



INVT Servo System

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Servo Products constitute

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DB100 Series (Best Buy)

Marketing : Low power, Low end market

Competing products : Delta AB/B2 Series 、 TECO TSTA Series 、 Inovance IS500 Series 、 Eston EDB / EDC Series

1. Power Range : 0.2kW-5.5kW
2. Three times overload capacity
3. Resonance Suppression to eliminate the mechanical resonance in the equipment
4. Auto gain Tuning and Inertial Identification to simplify the setup process
5. 3 ph, 380V direct power input to eliminate an input transformer for 1~5.5KW servo drives , single/3-phase 220V supply for 200w~1KW servo drivers.
6. Internal Dynamic braking resistor for all servo drives in the series



DA100 Series (High Performance)

invtr

Marketing : low power, mid&High-end market

Competing products : Delta A2 Series, Yaskawa Σ -V Series etc.

**FAST RESPONSE, HIGH PRECISION,
ETHER-CAT**



1. Power Range : 200W-5.5kW
2. Speed Bandwidth: 1.8kHz
3. Motor with 17 or 20 bits absolute encoder
4. Point-to-point position control programming
5. Due position control loops
6. Networking: CAN-open, Profibus-dp, Ether-Cat
7. On-line or Off-line inertial identification, Auto gain tuning to overcome the resonance in the equipment
8. Multi-axes synchronization with micro seconds level

New Launched

MH600 Series(High Performance)

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Marketing : mid power, mid&High-end market

The main application industries:

Spindle, all-electric injection molding machines, robots, etc.



MH600 servo

1. Power range : 3.7kW~45kW
2. Pulse and analog control commands
3. 250 us speed loop , 500 us position loop
4. Electronic cam and gear
5. Auto gain tuning
6. Network: CAN-open , Ether-Cat
7. Incremental encoder, serial link encoder and resolver

EtherCAT[®]



Launched in Jan. 2014

MH500 E-Hydraulic Servos (Dedicated)

1. Power Range : 5.5kW~55kW
2. Analog control inputs for flow and pressure commands
3. 250 us speed loop, 500 us position loop
4. Multi gain settings for special app
5. CAN-open networking
6. Motor with resolver for severe environment application



Application of Hydraulic Servo

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MH500

Injection molding machine



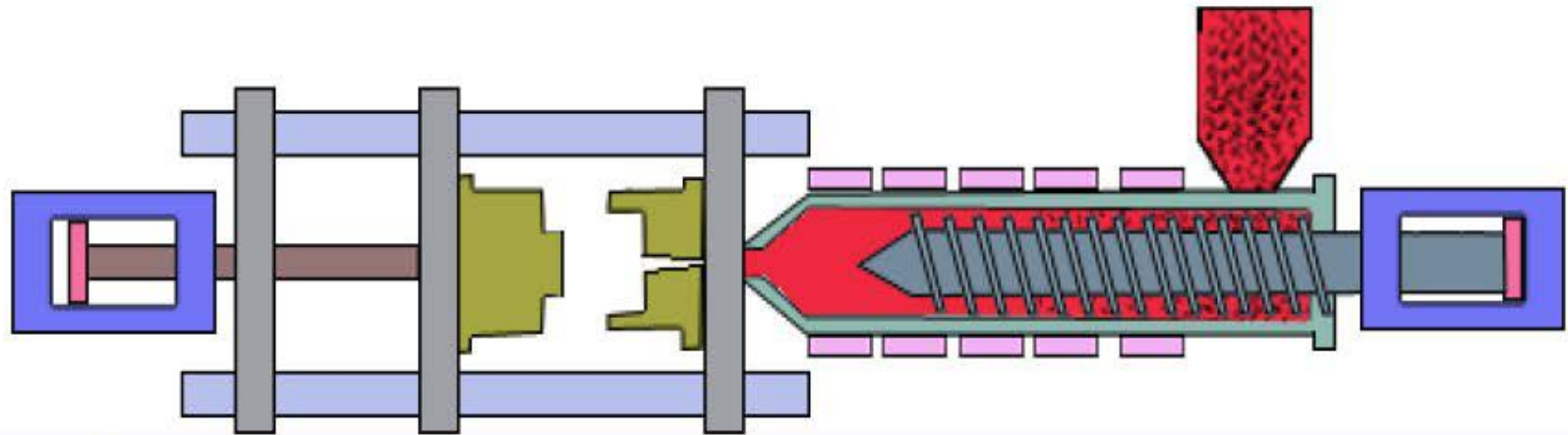
Die Casting Machine



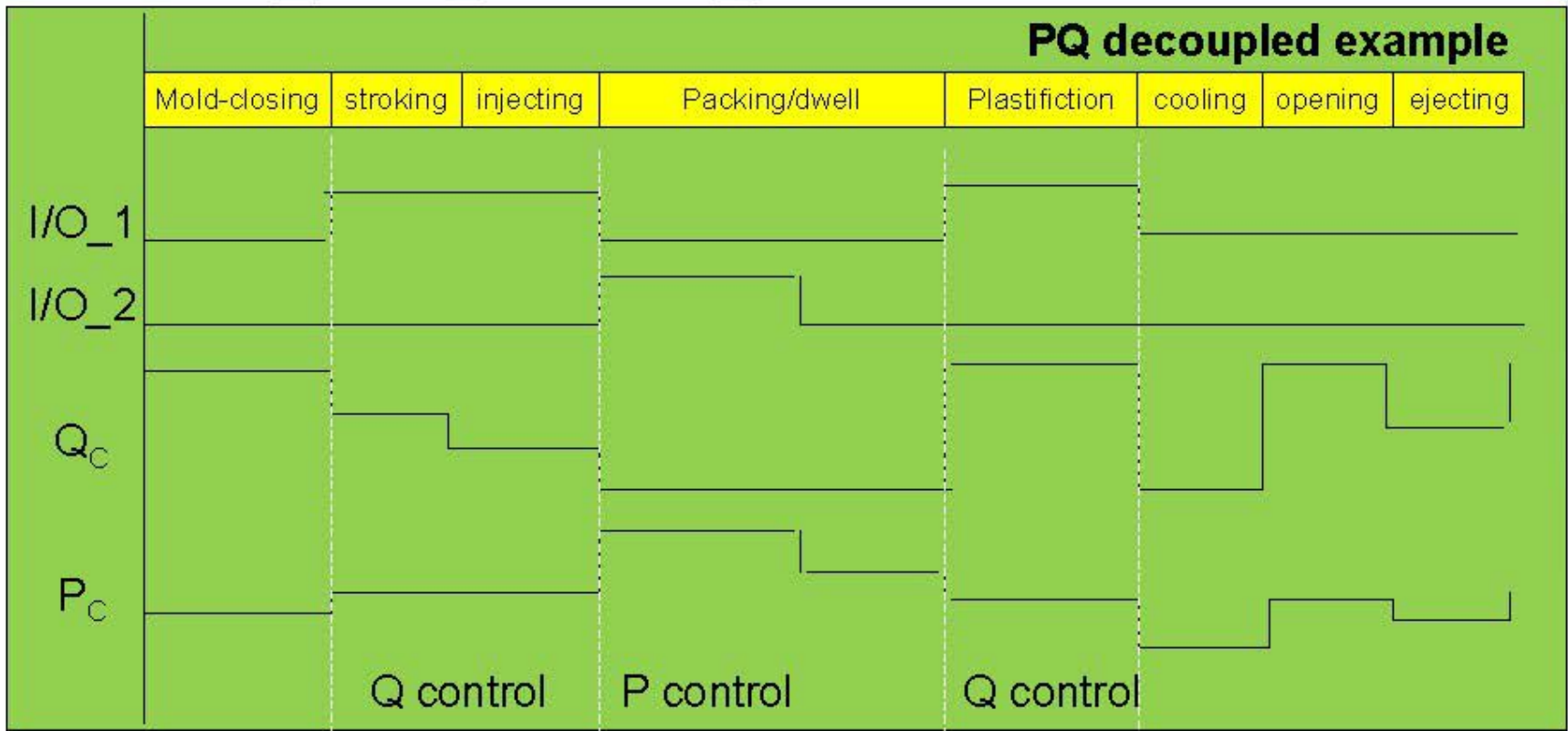
EVA shoes machine



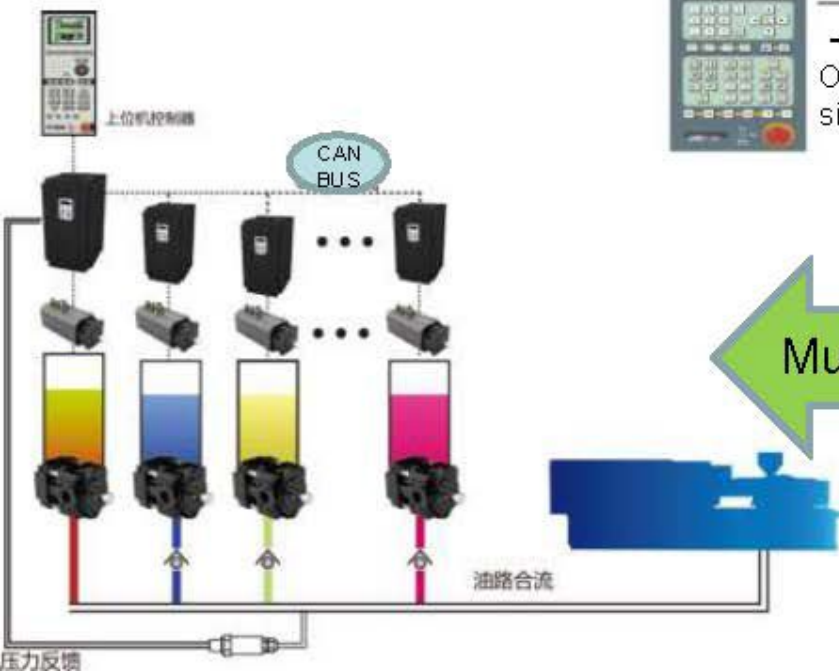
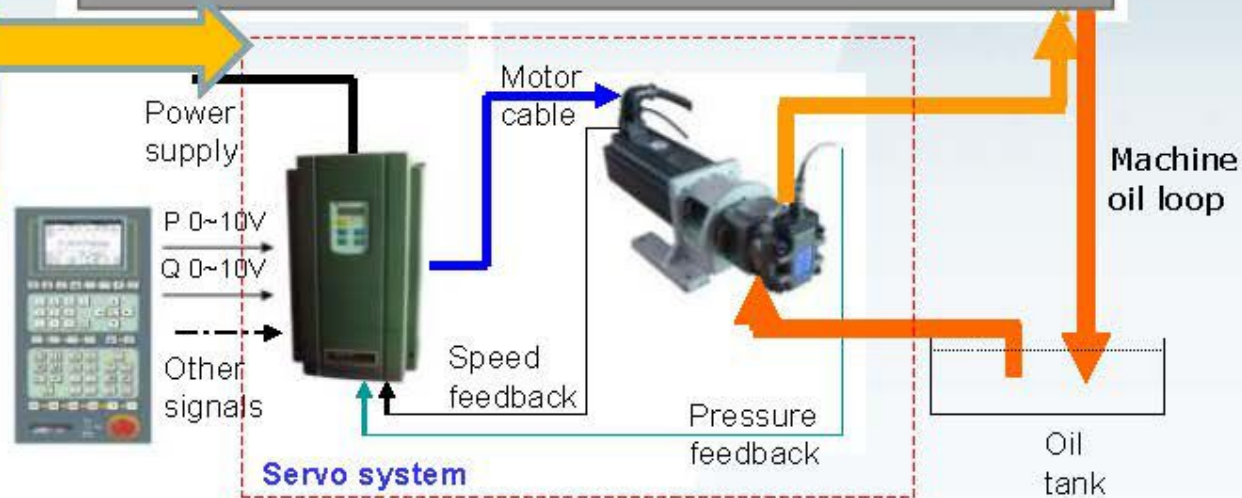
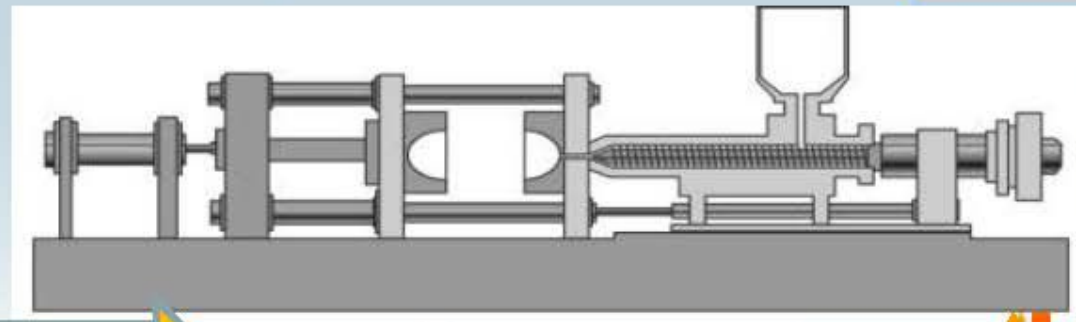
Molding machine basic processing



PQ decoupled example

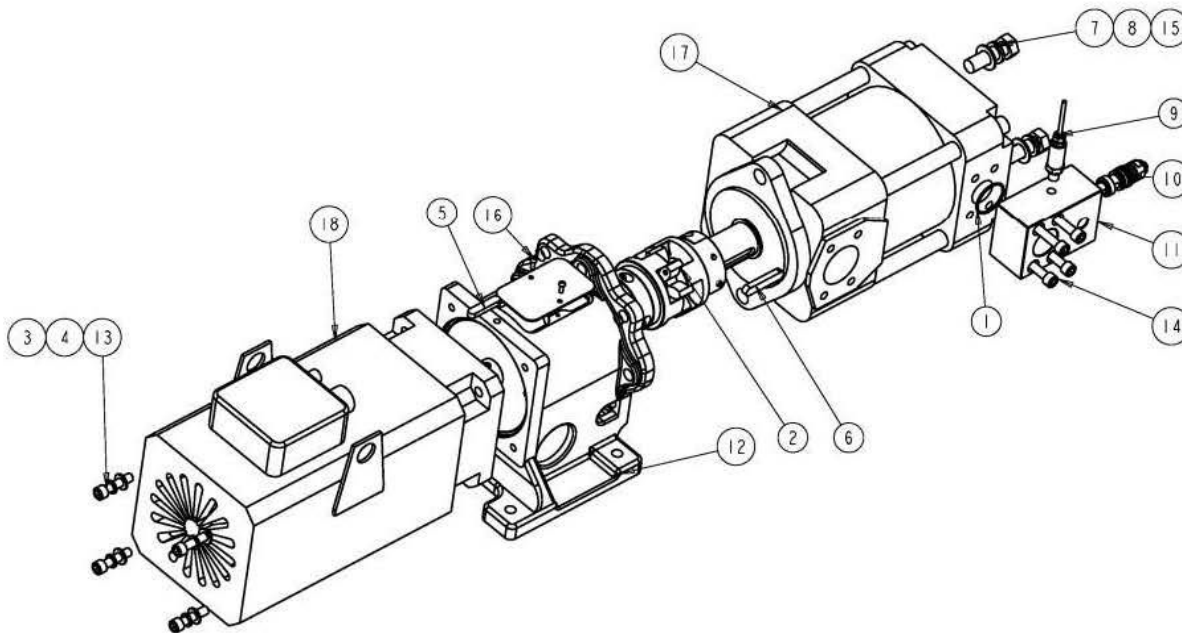
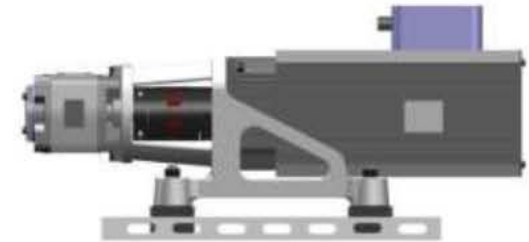
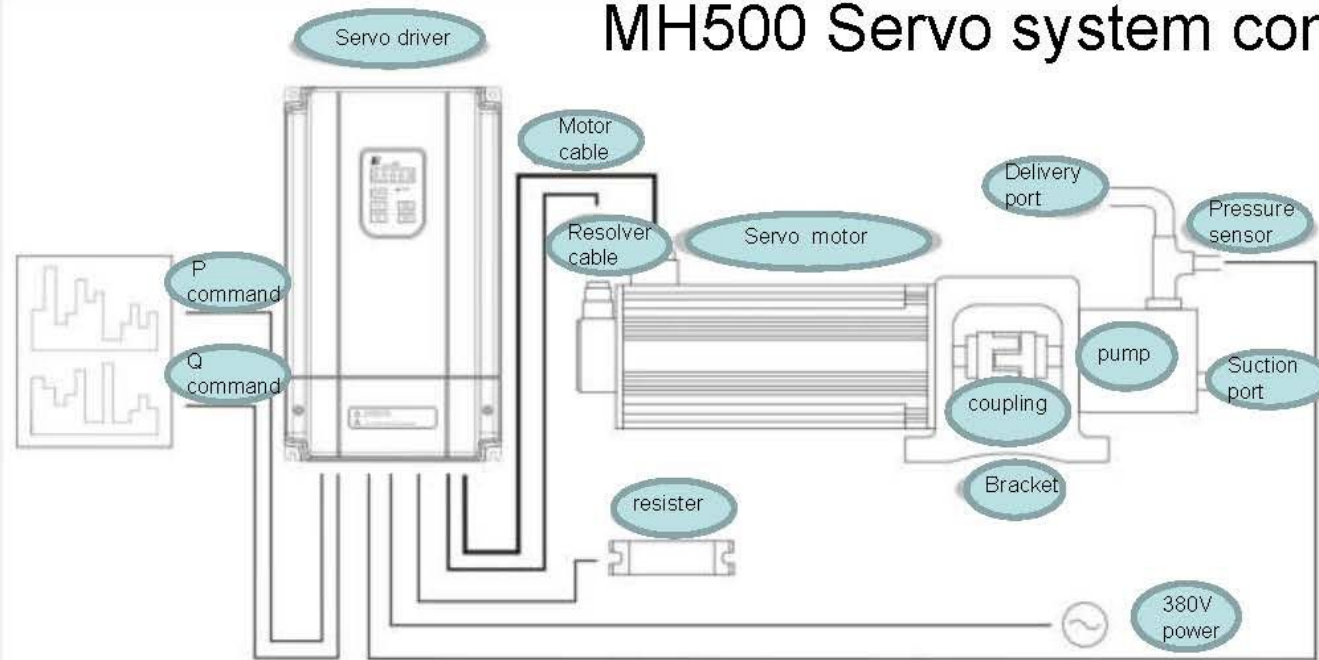


MH500 servo hydraulic system constitute



- CAN bus to communicate with drivers.
- Efficient flow Assignments for Master & slave driver.
- Be able to drive 16 sets of pumps together . Max flow could up to 4000L/min .

MH500 Servo system constituted



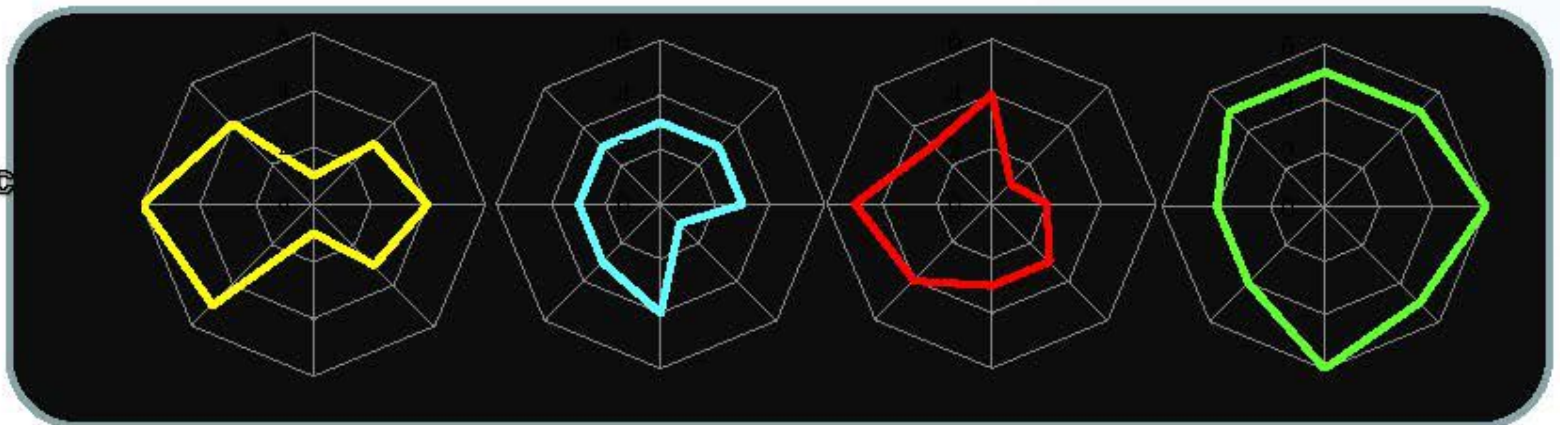
1 Rubber O-ring; 2 Coupler component; 3 Spring washer; 4 Flat washer; 5 Flat key of the motor; 6 Flat key of the oil pump; 7 Elastic ring; 8 Flat washer; 9 Pressure sensor; 10 Demountable thread relief valve (optional); 11 Oil plate of the manifold block; 12 Motor support; 13 Hexagon socket cap screw; 14 Hexagon socket cap screw; 15 Hexagon bolt; 16 Round head screw; 17 Oil pump; 18 Servo motor

Comparison of hydraulic system

(1,2,3,4,5,6) bigger Number means better

Details Comparison	Quantitative pump	Variable pump	Inverter	Hydraulic-Servo
Energy conservation	1	3	4	5
Low-speed stability	3	3	1	5
Quick Response	4	3	2	6
Less Noise	3	2	3	5
Low Oil temperature	1	4	3	6
Less Maintenance costs	5	2	4	4
Low Price	6	3	5	4
Packing stability	4	3	3	5

Diagrammatic
form



MH500 servo hydraulic system competitive advantages

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1

Quick response action=== Shorten the molding cycle

2

High repeatability=== Improve yields, raw material savings, Good quality products rate

3

Energy conservation=== Lower production costs, the energy saving rate up to 50%

4

Water conservation=== Lower costs, less pollution

5

Reduce electricity consumption===Control ladder electricity price

6

Low noise=== Enhance operating environment

7

Oil temperature steady===Extend machine life

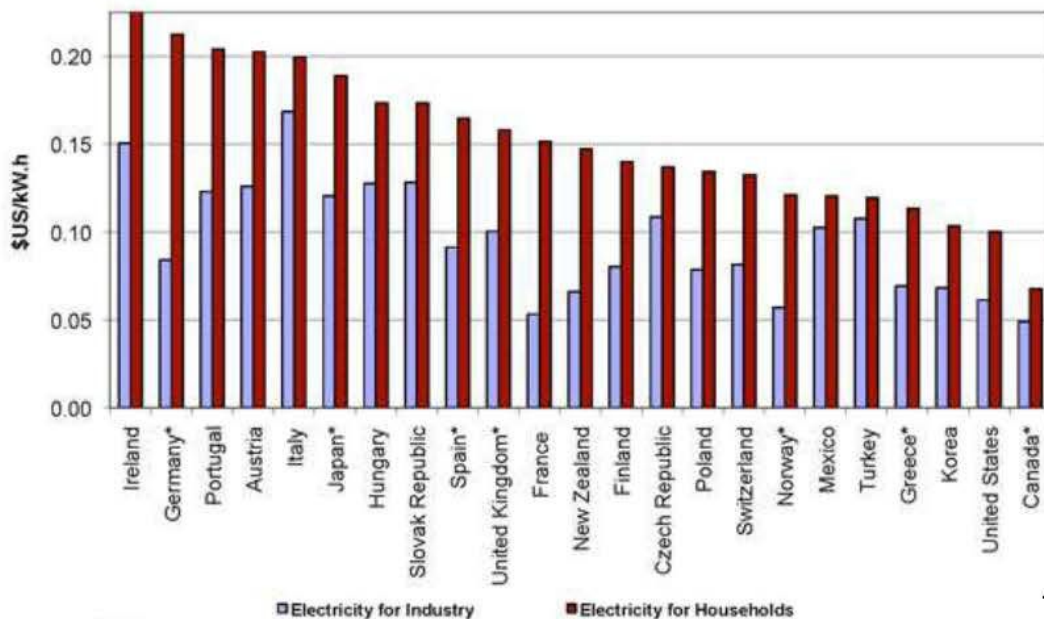
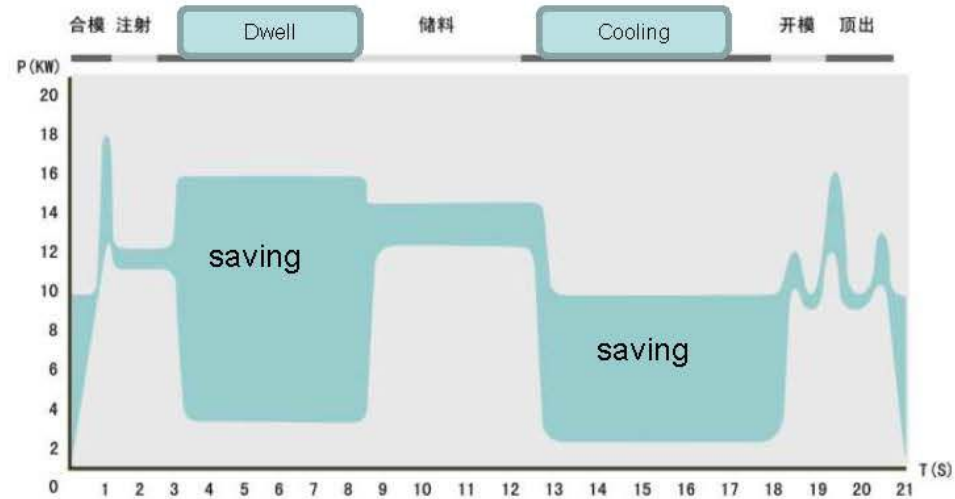
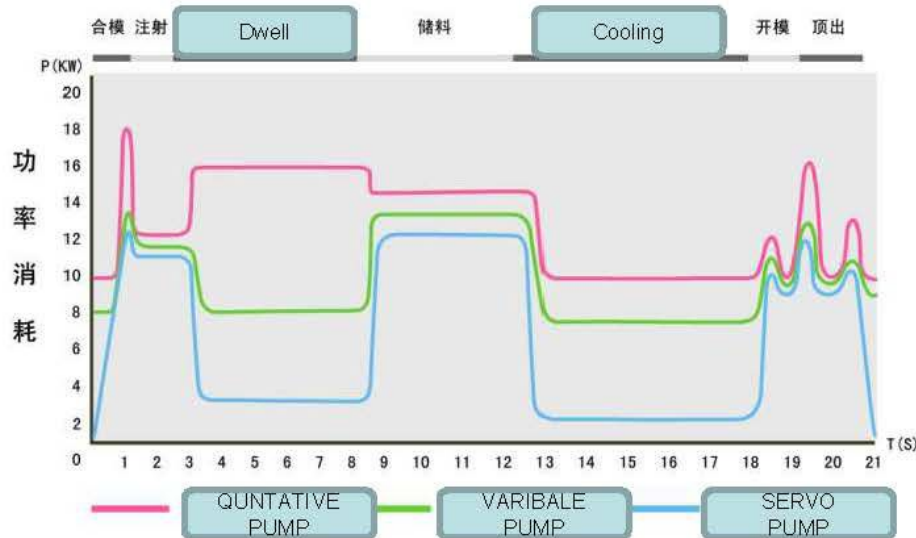
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National energy subsidies=== Receive government financial support

competitive advantages



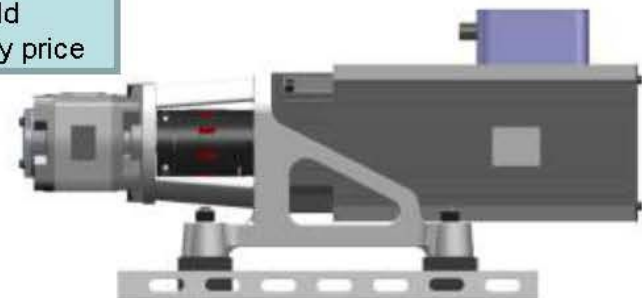
Energy conservation principle and significance



Notes:
* Latest available data

The world electricity price

Servo Hydraulic system ,
energy -saving rate
determined by Dwell&Cooling
time in the cycle. saving rate
from 20% to 80%



The higher electricity price country, the greater
energy saving efficiency of KW·H

Energy-saving effect of servo -hydraulic system

Servo Hydraulic system application in Plastic Machinery industry , The contrast according to injection molding machine tonnage ,

Machine size	Conventional Induction Motor power rate	Conventional system Energy consumption	Energy consumption after servo retrofit	Annual power saving	Annual money saving RMB	Exchange to USD
T	kw	kw. h	kw. h	kw. h/year	RMB/year	\$/year
58T	7.5	3.375	2.025	17739	¥14,191	\$2,365
90T	11	4.95	2.97	26017	¥20,814	\$3,469
120T	13	5.85	3.51	30748	¥24,598	\$4,100
160T	15	6.75	4.05	35478	¥28,382	\$4,730
200T	18.5	8.325	4.995	43756	¥35,005	\$5,834
250T	22	9.9	5.94	52034	¥41,628	\$6,938
300T	30	13.5	8.1	70956	¥56,765	\$9,461
360T	37	16.65	9.99	87512	¥70,010	\$11,668
450T	45	20.25	12.15	106434	¥85,147	\$14,191
530T	55	24.75	14.85	130086	¥104,069	\$17,345
650T	60	27	16.2	141912	¥113,530	\$18,922
800T	74	33.3	19.98	175025	¥140,020	\$23,337
900T	82	36.9	22.14	193946	¥155,157	\$25,860
1000T	90	40.5	24.3	212868	¥170,294	\$28,382
1250T	110	49.5	29.7	260172	¥208,138	\$34,690
1500T	120	54	32.4	283824	¥227,059	\$37,843

Calculation:

1. 24 hours a day attendance, 365 days one year.
2. Electricity bill 0.8 yuan / kw.h.
3. Energy saving around 60%

competition between quantitative pump system & Hydraulic servo

INVT MH500 SERIES VS DELTA VFD-VJ SERIES



Comparison	INVT MH500	DELTA VFD-VJ
overload capacity	3 times	2.2 times
overload alarming time	2 times (30s),3 times(3s)	1.66 times(30s);2.2 times(1s)
Servo hydraulic system launched	since 2007	since 2009
Maximum multi-pump capacity	16 sets	6 sets
Maximum Flow	4000L/min	1200L/min
Multi-pump mode selection	3 choices for multi-pump control	only 2 choices for multi-pump control
China market sales	¥80,000,000/year	¥15,000,000/year
Plastic Machinery Factory Partner		 Now stop purchase from Delta,start to use INVT servo hydraulic system since 2012 .
Quick commissioning steps	10 steps to finish Parameter setting	more than 20 steps
Driver Peak current	2.5 times of rated current	1.5 times of rated current
Motor series matching	All motor series made by INVT	Some motor purchased from other company
Brake unit	intemal	external
Driver dimention	more compact,small size	bloated,lager size
Pressure Response curve	0bar to 140bar only need 0.1 second	

Servo modification site

Previous --- Quantitative pump system



Former set: 13KW Induction motor;
Vickers 35V25A pump ; Yuken P,Q valve



Afterward--- Servo Hydraulic system



Servo set: INVT 11KW servo motor;
INVT 15KW servo driver ; P,Q valve shell;
Sumitomo 31.5cc/rev gear pump



Case 1

HC 450T Injection molding machine



Previous



After retrofit



Company name :

TTI group

Saving rate :

67%

Direct benefits :

\$14485/year

Case 2

HTF800X1注塑机

Broadway Industrial Holdings Limited

Project: Shenzhen Parkway (Hong Kong) servo energy saving injection molding machine

Products Name: 42-inch LCD TV shell

Mold number: the 6th, a model of a cavity

Energy saving : **56.3%**

Total direct economic benefits
for the year : **\$164433**



MH500 electro-hydraulic servo system configuration table

item	system Max flow (L/min)	system Max pressure(bar)	Pump model	servo motor model/rated power	servo driver model	Parts List
K1	55	175	HG1-25-01	K036F20C18P/7.5KW	KT-CT-7501-A-0	breaking resistor, bracket, coupling, pump delivery port, pump suction port, pressure sensor, power cable, resolver cable, fan cable, input reactance, input filter
K2	70	175	HG1-32-01	K060F18C18P/11KW	KT-CT-1502-A-0	
K3A	88	160	HG1-40-01	K072F18C18P/13KW	KT-CT-1502-A-0	
K3	88	175	HG1-40-01	K072F18C18P/13KW	KT-CT-1802-A-1	
K4	110	175	HG1-50-01	K078F20C18P/15KW	KT-CT-1802-A-1	
K5	140	175	HG1-64-01	K132F18C18P/25KW	KT-CT-1802-A-1	
K6	165	175	HG1-80-01	K132F18C18P/25KW	KT-CT-2502-A-1	
K7A	210	160	HG1-100-01	K187F18C25P/35KW	KT-CT-3502-A-0	
K7	210	175	HG1-100-01	K239F18C25P/45KW	KT-CT-3502-A-0	
K8	260	175	HG1-125-01	K235F20C25P/50KW	KT-CT-4502-A-1	



MH500EA-PAaOA
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