



经营范围

电液集成系统、泵阀一体单元和液压元件等创新产品

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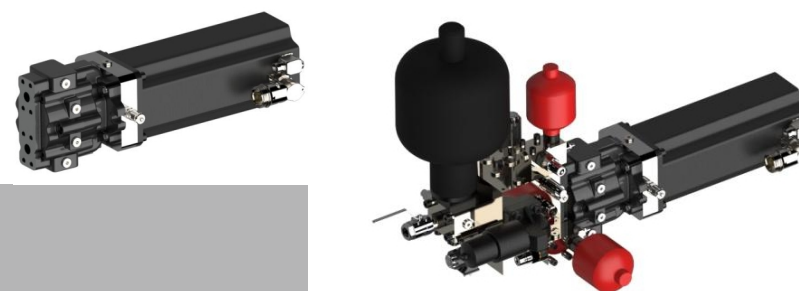


CYPAG
hydraulics

FIXED DISPLACEMENT FLOATING PUMP AND MOTORS

定量浮杯泵和马达

CXP Series CXP系列



Efficiency to MAX
效率最大化

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General Information

基本信息

Cypag Hydraulics CXP is an innovative Floating Pump and motor series, designed and developed to match the newest requirements of electric machines with variable speed drives.

CXP系列新型浮杯泵和马达，设计和开发以适应带可变速驱动电气化设备的最新需求。

Due to the particular mirrored design based on a high number of light cups and pistons, a pressure limit of 450 bar is possible with a very low pressure and flow ripple. Thanks to the short piston stroke, small displacement angle and hydrostatic bearings, CXP units can work with reduced noise and low vibration level even at very low speed (under 100 rpm).

基于大数量轻型杯桶和柱塞，由于以特殊的对称设计，可以实现在450bar的极限压力下，非常低的压力和流量波动。这得益于短柱塞行程，小位移倾角和静压支撑。即使在非常低的转速下(低于100rpm)，CXP装置也能在较低的噪声和振动水平下工作。

Small axial forces due to a symmetrical shaft design make the CXP series very compact while maintaining a high power density. CXP units provide outstanding efficiency even at the starting point, so much that the starting torque is available as the maximum theoretical value. A version with tandem through-drive is also available.

由于轴向对撑设计带来小的轴向力，使CXP系列泵(马达)非常紧凑，同时保持高的功率密度。CXP装置即使在刚开始的启动点也能够保持出色的效率，甚至于最大理论值该启动扭矩也是可达到的。带串联通轴驱动也是可提供的版本。

Features: 特征:

- Fixed displacement pump with internal mirrored design of pistons, for open loop and closed loop circuits
内部对称设计的柱塞式定量泵，适用于开环和闭环回路
- Product range from 18 to 122 cc
产品规格从18cc到122cc
- Used in mobile or industrial applications
可在道路或工业应用中使用
- Output flow rate is proportional to pump input speed and displacement
输出流量与泵的输入转速和排量成比例
- Maximum working pressure of 450 bar
450bar的峰值工作压力
- Required input torque is proportional to the differential pressure at pump ports
所需的轴端输入扭矩与泵出口的压差成比例
- Extremely high mechanical efficiency
极好的机械效率
- Extremely good starting characteristics
非常好的启动特性
- Especially suited for working at very low speed while maintaining a high pressure
特别适合在非常低的转速下工作，同时维持一个高的压力
- Very high overall efficiency
极好的整体效率
- Very high efficiency at a wide range of working speed and pressure
在较宽的工作速度和压力范围内具有极好的效率
- High power density
功率密度高
- Compact dimensions
尺寸紧凑
- Very low ripple for pressure and flow rate
非常低的压力和流量波动
- Low vibrations
振动低
- Low noise emission
噪音发散低
- Tandem through-drive
串联通轴驱动
- ISO or SAE flanges and shafts
遵循ISO和SAE标准的法兰和轴
- Speed sensor optional for motor versions
马达模式转速传感器可选
- Flanged valves optional for motor versions
马达模式法兰阀可选

Areas of Application 应用领域

Electric heavy machinery 电动重载机械

- Very high efficiency for increased autonomy
- 高效率下自主性的提升
- Low noise and low vibrations
- 低噪音和低振动
- Increased speed working range
- 增大转速工作域



eh-PTO for truck loading cranes eh-PTO汽车装载起重机

- High efficiency
- 高效率
- Low noise
- 低噪音



Winches and slew drives 绞车和回转驱动设备

- High starting torque
- 高起动扭矩
- Possibility to downsize the motor displacement
- 降低马达排量的潜能
- Precise load positioning with no vibrations
- 精确的负载定位, 无振动



Energy recovery 能量回收

- High efficiency when working as pump and as motor
- 作为泵和马达工作时效率高
- Increased speed working range
- 增大转速工作域
- High dynamics under pressure
- 压力下的高动态特性



Mining machinery 矿山机械

- Low vibrations for precise positioning
- 低振动, 实现精确定位
- Superior stability at low rpm with high dynamics
- 在低转速下具有出色的稳定性和高动态性
- Very high efficiency
- 极好的效率



Wheel drives and track drives 轮式和履带驱动设备

- High efficiency
- 高效率
- Good low speed behaviour
- 良好的低速性能
- High starting torque
- 高起动扭矩



Advantages 优势

Heavy duty
重载

400 bar
400bar

High efficiency
up to 98 % n_{hm}
up to 96 % n_{tot}

高效率
达98% $n_{(hm)}$
达96% $n_{(tot)}$

Long life
expectancy

预期寿命长

< 100 rpm at
350 bar

350bar的压力下,
转速<100 rpm

Low noise
低噪音

low pulsations
低脉动

High power
density

高功率密度

Tandem
through-drive

串联通轴
驱动

Low temperature
increase

温升低



Impressive maximum pressure limits 令人瞩目的高压力极限

- 450 bar peak working pressure
- 450bar峰值工作压力

- High efficiency and long life expectancy due to very strong cast iron body for reduced deformations
- 因为厚实的铸铁主体减少了变形, 带来了高效率 and 长寿命

- Reduced leakage and deformation thanks to top grade steel
- 受益于高性能钢的使用, 减少了变形和泄漏

Low noise and low vibration 低噪音、低振动

- Thanks to low pressure ripple
- 受益于低压力波动

- Low flow ripple due to a high number of pistons
- 柱塞数量多, 流量波动低

- Reduced internal forces due to mirrored design
- 对称设计结构减少内应力

- Flow path optimized with CFD
- 使用CFD仿真分析优化流道

The highest hydro-mechanical efficiency

最高的液压机械效率

- Mechanical efficiency up to 98 %, even at low speed, due to low friction and direct torque transmission between shaft and pistons
-由于轴和柱塞之间的低摩擦和直接扭矩传递，即使在低速下，机械效率也高达98%
- Very high starting torque (98%) due to a high number of pistons and hydrostatic bearings
-由于大数量的柱塞和静压支撑，起动扭矩高(98%)
- Overall efficiency up to 96% due to short stroke, optimized displacement angle, balanced forces and hydrostatic bearings
-由于短行程、优化的位移角、力平衡和静压支撑，总效率高达96%

Long product service life

产品使用寿命长

- No wear of rotating parts due to hydrostatic bearings
-采用静压支撑，旋转部件几乎无磨损
- Balanced axial forces mean reduced stress on bearings
-平衡的轴向力意味着轴承上的应力减小
- Less temperature increase because of less friction
-由于摩擦较小，温度升高较小
- Long maintenance intervals due to robust design
-坚固的设计使维护间隔周期长
- Cypag Hydraulics intensive validation plan
-Cypag液压传动增强化验证计划

Combination of high pressure and low work speed

高压与低工作速度的结合

- Very high starting torque (98%) due to a high number of pistons
-由于大数量的柱塞，起动扭矩高(98%)
- Motor units can work below 1 rpm minimum speed due to hydrostatic bearings and small internal axial forces on roller bearings
-由于采用静压支撑和滚子轴承上的小轴向力，马达单元可在低于1rpm的最低转速下工作
- Low friction of rotating parts also prevents wear and stick-slip effect
-旋转部件的低摩擦力也防止了磨损和粘滑效应

Hight power density

高功率密度

- Compact dimensions and high power density because of a small displacement angle, short stroke, smaller bearings and no joints
-由于小的位移角、短的行程、较小的轴承和无联接，因此具有紧凑尺寸和高功率密度
- Power density increasing with displacement if compared to traditional axial piston units
-与传统轴向柱塞装置相比，功率密度随排量增加

Through-drive shaft design

通轴驱动设计

- Tandem pump configuration is possible in combination with other Cypag Hydraulics pumps thanks to through drive shaft
-得益于贯穿驱动轴，串联泵配置可以与其他Cypag液压泵结合使用
- It is possible to customize solutions like motor brakes, double shaft, encoder or speed sensor
-可以定制诸如马达制动器、双轴、编码器或速度传感器等解决方案

Low temperature increase over time

温度随时间升高

- It is possible to downsize heat exchanger, oil tank or prime engine because of higher overall efficiency
-由于整体效率更高，因此可以缩小热交换器、油箱或主发动机的尺寸
- Reduced system energy losses due to the high unit efficiency in a wide range of working conditions
-在各种工作条件下，由于机组效率高，系统能量损失减少

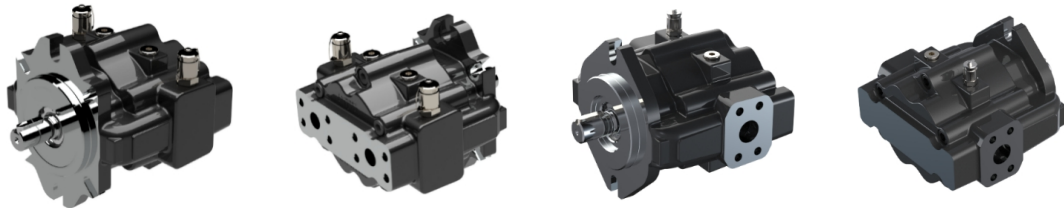
Long experience of endurance testing

长期的耐久性测试经验

- More than 6 years of intensive testing of innovative technology
-超过6年的创新技术密集测试
- Cypag Hydraulics strong validation model
-Cypag液压强度验证模型
- Impressive results on product reliability
-在产品可靠性方面取得了令人印象深刻的成果
- Robust Cypag Hydraulics design
-坚固的Cypag液压设计

Technical Data CXP-FP

技术数据CXP-FP



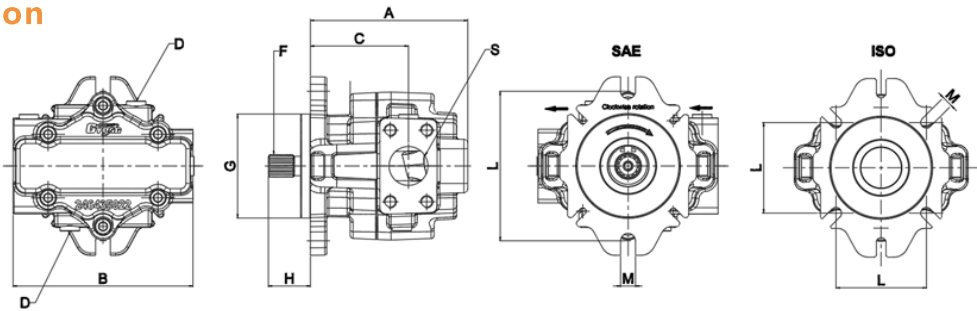
Single quadrant 1Q 单象限1Q	Two quadrant 2Q 双象限2Q	Displacement 排量			MCXP. Pressure MCXP. 压力		Speed (*) 速度
		cm ³ /rev	in ³ /rev	Vg - cc	Cont. - p _{nom} bar 连续 - p _{nom} bar	Peak - p _{max} bar 峰值 - p _{max} bar	
		18	1.10	17.83	400	450	4800 ¹⁾
		21	1.28	20.79			
		24	1.46	23.74			
		28	1.71	27.87			
		34	2.07	33.93	400	450	4000 ¹⁾
		40	2.44	39.56			
		45	2.75	45.18			
		48	2.93	47.99			
		54	3.30	53.92	400	450	3600 ¹⁾
		63	3.84	62.87			
		72	4.39	71.80			
		76	4.64	76.25			
		86	5.25	86.30	400	450	3000 ¹⁾
		100	6.10	100.62			
		115	7.02	114.90			
		122	7.44	122.03			

1)1bar(15psi)进口压力下的最大转速。

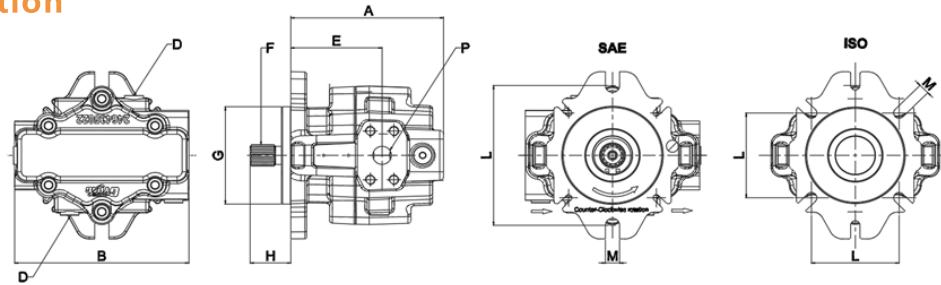
- (*) Maximum speed in self-priming conditions. For two-quadrant pump maximum speed, please contact Cypag Hydraulics.
(*) 自吸条件下的最大速度。关于双象限泵的最大转速，请联系Cypag Hydraulics。
- It is possible to order pumps with custom displacement values within the different ranges: between 18 and 24 cc, 34 and 48 cc, 54 and 76 cc, 86 and 122 cc.
可以订购具有不同范围内的自定义排量值的泵：18至24cc、34至48cc、54至76cc、86至122cc。

CW rotation

CW旋转

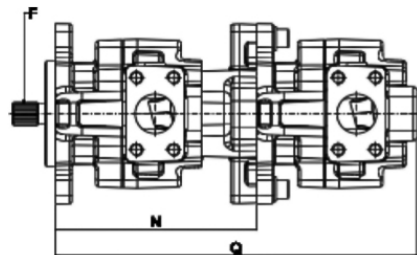


CCW rotation
CCW旋转



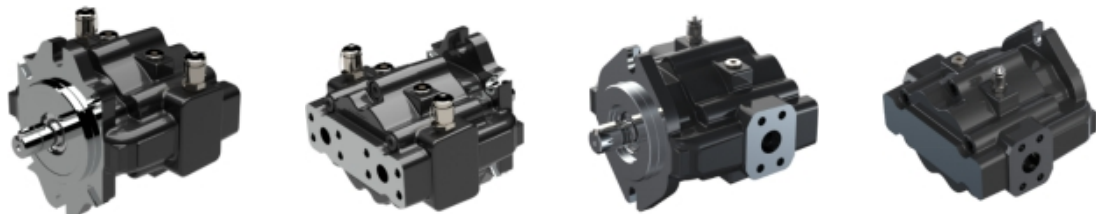
CXP-FP Displacements CXP-FP 排量		A mm	B mm	C mm	E mm	CXP-FP Displacements CXP-FP 排量	Flanges 法兰	F	G mm	H mm	L mm	M mm	Ports (*) 端口
18-21-24-28		154	176	96	92	18-21-24-28	SAE-B	13T	Ø101.6	41.1	146	14.5	S: 1" 1/2 SAE 3000
34-40-45-48		200.5	214	120	119		SAE B-B	15T	Ø101.6	41.1	146	14.5	P: 3/4" SAE 6000
54-63-72-76		216.5	242	148.5	132.5		ISO	W25	Ø100	68	88.4	14.5	D: 1/4" G-BSP
86-100-115-122		250	276	172	151	34-40-45-48	SAE B-B	15T	Ø101.6	46	146	14.5	S: 2" SAE 3000 P: 3/4" SAE 6000 D: 3/8" G-BSPP
							SAE -C	14T	Ø127	56	146	14.5	
							ISO	W30	Ø125	67	113.1	14.5	
							ISO	CIL.30	Ø125	92	113.1	14.5	
Shafts 轴	13T	16/32 D.P. ANSI B92.1A spline				54-63-72-76	SAE-C	14T	Ø127	56	181	17.5	S: 2" 1/2 SAE 3000 P: 1" SAE 6000 D: 3/8" G-BSPP
	14T	12/24 D.P. ANSI B92.1A spline					ISO	W35	Ø140	72	127.3	17.5	
	15T	16/32 D.P. ANSI B92.1A spline					ISO	W40	Ø140	77	127.3	17.5	
	13T	8/16 D.P. ANSI B92.1A spline					ISO	CIL.35	Ø140	102	127.3	17.5	
	CIL.30	Ø30 DIN 6885 AS8x7x50 Key				86-100-115-122	ISO	CIL.40	Ø140	102	127.3	17.5	
	CIL.35	Ø35 DIN 6885 AS10x8x64 Key					SAE-D	13T	Ø152.4	75	161.6	20.6	
	CIL.40	Ø40 DIN 6885 AS12x8x64 Key					ISO	W40	Ø160	77	141.4	17.5	
	W25	W25x1.5x18x9g DIN5480 spline					ISO	W45	Ø160	77	141.4	17.5	
	W30	W30x2x14x9g DIN5480 spline				(*) For special versions of pumps with rear ports please contact Cypag Hydraulics.							
	W35	W35x2x16x9g DIN5480 spline											
	W40	W40x2x18x9g DIN5480 spline											
	W45	W45x2x21x9g DIN5480 spline											
	W50	W50x2x24x9g DIN5480 spline											

CXP-FP Floating Pump dimensions: tandem version
CXP-FP浮杯泵尺寸：串联型



	F	N mm	Q mm
CXP-FP 24+24	15T SAE B-B	197	347
CXP-FP 48+48	14T SAE C	240	439
CXP-FP 76+76	14T SAE C	283	505

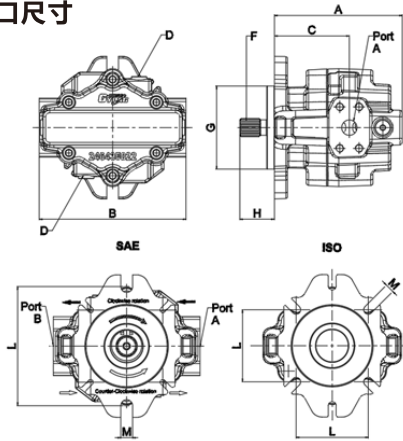
Technical Data CXP-FM
技术数据CXP-FM



Bi-directional 双向	Displacement 排量			MCXP. Pressure MCXP. 压力		Speed (*) 速度
	cm³/rev	in³/rev	Vg - cc	Cont. - p _{nom} bar 连续 - p _{nom} bar	Peak - p _{mCXP} bar 峰值 - p _{mCXP} bar	
	18	1.10	17.83	400	450	5000
	21	1.28	20.79			
	24	1.46	23.74			
	28	1.71	27.87			
	34	2.07	33.93	400	450	4500
	40	2.44	39.56			
	45	2.75	45.18			
	48	2.93	47.99			
	54	3.30	53.92	400	450	4000
	63	3.84	62.87			
	72	4.39	71.80			
	76	4.64	76.25			
	86	5.25	86.30	400	450	3500
	100	6.10	100.62			
	115	7.02	114.90			
	122	7.44	122.03			

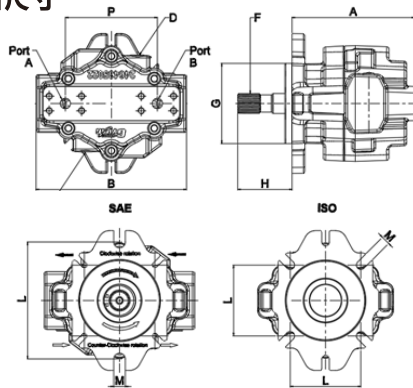
- (*) For special high speed versions, or for four-quadrant pump versions, please contact Cypag Hydraulics.
(*) 对于特殊的高速版本或四象限泵版本，请联系Cypag Hydraulics。
- It is possible to order motors with custom displacement values within the different ranges: between 18 and 24 cc, 34 and 48 cc, 54 and 76 cc, 86 and 122 cc.
可以订购不同范围内具有自定义排量值的马达：18至24 cc、34至48 cc、54至76 cc、86至122 cc。

Lateral ports dimensions
横向端口尺寸



CXP-FM Displacements CXP-FM 排量	A mm	B mm	C mm	P mm
18-21-24-28	154	176	92	115
34-40-45-48	200.5	214	119	140
54-63-72-76	216.5	242	132.5	138
86-100-115-122	250	276	172	151

Rear ports dimensions
后端口尺寸



Shafts 轴	13T	16/32 D.P. ANSI B92.1A spline
	14T	12/24 D.P. ANSI B92.1A spline
	15T	16/32 D.P. ANSI B92.1A spline
	13T	8/16 D.P. ANSI B92.1A spline
	W25	W25x1.5x18x9g DIN5480 spline
	W30	W30x2x14x9g DIN5480 spline
	W35	W35x2x16x9g DIN5480 spline
	W40	W40x2x18x9g DIN5480 spline
	W45	W45x2x21x9g DIN5480 spline
	W50	W50x2x24x9g DIN5480 spline

CXP-FM Displacements CXP-FM 排量	Flanges 法兰	F	G mm	H mm	L mm	M mm	Ports 端口
18-21-24-28	SAE-B	13T	Ø101.6	41.1	146	14.5	A-B: 1/2" SAE 6000 (rear ports) A-B: 3/4" SAE 6000 (lateral ports) D: 1/4" G-BSPP
	SAE B-B	15T	Ø101.6	41.1	146	14.5	
	ISO	W25	Ø100	68	88.4	14.5	
34-40-45-48	SAE B-B	15T	Ø101.6	46	146	14.5	A-B: 3/4" SAE 6000 D: 3/8" G-BSPP
	SAE-C	14T	Ø127	56	146	14.5	
	ISO	W30	Ø125	67	113.1	14.5	
	ISO	CIL.30	Ø125	92	113.1	14.5	
54-63-72-76	SAE-C	14T	Ø127	56	181	17.5	A-B: 1" SAE 6000 D: 3/8" G-BSPP
	ISO	W35	Ø140	72	127.3	17.5	
	ISO	W40	Ø140	77	127.3	17.5	
	ISO	CIL.35	Ø140	102	127.3	17.5	
	ISO	CIL.40	Ø140	102	127.3	17.5	
86-100-115-122	SAE-D	13T	Ø152.4	75	161.6	20.6	A-B: 1" 1/4" SAE 6000 D: 3/4" G-BSPP
	ISO	W40	Ø160	77	141.4	17.5	
	ISO	W45	Ø160	77	141.4	17.5	
	ISO	W50	Ø160	77	141.4	17.5	

Table of Theoretical Data 理论数据表

A nominal working pressure of 400 bar and 450 bar peak pressure is confirmed for the entire product range.

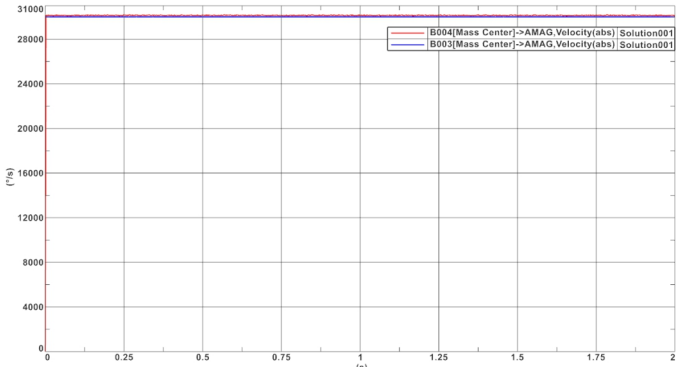
下表中理论报告值在机械和容积效率之前被考虑。这些值是根据标称尺寸的部件计算得出的。数据是基于使用粘度等级为ISO VG 32的矿物油和40°C的温度进行操作的。

Note: the theoretical values reported in the following tables are considered before mechanical or volumetric efficiency. These values are calculated for parts at nominal dimensions. The data has been considered for operation with a mineral oil that has a viscosity class of ISO VG 32 and a temperature of 40 °C.

注：下表中报告的理论值在考虑机械或容积效率之前。这些值是针对标称尺寸的零件计算的。这些数据已被考虑用于粘度等级为ISO VG 32、温度为40°C的矿物油。

Note: peak pressure working conditions must not exceed 1 % of every minute. It is not recommended that the units are used so they run at maximum pressure and maximum speed simultaneously. Operation at values above the maximum admitted working conditions may lead to reduced life, failure or loss of function of the pump/motor. For max working conditions of tandem units, please ask Cypag Hydraulics.

注：工作压力峰值不得超过每分钟1%。不建议设备同时以最大压力和最大速度运行。超过最大允许工作条件的操作可能导致泵/电机寿命缩短、故障或功能丧失。对于串联设备的最大工作条件，请咨询Cypag Hydraulics。



CXP28							CXP48			
	Symbol 符号	Unit 单位	18	21	24	28	34	40	45	48
Displacement 排量	V _g	cc/rev	17.83	20.79	23.74	27.87	33.93	39.56	45.18	47.99
		in ³ /rev	1.09	1.27	1.45	1.71	2.07	2.41	2.76	2.93
Nominal continuous pressure 标称连续压力	Δp	bar	400				400			
CXP Mimum peak pressure CXP最大峰值压力	Δp _{mCX}	bar	450				450			
Speed (pump mCXP) 转速 (泵 mCXP)	n _{pump}	rpm	3600	3600	3600	3600	3000	3000	3000	3000
Speed (motor mCXP) 转速 (马达 mCXP)	n _{motor}	rpm	5000	5000	5000	5000	4500	4500	4500	4500
Flow at n _{nom} (pump) n _{nom} 处的流量 (泵)	Q	l/min	62.4	72.8	83.1	97.5	101.8	118.7	135.5	144.0
Torque at Δp=400 bar Δp=400 bar的扭矩	T _l	Nm	113.5	132.4	151.2	182.9	216.0	251.9	287.6	305.5
Torque at Δp=450 bar Δp=450 bar的扭矩	T _{mCXP}	Nm	127.7	148.9	170.0	203.7	243.0	283.3	323.6	343.7
Power at n _{nom} and Δp=400 bar n _{nom} 和Δp=400 bar时的功率	P _l	kW	41.6	48.5	55.4	69.0	67.9	79.2	90.4	96.0
Power at n _{nom} and Δp=450 bar n _{nom} 和Δp=450 bar时的功率	P _{mCXP}	kW	46.8	54.6	62.3	76.8	76.3	89.0	101.7	108.0
Moment of inertia for Rotary Group 旋转组的转动惯量	J _{gr}	kgm ²	0.00126				0.00400			
Case volume 容器体积	V	l	0.3				0.5			
Weight 重量	m	kg	13.8				22.2			

CXP76							CXP122			
	Symbol 符号	Unit 单位	54	63	72	76	86	100	115	122
Displacement 排量	V _g	cc/rev	53.92	62.87	71.80	76.25	86.30	100.62	114.90	122.03
		in ³ /rev	3.29	3.84	4.38	4.65	5.27	6.14	7.01	7.45
Nominal continuous pressure 标称连续压力	Δp	bar	400				400			
CXP Mimum peak pressure CXP最大峰值压力	Δp _{mCX}	bar	450				450			
Speed (pump mCXP) 转速(泵 mCXP)	n _{pump}	rpm	2600	2600	2600	2600	2200	2200	2200	2200
Speed (motor mCXP) 转速(马达 mCXP)	n _{motor}	rpm	4000	4000	4000	4000	3500	3500	3500	3500
Flow at n _{nom} (pump) n _{nom} 处的流量(泵)	Q	l/min	140.2	163.5	186.7	198.3	190	221	254	270
Torque at Δp=400 bar Δp=400 bar的扭矩	T _l	Nm	343.3	400.3	457.1	485.4	549.4	640.6	731.5	776.9
Torque at Δp=450 bar Δp=450 bar的扭矩	T _{mCXP}	Nm	386.2	450.3	514.2	546.1	618.4	721.0	823.3	874.4
Power at n _{nom} and Δp=400 bar n _{nom} 和Δp=400 bar时的功率	P _l	kW	93.5	109.0	124.5	132.2	132.3	154.3	176.2	187.1
Power at n _{nom} and Δp=450 bar n _{nom} 和Δp=450 bar时的功率	P _{mCXP}	kW	105.1	122.6	140.0	148.7	148.9	173.6	198.3	210.6
Moment of inertia for Rotary Group 旋转组的转动惯量	J _{gr}	kgm ²	0.00912				0.01870			
Case volume 容器体积	V	l	0.7				1			
Weight 重量	m	kg	32.6				50.0			

