

Fixed displacement motor Axial piston design A10FM / A10FE

RE 91172/02.12
Replaces: 11.10

1/28

Data sheet

Series 52
Sizes 10 to 63
Nominal pressure 280 bar
Maximum pressure 350 bar
Open and closed circuit



A10FM 23...63



A10FE 10...45
(2-hole-flange)



A10FE 11...18
(8-hole-flange)

Contents

Type code for standard program	2
Technical data	4
Dimensions A10FM sizes 23 to 63	8
Dimensions A10FE sizes 10 to 63	14
Flushing and boost pressure valve	24
Anti cavitation valve	24
Speed sensor	25
Installation instructions	26
General instructions	28

Features

- Fixed displacement motor in axial piston swashplate design for hydrostatic drives in open and closed circuit operation
- The output speed is proportional to the inlet flow
- The output torque increases with the pressure differential between the high and low pressure sides
- For use in mobile and industrial applications
- Long service life
- High permissible output speeds
- Well proven A10-rotary group technology
- High power to weight ratio – compact design
- Plug-in version for space saving installation
- Low noise level
- Mechanical and hydraulic connections also acc. to SAE standards
- Speed sensor optional
- Integrated anti cavitation valve optional, i.e. for fan drives

Ordering code for standard program

A10F	M		/	52		-	V		C			
01	02	03		04	05		06	07	08	09	10	11

Axial piston unit

01	Swashplate design, fixed displacement, nominal pressure 280 bar, maximum pressure 350 bar	A10F
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Operating mode

02	Motor, open and closed circuit	M
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Size (NG)

03	Theoretical displacement see page 6	018	023	028	037	045	058	063
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Series

04	Series 5, Index 2	52
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Direction of rotation

05	Viewed on drive shaft	clockwise	R¹⁾
		counter clockwise	L¹⁾
		bidirectional	W

Seals

06	FKM (Fluoro-rubber)	V
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Drive shaft

018 023 028 037 045 058 063

07	Splined shaft to ISO 3019-1 (SAE J744)	○	●	●	●	●	●	R
	Splined shaft to ISO 3019-1 (SAE J744)	-	○	○	●	●	●	W
	Tapered with woodruff key and threaded end	○	●	●	●	●	●	C

Mounting flange

018 023 028 037 045 058 063

08	SAE 2-hole	○	●	●	●	●	●	C
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Ports for service lines

018 023 028 037 045 058 063

09	SAE-flange ports A and B on side, same side Mounting bolts metric	-	●	●	●	●	●	10N00
	Threaded ports A and B, metric, on side, same side	○	●	●	●	●	●	16N00

Ventile

018 023 028 037 045 058 063

10	Without valves	○	●	●	●	●	●	0
	With integrated flushing valve	-	●	●	●	●	●	7
	With integrated anti cavitation valve	○	●	●	●	●	●	2

Speed sensor

018 023 028 037 045 058 063

11	Without speed sensor	○	●	●	●	●	●	
	Prepared for speed sensor (for inductive speed sensor ID)	○	●	●	●	○	○	D

● = available

○ = on request

- = not available

¹⁾ Only necessary in conjunction with valve configuration „2“ (integrated anti cavitation valve)

Ordering code for standard program

A10F	E		/	52		-	V					
01	02	03		04	05		06	07	08	09	10	11

Axial piston unit

01	Swashplate design, fixed displacement, nominal pressure 280 bar, maximum pressure 350 bar										A10F
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Operating mode

02	Motor, open and closed circuit										E
----	--------------------------------	--	--	--	--	--	--	--	--	--	----------

Size (NG)

03	Theoretical displacement see page 6					010	011	014	016	018	023	028	037	045	058	063
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Series

04	Series 5, Index 2										52
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Direction of rotation

05	Viewed on drive shaft					clockwise					R¹⁾	
						counter clockwise					L¹⁾	
						bidirectional					W	

Seals

06	FKM (Fluoro-rubber)										V
----	---------------------	--	--	--	--	--	--	--	--	--	----------

Drive shaft

		010	011	014	016	018	023	028	037	045	058	063	
07	Splined shaft to ISO 3019-1 (SAE J744)	○	●	●	●	●	●	●	●	●	●	●	R
	Splined shaft to ISO 3019-1 (SAE J744)	-	-	-	-	-	○	○	●	●	●	●	W
	Tapered with woodruff key and threaded end	●	●	●	●	●	●	●	●	●	●	●	C

Mounting flange

		010	011	014	016	018	023	028	037	045	058	063	
08	SAE 2-hole	●	●	●	●	●	-	-	-	-	-	-	C²⁾
	Special 2-hole	-	-	-	-	-	●	●	●	●	●	●	F
	Special 8-hole	-	●	●	●	●	-	-	-	-	-	-	H

Ports for service lines

		010	011	014	016	018	023	028	037	045	058	063	
09	SAE-flange ports A and B, on side, same side mounting bolts metric	-	-	-	-	-	●	●	●	●	●	●	10N00
	Threaded ports A and B, metric, on side, same side	●	●	●	●	●	●	●	●	●	●	●	16N00

Valves

		010	011	014	016	018	023	028	037	045	058	063	
10	Without valves	○	●	○	●	●	●	●	●	●	●	●	0
	With integrated flushing valve	-	-	-	-	-	●	●	●	●	●	●	7
	With integrated anti cavitation valve	●	●	●	●	●	●	●	●	●	●	●	2

Speed sensor

		010	011	014	016	018	023	028	037	045	058	063	
11	Without speed sensor	●	●	●	●	●	●	●	●	●	●	●	
	Prepared for speed sensor (for inductive speed sensor ID)	-	-	-	-	○	●	●	●	●	○	○	D

● = available

○ = on request

- = not available

1) Only necessary in conjunction with valve configuration „2“ (integrated anti cavitation valve)

2) R-shaft with C-flange on sizes 10 to 18 in preparation

Technical data

Fluids

Prior to project design, please see our technical data sheets RE 90220 (mineral oil) and RE 90221 (environmentally acceptable fluids) for detailed information on fluids and operating conditions.

For operation on environmentally acceptable fluids please consult us (when ordering, please state in clear text the fluid to be used).

Operating viscosity range

To achieve optimum values for efficiency and service life we recommend an operation viscosity (at operating temperature) within the range,

$$v_{\text{opt}} = \text{opt. operating viscosity } 16 \dots 36 \text{ mm}^2/\text{s}$$

referred to the tank temperature (open circuit).

Limit of viscosity range

For critical operation conditions the following values apply:

$v_{\text{min}} = 5 \text{ mm}^2/\text{s}$ (closed circuit)
 $10 \text{ mm}^2/\text{s}$ (open circuit)
 for short periods ($t \leq 1 \text{ min}$)
 at a max. perm. temperature of 115°C .

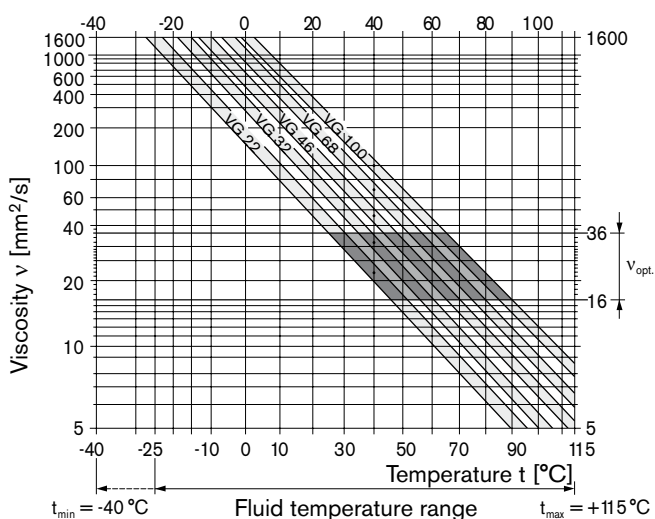
Please note that the max. leakage fluid temperature of 115°C is also not exceeded in certain areas (for instance bearing area). The fluid temperature in the bearing area is approx. 5 K higher than the average leakage fluid temperature

$v_{\text{max}} = 1600 \text{ mm}^2/\text{s}$
 for short periods ($t \leq 1 \text{ min}$)
 on cold start
 $(t_{\text{min}} = p \leq 30 \text{ bar}, n \leq 1000 \text{ min}^{-1}, -25^\circ\text{C})$.

At temperatures between -40°C and -25°C special measures are required, please consult us for further information.

For detailed information on operation with low temperatures see data sheet RE 90300-03-B.

Selection diagram



Notes on the selection of the hydraulic fluid

In order to select the correct fluid, it is necessary to know the operating temperature in the tank (open circuit) in relation to the ambient temperature.

The fluid should be selected so that within the operating temperature range, the viscosity lies within the optimum range (v_{opt}), see shaded section of the selection diagram. We recommend to select the higher viscosity grade in each case.

Example: at an ambient temperature of $X^\circ\text{C}$ the operating temperature in the tank is 60°C . In the optimum viscosity range (v_{opt} ; shaded area) this corresponds to viscosity grades VG 46 resp. VG 68; VG 68 should be selected.

Important: The leakage oil (case drain oil) temperature is influenced by pressure and input speed and is always higher than the tank temperature. However, at no point of the component may the temperature exceed 115°C .

If it is not possible to comply with the above conditions because of extreme operating parameters please consult us.

Filtration of the hydraulic fluid

Filtration improves the cleanliness level of the hydraulic fluid, which, in turn, increases the service life of the axial piston unit.

To ensure the functional reliability of the axial piston unit, a gravimetric evaluation is necessary for the hydraulic fluid to determine the amount of contamination by solid matter and to determine the cleanliness level according to ISO 4406. A cleanliness level of at least 20/18/15 to ISO 4406 is to be maintained.

If above requirements cannot be maintained please consult us.

Technical data

Operating pressure range

Pressure at service line port (pressure port) A or B

Nominal pressure p_{nom} _____ 280 bar absolute

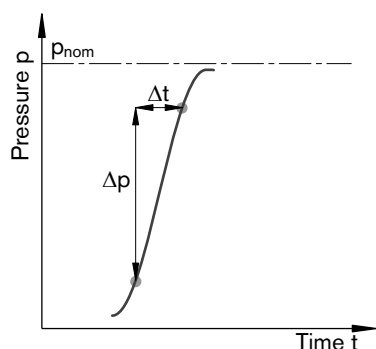
Maximum pressure p_{max} _____ 350 bar absolute

Single operating period _____ 2,5 ms

Total operating period _____ 300 h

Minimum pressure (high pressure side) _____ 10 bar²⁾

Rate of pressure change $R_{A \max}$ _____ 16000 bar/s



Outlet pressure

at n_{max}

Minimum pressure at low pressure side $p_{abs \max}$ _____ 18 bar

Case drain pressure

Maximum permissible case drain pressure
(at port L, L₁):

$p_{max \ abs}$ motor operation in open circuit _____ 4 bar_{abs}

$p_{max \ abs}$ motor operation in closed circuit _____ 4 bar_{abs}

$p_{max \ abs}$ pump/motor operation in open circuit _____ 2 bar_{abs}

Direction of flow

viewed on drive shaft

clockwise rotation

counter clockwise rotation

A to B

B to A

Definitions

Nominal pressure p_{nom}

The nominal pressure corresponds to the maximum design pressure.

Maximum pressure p_{max}

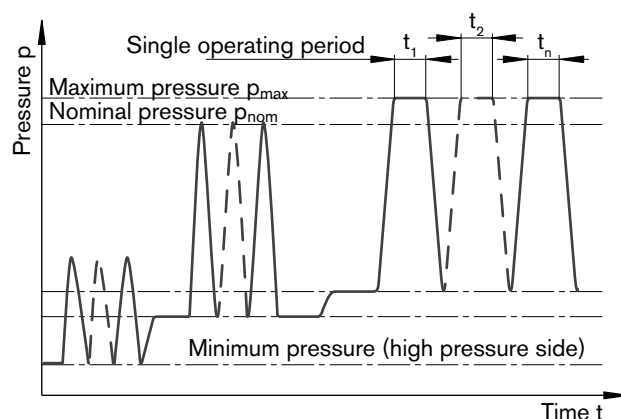
The maximum pressure corresponds to the maximum operating pressure within the single operating period. The sum of the single operating periods must not exceed the total operating period.

Minimum pressure (high-pressure side)

Minimum pressure at the high pressure side (A or B) which is required in order to prevent damage to the axial piston unit.

Rate of pressure change R_A

Maximum permissible rate of pressure rise and pressure reduction during a pressure change, over the entire pressure range.



Total operating period = $t_1 + t_2 + \dots + t_n$

¹⁾ Other values on request

²⁾ Lower pressures time dependent, please consult us.

Technical data

Table of values (theoretical values, without efficiency and tolerances: values rounded)

Size	NG			010	011	014	016	018	023
Displacement	$V_{g \max}$	cm ³		10.6	11.5	14.1	16.1	18	23.5
Speed ¹⁾									
at $V_{g \max}$	n_{nom}	rpm		5000	4200	4200	4200	4200	4900
Input flow									
at n_{nom}	$q_{v \max}$	L/min		53	48	59	68	76	115
Power									
at n_{nom} , $\Delta p = 280$ bar	P_{max}	kW		24.7	22.5	27.6	31.6	35.3	53.6
Actual starting torque									
at $n = 0$ rpm, $\Delta p = 280$ bar		Nm		37.5	30	45	53	67.5	75
Torque									
at $V_{g \max}$	$\Delta p = 280$ bar	T_{max}	Nm	47	51	63	72	80	105
Torsional stiffness	R	c	Nm/rad	–	–	–	–	14835	28478
Drive shaft	W	c	Nm/rad	–	–	–	–	–	–
	C	c	Nm/rad	15084	18662	18662	18662	18662	30017
Moment of inertia rotary group	J_{TW}	kgm ²		0.0006	0.00093	0.00093	0.00093	0.00093	0.0017
Maximum angular acceleration	α	rad/s ²		8000	6800	6800	6800	6800	5500
Case volume	V	L		0.1	0.15	0.15	0.15	0.15	0.6
Weight approx.	m	kg		5	6.5	6.5	6.5	6.5	12

Size	NG			028	037	045	058	063
Displacement	$V_{g \max}$	cm ³		28.5	36.7	44.5	58	63.1
Speed ¹⁾								
at $V_{g \max}$	n_{nom}	rpm		4700	4200	4000	3600	3400
Input flow								
at n_{nom}	$q_v \max$	L/min		134	154	178	209	215
Power								
at n_{nom} , $\Delta p = 280$ bar	$P_{\max}$	kW		62.5	71.8	83.1	97.4	100.1
Actual starting torque								
at $n= 0 \text{ min}^{-1}$, $\Delta p = 280$ bar		Nm		105	125	170	205	230
Torque								
at $V_{g \max}$	$\Delta p = 280$ bar	$T_{\max}$	Nm	127	163	198	258	281
Torsional stiffness	R	c	Nm/rad	28478	46859	46859	80590	80590
Drive shaft	W	c	Nm/rad	–	38489	38489	60907	60907
	C	c	Nm/rad	30017	46546	46546	87667	87667
Moment of inertia rotary group	J_{TW}	kgm ²		0.0017	0.0033	0.0033	0.0056	0.0056
Maximum angular acceleration	α	rad/s ²		5500	4000	4000	3300	3300
Case volume	V	L		0.6	0.7	0.7	0.8	0.8
Weight approx.	m	kg		12	17	17	22	22

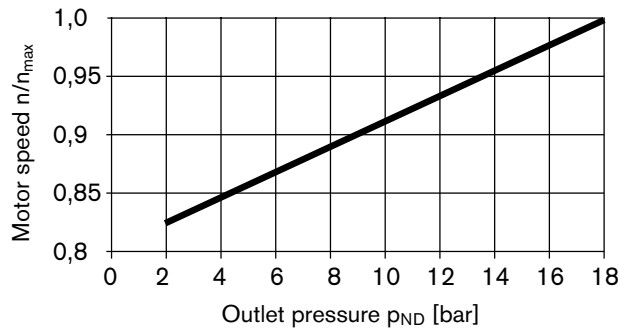
¹⁾ for maximum speed an outlet pressure (in low pressure side) of 18 bar is required (see diagram on page 7)

Note

Operation above the maximum values or below the minimum values may result in a loss of function, a reduced service life or in the destruction of the axial piston unit. We recommend testing the loads by means of experiment or calculation / simulation and comparison with the permissible values.

Technical data

Permissible motor speed in relation to outlet pressure



Determination of motor size (NG)

Input flow $q_v = \frac{V_g \cdot n}{1000 \cdot \eta_v}$ [L/min] V_g = Displacement per revolution in cm³

Torque $T = \frac{1,59 \cdot V_g \cdot \Delta p \cdot \eta_{mh}}{100}$ [Nm] Δp = Differential pressure in bar

or $T = T_k \cdot \Delta p \cdot \eta_{mh}$ n = Speed in rpm

Power $P = \frac{2 \pi \cdot T \cdot n}{60000} = \frac{q_v \cdot \Delta p \cdot \eta_t}{600}$ [kW] η_v = Volumetric efficiency

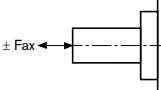
Output speed $n = \frac{q_v \cdot 1000 \cdot \eta_v}{V_g}$ [rpm] η_{mh} = Mechanical-hydraulic efficiency

η_t = Overall efficiency ($\eta_t = \eta_v \cdot \eta_{mh}$)

T_k = Torque constant

Permissible radial and axial forces on the drive shaft

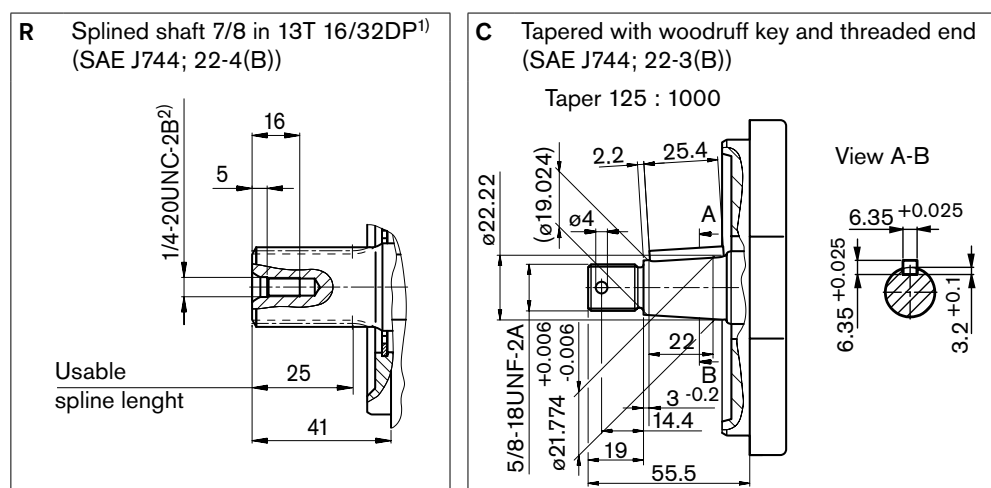
Size	NG		10	11	14	16	18	23		
Max. radial force at X/2	Drive shaft R; W	Drive shaft C								
			$F_{q \max}$	N	250	350	350	350	350	1200
Maximum axial force										
	$\pm F_{ax \max}$		N	400	700	700	700	700	700	1000

Size	NG		28	37	45	58	63		
Max. radial force at X/2	Drive shaft R; W	Drive shafte C	$F_{q \max}$	N	1200	1500	1500	1700	1700
Maximum axial force			$\pm F_{ax \max}$	N	1000	1500	1500	2000	2000

Dimensions A10FM size 23 - 28

Before finalising your design request a certified installation drawing. Maße in mm.

Drive shafts



Ports

Designation	Port for	Standard	Size ²⁾	Max. pressure [bar] ³⁾	State
A, B	Service line (high pressure series)	SAE J518	3/4 in	350	O
Port plate 10	Mounting bolts	DIN 13	M10 x 1.5; 17 deep		
A, B	Service line	DIN 3852	M27 x 2; 16 deep	350	O
Port plate 16					
L	Case drain	ISO 11926 ⁵⁾	3/4-16 UNF-2B; 11 deep	4	O ⁴⁾
L ₁	Case drain	ISO 11926 ⁵⁾	3/4-16 UNF-2B; 11 deep	4	X ⁴⁾

¹⁾ ANSI B92.1a-1996, 30° pressure angle, flat base, flank centering, tolerance class 5

²⁾ Observe the general instructions on page 28 for the maximum tightening torques.

³⁾ Momentary pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

⁴⁾ Depending on the installation position, L or L₁ must be connected (see also page 26 - 27).

⁵⁾ The counterbore can be deeper than stipulated in the standard.

O = Must be connected (plugged on delivery)

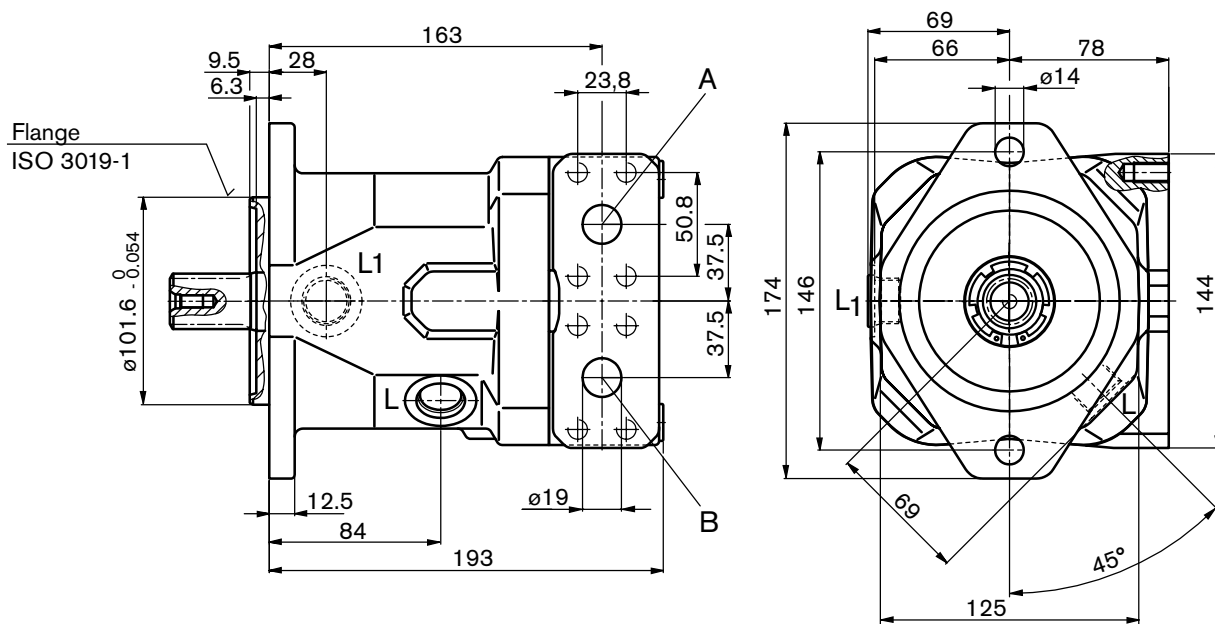
X = Plugged (in normal operation)

Dimensions A10FM size 37 - 45

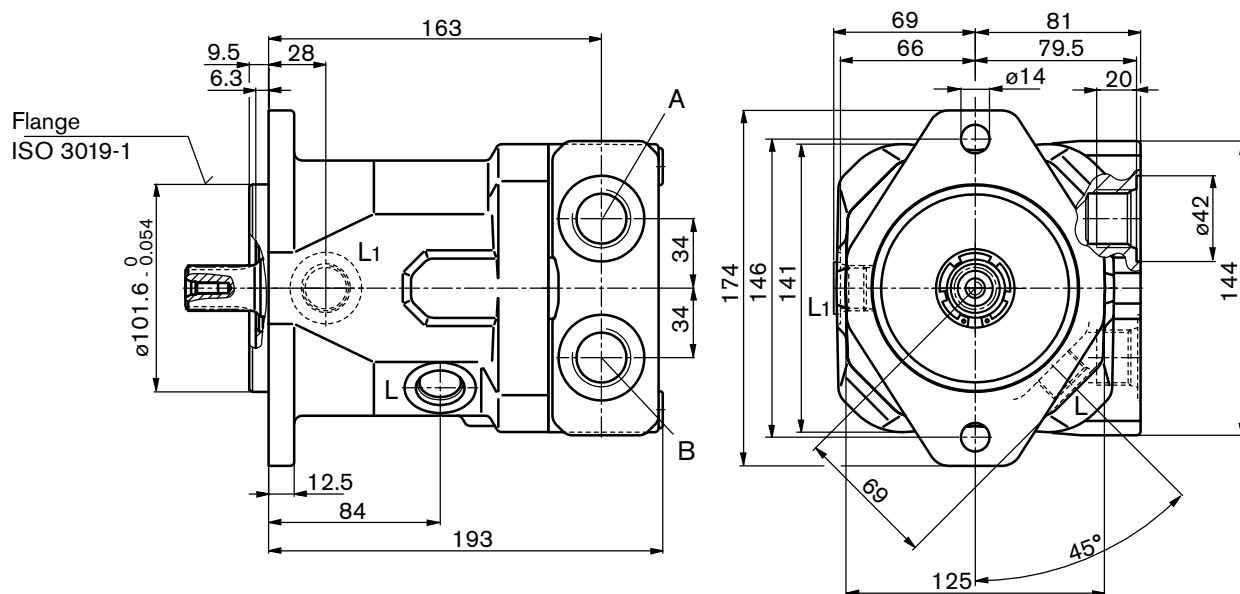
Before finalising your design request a certified installation drawing. Dimensions in mm.

A10FM 37-45/52W-VxCxxN000

Port plate 10



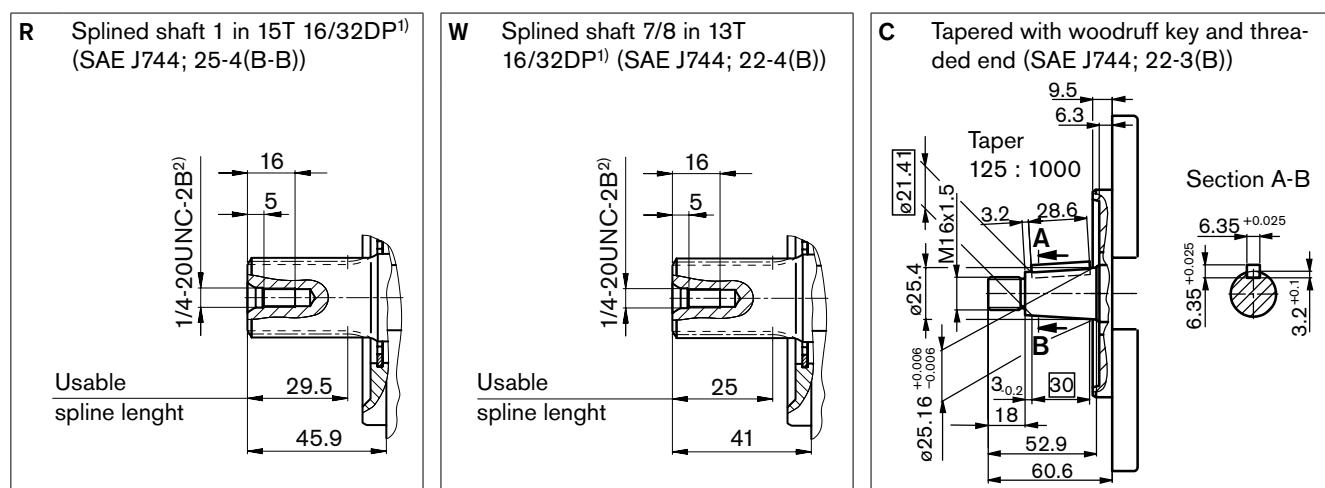
Port plate 16



Dimensions A10FM size 37 - 45

Before finalising your design request a certified installation drawing. Dimensions in mm.

Drive shafts



Ports

Designation	Port for	Standard	Size ²⁾	Max. pressure [bar] ³⁾	State
A, B	Service line (high pressure series)	SAE J518	3/4 in	350	O
Port plate 10	Mounting bolts	DIN 13	M10 x 1.5; 17 deep		
A, B	Service line	DIN 3852-1	M27 x 2; 16 deep	350	O
Port plate 16					
L	Case drain	ISO 11926 ⁵⁾	7/8-14 UNF-2B; 13 deep	4	O ⁴⁾
L ₁	Case drain	ISO 11926 ⁵⁾	7/8-14 UNF-2B; 13 deep	4	X ⁴⁾

¹⁾ ANSI B92.1a-1996, 30° pressure angle, flat base, flank centering, tolerance class 5

²⁾ Observe the general instructions on page 28 for the maximum tightening torques.

³⁾ Momentary pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

⁴⁾ Depending on the installation position, L or L₁ must be connected (see also page 26 - 27).

⁵⁾ The counterbore can be deeper than stipulated in the standard.

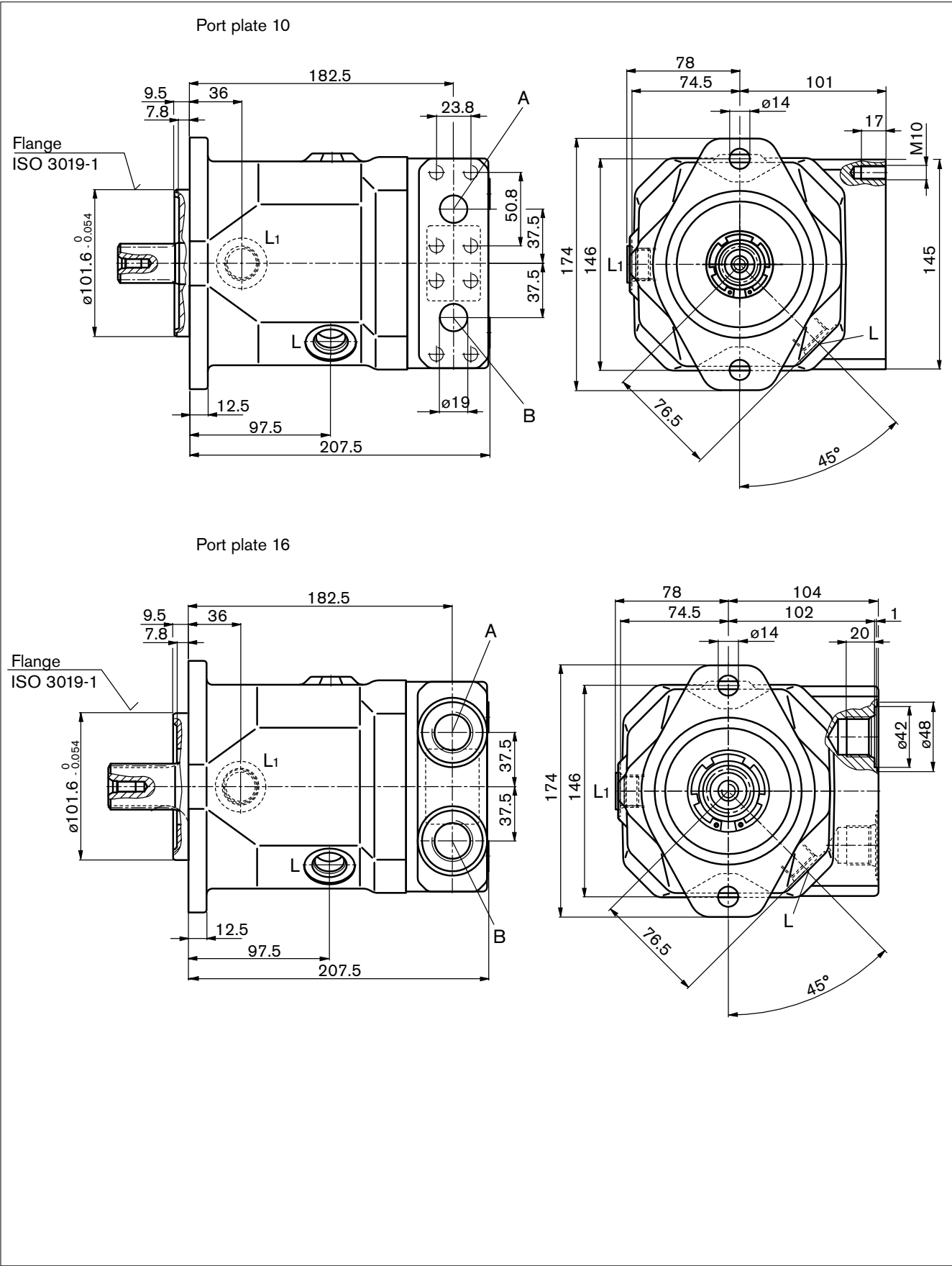
O = Must be connected (plugged on delivery)

X = Plugged (in normal operation)

Dimensions A10FM size 58 - 63

Before finalising your design request a certified installation drawing. Dimensions in mm.

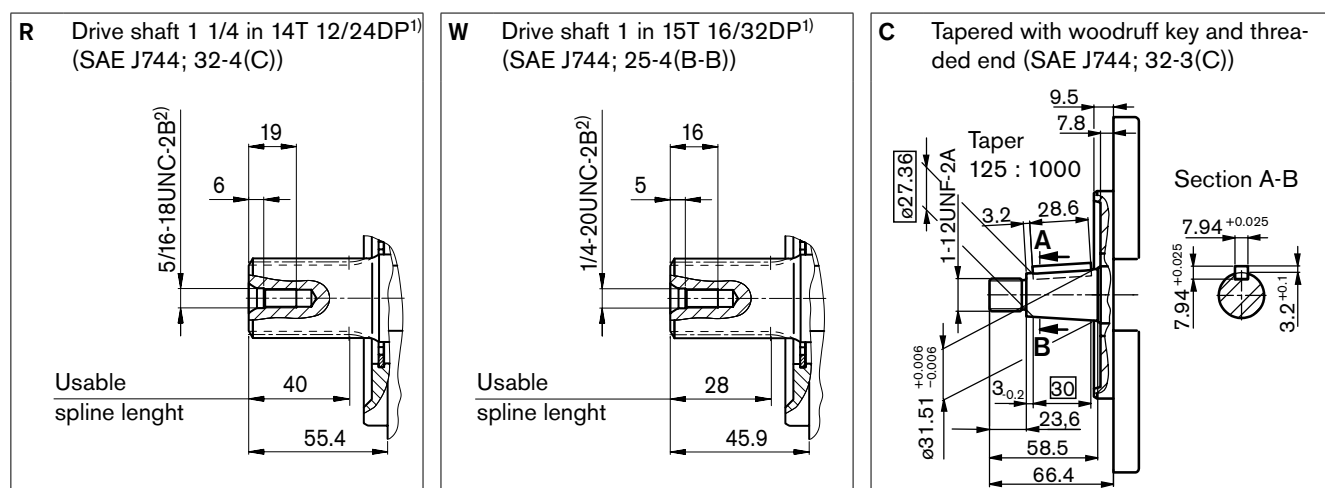
A10FM 58-63/52W-VxCxxN000



Dimensions A10FM size 58 - 63

Before finalising your design request a certified installation drawing. Dimensions in mm

Drive shafts



Ports

Designation	Port for	Standard	Size ²⁾	Max. press. [bar] ³⁾	State
A, B	Service line (high pressure series)	SAE J518	3/4 in	350	O
Port plate 10	Mounting bolts	DIN 13	M10 x 1.5; 17deep		
A, B	Service line	DIN 3852-1	M27 x 2; 16 deep	350	O
Port plate 16					
L	Case drain	ISO 11926 ⁵⁾	7/8-14 UNF-2B; 13 deep	4	O ⁴⁾
L ₁	Case drain	ISO 11926 ⁵⁾	7/8-14 UNF-2B; 13 deep	4	X ⁴⁾

¹⁾ ANSI B92.1a-1996, 30° pressure angle, flat base, flank centering, tolerance class 5

²⁾ Observe the general instructions on page 28 for the maximum tightening torques.

³⁾ Momentary pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

⁴⁾ Depending on the installation position, L or L₁ must be connected (see also page 26 - 27).

⁵⁾ The counterbore can be deeper than stipulated in the standard.

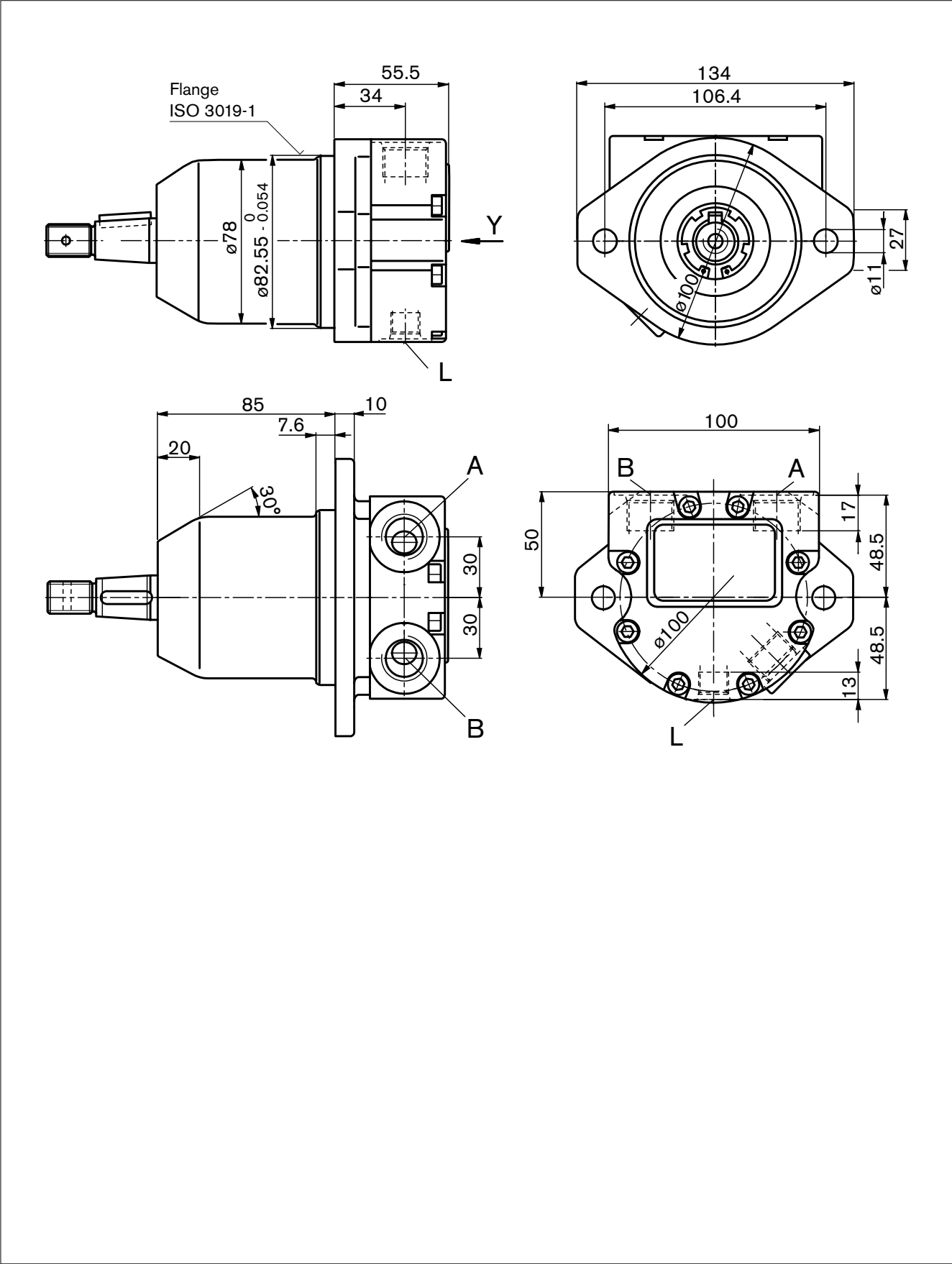
O = Must be connected (plugged on delivery)

X = Plugged (in normal operation)

Dimensions A10FE size 10

Before finalising your design request a certified installation drawing. Dimensions in mm

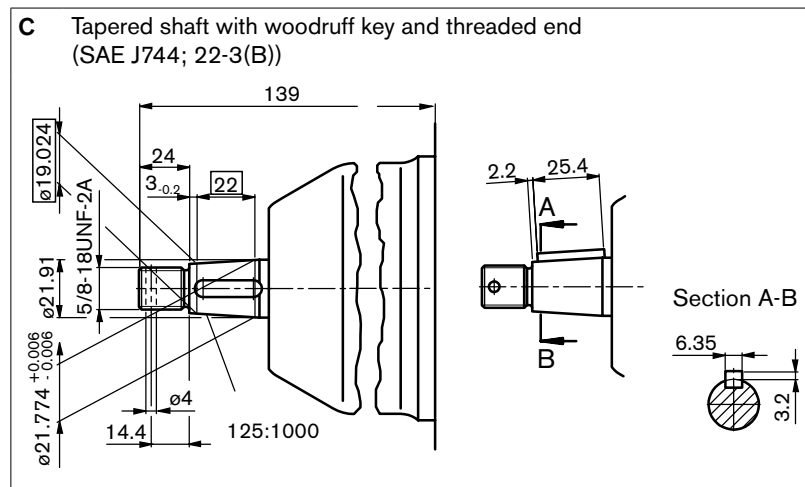
A10FE 10/52W-VxC16N000



Dimensions A10FE size 10

Before finalising your design request a certified installation drawing. Dimensions in mm.

Drive shaft



Ports

Designation	Port for	Standard	Size ²⁾	Max. pressure [bar] ³⁾	State
A, B	Service line	DIN 3852-1	M18 x 1.5; 17 deep	350	O
L	Case drain	DIN 3852-1	M14 x 1.5; 13 deep	4	O ⁴⁾

¹⁾ ANSI B92.1a-1996, 30° pressure angle, flat base, flank centering, tolerance class 5

²⁾ Observe the general instructions on page 28 for the maximum tightening torques.

³⁾ Momentary pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

⁴⁾ Depending on the installation position, L or L₁ must be connected (see also page 26 - 27).

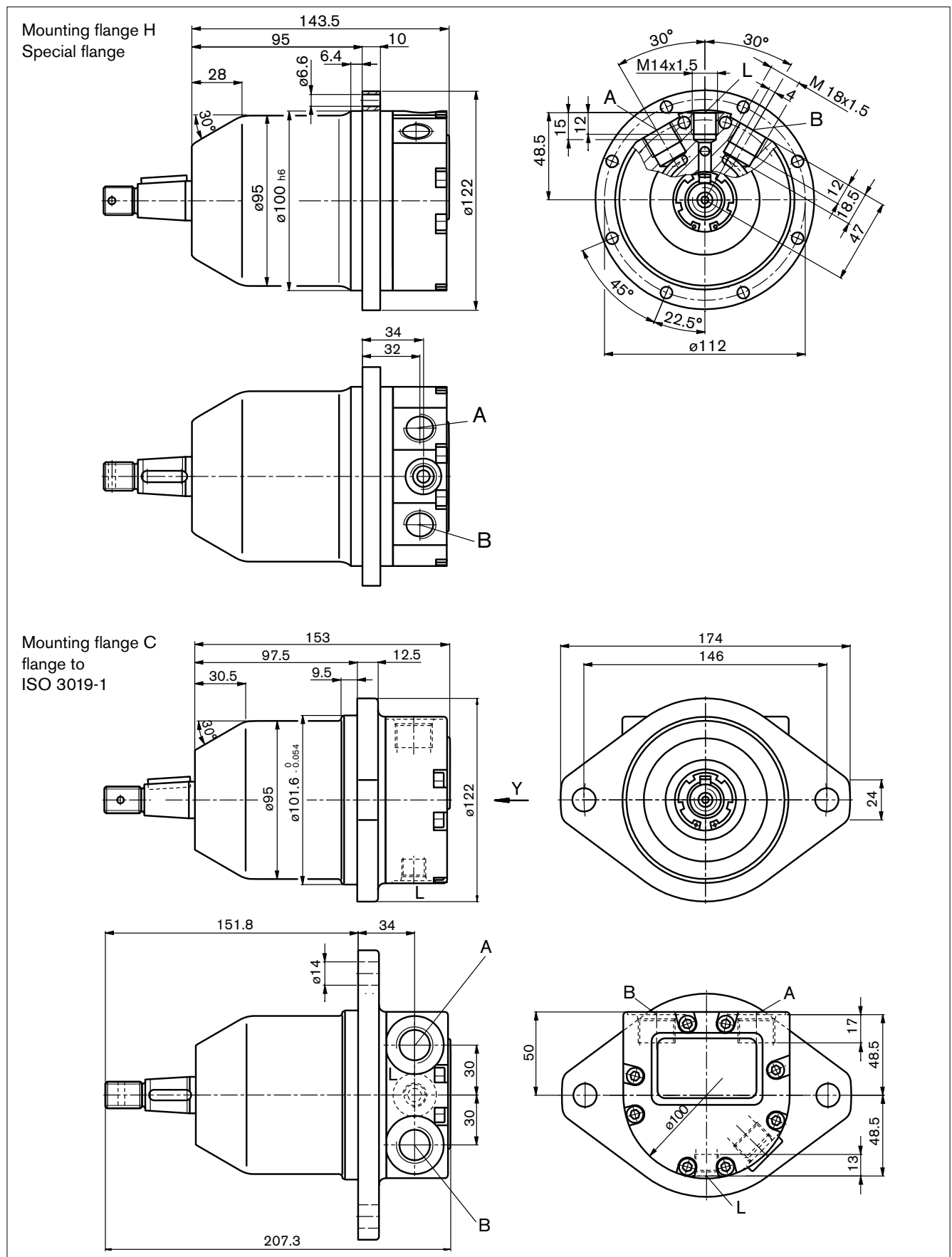
O = Must be connected (plugged on delivery)

X = Plugged (in normal operation)

Dimensions A10FE size 11 - 18

Before finalising your design request a certified installation drawing. Dimensions in mm.

A10FE 11-18/52W-Vxx16N000

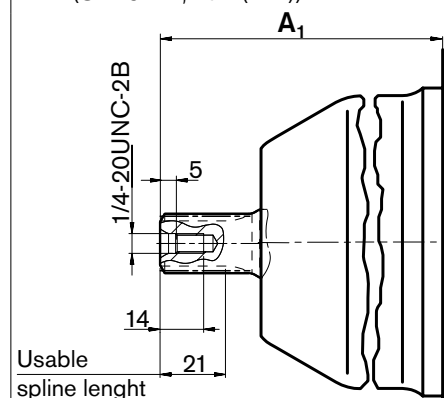


Dimensions A10FE size 11 - 18

Before finalising your design request a certified installation drawing. Dimensions in mm

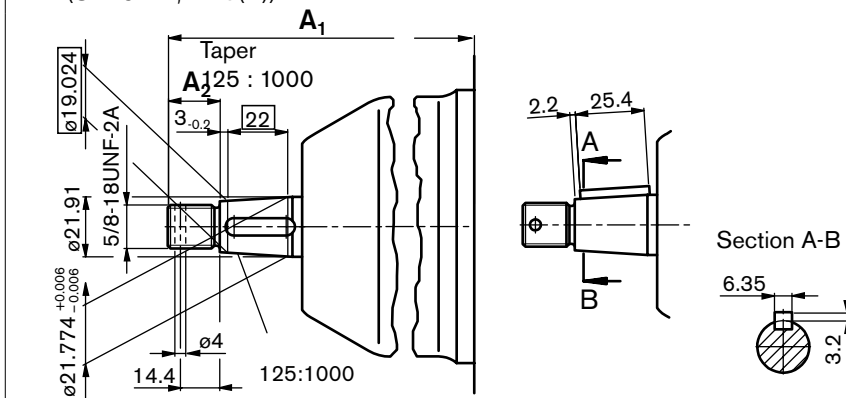
Drive shafts

R⁵⁾ Splined shaft 3/4 in 11T 16/32DP¹⁾
(SAE J744; 19-4(A-B))



Mounting flange	A ₁
H	126,6
C	–

C Tapered with woodruff key and threaded end
(SAE J744; 22-3(B))



Mounting flange	A ₁	A ₂
H	144.2	19
C	151.8	24

Ports

Designation	Port for	Standard	Size ²⁾	Max. pressure [bar] ³⁾	State
A, B	Service line	DIN 3852-1	M18 x 1.5; 12 deep	350	O
L	Case drain	DIN 3852-1	M14 x 1.5; 12 deep	4	O ⁴⁾
L ₁	Case drain	DIN 3852-1	M14 x 1.5; 12 deep	4	X ⁴⁾

¹⁾ ANSI B92.1a-1996, 30° pressure angle, flat base, flank centering, tolerance class 5

²⁾ Observe the general instructions on page 28 for the maximum tightening torques.

³⁾ Momentary pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

⁴⁾ Depending on the installation position, L or L₁ must be connected (see also page 26 - 27).

⁵⁾ R-shaft with C-flange for size 10 resp. 11 to 18 in preparation.

O = Must be connected (plugged on delivery)

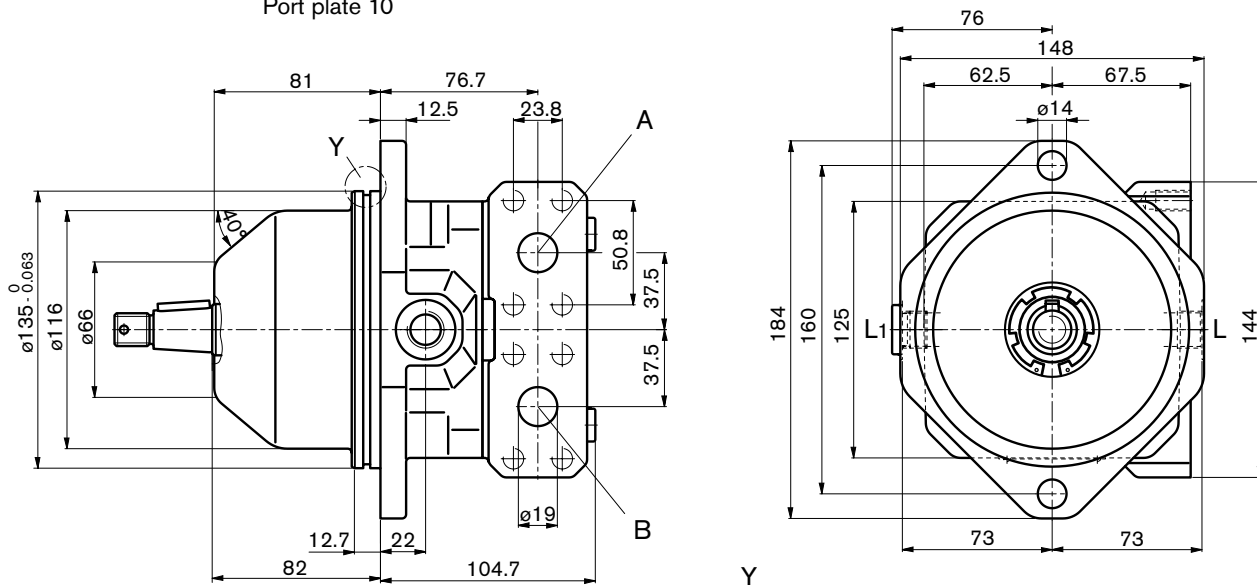
X = Plugged (in normal operation)

Dimensions A10FE size 23 - 28

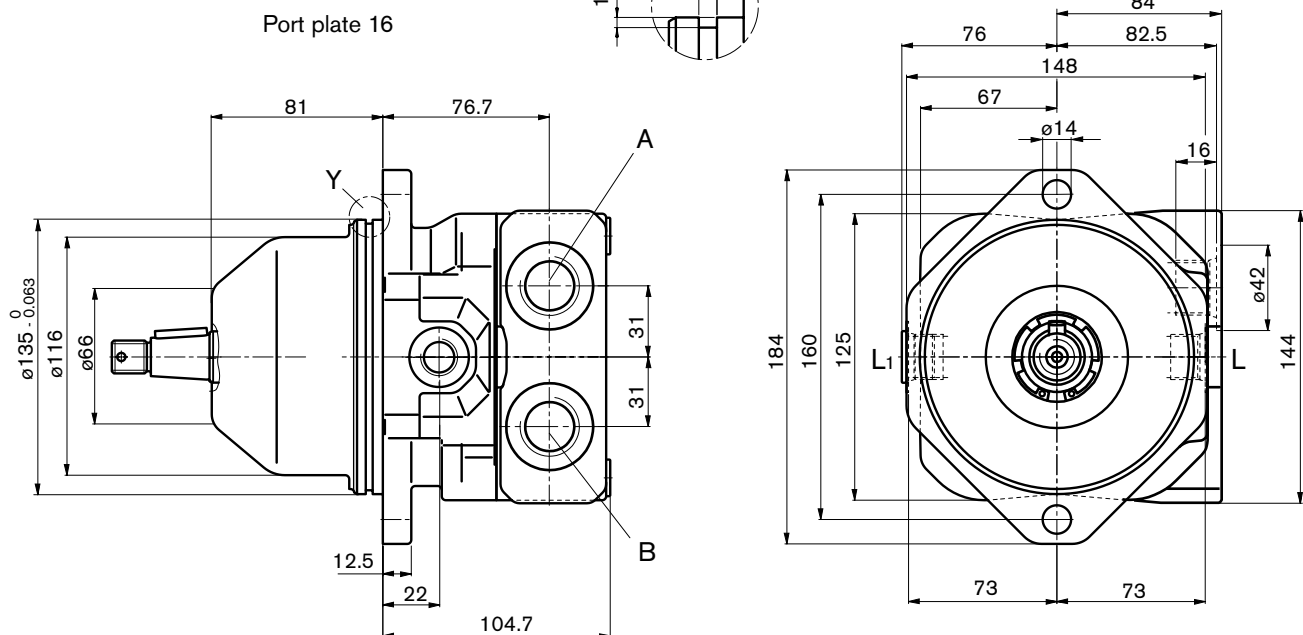
Before finalising your design request a certified installation drawing. Dimensions in mm

A10FE 23-28/52W-VxFxxN000

Port plate 10



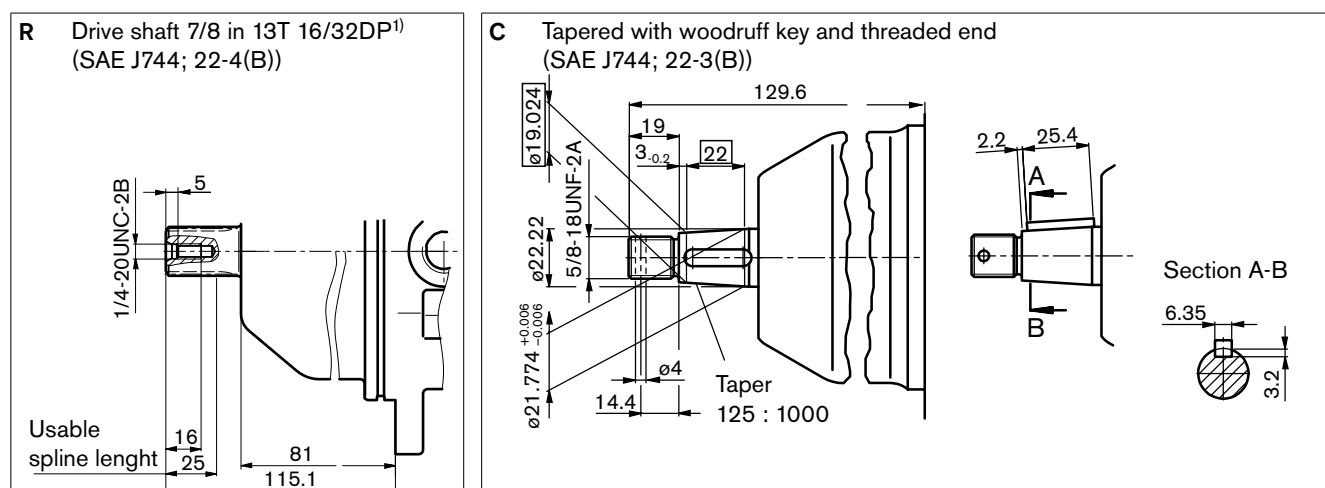
Port plate 16



Dimensions A10FE size 23 - 28

Before finalising your design request a certified installation drawing. Dimensions in mm

Drive shafts



Ports

Designation	Port for	Standard	Size ²⁾	Max. pressure [bar] ³⁾	State
A, B	Service line (high pressure series)	SAE J518	3/4 in	350	O
Port plate 10	Mounting bolts	DIN 13	M10 x 1.5; 17 deep		
A, B	Service line	DIN 3852-1	M27 x 2; 16 deep	350	O
Port plate 16					
L	Case drain	ISO 11926 ⁵⁾	3/4-16 UNF-2B; 11 deep	4	O ⁴⁾
L ₁	Case drain	ISO 11926 ⁵⁾	3/4-16 UNF-2B; 11 deep	4	X ⁴⁾

¹⁾ ANSI B92.1a-1996, 30° pressure angle, flat base, flank centering, tolerance class 5

²⁾ Observe the general instructions on page 28 for the maximum tightening torques.

³⁾ Momentary pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

⁴⁾ Depending on the installation position, L or L₁ must be connected (see also page 26 - 27).

⁵⁾ The counterbore can be deeper than stipulated in the standard.

O = Must be connected (plugged on delivery)

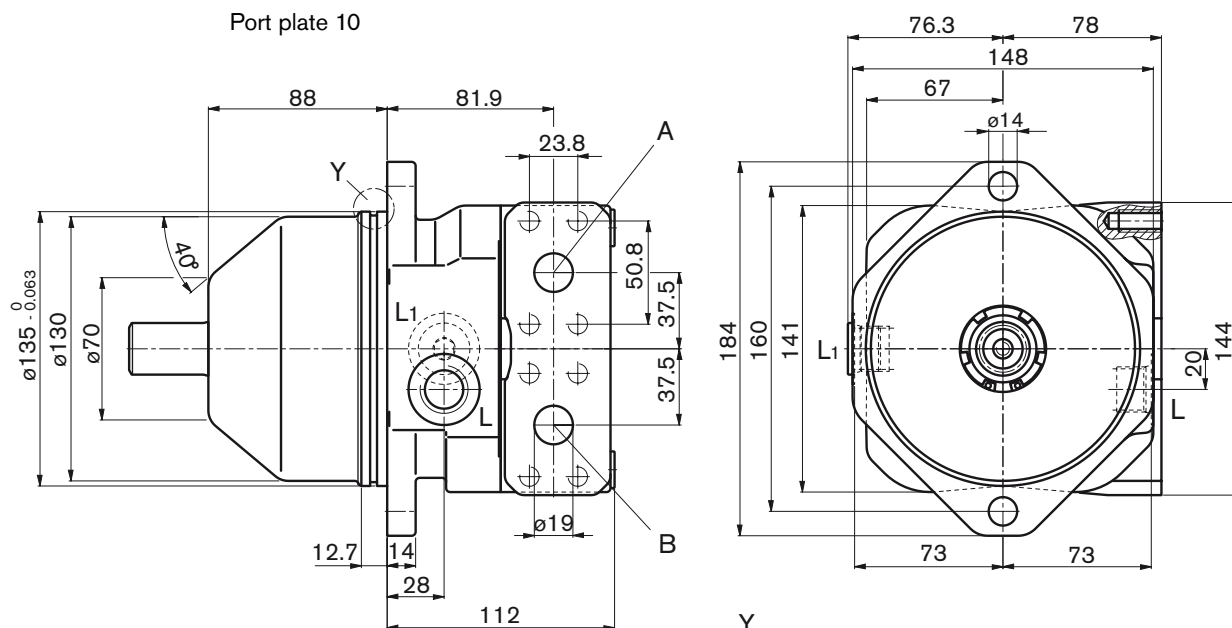
X = Plugged (in normal operation)

Dimensions A10FE size 37 - 45

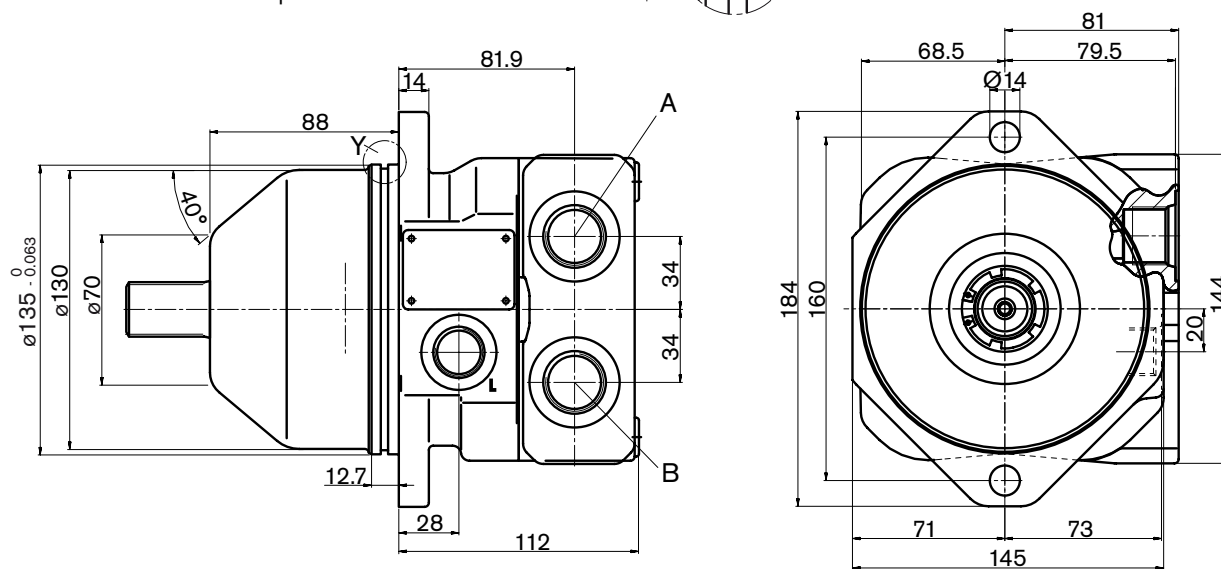
Before finalising your design request a certified installation drawing. Dimensions in mm

A10FE 37-45/52W-VxFxxN000

Port plate 10



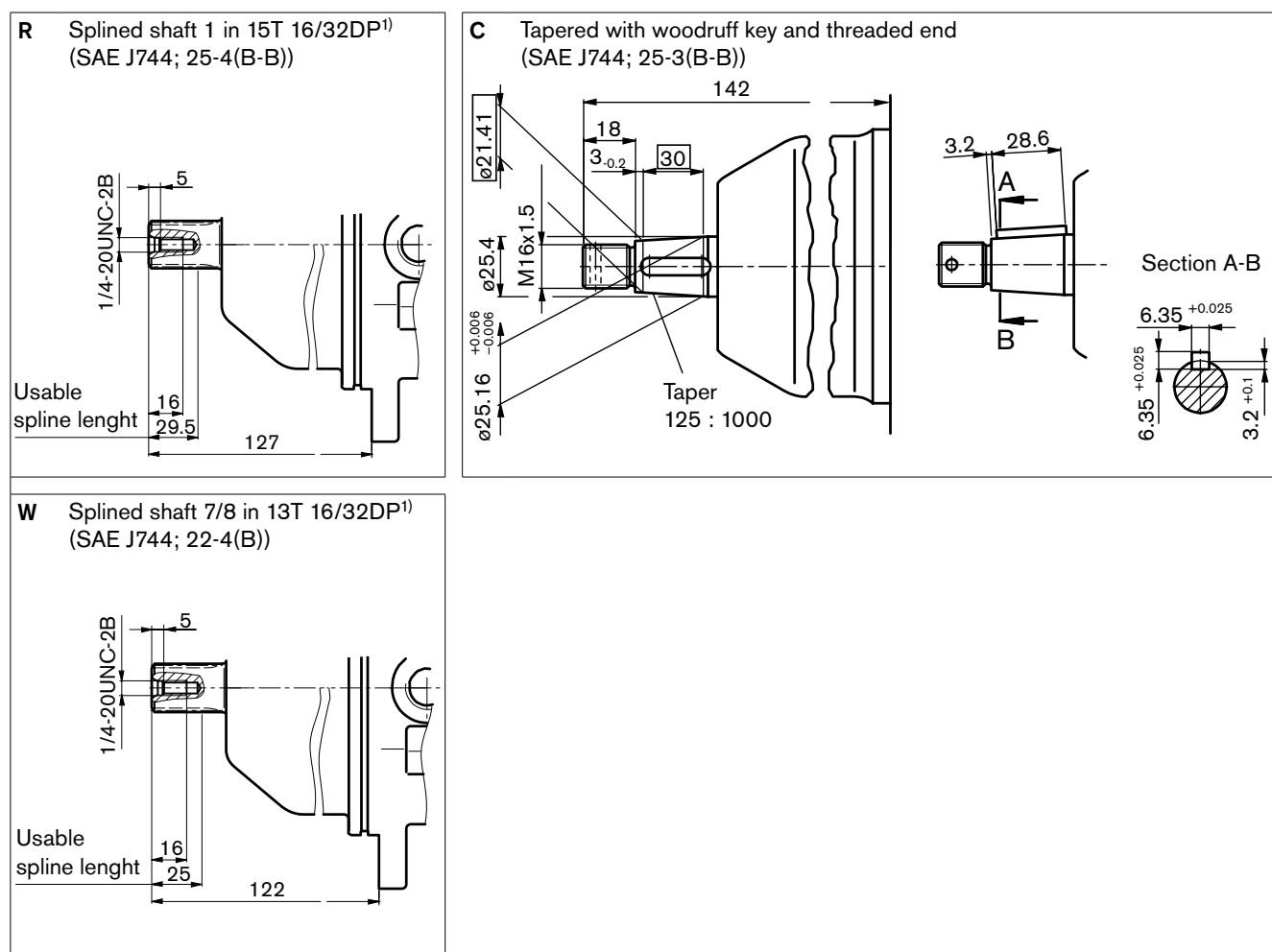
Port plate 16



Dimensions A10FE size 37 - 45

Before finalising your design request a certified installation drawing. Dimensions in mm.

Drive shafts



Ports

Designation	Port for	Standard	Size ²⁾	Max. pressure [bar] ³⁾	State
A, B	Service line (high pressure range)	SAE J518	3/4 in	350	O
Port plate 10	Mounting bolts	DIN 13	M10 x 1.5; 17 deep		
A, B	Service line	DIN 3852-1	M27 x 2; 16 deep	350	O
Port plate 16					
L	Case drain	ISO 11926 ⁵⁾	7/8-14 UNF-2B; 13 deep	4	O ⁴⁾
L ₁	Case drain	ISO 11926 ⁵⁾	7/8-14 UNF-2B; 13 deep	4	X ⁴⁾

¹⁾ ANSI B92.1a-1996, 30° pressure angle, flat base, flank centering, tolerance class 5

²⁾ Observe the general instructions on page 28 for the maximum tightening torques.

³⁾ Momentary pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

⁴⁾ Depending on the installation position, L or L₁ must be connected (see also page 26 - 27).

⁵⁾ The counterbore can be deeper than stipulated in the standard.

O = Must be connected (plugged on delivery)

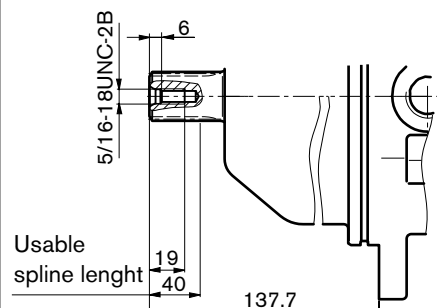
X = Plugged (in normal operation)

Dimensions A10FE size 58 - 63

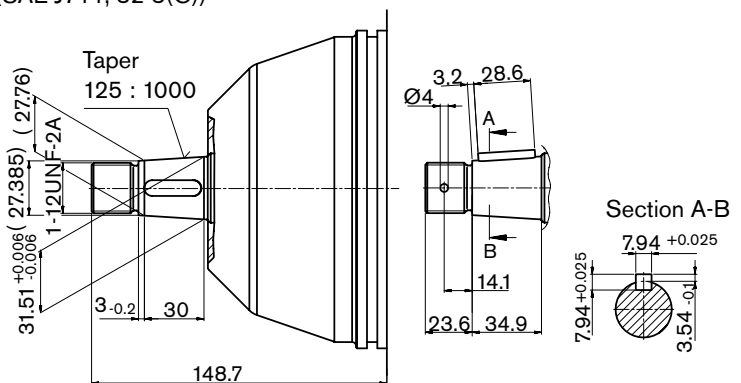
Before finalising your design request a certified installation drawing. Dimensions in mm.

Drive shafts

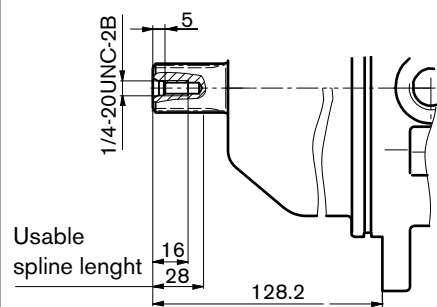
R Splined shaft 1 1/4 in 14T 12/24DP¹⁾
(SAE J744; 32-4(C))



C Tapered with woodruff key and threaded end
(SAE J744; 32-3(C))



W Splined shaft 1 in 15T 16/32DP¹⁾
(SAE J744; 25-4(B-B))



Ports

Designation	Port for	Standard	Size ²⁾	Max. pressure [bar] ³⁾	State
A, B Port plate 10	Service line (high pressure range) Mounting bolts	SAE J518 DIN 13	3/4 in M10 x 1.5; 17 deep	350	O
A, B Port plate 16	Service line	DIN 3852-1	M27 x 2; 16 deep	350	O
L	Case drain	ISO 11926 ⁵⁾	7/8-14 UNF-2B; 13 deep	4	O ⁴⁾
L ₁	Case drain	ISO 11926 ⁵⁾	7/8-14 UNF-2B; 13 deep	4	X ⁴⁾

¹⁾ ANSI B92.1a-1996, 30° pressure angle, flat base, flank centering, tolerance class 5

²⁾ Observe the general instructions on page 28 for the maximum tightening torques.

³⁾ Momentary pressure spikes may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

⁴⁾ Depending on the installation position, L or L₁ must be connected (see also page 26 - 27).

⁵⁾ The counterbore can be deeper than stipulated in the standard.

O = Must be connected (plugged on delivery)

X = Plugged (in normal operation)

Flushing and boost pressure valve

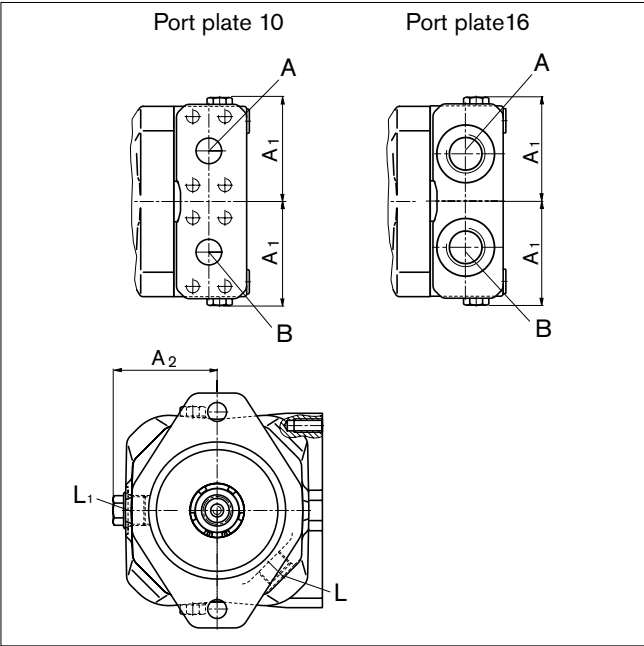
Before finalising your design request a certified installation drawing. Dimensions in mm.

Ordering Option N007

This valve assembly is used to flush an unacceptable heat load out of the closed loop circuit, and to maintain the necessary minimum boost pressure (16 bar, fixed setting). The valve is integrated into the port plate.

A built-in fixed orifice determines the flushing flow, which is taken out of the low pressure side of the loop and directed into the motor housing. It leaves the housing together with the case drain flow. This combined flow is replenished with fresh oil by means of the boost pump.

Dimensions A10FM / A10FE



Anti cavitation valve

Ordering option N002

When stopping a system with a relatively large mass (i.e. fan drive) the anti-cavitation valve provides fluid to the motor inlet during the coasting time.

The valve assembly is integrated inside the port plate.

Important

It is necessary **to specify a direction of rotation (clockwise or counter clockwise)** looking at the shaft end of the motor.

The outside dimensions are identical to the standard units except the A10FE 11 - 18 with the 8-hole mounting flange, for the difference in length see unit dimensions.

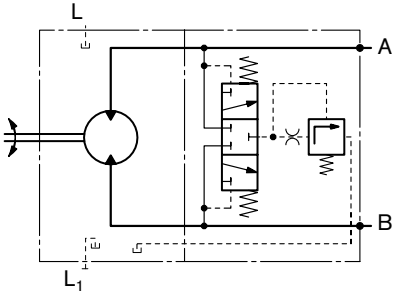
Standard flushing flow

With low press. side $p_{ND} = 20$ bar and an orifice dia. 1,6 mm: 5,5 L/min (sizes 23 - 63). Other orifice diameters are available, please state in clear text.

Further flushing flows for sizes 23 - 63 see table:

Flushing flow [L/min]	Orifice ϕ [mm]
3.5	1.2
5.5	1.6
9	2

Schematic



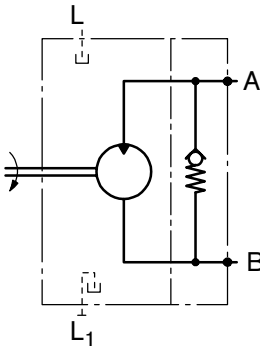
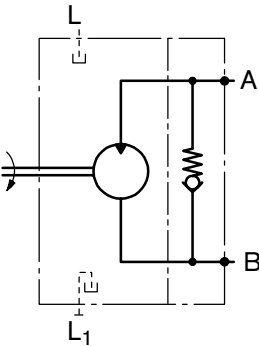
	Port for
A; B	Service line
L, L1	Case drain (L1 plugged)

Size (NG)	A1	A2
23/28	72	72
37/45	77	77
58/63	77	82

Schematic

Clockwise rotation

Counter clockwise rotation



	Port for
A; B	Service line
L, L1	Case drain (L1 plugged)

Speed sensor

Ordering option D

The version A10FM...D comprises gearing around the rotary unit (prepared for speed pickup).

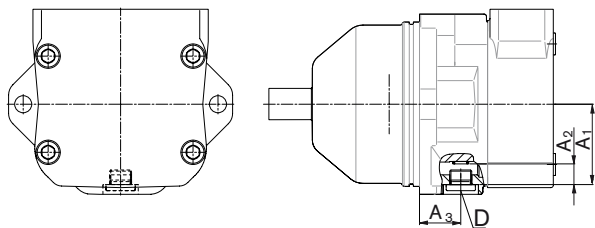
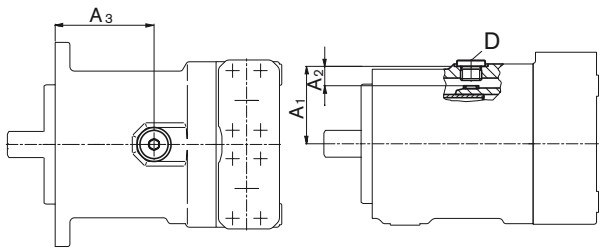
In this case, the rotating cylinder barrel can provide a speed dependent signal, which can be picked up by a suitable sensor and processed for further evaluation. Sensor port (D) will be closed for delivery.

A motor, prepared for speed sensing will be delivered without the necessary accessory parts which must be ordered separately.

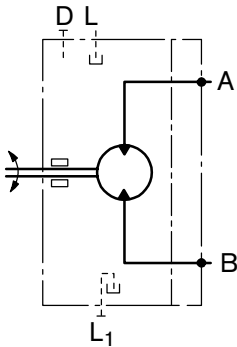
Inductive speed sensor ID R 18/20-L250 (see RE 95130) and mounting parts (spacer and 2 seals per kit) can be ordered separately with the following part numbers:

Size (NG)	Ordering Nr.	Nr. of teeth
23/28	R902428802	48
37/45	R902433368	48
58/63	in preparation	9

Dimensions



Schematic



	Port for
A; B	Service line
L, L ₁	Case drain (L ₁ plugged)

A10FM....D

Size (NG)	A1	A2	A3	Port „D“ (plugged)
23/28	61	15.5	101.8	M18 x 1.5
37/45	66	17	84.2	M18 x 1.5
58/63	69	14.8	128.5	M18 x 1.5

A10FE....D

Size (NG)	A1	A2	A3	Port „D“ (plugged)
23/28	61	15.5	27.7	M18 x 1.5
37/45	66	17	33.9	M18 x 1.5
58/63	69	14.8	46.1	M18 x 1.5

Installation instructions

General

At all times, the axial piston unit must be filled with fluid and air bled during commissioning and operation. This must also be observed after a prolonged period of standstill as the system may drain back to the reservoir via the hydraulic lines.

The case drain fluid in the motor housing must be directed to tank via the highest available tank port and must drain the fluid below the minimum fluid level in the reservoir.

Installation position

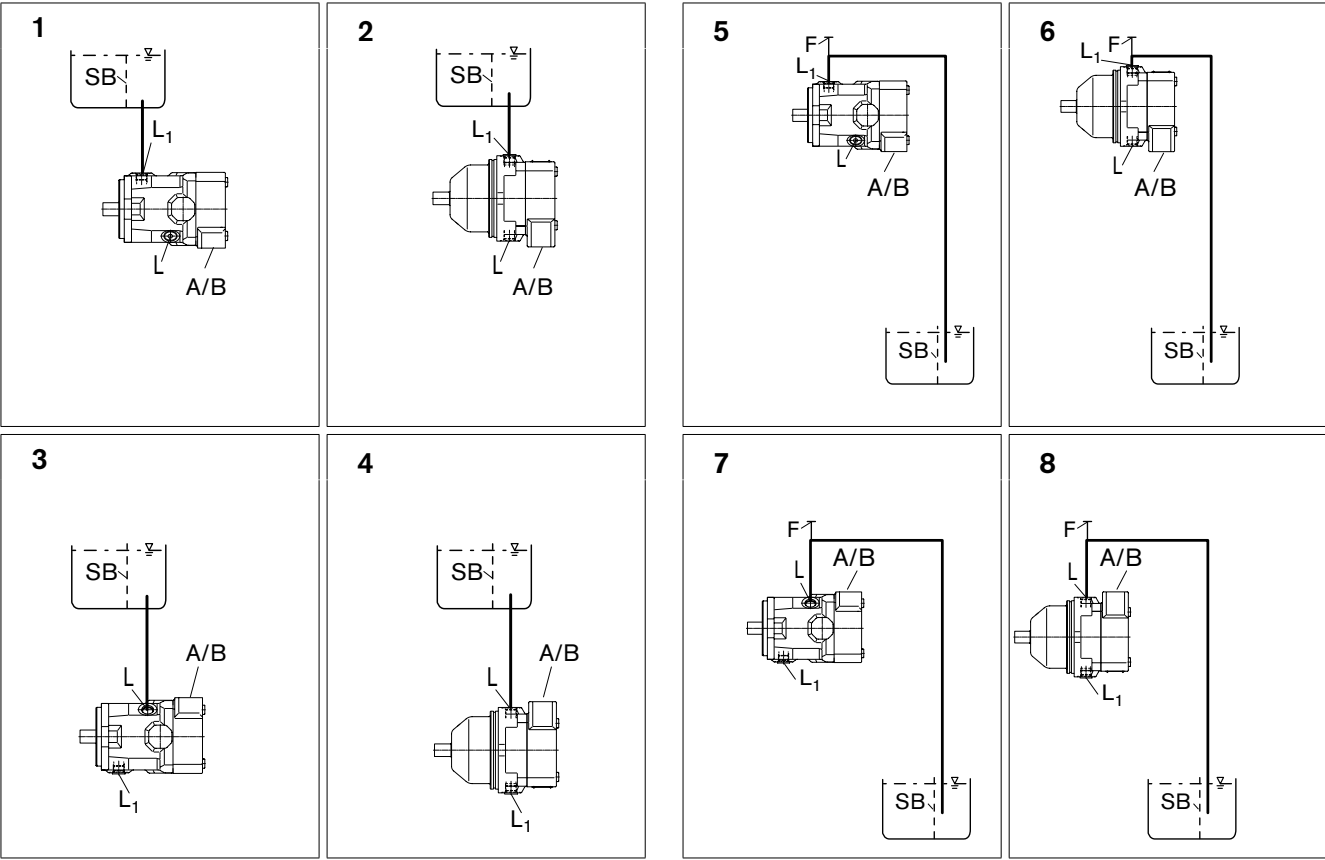
See following examples 1 to 8.
Recommended installation positions: 1 and 3 resp. 2 and 4.
Additional installation positions are available on request.

Below reservoir installation (standard)

Below reservoir installation means, that the motor is mounted below the minimum fluid level.

Above reservoir installation

Above reservoir installation means, that the motor is mounted above the minimum fluid level. A check valve in the case drain line is only permissible under certain conditions; please consult us.



Install. position	Air bleed	Filling
1, 2	–	L ₁
3, 4	–	L

Install. position	Air bleed	Filling
5, 6	F	L ₁ (F)
7, 8	F	L (F)

L/L₁ = Case drain port, F = Air bleed resp. filling port, SB = Baffle.

Notes



General instructions

- The motor A10FM and A10FE has been designed to be used in open and closed circuits.
- Project planning, assembly and commissioning of the axial piston unit require the involvement of qualified personnel.
- Before operating the axial piston unit read the relevant operating manual thoroughly and completely. If needed request this information from Rexroth
- During and shortly after operation, there is a risk of burns on the axial piston unit and especially on the solenoids. Take appropriate safety measures (e.g. by wearing protective clothing).
 - Pressure ports:
The ports and fastening threads are designed for the specified maximum pressure. The machine or system manufacturer must ensure that the connecting elements and lines correspond to the specified operating conditions (pressure, flow, hydraulic fluid, temperature) with the necessary safety factors.
- The service line ports and function ports are only designed to accommodate hydraulic lines.
- The data and notes contained herein must be adhered to.
- The product is not approved as a component for the safety concept of a general machine according to DIN 13849.
- The following tightening torques apply:
 - Fittings:
Observe the manufacturer's instructions regarding the tightening torques of the fittings used.
 - Mounting bolts:
For fixing screws with metric ISO thread according to DIN 13 or thread according to ASME B1.1, we recommend checking the tightening torque individually according to VDI 2230.
 - Mounting bolts threads and threaded ports in the axial piston unit:
The maximum permissible tightening torques $M_{G \max}$ are maximum values for the female threads and must not be exceeded. For values, see the following table.
 - Threaded plugs:
For the threaded plugs, supplied with the axial piston unit, the required tightening torques M_V apply. For values, see the following table.

Ports Standard	Thread sizes	Maximum permissible tightening torque for the female threads $M_{G \max}$	Required tightening torque for the threaded plugs M_V	WAF hexagon socket of the threaded plugs
DIN 3852	M14 x 1.5	80 Nm	35 Nm ¹⁾	6 mm
	M18 x 1.5	140 Nm	60 Nm ¹⁾	8 mm
	M27 x 2	330 Nm	135 Nm ¹⁾	12 mm
ISO 11926	3/4-16 UNF-2B	160 Nm	62 Nm	5/16 in
	7/8-14 UNF-2B	240 Nm	110 Nm	3/8 in

1) The tightening torques apply for screws in the "dry" state as received on delivery and in the "lightly oiled" state for installation.