Chemical Metering Hydrodrive Motor Pump Unit CMMPU(H)

- Controllable Flow Rates of up to 160 l/hr and down to 1.0 l/hr at up to 690 bar
- Established Piston Pump Designs Developed for use with Potentially Hazardous Chemicals
- Pump Speed Controlled By Adjustable Hydrostatic Drive
- Ultra Compact Multi-Piston Pump with Minimal Pressure Pulsation
- Worldwide Approvals
  - ATEX
  - CE
  - IECEx
  - UL

- Chemically Inert, Low Friction Ceramic Pistons
- Self-Priming on Start-up
- Hermetically Tight, Environmentally Friendly Product
- In Accordance with API 674 and 675 Standards

Innovative and Reliable Pump Solutions

www.bifold.co.uk
Introduction

Leading Technology

Product Innovation

The Bifold Group of companies have provided peace of mind to contractors, installers and end users for over a century. Our innovative range of products, specifically designed with the customer in mind, have gained worldwide approval and credibility for the onerous conditions as found in hazardous (classified) locations, hostile and subsea environments.

The customer requirements for sustained safety and reliability under extreme operating conditions are Bifold Marshalsea’s primary objectives.

Our state of the art production facilities based in the UK, allows our superior and innovative designs to be manufactured to rigorous manufacturing and quality standards.

The policy and overall business objective of Bifold Marshalsea, is to provide system packages of the highest quality and in compliance with customer requirements. We guarantee ease of installation and low lifetime cost of ownership - due to superior design, long-life materials, precision manufacturing and testing facilities.

Worldwide Service and Support

Located in Taunton, UK, Bifold Marshalsea has subsidiary locations in Houston, USA, Singapore and Manchester, UK. The Bifold Group of Companies are supported worldwide with our engineers and a global network of agents and distributors.

The Group have invested in state of the art machining centres ensuring accuracy of close tolerances, and a rapid turnaround capability together with state of the art assembly and testing facilities.

The customer can be confident that Bifold Marshalsea has the product portfolio and the technical and production capability to provide the correct solution for their system requirements, and provide support during and after installation.

Pumps for Special Fluids

Bifold Marshalsea provide pumps for use with fluids which include a variety of water-based, fire resistant and other media types. The properties of these fluids include a combination of high or low viscosity with either high or low lubricity.

Various pump models are available for use with water glycol and other calibration fluids.
Overview

The CMMPU(H) is designed to provide accurate chemical metering for oil and gas industry applications. This range of pumps has been developed for chemical fluids from the tried and tested Bifold Marshalsea water glycol pumps. These positive displacement, variable delivery, axial piston pumps feature a double sealing system to prevent the ingress of bearing housing oil into the process fluid. Bypass from the pistons is collected in an isolated cavity and returned to the inlet side of the pump. These pumps can have additional galleries and seals designed to prevent high pressure fugitive emissions and provide a hermetically tight product in the event of primary seal failures (shown in figures 16 & 17).

Chemically inert ceramic pistons with an extremely low coefficient of friction are fitted. Ceramic pistons extend the life of the seals and make for pumps with particularly long service intervals. The compact, three piston pump operates with minimal pressure pulsation and is in accordance with API 674 and 675 standards.

Motors can be either single or three phase AC or 24Vdc, subject to the power rating, and typically run at 1,450 rpm (max 1,800 rpm). The speed of the pump is controlled through either manual or electrical adjustment.

Certification Details

This pump conforms to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX compliant.

Bifold Marshalsea has been third party assessed and certified as meeting the requirements of ISO 9001: 2000 for the design, development, manufacture and servicing of Hydraulic Pumps, Relief Valves and Pressure Intensifiers.
Chemical Metering Hydrodrive Motor Pump Unit CMMPU(H)

Features-SMC Pump

Small Overall Footprint

Hermetically Tight, Environmentally Friendly Product Option

Established Piston Pump Designs Developed for use with Potentially Hazardous Chemicals

Accuracy of information:
The data are to ensure that product information in this catalogue is reasonably accurate and up-to-date. Important minor updates to product specifications may occur without prior notice. When ordering products, the applicable operating system design must be considered in ensuring safe use. The product specifications, material compatibility, adequate ratings, correct installation, operation and maintenance are the responsibilities of the system designer and user.

Quality Assurance:
All Bifold products are manufactured to a most stringent QA programme to ensure that every product will give optimum performance and reliability. We are third party certified to ISO 9001:2008. Functional test certificate, letter of conformance and copies of original mill certificates, providing total traceability are available on request, to BSEN 10204.3.1.B where available. We reserve the right to make changes to the specifications and design etc., without prior notice.

In Accordance with API 674 & 675
Features-SMC Pump

Ultra Compact Multi-Piston Pumps
Provide Minimal Pressure Pulsation

Chemically Inert, Low Friction
Ceramic Pistons

Controllable Flow Rates of up to 160 l/hr
and down to 1.0 l/hr at up to 690 bar

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Twin SMC Motor Pump Unit

Multiple Pump/Motor Sets Vs Multi-Head Drives

Whilst Bifold Marshalsea offers twin and triple pump configurations, multiple single pump/motor units are recommended in lieu of a single, high power, motor driving a multiple pump train.

Advantages of multiple single motor/pump units are:

- **Eliminates large power rated motor with very large start-up loads.**
- **Avoids Multiple Pump Shutdowns for a Single Pump Maintenance Requirement.**
- **Greater Installation Flexibility.**
- **Increased Life Expectancy for Pumps - Run only when Required.**
- **Reduced Installation Cost.**
- **Reduced Capital Spend.**
Overview

Remote Speed Control

As shown in Figure 7 above, the Hydrodrive can be adjusted electronically with a 4 - 20mA signal into a speed controller. Alternatively, as shown in Figure 8 above and in the picture on the left, the variable speed Hydrodrive can be directly controlled manually. Typically, a flow meter and flow rate readout are customer provided.

High Density, Close Grained Ceramic Piston

The pump pistons are made from close-grained, high density ceramic material. Figure 10 shows the spherical nature of the grain structure which results in a very low friction running surface. This, in turn, results in a product with a particularly long service life. The chemically inert nature of ceramic also makes it an excellent material for pistons designed to pump chemical fluids.

Suction Valve Lifters

The larger pumps are fitted with suction valve lifters to assist with priming.

Figure 12 shows the high integrity mechanical shaft seal fitted to this range of pumps. The provision of this seal prevents fluid escaping from the pump in the event that the pump casing becomes contaminated with the process fluid.
Overview

Chemical Metering Hydrodrive Motor Pump Unit CMMPU(H)

MMC Motor Pump Unit

SMC Motor Pump Unit

SWC Motor Pump Unit

Figures 16 & 17 Show Optional Additional Galleries and Seals Designed to Provide a Hermetically Tight Product for use with Toxic Chemical Fluids

XWHC Pump HP Outlet

XWHC Pump Delivery Valves

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Table 1

### PUMP SPECIFICATIONS

<table>
<thead>
<tr>
<th>Pump Type</th>
<th>cc/rev</th>
<th>Flow Range</th>
<th>Maximum Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>l/hr</td>
<td>USg/hr</td>
<td>bar</td>
</tr>
<tr>
<td>MMC</td>
<td>0.17</td>
<td>1 to 14.5</td>
<td>0.26 to 3.83</td>
</tr>
<tr>
<td>SMC</td>
<td>0.5</td>
<td>3 to 43.0</td>
<td>0.79 to 11.36</td>
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<tr>
<td>LMC (Pending)</td>
<td>1.0</td>
<td>8 to 80.0</td>
<td>2.1 to 21.0</td>
</tr>
<tr>
<td>LMC (Pending)</td>
<td>2.0</td>
<td>16 to 160</td>
<td>4.2 to 42.0</td>
</tr>
<tr>
<td>SWC</td>
<td>0.65</td>
<td>1 to 56.0</td>
<td>0.26 to 14.8</td>
</tr>
<tr>
<td>SWC</td>
<td>1.0</td>
<td>8 to 160</td>
<td>2.1 to 42.0</td>
</tr>
</tbody>
</table>

### MMC Motor Pump Unit

![Figure 18](image1.png)

### SMC Motor Pump Unit

![Figure 19](image2.png)

### SWC Pump With Motor Dimensional Drawing

![Figure 20](image3.png)
Comparison of Pump Types

Pump Comparisons

Comparison of Pump Types for Water-Based Fluids

Figure 21 shows the internal arrangement of a typical three piston triplex pump design. As can be seen from previous illustrations, pumps of this design are large and occupy a significant level of skid space. An external drive belt and pulley system is needed to drive these pumps. Typically, motors are mounted on top of the pump producing a large unit.

Guarding is required to enclose the belts further adding to the overall footprint and cost. Anti-sparking materials and corrosion protection are necessary for the external drive system components and guards. It is unusual for pumps of this type to be manufactured from stainless steel and as such further corrosion protection required.

Pulsation dampers are generally required when using triplex pumps.

The Bifold Marshalsea compact pump design is shown in figure 22. The motor is close-coupled to the pump, negating the requirement for pulleys and drive belts. There are no exposed rotating parts resulting in improved user and application safety, particularly in hazardous (classified) locations.

These pumps are manufactured from 316 Stainless Steel. The flow delivery of these pumps is smoother than with triplex pumps and there is generally no requirement for pulsation dampers. Since the design does not have belts or pulleys and is dynamically balanced, it has extremely low levels of vibration.
Information

Installation
The units can be mounted either horizontally or vertically. To ensure that low speed self-priming operates, a positive head must be provided by mounting the process fluid tank above the suction intake line. Standard configurations have the pump driven through a Hydrodrive variable speed gearbox. For some applications, having a single motor driving multiple pumps can be an attractive option - each pump individually controllable.

Quotations
For this product, variations in ranges of flow rates, operating pressures, control options and other parameters are extensive. If you can provide the information shown opposite, we will be delighted to respond with a specific quotation.

Information Required for a Quotation

Metered Fluid
Flow rate range required from ____ l/hr to ____ l/hr.
Operating pressure at discharge flange ____ bar.
Operating pressure at suction flange ____ bar.
Operating temperature, min ____°C to max ____°C.
Density at max operating temperature ____ g/cm³.
Viscosity at max operating temperature ____ cP.
Solids content / solids density ____%/g/cm³.
Solids grain size / solids hardness ____ mm/Mohs.

Motor Data
Hazardous area protection requirements.
Voltage, phases and frequency or whether dc.

Control Options
Remote or local manual.

Examples of Projects Supply for Pumps of this type

<table>
<thead>
<tr>
<th>Operator</th>
<th>Project / Rig</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP</td>
<td>Clair</td>
<td>North Sea</td>
</tr>
<tr>
<td>BP</td>
<td>Nam Con Son</td>
<td>Vietnam Offshore</td>
</tr>
<tr>
<td>BP</td>
<td>Shearwater</td>
<td>North Sea Central (UK)</td>
</tr>
<tr>
<td>BP</td>
<td>Thunderhorse</td>
<td>Gulf of Mexico</td>
</tr>
<tr>
<td>British Gas</td>
<td>Blake</td>
<td>North Sea</td>
</tr>
<tr>
<td>ConocoPhillips</td>
<td>Britannia</td>
<td>North Sea</td>
</tr>
<tr>
<td>Encana</td>
<td>Ross FPSO</td>
<td>North Sea (UK)</td>
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<tr>
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<td>Balder</td>
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<td>Statoil</td>
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<tr>
<td>Total</td>
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<td>North Sea</td>
</tr>
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</table>

Table 2

The table above is an extract taken from our main Project Reference List, where our range of pumps have been utilized.
Innovative and Reliable Pump Solutions

Instrument, Process, Directional Control Valves, and Pumps

Pneumatic and Instrumentation Valves

Hydraulic Valves

Subsea Valves

Hydraulic Pumps, Intensifiers and Valves

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