
- Metering
- Mixing and blending (double pump)
- OEM configurations
- Precise metering applications
- Low-volume transfers
- Light or medium duty

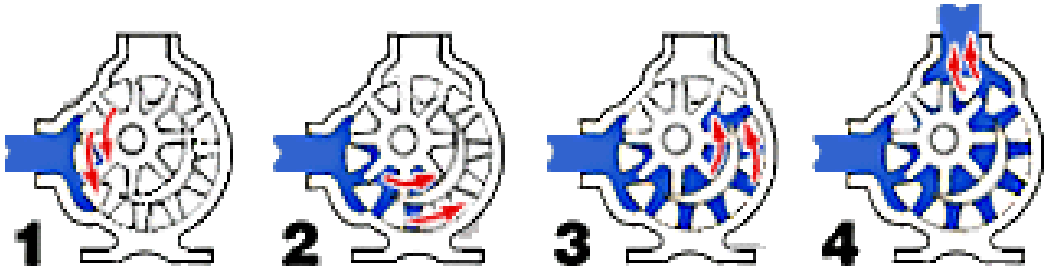


Gear Innovation





Competition: Int Gears



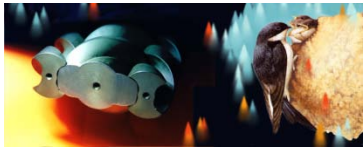
Fluid enters between the gears or through the external ring;

It travels between the gears. A special device separates the flows and operates as sealing between out/in ports;

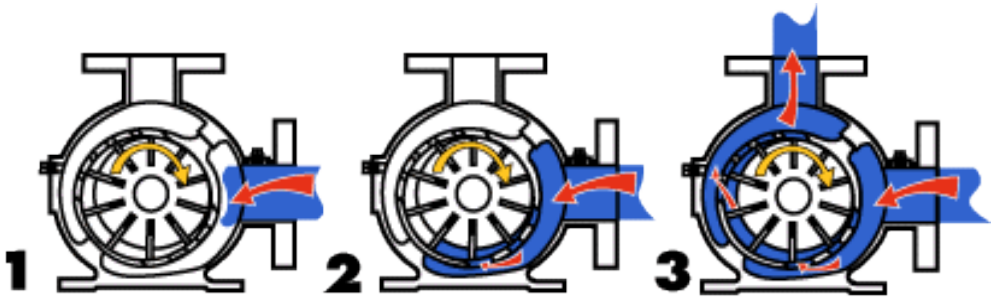
Pump head is full right before the fluid is forced to out in the pressure port;

The teeth of the rotors overlap completely to provide sealing on the remaining part of the pump and capable of withstand the pressure.

- Barge, tanker, and terminal loading and unloading.
- Filtering.
- Circulating.
- Transferring.
- Lubricating.
- General industrial.
- Marine applications.
- Petrochemical.
- Light, medium, or heavy-duty service.



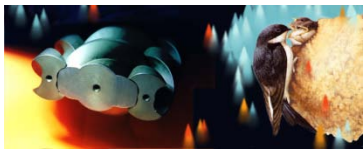
Competition: Vanes



The impeller is withstood eccentrically in a rotating chamber. The rotor retracts the vanes on one side of the body.

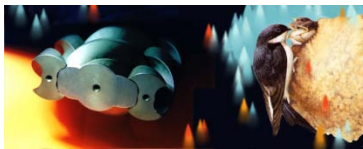
As the rotor revolves the blades are pushed toward the body of the pump. The sealing of the rotor and the vanes onto the lateral plates is paramount to guarantee a good suction.

- Aviation Service - Fuel Transfer
- Auto Industry - Fuels, Lubes, Refrigeration Coolants
- Barge Unloading
- Bulk Transfer of LPG and NH3
- Chemical Process Industry
- Ethanol/Alcohol Refining
- Fertilizer Production - CO Transfer
- Lubrication Blending - Solvents, Oils
- Petroleum Industry - Crude Oils and Hydrocarbons
- Power Generation - Fuels, Lubrication
- Railroad Transfer - Fuels, Lube Oils, Coolant
- Refrigeration - Freons, Ammonia
- Rubber and Plastic
- Textile



Market Sectors

- Industrial Power Hydraulics
- Mobile
- Marine
- Dosing/Metering
- Energy/Paper/Steel
- Tool Machine



Power Hydraulics

SETTIMA flow mechanisms

- Lift/Elevators
  - Industry Standard /Replace
- Parking systems
  - Low Noise High Pressure indoor systems
- Press/Compactors
  - Plastic injection (inverter driven)
  - Press brakes
  - Leather cutting systems
- Minipowerpacks
  - Bailers and compactors

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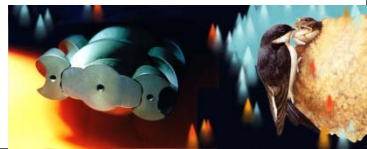
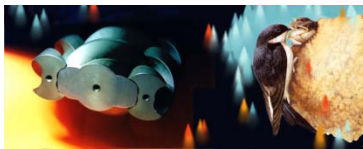
Mobile Hydraulic

- Forklifts
  - Powerlift/Steering
- Truck/Tractor Steering Systems
  - Hydraulic/Hybrid
- Rear Tractor Accessories
  - Loader
  - Liftings
- Municipality Machines
  - Waste
- Minipowerpacks
  - Tail Gates, Palleter



Marine Control

- Rudder Actuators
  - Tandem Systems
- Propeller Pitch control
- Propeller drive
  - Power transmission from Engine
- Minipowerpacks
  - Dock Operation
  - Door control
- Diesel Pump
  - Feeder pump for diesel engine

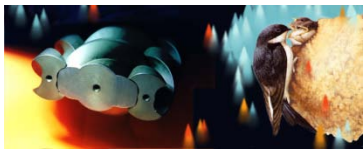


Energy / Paper Hydrocontrol

- Hydraulic Jacking
  - High Pressure Hydrostatic Jacking for turbine or calanders
- Hydropower valve control
  - Load the accumulator for the valve control
- Turbine Governor/Diverter Damper
  - High pressure circuit for actuation

Tool Machine Lube

- DeepHole Drilling
  - High pressure coolants
- High Pressure Lubrication
  - LastStage 200bar
- Rotating Joint jacking
  - Cooling/lubrication of fast rotating joint



Continuum ® order code

Ordering code / *Codice d'ordinazione*

DG**	2V	***CC	F****A***	*	GR**	***CC	*	*	**
1	2	3	4	5	6	7	8	9	10

Pump Type *Tipo*	Class *Classe*	Displacement *Cilindrata*	Flange & Shaft *Flangia & Albero*	Ports *Porte*	Shaft Seal *Guarnizione Albero*	Rotation *Rotazione*
28		004-006-008-010-013	F1AC3-F1PAC2-F1KAG54-F1LAGL54	G	(none) V	DX (default) SX
33		010-013-015-018	F2AC4-F2BK7AG-FSAEAAC-FSAEAAT9	G-M		
38		016-018-020-022-025-028	F2AC4-F2BK7AG-FSAEAAC-FSAEAAT11			
47		028-032-036-040-045-050	F3AC9-FSAEBAC-FSAEBAT13	O		
55		050-063-075-090	FSAEBAC-FSAEBAT15			
72		094-101-125-150-175-200	FSEADAC	M		

Ordering code multiple pumps / *Codice d'ordinazione pompe multiple*

DG**	2V	***CC	F****A***	*	GR**	***CC	*	*	**
1	2	3	4	5	6	7	8	9	10

Pump Type *Tipo*	Class *Classe*	Displacement 1st stage *Cilindrata primo stadio*	Flange & Shaft *Flangia & Albero*	Ports *Porte*	Displacement 2nd stage *Cilindrata secondo stadio*	Ports *Porte*	Shaft Seal *Guarnizione Albero*	Rotation *Rotazione*
		First stage - *primo stadio*			**Second stage** - *secondo stadio*			
33		010-013-015-018	F2AC4	G-M	28 004-006-008-010-013	G	(none) V	DX (default) SX
					33 010-013-015-018	G-M		
					38 016-018-020-022-025-028			
38		016-018-020-022-025-028	F2AC4		28 004-006-008-010-013	G		
					33 010-013-015-018	G-M		
					38 016-018-020-022-025-028			
47		028-032-036-040-045-050	F3AC9	O	33 010-013-015-018	G-M		
					38 016-018-020-022-025-028			
					47 028-032-036-040-045-050	O		
55		050-063-075-090	FSAEBAT15	O	33 010-013-015-018	G-M		
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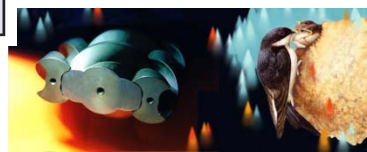

Application summary

Informations reported below are as basic scheme – for more information ask Settima

	Basic	SM	SMT	SMT	SMT	SMT	SMT	SMT8B	SMT16B	SMT16B	SMT16B	SMT16B	SMAPI	Continuum ®
	Options			SN	G	G HA	K HA			S1, S2...S4	G	K HA		
Cooling									X					
Cooling (water & glycole)											X			
Cooling systems - compact								X						
Diesel boilers injection						X								
Diesel oil high pressure						X								
Elevators		X												
Filtration systems											X	X		
Filtration systems - offline/portable														
Lube services										X				
Lube services - Bearing				X						X			X	
Lube services - Bearing jacking, high pressure														X
Lube services - gear boxes / air emulsions				X										
Lube services - power generation/oil & gas industry				X									X	
Lube services - Turbines				X									X	
Lube services (wide viscosity range)				X										
Marine control - propeller drive, picth control, actuators														X
Mobile hydraulics - forklift														X
Mobile hydraulics - steering systems														X
Oil transfer / Fluid transfer									X					
Parking systems		X												X
Power Hydraulics			X		X									X
Power packs									X					X
Power packs - minipower packs														X
Presses / Compactors			X											X
Tool machines - Coolant fluid transfer											X			
Tool machines - Coolant systems												X		
Tool machines - Coolant systems - high pressure							X							
Tool machines - rotary joint jacking														X
Tool machines - tool handling / axis control & movements														X