65t铁水罐液压翻转装置
Hydraulic Overturn Device for 65t Molten Iron Tank

使用说明书
User Manual

宝鸡市鑫冶设备制造有限公司
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前　言

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尊敬的用户：

Dear Users:

　　您能选择本公司的产品，忠心的感谢您对本公司的支持与厚爱，您在使用该产品前请您仔细阅读本说明书，谢谢。

　　Thank you for selecting products of our company and we're cordially appreciated for your support and patronage. Please read this manual carefully before you use the products.

一.系统主要技术参数:

I. Major Technical Parameters of System:

1.系统流量　　：36.5L/Min

1. System flow:　　36.5L/Min

2.系统压力　　：16Mpa

2. System pressure: 16Mpa

3.功　率　　：11kw

3. Power:　　11kw

4.油箱容积　　：500L

4. Oil tank capacity: 500L

5.电机电源　　：415V/HZ50

5. Power supply of electric motor: 415V/HZ50

6.建议液压油使用牌号:

6. Recommended hydraulic oils:

L-HM46#（夏 季）

L-HM46# (Summer)

L-HM32#（冬 季）

L-HM32# (Winter)

二．系统主要配置:

II. Major Configuration of System

序号	名　　称	型　　号	数量	单位	备　注
1	手动换向阀	4WMM16G50/F	2	件	
2	手动换向阀	4WMM10G10/F	1	件	
3	调压阀	DB20-1-30/315	2	件	
4	单向阀	CRNG-06	2	件	
5	单向阀	CRNG-03	1	件	
6	平衡阀	040201-3	1	件	
7	单向节流阀	LA-H20	2	件	
8	冷却器	(DLC)DP-2.1	1	件	
9	压力表	YN-100ZT	1	件	
		YN-60ZT	1	件	
10	压力表开关	KF-L8/14E	1	件	
11	空滤器	QUQ2.5	1	件	
12	变量柱塞泵	25SCY14-1	2	件	
13	高压过滤器	QU-H160X20DLP	2	件	
14	吸油滤	TF250X20	2	件	
15	蓄能器	NXQ-L40/315	1	件	
16	高压截止阀	BKHGM27	1	件	

17	电机	11KW	2	件	

S/N	Name	Model	Quantity	Unit	Remarks
1	Manual Operated Directional Control Valve	4WMM16G50/F	2	Piece	
2	Manual Operated Directional Control Valve	4WMM10G10/F	1	Piece	
3	Pressure Regulating Valve	DB20-1-30/315	2	Piece	
4	Check Valve	CRNG-06	2	Piece	
5	Check Valve	CRNG-03	1	Piece	
6	Balance Valve	040201-3	1	Piece	
7	One-way Throttle Valve	LA-H20	2	Piece	
8	Cooler	(DLC) DP-2.1	1	Piece	
9	Pressure Gauge	YN-100ZT	1	Piece	
		YN-60ZT	1	Piece	
10	Pressure Gauge Switch	KF-L8/14E	1	Piece	
11	Air Filter	QUQ2.5	1	Piece	
12	Variable Plunger Pump	25SCY14-1	2	Piece	
13	High Pressure Filter	QU-H160X20DLP	2	Piece	
14	Oil Filter	TF250X20	2	Piece	
15	Energy Accumulator	NXQ-L40/315	1	Piece	
16	High Pressure Check Valve	BKHGM27	1	Piece	
17	Electric Motor	11KW	2	Piece	

三. 系统简介及操作说明(液压原理图见附图):

III. Introduction of System & Operation Instruction (Please see the attached hydraulic schematic diagram):

系统简介:

System Introduction:

本液压系统分为动力单元和操作单元两部分,继而为远距离操作

提供了方便和保证了操作人员的安全。

The hydraulic system includes power unit and operation unit, so it can provide convenience for remote control and ensure safety of operation personnel.

液压动力源部分设有两台电机泵组可通过操作台上的旋转开关选择一号或二号泵工作，（交替使用可延长泵的使用寿命）。设有两台电机泵组也是为当有其中一台电机泵组发生故障不能进行正常工作时提供保障。液压控制部分设有“罐体倾翻”、“罐体复位”、“罐体锁定”、“罐体解锁”、“紧急解锁”和“紧急复位”操作。电气控制部分设有一号和二号泵选择的旋转开关以及罐体上限显示、罐体下限显示、罐体解锁显示和罐体锁定显示的显示灯。

The hydraulic power source part has two electric motor pump sets, which can select pump No. 1 or pump No. 2 to work through the rotary switch on the operation platform (alternate use of pump No. 1 and pump No. 2 can extend the service life of pumps). The other configuration of two electric motor pump sets is intended to provide guarantee for normal work when one of the electric motor pump sets fails. The hydraulic control part has “tank overturn”, “tank reset”, “tank lock”, ”tank unlock”, “emergent release” and emergent “reset” operation buttons. The electric control part has rotary switch for selecting pump No. 1 and pump No. 2 and the indicator lights for tank upper limit, tank lower limit, and tank unlock and tank lockup.

操作说明:

Operation Instruction:

在开机前首先检查液压管线和电路的连接是否正确。检查完后将动力源上的两个溢流阀 DB20 的调压手柄逆时针开到最大，打开压力

表开关。然后接通电源，首先启动电机，注意无论选择那个泵组都要确定电机的转向正确无误（**电机风叶罩上标有电机转向箭头**）。接通电源后让电机空转 3 到 5 分钟后在进行加压。顺时针缓慢调节工作电机泵组相对应的溢流阀。（**注意调节压力时必须保证在罐体锁紧油缸或着罐体倾翻油缸完全缩回的状态下。**）将压力调节到额定压力 16Mpa，待压力稳定后，进行第一次空载操作。

Before start the equipment, first check if the connection of hydraulic pipeline and electric circuit is correct. After that, anticlockwise move the pressure regulating handles of the two relief valve DB20 on the power source to the maximum position to turn on the pressure gauge switch. Then connect electric power and first start the electric motor; please make sure the rotation direction of the electric motor is correct no matter which pump set is selected **(the rotation direction of electric motor has been indicated with an arrow on the vane cover of electric motor)**. After the power source has been connected, let the electric motor run without load for 3 to 5 minutes and then pressurize. Slowly adjust the relief valve of the working electric motor pump set clockwise. **(Note: when the pressure is being regulated, you must ensure that the tank body has locked the oil cylinder or the tank has overturned the oil cylinder and has completely retracted.)** Adjust the pressure to the rated pressure of 16Mpa; when the pressure becomes stable, start the first no-load operation.

空载试车：

No-Load Test:

先进行“罐体锁紧”和“罐体解锁”操作，将操作手柄推动到相

应的位置观察“罐体锁紧”和“罐体解锁”指示灯，每个动作完成后相应的指示灯亮后，说明动作完成。

First carry out the operation of “tank lock” and ”tank unlock” operation; push the operation handle to the corresponding position and observe the “tank lock” and ”tank unlock” indicator lights; after every action has been completed, if the corresponding indicator light turns on it means the action has been completed.

然后进行罐体翻转、罐体回复操作，推动操作手柄“罐体上限”和“罐体下限”，观察操作台上的“罐体上限”指示灯，当灯亮后说明罐体倾翻已到位，最后反方向操作“罐体倾翻”手柄（罐体复位），继续观察操作台上，“罐体下限”指示灯,指示灯亮后说明罐体到位，即整个工作流程完成。

Then carry out the resumption operation of the “tank overturn”, tank restoration; push the operation handles for “tank upper limit” and “tank lower limit” and observe the indicator light for “tank upper limit”; when the light turns on, it means that the tank overturn has been in place. At last, operate the “tank overturn” handle (tank reset) in the reverse direction and continue observing the indicator light for “tank lower limit” on the operation platform; if the indicator light turns on, it means the tank has been in place and the whole working process has been completed.

测试系统停电操作（油泵不工作，活动架翻起一定角度），此时直接操作使用“紧急复位”手柄，活动架考自重缓慢回落到零位；**注意：操作“紧急解锁”前，先逆时针方向打开操作箱后的“紧急解锁开关”。**操作“紧急解锁”手柄，靠蓄能器力量保证锁紧油管带动锁紧销轴缩回。

Test the power-off operation of the system (the oil pump does not work and the active rack has been overturned to certain angle); now directly operate “urgent reset” handle, and the active rack shall be able to rely on its own gravity to slowly fall to the zero position; **Note: before operation of “emergent release”, first anti-clockwise turn on the “emergent release switch” on the back of the operation box.** Operate the “emergent release” handle and ensure the lockup oil pipe to drive the lockup pin roll to retract through the power of the energy accumulator.

确认全部工作流程完成无误后，再按照同样的操作程序多次操作后进行带空罐试车。

After all working processes have been completed properly, repeat the processes for several times and then carry out test with tank.

带罐试车：

Test with tank:

带罐试车操作顺序同空载试车，**特别注意：铁水罐吊入活动架龙门吊钩脱钩后必须先操作罐体锁紧；罐体未锁紧不得进行罐体翻转作业；罐体未解锁不得进行吊罐作业。否则会造成重大安全事故。**

The sequence of test with tank is the same with no-load test. Please note**: after the molten iron tank has been lifted by the moveable frame gantry and the hook has been released, you must first operate the process of “tank lockup”; if the tank has not been locked, do not overturn the tank; if the tank is not locked, do not lift the tank or significant safety accidents may happen.**

热试车：

Hot test:

热试车前必须确保操作人员能熟练操作，设备运转正常，液压系统无渗漏现象；确保与该设备配套的工艺溜槽、铸铁机、行车都能安全使用；管理人员、维修人员、消防人员及设施全部就位后方可进行。

Before the hot test, please make sure that the operation personnel are able to operate skilfully, the equipment operates normally and there is no leakage on the hydraulic system; ensure the process chute, casting machine and travelling crane of the equipment can all be useable; after the management personnel, maintenance personnel, fire fighting personnel and facilities have all been in place, the operation can be carried out.

热试车人员必须胆大心细，操作及注意事项与带罐试车相同。初次热试车必需缓慢操作，特别确认罐体锁紧后在进行罐体翻转，罐体翻转到一定角度（约 20^{o} 左右）时，罐内铁水就会流出，此时操作人员根据铸铁机生产能力随时调整翻转速度的快慢实现铁水流量大小，罐体翻转约 90^{o} 时，罐内铁水基本会全部流出。操作罐体复位直至回落到零位，此时必须操作罐体解锁并确认后方可进行罐体吊离作业。热试车后认真检查设备各部，发现隐患或故障及时处理。

The hot test personnel must be of great courage and carefulness. The operation and noticeable matters are the same with that for test with tank. The first-time hot test must be slowly carried out and please especially pay attention to the confirmation of tank lockup before the overturn of tank; when the tank overturns to certain angle (about 20º), the molten iron in the tank will flow out and now the operation personnel shall regulate the overturn speed

in time according to the production capacity of the casting machine to control the flow of the molten iron; when the tank overturns for about 90º, the molten iron in the tank will almost all flow out. Operate the tank reset until the tank falls to zero position and now you must operate the “tank unlock” and confirm the tank has been unlocked before you can lift the tank away. After the hot test, carefully check all parts of the equipment and find out the hidden troubles or fault and remove them in time.

四：注意事项

IV: Noticeable Matters

1.因意外故障而造成系统断电的情况下且又急需罐体复位时，先“紧急复位”，若需吊离罐体时，可“紧急解锁”，以便采取其它处理措施，其它情况下不得随意操作。**注：操作“紧急解锁”前，先逆时针方向打开操作箱后的“紧急解锁开关”。**

1. When the sudden faults cause power failure of the system while the tank needs to be reset, first operate the “urgent reset ”; if the tank is required to be lift away, you can operate “emergent release”, so as to take other process measures. On other occasions, do not operate at will. **Note: before operate “emergent release”, first anti-clockwise turn on the “emergent release switch” on the back of the operation box.**

2.本液压系统设有两台电机泵组，可通过选择开关进行 1#泵或 2#泵的选择。1#泵和 2#泵最好交替工作以延长油泵使用寿命。

2. The hydraulic system has been outfitted with two electric motor pump sets, which can be selected through selection of switch. It’s recommended that pump 1# and pump 2# alternately work to

extend the service life of the oil pump.

3.操作“罐体倾覆”前，若“锁定” 灯未亮不得操作，应查明原因解除故障后方可操作，以防发生危险。

3. Before the operation of “tank upset”, if the “lock” lamp is not on, do not operate; find out the cause and clean the fault before you can operate to prevent danger.

4.钵体吊离钵架时，先看“罐体下限”灯是否发亮，若不亮，再缓慢操作“罐体复位”至“复位”灯亮，然后“罐体解锁”，“锁定”灯灭，方可吊离。若有指示灯亮灭不正常，务必查明并解除故障，不得强行操作，以免发生事故。

4. When the bowl is being lifted away from the bowl rack, first observe the light of “tank lower limit”; if the light is not on, slowly operate the “tank reset” until the light of “reset” is on and then carry out “tank unlock”; when the light of “lock” is off, you can lift the bowl away. If any indicator light does not turn on or off normally, make sure the find out the causes and remove the fault; do not operate compulsorily to avoid accidents.

5．“罐体倾覆”和“罐体复位”操作时，要缓慢拉或推动操作手柄，防止因用力过猛而使钵体震动。

5. When operate “tank overturn” and “tank reset”, slowly pull or push the operation handle to prevent too strong force to vibrate the bowl body.

6．“罐体倾覆”和“罐体复位”速度可通过操作箱下出口处的调速阀来调整。

6. The speeds of “tank upset” and “tank reset” can be adjusted with the speed regulating valve at the outlet on the operation box.

7.系统压力可通过液压上的 2 个调压阀来调整，液压设定不超过 16MPa.

7. The system pressure can be regulated through 2 pressure regulating valves and the hydraulic setting does not exceed 16MPa.

8.维修时，若需拆卸“紧急解锁”阀和“紧急复位”阀时，**务必先将油箱上与蓄能器相连的三通球阀换向，使蓄能器完全失压，然后方可拆卸，否则，会发生危险。**

8. During maintenance, if the “emergent release” valve and “emergent reset” valve are to be disassembled, **please make sure to first reverse the direction of the three-way ball valve that’s connected with the energy accumulator on the oil tank, so the pressure of the energy accumulator is completely discharged; otherwise, dangers may happen.**

9.液压油选用 L-HM46 号抗磨液压油，更换时间根据使用情况而定。

9. Please select L-HM46 anti-wear hydraulic oil as hydraulic oil and replace it according to the practical situation.

10.严禁添加不干净或不同牌号的液压油。

10. It’s forbidden to refill unclean or different types of hydraulic oils.

11.维修过程应保持现场清洁，拆卸的液压件务必做好标记，装配前用煤油清洗干净。

11. Please keep cleanness on the site during maintenance process; please make necessary markings on the dismantled hydraulic parts

and clean them with kerosene before reassembly.

五：易损件明细表

V: Wearing Parts List

序号	名　　称	型　　号	备　　注
1	手动换向阀	4WMM16G50/F	
2	手动换向阀	4WMM10G10/F	
3	调压阀	DB20-1-30/315	
4	密封件	“O”型圈φ12×1.9	
		“O”型圈φ20×2.4	
		“O”型圈φ24×2.4	
		“O”型圈φ30×3.1	
		组合垫φ14	
		组合垫φ22	
		组合垫φ27	
		组合垫φ33	
		组合垫φ36	
5	油泵	25SCY14-1	左右各一台
6	滤芯	HX160	
		ZX160	

S/N	Name	Model	Remarks
1	Manual Operated Directional	4WMM16G50/F	

	Control Valve		
2	Manual Operated Directional Control Valve	4WMM10G10/F	
3	Pressure Regulating Valve	DB20-1-30/315	
4	Seal Element	“O” ringφ12×1.9	
		“O” ringφ20×2.4	
		“O” ringφ24×2.4	
		“O” ringφ30×3.1	
		compound gasket φ14	
		compound gasket φ22	
		compound gasket φ27	
		compound gasket φ33	
		compound gasket φ36	
5	Oil Pump	25SCY14-1	Each on left and right sides
6	Filter Core	HX160	
		ZX160	

五. 常见故障及处理

V. Common Faults & Troubleshooting

故 障	原 因	排除方法
1.无压力或压力不足	1 安全阀被杂物堵塞或损坏	1 清洗或更换新阀
	2 吸油滤油器堵塞	2 清洗或更换新滤
	3 管线有泄漏	3 处理泄漏管线
	4 油泵损坏	4 更换新油泵
	5 液压油不足	5 添足同型号液压油
	6 手动换向阀内泄	6 更换新阀或密封件
	7 油缸活塞密封失效产生内泄	7 更换活塞密封

2. 油温过高（正常 20～55℃） 超过 70℃	1 液压站位置通风条件不好或环境温度过高 2 向阀内泄严重	1 改善通风条件或强制水冷（增加水冷却器） 2 更换换向阀
3.油缸速度降低	1 吸油滤油器堵塞 2 管线有泄漏 3 油泵磨损产生内泄 4 换向阀内泄严重	1 清洗或更换新滤 2 处理泄漏管线 3 更换新油泵 4 更换换向阀
4.油泵噪音过大	1. 油液粘度过大 2. 吸油滤堵塞 3. 油泵连轴器坏 4. 油泵损坏	1. 更换低标号油 2. 更换吸油滤芯 3. 更换连轴器 4. 更新油泵
5.油泵电机不工作	1. 系统供电故障 2. 电器控制系统故障	1. 恢复供电 2. 检查并排除

Faults	Causes	Troubleshooting Methods
1. There is no pressure or insufficient pressure	1 The safety valve is jammed or damaged 2 The oil filter is jammed 3 The pipeline has leakage 4 Oil pump is damaged	1 Clean the valve or replace with a new valve 2 Clean the filter or replace with a new filter 3 Process the leakage of the pipeline

	5 Insufficient hydraulic oil 6 The manual operated directional control valve has internal leakage 7 The piston in the oil cylinder has internal leakage	4 Replace with a new oil pump 5 Add hydraulic oil of the same type 6 Replace with new valve or seal element 7 Replace piston seal
2. Oil temperature is too high (normal temperature: 20 - 55°C) and exceeds 70°C	1 The hydraulic station has bad ventilation conditions or the environment temperature is too high 2 The directional valve has serious internal leakage	1Improve ventilation conditions or forcefully cool it with water (increase water cooler) 2Replace reversing valve
3. The speed of oil cylinder decreases	1 Oil filter is jammed 2 The pipeline has leakage 3 The oil pump is worn and has internal leakage 4 The reversing valve	1 Clean or replace with a new filter 2 Process the leakage pipeline 3 Replace new oil pump 4 Replace reversing

	has serious leakage	valve
4. Too big noise in the oil pump	5. The oil has too big viscidity 6. The oil filter is jammed 7. The oil pump coupling is damaged 8. The oil pump is damaged	4. Replace the low grade oil 5. Replace oil filter core 6. Replace coupling 4. Update the oil pump
5. The electric motor of oil pump does not work	1. The system power supply fails 2. The electric control system has fault	1. Resume the power supply 2. Check and remove the fault

六：系统平面图（见附录）

VI: System Plan (Please see the appendices)

七：附录

VII: Appendices