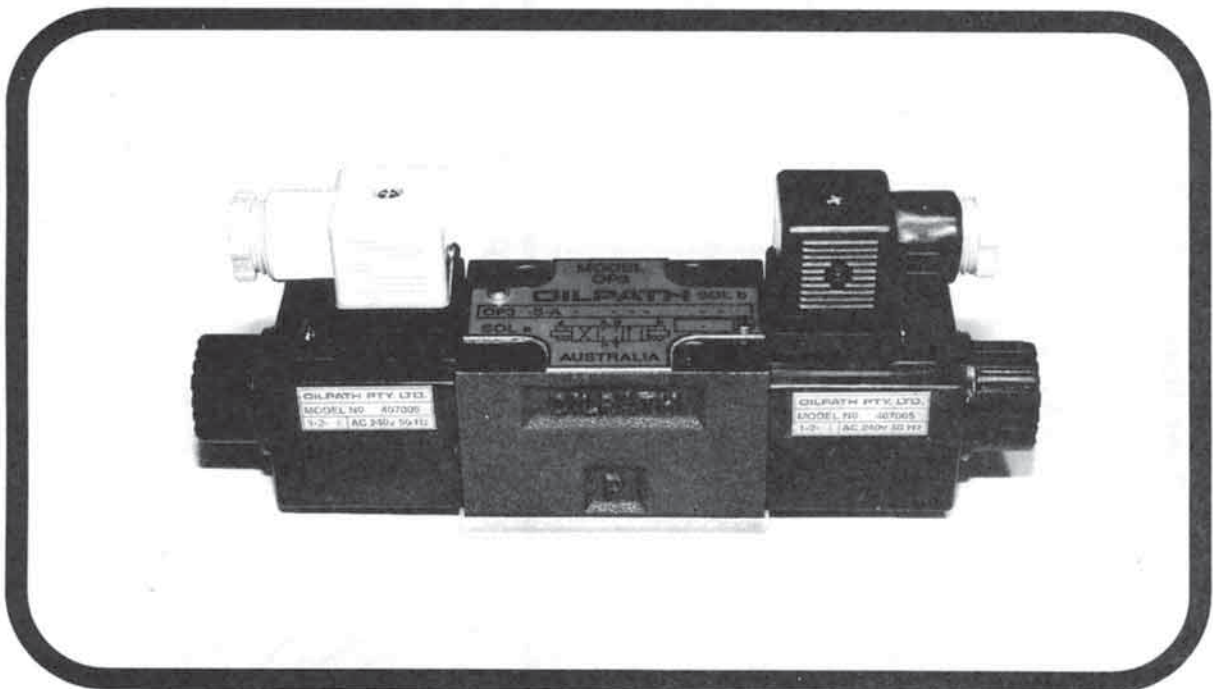


OILPATH

MODEL OP3

SOLENOID OPERATED DIRECTIONAL VALVE CETOP 3

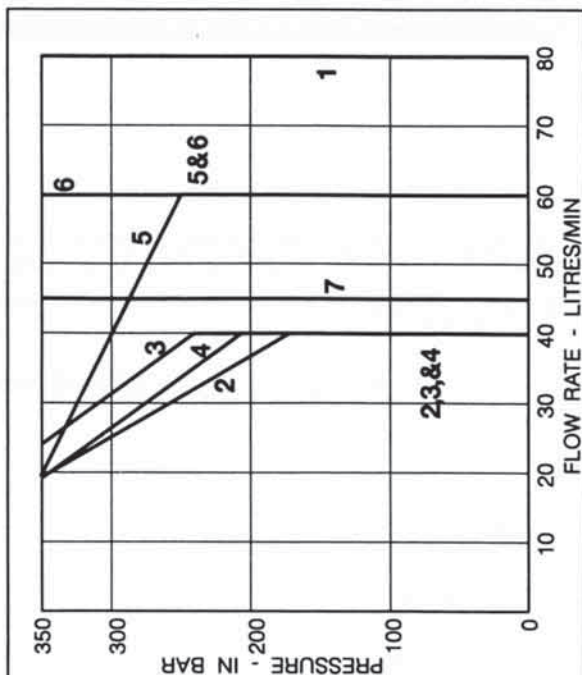


- Maximum operating pressure is 350 bar.
- Maximum flow dependant upon spool is 80 ltrs/min.
- Mounting surface to Cetop 3.
- Maximum operating return line pressure is 160 bar.
- Low pressure drops.
- Wet armature solenoid design.
- Spools are interchangeable.
- Hirschmann electrical connectors.

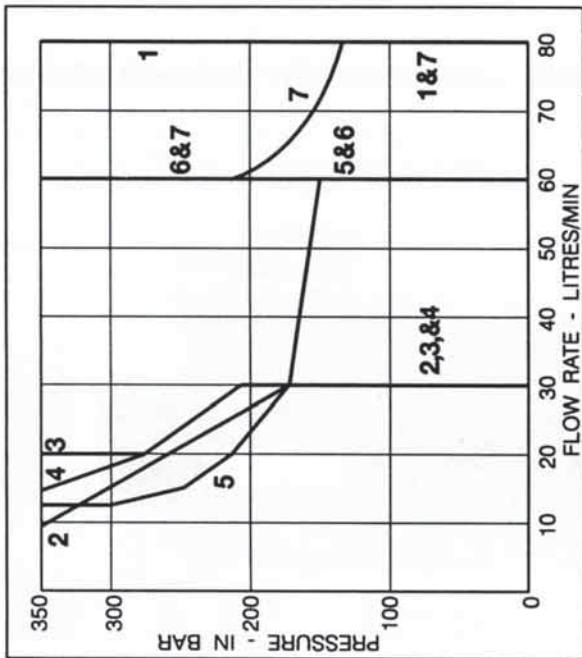
MAXIMUM OPERATING LIMITS

Measured with mineral oil @ 32 cst and 50°C, warm solenoids and 10% loss of voltage supply.

Operation by DC Solenoids



Operation by AC Solenoids

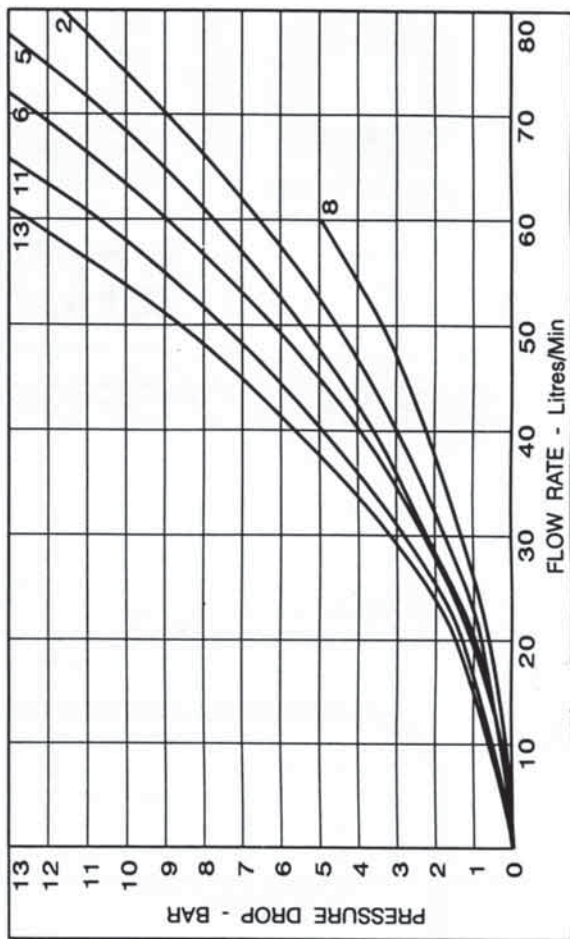
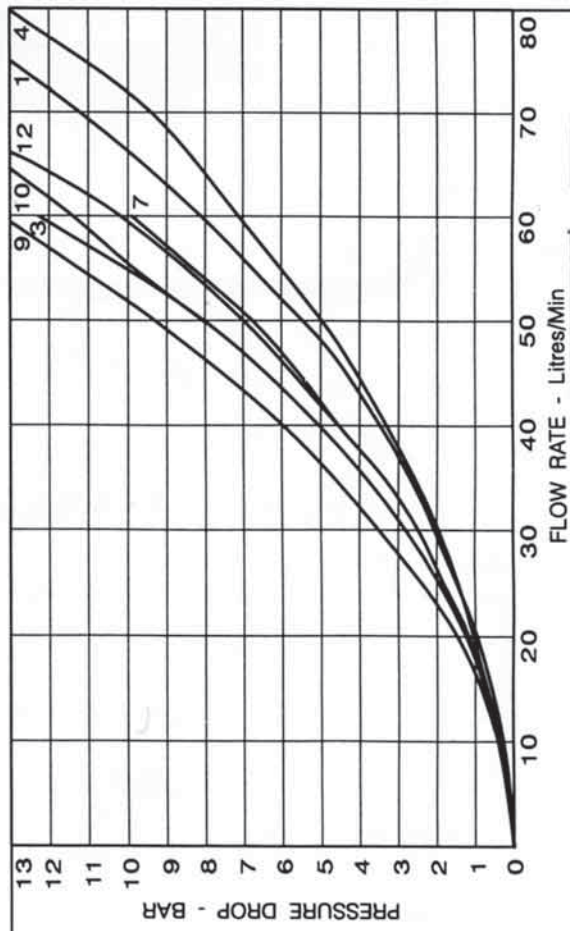


BUILD CODE SPECIFICATIONS

3SO	<p style="text-align: center;">SOLENOIDS ON ENDS "A" & "B"</p> <p style="text-align: center;">"3" Position "S"olenoid "O"</p>
2SA	<p style="text-align: center;">SOLENOID ON END "A"</p> <p style="text-align: center;">"2" Position "S"olenoid "A"</p>
2SB	<p style="text-align: center;">SOLENOID ON END "B"</p> <p style="text-align: center;">"2" Position "S"olenoid "B"</p>
2SM	<p style="text-align: center;">"2" Position "S"olenoid "M"emory</p>
2SD	<p style="text-align: center;">"2" Position "S"olenoid "D"etent</p>

PRESSURE DROP CURVES

Measured with mineral oil @ 32 cst and 50°C.



SPOOL SPECIFICATIONS

LINE No.	ORDERING CODES			DESCRIPTION OF SPOOL FUNCTION IN CROSSOVER POSITION	CROSSOVER GRAPHIC SYMBOL	SWITCHING LIMITS CURVE No.		NEUTRAL AND OR DE-ENERGISED POSITION	PRESSURE DROP CURVE No.	SOLENOID "A" ENERGISED OR RETURN SPRING	PRESSURE DROP CURVE No.	SOLENOID "B" ENERGISED OR RETURN SPRING	PRESSURE DROP CURVE No.
	SPOOL CODE	GRAPHIC SYMBOLS	BUILD CODE			AC	DC						
1	A1		3SO	P.A.B.T. CLOSED		1	1	ALL PORTS CLOSED	—	P - B A - T	1	P - A B - T	1
2			2SA	P.A.B.T. CLOSED		1	1	ALL PORTS CLOSED	—	P - B A - T	1	—	—
3			2SB	P.A.B.T. CLOSED		1	1	ALL PORTS CLOSED	—	—	—	P - A B - T	1
4	A2		2SA	P.A.B.T. CLOSED		1	6	P - A OPEN B - T OPEN	1	ALL PORTS CLOSED	—	—	—
5			2SB	P.A.B.T. CLOSED		1	6	P - B OPEN A - T OPEN	2	—	—	ALL PORTS CLOSED	—
6	A3		3SO	P.A.B. CLOSED B/A - T. PRE OPENING				ALL PORTS CLOSED	—	P - B A - T	—	P - A B - T	—
7			2SA	P.B CLOSED A - T. PRE OPENING				ALL PORTS CLOSED	—	P - B A - T	—	—	—
8			2SB	P.A. CLOSE B - T. PRE OPENING				ALL PORTS CLOSED	—	—	—	P - A B - T	—
9	B1		3SO	P.A.B.T. CLOSED		2	2	A.B. CLOSED P - T	3	P - A B - T	5	P - B A - T	5
10			2SA	P.A.B.T. CLOSED		2	2	A.B. CLOSED P - T	3	P - A B - T	5	—	—
11			2SB	P.A.B.T. CLOSED		2	2	A.B. CLOSED P - T	3	—	—	P - B A - T	5
12	B3		3SO	P.A.B.T. OPEN BUT RESTRICTED		3	3	A.B. CLOSED P - T	3	P - A B - T	4	P - B A - T	4
13			2SA	P.A.B.T. OPEN BUT RESTRICTED		3	3	A.B. CLOSED P - T	3	P - A B - T	4	—	—
14			2SB	P.A.B.T. OPEN BUT RESTRICTED		3	3	A.B. CLOSED P - T	3	—	—	P - B A - T	4
15	B5		3SO	A/B CLOSED P, A/B - T OPEN BUT RESTRICTED		4	4	A.B. CLOSED P - T	3	P - A B - T	4	P - B A - T	4
16			2SA	B CLOSED P, A - T OPEN BUT RESTRICTED		4	4	A.B. CLOSED P - T	3	P - A B - T	4	—	—
17			2SB	A CLOSED P, B - T OPEN BUT RESTRICTED		4	4	A.B. CLOSED P - T	3	—	—	P - B A - T	4

17			2SB	A CLOSED P. B. - T. OPEN BUT RESTRICTED		4	4	A. B. CLOSED P - T	3	—	—	P - B A - T	4 6
18	C1		3SO	P. A/B CLOSED B/A - T OPEN		5	5	P. CLOSED A. B. - T	—	P - B A - T	7 8	P - A B - T	7 8
19			2SA	P. B. CLOSED A - T OPEN		5	5	P. CLOSED A. B. - T	—	P - B A - T	7 8	—	—
20			2SB	P. A. CLOSED B - T OPEN		5	5	P. CLOSED A. B. - T	—	—	—	P - A B - T	7 8
21	D1		3SO	P. A. B. T. OPEN		6	6	ALL PORTS OPEN	9	P - B A - T	10 11	P - A B - T	10 11
22			2SA	P. A. B. T. OPEN		6	6	ALL PORTS OPEN	9	P - B A - T	10 11	—	—
23			2SB	P. A. B. T. OPEN		6	6	ALL PORTS OPEN	9	—	—	P - A B - T	10 11
24	E1		2SA	P. A. B. T. OPEN BUT RESTRICTED				ALL PORTS OPEN	—	P - B A - T		P - A B - T	
25			2SB	P. A. B. T. OPEN BUT RESTRICTED				ALL PORTS OPEN	—	P - B A - T		P - A B - T	
26			2SM	P. A. B. T. OPEN BUT RESTRICTED				ALL PORTS OPEN	—	P - B A - T		P - A B - T	
27			2SD	P. A. B. T. OPEN BUT RESTRICTED				ALL PORTS OPEN	—	P - B A - T		P - A B - T	
28	F1		2SA	P. A. B. T. CLOSED		7	7	ALL PORTS OPEN	—	P - B A - T	12 5	P - A B - T	12 5
29			2SB	P. A. B. T. CLOSED		7	7	ALL PORTS OPEN	—	P - B A - T	12 5	P - A B - T	12 5
30			2SM	P. A. B. T. CLOSED		1	1	ALL PORTS OPEN	—	P - B A - T	12 5	P - A B - T	12 5
31			2SD	P. A. B. T. CLOSED		1	1	ALL PORTS OPEN	—	P - B A - T	12 5	P - A B - T	12 5
32	G1		2SA	P. A. B. CLOSED				P. - A. OPEN B. CLOSED	—	P - B		P - A	
33			2SB	P. A. B. CLOSED				P. - B. OPEN A. CLOSED	—	P - B		P - A	
34			2SM	P. A. B. CLOSED				P. - B. OPEN A. CLOSED	—	P - B		P - A	
35			2SD	P. A. B. CLOSED				P. - B. OPEN A. CLOSED	—	P - B		P - A	
36	H1		3SO	P. - B/A OPEN A/B. T. CLOSED		6	6	P. - A. B. OPEN T. CLOSED	A-B 13 B-A	P - B A - T	1 5	P - A B - T	1 5
37			2SA	P. - B OPEN A. T. CLOSED		6	6	P. - A. B. OPEN T. CLOSED	A-B 13 B-A	P - B A - T	1 5	—	—
38			2SB	P. - A OPEN B. T. CLOSED		6	6	P. - A. B. OPEN T. CLOSED	A-B 13 B-A	—	—	P - A B - T	1 5

ENGINEERING AND OPERATING DATA

PRESSURE LIMITS

Ports P, A and B350 Bar (5000 PSI)
Port T.....160 Bar (2300 PSI)

MOUNTING INTERFACE

To DIN 24340 Form A (NG6)
ISO 4401
Cetop R35H Size 3

MOUNTING BOLTS

ISO M5 by 25mm long SHCS Grade 12.9
to be torqued 7 to 9 Nm (supplied with valve).

HYDRAULIC FLUIDS

Mineral Oils to DIN 51 524. Oils should have the maximum properties of antiwear and oxidation. When using flame-resistant fluids Viton seals are required, refer to the ordering code on page 4, or consult the factory. The absolute operating viscosity range is from 16-300 cst. The recommended operating range is 20-54 cst.

MAXIMUM FLOW

80 litres per minute for the model A1 spool. Refer to the charts on page 3 for details of other spool types.

TEMPERATURE

Ambient temperature limits

Minimum.....minus 20° C
Maximum with 50Hz AC coils*70° C
Maximum with DC coils.....70° C
* 100% - 110% of rated voltage.

Hydraulic fluid temperatures

For mineral oils-15° C to 70° C
Ensure that the viscosities stay within the limits as specified in "Hydraulic Fluids" above over the full working temperature range.

FILTRATION

For maximum valve life the filtration of the hydraulic fluid should be 25 µm or finer.

SPOOL LEAKAGE

Data below is typical for the spool type A1.
Oil type: Castrol Hyspin AWH 46
Test viscosity: 32 cst
Test temperature: 50° C

Pressure	Leakage Rate
70 Bar	2.4 cc per minute/land
140 Bar	6.7 cc per minute/land
200 Bar	12.0 cc per minute/land

SILTING

Silting which is dependant upon the application and system filtration can cause any sliding spool valve to stick if held shifted under pressure for long periods of time. The valve may need to be cycled periodically to remove fluid residue build up.

TANK LINES

When more than one valve share a common tank line, large surges of fluid in the line can result in unintentional shifting of the spools. If surges are a possibility then it is recommended that separate tank lines be used.

SOLENOID OPERATION

Double Solenoid

When solenoid "A" is energised the flow path becomes P => B and A => T. When solenoid "B" is energised the flow path becomes P => A and B => T. This applies to all double solenoid operated spools with the exception of the "A2" & "B" type spools (tandem centre), which have the reverse operation to that shown above. With both coils de-energised all of the spring centered three position spools return to the centre position. To ascertain the flow path for any spool when it is moving through the transition stage from centre to the fully shifted position, refer to the crossover symbols shown in the "Spool Specification" table on page 3.

UNBALANCED FLOWS

The valve flow ratings shown on page 3 are based upon equal flows in both paths. If these valves are to be used for single path operation or significantly different concurrent flow rates, then please contact your Oilpath distributor for assistance with the application design.

RESPONSE TIME

Typical response time in milliseconds based on an OP3-S-A1-3SO-N-1-***** valve with hydraulic oil at 32 cst and at 50° C. Flow at 40 litres per min and 350 bar pressure.

Solenoid Type	Pull-In	Drop-Out
AC	13	18
DC	45	27

SOLENOID DATA

Wet Armature type solenoids with DIN 43650 connections and plug.

Protection

Weatherproof to class IP65
Winding insulation to class H
Encapsulation to class F
Allowable voltage fluctuation is -10% to +10%

Power Consumption

	AC 50Hz	
Inrush, maximum	VA	248
Steady-state	VA	(200)
Holding	VA	50

All of the above values are RMS. Inrush value is with the armature fully retracted, first half cycle. Steady state is at the start of the normal working stroke of the valve.

DC

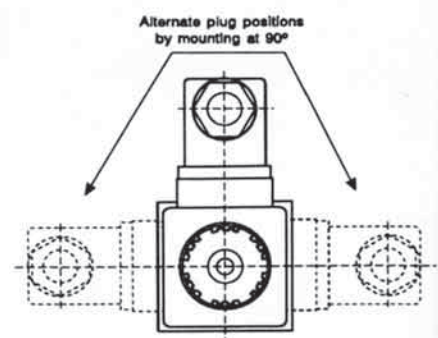
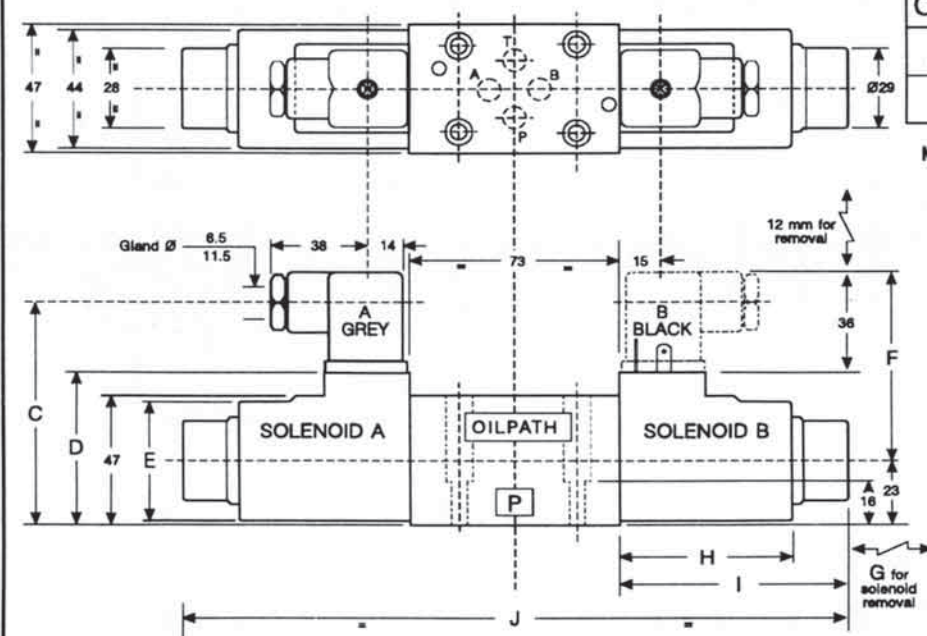
At correct voltage and 20° C		
12 Volts	24 Watts	
24 Volts	24 Watts	

The solenoids have a continuous duty factor rating of 100%.

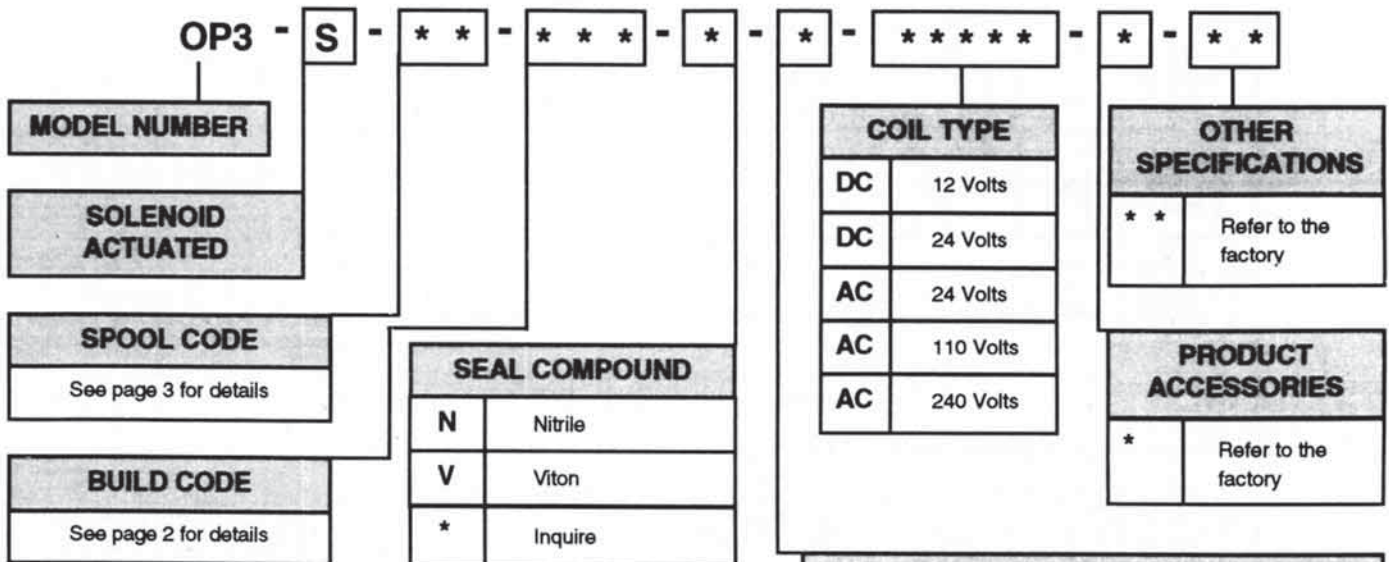
INSTALLATION DIMENSIONS FOR OP3 -S-

Code	C	D	E	F	G	H	I	J
AC	78	53	40	66	49	47	67	207
DC	80	55	44	68	62	60	80	233

MOUNTING CONFORMS TO CETOP 3 INTERFACE



ORDERING CODE



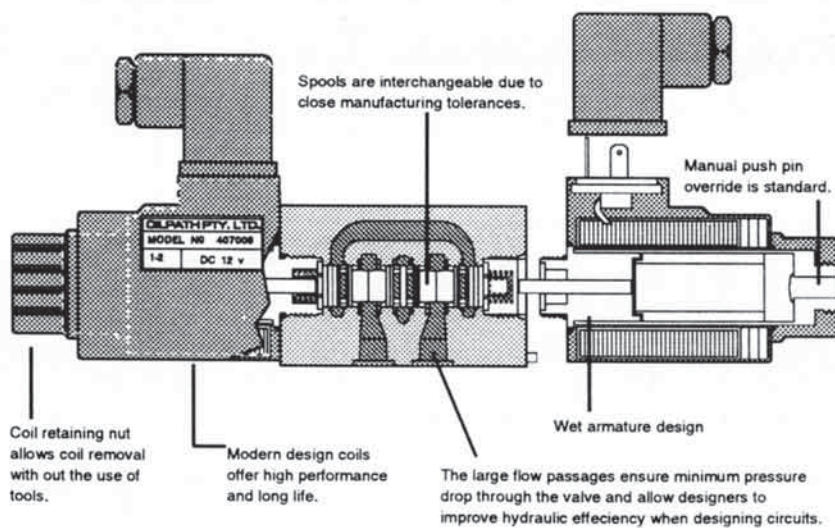
EXAMPLE

OP3 - S - A1 - 3S0 - N - 1 - AC240 - -

The above code describes a model OP3 valve that conforms to Cetop 3 standard. The spool is a three position all ports blocked in neutral and is operated by AC 240 volt coils with GDM 2011 connectors each end. The valve uses Nitrile seals and has no accessories or options.

HIRSCHMANN ELECTRICAL CONNECTOR

1.	GDM 2011 as standard
2.	GDML2011 with light indicator
3.	GDM 2011 with inbuilt surge absorber
*	Others, please specify if required



WARNING !

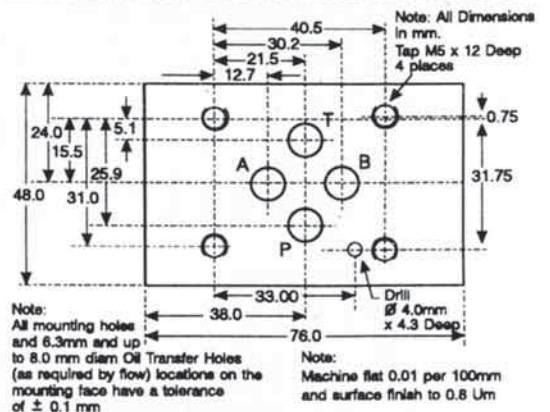
Incorrect selection and or improper use of the valves in this literature can result in damage to property or personal injury. All care should be taken when designing the hydraulic circuit. Please contact your nearest Oilpath distributor or the factory direct if clarification on the design parameters of the valve are required.

MASS

Approximate	AC	DC
Single Solenoid valve	1.5kg	1.8kg
Double Solenoid valve	1.8kg	2.4kg

Accessories: Oilpath manufacture a range of Cetop 3 manifolds to enhance the model OP3 valve. Please contact your Oilpath distributor for details.

MOUNTING DETAIL FOR OP3 VALVE



DISTRIBUTED BY

Manufactured by :
OILPATH PTY. LTD.
incorporated in South Australia
A.C.N. 007 683 472

21 Deloraine Road,
Edwardstown, South Australia.
PO Box 132, Edwardstown 5039
AUSTRALIA
Ph: (08) 8277 4933 Fax: (08) 8277 9126

WARRANTY

Oilpath products are warranted to be free of defects in material or workmanship. This warranty voids all other warranties, whether expressed or implied, and shall be in effect for 6 months from date of purchase. The warranty is limited to replacement or repair, excluding seals or damage arising from misuse or incorrect installation. The company accepts no liability for faults caused by improper use or faulty maintenance of the product, or its operation beyond recommended specifications, or contingent or consequential loss or damage under any situation whatsoever. All unauthorised modifications to the product automatically voids the conditions of this warranty.