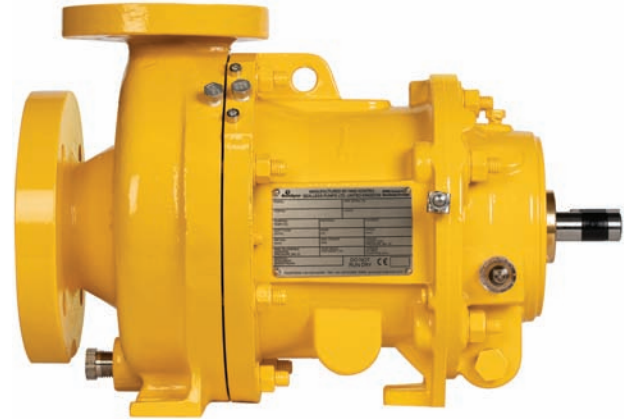


Technical Profile

HMD Kontro CSA Frame 1 (60Hz)

Magnet Drive end suction centrifugal pumps in accordance to ASME B73.3-2015

A modular range of chemical service pumps designed to cover a wide duty and application base using the minimum of pump models by maximizing interchangeability of components. Available within the range is the CSA (ASME B73.3-2015) and CSI (ISO 2858:2010 and ISO 15783:2003) versions. **This profile covers the CSA derivative only.**



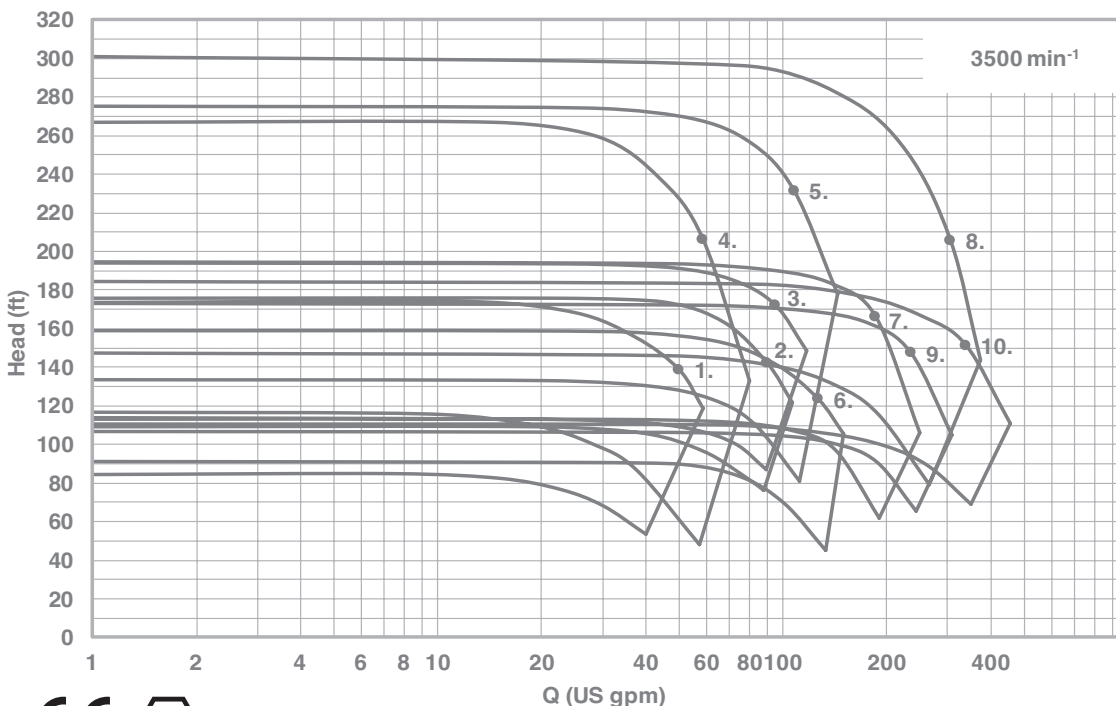
The CSA (ASME) Frame 1 product line covers a hydraulic range that offers pumping solutions up to 30hp. The pumps are offered with a range of bespoke Synchronous Magnetic Drives rated to match prime mover performance and fitted with either metallic or high efficiency ZeroLoss[®] containment shells as standard.

The range is based on a number of hydraulic sizes and fully conform to the ASME B73.3:2015 dimensional, performance and construction requirements. Close coupled and separately mounted variants are available.

The range is produced in 316 Stainless Steel as the standard material of construction with optional Alloy C and Alloy 20 materials available. Internal product lubricated bearings are Silicon Carbide, with Carbon and Ceramic Matrix Composite (CMC) variants to order.

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.

Performance of the CSA Frame 1 Pump Range



Pump Model

| Reference | CSA |
|-----------|------------|
| 1 | 1.5x1x6-L1 |
| 2 | 1.5x1x6 |
| 3 | 1.5x1x6H |
| 4 | 1.5x1x8-L1 |
| 5 | 1.5x1x8 |
| 6 | 3x1.5x6 |
| 7 | 3x1.5x6H |
| 8 | 3x1.5x8H |
| 9 | 3x2x6 |
| 10 | 3x2x6H |

Key Design Features

- **No Seals:** Minimizes 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 provide maximum flow / head coverage.
- **Low & High Flow Hydraulic Variants:** Provide optimised hydraulic fit.
- **Robust Design:** Featuring ZeroLoss® containment shell as standard for tolerance to system upsets.
- **Casing Gasket Fully Confined:** Eliminating the risk of blowout.
- **Internal & External Bump Ring Design:** Providing additional level of robustness.
- **Modular Rotating Element Cartridge:** Providing the most efficient way to perform replacements and manage your spare part inventory.

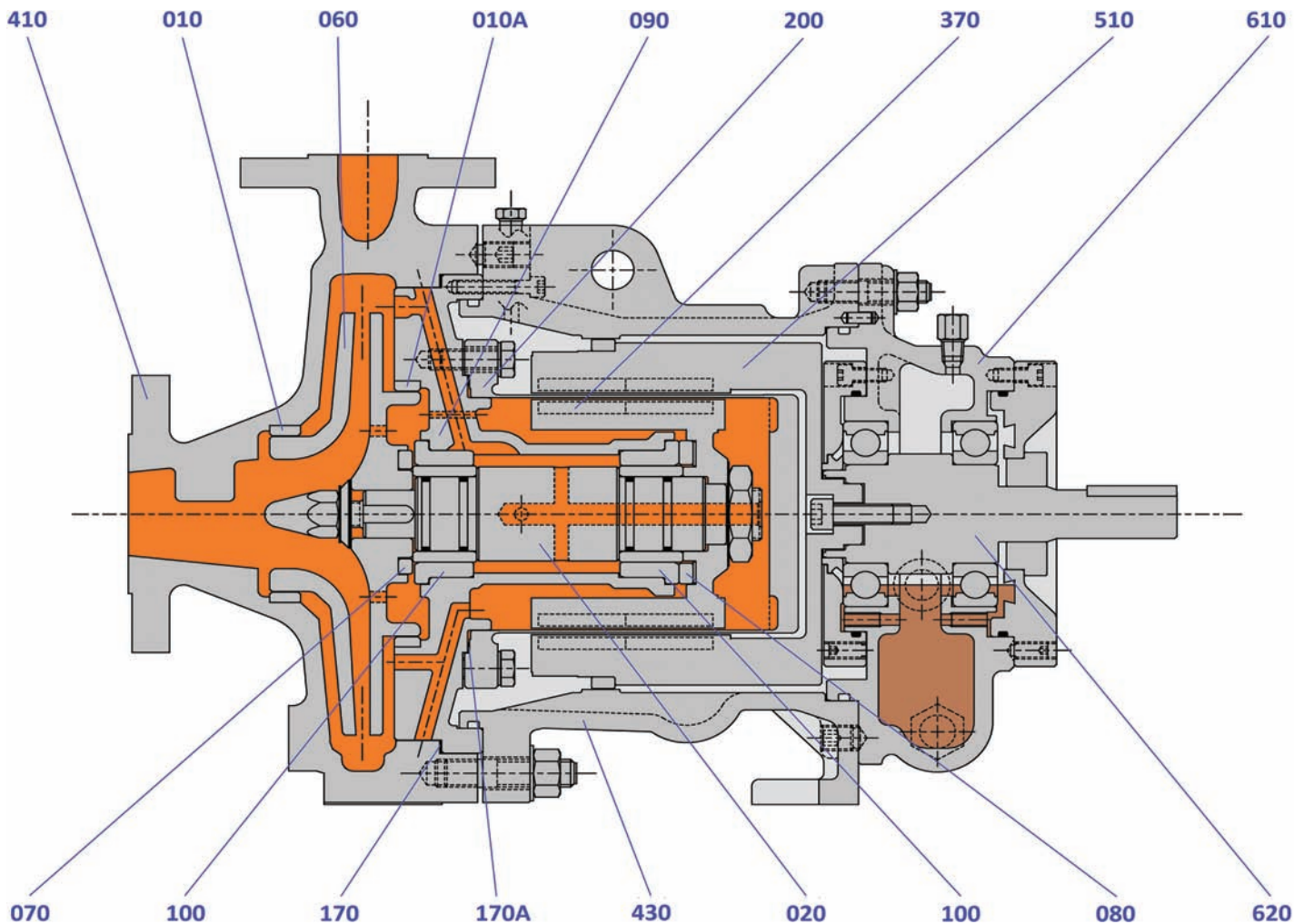
Benefits of CSA

Frame 1 Pump Range:

- Sealless design for total product containment
- Ideal for hazardous, toxic, aggressive, hot and valuable product
- Conforms fully to ASME standards
- Modular construction
- Interchangeable with existing ASME B73.1 or B73.3 installations
- Choice of materials of construction
- Site upgradable design features

Construction of CSA Frame 1 Pump

Separately mounted variant indicating standard build and materials

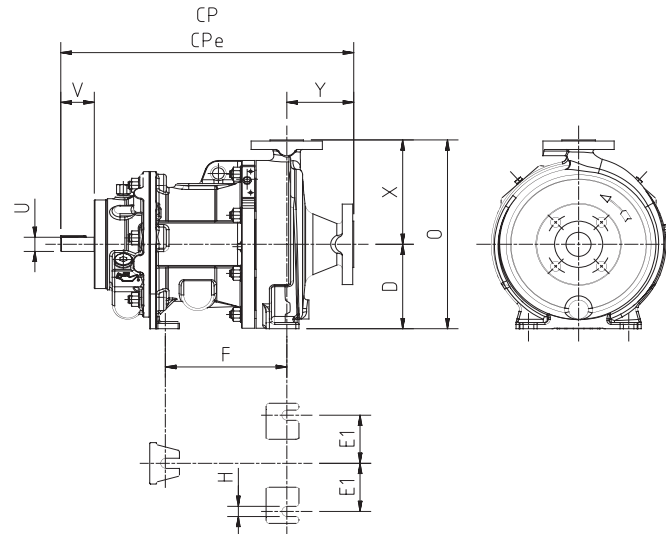


| | | | | | | | | |
|------|---------------------|-----------------|------|-------------------|-----------------|-----|-------------------|---------------------|
| 010 | Neck Ring (Front) | 316L St St | 090 | Bush Holder | 316L St St | 410 | Casing | 316L St St |
| 010A | Neck Ring (Back) | 316L St St | 100 | Bush | Silicon Carbide | 430 | Coupling Housing | SG Iron |
| 020 | Pump Shaft | 316L St St | 170 | Casing Gasket | CSF | 510 | Outer Magnet Ring | C. Steel (Sheathed) |
| 060 | Impeller | 316L St St | 170A | Shell Gasket | CSF | 610 | Bearing Housing | SG Iron |
| 070 | Front Thrust Washer | Silicon Carbide | 200 | Containment Shell | Alloy C / 316L | 620 | Drive Shaft | Carbon Steel |
| 080 | Back Thrust Washer | Silicon Carbide | 370 | Inner Magnet Ring | 316L St St Clad | | | |

Dimensions of CSA Frame 1 Pump

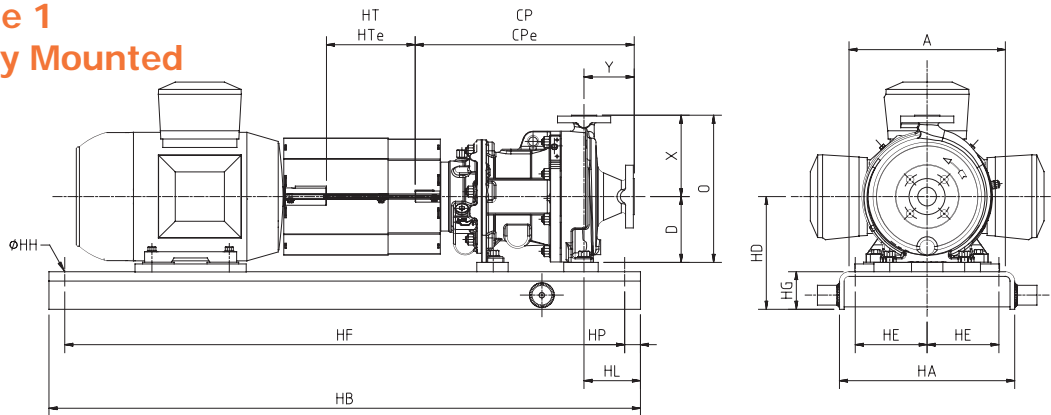
Dimensions are for guidance only

CSA Frame 1 Separately Mounted (Bareshaft)



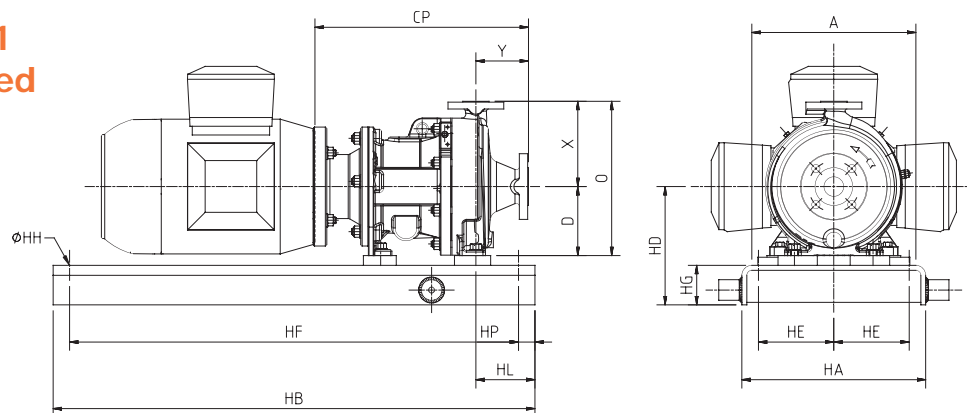
| Size | CP | CPe | D | 2E1 | F | H | O | U | V | X | Y |
|-------------|------|-----|------|-----|------|-------|-------|-------|---|-----|---|
| All Frame 1 | 17.5 | 19 | 5.25 | 6 | 7.25 | 0.625 | 11.75 | 0.875 | 2 | 6.5 | 4 |

CSA Frame 1 Separately Mounted



| Motor Frame | A | HA | HB | HT | HTe | HD | HE | HF | HG | HH | HL | HP |
|----------------|----|----|----|-------|-----|------|-----|------|-----|------|-----|------|
| 143TC – 184TC | 12 | 14 | 43 | 5.575 | 4 | 9 | 4.5 | 40.5 | 3 | 0.75 | 4.5 | 1.25 |
| 213TC – 256TC | 15 | 17 | 52 | 5.575 | 4 | 10.5 | 6 | 49.5 | 3.5 | 0.75 | 4.5 | 1.25 |
| 284TSC – 326TC | 18 | 20 | 57 | 5.575 | 4 | 12.5 | 7.5 | 54.5 | 4 | 0.75 | 4.5 | 1.25 |

CSA Frame 1 Close Coupled



| Motor Frame | CP | A | HA | HB | HD | HE | HF | HG | HH | HL | HP |
|-----------------|-------|----|----|----|------|-----|------|-----|------|-----|------|
| 143TC – 145TC | 15.14 | 12 | 14 | 32 | 9 | 4.5 | 29.5 | 3 | 0.75 | 4.5 | 1.25 |
| 182TC – 184TC | 15.65 | 12 | 14 | 32 | 9 | 4.5 | 29.5 | 3 | 0.75 | 4.5 | 1.25 |
| 213TC – 215TC | 16.17 | 15 | 17 | 41 | 10.5 | 6 | 38.5 | 3.5 | 0.75 | 4.5 | 1.25 |
| 254TC – 256TC | 16.80 | 15 | 17 | 41 | 10.5 | 6 | 38.5 | 3.5 | 0.75 | 4.5 | 1.25 |
| 284TSC – 286TSC | 16.05 | 18 | 20 | 44 | 12.5 | 7.5 | 41.5 | 4 | 0.75 | 4.5 | 1.25 |

Range Capabilities (60hz)

| Model | Head | Flow | Design Temperature | Design Pressure | Viscosity | Mounting |
|-------------|--------|------------|--------------------|--------------------|----------------|-------------------------------------|
| CSA Frame 1 | 296 ft | 340 US gpm | -40 to 400°F* | 275 psi (at 100°F) | 0.1 to 200 cSt | Separately Mounted or Close Coupled |

*500°F with Thermal Spacer

Solids Handling

The units are capable of handling solids up to 5% w/w with sizes less than 150 microns.

Flanges and Connections

Casing

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

| | |
|-------------------------------|---|
| ASME B16.5 Class 150lb | Machined with 0.06 inch raised face having a continuous spiral groove |
|-------------------------------|---|

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°F to 400°F)
- High Efficiency ZeroLoss® PEEK (-40°F to 250°F)

Internal Bearings:

- Silicon Carbide vs Silicon Carbide (standard)
- Carbon vs Silicon Carbide (optional)
- Silicon Carbide vs CMC (optional)

Casings Drain:

- No Drain or ½" NPT Plugged

Flange Loadings

Allowable flange loadings imposed by the pipework are in accordance with ANSI/HI 9.6.2.

Gaskets:

- Compressed Synthetic Fibre or PTFE

Mounting Configuration:

- Close Coupled (NEMA C-Face or C-Face/Foot Flange Motors)
- Separately Mounted (NEMA Foot Mounted Motor and Flexible Coupling)

Constructional Variants:

- Secondary Containment
- Secondary Control
- Oil Bath / Oil Mist Lubrication of external bearing assembly
- 400-500°F Thermal Break

Instrumentation:

- Power Sensing, Temperature Sensing and VapourView®

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CSAF1 5.0 3/20 AM Letter.