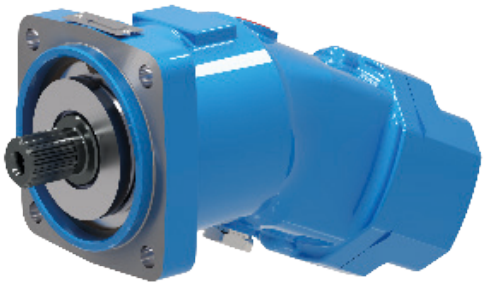
H1C - Fixed displacement pump





Index

General information - Features..... G2
Technical Data..... G4
Ordering code..... G5
Dimensions ISO 4 Bolts flange..... G9

Type	**Displacement** cm³/rev [in³/rev]	**Max. flow** l/min [U.S. gpm]	**Max. pressure cont.** bar [psi]
H1C 006	6.067 [0.37]	30.3 [7.99]	350 [5100]
H1C 012	10.9 [0.66]	47 [12.4]	350 [5100]
H1C 020	19.6 [1.20]	84 [22.2]	350 [5100]
H1C 030	30.0 [1.83]	90 [23.7]	350 [5100]
H1C 040	40.1 [2.45]	132 [34.8]	350 [5100]
H1C 055	54.8 [3.34]	143 [37.7]	350 [5100]
H1C 075	75.3 [4.60]	173 [45.6]	350 [5100]
H1C 090	87.0 [5.30]	217 [57.3]	350 [5100]
H1C 108	107.5 [6.56]	215 [56.7]	350 [5100]
H1C 160	160.8 [9.81]	289 [76.3]	350 [5100]
H1C 226	225.1 [13.73]	360 [95]	350 [5100]

H1C series units are a family of fixed displacement pumps, bent axis piston design for operation in both open and closed circuit. The proven design incorporating the lens shape valve plate, the high quality components and manufacturing techniques make the H1C series units to able provide up to 350 bar [5100 psi] continuous and 450 bar [6500 psi] peak performance. Fully laboratory tested and field proven, these units provide maximum efficiency and longlife. Heavy duty bearings permit high radial and axial loads. Versatile design includes a variety of port plate, shaft end and valves package that will adapt the H1C series units to any application both industrial and mobile. H1C series units are available in both ISO and SAE version.

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The product images and drawings shown are for illustration purposes only and may not be an exact representation of the product.
We reserve the right to change or modify our product specifications, configurations, or dimensions at any time without notice.
Each product configuration listed below is subject to availability: please contact Sales Dpt. for more commercial detailed info.

General information - Features

Simbology:

C	N/bar [lbf/psi]	Load
$F_{ax\ max}$	N [lbf]	Axial pushing load
$F_{ax\ max}$	N [lbf]	Axial pulling load
F_q	N [lbf]	Radial load
$F_{q\ max}$	N [lbf]	Maximum permissible radial load
J	kg·m² [lbf·ft²]	Moment of inertia
m	kg [lbs]	Weight
n_{max}	rpm	Maximum speed
p_{max}	bar [psi]	Maximum continuous pressure
p_{peak}	bar [psi]	Maximum pressure peak

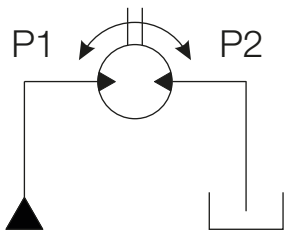
Q_{max}	l/min [U.S. gpm]	Maximum flow
Q_d	l/min [U.S. gpm]	External drain flow
T_k	Nm/bar [lbf.ft/psi]	Torque costant
T_{max}	Nm [lbf.ft]	Maximum torque at pressure continuous
T_{peak}	Nm [lbf.ft]	Maximum torque at pressure peak
V_g	cm³/rev [in³/rev]	Displacement
P_{max}	kW [hp]	Maximum power at p_{nom}
η_{hm}	%	Mech-hyd. efficiency
η_v	%	Volumetric efficiency

Hydraulic fluids:
Use fluids with mineral oil basis and anticorrosive, antioxidant and wear preventing addition agents (HL or HM). Viscosity range at operating temperature must be of 15 ÷40 cSt. For short periods and upon cold start, a max. viscosity of 800 cSt is allowed. Viscosities less then 10 cSt are not allowed. A viscosity range of 10 ÷ 15 cSt is allowed for extreme operating conditions and for short periods only. For further information see on the General Information Catalogue, the section “Fluids and filtering”.

Temperature ranges:
The operating temperature of the oil must be within -25ºC÷ 90ºC [-13ºF ÷ 194ºF]. The running of the axial piston unit with oil temperature higher than 90ºC [194°F] or lower than -25ºC [-13°F] is not allowed. For further information see at Fluids and filtering section.

Filtering:
A correct filtering is essential for long and satisfactory life of axial piston units. In order to ensure a correct functioning of the unit, the max. permissible contamination class is 21/19/16 according to ISO 4406:1999. For further details see on the General Information Catalogue, the section “Fluids and filtering”.

Inlet pressure:
(Pumps in open circuit) Minimum absolute pressure at suction port is 0.8 bar [11.6 psi]. In no circumstances can inlet pressure be lower.



Operating pressure:
The maximum permissible pressure on pressure ports is 350 bar [5100 psi] continuous and 450 bar [6500 psi] peak. If two motors are connected in series, working pressure has to be limited to following values: P1 400 bar max. [5800 psi] and P2 200 bar max. [2900 psi].

Case drain pressure:
Maximum permissible case drain pressure is 1.5 bar [22 psi]. A higher pressure can affect the main shaft seal or reduce its life.

Seals:
Seals used on standard H1C series axial piston pumps are of NBR (Acrylonitrile-Butadiene Elastomer). For special uses (high temperatures or corrosive fluids) it is possible to order the unit with FKM seals (Fluoroelastomer). In case of use of special fluids, contact Dana.

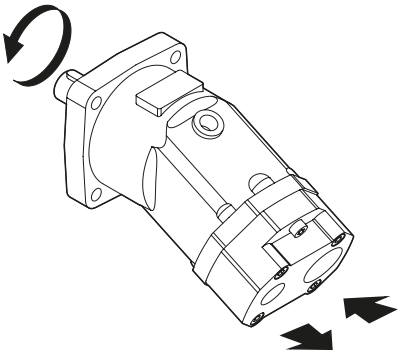
Output shaft:
Main shaft has bearings that can bear both radial and axial loads. As for loads permissible values, see on the General Information Catalogue, the section “Service life of bearings for axial piston units”.

Minimum rotating speed::
Minimum rotating speed is the minimum speed ensuring a smooth running of the piston unit. Operation smooth at low speeds depends on many factors, as type of load and operating pressure. At a speed higher than 150 rpm, a smooth running is ensured almost in every case. Lower speeds are, usually, possible. Please contact Dana.

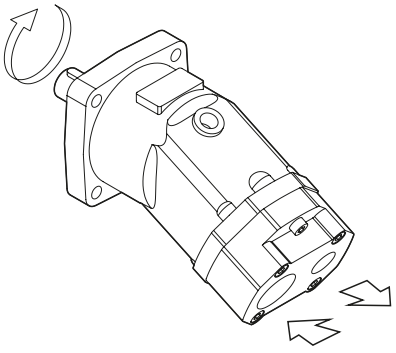
Installation:
H1C series pumps can be installed in every position or direction. These axial piston units have separate ports and drain chambers and so must be always drained. As for pumps, installation of the unit with shaft in vertical position and above the tank involves some limitations. For further details see on the General Information Catalogue, the section “General installation guidelines”.

Relation between direction of rotation and direction of flow:
The relation between direction of rotation of shaft and direction of flow in H1C piston units is shown in the picture below.

Note: for pump operation, the direction of rotation is determined by the port plate mounting position. Usually, in order to change direction of rotation of a pump, port plate has to be removed, turned of 180° and reassembled.



CW rotating pump



CCW rotating pump

			Size										
			006	012	020	030	040	055	075	090	108	160	226
Displacement	V_g	cm^3/rev [in^3/rev]	6.067 [0.37]	10.9 [0.66]	19.6 [1.20]	30.0 [1.83]	40.1 [2.45]	54.8 [3.34]	75.3 [4.60]	87.0 [5.30]	107.5 [6.56]	160.8 [9.81]	225.1 [13.73]
Max. pressure	p_{max}	bar [psi]	350 [5100]	350 [5100]	350 [5100]	350 [5100]	350 [5100]	350 [5100]	350 [5100]	350 [5100]	350 [5100]	350 [5100]	350 [5100]
Max. peak pressure	p_{peak}	bar [psi]	450 [6500]	450 [6500]	450 [6500]	450 [6500]	450 [6500]	450 [6500]	450 [6500]	450 [6500]	450 [6500]	450 [6500]	450 [6500]
*** Max. speed pump (1)**	n_{max}	rpm	5000	4300	4300	3000	3300	2600	2300	2500	2000	1800	1600
Max. flow pump (2)	$Q_{1\ max}$	l/min [U.S.gpm]	30.3 [7.99]	47 [12.4]	84 [22.2]	90 [23.7]	132 [34.8]	143 [37.7]	173 [45.6]	217 [57.3]	215 [56.7]	289 [76.3]	360 [95]
Max. power at p_{max} pump	P_{max}	kW [hp]	17.7 [23.7]	27 [36]	49 [65]	53 [71]	77 [103]	83 [111]	101 [135]	127 [170]	125 [167]	169 [226]	210 [281]
Torque costant	T_k	Nm/bar [lbf.ft/psi]	0.097 [0.005]	0.17 [0.0087]	0.31 [0.016]	0.48 [0.024]	0.64 [0.032]	0.87 [0.044]	1.20 [0.0061]	1.38 [0.070]	1.71 [0.087]	2.56 [0.130]	3.58 [0.182]
Max. torque at p_{max}	T_{max}	Nm [lbf.ft]	33.8 [24.9]	60.5 [44.5]	109 [80]	167 [123]	223 [164]	306 [225]	420 [310]	485 [357]	599 [442]	896 [661]	1254 [925]
Max. torque at p_{peak}	T_{peak}	Nm [lbf.ft]	43.5 [32.1]	76 [56]	139 [102]	216 [159]	288 [212]	391 [288]	540 [398]	623 [460]	770 [568]	1152 [849]	1613 [1189]
Moment of inertia (3)	J	$kg{\cdot}m^2$ [$lbf.ft^2$]	0.0007 [0.016]	0.0007 [0.016]	0.002 [0.047]	0.002 [0.047	0.004 [0.094]	0.004 [0.094]	0.008 [0.190]	0.013 [0.308]	0.13 [0.308]	0.025 [0.593]	0.040 [0.949]
Weight (3)	m	kg [lbs]	5.5 [12.1]	5.5 [12.1]	13 [28.7]	13 [28.7]	22 [48.5]	22 [48.5]	30 [66.1]	45 [99.2]	45 [99.2]	61 [134.5]	86 [189.6]
External drain flow (4)	Q_d	l/min [U.S.gpm]	0.4 [0.10]	0.4 [0.10]	0.4 [0.10]	0.6 [0.16]	0.7 [0.18]	0.8 [0.21]	0.9 [0.23]	1.0 [0.26]	1.2 [0.31]	1.8 [0.47]	2.5 [0.66]

Theorical values, without considering η_{hm} e η_v approximate values. Peak operations must not excede 1% of every minute. Simultaneous maximum pressure and maximum speed are not recommended.

Notes:

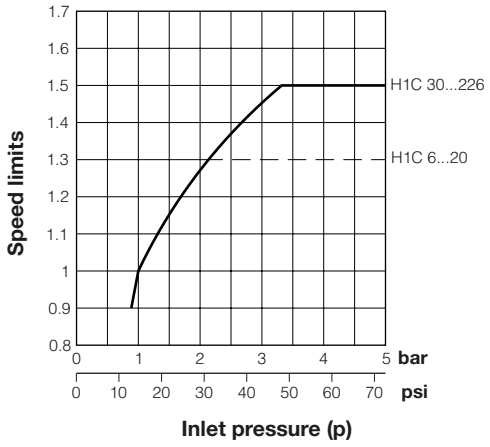
(1) Calculation of permissible speed: the pump rotation speed may be increased by increasing the suction pressure. The max pump speed must be always less then value n_{max} shown in table. To calculate the max permissible speed related to the pump suction pressure see the diagram below.

(2) The values are valid for a rotating speed of n_{max}.

(3) Approximate values.

(4) Average values at 250 bar [3600 psi] with mineral oil at 45°C [113°F] and 35 cSt of viscosity.

Speed limits calculation



Ordering code

The following alphanumeric codes system has been developed to identify all of the configuration options for the H1C series. Use the model code below to specify the desired features.
All alphanumeric digits system of the code must be present when ordering.
We advise to carefully read the catalogue before filling the ordering code.

1	2	3	4	5	6	7	8	9	10 (*)	11(*)	12(*)	13	14
Series	Motor/pump	Size	Version	Mount flange	Shaft end	Port cover	Direction of rotation	Seal	Valve	Valves feature	Flushing valve	Special feature	Painting
H1C	P	006	ME/SE	OA	CAV	LM1	RV	N/V	XXXX	000	XX	XX	XX

1

Series	
H1C	Fixed displacement, bent axis, axial piston unit

2

Pump	
P	Pump

3

Size	
006	6.067 cm³/giro [0.37 in³/rev]
012	10.9 cm³/giro [0.66 in³/rev]
020	19.6 cm³/giro [1.20 in³/rev]
030	30.0 cm³/giro [1.83 in³/rev]
040	40.1 cm³/giro [2.45 in³/rev]
055	54.8 cm³/giro [3.34 in³/rev]
075	75.3 cm³/giro [4.60 in³/rev]
090	87.0 cm³/giro [5.30 in³/rev]
108	107.5 cm³/giro [6.56 in³/rev]
160	160.8 cm³/giro [9.81 in³/rev]
226	225.1 cm³/giro [13.73 in³/rev]

4

Version	
ME	ISO

(*) Fields 10, 11 and 12 reserved for H1C motors

Ordering code

1	2	3	4	5	6	7	8	9	10(*)	11(*)	12(*)	13	14
H1C	P	006	ME	OA	CAV	LM1	RV	N/V	XXXX	000	XX	XX	XX

5

Mount Flange		Size										
		006	012	020	030	040	055	075	090	108	160	226
OA	ISO 4 Bolts Ø 80 mm [Ø 3.149 in]	●	●	-	-	-	-	-	-	-	-	-
OB	ISO 4 Bolts Ø 100 mm [Ø 3.937 in]	-	-	●	●	-	-	-	-	-	-	-
OC	ISO 4 Bolts Ø 125 mm [Ø 4.921 in]	-	-	-	-	●	●	-	-	-	-	-
OD	ISO 4 Bolts Ø 140 mm [Ø 5.511 in]	-	-	-	-	-	-	●	-	-	-	-
OE	ISO 4 Bolts Ø 160 mm [Ø 6.299 in]	-	-	-	-	-	-	-	●	●	-	-
OF	ISO 4 Bolts Ø 180 mm [Ø 7.086 in]	-	-	-	-	-	-	-	-	-	●	-
OG	ISO 4 Bolts Ø 200 mm [Ø 7.874 in]	-	-	-	-	-	-	-	-	-	-	●

●: Available
–: Not Available

6

Shaft end		Size										
		006	012	020	030	040	055	075	090	108	160	226
CAV	Parallel keyed Ø 20 mm k6 [0.787 in k6]	●	●	-	-	-	-	-	-	-	-	-
SAF	Splined W20x1.25x14x9g DIN 5480	●	●	-	-	-	-	-	-	-	-	-
CBM	Parallel keyed Ø 25 mm k6 [0.984 in k6]	-	●	●	●	-	-	-	-	-	-	-
SAG	Splined W25x1.25x18x9g DIN 5480	-	-	●	●	-	-	-	-	-	-	-
CAW	Parallel keyed Ø 30 mm k6 [1.181 in k6]	-	-	-	-	●	●	-	-	-	-	-
SAI	Splined W30x2x14x9g DIN 5480	-	-	-	-	●	●	-	-	-	-	-
CAY	Parallel keyed Ø 35 mm k6 [1.377 in k6]	-	-	-	-	-	-	●	-	-	-	-
SAM	Splined W35x2x16x9g DIN 5480	-	-	-	-	-	-	●	-	-	-	-
SAO	Splined W40x2x18x9g DIN 5480	-	-	-	-	-	-	-	●	●	-	-
CAK	Parallel keyed Ø 40 mm k6 [1.574 in k6]	-	-	-	-	-	-	-	●	●	-	-
CAJ	Parallel keyed Ø 45 mm k6 [1.771 in k6]	-	-	-	-	-	-	-	-	-	●	-
SAP	Splined W45x2x21x9g DIN 5480	-	-	-	-	-	-	-	-	-	●	-
CAX	Parallel keyed Ø 50 mm k6 [1.968 in k6]	-	-	-	-	-	-	-	-	-	-	●
SAR	Splined W50x2x24x9g DIN 5480	-	-	-	-	-	-	-	-	-	-	●

●: Available
–: Not Available

(*) Fields 10, 11 and 12 reserved for H1C motors

Ordering code

1	2	3	4	5	6	7	8	9	10(*)	11(*)	12(*)	13	14
H1C	P	006	ME	OA	CAV	LM1	RV	N/V	XXXX	000	XX	XX	XX

7

Port Cover		Size										
		006	012	020	030	040	055	075	090	108	160	226
FP1	Frontal ports	●	●	●	●	●	-	●	●	●	-	-
LP2	Lateral ports	-	-	-	-	●	●	●	●	●	-	-
FP2	Frontal ports	-	-	-	-	-	-	-	-	-	●	●
FPM	Special FP2+LM2	-	-	-	-	-	-	-	-	-	-	●

●: Available
–: Not Available

8

Direction of rotation (viewed from shaft side)	
DX	CW - Clockwise
SX	CCW - Counter Clockwise

9

Seal	
N	NBR
V	FKM

(*) Fields 10, 11 and 12 reserved for H1C motors

Ordering code

1	2	3	4	5	6	7	8	9	10(*)	11(*)	12(*)	13	14
H1C	P	006	ME	OA	CAV	LM1	RV	N/V	XXXX	000	XX	XXX	XXX

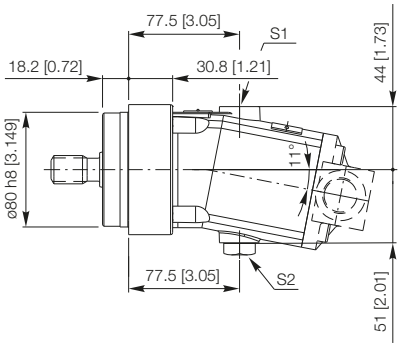
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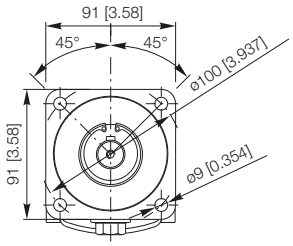
Special feature	
XXX	None

14

Painting	
XXX	None
01	Black Painted RAL 9005
02	Blue Painted RAL 5015

(*) Fields 10, 11 and 12 reserved for H1C motors

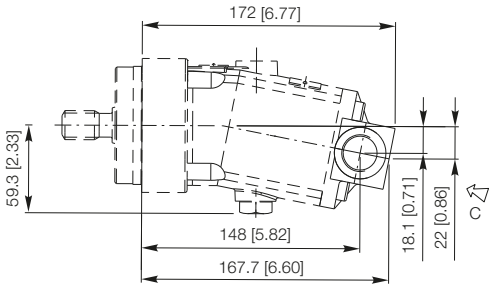


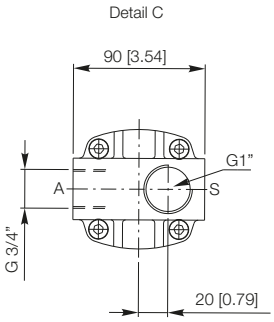


S1, S2: Drain ports (1 plugged) - 3/8 G (BSPP)
A, B: Service line ports
S: Suction port

7 Port cover

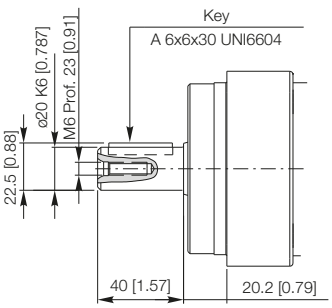
FP1



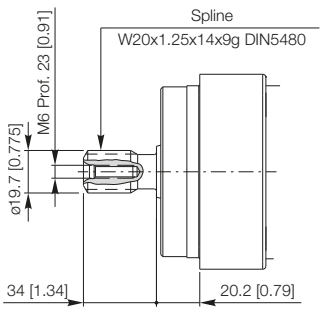


6 Shaft end

CAV Splined shaft

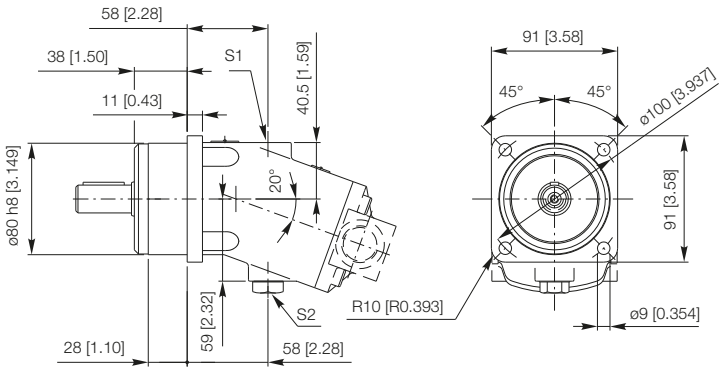


SAF Splined shaft



Dimensions ISO 4 Bolts flange (OA)

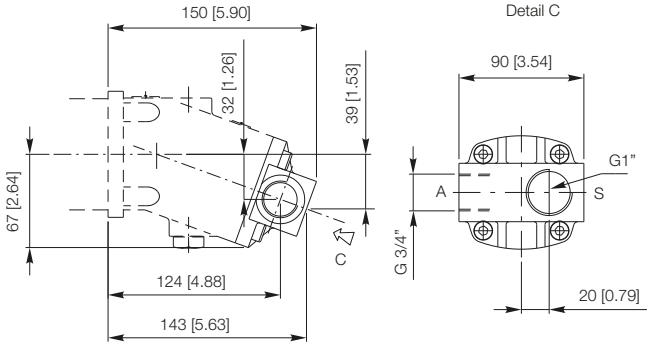
H1C 012 ME



S1, S2: Drain ports - 1/2 G (BSPP)
A, B: Service line ports

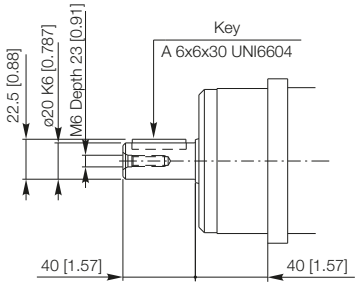
7 Port cover

FP1

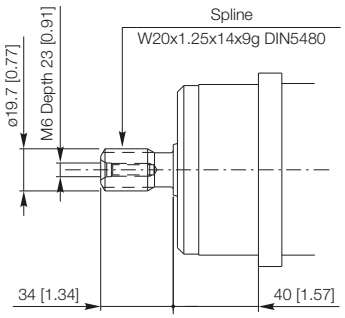


6 Shaft end

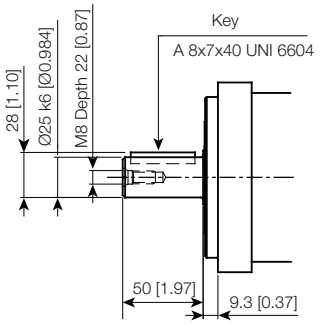
CAV Splined shaft

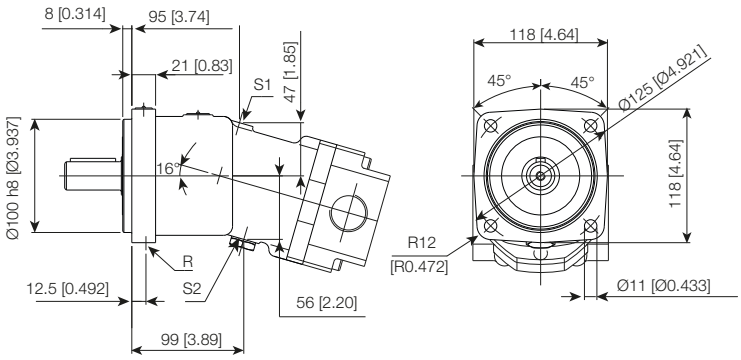


SAF Splined shaft



CBM Parallel keyed Shaft

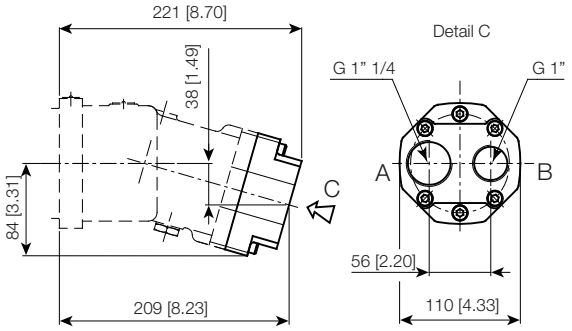




S1, S2: Drain ports (1 plugged) - 3/8 G (BSPP)
A, B: Service line ports
S: Suction port

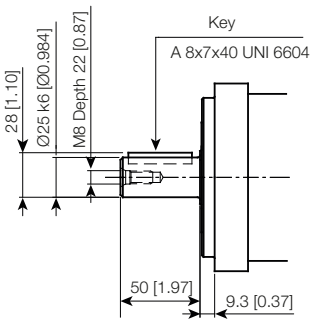
7 Port cover

FP1

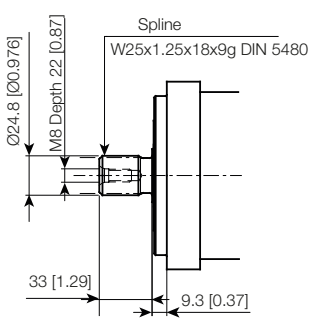


6 Shaft end

CBM Parallel keyed Shaft

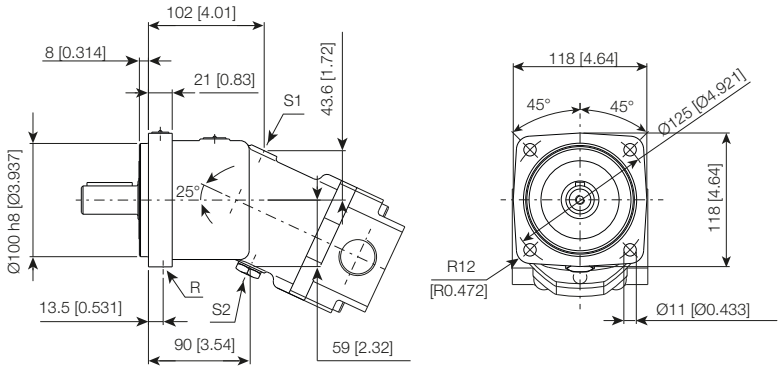


SAG Splined shaft



Dimensions ISO 4 Bolts flange (OA)

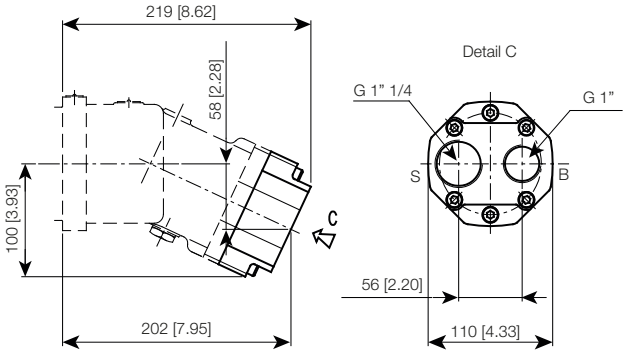
H1C 030 ME



S1, S2: Drain ports - 1/2 G (BSPP)
A, B: Service line ports

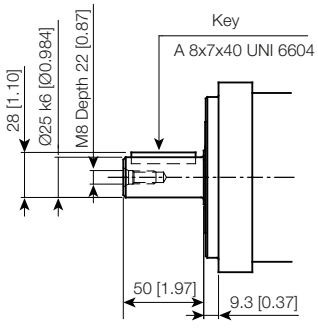
7 Port cover

FP1

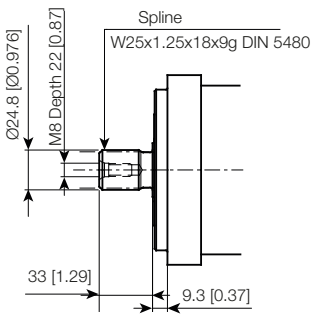


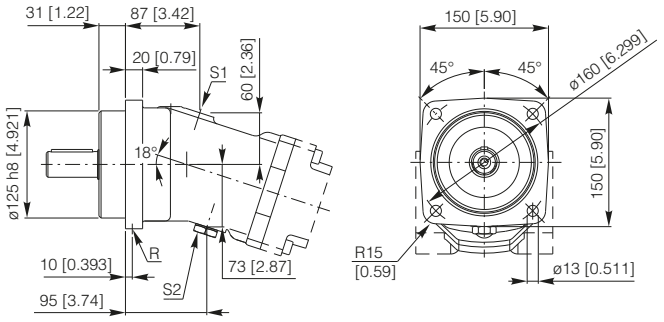
6 Shaft end

CBM Parallel Splined shaft



SAG Splined shaft

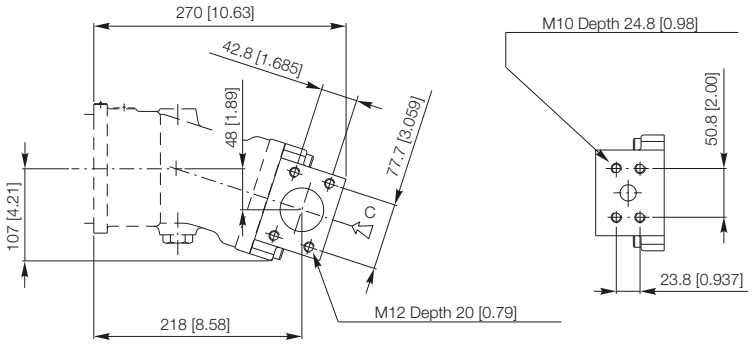


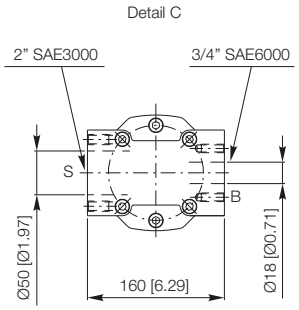


S1, S2: Drain ports - (1 plugged) - 1/2 G (BSPP)
A, B: Service line ports
S: Suction port
R: Air bleed (plugged) - 1/8 G (BSPP)

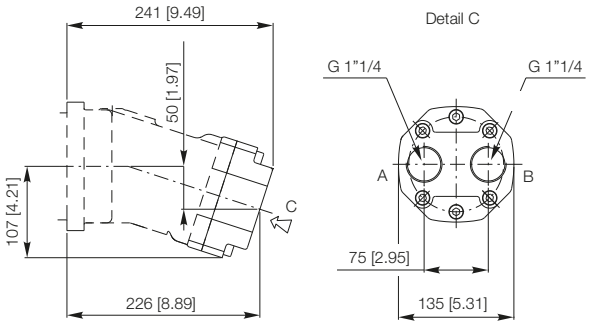
7 Port cover

LP2



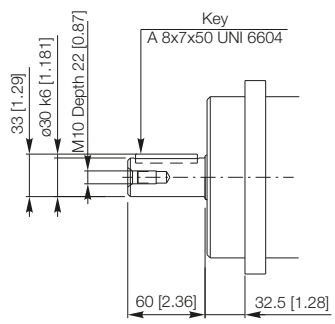


FP1

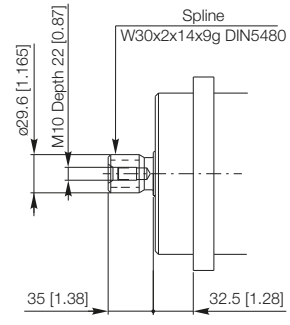


6 Shaft end

CAW Parallel keyed shaft

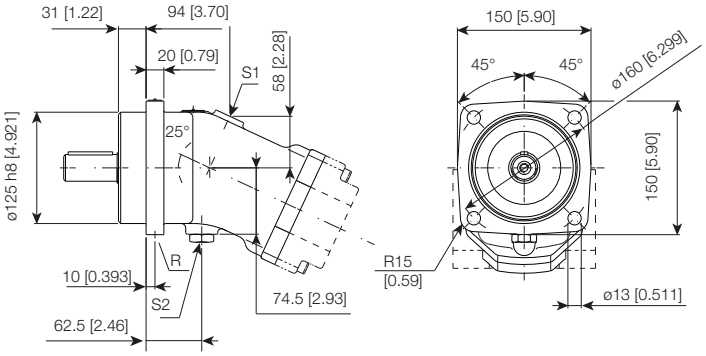


SAI Splined shaft



Dimensions ISO 4 Bolts flange (OA)

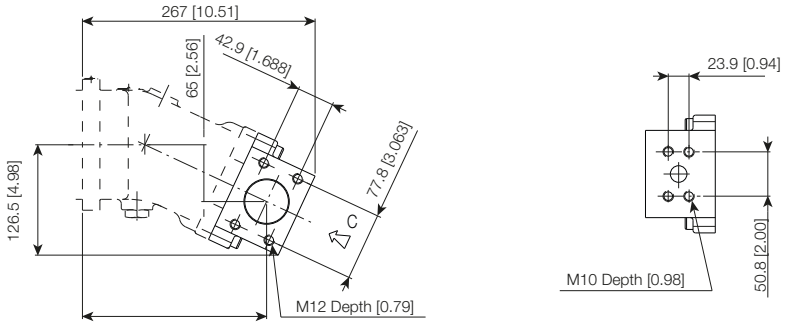
H1C 055 ME



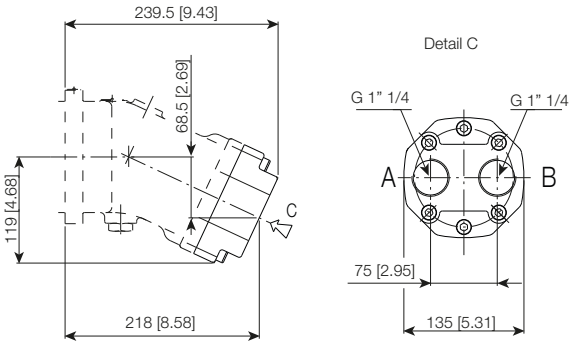
S1, S2: Drain ports - 1/2 G (BSPP)
A, B: Service line ports

7 Port cover

LP2

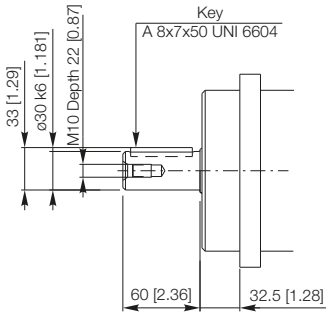


FP1

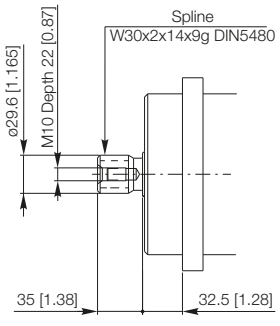


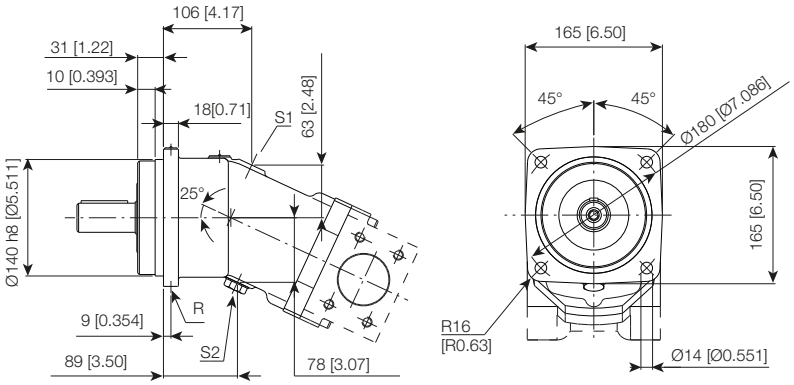
6 Shaft end

CAW Parallel keyed shaft



SAI Splined shaft

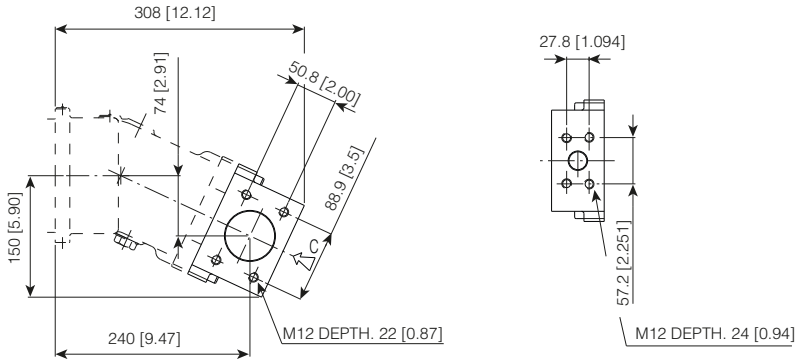




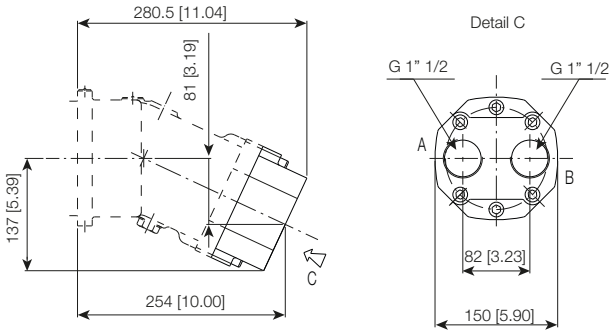
S1, S2: Drain ports - (1 plugged) - 1/2 G (BSPP)
A, B: Service line ports
S: Suction port
R: Air bleed (plugged) - 1/8 G (BSPP)

7 Port cover

LP2

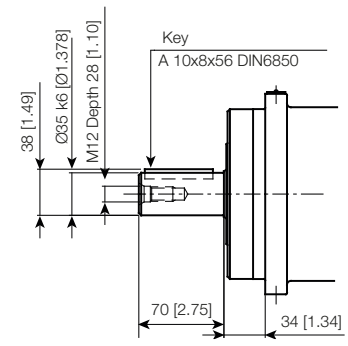


FP1

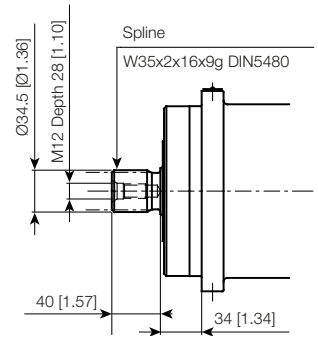


6 Shaft end

CAY Parallel keyed shaft

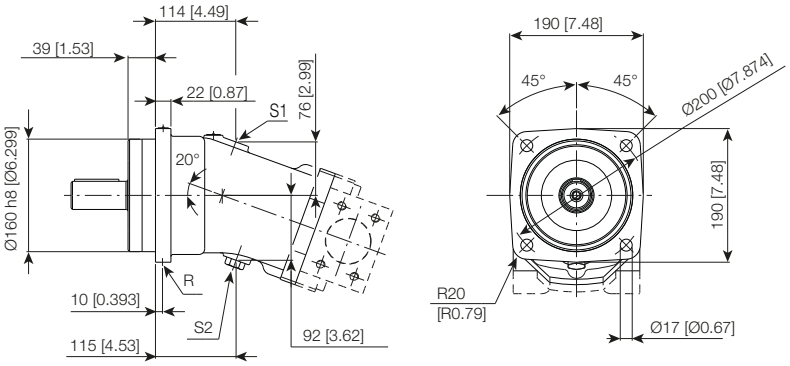


SAM Splined shaft



Dimensions ISO 4 Bolts flange (OA)

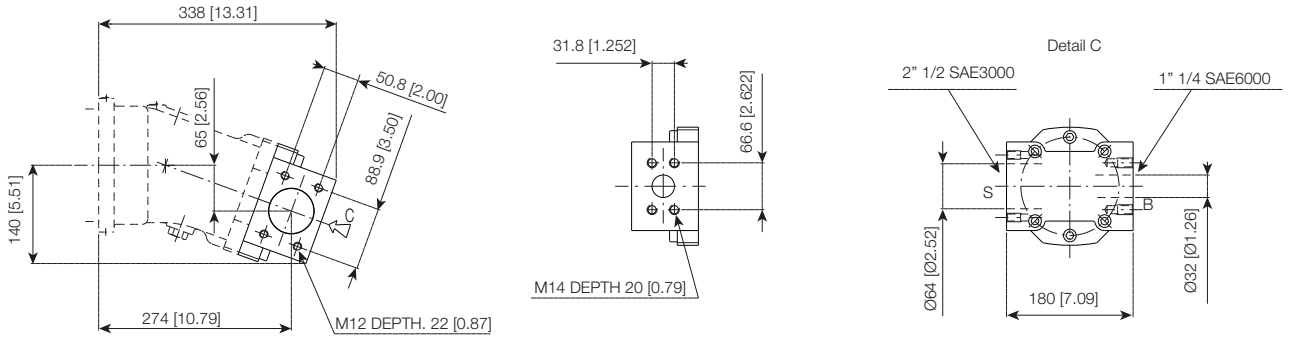
H1C 090 ME



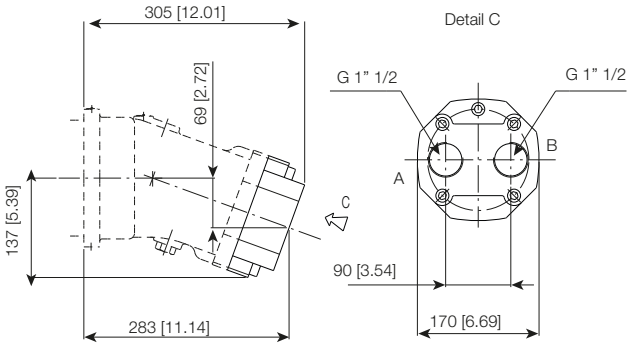
S1, S2: Drain ports - 1/2 G (BSPP)
A, B: Service line ports

7 Port cover

LP2

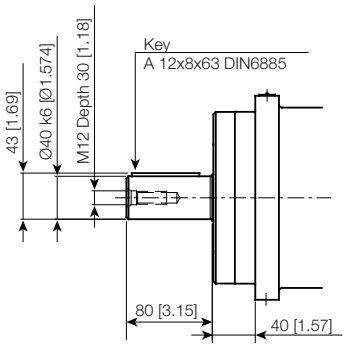


FP1

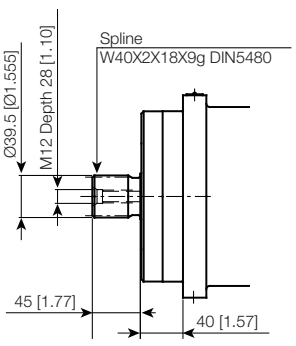


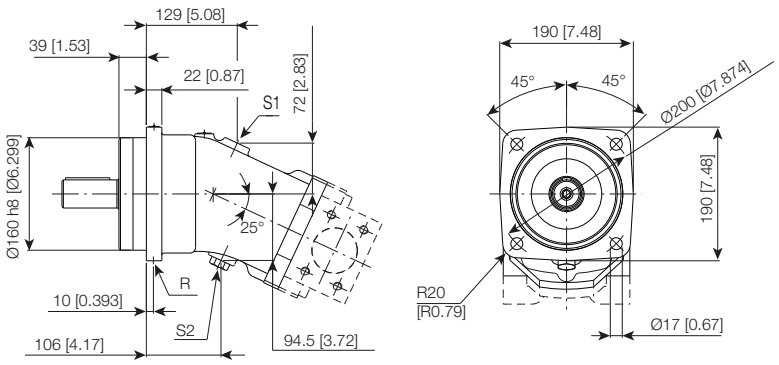
6 Shaft end

CAK Parallel keyed shaft



SAO Splined shaft

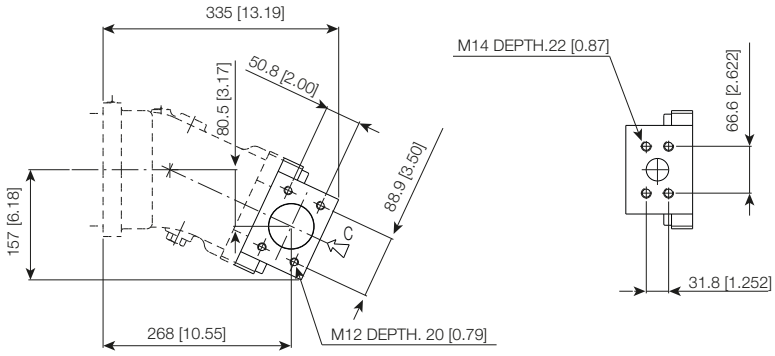


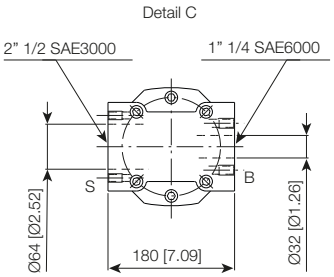


S1, S2: Drain ports - (1 plugged) - 1/2 G (BSPP)
A, B: Service line ports
S: Suction port
R: Air bleed (plugged) - 1/8 G (BSPP)

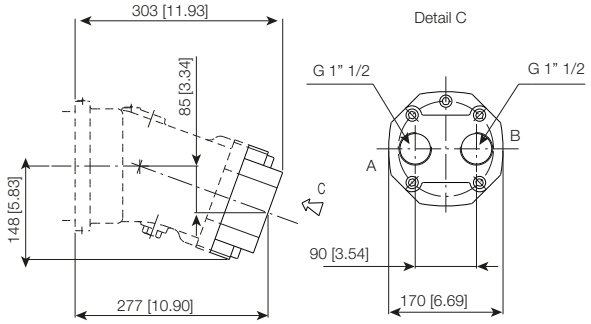
7 Port cover

LP2



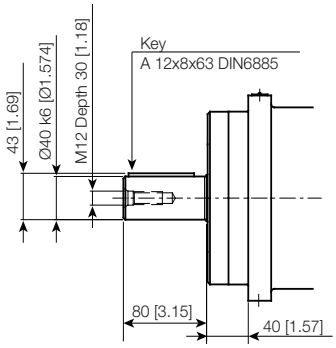


FP1

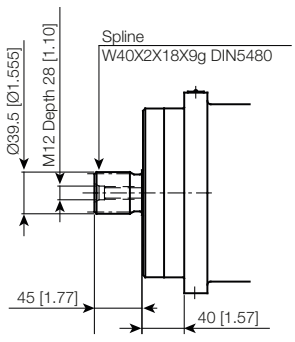


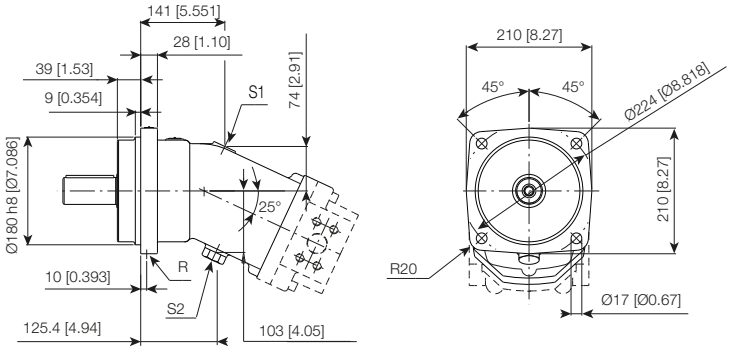
6 Shaft end

CAK Parallel keyed shaft



SAO Splined shaft

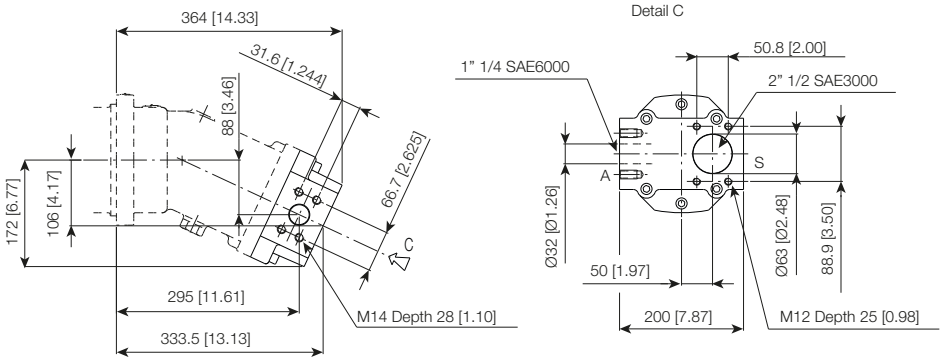




S1, S2: Drain ports - 1/2 G (BSPP)
A, B: Service line ports

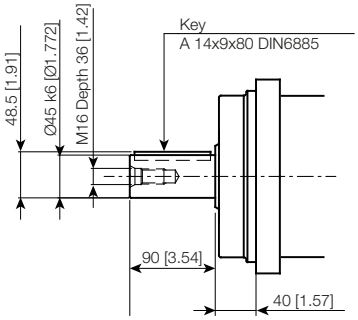
7 Port cover

FP2

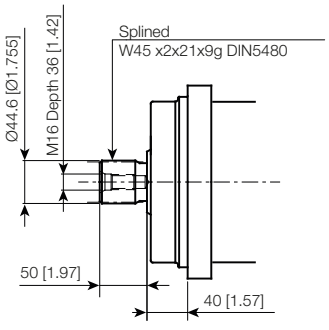


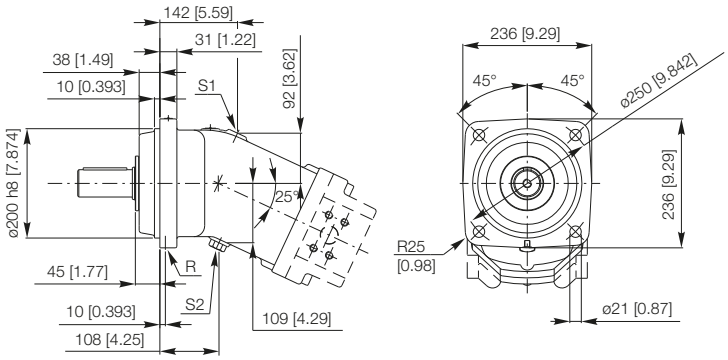
6 Shaft end

CAJ Parallel key shaft



SAP Splined shaft

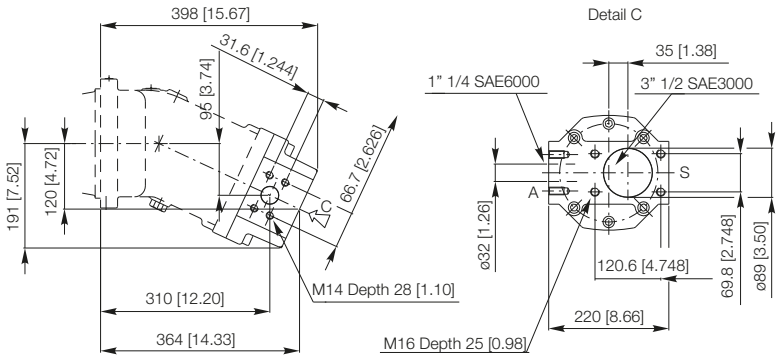




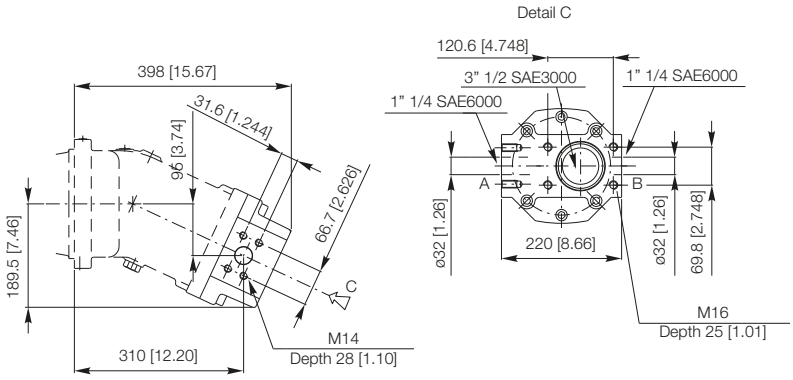
S1, S2: Drain ports (1 plugged) - 3/4 G (BSPP)
A, B: Service line ports
S: Suction port
R: Air bleed (plugged) - 1/8 G (BSPP)

7 Port cover

FP2

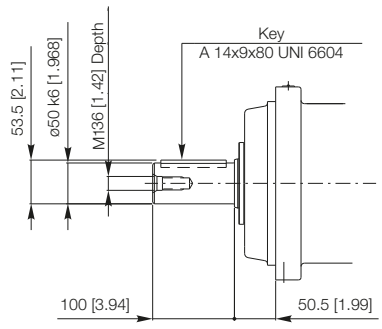


FPM

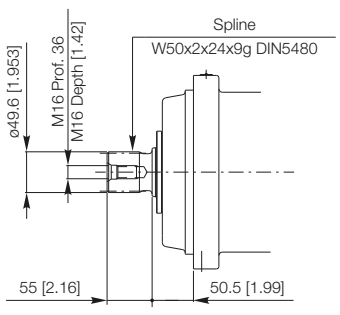


6 Shaft end

CAX Parallel keyed shaft



SAR Splined shaft



DANA SAMHYDRAULIK™