

## ULTRA HIGH RESPONSE RANGE

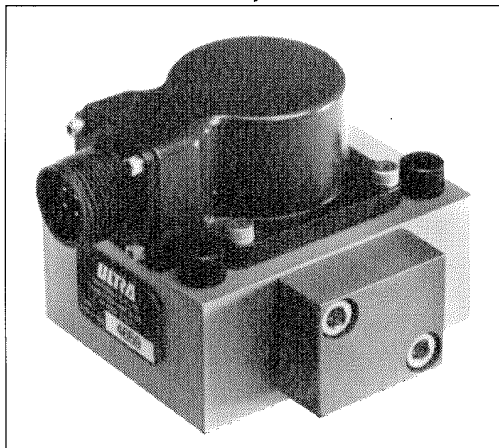
Series 4659, 4665, 4667, 4679 and 4689

Ultra High Response range of valves are two stage nozzle flapper pilot stage, dry torque motor units incorporating an internal filter to afford additional protection to the precision first stage components.

Ultra High Response range valves are suitable for a wide range of control applications where the highest levels of dynamic response are required.

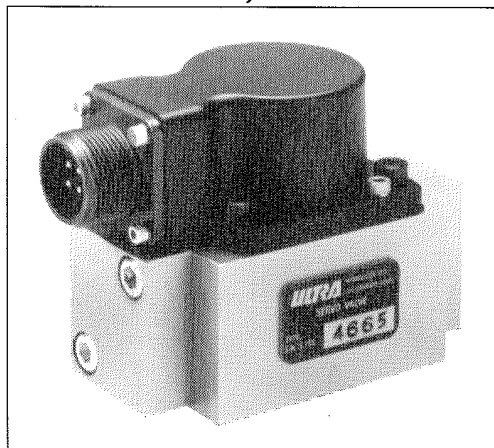
Nominal rated flows:- 3.8 to 60 l/min at 70 bar (1 to 15 US.GPM at 1015 psi) pressure drop.

**4659, 4689**



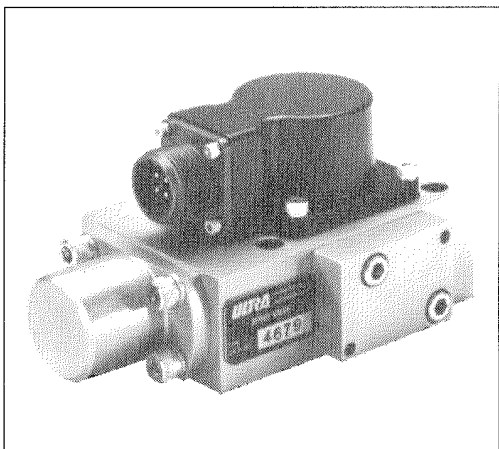
4659 Series valves are 4 port high performance servo valves. 4689 Series valves are suitable for the same application as 4659, but have a separate pilot supply.

**4665, 4667**



4665/4667 Series valves are suitable for applications where space constraints require a narrow valve body.

**4679**



4679 Series valves are derivatives of the standard 4659 valve and are designed for those applications where additional pilot stage protection is required. A field replaceable filter is incorporated for this purpose. Stainless steel versions are available for high pressure applications.

## HIGH RESPONSE RANGE - TECHNICAL SPECIFICATION

### RATED FLOW 4659, 4665, 4679 and 4689

Nominal rated flow at 70 bar (1015 psi) $\Delta P$		Null Leakage at 140 bar (2030 psi) supply	
l/min	US.GPM	l/min	US.GPM
3.8	1	1,0	0.26
9.6	2.5	1,6	0.42
19	5	1,6	0.42
38	10	1,6	0.42
57	15	1,6	0.42

### RATED FLOW 4667

Nominal rated flow at 70 bar (1015 psi) $\Delta P$		Null Leakage at 140 bar (2030 psi) supply	
l/min	US.GPM	l/min	US.GPM
5	1.3	0,9	0.24
10	2.6	1,2	0.32
20	5.3	1,6	0.42
30	7.9	1,6	0.42
40	10.5	1,6	0.42
60	15.8	1,6	0.42

### COIL RATINGS 4659, 4665, 4679 and 4689

Differential signal	Resistance per coil
10 mA	1000 Ohm
15 mA	200 Ohm
15 mA	350 Ohm
40 mA	80 Ohm
80 mA	22 Ohm
200 mA	22 Ohm
60 mA	40 Ohm

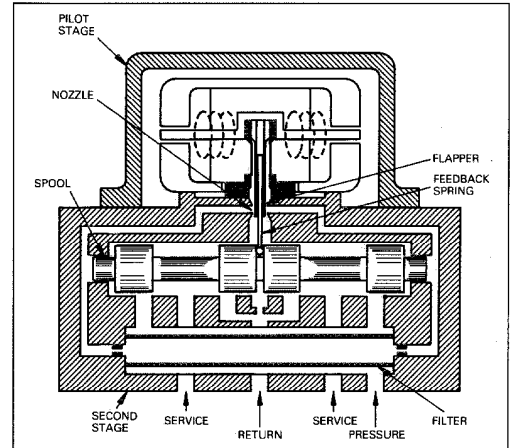
### COIL RATINGS 4667

Differential signal	Resistance per coil
10 mA	1200 Ohm
20 mA	1200 Ohm
30 mA	800 Ohm
40 mA	1200 Ohm
200 mA	22 Ohm

Special coils and flow ratings are available - please Consult the Sales Department.

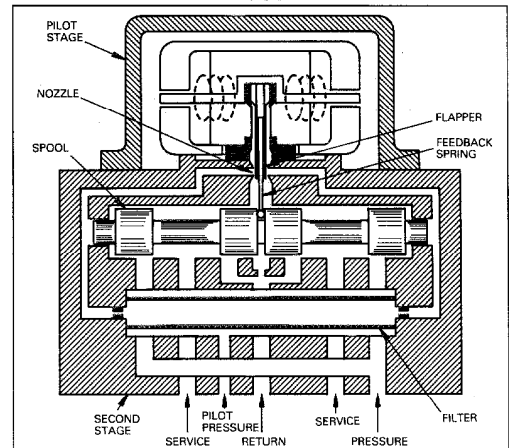
Intrinsically Safe versions are available, see Installation Data and Ordering Codes.

### 4659, 4665 and 4667



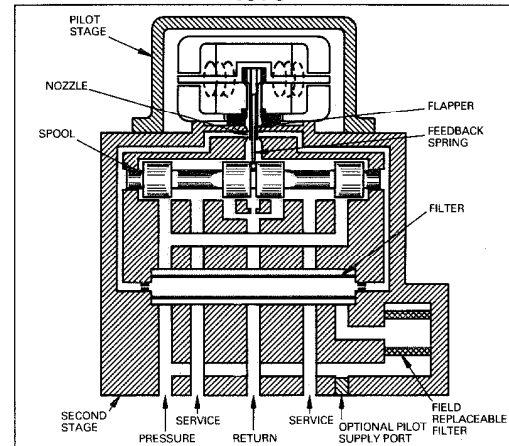
**Standard and narrow body**

### 4689



**Separate 1st stage supply**

### 4679



**Field replaceable filter**

## HIGH RESPONSE RANGE - TECHNICAL SPECIFICATION

Supply pressure bar (psi)	4659, 4665 4667, 4689	4679 Standard	4679 High Pressure	
Minimum required to effect spool movement	3,5 (50)	3,5 (50)	3,5 (50)	
Minimum recommended	15 (217)	15 (217)	15 (217)	Note: pilot pressure limited to 280 (4060)
Maximum continuous	280 (4060)	280 (4060)	500 (7250)	

### Proof pressure

At pressure port	150% max supply pressure
At return port	100% max supply pressure (up to 280 bar)

### Burst pressure

Return port open	250% max supply pressure
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### External leakage

Zero

### Fluid

Industrial petroleum based hydraulic fluid. Other fluids can be considered - consult Sales Department

### System filtration

NAS 1638 class 7. ISO 4406 Code 16/13 or better

### Seal material

High nitrile standard. Viton and other materials supplied on request.

### Operating temperature

-30° to +120° C (-22° F to + 248° F)

### Null setting

Externally adjustable

### Mass

4659	0,85 Kg (1.87 lbs)
4665	0,75 Kg (1.65 lbs)
4667	0,75 Kg (1.65 lbs)
4689	0,85 Kg (1.87 lbs)
4679 Standard	1,2 Kg (2.65 lbs)
4679 High Pressure	2,3 Kg (5.06 lbs)

### Hysteresis

Less than 3% without dither

### Threshold

Less than 1% without dither

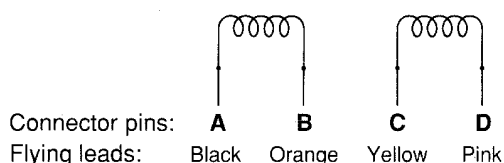
### Null shift

The servo valve null setting is liable to change under certain environmental and operational conditions:

		NULL SHIFT
Temperature	40° C (104° F) change	< 2%
Supply pressure	80% to 110%	< 2%
Back pressure	0 to 20% of supply pressure	< 2%

### Coil Schematic

4659, 4665, 4689 & 4679

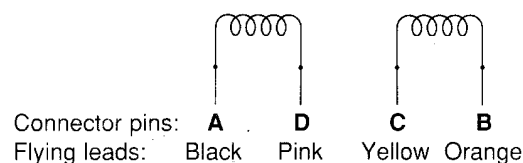


### Valve polarity:

Flow from port 2 will result with:  
SERIES: A + (positive), B and C linked, D - (negative).  
PARALLEL: A + positive, B - (negative), C + (positive), D - (negative).

### Coil Schematic

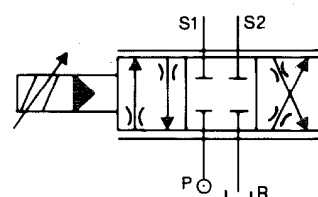
4667



### Valve polarity:

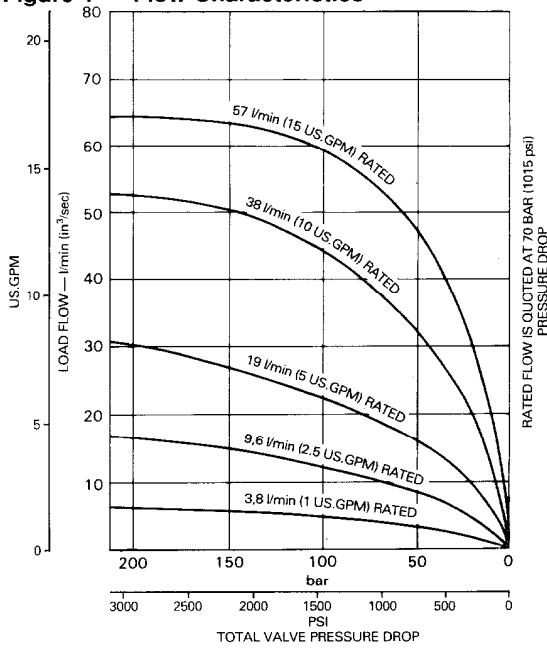
Flow from port 1 will result with:  
SERIES: A + (positive), D and C linked, B - (negative).  
PARALLEL: A + (positive), B - (negative), C + (positive), D - (negative).

### Functional Symbol

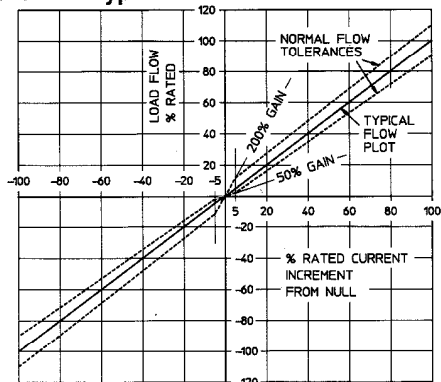


# PERFORMANCE DATA - 4659, 4665, 4667, 4679 & 4689 SERIES VALVE

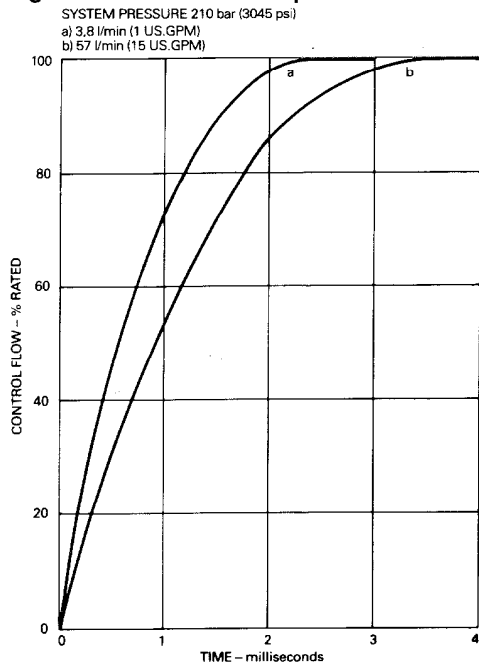
**Figure 1 Flow Characteristics**



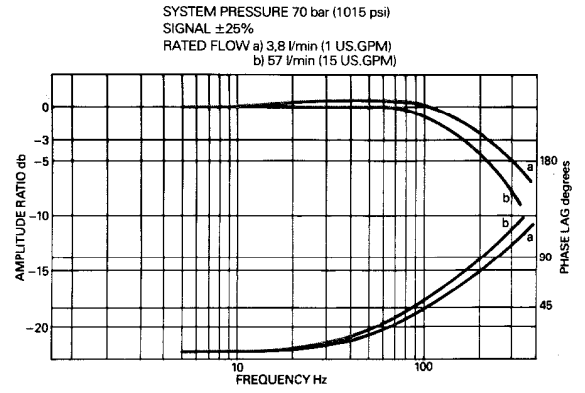
**Figure 2 Typical Flow Gain**



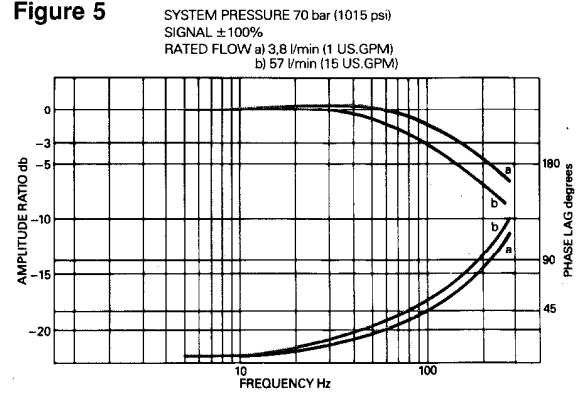
**Figure 3 Transient Response**



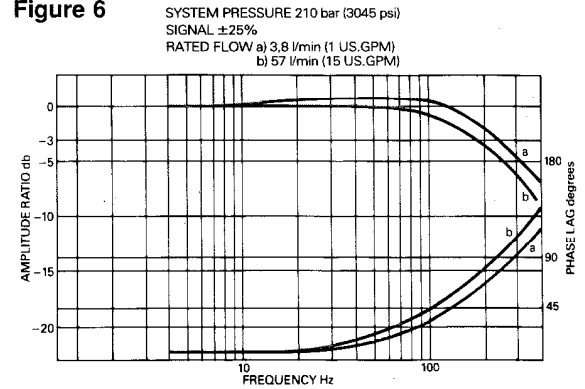
**Figure 4 Dynamic Response**



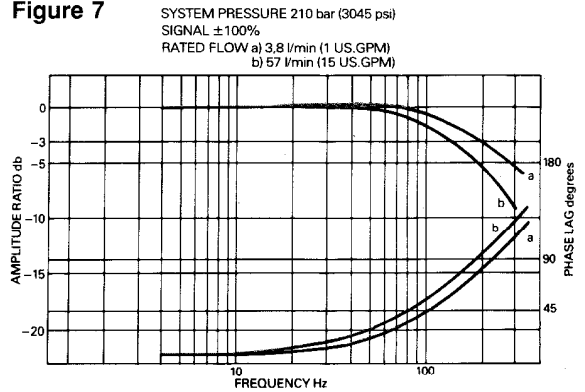
**Figure 5**



**Figure 6**



**Figure 7**



## HIGH RESPONSE RANGE - ORDERING CODE

SERVO VALVE PART No \_\_\_\_\_

4659  
4665  
4667 - X X X - X X X  
4679  
4689

1st TO 4th Digits SERIES \_\_\_\_\_

NOTE : 2nd Digit 8 denotes Intrinsically Safe eg. 4859, 4865, 4867, 4879, 4889

5th Digit ELECTRICAL CONNECTOR \_\_\_\_\_

	4659 4665 4667 4679 4689	4859 4865 4867 4879 4889
1	Flying Lead (600 mm)	_____
2	MS Type (4 Pin)	MS Type (4 Pin)
9	Non Standard	Non Standard

6th Digit VALVE SIGNAL \_\_\_\_\_

	4659 4665 4679 4689		4667		4859 4865 4867 4879 4889		IS. Approval authority
	Differential rated current (milliamps)	Resistance per coil (ohms)	Differential rated current (milliamps)	Resistance per coil (ohms)	Differential rated current (milliamps)	Resistance per coil (ohms)	
1	10	1000	10	1200	10	1000	Baseefa
2	15 *	200	20	1200	15	200	Baseefa
3	15	350	30	800	10	1000	F.M.
4	40	80	40	1200	15	200	F.M.
5	80	22	200	22	—	—	—
6	200	22	—	—	—	—	—
8	60	40	—	—	—	—	—
9	Non standard		Non standard		—		—

\* Non Preferred Standard

7th Digit RATED FLOW \_\_\_\_\_

	4659 4665 4679 4689		4667	
	4859 4865 4879 4889		4867	
	l/min at 70 bar Δ P (US.GPM. at 1015 PSI)		l/min at 70 bar Δ P (US.GPM. at 1015 PSI)	
1	3.8	(1)	5	(1.3)
2	9.6	(2.5)	10	(2.6)
3	19	(5)	20	(5.3)
4	38	(10)	30	(7.9)
5	57	(15)	40	(10.5)
6	—	—	60	(15.8)
9	Non Standard		Non Standard	

8th, 9th & 10th Digits DESIGN CODE \_\_\_\_\_

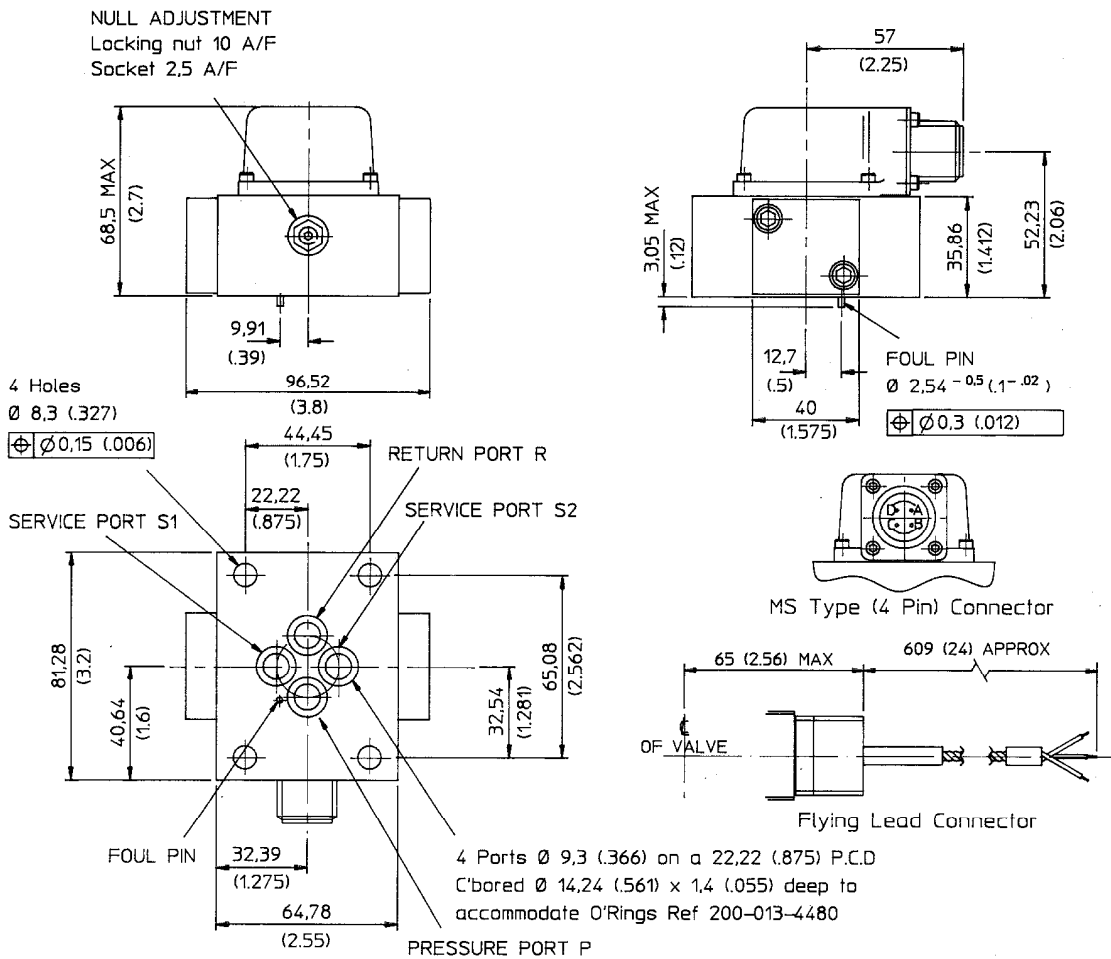
	4659 4665 4667		4689		4679	
	4859 4865 4867		4889		4879	
000	Internal Pilot		External Pilot		Internal Pilot	
810	—		—		External Pilot	
820	—		—		High Pressure External Pilot	
830	—		—		High Pressure External Pilot External Drain	
9**	Special numbers allocated by design office to denote valve with non standard features					

SPECIAL FLOW AND COIL OPTIONS AVAILABLE ON REQUEST CONSULT ULTRA SALES OFFICE

High Response Range

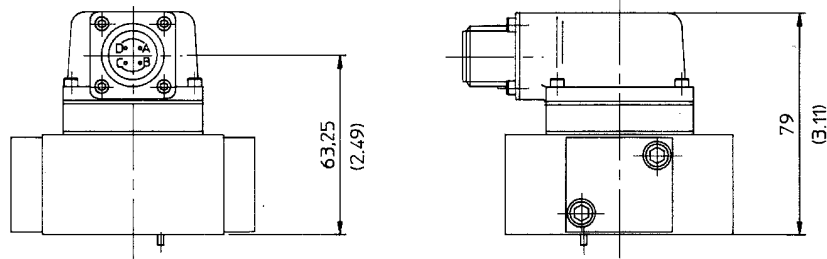
## INSTALLATION DATA - 4659 SERIES VALVE

- 1 Before installation refer to Application Data.
- 2 Suggested mounting screws: M8 x 50 long (5/16 UNC or UNF x 2 long) high tensile steel socket head cap screws.
- 3 Null adjustment: Flow out of service port 1 will increase with clockwise rotation of null adjuster.
- 4 Surface to which valve is mounted requires 0,8 microns (32 micro inches) finish flat within 0,025 (.001).
- 5 Electrical connector: MS 3102E-14S-2P.
- 6 Replacement base mounting O'Rings: 200-013-4480 are 10,82 (.426) I/D x 1,78 (.07) sect'.
- 7 Motor cap normally positioned with electrical connector over pressure port, may be rotated 90° or 180° to suit particular installations.
- 8 Optional electrical mating connector: MS 3106E/MC-14S-2S (maximum cable size 7,75mm (.305) diameter).



## INSTALLATION DATA - INTRINSICALLY SAFE 4859 SERIES VALVE

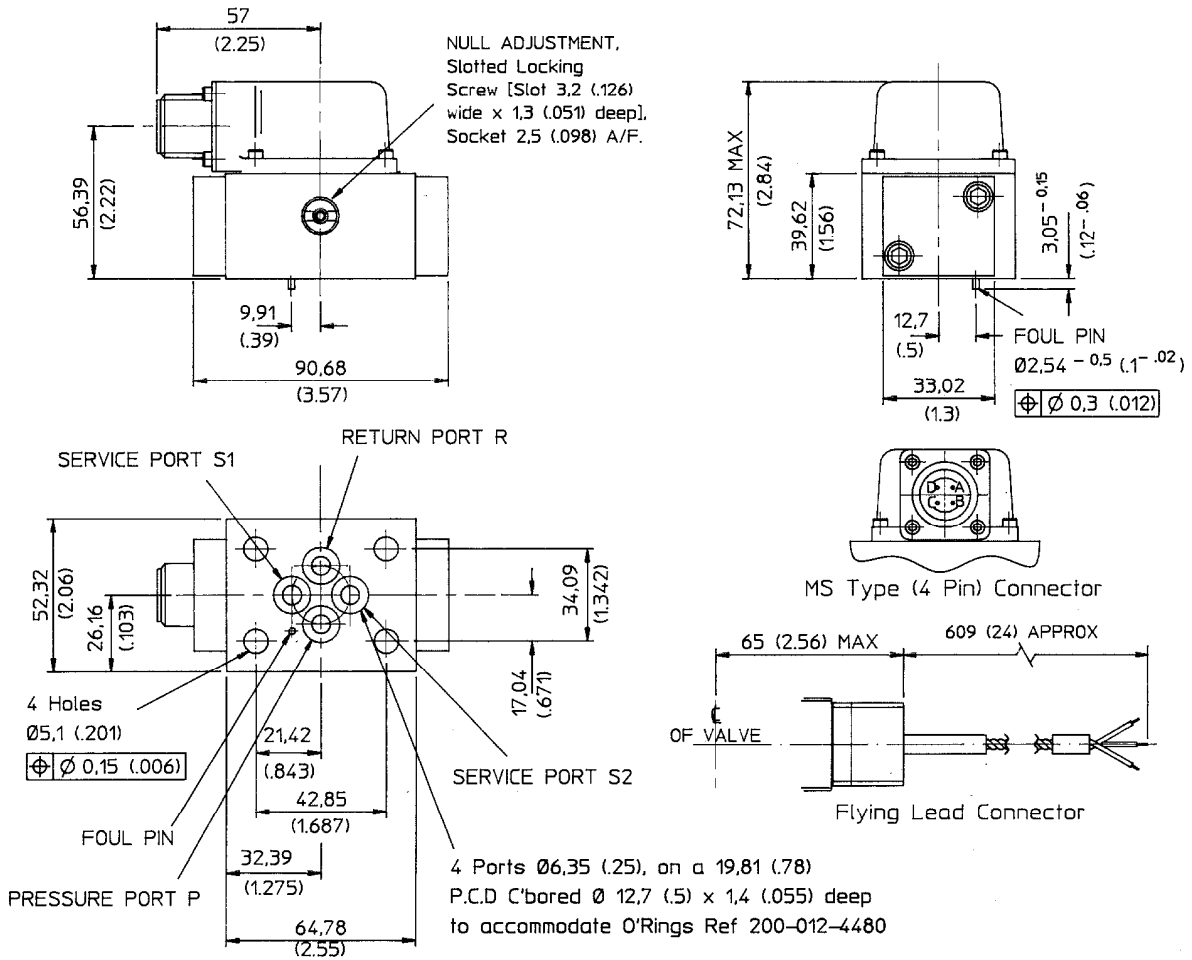
NOTE: TO COMPLY WITH I.S. APPROVALS THIS VALVE MUST NOT BE DISMANTLED.



DIMENSIONS SHOWN IN MILLIMETRES (INCHES)

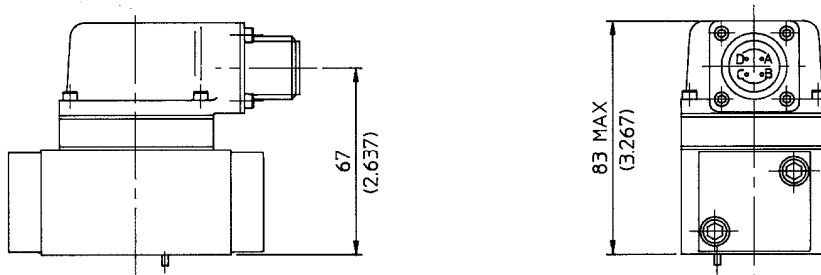
## INSTALLATION DATA - 4665 SERIES VALVE

- 1 Before installation refer to Application Data.
- 2 Suggested mounting screws: M5 x 55 long (No. 10 UNF x 2.25 long) high tensile steel socket head cap screws.
- 3 Null adjustment: Flow out of service port 1 will increase with clockwise rotation of null adjuster.
- 4 Surface to which valve is mounted requires 0,8 microns (32 micro inches) finish flat within 0,025 (.001).
- 5 Electrical connector: MS 3102E-14S-2P.
- 6 Replacement base mounting O'Rings: 200-012-4480 are 9,25 (.364) I/D x 1,78 (.07) sect'.
- 7 Motor cap normally positioned with electrical connector over S1 port, may be rotated 180° to to suit particular installations.
- 8 Optional electrical mating connector: MS 3106E/MC-14S-2S (maximum cable size 7,75mm (.305) diameter).



## INSTALLATION DATA - INTRINSICALLY SAFE 4865 SERIES VALVE

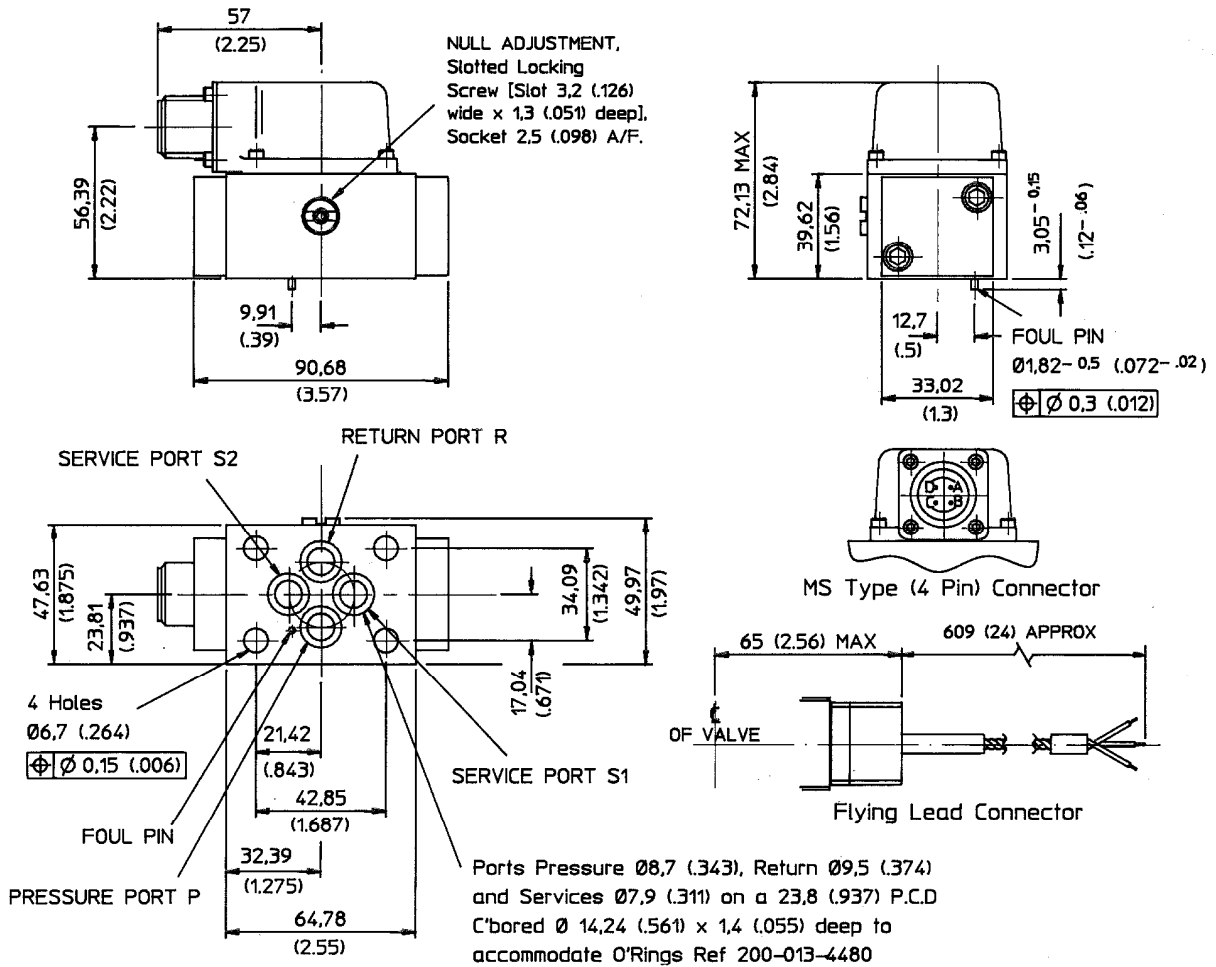
NOTE: TO COMPLY WITH I.S. APPROVALS THIS VALVE MUST NOT BE DISMANTLED.



DIMENSIONS SHOWN IN MILLIMETRES (INCHES)

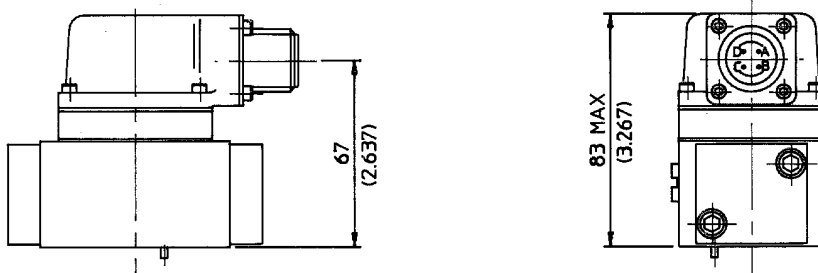
## INSTALLATION DATA - 4667 SERIES VALVE

- 1 Before installation refer to Application Data.
- 2 Suggested mounting screws: M6 x 55 long (1/4-28 UNF or 1/4-20 UNC x 2.25 long) high tensile steel socket head cap screws.
- 3 Null adjustment: Flow out of service port 2 will increase with clockwise rotation of null adjuster.
- 4 Surface to which valve is mounted requires 0,8 microns (32 micro inches) finish flat within 0,025 (.001).
- 5 Electrical connector: MS 3102E-14S-2P.
- 6 Replacement base mounting O'Rings: 200-013-4480 are 10,82 (.426) I/D x 1,7 (.07) sect'.
- 7 Motor cap normally positioned with electrical connector over S2 port, may be rotated 180° to suit particular installations.
- 8 Optional electrical mating connector: MS 3106E/MC-14S-2S (maximum cable size 7,75mm (.305) diameter).



## INSTALLATION DATA - INTRINSICALLY SAFE 4867 SERIES VALVE

NOTE: TO COMPLY WITH I.S. APPROVALS THIS VALVE MUST NOT BE DISMANTLED.



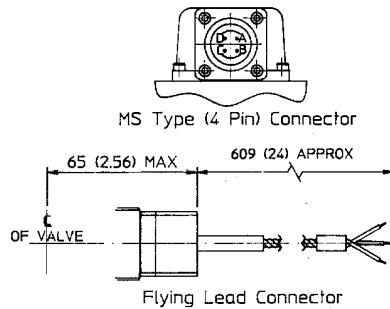
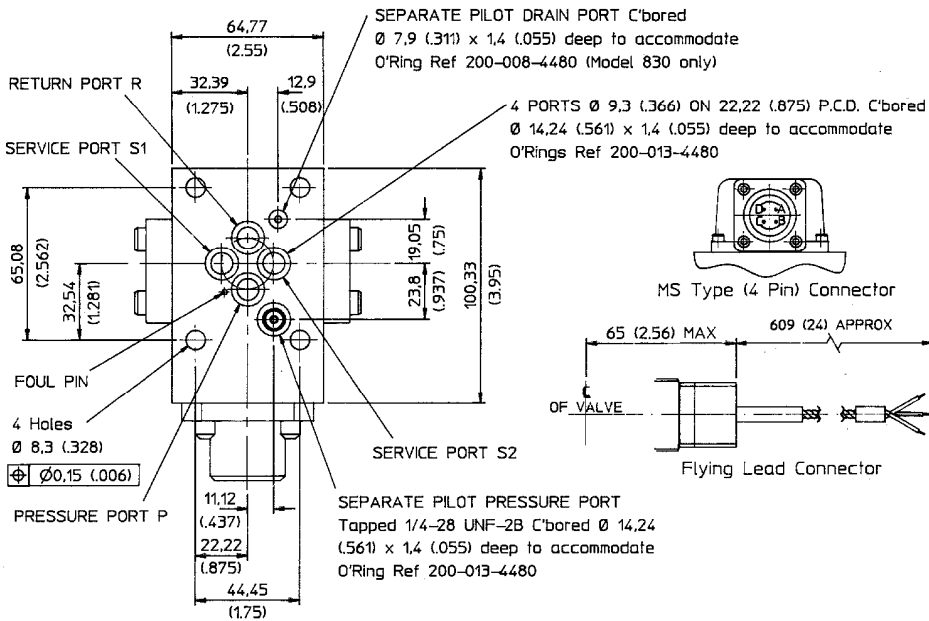
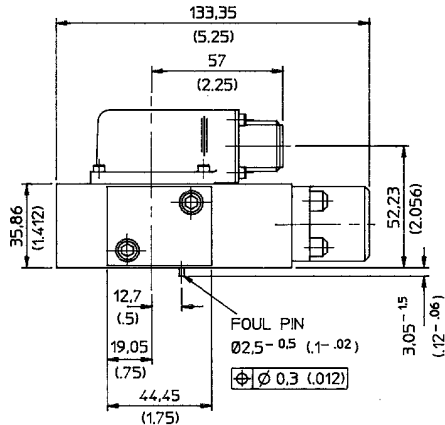
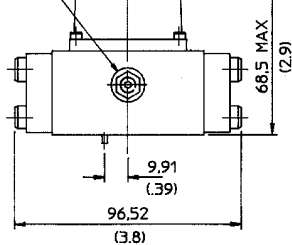
DIMENSIONS SHOWN IN MILLIMETRES (INCHES)



## INSTALLATION DATA - 4679 SERIES VALVE

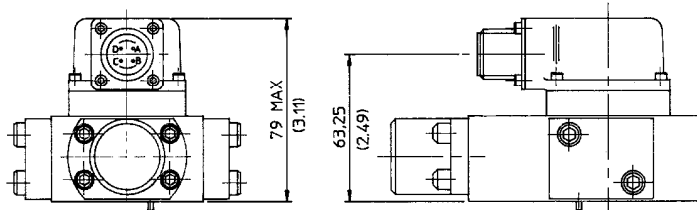
- 1 Before installation refer to Application Data.
- 2 Suggested mounting screws: M8 x 50 long (5/16 UNC or UNF x 2 long) high tensile steel socket head cap screws.
- 3 Null adjustment: Flow out of service port 1 will increase with clockwise rotation of null adjuster.
- 4 Surface to which valve is mounted requires 0,8 microns (32 micro inches) finish flat within 0,025 (.001).
- 5 Electrical connector: MS 3102E-14S-2P.
- 6 Replacement base mounting O'Rings: 200-013-4480 are 10,82 (.426) I/D x 1,78 (.07) sect', or 200-008-4480 are 4,47 (.176) I/D x 1,78 (.07) sect'.
- 7 Motor cap normally positioned with electrical connector over pressure port, may be rotated 90° or 180° to suit particular installations.
- 8 Optional electrical mating connector: MS 3106E/MC-14S-2S (maximum cable size 7,75mm (.305) diameter).

NULL ADJUSTMENT  
Locknut 10 A/F  
Socket 2.5 A/F



## INSTALLATION DATA - INTRINSICALLY SAFE 4879 SERIES VALVE

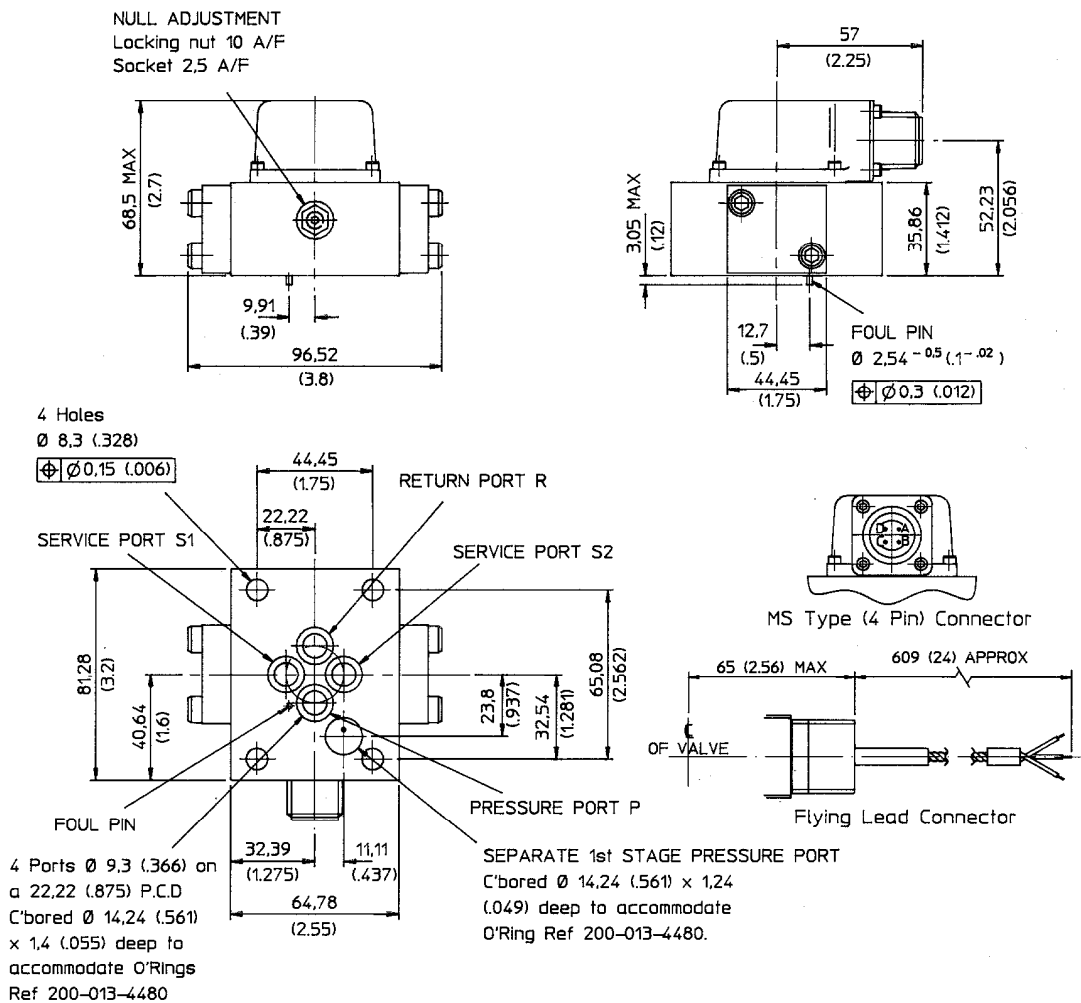
NOTE: TO COMPLY WITH U.S. APPROVALS THIS VALVE MUST NOT BE DISMANTLED.



DIMENSIONS SHOWN IN MILLIMETRES (INCHES)

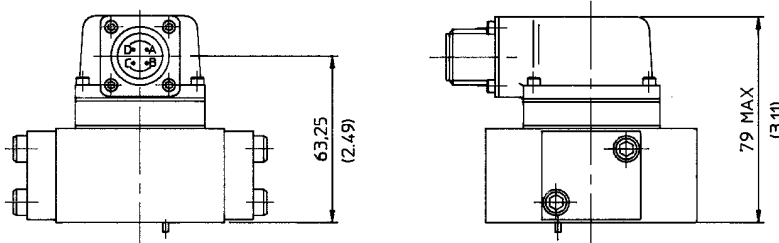
## INSTALLATION DATA - 4689 SERIES VALVE

- 1 Before installation refer to Application Data.
- 2 Suggested mounting screws: M8 x 50 long (5/16 UNC or UNF x 2 long) high tensile steel socket head cap screws.
- 3 Null adjustment: Flow out of service port 1 will increase with clockwise rotation of null adjuster.
- 4 Surface to which valve is mounted requires 0,8 microns (32 micro inches) finish flat within 0,025 (.001).
- 5 Electrical connector: MS 3102E-14S-2P.
- 6 Replacement base mounting O'Rings: 200-013-4480 are 10,82 (.426) I/D x 1,78 (.07) sect', or 200-008-4480 are 4,47 (.176) I/D x 1,78 (.07) sect'.
- 7 Motor cap normally positioned with electrical connector over pressure port, may be rotated 90° or 180° to suit particular installations.
- 8 Optional electrical mating connector: MS 3106E/MC-14S-2S (maximum cable size 7,75mm (.305) diameter).



## INSTALLATION DATA - INTRINSICALLY SAFE 4889 SERIES VALVE

NOTE: TO COMPLY WITH I.S. APPROVALS THIS VALVE MUST NOT BE DISMANTLED.



DIMENSIONS SHOWN IN MILLIMETRES (INCHES)