

## Technical Profile

### Secondary Control/ Containment Options

**Selection of a magnetic drive pump for extremely hazardous liquids is quite common. The nature of the design eliminating the need for a dynamic seal and associated ancillary support system has many benefits. However, on some applications additional levels of product security may be needed.**



The HMD Kontro ranges of magnetic drive pumps feature containment shells that are designed in accordance to the ASME Boiler and Pressure Vessel Code. The containment shell forms part of the primary pressure vessel and is hydro-tested to 150% of MAWP, prior to final test and shipment, to demonstrate the integrity of the design and material of construction. A breach of the primary containment shell is an extremely rare occurrence. To further guard against the highly unlikely consequences of a primary shell leak, HMD Kontro can offer options for upgrades.

#### Purpose

Secondary protection is used to either control or contain any leakage in the unlikely event of a breach in primary pressure containment (Containment Shell). HMD Kontro have developed an approach that facilitates the upgrading of many existing installations to feature secondary protection options.

#### Options

There are two methods of secondary protection:

- 1) Secondary Control is a structure that surrounds the primary pressure containment shell that restricts liquid release, but does not completely contain it. Some leakage would occur through the secondary structure, but this release would be slowed.
- 2) Secondary Containment provides a structure that surrounds the primary pressure containment shell, which will fully contain all liquid that is present from a primary pressure containment leak.

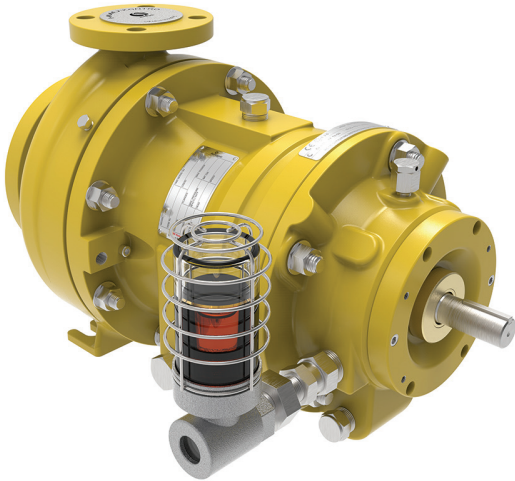
Both methods should be instrumented such that upon detection of the primary pressure breach, operation of the pump is immediately ceased.

# Pump Upgrades

Upgrades are available for most HMD Kontro ASME, ISO and API pump installations:

- GSA or GSI Frame 1 pumps (DA magnetic coupling sizes)
- GSA or GSI Frame 2 pumps (EA magnetic coupling sizes)
- GSP Frame 1 (DA magnetic coupling sizes)
- GSP Frame 2 (EA magnetic coupling sizes)
- GSP Frame 3 (FA magnetic coupling sizes)

## Typical GSA or GSI upgrade:



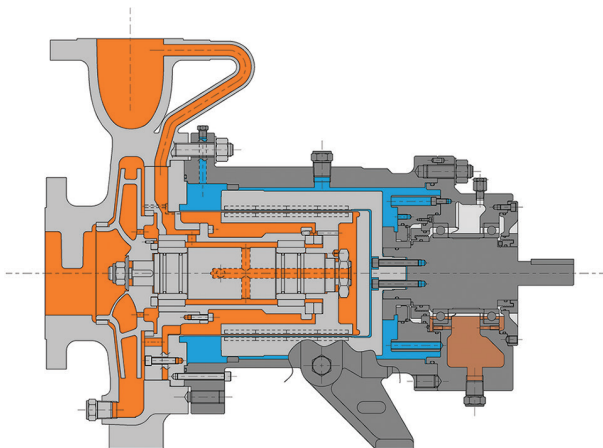
### Application Parameters:

Temperature: -40°C to 260°C (-40°F to 400°F)  
Pressure: 18.9 Bar (275 psi)

**Coupling Housing** – Pressure tested with screwed and plugged Vent, Drain and Leakage Detector connections.

**Bearing Housing** – Pressure tested and includes selected sealing option. Supplied with 40-50mm (1.6-2.0 in) integrated spacer piece.

**Note:** Overall length of pump increases by 40-50mm (1.6-2.0 in). Specific dimension will depend on pump model.



## Typical GSP upgrade:

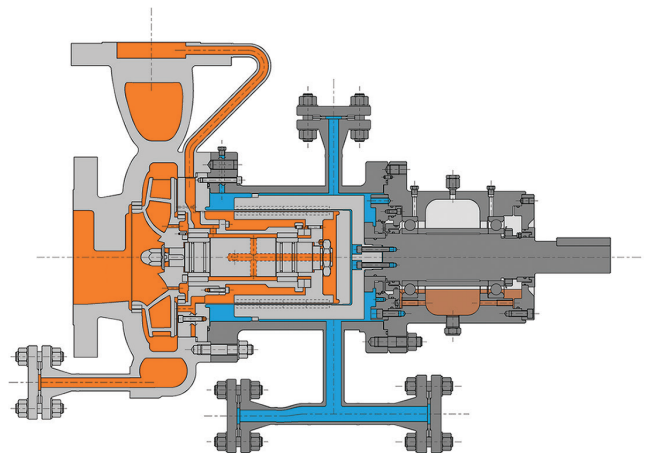


### Application Parameters:

Temperature: -40 to 260°C (-40°F to 400°F)  
Pressure: 40 Bar (580 psi)

**Coupling Housing** – Pressure tested with Flanged Vent, Drain and Leakage Detector connections.

**Bearing Housing** – Pressure tested and includes selected sealing option.



Each installation will be reviewed by HMD Kontro to ensure the specific installation can be upgraded, and a detailed scope of work generated covering all aspects of the upgrade will be provided.

## Secondary Containment Details

### Non-contacting gas seal

<b>Materials of Construction</b>	Seal Body: Stainless Steel Static Facing: Impregnated Carbon Dynamic Face: Silicon Carbide O-Rings: FKM or FFKM
<b>Pressure Rating</b>	40 bar (580 psi)
<b>Application Temperature (Liquid)</b>	-40°C to 260°C (-40°F to 500°F)
<b>Maximum Speed</b>	3500 rpm

When operating at normal operating speed, the non-contacting gas seal rotor and stator parts are separated by a micrometre thick gas film. If primary leakage is detected, the pump is immediately shutdown. With the pump decelerating, secondary containment is maintained by the non-contacting mechanical seal. As soon as the pump rotation is halted the sealing gap between the rotor and stator parts of the non-contacting mechanical seal reduces to zero and secondary containment is achieved.

## Secondary Control Details

### Non-contacting Labyrinth

<b>Materials of Construction</b>	Seal: Stainless Steel Static Face: Carbon Dynamic Face: Stainless Steel O-Rings: FKM or FFKM
<b>Pressure Rating</b>	40 bar (580 psi)
<b>Application Temperature (Liquid)</b>	-40°C to 260°C (-40°F to 500°F)
<b>Maximum Speed</b>	3500 rpm

Under normal operating conditions the Non-contacting Labyrinth device features dynamic O-rings that form a non-contacting labyrinth. If primary leakage is detected, the pump is immediately shutdown. With the pump decelerating, secondary control is maintained by the non-contacting labyrinth. Pressure within the secondary pressure housing causes the normally non-contacting seal faces to become contacting further minimising leakage, until the pump is halted. Once pump rotation is halted, the now contacting seal faces minimise leakage and secondary control is achieved.

It is recommended that for secondary control the coupling housing drain be connected to a suitable drainage system via an open valve. The entire drain system must be at a lower pressure than the pumps suction pressure to ensure that leakage flows away from the pump.

## Considerations

**Materials of Construction** – The coupling housing and bearing housing are normally supplied in Carbon Steel materials. It should be noted that exposure to the pumped liquid would not normally occur, and if it does occur as a result of a primary containment leak, the amount of time these components would be exposed to the pumped liquid would not typically be long.

**Leakage Detection Devices** – Liquids that have low Vapour Pressures will remain in their liquid state, thus a Liquid sending probe located in the bottom of the secondary housing will detect leakage. Liquids that have higher Vapor Pressure characteristics may require a pressure sensor located at the top of the secondary housing to detect leakage.

Some applications may have a specific Instrumentation requirement or require specific sized drain or flush connections.



## HMD Kontro offer a variety of retrofit upgrade options to optimise reliability and performance

### ZeroLoss Shell Upgrade

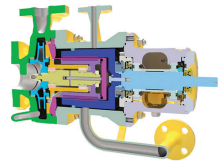
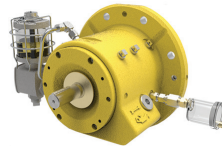
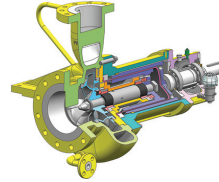
The ZeroLoss containment shell/shroud features a revolutionary shroud design and material to improve efficiency and reduce equipment life cycle costs. Engineered from a low mass material blend, the ZeroLoss containment shell is capable of enduring the rigours of a wide range of process applications plus offers a range of benefits including a high tensile strength and resistance to thermal shock.

### CMC Thrust Bearing Upgrade

The CMC Thrust Bearing, made from Ceramic Matrix Composite material, is a robust design solution for cavitation, volatile liquids and marginal pumping applications. The CMC material comprises a silicon oxy-carbide matrix with continuous carbon fibre reinforcing which offers greater fracture resistance to shock or vibration loading.

### GSP Modular Bearing Housing Upgrade

The Modular Bearing Housing can be retrofitted to existing GSP pumps, and is available in two configurations, 'standard' and 'pressure-tested' for those applications requiring secondary containment. The advantages of the Modular Bearing Housing include improved lubrication, no overfilling, and a variety of oil seal options.



To maximise your uptime, please contact HMD Kontro's highly skilled Aftersales Technical Support Team who have vast experience in the operational aspects that customers may encounter during the lifetime of their sealless pump installations. We are keen to share this knowledge with you to ensure your pump maintenance is optimised and straightforward, fast and cost effective. Our Engineers are always on hand to provide trouble shooting advice and to recommend suitable upgrades, spares kits and stock inventory levels for pumps located at any plant or location around the globe.

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