

# QR4/QS4

HYDRAULIC GEAR PUMPS



 **DAVID BROWN**  
HYDRAULICS

# QR4/QS4 DIMENSIONAL DATA

**Note** Drawings show clockwise rotation pumps. For anti-clockwise rotation pumps reverse the inlet and outlet port positions. (Rotation convention - view from pump shaft end).

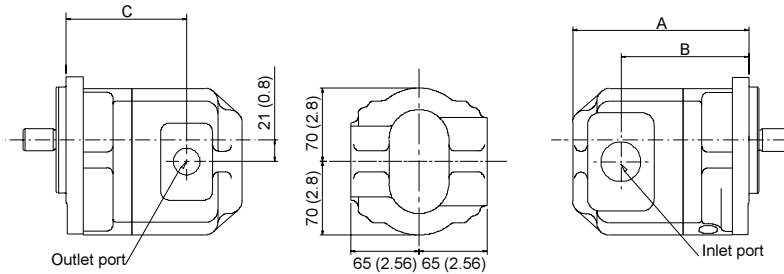
Full detailed dimensions are shown on the relevant pages covering drive shafts, mounting flanges and ports.

## SINGLE PUMPS - standard ports

Code **A**

Example

R1A4016A11 **A** 1D1AA

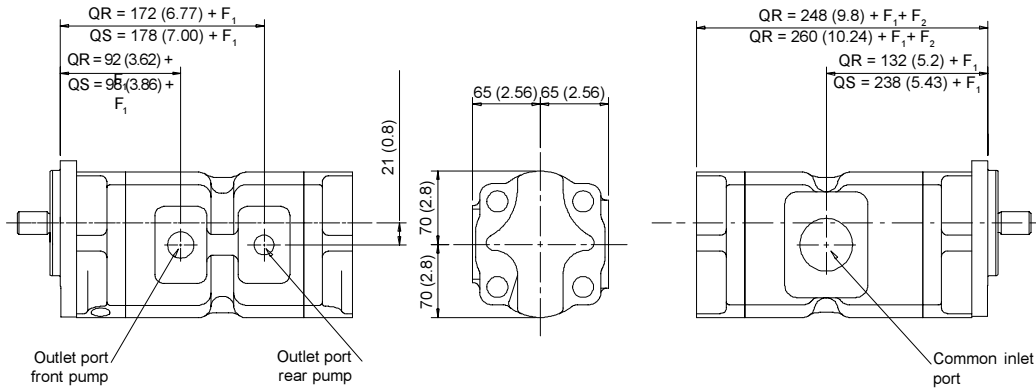


## DUAL PUMPS - 1 inlet/2 outlets

Code **C**

Example

R1A40164016R4016A12 **C** 1K1A

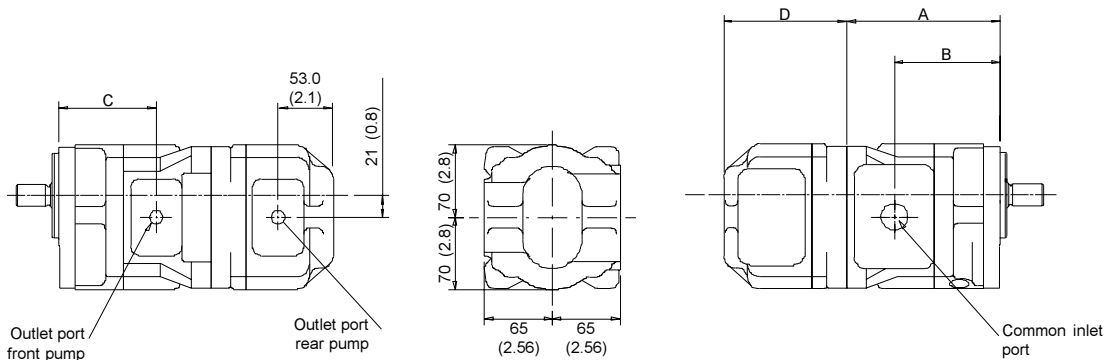


## DOUBLE PUMPS - 1 inlet/2 outlets

Code **A**

Example

R1A40164016A12 **A** 1K1A1K1AA

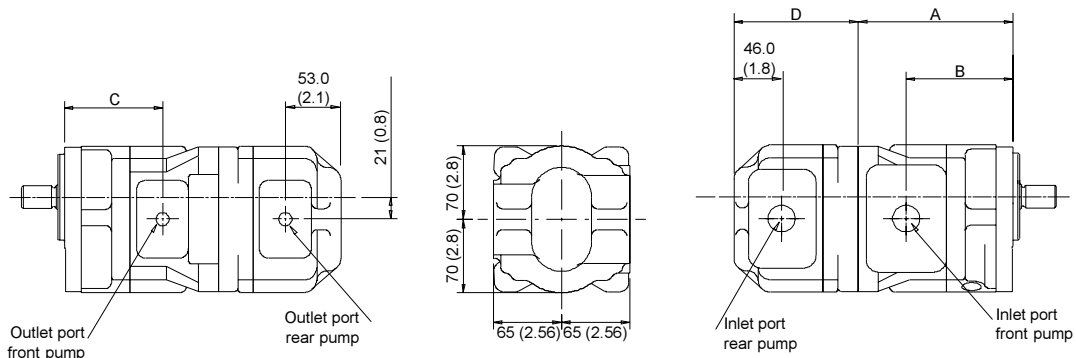


## DOUBLE PUMPS - 2 inlets/2 outlets

Code **B**

Example

R1A40164016A12 **B** 1D1A1D1AA



**TRIPLE AND QUADRUPLE PUMPS** - See Pages 38 and 39.

# QR4/QS4 DIMENSIONAL DATA

PUMP	A mm (in)	B mm (in)	C mm (in)	D mm (in)	F1 Front Pump mm (in)	F2 Rear Pump mm (in)	WEIGHT kg (lb)		
							Single*	Front*	Rear*
R4016	145 (5.7)	99 (3.9)	92 (3.6)	115 (4.5)	0	0	11.7 (25.7)	13.9 (30.6)	11.2 (24.6)
R4019	147 (5.8)	101 (4.0)	94 (3.7)	118 (4.6)	3 (0.1)	3 (0.1)	12.0 (26.4)	14.2 (31.2)	11.5 (25.3)
R4023	150 (5.9)	104 (4.1)	97 (3.8)	121 (4.8)	6 (0.2)	6 (0.2)	12.2 (26.8)	14.4 (31.7)	11.7 (25.7)
R4027	154 (6.1)	108 (4.2)	101 (4)	124 (4.9)	9 (0.3)	9 (0.3)	12.6 (27.7)	14.8 (32.6)	12.1 (26.6)
R4032	158 (6.2)	112 (4.4)	105 (4.1)	128 (5)	13 (0.5)	13 (0.5)	13.0 (28.6)	15.2 (33.4)	12.5 (27.5)
R4038	163 (6.4)	117 (4.6)	110 (4.3)	133 (5.2)	18 (0.7)	18 (0.7)	13.5 (29.7)	15.7 (34.5)	13.0 (28.6)
R4045	169 (6.6)	123 (4.8)	116 (4.6)	139 (5.5)	24 (0.9)	24 (0.9)	14.0 (30.8)	16.2 (35.6)	13.5 (29.7)
R4053	175 (6.9)	129 (5.1)	122 (4.8)	146 (5.7)	31 (1.2)	31 (1.2)	14.7 (32.3)	16.9 (37.2)	14.2 (31.2)
R4060	181 (7.1)	135 (5.3)	128 (5.0)	151 (5.9)	36 (1.4)	36 (1.4)	15.2 (33.4)	17.4 (38.3)	14.7 (32.3)
S4016	151 (5.9)	104 (4.1)	98 (3.8)	121 (4.8)	0	0	12.3 (27.0)	14.5 (31.9)	11.8 (26.0)
S4023	158 (6.2)	112 (4.4)	105 (4.1)	129 (5.1)	8 (0.3)	8 (0.3)	13.0 (28.6)	15.2 (33.4)	12.5 (27.5)
S4027	163 (6.4)	117 (4.6)	110 (4.3)	134 (5.3)	13 (0.5)	13 (0.5)	13.5 (29.7)	15.7 (34.5)	13.0 (28.6)
S4032	169 (6.6)	123 (4.8)	116 (4.6)	139 (5.5)	18 (0.7)	18 (0.7)	14.0 (30.8)	16.2 (35.6)	13.5 (29.7)
S4037	175 (6.9)	129 (5.1)	122 (4.8)	145 (5.7)	24 (0.9)	24 (0.9)	14.5 (31.9)	16.7 (36.7)	14.0 (30.8)
S4042	181 (7.1)	135 (5.3)	128 (5.0)	151 (5.9)	30 (1.2)	30 (1.2)	15.0 (33.0)	17.2 (37.8)	14.5 (31.9)

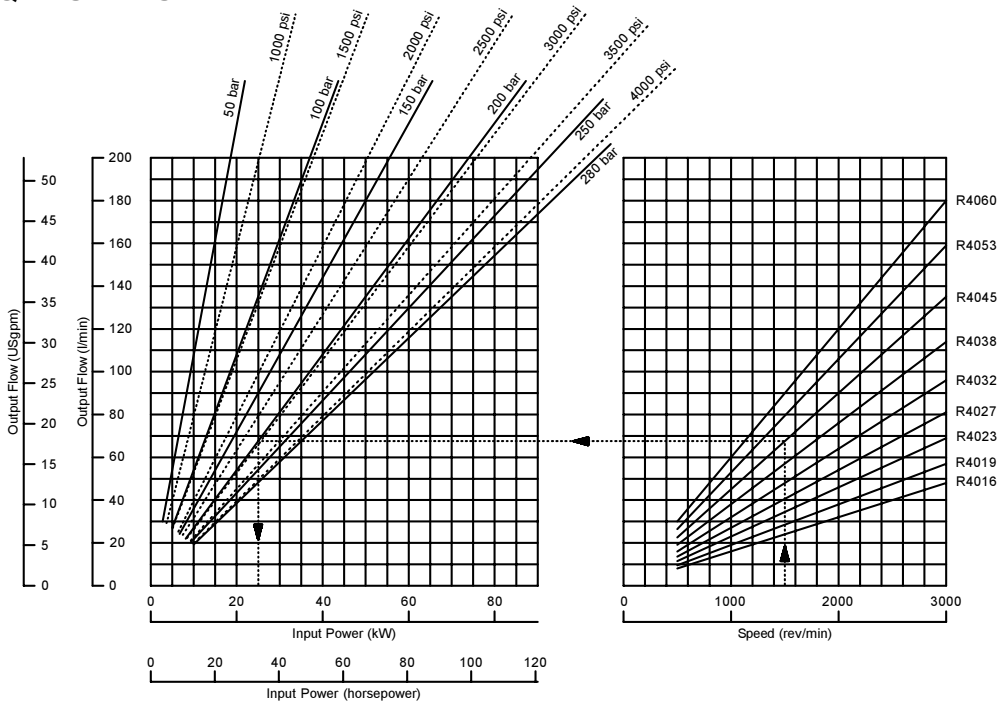
**\* Note**

Weights are approximate

Double pump weight = (front + rear) weights  
Dual pump weight = (front + rear) weights - 4.5 kg (10 lb)

# QR4/QS4 PERFORMANCE DATA

## QR4 SERIES

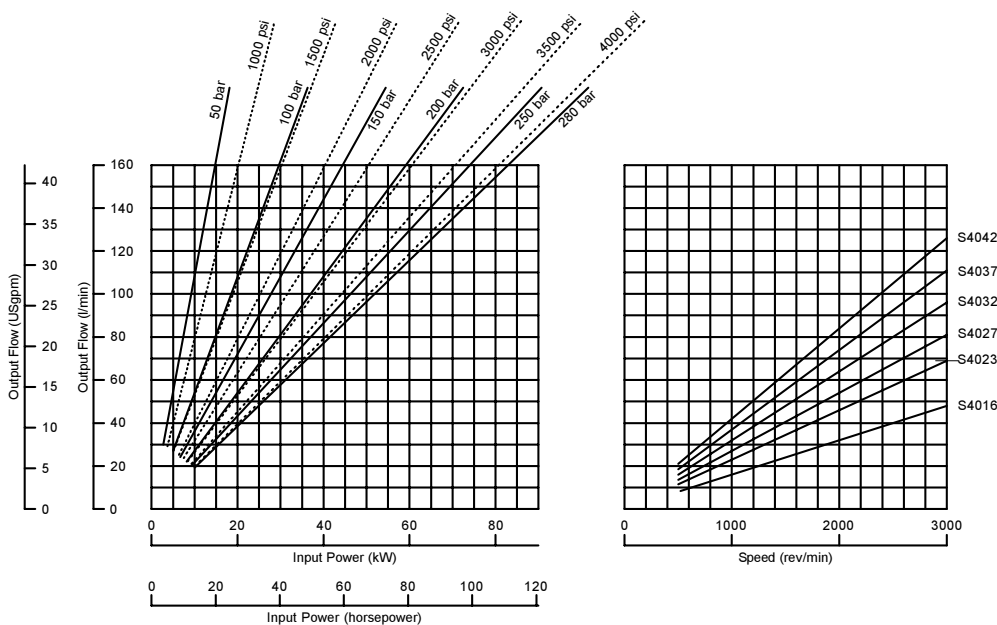


OUTPUT FLOWS are theoretical. Generally volumetric efficiencies are in excess of 95%. Your David Brown representative will advise for specific conditions.

INPUT POWERS are actual, taking into account average efficiencies. Please consult your David Brown Hydraulics' representative when output pressure is less than 50 bar.

*Example* R4045 at 1500 rev/min gives output flow of 67.5 l/min (17.8 US gal/min) and requires 25 kW (33.5 hp) to drive it at 200 bar (2900 psi).

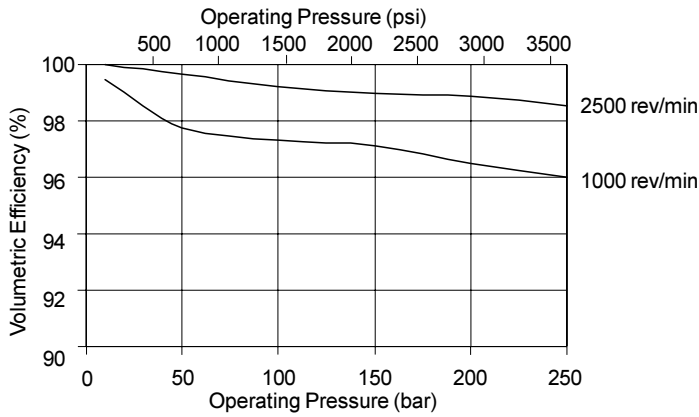
## QS4 SERIES



Curves drawn for average pumps at 50°C (120°F) - fluid viscosity 23 mm<sup>2</sup>/sec (110 SSU).

# QR4/QS4 EFFICIENCIES, NOISE LEVELS, MOMENTS OF INERTIA

## PUMP EFFICIENCIES

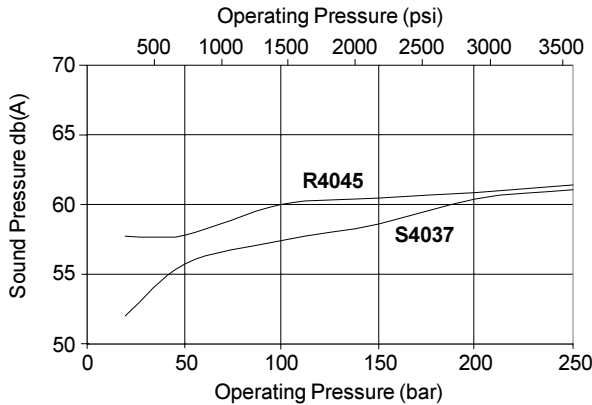


All Q Series pumps share very high efficiencies. The graph shows typical QS4 volumetric efficiency curves at 1000 and 2500 rev/min.

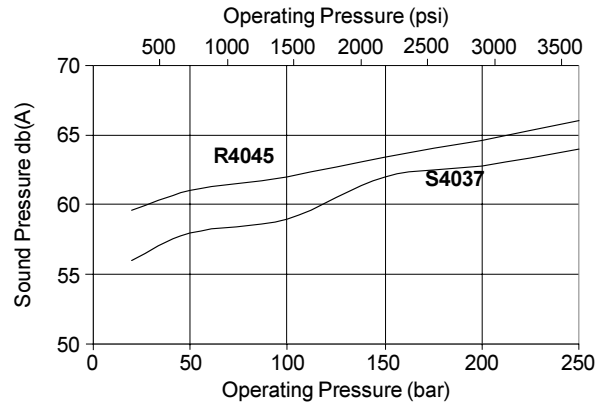
## NOISE LEVELS

As described on Page 6, the reduction of noise levels was a major factor in the development of the Q Series pumps. The following graphs show QR4 and QS4 sound pressure levels at one metre from the pump obtained in accordance with ISO 9614-4.

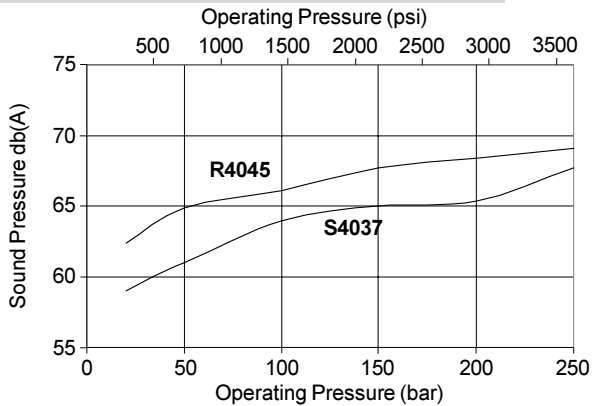
**Q4 Sound Pressure at 1 metre - 1000 rpm**



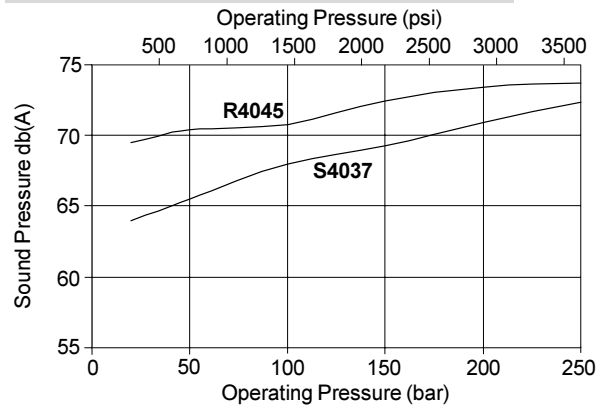
**Q4 Sound Pressure at 1 metre - 1500 rpm**



**Q4 Sound Pressure at 1 metre - 1800 rpm**



**Q4 Sound Pressure at 1 metre - 2500 rpm**



## MOMENTS OF INERTIA

### QR4 SERIES

PUMP SIZE		R4016	R4019	R4023	R4027	R4032	R4038	R4045	R4053	R4060
Moment of Inertia	kg cm <sup>2</sup> (lb in <sup>2</sup> )	1.42 (.48)	1.61 (.55)	1.70 (.58)	1.86 (.63)	2.06 (.70)	2.30 (.78)	2.59 (.88)	2.91 (.99)	3.19 (1.09)

### QS4 SERIES

PUMP SIZE		S4016	R4023	R4027	R4032	R4037	R4042
Moment of Inertia	kg cm <sup>2</sup> (lb in <sup>2</sup> )	2.05 (.70)	2.41 (.82)	2.63 (.90)	2.91 (.99)	3.18 (1.08)	3.46 (1.18)

# QR4/QS4 SHAFT SEALS AND DRIVE SHAFTS

## SHAFT SEALS

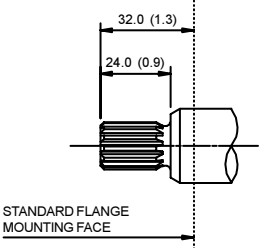
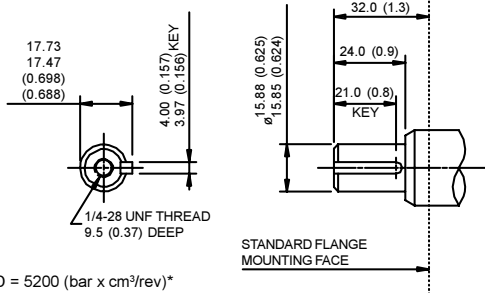
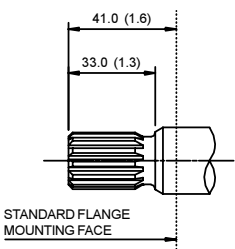
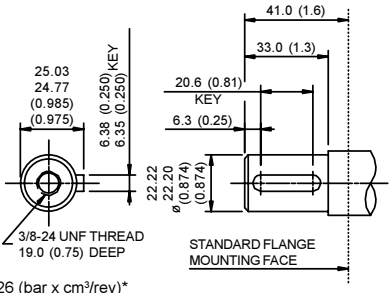
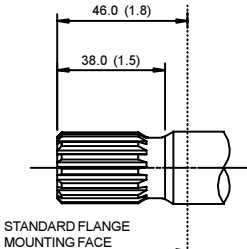
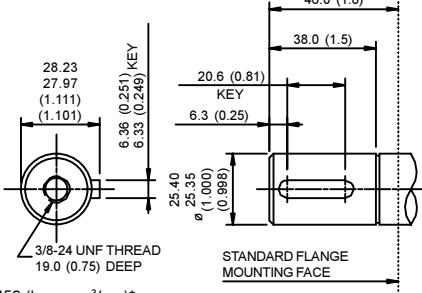
Code **A** Shaft seal and wiper for external drives

Example R1**A**4016A11A1D1AA

Code **C** Shaft seal, wiper and seal with tell-tale hole for torque converter and gearbox drives. The tell-tale hole indicates leakage before mixing of fluids can occur.

Example R1**C**4016A11A1D1AA

## DRIVE SHAFTS

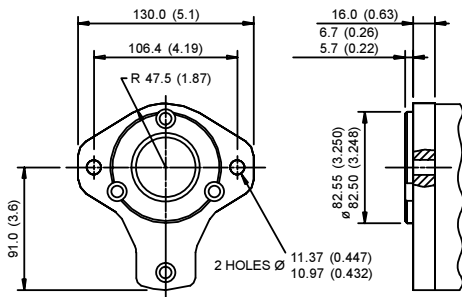
<p>Code <b>A</b> SAE 16-4 (A) 5/8" spline Example R1A4016<b>A</b>11A1D1AA</p> <p>INVOLUTE SPLINE 9 TEETH 16/32 DP FLAT ROOT SIDE FIT 30° PRESSURE ANGLE MAJOR DIA: 15.44/15.34 (0.608/0.604)</p>  <p>STANDARD FLANGE MOUNTING FACE</p> <p>p x D = 5200 (bar x cm³/rev)* p x D = 4600 (psi x cu.in/rev)*</p>	<p>Code <b>E</b> SAE 16-1 (A) 5/8" parallel Example R1A4016<b>E</b>11A1D1AA</p>  <p>STANDARD FLANGE MOUNTING FACE</p> <p>p x D = 5200 (bar x cm³/rev)* p x D = 4600 (psi x cu.in/rev)*</p>
<p>Code <b>B</b> SAE 22-4 (B) 7/8" spline Example R1A4016<b>B</b>11A1D1AA</p> <p>INVOLUTE SPLINE 13 TEETH 16/32 DP FLAT ROOT SIDE FIT 30° PRESSURE ANGLE MAJOR DIA: 21.79/21.69 (0.858/0.854)</p>  <p>STANDARD FLANGE MOUNTING FACE</p> <p>p x D = 14226 (bar x cm³/rev)* p x D = 12590 (psi x cu.in/rev)*</p>	<p>Code <b>F</b> SAE 22-1 (B) 7/8" parallel Example R1A4016<b>F</b>11A1D1AA</p>  <p>STANDARD FLANGE MOUNTING FACE</p> <p>p x D = 14226 (bar x cm³/rev)* p x D = 12590 (psi x cu.in/rev)*</p>
<p>Code <b>Q</b> SAE 25-4 (BB) 1" spline Example R1A4016<b>Q</b>11A1D1AA</p> <p>INVOLUTE SPLINE 15 TEETH 16/32 DP FLAT ROOT SIDE FIT 30° PRESSURE ANGLE MAJOR DIA: 24.97/24.87 (0.983/0.979)</p>  <p>STANDARD FLANGE MOUNTING FACE</p> <p>p x D = 22450 (bar x cm³/rev)* p x D = 19869 (psi x cu.in/rev)*</p>	<p>Code <b>H</b> SAE 25-1 (BB) 1" parallel Example R1A4016<b>H</b>11A1D1AA</p>  <p>STANDARD FLANGE MOUNTING FACE</p> <p>p x D = 22450 (bar x cm³/rev)* p x D = 19869 (psi x cu.in/rev)*</p>

\* p = pressure, D = displacement. The stated values must not be exceeded.

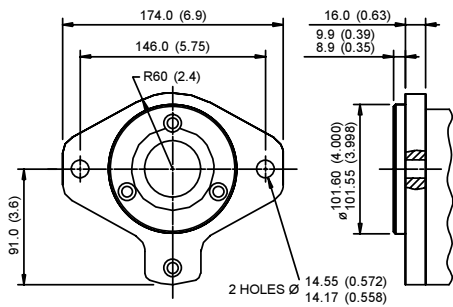
**Note:** For multiple pumps the sum of the p x D values must not exceed the stated value. See Page 38.

# QR4/QS4 MOUNTING FLANGES

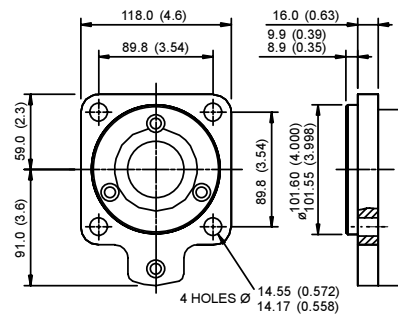
Code **1** SAE 82-2 (A - 2 bolt)  
 Example R1A4016A**1**1A1D1AA



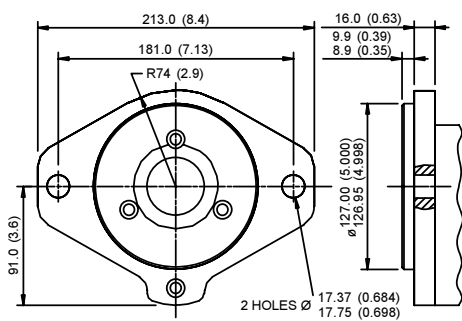
Code **2** SAE 101-2 (B - 2 bolt)  
 Example R1A4016B**2**1A1D1AA



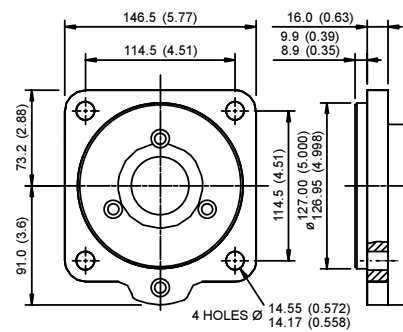
Code **3** SAE 101-4 (B - 4 bolt)  
 Example R1A4016A**3**1A1D1AA



Code **4** SAE 127-2 (C - 2 bolt)  
 Example R1A4016A**4**1A1D1AA



Code **5** SAE 127-4 (C - 4 bolt)  
 Example R1A4016A**5**1A1D1AA



# QR4/QS4 PORT POSITIONS & TYPES, SAE FLANGE DETAILS

## NUMBER OF PUMP SECTIONS AND INLET PORT POSITIONS

Code **A**

**SINGLE PUMP Example**

**R 1 A 4 0 2 7 B 5 1 A 1 F 1 B C**

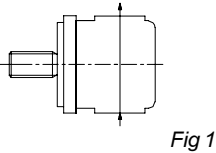
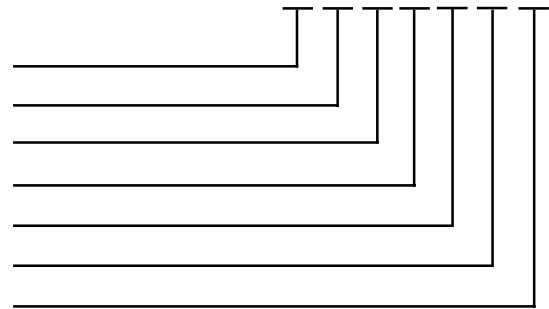


Fig 1

Number of pump sections  
 Inlet port position - see fig 1  
 Inlet port type - see table 1  
 Inlet port size - see table 1  
 Outlet port type - see table 2  
 Outlet port size - see table 2  
 Rotation - viewed from shaft



A = anti-clockwise  
 C = clockwise

Code **C**

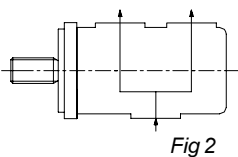


Fig 2

**MULTI PUMP Example**

**R 1 A 4 0 2 7 S 4 0 2 7 Q 5 2 B 1 H 3 D 1 F 3 B C**

Code **B**

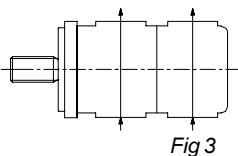
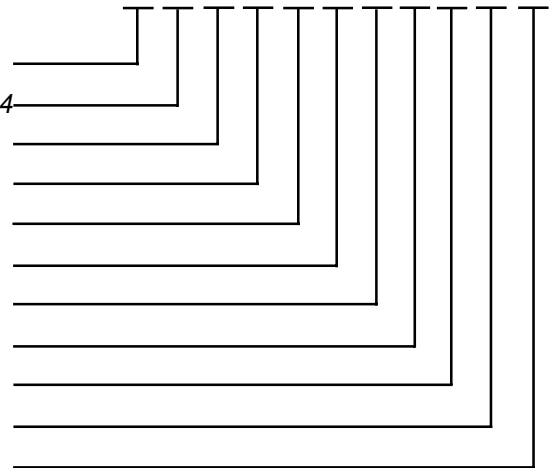


Fig 3

Number of pump sections  
 Inlet port position - see figs 2, 3 or 4  
 1st Inlet port type - see table 1  
 1st Inlet port size - see table 1  
 1st Outlet port type - see table 2  
 1st Outlet port size - see table 2  
 2nd Inlet port type - see table 1  
 2nd Inlet port size - see table 1  
 2nd Outlet port type - see table 2  
 2nd Outlet port size - see table 2  
 Rotation - viewed from shaft



A = anti-clockwise  
 C = clockwise

Code **A**

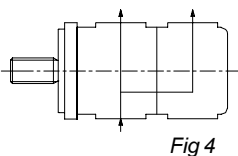
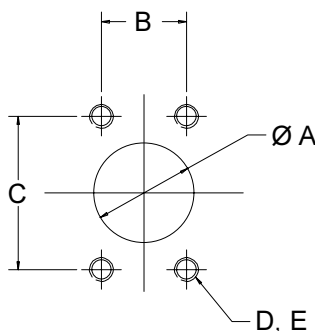


Fig 4

**MULTIPLE PUMPS** - Please consult your David Brown Hydraulics' representative.

### SAE FLANGE PORT DETAILS

SAE code 61.  
 Standard pressure series



SAE FLANGE SIZE	A mm (in)	B mm (in)	C mm (in)	D	E DEPTH mm (in)
1/2"	12.7 (.500)	17.5 (.688)	38.1 (1.500)	M8x1.25 5/16"-18 UNC	24.0 (.95)
	3/4"	19.1 (.750)	22.0 (.875)	47.6 (1.875)	M10x1.5 3/8"-16 UNC
1"		25.4 (1.00)	26.0 (1.031)	52.4 (2.062)	M10x1.5 3/8"-16 UNC
	1.1/4"	31.8 (1.25)	30.0 (1.188)	58.7 (2.312)	M10x1.5 7/16"-14 UNC
1.1/2"		38.1 (1.50)	35.7 (1.406)	70.0 (2.750)	M12x1.75 1/2"-13 UNC
	2"	50.8 (2.00)	42.9 (1.688)	77.9 (3.062)	M12x1.75 1/2"-13 UNC



# QR4/QS4 PORT OPTIONS

**INLET PORT OPTIONS - Table 1**

Port Type	SINGLE PUMP INLET PORT OPTIONS										COMMON INLET PORT OPTIONS								DUAL INLET PORT OPTION					
Port Type Code	3		1			2			4		1				2				1			2		
Port Type	BSPP		SAE Flange Metric			SAE Flange UNC			UNF O-ring		SAE Flange Metric				SAE Flange UNC				SAE Flange Metric			SAE Flange UNC		
Port Size Code	D	F	D	F	H	D	F	H	G	J	D	F	H	K	D	F	H	K	F	H	K	F	H	K
Port Size	1	1.1/4	1	1.1/4	1.1/2	1	1.1/4	1.1/2	1.5/16	1.5/8	1	1.1/4	1.1/2	2	1	1.1/4	1.1/2	2	1.1/4	1.1/2	2	1.1/4	1.1/2	2
R4016	■	□	■	□	□	■	□	□	■	□	□	□	□	■	□	□	□	■	□	□	■	□	□	■
R4019	■	□	■	□	□	■	□	□	■	□	□	□	□	■	□	□	□	■	□	□	■	□	□	■
R4023	■	□	■	□	□	■	□	□	■	□	□	□	□	■	□	□	□	■	□	□	■	□	□	■
R4027	□	■	□	■	□	□	■	□	□	■	□	□	□	■	□	□	□	■	□	□	■	□	□	■
R4032	□	■	□	■	□	□	■	□	□	■	□	□	□	■	□	□	□	■	□	□	■	□	□	■
R4038			□	■	□	□	■	□	□	■	□	□	□	■	□	□	□	■	□	□	■	□	□	■
R4045			□	□	■	□	□	■			□	□	□	■	□	□	□	■	□	□	■	□	□	■
R4053			□	□	■	□	□	■			□	□	□	■	□	□	□	■	□	□	■	□	□	■
R4060			□	□	■	□	□	■			□	□	□	■	□	□	□	■	□	□	■	□	□	■
S4016	■	□	■	□	□	■	□	□	■	□	□	□	□	■	□	□	□	■	□	□	■	□	□	■
S4023	■	□	■	□	□	■	□	□	■	□	□	□	□	■	□	□	□	■	□	□	■	□	□	■
S4027	□	■	□	■	□	□	■	□	□	■	□	□	□	■	□	□	□	■	□	□	■	□	□	■
S4032	□	■	□	■	□	□	■	□	□	■	□	□	□	■	□	□	□	■	□	□	■	□	□	■
S4037	□	■	□	■	□	□	■	□	□	■	□	□	□	■	□	□	□	■	□	□	■	□	□	■
S4042			□	□	■	□	□	■			□	□	□	■	□	□	□	■	□	□	■	□	□	■

- Preferred port size
- Non-preferred port size

**Note:** When coding, for single inlet multiple pumps, use 'O' in '2nd inlet port position' and 'X' in '2nd inlet port type' in the model number.

**OUTLET PORT OPTIONS - Table 2**

Port Type Code	3				1			2			4			
Port Type	BSPP				SAE Flange Metric			SAE Flange UNC			UNF O-ring			
Port Size Code	A	B	D	F	A	B	D	A	B	D	C	E	G	J
Port Size	1/2	3/4	1	1.1/4	1/2	3/4	1	1/2	3/4	1	7/8	1.1/16	1.5/16	1.5/8
R4016	■	□	□	□	■	□	□	■	□	□	■	□	1	1.1/4
R4019	■	□	□	□	■	□	□	■	□	□	□	□	□	□
R4023	■	□	□	□	■	□	□	■	□	□	□	□	□	□
R4027	□	■	□	□	□	■	□	□	■	□	□	■	□	□
R4032	□	■	□	□	□	■	□	□	■	□	□	■	□	□
R4038	□	■	□	□	□	■	□	□	■	□	□	■	□	□
R4045	□	■	□	□	□	■	□	□	■	□	□	■	□	□
R4053	□	■	□	□	□	■	□	□	■	□	□	■	□	□
R4060	□	■	□	□	□	■	□	□	■	□	□	■	□	□
S4016	■	□	□	□	■	□	□	■	□	□	■	□	□	□
S4023	■	□	□	□	■	□	□	■	□	□	■	□	□	□
S4027	■	□	□	□	□	■	□	□	■	□	□	□	□	□
S4032	□	■	□	□	□	■	□	□	■	□	□	□	□	□
S4037	□	■	□	□	□	■	□	□	■	□	□	□	□	□
S4042	□	■	□	□	□	■	□	□	■	□	□	□	□	□

- Preferred port size
- Non-preferred port size



## SUBSIDIARY COMPANIES

### AUSTRALIA

David Brown Engineering & Hydraulics (Pty) Ltd  
- Sydney  
Telephone: +61(0)2 9838 6800  
Facsimile: +61(0)2 9838 6899  
E-mail: [gtuffy@dbeh.com.au](mailto:gtuffy@dbeh.com.au)

### DENMARK

David Brown Hydraulics Danmark A/S  
- Copenhagen  
Telephone: +45 32 51 4015  
Facsimile: +45 32 51 2022  
E-mail: [david-brown@david-brown.dk](mailto:david-brown@david-brown.dk)

### FINLAND

David Brown Hydraulics Finland OY  
- Helsinki  
Telephone: +358 9 342 4120  
Facsimile: +358 9 342 41236  
E-mail: [jouko.mainola@davidbrownhydraulics.fi](mailto:jouko.mainola@davidbrownhydraulics.fi)

### FRANCE

David Brown Hydraulics France SA  
- Lyon  
Telephone: +33(0)4 72 47 03 03  
Facsimile: +33(0)4 78 90 46 39  
E-mail: [davidbrownhydraulics@wanadoo.fr](mailto:davidbrownhydraulics@wanadoo.fr)

### GERMANY

David Brown Hydraulics Deutschland GmbH  
- Ratingen  
Telephone: +49(0)2102 99680  
Facsimile: +49(0)2102 996822  
E-mail: [davidbrown@t-online.de](mailto:davidbrown@t-online.de)

### ITALY

David Brown Hydraulics Italia Srl  
- Vignola (MO)  
Telephone: +39 059 7700411  
Facsimile: +39 059 7700425  
E-mail: [dbitalia@tin.it](mailto:dbitalia@tin.it)

### NORWAY

David Brown Hydraulics Norway A/S  
- Oslo  
Telephone: +47 2290 9410  
Facsimile: +47 2290 9411  
E-mail: [davidbrown@davidbrown.no](mailto:davidbrown@davidbrown.no)

### SWEDEN

David Brown Hydraulics AB  
- Stockholm  
Telephone: +46(0)8 445 73 60  
Facsimile: +46(0)8 445 73 69

### UNITED STATES

David Brown Hydraulics Inc  
- Greenville, Ohio  
Telephone: +1 937 548 3166  
Facsimile: +1 937 548 8712  
E-mail: [jhill@hrtextron.textron.com](mailto:jhill@hrtextron.textron.com)

## TEXTRON MOTION CONTROL COMPANIES

### WILLIAMS

Williams Machine & Tool Co  
PO Box 12427, Omaha, NE6811209427  
United States  
Telephone: +1 402 451 5553  
Facsimile: +1 402 451 1242

### ENERGY

Energy Hydraulics  
204 Plastic Lane, Monticello, Iowa 5310  
United States  
Telephone: +1 319 465 3537  
Facsimile: +1 319 465 5279



### David Brown Hydraulics Limited

Fleets Corner  
Poole, Dorset  
England, BH17 0LB  
Telephone: +44(0)1202 441200  
Facsimile: +44(0)1202 665666  
E-mail: [info.hydraulics@davidbrown.com](mailto:info.hydraulics@davidbrown.com)  
Web Site: [www.davidbrownhydraulics.com](http://www.davidbrownhydraulics.com)