



**Fluidsentry™**  
Monitored Valves

# MONITORED HYDRAULIC VALVE SYSTEMS

*'HBV' Cetop 7&8 Series.*



**WORKSAFE VICTORIA AWARDS**  
**BEST RISK SOLUTION**  
**2005**



**SAFE WORK AUSTRALIA AWARDS 2005**



HBV762MA



HBV762MS



HBV862MA



HBV862MS

*Patented Technology*

**SUITABLE FOR RISK CATEGORY 4 APPLICATIONS**

*As per AS4024.1 – Parts 1501 & 1502*

*SIL3 (Dual Valves) as per IEC 61508 & EN ISO 13849*

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# SYSTEM OVERVIEW

## PURPOSE

The valve monitoring system is primarily designed as an interface between the fluid power operation of a machine and the electrical safety circuits monitoring gates, guard and emergency stop circuits. The monitoring function can provide for detection of a single valve fault including change of switching times, sticking valve or spontaneous change of state as per the requirements of Australian Standard AS4024.1 Safety of Machinery, **Part 1501** Design of safety related parts of control systems – General principles and European Standard EN954-1 Safety of Machinery – Safety related parts of control systems. The systems are additionally suited to the monitoring requirements of machine specific standards such as **AS1219** Power Presses-Safety Requirements, EN693 Safety of Hydraulic Presses and EN692 Mechanical Presses, CSA C22.2 No.139-1982 & CSA Z142-02 Code for power press operation: Health, safety and guarding requirements

## HYDRAULIC SYSTEM

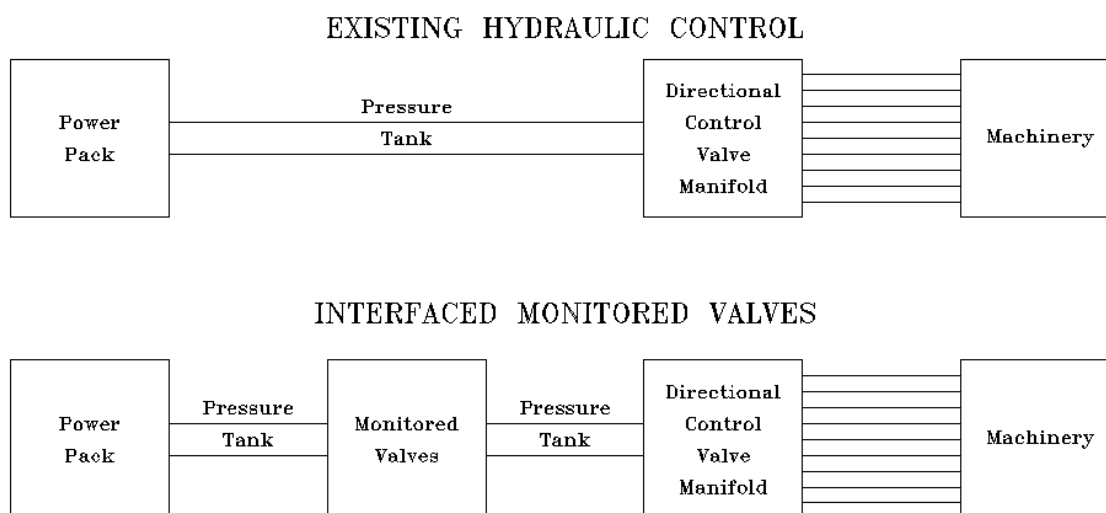
The Hydraulic system comprises two Cetop 3 valves for pilot function and two series connected Cetop 8 Eaton valves with a block & bleed spool configuration selected as determined by a hazard identification / risk assessment for each and every application.

The operation of the monitoring will now permit hydraulic power pack motors and pumps to remain online during operator access in to machinery areas which would have previously required full current isolation.

The following installation guidelines would require the pump to be pressure compensated type or a relief / unloading valve fitted directly on pump outlet.

## INSTALLATION

The dual valve system has been designed to interface with new or existing hydraulic applications and can be fully interlocked in to any existing safety systems to a category 4 level of integrity.



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## *HYDRAULIC PILOT VALVE SPECIFICATIONS*

<b>Description:</b>	Two directional control valves mounted on each of the Cetop 8 directional control valves for hydraulic safety applications in Cetop 3 sizes supplied in a four port two position single solenoid format. The valve incorporates a two pole precision positive driven plunger type limit switch pre approved to category 4 safety applications.	
<b>Materials:</b>	Main body, extension housing and end cap: Spool:  Pushrod Return spring: Spool Return Spring: Screws:	<b>Steel and Aluminium Induction Hardened Steel  Steel Steel Cap Screws</b>
<b>Switch:</b>	Make: Model: Type: Approvals: Contacts:	<b>Bernstein GC-U1Z iw Precision Limit Plunger EN 60947-5-1, EN 60947-1, 73/23/EEC 1 x Normally closed 1 x Normally Open</b>
<b>Wiring:</b>	Switch Contacts NC: Spare Contacts NO:	<b>11 – 12 White – Black 23 – 24 Brown – blue</b>
<b>Lead:</b>	Type:	<b>Polyurethane Oil Resistant</b>
<b>Coil:</b>	Voltages available: Current/Watts	<b>24VDC Cetop 3 1.25 Amp/30Watts</b>
<b>Performance:</b>	Valve working pressure range:  Solenoid: Port connection: P, T, T1, A, B Medium: Operating temperature range: Flow Rate Activation time: Deactivation time:	<b>0 – 350 Bar – Cetop 3  Direct Acting Cetop 3 Mounting Hydraulic Oil ISO 32 to 68 +20 C to +70 C Subject To Spool Selection Cetop 3 32 Milliseconds Cetop 3 40 Milliseconds</b>
<b>Rating:</b>	Protection:	<b>IP 65</b>
<b>Weight:</b>	Cetop 3 valve	<b>3Kg</b>
<b>Manual:</b>	Manual Override:	<b>Removed</b>
<b>Cleanliness:</b>	<b>ISO 4406 Code</b>	<b>19 / 16 / 13</b>



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Monitored Valves

## EN ISO 13849 Data Sheet

<b>Valve Type</b>	HBV-76, HBV-762MA, HBV-762MS HBV-86, HBV-862MA, HBV-862MS
<b>Date</b>	April 2011
<b>Revision</b>	A
<b>MTTFd</b>	150 years
<b>Vibration</b>	Vibration in line with spool axis < 5g
<b>Silting</b>	Silting occurs when hydraulic valves are left in the actuated position for long periods of time. It is recommended that the user considers periodically cycling the valve to limit these effects.

### Note

The products must be used in accordance with the installation instructions and operating conditions in the relevant data sheet, which has been produced to support the requirements of the harmonized standard EN ISO 13849.

Additionally, for products intended to be sold in European Economic Area:

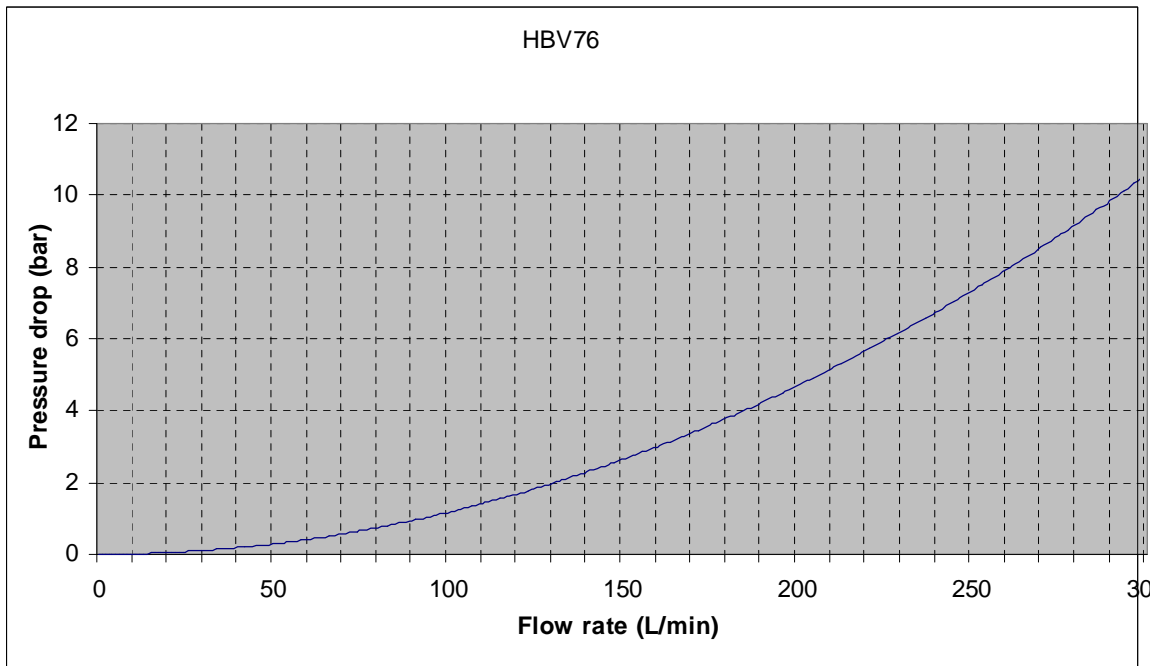
“Safety devices” or other safety functions mentioned in any product literature are not necessarily “safety components” as defined by the Machinery Directive 2006/42/EC, unless otherwise stated together with the CE Mark and specific reference to said directive.

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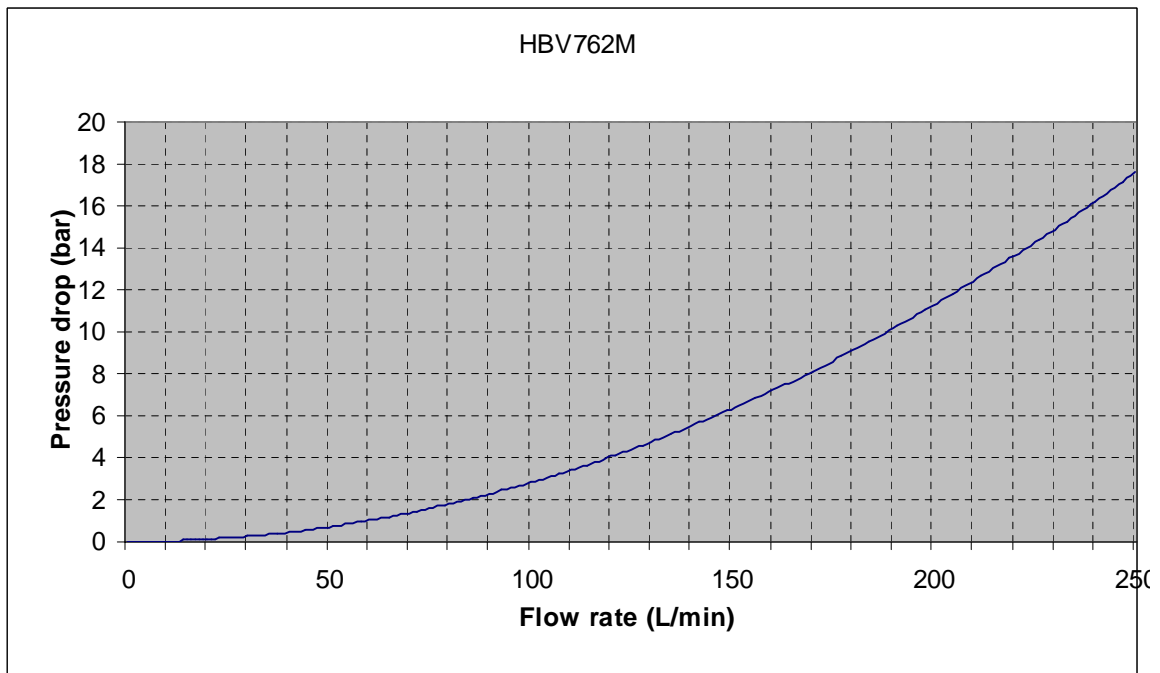
## HYDRAULIC CETOP 7 & 8 VALVE & MANIFOLD SPECIFICATIONS

<b>Description:</b>	Dual directional control valves mounted on a specially manufactured series ported manifold for hydraulic safety applications in Cetop 7 & 8 sizes supplied in a four port two position hydraulic pilot format. Each valve incorporates 2 two pole precision positive driven plunger type limit switch pre approved to Category 4 safety applications for both actuated and unactuated states.	
<b>Models:</b>	Cetop 7 Single / Dual Cetop 8 Single / Dual	<b>HBV76 / HBV762M</b> <b>HBV86 / HBV862M</b>
<b>Materials:</b>	Main body, extension housing and end cap: Spool:  Pushrod Return spring: Spool Return Spring: Screws:	<b>Steel and Aluminium</b> <b>Induction Hardened Steel</b>  <b>Steel</b> <b>Steel</b> <b>Cap Screws</b>
<b>Switch:</b>	Make: Model: Type: Approvals: Contacts:	<b>Bernstein</b> <b>C2-U1Z (600.8101.001)</b> <b>Precision Limit Plunger</b> <b>EN 60947-5-1, EN 60947-1, VDE 0660/100</b> <b>1 x Normally closed 1 x Normally Open</b>
<b>Wiring:</b>	Switch Contacts NC: Spare Contacts NO: Primary Valve Unactuated Primary Valve Actuated Secondary Valve Unactuated Secondary Valve Actuated	<b>11 – 12 White – Black</b> <b>23 – 24 Brown – blue</b> <b>Normally Open</b> <b>Normally Closed</b> <b>Normally Open</b> <b>Normally Closed</b>
<b>Lead:</b>	Type:	<b>Polyurethane Oil Resistant</b>
<b>Performance:</b>	Valve working pressure range:  Pilot Signal: Medium: Operating temperature range: Flow Rate Activation time: Deactivation time:	<b>0 – 350 Bar Steel Manifold</b> <b>0 – 210 Bar Aluminium Manifold</b> <b>Hydraulic</b> <b>Hydraulic Oil ISO 32 to 68</b> <b>+20 C to +70 C</b> <b>T.B.A.</b> <b>32 Milliseconds</b> <b>67 Milliseconds</b>
<b>Rating:</b>	Protection:	<b>IP 65</b>
<b>Weight:</b>	Cetop 7 Valve System Cetop 8 Valve System	<b>75Kg</b> <b>110kg</b>
<b>Manual:</b>	Manual Override:	<b>Removed</b>
<b>Manifold:</b>	Material:	<b>Aluminium</b> <b>Steel (Zinc Plated)</b>
<b>Connections:</b>	P & A Ports T Ports	<b>C7 Code 62 1" / C8 Code 62 1 1/4"</b> <b>C7 Code 61 1" / C8 Code 61 1 1/4"</b>

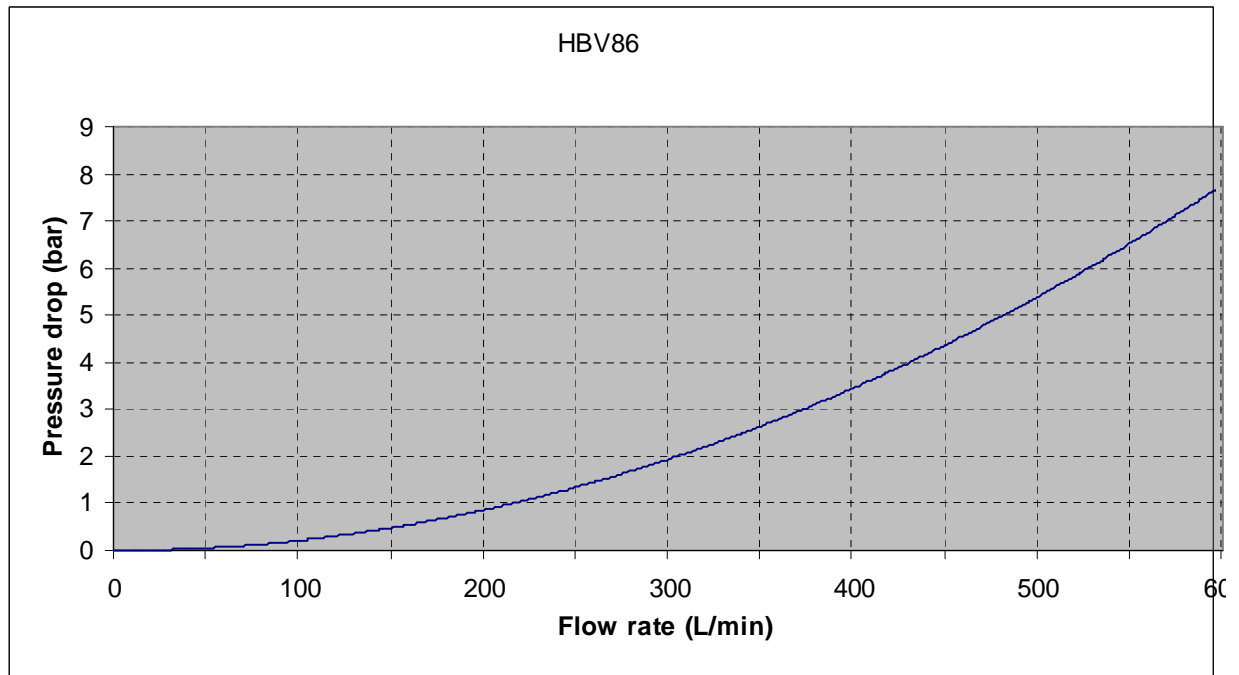
### *Cetop 7 Single Valve HBV76*



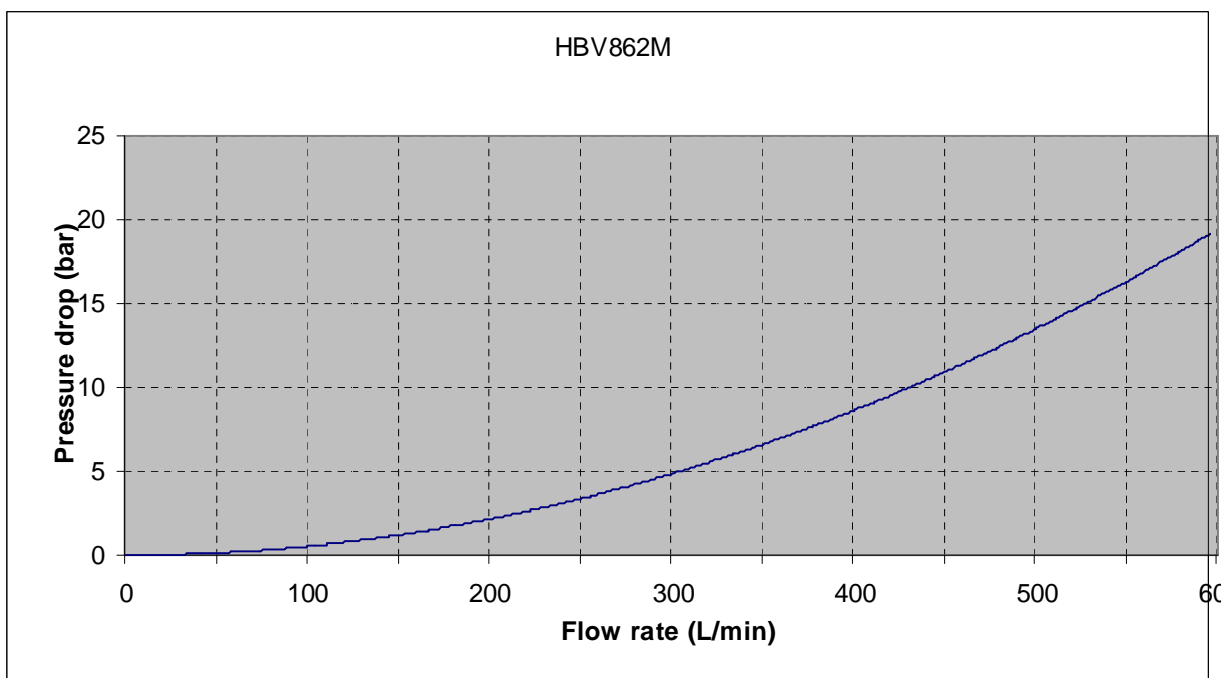
### *Cetop 7 Dual Valve HBV762M*



### *Cetop 8 Single Valve HBV86*



### *Cetop 8 Dual Valve HBV862M*





# DECLARATION OF CONFORMITY

Valves manufactured by Fluidsentry Pty Ltd to the specifications to conform to the requirements of the following Directives and European Standards.

Low Voltage Directive: 73/23/EEC – EN 60204, IEC 1010, IEC 950.

EMC Directive: 89/336/EEC – EN 55014, EN 50081-2, EN 50082-1, EN 50082-2

Machinery Directive: 98/37/EC – EN 292-1, EN 292-2, EN 982, EN 954-1, EN 1050.

Fluidsentry Pty Ltd herewith declares that the supplied Fluidsentry™ models of:

**VALVES: HBV 7 & 8 Series**

**TYPE: HYDRAULIC**

Comply with all applicable Directives and Harmonized Standards for Hydraulic Fluid Power Systems and their components and are qualified to bear the CE mark. Melbourne Australia – 7<sup>th</sup> May 2009

Valve 1 Serial No: ..... Valve 3 Serial No: .....

Valve 2 Serial No: ..... Valve 4 Serial No: .....

Manifold Serial No: .....

Test Date: ...../...../.....

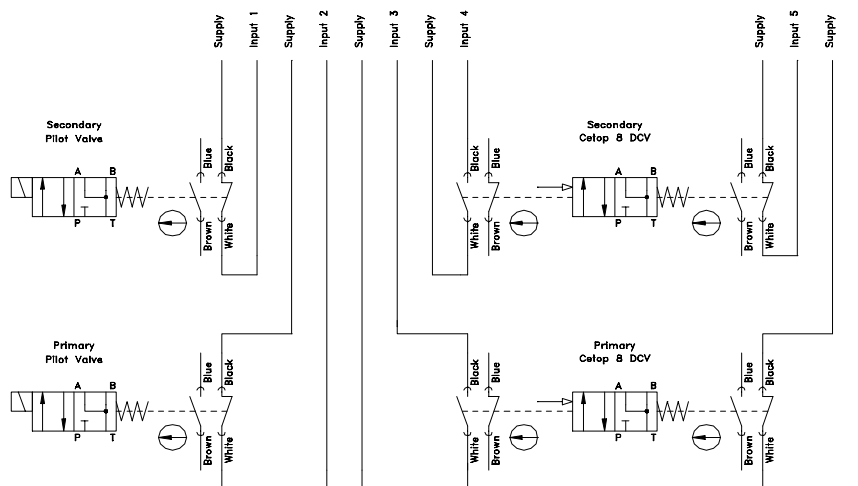
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**Murray Andrew Hodges**

Name and signature of  
Authorized person.



# ELECTRICAL INTERFACING/INTERLOCKING

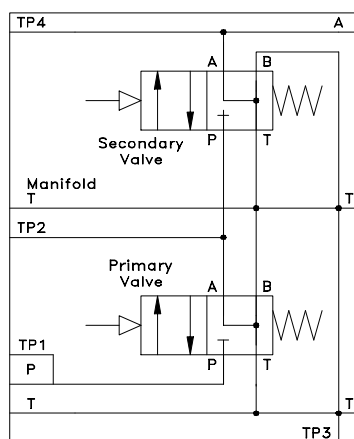


Copyright Fluidsentry PATENT PENDING Example Only

*Note: Inputs 3 & 4 are in actuated state when valve system deenergized.*

## MANIFOLD

Copyright Fluidsentry PATENTED TECHNOLOGY



Warning: Not Suitable For Supporting Gravity Loads

**CAUTION – IMPORTANT:** The above drawings are a conceptual example and are intended for guidance purposes only. They have not been specifically drawn in relation to your plant. Failing to ensure professional installation of Fluidsentry equipment which has regard to the specific circuit design and operation of the plant on which it is being installed may create a safety hazard. Accordingly Fluidsentry is not liable for any loss or injury, whether direct or indirect, resulting from the incorrect installation of this product.

## **CORRECT USAGE**

### **Circuit Placement and Connection**

Careful consideration must be given to suitable circuit placement and care must be taken not to pressurise the tank port of the monitored valve. Pressurisation of the tank ports can cause damage to the valve. Outlet ports of control valving must not be connected the 'T' port of the monitored valves. For example where a monitored block and bleed function is to be performed in conjunction with a directional control valve (DCV), the monitored valve would be typically placed in circuit prior to the DCV. The 'T' or tank ports must be plumbed directly to tank without any other interconnection or restriction.

### **Cleanliness**

Fluidsentry recommends 10 micron absolute filtering for the hydraulic supply to monitored valving.

### **Connection of Tank Lines**

Return line filtering must not be used on 'T' or 'T1' tank lines.

### **Silting**

Silting occurs when hydraulic valves are left in the actuated position for long periods of time and in conjunction with dirty or contaminated oil this can cause valves to seize in a dangerous state. The only remedy for such a situation is maintained oil filtering systems and periodic operation of valves. Valves should be cycled a minimum once every 8 hours of continuous operation. Silting may also be overcome by cycling each valve at some idle time when there is no requirement for access by operators and there is no operation of the hydraulics.

### **Power Supply**

A power supply providing the total current consumption of each coil energised at any one time is required. If an inadequate power supply exists, valves may fail to energise and solenoid coils could be subject to damage.

### **Cooling**

The solenoid coils of the HBV series monitored valves are cooled via recirculation of the hydraulic oil. Solenoid coils should not be energised for an extended period without an active hydraulic oil supply.

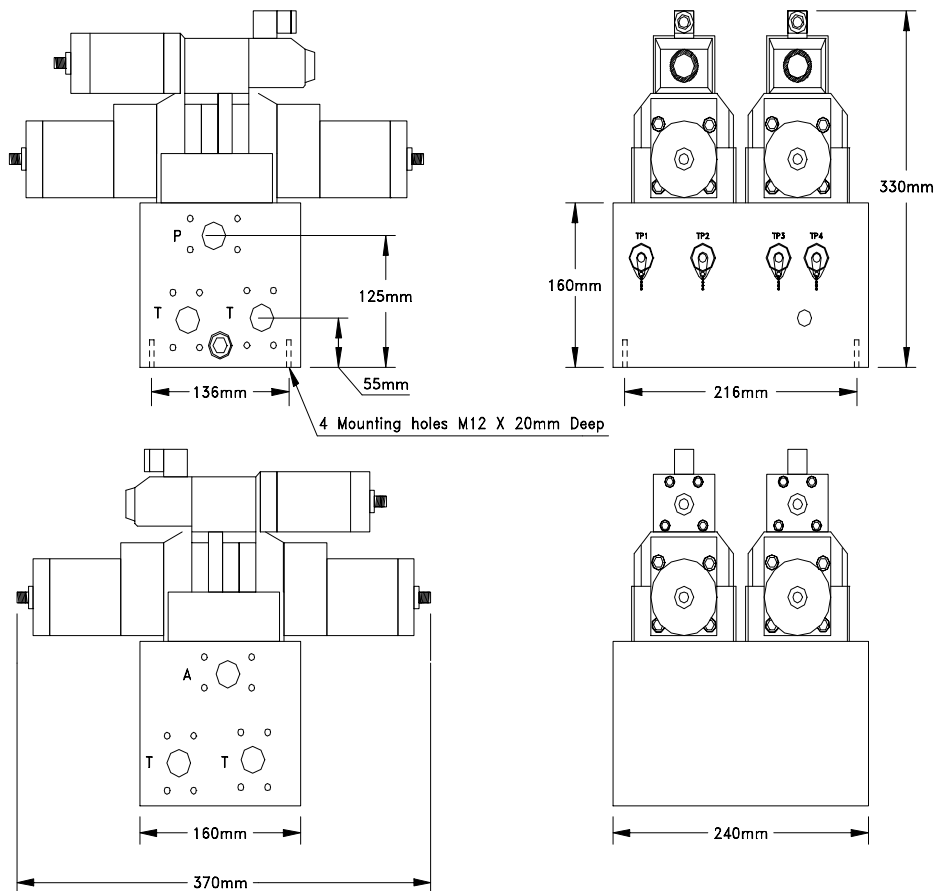
### **Gravity Loads**

Due to spool seepage and or drainage orifices where applied, monitored spool valves are not recommended for gravity loads.

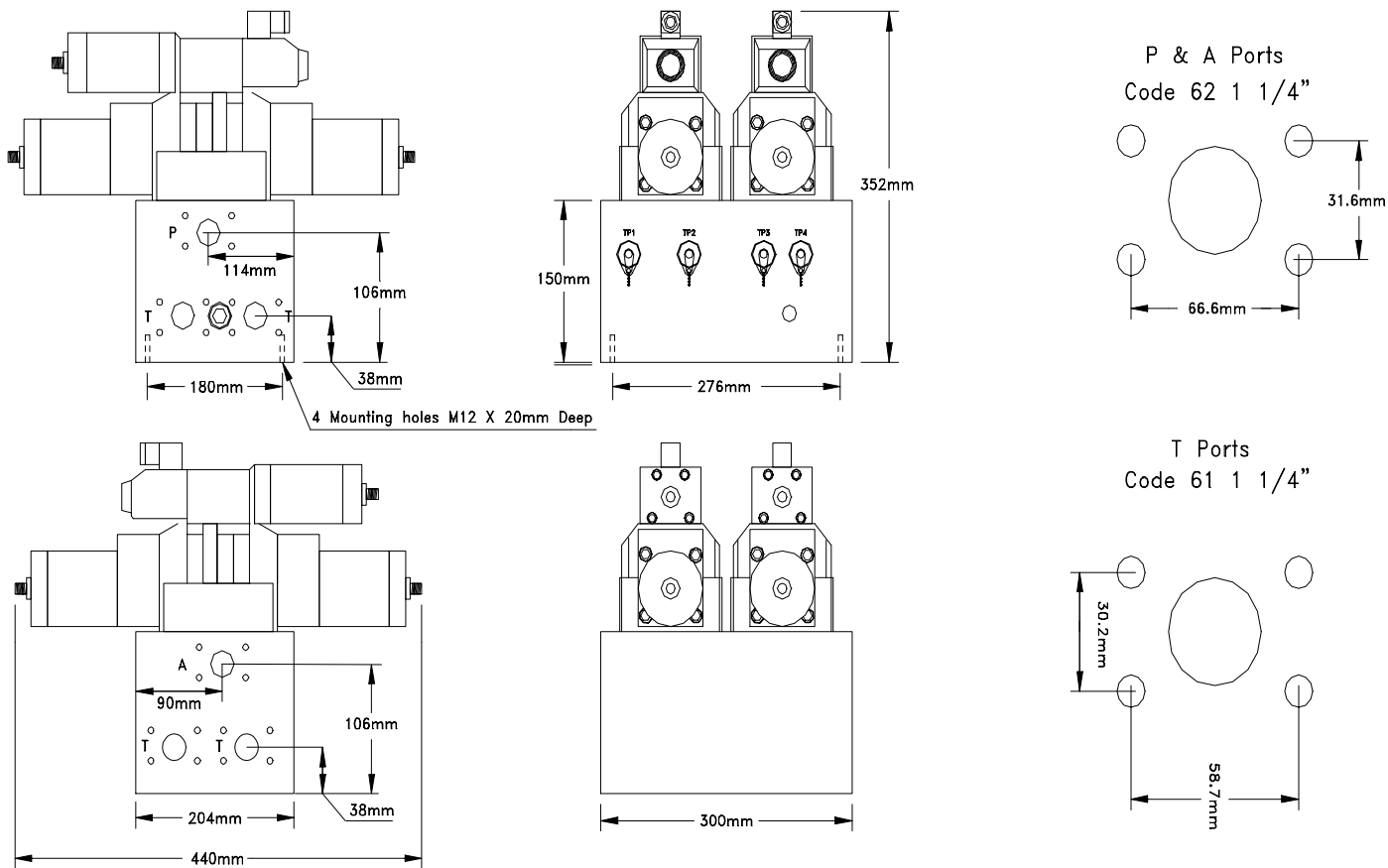
### **Monitoring**

Each Fluidsentry monitored valve provides a normally closed mechanically linked positive opening high precision switch for the safety function (de-energised state). To prevent undetected faults the monitoring contacts should not be series connected in a feedback circuit. For safety applications the normally closed contacts must be connected to individual electrical safety monitoring system inputs. Each valve has an additional normally open contact for process control signaling purposes.

## Cetop 7 Dimensions



## *Cetop 8 Dimensions*



# Safety Instructions



These safety instructions are general in nature, and intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard by labeling 'Caution' 'Warning' or 'Danger'.

The person who designs the pneumatic or hydraulic system or decides its specification must also refer to the specific Safety Instructions supplied for individual components which can be found in each Product Series brochure.



Caution: Operator error could result in injury or equipment damage.



Warning: Operator error could result in serious injury or loss of life.



Danger: In extreme conditions, there is a possibility of serious injury or loss of life.



## Warning

**1. The compatibility of pneumatic and hydraulic equipment is the responsibility of the person who designs the pneumatic and hydraulic system or decides its specifications.**

Since the products specified here are used in various operating conditions, their compatibility with the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements.

**2. Only trained personnel should operate pneumatically and hydraulically operated machinery and equipment.**

Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic and hydraulic systems should be performed by trained and experienced operators.

**3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.**

1. Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for the equipment and exhaust all residual stored energy in the system.
3. Before machinery/equipment is re-started, take measures to prevent quick extensions of the cylinder piston rod etc.

**4. Contact Fluidsentry if the product is to be used in any of the following conditions:**

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

# Precautions



## Selection

### Warning

#### 1. Confirm specifications

Products represented in this data sheet are designed for use in compressed air and hydraulic applications only, unless otherwise indicated. Do not use the products outside their design parameters.

## Installation

### Warning

#### 1. Do not install unless the safety instructions have been read and understood.

Keep this data sheet on file for future reference.

#### 2. Maintenance

When installing the products, please allow access for maintenance.

#### 3. Tightening Torque

When installing the products, please follow the listed torque specifications

## Piping

### Caution

#### 1. Before Piping

Make sure that all debris, cutting oil, dust, etc. are removed from the piping.

#### 2. Sealant Tape

When installing piping or fitting into a port, ensure that sealant material does not clog up the pressure port. When using sealant tape, leave the first 1.5 to 2 thread turns exposed at the end of the pipe/fitting.

## Air Supply (pneumatic)

### Warning

#### 1. Operation fluid

Compressed Air

#### 2. Install an air dryer, after cooler etc.

Excessive condensate in a compressed air system may cause valves and other pneumatic equipment to malfunction. Installation of an air dryer, after cooler, etc. is recommended.

#### 3. Drain

If condensate in the drain bowl is not emptied on a regular basis, the bowl will overflow and allow the condensate to enter the compressed air lines. If the drain is difficult to check and remove, it is recommended that a drain bowl with the auto drain option be installed.

#### 4. Use clean air

If the compressed air supply is contaminated with chemicals, synthetic materials, corrosive gas, etc., damage to the pneumatic equipment may occur.

## Environment

### Warning

1. Do not use in an environment where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.

2. Do not expose the product to direct sunlight for an extended period of time. If the product has to be mounted in an area where exposure to direct sunlight cannot be avoided, the use of a protective cover is recommended.

3. Do not mount the product in a location where it is subject to strong vibrations and/or shock.

4. Do not mount the product in a location where it is exposed to radiant heat

## Maintenance

### Warning

#### 1. Maintenance

If handled improperly, compressed air can be dangerous. Assembly, handling and repair of pneumatic and hydraulic systems should be performed by qualified personnel only.

#### 2. Drain

Remove condensate from the filter bowl on a regular basis.

#### 3. Shut-down before maintenance

Before attempting any kind of maintenance make sure the supply pressure is shut off and all residual air pressure is released from the system to be worked on.

#### 4. Start-up after maintenance

Apply operating pressure and power to the equipment and check for proper operation and possible air leaks. If operation is abnormal, please verify product set-up parameters.

#### 5. Do not make any modification to the product

Do not take the product apart