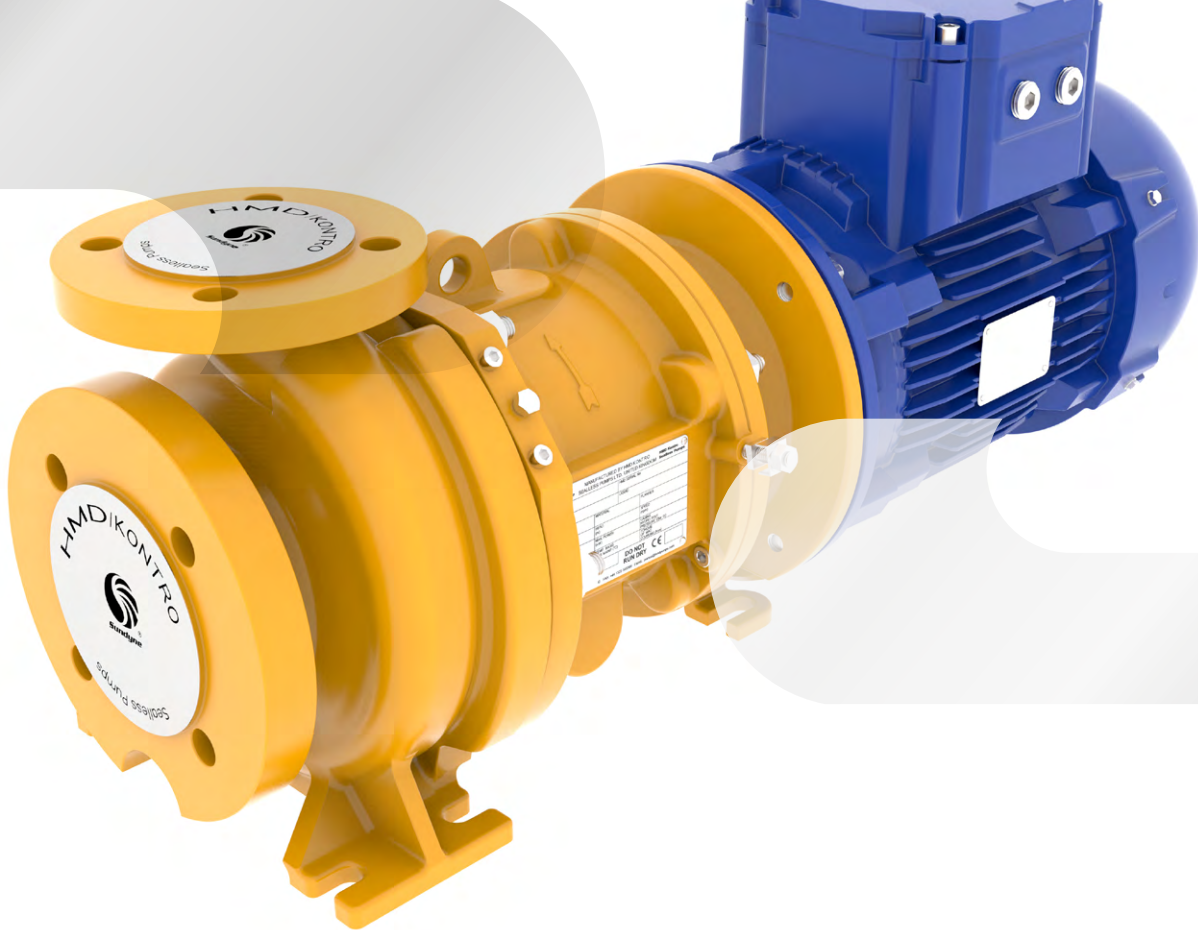




CSI FRAME 1 PUMP RANGE (50HZ)

Magnet Drive end suction centrifugal pumps in accordance to:
ISO 2858:2010 and ISO 15783:2003



Introducing HMD

Having pioneered the magnetic drive pump over seventy years ago HMD Kontro have continued to develop the technology. We are proud to offer an extensive range of products and services to satisfy the pumping needs and specific requirements found within the Chemical industry, whilst maintaining our flexible approach and without compromising the quality or reliability of our equipment. The products and services provided by HMD Kontro offer the ultimate solution to;

- **Environmental concerns**
- **Recurring mechanical seal problems**
- **Health and safety concerns**
- **Seal system complexities**
- **Maintenance / downtime reduction**
- **Minimising spare parts inventory**
- **Lowering the cost of ownership**

The chemical industry demands reliability, safety and cost efficiency. The production of chemicals in their various forms leads to great volumes of liquid and other materials being pumped around a plant. Containing these liquids calls for pump systems that can be relied upon to keep hazardous chemicals contained throughout the production process and so, sealless pumps are playing an ever greater part in meeting these challenges. Indeed, in some cases more stringent regulations and local agencies are mandating their use.

Introducing the CSI Range

The CSI magnet drive end suction centrifugal pumps are a modular range of chemical service pumps designed to cover a wide duty and application base using the minimum of pump models by maximising interchangeability of components.

The range is based on a number of hydraulic sizes and fully conform to the current ISO 2858 and ISO 15783 dimensional, performance and construction requirements. Close coupled and separately mounted variants are available.

A wide range of options are available including secondary sealing options and numerous bearing assembly variants. The range is specifically designed for maximum part interchangeability, ease of onsite service and has a wide number of site upgradable features.

Products in the Range

Parameters

Temperatures:	- 40°C to 260°C
Flow Rates to:	64m ³ /hr
Heads to:	62 m
Viscosity:	0.1 to 200 cSt
Powers:	22kW
Design Pressures:	16 bar @ 20°C
Solids Capability:	5% w/w <150 microns

CSI (ISO 2858 and ISO 15783)

Key Design Features

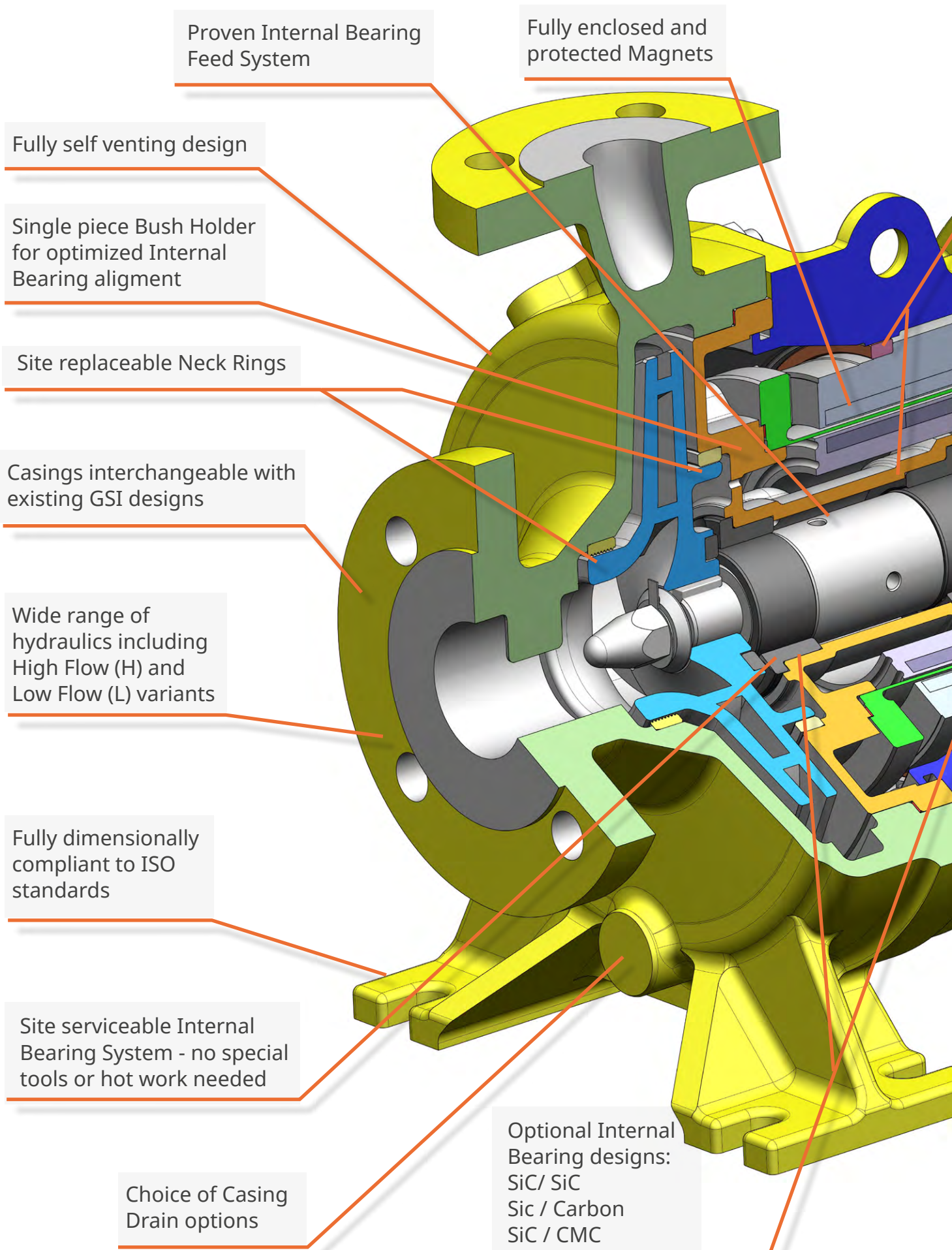
- **No Seals:** Minimises maintenance, all of the associated costs and eliminates potential leaks.
- **Sealless design:** For total containment, essential for hazardous, aggressive or valuable product.
- **Modular & Interchangeable components:** For maximum convenience and minimal lead time.
- **High efficiency hydraulics:** To benefit maximum flow / head coverage.
- **Low and High Flow hydraulic variants:** Provides optimised hydraulic fit.
- **Robust design:** Featuring ZeroLoss® containment shell for tolerance to system upsets.
- **Casing Gasket fully confined:** Eliminating risk of blowout.
- **Internal & External Bump Ring Design:** Providing additional level of robustness.
- **Modular Rotating Element Cartridge:** Providing the most efficient way to perform rapid replacement and manage spare part inventory.

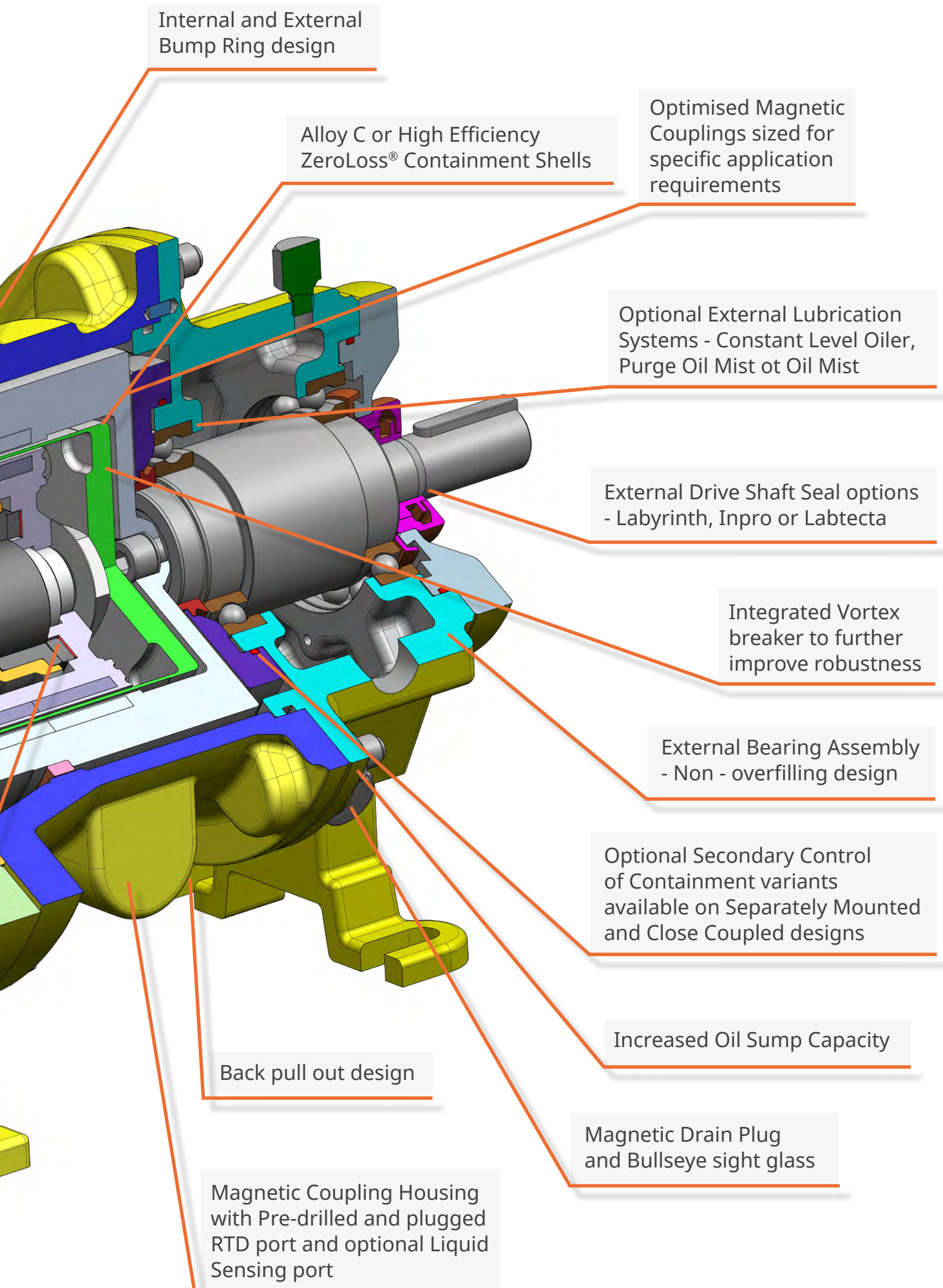
Benefits of CSI Frame 1 Pump Range:

- Sealless design for total product containment
- Ideal for hazardous, toxic, aggressive, hot and valuable product
- Fully Enclosed Magnets
- Modular construction
- Choice of materials of construction
- Site upgradable design features

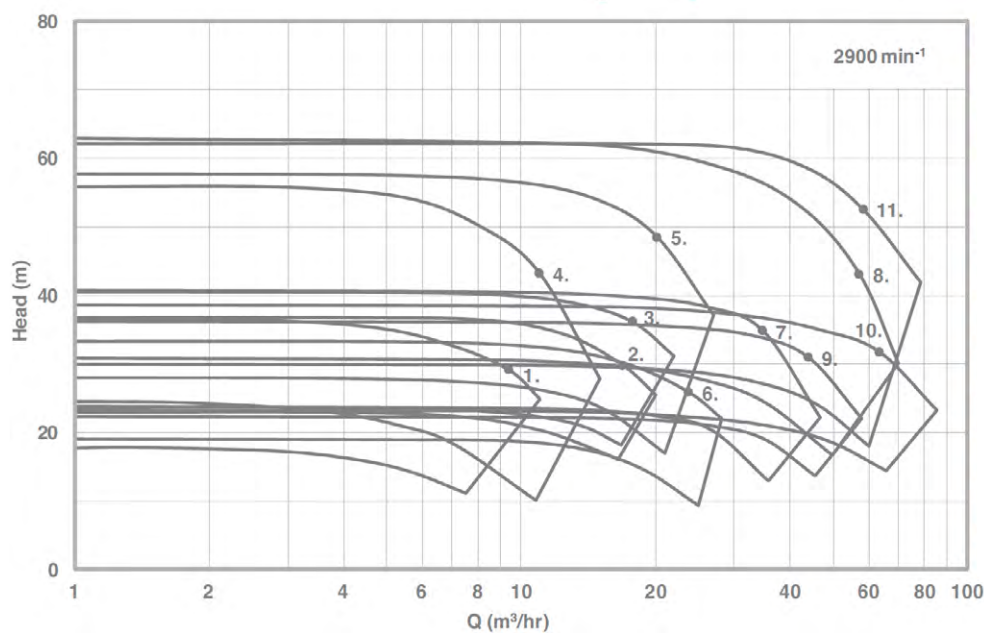


CSI Pump range





Performance of the CSI Frame 1 Pump Range

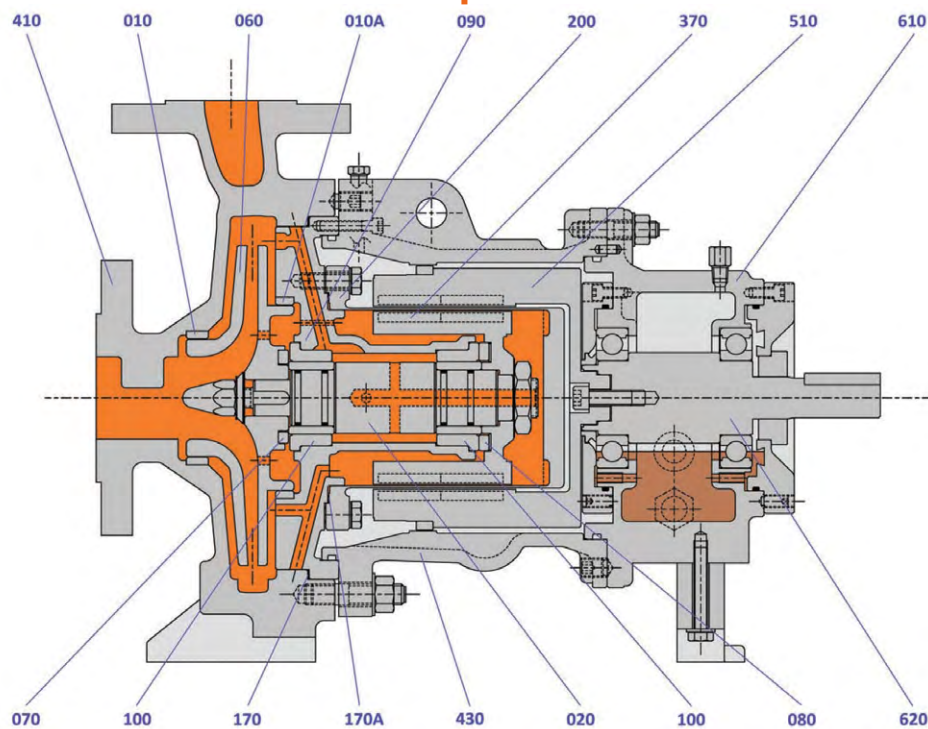


Reference

CSI

1	50-32-160-L1
2	50-32-160
3	50-32-160H
4	50-32-200-L1
5	50-32-200
6	65-50-160
7	65-50-160H
8	65-40-200H
9	80-65-160
10	80-65-160H
11	80-50-200

Construction of CSI Frame 1 Pump

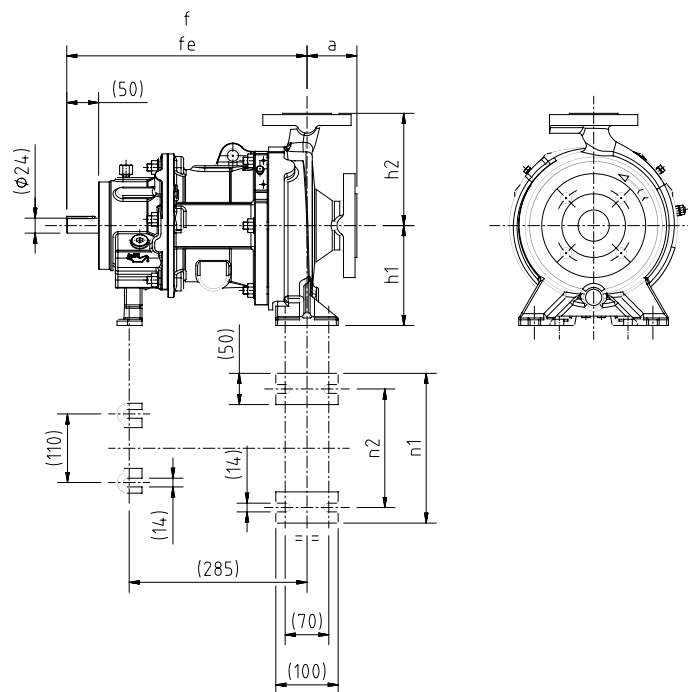


010	Neck Ring (Front)	316L St St
010A	Neck Ring (Back)	316L St St
020	Pump Shaft	316L St St
060	Impeller	316L St St
070	Front Thrust Washer	Silicon Carbide
080	Back Thrust Washer	Silicon Carbide
090	Bush Holder	316L St St
100	Bush	Silicon Carbide
170	Casing Gasket	CSF

170A	Shell Gasket	CSF
200	Containment Shell	Alloy C / 316L
370	Inner Magnet Ring	316L St St Clad
410	Casing	316L St St
430	Coupling Housing	SG Iron
510	Outer Magnet Ring	C. Steel (Sheathed)
610	Bearing Housing	SG Iron
620	Drive Shaft	Carbon Steel

Dimensions of CSI Frame 1 Pump

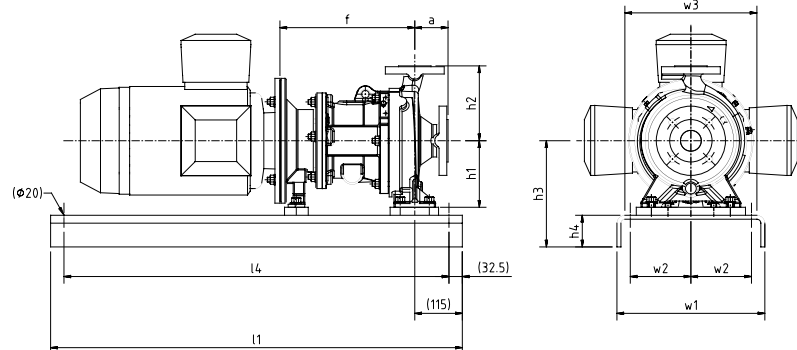
Dimensions are
for guidance only



CSI Frame 1 Separately Mounted (Bareshaft)

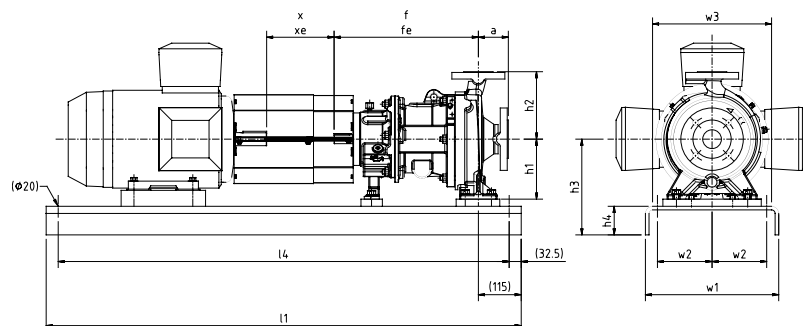
Size	a	f (Standard)	Fe (extended)	h1	h2	n1	n2	Keyway
50-32-160-L1	80	385	425	132	160	240	190	8 BSR
50-32-160	80	385	425	132	160	240	190	8 BSR
50-32-160H	80	385	425	132	160	240	190	8 BSR
65-50-160	80	385	425	132	160	240	190	8 BSR
65-50-160H	80	385	425	132	160	240	190	8 BSR
80-65-160	100	385	425	160	180	265	212	8 BSR
80-65-160H	100	385	425	160	180	265	212	8 BSR
50-32-200-L1	80	385	425	160	180	240	190	8 BSR
50-32-200	80	385	425	160	180	240	190	8 BSR
65-40-200H	100	385	425	160	180	265	212	8 BSR
80-50-200	100	385	425	160	200	265	212	8 BSR

CSI Frame 1 Close Coupled



Motor Frame	h3	h4	l1	l4	w1	w2	w3	x	xe
90S – 112M	250	75	1125	1060	360	115	328	140	100
132S – 160L	265	90	1350	1285	430	150	398	140	100
180M – 200L	315	100	1500	1435	500	185	468	140	10

CSI Frame 1 Separately Mounted

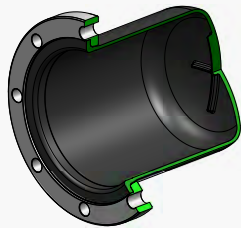


Motor Frame	f	h3	h4	l1	l4	w1	w2	w3
90S – 90L	294	250	75	825	760	360	115	328
100S – 112M	304	250	75	825	760	360	115	328
132S – 132M	324	265	90	1050	985	430	150	398
160M – 160L	354	265	90	1050	985	430	150	398
180M – 180L	354	315	100	1125	1060	500	185	468

Metallic and ZeroLoss[®] shell options

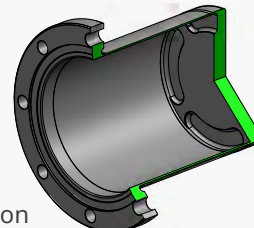
- interchangeable

ZeroLoss[®] Shell



- 18.9 bar Design pressure
- PEEK Composite design
- Suitable for process temperatures up to 120°C
- High Power NdFeB Magnetic Coupling
- High efficiency – no induction losses, no heat into process liquid
- Provides highest process upset tolerance
- In-built vortex breaker

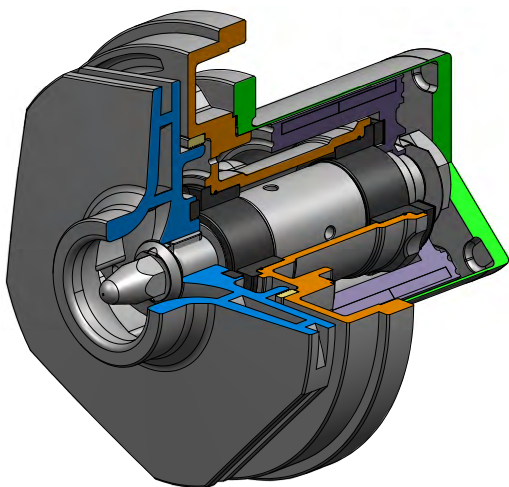
Metallic Shell



- 18.9 bar Design pressure
- Proven welded construction
- High strength alloy C276 tube
- Suitable for process temperatures up to 260°C
- Range of SmCo Magnetic Couplings to suit specific duty requirements
- In-built vortex breaker

Site Serviceable Design

Site replaceable Cartridge design ensures maximum up time and minimum disruption in the unlikely event of a breakdown.



Comprising of wetted parts (not casing):

- Impeller
- Shaft
- Internal Bush Holder and Bearings
- Containment Shell
- Inner Rotor

Designed to be serviced / overhauled on site:

- No special tools
- No hot working
- Simple to decontaminate
- No special motor decontamination needed

Site serviceable Internal Product

Lubricated Bearing assembly:

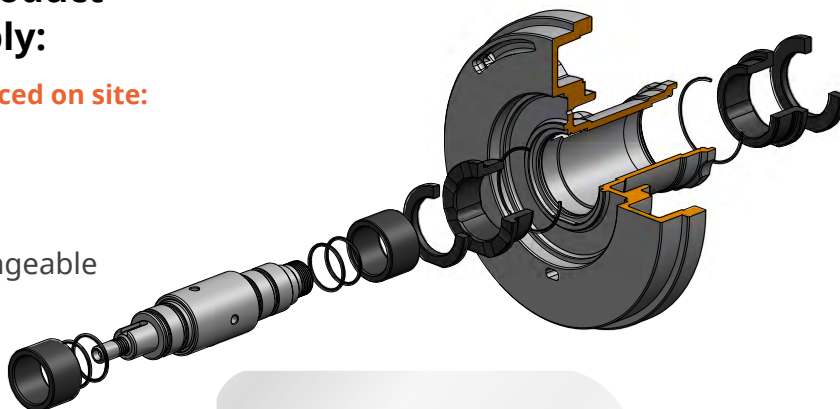
Single piece Bush Holder – easily serviced on site:

- No hot working
- No special tools
- In built bush retention features

Radial and Thrust Bearings interchangeable across entire Frame 1 range

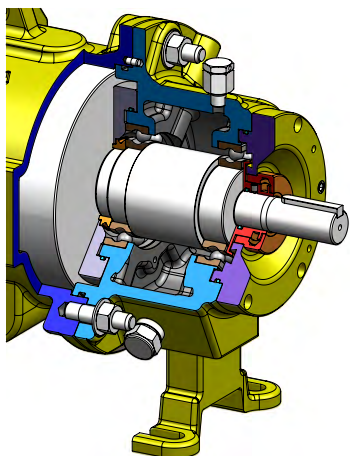
Optional Internal Bearing Materials

- SiC vs Sic (Standard Build)
- SiC vs Carbon (Variant for low lubricity conditions)
- SiC vs Ceramic Matrix Composite (CMC) thrust bearing (Variant for marginal applications)

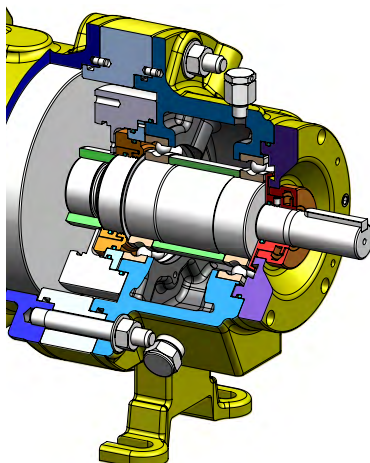


External Bearing Assembly

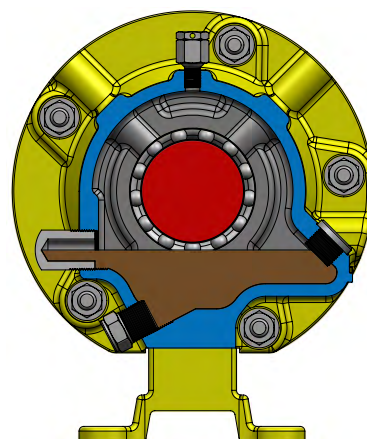
Extended Spacer and Shaft design for increased process temperatures from 205°C to 260°C.



Standard design



Extended Fe design



Non-overfilling design

External bearing assembly:

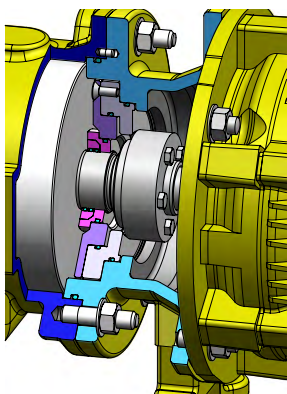
- Non-overfilling design
- Large sump capacity
- Magnetic sump plug
- Bulls eye style sight glass
- External bearing isolator options available

Available lubrication systems:

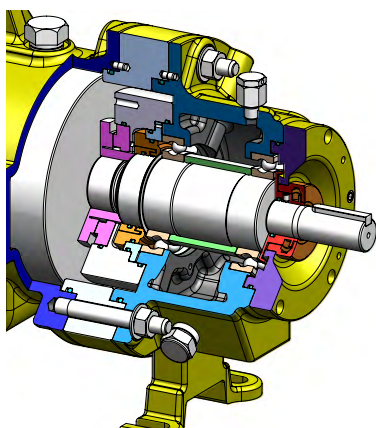
- Oil bath (standard)
- Oil bath and constant level oiler
- Purge Oil mist
- Pure Oil mist

Additional Security

...designed for maximum service life and ease of maintenance



Close Coupled
Secondary Control




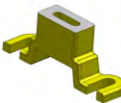




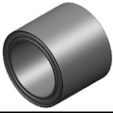


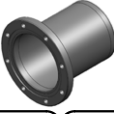

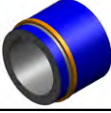
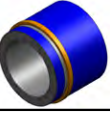
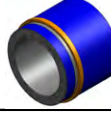



Separately Mounted
Secondary Containment

Secondary Control and Containment Options:












- Choice of secondary control or secondary containment systems
- Secondary housing designed for 16 bar pressure conditions
- O-rings to completely seal secondary housing
- Provision for Liquid Sensing probe or Pressure Sensing device to be fitted in Secondary housing
- Fully compliant to ISO requirements
- Available on both Close Coupled and Separately Mounted design configurations
- Extended Spacer and Shaft design utilised on Separately Mounted designs
- For process temperatures < 205°C

...when product integrity cannot be compromised

Pump End Interchangeability Matrix

PUMP C/L HEIGHT PUMP REAR FOOT	132mm 		160mm 		HYDRAULIC PARTS KIT							
SIZE CASING & IMPELLER	J3 50-32-160L	J1 50-32-160	J1H 50-32-160H	J2 65-50-160		J2H 65-50-160H	J4 80-65-160	J4H 80-65-160H	J5 50-32-200	J6 50-32-200L	J7H 65-40-200H	J8 80-50-200
CASING DRAIN	NONE					3/8"BSPP PLUGGED						
PUMP SHAFT	STANDARD 					COMMON PARTS KIT						
BUSH HOLDER	STANDARD 											
PRIMARY CONTAINMENT GASKETS	STANDARD 					CASING & CONTAINMENT SHELL 					PRIMARY SEAL KIT	
INNER MAGNETIC RING	DB4 		DB6/DB8 		DB6-ZL 		MAGNETIC DRIVE KIT					
CONTAINMENT SHELL	METALLIC 					COMPOSITE 						
OUTER MAGNETIC RING	DB4 		DB6 		DB8 			DB6-ZL 				
SECONDARY CONTROL / SECONDARY CONTAINMENT	NO					YES					COUPLING HOUSING KIT	
COUPLING HOUSING	STANDARD 					PRESSURE TESTED 						VENT, DRAIN & INSTRUMENT CONNECTIONS
DRIVE END OPTIONS	REFER TO CLOSE COUPLED DRIVE END MATRIX					REFER TO SEPARATE MOUNTED DRIVE END MATRIX						

Drive End Interchangeability Matrix

LIQUID END OPTIONS	REFER TO LIQUID END MATRIX				
SECONDARY SEAL	NONE	SECONDARY CONTROL 	SECONDARY CONTAINMENT 		
MOTOR ADAPTOR PRESSURE TEST	NO PRESSURE TEST		PRESSURE TESTED		
MOTOR ADAPTOR	IEC 90SL 	IEC 100SL/112SM 	IEC 132SM 	IEC 160ML/180ML 	
DRIVE ADAPTOR	IEC 90SL 	IEC 100SL/112SM 	IEC 132SM 	IEC 160ML 	IEC 180ML 
MOTOR	IEC 90SL	IEC 100SL/112SM	IEC 132SM	IEC 160ML	IEC 180ML
	FLANGE MOUNTED	FLANGE MOUNTED	FLANGE MOUNTED	FOOT & FLANGE MOUNTED	FOOT & FLANGE MOUNTED

CLOSE COUPLED DRIVE END KIT

CLOSE COUPLED DRIVE END MATRIX

LIQUID END OPTIONS	REFER TO LIQUID END MATRIX					
SECONDARY SEAL	NONE	NONE SPACER	SECONDARY CONTROL	SECONDARY CONTAINMENT		
BEARING HOUSING PRESSURE TEST	NO PRESSURE TEST		NO PRESSURE TEST	PRESSURE TESTED		
BEARING HOUSING SPACER	NONE STANDARD PUMP LENGTH		SPACER EXTENDED PUMP LENGTH			
INBOARD OIL SEAL	THROWER	LABYRINTH	AES OP66	INPRO VB45S	INPRO VB45U	ISOMAG MPV
INBOARD OIL SEAL	LABYRINTH	AES OP66	INPRO VB45S	INPRO VB45U	ISOMAG MPV	
OIL LUBRICATION METHOD	OIL BATH				PURE OIL MIST	PURGE OIL MIST
OIL LEVEL MONITORING	SIGHTGLASS	CONSTANT LEVEL OILER INC. VIEWPORT		NONE	OILER & DRAINABLE SIGHTGLASS	
BEARING HOUSING VENTING	VENTED		CLOSED		CLOSED ONLY	
BEARING HOUSING DESIGN	BASIC	COMPLEX		COMPLEX ONLY		

SEPARATE MOUNTED
DRIVE END KIT

SEPARATE MOUNTED DRIVE END MATRIX

Flanges and Connections

Casing

Suction and discharge flanges are designed in accordance with the following standards:

DIN 2543 PN16 Machined with 2.0 mm high raised face having a continuous spiral groove

Flange Loadings

Allowable flange loadings imposed by the pipework are in accordance with ISO 5199.



Options

A wide variety of options are available:

Materials of Construction:

316L Stainless Steel (standard)

Alloy C (optional variant)

Alloy 20 (optional variant)

Containment Shells:

Metallic Construction (- 40°C to 260°C)

High Efficiency ZeroLoss® PEEK (- 40°C to 120°C)

Internal Bearings:

Silicon Carbide vs Silicon Carbide (standard)

Carbon vs Silicon Carbide (optional)

Silicon Carbide vs CMC (optional)

Casings Drain:

No Drain or 3/8" BSP Plugged

Gaskets:

Compressed Synthetic Fibre, PTFE or Graphite

Mounting Configuration:

Close Coupled:

(IEC B5 Flange or B35 Foot / Flange Mounted Motor)

Separately Mounted:

(IEC B3 Foot Mounted Motor and Flexible Coupling)

Constructional Variants:

Secondary Containment

Secondary Control

Oil Bath / Oil Mist Lubrication of external bearing assembly

205°C - 260°C Thermal Break

Instrumentation:

Power Sensing, Temperature Sensing and VapourView®

Instrumentation and Protection

It is recommended that magnetic drive pumps are installed with one or more of the following instrumentation options.

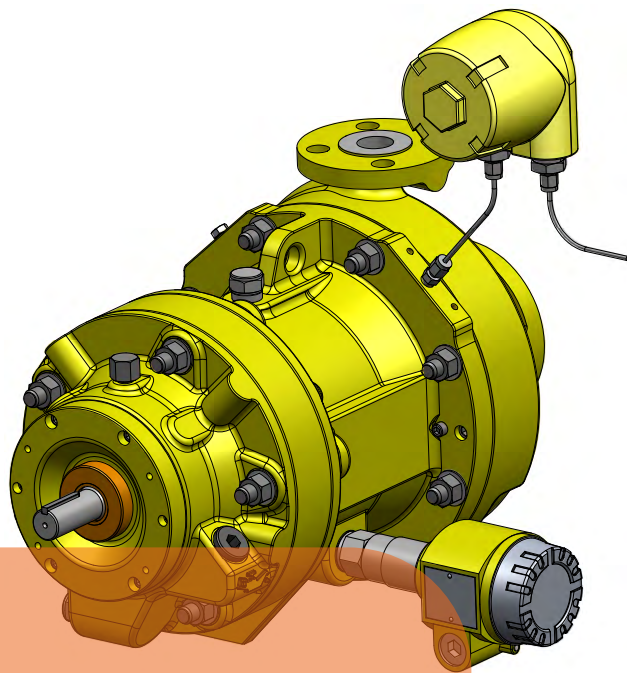
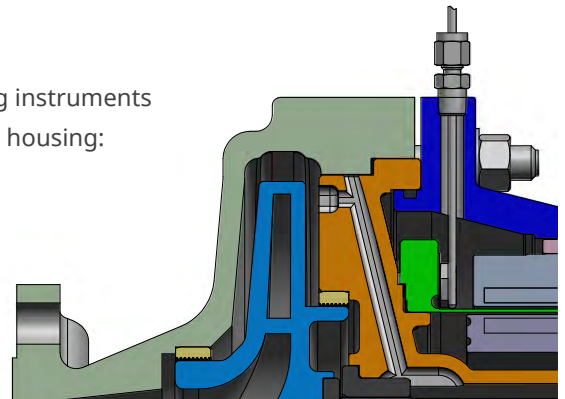
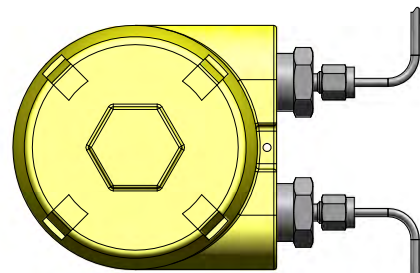
- **Power Control Monitor**
- **Temperature measurement of the containment shell**

Provision for VapourView® is also included.

For pumps supplied with Secondary Sealing systems, the following instruments should be considered to detect leakage in the secondary pressure housing:

- **Liquid sensing probe**
- **Pressure sensing device**

It should be noted that both should be set to stop the pump immediately if the presence of process liquid is detected



In situ site upgrade options

The CSA pump has been specifically designed to allow onsite changes/upgrades to be carried out with ease. All require only standard tools and no hot working:

- Conversion between Close Coupled and Separately Mounted configurations
- Lubrication type of the external bearing assembly
 - Oil bath / Purge Oil Mist / Purge Oil Mist
- Upgrades to the external bearing assembly seals
 - A number of proprietary seal options are available
- Change to ZL magnetic coupling and containment shell
- Upgrade of CC or SM pumps to feature secondary control or containment

Value Proposition

HMD Kontro high quality Sealless Pumps move hazardous and high value liquids with simplicity and in complete safety whilst ensuring maximum production output and profitability.

THINK SEALLESS

"We find HMD Kontro pumps last over 20 years but sealed pumps need to be replaced in 10 or 12 years."

Pharmaceutical manufacturer

Sealless pumps are easy to maintain, have few working parts, no potential leak paths and no support systems to design, install and maintain. When selecting a sealless pump over a mechanical sealed pump it doesn't just come just down to the long term cost benefits. The sealless technology is by design, the right choice for situations involving high temperatures, high viscosity, high pressures and volatile substances for many more reasons than just the life time cost.



SEALLESS SYSTEM

What is a sealless magnetic drive pump?

A sealless pump is essentially a conventional centrifugal pump without packed glands or mechanical seals. The dynamic seal that would normally be used to seal the impeller shaft is instead replaced by a static containment shell -- or shroud -- to form a completely sealed liquid end or pressure boundary.

Why are they sealless?

Mechanical seals are widely regarded as the weakest point in any pumping system using them, according to a report by the Uk Health and Safety Executive, they account for 80% of all pump failures, the remainder being leakage through static seals such as gaskets / O rings and bearing failure. It follows that if you eliminate the problem, you eliminate the failures and save costs.

Sealless pumps don't leak, meaning that they can help reduce process inefficiencies, maximize output and minimize the risks posed to your process environment by hazardous and volatile materials.



SEALLESS SELECT

For situations involving high temperatures, high viscosity, high pressures and volatile substances, sealless magnetic drive pumps are the clear choice. Specifically, when it comes to applications that involve toxic, fine, corrosive and aggressive liquids that must be handled, our sealless magnetic drive pumps deliver the rock solid performance that engineers demand and that industrial regulations require.

- **Chemical**
- **Pharmaceutical**
- **Fine chemical**
- **Agrichemical**
- **Oil & Gas (upstream and downstream offshore and onshore)**
- **Food & beverage production**
- **And across many industrial operations**



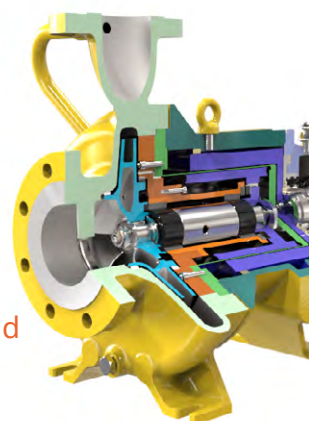
Typical applications are for fluids presenting difficult and/or costly sealing challenges:

- Acids
- Solvents
- High Melting Point Liquids
- Heat Transfer Fluids
- Volatile liquids - LPG, Processed hydrocarbons, Crude oil
- Hazardous liquids
- Expensive Fluids
- Fluids under pressure
- Toxic
- Pungent
- Corrosive
- Radioactive
- Crystallising



SEALLESS SERVICING

Thanks to a modular construction and the ability to dismantle HMD Kontro sealless pumps without special tools, servicing and maintenance of the pumps on site is simple and straightforward.



- **Simple design**
- **Minimal maintenance skills required**
- **No complex seals or sealing systems**
- **No special tools**

The modular construction and common componentry, for example cartridges, means less spare parts stock and inventory for reduced operational costs

- **Site repairable**
- **Cartridge design means minimum spares**
- **Cartridge Replacement: Only basic tools needed (spanner & hex key) Time: 20 minutes**
- **No need for vibration monitoring**



SEALLESS SAVINGS

The adoption of sealless pumps can achieve the step change savings that are needed from concept to completion of your project and beyond, throughout the life of the pump.



SEALLESS SOLUTION

Combining cutting edge technology with over seventy years of expertise and experience, since we were the first in the world to develop the concept, sealless pumps provide complete peace of mind.

- | | | |
|----------------------------------|---|---------------------------------------|
| • No Seals | • No Environmental Hazards | • No Need to Decontaminate |
| • No Seal Support Systems | • No Health Issues | • No Loss of Product |
| • No Risk of Seal Failure | • No Safety Concerns | • No Loss of Production Output |
| • No Leaks (At All!) | • No Maintenance (Almost!) | • No Unexpected Expenses |
| • No Emissions | • No Buffer or Flush Fluid Costs | • No Problems! |

Sealless Service

Although our pumps only require minimal maintenance, that does not mean there is no after sales service from HMD Kontro. Quite the opposite in fact.

Our own After Sales team, together with our channel partners around the world, can help to optimise the performance and through life experience of using HMD Kontro pumps. From assisting with installation and commissioning, including ensuring smooth contract execution and swift provision of all the appropriate documentation, through to optimising your spares inventory and operating efficiency using the benefit of our experience.

Extending MTBF (mean time between failure) and providing you with the appropriate parts to effect fast maintenance and quick replacement where necessary, will significantly assist in reducing downtime and minimising through life costs, which are already inherently low with an HMD Kontro pump.

To learn more about why sealless is so suitable for your application, please contact us, either directly or through your country partner, details of which can be found on www.sundyne.com. We look forward to helping sealless be of service to you.

