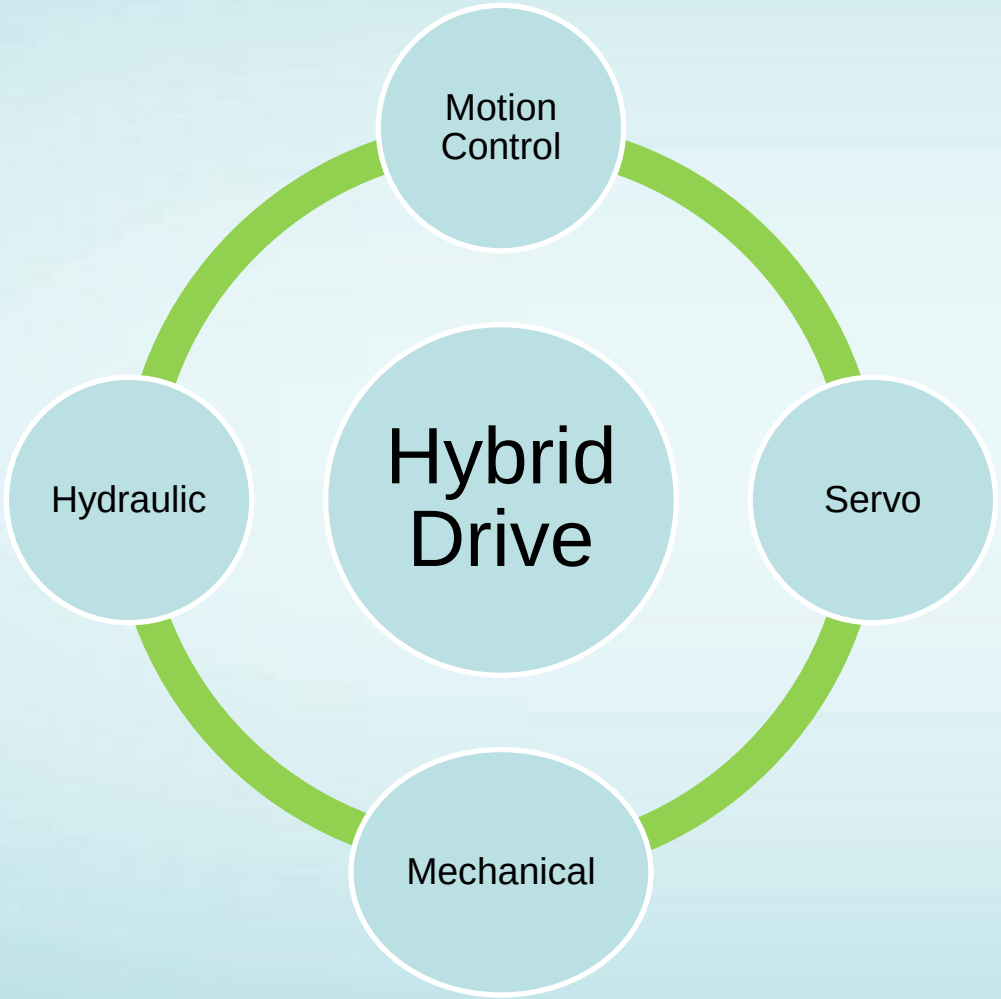
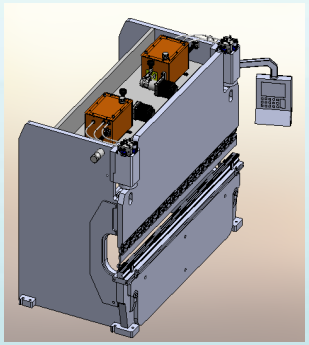
Hybrid Drive

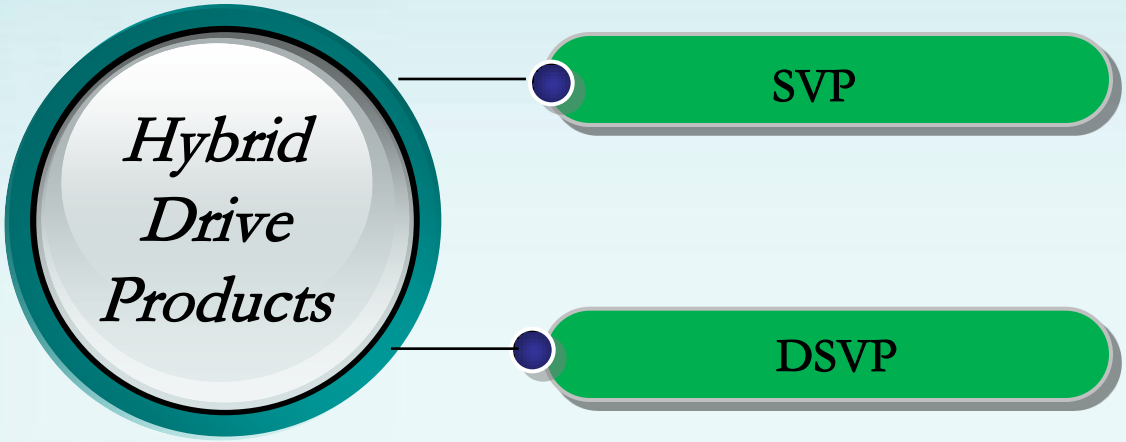
Contents

1.Introduction





1.Introduction



SVP –Servo Variable-speed Pump 【each pump 25cc ~250cc】
DSVP--Double Servo Variable-speed Pump 【each pump 6cc ~ 71cc】

SVP system is formed by pressure and flow double closed-loop control, and can only rotate in one direction. Selector valve controls the direction. SVP is normally used for power supply;

DSVP system is formed by position, pressure and flow triple closed-loop control. It can rotate in both direction. DSVP is suitable for machines which require high precision and position control.

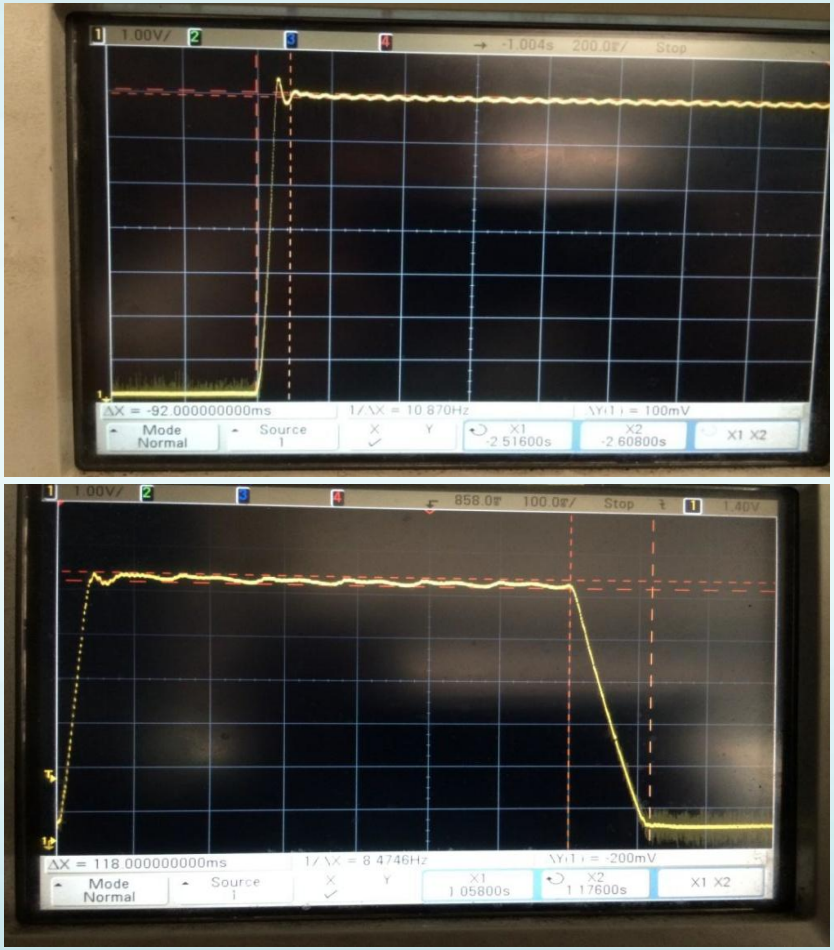
1.Introduction-SVP

- **Pressure and flow double closed-loop control**
- **ESTUN servo system**
- **PQ Decoupling control algorithm**
- **Rexroth (or specified) Internal gear pump**

1.Iintroduction-SVP

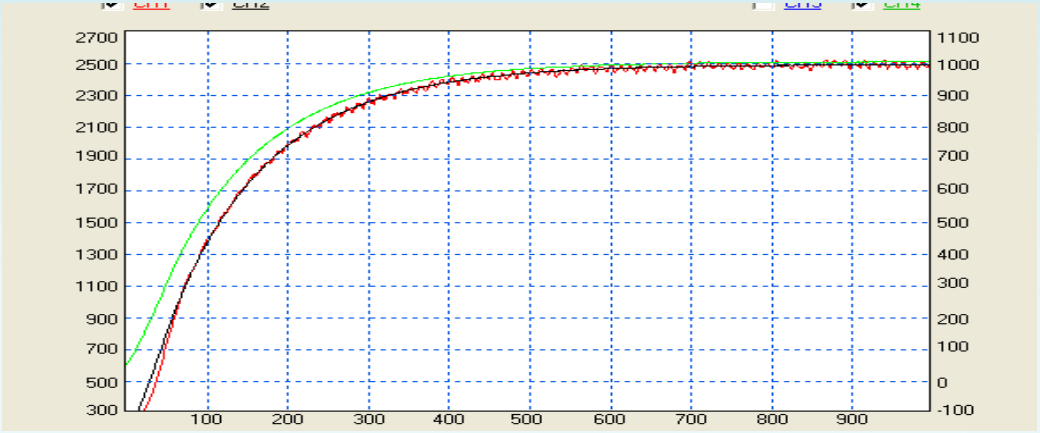
- **fast dynamic response**

  - 0~175 bar build-up time: 70ms
  - 175~0 bar decompression time: 120ms
  - 0~1800 rpm flow 20ms
  - ±0.3 bar pressure control

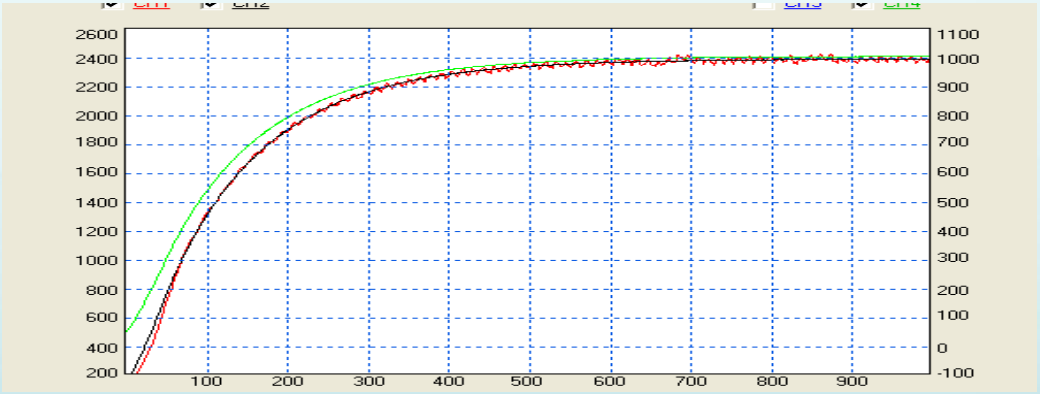


1.Introduction-SVP

- fast flow response



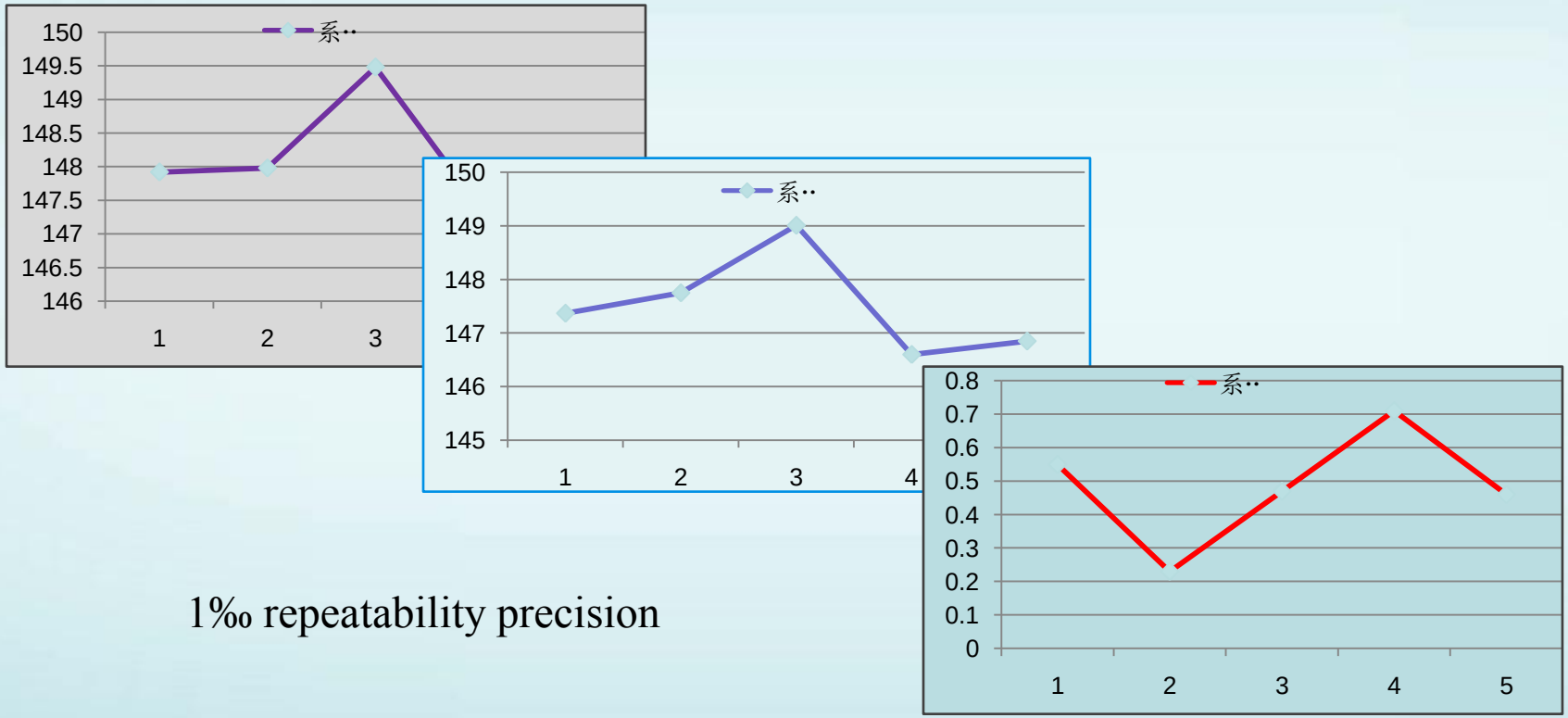
2500rpm



2400rpm

1.Introduction-SVP

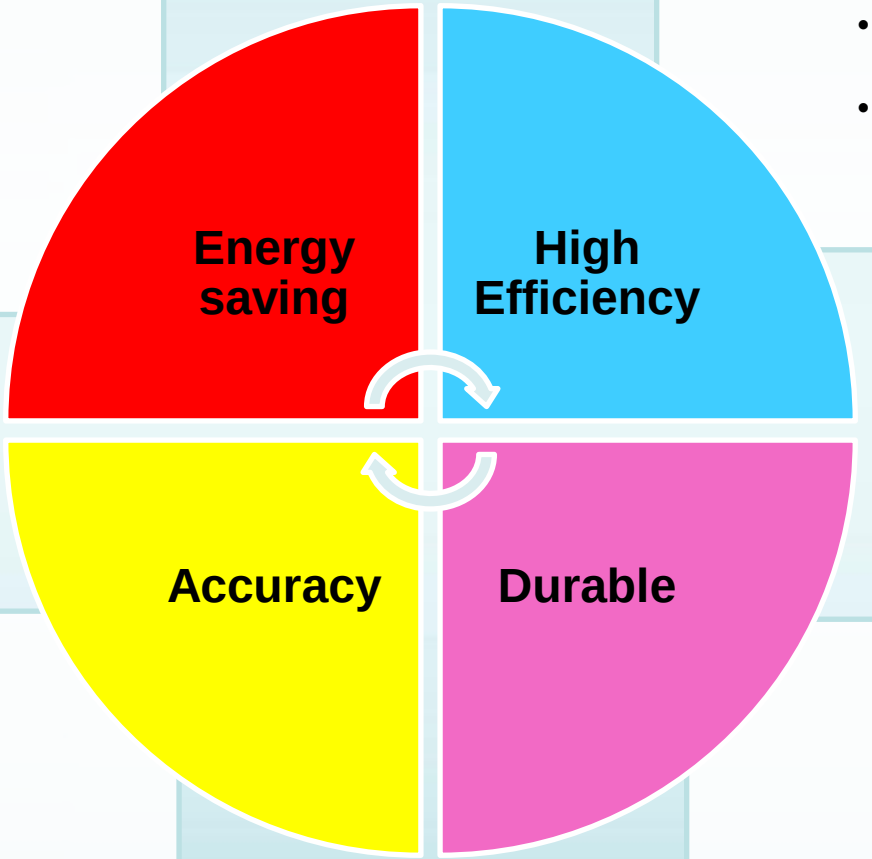
- **high position repeatability**



1‰ repeatability precision

1.Introduction-SVP

- Permanent magnet synchronous servo motor
- PQ Decoupling control algorithm
- 40%~80% Energy saving

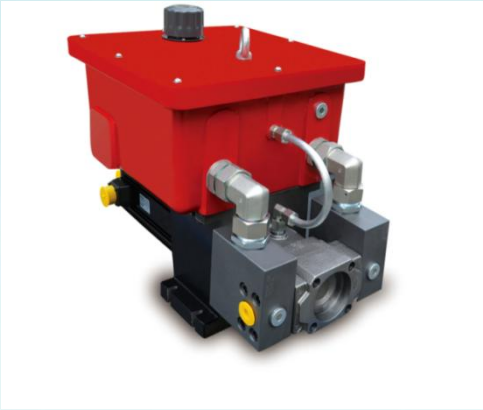


- Flow response 20ms
- Pressure response 70ms
- Decompression time120ms

- 1‰ repeatability precision
- ±0.3bar accuracy
- ±0.1mm Injection

- Triple protection
- high overload capacity

1.Introduction-DSVP



DSVP is a integrated product made by servo system, hydraulic cylinder, hydraulic pump and valves.

- Pressure, flow and position triple closed-loop control
- ESTUN servo system
- Synchronous compensation algorithm
- Hydraulic cylinder
- Rexroth (or specified) Bidirectional piston pump

1.Introduction-DSVP

Performance

- High Position accuracy，Repeat positioning accuracy ±0.005mm
- High Synchronization accuracy, within 0.020mm
- Fast dynamic response, pressure build-up time70ms

Economic

- Extreme power saving more than 70%;
- Extreme maintenance costs saving, Hydraulic oil reduce more than 75%;
- Cooling system free, oil temp rise within 25 ℃

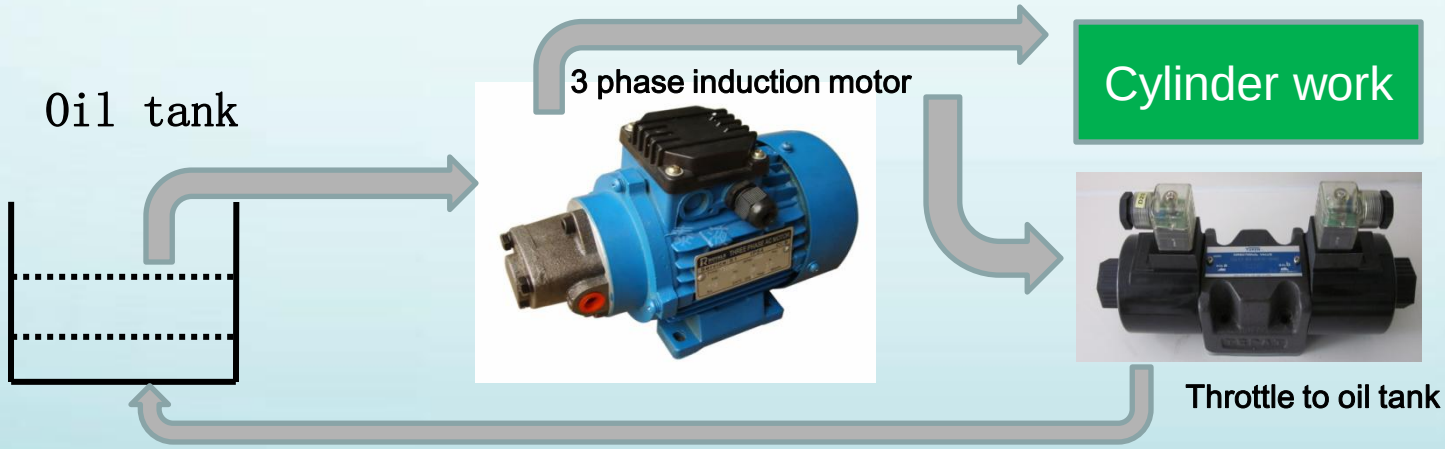
Environmental Friendly

- Extreme Noise reduction, more than 10dB;
- Extreme carbon emission reduction，6 tons CO_2 reducing per year for 100T hydraulic press machine.

2. Why electrical hydraulic drive

➢ high pressure throttle overflow loss

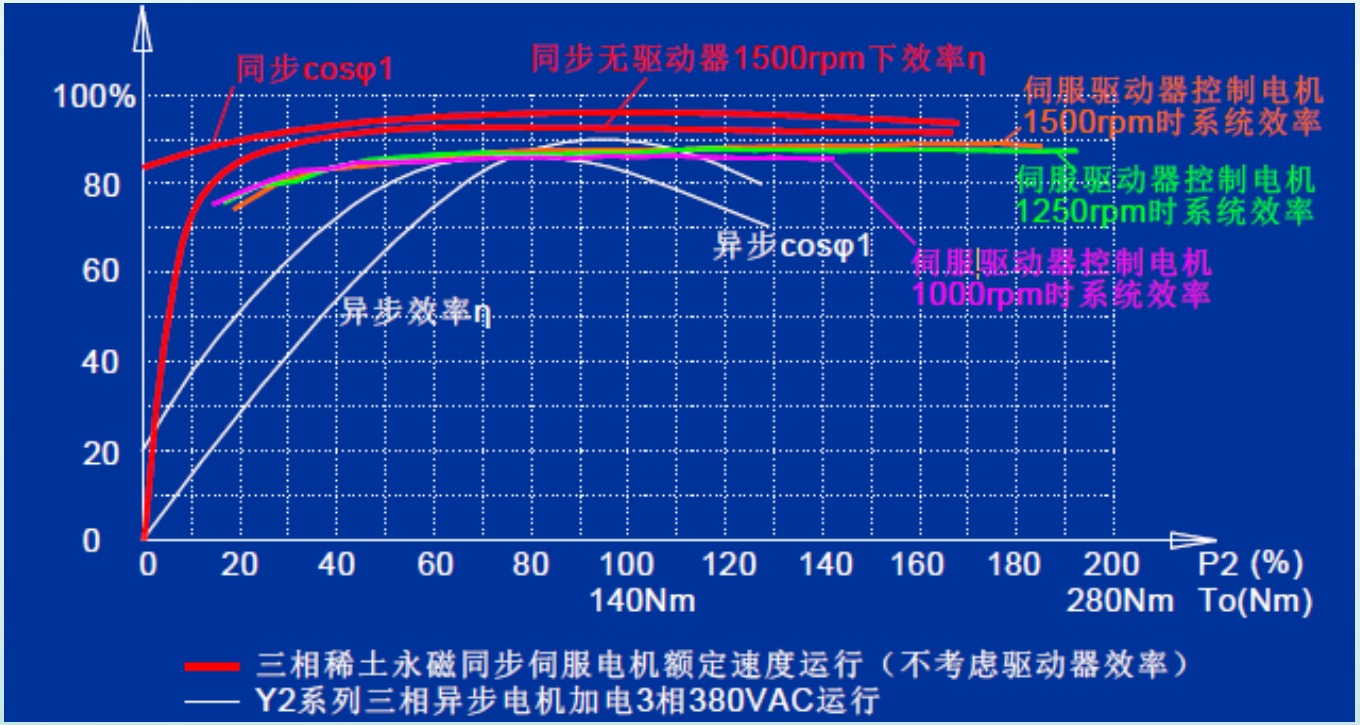
Hydraulic process is generally divided into several stages, each stage requires different pressure and flow. Motors' rated power are determined by the highest pressure and flow requirements. Motor runs at a constant speed to provide a constant flow (some variable pump has variable flow) In the most time of working time, the flow & pressure demand of equipment is less than the rated flow and maximum pressure. In traditional hydraulic structure, extra hydraulic oil which is brought by constant motor speed will go back into oil tank through overflow valve, and does not go through the cylinder. In this process which is called high-pressure throttling, usually about 30% to 70% oil will be wasted.



2. Why electrical hydraulic drive

➢ Low efficiency of 3 phases induction motor

The efficiency and power factor of traditional pump motor which is 3 phases induction asynchronous motor is normally 10% lower than permanent magnet synchronous servo motor. During standby stage, the efficiency and power factor is much lower.



2. Why electrical hydraulic drive

➢ Power consumption of cooling system

Because of the high-pressure throttling, the temperature rising of hydraulic oil can cause oil dilution, oil tube softening, oil leaking and many other problems. So, many hydraulic systems require extra cooling system. Comparing with traditional hydraulic system, there will be no cooling system needed. 100% power consumption of cooling system will be saved.

➢ Rated power and power distribution loss

1、The overload (normally 1.5 times) of 3 phases induction asynchronous motor is lower than the overload (more than 2 times) of permanent magnet synchronous servo motor.

2、 3 phases induction asynchronous motor requires more complicated power distribution system, because its high starting current, and starting mode (star connection). Permanent magnet synchronous servo motor only requires 2 times current, even when it is in 2 times torque output.

3、 Duplex pump (high & low pressure switching) can be supported by servo pump system. Rated power is much lower when pressure maintaining stage is finished by small pump

2. Why electrical hydraulic drive

Pressure, flow 0~10V signal corresponds 0~25MPa

Pressure instruction

Flow instruction

Speed feedback

Pressure feedback

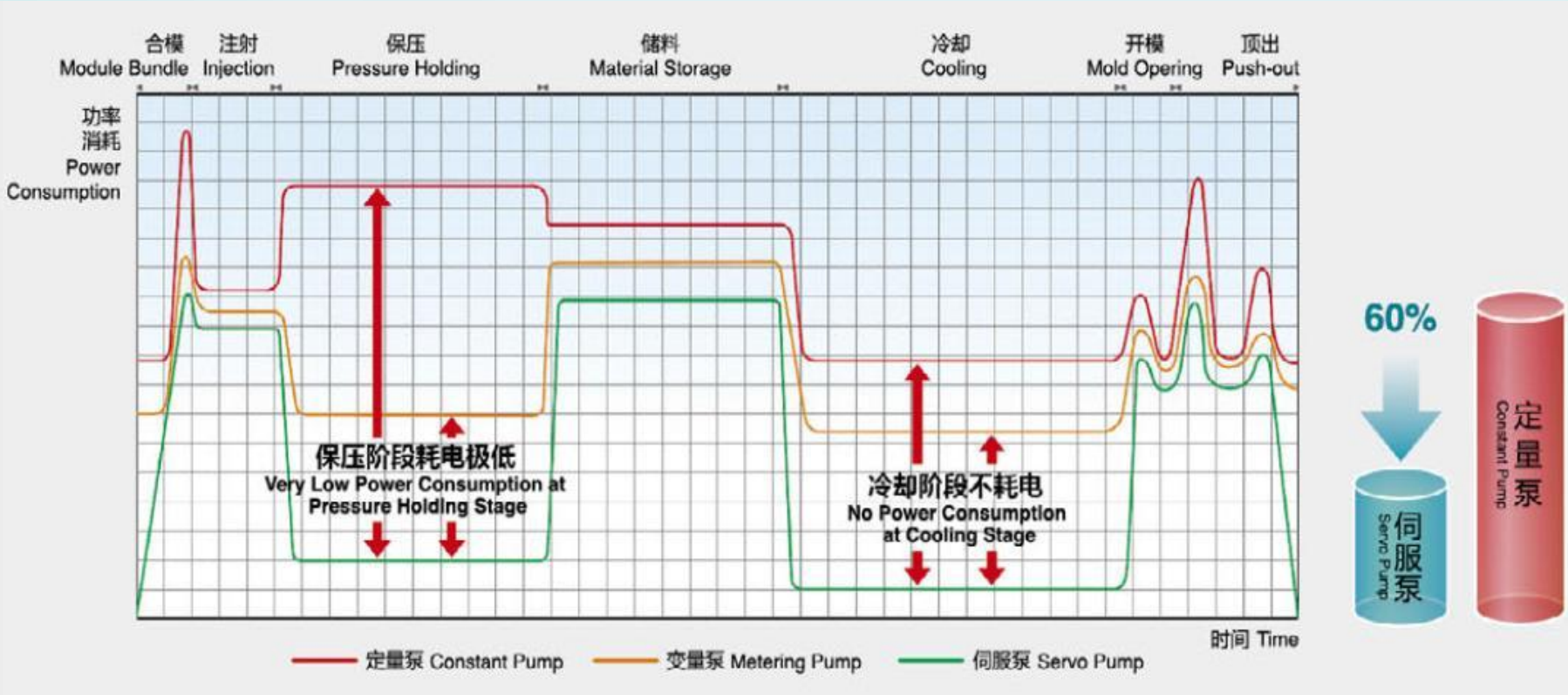
Oil circuit switching

Oil tank

Servo Injection molding machine

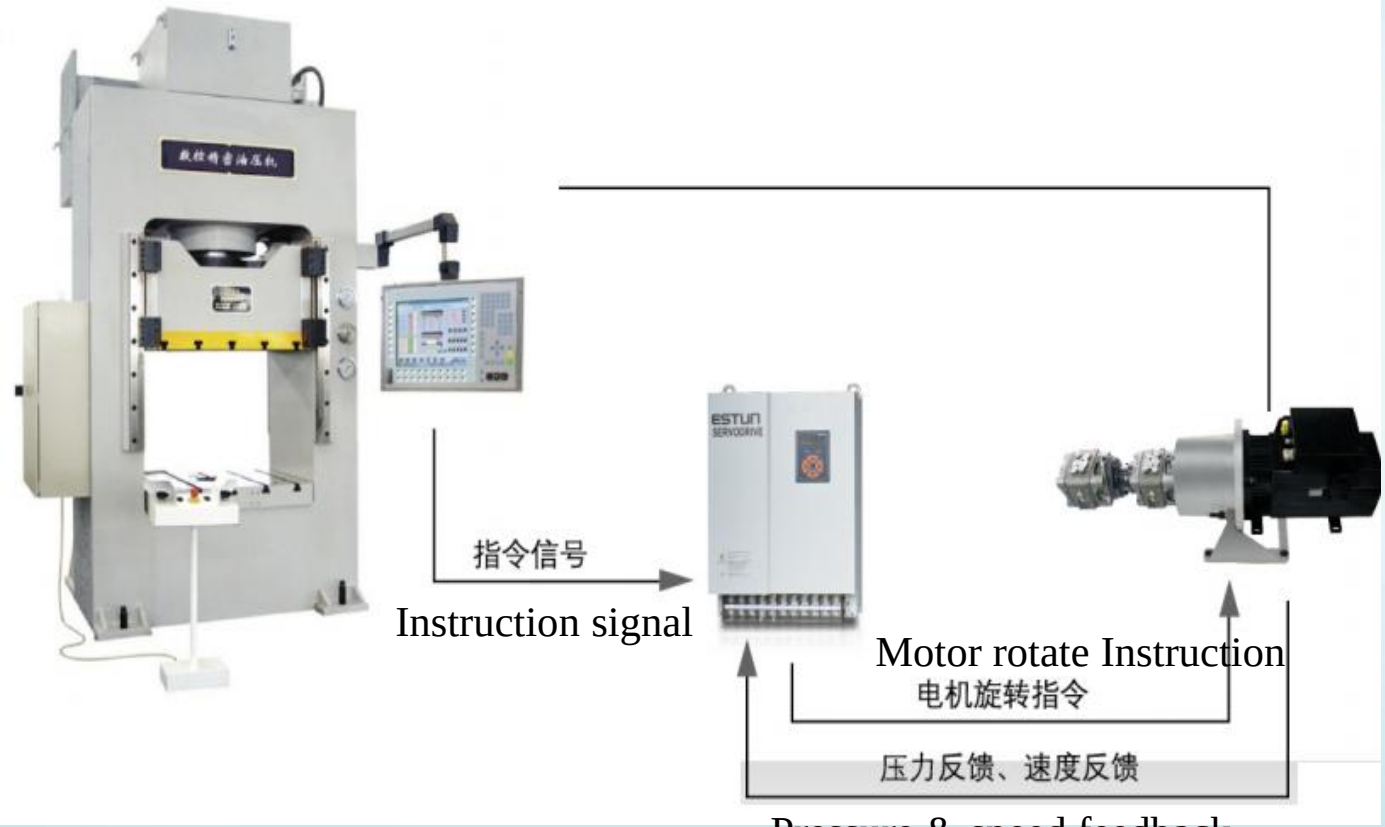
2. Why electrical hydraulic drive

Energy consumption curve of two kinds of Injection molding machine



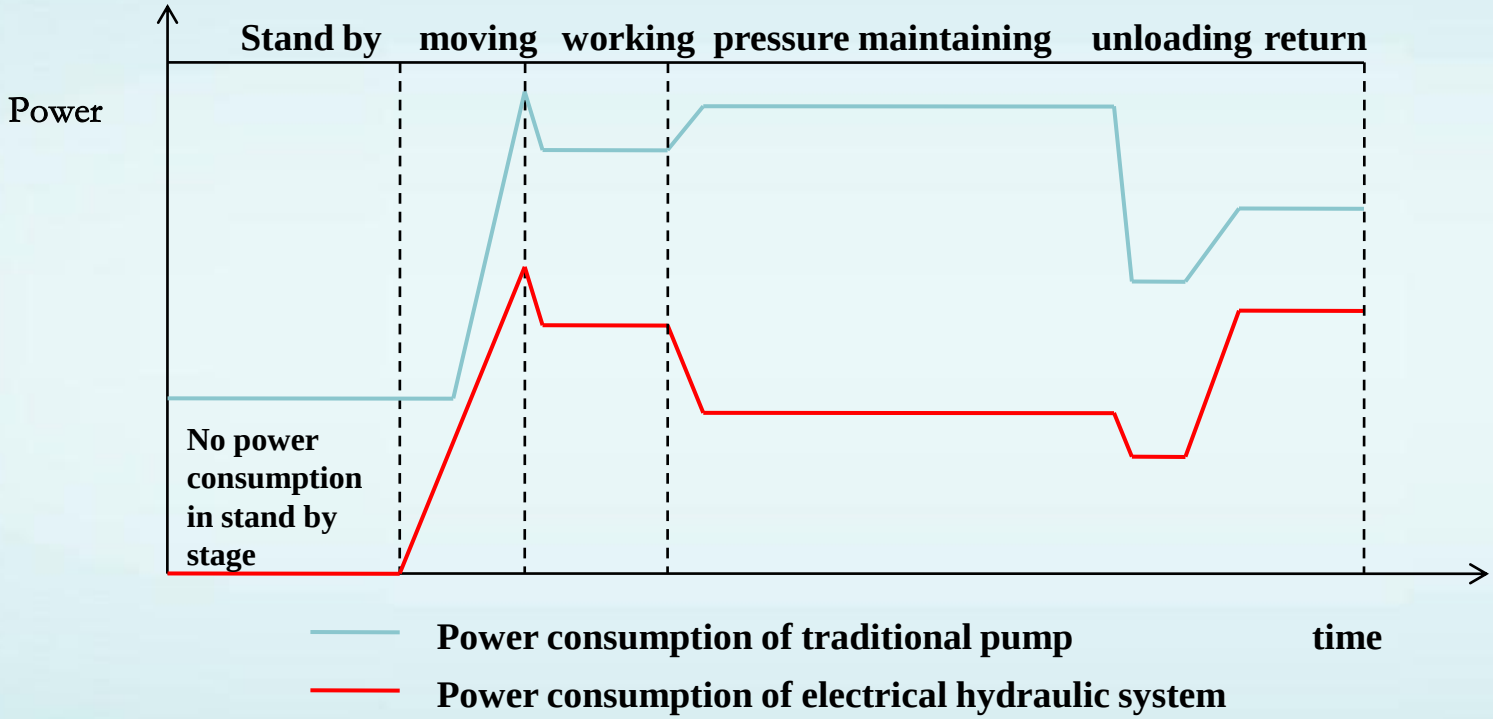
2. Why electrical hydraulic drive

Servo hydraulic press machines



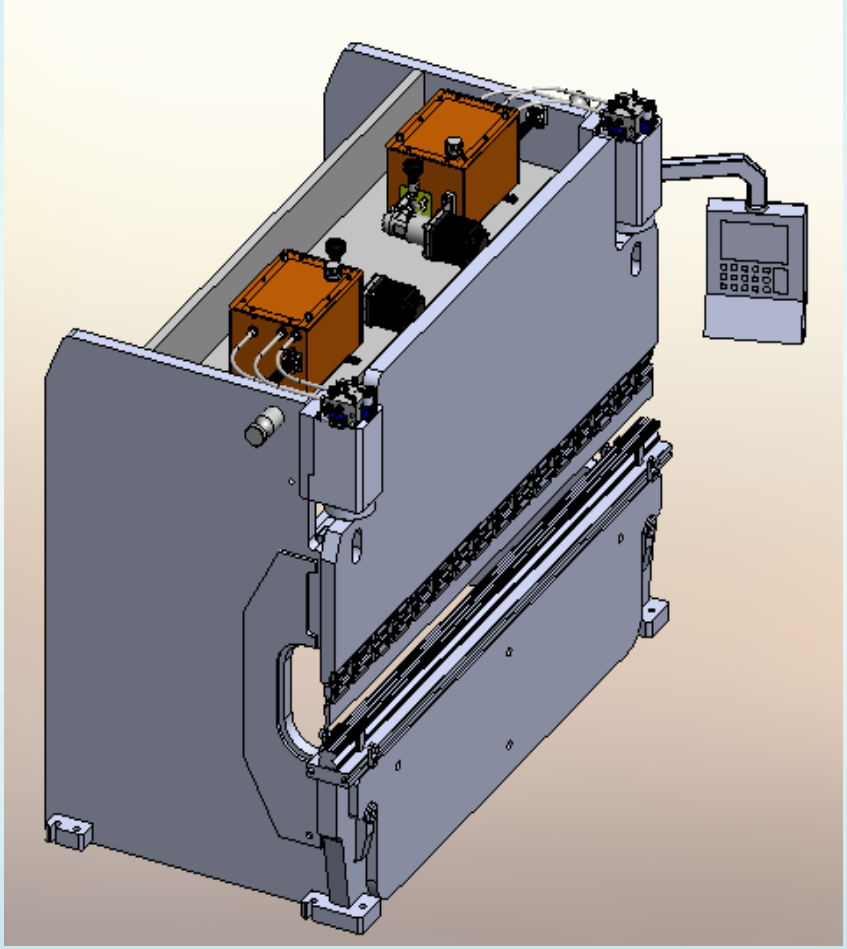
2. Why electrical hydraulic drive

Energy consumption curve of two kinds of hydraulic press machine



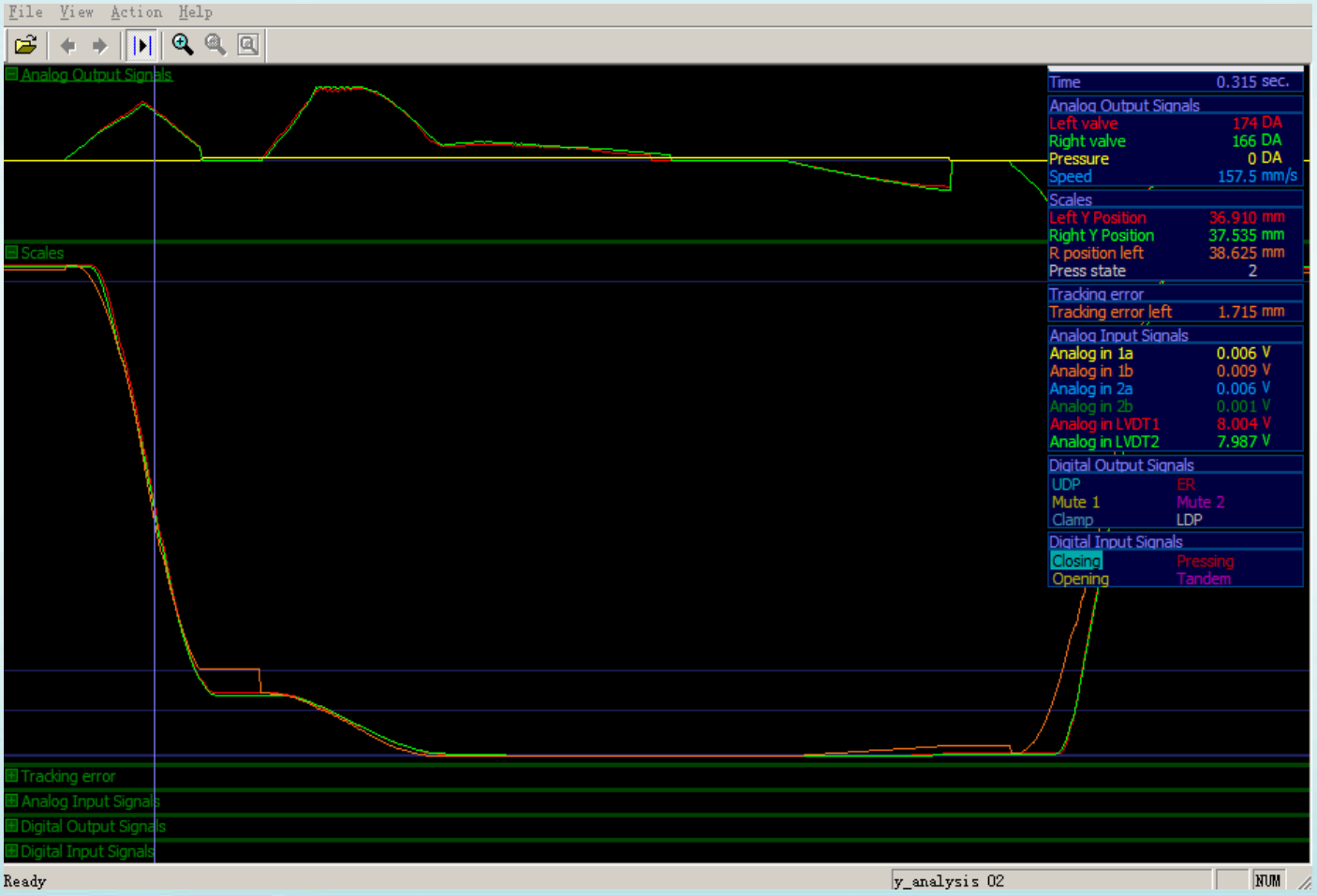
2. Why electrical hydraulic drive

Shearing and cutting machine



2. Why electrical hydraulic drive

DSVP position curve



3. Application analysis

Product features	Advantages	Benefit
No need valve control system	high efficiency, low power consumption	up to 60% energy saving,
Block-based design, compact oil tank	50% less Installation volume	high productivity, easy to install, retrofitting
position, pressure and flow triple closed-loop control	Up to 80% Hydraulic oil saving	Accurate, maintenance free
Full process monitoring	System self-diagnose	Low failure rate
Specially designed algorithm for hydraulic system	Total solution is ready for use	Short developing, designing, and installation time. extremely testing, training and maintenance costs saving.

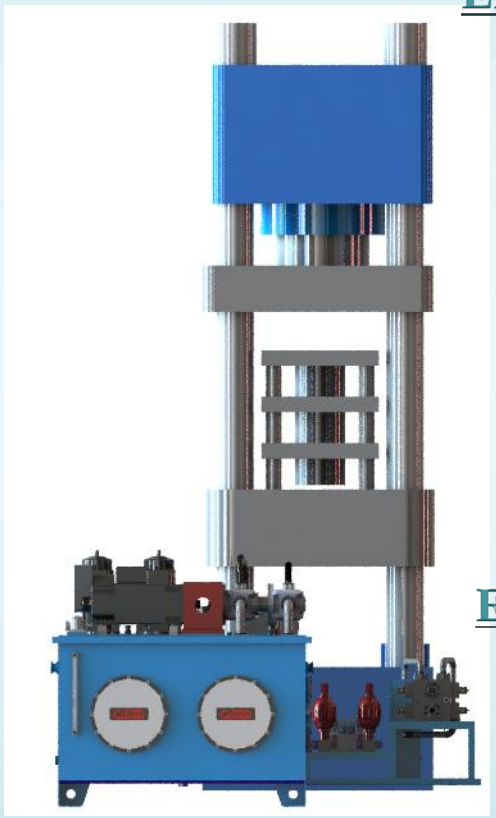
3. Application analysis

Powder press

HMI

Controller

Servo System

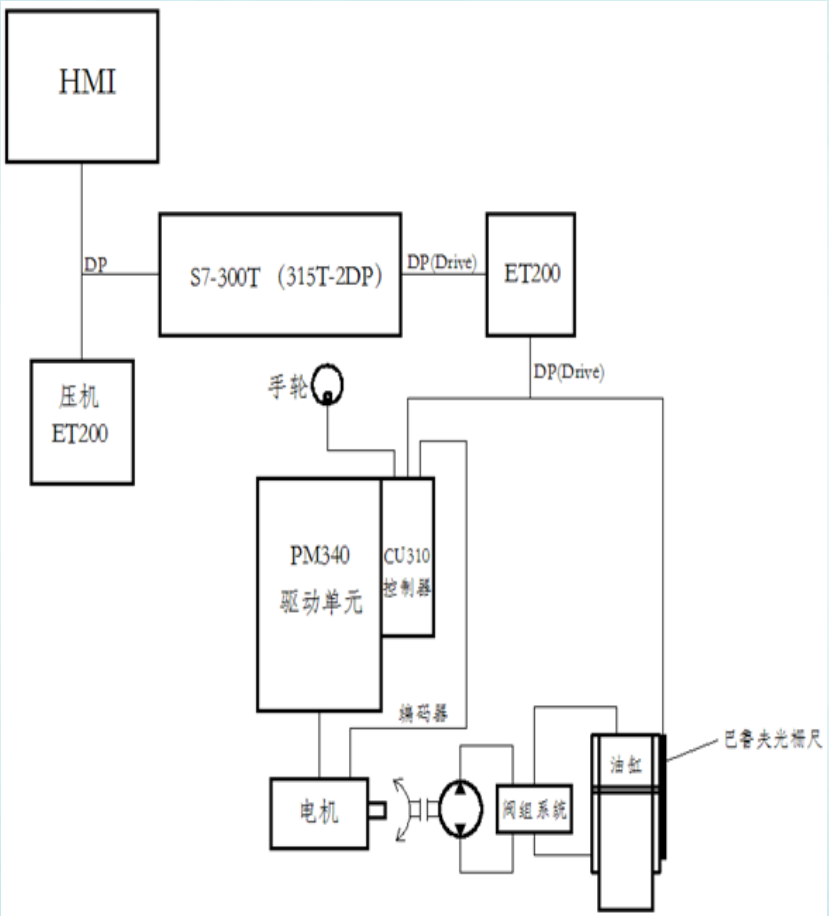


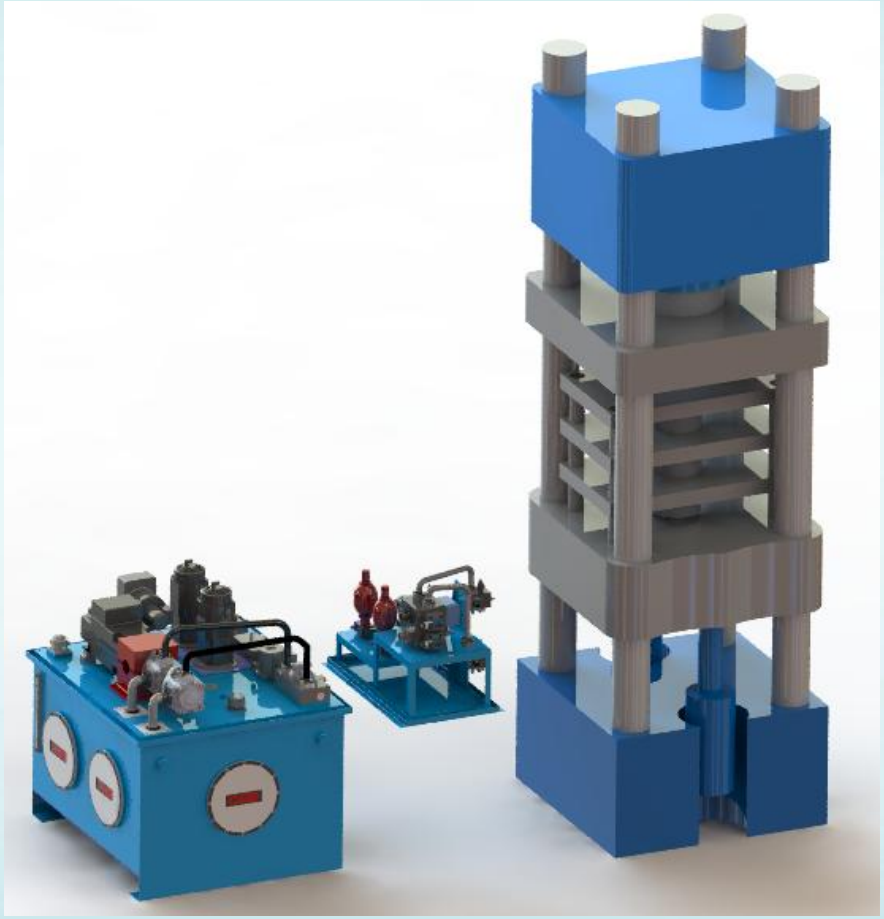
Electrical Hydraulic System

Closed-loop sensing

Electric cabinet

3. Application analysis

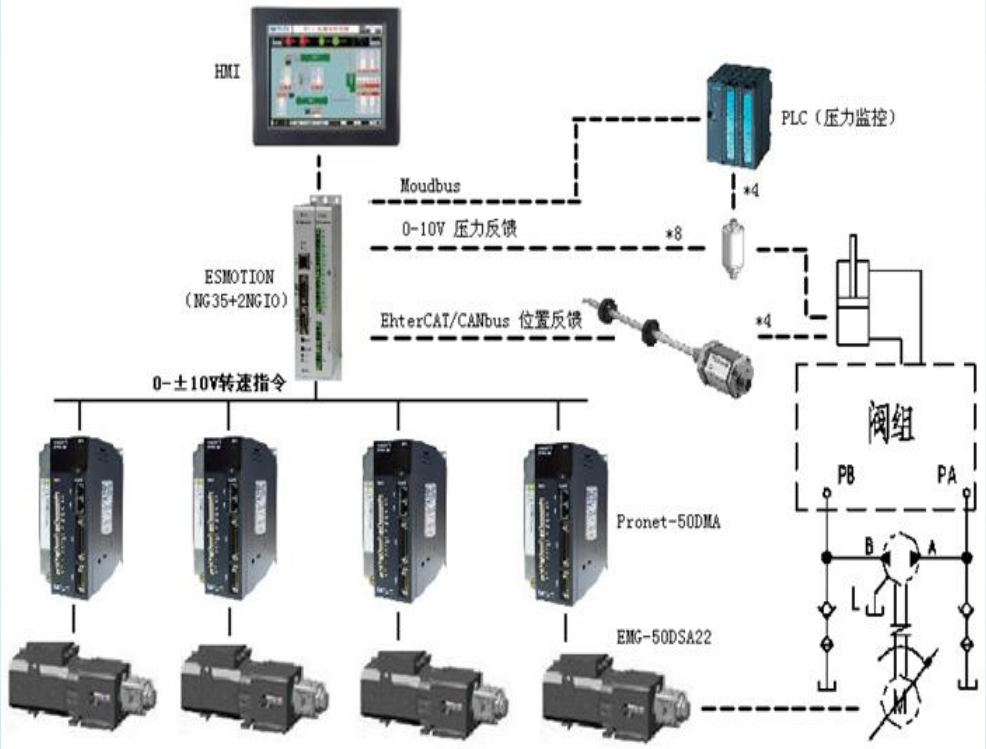


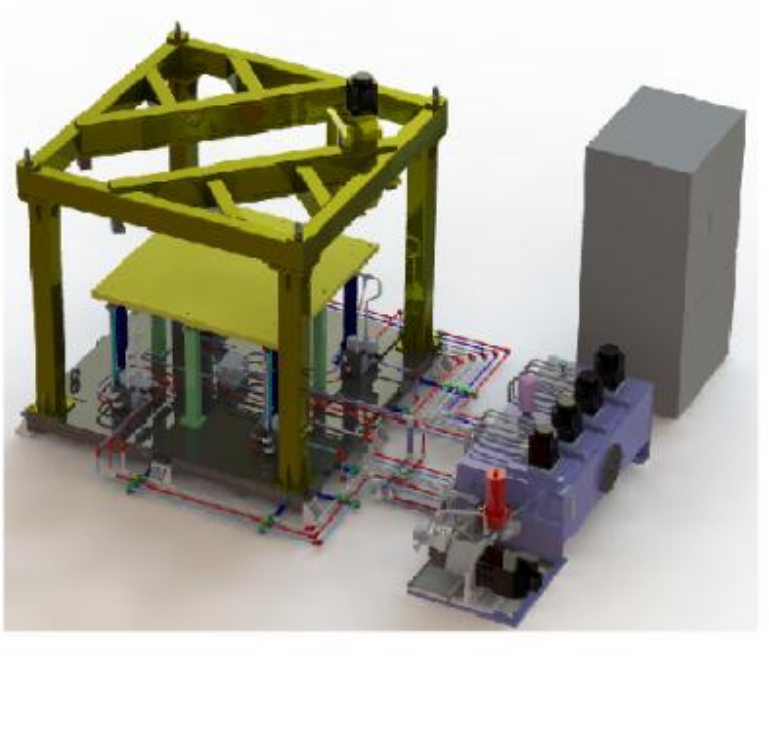


Power press

3. Application analysis

FRP press





四角调平原理及效果图

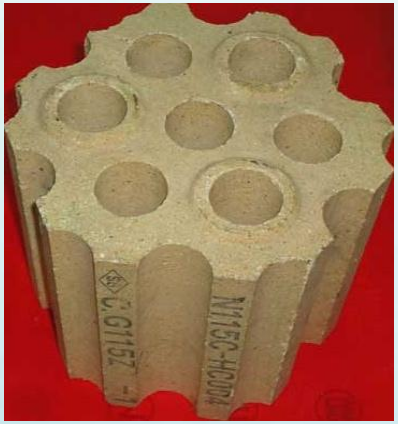
3. Application analysis

Refractory bricks

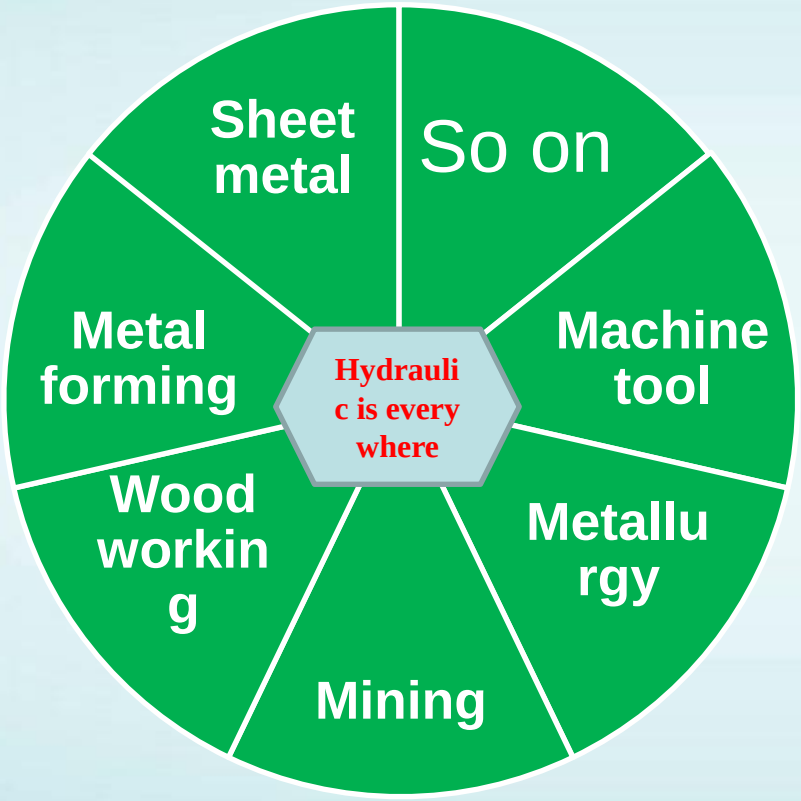
40% energy saving

60% noise reduction

30% efficiency increase



3. Application analysis



Electrical hydraulic system can be used in, bottle blowing machine, extruding machine , blow molding machine, vulcanizing machine, precision punching machine, laminating machine, pressing machine, sole molding machine, electro hydraulic cylinder and many other machines.

4. Application cases & reference

- LANSON injection molding machine-High speed type

4. Application cases & reference

- Injection molding machine-precision type

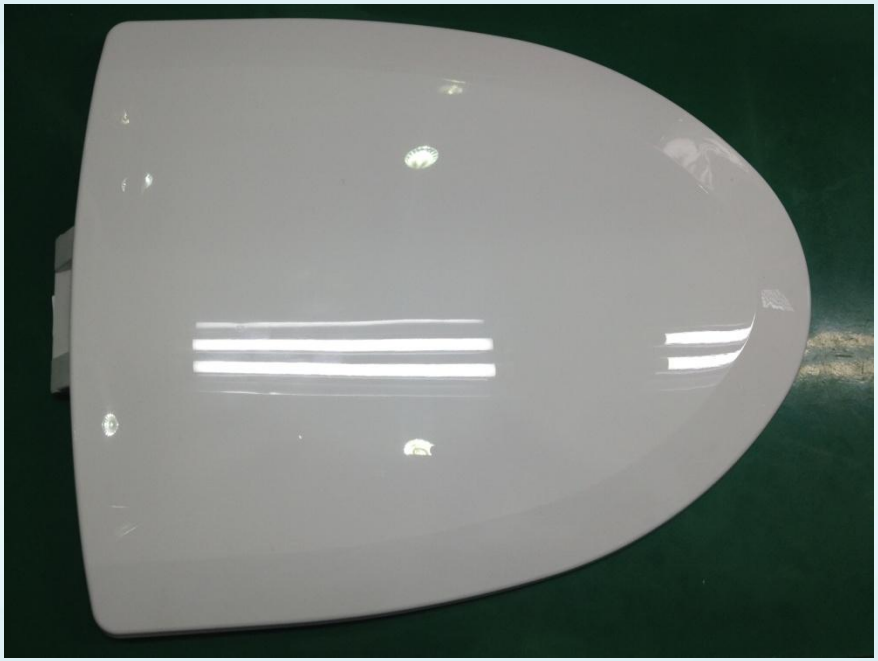
4. Application cases & reference

LS IDE 350EN II Injection molding machine

Place： Suwon
Energy saving： 59%
Efficiency increase： 30%
Cost recovery period： 10 months

4. Application cases & reference

700T



Energy saving：62%
Efficiency increase：28%
Cost recovery period：13 months

4. Application cases & reference

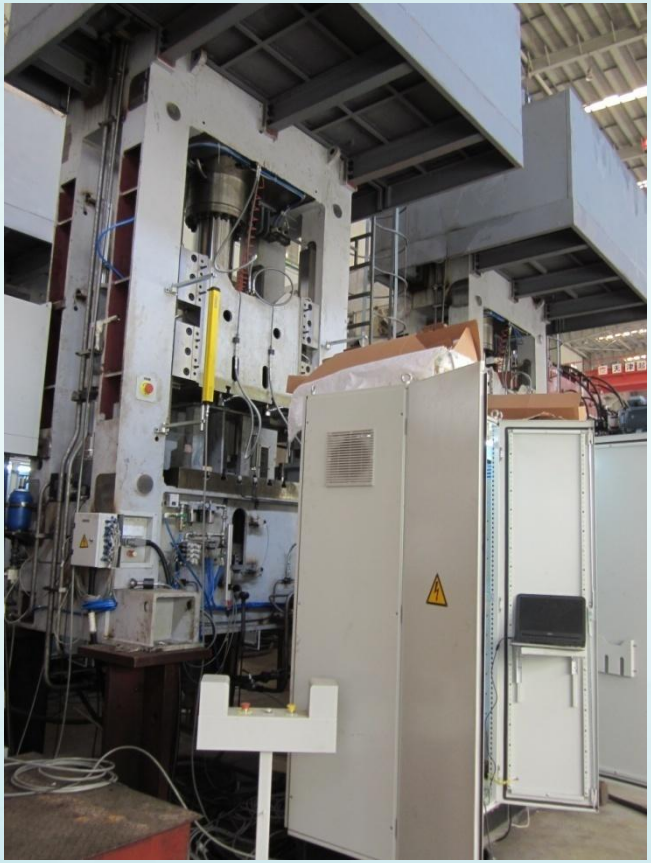
500T Die casting machine

4. Application cases & reference

Kitchenware factory die casting machine retrofitting

Energy saving：67%
Efficiency increase：21%
Cost recovery period：14 months

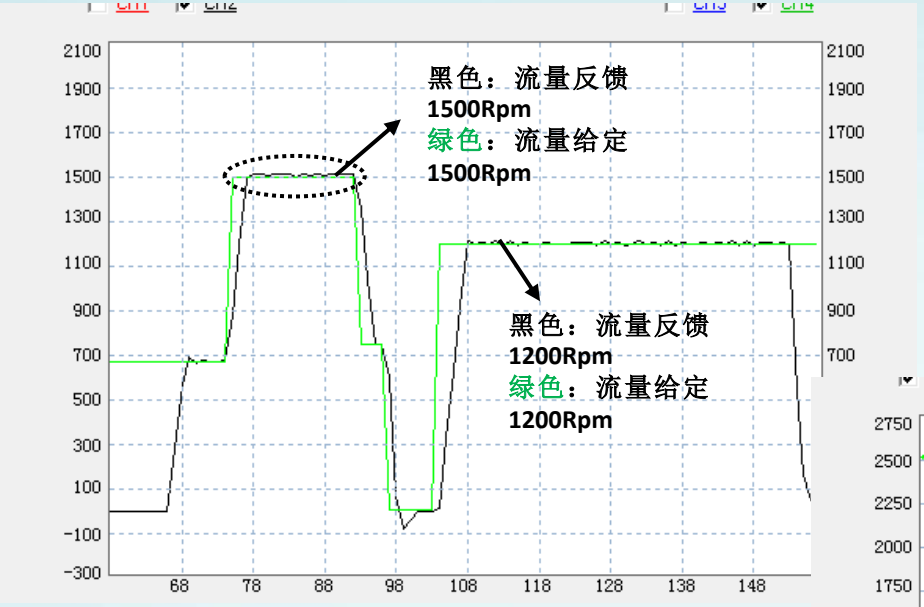
4. Application cases & reference



TIANDUAN 200T Sheet drawing press

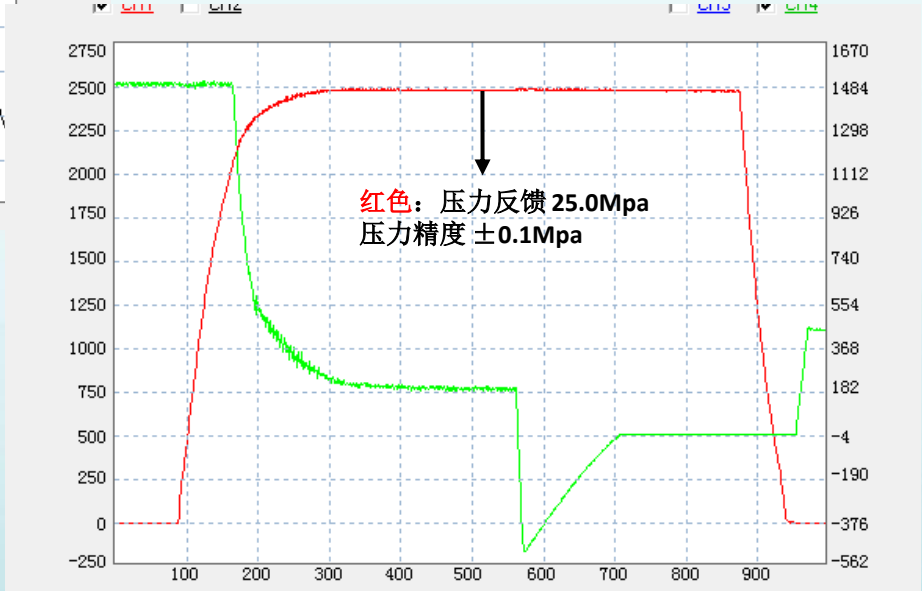
YANGLI 315T Hydraulic press

4. Application cases & reference



Flow characteristic curve

Pressure characteristic curve



4. Application cases & reference

HAIDE high precision hydraulic pressure machine

PENGDA DSVP high precision hydraulic pressure machine

4. Application cases & reference

XINHONG Machinery-- 2000T Hydraulic Press Machine

4. Application cases & reference

6 sets 35kw servo, 100+63cc Dual pump system. 49% energy saving

4. Application cases & reference

WUZHENG Group YT27-1000H hydraulic press machine Energy saving project

4. Application cases & reference

WUZHENG Group YT27-1000H hydraulic press machine Energy saving project

4. Application cases & reference

Short term energy saving comparing test

	YT27-1000H	YT27-1000H Hybrid type
Test date	2015.05.15	
Product	1800 Cover	
Material	0.8mm sheet	
Quantity (pieces)	100	
Total test time（min）	40	40
Starting meter read (kW.h)	3.2（X120）	3.35（X120）
final meter read (kW.h)	3.7（X120）	3.65（X120）
Power consumption (kW.h)	60	36
Energy saving %	（60-36）/60 =40（%）	
Starting oil temp（℃）	29	33.4
Final oil temp（℃）	35.4	36.5
Temp rising （℃）	6.4	4.1
power consumption (kW.h/h)	90 kW.h/h	54 kW.h/h
production cycle (s)	24s	24s
Motor noise（dB）	85	78

Long term energy saving comparing test

Punching workshop data comparison

Date	East 1000t				West 1000t			
	Work times	Meter reading	Power consumption（kw.h）	Power/time（kw.h）	Work times	Meter reading	Power consumption（kw.h）	Power/time（kw.h）
3/6		36. 8				25. 3		
4/6	918	39. 4	312	0. 33987	1036	27	204	0. 19691
5/6		39. 7	36		1057	29. 4	288	0. 27247
6/6	1361	42. 9	384	0. 28215	1189	31. 7	276	0. 23213
7/6	1540	46. 2	396	0. 25714	1370	34. 4	324	0. 23650
8/6		49	336			35	72	
9/6		54. 5	660					
10/6	1042	58	420	0. 40307	1065	38. 3	396	0. 37183
11/6	906	63. 6	672	0. 74172	708	41. 1	336	0. 47458
Total	5767		3216		6425		1896	

4. Application cases & reference

Powder press

Thank You!