

Compact power module catalogue

RE 00198/02.07

The Drive & Control Company

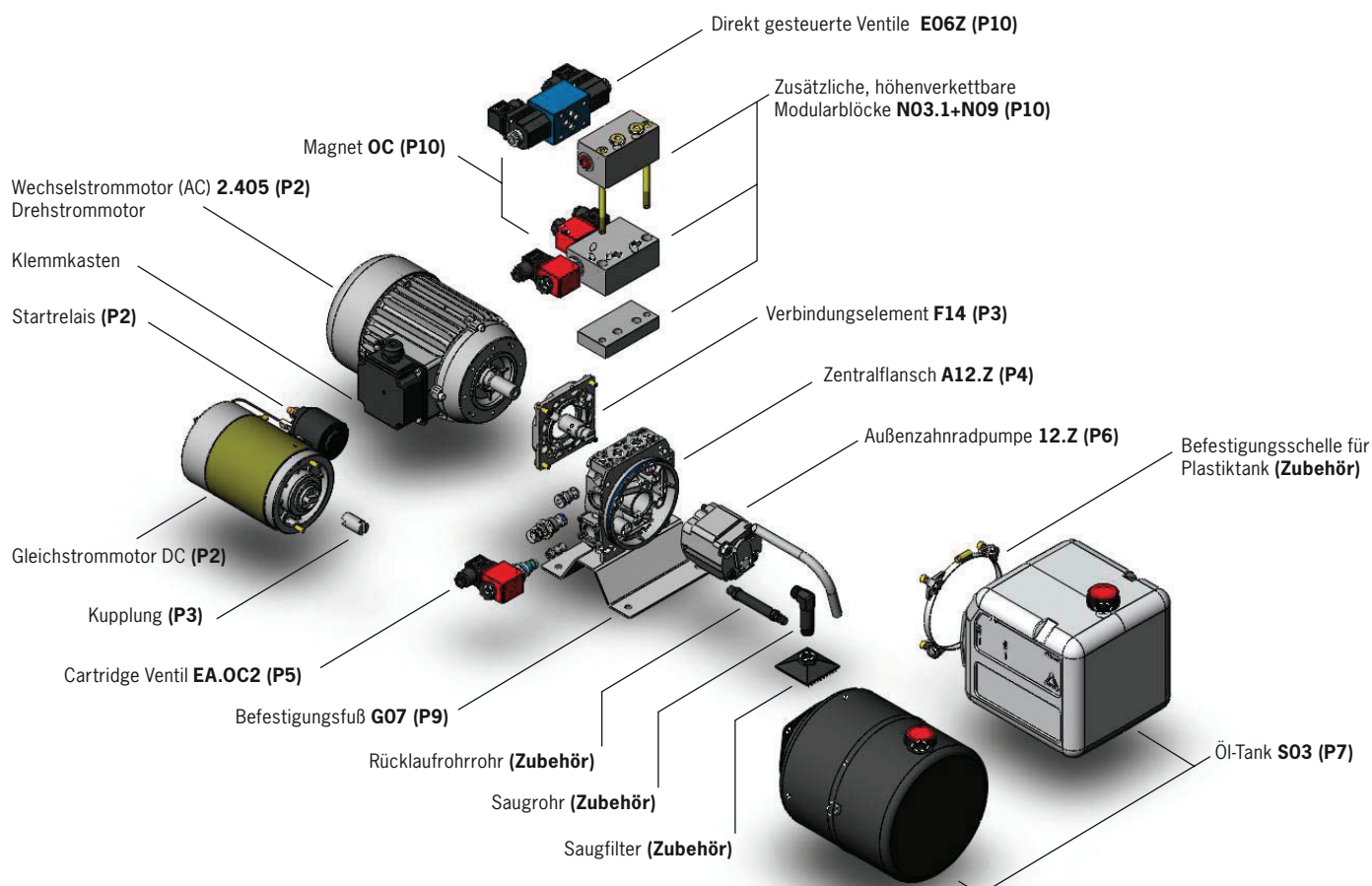


So bestellen Sie richtig:

Beispielcode

KE	1 – C91 – B0	TR51	M04.Z	B – MC.17 – TC2 – TC4	13	S248	01-R4	G80	N22
1	2	3	4	5	6	7	8	9	10

- 1 Kompaktaggregate – Typ
- 2 Motor + Startrelais und Plastikschutz für Gleichstrommotoren
- 3 Zwischenflansch
- 4 Zentralflansch mit einstellbarem Druckbegrenzungsventil
- 5 Eingebaute Ventile
- 6 Zahnradpumpen
- 7 Öl-Tank
- 8 Montageposition
- 9 Montagefuß
- 10 Module zur Höhenverkettung



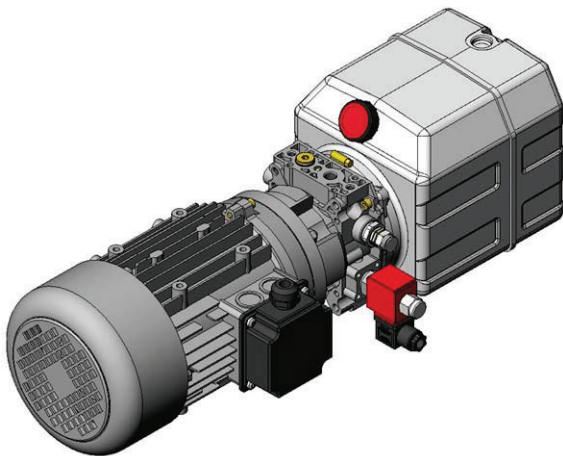
Beispielcode des dargestellten Aggregats

K	2 – 405	F14	A12.Z	F – EA.OC	12	S03	01	G07	N09 – V07 – N03 1 – E06Z.OC
P1	P2	P3	P4	P5	P6	P7	P8	P9	P10

Inhaltsverzeichnis und Typenschlüsselerklärung

Nr.	Bezeichnung	Code – Erklärung und Beispiel	Seite
1	Aggregate-Typ	K oder K E	4
2	Motor und Startrelais sowie Plastikschutz für DC Motoren AC Motoren	A - X X X X - B C A: 0 für Aggregate ohne Motor 1 für Gleichstrommotoren (DC) 2 für 3-Phasen Motoren (AC) 3 für 1-Phasen Motoren (AC) XXXX: Motor-Code B: Start-Relais für Gleichstrommotoren (DC) C: Plastikschutz für Gleichstrommotoren (DC) z. B.: 1 - C 9 1 - B 0	6–8
3	Anschlussflansch	z. B.: T R 5 1	9–10
4	Zentralflansch und Druckbereich	X X X . A XXX: Zentralflansch-Code A: Einstellung des Druckbegrenzungsventils z. B.: M 0 4 . Z	11–12
5	eingebaute Ventile	z. B.: E E . O C - P M C 1 2	13–17
6	Zahnradpumpen	z. B.: 1 1	18
7	Öl-Tanks	z. B.: S 1 8 2	19
8	Montage-Position	Freilassen für Standard-Positionen (-) z. B.: 0 6	20
9	Montagehalterungen	Falls nicht gewünscht, bitte nicht ausfüllen! z. B.: G 0 7	21
10	Modulelemente	z. B.: N 2 2	22–23
Zubehör und technische Daten			
11	Saug- und Rücklaufrohre, Filter, Montagesätze für Kunststofftanks		24–25
12	Diagramme	für Gleichstrommotoren	26–31
13	Allgemeine Informationen Kompaktaggregate – Konfiguration		32–33
14	Sonstiges	weitere Produkte aus unserem Standardprogramm	34–35

Einzelteile zu diesen Aggregate-Typen sind bei uns lagernd

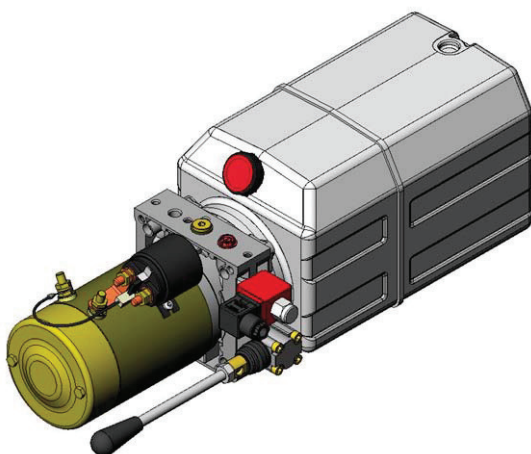


K

- Standard Zentralflansch für einfache hydraulische Anwendungen
- Gleichstrommotoren (DC) bis 3000 W
- Dreh-/Wechselstrommotoren (AC) bis 4 kW
- Pumpen-Verdrängungsvolumen bis 9,9 cm³
- Druck bis 300 bar (4350 psi)

Optional:

- Doppel-Pumpen
- elastische Kupplungen



KE

- komplizierte Schaltungen, direkt geflanschte Wechselstrommotoren (AC)
- Gleichstrommotoren (DC) bis 3000 W
- Dreh-/Wechselstrommotoren (AC) bis 4 kW
- Pumpen-Verdrängungsvolumen bis 9,9 cm³
- Druck bis 300 bar (4350 psi)

Optional:

- Startrelais
- 4-Wege-Magnetschieberventile (Cartridge)
- Dreh-/Wechselstrommotoren (AC) mit direkter Kupplung für platzsparende Bauweise

Andere Aggregate-Typen auf Anfrage

Installation – Montage – Einbau – Wartung

Die Einbaulage unterliegt keinen Beschränkungen, aber vermeiden Sie beim Einbau jegliches Hindernis im Saugbereich der Pumpe. Falls das Leistungsmodul auf Unterlagen montiert werden soll, die vibrieren könnten, ist es besser, schwingungsdämpfende Elemente in die Befestigungspunkte einzubringen.

Öltank, Temperatur und Öle

Die Tankgröße sollte immer ausreichend sein, um einwandfreie Saugfähigkeit sicherzustellen. Die empfohlene maximale Arbeitstemperatur beträgt 60 °C.

Die Dichtungen (Dichtflansch, Dichtring, Dichtscheibe, Dichtung, Flanschdichtung etc.) dieser Leistungsmodule erlauben ein einwandfreies Arbeiten zwischen -15 °C und +80 °C.

Nach der ersten Inbetriebnahme ist es notwendig, den Ölstand ruhen zu lassen und evtl. anzugleichen!

Für die Hydraulik-Elemente muss Öl mit einer Viskosität zwischen 15–68 cSt (1 cSt = 1 mm²/s) benutzt werden; empfohlen wird eine Viskosität zwischen 25 und 40 cSt (3.5 °E ÷ 5.5 °E).

Verschiedene Öl-Klassen müssen entsprechend der Umgebungstemperatur gewählt werden und auch entsprechend der Temperatur, die während der Betätigung erreicht wird. Uneingeschränkt einsetzbar sind Öle nach DIN 51524 Teil 1 (HL-Öle) und DIN 51524 Teil 2 (HLP-Öle).

Reinigung und Wartung

Jedes Teil des Gerätesatzes muss gereinigt werden, da die Einheit nur einen Ansaugfilter (Standard: 90 µm) hat. Im Fall eines mangelhaften Betriebes sollten geprüft werden:

- Ölstand und Beschaffenheit
- Pumpenwirkungsgrad
- Ventileinstellung
- Batterie und Motorleistung

Das Öl sollte das erste Mal nach 100 Stunden Betriebszeit ausgetauscht werden.

Danach alle 3000 Stunden Betriebszeit (auf jeden Fall mindestens einmal jährlich).

Verkabelung und Startrelais

Die Verkabelung zwischen Batterie und Schaltkonsole muss entsprechend der zugeführten elektrischen Energie wie in den Schaltplänen angegeben gewählt werden.

Die Schaltung muss eine einwandfreie Drehrichtung der Pumpe gewährleisten. Es ist ausdrücklich verboten, die Drehrichtung umzukehren. (Pumpen sind linksdrehend)

Hinweis: Für den Anschluss von Drehstrommotoren ist ein Linksdrehfeld erforderlich!

Wechsel-/Drehstrommotoren (AC)

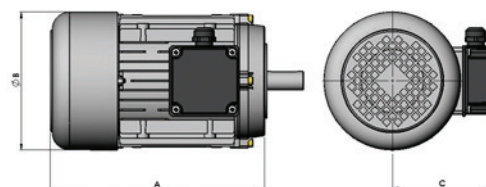
Drehstrommotoren 2-polig (2900 U/min-50Hz)								
Code	Leistung (kW)	Leistung (hp)	Arbeitszyklus	Baugröße	A (mm)	Ø B (mm)	C (mm)	D (mm)
200	0,13	0,18	S1	56	169	110	95	56
201	0,25	0,34	S1	63	189	124	104	63
202	0,37	0,50	S1	71	218	140	109	71
203	0,55	0,75	S1	71	218	140	109	71
204	0,75	1,00	S1	80	237	156	123	80
205	1,10	1,50	S1	80	237	156	123	80
206	1,50	2,00	S1	90	255	178	128	90
207	2,20	3,00	S1	90	279	178	128	90
208	3,00	4,00	S1	90	279	178	128	90
210	4,00	5,50	S1	112	331	219	150	112

Wechselstrommotoren 2-polig (2900 U/min-50Hz)								
Code	Leistung (kW)	Leistung (hp)	Arbeitszyklus	Baugröße	A (mm)	Ø B (mm)	C (mm)	D (mm)
200M	0,13	0,18	S1	56	169	110	95	56
201M	0,25	0,34	S1	63	189	124	104	63
202M	0,37	0,50	S1	71	218	140	109	71
203M	0,55	0,75	S1	71	218	140	109	71
204M	0,75	1,00	S1	80	237	156	123	80
205M	1,10	1,50	S1	80	237	156	123	80
206M	1,50	2,00	S1	90	255	178	128	90
207M	2,20	3,00	S1	90	279	178	128	90

Drehstrommotoren 4-polig (1495 U/min-50Hz)								
Code	Leistung (kW)	Leistung (hp)	Arbeitszyklus	Baugröße	A (mm)	Ø B (mm)	C (mm)	D (mm)
400	0,09	0,12	S1	56	169	110	95	56
401	0,18	0,25	S1	63	189	124	104	63
402	0,25	0,35	S1	71	218	140	109	71
403	0,37	0,50	S1	71	218	140	109	71
404	0,55	0,75	S1	80	237	156	123	80
405	0,75	1,00	S1	80	237	156	123	80
406	1,10	1,50	S1	90	255	178	128	90
407	1,50	2,00	S1	90	279	178	128	90
408	2,20	3,00	S1	90	279	178	128	90
409	3,00	4,00	S1	100	309	194	137	100
410	4,00	5,50	S1	112	331	219	150	112

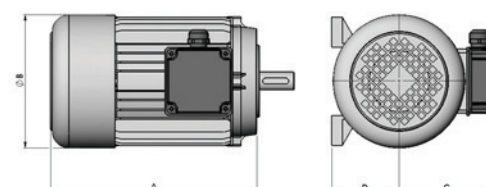
Wechselstrommotoren 4-polig (1495U/min-50Hz)								
Code	Leistung (kW)	Leistung (hp)	Arbeitszyklus	Baugröße	A (mm)	Ø B (mm)	C (mm)	D (mm)
400M	0,09	0,12	S1	56	169	110	95	56
401M	0,18	0,25	S1	63	189	124	104	63
402M	0,25	0,35	S1	71	218	140	109	71
403M	0,37	0,50	S1	71	218	140	109	71
404M	0,55	0,75	S1	80	237	156	123	80
405M	0,75	1,00	S1	80	237	156	123	80
406M	1,10	1,50	S1	90	255	178	128	90
407M	1,50	2,00	S1	90	279	178	128	90
408M	2,20	3,00	S1	90	279	178	128	90

Standard AC-Motoren in Bauform B14



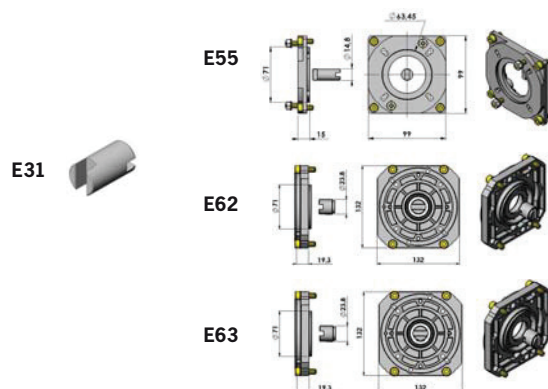
Standard AC-Motoren in Bauform B14

Standard AC-Motoren in Bauform B14
Die Motoren können auch in Bauform B34 geliefert werden.
z. B. 408MB34

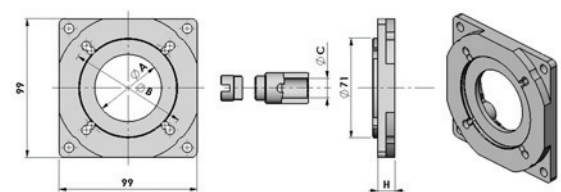


Anschlussflansche/Kupplungen für Aggregate – Typ K

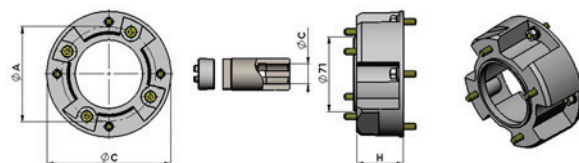
DC Motoren	
Code	Motor Codes
E31	C78-C79-C91-C92-C97-C98-C102-C103-C144-C145
E55	C40-C41-C67-C94-C105-C122-C123
E62	C96-C151-C140
E63	C111



AC Motoren						
Standard Kupplungen						
Code	Motorbezeichnung	Baugröße	A (mm)	B (mm)	C (mm)	H (mm)
F69	201-201M-401-401M	63	60	-	11	12,5
F68	202-202M-402-402M	71	70	-	14	12,5
	203-203M-403-403M					
F14	204-204M-404-404M	80	80	120	19	45
	205-205M-405-405M					
F16	206-206M-406-406M	90	95	140	24	57
	207-207M-407-407M					
	208-208M-408-408M					
F18	409	100	110	160	28	67
	210-410	112				



F68-F69



F14-F16-F18

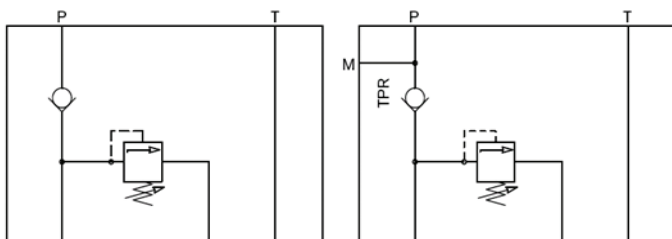
AC Motoren		
Elastische Kupplungen		
Code	Motorbezeichnung	Baugröße
F25	206-206M-406-406M	90
	207-207M-407-407M	
	208-208M-408-408M	
F26	409	100
	210-410	112



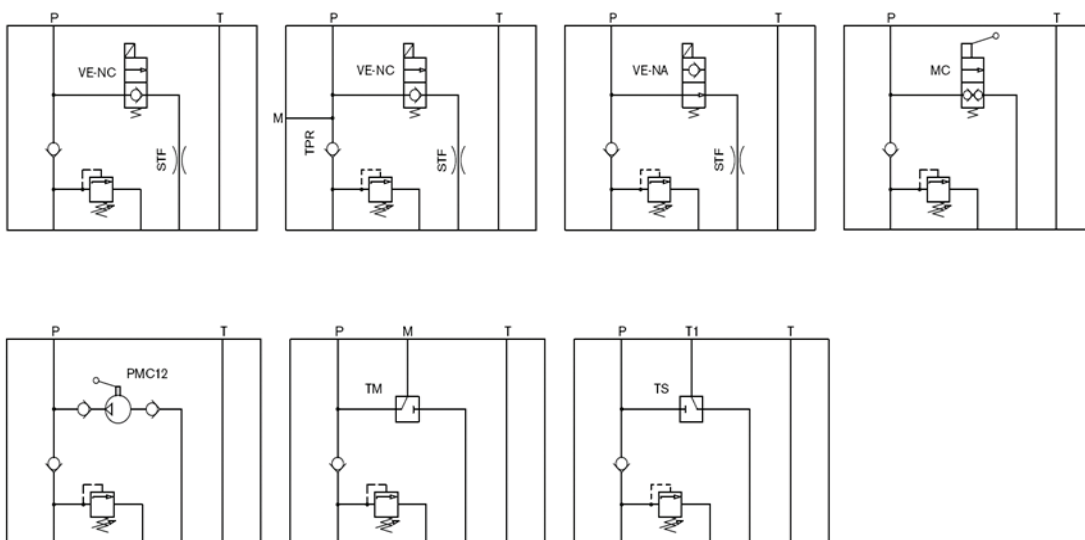
F25-F26

Zentralflansche für Aggregate – Typ K

A1 Basis Flansch



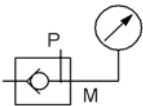
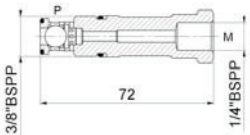
A12 Standard Flansche



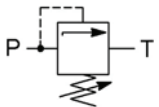
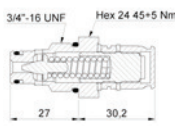
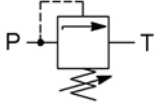
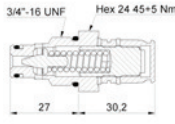
Druckbereiche für eingebaute Druckbegrenzungsventile

Druckbegrenzungsventil		Druckbereich (bar)
VM15 standard	W	5–50
	Y	30–120
	Z	80–250
VM25 optional	W	5–50
	Y	10–100
	Z	40–200
	X	70–350

Einbau – Rückschlagventile mit Messanschluss für Zentralflansche

Code	Beschreibung	Schaltsymbol	Zeichnung	kompatibel
TPR	Rückschlagventil mit Messanschluss 1/4" BSPP		 	K

Einbau – Druckbegrenzungsventile für Zentralflansche

Code	Beschreibung	Schaltsymbol	Zeichnung	kompatibel
VM15	Direktgesteuertes Druckbegrenzungsventil		 	ME K-KS
	max. Arbeitsdruck			
	max. Durchflussmenge			
VMP15	Direktgesteuertes Druckbegrenzungsventil		 	KE
	max. Arbeitsdruck			
	max. Durchflussmenge			

Ventile für andere Druckbereiche auf Anfrage

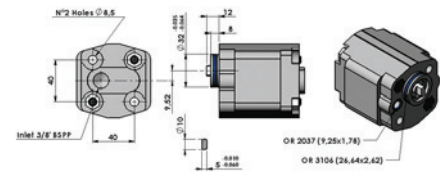
Außenzahnradpumpen

Zahnradpumpen Gruppe 1 für Zentralflansch „K-KE-KS“ – Standardversion

Code	Fördervolumen (cm ³)	Durchfluss (l/min) bei 1500 U/min	P2* (bar)	P3* (bar)
10	0,82	1,3	230	270
11	1,1	1,6	230	270
12	1,6	2,4	230	270
13	2,1	3,1	230	270
14	2,7	3,9	230	270
15	3,2	4,8	210	250
16	3,7	5,5	210	250
17	4,2	6,3	210	250
18	4,8	7,2	190	230
19	5,8	8,7	190	230
21	9,9	14,8	150	190

* P2 = Dauerdruck

* P3 = max. Spitzendruck (max. 2 Sekunden)

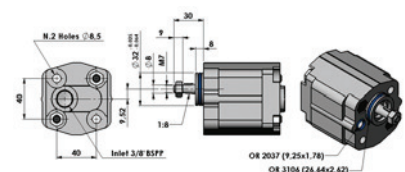


Zahnradpumpen Gruppe 1 für Zentralflansch „K“ – mit konischer Welle für elastische Kupplung

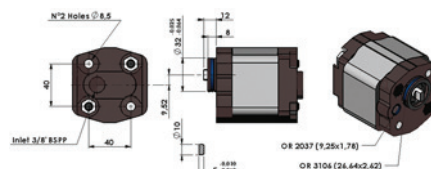
Code	Fördervolumen	Durchfluss (l/min) bei 1500 U/min	P2* (bar)	P3* (bar)
10CON	0,82	1,3	230	270
12CON	1,6	2,4	230	270
13CON	2,1	3,1	230	270
15CON	3,2	4,8	210	250
17CON	4,2	6,3	210	250
19CON	5,8	8,7	190	230
21CON	9,9	14,8	190	190

* P2 = Dauerdruck

* P3 = max. Spitzendruck (max. 2 Sekunden)



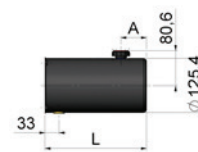
Hochdruck – Außenzahnradpumpen (GH) auf Anfrage



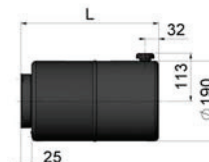
Öl-Tank aus Stahl für horizontalen Einbau

Stahltank

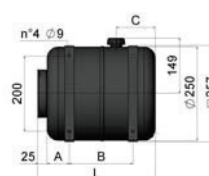
Code	Tankinhalt (l)	Nutzvolumen (l)	L (mm)	A (mm)
S107	4	3,2	409	60



Code	Tankinhalt (l)	Nutzvolumen (l)	L (mm)
S34	7	5,4	271
S04	8	6,6	323



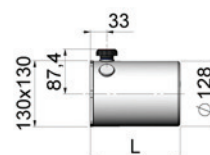
Code	Tankinhalt (l)	Nutzvolumen (l)	A (mm)	B (mm)	C (mm)	L (mm)
S90	12	10,5	60	170	105	315
S128	16	13	60	170	158	368
S105	19	15	52,5	290	158	420



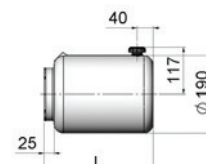
Öl-Tank aus Kunststoff für horizontalen Einbau

Kunststofftank

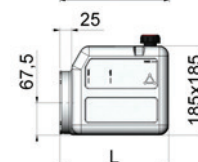
Code	Tankinhalt (l)	Nutzvolumen (l)	L (mm)	Material
S335	1	0,7	140	PP
S336	1,8	1,2	180	PP
S337	2,5	1,7	240	PP
S338	3	2,3	285	PP



Code	Tankinhalt (l)	Nutzvolumen (l)	L (mm)	Material
S374	5	4	219	PP
S376	7	5,4	271	PP
S378	8	6,6	323	PP

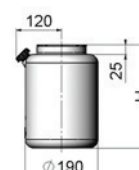


S343	5	3,8	230	PP
------	---	-----	-----	----



Kunststofftank für vertikalen Einbau

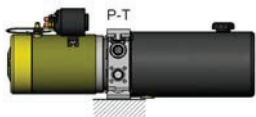
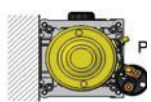
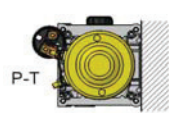
Code	Tankinhalt (l)	Nutzvolumen (l)	L (mm)	Material
S377	7	5,4	271	PP



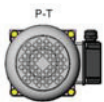
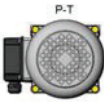
Andere Tankgrößen aus Stahl oder Kunststoff für horizontalen oder vertikalen Einbau auf Anfrage

Montagepositionen

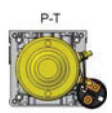
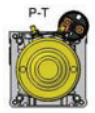
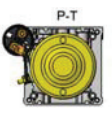
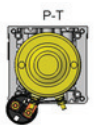
Montagepositionen für DC Motoren

Code	Abbildung					
O1	1	1 	3 	5 	6 	
O2	2					
O3	3					
O4	4	4 				
V1	5					
V2	6					

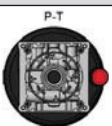
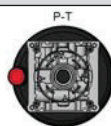
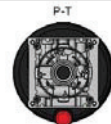
Klemmkastenpositionen für AC Motoren

Code	Abbildung		
-	11	11 Standard 	12 
M2	12		
M3	13		
M4	14	13 	14 

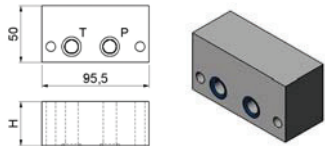
Startrelaispositionen für DC Motoren

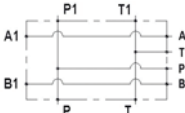
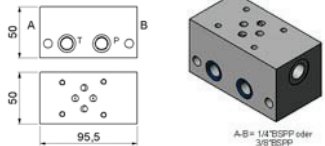
Code	Abbildung		
-	15	15 Standard 	16 
R2	16		
R3	17		
R4	18	17 	18 

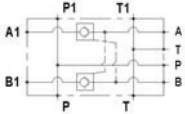
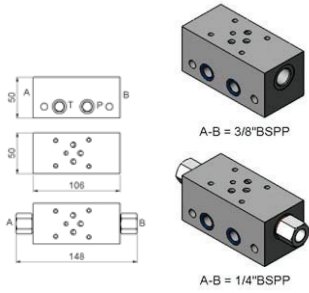
Position der Einfüll- und Belüftungskappe für vertikale Montagen

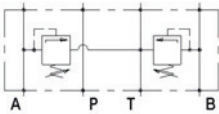
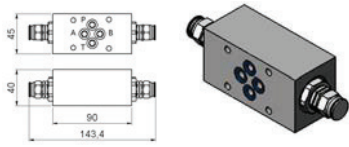
Code	Abbildung		
-	19	19 Standard 	21 
LU	20		
LO	21		
LP	22	20 	22 

Modulare Elemente

Code	Beschreibung	Schaltbild	Zeichnung
N09	Distanzelement H = 18 mm		
N01	Distanzelement H = 39 mm		
N02	Distanzelement H = 69 mm		

Code	Beschreibung	Schaltbild	Zeichnung
N03	Element für CETOP 3 Ventile (NG6) Paralleler Anschluss		

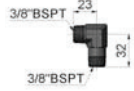
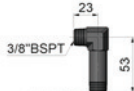
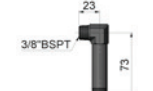
Code	Beschreibung	Schaltbild	Zeichnung
N12	Element für CETOP 3 Ventile (NG6) mit entsperbarem Rückschlagventil in A und B		

Code	Beschreibung	Schaltbild	Zeichnung
N07	Element für CETOP 3 (NG6) mit Druckbegrenzungsventil in A und B		

Zubehör für horizontalen und vertikalen Einbau

Saugrohre

Kunststoffsaugrohre für horizontalen Einbau

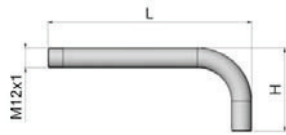
Zentralflansch	Öl-Tank Durchmesser (mm)	Code			
K	Ø 123	K2.340.S2.004	 Code: K2.340.S2.004	 Code: K2.501.S1.060	 Code: K2.501.S1.061
	Ø 190	K2.501.S1.060			
	Ø 250	K2.501.S1.061			
KE	Ø 123	K2.340.S2.005	 Code: K2.340.S2.005	 Code: K2.340.S2.006	 Code: K2.340.S2.007
	Ø 190	K2.340.S2.006			
	Ø 250	K2.340.S2.007			

Kunststoffsaugrohre für vertikalen Einbau

Zentralflansch	Code	H (mm)	
K-KE	K2.340.79.000	109	 Code: K2.340.72.000
	K2.340.72.000	129	
	K2.340.63.000	144	

Rücklaufrohre

Stahlrücklaufrohre für horizontalen Einbau

Code	L (mm)	H (mm)	
K2.347.16.000	120	45	
K2.347.17.000	134	90	
K2.347.27.000	170	90	

Zubehör für horizontalen und vertikalen Einbau

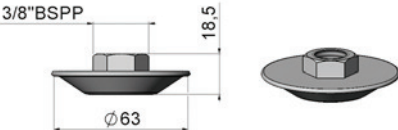
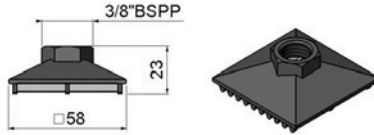
Rücklaufrohre

Kunststoffrücklaufrohre für vertikalen Einbau

Code	H (mm)	
K2.347.14.000	150	

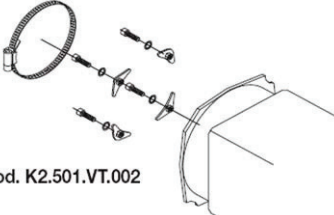
Saugfilter

Saugfilter für horizontalen und vertikalen Einbau

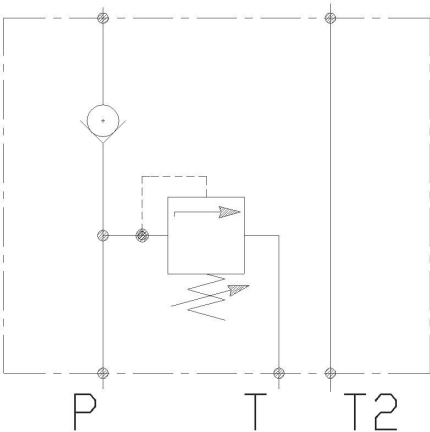
Zentralflansch	Code	Filterfeinheit (l/min)	
K-KE	K2.255.37.000	90 µm, 8 l/min	
K-KE	K2.255.66.000	90 µm, 15 l/min	

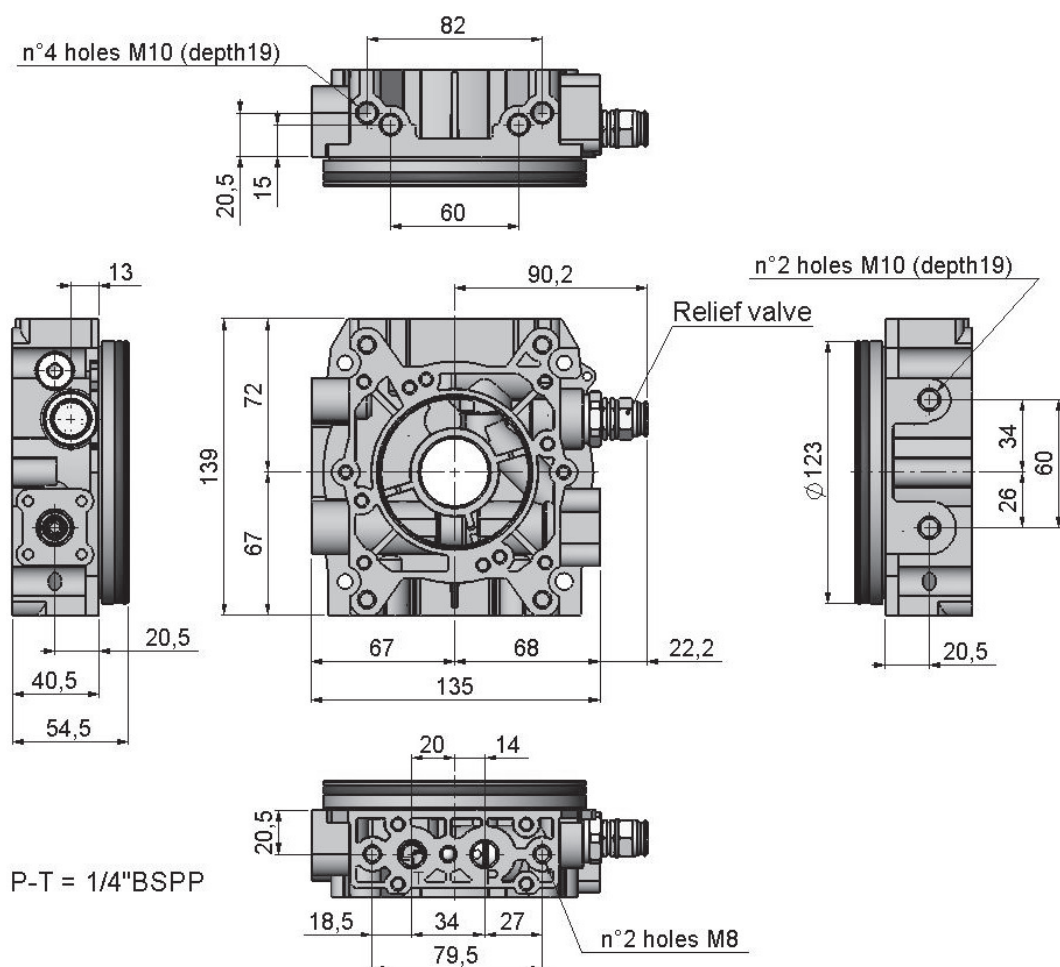
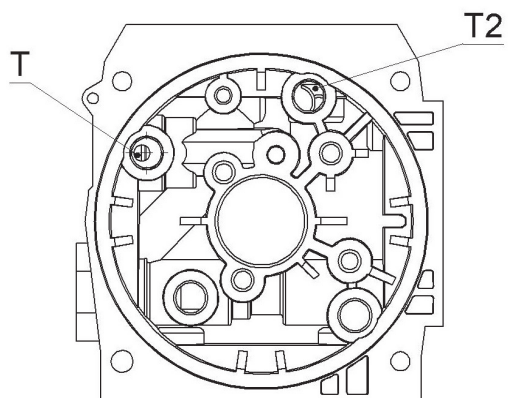
Montagesätze für Kunststofftanks

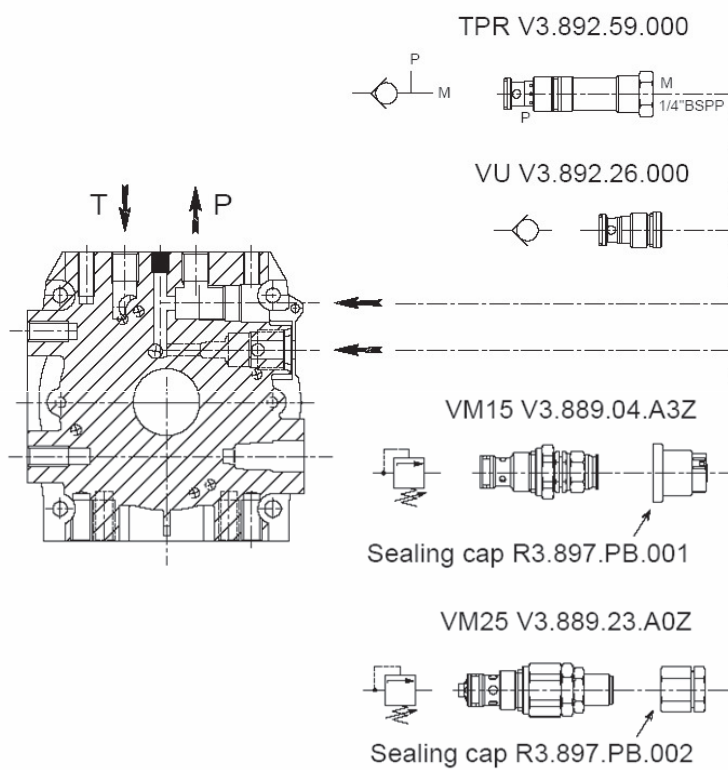
Saugfilter für horizontalen und vertikalen Einbau

Öl-Tank	K	KE	
S191-S192-S198-S202-S205-S208-S335-S336-S337-S338-S339-S340-S341-S342	K2.501.VT.001	K2.501.VT.006	 Cod. K2.501.VT.002
S313-S314-S315-S316-S331-S332-S343-S344-S374-S375-S376-S377-S378-S379-S380-S381	K2.501.VT.013	K2.501.VT.014	

A1

Relief valve		Pressure range (bar)	Manifold hydraulic diagram
VM15 standard	W	5 ÷ 50	
	Y	30 ÷ 120	
	Z	80 ÷ 250	
VM25 optional	W	5 ÷ 50	
	Y	10 ÷ 100	
	Z	40 ÷ 200	
	X	70 ÷ 350	







Rexroth
Bosch Group

Bosch Rexroth Oil Control
Divisione Oil Sistem
Via Ragazzi del 99, n. 39
I-42100 Reggio Emilia
Phone +39 0522 513 319
Fax +39 0522 513 310
oilsistem@oilsistem.it

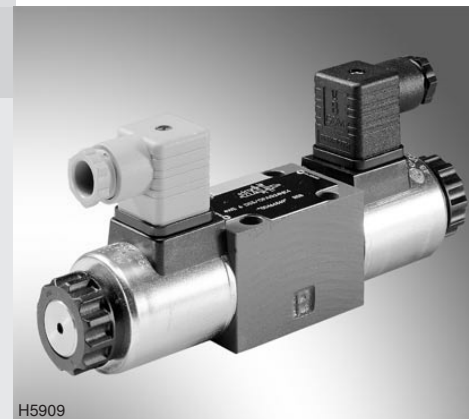
4/3-, 4/2- und 3/2-Wegeventil mit in Öl schaltenden Gleich- oder Wechselspannungsmagneten

RD 23178/04.09
Ersetzt: 08.08

1/16

Typ WE

Nenngröße 6
 Geräteserie 6X
 Maximaler Betriebsdruck 350 bar [5076 psi]
 Maximaler Volumenstrom: 80 l/min [21 US gpm] – DC
 60 l/min [15.8 US gpm] – AC



H5909

Inhaltsübersicht

Inhalt	Seite
Merkmale	1
Bestellangaben	2, 3
Kolbensymbole	4
Funktion, Schnitt	5
Technische Daten	6, 7
Kennlinien	8
Leistungsgrenzen	8 bis 10
Geräteabmessungen	11 bis 15
Leitungsdosen	16

Merkmale

- direktgesteuertes Wege-Schieberventil mit Magnetbetätigung in Hochleistungsausführung
- Lage der Anschlüsse nach DIN 24340 Form A
- Lage der Anschlüsse nach ISO 4401-03-02-0-05 und NFPA T3.5.1 R2-2002 D03
- Anschlussplatten siehe Datenblatt RD 45052
- in Öl schaltende Gleich- oder Wechselspannungsmagnete mit abziehbarer Spule
- Magnetspule um 90° drehbar
- kein Öffnen des druckdichten Raumes bei Spulenwechsel erforderlich
- elektrischer Anschluss als Einzel- oder Zentralanschluss (weitere elektrische Anschlüsse siehe RD 08010)
- Hilfsbetätigungseinrichtung, wahlweise
- Weichschaltende Ausführung siehe RD 23183
- Induktive Stellungsschalter und Näherungssensoren (kontakt- und berührungslos), siehe RD 24830
- Ergänzende Dokumentation:
 - "Allgemeine Produktinformation für Hydraulikprodukte" RD 07008
 - "Montage, Inbetriebnahme, Wartung von Industrieventilen" RD 07300

Informationen zu lieferbaren Ersatzteilen:
www.boschrexroth.com/spc

Bestellangaben

		WE	6		6X/	E				
3 Hauptanschlüsse	= 3									
4 Hauptanschlüsse	= 4									
Nenngröße 6	= 6									
Kolbensymbole z. B. C, E, EA, EB usw; mögliche Ausführung siehe Seite 4										
Geräteserie 60 bis 69 (60 bis 69: unveränderte Einbau- und Anschlussmaße)	= 6X									
mit Federrückstellung	= ohne Bez.									
ohne Federrückstellung	= O									
ohne Federrückstellung mit Raste	= OF									
Hochleistungsmagnet nass (in Öl schaltend) mit abziehbarer Spule	= E									
Gleichspannung 24 V	= G24									
Wechselspannung 230 V 50/60 Hz	= W230									
Wechselspannung 120 V oder 110 V 50/60 Hz	= W110									
	= W + Spannung									
Gleichspannung 205 V	= G205 ¹⁾									
Gleichspannungsmagnet mit Gleichrichter für Wechselspannung (nicht frequenzbezogen; nur verfügbar mit Steckverbindung mit D-Deckel, Seite 14)	= W110R									
Weitere Bestellangaben für sonstige Spannungen und Frequenzen siehe Seite 7										
mit verdeckter Hilfsbetätigungseinrichtung (Standard)	= N9									
mit Hilfsbetätigungseinrichtung	= N									
ohne Hilfsbetätigungseinrichtung	= ohne Bez.									
elektrischer Anschluss										
Einzelanschluss										
ohne Leitungsdose mit Gerätestecker DIN EN 175301-803	= K4 ³⁾									
ohne Leitungsdose mit Gerätestecker AMP Junior-Timer	= C4 ³⁾									
ohne Leitungsdose mit Gerätestecker DT 04-2PA (Deutsch-Stecker)	= K40 ³⁾									
ohne Leitungsdose mit M12x1-Steckverbindung mit Betriebsanzeige-LED	= K72L ⁴⁾									
ohne Leitungsdose mit M12x1-Steckverbindung mit Betriebsanzeige-LED (keine Verbindung Pin 1 zu Pin 2)	= K73L ⁴⁾									
Zentralanschluss										
Kabeleinführung am Deckel, mit Leuchtanzeige	= DL									
Zentralsteckung am Deckel, mit Leuchtanzeige (ohne Leitungsdose)	= DKL ⁵⁾									
Weitere elektrische Anschlüsse siehe RD 08010										

¹⁾ Für den Anschluss an das Wechselspannungsnetz **muss** ein Gleichspannungsmagnet, der über einen Gleichrichter angesteuert wird, verwendet werden (siehe Tabelle unten).
Bei Einzelanschluss kann eine große Leitungsdose mit eingebautem Gleichrichter verwendet werden (separate Bestellung).

²⁾ Spannstift ISO 8752-3x8-St,
Material-Nr. **R900005694** (separate Bestellung)

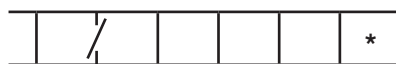
³⁾ Leitungsdosen, separate Bestellung, siehe Seite 16 und RD 08006.

⁴⁾ nur Ausführung „G24“, siehe RD 08010

⁵⁾ Leitungsdose, separate Bestellung,
Material-Nr. **R900005538**

Wechselspannungsnetz (zulässige Spannungstoleranz $\pm 10\%$)	Nennspannung des Gleichspannungsmagneten bei Betrieb mit Wechselspannung	Bestellangabe
110 V - 50/60 Hz	96 V	G96
230 V - 50/60 Hz	205 V	G205

Vorzugstypen und Standardgeräte sind in der EPS (Standard Preisliste) ausgewiesen.



weitere Angaben im Klartext

ohne Bez. =**ohne** Fixierbohrung**/60 ²⁾ =****mit** Fixierbohrung**/62 =****mit** Fixierbohrung und Spannstift
ISO 8752-3x8-St**Dichtungswerkstoff**

NBR-Dichtungen

FKM-Dichtungen

(andere Dichtungen auf Anfrage)

Achtung!

Dichtungstauglichkeit der verwendeten Druckflüssigkeit beachten!

Klemmlänge

42 mm [1.65 inch] (Standard)

22 mm [0.87 inch]

ohne Bez. =**Z =****ohne Bez. =****ohne** Einsteckdrossel

mit Einsteckdrossel siehe Tabelle:

Anschluss	Drossel-Ø in mm [inch]		
	0,8 [0.031]	1,0 [0.039]	1,2 [0.047]
P	= B08	= B10	= B12
A	= H08	= H10	= H12
B	= R08	= R10	= R12
A und B	= N08	= N10	= N12
T	= X08	= X10	= X12

Einsatz bei Volumenstrom größer Leistungsgrenze des Ventils (siehe Seite 5).

Schaltstellungsüberwachung**ohne** Stellungsschalter**ohne Bez. =**– **Induktiver Stellungsschalter Typ QM**

überwachte Schaltstellung „a“

überwachte Schaltstellung „b“

überwachte Ruhestellung

– **Induktiver Stellungsschalter Typ QR**

überwachte Ruhestellung

überwachte Schaltstellung „a“ und „b“

– **Induktiver Näherungssensor Typ QS**

überwachte Schaltstellung „a“

überwachte Schaltstellung „b“

überwachte Schaltstellung „0“

überwachte Schaltstellung „0“ und „a“

überwachte Schaltstellung „0“ und „b“

überwachte Schaltstellung „a“ und „b“

weitere Angaben siehe RD 24830

QMAG24 =**QMBG24 =****QM0G24 =****QR0G24S =****QRABG24E =****QSAG24W =****QSBG24W =****QS0G24W =****QS0AG24W =****QS0BG24W =****QSABG24W =**

Funktion, Schnitt

Wegeventile des Typs WE sind magnetbetätigte Wege-Schieberventile. Sie steuern Start, Stopp und Richtung eines Volumenstromes.

Die Wegeventile bestehen im Wesentlichen aus dem Gehäuse (1), einem oder zwei Magneten (2), dem Steuerkolben (3), sowie einer oder zwei Rückstellfedern (4).

In unbetätigtem Zustand wird der Steuerkolben (3) durch die Rückstellfedern (4) in Mittelstellung oder in Ausgangsstellung gehalten (ausgenommen Impulsschieber). Die Betätigung des Steuerkolbens (3) erfolgt über in Öl schaltende Magnete (2).

Für eine einwandfreie Funktion ist darauf zu achten, dass der Druckraum des Magneten mit Öl gefüllt ist.

Die Kraft des Magneten (2) wirkt über den Stößel (5) auf den Steuerkolben (3) und schiebt diesen aus seiner Ruhelage in die gewünschte Endstellung. Dadurch wird die geforderte Volumenstromrichtung P nach A und B nach T oder P nach B und A nach T frei.

Nach Entregung des Magneten (2) wird der Steuerkolben (3) durch die Rückstellfeder (4) wieder in seine Ruhelage geschoben.

Eine Hilfsbetätigungseinrichtung (6), wahlweise, gestattet das Verschieben des Steuerkolbens (3) ohne Magneterregung.

Typ .WE 6.6X/O... (nur möglich bei Symbolen A, C und D)

Bei dieser Ausführung handelt es sich um Wegeventile mit zwei Schaltstellungen und zwei Magneten ohne Raste. Eine definierte Schaltstellung in stromlosem Zustand ist nicht gegeben.

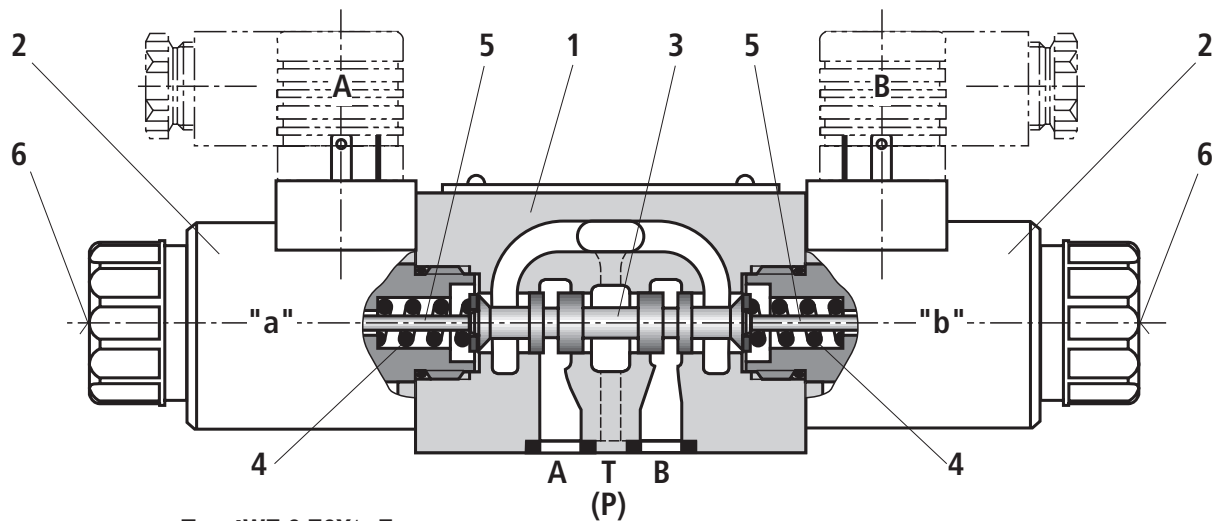
Typ .WE 6.6X/OF... (Impulsschieber, nur möglich bei Symbolen A, C und D)

Bei dieser Ausführung handelt es sich um Wegeventile mit zwei Schaltstellungen, zwei Magneten und einer Raste. Dadurch sind wechselseitig beide Schaltstellungen fixiert und auf Dauererregung des Magneten kann verzichtet werden.

Hinweise!

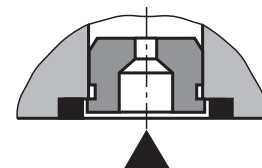
Druckspitzen in der Tankleitung zu zwei oder mehreren Ventilen können, bei Ventilen mit Raste, unbeabsichtigte Kolbenbewegungen hervorrufen! Es wird empfohlen, separate Rücklaufleitungen zu verlegen oder ein Rückschlagventil in die Tankleitung einzubauen.

Die interne Leckage eines Wege-Schieberventils verändert sich bauteilbedingt über die Lebensdauer.



Einsteckdrossel

Der Einsatz der Einsteck-Drossel ist dann erforderlich, wenn auf Grund gegebener Betriebsbedingungen während der Schaltvorgänge Volumenströme auftreten können, die über der Leistungsgrenze des Ventils liegen.



Technische Daten (Bei Geräteeinsatz außerhalb der angegebenen Werte bitte anfragen!)**allgemein**

Masse	– Ventil mit einem Magnet	kg [lbs]	1,45 [3.2]
	– Ventil mit zwei Magneten	kg [lbs]	1,95 [4.3]
Einbaulage			beliebig
Umgebungstemperaturbereich		°C [°F]	–30 bis +50 [–22 bis +122] (NBR-Dichtungen) –20 bis +50 [–4 bis +122] (FKM-Dichtungen)

hydraulisch

Maximaler Betriebsdruck	– Anschluss A, B, P	bar [psi]	350 [5076]
	– Anschluss T	bar [psi]	210 [3050] (DC); 160 [2320] (AC) Bei Symbol A und B muss der Anschluss T als Leck- ölanschluss benutzt werden.
Maximaler Volumenstrom		l/min [US gpm]	80 [21] (DC); 60 [15.8] (AC)
Volumenstromquerschnitt (Schaltstellung 0)	– Kolbensymbol Q	mm ²	ca. 6 % vom Nennquerschnitt
	– Kolbensymbol W	mm ²	ca. 3 % vom Nennquerschnitt
Druckflüssigkeit ¹⁾			Mineralöl (HL, HLP) nach DIN 51524 ²⁾ ; biologisch schnell abbaubare Druckflüssigkeiten nach VDMA 24568 (siehe auch RD 90221); HETG (Rapsöl) ²⁾ ; HEPG (Polyglykole) ³⁾ ; HEES (Synthetische Ester) ³⁾ ; andere Druckflüssigkeiten auf Anfrage
Druckflüssigkeitstemperaturbereich		°C [°F]	–30 bis +80 [–22 bis +176] (NBR-Dichtungen) –15 bis +80 [–4 bis +176] (FKM-Dichtungen)
Viskositätsbereich		mm ² /s [SUS]	2,8 bis 500 [35 bis 2320]
Maximal zul. Verschmutzungsgrad der Druckflüssig- keit Reinheitsklasse nach ISO 4406 (c)			Klasse 20/18/15 ⁴⁾

¹⁾ Der Flammpunkt des verwendeten Prozess- und Betriebsmediums muss 15 K über der maximalen Magnetoberflächentemperatur liegen.

²⁾ geeignet für NBR- und FKM-Dichtungen

³⁾ geeignet nur für FKM-Dichtungen

⁴⁾ Die für die Komponenten angegebenen Reinheitsklassen müssen in Hydrauliksystemen eingehalten werden. Eine wirksame Filtration verhindert Störungen und erhöht gleichzeitig die Lebensdauer der Komponenten.

Anforderungen an die Pflege der Druckflüssigkeit sowie Grenzwert der Verschmutzung siehe Datenblatt RD 07300.

Zur Auswahl der Filter siehe Datenblätter RD 50070, RD 50076, RD 50081, RD 50086, RD 50087 und RD 50088.

Technische Daten (Bei Geräteeinsatz außerhalb der angegebenen Werte bitte anfragen!)

elektrisch

Spannungsart		Gleichspannung	Wechselspannung 50/60 Hz
lieferbare Spannungen ⁵⁾ (Bestellangaben für Wechselspannungsmagnete siehe unten)	V	12, 24, 96, 205	110, 230
Spannungstoleranz (Nennspannung)	%	±10	
Leistungsaufnahme	W	30	–
Halteleistung	VA	–	50
Einschaltleistung	VA	–	220
Einschaltdauer (ED)	%	100	
Schaltzeit nach – EIN	ms	25 bis 45	10 bis 20
ISO 6403 ⁶⁾ – AUS	ms	10 bis 25	15 bis 40
Maximale Schaltfrequenz	1/h	15000	7200
Maximale Oberflächentemperatur der Spule ⁷⁾	°C [°F]	120 [248]	180 [356]
Schutzart nach – mit Gerätestecker „K4“, „K72L“, „K73L“		IP 65 (mit montierter und verriegelter Leitungsdose)	
DIN EN 60529 – mit Gerätestecker „C4“		IP 66A (mit montierter und verriegelter Leitungsdose)	
– mit Gerätestecker „K40“		IP 69K (mit montierter und verriegelter Leitungsdose)	

⁵⁾ Sonderspannungen auf Anfrage

⁶⁾ Die Schaltzeiten wurden bei einer Druckflüssigkeitstemperatur von 40 °C [104 °F] und einer Viskosität von 46 cSt ermittelt. Abweichende Druckflüssigkeitstemperaturen können eine veränderte Schaltzeit ergeben! Schaltzeiten verändern sich in Abhängigkeit von Betriebsdauer und Einsatzbedingungen.

⁷⁾ Auf Grund der auftretenden Oberflächentemperaturen der Magnetspulen sind die Normen ISO 13732-1 und EN 982 zu beachten!

Die angegebene Oberflächentemperatur bei Wechselspannungsmagneten gilt für den störungsfreien Betrieb. Im Fehlerfall (z. B. bei Blockieren des Steuerkolbens) kann die Oberflächentemperatur über 180 °C [356 °F] ansteigen. Daher muss die Anlage unter Berücksichtigung des Flammpunktes (siehe Fußnote ¹⁾ Seite 6) auf mögliche Gefahren überprüft werden.

Zur Absicherung müssen Leitungsschutzschalter (siehe Tabelle Seite 16), sofern die Entstehung einer zündfähigen Atmosphäre nicht auf andere Weise ausgeschlossen wird, verwendet werden. Die Oberflächentemperatur kann hiermit im Fehlerfall auf maximal 220 °C [428 °F] begrenzt werden.

Der Auslösestrom muss in einem Zeitintervall von 0,6 s bei dem 8- bis 10-fachen der Nennstromaufnahme liegen. (Auslösecharakteristik "K").

Der erforderliche Nichtauslösestrom der Sicherung darf den Wert I_1 (siehe Tabelle Seite 16) nicht unterschreiten.

Der maximale Auslösestrom der Sicherung darf den Wert I_2 (siehe Tabelle Seite 16) nicht überschreiten.

Die Temperaturabhängigkeit des Auslöseverhaltens der Leitungsschutzschalter ist entsprechend den Herstellerangaben zu berücksichtigen.

Hinweise!

- Die Betätigung der Hilfsbetätigungseinrichtung ist nur bis ca. 50 bar [725 psi] Tankdruck möglich. Beschädigung der Bohrung für Hilfsbetätigungseinrichtung vermeiden! (Spezialwerkzeug zur Betätigung, separate Bestellung, Material-Nr. **R900024943**). Bei blockierter Hilfsbetätigungseinrichtung ist die Betätigung des Magneten auszuschließen!
- Die gleichzeitige Betätigung der Magnete ist auszuschließen!

Beim elektrischen Anschluss ist der Schutzleiter (PE $\perp$) vorschriftsmäßig anzuschließen.

Hinweis!

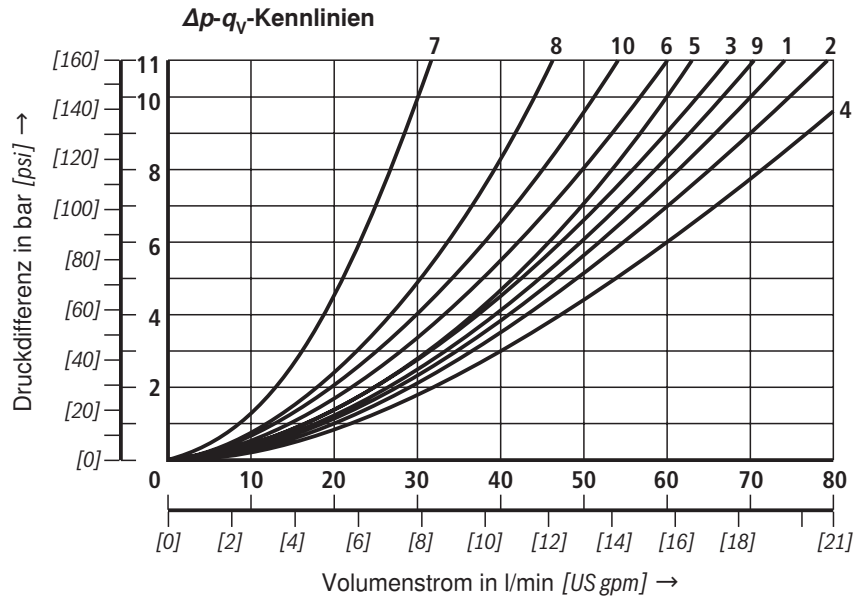
Wechselspannungsmagnete sind für 2 oder 3 Netze einsetzbar;

z. B. Magnettyp **W110** für:

110 V, 50 Hz; 110 V, 60 Hz; 120 V, 60 Hz

Bestellangaben	Netze
W110	110 V, 50 Hz 110 V, 60 Hz 120 V, 60 Hz
W230	230 V, 50 Hz 230 V, 60 Hz

Kennlinien (gemessen mit HLP46, $\vartheta_{\text{Öl}} = 40 \pm 5 \text{ °C}$ [$104 \pm 9 \text{ °F}$])



- 7 Kolbensymbol "R" in Schaltstellung B – A
 8 Kolbensymbol "G" und "T" in Mittelstellung P – T
 9 Kolbensymbol "H" in Mittelstellung P – T

Kolben- symbol	Volumenstromrichtung			
	P – A	P – B	A – T	B – T
A; B	3	3	–	–
C	1	1	3	1
D; Y	5	5	3	3
E	3	3	1	1
F	1	3	1	1
T	10	10	9	9
H	2	4	2	2
J; Q	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
R	5	5	4	–
V	1	2	1	1
W	1	1	2	2
U	3	3	9	4
G	6	6	9	9

Leistungsgrenzen (gemessen mit HLP46, $\vartheta_{\text{Öl}} = 40 \pm 5 \text{ °C}$ [$104 \pm 9 \text{ °F}$])

Achtung!

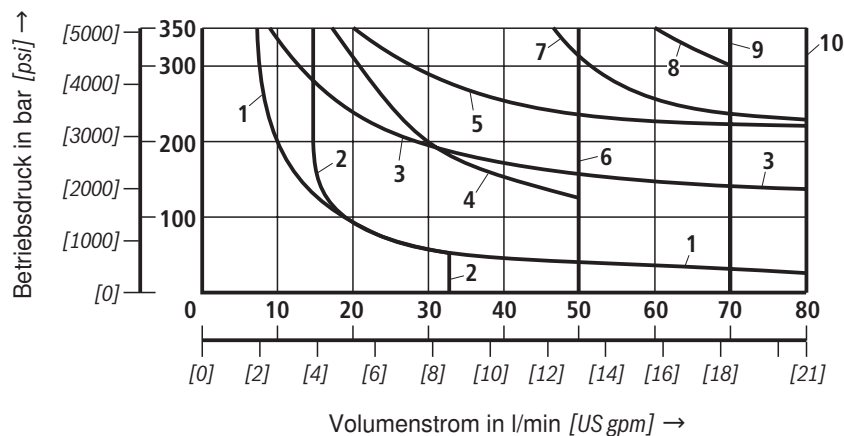
Die angegebenen Schaltleistungsgrenzen sind für den Einsatz mit zwei Volumenstromrichtungen (z. B. von P nach A und gleichzeitigem Rückstrom von B nach T) gültig.

Auf Grund der innerhalb der Ventile wirkenden Strömungskräfte kann bei nur einer Volumenstromrichtung (z. B. von P

nach A und gesperrtem Anschluss B) die zulässige Schaltleistungsgrenze wesentlich geringer sein!

Bei solchen Einsatzfällen bitten wir um Rücksprache!

Die Schaltleistungsgrenze wurde mit betriebswarmen Magneten, 10% Unterspannung und ohne Tankvorspannung ermittelt.



Gleichspannungsmagnet Magnetspannung

12; 24; 48; 96; 125; 205 V

(andere Spannungen siehe Seite 10)

Gleichspannungsmagnet	
Kennli- nie	Kolbensymbol
1	A; B ¹⁾
2	V
3	A; B
4	F; P
5	J
6	G; H; T
7	A/O; A/OF; L; U
8	C; D; Y
9	M
10	E; E1 ²⁾ ; R ³⁾ ; C/O; C/OF D/O; D/OF; Q; W

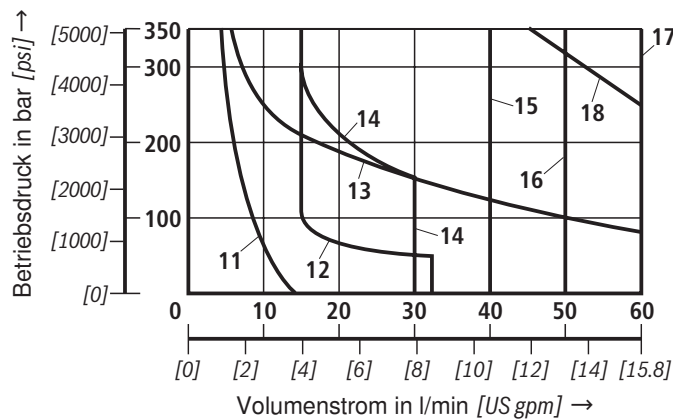
¹⁾ mit Hilfsbetätigungseinrichtung

²⁾ P – A/B Voröffnung

³⁾ Rückfluss vom Verbraucher zum Behälter

Leistungsgrenzen (gemessen mit HLP46, $\vartheta_{\text{Öl}} = 40 \pm 5 \text{ °C}$ [$104 \pm 9 \text{ °F}$])

siehe Hinweis Seite 8.



Wechselspannungsmagnet Magnetspannung	
W110	110 V; 50 Hz 120 V; 60 Hz
W230	230 V; 50 Hz

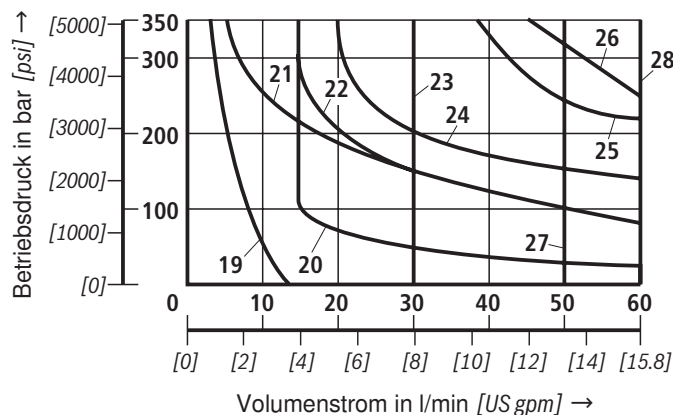
(andere Spannungen auf Anfrage)

Wechselspannungsmagnet – 50 Hz	
Kennlinie	Kolbensymbol
11	A; B ¹⁾
12	V
13	A; B
14	F; P
15	G; T
16	H
17	A/O; A/OF; C/O; C/OF; D/O; D/OF; E; E1 ²⁾ ; J; L; M; Q; R ³⁾ ; U; W
18	C; D; Y

¹⁾ mit Hilfsbetätigungseinrichtung

²⁾ P – A/B Voröffnung

³⁾ Rückfluss vom Verbraucher zum Behälter



Wechselspannungsmagnet Magnetspannung	
W110	110 V; 60 Hz
W230	230 V; 60 Hz

(andere Spannungen auf Anfrage)

Wechselspannungsmagnet – 60 Hz	
Kennlinie	Kolbensymbol
19	A; B ¹⁾
20	V
21	A; B
22	F; P
23	G; T
24	J; L; U
25	A/O; A/OF; Q; W
26	C; D; Y
27	H
28	C/O; C/OF; D/O; D/OF; E E1 ²⁾ ; M; R ³⁾

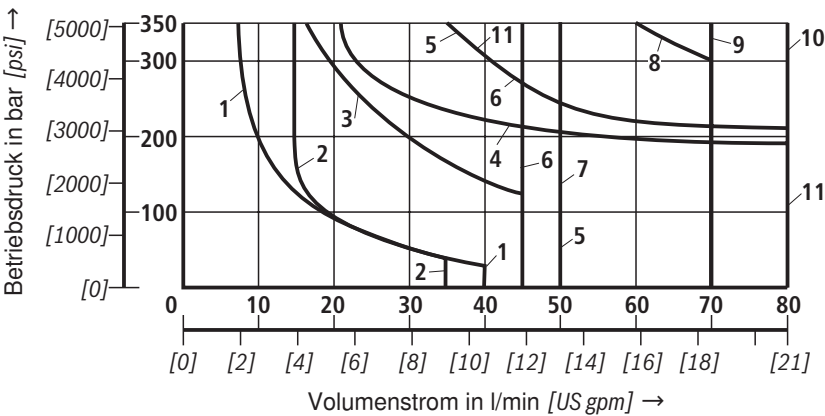
¹⁾ mit Hilfsbetätigungseinrichtung

²⁾ P – A/B Voröffnung

³⁾ Rückfluss vom Verbraucher zum Behälter

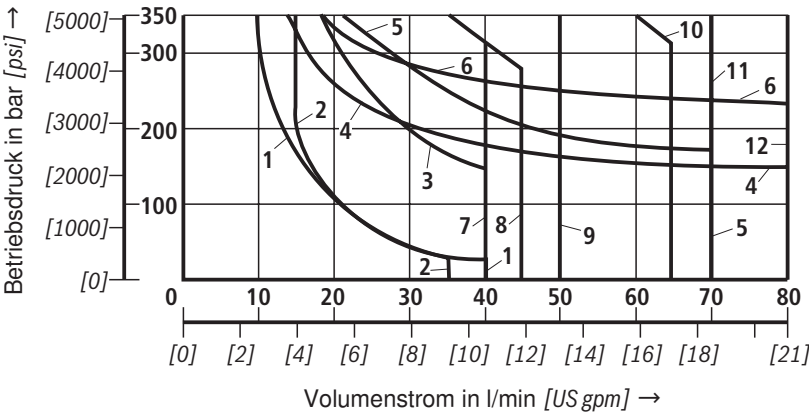
Leistungsgrenzen (gemessen mit HLP46, $\vartheta_{\text{Öl}} = 40 \pm 5 \text{ }^{\circ}\text{C}$ [104 ± 9 °F])

siehe Hinweis Seite 8.



Gleichspannungsmagnet
Magnetspannung
110; 180 V

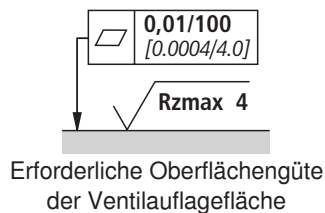
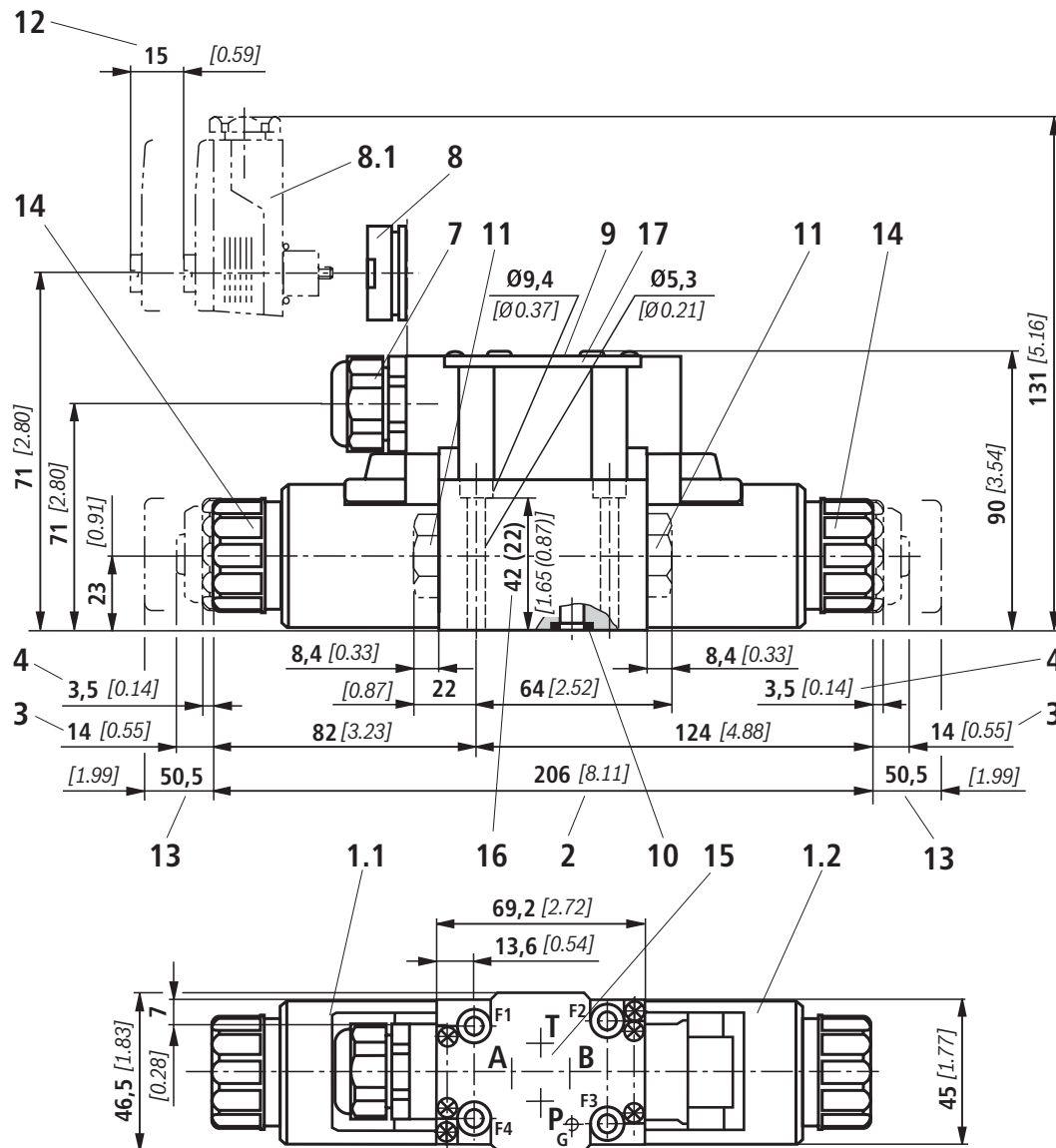
Gleichspannungsmagnet	
Kennlinie	Kolbensymbol
1	A; B
2	V
3	F; P
4	J; L; U
5	G
6	T
7	H
8	D; C
9	M
10	C/O; C/OF; D/O; D/OF; E; E1-; R, Q; W
11	A/O; A/OF



Gleichspannungsmagnet
Magnetspannung
42; 80; 220 V

Gleichspannungsmagnet	
Kennlinie	Kolbensymbol
1	A; B
2	V
3	F; P
4	J; L; U
5	A/O; A/OF
6	E
7	T
8	G
9	H
10	D; C
11	M
12	C/O; C/OF; D/O; D/OF; E1-; R, Q; W

Geräteabmessungen: Ventil mit Gleichspannungsmagnet – Zentralanschluss (Maßangaben in mm [inch])

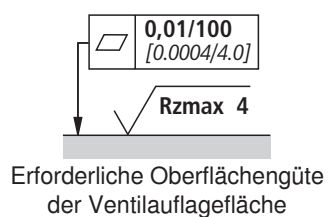
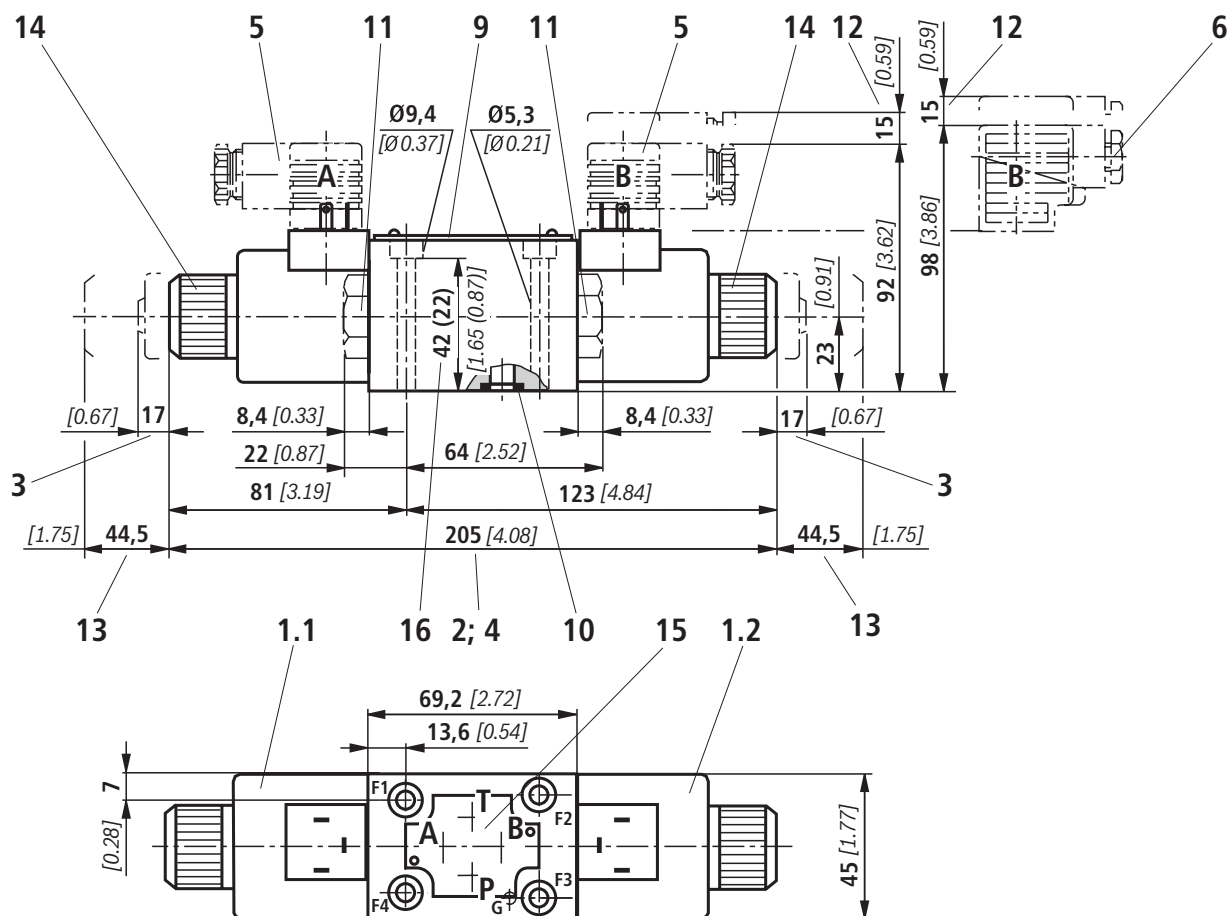


Klemmenbelegung bei Zentralanschluss:

- **1 Magnet:**
Magnet immer an Klemmen 1 und 2,
Schutzleiter an Klemme $\oplus$ PE
- **2 Magnete:**
Magnet "a" an Klemmen 1 und 2,
Magnet "b" an Klemmen 3 und 4,
Schutzleiter an Klemme $\oplus$ PE

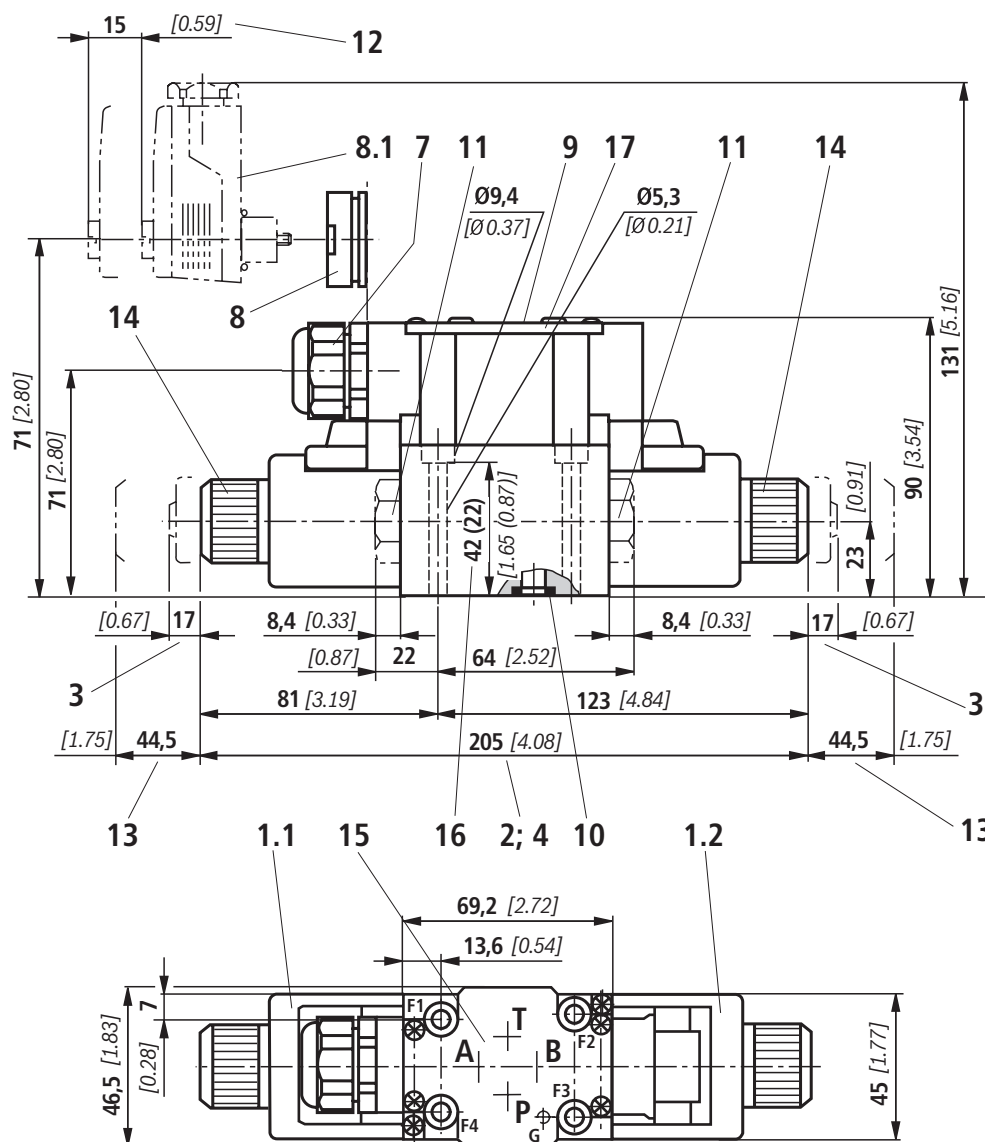
Positionserklärungen, Ventilebefestigungsschrauben und Anschlussplatten siehe Seite 15.

Geräteabmessungen: Ventil mit Wechselspannungsmagnet – Einzelanschluss
(Maßangaben in mm [*inch*])



Positionserklärungen, Ventilbefestigungsschrauben und Anschlussplatten siehe Seite 15.

Geräteabmessungen: Ventil mit Wechselspannungsmagnet – Zentralanschluss (Maßangaben in mm [inch])



Erforderliche Oberflächengüte
 der Ventilaufklappfläche

Klemmenbelegung bei Zentralanschluss:

- **1 Magnet:**
Magnet immer an Klemmen 1 und 2,
Schutzleiter an Klemme $\perp$ PE
- **2 Magnete:**
Magnet "a" an Klemmen 1 und 2,
Magnet "b" an Klemmen 3 und 4,
Schutzleiter an Klemme $\perp$ PE

Positionserklärungen, Ventilbefestigungsschrauben und Anschlussplatten siehe Seite 15.

Geräteabmessungen

- 1.1 Magnet "a"
- 1.2 Magnet "b"
- 2 Maß für Magnet **mit verdeckter** Hilfsbetätigungseinrichtung "N9" (Standard)
- 3 Maß für Magnet **mit** Hilfsbetätigungseinrichtung "N"
- 4 Maß für Magnet **ohne** Hilfsbetätigungseinrichtung
- 5.1 Leitungsdose **ohne** Beschaltung für Gerätestecker „K4“ (separate Bestellung, siehe Seite 16 und RD 08006)
- 5.2 Leitungsdose (AMP Junior-Timer) mit Gerätestecker „C4“ (separate Bestellung, siehe RD 08006)
- 5.3 Leitungsdose DT 04-2PA (Deutsch-Stecker) mit Gerätestecker „K40“ (separate Bestellung, siehe RD 08006)
- 5.4 Leitungsdose abgewinkelt mit M12x1-Steckverbindung mit Betriebsanzeige-LED „K33L“ (separate Bestellung, siehe RD 08006)
- 6 Leitungsdose **mit** Beschaltung für Gerätestecker „K4“ (separate Bestellung, siehe Seite 16 und RD 08006)
- 7 Kabelverschraubung Pg 16 [1/2" NPT] "DL"
- 8 Zentralsteckung "DKL"
- 8.1 Winkelsteckdose (Farbe rot, separate Bestellung) Material-Nr. **R900005538**
- 9 Typschild
- 10 Gleiche Dichtringe für Anschlüsse A, B, P, T
 **Hinweis!** Die Anschlüsse sind entsprechend ihren Aufgaben eindeutig festgelegt und dürfen nicht beliebig vertauscht oder verschlossen werden.
- 11 Verschlusschraube für Ventile mit einem Magneten
- 12 Platzbedarf zum Entfernen der Leitungsdose/Winkelsteckdose
- 13 Platzbedarf zum Entfernen der Spule
- 14 Befestigungsmutter, Anziehdrehmoment $M_A = 4^{+1} \text{ Nm}$ [2.95^{+0.74} ft-lbs]
- 15 Lage der Anschlüsse nach DIN 24340 Form A (**ohne** Fixierbohrung), oder ISO 4401-03-02-0-05 und NFPA T3.5.1 R2-2002 D03 (**mit** Fixierbohrung für Spannstift ISO 8752-3x8-St, Material-Nr. **R900005694**, separate Bestellung)
- 16 Alternative Klemmlänge (): 22 mm [0.87 inch]
- 17 Deckel

Achtung!

Das Ventil darf nur mit ordnungsgemäß montiertem Deckel betrieben werden!

Anschlussplatten nach Datenblatt RD 45052

(separate Bestellung)

(ohne Fixierbohrung)	G 341/01 (G1/4)
	G 342/01 (G3/8)
	G 502/01 (G1/2)
(mit Fixierbohrung)	G 341/60 (G1/4)
	G 342/60 (G3/8)
	G 502/60 (G1/2)
	G 341/12 (SAE-6) ¹⁾
	G 342/12 (SAE-8) ¹⁾
	G 502/12 (SAE-10) ¹⁾

¹⁾ auf Anfrage

Ventilbefestigungsschrauben (separate Bestellung)

– Klemmlänge 42 mm:

4 Zylinderschrauben metrisch

ISO 4762 - M5 x 50 - 10.9-flZn-240h-L

(Reibungszahl $\mu_{\text{ges}} = 0,09$ bis $0,14$);
Anziehdrehmoment $M_A = 7 \text{ Nm}$ [5.2 ft-lbs] $\pm 10\%$,
Material-Nr. **R913000064**

oder

4 Zylinderschrauben

ISO 4762 - M5 x 50 - 10.9 (Selbstbeschaffung)

(Reibungszahl $\mu_{\text{ges}} = 0,12$ bis $0,17$);
Anziehdrehmoment $M_A = 8,1 \text{ Nm}$ [6 ft-lbs] $\pm 10\%$

4 Zylinderschrauben UNC

10-24 UNC x 2" ASTM-A574

(Reibungszahl $\mu_{\text{ges}} = 0,19$ bis $0,24$);
Anziehdrehmoment $M_A = 11 \text{ Nm}$ [8.2 ft-lbs] $\pm 15\%$,
(Reibungszahl $\mu_{\text{ges}} = 0,12$ bis $0,17$);
Anziehdrehmoment $M_A = 8 \text{ Nm}$ [5.9 ft-lbs] $\pm 10\%$,
Material-Nr. **R978800693**

– Klemmlänge 22 mm:

4 Zylinderschrauben metrisch

ISO 4762 - M5 x 30 - 10.9-flZn-240h-L

(Reibungszahl $\mu_{\text{ges}} = 0,09$ bis $0,14$);
Anziehdrehmoment $M_A = 7 \text{ Nm}$ [5.2 ft-lbs] $\pm 10\%$,
Material-Nr. **R913000316**

oder

4 Zylinderschrauben

ISO 4762 - M5 x 30 - 10.9 (Selbstbeschaffung)

(Reibungszahl $\mu_{\text{ges}} = 0,12$ bis $0,17$);
Anziehdrehmoment $M_A = 8,1 \text{ Nm}$ [6 ft-lbs] $\pm 10\%$

4 Zylinderschrauben UNC

10-24 UNC x 1 1/4"

(Reibungszahl $\mu_{\text{ges}} = 0,19$ bis $0,24$);
Anziehdrehmoment $M_A = 11 \text{ Nm}$ [8.2 ft-lbs] $\pm 15\%$,
(Reibungszahl $\mu_{\text{ges}} = 0,12$ bis $0,17$);
Anziehdrehmoment $M_A = 8 \text{ Nm}$ [5.9 ft-lbs] $\pm 10\%$,
Material-Nr. **R978802879**

Leitungsdosen nach DIN EN 175301-803

Details und weitere Leitungsdosen siehe RD 08006							
			Material-Nummer				
Anschluss	Ventilseite	Farbe	ohne Beschaltung	mit Leuchtanzeige 12 ... 240 V	mit Leuchtanzeige und Gleichrichter 12 ... 240 V	mit Gleichrichter 12 ... 240 V	mit Leuchtanzeige und Z-Dioden-Schutzbeschaltung 24 V
M16 x 1,5	a	grau	R901017010	–	–	–	–
	b	schwarz	R901017011	–	–	–	–
	a/b	schwarz	–	R901017022	R901017029	R901017025	R901017026
1/2" NPT (Pg 16)	a	rot/braun	R900004823	–	–	–	–
	b	schwarz	R900011039	–	–	–	–
	a/b	schwarz	–	R900057453	R900057455	R900842566	–

Leitungsschutzschalter mit Auslösecharakteristik "K"

nach EN 60898-1 (VDE 0641-11), EN 60947-2 (VDE 0660-101), IEC 60898 und IEC 60947-2

Wechselspannungsmagnet, 50 Hz	Unterer Bemessungsstrom I_1 in A	Oberer Bemessungsstrom I_2 in A
W24	2,30	3,60
W42	1,45	1,92
W48	1,15	1,92
W100	0,64	0,90
W110	0,60	0,90
W115	0,52	0,90
W127	0,48	0,60
W200	0,33	0,60
W220	0,31	0,60
W230	0,26	0,36
W240	0,26	0,36

Wechselspannungsmagnet, 60 Hz	Unterer Bemessungsstrom I_1 in A	Oberer Bemessungsstrom I_2 in A
W24	1,73	2,40
W42	1,13	1,92
W48	1,09	1,92
W100	0,58	0,90
W110	0,52	0,90
W115	0,43	0,90
W127	0,37	0,60
W200	0,30	0,60
W220	0,26	0,36
W230	0,20	0,36
W240	0,22	0,36

RD 27 506/02.03

Ersetzt: 08.97 und 12.02

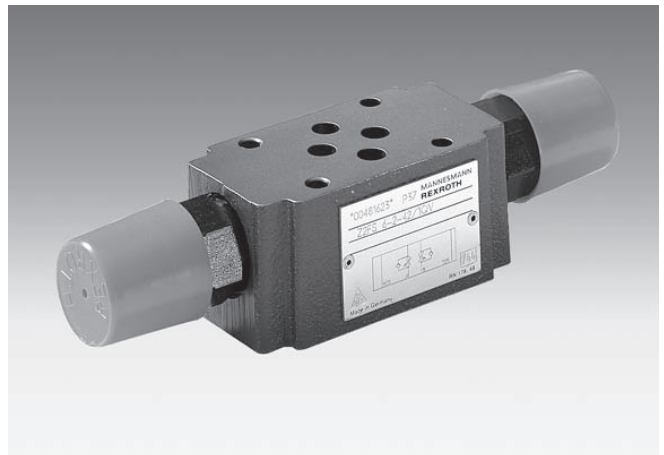
**Zwillings-Drosselrückschlagventil
Typ Z2FS 6**

Nenngröße 6

Serie 4X

Maximaler Betriebsdruck 315 bar

Maximaler Volumenstrom 80 L/min



H/A 5556/96

Typ Z2FS 6 –2–4X/...

Inhaltsübersicht

Inhalt	Seite
Merkmale	1
Bestellangaben	2
Vorzugstypen	2
Symbole	2
Funktion, Schnitt	3
Technische Daten	3
Kennlinien	4
Geräteabmessungen	5

Merkmale

- Zwischenplattenventil
- Lochbild nach DIN 24 340 Form A, **ohne** Fixierbohrung (Standard)
- Lochbild nach ISO 4401 und CETOP–RP 121 H, **mit** Fixierbohrung, (Bestellbezeichnung .../60 am Ende der Ventiltype)
- 4 Verstellelemente:
 - Einstellschraube mit Kontermutter und Schutzkappe
 - abschließbarer Drehknopf mit Skala
 - Spindel mit Innensechskant und Skala
 - Drehknopf mit Skala
- zur Haupt- oder Steuer-Volumenstrombegrenzung von 2 Verbraucheranschlüssen
- für Zulauf- oder Ablaufdrosselung



© 2003
by Bosch Rexroth AG, Industrial Hydraulics, D-97813 Lohr am Main

Alle Rechte vorbehalten. Kein Teil des Werkes darf in irgendeiner Form ohne vorherige schriftliche Zustimmung von Bosch Rexroth AG, Industrial Hydraulics reproduziert oder unter Verwendung elektronischer Systeme gespeichert, verarbeitet, vervielfältigt oder verbreitet werden. Zuwiderhandlungen verpflichten zu Schadensersatz.

Bestellangaben

Z2FS	6		- 4X/	V		*
-------------	----------	--	--------------	----------	--	----------

Zwillings-Drosselrückschlagventil

Nenngröße 6 = 6

Drosselrückschlagventil Seite A und B = - ¹⁾

Drosselrückschlagventil Seite A = A

Drosselrückschlagventil Seite B = B

Verstellelement

Einstellschraube mit Kontermutter und Schutzkappe = 2

abschließbarer Drehknopf mit Skala = 3 ²⁾

Spindel mit Innensechskant und Skala = 5

Drehknopf mit Skala = 7

weitere Angaben im Klartext

ohne Bez. = **ohne** Fixierbohrung

/60 ³⁾ = **mit** Fixierbohrung

V = FKM-Dichtungen
(andere Dichtungen auf Anfrage)

⚠ Achtung!
Dichtungstauglichkeit der verwendeten
Druckflüssigkeit beachten!

1Q = mit Feineinstellung

2Q = Standardausführung

4X = Serie 40 bis 49
(40 bis 49: unveränderte Einbau- und Anschlussmaße)

- 1) gleiche Verstellelemente auf den Seiten A und B
- 2) H-Schlüssel mit der Material-Nr. **R900008158** ist im Lieferumfang enthalten
- 3) Fixierstift 3 x 8 DIN EN ISO 8752, Material-Nr. **R900005694** (separate Bestellung)

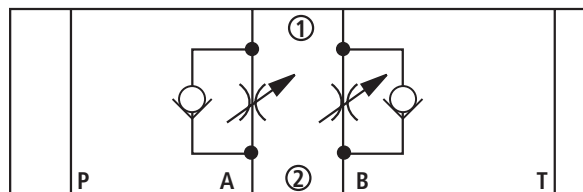
Vorzugstypen (kurzfristig lieferbar)

Typ	Material-Nummer
Z2FS 6 A2-4X/1QV	R900581526
Z2FS 6 A2-4X/2QV	R900439389
Z2FS 6 B2-4X/1QV	R900438760
Z2FS 6 B2-4X/2QV	R900440565
Z2FS 6-2-4X/1QV	R900481623
Z2FS 6-2-4X/2QV	R900481624

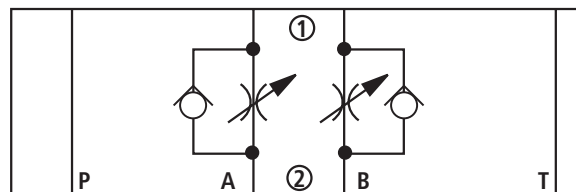
Weitere Vorzugstypen und Standardgeräte sind in der EPS (Standard Preisliste) ausgewiesen.

Symbole (① = geräteseitig, ② = plattenseitig)

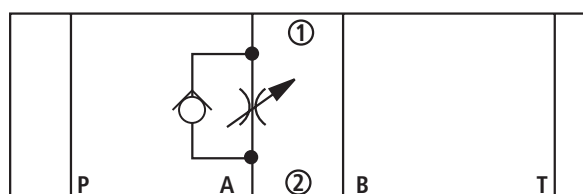
Z2FS 6 -.. -4X/.. (Zulaufdrosselung)



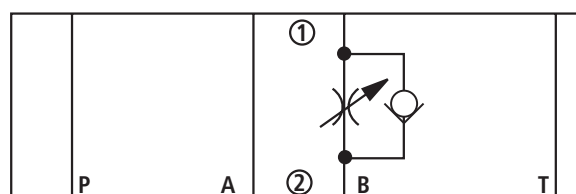
Z2FS 6 -.. -4X/.. (Ablaufdrosselung)



Z2FS 6 A.. -4X/.. (Ablaufdrosselung)



Z2FS 6 B ..-4X/.. (Zulaufdrosselung)



Funktion, Schnitt

Ventile des Typs Z2FS 6 sind Zwillings-Drosselrückschlagventile in Zwischenplatten-Bauweise.

Sie dienen zur Haupt- oder Steuer-Volumenstrombegrenzung von einem oder zwei Verbraucheranschlüssen.

Zwei symmetrisch zueinander angeordnete Drosselrückschlagventile begrenzen Durchflüsse in der einen Richtung und gestatten in der Gegenrichtung freien Rücklauf.

Bei Zulaufdrosselung gelangt die Druckflüssigkeit durch den Kanal A1 über Drosselstelle (1), die durch den Ventilsitz (2) und den Drosselkolben (3) gebildet wird, zum Verbraucher A2. Der Drosselkolben (3) ist über die Einstellschraube (4) axial verstellbar und ermöglicht dadurch ein Einstellen der Drosselstelle (1).

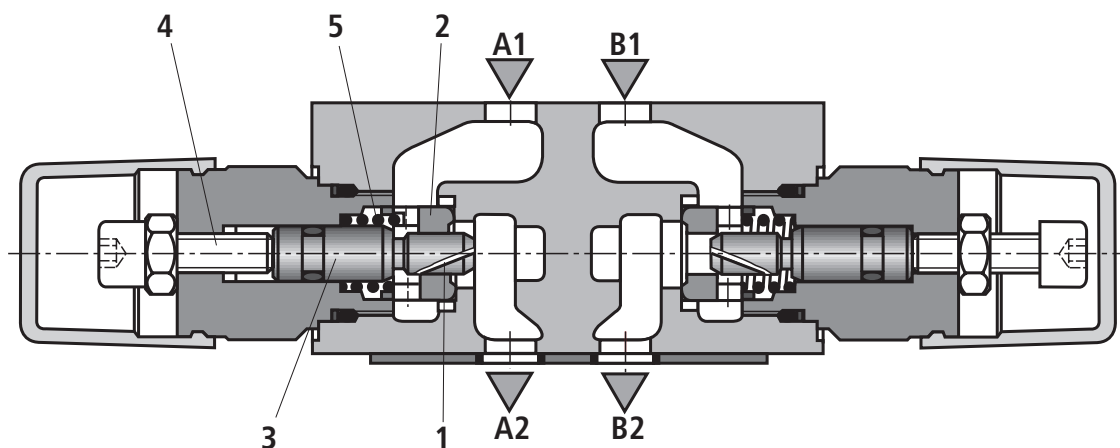
Die vom Verbraucher A2 zurückfließende Druckflüssigkeit verschiebt den Ventilsitz (2) gegen die Feder (5) in Richtung Drosselkolben (3) und ermöglicht dadurch den ungehinderten Durchfluss als Rückschlagventil. Je nach Einbaulage kann der Drosseleffekt im Zulauf oder im Ablauf erfolgen.

Haupt-Volumenstrombegrenzung (Ausführung ..2Q..)

Zur Änderung der Geschwindigkeit eines Verbrauchers (Haupt-Volumenstrombegrenzung) wird das Zwillings-Drosselrückschlagventil zwischen dem Wegeventil und der Anschlussplatte eingebaut.

Steuer-Volumenstrombegrenzung (Ausführung ..1Q..)

Bei vorgesteuerten Wegeventilen kann das Zwillings-Drosselrückschlagventil als Schaltzeiteinstellung (Steuer-Volumenstrombegrenzung) eingesetzt werden. Es wird dann zwischen Vorsteuer- und Hauptventil eingebaut.



Typ Z2FS 6 –2–4X/... (Zulaufdrosselung)

Technische Daten (Bei Geräteeinsatz außerhalb der angegebenen Werte bitte anfragen!)

allgemein

Einbaulage		beliebig
Umgebungstemperaturbereich	°C	– 20 bis + 80
Masse	kg	ca. 0,8

hydraulisch

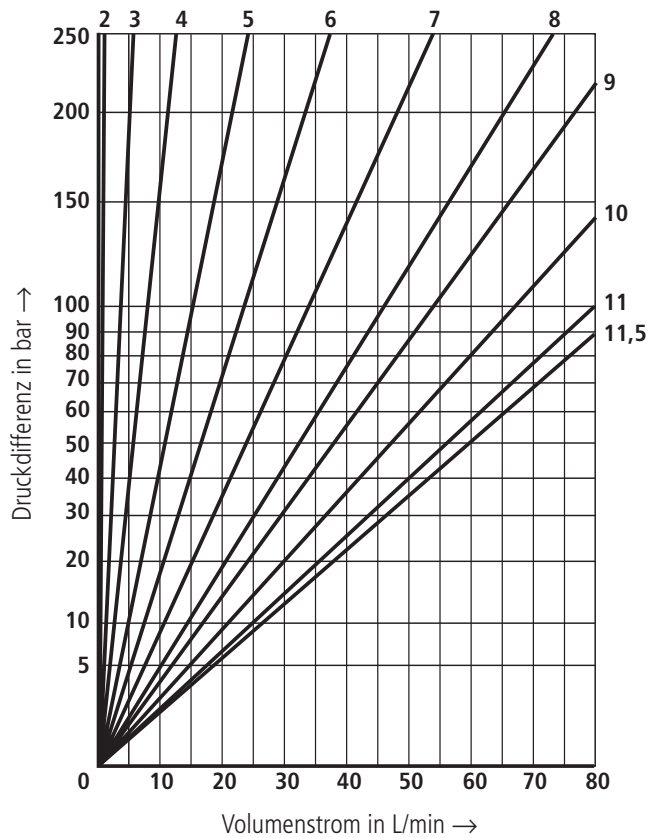
Maximaler Betriebsdruck	bar	315
Maximaler Volumenstrom	L/min	80
Druckflüssigkeit		Mineralöl (HL, HLP) nach DIN 51 524; Biologisch schnell abbaubare Druckflüssigkeiten nach VDMA 24 568 (siehe auch RD 90 221); HETG (Rapsöl); HEPG (Polyglykole); HEES (Synthetische Ester); andere Druckflüssigkeiten auf Anfrage
Druckflüssigkeitstemperaturbereich	°C	– 20 bis + 80
Viskositätsbereich	mm ² /s	10 bis 800
Reinheitsklasse nach ISO-Code		maximal zulässiger Verschmutzungsgrad der Druckflüssigkeit nach ISO 4406 (C) Klasse 20/18/15 ¹⁾

¹⁾ Die für die Komponenten angegebenen Reinheitsklassen müssen in Hydrauliksystemen eingehalten werden. Eine wirksame Filtration verhindert Störungen und erhöht gleichzeitig die Lebensdauer der Komponenten.
Zur Auswahl der Filter siehe Katalogblätter RD 50 070, RD 50 076 und RD 50 081.

Kennlinien (gemessen mit HLP46, $\vartheta_{01} = 40\text{ °C} \pm 5\text{ °C}$)

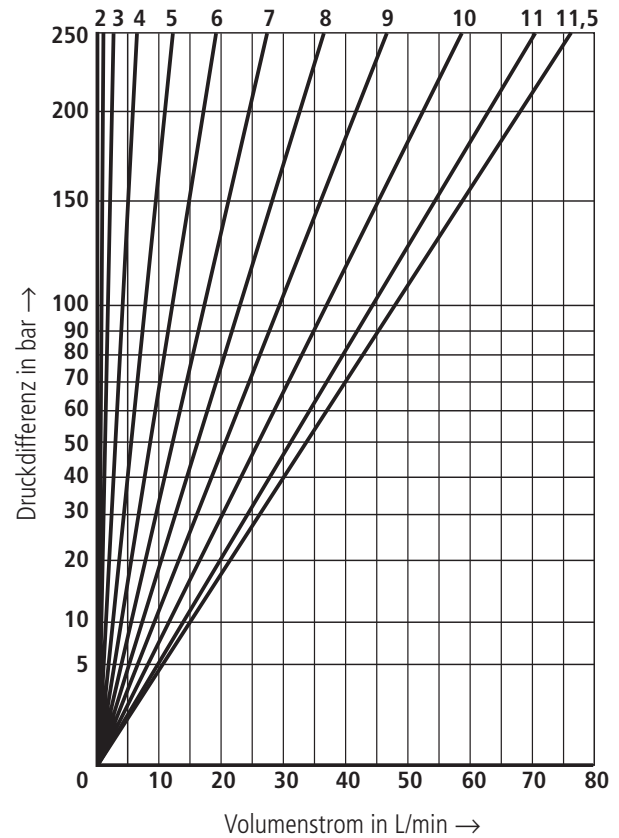
$\Delta p-q_v$ -Kennlinien – Typ Z2FS 6 ..-4X/2QV

Drosselstellung in Umdrehungen

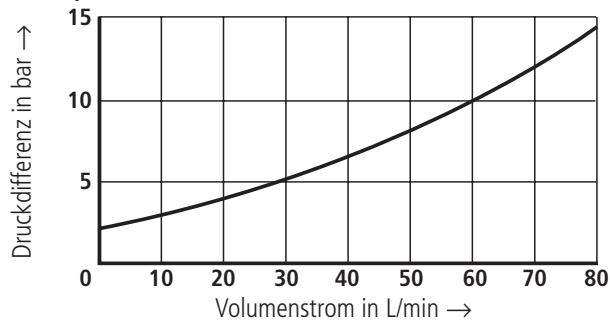


$\Delta p-q_v$ -Kennlinien – Typ Z2FS 6 ..-4X/1QV

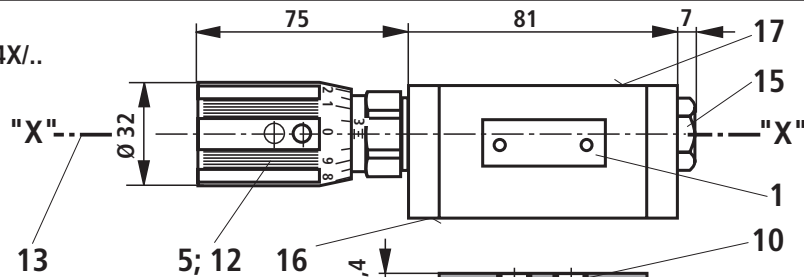
Drosselstellung in Umdrehungen



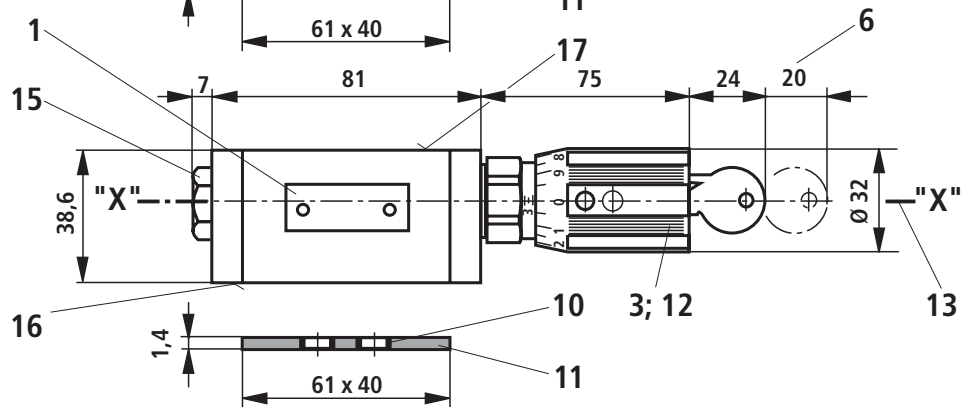
$\Delta p-q_v$ -Kennlinien über Rückschlagventil (Drossel geschlossen)



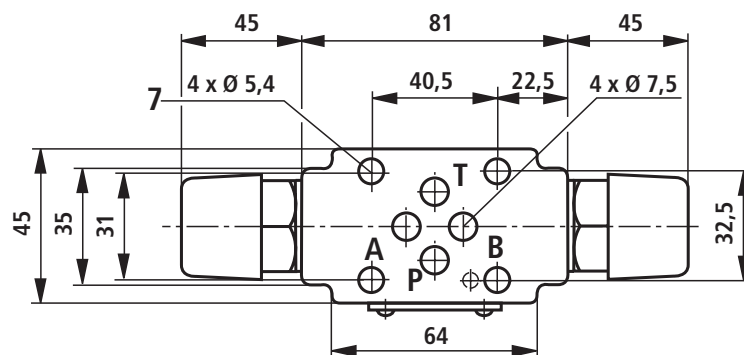
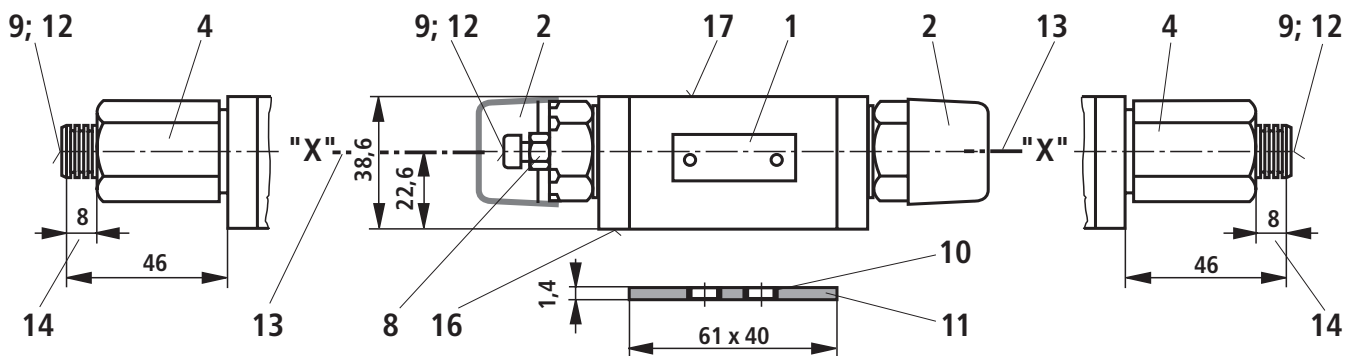
Typ Z2FS 6 A..-4X/..



Typ Z2FS 6 B..-4X/..



Typ Z2FS 6 ..-4X/..



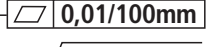
- 1 Typenschild
- 2 Verstellelement "2"
- 3 Verstellelement "3"
- 4 Verstellelement "5"
- 5 Verstellelement "7"
- 6 Platzbedarf zum Entfernen des Schlüssels
- 7 Ventilbefestigungsbohrungen
- 8 Kontermutter SW 10
- 9 Einstellschraube/Spindel zum Verändern des Durchflussquerschnittes (Innensechskant SW 5)
- 10 Gleiche Dichtringe für Anschlüsse A, B, P und T
- 11 Dichtringplatte
- 12 bei allen Verstellungen:
Links-drehung = größerer Volumenstrom
Rechts-drehung = kleinerer Volumenstrom

- 13 Der Umbau von Zulauf- in Ablaufdrosselung erfolgt durch Drehen des Gerätes um die Achse „X“ – „X“
- 14 Hub
- 15 Verschlusschraube SW22

Ventilbefestigungsschrauben
M5 DIN 912-10.9,
Anzugsmoment $M_A = 8,9 \text{ Nm}$,
müssen gesondert bestellt werden

- 16 Lochbild nach ISO 4401 und CETOP-RP 121 H mit Fixierbohrung Ø 3 x 5 mm tief für Fixierstift Ø 3 x 8 DIN EN ISO 8752, Material-Nr. **R900005694** (separate Bestellung)

- 17 Lochbild nach ISO 4401 und CETOP-RP 121 H mit Fixierbohrung Ø 4 x 4 mm tief

 0,01/100mm
 R max 4
Erforderliche Oberflächengüte des Gegenstückes

Bosch Rexroth AG
Industrial Hydraulics

D-97813 Lohr am Main
Zum Eisengießer 1 • D-97816 Lohr am Main
Telefon 0 93 52 / 18-0
Telefax 0 93 52 / 18-23 58 • Telex 6 89 418-0
eMail documentation@boschrexroth.de
Internet www.boschrexroth.de

Die angegebenen Daten dienen allein der Produktbeschreibung. Eine Aussage über eine bestimmte Beschaffenheit oder eine Eignung für einen bestimmten Einsatzzweck kann aus unseren Angaben nicht abgeleitet werden. Die Angaben entbinden den Verwender nicht von eigenen Beurteilungen und Prüfungen. Es ist zu beachten, dass unsere Produkte einem natürlichen Verschleiß- und Alterungsprozess unterliegen.

Rückschlagventil, hydraulisch entsperrbar

RD 21548/02.09
Ersetzt: 07.05

1/8

Typ Z2S

Nenngröße 6
Geräteserie 6X
Maximaler Betriebsdruck 315 bar [4568 psi]
Maximaler Volumenstrom 60 l/min [15.8 US gpm]



tb0256

Inhaltsübersicht

Inhalt	Seite
Merkmale	1
Bestellangaben	2
Symbole	3
Funktion, Schnitte	4, 5
Technische Daten	6
Kennlinien	7
Geräteabmessungen	8

Merkmale

- Zwischenplattenventil zum Einsatz in Höhenverkettungen
- Lage der Anschlüsse nach DIN 24340 Form A (**ohne** Fixierbohrung) (Standard)
- Lage der Anschlüsse nach ISO 4401-03-02-0-05 und NFPA T3.5.1 R2-2002 D03 (**mit** Fixierbohrung)
- zur leakagefreien Sperrung von einem oder zwei Verbraucheranschlüssen, wahlweise
- verschiedene Öffnungsdrücke
- Sonderausführungen auf Anfrage
- Ergänzende Dokumentation:
 - Zwischenplatten NG6 siehe RD 48050
 - Druckflüssigkeiten auf Mineralölbasis siehe RD 90220

Informationen zu lieferbaren Ersatzteilen:
www.boschrexroth.com/spc

Bestellangaben

Z2S	6			6X/				*
-----	---	--	--	-----	--	--	--	---

Rückschlagventil, Zwischenplatte

weitere Angaben im Klartext

Nenngröße 6

= 6

leckagefreie Sperrung im Kanal A und B

= -

leckagefreie Sperrung im Kanal A

= A

leckagefreie Sperrung im Kanal B

= B

Öffnungsdruck

1,5 bar [21.7 psi]

= 1

3 bar [43.5 psi]

= 2

6 bar [86.0 psi]

= 3

Geräteserie 60 bis 69

= 6X

(60 bis 69: unveränderte Einbau- und Anschlussmaße)

Oberfläche ohne Korrosionsbeständigkeit ¹⁾

= ohne Bez.

Dichtungswerkstoff

NBR-Dichtungen

= ohne Bez.

FKM-Dichtungen

= V

Hinweis!

Für Auswahl Abhängigkeit der Betriebsparameter (Fluid, Temperatur, etc.) beachten!

Sonderausführung

ohne Bez. = ohne

SO40 = Aufsteuerung durch externen Anschluss G1/4 (nur Ausführung „A“ und „B“)

SO55 = mit Voröffnung

SO60 = Steuerschieber zu Anschluss „T“ entlastet

SO150 = mit Voröffnung und Aufsteuerung aus Kanal „P“
Symbole (Beispiele) siehe Seite 3

ohne Bez. = ohne Fixierbohrung

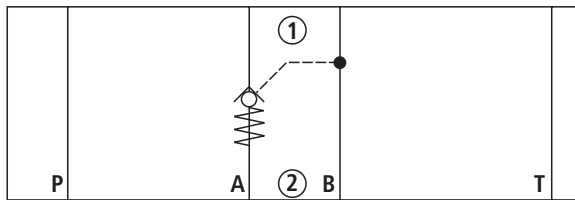
/60 ²⁾ = mit Fixierbohrung/62 = mit Fixierbohrung und Spannstift
ISO 8752-3x8-St

¹⁾ korrosionsbeständige Oberfläche auf Anfrage.

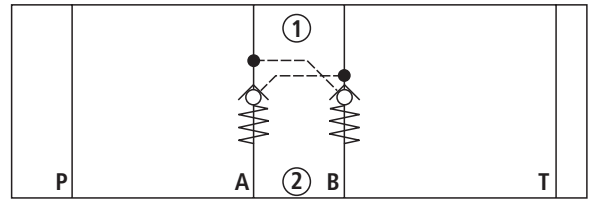
²⁾ Spannstift ISO 8752-3x8-St,
Material-Nr. **R900005694** (separate Bestellung)

Symbole (① = geräteseitig, ② = plattenseitig)

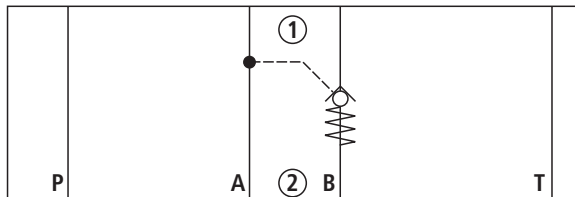
Typ Z2S 6 A...



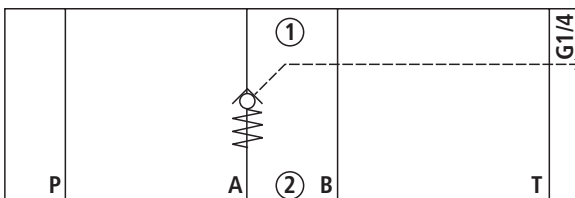
Typ Z2S 6 –... und Z2S 6 –...SO55



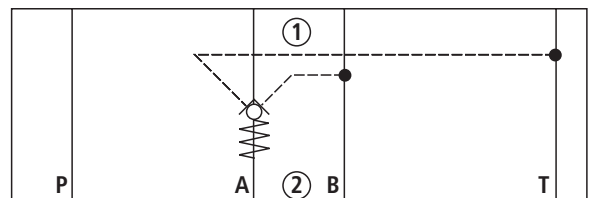
Typ Z2S 6 B...



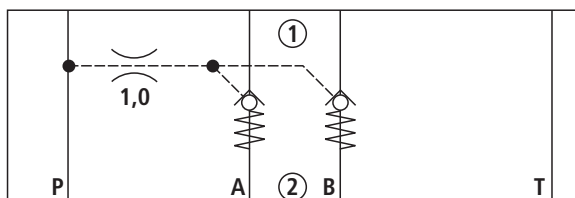
Typ Z2S 6 A...SO40



Typ Z2S 6 A...SO60



Typ Z2S 6 –...SO150



Funktion, Schnitte, Schaltungsbeispiel

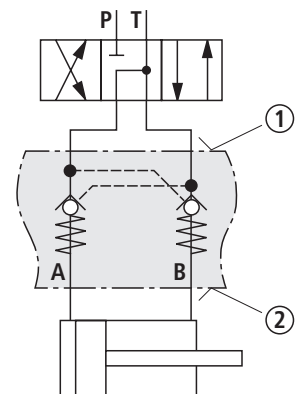
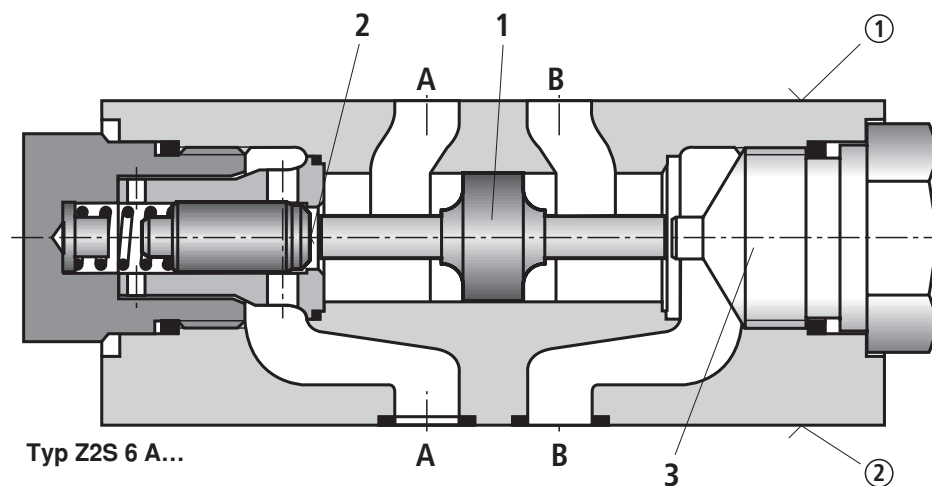
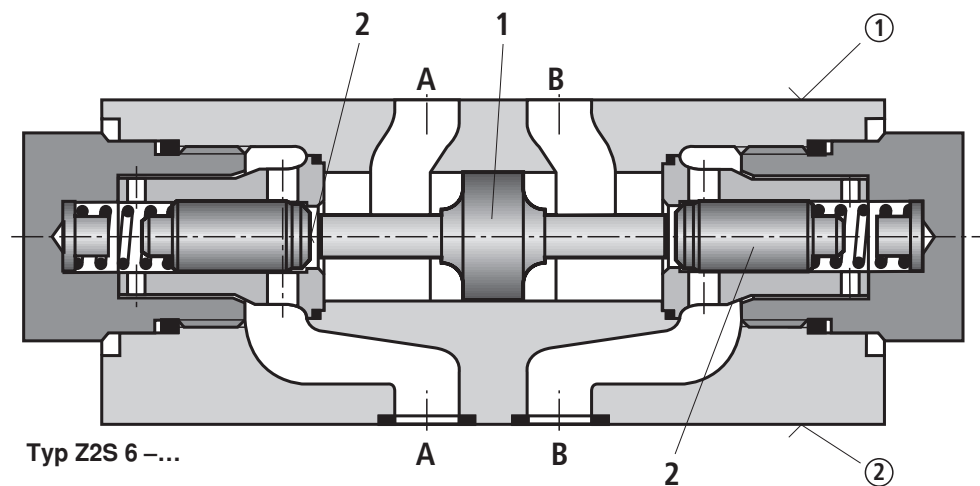
Das Sperrventil Typ Z2S ist ein entsperbares Rückschlagventil in Zwischenplatten-Bauweise.

Es dient zur leakagefreien Sperrung von einem oder zwei Verbraucheranschlüssen, auch bei längeren Stillstandzeiten.

In Richtung A^① nach A^② oder B^① nach B^② ist freier Volumenstrom gegeben, in Gegenrichtung ist der Volumenstrom gesperrt.

Wird das Ventil beispielsweise in Richtung A^① nach A^② durchströmt, wird der Steuerschieber (1) in Richtung B-Seite verschoben und stößt den Kegel (2) von seinem Sitz. Jetzt kann Druckflüssigkeit von B^② nach B^① fließen.

Um ein sicheres Schließen der Kegel (2) zu ermöglichen, ist der Steuerschieber (1) hydraulisch zu entlasten (siehe Schaltungsbeispiel).



① = geräteseitig

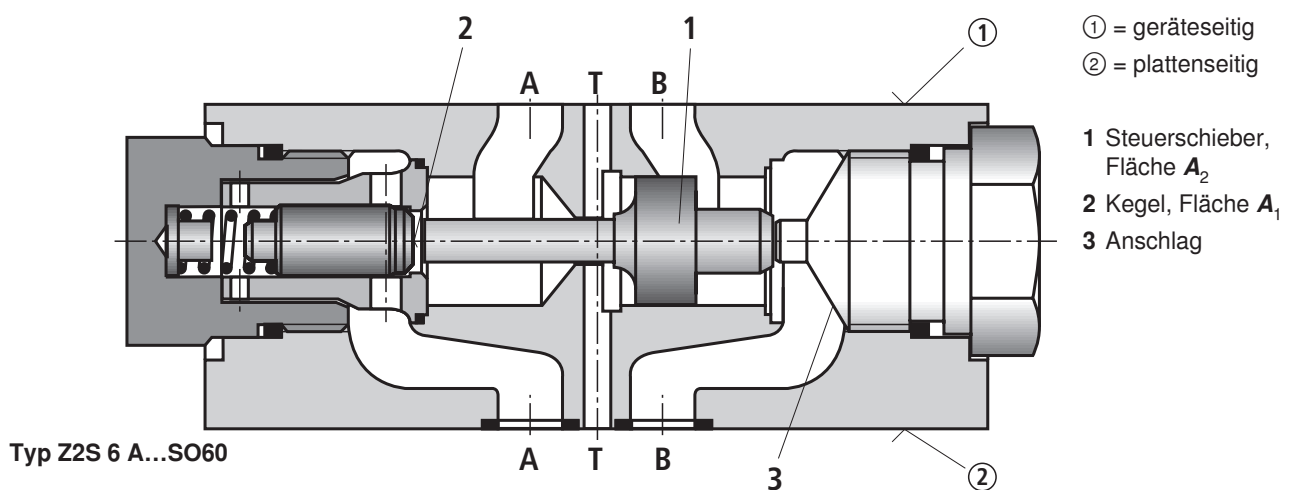
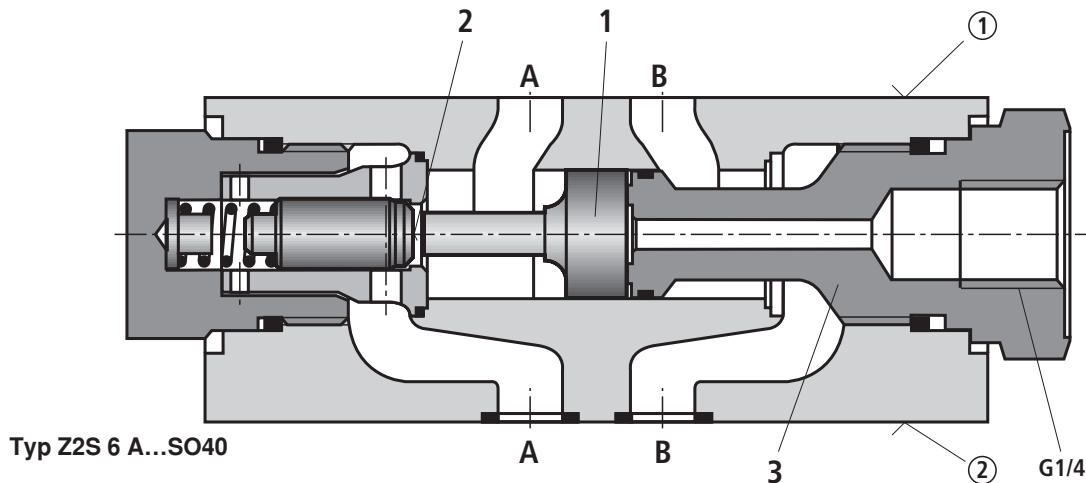
② = plattenseitig

1 Steuerschieber,
Fläche A_2

2 Kegel, Fläche A_1

3 Anschlag

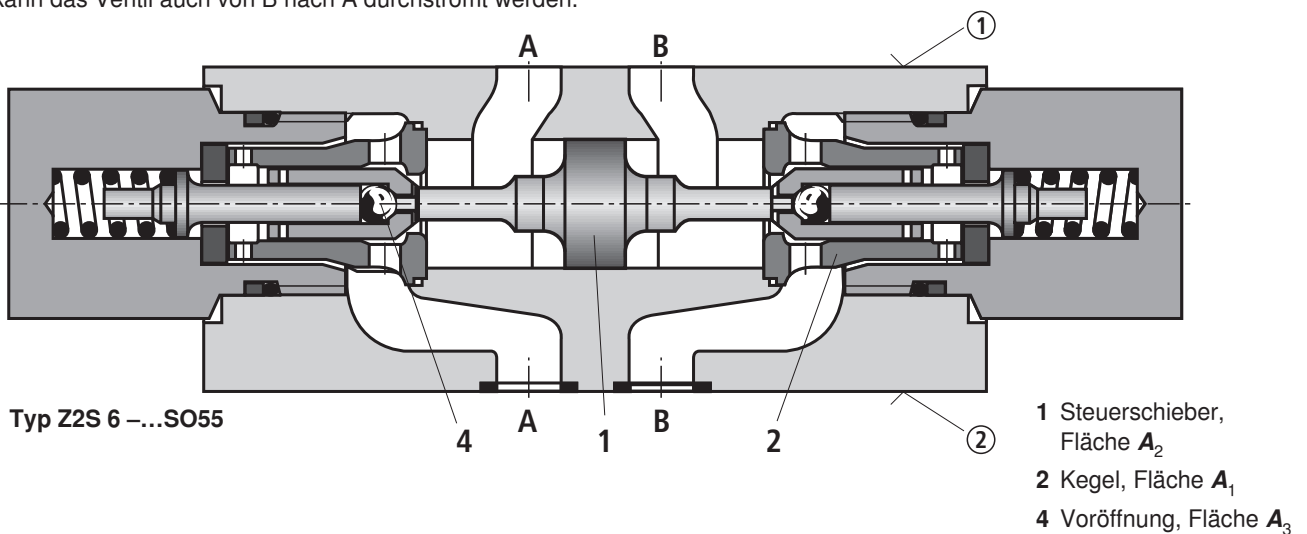
Funktion, Schnitte



Ausführung „SO55“ (mit Voröffnung)

Dieses Ventil ist mit einer zusätzlichen Voröffnung versehen. Durch Druckbeaufschlagung am Anschluss X wird der Steuerschieber (1) nach rechts verschoben. Dabei wird zuerst die Kugel (5) und dann der Kegel (2) vom Sitz gedrückt. Jetzt kann das Ventil auch von B nach A durchströmt werden.

Durch die Voröffnung erfolgt ein gedämpftes Entspannen der unter Druck stehenden Flüssigkeit. Dadurch werden mögliche Schaltschläge vermieden.



Technische Daten (Bei Geräteeinsatz außerhalb der angegebenen Werte bitte anfragen!)**allgemein**

Masse	kg [lbs]	ca. 0,8 [1.76]
Einbaulage		beliebig
Umgebungstemperaturbereich	°C [°F]	–30 bis +80 [–22 bis +176] (NBR-Dichtungen) –20 bis +80 [–4 bis +176] (FKM-Dichtungen)

hydraulisch

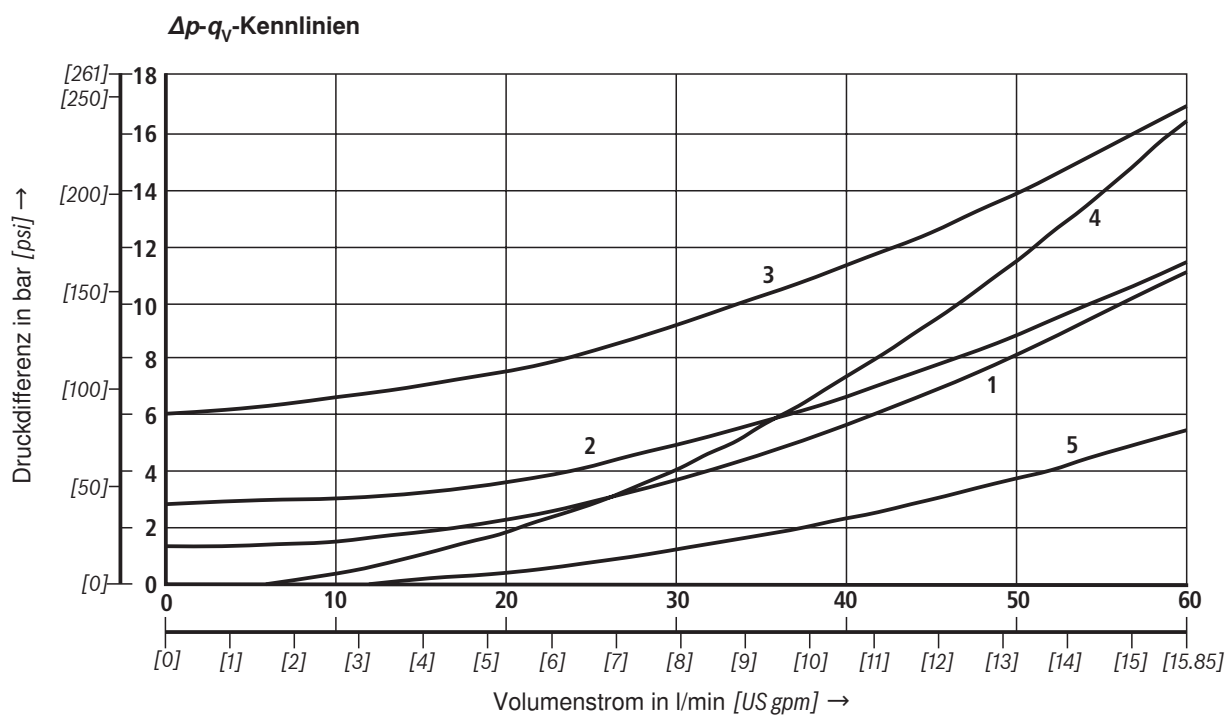
Maximaler Betriebsdruck	bar [psi]	315 [4568]
Öffnungsdruck in freier Richtung		siehe Kennlinien Seite 6
Maximaler Volumenstrom	l/min [US gpm]	60 [15.8]
Volumenstromrichtung		siehe Symbole Seite 3
Druckflüssigkeit		Mineralöl (HL, HLP) nach DIN 51524 ¹⁾ ; andere Druckflüssigkeiten auf Anfrage
Druckflüssigkeitstemperaturbereich	°C [°F]	–30 bis +80 [–22 bis +176] (NBR-Dichtungen) –20 bis +80 [–4 bis +176] (FKM-Dichtungen)
Viskositätsbereich	mm ² /s [SUS]	2,8 bis 500 [35 bis 2320]
Maximal zul. Verschmutzungsgrad der Druckflüssigkeit Reinheitsklasse nach ISO 4406 (c)		Klasse 20/18/15 ²⁾
Flächenverhältnis	– ohne Voröffnung	$A_1/A_2 \sim 1/3,5$ (siehe Schnittzeichnung Seite 4)
	– mit Voröffnung	$A_3/A_2 \sim 1/12,5$ (siehe Schnittzeichnung Seite 4)

¹⁾ geeignet für NBR- und FKM-Dichtungen

²⁾ Die für die Komponenten angegebenen Reinheitsklassen müssen in Hydrauliksystemen eingehalten werden. Eine wirksame Filtration verhindert Störungen und erhöht gleichzeitig die Lebensdauer der Komponenten.

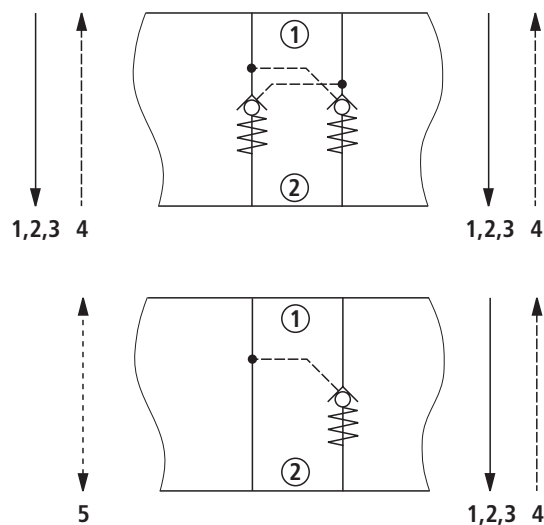
Zur Auswahl der Filter siehe Datenblätter RD 50070, RD 50076, RD 50081, RD 50086, RD 50087 und RD 50088.

Kennlinien (gemessen mit HLP46, $\vartheta_{\text{Öl}} = 40 \text{ °C} \pm 5 \text{ °C}$ [$104 \text{ °F} \pm 9 \text{ °F}$])

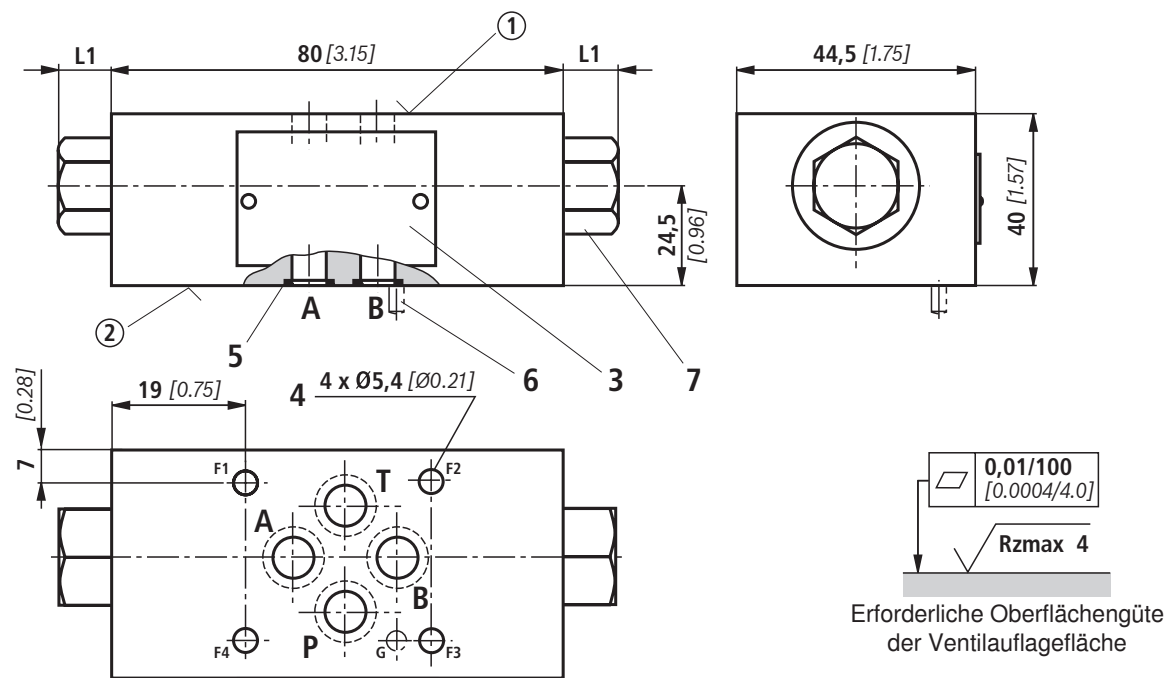


Öffnungsdruck:

- 1 1,5 bar [21.7 psi]
- 2 3 bar [43.5 psi]
- 3 6 bar [87.0 psi]
- 4 Rückschlagventil über Kolben aufgesteuert
- 5 freier Volumenstrom (ohne Rückschlagventil-Einsatz), Ausführung "A" und "B"



Geräteabmessungen (Maßangaben in mm)



L1 in mm [inch]					
„ohne Bez.“	„SO40“	„SO55“		„SO60“	„SO150“
11 [0.43]	11 [0.43]	11 [0.43]	21,5 ¹⁾ [0.85]	11 [0.43]	21,5 [0.85]

¹⁾ Maximalmaß auf der Seite des Rückschlagventil-Einsatzes

- ① geräteseitig – Lage der Anschlüsse nach DIN 24340 Form A (**ohne** Fixierbohrung), oder ISO 4401-03-02-0-05 (**mit** Fixierbohrung $\varnothing 4 \times 4$ mm tief) und NFPA T3.5.1 R2-2002 D03
- ② plattenseitig – Lage der Anschlüsse nach DIN 24340 Form A (**ohne** Fixierbohrung), oder ISO 4401-03-02-0-05 (**mit** Fixierbohrung für Spannstift ISO 8752-3x8-St; Ausführung „/60“ und „/62“) und NFPA T3.5.1 R2-2002 D03
- 3 Typschild
- 4 Durchgangsbohrung für Ventilbefestigung
- 5 Gleiche Dichtringe für Anschlüsse A, B, P, T
- 6 Spannstift ISO 8752-3x8-St (nur Ausführung „/62“)
- 7 Verschlusschraube SW22, Anziehdrehmoment $M_A = 25^{+5} \text{ Nm}$ [18.4^{+3.7} ft-lbs]

Ventilbefestigungsschrauben (separate Bestellung)

4 Zylinderschrauben ISO 4762 - M5 - 10.9

4 Zylinderschrauben 10-24 UNC

Hinweis!

Die Länge der Ventilbefestigungsschrauben des Zwischenplattenventils (Einschraubtiefe $\geq 10 \text{ mm}$ [0.39 inch]) muss passend zu den unter und über dem Sperrventil montierten Komponenten gewählt werden.

Schraubentyp und Anziehdrehmoment sind, je nach Anwendung, den Gegebenheiten anzupassen.

Bitte fragen Sie Schrauben der benötigten Länge bei Rexroth an.

External Gear Pumps F, N, & G Series

RA 10 097/02.06
Replaces 11.04

1/96

Fixed displacement pumps
Sizes 4.0...63 cm³ (.25...3.84 in³)

Contents

Product Overview	4
Installation	7
Drive Arrangements	8
Multiple Gear Pumps	11
Pumps with Integral Valves	13
F-Series External Gear Pump	
- Ordering Code	14
- Product Index	15
- Drive Shafts	16
- Front Cover	17
- Port Connections	18
- Performance Ratings	19
- SAE O-Ring BOSS - Standard Porting	19
- SAE Porting-Specifications & Dimensions	19
- Performance Curves	20
- Drawings and Charts	23
N-Series External Gear Pump	
- Ordering Code	44
- Product Index	45
- Performance Ratings	46
- SAE O-Ring BOSS - Standard Porting	46
- SAE Porting-Specifications & Dimensions	46
- Performance Curves	47
- Drawings and Charts	49

Contents

G-Series External Gear Pump	
- Ordering Code	68
- Product Index	69
- Performance Ratings	70
- SAE O-Ring BOSS - Standard Porting	70
- SAE Porting-Specifications & Dimensions	70
- Performance Curves	71
- Drawings and Charts	73
Multiple Pump Arrangements	
- Ordering Code	80
- Drawing Index	81
- Drawing and Charts	82
Seal Kits	92
Part Number Index	94

Features

- Displacements of 4cc to 63cc
- Plain bearings for heavy duty applications
- Drive shafts SAE or ISO
- Multiple Pump Assemblies
- Port connections: flange or threaded
- Optimized pressure pulsation, which reduces noise levels and vibration excitation in the system
- Consistent high quality
- Considerably longer life due to reinforced shaft and housing

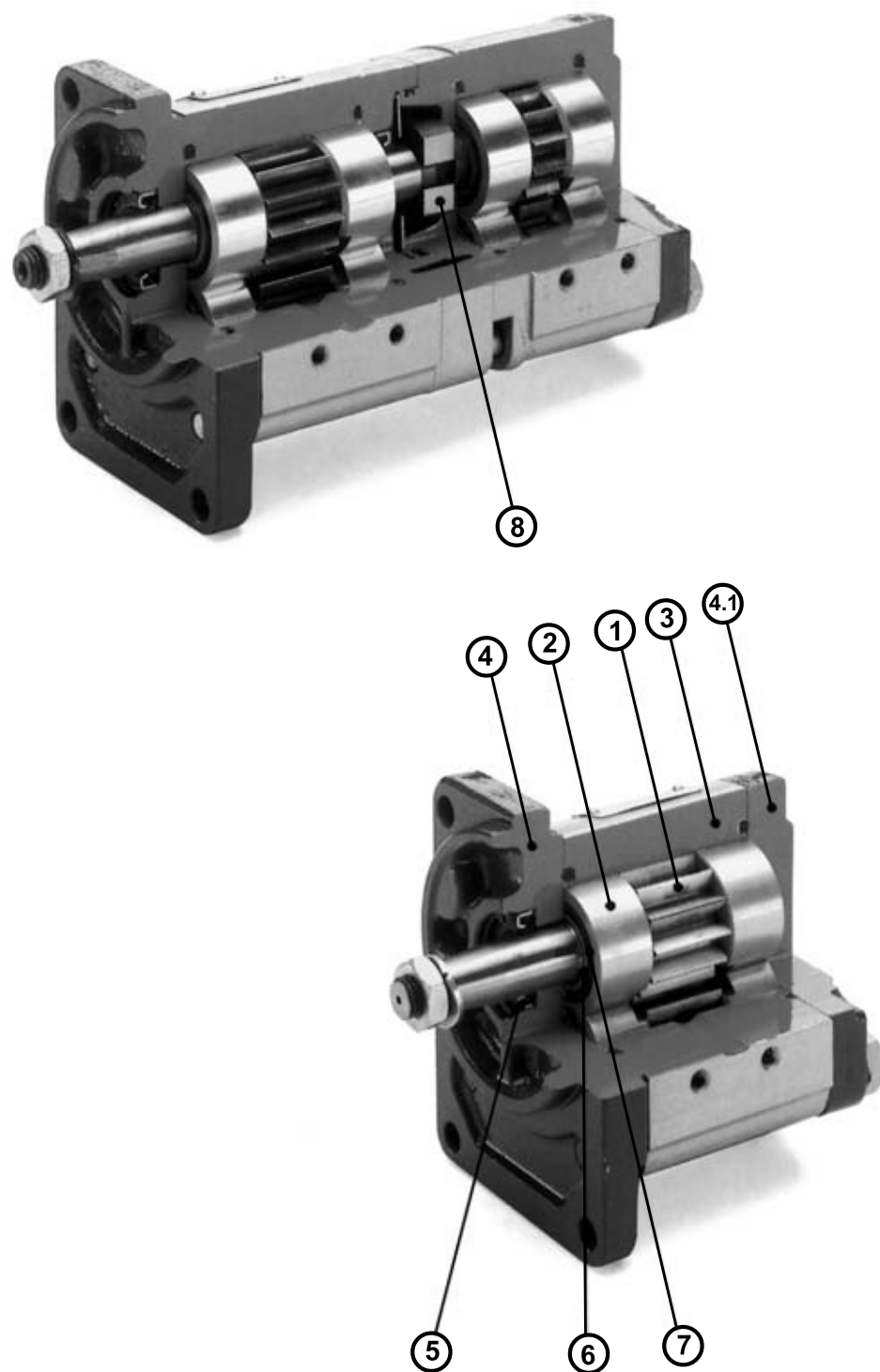


Fig. 1

- ① Gears
- ② Bearings
- ③ Extruded aluminium body
- ④ Covers
- ⑤ Shaft seal
- ⑥ Plain-bearing
- ⑦ Thrust pressure seal
- ⑧ Center coupling

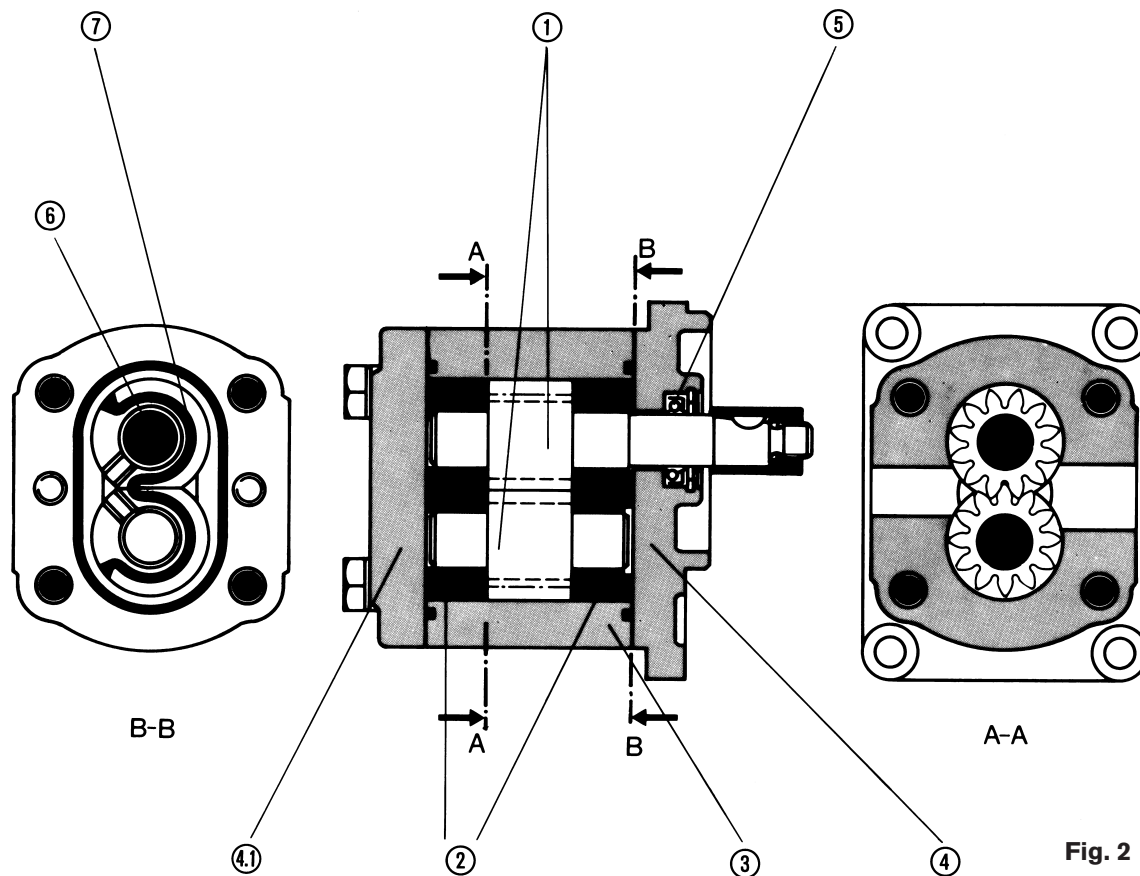


Fig. 2

There is no doubt that the gear-type pump is the most widely used design in hydraulic systems. It is simple in construction, reliable in operation and the most cost-effective way of generating hydraulic pressure.

Bosch Rexroth has been involved with the design, development and manufacture of gear pumps for many decades. Well-proven designs, the use of specially developed materials, constant testing and sophisticated mass production techniques ensure products of the very highest quality. Universal application is assured by a carefully graded range of sizes and a variety of different design options.

Basic design

The pump (see FIG. 2) consists essentially of a pair of gears ① supported in bearings ② and the body ③ with front and rear covers ④ and ④.1. The drive shaft protrudes from the front cover where it is sealed by the shaft seal ⑤.

The bearing forces are absorbed by special bearing-bushings with sufficient elasticity to produce surface contact instead of line contact ⑥. They also assure good operation under emergency conditions especially at low speed.

The gears have 12 teeth and this keeps both flow pulsation and noise emission to a minimum.

The internal sealing is pressure-sensitive, which provides optimum efficiency.

The bearings provide the seal at the ends of the gaps between the teeth, which carry the pressurized oil ②. The sealing zone between the gear teeth and the bearings is controlled by the admission of operating pressure to the rear of the bearings. Special seals ⑦ form the boundary of the zone.

The radial clearance at the tips of the gear teeth is sealed by forcing them against the body.

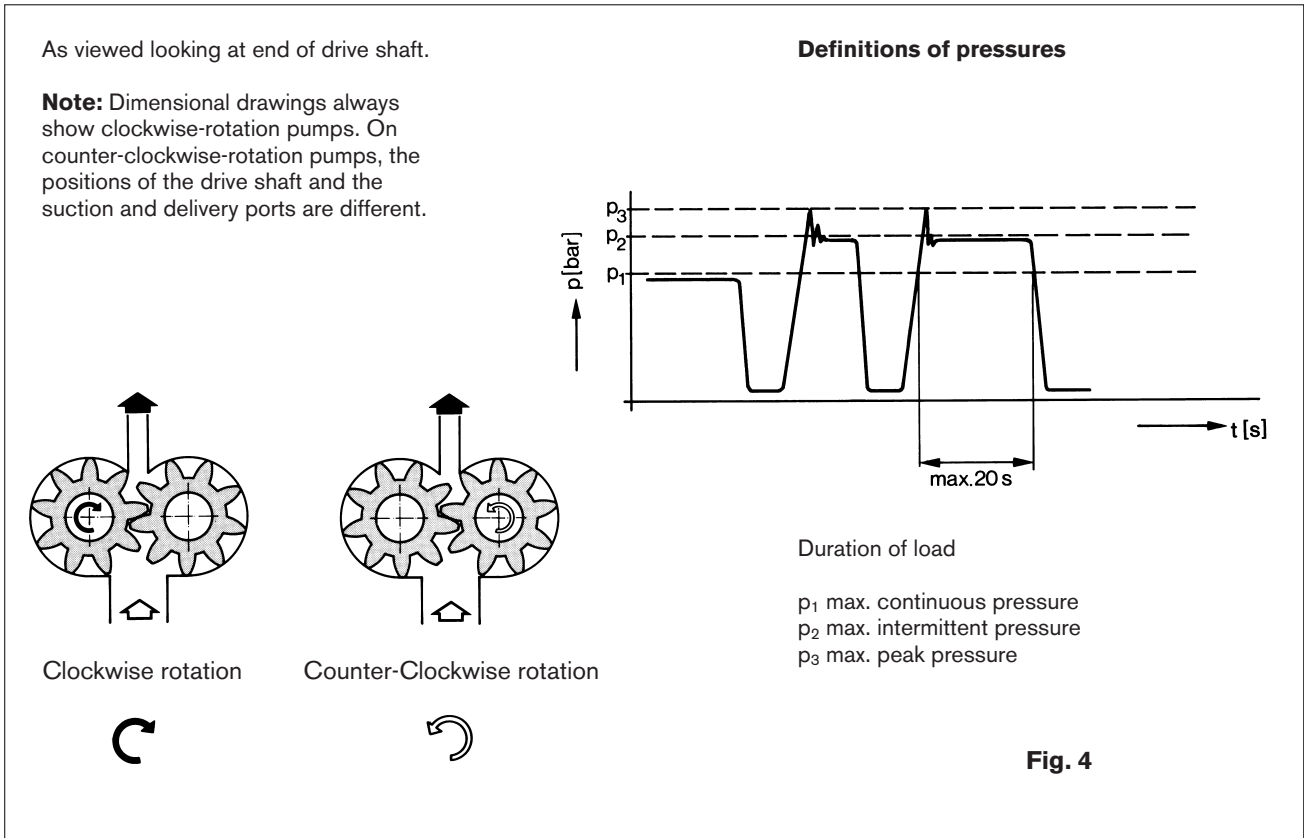
Specifications
& Ratings

General	
Construction	external gear-type pump
Mounting	flange or through-bolting with pilot
Line connections	screw, flange
Direction of rotation (Fig. 4)	clockwise or counter-clockwise The pump may only be driven in the direction indicated.
Mounting position	any
Ambient temperature range	− 15 °C to +60 °C (+5°F to 140°F)
Fluid	mineral oil-based hydraulic fluids to DIN/ISO, other fluids to order
Viscosity – centistokes (mm²/s)	12 ... 800 mm²/s permitted range 20 ... 100 mm²/s recommended range ... 2000 mm²/s max. cold start
Fluid temperature range	− 15 °C to +80 °C (+5°F to 176°F)
Filter **) (further informations see page 27)	contamination class 10 to NAS 1638 obtained with filter $\beta_{25} = 75$

**) During the application of control systems or devices with critical counter-reaction, such as steering and brake valves, the type of filtration selected must be adapted to the sensitivity of these devices/systems.

Safety requirements pertaining to the whole system are to be observed.

In the case of applications with high numbers of load cycles please check.



Design calculations
for pumps

The design calculations for pumps are based on the following parameters:

- V [cm³/rev]

Displacement
- Q [l/min]

Delivery
- p [bar]

Pressure
- M [Nm]

Drive torque
- n [rev/min]

Drive speed
- P [kW]

Drive power

It is also necessary to allow for different efficiencies such as:

- η_v

Volumetric efficiency
- η_{hm}

Hydraulic-mechanical efficiency
- η_t

Overall efficiency

The formulas down in Fig. 5 describe the various relationships. They include correction factors for adapting the parameters to the usual units encountered in practice.

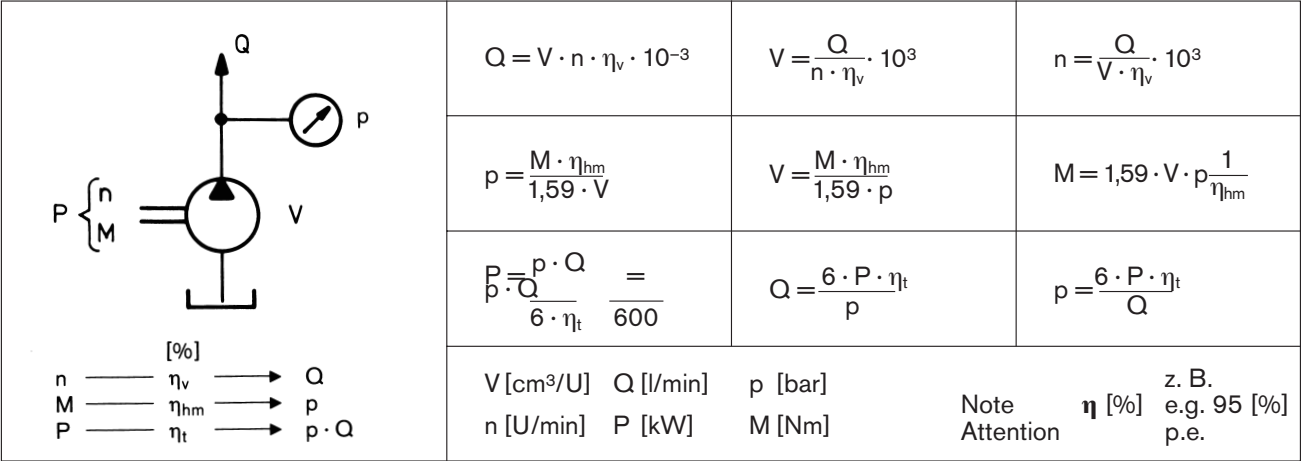


Fig. 5

**Notes on
installation**

**Further information
see “General operating and
Maintenance Instructions”.
Ⓜ 1 987 762 101**

Installation and commissioning

- Fill the pump with fluid before installing.
- Check the direction of rotation.
- Before installing the pump, clean the pipes thoroughly of all dirt, scale, sand, swarf, etc. Welded pipes in particular must be pickled or flushed out.
- Before starting up the pump for the first time, the entire hydraulic system must be thoroughly purged of air.
- Cover the shaft seal when spraying or brush-painting the equipment.
- Pay close attention to the specification, especially speeds, pressures and suction vacuum.

Filter recommendations

By far the largest number of premature failures to gear pumps are due to contaminated fluid.

Since our guarantee does not apply to wear resulting from dirt in the system, we recommend filtering, which reduces the size and concentration of the contamination particles to a permitted minimum.

Operating pressure [bar]	>160	<160
Contamination class NAS 1638	9	10
Contamination class ISO 4406	18/15	19/16
Achieved with filter $\beta_x = 75$	20	25

Fig. 6

Full-flow filtering is always recommended.

The initial contamination of the fluid with which the system is filled must not exceed Class 10 to NAS 1638. Past experience has shown that even brand new fluids often exceed this value. In such cases a filter incorporating a special element will have to be used.

Drive arrangements

1. Flexible couplings

The coupling must not transfer any radial or axial forces to the pump.

The maximum radial runout of shaft pilot is 0.2 mm. Refer to the fitting instructions provided by the coupling manufacturer for details of the maximum permitted shaft misalignment.

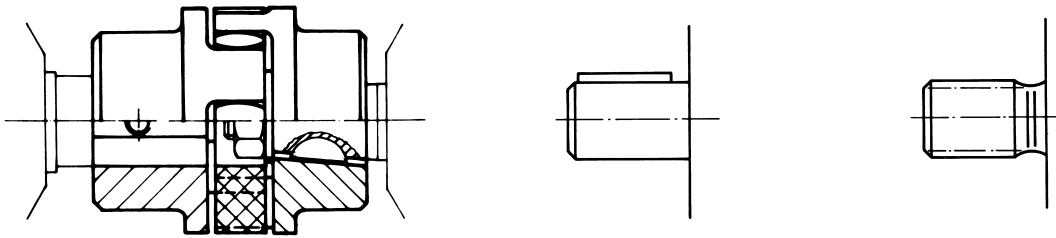
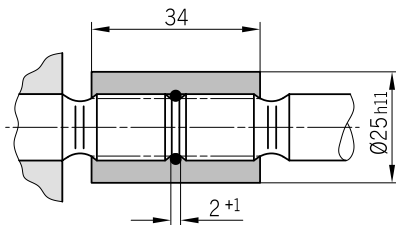


Fig. 7

2. Sleeve couplings

Used on shafts with DIN or SAE splining. **Note:** There must be no radial or axial forces exerted on the pump or sleeve coupling. The sleeve must be free to move axially. The distance between the pump shaft and drive shaft must be 2^{+1} . Oil-bath or oil-mist lubrication is necessary.



Size
B 17 x 14 DIN 5482
 $M_{\max} = 190 \text{ Nm}$

3. Tang Drive (Ref. Fig. 8 & 9)

For the close-coupling of pumps to engines, gearboxes, etc. the pump shaft has a special drive dog which combines with a center coupling ③ (included with the pumps). There is no shaft seal.

The recommended arrangements and dimensions for the drive end and sealing are as follows.

① Drive shaft

Case-hardening steel DIN 17 210

e.g. 20 Mn CrS 5

case-hardened 0.6 deep; HRc 60 ±3.

Surface for sealing ring

ground without rifling $R_t \leq 4\mu\text{m}$

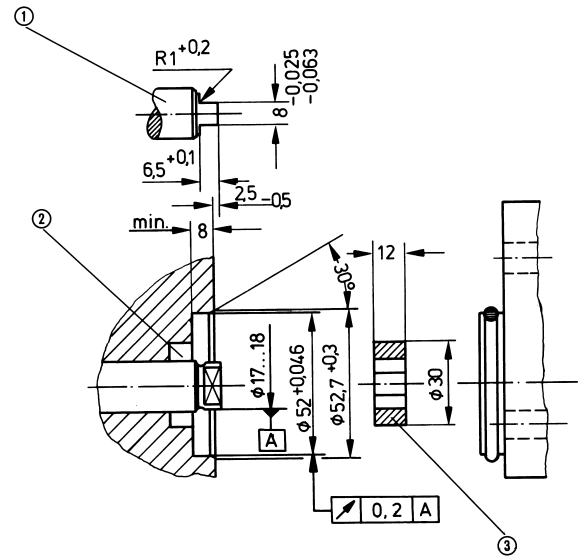
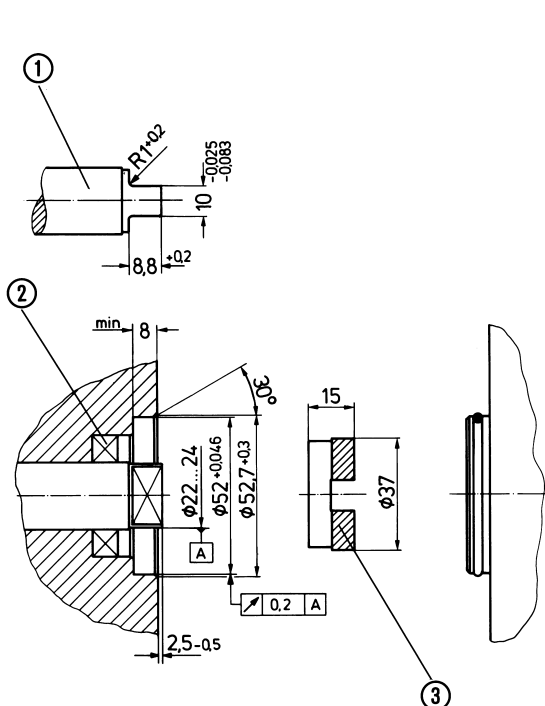
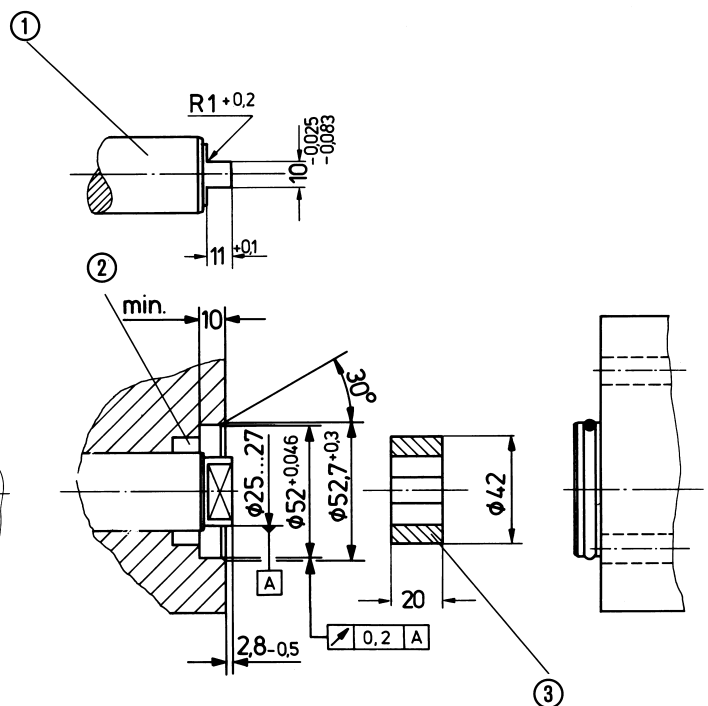
② Radial shaft seal

Rubber-covered seal (see DIN 3760, Type AS or double-lipped ring).

Cut 15° chamfer or fit shaft seal with protective sleeve.

F Series

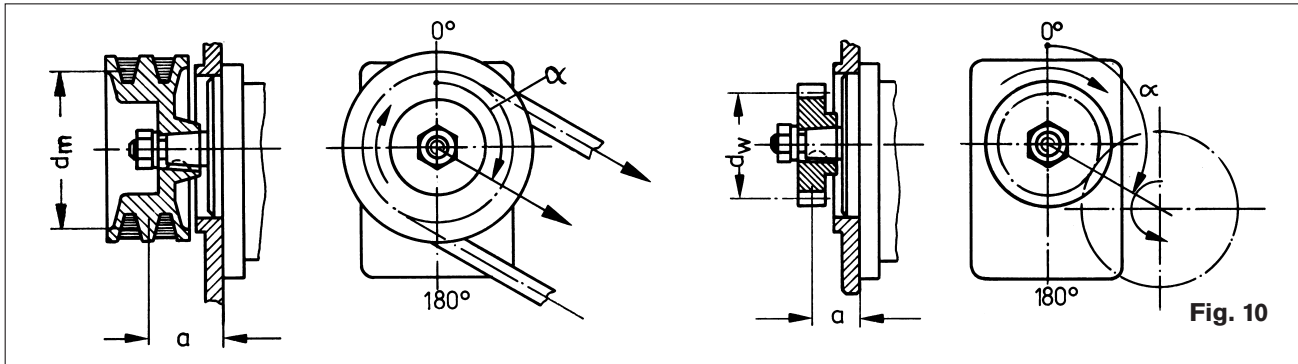
M_{max} [Nm]	V [cm ³ /rev]	p_{max} [bar]
65	16	230
	19	190
	22,5	160

**Fig. 8****N Series****G Series****Fig. 9**

4. V-belts and gearwheels without outrigger bearings

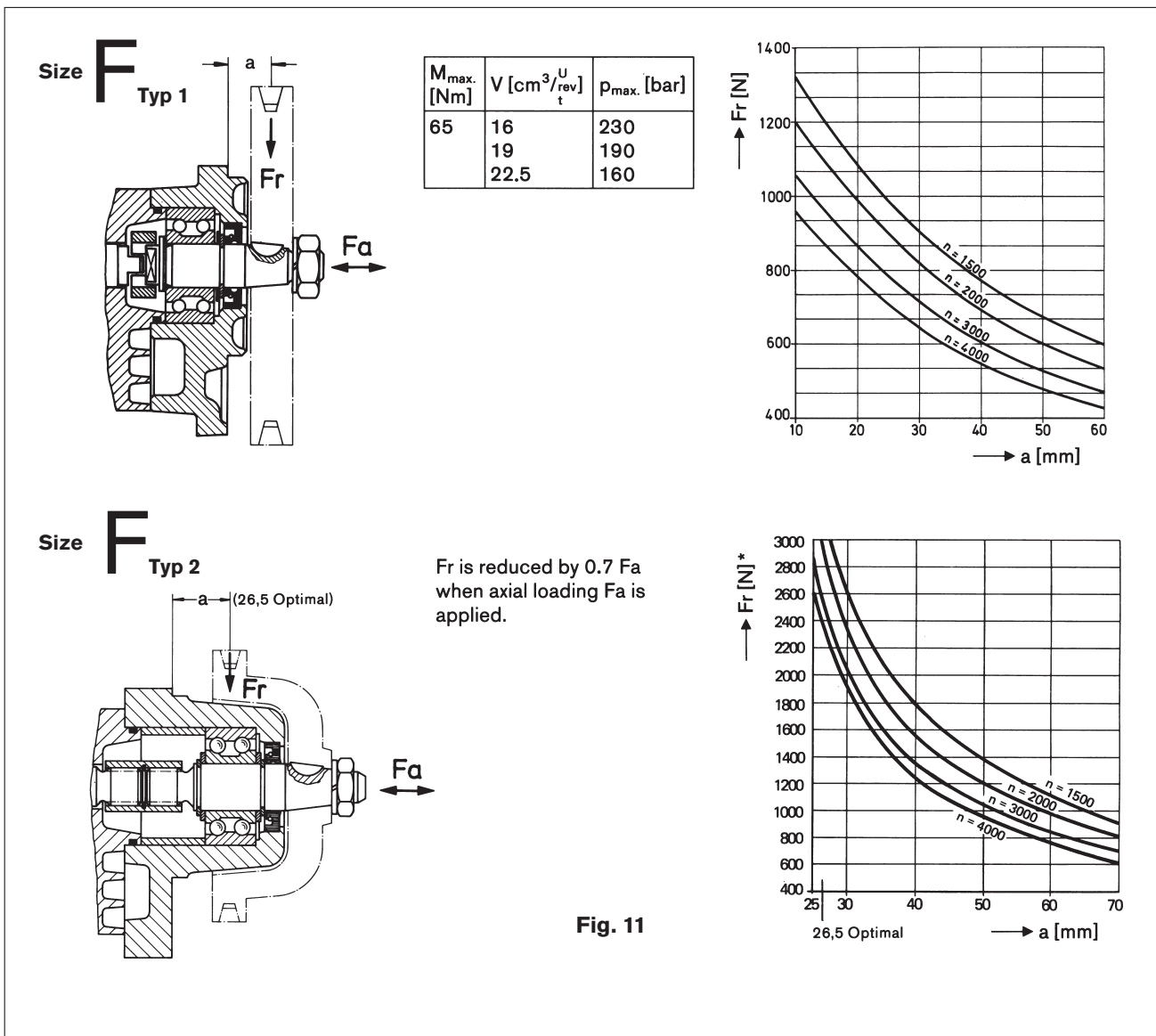
(Ref. Fig. 10)

When proposing to use V-belt or gearwheel drive, please submit details of the application for our comments (especially dimensions a , d_m , d_w and angle α).



5. Outrigger bearings (Ref. Fig. 11)

Outrigger bearings eliminate possible problems when the pumps are driven by V-belts or gearwheels. The diagrams below show the maximum overhung and thrust loads that can be tolerated referred to a bearing life of $L_H = 1000$ hours.



Multiple gear pumps

F & N Series

Ref. Fig. 12

Gear pumps are well-suited to tandem combinations of pumps in which the drive shaft of the first pump is extended to drive a second pump, and sometimes a third pump in the same manner.

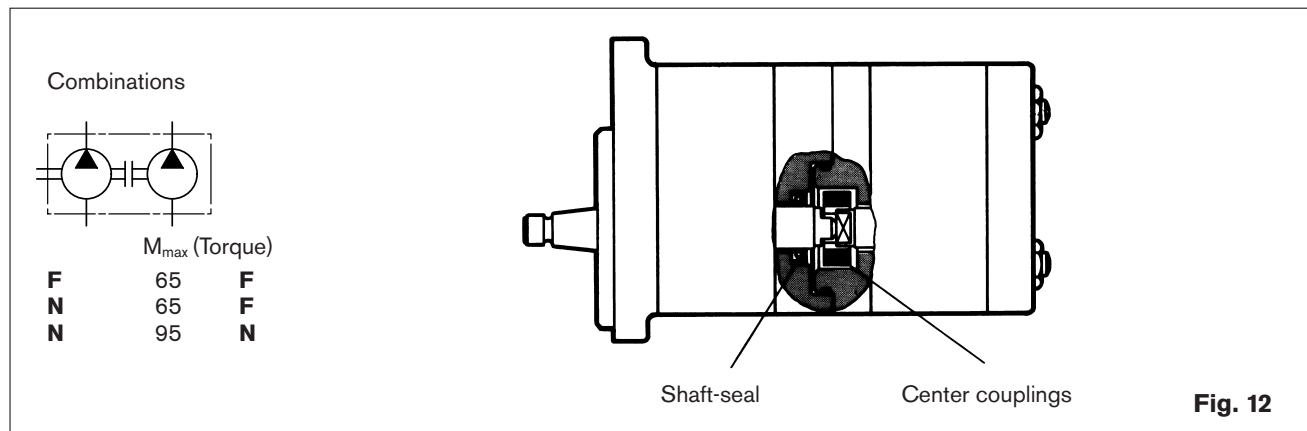
A coupling is fitted between each pair of pumps. In most cases, each pump is isolated from its neighbour, (i. e. the suction and delivery ports are separate).

Specifications: Basically, the specifications for the individual pumps apply, but with certain restrictions:

Max. speed: This is determined by the highest rated pump speed in use.

Pressures: These are restricted by the strength of the drive shaft, the transmissions and the couplings. Appropriate data is given in the dimensional drawings and the graph on the following page.

Multiple Gear Pumps



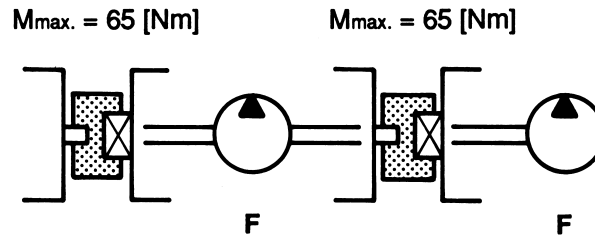
Multiple pump units – Pressure & Torque Ratings

In the case of Size F the center coupling for the second pump can carry a load of up to $M_{\max} = 65 \text{ Nm}$. The pressure restriction for the second pump is as follows:

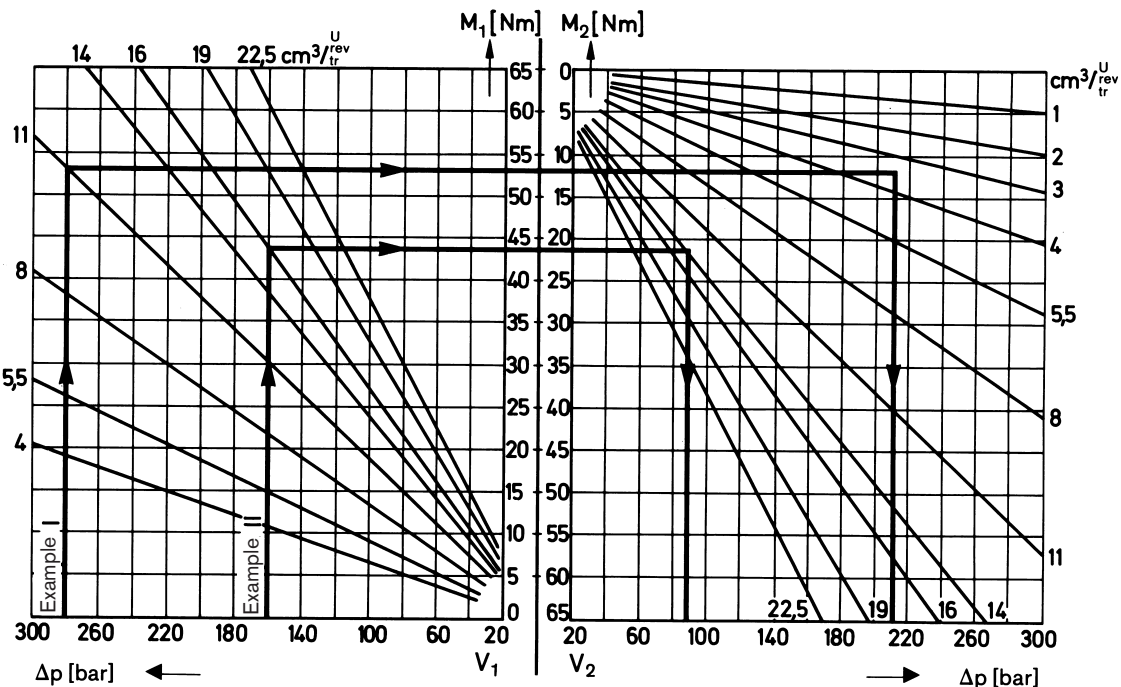
V [cm ³ /rev]	P _{max} [bar]
16	230
19	190
22.5	160

If the first pump is driven through a dog and center coupling or Type 1 outrigger bearing, the pressure restrictions for both pumps are as indicated in the diagram below.

In the case of applications with high numbers of load cycles, please contact the factory.



Reinforced transmissions are available for applications with higher transfer torques and/or torsional vibrations. Customized designs are available on request.



Beispiel, Example, Exemple

Fig. 13

Gear pumps with integral valves



In order to reduce external pipework it is possible to incorporate a flow control valve or pressure relief valve in the end cover of the pump. A typical application of this is in power-assisted steering systems. The pump delivers a constant flow irrespective of the speed at which it is driven. The excess flow is either returned internally to the suction or distributed externally to other items of equipment.

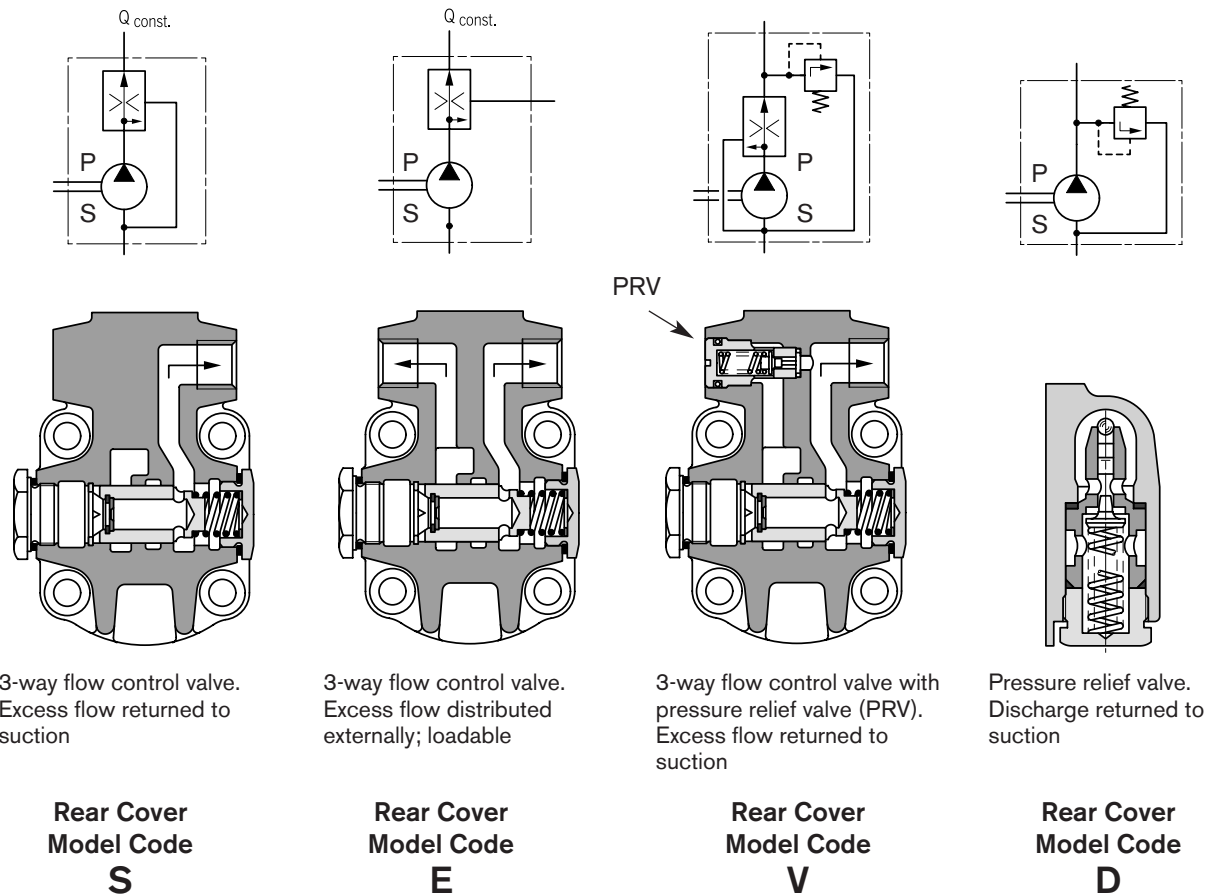


Fig. 14

Ordering Code (F Series Pump)

AZ		P		F - 1□ or 2□ - 016		R		R		R		12 M		B - □□□ □□ - S□□□□					
														PRV(bar)		FCV(l/min)		Special Design*	
Function														EXAMPLE:					
P = Pump														180 bar, 9 l/min = 180 09					
Size (F)														Use XXX if valve not applicable					
.26in ³ (4.1 cm ³) = 004 .35in ³ (5.6 cm ³) = 005 .51in ³ (8.2 cm ³) = 008 .71in ³ (11.3 cm ³) = 011 .89in ³ (14.3 cm ³) = 014 1.03in ³ (16.5 cm ³) = 016 1.22in ³ (19.5 cm ³) = 019 1.43in ³ (22.9 cm ³) = 022 1.59in ³ (25.4 cm ³) = 025 1.78in ³ (28.5 cm ³) = 028														End cover B - Standard A - Rear ports E - FCV, excess flow ext. V - PRV + FCV P - Priority flow control D - Pressure relief valve					
Direction of rotation														Seals					
Right = R Left = L														NBR = M FPM = P NBR, shaft seal in FPM = K					
Drive shafts						Front flange						Line connections							
Matching front flange																			
C	Conical 1:5 (Tapered key)		B	P		B	Square flange Pilot Ø 80 mm			20	Rectangular flange								
S	Conical 1:5 for flange A (Tapered key)		A			R	SAE A 2-bolt			12	Thread (UN-2B) SAE O-ring BOSS								
H	Conical 1:8 (Tapered key)		O			P	Transmission flange Pilot Ø 50 mm			01	BSP Pipe thread ISO 228								
N	Dog (Tang)		M			O	Square flange Pilot Ø 36.47 mm			30	Rectangular flange								
A	Cylindrical (Straight key) ISO Ø 18mm		B			C	SAE B 2-bolt			07	Split flange SAE Code 61 Metric bolts								
Q	Cylindrical (Straight key) SAE A 5/8"		R			M	Transmission flange Pilot Ø 52 mm with O-ring			40	Split flange SAE Code 61 UNC bolts								
Q	SAE 3/4" Keyed, Long *Use S0022 suffix		R			A	Outrigger bearing Pilot Ø 80 mm (outboard bearing)												
R	Spline shaft SAE A 9T		R	C															
P	Spline shaft SAE 11T		R	C															
F	Spline shaft DIN 5482 B17x14		B	P															

* Common SO Codes:
 S0022 – Long keyed shaft
 Contact Factory for additional codes.

Size **F**
4 ... 28 cm³/rev

F Series Pump Product Index

(Reference page 14 for ordering code designators)

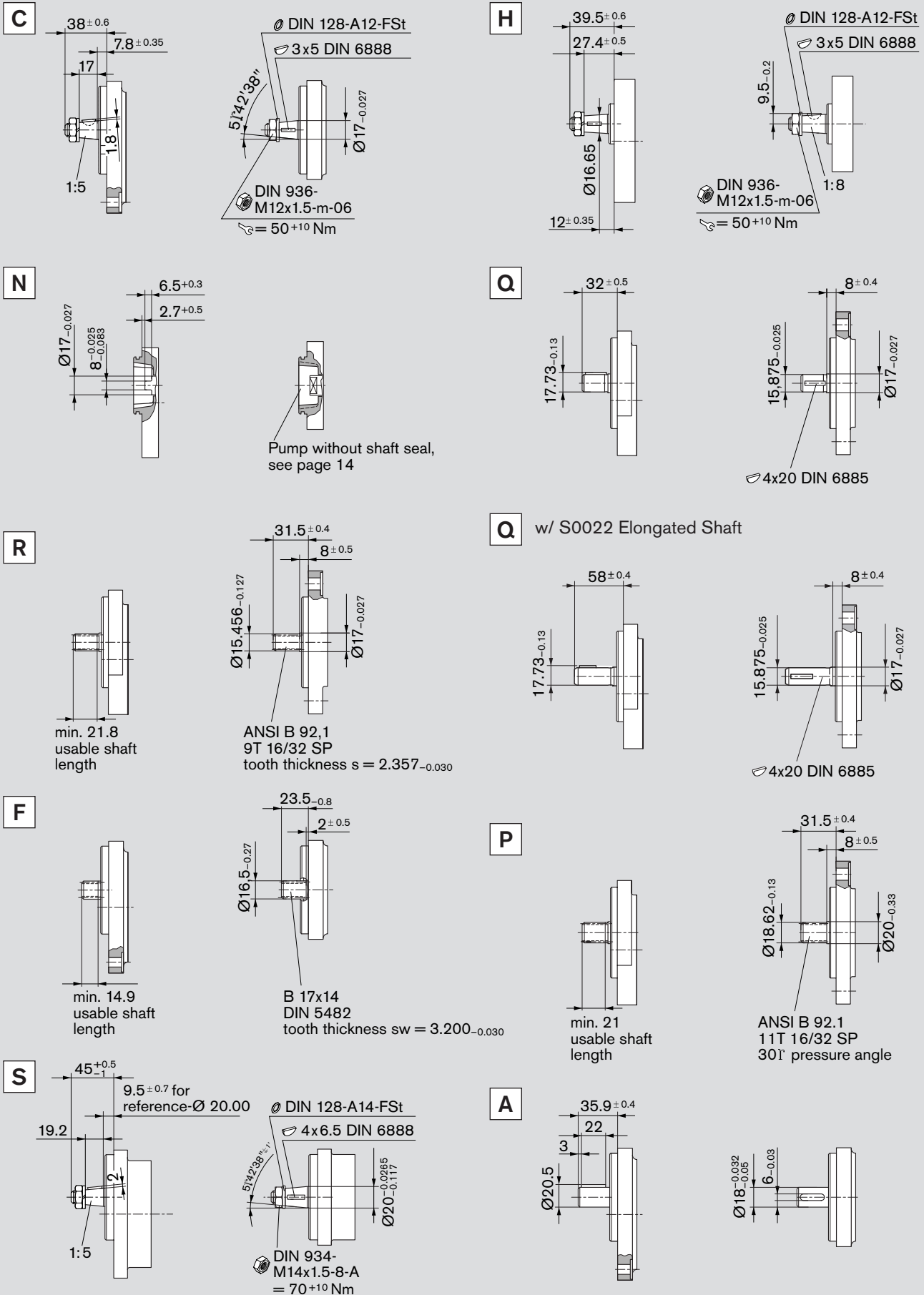
AZPF-XX-XXXX - - MB

```

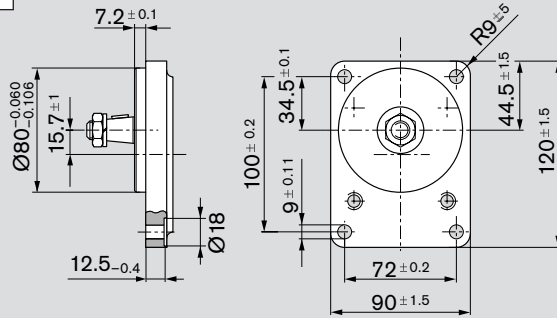
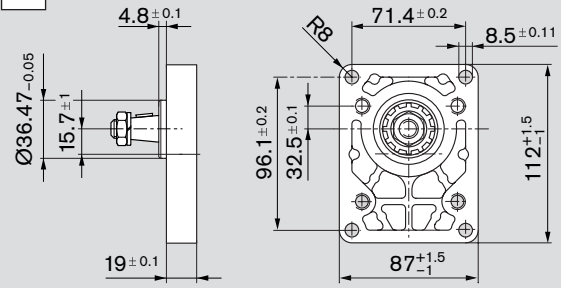
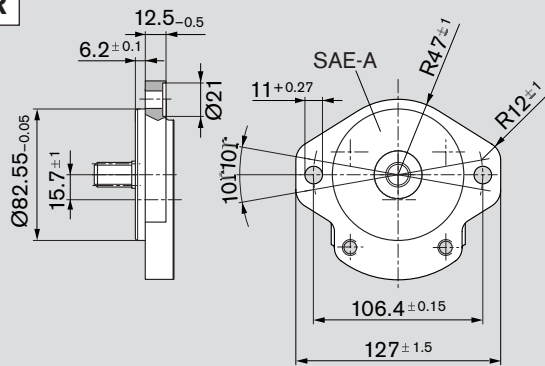
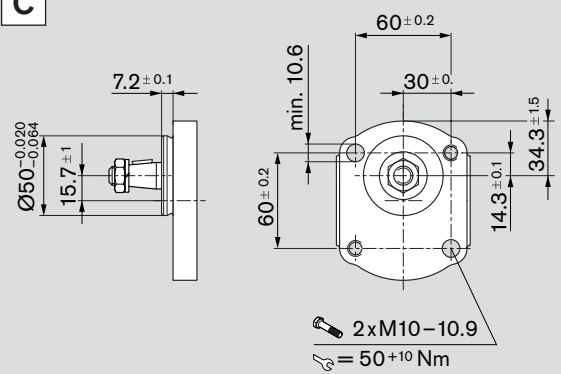
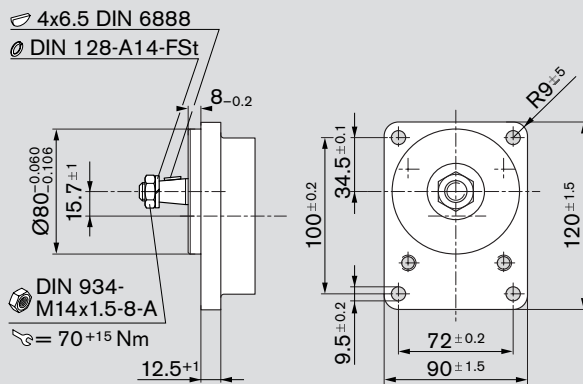
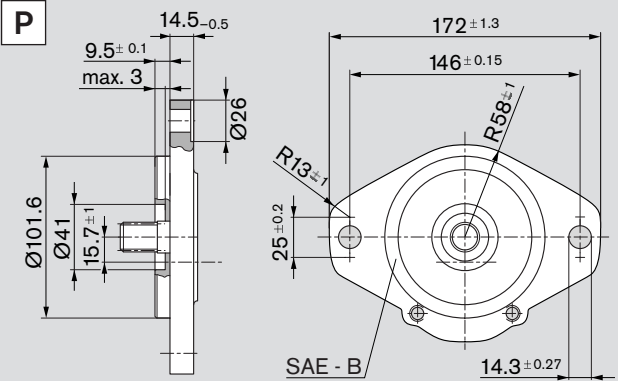
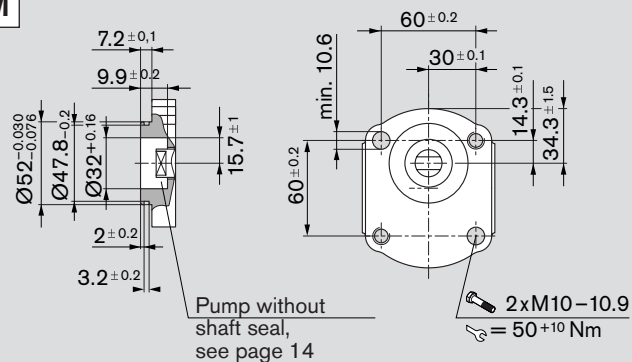
graph TD
    A[AZPF-XX-XXXX - - MB] --> B[Shaft Type]
    A --> C[Flange]
    A --> D[Mounting Ports]
    A --> E[Port Orientation]
  
```

Page Number	Ordering code	Shaft Type	Flange	Mounting Ports	Port Orientation
23	AZPF-XX-XXXXRR12MB	R	R	12	side
24	AZPF-XX-XXXXRR12MA	R	R	12	rear
25	AZPF-XX-XXXXQR12MB	Q	R	12	side
26	AZPF-XX-XXXXQR12MA	Q	R	12	rear
27	AZPF-XX-XXXXPR12MB	P	R	12	side
28	AZPF-XX-XXXXQR12MB-S0022	Q-long	R	12	side
29	AZPF-XX-XXXXQR12MA-S0022	Q-long	R	12	rear
30	AZPF-XX-XXXXPC12MB	P	C	12	side
31	AZPF-XX-XXXXRR20MB	R	R	20	side
32	AZPF-XX-XXXXCB20MB	C	B	20	side
33	AZPF-XX-XXXXFB20MB	F	B	20	side
34	AZPF-XX-XXXXHO30MB	H	O	30	side
35	AZPF-XX-XXXXFO30MB	F	O	30	side
36	AZPF-XX-XXXXHO01MB	H	O	01	side
37	AZPF-XX-XXXXCN20MB	C	N	20	side
38	AZPF-XX-XXXXFN20MB	F	N	20	side
39	AZPF-XX-XXXXCP20MB-S0007	C	P	20	side
40	AZPF-XX-XXXXFP20PB	F	P	20	side
41	AZPF-XX-XXXXNT20MB	N	T	20	side
42	AZPF-XX-XXXXSA20MB	S	A	20	side
43	AZPF-XX-XXXXSG20MB	S	G	20	side

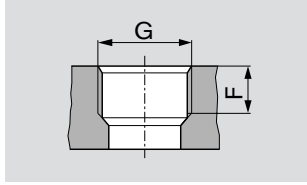
F Series Drive Shafts



F Series Front Cover

B**O****R****C****A****P****M**

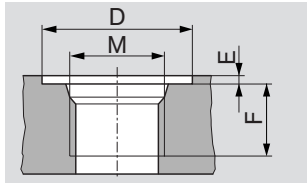
F Series Port Connections



01 Pipe thread
ISO 228/1

when pressure $p_2 > 210$ bar
limited fatigue strength

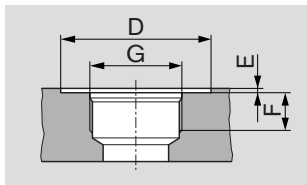
Synopsis of Types	Size	Pressure port		Suction port	
		G	F	G	F
01	4 ... 16 cm ³	G 1/2	16	G 3/4	16
	19 ... 28 cm ³	G 3/4		G1	19



03 Thread metric
ISO 6149
with O-ring

when pressure $p_2 > 210$ bar
limited fatigue strength

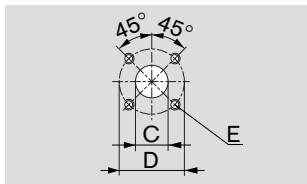
Synopsis of Types	Size	Pressure port				Suction port			
		M	D	E	F	M	D	E	F
03	4 ... 5.5 cm ³	M 18 x 1.5	29	0.5	14.5	M 18 x 1.5	29	0.5	14.5
	8 ... 16 cm ³	M 22 x 1.5	34		18	M 27 x 1.5	40		19
	19 ... 28 cm ³					M 33 x 1.5	46		22



12 Thread
(UN-2B) SAE
O-ring BOSS

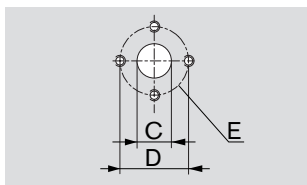
when pressure $p_2 > 210$ bar
limited fatigue strength

Synopsis of Types	Size	Pressure port				Suction port			
		G	D	E	F	G	D	E	F
12	4 ... 5.5 cm ³	SAE - 8	25	0.5	13	SAE - 10	25	0.5	13
	8 ... 14 cm ³	SAE - 10	35		16	SAE - 12	35		16
	16 ... 28 cm ³	SAE - 10				SAE - 16	45		19



20 Rectangular flange
DIN 8901/8902

Synopsis of Type	Size	Pressure port			Suction port		
		C	D	E	C	D	E
20	4 ... 5.5 cm ³	15	35	M 6 depth 13	15	40	M 6 depth 13
	8 ... 16 cm ³				20		
	19 ... 28 cm ³				26	55	M 8 depth 13



30 Rectangular flange

Synopsis of Type	Size	Pressure port			Suction port		
		C	D	E	C	D	E
30	4 ... 8 cm ³	13.5	30.2	M 6 depth 13	13.5	30.2	M 6 depth 13
	11 ... 28 cm ³				20.0	39.7	M 8 depth 13

F Series Performance Ratings

Size		004	005	008	011	014	016	019	022	025	028
Displacement	cm ³ /rev	4.1	5.6	8.2	11.3	14.3	16.5	19.5	22.9	25.4	28.5
Inlet pressure	bar	min. 0.7 max. 3 (absolute)									
max. continuous pressure p ₁	bar	250						210	180	200	170
	psi	3625						3045	2610	2900	2465
max. intermittent pressure p ₂	bar	280						230	210	220	190
	psi	4060						3335	3045	3190	2755
max. peak pressure p ₃	bar	300						250	230	240	210
	psi	4350						3625	3335	3528	3045
min. rotational speed (RPM) ≤ 100	RPM	600	500	500	500	500	500	500	500	500	500
max. rotational speed at (RPM)	p ₁	3500			3000	2500	2000	2000	2000	2000	2000
	p ₂	4000			3500	3500	3500	3000	2750	2500	2500

F Series Pumps**SAE O-Ring BOSS - Standard Porting**

Displacement (cc)	Side Ports		Rear Port	
	Inlet	Outlet	Inlet	Outlet
4	-10	-8	-12	-10
5	-10	-8	-12	-10
8	-12	-10	-12	-10
11	-12	-10	-12	-10
14	-12	-10	-12	-10
16	-16	-10	-12	-10
19	-16	-10	-12	-10
22	-16	-10	-12	-10
25	-16	-10	-12	-10
28	-16	-10	-12	-10

**SAE Porting - Specifications and Dimensions
per SAE J1926/1**

Dash Size	Thread Size (in)
-2	5/16-24 UNF-2B
-3	3/8-24 UNF-2B
-4	7/16-20 UNF-2B
-5	1/2-20 UNF-2B
-6	9/16-18 UNF-2B
-8	3/4-16 UNF-2B
-10	7/8-14 UNF-2B
-12	1-1/16-12 UN-2B
-14	1-3/16-12 UN-2B
-16	1-5/16-12 UN-2B
-20	1-5/8-12 UN-2B
-24	1-7/8-12 UN-2B
-32	2-1/2-12 UN-2B

Note: Ratings represent units incorporating SAE O-Ring BOSS threaded ports. Pressure ratings may differ for other types of ports.

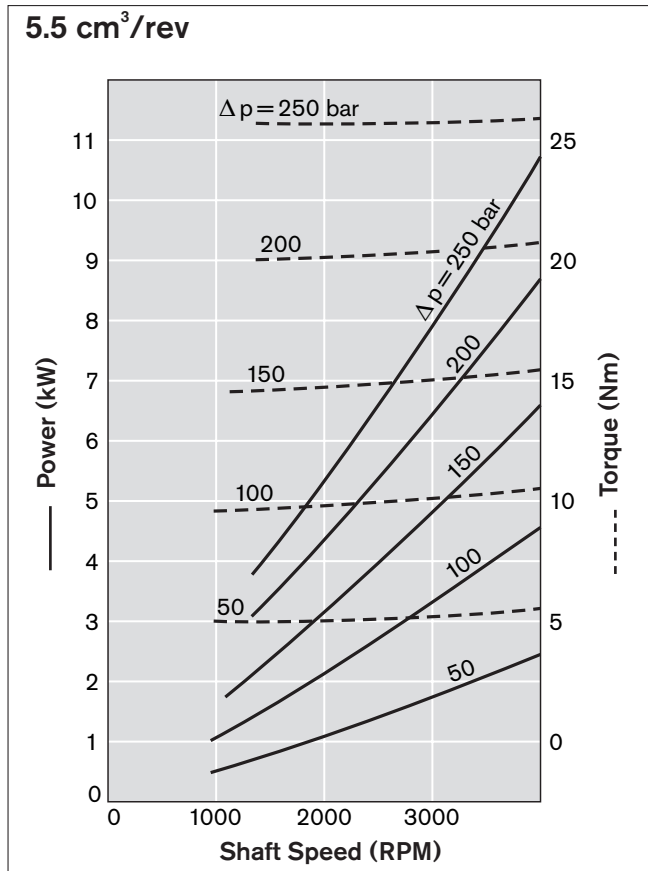
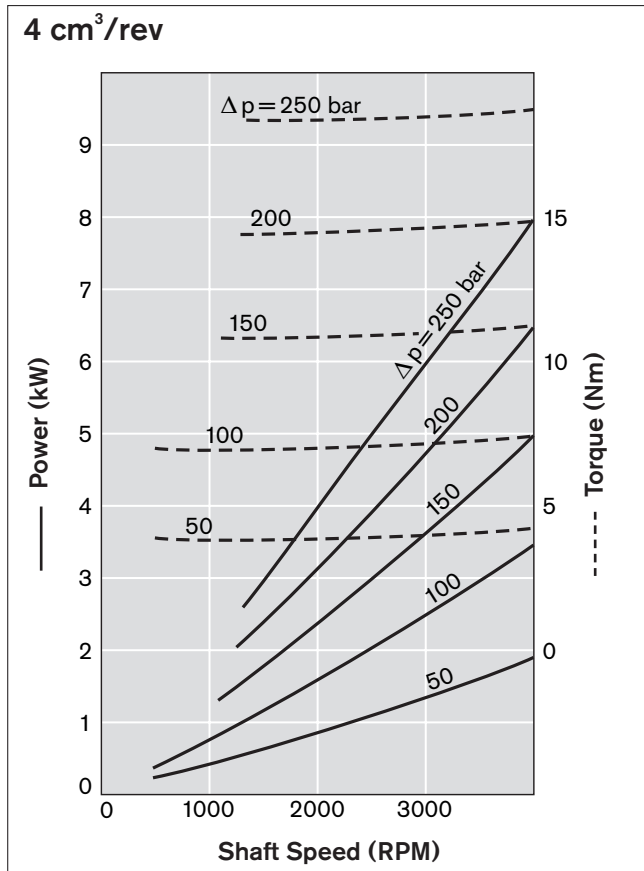
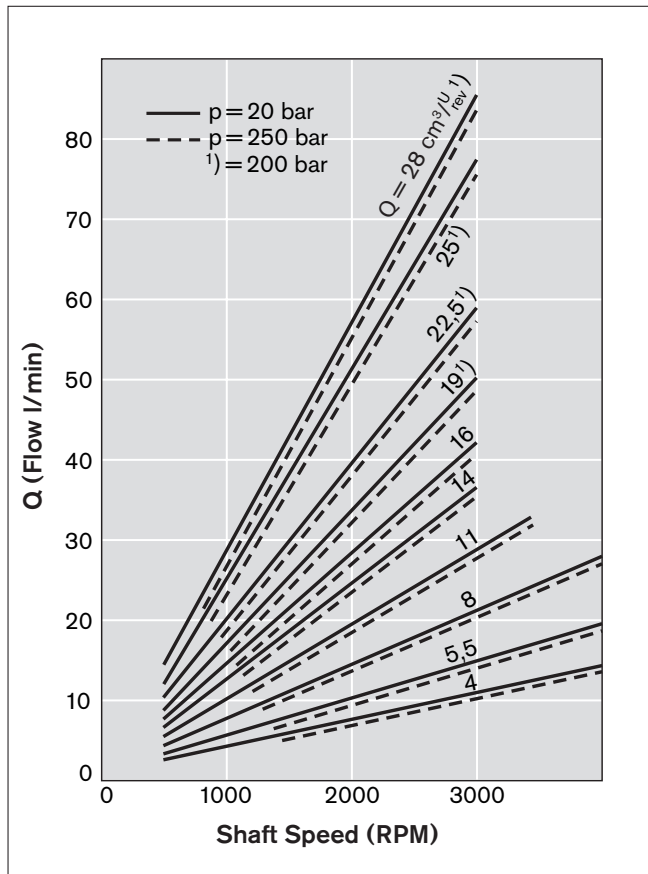
Diagrams

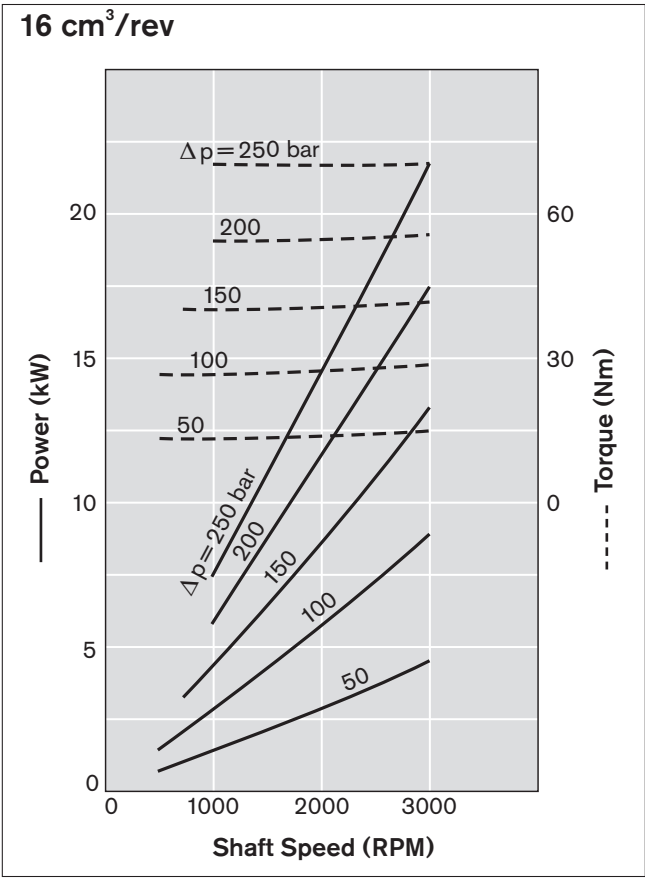
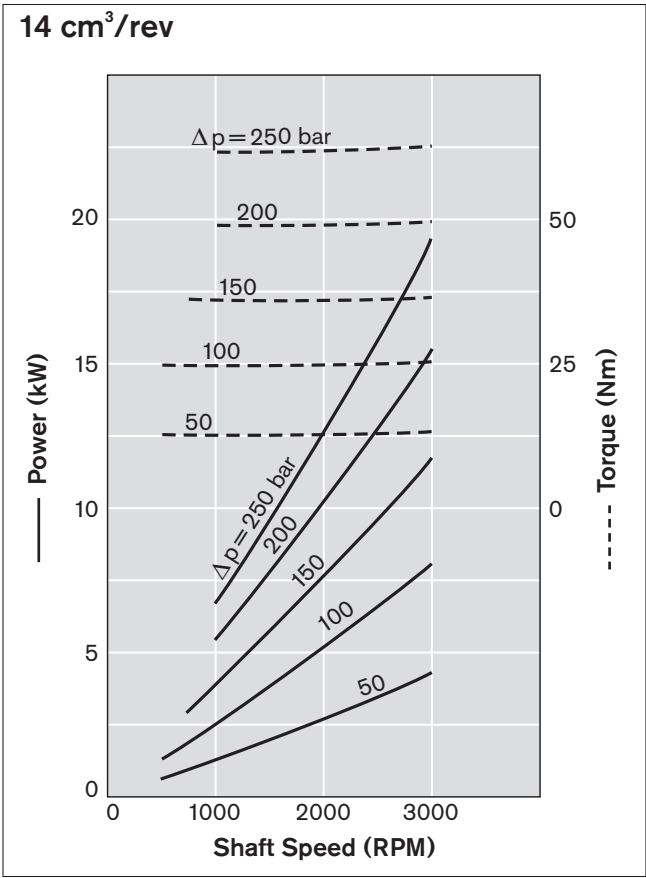
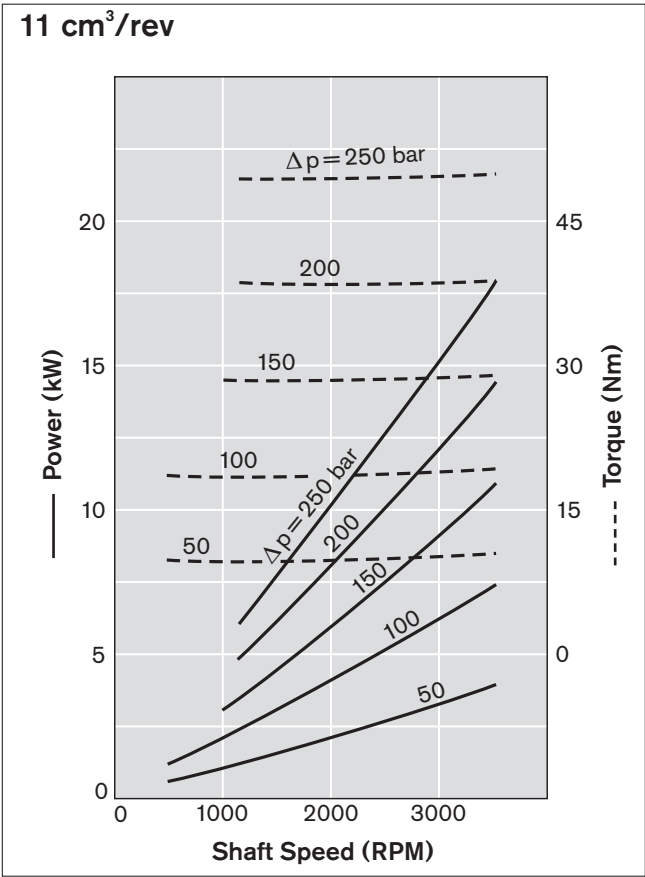
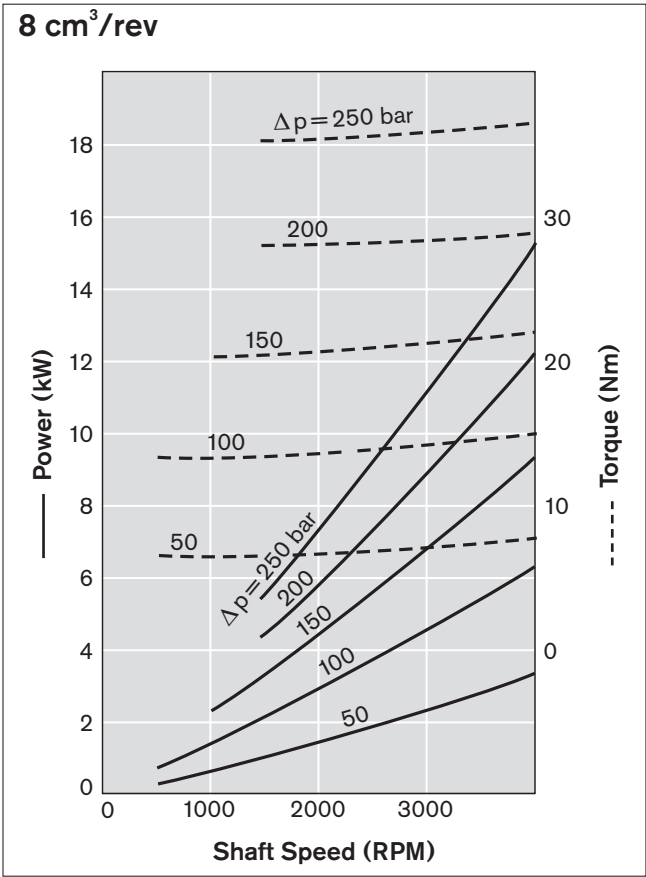
Size **F**

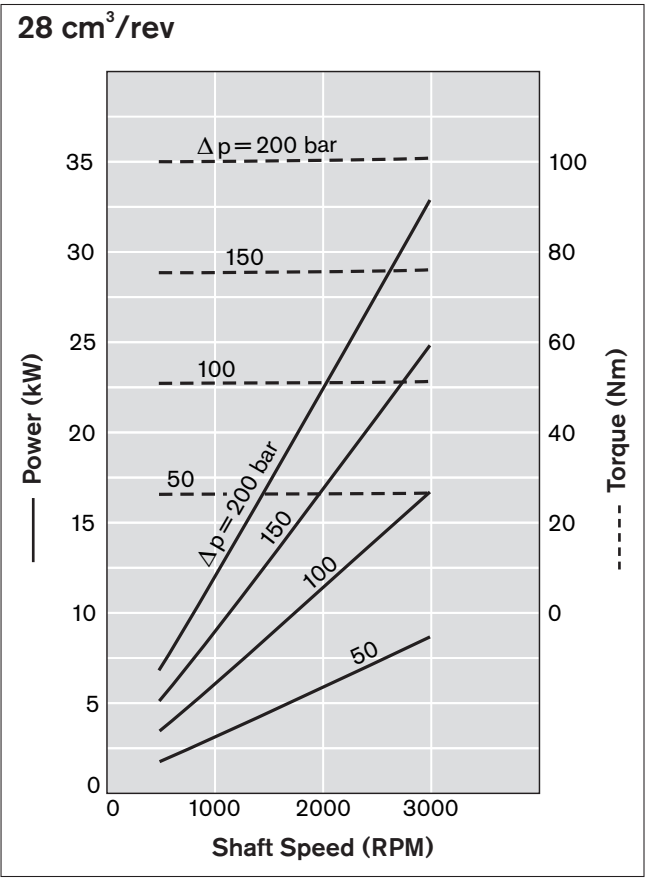
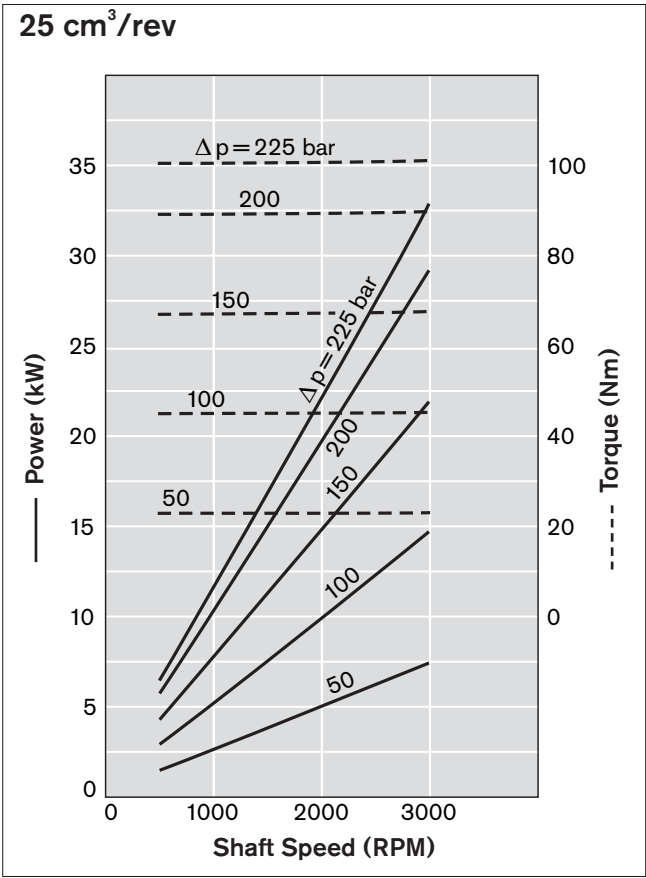
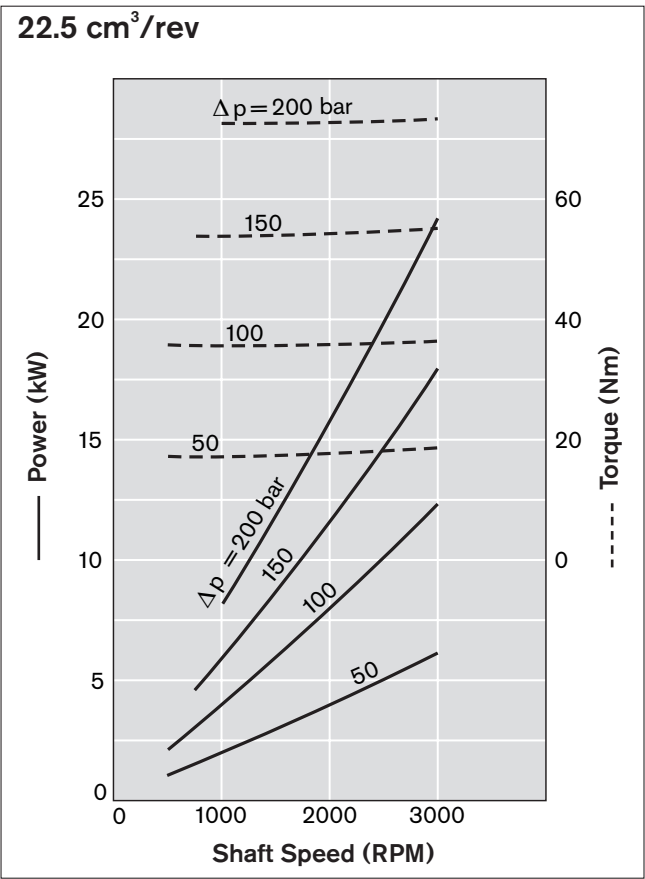
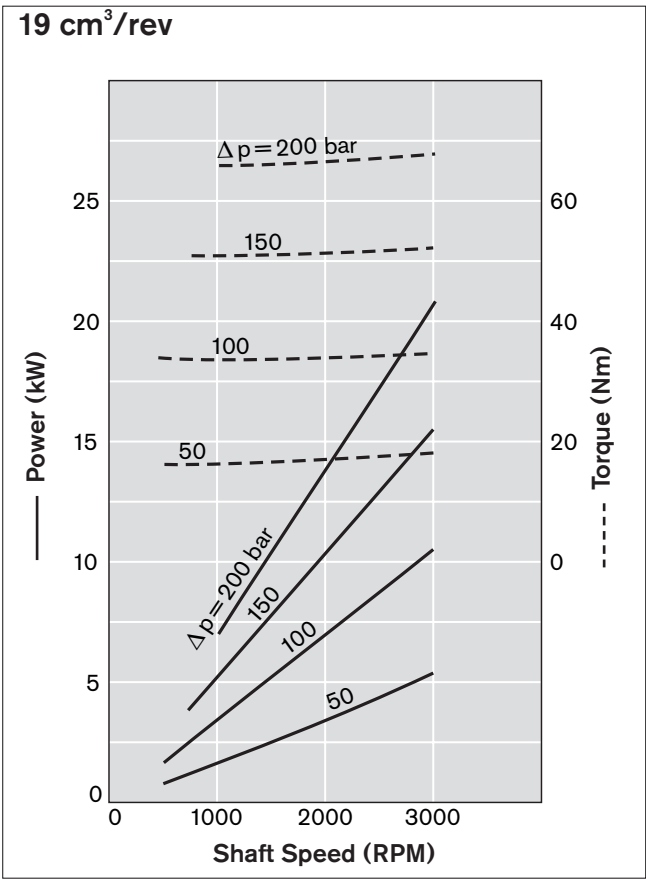
$\nu = 35 \text{ mm}^2/\text{s}$, $T = 50 \text{ }^\circ\text{C}$

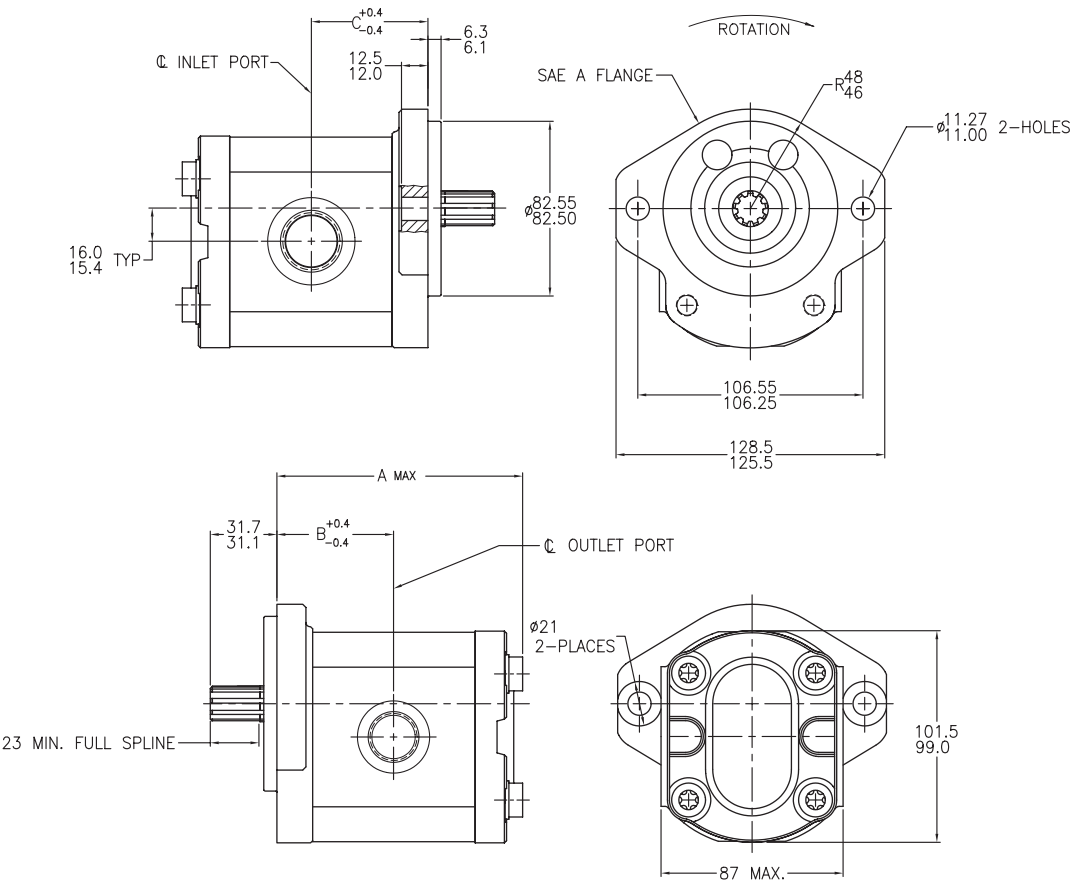
Unit Conversions

Pressure: $\text{psi} = \text{bar} \times 14.7$
 Torque: $\text{ft-lbs} = (\text{Nm}) \times .738$
 Power: $\text{hp} = (\text{kW}) \times 1.341$
 Volume: $\text{in}^3 = (\text{cc}) \times 16.39$
 $\text{gpm} = (\text{LPM}) \times .2642$

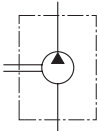








Features	Details
Shaft	9t spline
Front Cover	SAE A 2-bolt
Ports	SAE ORB
Rear Cover	Standard



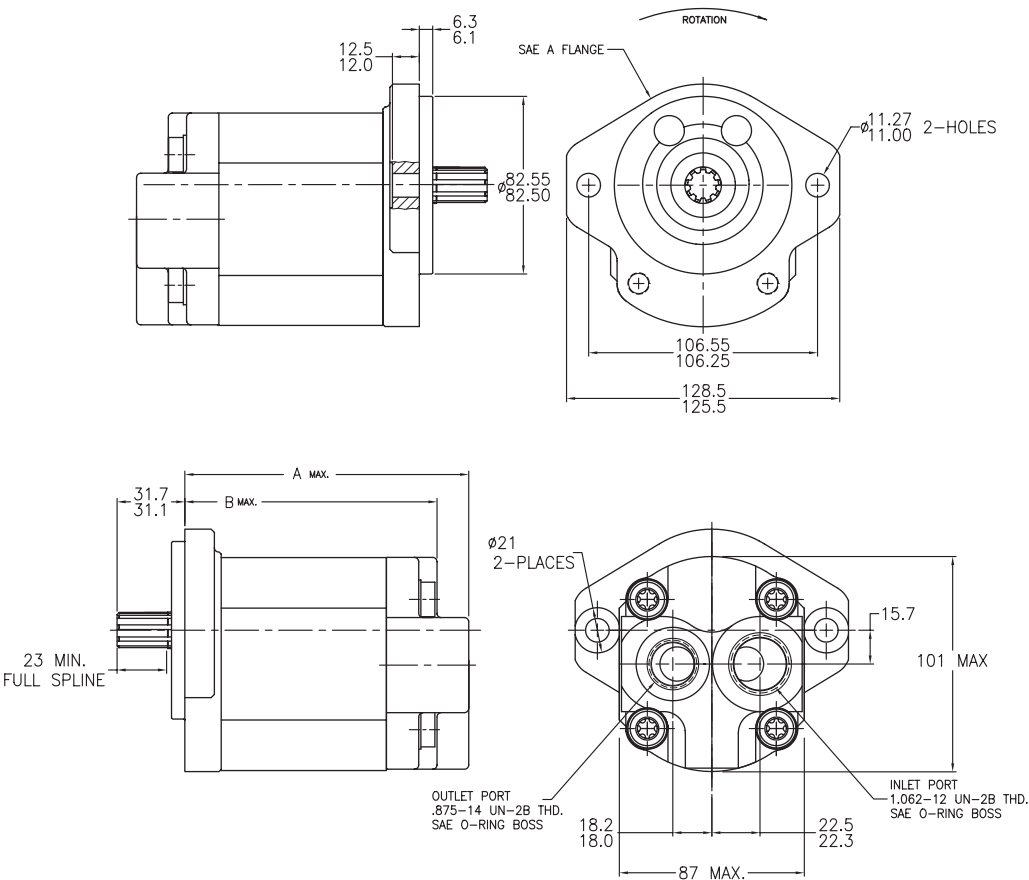
 Clockwise
As shown in drawing

 Counter-Clockwise
Inlet and outlet port changed

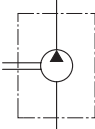
Ordering code
AZPF - X X - □ □ □ □ R R 12 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	 L	 R			A	B	C		
4.0	9 510 290 036	9 510 290 015	250	4000	85.0	39.9	39.9	-10	-8
5.5	9 510 290 037	9 510 290 005	250	4000	85.6	41.1	41.1	-10	-8
8.0	9 510 290 038	9 510 290 017	250	4000	91.6	43.2	43.2	-12	-10
11.0	9 510 290 039	9 510 290 018	250	3500	96.6	47.0	47.0	-12	-10
14.0	9 510 290 040	9 510 290 004	250	3000	101.8	47.5	47.5	-12	-10
16.0	9 510 290 127	9 510 290 056	250	3000	105.0	47.5	47.5	-16	-10
19.0	9 510 290 128	9 510 290 125	210	3000	110.0	47.5	47.5	-16	-10
22.5	9 510 290 129	9 510 290 126	180	2500	115.4	55.1	55.1	-16	-10
25.0	9 510 290 117	9 510 290 111	200	3000	131.6	63.2	63.2	-16	-10
28.0	9 510 290 120	9 510 290 114	170	3000	136.4	65.6	65.6	-16	-10

* Contact factory for availability of units with no ordering number listed.
** Refer to page 19 for SAE O-Ring Boss Specifications and Dimensions.



Features	Details
Shaft	9t spline
Front Cover	SAE A 2-bolt
Ports	SAE ORB
Rear Cover	Rear ports



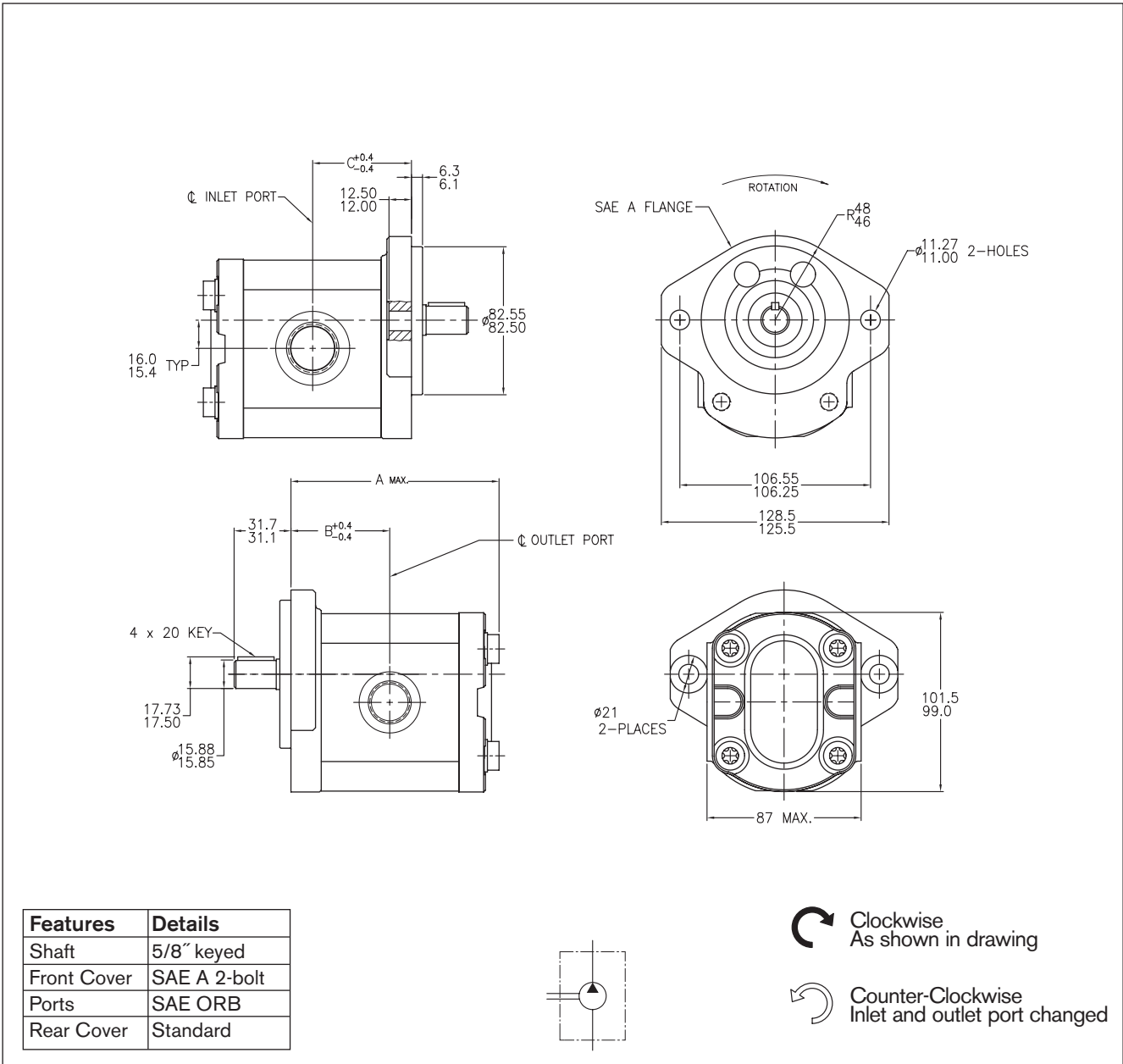
 Clockwise
As shown in drawing

 Counter-Clockwise
Inlet and outlet port changed

Ordering code
AZPF – 12 – ☐☐☐☐ R R 12 MA

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	 L	 R			A	B	C		
4.0	9 510 290 083	9 510 290 075	250	4000	100.3	85.0		-12	-10
5.5	9 510 290 084	9 510 290 076	250	4000	103.3	88.4		-12	-10
8.0	9 510 290 085	9 510 290 077	250	4000	107.4	92.5		-12	-10
11.0	9 510 290 086	9 510 290 078	250	3500	112.4	97.5		-12	-10
14.0	9 510 290 087	9 510 290 079	250	3000	117.4	102.5		-12	-10
16.0	9 510 290 088	9 510 290 080	250	3000	120.8	105.9		-12	-10
19.0	9 510 290 089	9 510 290 081	210	3000	126.8	110.9		-12	-10
22.5	9 510 290 090	9 510 290 082	180	2500	131.2	116.3		-12	-10
25.0	*	*							
28.0	*	*							

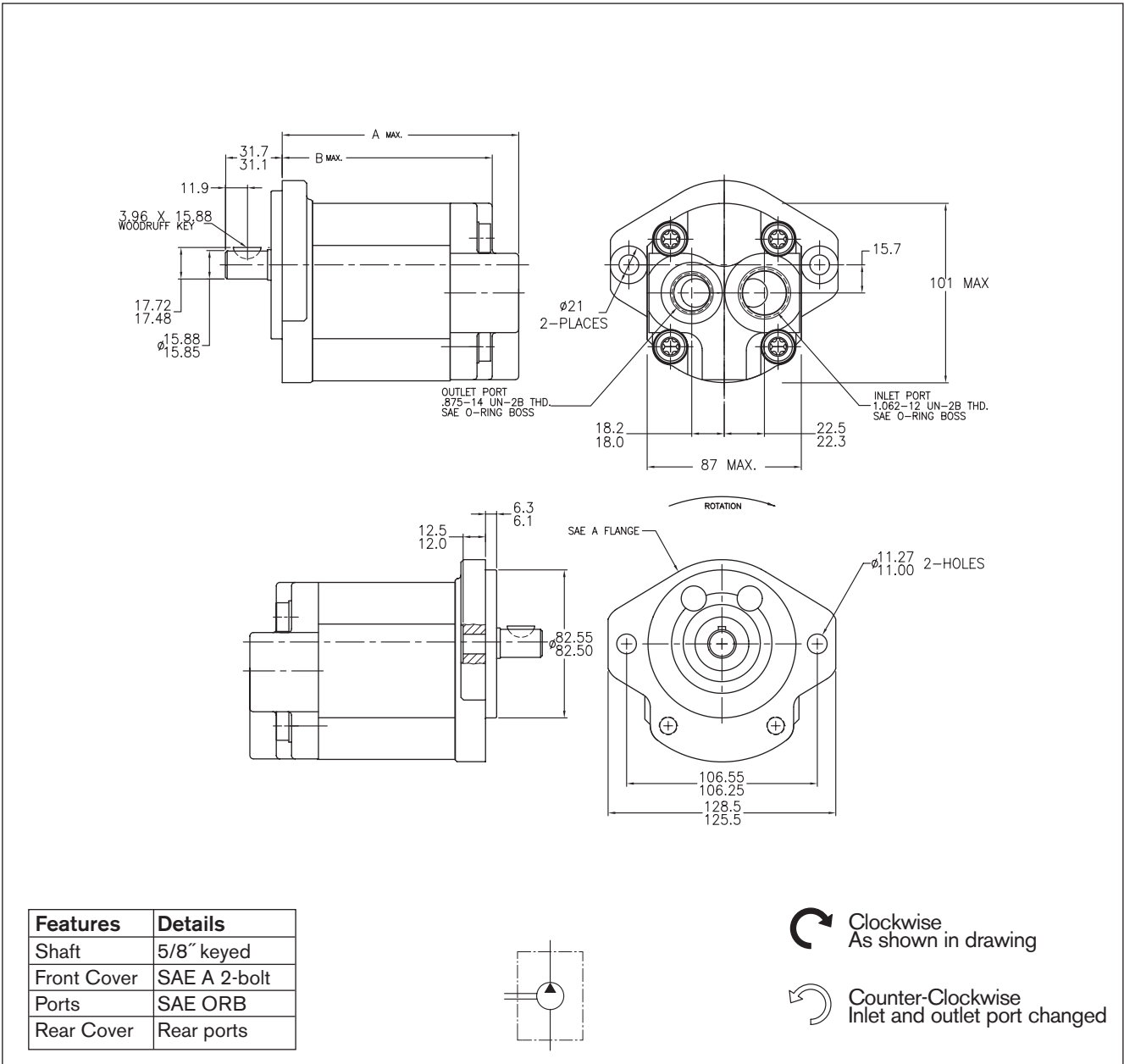
* Contact factory for availability of units with no ordering number listed.
** Refer to page 19 for SAE O-Ring Boss Specifications and Dimensions.



Ordering code
AZPF – 1 2 – □ □ □ □ Q R 12 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	 L	 R			A	B	C		
4.0	9 510 290 044	9 510 290 021	250	4000	85.0	39.9	39.9	-10	-8
5.5	9 510 290 045	9 510 290 022	250	4000	85.6	41.1	41.1	-10	-8
8.0	9 510 290 046	9 510 290 023	250	4000	91.6	43.2	43.2	-12	-10
11.0	9 510 290 047	9 510 290 024	250	3500	96.6	47.0	47.0	-12	-10
14.0	9 510 290 048	9 510 290 025	250	3000	101.6	47.5	47.5	-12	-10
16.0	9 510 290 130	9 510 290 122	250	3000	105.0	47.5	47.5	-16	-10
19.0	9 510 290 131	9 510 290 123	210	3000	110.0	47.5	47.5	-16	-10
22.5	9 510 290 132	9 510 290 124	180	2500	115.4	55.1	55.1	-16	-10
25.0	9 510 290 118	9 510 290 112	200	3000	131.6	63.2	63.2	-16	-10
28.0	9 510 290 121	9 510 290 115	170	3000	136.4	65.6	65.6	-16	-10

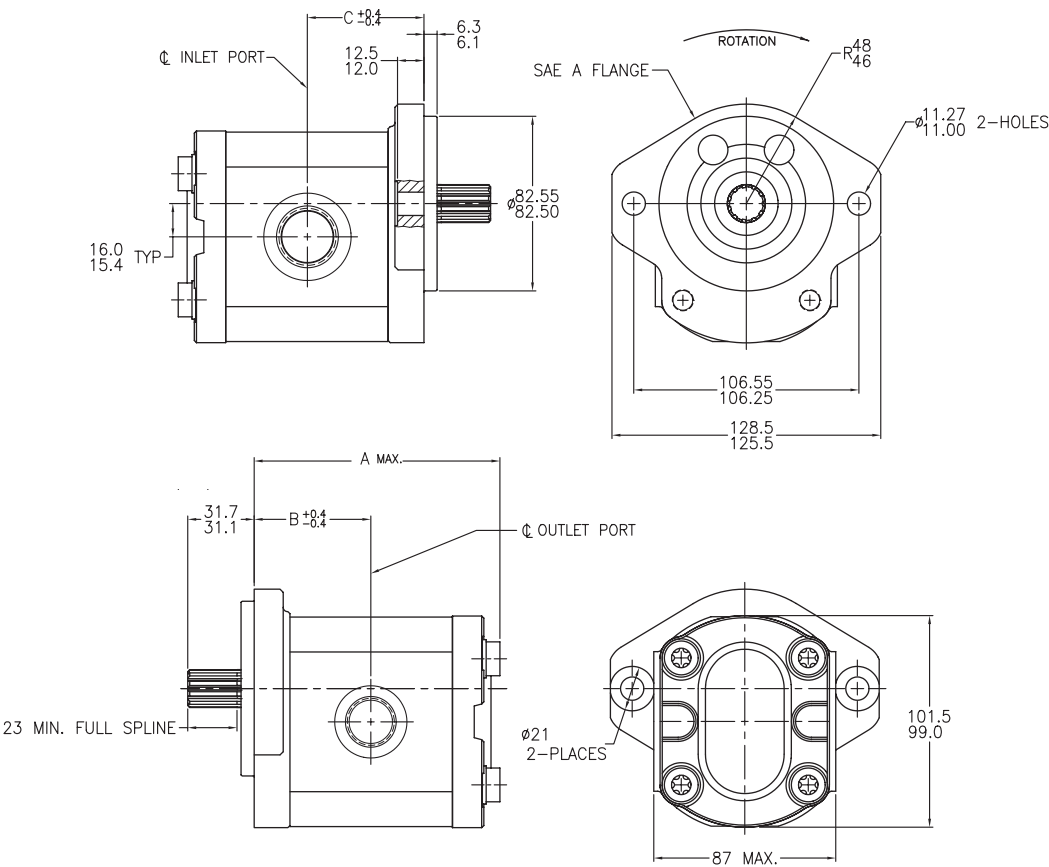
* Contact factory for availability of units with no ordering number listed.
** Refer to page 19 for SAE O-Ring Boss Specifications and Dimensions.



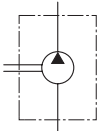
Ordering code
AZPF - 1 2 - □ □ □ □ Q R 12 MA

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	 L	 R			A	B	C		
4.0	9 510 290 099	9 510 290 091	250	4000	100.8	85.9		-12	-10
5.5	9 510 290 100	9 510 290 092	250	4000	103.3	88.4		-12	-10
8.0	9 510 290 101	9 510 290 093	250	4000	107.4	92.5		-12	-10
11.0	9 510 290 102	9 510 290 094	250	3500	112.4	97.5		-12	-10
14.0	9 510 290 103	9 510 290 095	250	3000	117.4	102.5		-12	-10
16.0	9 510 290 104	9 510 290 096	250	3000	120.8	105.9		-12	-10
19.0	9 510 290 105	9 510 290 097	210	3000	126.8	110.9		-12	-10
22.5	9 510 290 106	9 510 290 098	180	2500	131.2	116.3		-12	-10
25.0	*	*							
28.0	*	*							

* Contact factory for availability of units with no ordering number listed.
** Refer to page 19 for SAE O-Ring Boss Specifications and Dimensions.



Features	Details
Shaft	11t spline
Front Cover	SAE A 2-bolt
Ports	SAE ORB
Rear Cover	Standard



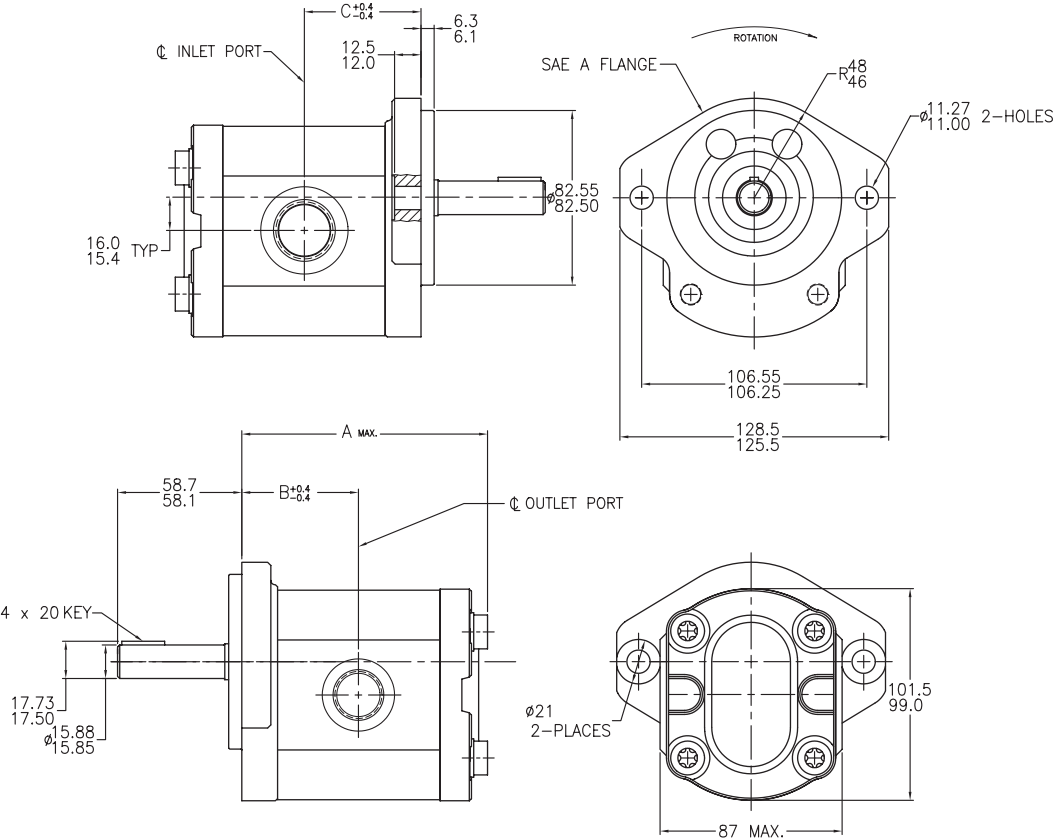
 Clockwise
As shown in drawing

 Counter-Clockwise
Inlet and outlet port changed

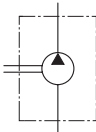
Ordering code
AZPF – 1 2 – □ □ □ □ P R 12 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	 L	 R			A	B	C		
4.0	9 510 290 065	9 510 290 057	250	4000	85.0	40.5	40.5	-10	-8
5.5	9 510 290 066	9 510 290 058	250	4000	85.6	41.1	41.1	-10	-8
8.0	9 510 290 067	9 510 290 059	250	4000	91.6	43.2	43.2	-12	-10
11.0	9 510 290 068	9 510 290 060	250	3500	96.6	47.0	47.0	-12	-10
14.0	9 510 290 069	9 510 290 061	250	3000	101.6	47.5	47.5	-12	-10
16.0	9 510 290 070	9 510 290 062	250	3000	105.0	49.9	49.9	-16	-10
19.0	9 510 290 071	9 510 290 063	210	3000	110.0	52.4	52.4	-16	-10
22.5	9 510 290 072	9 510 290 064	180	2500	115.4	55.1	55.1	-16	-10
25.0	9 510 290 116	9 510 290 110	200	3000	131.6	63.2	63.2	-16	-10
28.0	9 510 290 119	9 510 290 113	170	3000	136.4	65.6	65.6	-16	-10

* Contact factory for availability of units with no ordering number listed.
** Refer to page 19 for SAE O-Ring Boss Specifications and Dimensions.



Features	Details
Shaft	5/8" keyed - long
Front Cover	SAE A 2-bolt
Ports	SAE ORB
Rear Cover	Standard



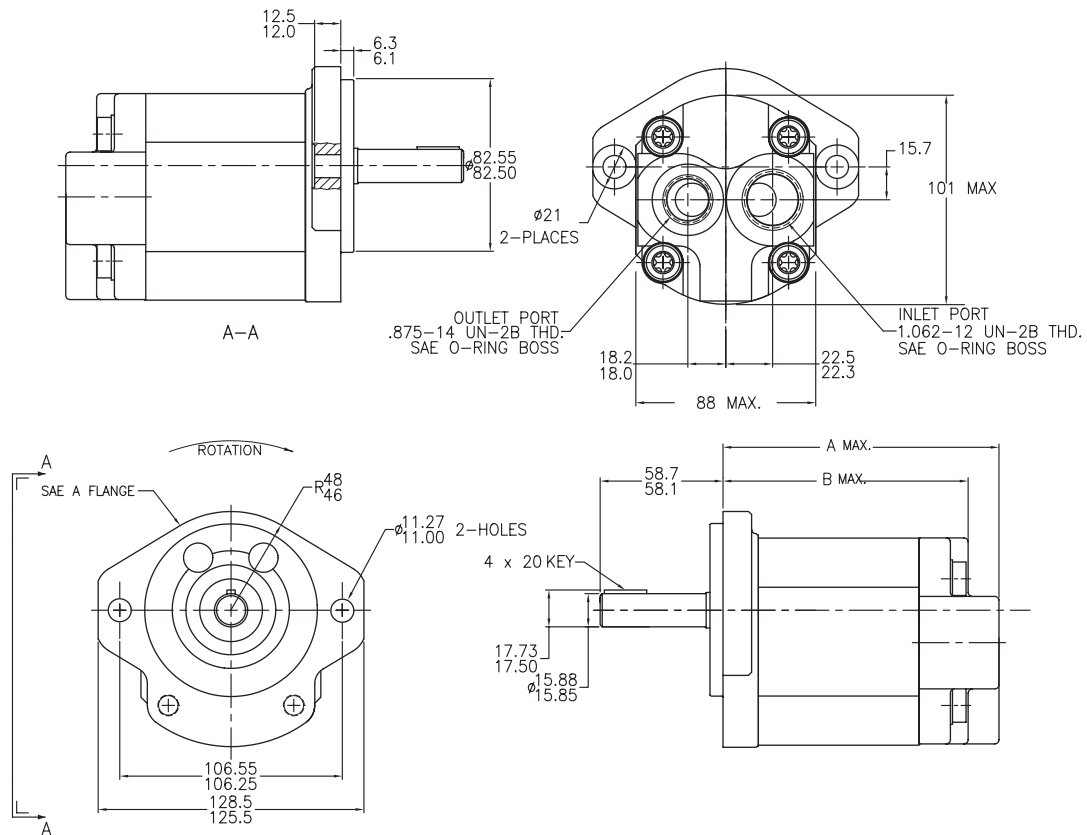
 Clockwise
As shown in drawing

 Counter-Clockwise
Inlet and outlet port changed

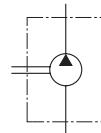
Ordering code
AZPF - 1 2 - □ □ □ □ Q R 12 MB - S0022

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	 L	 R			A	B	C		
4.0	*	*							
5.5	*	9 510 290 259	250	4000	85.6	41.1	41.1	-10	-8
8.0	9 510 290 214	9 510 290 191	250	4000	91.6	43.2	43.2	-12	-10
11.0	9 510 290 254	9 510 290 209	250	3500	96.6	47.0	47.0	-12	-10
14.0	9 510 290 215	9 510 290 133	250	3000	101.6	47.5	47.5	-12	-10
16.0	9 510 290 255	9 510 290 210	250	3000	105.0	49.9	49.9	-16	-10
19.0	9 510 290 256	9 510 290 211	210	3000	110.0	52.4	52.4	-16	-10
22.5	9 510 290 257	9 510 290 212	180	2500	115.4	55.1	55.1	-16	-10
25.0	*	*							
28.0	*	*							

* Contact factory for availability of units with no ordering number listed.
** Refer to page 19 for SAE O-Ring Boss Specifications and Dimensions.



Features	Details
Shaft	5/8" keyed - long
Front Cover	SAE A 2-bolt
Ports	SAE ORB
Rear Cover	Rear ports



 Clockwise
As shown in drawing

 Counter-Clockwise
Inlet and outlet port changed

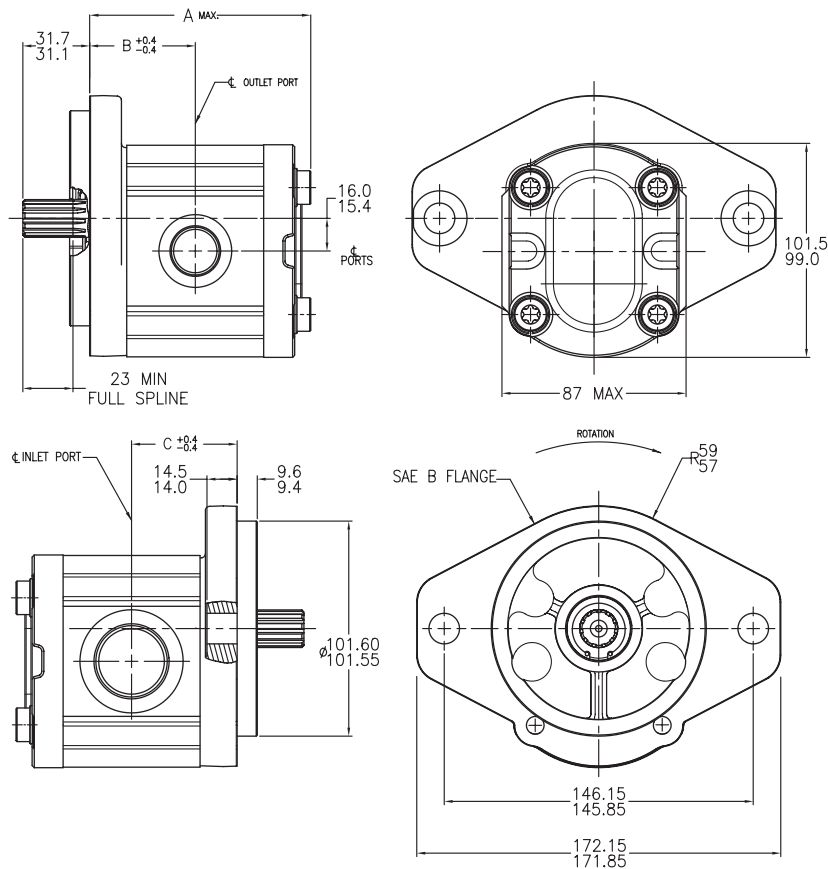
Ordering code

AZPF - 1 2 - □ □ □ □ Q R 12 MA - S0022

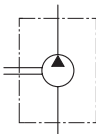
Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	 L	 R			A	B	C		
4.0	*	*							
5.5	*	*							
8.0	*	*							
11.0	*	9 510 290 134	250	3500	112.4	97.5		-12	-10
14.0	*	*							
16.0	*	*							
19.0	9 510 290 135	9 510 290 213	210	3000	125.8	110.9		-12	-10
22.5	*	*							
25.0	*	*							
28.0	*	*							

* Contact factory for availability of units with no ordering number listed.

** Refer to page 19 for SAE O-Ring Boss Specifications and Dimensions.



Features	Details
Shaft	11t spline
Front Cover	SAE B 2-bolt
Ports	SAE ORB
Rear Cover	Standard



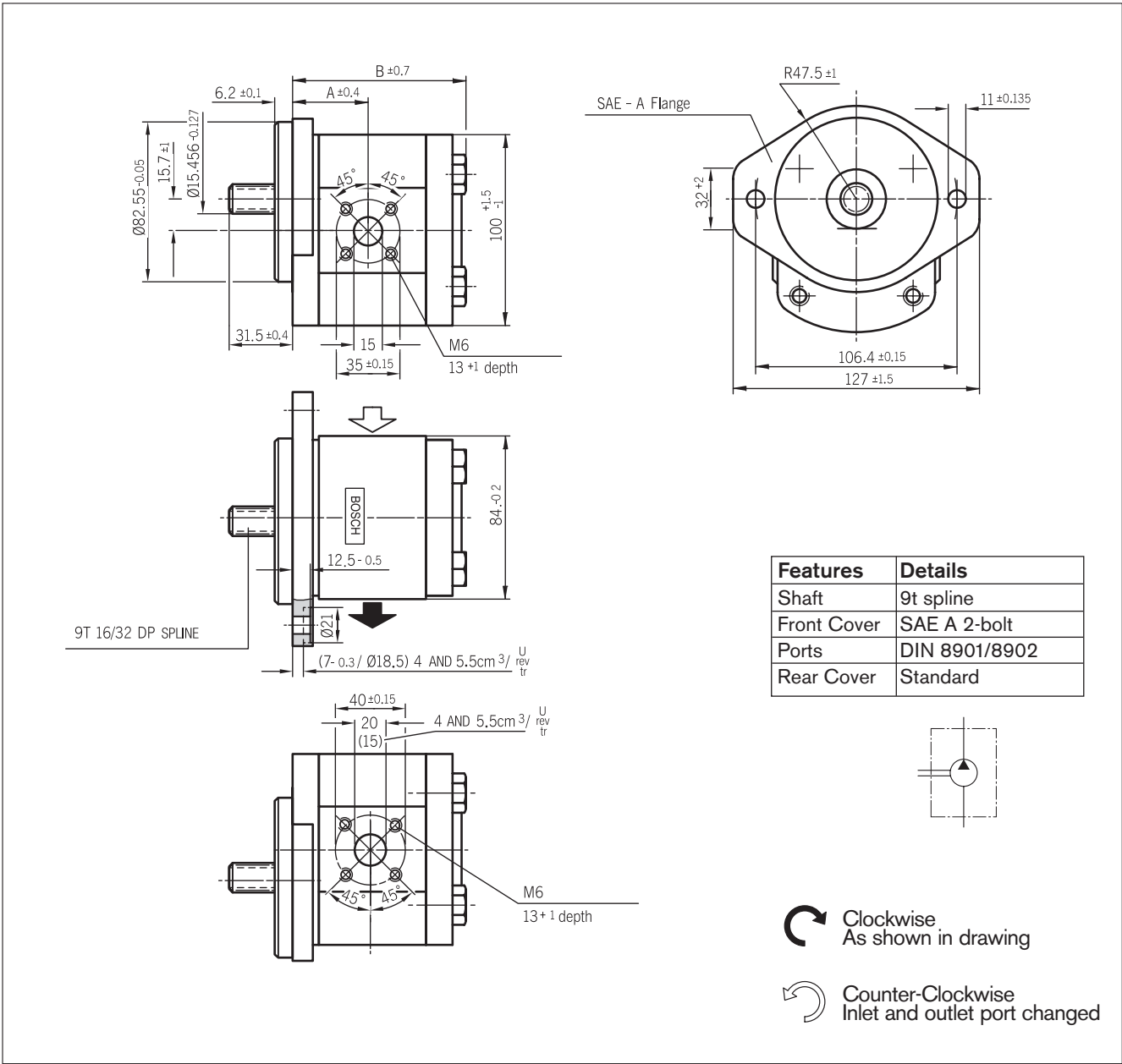
 Clockwise
As shown in drawing

 Counter-Clockwise
Inlet and outlet port changed

Ordering code
AZPF – 1 2 – ☐☐☐☐ P C 12 MB

Displacement [cm ³ /rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	 L	 R			A	B	C		
4.0	*	9 510 290 323	250	4000	85.0	40.5	40.5	-10	-8
5.5	*	9 510 290 324	250	4000	85.0	41.1	41.1	-10	-10
8.0	*	9 510 290 325	250	4000	91.6	43.2	43.2	-12	-10
11.0	*	9 510 290 326	250	3500	96.6	47.0	47.0	-12	-10
14.0	*	9 510 290 327	250	3000	101.6	47.5	47.5	-12	-10
16.0	*	9 510 290 328	250	3000	105.0	49.9	49.9	-16	-10
19.0	*	9 510 290 329	210	3000	110.0	52.4	52.4	-16	-10
22.5	*	9 510 290 330	180	2500	115.4	55.1	55.1	-16	-10
25.0	*	9 510 290 331	200	3000	131.6	63.2	63.2	-16	-10
28.0	*	9 510 290 332	170	3000	136.4	65.6	65.6	-16	-10

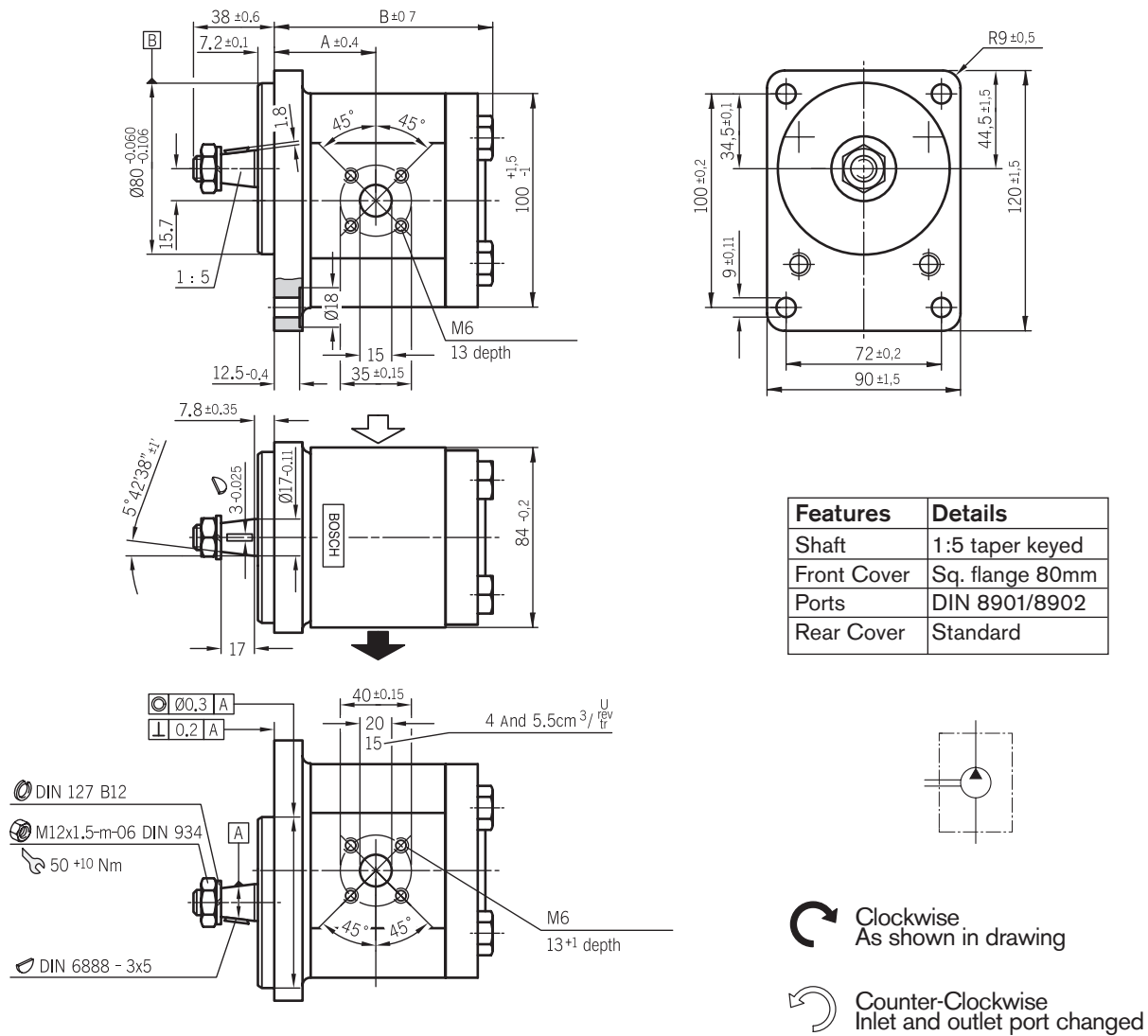
* Contact factory for availability of units with no ordering number listed.
** Refer to page 19 for SAE O-Ring Boss Specifications and Dimensions.



Ordering code
AZPF - 1 2 - □ □ □ □ R R 20 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			
	 L	 R			A	B		
4.0	0 510 225 314	0 510 225 013	250	4000	39.9	85.0		
5.5	0 510 325 313	0 510 325 013	250	4000	41.1	87.5		
8.0	0 510 425 314	0 510 425 020	250	4000	43.2	91.6		
11.0	0 510 525 324	0 510 525 019	250	3500	47.0	96.6		
14.0	0 510 525 325	0 510 525 020	250	3000	47.5	101.6		
16.0	0 510 625 329	0 510 625 028	250	3000	47.5	105.0		
19.0	0 510 625 330	0 510 625 029	210	3000	47.5	110.0		
22.5	0 510 725 361	0 510 725 077	180	2500	55.1	115.4		
25.0								
28.0								

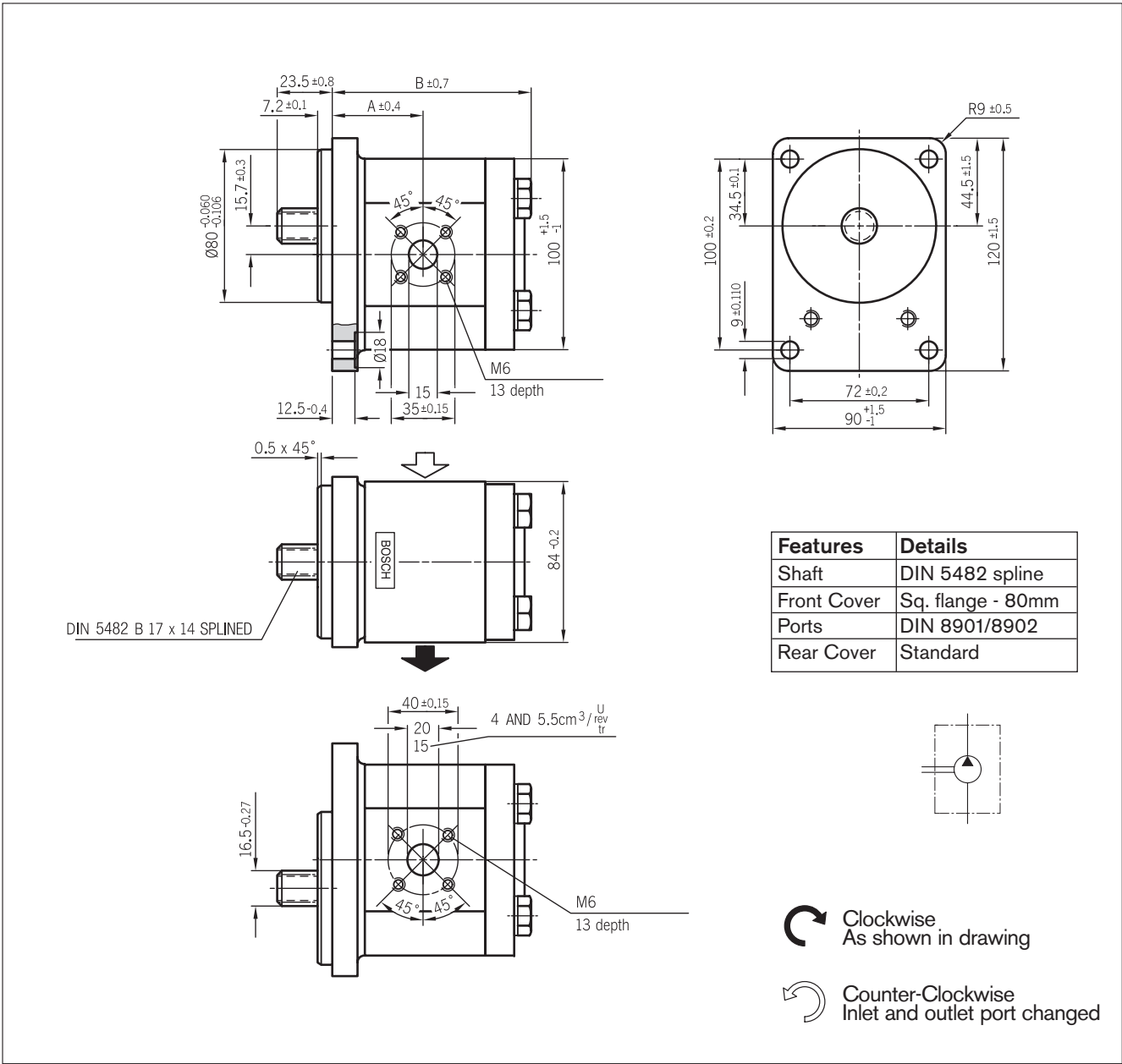
* Contact factory for availability of units with no ordering number listed.



Ordering code
AZPF - X X - □ □ □ □ C B 20 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			
	 L	 R			A	B		
4.0	0 510 225 306	0 510 225 006	250	4000	39.8	85.2		
5.5	0 510 325 306	0 510 325 006	250	4000	41.1	87.5		
8.0	0 510 425 307	0 510 425 009	250	4000	43.1	91.8		
11.0	0 510 525 311	0 510 525 009	250	3500	47.5	96.8		
14.0	0 510 525 319	0 510 525 018	250	3000	47.5	101.8		
16.0	0 510 625 315	0 510 625 022	250	3000	47.5	105.2		
19.0	0 510 625 314	0 510 625 013	210	3000	47.5	110.2		
22.5	0 510 725 330	0 510 725 030	180	2500	55.0	115.6		
25.0								
28.0								

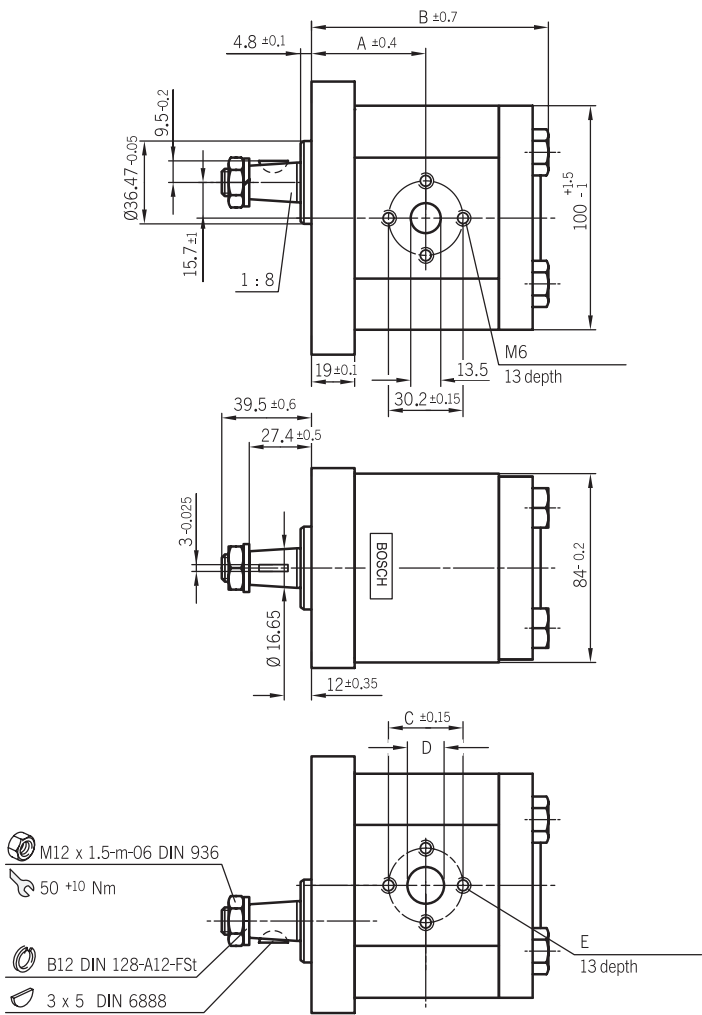
* Contact factory for availability of units with no ordering number listed.



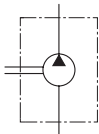
Ordering code
AZPF - X X - ☐☐☐☐ F B 20 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			
	L	R			A	B		
4.0	0 510 225 307	0 510 225 007	250	4000	39.8	85.2		
5.5	0 510 325 307	0 510 325 007	250	4000	41.0	87.5		
8.0	0 510 425 308	0 510 425 010	250	4000	43.1	91.8		
11.0	0 510 525 312	0 510 525 010	250	3500	47.5	96.6		
14.0	0 510 525 328	0 510 525 030	250	3000	47.5	101.8		
16.0	0 510 625 317	0 510 625 015	250	3000	47.5	105.2		
19.0	0 510 625 316	0 510 625 014	210	3000	47.5	110.2		
22.5		0 510 725 062	180	2500	55.0	115.6		
25.0								
28.0								

* Contact factory for availability of units with no ordering number listed.



Features	Details
Shaft	1:8 taper keyed
Front Cover	Sq. flange 36.47mm
Ports	Plessey
Rear Cover	Standard



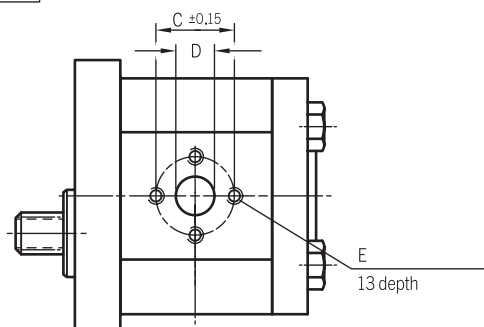
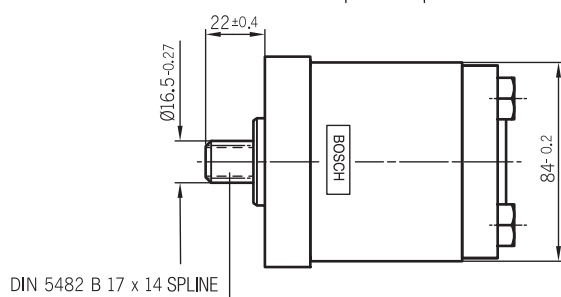
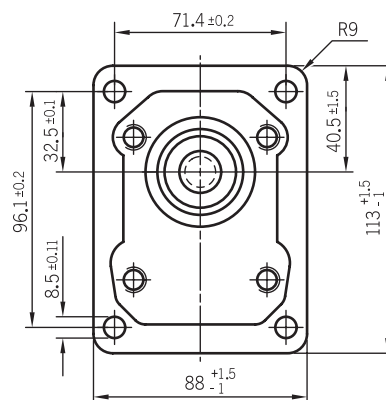
 Clockwise
As shown in drawing

 Counter-Clockwise
Inlet and outlet port changed

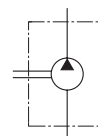
Ordering code
AZPF - X X - ☐☐☐☐ H O 30 MB

Displacement [cm ³ /rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]				
	 L	 R			A	B	C	D	E
4.0	0 510 225 308	0 510 225 008	280	4000	41.4	86.5	30.2	13.5	M6
5.5	0 510 325 308	0 510 325 008	280	4000	42.5	89.0	30.2	13.5	M6
8.0	0 510 425 309	0 510 425 011	280	4000	44.6	93.3	30.2	13.5	M6
11.0	0 510 525 313	0 510 525 011	280	3500	49.0	98.3	39.7	20.0	M8
14.0	0 510 525 314	0 510 525 012	280	3000	49.0	103.1	39.7	20.0	M8
16.0	0 510 625 318	0 510 625 016	280	3000	49.0	106.5	39.7	20.0	M8
19.0	0 510 625 319	0 510 625 017	210	3000	49.0	111.5	39.7	20.0	M8
22.5	0 510 725 331	0 510 725 031	180	2500	56.6	116.9	39.7	20.0	M8
25.0									
28.0									

* Contact factory for availability of units with no ordering number listed.



Features	Details
Shaft	DIN 5482 spline
Front Cover	Sq. flange 36.47 Sq.
Ports	Plessey
Rear Cover	Standard



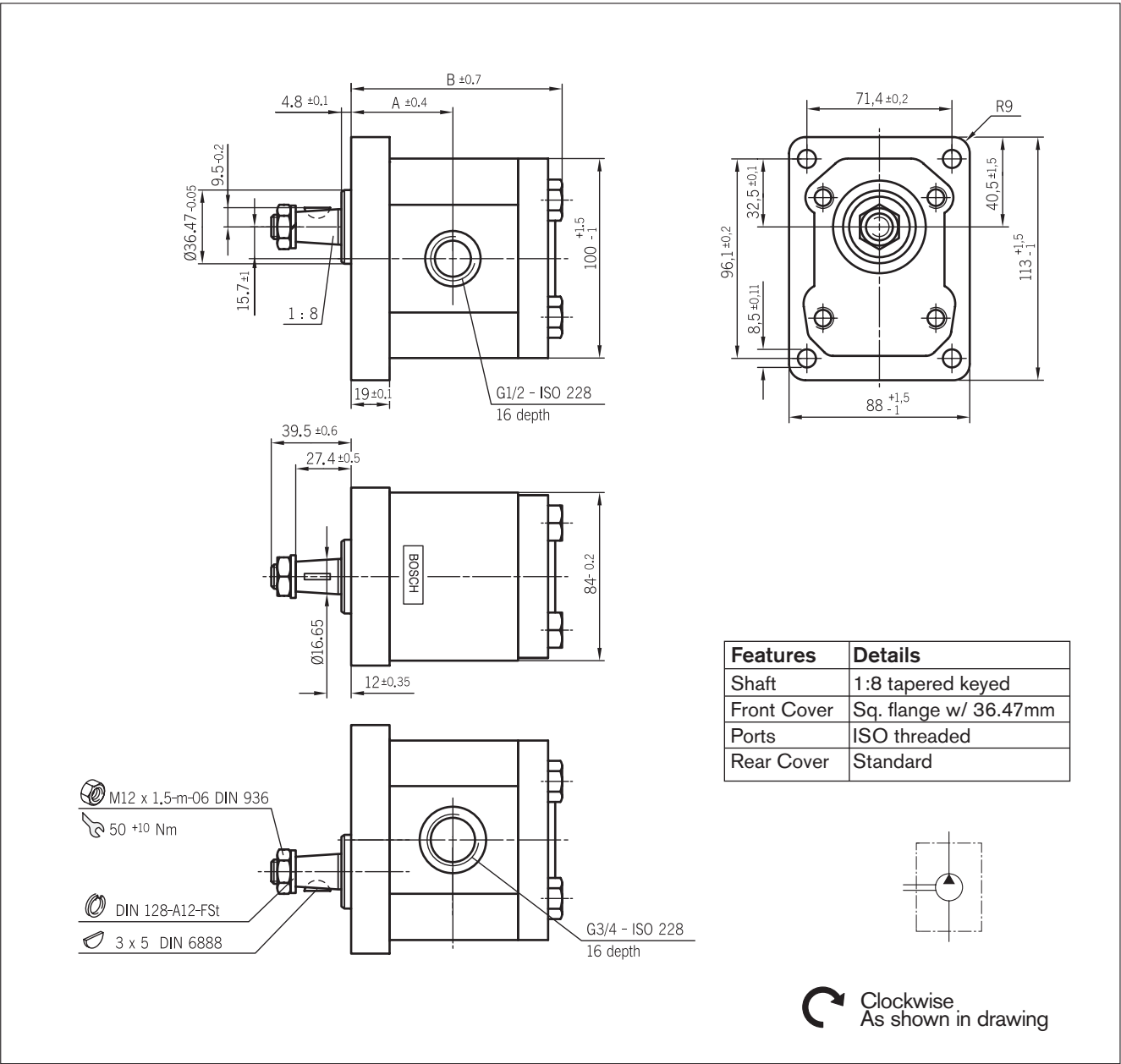
 Clockwise
As shown in drawing

 Counter-Clockwise
Inlet and outlet port changed

AZPF - XX - □□□□ F O 30 MB

[illegible]

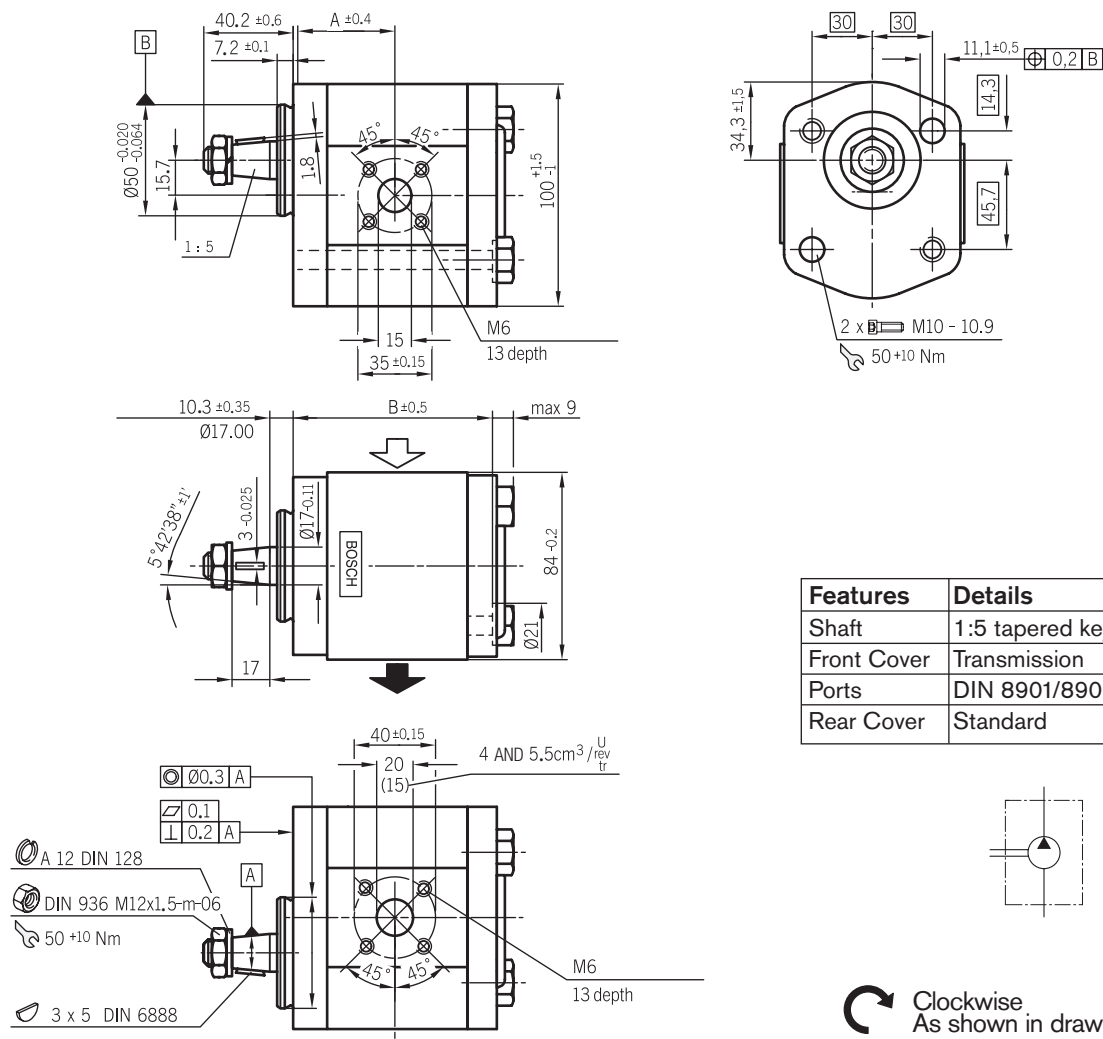
* Contact factory for availability of units with no ordering number listed.



Ordering code
AZPF - X X - ☐☐☐☐ H O 01 MB

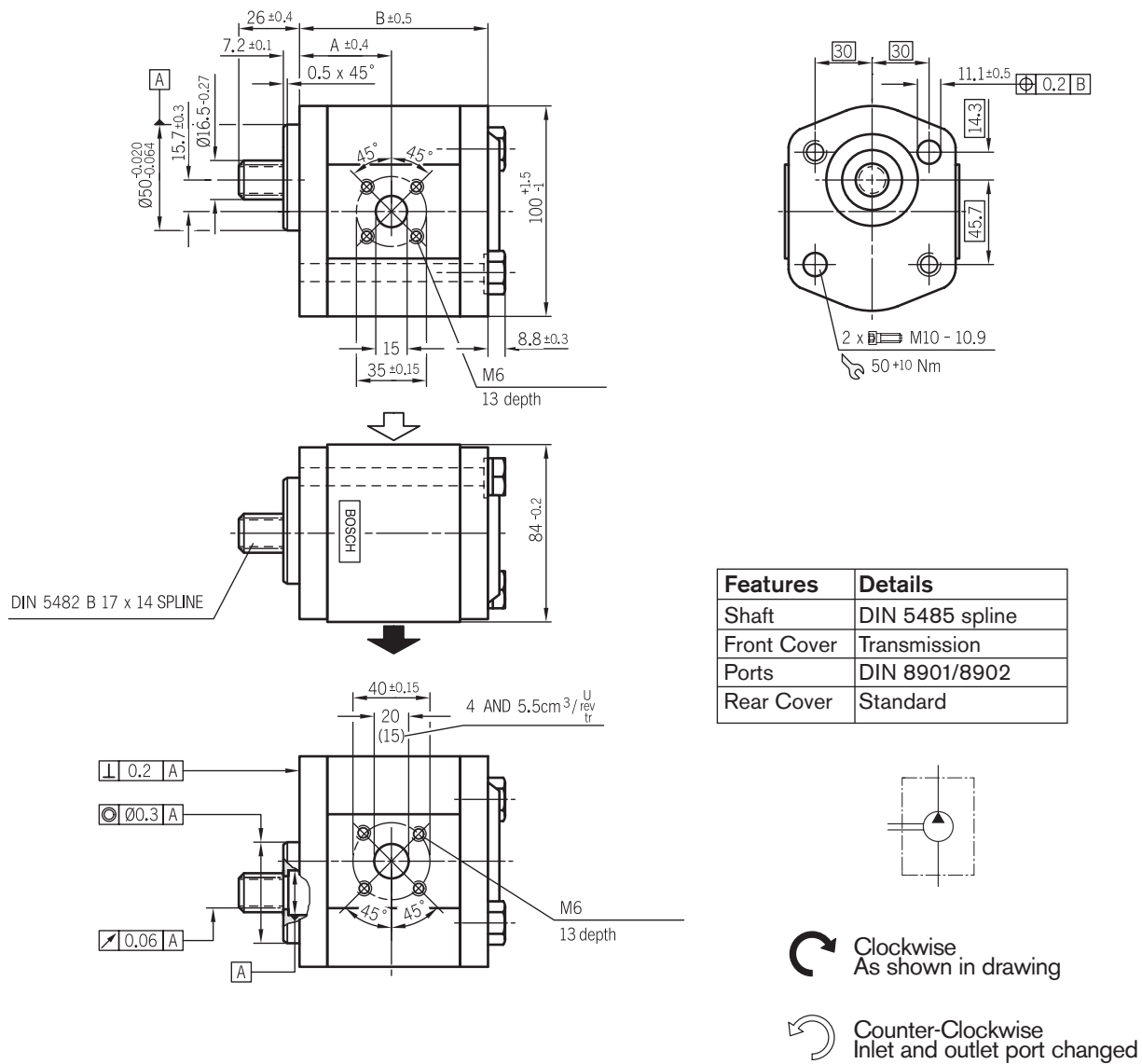
Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			
	 L	 R			A	B		
4.0		0 510 225 015	250	4000	41.4	86.5		
5.5		0 510 325 018	250	4000	42.6	89.0		
8.0		0 510 425 027	250	4000	44.7	93.1		
11.0		0 510 525 039	250	3500	48.5	98.1		
14.0		0 510 525 040	250	3000	49.0	103.1		
16.0		0 510 625 047	250	3000	49.0	106.5		
19.0		0 510 625 052	210	3000	49.0	111.5		
22.5		0 510 725 084	180	2500	56.6	116.4		
25.0								
28.0								

* Contact factory for availability of units with no ordering number listed.

**Ordering code****AZPF - X X - □ □ □ □ C N 20 MB**

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			
	L	R			A	B		
4.0	0 510 215 306	0 510 215 006	250	4000	37.4	73.7		
5.5	0 510 315 304	0 510 315 004	250	4000	38.6	76.2		
8.0	0 510 415 313	0 510 415 005	250	4000	40.7	80.3		
11.0	0 510 515 310	0 510 515 004	250	3500	44.5	85.3		
14.0		0 510 515 015	250	3000	45.0	90.3		
16.0	0 510 615 314	0 510 615 006	250	3000	45.0	93.7		
19.0	0 510 615 341		210	3000	45.0	98.7		
22.5		0 510 715 016	180	2500	58.6	116.1		
25.0								
28.0								

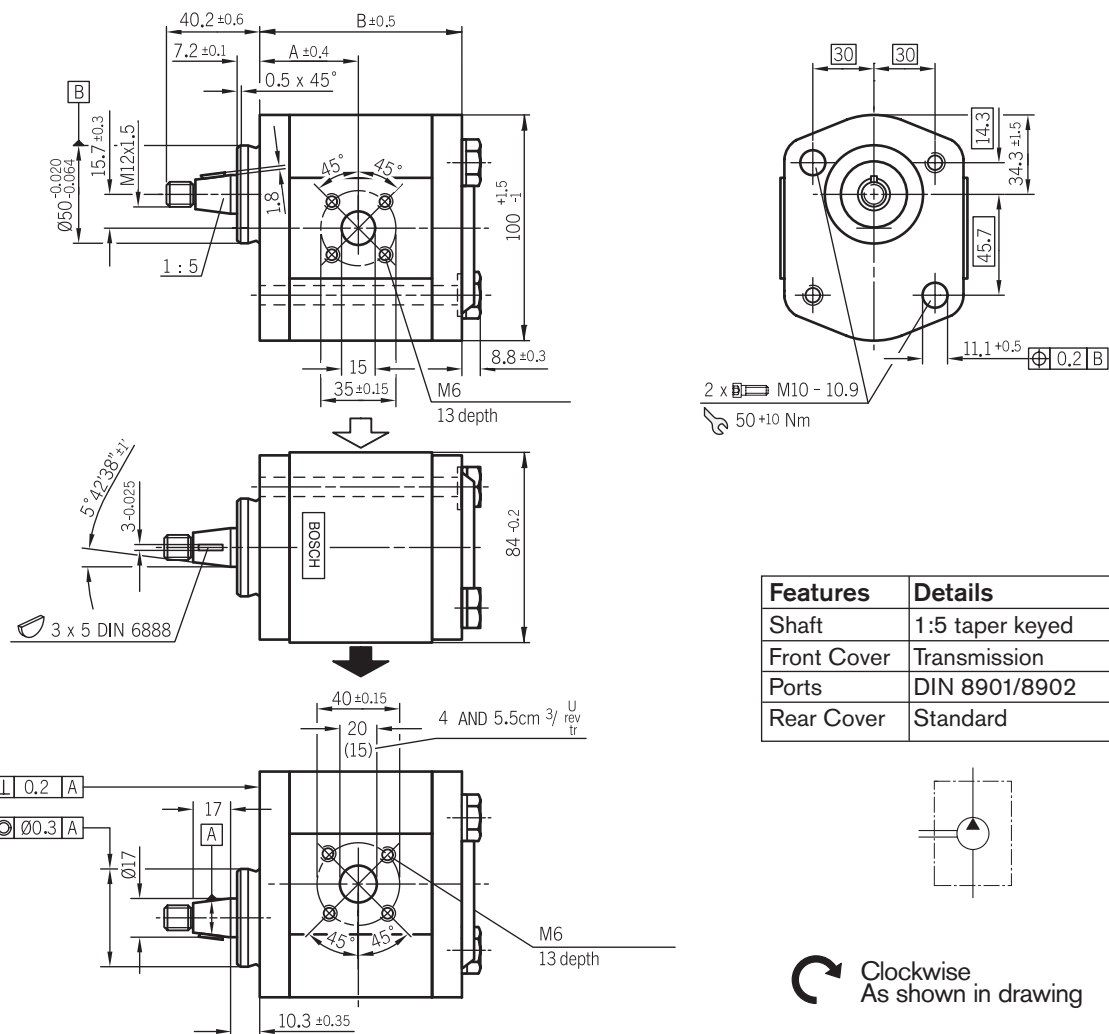
* Contact factory for availability of units with no ordering number listed.



Ordering code
AZPF - X X - □ □ □ □ F N 20 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			
	 L	 R			A	B		
5.5		0 510 315 007	250	4000	38.6	76.2		
11.0		0 510 515 011	250	3500	45.0	85.3		
19.0		0 510 615 009	210	3000	45.0	98.7		

* Contact factory for availability of units with no ordering number listed.



 Clockwise
As shown in drawing

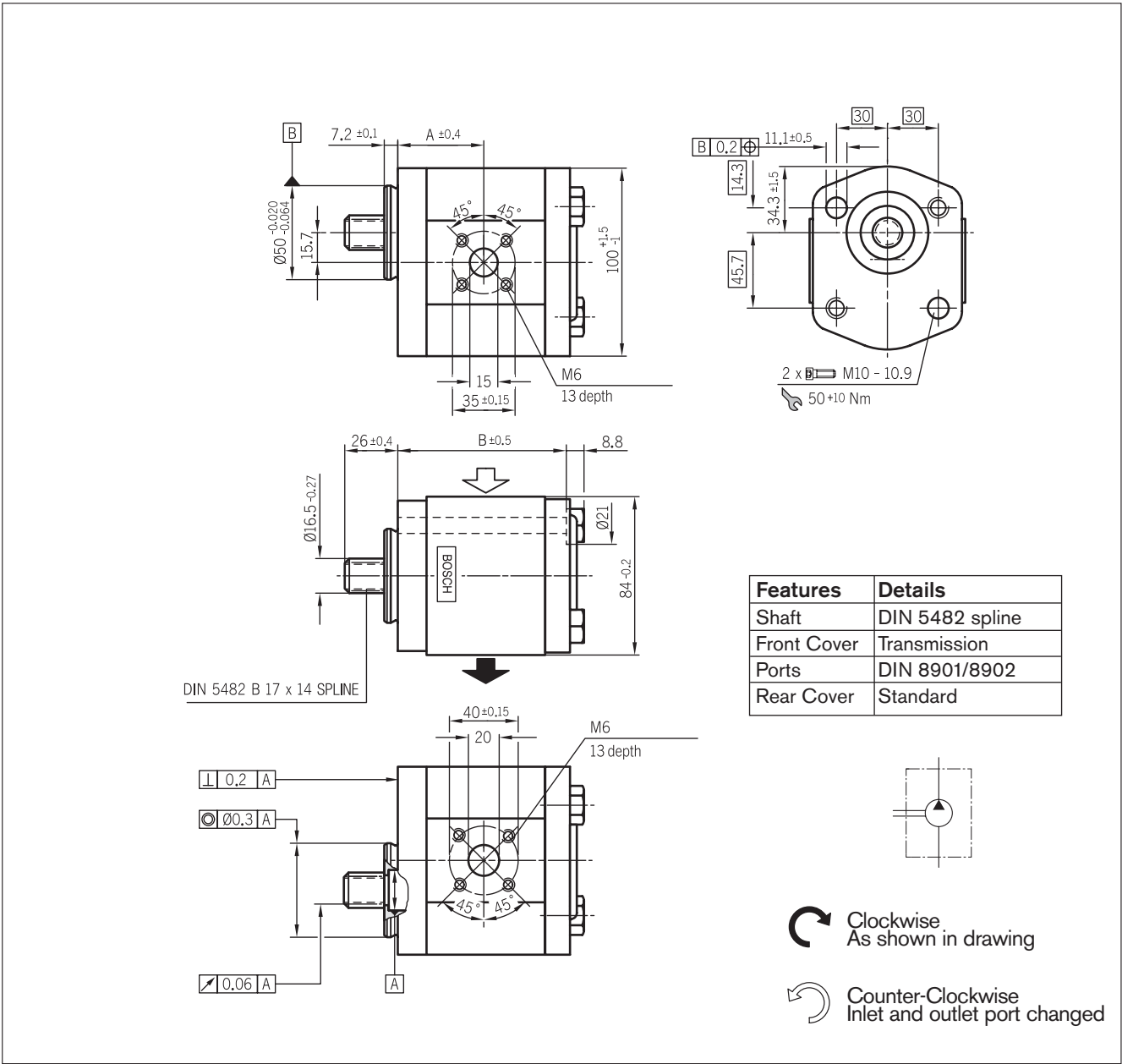
 Counter-Clockwise
Inlet and outlet port changed

Ordering code

AZPF – X X – □ □ □ □ C P 20 MB – S0007

[illegible]

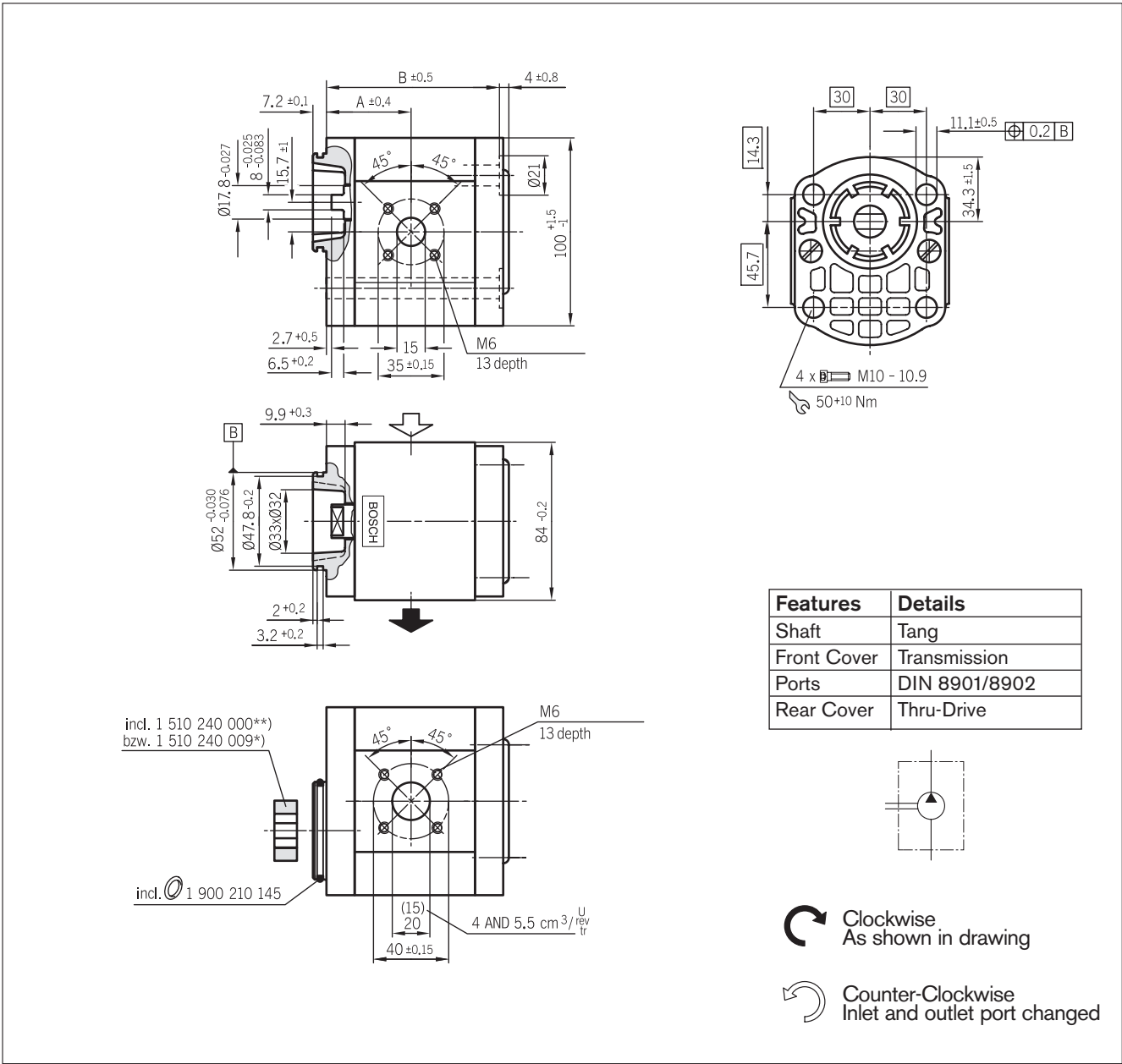
* Contact factory for availability of units with no ordering number listed.



Ordering code
AZPF - X X - ☐☐☐☐ F P 20 PB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			
	 L	 R			A	B		
8.0	0 510 415 328		250	4000	40.7	80.3		
11.0	0 510 515 337	0 510 515 012	250	3500	44.5	85.3		
14.0	0 510 515 338	0 510 515 013	250	3000	45.0	90.3		
16.0		0 510 615 023	250	3000	45.0	93.7		
22.5	0 510 715 320	0 510 715 008	180	2500	58.6	116.1		

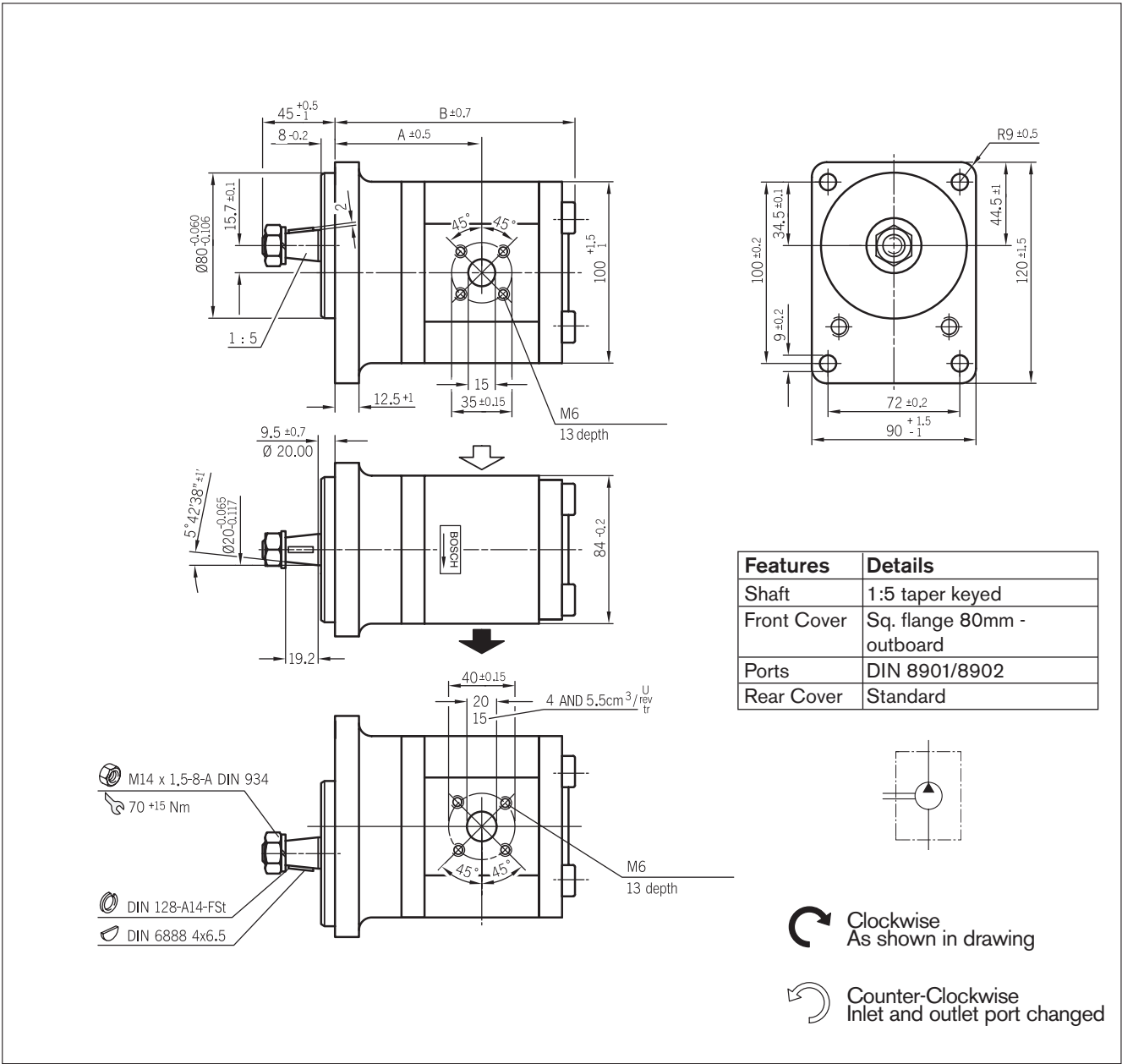
* Contact factory for availability of units with no ordering number listed.



Ordering code
AZPF - X X - □ □ □ □ N T 20 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			
	L	R			A	B		
4.0	0 510 215 307	0 510 215 007	250	4000	37.4	73.7		
5.5	0 510 315 305	0 510 315 005	250	4000	38.6	76.2		
8.0	0 510 415 314	0 510 415 006	250	4000	40.7	80.3		
11.0	0 510 515 311	0 510 515 005	250	3500	44.5	85.3		
14.0	0 510 515 340	0 510 515 019	250	3000	45.0	90.3		
16.0	0 510 615 315	0 510 615 007	250	3000	45.0	93.7		
19.0	0 510 615 321	0 510 615 008	210	3000	45.0	98.7		
22.5	0 510 715 307	0 510 715 004	180	2500	52.6	104.1		
25.0								
28.0								

* Contact factory for availability of units with no ordering number listed.



Ordering code
AZPF - X X - □ □ □ □ S A 20 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			
	L	R			A	B		
4.0	0 510 245 300	0 510 245 001	250	4000	71.3	116.7		
5.5	0 510 345 300	0 510 345 001	250	4000	72.6	119.2		
8.0	0 510 445 300	0 510 445 001	250	4000	74.7	121.5		
11.0	0 510 545 300	0 510 545 001	250	3500	79.0	126.5		
16.0	0 510 645 300	0 510 645 004	250	3000	79.0	134.9		
19.0		0 510 645 002	210	3000	79.0	134.9		

* Contact factory for availability of units with no ordering number listed.

A Z	P	N - 1 □ - 0 3 2	R	D	C	1 2	M	B - S □ □ □ □ *
Function								
P = Pump								
Size (N)								
1.28 in ³ (20.4 cm ³) = 020								
1.44 in ³ (23.1 cm ³) = 022								
1.61 in ³ (25.8 cm ³) = 025								
1.78 in ³ (28.4 cm ³) = 028								
2.02 in ³ (32.4 cm ³) = 032								
2.28 in ³ (36.4 cm ³) = 036								
Direction of rotation								
Right = R								
Left = L								
End cover								
Standard = B								
Rear Ports = A								
Seals								
NBR = M								
FPM = P								
NBR, shaft seal in FPM = K								
Drive shafts			Front flange			Line connections		
Matching front flange								
C	Conical 1:5 (Tapered key) 	B	B	Square flange Pilot Ø 100 mm 		20	Rectangular flange 	
N	Dog (Tang) 	M	C	SAE B 2-bolt 		12	Thread (UN-2B) SAE O-ring BOSS 	
D	Spline shaft SAE B 13T 	C	M	Transmission flange Pilot Ø 52 mm with O-ring 		07	Split flange SAE Code 61 Metric bolts 	
P	Spline shaft SAE 11T 	R	C	SAE A 2-bolt 		40	Split flange SAE Code 61 UNC bolts 	
Q	SAE 3/4" Keyed Short 	R	C					
Q	SAE 3/4" Keyed Long - use S0022 Suffix 	R	C					
X	Special (SO Code Defines Special Shaft)	R	C					

* Common Suffix Codes:
S0075 – Tapered shaft
Contact Factory for additional codes.



N Series Pump Product Index
(Reference page 43 for ordering code designators)



Page Number	Ordering code	Shaft Type	Mounting Flange	Ports	Port Orientation
49	AZPN-12-XXXXPC12MB	P	C	12	side
50	AZPN-12-XXXXPC12MA	P	C	12	rear
51	AZPN-12-XXXXPR12MB	P	R	12	side
52	AZPN-12-XXXXPR12MA	P	R	12	rear
53	AZPN-12-XXXXQC12MB	Q	C	12	side
54	AZPN-12-XXXXQC12MA	Q	C	12	rear
55	AZPN-12-XXXXQR12MB	Q	R	12	side
56	AZPN-12-XXXXQR12MA	Q	R	12	rear
57	AZPN-12-XXXXRR12MB	R	R	12	side
58	AZPN-12-XXXXRR12MA	R	R	12	rear
59	AZPN-12-XXXXDC12MB	D	C	12	side
60	AZPN-12-XXXXDC12MA	D	C	12	rear
61	AZPN-12-XXXXDR12MB	D	R	12	side
62	AZPN-12-XXXXDR12MA	D	R	12	rear
63	AZPN-12-XXXXXR12MB-S0075	X-S0075	R	12	side
64	AZPN-12-XXXXXR12MA-S0075	X-S0075	R	12	rear
65	AZPN-12-XXXXDC20MB	D	C	20	side
66	AZPN-12-XXXXCB20MB	C	B	20	side
67	AZPN-12-XXXXNM20MB	N	M	20	side

N Series Performance Ratings

Size		020	022	025	028	032	036
Displacement	cm ³ /rev	20.4	23.1	25.8	28.4	32.4	36.4
Inlet pressure	bar	min. 0.7 max. 3 (absolute)					
max. continuous pressure p ₁	bar	230	230	230	210	180	160
	psi	3335	3335	3335	3045	2610	2610
max. intermittent pressure p ₂	bar	250	250	250	230	200	180
	psi	3625	3625	3625	3335	2900	2610
max. peak pressure p ₃	bar	270	270	270	250	220	200
	psi	3915	3915	3915	3625	3190	2900
min. rotational speed (RPM) ≤ 100	RPM	500	500	500	500	500	500
max. rotational speed at (RPM) p ₁		2500	2500	2500	2300	2300	2100
p ₂		3000	3000	3000	2800	2800	2600

N Series Pumps**SAE O-Ring BOSS - Standard Porting**

Displacement (cc)	Side Ports		Rear Port	
	Inlet	Outlet	Inlet	Outlet
20	-16	-10	-16	-12
22	-16	-10	-16	-12
25	-20	-12	-16	-12
28	-20	-12	-16	-12
32	-20	-12	-16	-12
36	-20	-12	-16	-12

**SAE Porting - Specifications and Dimensions
per SAE J1926/1**

Dash Size	Thread Size (in)
-2	5/16-24 UNF-2B
-3	3/8-24 UNF-2B
-4	7/16-20 UNF-2B
-5	1/2-20 UNF-2B
-6	9/16-18 UNF-2B
-8	3/4-16 UNF-2B
-10	7/8-14 UNF-2B
-12	1-1/16-12 UN-2B
-14	1-3/16-12 UN-2B
-16	1-5/16-12 UN-2B
-20	1-5/8-12 UN-2B
-24	1-7/8-12 UN-2B
-32	2-1/2-12 UN-2B

Note: Ratings represent units incorporating SAE O-Ring BOSS threaded ports. Pressure ratings may differ for other types of ports.

Diagrams

Size **N**

$v = 35 \text{ mm}^2/\text{s}$, $T = 50^\circ\text{C}$

Unit Conversions

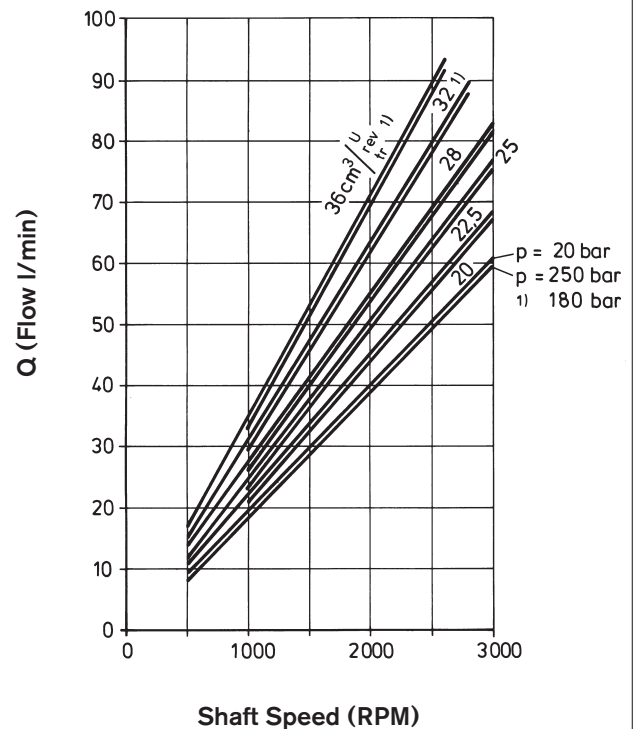
Pressure: $\text{psi} = \text{bar} \times 14.7$

Torque: $\text{ft-lbs} = (\text{Nm}) \times .738$

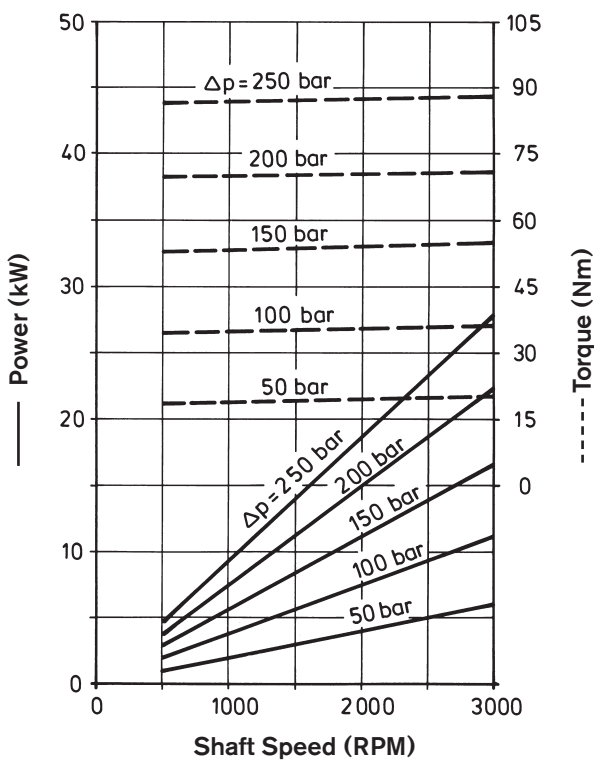
Power: $\text{hp} = (\text{kW}) \times 1.341$

Volume: $\text{in}^3 = (\text{cc}) \times 16.39$

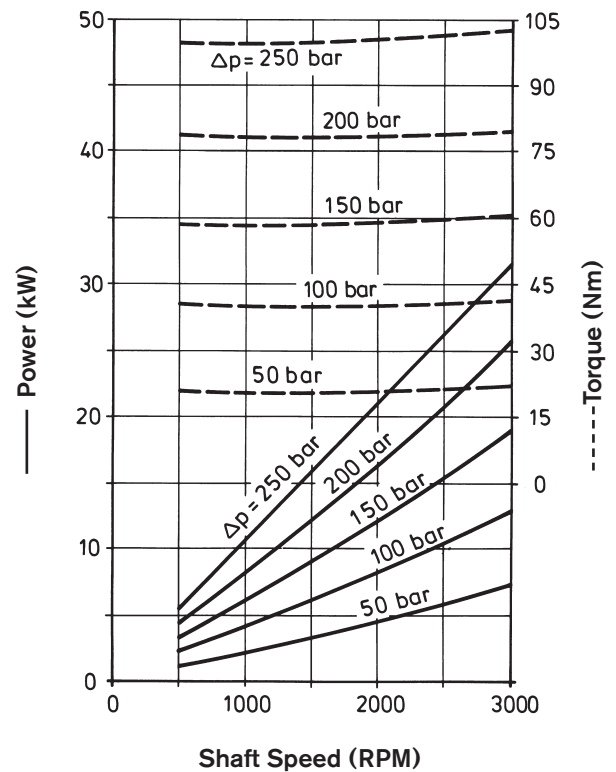
$\text{gpm} = (\text{LPM}) \times .2642$

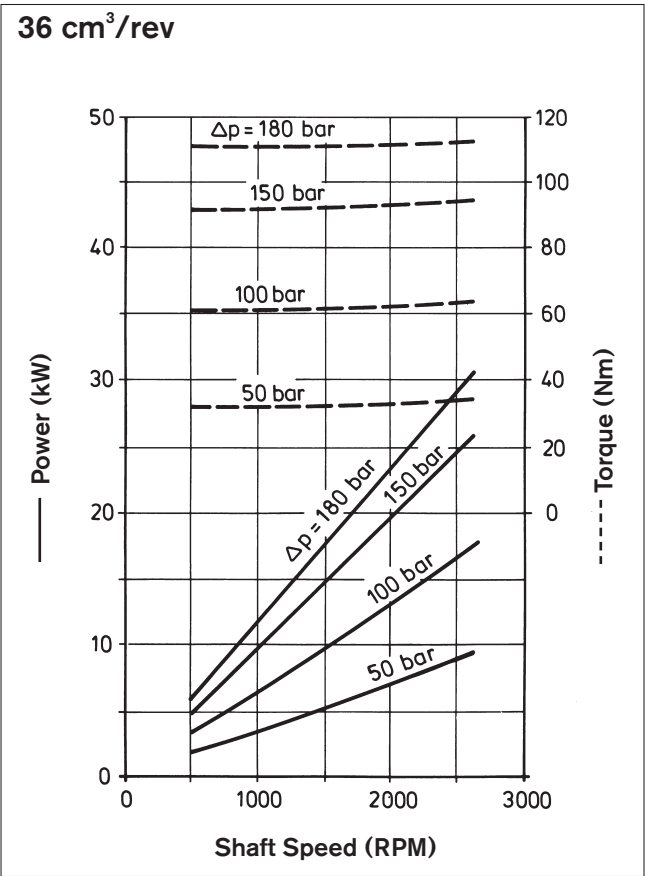
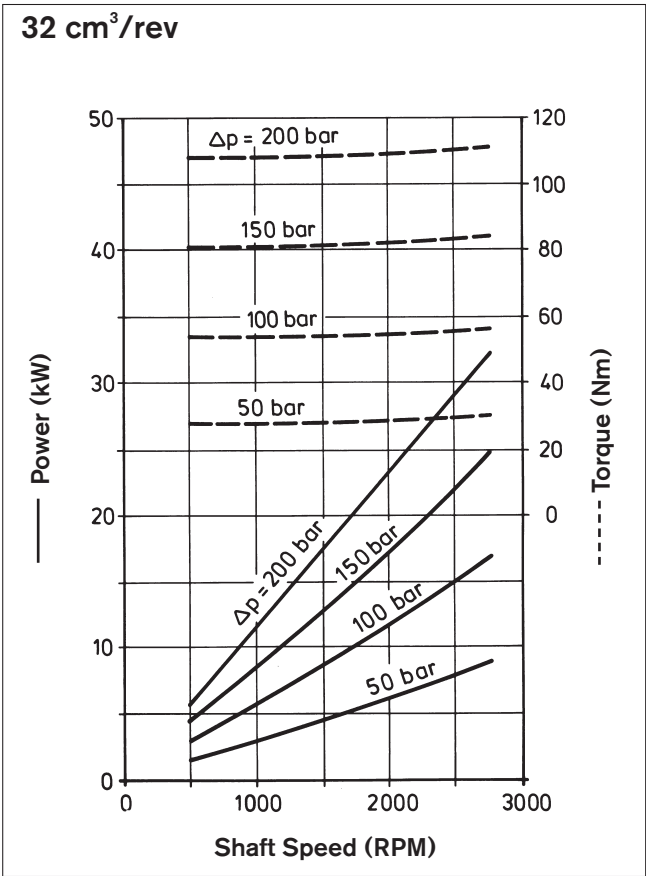
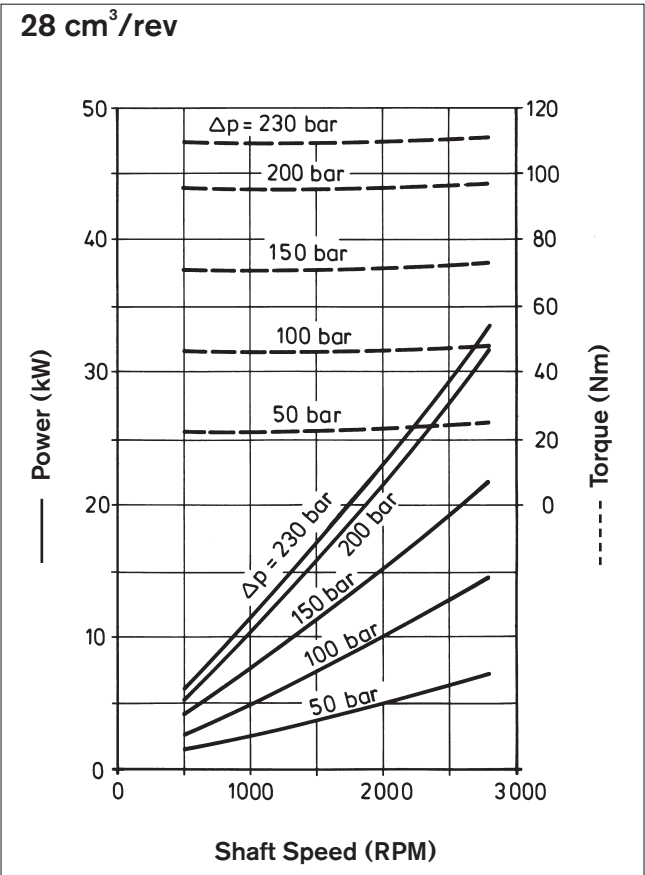
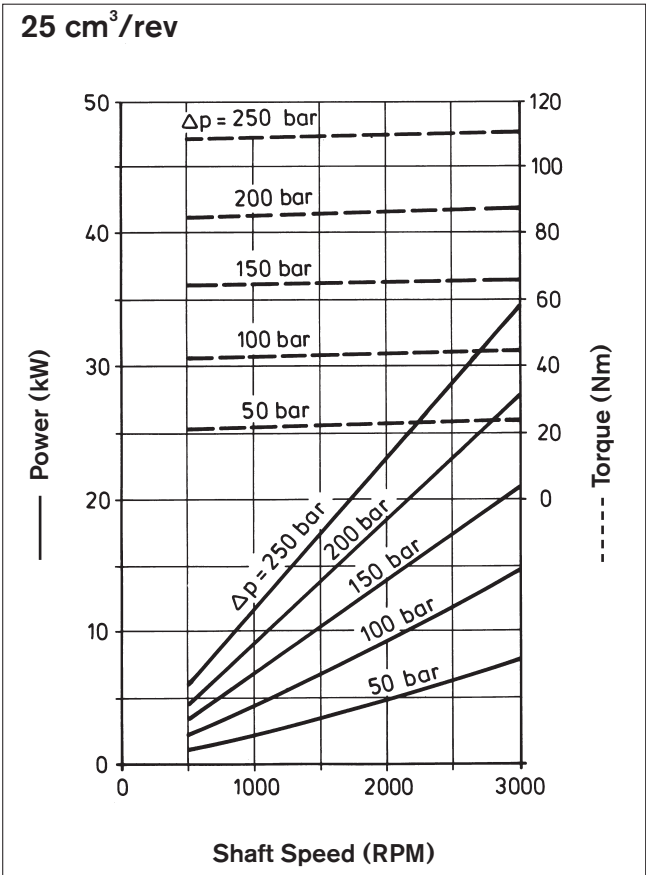


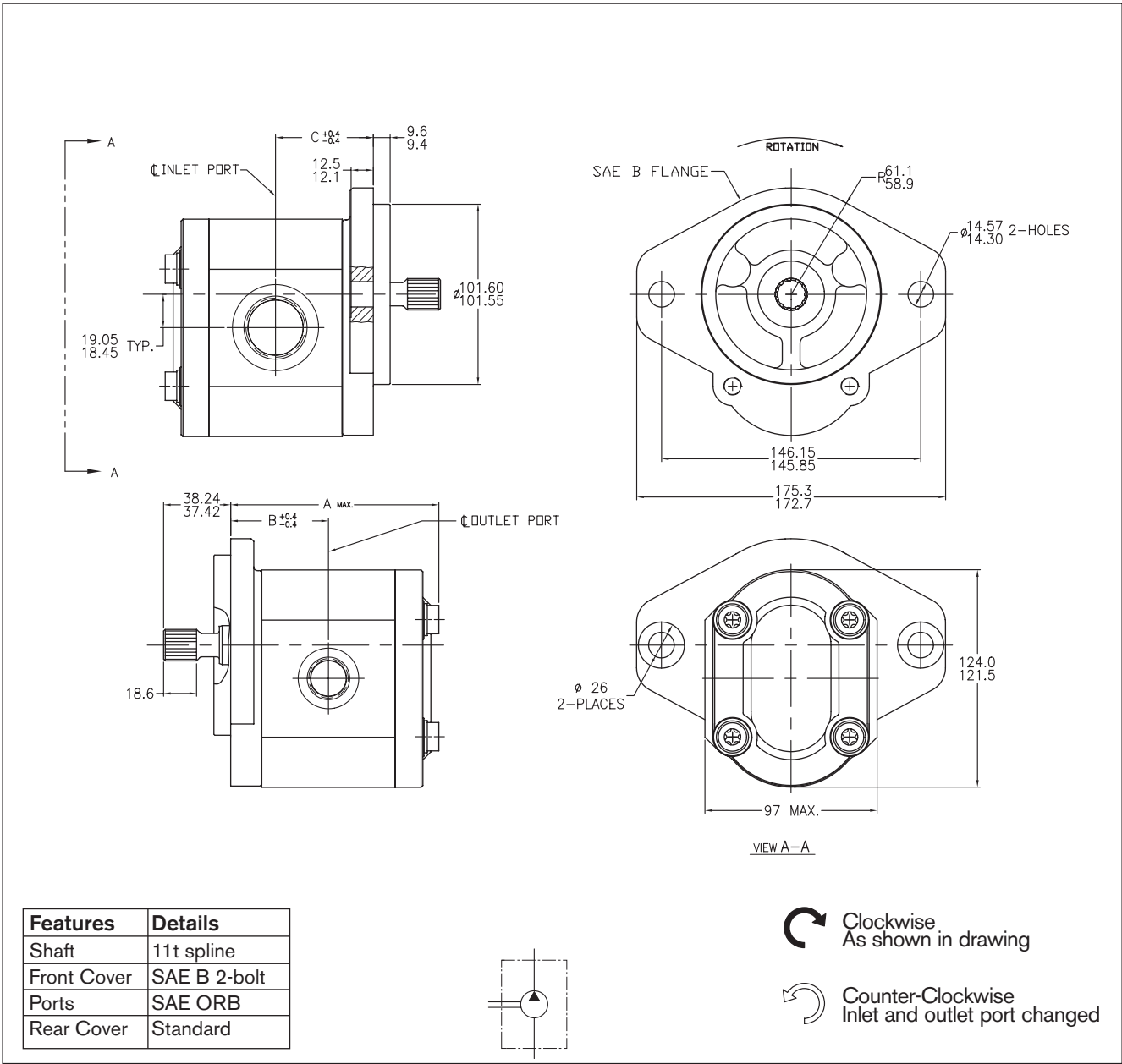
20 cm³/rev



22.5 cm³/rev



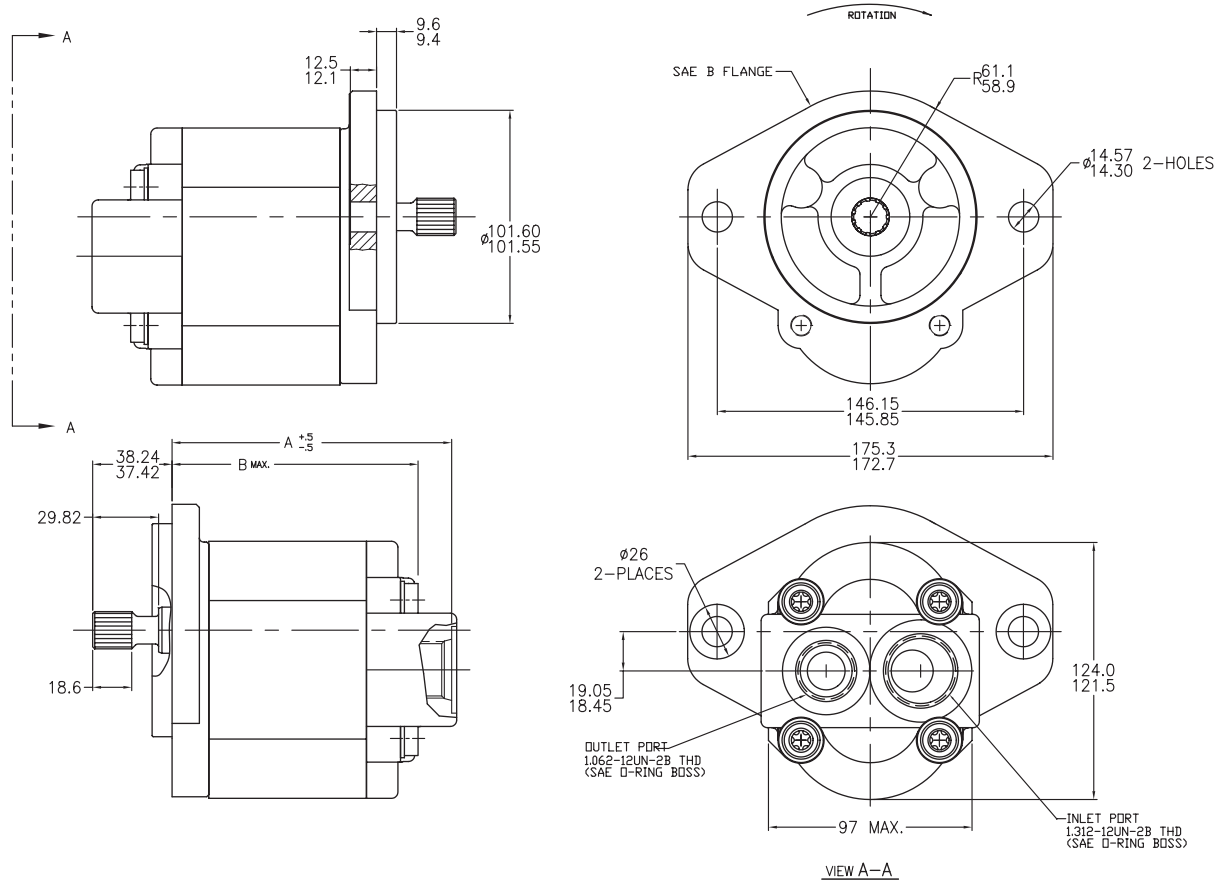




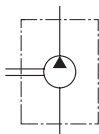
Ordering code
AZPN - X X - □ □ □ □ P C 12 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	L	R			A	B	C		
20.0	9 510 390 153	9 510 390 147	230	3000	109.8	52.1	52.1	-16	-10
22.0	9 510 390 154	9 510 390 148	230	3000	114.7	53.6	53.1	-16	-10
25.0	9 510 390 155	9 510 390 149	230	3000	115.8	55.1	55.1	-20	-12
28.0	9 510 390 156	9 510 390 150	210	2800	118.8	56.6	56.1	-20	-12
32.0	9 510 390 157	9 510 390 151	180	2800	123.3	58.8	58.8	-20	-12
36.0	9 510 390 158	9 510 390 152	160	2600	129.7	61.1	61.1	-20	-12

* Contact factory for availability of units with no ordering number listed.
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.



Features	Details
Shaft	11t spline
Front Cover	SAE B 2-bolt
Ports	SAE ORB
Rear Cover	Rear ports



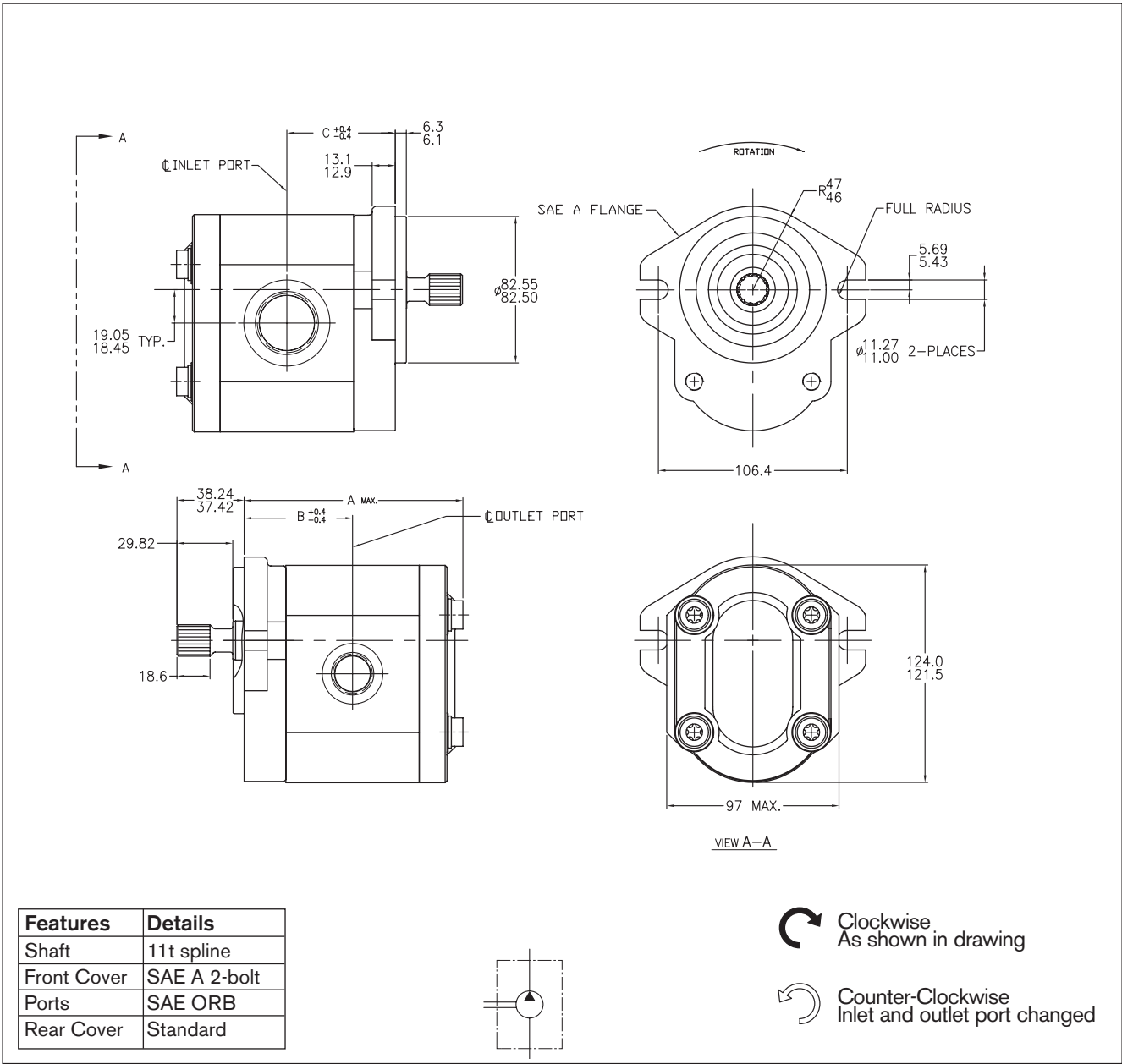
 Clockwise
As shown in drawing

 Counter-Clockwise
Inlet and outlet port changed

Ordering code
AZPN – X X – □ □ □ □ P C 12 MA

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]		Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	 L	 R			A	B		
20.0	9 510 390 104	9 510 390 098	230	3000	128.1	110.0	-16	-12
22.0	9 510 390 105	9 510 390 099	230	3000	131.1	114.9	-16	-12
25.0	9 510 390 106	9 510 390 100	230	3000	134.1	116.0	-16	-12
28.0	9 510 390 107	9 510 390 101	210	2800	137.1	119.0	-16	-12
32.0	9 510 390 108	9 510 390 102	180	2800	141.6	123.5	-16	-12
36.0	9 510 390 109	9 510 390 103	160	2600	146.1	124.4	-16	-12

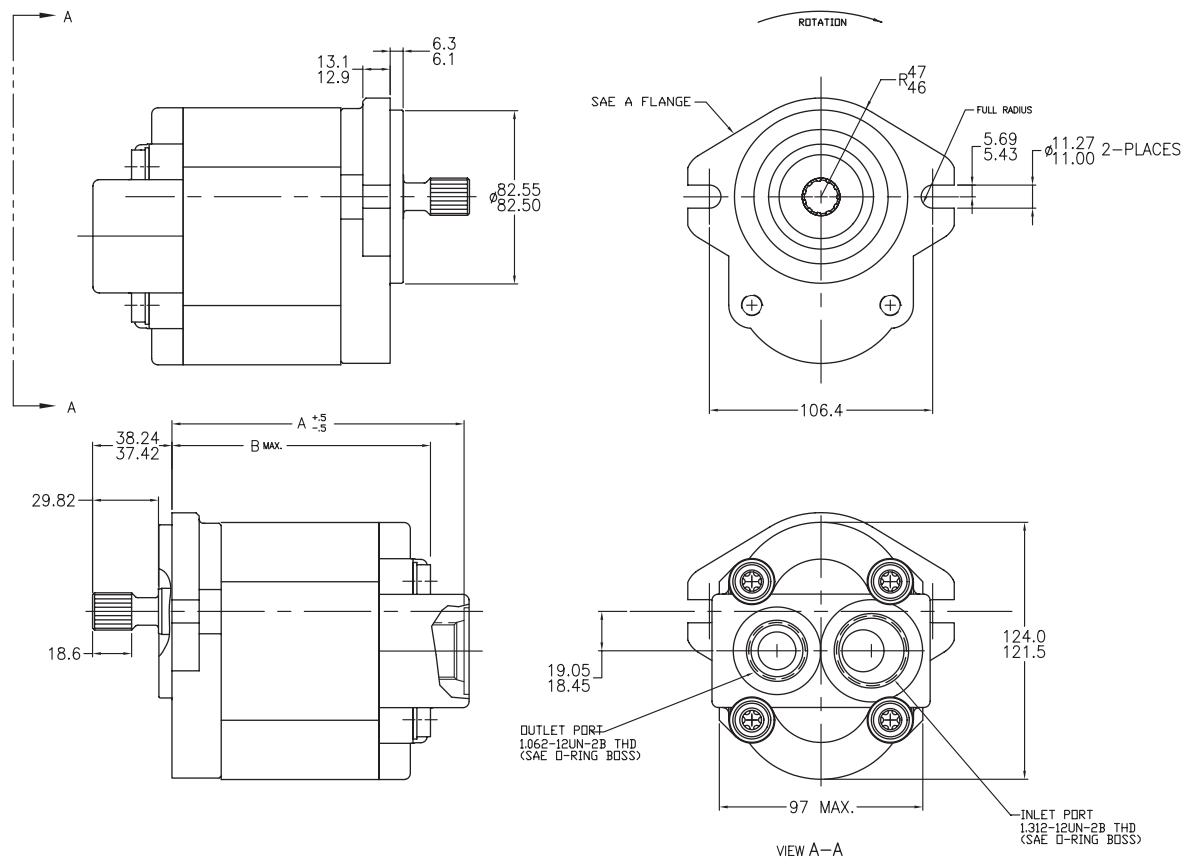
* Contact factory for availability of units with no ordering number listed.
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.



Ordering code
AZPN - X X - □ □ □ □ P R 12 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	 L	 R			A	B	C		
20.0	9 510 390 165	9 510 390 159	230	3000	115.4	58.1	58.1	-16	-10
22.0	9 510 390 166	9 510 390 160	230	3000	118.4	59.6	59.6	-16	-10
25.0	9 510 390 167	9 510 390 161	230	3000	121.4	61.1	61.1	-20	-12
28.0	9 510 390 168	9 510 390 162	210	2800	124.4	62.6	62.6	-20	-12
32.0	9 510 390 169	9 510 390 163	180	2800	128.5	64.8	64.8	-20	-12
36.0	9 510 390 170	9 510 390 164	160	2600	133.0	67.1	67.1	-20	-12

* Contact factory for availability of units with no ordering number listed.
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.



Features	Details
Shaft	11t spline
Front Cover	SAE A 2-bolt
Ports	SAE ORB
Rear Cover	Rear ports

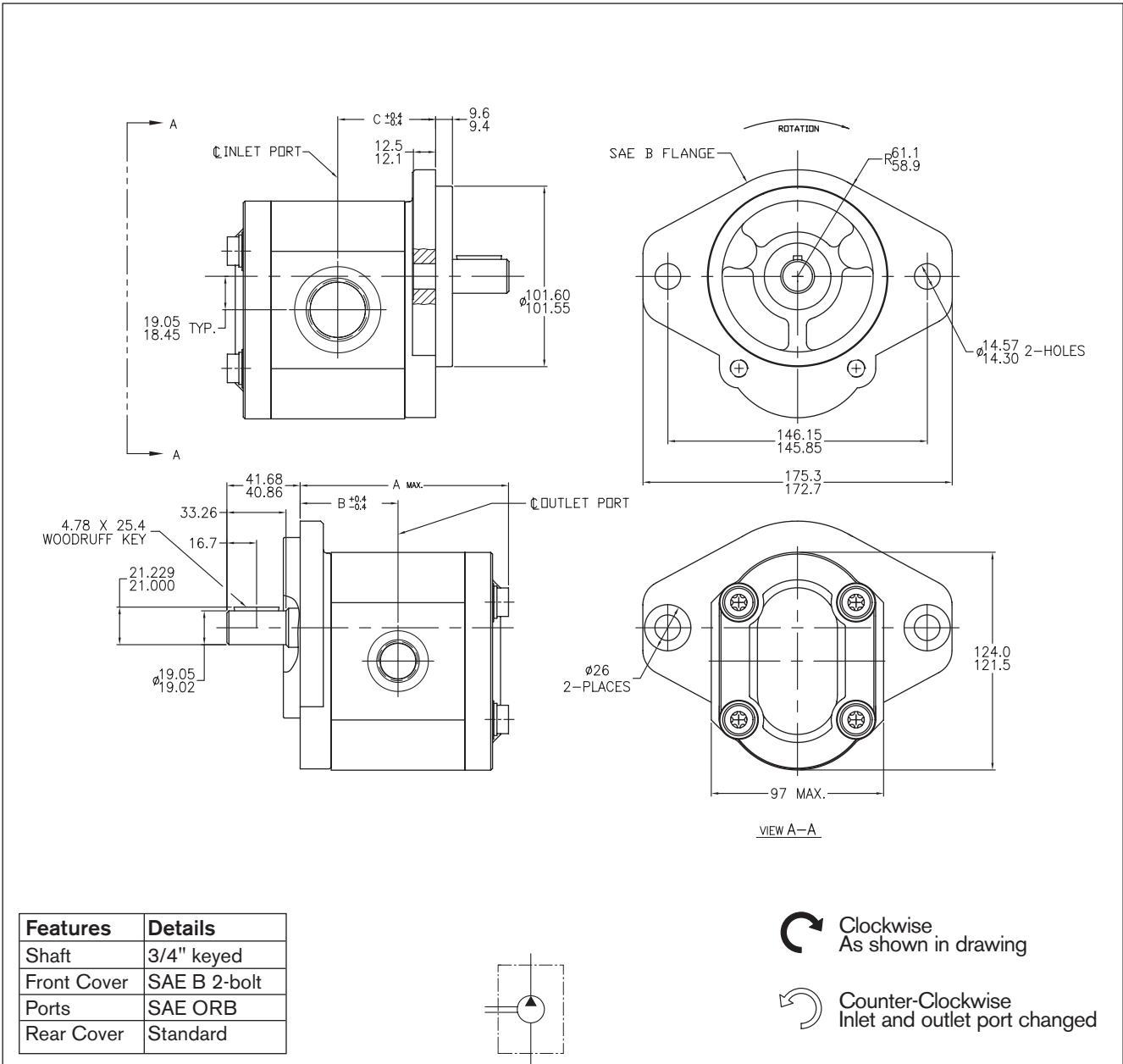
 Clockwise
As shown in drawing

 Counter-Clockwise
Inlet and outlet port changed

Ordering code
AZPN - X X - □ □ □ □ P R 12 MA

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	 L	 R			A	B			
20.0	9 510 390 092	9 510 390 086	230	3000	134.1	116.0		-16	-12
22.0	9 510 390 093	9 510 390 087	230	3000	137.1	120.9		-16	-12
25.0	9 510 390 094	9 510 390 088	230	3000	140.1	122.0		-16	-12
28.0	9 510 390 095	9 510 390 089	210	2800	143.1	125.0		-16	-12
32.0	9 510 390 096	9 510 390 090	180	2800	147.6	129.5		-16	-12
36.0	9 510 390 097	9 510 390 091	160	2600	152.1	135.9		-16	-12

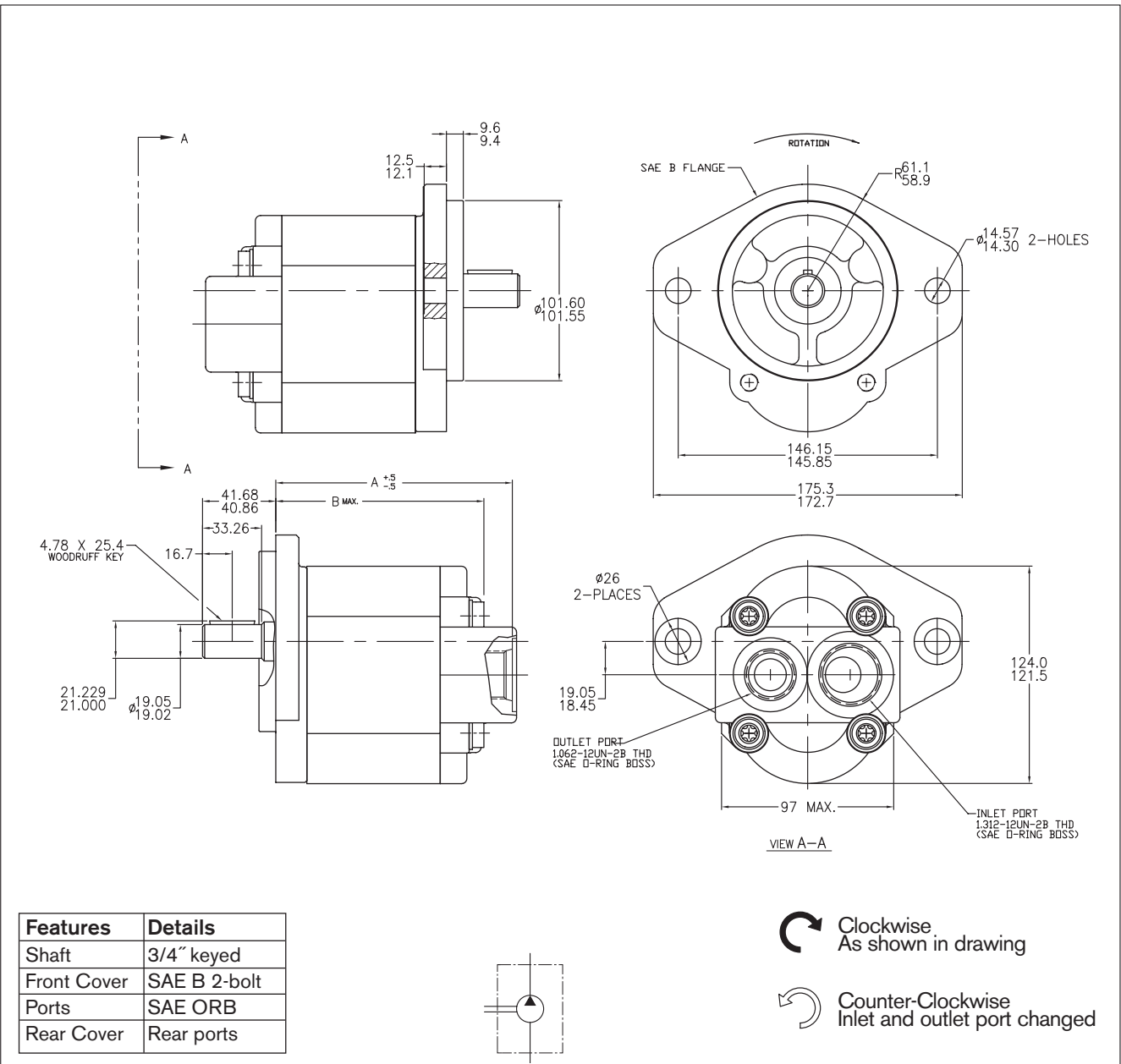
* Contact factory for availability of units with no ordering number listed.
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.



Ordering code
AZPN - X X - □ □ □ □ Q C 12 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	L	R			A	B	C		
20.0	9 510 390 055	9 510 390 049	230	3000	109.4	52.1	52.1	-16	-10
22.0	9 510 390 056	9 510 390 050	230	3000	112.4	53.6	53.6	-16	-10
25.0	9 510 390 057	9 510 390 051	230	3000	115.4	55.1	55.1	-20	-12
28.0	9 510 390 058	9 510 390 052	210	2800	118.4	56.6	56.6	-20	-12
32.0	9 510 390 059	9 510 390 053	180	2800	122.5	58.8	58.8	-20	-12
36.0	9 510 390 060	9 510 390 054	160	2600	127.0	61.1	61.1	-20	-12

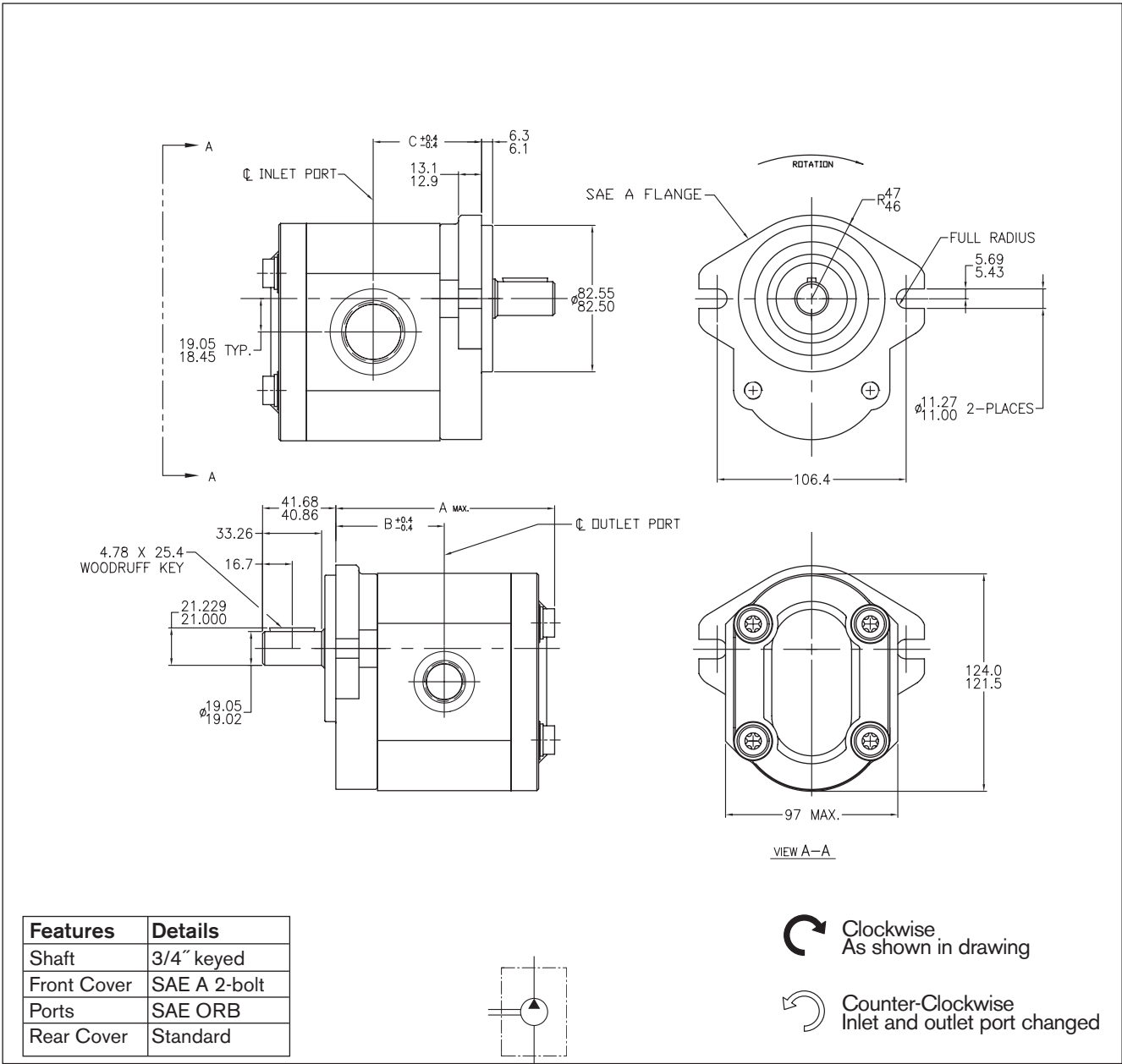
* Contact factory for availability of units with no ordering number listed.
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.



Ordering code
AZPN - X X - □ □ □ □ Q C 12 MA

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]		Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	L	R			A	B		
20.0	9 510 390 067	9 510 390 061	230	3000	128.1	110.0	-16	-12
22.0	9 510 390 068	9 510 390 062	230	3000	131.1	114.9	-16	-12
25.0	9 510 390 069	9 510 390 063	230	3000	134.1	116.0	-16	-12
28.0	9 510 390 070	9 510 390 064	210	2800	137.1	119.0	-16	-12
32.0	9 510 390 071	9 510 390 065	180	2800	141.6	123.5	-16	-12
36.0	9 510 390 072	9 510 390 066	160	2600	146.1	129.9	-16	-12

* Contact factory for availability of units with no ordering number listed.
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.



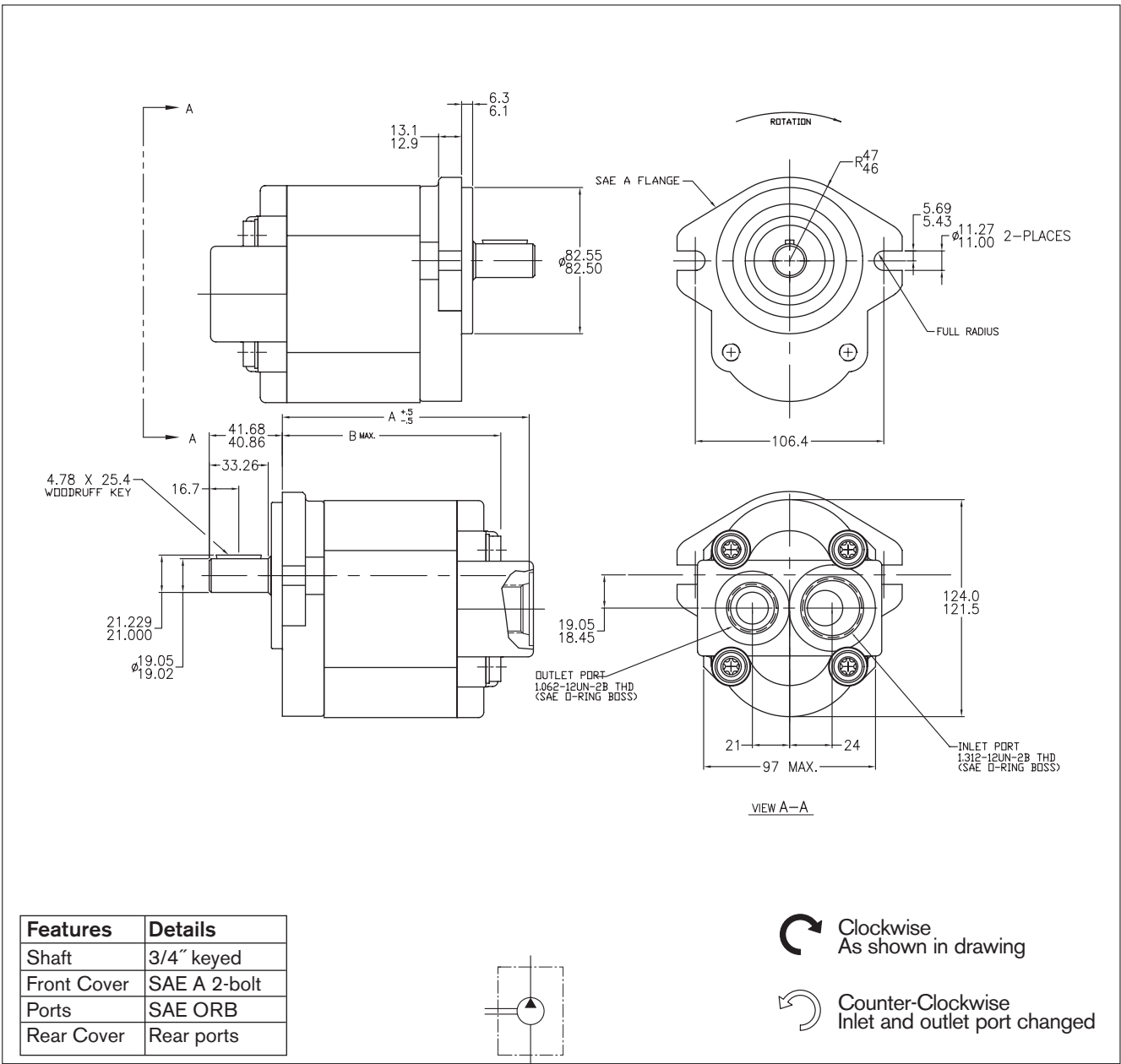
Ordering code

AZPN - X X - □ □ □ □ Q R 12 MB

Displacement [cm ³ /rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	L	R			A	B	C		
20.0	9 510 390 079	9 510 390 073	230	3000	115.4	58.1	58.1	-16	-10
22.0	9 510 390 080	9 510 390 074	230	3000	118.4	59.6	59.6	-16	-10
25.0	9 510 390 081	9 510 390 075	230	3000	121.4	61.1	61.1	-20	-12
28.0	9 510 390 082	9 510 390 076	210	2800	124.4	62.6	62.6	-20	-12
32.0	9 510 390 083	9 510 390 077	180	2800	128.5	64.8	64.8	-20	-12
36.0	9 510 390 084	9 510 390 078	160	2600	133.0	67.1	67.1	-20	-12

* Contact factory for availability of units with no ordering number listed.

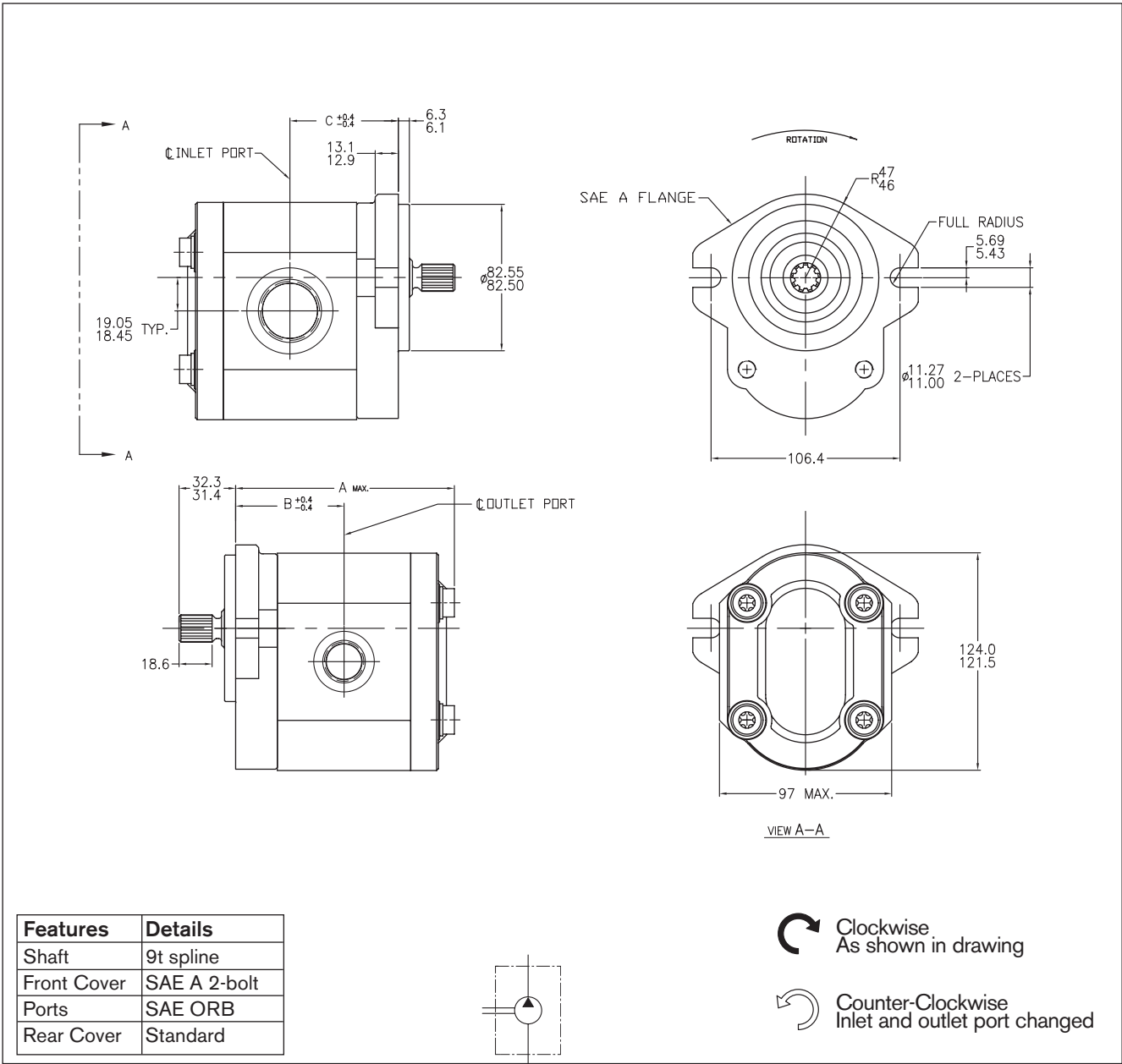
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.



Ordering code
AZPN - X X - □ □ □ □ Q R 12 MA

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]		Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	 L	 R			A	B		
20.0	9 510 390 128	9 510 390 122	230	3000	115.4	58.1	-16	-12
22.0	9 510 390 129	9 510 390 123	230	3000	118.4	59.6	-16	-12
25.0	9 510 390 130	9 510 390 124	230	3000	121.4	61.1	-16	-12
28.0	9 510 390 131	9 510 390 125	210	2800	124.4	62.6	-16	-12
32.0	9 510 390 132	9 510 390 126	180	2800	128.5	64.8	-16	-12
36.0	9 510 390 133	9 510 390 127	160	2600	133.0	67.1	-16	-12

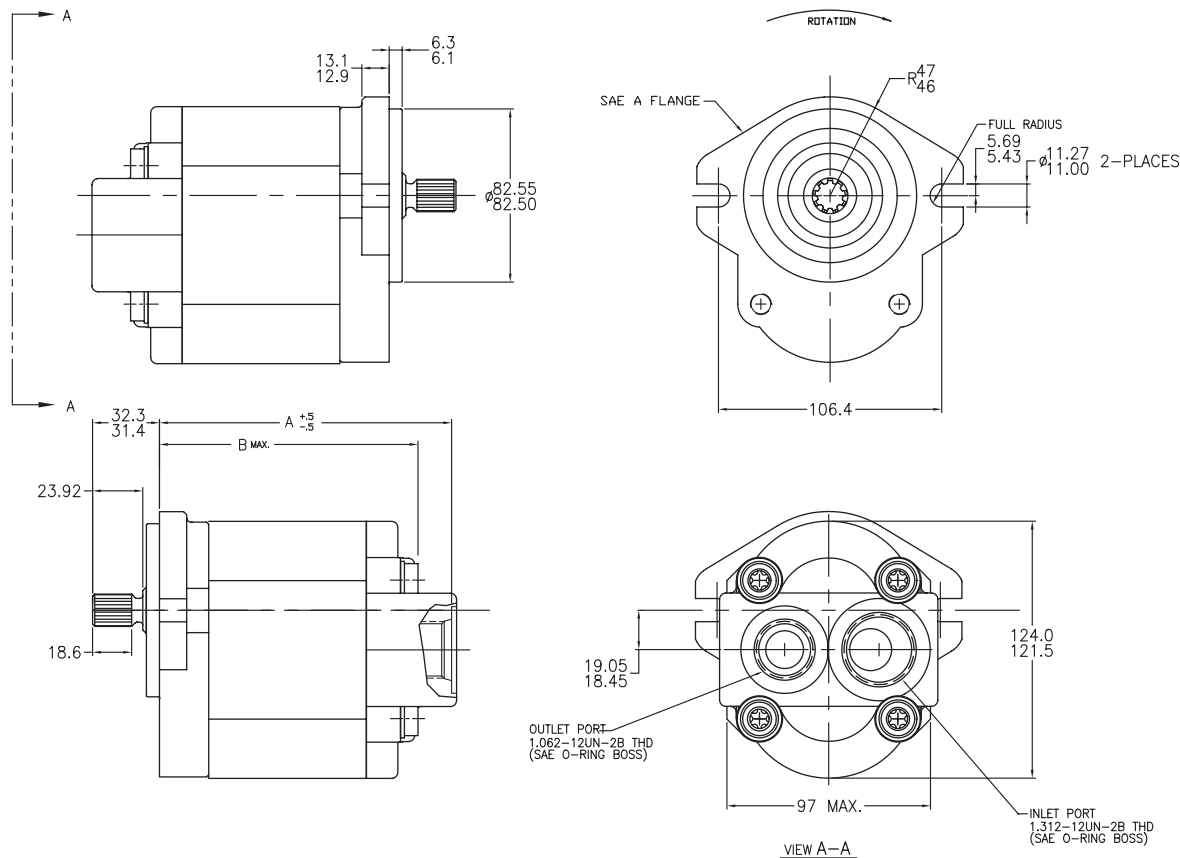
* Contact factory for availability of units with no ordering number listed.
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.



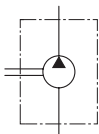
Ordering code
AZPN – X X – □ □ □ □ R R 12 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	L	R			A	B	C		
20.0	9 510 390 031	9 510 390 025	230	3000	117.7	58.1	58.1	-16	-10
22.0	9 510 390 032	9 510 390 026	230	3000	120.7	59.6	59.6	-16	-10
25.0	9 510 390 033	9 510 390 027	230	3000	123.7	61.1	61.1	-20	-12
28.0	9 510 390 034	9 510 390 028	210	2800	126.7	62.6	62.6	-20	-12
32.0	9 510 390 035	9 510 390 029	180	2800	130.8	64.8	64.8	-20	-12
36.0	9 510 390 036	9 510 390 030	160	2600	135.3	67.1	67.1	-20	-12

* Contact factory for availability of units with no ordering number listed.
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.



Features	Details
Shaft	9t spline
Front Cover	SAE A 2-bolt
Ports	SAE ORB
Rear Cover	Rear ports



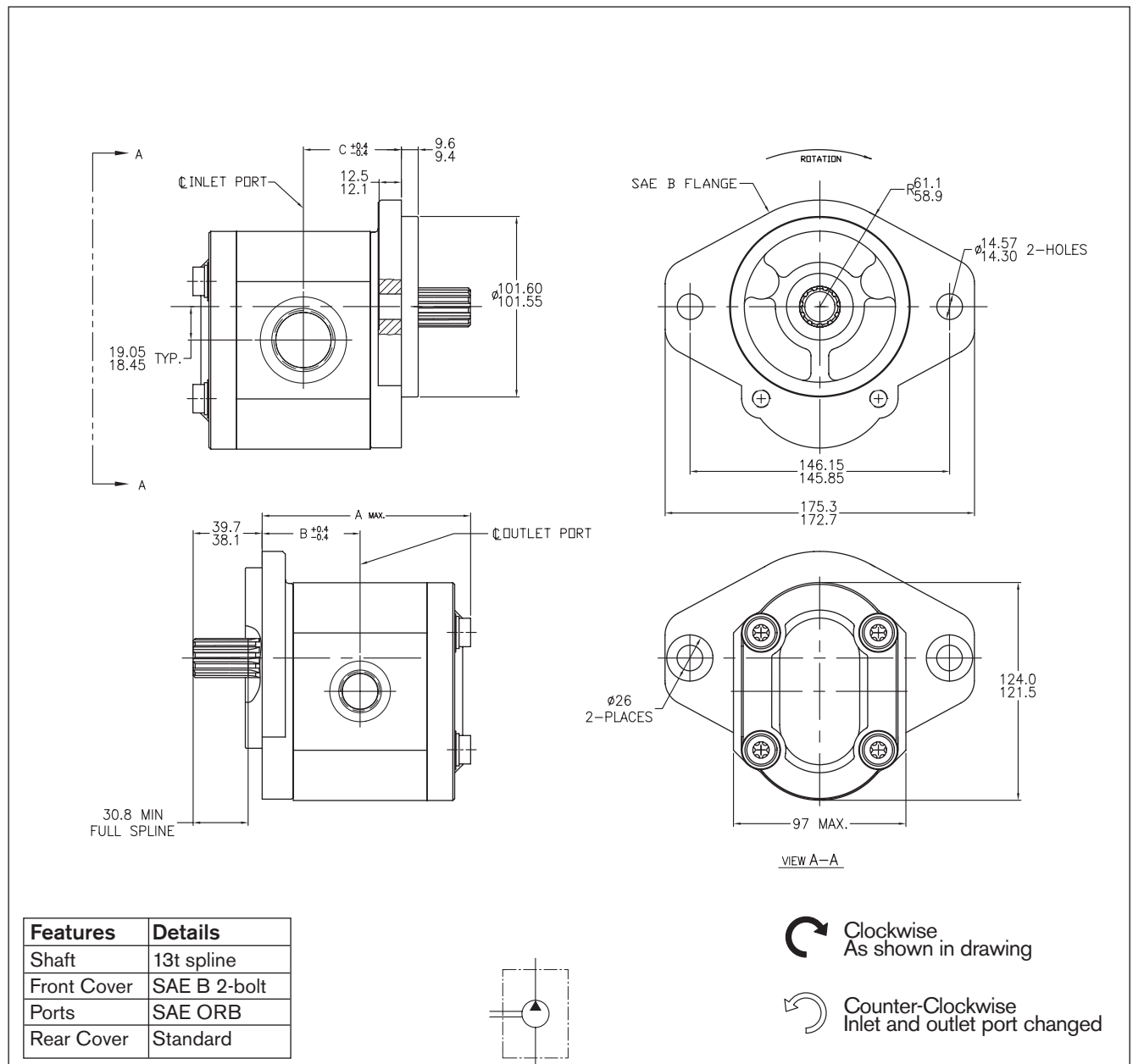
 Clockwise
As shown in drawing

 Counter-Clockwise
Inlet and outlet port changed

Ordering code
AZPN - X X - □ □ □ □ R R 12 MA

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]		Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	 L	 R			A	B		
20.0	9 510 390 043	9 510 390 037	230	3000	134.1	116.0	-16	-12
22.0	9 510 390 044	9 510 390 038	230	3000	131.1	120.9	-16	-12
25.0	9 510 390 045	9 510 390 039	230	3000	140.1	122.0	-16	-12
28.0	9 510 390 046	9 510 390 040	210	2800	143.1	125.0	-16	-12
32.0	9 510 390 047	9 510 390 041	180	2800	147.6	129.5	-16	-12
36.0	9 510 390 048	9 510 390 042	160	2600	152.1	135.9	-16	-12

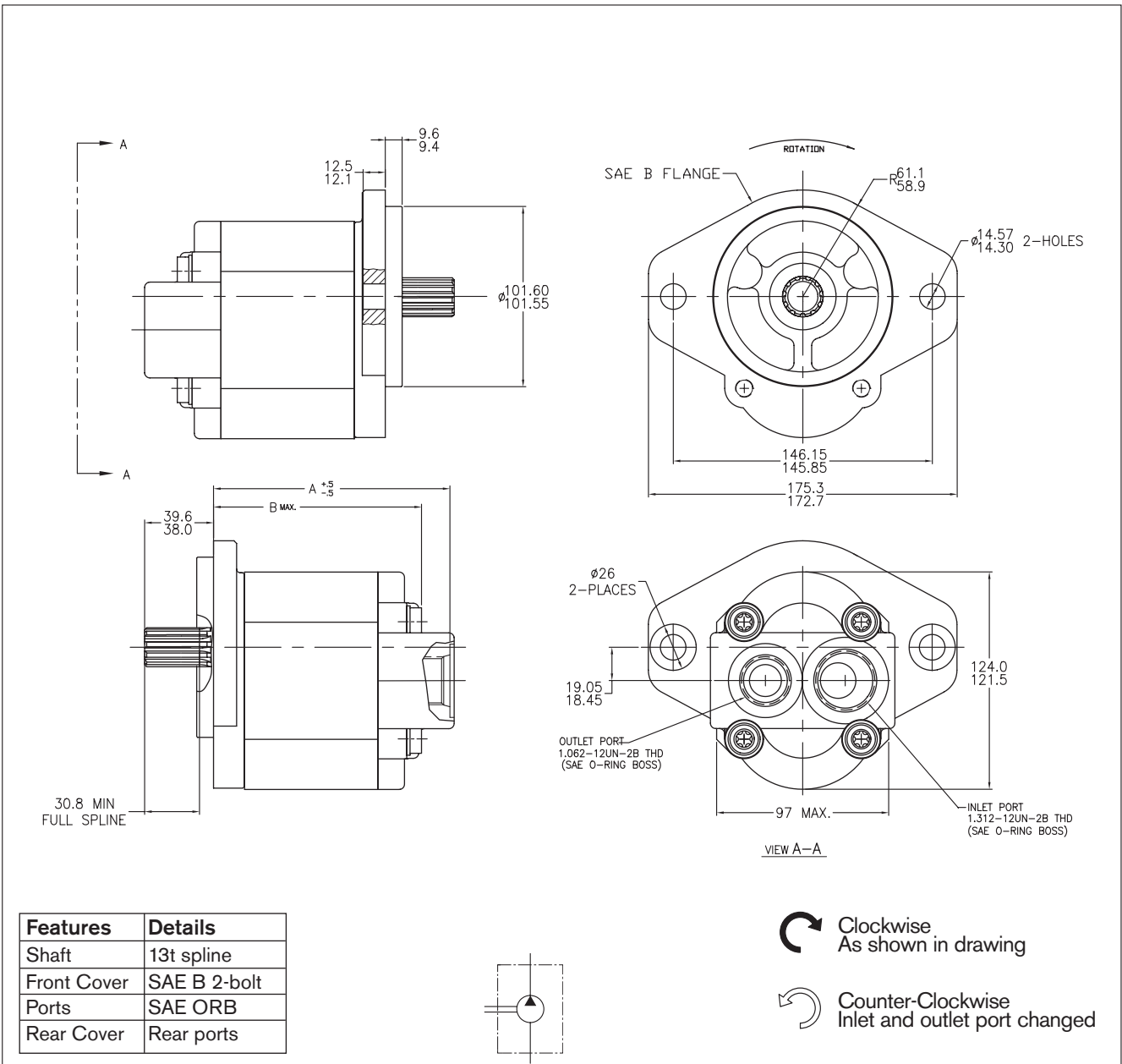
* Contact factory for availability of units with no ordering number listed.
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.

**Ordering code****AZPN - X X - □ □ □ □ D C 12 MB**

Displacement [cm ³ /rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	L	R			A	B	C		
20.0	9 510 390 007	9 510 390 001	230	3000	109.8	52.1	52.1	-16	-10
22.0	9 510 390 008	9 510 390 002	230	3000	114.7	53.6	53.6	-16	-10
25.0	9 510 390 009	9 510 390 003	230	3000	115.8	55.1	55.1	-20	-12
28.0	9 510 390 010	9 510 390 004	210	2800	118.8	56.6	56.6	-20	-12
32.0	9 510 390 011	9 510 390 005	180	2800	123.3	58.8	58.8	-20	-12
36.0	9 510 390 012	9 510 390 006	160	2600	129.7	61.1	61.1	-20	-12

* Contact factory for availability of units with no ordering number listed.

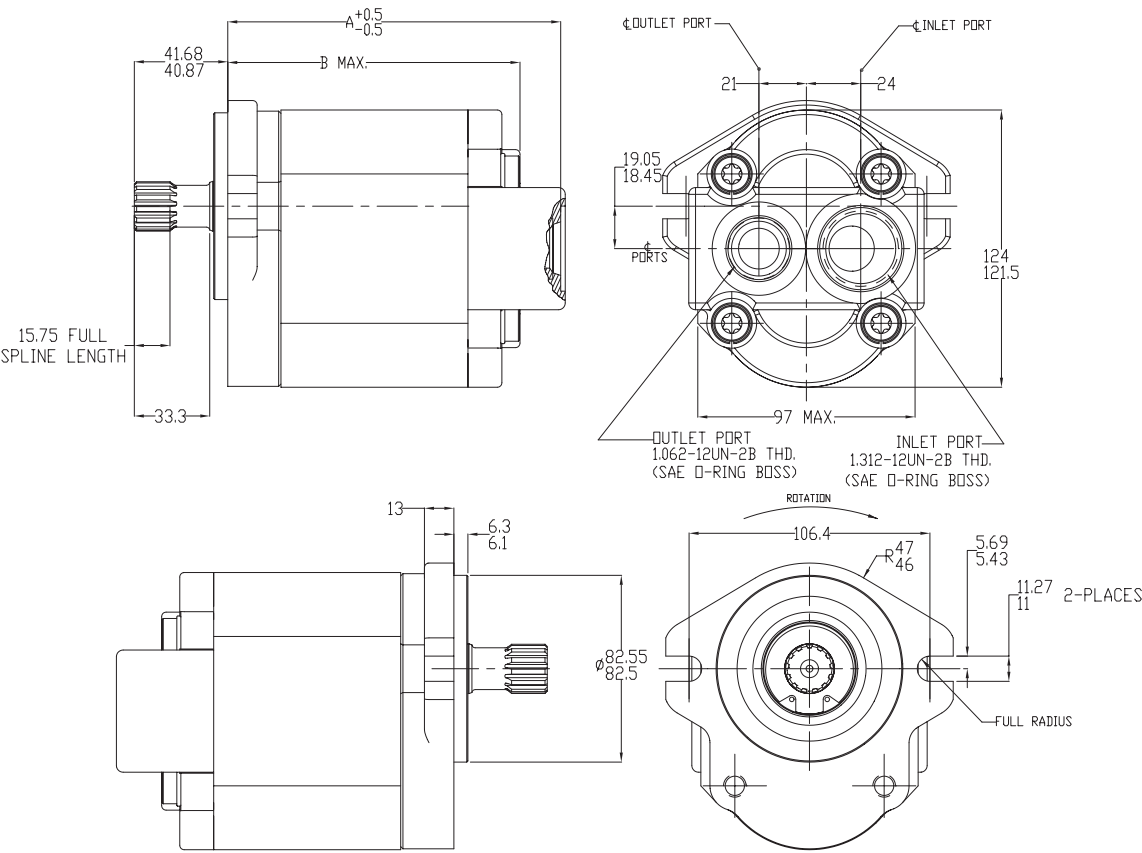
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.



Ordering code
AZPN - X X - □ □ □ □ D C 12 MA

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]		Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	 L	 R			A	B		
20.0	9 510 390 019	9 510 390 013	230	3000	128.1	110.0	-16	-12
22.0	9 510 390 020	9 510 390 014	230	3000	131.1	114.9	-16	-12
25.0	9 510 390 021	9 510 390 015	230	3000	134.1	116.0	-16	-12
28.0	9 510 390 022	9 510 390 016	210	2800	137.1	119.0	-16	-12
32.0	9 510 390 023	9 510 390 017	180	2800	141.6	123.5	-16	-12
36.0	9 510 390 024	9 510 390 018	160	2600	146.1	129.9	-16	-12

* Contact factory for availability of units with no ordering number listed.
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.



Features	Details
Shaft	13t spline
Front Cover	SAE A 2-bolt
Ports	SAE ORB
Rear Cover	Rear ports

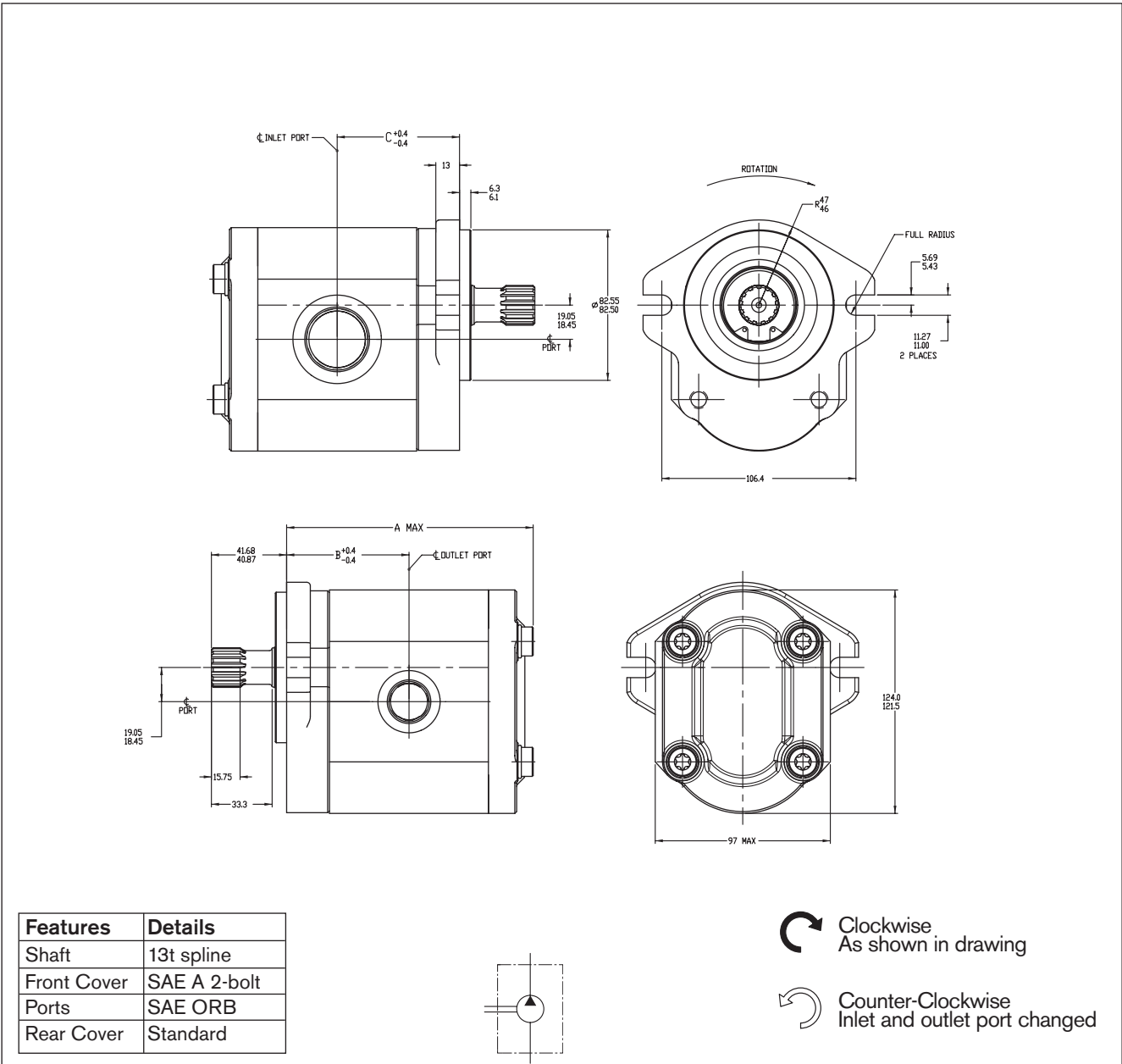
 Clockwise
As shown in drawing

 Counter-Clockwise
Inlet and outlet port changed

Ordering code
AZPN - X X - □ □ □ □ D R 12 MA

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]		Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	 L	 R			A	B		
20.0	*	9 510 390 175	230	3000	133.6	116.0	-16	-12
22.0	9 510 390 188	9 510 390 176	230	3000	136.6	119.0	-16	-12
25.0	*	9 510 390 177	230	3000	139.6	124.0	-16	-12
28.0	*	9 510 390 178	210	2800	142.6	125.0	-16	-12
32.0	*	9 510 390 179	180	2800	147.1	129.5	-16	-12
36.0	*	9 510 390 180	160	2600	151.6	134.0	-16	-12

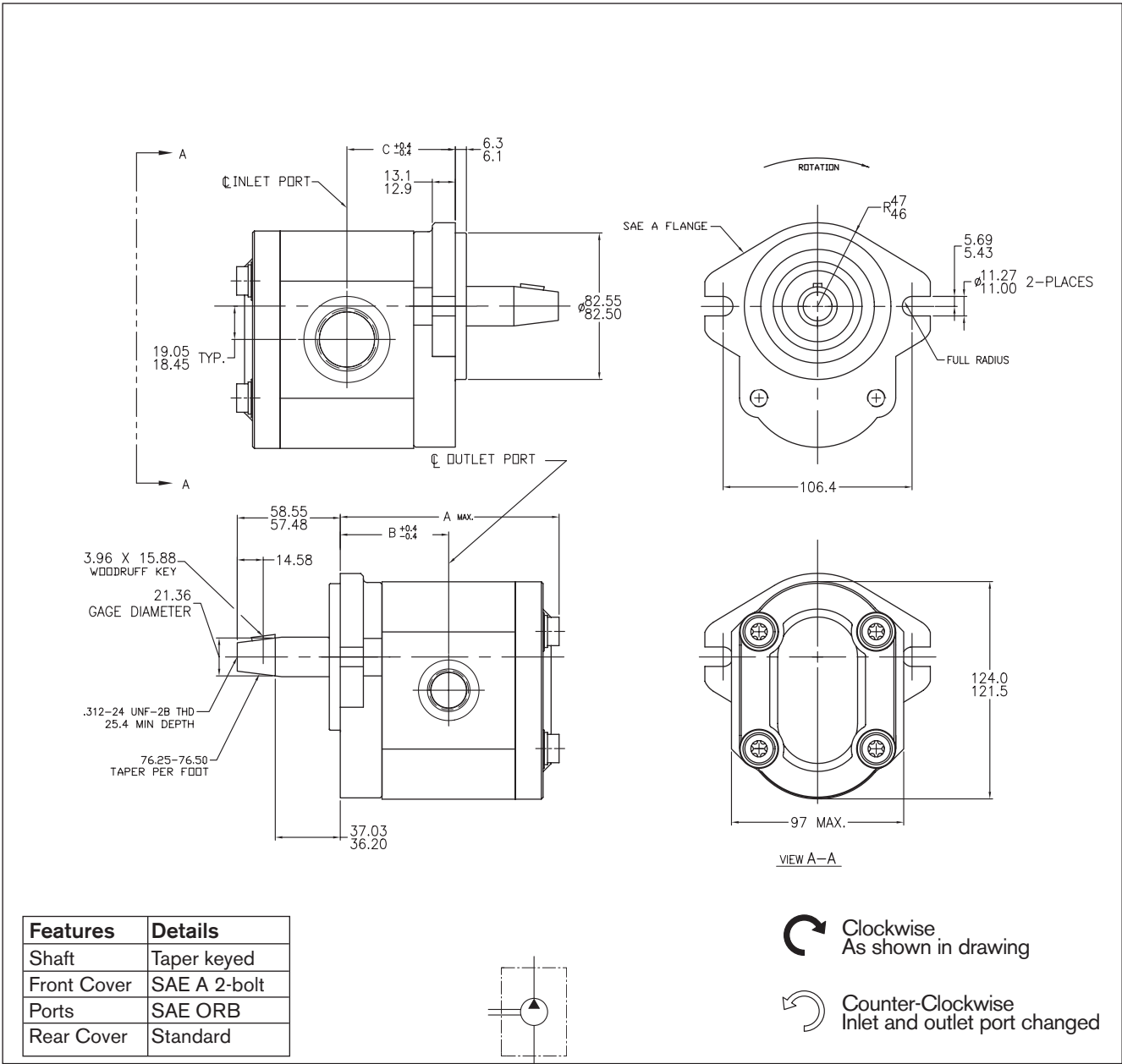
* Contact factory for availability of units with no ordering number listed.
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.



Ordering code
AZPN – X X – □ □ □ □ D R 12 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	L	R			A	B	C		
20.0	*	*							
22.0	*	*							
25.0	*	*							
28.0	9 510 390 174	*	210	2800	124.7	62.8	62.8	-20	-12
32.0	*	9 510 390 173	180	2800	129.3	64.8	64.8	-20	-12
36.0	*	9 510 390 190	160	2600	135.7	67.1	67.1	-20	-12

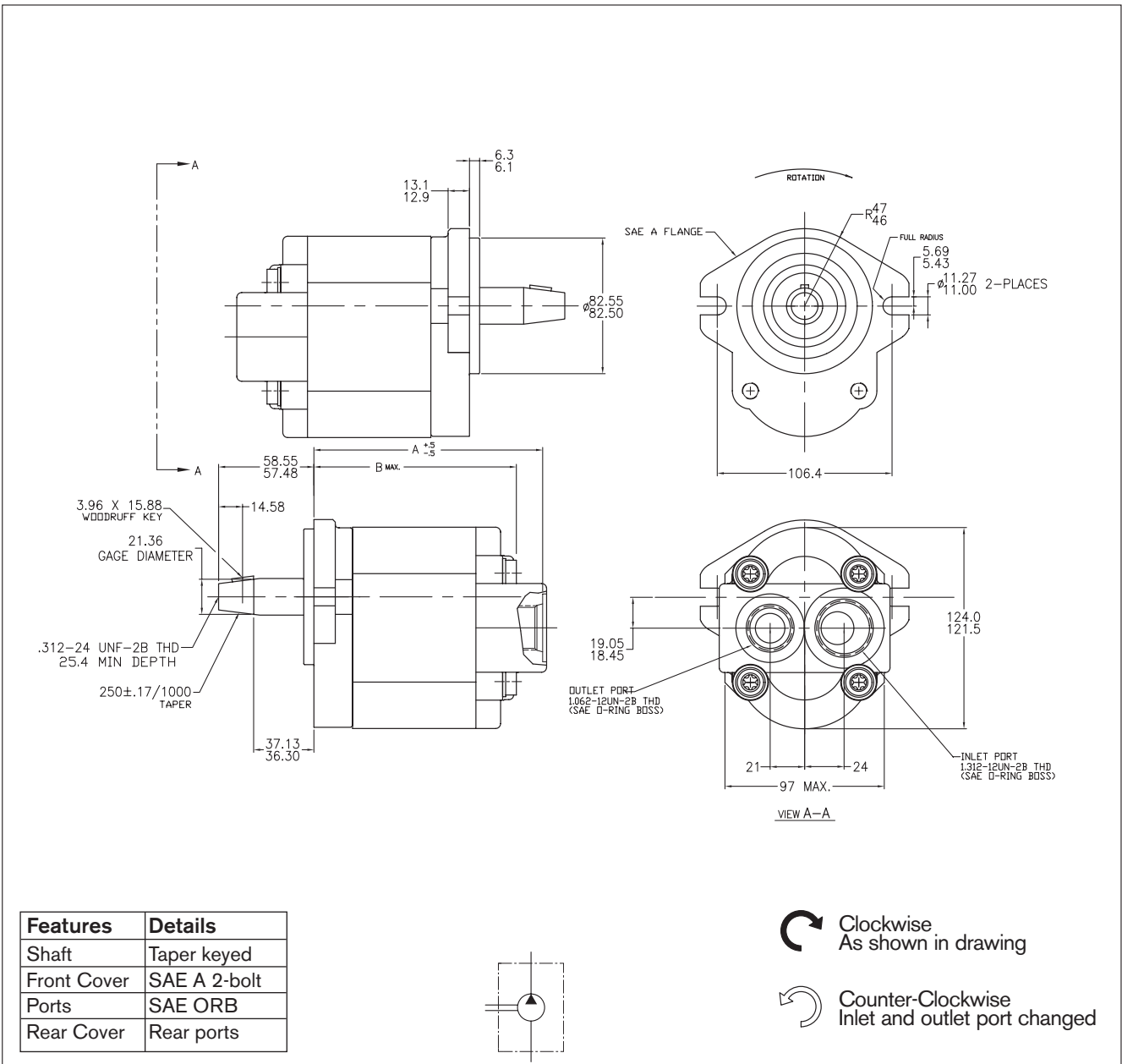
* Contact factory for availability of units with no ordering number listed.
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.



Ordering code
AZPN – X X – □ □ □ X R 12 MB-S0075

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	L	R			A	B	C		
20.0	9 510 390 116	9 510 390 110	230	3000	115.8	58.1	58.1	-16	-10
22.0	9 510 390 117	9 510 390 111	230	3000	120.7	59.6	59.6	-16	-10
25.0	9 510 390 118	9 510 390 112	230	3000	121.8	61.1	61.1	-20	-12
28.0	9 510 390 119	9 510 390 113	210	2800	124.8	62.6	62.6	-20	-12
32.0	9 510 390 120	9 510 390 114	180	2800	129.3	64.8	64.8	-20	-12
36.0	9 510 390 121	9 510 390 115	160	2600	135.7	67.1	67.1	-20	-12

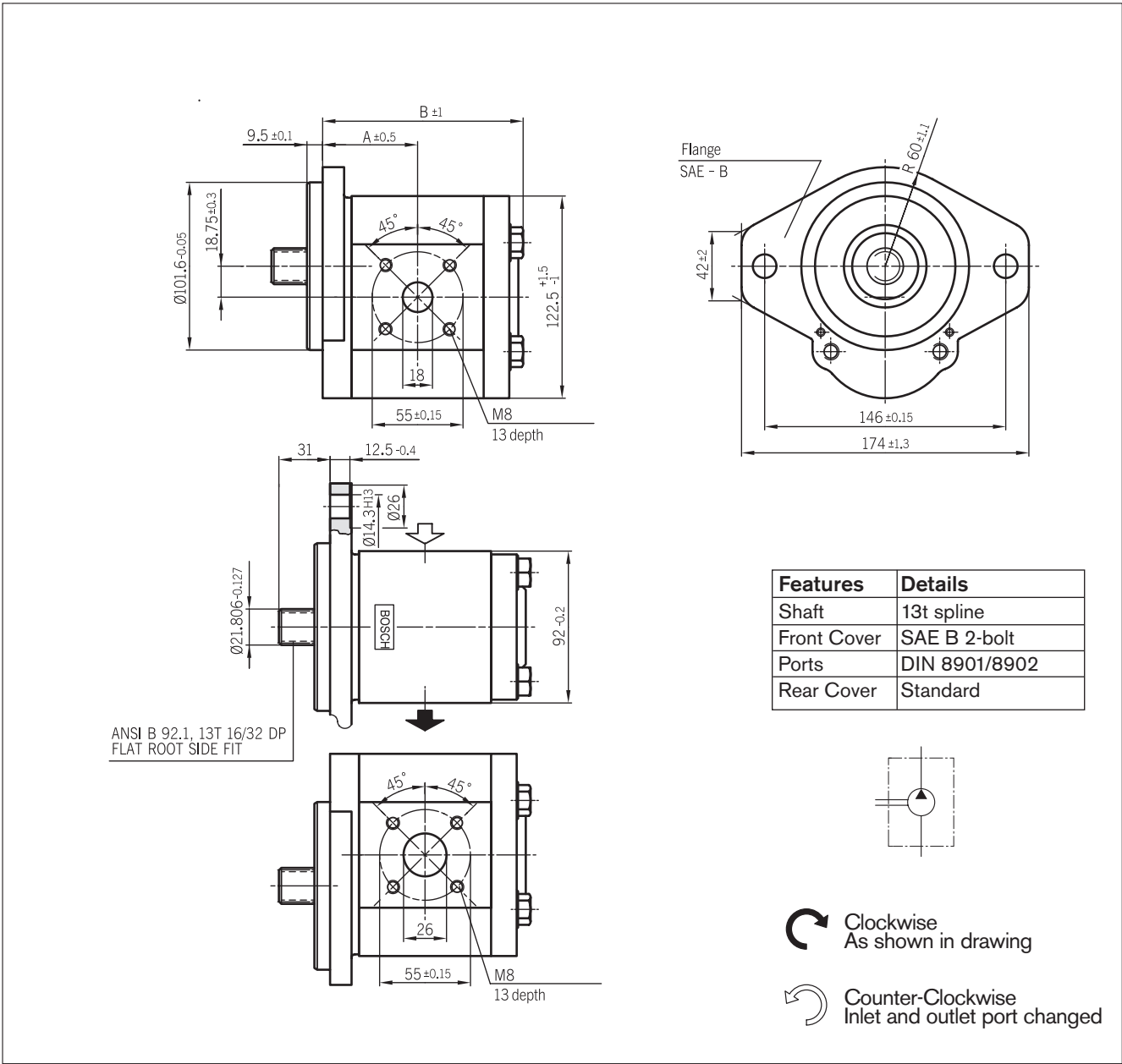
* Contact factory for availability of units with no ordering number listed.
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.



Ordering code
AZPN - X X - □ □ □ X R 12 MA-S0075

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]		Inlet Port ** (SAE O-Ring BOSS)	Outlet Port (SAE O-Ring BOSS)
	 L	 R			A	B		
20.0	9 510 390 140	9 510 390 134	230	3000	134.1	116.0	-16	-12
22.0	9 510 390 141	9 510 390 135	230	3000	137.1	120.9	-16	-12
25.0	9 510 390 142	9 510 390 136	230	3000	140.1	122.0	-16	-12
28.0	9 510 390 143	9 510 390 137	210	2800	143.1	125.0	-16	-12
32.0	9 510 390 144	9 510 390 138	180	2800	147.6	129.5	-16	-12
36.0	9 510 390 145	9 510 390 139	160	2600	152.1	135.9	-16	-12

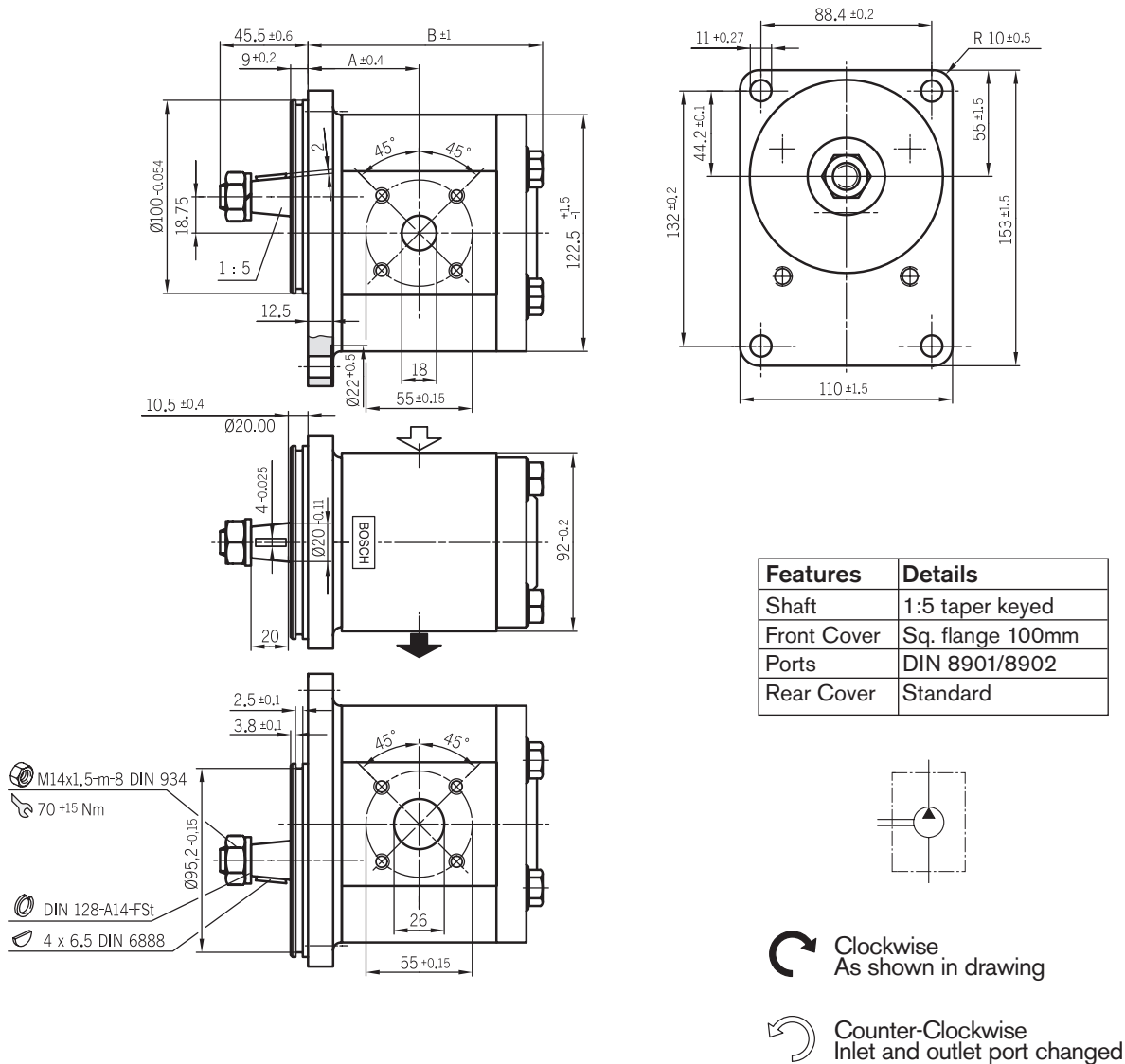
* Contact factory for availability of units with no ordering number listed.
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.



Ordering code
AZPN – X X – □ □ □ □ D C 20 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			
	 L	 R			A	B		
25.0	0 510 725 377	0 510 725 057	230	3000	55.0	116.1		
28.0		0 510 725 058	210	2800	56.5	119.1		
36.0	0 510 725 363		160	2600	61.0	128.1		

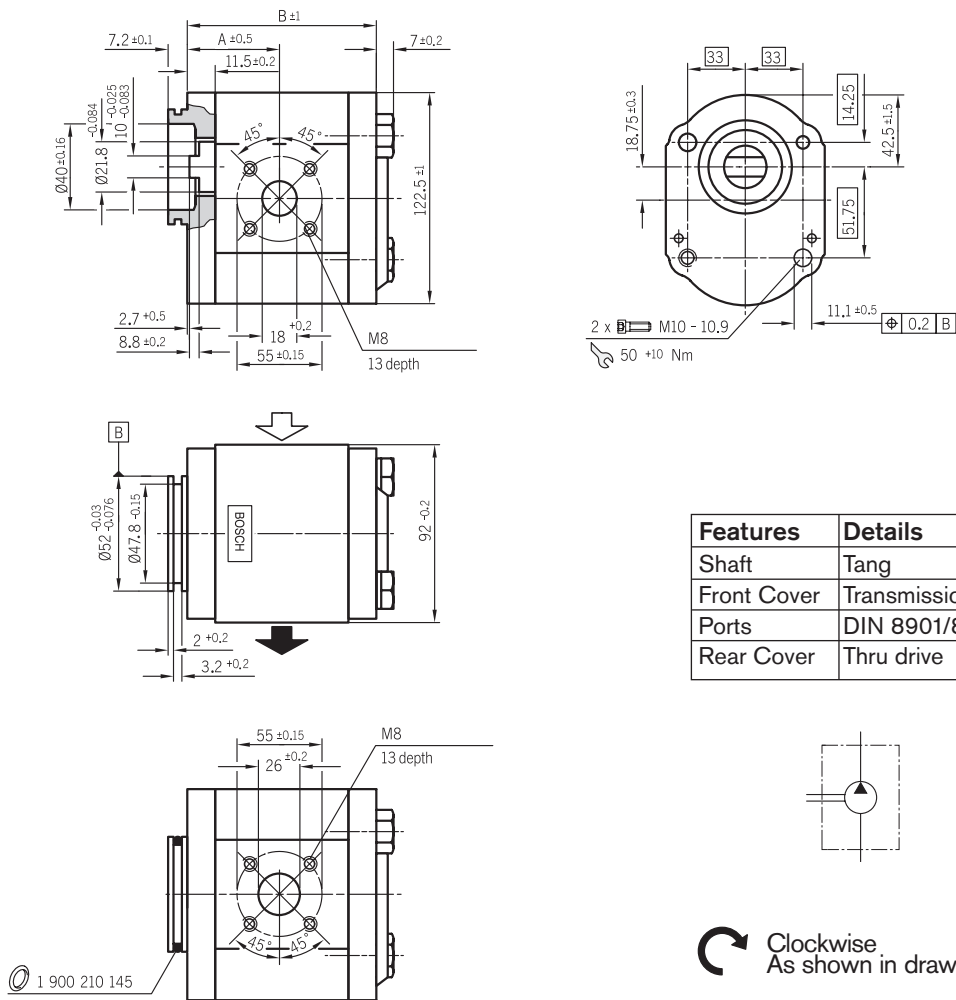
* Contact factory for availability of units with no ordering number listed.
** Refer to page 46 for SAE O-Ring Boss Specifications and Dimensions.



Ordering code
AZPN - X X - □ □ □ □ C B 20 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]				
	L	R			A	B			
20.0	0 510 625 335	0 510 625 035	230	3000	52.0	109.8			
25.0	0 510 725 352	0 510 725 047	230	3000	55.0	115.8			
28.0	0 510 725 364	0 510 725 055	210	2800	56.5	118.8			
32.0	0 510 725 353	0 510 725 048	180	2800	59.0	123.3			

* Contact factory for availability of units with no ordering number listed.



 Clockwise
As shown in drawing

 Counter-Clockwise
Inlet and outlet port changed

Ordering code
AZPN – X X – □ □ □ □ N M 20 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			
	 L	 R			A	B		
25.0		0 510 715 006	230	3000	55.0	109.1		
32.0		0 510 715 007	180	2800	59.0	116.6		

* Contact factory for availability of units with no ordering number listed.

Ordering Code (G Series Pump)

A Z	P	G	- 22 - 045 - R	D	C	12	M	B																																																										
<table border="1"> <tr> <td>Function</td> <td></td> </tr> <tr> <td>P = Pump</td> <td></td> </tr> <tr> <td>Size (G)</td> <td></td> </tr> <tr> <td>1.99 in³ (32.6 cm³) = 032</td> <td></td> </tr> <tr> <td>2.20 in³ (36.0 cm³) = 036</td> <td></td> </tr> <tr> <td>2.75 in³ (45.0 cm³) = 045</td> <td></td> </tr> <tr> <td>3.42 in³ (56.0 cm³) = 056</td> <td></td> </tr> <tr> <td>3.84 in³ (63.0 cm³) = 063</td> <td></td> </tr> <tr> <td>Direction of rotation</td> <td></td> </tr> <tr> <td>Right = R</td> <td></td> </tr> <tr> <td>Left = L</td> <td></td> </tr> </table>									Function		P = Pump		Size (G)		1.99 in ³ (32.6 cm ³) = 032		2.20 in ³ (36.0 cm ³) = 036		2.75 in ³ (45.0 cm ³) = 045		3.42 in ³ (56.0 cm ³) = 056		3.84 in ³ (63.0 cm ³) = 063		Direction of rotation		Right = R		Left = L																																					
Function																																																																		
P = Pump																																																																		
Size (G)																																																																		
1.99 in ³ (32.6 cm ³) = 032																																																																		
2.20 in ³ (36.0 cm ³) = 036																																																																		
2.75 in ³ (45.0 cm ³) = 045																																																																		
3.42 in ³ (56.0 cm ³) = 056																																																																		
3.84 in ³ (63.0 cm ³) = 063																																																																		
Direction of rotation																																																																		
Right = R																																																																		
Left = L																																																																		
<table border="1"> <tr> <td>End cover</td> <td></td> </tr> <tr> <td>Standard = B</td> <td></td> </tr> <tr> <td>Seals</td> <td></td> </tr> <tr> <td>NBR = M</td> <td></td> </tr> <tr> <td>FPM = P</td> <td></td> </tr> <tr> <td>NBR, shaft seal in FPM = K</td> <td></td> </tr> </table>									End cover		Standard = B		Seals		NBR = M		FPM = P		NBR, shaft seal in FPM = K																																															
End cover																																																																		
Standard = B																																																																		
Seals																																																																		
NBR = M																																																																		
FPM = P																																																																		
NBR, shaft seal in FPM = K																																																																		
Drive shafts			Front flange			Line connections																																																												
Matching front flange <table border="1"> <tr> <td>C</td> <td>Conical 1:5 (Tapered key)</td> <td></td> <td>B</td> </tr> <tr> <td>S</td> <td>Conical 1:5 for flange A (Tapered key)</td> <td></td> <td>A</td> </tr> <tr> <td>H</td> <td>Conical 1:8 (Tapered key)</td> <td></td> <td>O</td> </tr> <tr> <td>N</td> <td>Dog (Tang)</td> <td></td> <td>M</td> </tr> <tr> <td>Q</td> <td>Cylindrical (Straight Key) SAE B 7/8"</td> <td></td> <td>C</td> </tr> <tr> <td>D</td> <td>Spline shaft SAE B 13T</td> <td></td> <td>C</td> </tr> <tr> <td>F</td> <td>Spline shaft DIN 5482 B17x14</td> <td></td> <td>B</td> </tr> </table>			C	Conical 1:5 (Tapered key)		B	S	Conical 1:5 for flange A (Tapered key)		A	H	Conical 1:8 (Tapered key)		O	N	Dog (Tang)		M	Q	Cylindrical (Straight Key) SAE B 7/8"		C	D	Spline shaft SAE B 13T		C	F	Spline shaft DIN 5482 B17x14		B	<table border="1"> <tr> <td>B</td> <td>Square flange Pilot Ø 105 mm</td> <td></td> </tr> <tr> <td>O</td> <td>Square flange Pilot Ø 50.78 mm</td> <td></td> </tr> <tr> <td>C</td> <td>SAE B 2-bolt</td> <td></td> </tr> <tr> <td>M</td> <td>Transmission flange Pilot Ø 52 mm with O-ring</td> <td></td> </tr> <tr> <td>A</td> <td>Outrigger bearing Pilot Ø 105 mm (outboard bearing)</td> <td></td> </tr> </table>			B	Square flange Pilot Ø 105 mm		O	Square flange Pilot Ø 50.78 mm		C	SAE B 2-bolt		M	Transmission flange Pilot Ø 52 mm with O-ring		A	Outrigger bearing Pilot Ø 105 mm (outboard bearing)		<table border="1"> <tr> <td>20</td> <td>Rectangular flange</td> <td></td> </tr> <tr> <td>30</td> <td>Rectangular flange</td> <td></td> </tr> <tr> <td>07</td> <td>Split flange SAE Code 61 Metric bolts</td> <td></td> </tr> <tr> <td>40</td> <td>Split flange SAE Code 61 UNC bolts</td> <td></td> </tr> <tr> <td>12</td> <td>Thread (UN-23) SAE O-Ring BOSS</td> <td></td> </tr> </table>			20	Rectangular flange		30	Rectangular flange		07	Split flange SAE Code 61 Metric bolts		40	Split flange SAE Code 61 UNC bolts		12	Thread (UN-23) SAE O-Ring BOSS	
C	Conical 1:5 (Tapered key)		B																																																															
S	Conical 1:5 for flange A (Tapered key)		A																																																															
H	Conical 1:8 (Tapered key)		O																																																															
N	Dog (Tang)		M																																																															
Q	Cylindrical (Straight Key) SAE B 7/8"		C																																																															
D	Spline shaft SAE B 13T		C																																																															
F	Spline shaft DIN 5482 B17x14		B																																																															
B	Square flange Pilot Ø 105 mm																																																																	
O	Square flange Pilot Ø 50.78 mm																																																																	
C	SAE B 2-bolt																																																																	
M	Transmission flange Pilot Ø 52 mm with O-ring																																																																	
A	Outrigger bearing Pilot Ø 105 mm (outboard bearing)																																																																	
20	Rectangular flange																																																																	
30	Rectangular flange																																																																	
07	Split flange SAE Code 61 Metric bolts																																																																	
40	Split flange SAE Code 61 UNC bolts																																																																	
12	Thread (UN-23) SAE O-Ring BOSS																																																																	

Note: Consult Factory for Availability

Size

G

4 ... 28 cm³/rev

Check sizes

N Series Pump Product Index

(Reference page 43 for ordering code designators)



Page Number	Shaft Ordering code	Mounting Type	Flange	Port Ports	Orientation
73	AZPG-22-XXXXDC12MB	D	C	12	side
74	AZPG-22-XXXXDC12MA	D	C	12	rear
75	AZPG-22-XXXXQC12MB	Q	C	12	side
76	AZPG-22-XXXXQC12MA	Q	C	12	rear
77	AZPG-22-XXXXDC40MB	D	C	40	side
78	AZPG-22-XXXXQC40MB	Q	C	40	side

G Series Performance Ratings

Size			32	36	45	56	63
Displacement:		cm ³ /rev	32	36	45	56	63
		cu in/rev	1.95	2.20	2.75	3.42	3.84
Range Speed:		Min RPM	400	400	400	400	400
		Max RPM	2800	2800	2600	2300	2300
Pressure - Rated: p ₁		(Bar)	250	250	250	195	170
		(PSI)	3625	3625	3625	2828	2465
Intermittent: p ₂		(Bar)	280	280	280	225	200
		(PSI)	4060	4060	4060	3263	2900
Max Peak: p ₃		(Bar)	300	300	300	250	230
		(PSI)	4350	4350	4350	3625	3335
Inlet Pressure:		Continuous	0.7 - 3.0 bar absolute (9in Hg vacuum to 29 PSIG)				
		Intermittent	0.1 - 10 bar absolute (26in Hg vacuum to 130 PSIG)				

G Series Pumps**SAE O-Ring BOSS - Standard Porting**

Side Ports			Rear Port	
Displacement	Inlet	Outlet	Inlet	Outlet
32	-20	-16	-20	-16
36	-20	-16	-20	-16
45	-20	-16	-20	-16
56	-24	-20	-20	-16
63	-24	-20	-20	-16

**SAE Porting - Specifications and Dimensions
per SAE J1926/1**

Dash Size	Thread Size (in)
-2	5/16-24 UNF-2B
-3	3/8-24 UNF-2B
-4	7/16-20 UNF-2B
-5	1/2-20 UNF-2B
-6	9/16-18 UNF-2B
-8	3/4-16 UNF-2B
-10	7/8-14 UNF-2B
-12	1-1/16-12 UN-2B
-14	1-3/16-12 UN-2B
-16	1-5/16-12 UN-2B
-20	1-5/8-12 UN-2B
-24	1-7/8-12 UN-2B
-32	2-1/2-12 UN-2B

**Split Flange SAE Porting - Specifications and Dimensions
per SAE J518 (Code 61)**

Nominal Flange Size	Flange Dash Size	Port Diameter (max)	
		Inches	mm
1/2	-8	0.50	13
3/4	-12	0.75	19
1	-16	1.00	25
1-1/4	-20	1.25	32
1-1/2	-24	1.50	38
2	-32	2.00	51

Note: Ratings represent units incorporating SAE O-Ring BOSS threaded ports. Pressure ratings may differ for other types of ports.

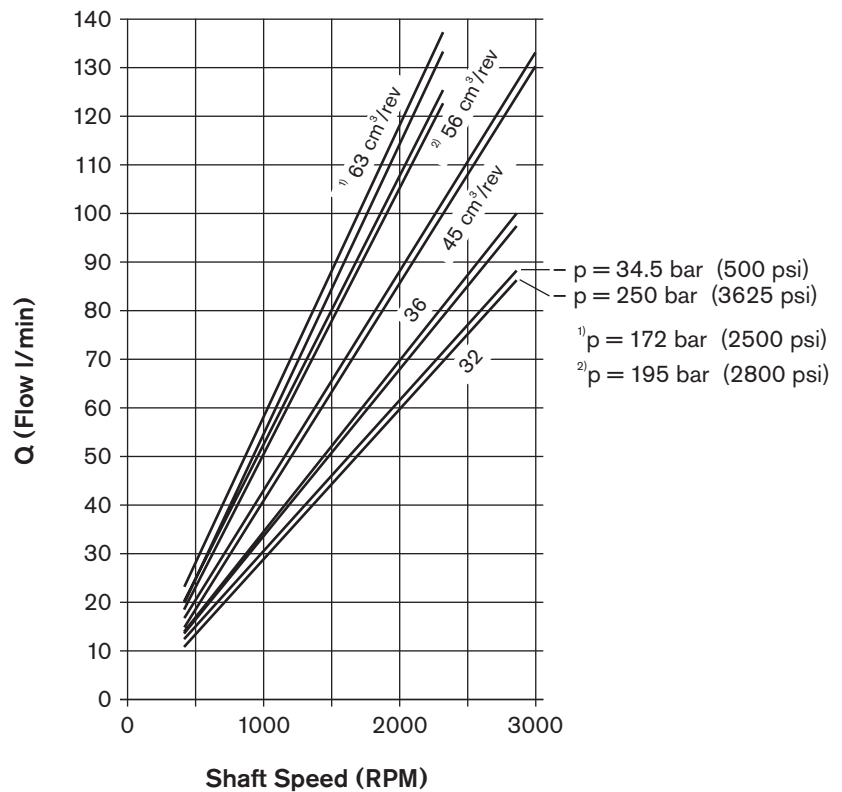
Diagrams

Size **G**

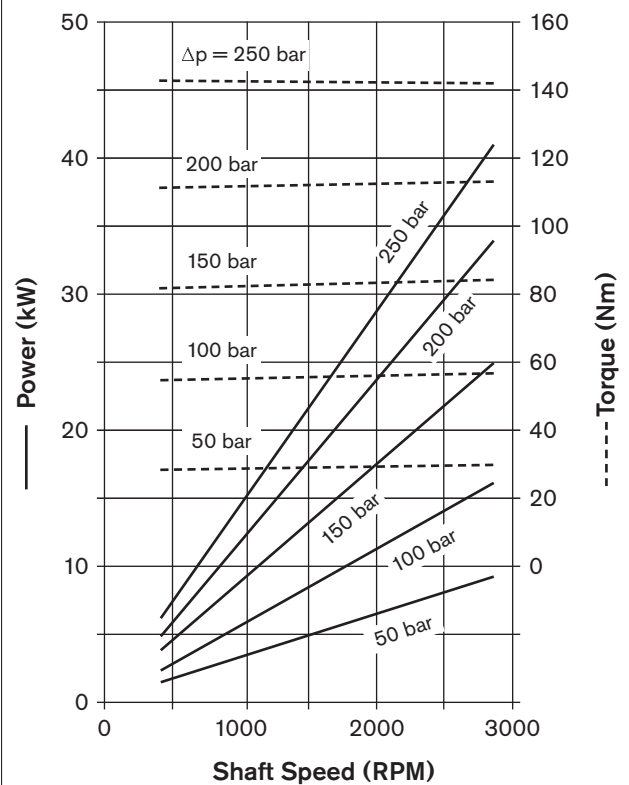
$v = 35 \text{ mm}^2/\text{s}$, $T = 50^\circ\text{C}$

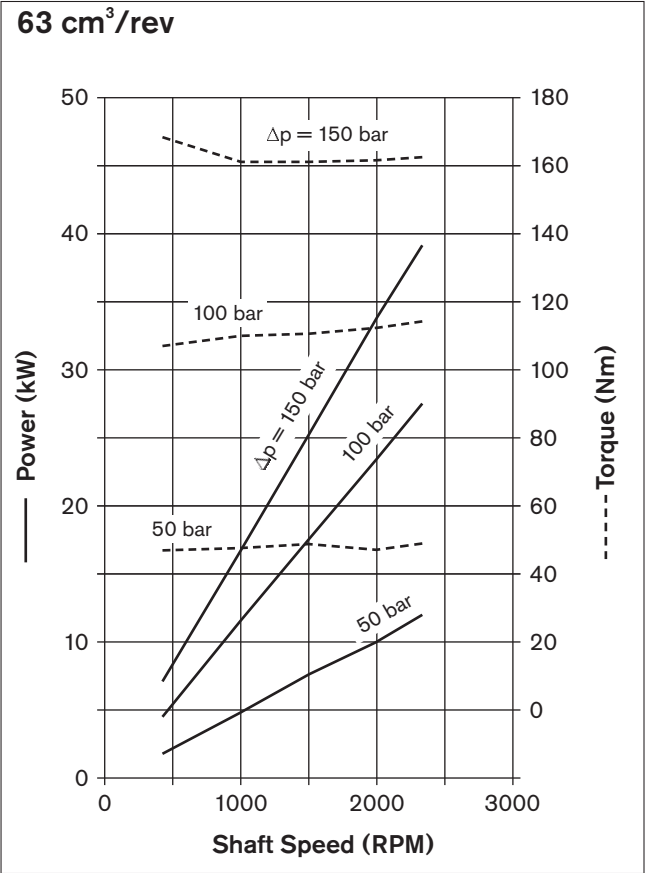
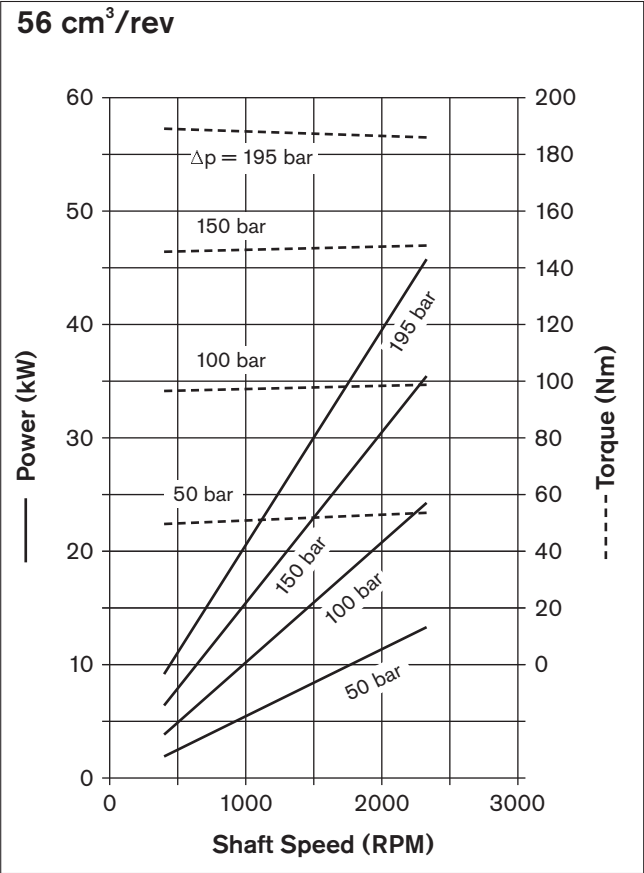
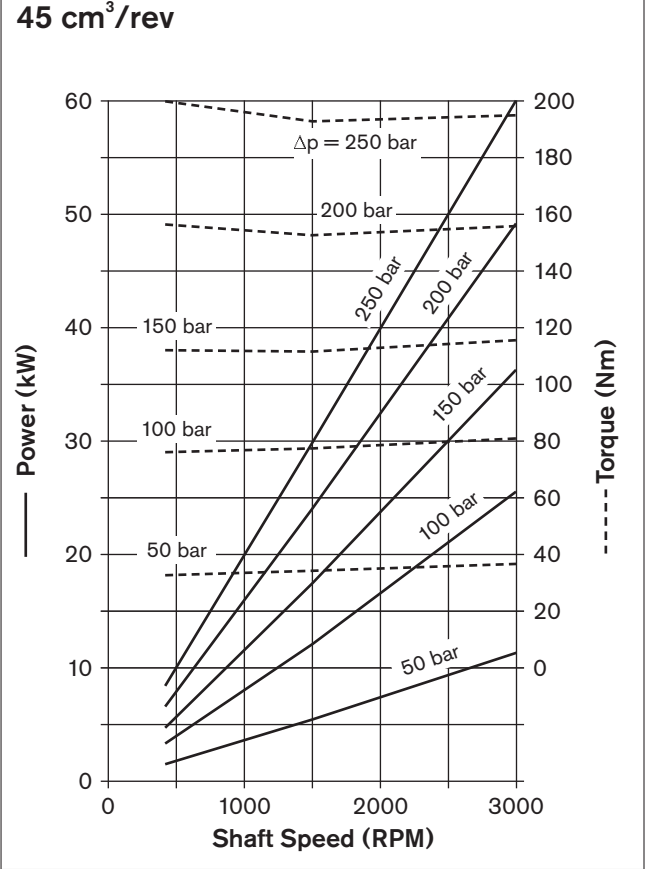
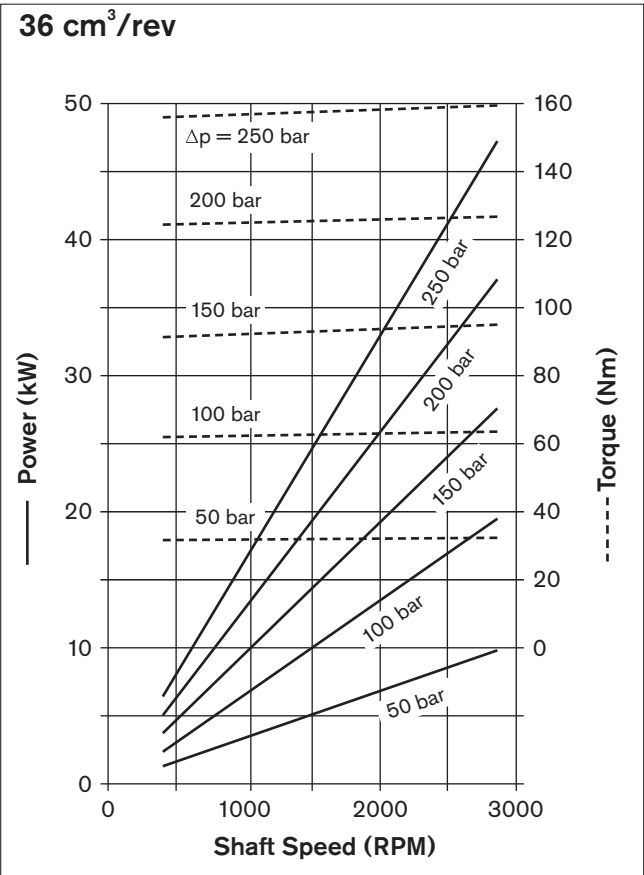
Unit Conversions

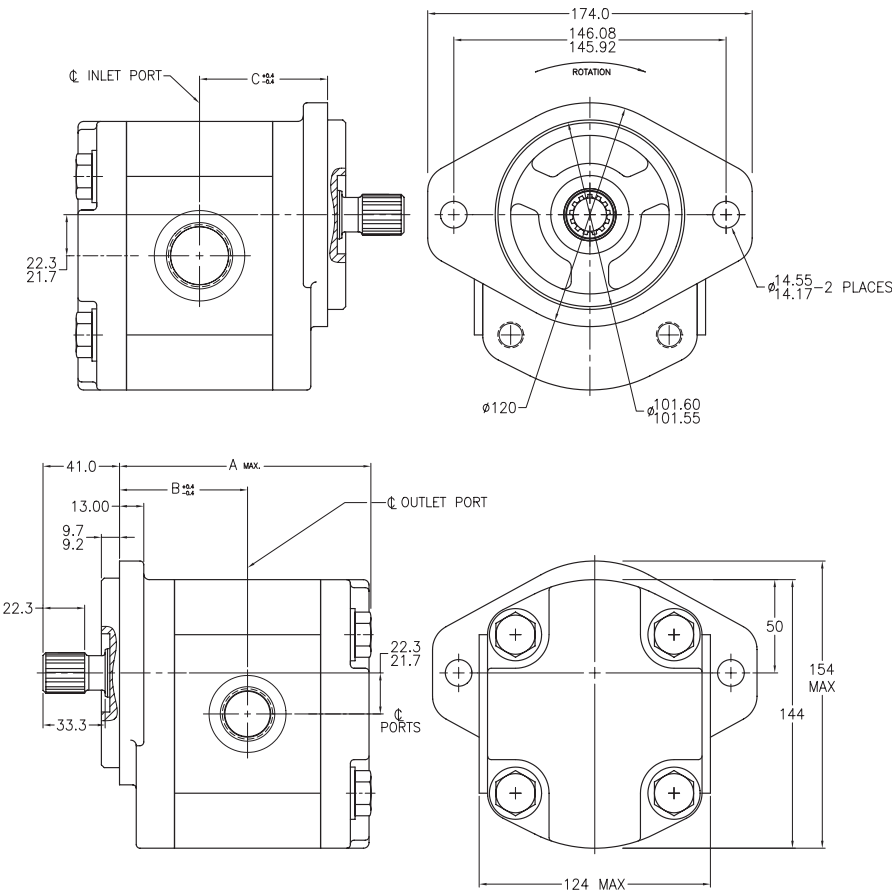
Pressure: $\text{psi} = \text{bar} \times 14.7$
 Torque: $\text{ft-lbs} = (\text{Nm}) \times .738$
 Power: $\text{hp} = (\text{kW}) \times 1.341$
 Volume: $\text{in}^3 = (\text{cc}) \times 16.39$
 $\text{gpm} = (\text{LPM}) \times .2642$



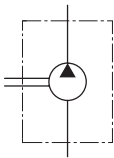
32 cm³/rev







Features	Details
Shaft	13t spline
Front Cover	SAE B 2-bolt
Ports	SAE ORB
Rear Cover	Standard



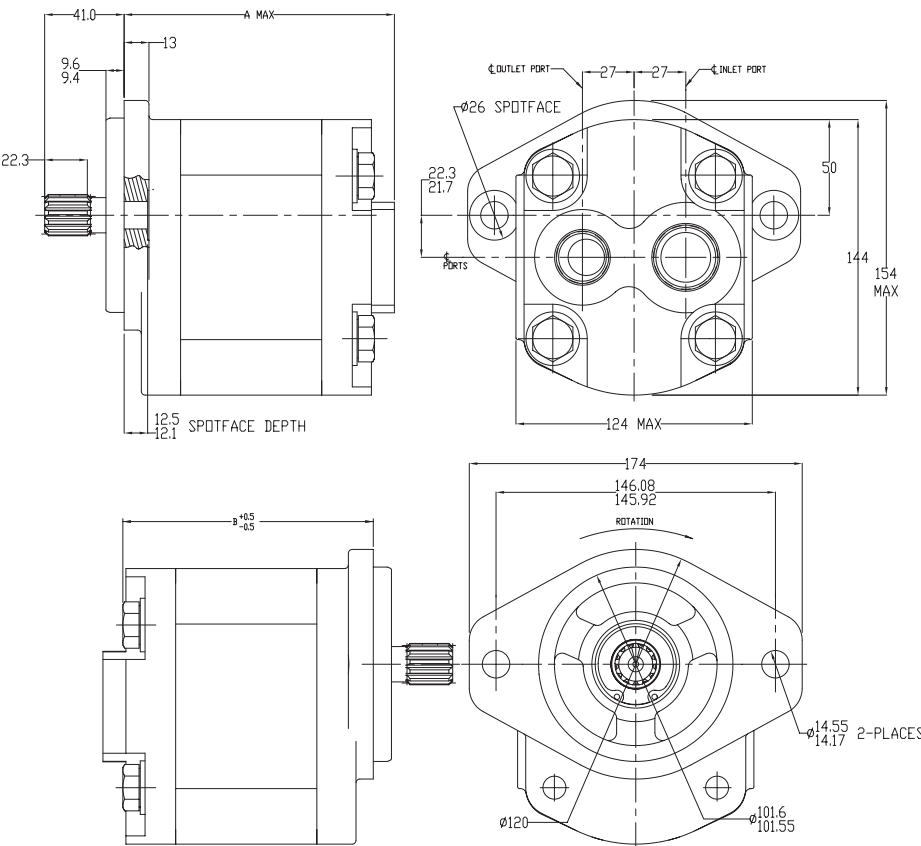
 Clockwise
As shown in drawing

 Counter-Clockwise
Inlet and outlet port changed

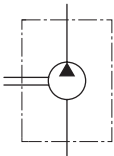
Ordering code
AZPG – 2 2 – □ □ □ □ D C 12 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			Inlet Port** (SAE O-Ring BOSS)	Outlet Port** (SAE O-Ring BOSS)
	 L	 R			A	B	C		
32.0	9 510 490 014	9 510 490 004	250	2800	139.2	70.3	70.3	-20	-16
36.0	9 510 490 015	9 510 490 005	250	2800	142.5	72.0	72.0	-20	-16
45.0	9 510 490 017	9 510 490 007	250	2600	149.9	75.7	75.7	-24	-20
56.0	9 510 490 019	9 510 490 009	195	2300	159.0	80.2	80.2	-24	-20
63.0	9 510 490 020	9 510 490 010	170	2300	164.8	83.1	83.1	-24	-20

* Contact factory for availability of units with no ordering number listed.
** Refer to page 70 for SAE O-Ring Boss Specifications and Dimensions.



Features	Details
Shaft	13t spline
Front Cover	SAE B 2-bolt
Ports	SAE ORB
Rear Cover	Rear ports

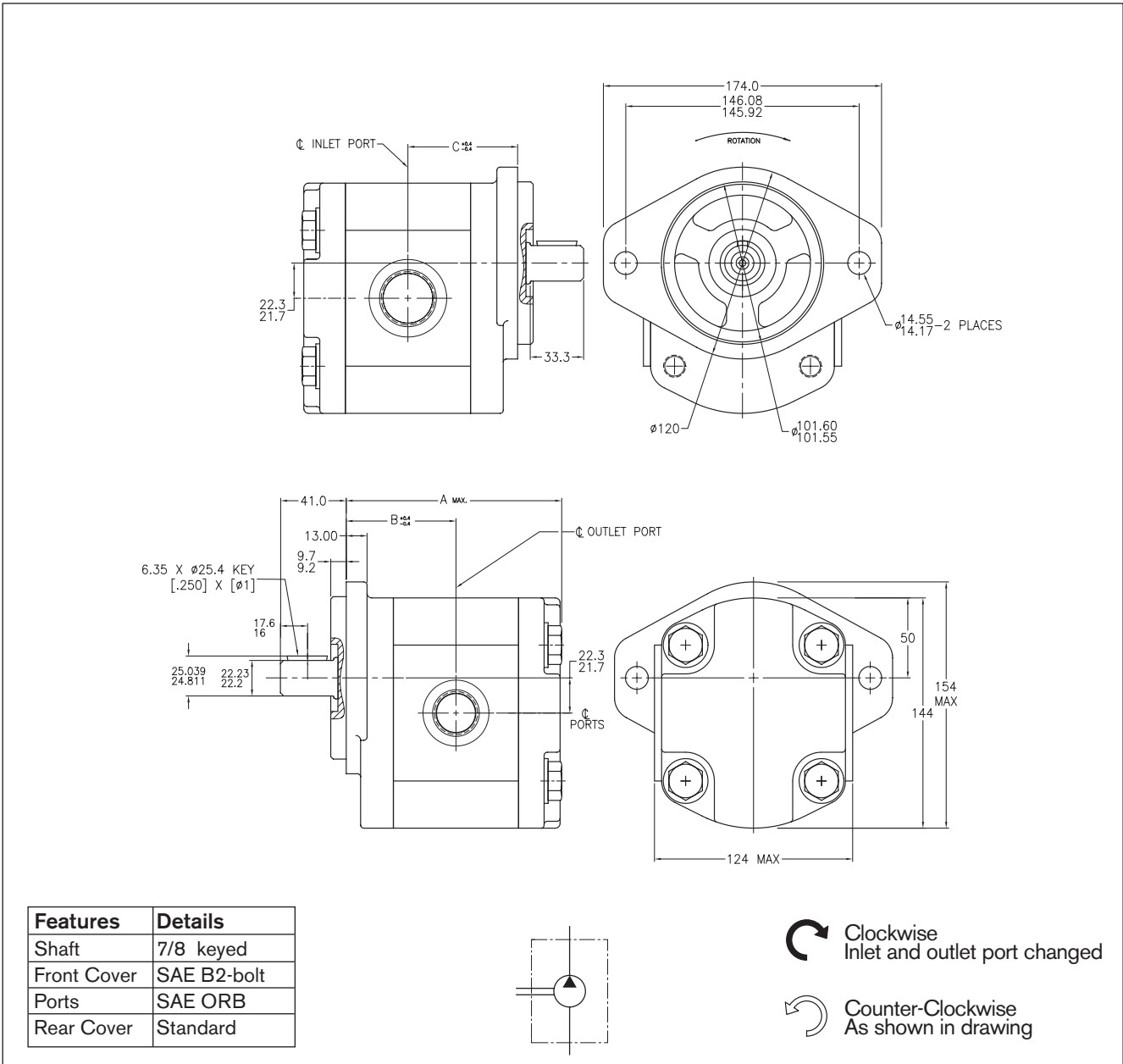


- Clockwise
Inlet and outlet port changed
- Counter-Clockwise
As shown in drawing

Ordering code
AZPG – 2 2 – □ □ □ □ D C 12 MA

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]		Inlet Port** (SAE O-Ring BOSS)	Outlet Port** (SAE O-Ring BOSS)
	L	R			A	B		
32.0	9 510 490 074	9 510 490 064	250	2800	149.4	138.7	-20	-16
36.0	9 510 490 075	9 510 490 065	250	2800	152.8	142.0	-20	-16
45.0	9 510 490 077	9 510 490 067	250	2600	160.2	149.4	-20	-16
56.0	9 510 490 079	9 510 490 069	195	2300	169.2	158.5	-20	-16
63.0	9 510 490 080	9 510 490 070	170	2300	175.1	164.3	-20	-16

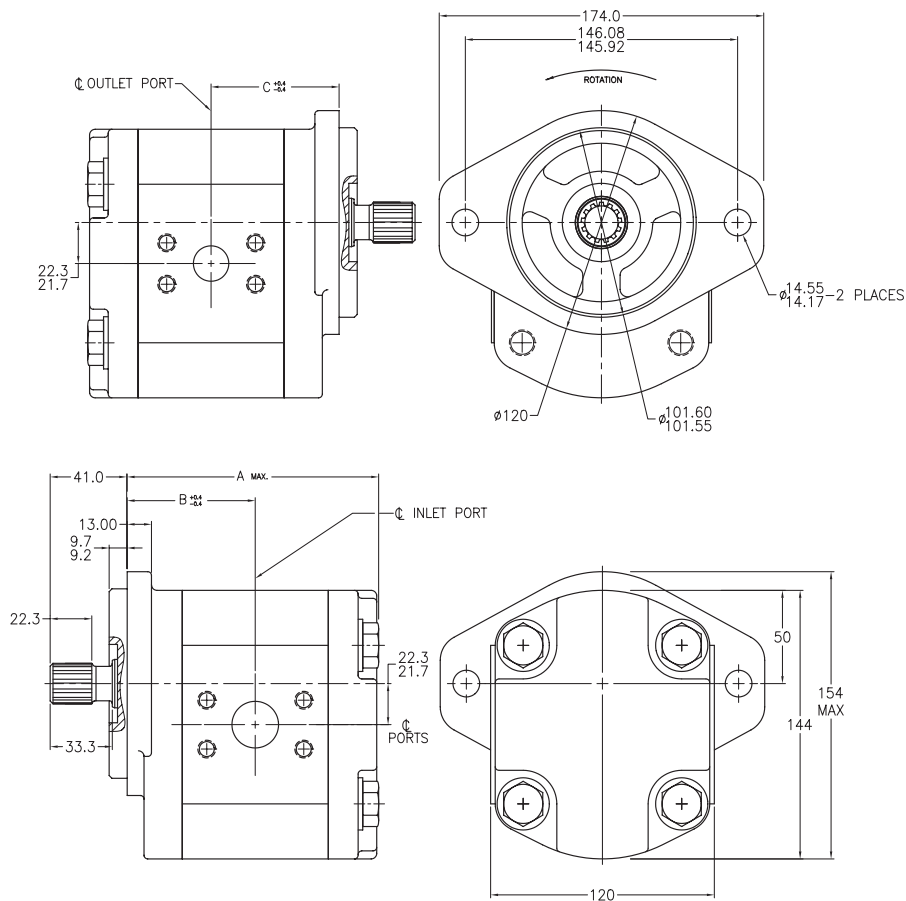
* Contact factory for availability of units with no ordering number listed.
 ** Refer to page 70 for SAE O-Ring Boss Specifications and Dimensions.



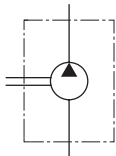
Ordering code
AZPG - 2 2 - □ □ □ □ Q C 12 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			Inlet Port** (SAE O-Ring BOSS)	Outlet Port** (SAE O-Ring BOSS)
	 L	 R			A	B	C		
32.0	9 510 490 034	9 510 490 024	250	2800	139.2	70.3	70.3	-20	-16
36.0	9 510 490 035	9 510 490 025	250	2800	142.5	72.0	72.0	-20	-16
45.0	9 510 490 037	9 510 490 027	250	2600	149.9	75.7	75.7	-24	-20
56.0	9 510 490 039	9 510 490 029	195	2300	159.0	80.2	80.2	-24	-20
63.0	9 510 490 040	9 510 490 030	170	2300	164.8	83.1	83.1	-24	-20

* Contact factory for availability of units with no ordering number listed.
** Refer to page 70 for SAE O-Ring Boss Specifications and Dimensions.



Features	Details
Shaft	13t spline
Front Cover	SAE B 2-bolt
Ports	SAE Split flange
Rear Cover	Standard

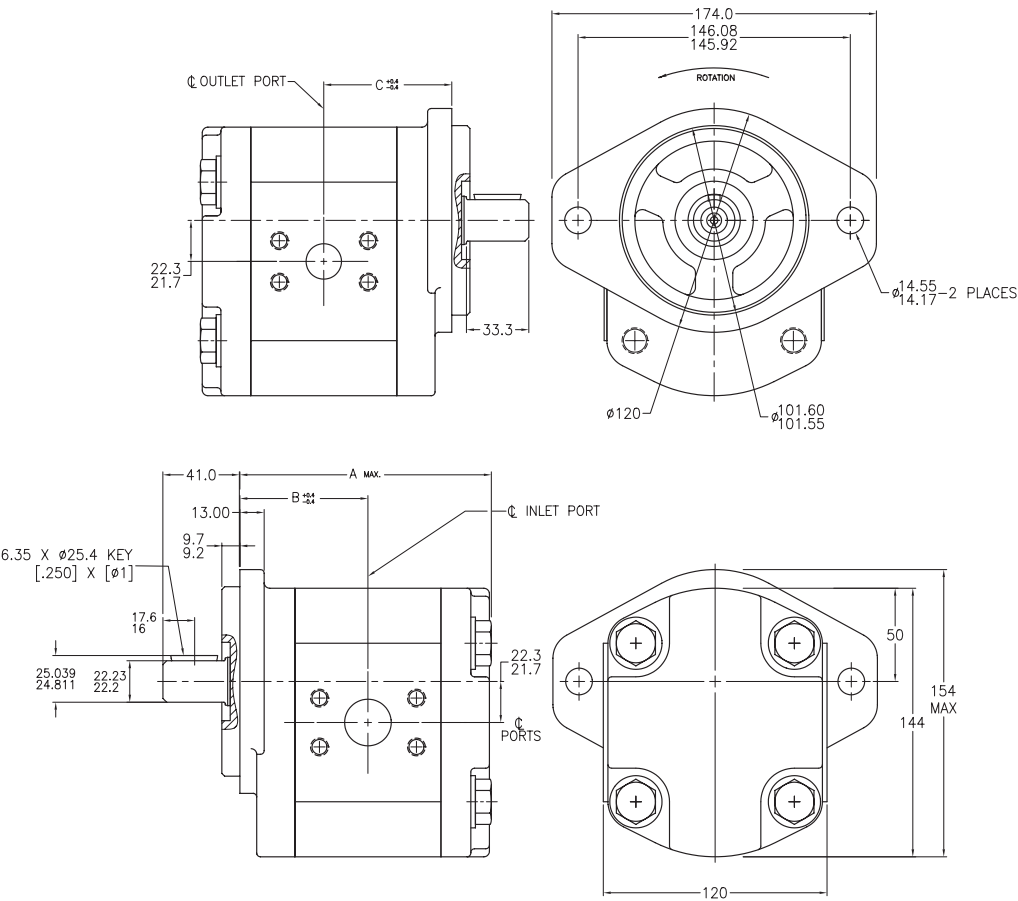


-  Clockwise
Inlet and outlet port changed
-  Counter-Clockwise
As shown in drawing

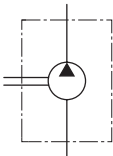
Ordering code
AZPG – 2 2 – ☐☐☐☐ D C 40 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			Port Size Per SAE J 518	
	 L	 R			A	B	C	Inlet Port**	Outlet Port**
32.0	9 510 490 054	9 510 490 044	250	2800	139.2	70.3	70.3	-16	-12
36.0	9 510 490 055	9 510 490 045	250	2800	142.5	72.0	72.0	-16	-12
45.0	9 510 490 057	9 510 490 047	250	2600	149.9	75.7	75.7	-20	-16
56.0	9 510 490 059	9 510 490 049	195	2300	159.0	80.2	80.2	-24	-20
63.0	9 510 490 060	9 510 490 050	170	2300	164.8	83.1	83.1	-24	-20

* Contact factory for availability of units with no ordering number listed.
** Refer to page 70 for SAE Split flange porting Specifications and Dimensions.



Features	Details
Shaft	7/8" keyed
Front Cover	SAE B 2-bolt
Ports	SAE Split flange
Rear Cover	Standard



 Clockwise
Inlet and outlet port changed

 Counter-Clockwise
As shown in drawing

Ordering code
AZPG - 2 2 - ☐☐☐☐ Q C 40 MB

Displacement [cm ³ /rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			Port Size Per SAE J 518	
	 L	 R			A	B	C	Inlet Port**	Outlet Port**
32.0	9 510 490 094	9 510 490 084	250	2800	139.2	70.3	70.3	-16	-12
36.0	9 510 490 095	9 510 490 085	250	2800	142.5	72.0	72.0	-16	-12
45.0	9 510 490 097	9 510 490 087	250	2600	149.9	75.7	75.7	-20	-16
56.0	9 510 490 099	9 510 490 089	195	2300	159.0	80.2	80.2	-24	-20
63.0	9 510 490 100	9 510 490 090	170	2300	164.8	83.1	83.1	-24	-20

* Contact factory for availability of units with no ordering number listed.
** Refer to page 70 for SAE Split flange porting Specifications and Dimensions.

Notes

Ordering code

External Gear Pumps – Multiple Pumps

AZ	P	GGFF	-	☐	☐	-	032 / 022 / 016 / 005	R	R	R	12	12	12	12	M	B
-----------	----------	-------------	----------	--------------------------	--------------------------	----------	------------------------------	----------	----------	----------	-----------	-----------	-----------	-----------	----------	----------

Function

P = Pump

Model **

F = 4.0 ... 28.0 cm³/rev
N = 20.0 ... 36.0 cm³/rev
G = 32.0 ... 63.0 cm³/rev

Series

1x = Standard bearing
2x = Reinforced bearing

Size

Based on available sizes per series

Direction of rotation

Right = R
Left = L

Rear cover
refers on the last pumps part

Model F Standard = **B**
Model N Standard = **B**
Model G Standard = **B**

Seals

NBR = **M**
NBR, Shaft Seal in FPM = **K**

Drive shafts	Front cover	Port connections
Model F: Q Cylindrical (Straight Way) SAE A 5/8" R P Spline Shaft SAE 11T R C R Multiple spline shaft SAE A 5/8" 9T R C	C SAE B 2-bolt flange Pilot Ø 101.6 mm R SAE A 2-bolt flange Ø 82.55 mm	12 Thread (UN-2B) SAE O-Ring BOSS
Model N: P Spline Shaft SAE 11T R C D Multiple spline shaft SAE B 13T C Q SAE 3/4" Keyed, Short R C	R SAE A 2-bolt flange Ø 82.55 mm C SAE B 2-bolt flange Pilot Ø 101.6 mm	12 Thread (UN-2B) SAE O-Ring BOSS
Model G: D Multiple spline shaft SAE B 13T C Q Cylindrical (Straight Key) SAE B 7/8" C	C SAE B 2-bolt flange Pilot Ø 101.6 mm	12 Thread (UN-2B) SAE O-Ring BOSS 40 Split Flange SAE Code 61 UNC bolts

* Contact factory for availability of units with no ordering number listed

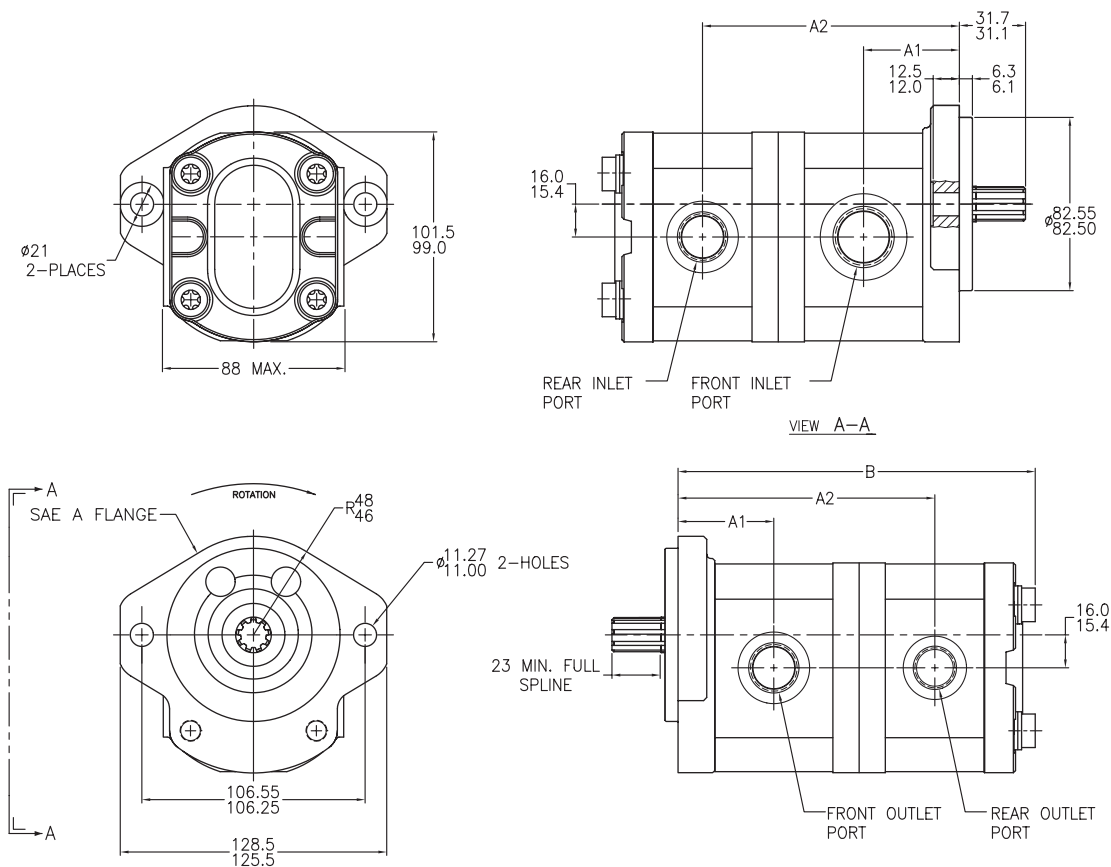
** Refer to page 18 for SAE O-Ring Boss Specifications and dimensions



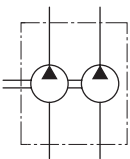
N Series Pump Product Index
(Reference page 43 for ordering code designators)



Page Number	Ordering code	Shaft Type	Mounting Flange	Ports	Port Orientation
82	AZPFF-XX-XXX/XXXXRR1212MB	R	R	12	side
83	AZPFF-XX-XXX/XXXXQR1212MB	Q	R	12	side
84	AZPFF-XX-XXX/XXXXPR1212MB	P	R	12	side
85	AZPFF-XX-XXX/XXXXCB2020MB	C	B	20	side
86	AZPFF-XX-XXX/XXXXFB2020MB	F	B	20	side
87	AZPFF-XX-XXX/XXXXNM2020MB	N	M	20	side
88	AZPFF-XX-XXX/XXXXRR2020MB	R	R	20	side
89	AZPFF-XX-XXX/XXXXSA2020MB	S	A	20	side
90	AZPFFF-XX-XXX/XXX/XXXXFB202020MB	F	B	20	side
91	AZPNF-XX-XXX/XXXXDC2020KB	D	C	20	side



Features	Details
Shaft	9t spline
Front Cover	SAE A 2-bolt
Ports	SAE ORB
Rear Cover	Standard



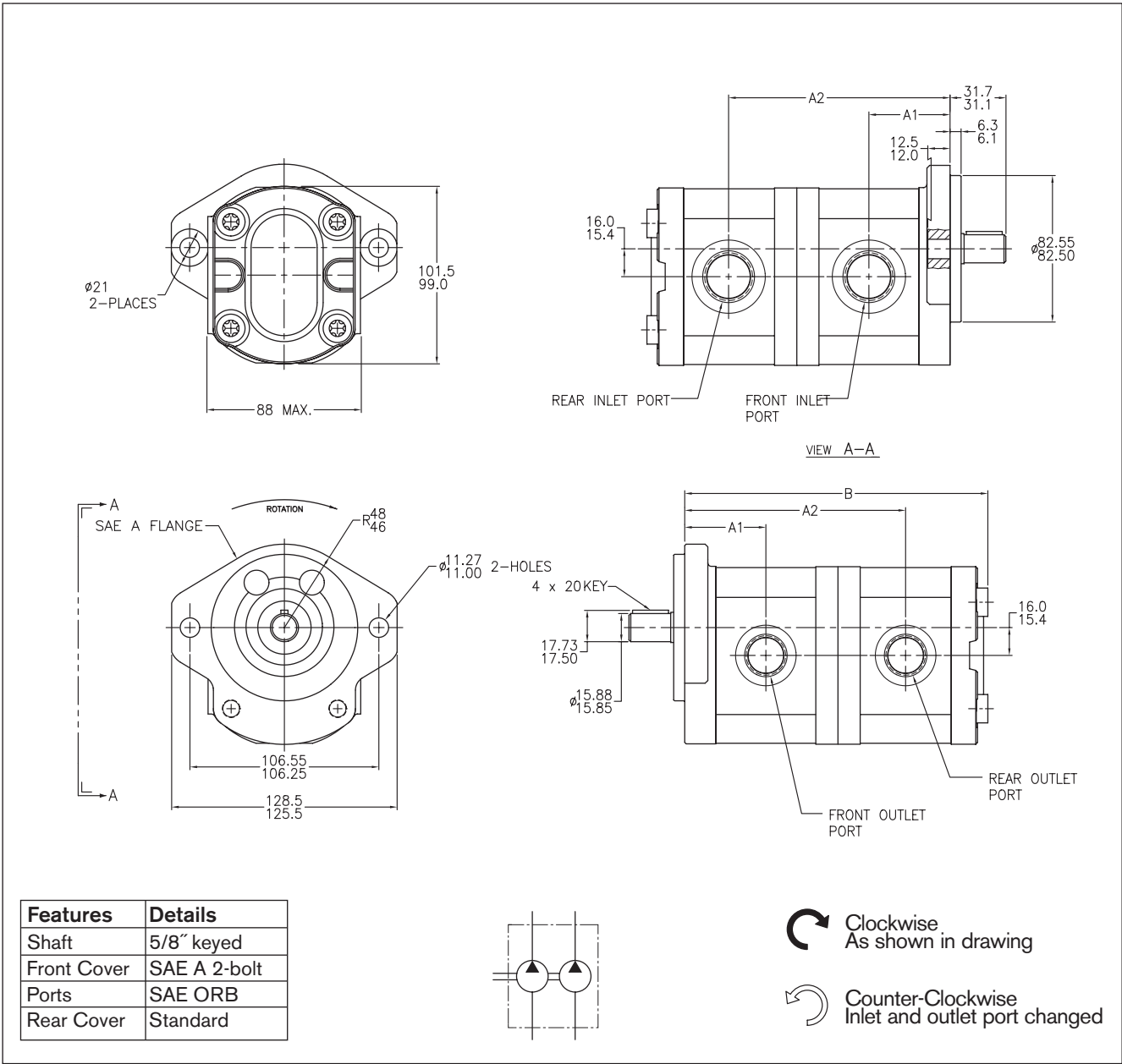
 Clockwise
As shown in drawing

 Counter-Clockwise
Inlet and outlet port changed

Ordering code
AZPFF - X X - □ □ □ - □ □ □ □ R R 12 12 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			Inlet Port** (SAE O-Ring BOSS)	Outlet Port** (SAE O-Ring BOSS)
	 L	 R			A1	A2	B		
008 / 008	*	9 510 290 034	250	3000	43.2	119.5	166.2	-12 / -12	-8 / -8
011 / 005	*	9 510 290 142	210	3000	45.7	122.4	170.9	-12 / -10	-10 / -8
014 / 005	*	9 510 290 143	210	3000	48.2	127.4	175.9	-12 / -10	-10 / -8
014 / 008	*	9 510 290 144	210	3000	48.2	129.0	176.2	-12 / -12	-10 / -10

* Contact factory for availability of units with no ordering number listed.
** Refer to page 19 for SAE O-Ring Boss Specifications and Dimensions.



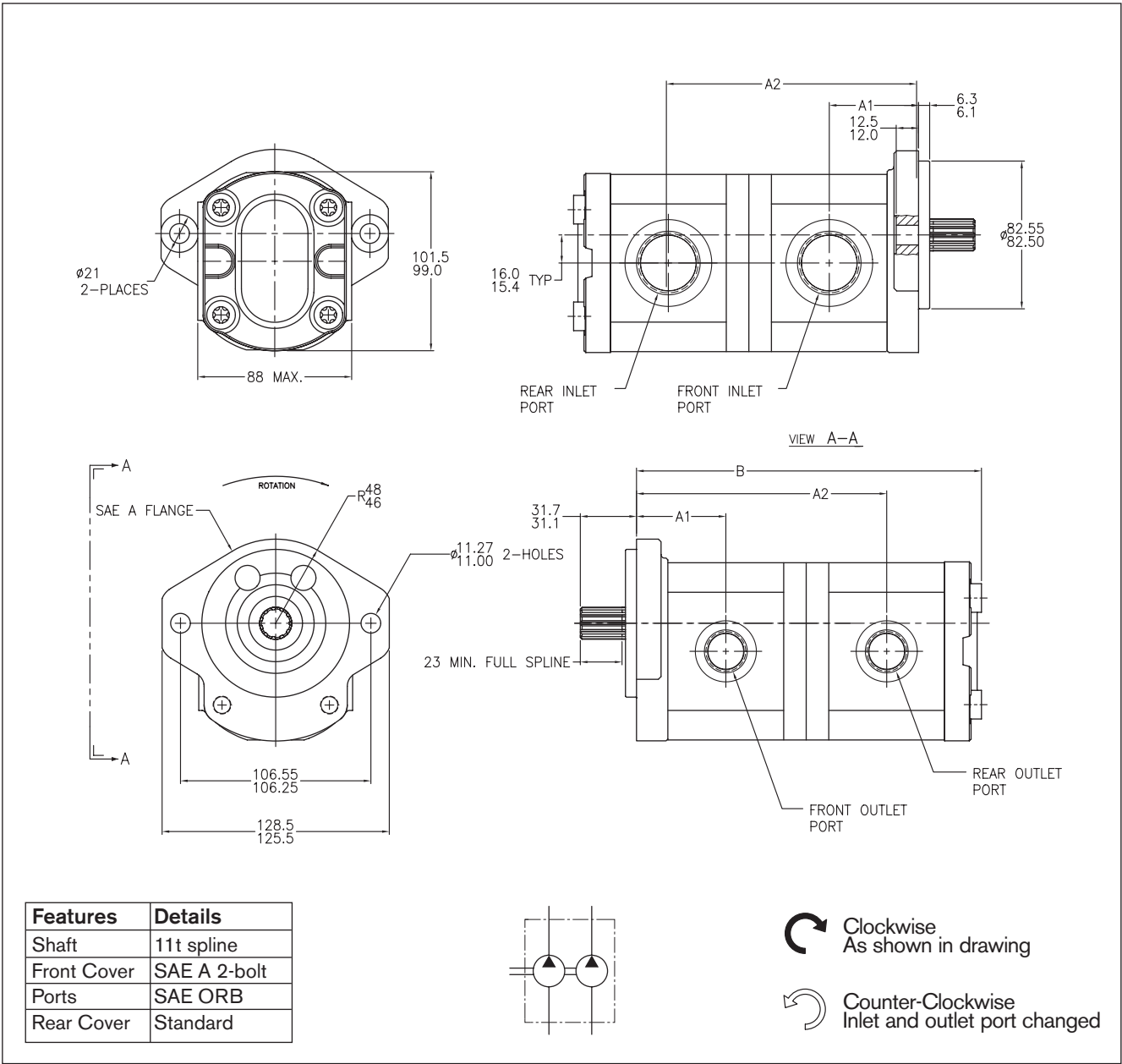
Ordering code

AZPFF - X X - □ □ □ / □ □ □ □ Q R 12 12 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]			Inlet Port** (SAE O-Ring BOSS)	Outlet Port** (SAE O-Ring BOSS)
	L	R			A1	A2	B		
008 / 004	*	9 510 290 138	210	3000	43.2	155.0	161.5	-12 / -10	-10 / -8
008 / 008	*	9 510 290 137	210	3000	43.2	155.0	166.2	-12 / -12	-10 / -10
011 / 004	*	9 510 290 139	210	3000	45.7	121.3	164.6	-12 / -10	-10 / -8
011 / 005	*	9 510 290 140	210	3000	45.7	122.5	170.9	-12 / -10	-10 / -8
011 / 008	*	9 510 290 141	210	3000	45.7	124.6	171.2	-12 / -12	-10 / -10
014 / 005	*	9 510 290 052	210	3000	48.2	127.4	175.9	-12 / -10	-10 / -8

* Contact factory for availability of units with no ordering number listed.

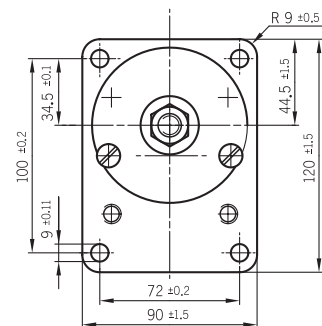
** Refer to page 19 for SAE O-Ring Boss Specifications and Dimensions.



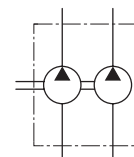
Ordering code
AZPFF - X X - □ □ □ - □ □ □ □ P R 12 12 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			Inlet Port** (SAE O-Ring BOSS)	Outlet Port** (SAE O-Ring BOSS)
	 L	 R			A1	A2	B		
016 / 016	*	9 510 290 108	210	3000	49.9	139.6	193.0	-16 / -16	-10 / -10

* Contact factory for availability of units with no ordering number listed.
** Refer to page 19 for SAE O-Ring Boss Specifications and Dimensions.



Features	Details
Shaft	1:5 taper keyed
Front Cover	Sq. flange 80mm
Ports	DIN 8901/8902
Rear Cover	Standard



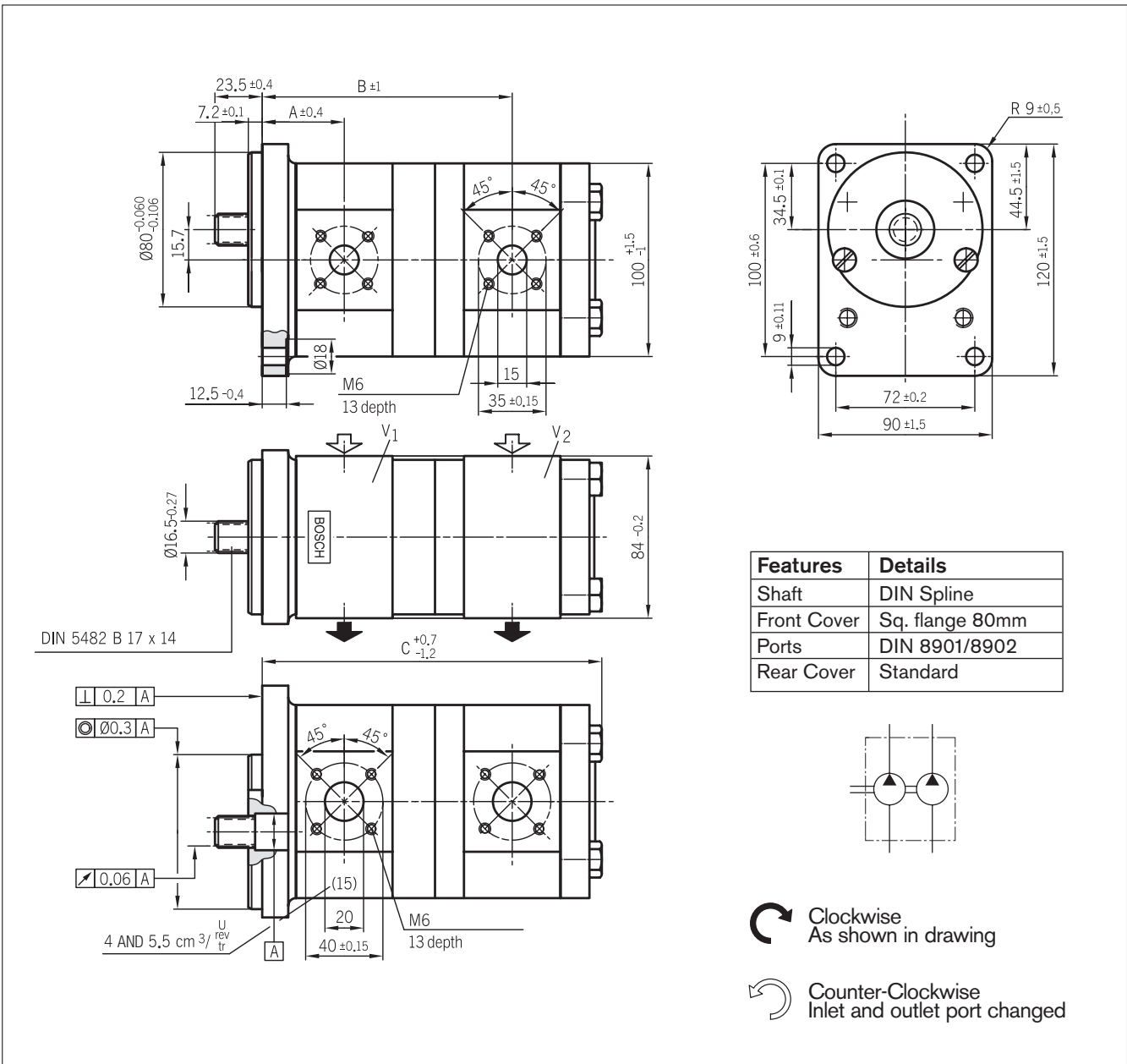
 Clockwise
As shown in drawing

 Counter-Clockwise
Inlet and outlet port changed

+ AZPFF - XX - □□□ / □□□□ C B 20 20 MB - S0012

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min⁻¹]	Dimension [mm]				
	 L	 R			A	B	C		
014 / 008	0 510 565 364	0 510 565 012	280	3000	47.5	141.5	188.1		
014 / 011	0 510 565 353	0 510 565 033	280	3000	47.5	145.3	193.1		
014 / 014		0 510 565 037	280	3000	47.5	145.8	198.1		
019 / 05.5		0 510 665 067	230/280	3000	47.5	147.8	192.4		
019 / 008	0 510 665 325	0 510 665 024	230/280	3000	47.5	149.9	196.5		
019 / 011	0 510 665 326		230/280	3000	47.5	153.9	201.5		
019 / 016	0 510 665 327	0 510 665 053	230	3000	47.5	154.2	209.9		
019 / 019	0 510 665 400	0 510 665 025	230/190	3000	47.5	154.2	214.9		
22.5 / 008		0 510 765 023+	230/280	3000	61.0	167.2	213.9		
22.5 / 011	0 510 765 320+		230/280	3000	61.0	171.5	218.2		
22.5 / 016	0 510 465 340+				61.0	171.6	227.3		
22.5 / 22.5		0 510 765 012+	230/160	3000	61.0	185.2	249.7		

* Contact factory for availability of units with no ordering number listed.



Ordering code
AZPFF – X X – □ □ □ / □ □ □ F B 20 20 MB

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]				
	 L	 R			A	B	C		
019 / 011	0 510 665 375		230/280	3000	47.5	153.7	201.5		
019 / 019	0 510 665 420	0 510 665 097	230/190	3000	47.5	154.2	214.9		
022 / 05.5	0 510 765 317	0 510 665 022	210/280	2500	61.1	165.2	209.8		
022 / 008	0 510 765 331		210/280	2500	61.1	167.3	213.9		

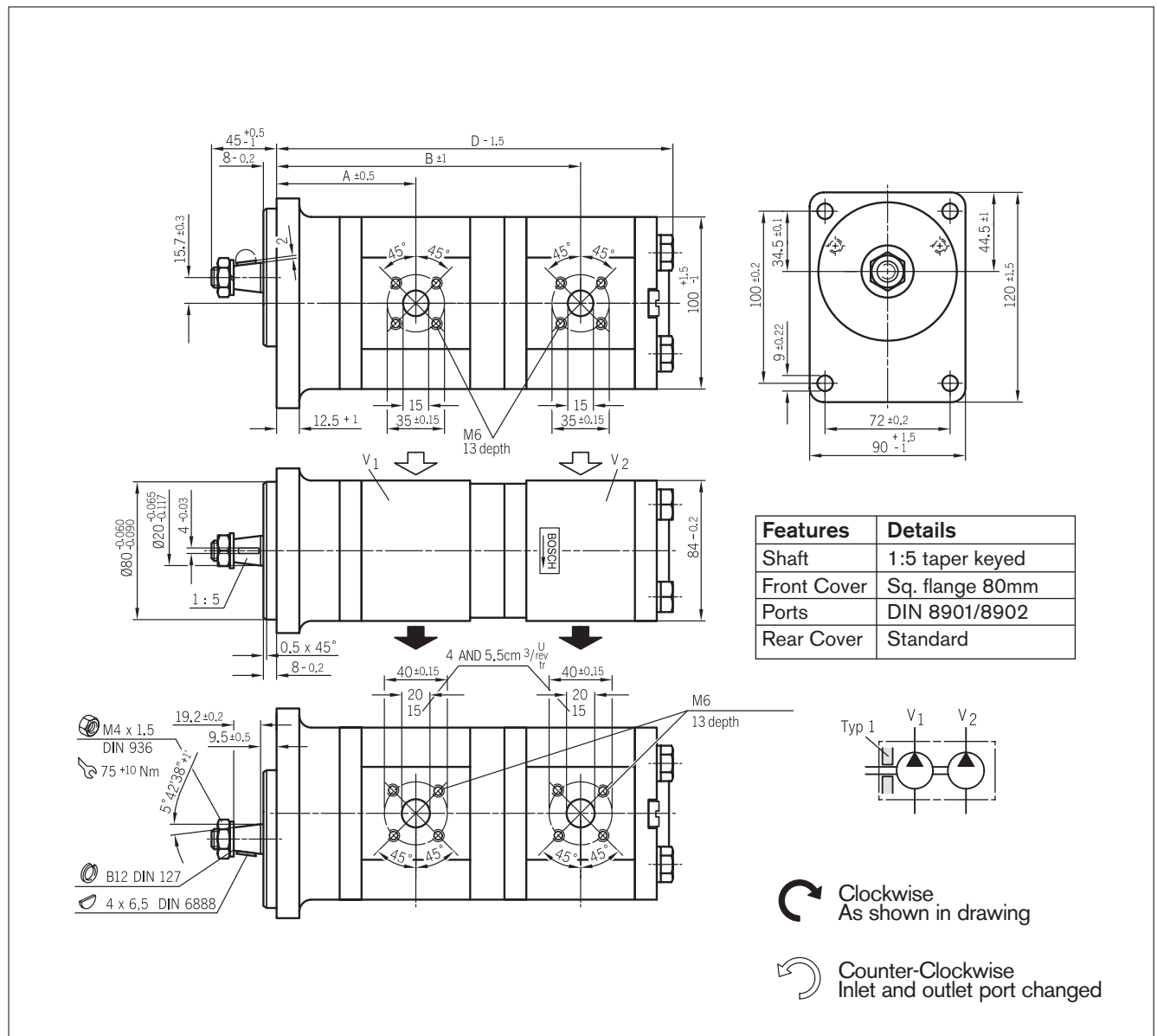
* Contact factory for availability of units with no ordering number listed.

Ordering code

AZPFF – X X – □ □ □ / □ □ □ N M 20 20 MB

[illegible]

* Contact factory for availability of units with no ordering number listed.

**Ordering code****AZPFF - X X - □□□ / □□□□ S A 20 20 MB**

Displacement [cm³/rev]	Ordering-Number *		Max. operating pressure [bar]	Max. rotation speed [min ⁻¹]	Dimension [mm]			
	 L	 R			A	B	D	
004 / 004	0 510 255 300		280	4000	71.3	153.0	197.0	
05.5 / 004	0 510 355 301		280	4000	72.6	155.5	199.5	
008 / 05.5	0 510 455 300	0 510 455 001	280	4000	74.6	160.8	205.1	
008 / 008	0 510 455 301	0 510 455 002	280	4000	74.6	163.0	210.2	
011 / 05.5	0 510 555 300	0 510 555 001	280	3500	79.0	165.8	211.1	
011 / 008	0 510 555 301	0 510 555 002	280	3500	79.0	168.0	215.2	
011 / 011	0 510 555 302	0 510 555 003	280	3500	79.0	172.3	220.2	
016 / 004	0 510 655 300	0 510 655 001	280	3000	79.0	173.0	217.0	
016 / 05.5	0 510 655 301	0 510 655 002	280	3000	79.0	174.2	219.5	
016 / 008	0 510 655 302	0 510 655 003	280	3000	79.0	176.3	223.6	
016 / 011	0 510 655 303	0 510 655 004	280	3000	79.0	180.7	228.6	
016 / 016	0 510 655 304	0 510 655 005	280	3000	79.0	180.7	237.0	

* Contact factory for availability of units with no ordering number listed.

Seal Kits (reference Fig. 15)

Example Model Code: AZPF – 12 – 008 RRR 12MB

Model Code Designator for Shaft

Model Code Designator for Seal

	Model Code For Shaft	Shaft Description	Model Code For Seal	Seal Material	Seal Pos. 800 & Pos. 3	Sets of Seals Sps. 800	Shaft Seal Pos. 3	O-ring Pos. 31
F Series Pump	R	SAE 9T Spline	M	NBR	1506635001	1517010152	1510283035	—
			P	FPM	—	1517010193	1510283027	—
			K	NBR W/FPM SHAFT SEAL	—	1517010152	1510283027	—
	Q	5/8" Straight Key	M	NBR	1506635001	1517010152	1510283035	—
			P	FPM	—	1517010193	1510283027	—
			K	NBR W/FPM SHAFT SEAL	—	1517010152	1510283027	—
	P	SAE 11T Spline	M	NBR	1506635003	1517010152	1510283037	—
			P	FPM	—	1517010193	1510283044	—
			K	NBR W/FPM SHAFT SEAL	—	1517010152	1510283044	—
	C	1:5 Tapered Key	M	NBR	1506635001	1517010152	1510283038	—
			P	FPM	—	1517010193	1510283027	—
			K	NBR W/FPM SHAFT SEAL	—	1517010152	1510283027	—
	S	1:5 Tapered for Flange A	M	NBR	—	1517010152	1510283009	—
			P	FPM	—	1517010193	1510283015	—
			K	NBR W/FPM SHAFT SEAL	—	1517010152	1510283015	—
	H	1:8 Tapered Key	M	NBR	1506635001	1517010152	1510283008	—
			P	FPM	—	1517010193	1510283027	—
			K	NBR W/FPM SHAFT SEAL	—	1517010152	1510283027	—
	N	Dog	M	NBR	1506635001	1517010152	1510283008	1900210145
			P	FPM	—	1517010193	1510283027	1900210145
			K	NBR W/FPM SHAFT SEAL	—	1517010152	1510283027	—
	A	18mm Straight Key	M	NBR	1506635003	1517010152	1510283037	—
			P	FPM	—	1517010193	1510283027	—
			K	NBR W/FPM SHAFT SEAL	—	1517010152	1510283027	—
	F	Din 5482 B17x14 Spline	M	NBR	1506635001	1517010152	1510283008	—
			P	FPM	—	1517010193	1510283027	—
			K	NBR W/FPM SHAFT SEAL	—	1517010152	1510283027	—
N Series Pump	P	SAE 11T Spline	M	NBR	1509635001	1517010194	1510283023	—
			P	FPM	—	1517010197	1510283028	—
			K	NBR W/FPM SHAFT SEAL	—	1517010194	1510283028	—
	Q	SAE 3/4" Keyed Shaft	M	NBR	1509635001	1517010194	1510283023	—
			P	FPM	—	1517010197	1510283028	—
			K	NBR W/FPM SHAFT SEAL	—	1517010194	1510283028	—
	R	SAE 9T Spline	M	NBR	1509635001	1517010194	1510283023	—
			P	FPM	—	1517010197	1510283028	—
			K	NBR W/FPM SHAFT SEAL	—	1517010194	1510283028	—
	D	SAE 13T Spline	M	NBR	1509635001	1517010194	1510283023	—
			P	FPM	—	1517010197	1510283028	—
			K	NBR W/FPM SHAFT SEAL	—	1517010194	1510283028	—
	Q-S0022	SAE 3/4" Keyed, Long	M	NBR	1509635001	1517010194	1510283023	—
			P	FPM	—	1517010197	1510283028	—
			K	NBR W/FPM SHAFT SEAL	—	1517010194	1510283028	—
	C	1:5 Tapered Key	M	NBR	1509635001	1517010194	1510283023	—
			P	FPM	—	1517010197	1510283028	—
			K	NBR W/FPM SHAFT SEAL	—	1517010194	1510283028	—
	N	Dog (tang)	M	NBR	1509635001	1517010194	1510283023	—
			P	FPM	—	1517010197	1510283028	—
			K	NBR W/FPM SHAFT SEAL	—	1517010194	1510283028	—
	H	1:8 Tapered Key	M	NBR	1509635001	1517010194	1510283023	—
			P	FPM	—	1517010197	1510283028	—
			K	NBR W/FPM SHAFT SEAL	—	1517010194	1510283028	—
	A	ISO Keyed, 18mm	M	NBR	1509635001	1517010194	1510283023	—
			P	FPM	—	1517010197	1510283028	—
			K	NBR W/FPM SHAFT SEAL	—	1517010194	1510283028	—
G Series Pump	D	SAE B - 13T Spline	M	NBR	—	1517010190	1510283010	—
			P	FPM	—	1517010203*	1510283068	—
			K	NBR W/FPM SHAFT SEAL	—	1517010190	1510283068	—
	Q	SAE 7/8" Keyed Shaft	M	NBR	—	1517010190	1510283010	—
			P	FPM	—	1517010203*	1510283025	—
			K	NBR W/FPM SHAFT SEAL	—	1517010190	1510283025	—
	C	1:5 Tapered Key	M	NBR	—	1517010190	1510283010	—
			P	FPM	—	—	—	—
			K	NBR W/FPM SHAFT SEAL	—	1517010190	1510283025	—
	S	1:5 Tapered Key (flange A)	M	NBR	—	1517010190	1510283010	—
			P	FPM	—	—	—	—
			K	NBR W/FPM SHAFT SEAL	—	—	—	—
	H	1:8 Tapered Key	M	NBR	—	1517010190	1510283010	—
			P	FPM	—	—	—	—
			K	NBR W/FPM SHAFT SEAL	—	—	—	—
	N	Dog (tang)	M	NBR	—	1517010190	1510283010	—
			P	FPM	—	—	—	—
			K	NBR W/FPM SHAFT SEAL	—	—	—	—
	F	DIN 5482 B17x14 Spline	M	NBR	—	1517010190	1510283014	—
			P	FPM	—	—	—	—
			K	NBR W/FPM SHAFT SEAL	—	—	—	—

* only housing seal are in FPM

Outboard bearing

Single pump

Multiple pump

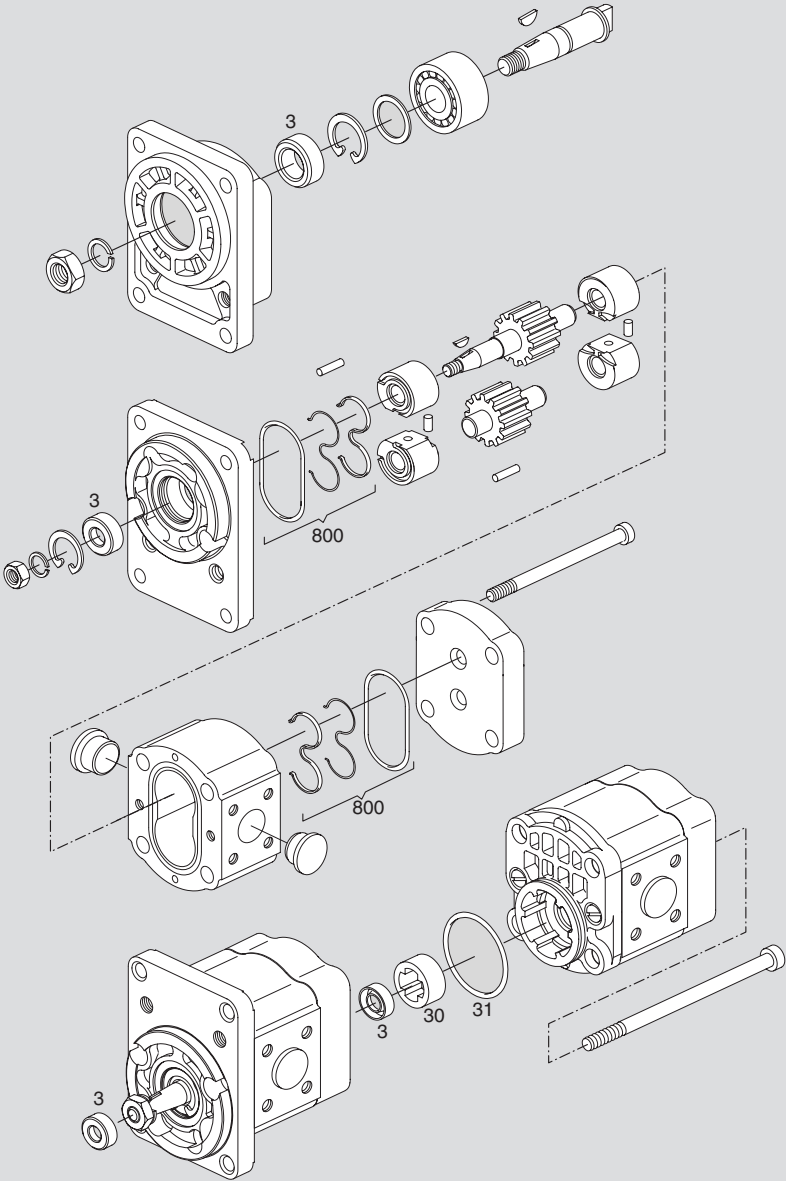


Fig. 15

Part Number Index

External Gear Pumps – Multiple Pumps

Part Number	Page	Part Number	Page	Part Number	Page	Part Number	Page
0510 215 006.....	37	0510 515 019.....	41	0510 625 028.....	31	0510 765 023.....	85
0510 215 007.....	41	0510 515 309.....	39	0510 625 029.....	31	0510 765 312.....	87
0510 215 009.....	39	0510 515 310.....	37	0510 625 035.....	66	0510 765 317.....	86
0510 215 306.....	37	0510 515 311.....	41	0510 625 047.....	36	0510 765 320.....	85
0510 215 307.....	41	0510 515 316.....	39	0510 625 052.....	36	0510 765 331.....	86
0510 215 309.....	39	0510 515 337.....	40	0510 625 314.....	32	0510 766 010.....	91
0510 225 006.....	32	0510 515 338.....	40	0510 625 315.....	32	0510 767 018.....	91
0510 225 007.....	33	0510 515 340.....	41	0510 625 316.....	33	0510 767 311.....	91
0510 225 008.....	34	0510 525 009.....	32	0510 625 317.....	33	0510 768 021.....	91
0510 225 013.....	31	0510 525 010.....	33	0510 625 318.....	34	9510 290 004.....	23
0510 225 015.....	36	0510 525 011.....	34	0510 625 319.....	34	9510 290 005.....	23
0510 225 306.....	32	0510 525 012.....	34	0510 625 329.....	31	9510 290 015.....	23
0510 225 307.....	33	0510 525 018.....	32	0510 625 330.....	31	9510 290 017.....	23
0510 225 308.....	34	0510 525 019.....	31	0510 625 335.....	66	9510 290 018.....	23
0510 225 314.....	31	0510 525 020.....	31	0510 645 002.....	42	9510 290 021.....	25
0510 245 001.....	42	0510 525 024.....	35	0510 645 003.....	43	9510 290 022.....	25
0510 245 300.....	42	0510 525 030.....	33	0510 645 004.....	42	9510 290 023.....	25
0510 255 300.....	89	0510 525 039.....	36	0510 645 005.....	43	9510 290 024.....	25
0510 315 004.....	37	0510 525 040.....	36	0510 645 300.....	42	9510 290 025.....	25
0510 315 005.....	41	0510 525 311.....	32	0510 655 001.....	89	9510 290 034.....	82
0510 315 006.....	39	0510 525 312.....	33	0510 655 002.....	89	9510 290 036.....	23
0510 315 007.....	38	0510 525 313.....	34	0510 655 003.....	89	9510 290 037.....	23
0510 315 304.....	37	0510 525 314.....	34	0510 655 004.....	89	9510 290 038.....	23
0510 315 305.....	41	0510 525 319.....	32	0510 655 005.....	89	9510 290 039.....	23
0510 315 307.....	39	0510 525 323.....	35	0510 655 300.....	89	9510 290 040.....	23
0510 325 006.....	32	0510 525 324.....	31	0510 655 301.....	89	9510 290 044.....	25
0510 325 007.....	33	0510 525 325.....	31	0510 655 302.....	89	9510 290 045.....	25
0510 325 008.....	34	0510 525 328.....	33	0510 655 303.....	89	9510 290 046.....	25
0510 325 013.....	31	0510 545 001.....	42	0510 655 304.....	89	9510 290 047.....	25
0510 325 018.....	36	0510 545 002.....	43	0510 656 061.....	90	9510 290 048.....	25
0510 325 306.....	32	0510 545 003.....	43	0510 665 022.....	86	9510 290 052.....	83
0510 325 307.....	33	0510 545 300.....	42	0510 665 024.....	85	9510 290 056.....	23
0510 325 308.....	34	0510 545 302.....	43	0510 665 025.....	85	9510 290 057.....	27
0510 325 313.....	31	0510 555 001.....	89	0510 665 030.....	87	9510 290 058.....	27
0510 345 001.....	42	0510 555 002.....	89	0510 665 053.....	85	9510 290 059.....	27
0510 345 300.....	42	0510 555 003.....	89	0510 665 067.....	85	9510 290 060.....	27
0510 355 301.....	89	0510 555 300.....	89	0510 665 097.....	86	9510 290 061.....	27
0510 365 010.....	87	0510 555 301.....	89	0510 665 325.....	85	9510 290 062.....	27
0510 365 314.....	87	0510 555 302.....	89	0510 665 326.....	85	9510 290 063.....	27
0510 415 005.....	37	0510 565 012.....	85	0510 665 327.....	85	9510 290 064.....	27
0510 415 006.....	41	0510 565 015.....	87	0510 665 371.....	90	9510 290 065.....	27
0510 415 313.....	37	0510 565 016.....	87	0510 665 372.....	90	9510 290 066.....	27
0510 415 314.....	41	0510 565 022.....	88	0510 665 375.....	86	9510 290 067.....	27
0510 415 316.....	39	0510 565 023.....	88	0510 665 379.....	90	9510 290 068.....	27
0510 415 328.....	40	0510 565 033.....	85	0510 665 400.....	85	9510 290 069.....	27
0510 425 009.....	32	0510 565 037.....	85	0510 665 416.....	90	9510 290 070.....	27
0510 425 010.....	33	0510 565 078.....	87	0510 665 420.....	86	9510 290 071.....	27
0510 425 011.....	34	0510 565 329.....	87	0510 715 004.....	41	9510 290 072.....	27
0510 425 020.....	31	0510 565 339.....	87	0510 715 006.....	67	9510 290 075.....	24
0510 425 021.....	35	0510 565 346.....	88	0510 715 007.....	67	9510 290 076.....	24
0510 425 027.....	36	0510 565 353.....	85	0510 715 008.....	40	9510 290 077.....	24
0510 425 307.....	32	0510 565 364.....	85	0510 715 016.....	37	9510 290 078.....	24
0510 425 308.....	33	0510 565 371.....	90	0510 715 306.....	39	9510 290 079.....	24
0510 425 309.....	34	0510 565 379.....	87	0510 715 307.....	41	9510 290 080.....	24
0510 425 314.....	31	0510 565 408.....	90	0510 715 320.....	40	9510 290 081.....	24
0510 425 315.....	35	0510 615 005.....	39	0510 725 030.....	32	9510 290 082.....	24
0510 445 001.....	42	0510 615 006.....	37	0510 725 031.....	34	9510 290 083.....	24
0510 445 300.....	42	0510 615 007.....	41	0510 725 047.....	66	9510 290 084.....	24
0510 455 001.....	89	0510 615 008.....	41	0510 725 048.....	66	9510 290 085.....	24
0510 455 002.....	89	0510 615 009.....	38	0510 725 055.....	66	9510 290 086.....	24
0510 455 300.....	89	0510 615 010.....	39	0510 725 057.....	65	9510 290 087.....	24
0510 455 301.....	89	0510 615 023.....	40	0510 725 058.....	65	9510 290 088.....	24
0510 465 008.....	87	0510 615 314.....	37	0510 725 062.....	33	9510 290 089.....	24
0510 465 012.....	87	0510 615 315.....	41	0510 725 077.....	31	9510 290 090.....	24
0510 465 340.....	85	0510 615 317.....	39	0510 725 084.....	36	9510 290 091.....	26
0510 465 346.....	87	0510 615 318.....	39	0510 725 330.....	32	9510 290 092.....	26
0510 515 004.....	37	0510 615 321.....	41	0510 725 331.....	34	9510 290 093.....	26
0510 515 005.....	41	0510 615 341.....	37	0510 725 352.....	66	9510 290 094.....	26
0510 515 007.....	39	0510 625 013.....	32	0510 725 353.....	66	9510 290 095.....	26
0510 515 011.....	38	0510 625 014.....	33	0510 725 361.....	31	9510 290 096.....	26
0510 515 012.....	40	0510 625 015.....	33	0510 725 363.....	65	9510 290 097.....	26
0510 515 013.....	40	0510 625 016.....	34	0510 725 364.....	66	9510 290 098.....	26
0510 515 015.....	37	0510 625 017.....	34	0510 725 377.....	65	9510 290 099.....	26
0510 515 018.....	39	0510 625 022.....	32	0510 765 012.....	85	9510 290 100.....	26

Part Number	Page	Part Number	Page	Part Number	Page	Part Number	Page
9 510 290 101.....	26	9 510 390 015.....	60	9 510 390 094.....	52	9 510 390 175.....	62
9 510 290 102.....	26	9 510 390 016.....	60	9 510 390 095.....	52	9 510 390 176.....	62
9 510 290 103.....	26	9 510 390 017.....	60	9 510 390 096.....	52	9 510 390 177.....	62
9 510 290 104.....	26	9 510 390 018.....	60	9 510 390 097.....	52	9 510 390 178.....	62
9 510 290 105.....	26	9 510 390 019.....	60	9 510 390 098.....	50	9 510 390 179.....	62
9 510 290 106.....	26	9 510 390 020.....	60	9 510 390 099.....	50	9 510 390 180.....	62
9 510 290 108.....	84	9 510 390 021.....	60	9 510 390 100.....	50	9 510 390 188.....	62
9 510 290 110.....	27	9 510 390 022.....	60	9 510 390 101.....	50	9 510 390 190.....	61
9 510 290 111.....	23	9 510 390 023.....	60	9 510 390 102.....	50	9 510 490 004.....	73
9 510 290 112.....	25	9 510 390 024.....	60	9 510 390 103.....	50	9 510 490 005.....	73
9 510 290 113.....	27	9 510 390 025.....	57	9 510 390 104.....	50	9 510 490 007.....	73
9 510 290 114.....	23	9 510 390 026.....	57	9 510 390 105.....	50	9 510 490 009.....	73
9 510 290 115.....	25	9 510 390 027.....	57	9 510 390 106.....	50	9 510 490 010.....	73
9 510 290 116.....	27	9 510 390 028.....	57	9 510 390 107.....	50	9 510 490 014.....	73
9 510 290 117.....	23	9 510 390 029.....	57	9 510 390 108.....	50	9 510 490 015.....	73
9 510 290 118.....	25	9 510 390 030.....	57	9 510 390 109.....	50	9 510 490 017.....	73
9 510 290 119.....	27	9 510 390 031.....	57	9 510 390 110.....	63	9 510 490 019.....	73
9 510 290 120.....	23	9 510 390 032.....	57	9 510 390 111.....	63	9 510 490 020.....	73
9 510 290 121.....	25	9 510 390 033.....	57	9 510 390 112.....	63	9 510 490 024.....	75
9 510 290 122.....	25	9 510 390 034.....	57	9 510 390 113.....	63	9 510 490 025.....	75
9 510 290 123.....	25	9 510 390 035.....	57	9 510 390 114.....	63	9 510 490 027.....	75
9 510 290 124.....	25	9 510 390 036.....	57	9 510 390 115.....	63	9 510 490 029.....	75
9 510 290 125.....	23	9 510 390 037.....	58	9 510 390 116.....	63	9 510 490 030.....	75
9 510 290 126.....	23	9 510 390 038.....	58	9 510 390 117.....	63	9 510 490 034.....	75
9 510 290 127.....	23	9 510 390 039.....	58	9 510 390 118.....	63	9 510 490 035.....	75
9 510 290 128.....	23	9 510 390 040.....	58	9 510 390 119.....	63	9 510 490 037.....	75
9 510 290 129.....	23	9 510 390 041.....	58	9 510 390 120.....	63	9 510 490 039.....	75
9 510 290 130.....	25	9 510 390 042.....	58	9 510 390 121.....	63	9 510 490 040.....	75
9 510 290 131.....	25	9 510 390 043.....	58	9 510 390 122.....	56	9 510 490 044.....	77
9 510 290 132.....	25	9 510 390 044.....	58	9 510 390 123.....	56	9 510 490 045.....	77
9 510 290 133.....	28	9 510 390 045.....	58	9 510 390 124.....	56	9 510 490 047.....	77
9 510 290 134.....	29	9 510 390 046.....	58	9 510 390 125.....	56	9 510 490 049.....	77
9 510 290 135.....	29	9 510 390 047.....	58	9 510 390 126.....	56	9 510 490 050.....	77
9 510 290 137.....	83	9 510 390 048.....	58	9 510 390 127.....	56	9 510 490 054.....	77
9 510 290 138.....	83	9 510 390 049.....	53	9 510 390 128.....	56	9 510 490 055.....	77
9 510 290 139.....	83	9 510 390 050.....	53	9 510 390 129.....	56	9 510 490 057.....	77
9 510 290 140.....	83	9 510 390 051.....	53	9 510 390 130.....	56	9 510 490 059.....	77
9 510 290 141.....	83	9 510 390 052.....	53	9 510 390 131.....	56	9 510 490 060.....	77
9 510 290 142.....	82	9 510 390 053.....	53	9 510 390 132.....	56	9 510 490 064.....	74
9 510 290 143.....	82	9 510 390 054.....	53	9 510 390 133.....	56	9 510 490 065.....	74
9 510 290 144.....	82	9 510 390 055.....	53	9 510 390 134.....	64	9 510 490 067.....	74
9 510 290 191.....	28	9 510 390 056.....	53	9 510 390 135.....	64	9 510 490 069.....	74
9 510 290 209.....	28	9 510 390 057.....	53	9 510 390 136.....	64	9 510 490 070.....	74
9 510 290 210.....	28	9 510 390 058.....	53	9 510 390 137.....	64	9 510 490 074.....	74
9 510 290 211.....	28	9 510 390 059.....	53	9 510 390 138.....	64	9 510 490 075.....	74
9 510 290 212.....	28	9 510 390 060.....	53	9 510 390 139.....	64	9 510 490 077.....	74
9 510 290 213.....	29	9 510 390 061.....	54	9 510 390 140.....	64	9 510 490 079.....	74
9 510 290 214.....	28	9 510 390 062.....	54	9 510 390 141.....	64	9 510 490 080.....	74
9 510 290 215.....	28	9 510 390 063.....	54	9 510 390 142.....	64	9 510 490 084.....	78
9 510 290 323.....	30	9 510 390 064.....	54	9 510 390 143.....	64	9 510 490 085.....	78
9 510 290 324.....	30	9 510 390 065.....	54	9 510 390 144.....	64	9 510 490 087.....	78
9 510 290 325.....	30	9 510 390 066.....	54	9 510 390 145.....	64	9 510 490 089.....	78
9 510 290 326.....	30	9 510 390 067.....	54	9 510 390 147.....	49	9 510 490 090.....	78
9 510 290 327.....	30	9 510 390 068.....	54	9 510 390 148.....	49	9 510 490 094.....	78
9 510 290 328.....	30	9 510 390 069.....	54	9 510 390 149.....	49	9 510 490 095.....	78
9 510 290 329.....	30	9 510 390 070.....	54	9 510 390 150.....	49	9 510 490 097.....	78
9 510 290 330.....	30	9 510 390 071.....	54	9 510 390 151.....	49	9 510 490 099.....	78
9 510 290 331.....	30	9 510 390 072.....	54	9 510 390 152.....	49	9 510 490 100.....	78
9 510 290 332.....	30	9 510 390 073.....	55	9 510 390 153.....	49	9 510 490 104.....	76
9 510 290 254.....	28	9 510 390 074.....	55	9 510 390 154.....	49	9 510 490 105.....	76
9 510 290 255.....	28	9 510 390 075.....	55	9 510 390 155.....	49	9 510 490 107.....	76
9 510 290 256.....	28	9 510 390 076.....	55	9 510 390 156.....	49	9 510 490 109.....	76
9 510 290 257.....	28	9 510 390 077.....	55	9 510 390 157.....	49	9 510 490 110.....	76
9 510 290 259.....	28	9 510 390 078.....	55	9 510 390 158.....	49	9 510 490 114.....	76
9 510 390 001.....	59	9 510 390 079.....	55	9 510 390 159.....	51	9 510 490 115.....	76
9 510 390 002.....	59	9 510 390 080.....	55	9 510 390 160.....	51	9 510 490 117.....	76
9 510 390 003.....	59	9 510 390 081.....	55	9 510 390 161.....	51	9 510 490 119.....	76
9 510 390 004.....	59	9 510 390 082.....	55	9 510 390 162.....	51	9 510 490 120.....	76
9 510 390 005.....	59	9 510 390 083.....	55	9 510 390 163.....	51		
9 510 390 006.....	59	9 510 390 084.....	55	9 510 390 164.....	51		
9 510 390 007.....	59	9 510 390 086.....	52	9 510 390 165.....	51		
9 510 390 008.....	59	9 510 390 087.....	52	9 510 390 166.....	51		
9 510 390 009.....	59	9 510 390 088.....	52	9 510 390 167.....	51		
9 510 390 010.....	59	9 510 390 089.....	52	9 510 390 168.....	51		
9 510 390 011.....	59	9 510 390 090.....	52	9 510 390 169.....	51		
9 510 390 012.....	59	9 510 390 091.....	52	9 510 390 170.....	51		
9 510 390 013.....	60	9 510 390 092.....	52	9 510 390 173.....	61		
9 510 390 014.....	60	9 510 390 093.....	52	9 510 390 174.....	61		

Bosch Rexroth Corporation
Mobile Hydraulics
Mobile Controls, Electronics,
and External Gear Units
1700 Old Mansfield Road
Wooster, OH 44691-0394
Telephone (330) 263-3300
Facsimile (330) 263-3330
www.boschrexroth-us.com

© 2006 Bosch Rexroth Corporation

All rights reserved. Neither this document, nor any part of it, may be reproduced, duplicated, circulated or disseminated, whether by copy, electronic format or any other means, without the prior consent and authorization of Bosch Rexroth Corp.

The data and illustrations in this brochure/data sheet are intended only to describe or depict the products. No representation or warranty, either express or implied, relating to merchantability or fitness for intended use, is given or intended by virtue of the information contained in this brochure/data sheet. The information contained in this brochure/data sheet in no way relieves the user of its obligation to insure the proper use of the products for a specific use or application. All products contained in this brochure/data sheet are subject to normal wear and tear from usage.

Subject to change.

Tank mounted return line filter

RE 51424/06.11
Replaces: 11.09

1/26

Type 10TEN0040 to 1000; 10TE2000/2500

Size according to **DIN 24550**: 0040 to 1000
 Additional sizes: 2000, 2500
 Nominal pressure 10 bar [*145 psi*]
 Connection up to G 1 1/2; to SAE 4"; to SAE 24



H7855_d

Table of contents

Contents	Page
Features	1
Ordering code	2...5
Standard types	6, 7
Symbols	8
Function, section	9
Technical data	10, 11
Characteristic curves	12...15
Unit dimensions	16...19
Options	20
Maintenance indicator	21
Spare parts and accessories	22, 23
Installation, commissioning and maintenance	24
Classification according to pressure equipment directive 97/23/EC	24
Use in explosive areas according to directive 94/9/EC (ATEX)	25

Features

The tank mounted return line filters are designed for installation on fluid tanks. They serve the separation of solid materials from the whole fluid flowing back to the tanks.

They distinguish themselves by the following:

- Adsorption of very fine particles across a broad pressure differential range
- High dirt holding capacity thanks to large specific filter area
- Good chemical resistance of the filter elements
- High collapse resistance of the filter elements (e.g. in case of cold start)
- Filter ratings: 3...100 µm
- By default, the filters are equipped with a bypass valve
- Broad range of accessories, e.g. different maintenance indicators, outlet pipes, ...

Ordering code

of the filters of sizes 0040 to 0100

10	TEN	—	A	00	—	—	—
----	-----	---	---	----	---	---	---

Pressure
10 bar [145 psi] = 10

Design
Return line filter, simple,
with filter element according
to DIN 24550 = TEN

Size
0040 = 0040
0063 = 0063
0100 = 0100

Filter rating in µm
nominal
Stainless steel wire mesh, cleanable
G10, G25, G40, G60, G100 = G...
Paper, non-cleanable
P10, P25 = P...
absolute (ISO 16889)
Micro glass, non-cleanable
H3XL, H6XL, H10XL, H20XL = H...XL

Pressure differential
Max. admissible pressure differential of the filter element
30 bar [435 psi] with bypass valve
(cracking pressure 3.5 bar [51 psi]) = A

Element model
Standard adhesive T = 100 °C [212 °F] = 0...
Standard material = ...0

Maintenance indicator
Without = 0
Mechanical optical (polyamide, switching pressure 2.2 bar [32 psi]) = P2,2
Mechanical optical (aluminum, switching pressure 2.2 bar [32 psi]) = V2,2
Mechanical optical (aluminum, switching pressure 1.5 bar [22 psi]) = V1,5
Mechanical optical (aluminum, switching pressure 0.8 bar [12 psi]) = V0.8
Pressure gauge 0...6 bar [0...87 psi] right = MR
Mechanical optical + pressure gauge right = MRV2,2

Complementary details (if necessary)
NB = Without bypass
F = Ventilation filter
FN = Ventilation filter with surge protection
M = Minimes connection (not possible with pressure gauge)
R110 = Outlet pipe 110 mm [4.3"]
R150 = Outlet pipe 150 mm [5.9"]
R250 = Outlet pipe 250 mm [9.8"]
S = Filling port (not possible with mech.-opt. maintenance indicator)

Main inlet

	Port	Frame size	
		0040	0063-0100
R3 =	G3/4	●	x
R4 =	G1	x	●
U4 =	1 1/16-12 UN-2B [SAE 12]	x	x
U9 =	1 5/16-12 UN-2B [SAE 16]	x	x

● = Standard port
x = Alternative port

Seal
M = NBR seal
V = FKM seal

Example: 10TEN0040-H10XLA00-P2,2-M-R3
10TEN0100-H10XLA00-MR-M-R4

Further models, e.g. filter media, connections, are available at request.

Ordering code

of the filters of sizes 1000 to 2500

10	TE		—	A	00	—	—	—	—
----	----	--	---	---	----	---	---	---	---

Pressure

10 bar [145 psi] = 10

Design

Return line filter simple = TE

Filter element

According to DIN 24550
(not with 2000 and 2500) = N

Size

10TEN1000 = 1000
10TE2000 = 2000
10TE2500 = 2500

Filter rating in µm nominal

Stainless steel wire mesh, cleanable
G10, G25, G40, G60, G100 = G...

Paper, non-cleanable
P10, P25 = P...

absolute (ISO 16889)

Micro glass, non-cleanable
H3XL, H6XL, H10XL, H20XL = H...XL

Pressure differential

Max. admissible pressure differential of the filter element
30 bar [435 psi] incl. bypass valve
(cracking pressure 3.5 bar [51 psi]) = A

Element model

Standard adhesive T = 100 °C [212 °F] = 0...
Standard material = ...0

Maintenance indicator

Without = 0
Mechanical optical (polyamide, switching pressure 2.2 bar [32 psi]) = P2,2
Mechanical optical (aluminum, switching pressure 2.2 bar [32 psi]) = V2,2
Mechanical optical (aluminum, switching pressure 1.5 bar [22 psi]) = V1,5
Mechanical optical (aluminum, switching pressure 0.8 bar [12 psi]) = V0.8
Pressure gauge 0...6 bar [0...87 psi] left = ML
Mechanical optical + pressure gauge left = MLV2,2

Complementary details (if necessary)

NB = Without bypass
M = Minimes connection
(not possible with pressure gauge)
S = Filling port
(not possible with mech.-opt.
maintenance indicator)

Main inlet

	Port	Frame size		
		1000	2000	2500
S10 =	SAE 3" 3000 psi	●	x	x
S12 =	SAE 4" 3000 psi	x	●	●

● = Standard port
x = Alternative port

Seal

M = NBR seal
V = FKM seal

Example: 10TEN1000-H10XLA00-P2,2-M-S10
10TE2500-H20XLA00-P2,2-M-S12

Further models, e.g. filter media, connections, are available at request.

Standard types

Tank mounted return line filter, filter rating 3 µm, 10 µm and 20 µm

Filter type	Flow in l/min [gpm] with $v = 30 \text{ mm}^2/\text{s}$ [142 SUS] and $\Delta p = 0.5 \text{ bar}$ [7.25 psi]	Port/Material no.			
10TEN0040-H20XLA00-P2,2-M-...	62 [16.4]	..R3	R928041199	..U4	R928041200
10TEN0063-H20XLA00-P2,2-M-...	80 [21.1]	..R4	R928041201	..U9	R928041202
10TEN0100-H20XLA00-P2,2-M-...	95 [25.1]	..R4	R928041203	..U9	R928041204
10TEN0160-H20XLA00-P2,2-M-...	260 [68.7]	..R5	R928041205	..S5	R928041206
10TEN0250-H20XLA00-P2,2-M-...	320 [84.5]	..R6	R928041208	..S6	R928041209
10TEN0400-H20XLA00-P2,2-M-...	560 [147.9]	..S8	R928041210	..S9	R928041211
10TEN0630-H20XLA00-P2,2-M-...	630 [166.4]	..S9	R928041223	..S8	R928041224
10TEN1000-H20XLA00-P2,2-M-...	1270 [335.5]	..S10	R928041225	..S12	R928041226
10TE2000-H20XLA00-P2,2-M-...	1600 [422.7]	..S12	R928041228	..S10	R928041229
10TE2500-H20XLA00-P2,2-M-...	1680 [443.8]	..S12	R928041230	..S10	R928041231
10TEN0040-H10XLA00-P2,2-M-...	43 [11.3]	..R3	R928041271	..U4	R928041272
10TEN0063-H10XLA00-P2,2-M-...	62 [16.4]	..R4	R928041273	..U9	R928041274
10TEN0100-H10XLA00-P2,2-M-...	80 [21.1]	..R4	R928041275	..U9	R928041276
10TEN0160-H10XLA00-P2,2-M-...	190 [50.2]	..R5	R928041277	..S5	R928041278
10TEN0250-H10XLA00-P2,2-M-...	260 [68.7]	..R6	R928041279	..S6	R928041280
10TEN0400-H10XLA00-P2,2-M-...	460 [121.5]	..S8	R928041281	..S9	R928041282
10TEN0630-H10XLA00-P2,2-M-...	560 [147.9]	..S9	R928041283	..S8	R928041284
10TEN1000-H10XLA00-P2,2-M-...	970 [256.2]	..S10	R928041285	..S12	R928041286
10TE2000-H10XLA00-P2,2-M-...	1350 [356.6]	..S12	R928041288	..S10	R928041289
10TE2500-H10XLA00-P2,2-M-...	1450 [383.0]	..S12	R928041290	..S10	R928041291
10TEN0040-H3XLA00-P2,2-M-...	23 [6.1]	..R3	R928041292	..U4	R928041293
10TEN0063-H3XLA00-P2,2-M-...	35 [9.2]	..R4	R928041294	..U9	R928041295
10TEN0100-H3XLA00-P2,2-M-...	52 [13.7]	..R4	R928041296	..U9	R928041297
10TEN0160-H3XLA00-P2,2-M-...	105 [27.7]	..R5	R928041298	..S5	R928041299
10TEN0250-H3XLA00-P2,2-M-...	160 [42.3]	..R6	R928041300	..S6	R928041301
10TEN0400-H3XLA00-P2,2-M-...	290 [76.6]	..S8	R928041302	..S9	R928041303
10TEN0630-H3XLA00-P2,2-M-...	410 [108.3]	..S9	R928041304	..S8	R928041305
10TEN1000-H3XLA00-P2,2-M-...	560 [147.9]	..S10	R928041306	..S12	R928041307
10TE2000-H3XLA00-P2,2-M-...	900 [237.7]	..S12	R928041308	..S10	R928041309
10TE2500-H3XLA00-P2,2-M-...	1100 [290.6]	..S12	R928041310	..S10	R928041311

Standard types

Element type	Filter material/Material no.		
	H3XL	H10XL	H20XL
1.0040 ...A00-0-M	R928005835	R928005837	R928005838
1.0063 ...A00-0-M	R928005853	R928005855	R928005856
1.0100 ...A00-0-M	R928005871	R928005873	R928005874
1.0160 ...A00-0-M	R928005889	R928005891	R928005892
1.0250 ...A00-0-M	R928005925	R928005927	R928005928
1.0400 ...A00-0-M	R928005961	R928005963	R928005964
1.0630 ...A00-0-M	R928005997	R928005999	R928006000
1.1000 ...A00-0-M	R928006033	R928006035	R928006036
1.2000 ...A00-0-M	R928041312	R928040797	R928041313
1.2500 ...A00-0-M	R928041314	R928040800	R928041315

Ordering code, standard types: Electronic switching element for maintenance indicator

If an electric switching element with signal suppression up to 30 °C is used (WE-2SPSU-M12x1, **R928028411**), it has to be ensured that the aluminum version of the mechanical-optical maintenance indicator must be used. In the filter type key,

these maintenance indicators are referred to as "V2,2", "V1,5" or "V0,8". Also refer to the chapter "Spare parts and accessories".

The temperature-controlled signal processing does not work with mechanical-optical maintenance indicators made of polyamide.

		WE	
Maintenance indicator			
Electronic switching element	= WE		
Type of signal			
1 switching point	= 1SP		
2 switching points, 3 LED	= 2SP		
2 switching points, 3 LED and signal suppression up to 30 °C [86 °F]	= 2SPSU		
			Connector
			M12x1 = Round plug-in connection M12x1, 4-pin
			EN 175301-803 = Rectangular plug-in connector, 2-pin design A according to EN-175301-803

Material numbers of the mechanical optical maintenance indicators

Material no.	Type	Signal	Switching points	Connector	LED
R928028409	WE-1SP-M12x1	Changeover	1	M12x1	No
R928028410	WE-2SP-M12x1	Normally open (at 75 %)/ normally closed contact (at 100 %)	2		3 pieces
R928028411	WE-2SPSU-M12x1				
R928036318	WE-1SP-EN175301-803	Normally closed contact	1	EN 175301-803	No

Order example:

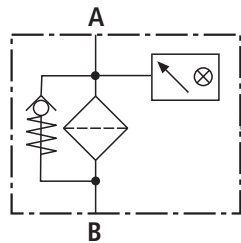
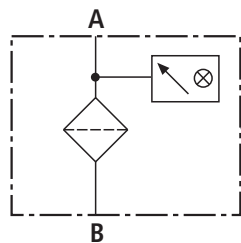
Tank mounted return line filter with mechanical-optical maintenance indicator for $p_{nom.} = 10 \text{ bar}$ [145 psi], size 0100, with filter element 10 µm and electronic switching element M12x1 with 1 switching point for hydraulic fluid mineral oil HLP according to DIN 51524.

Filter: 10TEN0100-H10XLA00-P2,2-M-R4
 El. maintenance indicator: WE-1SP-M12x1

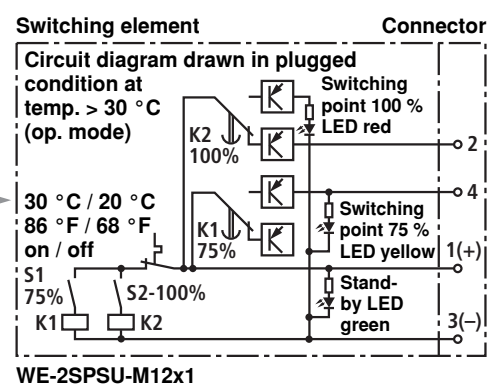
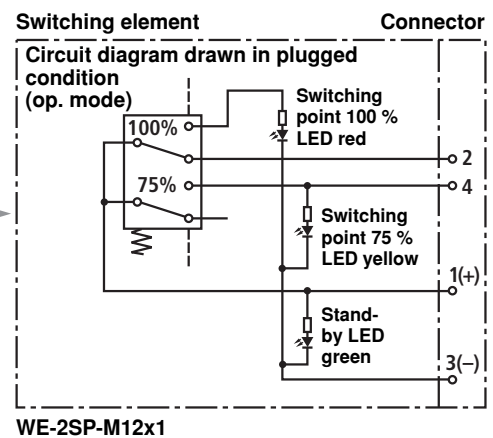
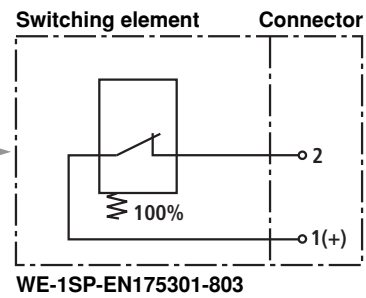
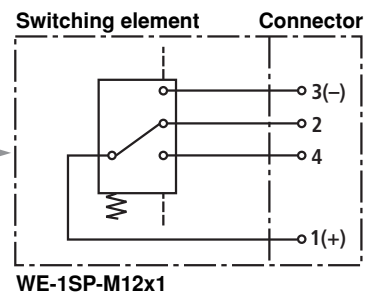
Material no.: R928041275
 Material no.: R928028409

For round plug-in connections refer to data sheet 08006.

Symbols



Electronic switching element
for maintenance indicator



Function, section

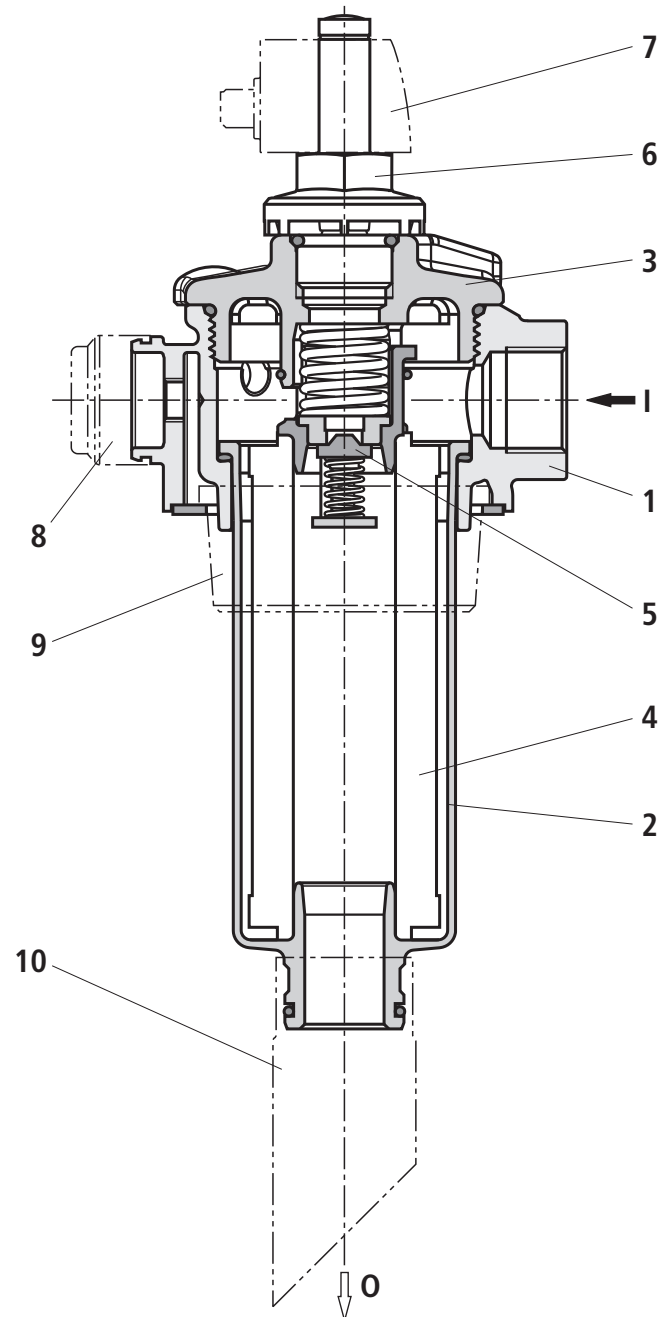
The tank mounted return line filters are designed for direct attachment to the fluid tank.

They basically consist of filter head (1), filter bowl (2), cover (3), filter element (4) as well as a serial bypass valve (5).

The filters can be configured with different maintenance indicators - here, you are shown a mechanical-optical maintenance indicator (6) in connection with an electronic switching element (7).

Depending on the filter size, more additional functions are available - e.g. a ventilation filter (8), surge protection (9) or return pipes in different lengths (10) - in this connection, also refer to the chapter "Spare parts and accessories".

During operation, the hydraulic fluid reaches the filter housing via port I, here flows through the filter element (4) in the flow direction from outside to inside and is cleaned according to the filter rating. The dirt particles filtered out settle in the filter element. Via the outlet opening O, the filtered hydraulic fluid enters the tank.



Sample presentation using a 10TEN0063 filter.

Technical data (For applications outside these parameters, please consult us!)**general**

Installation position		Vertical				
Ambient temperature range		°C [°F]	-10...+100 [14...+212] (shortly to -30 [-22])			
Size	Size	0040	0063	0100	0160	0250
Weight	kg [lbs]	1.4 [3.09]	1.6 [3.53]	1.8 [3.97]	4.5 [9.92]	5.0 [11.03]
Size	Size	0400	0630	1000	2000	2500
Weight	kg [lbs]	8.0 [17.64]	10.0 [22.05]	18 [39.7]	21.5 [47.42]	27 [59.55]
Material	Filter cover		Carbon fiber reinforced plastic (sizes 0040...0100) Aluminum (sizes 0160...2500)			
	Filter head		Aluminum			
	Filter bowl		Carbon fiber reinforced plastic (sizes 0040...0630) Coated steel (sizes 1000...2500)			
	Optical maintenance indicator	(P2,2)	Plastic PA6			
		(V...)	Aluminum			
	Electronic switching element		Plastic PA6			
	Pressure gauge		Plastic			

hydraulic

Maximum operating pressure	bar [psi]	10 [145]
Hydraulic fluid temperature range	°C [°F]	-10...+100 [+14...+212]
Minimum conductivity of the medium	pS/m	300
Fatigue strength according to ISO 10771	Load cycles	> 10 ⁵ with max. operating pressure
Cracking pressure of the bypass valve	bar [psi]	3.5 ± 0.35 [50.7 ± 5]
Type of pressure measurement of the maintenance indicator		Backpressure
Response pressure of the P2,2 maintenance indicator	bar [psi]	2.2 (+0.45/-0.25) [31.9 (+6.4/-3.6)]
Response pressure of the V... maintenance indicator	bar [psi]	2.2 ± 0.25 [31.9 ± 3.6], 1.5 ± 0.2 [21.8 ± 2.9], 0.8 ± 0.15 [11.6 ± 2.2]

electrical (electronic switching element)

Electrical connection		Round plug-in connection M12x1, 4-pin			Standard connection EN 175301-803
		Version	1SP-M12x1	2SP-M12x1	2SP-M12x1
Contact load, direct voltage	A _{max.}	1			
Voltage range	V _{max.}	150 (AC/DC)	10-30 (DC)		250 (AC) / 200 (DC)
Max. switching power with resistive load	W	20			70
Switching type	75 % signal	–	Normally open contact		–
	100 % signal	Change-over	Normally closed contact		Normally closed contact
	2SPSU			Signal switching through at 30 °C [86 °F], Return switching at 20 °C [68 °F]	
Display via LEDs in the electronic switching element 2SP...			Stand-by (LED green); 75 % switching point (LED yellow) 100 % switching point (LED red)		
Protection class according to EN 60529		IP 67			IP 65
Ambient temperature range		°C [°F]	–25...+85 [–13...+185]		
For direct voltage above 24 V, spark extinguishing is to be provided for protecting the switching contacts.					
Weight	Electronic switching element: – with round plug-in connection M12x1	kg [lbs]	0.1 [0.22]		

Technical data (For applications outside these parameters, please consult us!)**Filter element**

Glass fiber paper H..XL		Single-use element on the basis of inorganic fiber				
		Filtration ratio according to ISO 16889 up to $\Delta p = 5 \text{ bar } [72.5 \text{ psi}]$		Achievable oil cleanliness according to ISO 4406 (SAE-AS 4059)		
Particle separation	H20XL	$\beta_{20(c)} \geq 200$		19/16/12 ... 22/17/14		
	H10XL	$\beta_{10(c)} \geq 200$		17/14/10 ... 21/16/13		
	H6XL	$\beta_{6(c)} \geq 200$		15/12/10 ... 19/14/11		
	H3XL	$\beta_{5(c)} \geq 200$		13/10/8 ... 17/13/10		
Admissible pressure differential	bar $[psi]$	30 $[435]$				
Size	Size	0040	0063	0100	0160	0250
Weight	kg $[lbs]$	0.20 $[0.44]$	0.30 $[0.66]$	0.35 $[0.77]$	0.8 $[1.76]$	1.1 $[2.42]$
Size	Size	0400	0630	1000	2000	2500
Weight	kg $[lbs]$	2.0 $[4.41]$	2.3 $[5.07]$	3.0 $[6.62]$	3.5 $[7.72]$	5.0 $[11.03]$

Seal material for hydraulic fluids

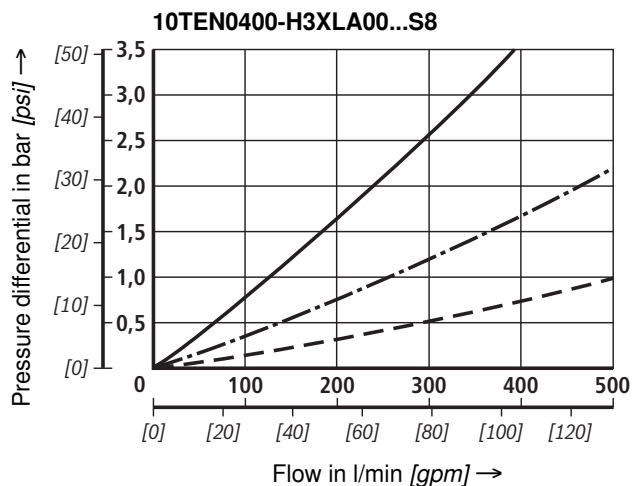
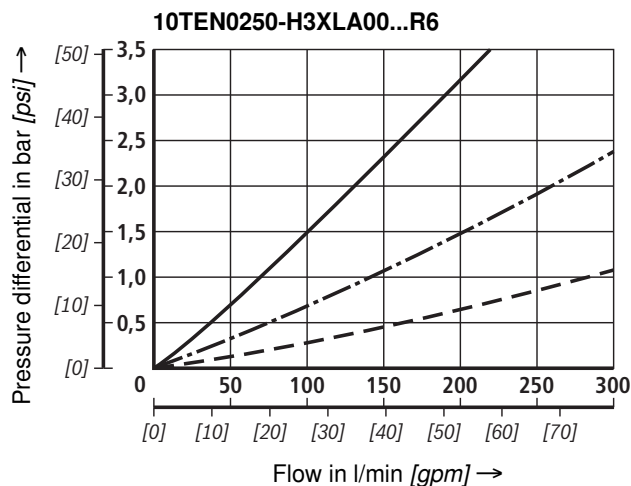
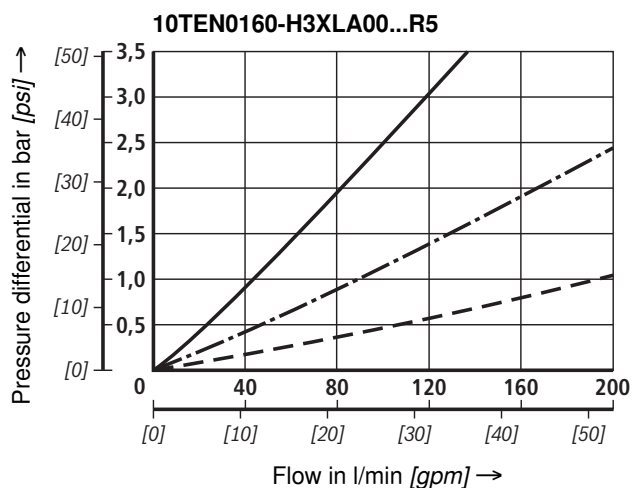
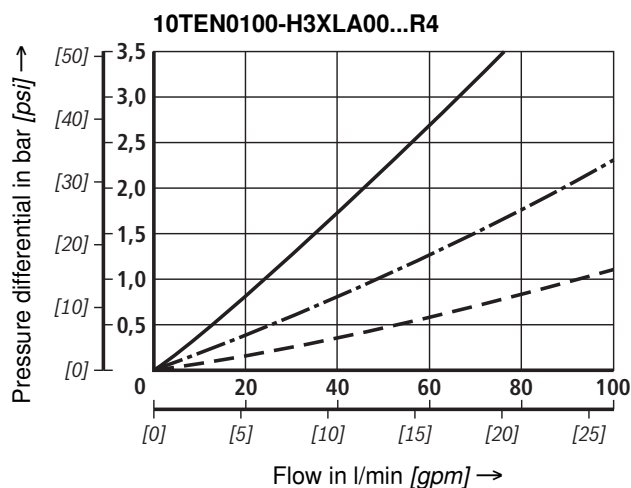
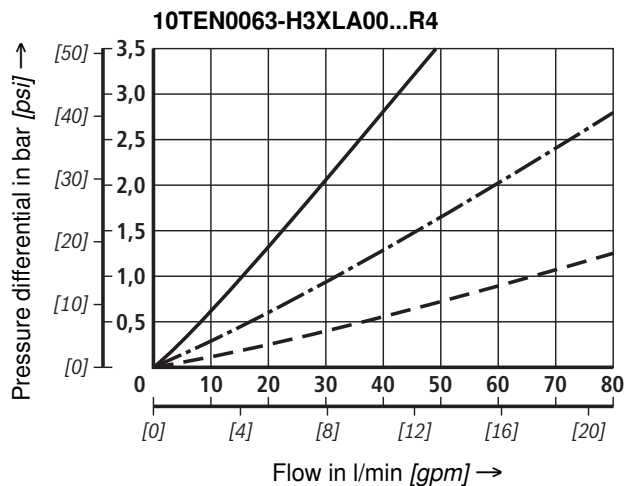
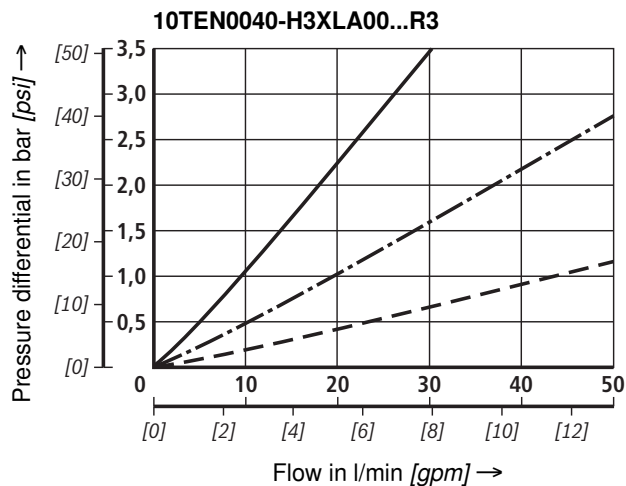
Mineral oils			Ordering code		
Mineral oil	HLP	according to DIN 51524	M		
Flame-resistant hydraulic fluids			Ordering code		
Emulsions	HFA-E	according to DIN 24320	M		
Synthetic water solutions	HFA-S	according to DIN 24320	M		
Water solutions	HFC	according to VDMA 24317	M		
Phosphoric acid esters	HFD-R	according to VDMA 24317	V		
Organic esters	HFD-U	according to VDMA 24317	V		
Fast biodegradable hydraulic fluids			Ordering code		
Triglycerides (rape seed oil)	HETG	according to VDMA 24568	M		
Synthetic esters	HEES	according to VDMA 24568	V		
Polyglycols	HEPG	according to VDMA 24568	V		

Characteristic curves (measured with mineral oil HLP46 according to DIN 51524 at T = 40 °C) [104 °F] H3XL

An optimal filter design and the design with other filter media and filtration ratings are enabled by our computer program "BR Filter Select".

Oil viscosity:

— 140 mm²/s [649 SUS]
 - - - 68 mm²/s [315 SUS]
 --- 30 mm²/s [142 SUS]

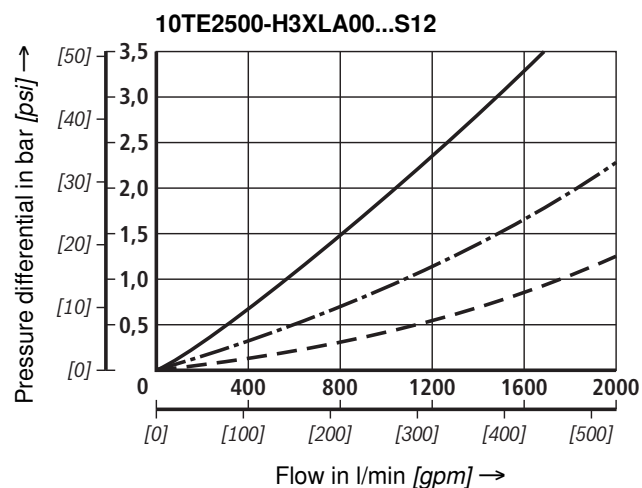
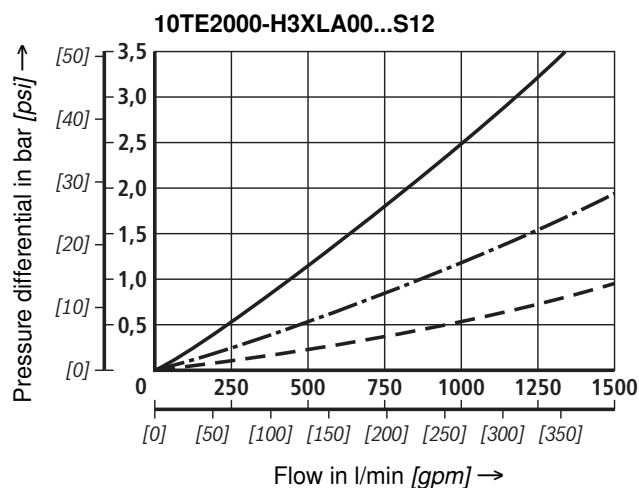
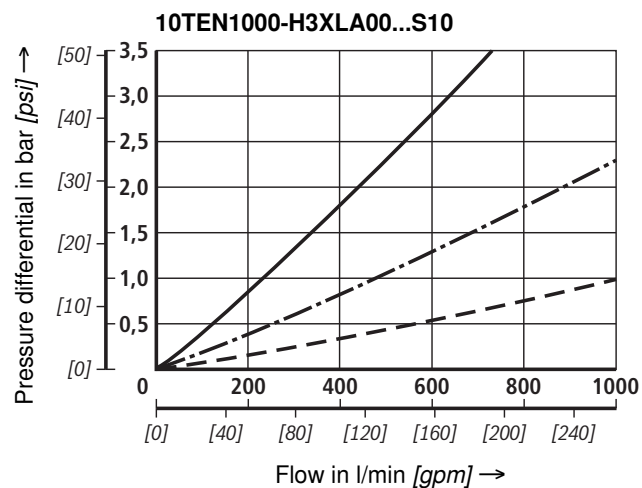
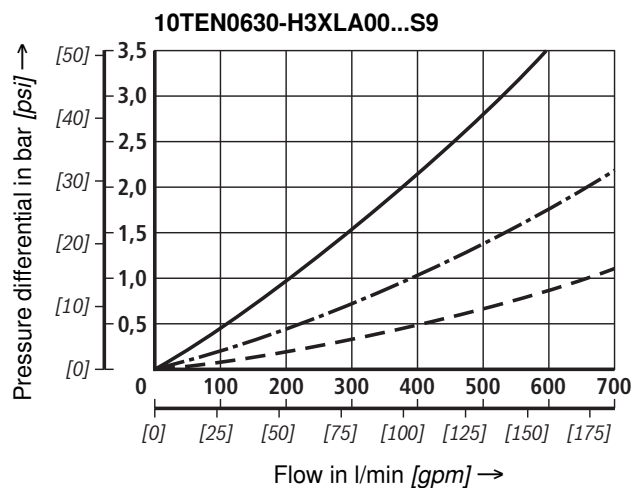


Characteristic curves (measured with mineral oil HLP46 according to DIN 51524 at T = 40 °C) [104 °F] **H3XL**

An optimal filter design and the design with other filter media and filtration ratings are enabled by our computer program "BR Filter Select".

Oil viscosity:

— 140 mm²/s [649 SUS]
 - - - 68 mm²/s [315 SUS]
 - - - 30 mm²/s [142 SUS]

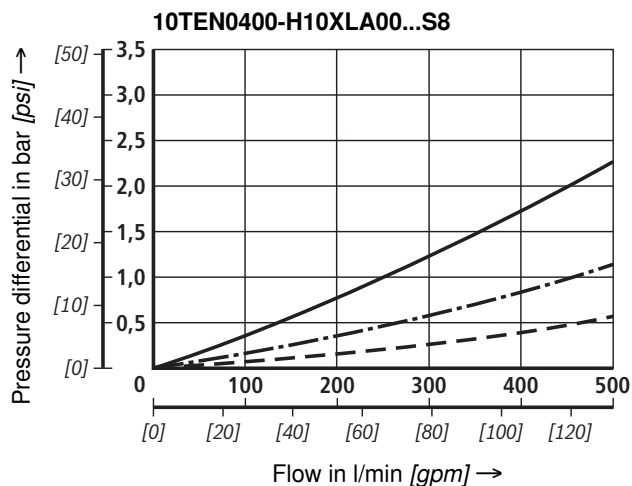
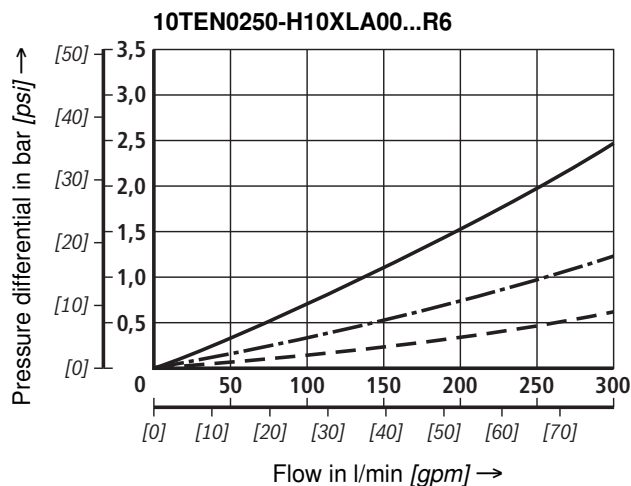
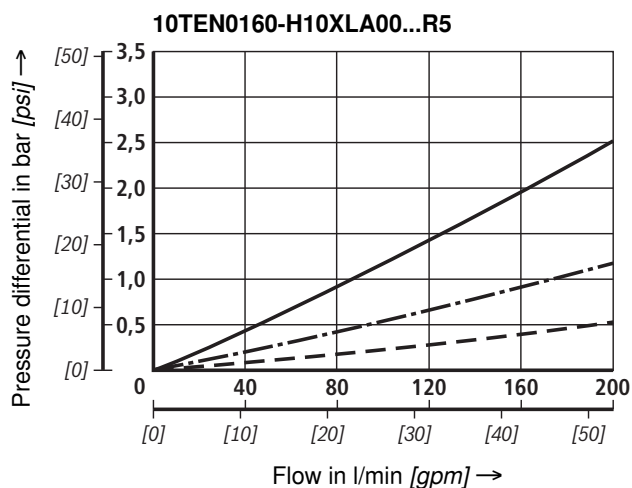
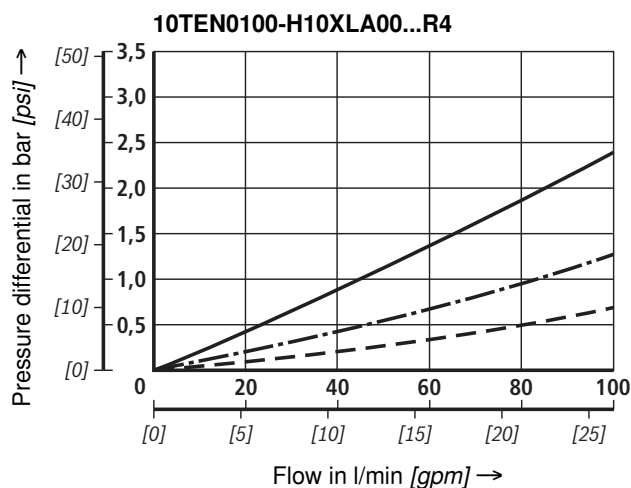
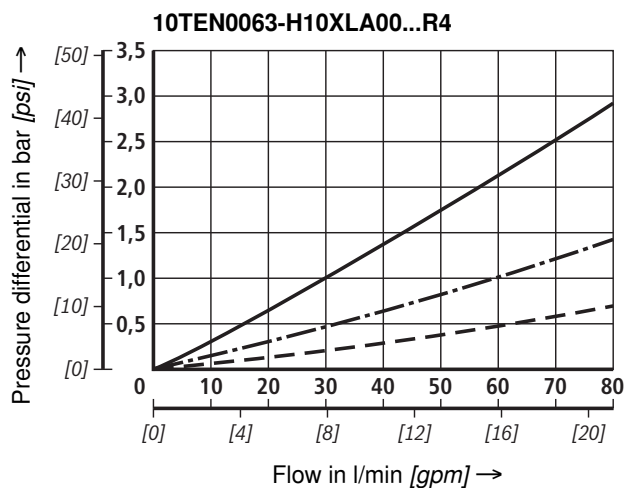
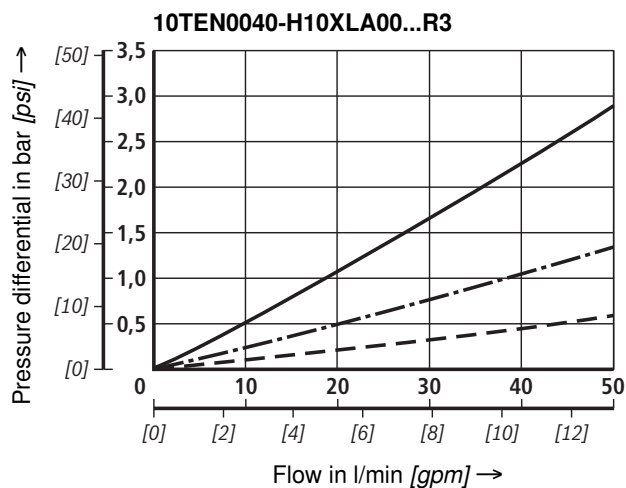


Characteristic curves (measured with mineral oil HLP46 according to DIN 51524 at T = 40 °C) [104 °F] H10XL

An optimal filter design and the design with other filter media and filtration ratings are enabled by our computer program "BR Filter Select".

Oil viscosity:

— 140 mm²/s [649 SUS]
 - - - 68 mm²/s [315 SUS]
 --- 30 mm²/s [142 SUS]

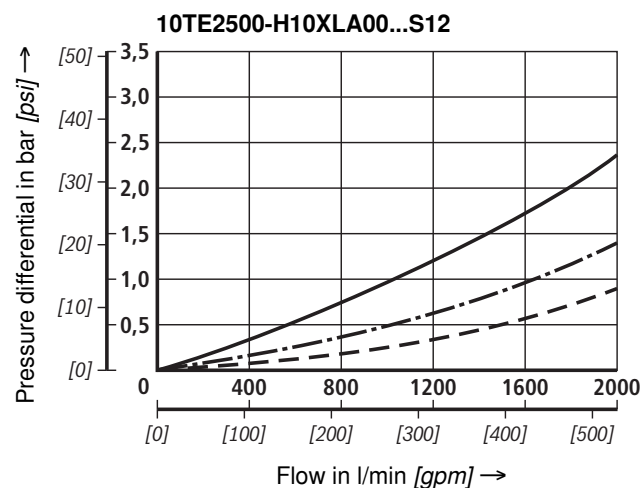
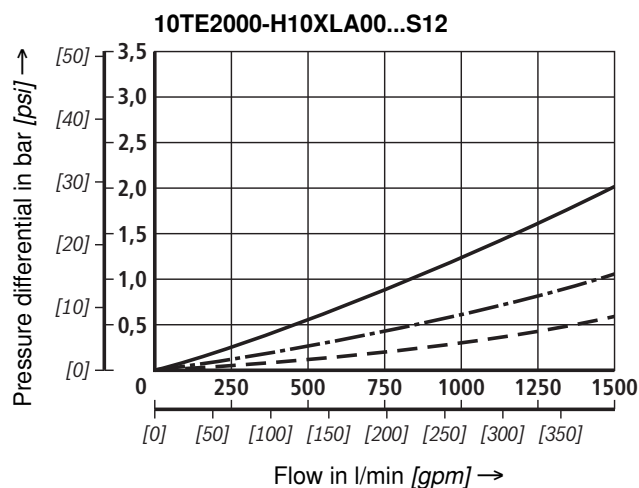
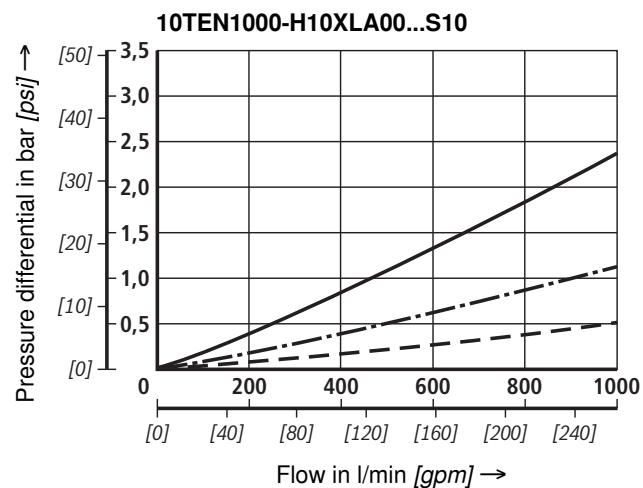
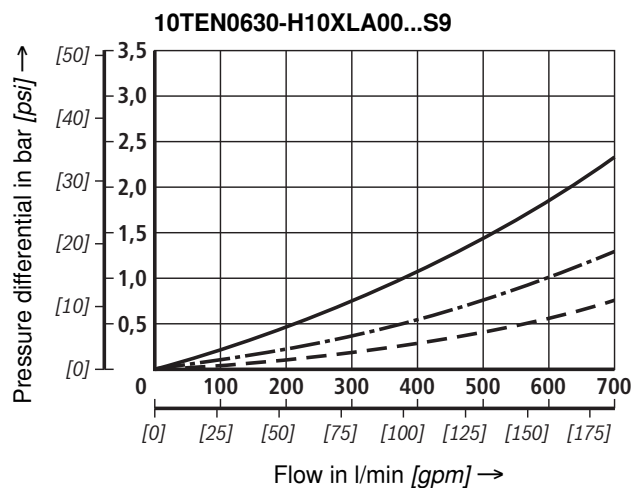


Characteristic curves (measured with mineral oil HLP46 according to DIN 51524 at $T = 40\text{ }^{\circ}\text{C}$ [$104\text{ }^{\circ}\text{F}$]) **H10XL**

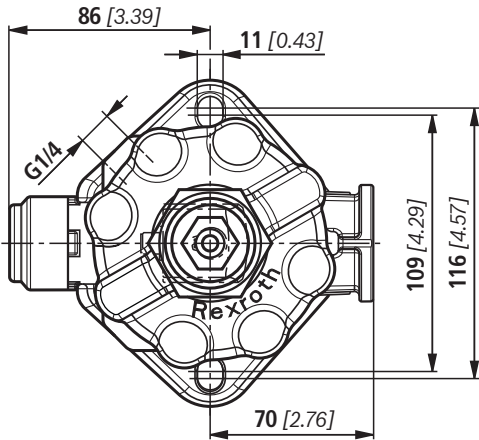
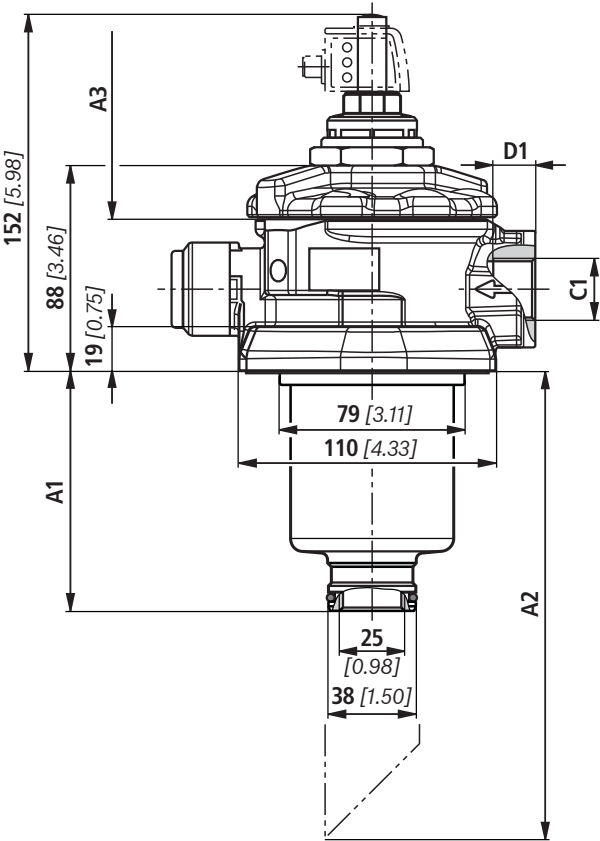
An optimal filter design and the design with other filter media and filtration ratings are enabled by our computer program "BR Filter Select".

Oil viscosity:

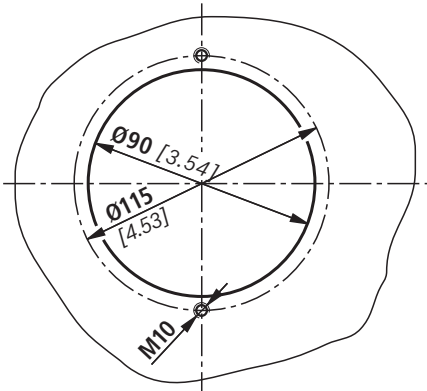
— 140 mm²/s [649 SUS]
 - - - 68 mm²/s [315 SUS]
 - - - 30 mm²/s [142 SUS]



Unit dimensions size 0040...0100 (dimensions in mm [inch])



Tank connection diagram:

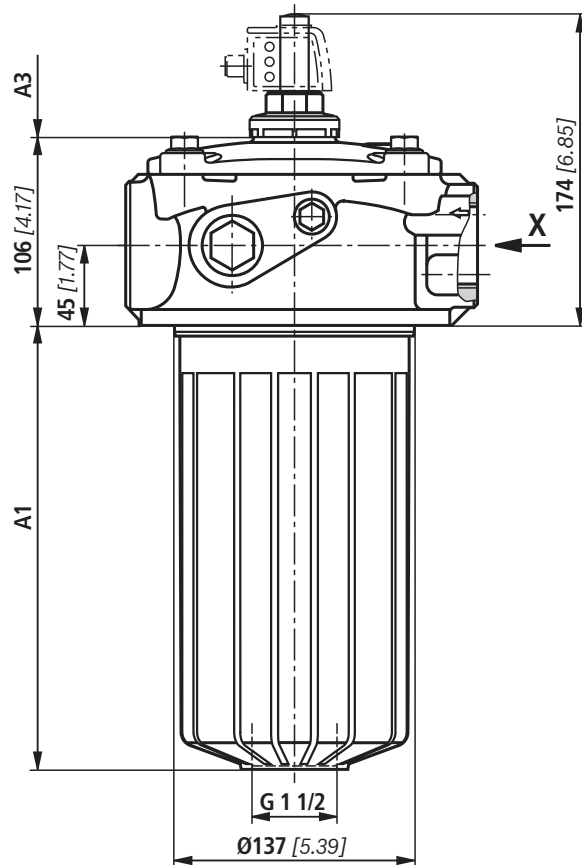


Filter housing for filter elements in accordance with DIN 24550

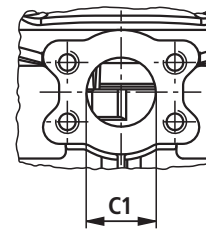
Type 10 TEN	Content in l [gal]	A1	A2 ¹⁾	A3 ²⁾	C1		D1
					Standard Pipe thread accord- ing to ISO 228	Optional Pipe thread accord- ing to SAE J1926	
0040	0.6 [0.16]	103 [4.06]	230 [9.06]	100 [3.94]	G3/4	SAE 12 1 1/16-12 UN-2B	16 [0.63]
0063	0.8 [0.21]	163 [6.42]	290 [11.42]	160 [6.30]	G1	SAE 16 1 5/16-12 UN-2B	18 [0.71]
0100	1.2 [0.32]	253 [9.96]	380 [14.96]	250 [9.84]			

¹⁾ With outlet pipe 150 mm [5.9"]
²⁾ Servicing height for filter elements

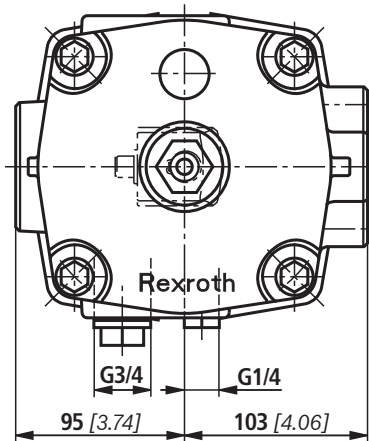
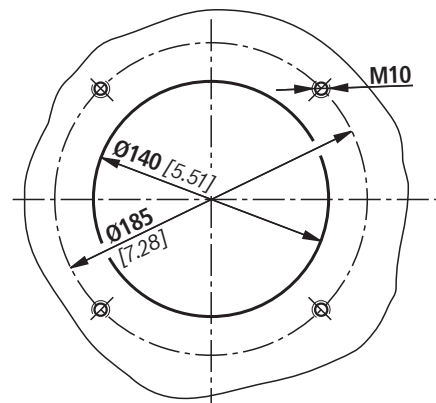
Unit dimensions size 0160...0250 (dimensions in mm [inch])



View X



Tank connection diagram:

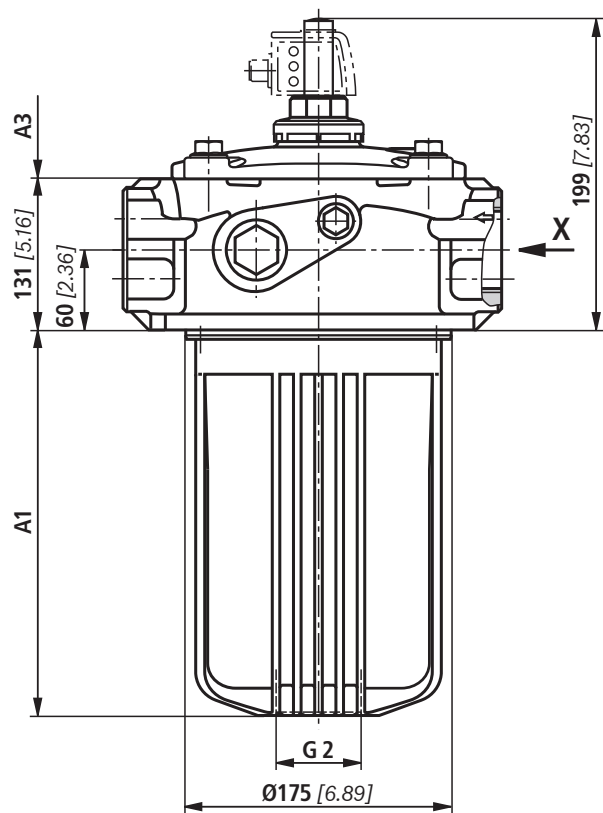


Filter housing for filter elements in accordance with DIN 24550

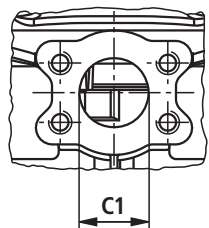
Type 10 TEN	Content in l [gal]	A1	A3 ¹⁾	C1			
				Standard Pipe thread according to ISO 228	Pipe thread according to ISO 228	Optional SAE flange according to ISO 6162	Pipe thread according to SAE J1926
0160	3.5 [0.92]	160 [6.30]	160 [6.30]	G1 1/4	G1 1/2	SAE 1 1/4" 3000 psi/	SAE 24 1 7/8-12 UN-2B
0250	4.5 [1.19]	250 [9.84]	260 [10.24]	G1 1/2	G1 1/4	SAE 1 1/2" 3000 psi/	

¹⁾ Servicing height for filter element replacement

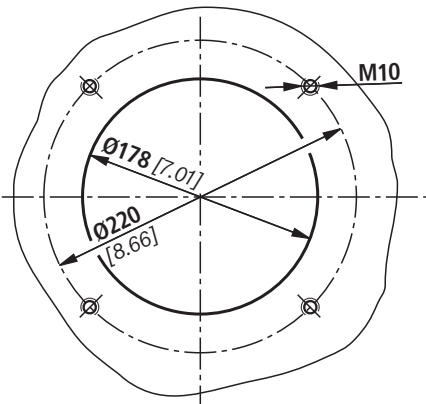
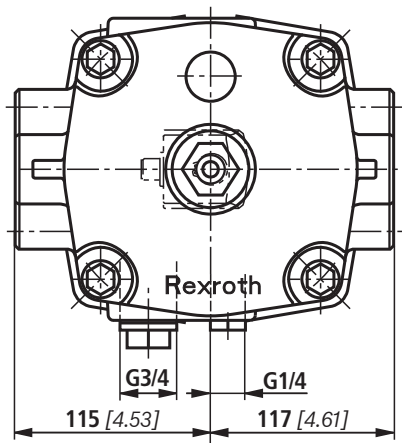
Unit dimensions size 0400...0630 (dimensions in mm [inch])



View X



Tank connection diagram:

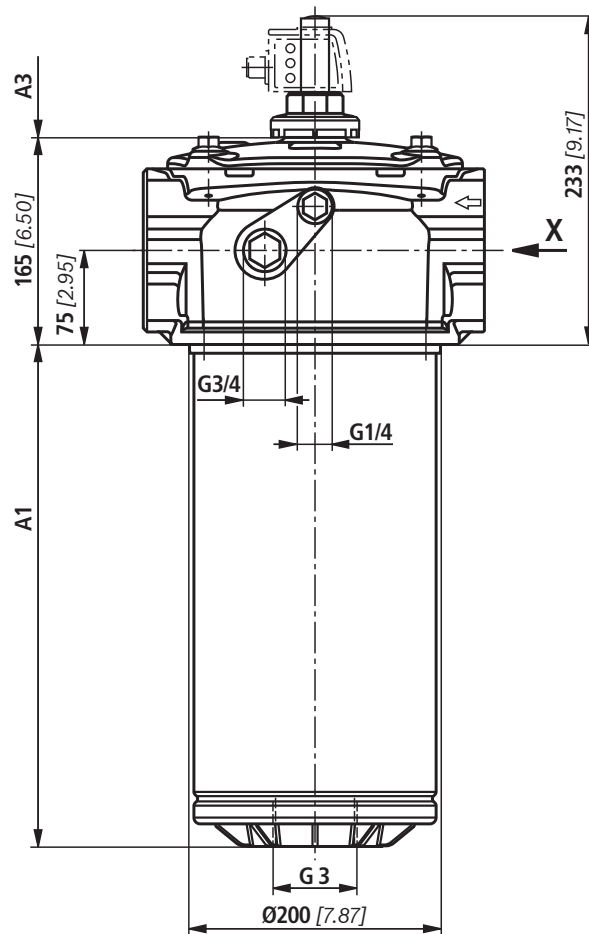


Filter housing of sizes 0400 to 0630

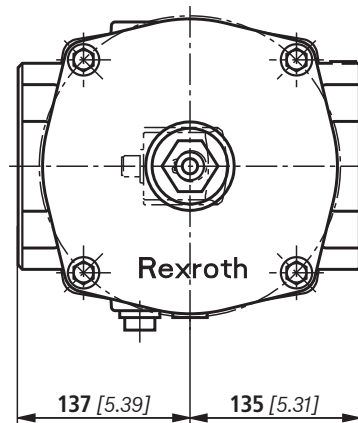
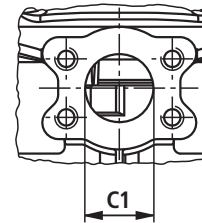
Size	Content in l [gal]	A1	A3 ¹⁾	C1	
				Standard SAE flange accord- ing to ISO 6162	Optional SAE flange accord- ing to ISO 6162
0400	7 [1.85]	255 [10.04]	250 [9.84]	SAE 2" 3000 psi	SAE 2 1/2" 3000 psi
0630	10 [2.64]	405 [15.94]	400 [15.75]	SAE 2 1/2" 3000 psi	SAE 2" 3000 psi

¹⁾ Servicing height for filter element replacement

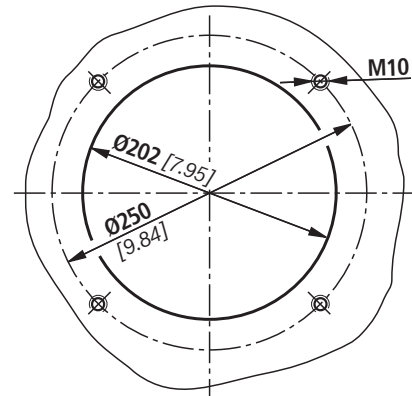
Unit dimensions size 1000...2500 (dimensions in mm [inch])



View X



Tank connection diagram:

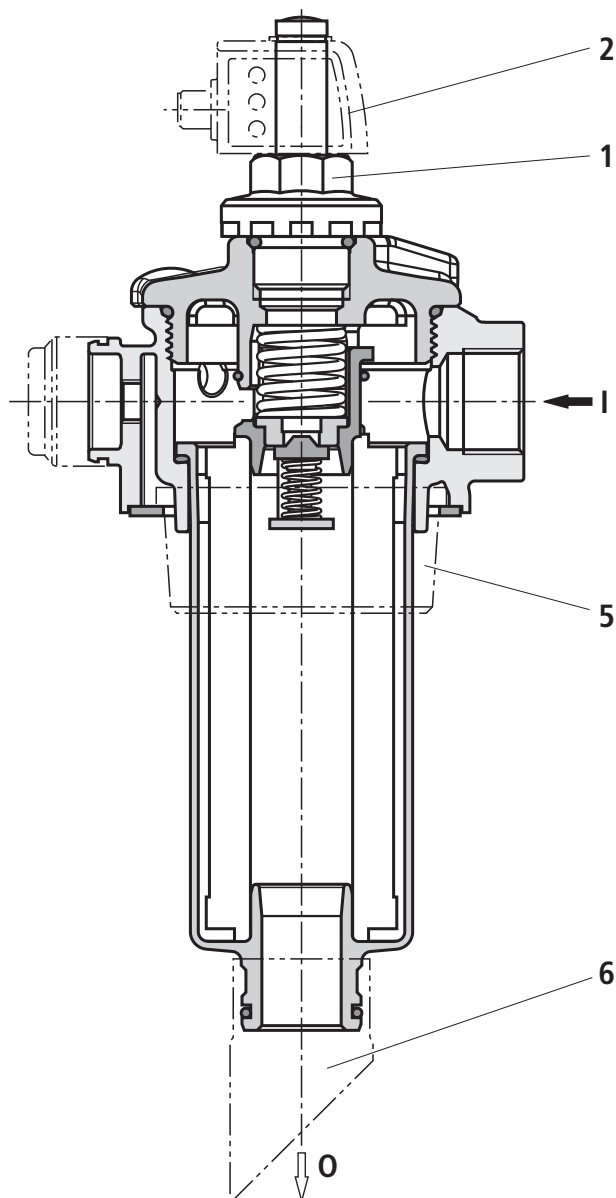
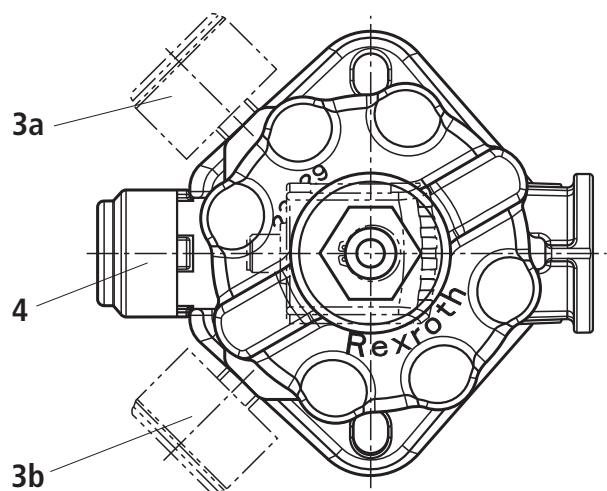


Filter housing of sizes 1000, 2000 and 2500

Size	Content in l [gal]	A1	A3 ¹⁾	C1	
				Standard SAE flange according to ISO 6162	Optional SAE flange according to ISO 6162
1000	15 [3.96]	391 [15.39]	530 [20.87]	SAE 3" 3000 psi	SAE 4" 3000 psi
2000	25 [6.60]	749 [29.49]	880 [34.65]	SAE 4" 3000 psi	SAE 3" 3000 psi
2500	32 [8.45]	983 [38.70]	1130 [44.49]		

¹⁾ Servicing height for filter element replacement

Options



Sample presentation using a 10TEN0063 filter.

Options	Item	Ordering code	Filter size		
			0040...0100	0160...0630	1000...2500
Mechanical optical indicator	1	P2,2; V0,8; V1,5; V2,2	●	●	●
Pressure gauge right	3.a	MR	●	-	-
Pressure gauge left	3.b	ML	-	●	●
Mechanical optical + pressure gauge right	1 + 3.b	MRV2,2	●	●	●
Minimess connection	3.a or 3.b	M	●	●	●
Filling port (without maintenance indicator)	1	S	●	●	●
Outlet pipe ¹⁾	6	R	●	See chapter "Spare parts and accessories"	
Ventilation filter	4	F	●	-	-
Ventilation filter + surge protection	4 + 5	FN	●	-	-
Electronic switching element	2	See chapter "Ordering code, standard types"			

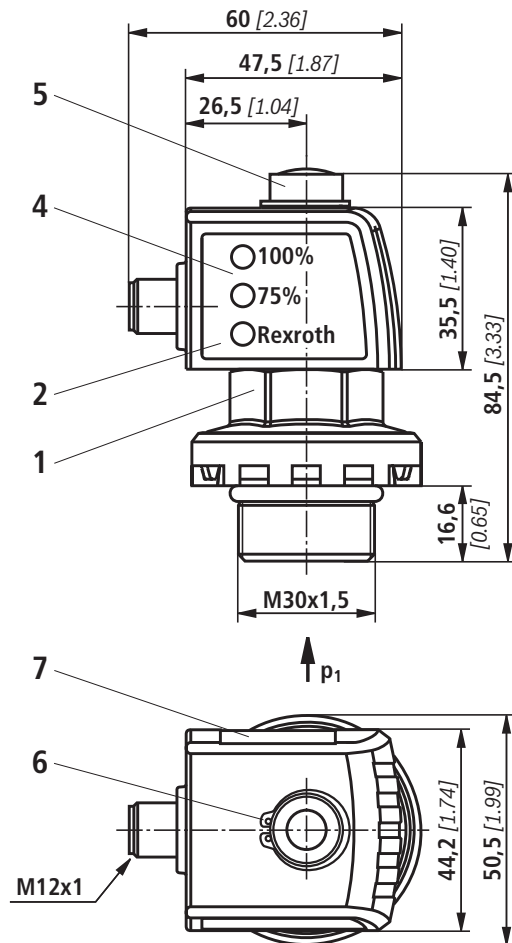
¹⁾ Outlet pipe for sizes 0040...0100 are only available pre-assembled through the complete filter.

Outlet pipes for other sizes must be ordered separately and are not pre-assembled.

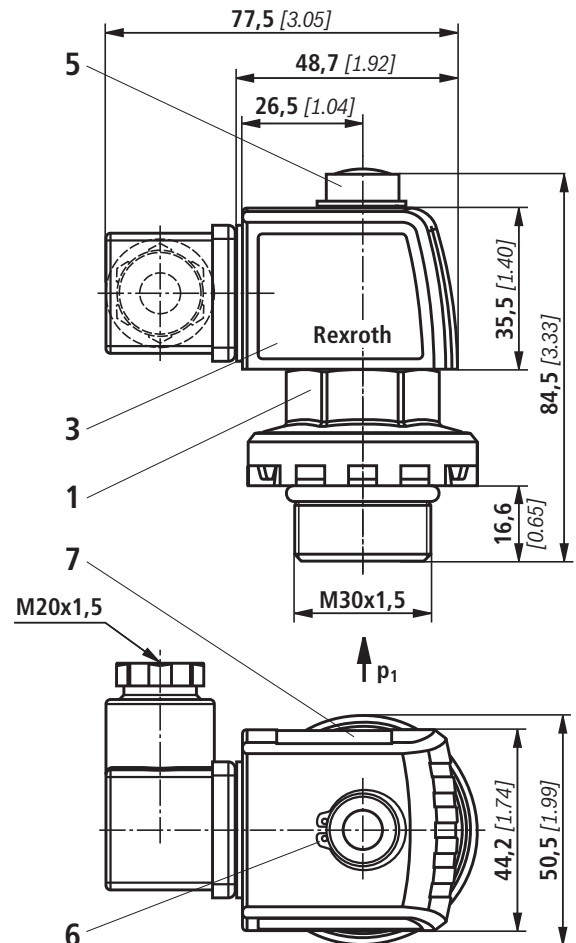
For the ordering code refer to "Spare parts and accessories".

Maintenance indicator (dimensions in mm [inch])

**Electronic switching element
with round plug-in connection M12x1, 4-pin**



**Electronic switching element
with rectangular plug-in connection EN 175301-803**



- 1 Mechanical optical maintenance indicator;
max. tightening torque $M_{A \max} = 50 \text{ Nm}$ [36.88 lb-ft]
Tightening torque for backpressure indicator in
PA6.6 $M_{A \max} = 35 \text{ Nm}$ [25.82 lb-ft]
- 2 Switching element with locking ring for electrical maintenance indicator (rotatable by 360°);
plug-in connection M12x1, 4-pin
- 3 Switching element with locking ring for electrical maintenance indicator (rotatable by 360°);
plug-in connection EN175301-803
- 4 Housing with three LEDs: 24 V =
Green: Stand-by
Yellow: Switching point 75 %
Red: Switching point 100 %
- 5 Optical indicator bistable
- 6 Locking ring DIN 471-16x1,
Material no. R900003923
- 7 Name plate

Notes:

Presentation contains mechanical optical maintenance indicator (1) and electronic switching element (2) (3).

Switching elements with increased switching power at request.

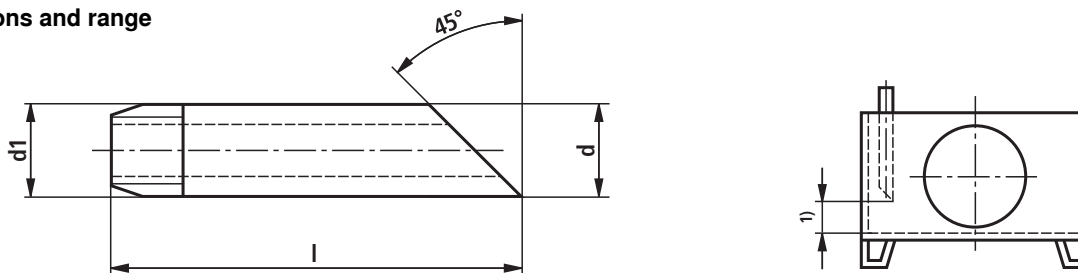
If an electronic switching element with signal suppression up to 30 °C is used (WE-2SPSU-M12X1, **R928028411**), it has to be ensured that the aluminum version of the mechanical-optical maintenance indicator must be used. In the filter type key, these maintenance indicators are referred to as "V2,2", "V1,5" or "V0,8". Also refer to the chapter "Spare parts and accessories".

The temperature-controlled signal processing does not work with mechanical-optical maintenance indicators made of polyamide.

Spare parts and accessories (dimensions in mm [inch])

Pipes with threaded connection

Dimensions and range



¹⁾ Recommended distance to tank bottom (unless otherwise specified): 60...160 mm [2.4...6.3"]

From a pipe length of 400 mm, we strongly recommend fixing the outlet pipe by means of a tank-internal pipe bracket.

DN	Dimensions d d1 l				Galvanized	ES (stainless)
					Description: ROHR AB23-03/R...	Description: ROHR AB23-03/R... -ES
					Material no.	Material no.
40	48.3	R 1 1/2	250	1 1/2 L = 250	R900109501	R900062066
			400	1 1/2 L = 400	R900083146	R900074878
			800	1 1/2 L = 800	R900029854	—
			1300	1 1/2 L = 1300	R900302230	—
			2000	1 1/2 L = 2000	R900229461	—
50	60.3	R 2	400	2 L = 400	R900727174	R900987657
			800	2 L = 800	R900029856	R900226706
80	88.9	R 3	160	3 L = 160	R900062845	—
			200	3 L = 200	R900061785	R900062067
			350	3 L = 350	R900084137	—
			650	3 L = 650	R900076923	R900757513
			800	3 L = 800	R900029838	R900987653

Thread:

Whitworth pipe thread according to DIN 2999 part 1, poppet 1:16

Material/surface treatment:

St 33-1 according to DIN 17100 / galvanized (B) according to DIN 2444 1.4541

Order example/search term

Pipe according to DIN 2440 (ISO 65) with thread R 1 1/2 and L = 250 mm, galvanized:

ROHR AB23-03/R 1 1/2L = 250 Material no. R900109501

Spare parts and accessories

Mechanical optical maintenance indicator

W O - S01 - - - 10

Maintenance indicator = W

Mechanical optical indicator = O

Design

Backpressure M30x1.5

= S01

Switching pressure

0.8 bar (not possible with PA version)

= 0.8

1.5 bar (not possible with PA version)

= 1.5

2.2 bar

= 2.2

Housing material
PA = Plastic
no code = Aluminum

10 = Max. nominal pressure 10 bar

M = Seal
V = NBR seal
FKM seal

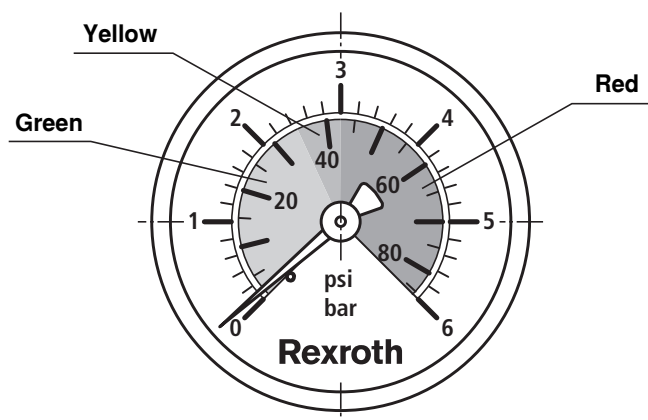
Mechanical optical maintenance indicator	Material no.
WO-S01-2,2-M-10	R901025310
WO-S01-2,2-V-10	R901066232
WO-S01-1,5-M-10	R928038776
WO-S01-1,5-V-10	R928038774
WO-S01-0,8-M-10	R928038773
WO-S01-0,8-V-10	R928038772
WO-S01-2,2-M-10-PA	R928038771
WO-S01-2,2-V-10-PA	R928038769

Ventilation filter element (only for 10TEN0040-0100)

Type	Material no.
71.001 P5-S00-0-0	R928019705

Pressure gauge

Type	Material no.
M010 0-6 bar	R928019224



Seal kit

D 10TE - - -

Seal kit

Series 10 TE

Size

0040-0100

N0040-0100

0160-0250

N0160-0250

0400-0630

N0400-0630

1000

N1000

2000-2500

2000-2500

Seal

NBR seal

= M

FKM seal

= V

Seal kit	Material no.
D10TEN0040-0100-M	R928028013
D10TEN0160-0250-M	R928028014
D10TEN0400-0630-M	R928028015
D10TEN1000-M	R928039806
D10TE2000-2500-M	R928039807

Installation, commissioning and maintenance

Installation of the filter

When installing the filter make sure that

- a) the required servicing height for removing the filter element and the filter bowl is available,
- b) the installation opening for mounting the filter in the tank is not too large so that unobjectionable sealing is guaranteed,
- c) the filter is assembled on the tank cover without tension stress, and
- d) the filter housing is grounded.

The filter is designed with a two-part housing. It is to be installed into the tank with the filter bowl downward. It is recommended to lead drain pipes as of a length of 500 mm in a bracket in order to avoid oscillations caused by the fluid flow in the tank. It is to be ensured that in case of maintenance works, the filter bowl and the drain pipe are pulled out of the filter head together.

Connection of the electrical maintenance indicator

The electrical maintenance indicator is connected via the electrical switching element with 1 or 2 switching points, which is attached to the mechanical optical maintenance indicator and held by means of the locking ring.

When must the filter element be exchanged or cleaned respectively?

- After initial start-up of the system, the filter element is to be exchanged.
- Upon start-up in cold condition, the red pushbutton of the optical maintenance indicator may jump out and an electrical signal is output via the switching element. Only push the red pushbutton in again after the operating temperature

has been reached. If it jumps out again immediately or if the electrical signal has not gone out at operating temperature, the filter element must be exchanged or cleaned respectively after the end of the shift.

- The filter element should be replaced or cleaned after max. 6 months.

Element exchange

- Switch off the system, discharge the filter on the pressure side.
- Remove the screws at the filter cover, loosen the filter cover and remove it upwards.
- Remove the filter element from the lower spigot in the filter bowl by turning it slightly.
- Check the seal rings at the filter cover and at the filter bowl for damage. If necessary, renew them. Also refer to seal kits in the "Spare parts and accessories" section.
- Renew filter element, filter elements made of wire mesh can be cleaned. The efficiency of the cleaning process depends on the type of dirt and the amount of the pressure differential before the filter element exchange. If the pressure differential after the filter element exchange exceeds 150 % of the value of a brand-new filter element, the G... element also needs to be replaced.
- Check whether the type designation or material number on the replacement element corresponds to the type designation/material number on the name plate of the filter.
- Install the new or cleaned filter element on the spigot again by slightly turning it.
- Reassemble the filter in reverse order.

Classification according to pressure equipment directive 97/23/EC

The tank mounted return line filters according to 51425 are pressure holding equipment according to article 1, section 2.1.4 of the Pressure Equipment Directive 97/23/EC (PED). As the maximum operating pressure does not exceed 10 bar, they are - according to annex II diagram 4 of the PED - produced according to article 3 and not provided with a CE mark.

Use in explosive areas according to directive 94/9/EC (ATEX)

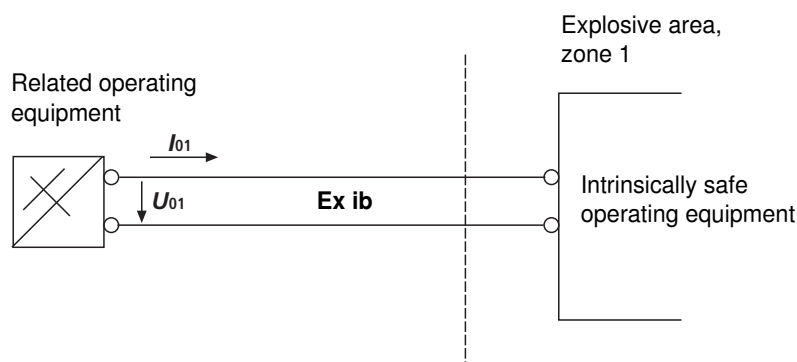
The tank mounted return line filters according to 51424 are no equipment or components in the sense of directive 94/9/EC and are not provided with a CE mark.

According to DIN EN 60079-11, the electronic maintenance indicators WE-1SP-M12x1 are simple, electronic operating equipment not having an own voltage source. This simple, electronic operating equipment may - according to DIN EN 60079-14 - in intrinsically safe electrical circuits (Ex ib) be used in systems for device group II,

category 2G (zone 1) and category 3G (zone 2) without marking and certification. The operating equipment is assigned to explosion group II B and temperature class T5.

When using Rexroth filters in explosive areas, potential equalization must always be ensured.

Possible circuit according to DIN EN 60079-14



The manufacturer's declaration according to DIN EN 13463 is available for this filter separately, with Material no. R928028899.

Notes

Bosch Rexroth Filtration Systems GmbH
Hardtwaldstraße 43, 68775 Ketsch, Germany
POB 1120, 68768 Ketsch, Germany
Phone +49 (0) 62 02 / 6 03-0
Fax +49 (0) 62 02 / 6 03-1 99
brfs-support@boschrexroth.de
www.eppensteiner.de

© This document, as well as the data, specifications and other information set forth in it, are the exclusive property of Bosch Rexroth AG. It may not be reproduced or given to third parties without its consent. The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.