

PLC Synchronous Lifting System Brief Introduction

Why choosing PLC synchronous lifting system?

To achieve the synchronous lifting requirement for large buildings, the semi-automatic hydraulic lifting systems were widely used in the past. But with increasing of the weight and volume of the large building, more complex structure, nonuniform loads, these require the more higher synchronous precision and more control points. That means the hydraulic lifting systems must can reach the multi-point synchronous lifting with the high precision, but how to achieve that has become a difficult problem. The feature of PLC synchronous hydraulic lifting system lies in it can achieve multi-point synchronous lifting with the high precision.

System Features

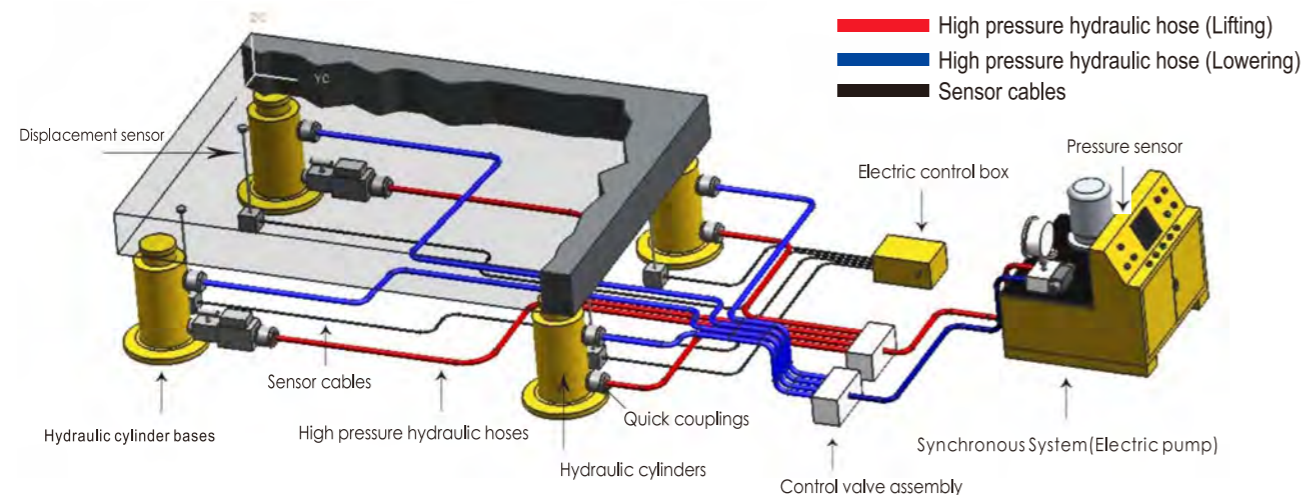
- ◆ Variable frequency, pulse width speed adjusting closed loop control, high speed reaching, low speed lifting. The lifting speed can be controlled.
- ◆ Advanced Oil feeding with speed regulation, heavy load preferential declining hydraulic circuit.
- ◆ Not only keeping the precisely synchronous when lifting, the same as declining with load.
- ◆ Multi-point synchronous, and in this condition, except keeping the position synchronous, the load in every point can be adjusted.
- ◆ The points can be: 4,8,12,16,24,40,80 to infinite.
- ◆ Operation mode: button and touch screen combination or button and Industrial computer combination.
- ◆ The main console using industrial computer, concise interface easy operation. Strong stability makes it can be used to kinds of Industrial environment.
- ◆ Lifting data can be imported into the equipment database one time, for checking, printing, Download.
- ◆ The system with function of " automatically being Zero position" through one button. No matter how complex of the foundation, all jacks can reach to the foundation at same time.
- ◆ Telecommunication bus form networks, one telecommunication bus connect with Central synchronization Console and PLC substation of many pumps using fast-inserting way, to achieve the purpose of passing information.
- ◆ This systems can work with the most of KIET standard hydraulic jacks together, the sing acting jacks and double acting jacks both can be chose.
- ◆ Good quality, flexible configuration, high cost performance.

System Description

PLC multi-point synchronous hydraulic lifting system is consisted by 5 parts: hydraulic pump, PLC computer control system, hydraulic terminal, displacement and pressure detection and human-machine interface operation system. This system integrates the hydraulic lifting system, PLC signal processing, displacement detection, analysis of bridge structures, and construction technology as a whole advanced system. The core is that based on the analysis of bridge structures and conclusion of construction technology, according bridge features to design the PLC signal processing and hydraulic system. Inputting the displacement signals and outputting oil control information of hydraulic system. Using terminal cylinder groups to achieve the purpose of lifting bridge with safety and high efficiency. The precision error no more than $\pm 0.5\text{mm}$.

System Application

- ◆ Replacement of rubber support of the bridge in highway.
- ◆ Overpass elevation in highway.
- ◆ Bridge maintenance
- ◆ Ancient buildings lifting and horizontal movement.
- ◆ Tunnel support, structure testing.
- ◆ Large equipment horizontal movement.
- ◆ Lifting and weighting of oil platforms
- ◆ Lifting and lowering of heavy equipment
- ◆ Lifting ship, propeller assembling or host installation



PLC Single Acting Pulse-Width Control Synchronous Lifting System

Product Descriptions

This system is hydraulic driven and automatically controlled by pressure and displacement closed-loop, the system is widely applied in rubber support replacement of expressway, lifting of flyovers and river bridges, rectification of heavy equipment.

The components and principle of the system

This system was composed by high pressure hydraulic pump, hydraulic control Valve Group, hydraulic cylinders, displacement detection devices, pressure detection devices, one set electrical control system.

The flow of the pump in this system is controlled by changing the the switch frequency of the on-off valve, that means the output flow of pump was adjustable. And equipped with the suitable electric control devices to form the pressure and displacement closed-loop. Then, every cylinder can be precisely controlled to achieve synchronous lifting and keep balanced load when in weighting process.

Specification

- ◆ Displacement Precision $\leq \pm 0.2\text{mm}$.
- ◆ Working Voltage: AC380V/50Hz (Three-phase-Five-wire system).
- ◆ Max Pressure: 700bar.
- ◆ Control Pattern: PWM(Pulse Width Modulation).
- ◆ Operation Interface: Human-Computer.
- ◆ Alarm device: Alarm running light.



Equipped with supper low height cylinders, Been applied in rubber support replacement of expressway.

Parameter Selection Table

Model	Points	Synchronous Precision (mm)	Motor Power (KW)	Voltage (AC/V)	Working Pressure (MPa)	Flow (L)	Oil Tank Capacity (L)	Weight (kg)	Dimensions (mm)
KET-SMTB-4	4-point synchronization	$\leq \pm 0.5$	2.2	380	70	2	130	220	760 × 870 × 1210
KET-SMTB-8	8-point synchronization	$\leq \pm 0.5$	2.2	380	70	2	130	240	760 × 870 × 1210
KET-SMTB-12	12-point synchronization	$\leq \pm 0.5$	2.2	380	70	2	130	260	760 × 870 × 1210
KET-SMTB-16	16-point synchronization	$\leq \pm 0.5$	5.5	380	70	5	200	380	1100 × 960 × 1130
KET-SMTB-24	24-point synchronization	$\leq \pm 0.5$	5.5	380	70	5	200	432	1100 × 960 × 1130

PLC Single Acting Pulse-Width Control Synchronous Lifting System

The components parts and the characteristic

No.	Main Products	Pictures	Functions and Features
1	Hydraulic pump station		Hydraulic power pack (The main equipment of this system, to release instruction and collect the information. Supplying the hydraulic oil for the whole system, Using PWM signals control high frequency solenoid valve to execute orders.)
2	Hydraulic cylinders		Hydraulic cylinder (Main executive components, lifting or declining according to the system instruction. The capacity of signal set is 50T-1000T.)
3	Stroke sensors		Displacement sensor (Measure the lifting or declining height of cylinders.)
4	Pressure sensors		Pressure sensor (Measure the pressure in real-time with high precision.)
5	Hydraulic hose		Hydraulic hose (Connecting the cylinders with pumps,Conveying hydraulic oil, high safety, fast-inserting.)
6	Communication bus		Telecommunication bus (One telecommunication bus connect with Central synchronization Console and PLC substation of many pumps using fast-inserting way.)
7	Sensor cable		Sensor cable (Connecting the sensors with PLC control box.)
8	PLC Master control system		PLC main control system (Connecting pumps and PLC control box.)

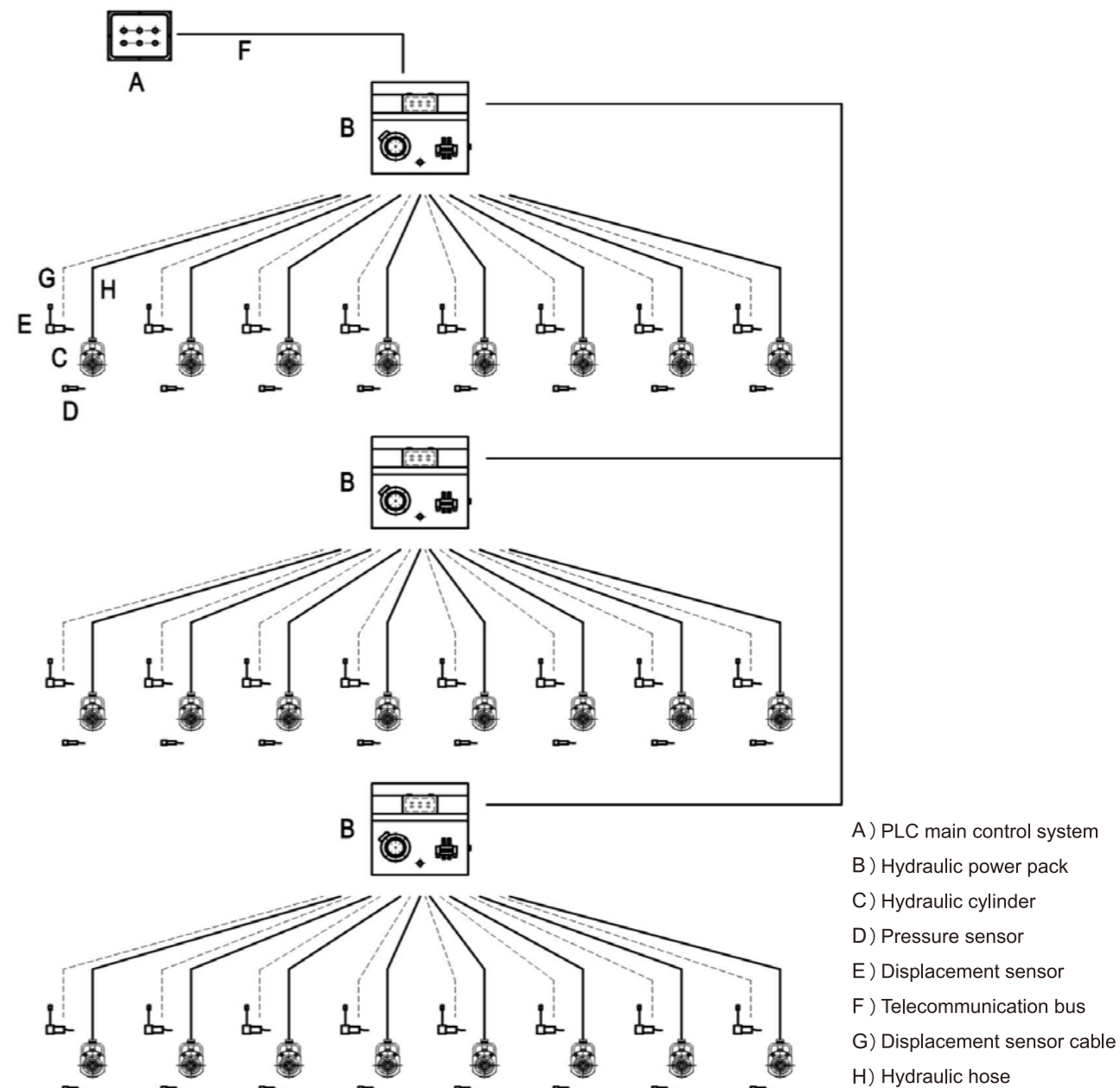
PLC Single Acting Pulse-Width Control Synchronous Lifting System

Structure Descriptions

The plunger pump is used in this system, with the two-way shut-off valve in this pump, that can make sure cylinders in oil feeding speed control situation both in lifting and declining process, and relieve the influence the hydraulic impact on the synchronization accuracy when the cylinders in lifting switch process. Same times, the balance valve can lock the cylinders without leakage, that can make sure the cylinders wouldn't decline and the load wouldn't lose control when unexpected power failure happened. There are pressure transmitter detection devices and displacement detection devices in this system. When the cylinders being moved, the pressure detection devices can accurately measure the load on cylinders in real-time, the displacement detection devices can measure the cylinders' displacement in real-time.

The features of electrical control system is the controller made up of Siemens PLC, the pressure sensor and displacement sensor of each cylinder pass the the signal to PLC for monitor. The valve groups are driven and the hydraulic oil were output to hydraulic cylinders to make them lifting according to the order from the main console. PLC keep correcting the displacement error and load balance by the value of pressure and displacement.

When one group system can not meet the requirement, multi-group connection can be chosen as follow:



PLC Double Acting Pulse-Width Control Synchronous Lifting System

PLC Double Acting Frequency Conversion Control Synchronous Lifting System



Product Descriptions

This system is hydraulic driven and automatically controlled by pressure and displacement closed-loop, the system is widely applied in rubber support replacement of expressway, lifting of flyovers and river bridges, rectification of heavy equipment.

The components and principle of the system

This system is composed by high pressure hydraulic pump, hydraulic control Valve Group, hydraulic cylinders, displacement detection devices, pressure detection devices, one set electrical control system.

The flow of the pump in this system is controlled by changing the the switch frequency of the on-off valve, that means the output flow of pump is adjustable. And equipped with the suitable electric control devices to form the pressure and displacement closed-loop. Then, every cylinder can be precisely controlled to achieve synchronous lifting and keep load balance when in weighting process.

Specification

- ◆ Displacement Precision $\leq \pm 0.5\text{mm}$.
- ◆ Working Voltage: AC380V/50Hz (Three-phase-Five-wire system).
- ◆ Max Pressure: 700bar.
- ◆ Control Pattern: PWM(Pulse Width Modulation).
- ◆ Operation Interface: Human-Computer.
- ◆ Alarm device: Alarm running light.



Structure Descriptions

The plunger pump is used in this system, with the balance valve in this pump, that can make sure cylinders in oil feeding speed control situation both in lifting and declining process, and relieve the influence the hydraulic impact on the synchronization accuracy when the cylinders in lifting switch process. Same times, the balance valve can lock the cylinders without leakage, that can make sure the cylinders wouldn't decline and the load wouldn't lose control when unexpected power failure happened.

There are pressure transmitter detection devices and displacement detection devices in this system. When the cylinders being moved, the pressure detection devices can accurately measure the load on cylinders in real-time, the displacement detection devices can measure the cylinders' displacement in real-time.

The features of electrical control system is the controller made up of Siemens PLC, the pressure sensor and displacement sensor of each cylinder pass the the signal to PLC for monitor. The valve groups are driven and the hydraulic oil were output to hydraulic cylinders to make them lifting according to the order from the main console. PLC keep correcting the displacement error and load balance by the value of pressure and displacement.

Parameter Selection Table

Model	Points	Synchronous Precision (mm)	Motor Power (KW)	Voltage (ACV)	Working Pressure (MPa)	Flow (L)	Oil Tank Capacity (L)	Weight (kg)	Dimensions (mm)
KET-DMTB-4	4-point synchronization	$\leq \pm 0.5$	2.2	380	70	2	130	220	760 × 870 × 1210
KET-DMTB-8	8-point synchronization	$\leq \pm 0.5$	2.2	380	70	2	130	240	760 × 870 × 1210
KET-DMTB-12	12-point synchronization	$\leq \pm 0.5$	2.2	380	70	2	130	260	760 × 870 × 1210
KET-DMTB-16	16-point synchronization	$\leq \pm 0.5$	5.5	380	70	5	200	380	1100 × 960 × 1130
KET-DMTB-24	24-point synchronization	$\leq \pm 0.5$	5.5	380	70	5	200	432	1100 × 960 × 1130



Product Descriptions

This system is hydraulic driven and automatically controlled by pressure and displacement closed-loop. It can achieve heavy load weighing, synchronous pushing, synchronous lifting and declining, equal ratio slop adjustment lifting, automatic stabilizing pressure etc. The frequency conversion speeders control motor of the oil pumps, by adjusting the frequency of power supply to change the motor speed, then, the flow of the pumps is adjustable. In addition, Equipped with electrical control and detection systems, then, every cylinder can be precisely controlled to achieve synchronous lifting.

Components of the systems (based on 4 points variable frequency systems)

This system is composed by 4 sets pumps, 4 sets frequency conversion speed regulating devices, 4 sets control valve groups, electrical control systems, and displacement sensors etc.

Specification

- ◆ Displacement Precision $\leq \pm 0.3\text{mm}$.
- ◆ Working Voltage: AC380V/50Hz (Three-phase-Five-wire system).
- ◆ Control voltage: DC24V.
- ◆ Pressure: 700bar.
- ◆ Control Pattern: frequency conversion speed regulating.
- ◆ Operation Interface: Human-Computer.
- ◆ Alarm device: Alarm running light.
- ◆ Pressure sensor: input DC24V, range: 0-70MPa, output 4-20mA.
- ◆ Displacement sensor: input DC24V, range: 0-1000mm, Push-pull output (A,B phrase).



Double Acting Frequency Conversion Selection Table

Model	Points	Synchronous Precision (mm)	Motor Power (KW)	Voltage (ACV)	Working Pressure (MPa)	Flow (L)	Oil Tank Capacity (L)	Weight (kg)	Dimensions (mm)
KET-DBTB-2A	2-point synchronization	$\leq \pm 0.2$	1.1	380	70	2 × 1	130	180	760 × 820 × 1150
KET-DBTB-2B	2-point synchronization	$\leq \pm 0.2$	2.2	380	70	2 × 2	130	240	760 × 820 × 1150
KET-DBTB-2C	2-point synchronization	$\leq \pm 0.2$	5.5	380	70	2 × 5	250	300	960 × 880 × 1170
KET-DBTB-4A	4-point synchronization	$\leq \pm 0.2$	1.1	380	70	4 × 1	200	350	1100 × 875 × 1160
KET-DBTB-4B	4-point synchronization	$\leq \pm 0.2$	2.2	380	70	4 × 2	250	430	1200 × 820 × 1120
KET-DBTB-4C	4-point synchronization	$\leq \pm 0.2$	5.5	380	70	4 × 5	500	550	1100 × 960 × 1130

PLC Double Acting Frequency Conversion Control Synchronous Lifting System

Main Principle

Due to the surface of the work pieces is not always smooth, to make sure the balance load on every cylinder, before synchronous lifting, the first step is that make the cylinder touch the surface of the work pieces evenly, and every touch point as the base. Hence, the systems have

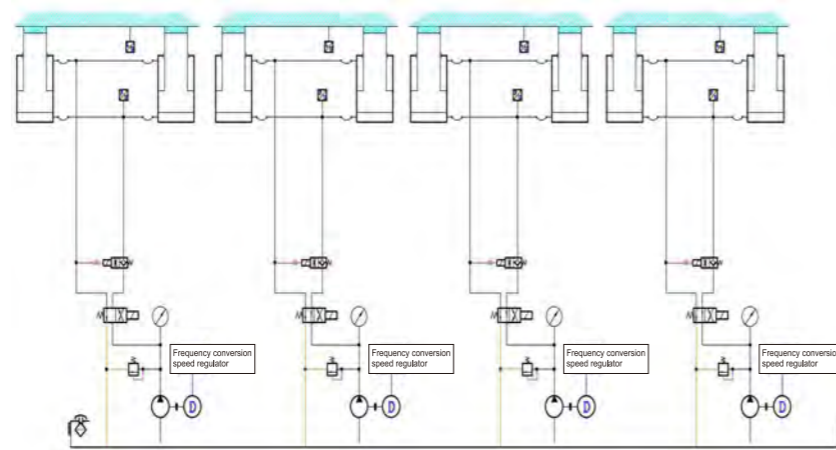
attached function which is started before synchronous lifting. All cylinders keeping lifting at same time, and stopped once the top of cylinders touched the work pieces. And then, the pressure of every cylinder is raised to 5MPa (the pressure for attaching can be set), then, every cylinder stopped again, here, the points every cylinder being is their zero points.

4 sets displacement detection devices in this system are put on suitable place in control points.

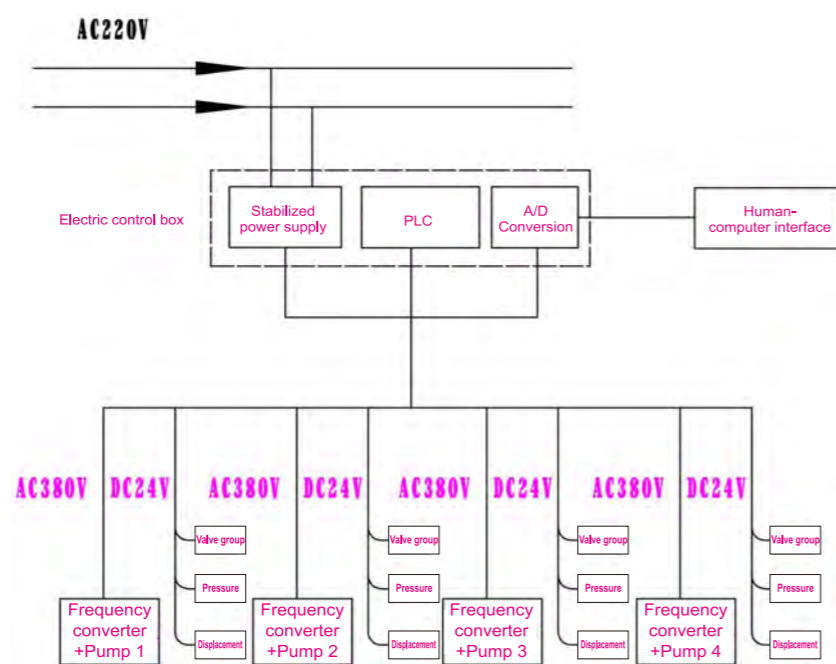
When cylinders are lifting, the displacement sensor can precisely measure the displacement of the cylinders in real-time. And there are the pressure sensors in oil inlet of the cylinder, that can measure the load on every cylinder. Also there is a balance valve, that can make sure cylinders in oil feeding speed regulation situation both in lifting and declining process. Same times, the balance valve is reliable in keeping pressure, that can make sure the cylinders wouldn't decline and the load wouldn't lose control when unexpected power failure happened. This systems suitable for high tonnage long stroke the cylinders, special with fast lifting speed.

Electronic control system is the key point to achieve synchronous lifting. it based on the closed-loop control system theory, make displacement signal of the heavy as controlled parameters, the pressure signal in the cylinder as the reference, through sensors to collect these signals and pass them to controllers. The controllers operate these signals and compare them with allowable difference. when finding they are more than allowable difference in some points, the controllers sent the signals to make the transducers in these points close the hydraulic pumps, then, the cylinders would stop lifting. Equally, when the signals feedback that the cylinders lagged in the stopped points, the controllers sent the signals to make the transducers in these points open the hydraulic pumps, then, the cylinders would start lifting again. That means the whole system achieve the synchronous through precisely control lifting in every points.

When the errors in some points can not be corrected, the controllers would issue the system-error alarm and signals, to make transducers in very points close the pumps, then, all the cylinders would stop lifting. Until the errors are corrected and getting the restart order from operator, the systems would recover work again.



Hydraulic Scheme of Four Points Synchronous System



Electrical Scheme of Four Points Synchronous System

PLC Synchronous Hydraulic Lifting System Field Application

Field Applications

- ▲ Synchronous lifting of high-speed rail pile foundation.
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- ▲ Replacement of highway bridge rubber bearings.
- ▲ Synchronous lifting and translation of historic buildings.
- ▲ Synchronous lifting and raising of inland river bridge.
- ▲ Synchronous lifting assembly of large steel construction.
- ▲ Synchronous lifting assembly of shield tunneling machine.
- ▲ Synchronous lifting and rectification of ancient tower.
- ▲ Synchronous falling beam in expressway.
- ▲ Synchronous falling beam in expressway.
- ▲ Synchronous lifting and valve repairing in hydropower station.
- ▲ Loading test of high-speed rail ballastless track.
- ▲ Loading test of high-speed rail ballastless track.
- ▲ Synchronous lifting and maintenance of 5000T crane barge.
- ▲ Ship maintenance and synchronous lifting.
- ▲ Synchronous lifting and maintenance of large engineering machinery.
- ▲ Synchronous lifting and maintenance of large mining machinery.
- ▲ Synchronous lifting and installation of coal mill in thermal power plant.
- ▲ Synchronous lifting and weighing of drilling platform.

PLC Multi-point Proportional Pressure Regulator Hydraulic Control System

With the development of modern metropolis, high-rise buildings and underground transportation and other large buildings also followed, density between buildings is also getting higher and higher, which causes difficulty in deep foundation pit construction. Internal supporting is always used in foundation pit construction. In the process of excavation and construction of foundation pit, difficult construction technology and much uncertain factors, steel support is prone to plastic deformation under the environmental conditions such as temperature changing. Taking pit follow-up construction and conservation into account, the axial capacity will be a significant attenuation with the passage of time, then resulting in deformation of the pit side wall. Damage to the adjacent buildings or support off and other major accidents will be caused when the deformation increase to some degree. In order to meet the higher standards of safe construction requirements, our company designed and developed the PLC proportional pressure hydraulic control system. According to the requirements, the support force is always kept within a reasonable range through automatically compensate and control the axial force, which can reduce the construction risk and enhance the safety of construction.

Our PLC proportional pressure hydraulic control system combines the modern mechanical, electrical and hydraulic integration of automatic control technology, computer information processing technology and visual monitoring system and other high-tech means to monitor the axial force 24 hours in full day, based on data measured by highly precised sensor, timely compensate support force to achieve the purpose of controlling the deformation of the foundation pit support system. The real-time monitoring and control of the steel support axial force is achieved by using the adaptive support system, which solves the harsh deformation requirements and technical problems which can not be controlled by the conventional construction method, so that the project is always in a state of controllable and known, has good social benefits, economic benefits and environmental protection benefits. Therefore, the system is bound to become a common method in foundation pit construction and can be widely used.

Product Descriptions

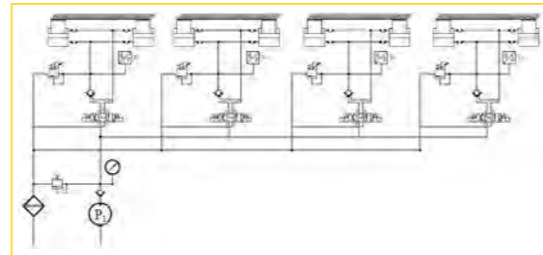
PLC proportional pressure regulator hydraulic control system is mainly used in situation where both loading force and unloading force require to be linearly tunable. The system uses high pressure proportional overflow valve for pressure control, control accuracy up to $\pm 0.5\text{MPa}$. The automatic compensation of internal support of the foundation pit steel in the soft soil area is the typical application of the system and has been widely used in many fields such as high-speed rail ballastless track experiment and steel structure loading and unloading experiment.

Main working principle:

- ◆ The working pressure of the pump is automatically set by the high pressure proportional overflow valve, and tested by the pressure sensor, to form the closed loop control to ensure the continuous adjustable and control precision of the jack pressure.
- ◆ The electrical system is automatically controlled by PLC controller. The operation panel is equipped with a colorful touch screen to display and set the working pressure, overload alarm and system working condition.
- ◆ The host computer system has functions including input / output / display / operation / modification / storage / printing.
- ◆ When the power is off, the entire electronic control system is uninterruptedly powered by the backup UPS to ensure system security.
- ◆ In the jack lifting process, lock the mechanical self-locking device at any time to ensure that support does not fail in the case of sudden failure of the automatic control system.

Brief introduction of function

The application of automatic compensation for internal steel force of foundation pit in soft soil area can realize the function of real-time data acquisition, display and internal force alarm setting, pressure curve, report production / printing, historical data storage and so on, and control jack pressure based on actual needs to control the displacement of the situation. And intelligent construction of complex deep foundation pit in soft soil area can be achieved, to enhance the scientific and technological content and the effect of construction of foundation pit supporting structure, reduce the deformation of supporting structure during excavation of the foundation pit, and reach the purpose of improving core competitiveness of enterprises in scientific and technological innovation.



4 - point proportional pressure regulator hydraulic schematic diagram

Technical Parameters

Model	Points	Control Accuracy (MPa)	Motor Power (KW)	Voltage (AC/V)	Working Pressure (MPa)	System Maximum Pressure (MPa)	Flow (L/Min)	Working Medium	Control Mode
KET-DPR-4	4	± 0.5	7.5	380	28	35	15	YB-N46 anti-wear hydraulic oil	proportional pressure control

Field Applications



PLC Multi-point Alternation Lifting Hydraulic Control System

In the general building (such as bridges, etc.) lifting process, support bracket system is equipped below the jack and the servo, including steel support, steel block and leveling steel plate. The jack provides initiative force, servo device can only take pressure passively or impose smaller initiative force. When the jack finishes lifting in a stroke, the servo device has been followed up, but in the process of lowering beam, upper load is transferred from the jack to the servo, a certain amount compression deformation happens to the support bracket system under the servo. This deformation is related to the composition of the lower support bracket system, the gap between the flat steel plate has the greatest impact, and the influence of the gap between each section and between the steel blocks is the second. In the course of practice, The amount of compression under the device is different. This is bound to produce heavy stress on the upper heavy load, while uneven force in each support, resulting in adverse effects. In the event of jack failure, the upper heavy load falls, due to the existence of support compression and the resulting gap, and the difference between the support points, the consequences will be unimaginable, so there is a huge security risk.

Product Descriptions

Through accumulated experience for many years in the field of hydraulic synchronization technology, from the point of view of safety and construction period of the construction site, on the basis of the ordinary frequency conversion control system, our company has successfully developed the high intelligent PLC alternation control system. The system has multi-point conventional synchronous jacking control function, multi-point bit alternation synchronous jacking control function, multi-point space three-dimensional adjustment control function, multi-point and other proportional slope lifting control function.

System Composition

The system is composed of two high-pressure oil pumps, two low-pressure oil pumps, two sets of frequency control device, six sets of valve group, pressure sensor, displacement sensor, a set of intelligent electronic control system.



Technical Parameters

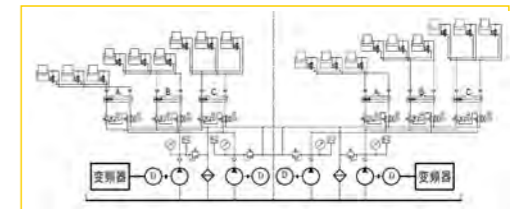
- ◆ Power Supply: AC380V/50Hz (3 Phase).
- ◆ Control supply: DC24V.
- ◆ System pressure: high pressure 70MPa, low pressure 20MPa.
- ◆ System flow: high pressure 4L / Min, low pressure 7.9L / Min.
- ◆ Motor power: 5.5KW * 2, 3KW * 2.
- ◆ Display accuracy: 1%.
- ◆ Control accuracy: $\leq \pm 0.3\text{mm}$.
- ◆ Control Mode: Frequency conversion.
- ◆ Operating Interface: Human-computer interface.
- ◆ Alarm device: Alarm lamp.
- ◆ Pressure sensor: Input DC24V, Rang 0-70Mpa, Output 4-20mA.
- ◆ Stroke sensor: Input DC24V, Rang 0-1000mm, Push-pull output (A, B phase).

Brief introduction of function

Safety in building lifting is ensured by setting two sets of jacks which can provide initiative force at the bottom of the building, and the jacks are controlled by the console-controlled hydraulic pump station to drive alternately, meanwhile during the jacking of a set of jacks, steel supporting pad is set to the bottom of the jack to eliminate the height difference between the various support points.

Detailed steps as follow:

- Install two sets of jacks at the bottom of the roof to be lifted, pistons of which are facing downwards, and set steel supporting blocks equal in height;
- Set a plurality of displacement sensors on the building to measure the lifting height of the building in real time;
- Control the hydraulic pump station through the console to drive the first group of jacks to lift the building for a stroke and pad the corresponding height of the steel support pad at the lower end of the piston of the second group;
- Control the hydraulic pump station through the console to drive the second group of jacks to lift the building for a stroke, while controlling the first group of jacks to retract, and pad the corresponding height of the steel support pad after full retraction of the first group of jack
- Repeat steps C, D for repeated alternation lifting until the building is raised to the design height.



Hydraulic schematic diagram



Double Acting Frequency Conversion Selection Table

Model	Points	Control Accuracy (mm)	Motor Power (KW)	Voltage (AC/V)	System Pressure (MPa)	High Pressure Flow (L/Min)	Low Pressure Flow (L/Min)
KET-DJTB-2	2	$\leq \pm 0.3$	5.5	380	70	4	7.9

PLC Multi-point Synchronous Hydraulic Lifting System



PLC portal low pressure multi-point synchronous hydraulic lifting system



PLC portal high pressure multi-point synchronous hydraulic lifting system

Product Descriptions

PLC portal low pressure multi-point synchronous hydraulic lifting system

This system is hydraulic driven and automatically controlled by pressure and displacement closed-loop, the system is widely applied in rubber support replacement of expressway, lifting of flyovers and river bridges, rectification of heavy equipment.

PLC portal high pressure multi-point synchronous hydraulic lifting system

Our company successfully develop the synchronous hydraulic lifting system for bridge based on learning the latest technology of international similar products and our so many years rich experience in hydraulic field. According to our hydraulic products application experience in highway and bridge, we get the conclusion this system is suitable for highway and bridge maintenance and can fill in gaps of similar products.

Field Applications



▲ Synchronous lifting and replacement of highway bridge rubber bearings.

▲ Synchronous translation of historic buildings.

Technical Parameters

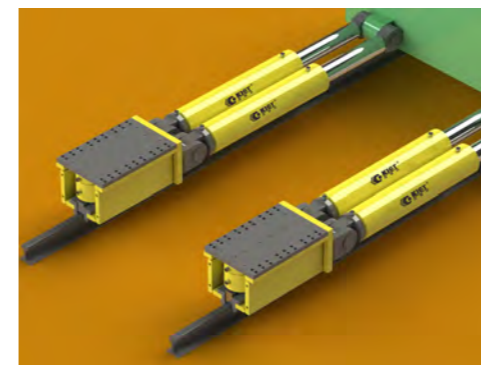
PLC portal low pressure multi-point synchronous hydraulic lifting system

Model	Synchronous Precision (mm)	Voltage	Max.working Pressure (MPa)	Operating Mode	Control Model	Control Points	Points Extended
KET-LDXT-4	±0.5	AC380V/50Hz (Three-phase-Five-wire system)	35	Button operating and touch screen operating	Pulse Width-Modulation	Four points synchronization	Support network communication and points extended

PLC portal high pressure multi-point synchronous hydraulic lifting system

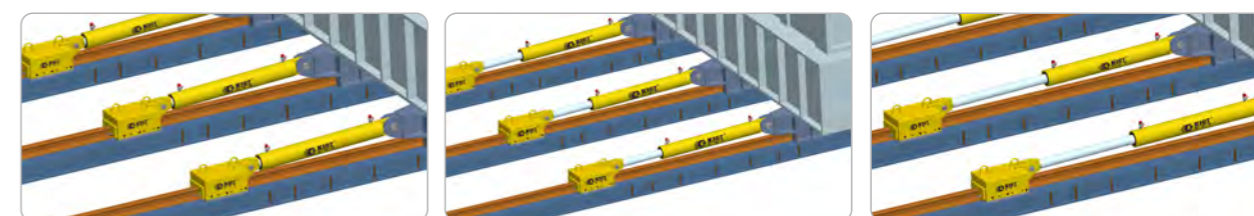
Model	Synchronous Precision (mm)	Voltage	Max.working Pressure (MPa)	Operating Mode	Control Model	Control Points	Points Extended
KET-HDXT-8	±0.5	AC380V/50Hz (Three-phase-Five-wire system)	70	Button operating and touch screen operating	Pulse Width-Modulation	Eight points synchronization	Support network communication and points extended

Synchronous Hydraulic Sliding System



Product Descriptions

This system is composed by hydraulic crawler (include hydraulic cylinders and Wedge locking structure), hydraulic power system, computer control system and sensors etc. The basic working principle: the locking structures in the crawlers clip on the tracks, according to the orders from the computer control system, the two pulling cylinders alternately stretch out and draw back, that makes the large equipment forward synchronously. The highlights of this system are small volume, lightweight, high capacity, reliable and safe, easy to operating etc.



Pulling process

Field Applications



▲ Synchronous pushing of blast furnace in steel plant.

▲ Synchronous pushing and installations of waiting room steel structure in railway station.

▲ Synchronous pushing and overhauling of pressure vessel in oil refinery.

▲ Synchronous pushing of ship body in shipyard.

▲ Synchronous pushing in position of large gymnasium dome.

▲ Synchronous pushing and installations of steel box girder in bridge construction.

▲ Synchronous pushing and installations of steel box girder in bridge construction.

▲ Synchronous pushing and installations of steel box girder in bridge construction.

Technical Parameters

Model	Capacity (T)	Working Pressure (MPa)	Stroke (mm)	Clamping Force (KN)
KET-HYD-60	60	31.5	600	897
KET-HYD-110	110	31.5	800	1668
KET-HYD-200	200	31.5	1000	2976
KET-HYD-300	300	31.5	1250	4636
KET-HYD-450	450	31.5	1500	6675

Intelligent Tensioning Hydraulic Control System



Product Descriptions

Intelligent tensioning hydraulic system is mainly used in bridge intelligent tensioning project. Hydraulic system equipped with displacement sensor and force sensors form a closed-loop control system. The intelligent tensioning can be realized by operating control device to carry out accurate and effective tensioning construction. It can store and process the data, has strong anti-interference ability, and can guarantee the prestressed tensioning construction quality effectively. The control system monitors the tensioning value and steel strand elongation of each tensioning device in real time, analyzing and judging in real time, adjusting the working parameters of frequency conversion motor in real time and high speed adjustment of the oil pump motor speed in real time to achieve the accurate control of tensioning force and loading speed. This system also automatically adjusts the tension process according to the preset force value and the tension step.

Prestressed computer numerical control precision tensioning equipment is mainly composed of computer synchronous control station, synchronous hydraulic sub-stations, tensioning hydraulic cylinders, pressure sensors and hydraulic system accessories, large diameter high strength finish-rolling screw and nut etc. This equipment has 4 synchronous points, displacement synchronous tensioning precision 1mm, force synchronous tensioning precision 0.5%. This device has the advantages of high precision dual control of force and displacement, humanized touch screen human-machine interface, tensioning data saving, printing and transmission.

Field Applications



▲ Prestressed tensioning of high-speed rail box girder.

Technical Parameters

Model	Tensioning Technology	Quantity Of Cylinder	Data Management Function	Screen Features	Voltage (V)	Dimensions(mm)		Weight(kg)		
						Cabinet Type	Portable	Cabinet Type	Portable	
KET-HZF-4A	Post tensioning	4	Data management of tensioning process	5' touch screen	220	800×680	1500	550×436	100	15
KET-HZF-4B		4	Database management of whole process							16
KET-HZF-8A		8	Data management of tensioning process							16
KET-HZF-8B		8	Database management of whole process	16						
KET-HZF-20A		20	Data management of tensioning process	16						
KET-HZF-20B		20	Database management of whole process	16						
KET-XZF-4A	Pre tensioning	4	Data management of tensioning process	5' touch screen	220	800×680	1500	550×436	100	15
KET-XZF-4B		4	Database management of whole process							16
KET-XZF-8A		8	Data management of tensioning process							16
KET-XZF-8B		8	Database management of whole process	16						
KET-XZF-20A		20	Data management of tensioning process	16						
KET-XZF-20B		20	Database management of whole process	16						

Equipment standard models default to be portable, model code of cabinet is to add "G" letters to suffix. Example: model of portable 4-point tension control console is KET-HZF-4A, model of cabinet tension control console is KET-HZF-4AG.

Intelligent Support Axial Force Hydraulic System



Product Descriptions

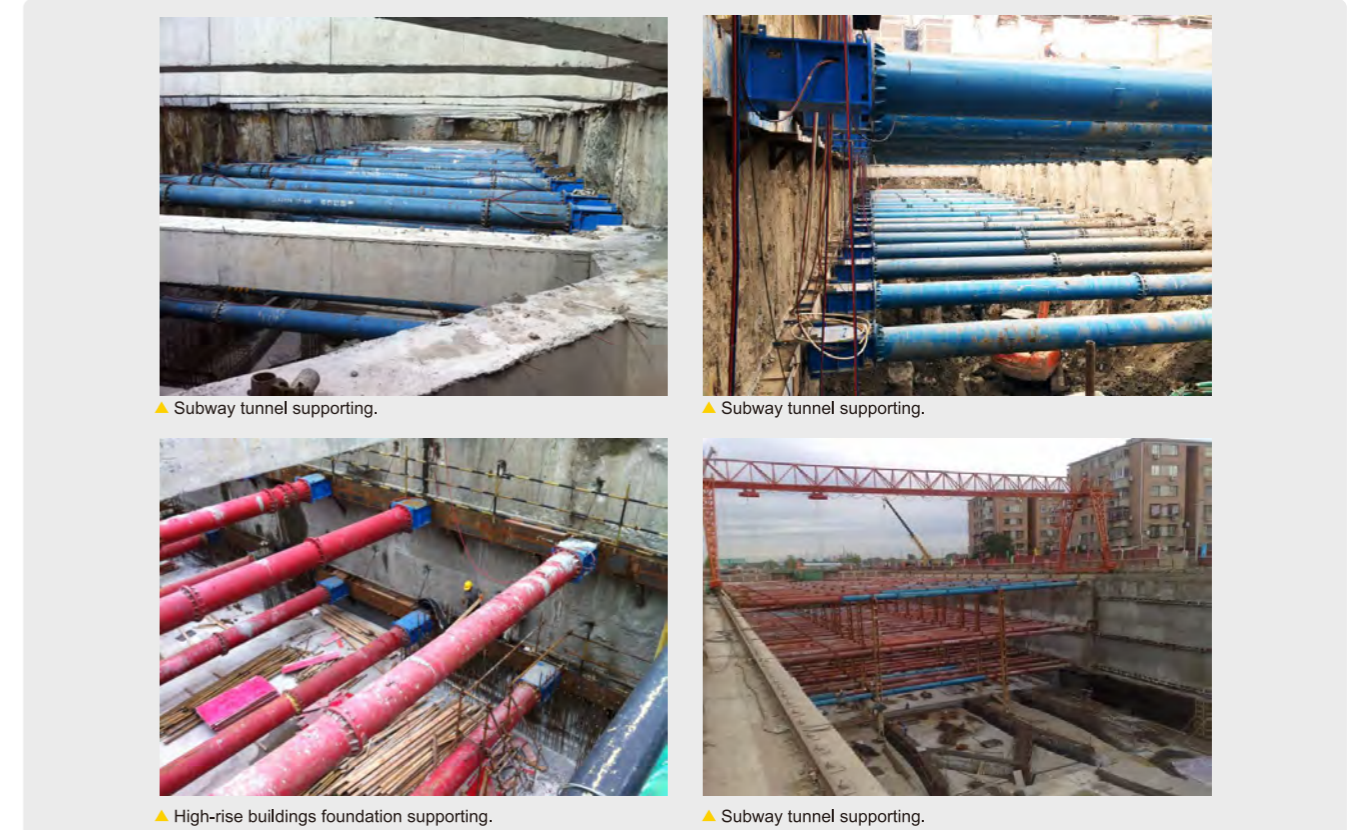
Steel support axial force servo hydraulic system is a complete set of safety solutions for foundation pit engineering which has the characteristics of 24 hours real-time monitoring, low pressure automatic compensation, high pressure automatic alarm and multiple security protection. Applicable to the project of strictly controlling the deformation of foundation pit.

This system is composed of several distributed numerical control hydraulic pump stations. Every NC hydraulic pump station is controlled independently and not affected each other. Every NC hydraulic pump station has 4 independent oil passage, which can realize the independent control of 4 hydraulic cylinders. CNC oil pump built-in pressure and displacement sensor, achieves the dual control of pressure and stroke.

Product Features

- ◆ NC hydraulic pump station is small in size, light in weight and convenient in layout. Distributed structure greatly shortens the hose connection between pump station and support equipment, system assembly is more convenient and quick.
- ◆ Self locking and alarming for abnormal states, such as low pressure automatic compensation, high pressure, etc. provide full range of multiple security protection including dual control of pressure and displacement.
- ◆ NC pump stations are independent from each other, the relative concentration of large pumping station, to avoid oil leakage or explosion due to a single tube and the impact of other oil, while avoiding the pump head hydraulic power failure caused the paralysis of the whole system dilemma, the greatest degree of dispersion of systemic risk, improve the reliability of the whole system.
- ◆ Monitoring data can be outputted through the electronic control system network, while equipped with dedicated data acquisition industrial computer monitoring, to achieve 24 hours online monitoring.
- ◆ Lifting data can be imported into the equipment database at once. Lifting results are automatically recorded in the database, which can be printed and downloaded.

Field Applications



▲ Subway tunnel supporting.

▲ Subway tunnel supporting.

▲ High-rise buildings foundation supporting.

▲ Subway tunnel supporting.