江南造船（集团）有限公司
JIANGNAN SHIPYARD

5100TEU 集装箱船
5100TEU CONTAINER VESSEL

H2431

阀控式密封铅酸蓄电池完工图

VALVE REGULATED SEALED MAINTENANCE-FREE LEAD-ACID BATTERY FINAL DRAWING

上海莘舟船舶设备有限公司

新乡太行电源股份有限公司

SHANGHAI XINZHOU MARINE EQUIPMENT CO., LTD

XINXIANG TAIHANG POWER SOURCE (GROUP) CO., LTD

HULL: H2431

船号：H2431

VESSELTYPE: 5100TEU CONTENINER VESSEL

船型：5100TEU 集装箱船

SHIP OWNER: BCH

船东：BCH

QUANLITY

数量：

1 SET/SHIP, TOTAL 8 SETS. EACH SHIP SET CONTAINS:
每船一套，共 8 套。每船套包括：

NO.	BATTERY TYPE	PURPOSE	QTY	LOCATION
1	GFM-200(2) (2V,200AH)	For General Service	12+1	Battery room
2	GFM-200(2) (2V,200AH)	For engine room	12+1	Engine room
3	GFM-200(2) (2V,200AH)	For radio equipment	12+1	Radio space

CONNECTIONG WIRING
连接导线

3SET/SHIP
每船 3 组

FIBREGLASS STORAGE BOX
(Manufactory Standard)
蓄电池玻璃钢存放箱　（依据制造厂标准）

QUANTITY
3 Pieces
每船 3 个

BATTERY BRACKET
(Manufactory Standard)
蓄电池支架 （依据制造厂标准）

QUANTITY
3 Pieces
每船 3 个

一.计算方法：

电池的主要特性是它储存的电能量，即容量。容量以 Ah 表示，但它随使用条件而变化，如放电电流、终止电压、温度。

1. 额定容量

额定容量指完全充电的电池在特定的放电电流、终止电压、温度条件下放出的电量、此数值由制造厂作为参考值给出。

10 小时率的额定容量用 C_{10} 表示。

电池 10 小时率放电有效电流 I_{10} 值为 $C_{10}/10(A)$。

终止电压 U_f 为 1.8V/cell。

2. 实际容量 C_a

3. 实际容量 C_a 完全充电的电池以 I_{10} 的恒电流在特定条件下放出的容量得出。

（1） 完全充电指电池在温度为 25±5℃的环境中，以 2.35～2.4V 电压充电，时间不低于 24 小时，充电初期电流不超过 $3\times I_{10}$，充电末期 4h 内、电流无明显变化即可。

（2） 放电条件：

a. 在温度为 25±5℃的环境中，开路状态放置 5～24h

b. 温度为 25±5℃。

c. 放电电流为 I_{10},电流值在整个放电过程中在±2%的范围内保持恒定。

d. 终止电压为 1.80V。

（3） C_a 计算：

$C_a=t\times I_{10}$

t-----电池到终止电压时的持续时间（h）

10 小时的实际容量在五次循环内不应低于额定容量的 95%。对于 GFM2/200、GFM2/300

电池型号	额定容量 C_{10}	放电电流 I_{10}	终止电压 U_f
GFM2/200	200Ah	20A	1.80V/cell
GFM2/300	300Ah	30A	1.80V/cell

二 电池充电特性：

1. 常用充电方法

（1） 恒压限流充电

在 25±5℃条件下，以 $3\times I_{10}$A 恒流充电，当单体电压达到 2.4V 时，改为浮充电压充电，浮充电压为 2.23～2.27/单体。当充电电流降为零时，充电结束。

（2） 浮充电

浮充电压为 2.23～2.27V/单体。在单体电压为 2.23～2.27V 范围内任意一电压值乘以电池只数，既是总的浮充电压。

2. 均衡充电

在停电频繁的地区，需每隔三个月对电池充电一次，均充电压为 2.35～2.40V/单体。

3. 温度变化对充电电压的影响及调整

充电电压随温度变化而变化，如较长时间内平均环境温度不是 25℃，则浮充电压必须调整，即温度每降低 10℃，应增加约 30mV。

三 安装手册

1. 准备工作

1） 开箱检查

蓄电池运到后，检查包装有无异常，开箱时要谨慎小心，不允许碰撞、摔伤蓄电池，如发现蓄电池外观、零部件质量有问题，应及时通知本公司，以便及时更换处理。

2） 贮存

蓄电池出厂时已充足电，允许直接使用。若用户收货后不立即使用，应贮藏在温度为 10～30℃的仓库内，贮存地点应清洁、通风、不潮湿、严禁明火。

2. 安装

GFM2/200、GFM2/300 根据本公司提供安装图安装；安装完毕后按照正确的使用方法使用电池，避免过充电及过放电。

3. 注意事项

1） 避免不同容量、型号规格、不同厂家的蓄电池混用；

2） 严禁电池接近火源，热源；

3） 严禁电池正负极接反，防止短路；

4） 蓄电池允许使用温度范围-15～45℃，但为了延长使用寿命，建议在 10～30℃的温度范围内使用；

5） 严禁随意打开安全阀；

6） 每隔半年必须对电池紧固件进行检查，防止松动。

四 蓄电池常见故障

4.1 蓄电池在使用过程中发生故障，可按下表的方法进行分析及故障的排除；

4.2 为了保护使用客户的安全，禁止用户打开电池；

4.3 电池如发生特别异常时，请速与厂家联系。

现象	特征	原因	处理方法
蓄电池外壳鼓肚、变形、裂纹	1. 蓄电池外壳变形 2. 蓄电池外壳中间部位凸出 3. 蓄电池外壳有裂纹	1. 充电电压过高 2. 内部电阻大 3. 温度长时间高于规定值 4. 搬运时碰撞	1. 严禁控制高压充电 2. 更换内阻大的蓄电池 3. 更换有裂纹的蓄电池
蓄电池表面有酸液	1. 蓄电池表面有白色结晶 2. 铜排被腐蚀	出厂时蓄电池表面有残留酸液	1. 擦掉残留酸液和白色结晶 2. 更换被腐蚀的铜排
蓄电池容量不能恢复	1. 容量判断不合格	1. 蓄电池内部短路	更换蓄电池

	2. 蓄电池温度很快升高	2. 蓄电池极板硫酸盐化 3. 蓄电池早期容量损失	
蓄电池失水	蓄电池重量减轻	1. 温度长时间过高 2. 蓄电池过充电	补加去离子水

一. Calculation method for battery capacity

The essential characteristic of a battery is its capacity for the storage of electric energy. This capacity, expressed in ampere-hours(Ah), varies with the conditions of use(discharge-current, final voltage, temperature).

1. Rated capacity

The quantity of electricity (Ah) which can be taken out from a battery of full charge under specified conditions of temperature, discharge current and final voltage which is declared by the manufacturer as the reference value.

The numerical value of rated capacity at 10 hour rate is expressed by C_{10}.

The value of discharge current at 10 hour rate I_{10} shall be $C_{10}/10$

The final voltage U_f shall be 1.80 V/cell.

2. Actual capacity

The actual capacity Ca shall be determined by discharging a fully charged battery with constant current I_{10} in accordance with test conditions.

(1) Fully charged sample

Batteries shall be charged at an ambient temperature of 25±5℃, at the constant voltage (2.35-2.4) V/cell which limits the initial charging current to the current $3\times I_{10}$ for more than 24 hours and the current does not change within four consecutive hours.

(2) Discharge conditions

a. The battery shall be kept on open circuit at an ambient temperature of 25±5℃ for 5h to 24h.

b. The temperature shall be 25±5℃

c. The discharge current shall be the I_{10}. This current value shall be kept constant to within ±2% during the test.

d. The final voltage U_f shall be 1.8V/cell.

(3) Calculate of Ca

$$Ca = t \times I_{10}$$

Where

t : duration of discharge until the battery voltage drops to 1.8V/cell(h)

*** The Ca shall become at least $0.95\times C_{10}$ within 5 cycles of charging and discharging.

To GFM2/200

Type	Rated capacity C_{10}	Discharge Current I_{10}	The final voltage U_f

GFM2/200	200Ah	20A	1.8V/cell

二. Charging performance for battery

1. general charge method

(1) Constant voltage limiting current charge

At temperature 25±5℃, batteries shall be charged by $3\times I_{10}$ a constant current. When the cell voltage reached 2.4V, it shall be converted to floating voltage charge, which the voltage is 2.23~2.27V/cell. When the current lower to zero, charge shall be end.

（2）Floating charge

The floating charge voltage is 2.23-2/27V/Cell. Cell voltage range is 2.23-2.27V. That voltage within 2.23-2.27V/cell multiplies battery number is total floating voltage charge.

2. Equalizing charge

In the frequently power-cutting district, equalizing charge voltage must be carried out every 3 months equalizing charge voltage is 2.35-2.40V/cell.

3. Effect of temperature on charge voltage

Charge voltage change with temperature. If average environment temperature is not at 25℃ in a long time, floating charge should add 3 mV when temperature lower every 1℃.

三. Installation and outline size

1. Preparation working

a. Inspection

After the battery is delivered, the packaging shall be inspected for irregularities, care shall be taken when opening the packaging, the battery must not be knocked, bumped or dropped. The external appearance and the spare components of the battery shall be inspected in terms of quality and quantity, if problems are found out, then company should be informed immediately, in order to arrange a prompt replacement.

b. Store

The battery is already fully charged before leaving the factory, it can be used directly. If customer don't use it at once, the battery shall be stored at 10-30℃ in room. The store location shall be clean，ventilated, dry and naked flame should be absolutely prohibited.

2. Installation

The battery GFM2/200 should be installed in accordance with installation drawings.

When installation finish, the battery shall be charged according to correctly

charge method, to avoid overcharge: and the battery shall be used according to correctly method, to avoid over discharge.

3. Notes

a. Avoid using batteries with different capacity, different specifications and from different manufactures;

b. It is absolutely prohibited to place the battery near fire of heat source;

c. Don't short-circuit the battery as it can burn out the connections;

d. The permitted temperature is -15~45℃. However to prolong the life of the battery, we recommend that it is best to be used at temperature range 10~30 ℃;

e. Prohibit freely to open the safe valve of battery;

f. Turn the screws and tighten them every six months.

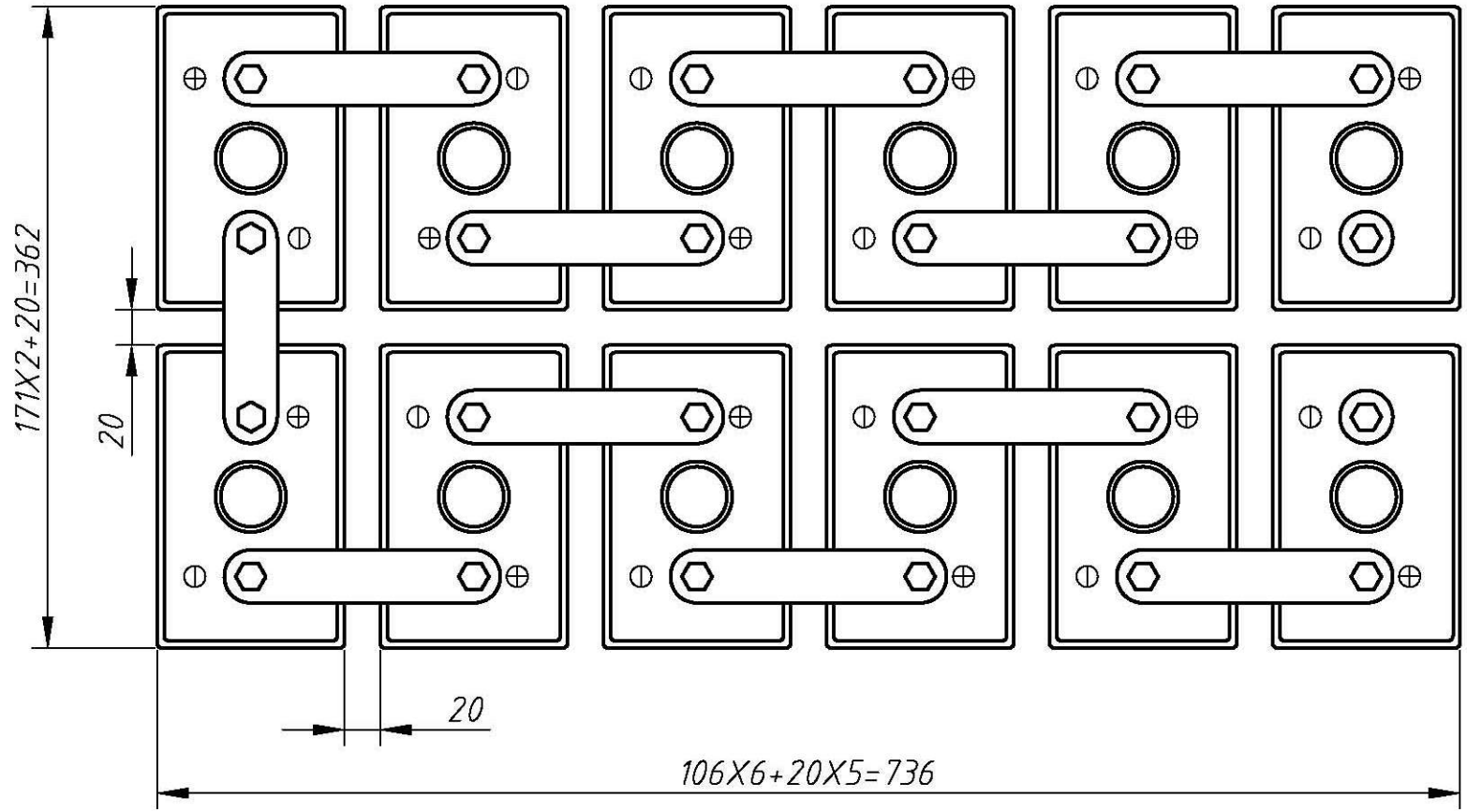
四. Troubleshooter

4.1 Table answers frequently asked questions.

4.2 Never disassemble of reassemble the battery, Use in a well-ventilated area.

4.3 If necessary, connecting with manufactory immediately.

Problem	Possible cause	Solution
Distortion of case	Overcharge. High internal resistant Operating at high temperature environment	Controlling charge accurately. Exchange battery of high internal resistant.
White crystal appeared. Corrosion of connectors.	Residual electrolyte.	Cleaning surface. Exchange connectors
Capacity loss. Temperature of battery Rises immediately	Internal short-circuit of battery. Negative plates sulfurrized. Premature capacity loss	Exchange battery
Water loss	Operating at high temperature environment Overcharge	Added pure water



标记	处数	分区	更改文件号	签名	年月日
设计			标准化		
审核					
工艺			批准		

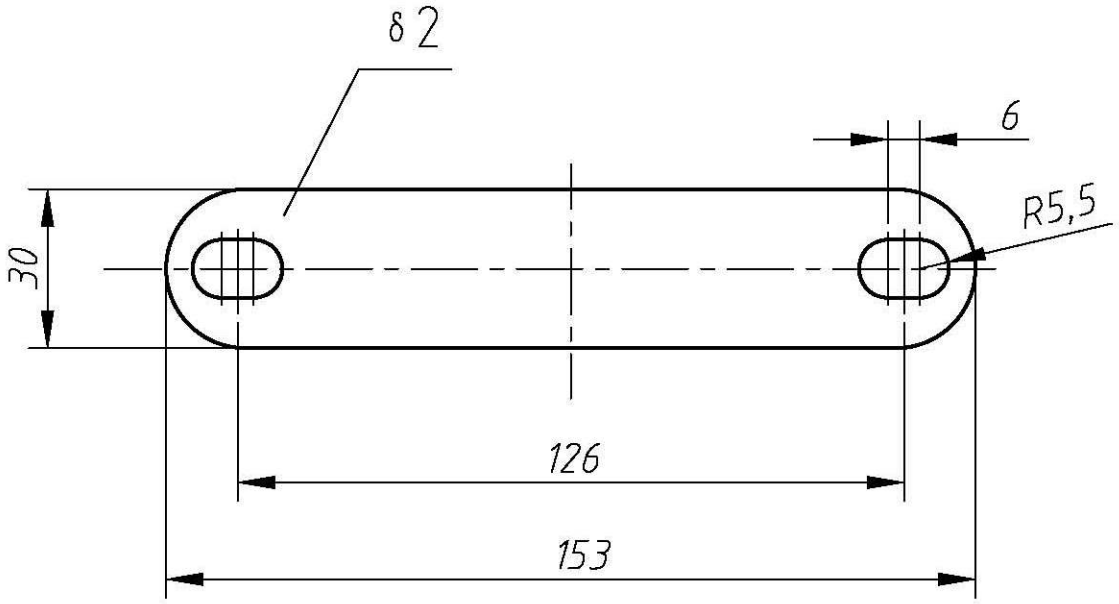
电池安装图

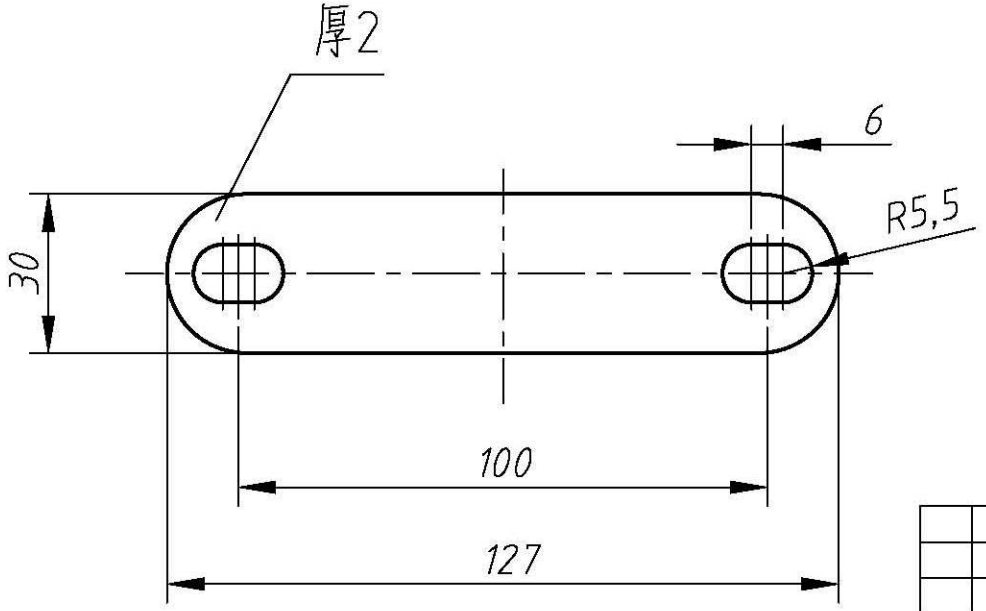
阶段标记	重量	比例

共 张 第 张

新乡八达电源有限公司

规格：GFM-200





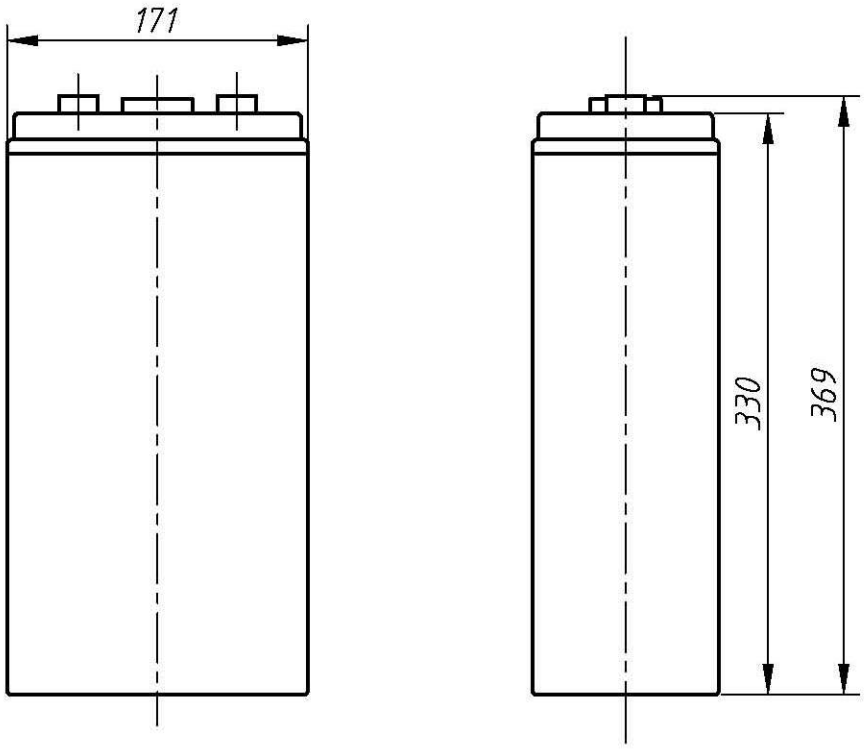
技术要求

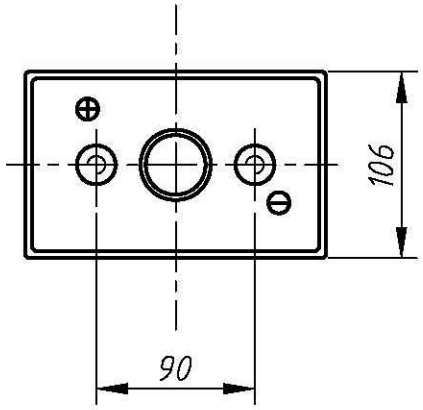
1.表面镀锡，镀层牢固。

2.未注线性公差依照

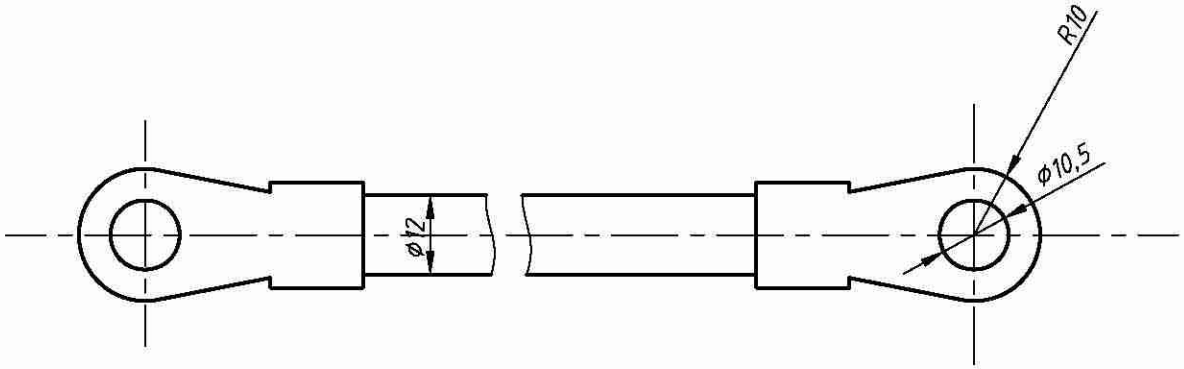
GB/1804—m中级

						黄铜62		新乡八达电源有限公司
标记	处数	分区	更改文件号	签名	年月日			
设计			标准化			阶段标记	重量	比例
								GFM-200电池跨接板
审核								
工艺			批准			共 张 第 张		

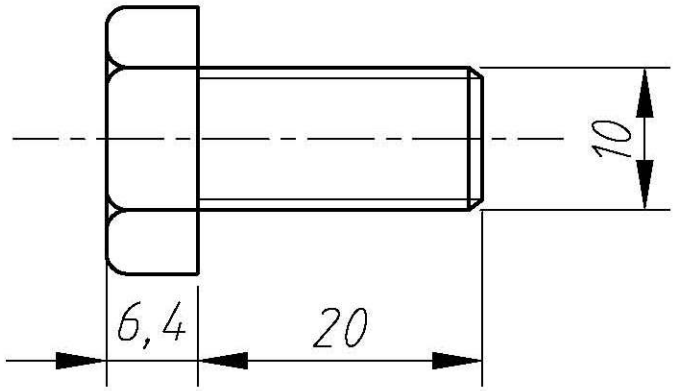


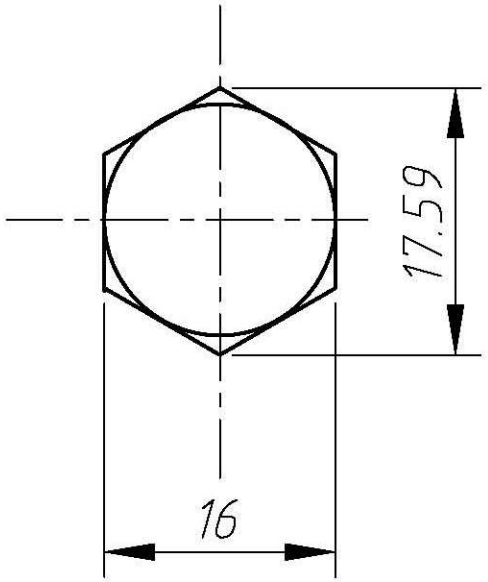


						蓄电池外形图		新乡八达电源有限公司
标记	处数	分区	更改文件号	签名	年月日			
设计			标准化			阶段标记	重量	比例
								GFM-200
审核								
工艺			批准			共 张 第 张		



								新乡八达电源有限公司
								连接软线
标记	处数	分区	更改文件号		签名	年月日		
设计			标准化				阶段标记 重量 比例	
审核								
工艺			批准				共 张 第 张	

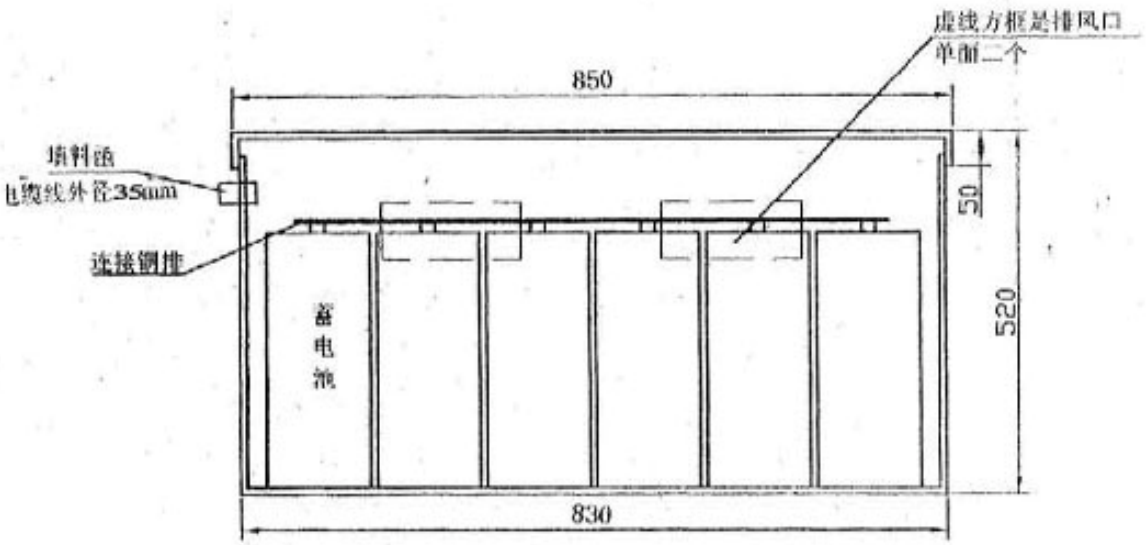


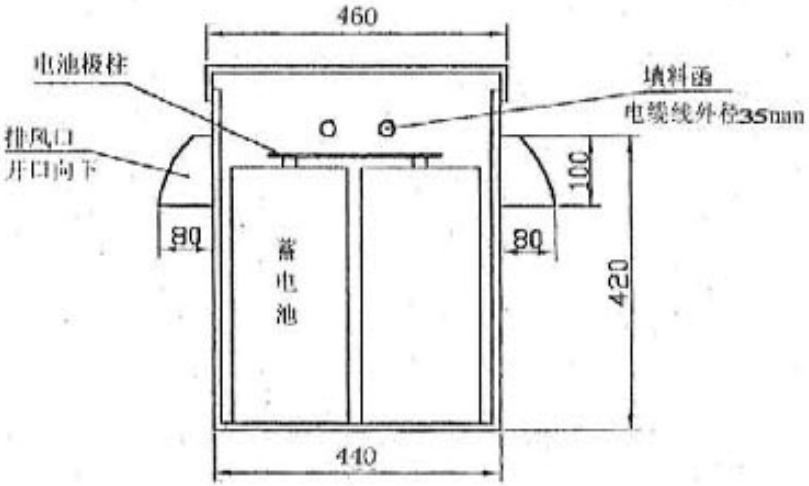


技术要求

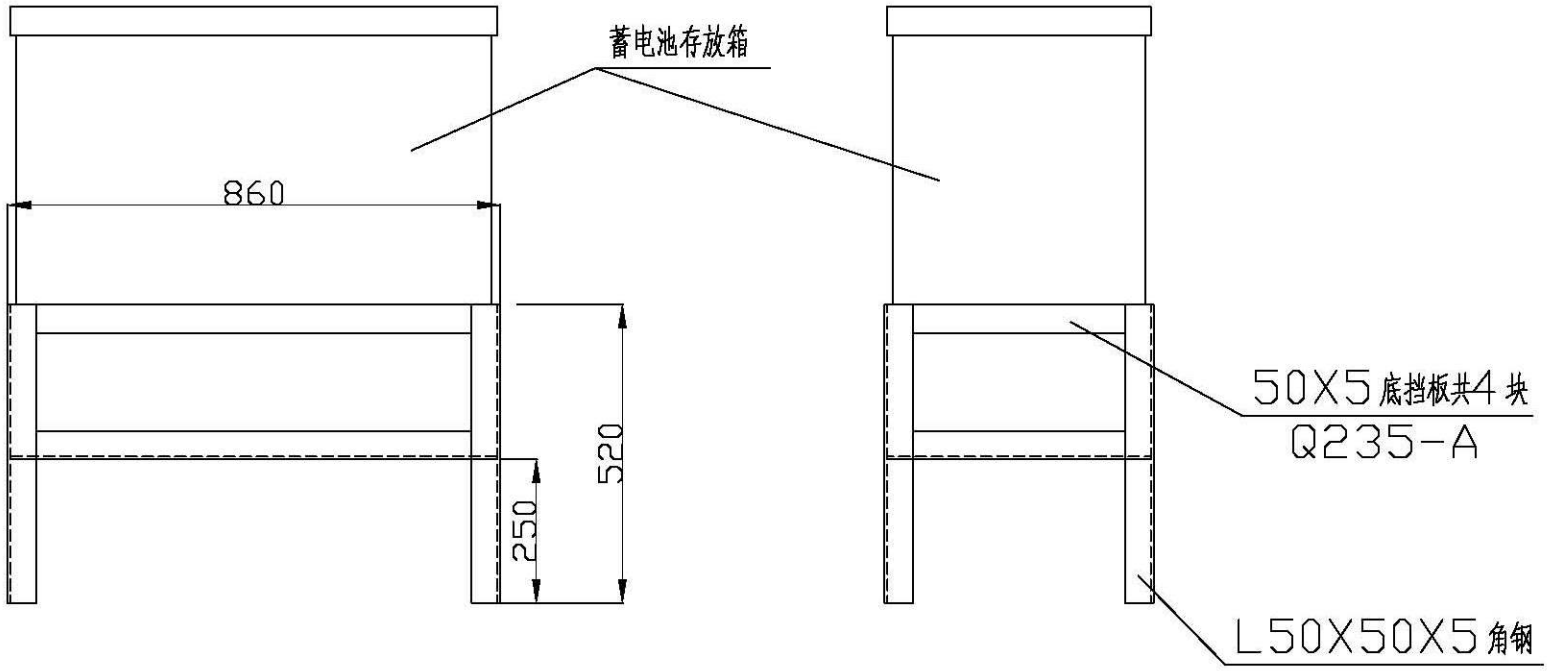
1.螺栓GB/T5782　M10x20。

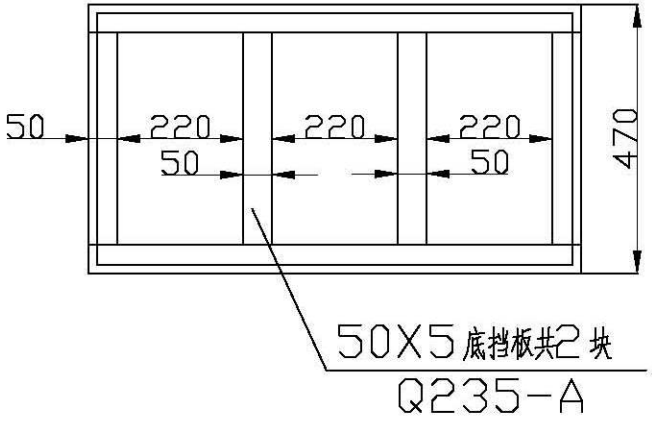
								新乡八达电源有限公司
标记	处数	分区	更改文件号		签名	年月日		
设计			标准化				阶段标记 重量 比例	六角头螺栓-全螺纹
审核								GB/T5783-2000
工艺			批准				共 张 第 张	





SIGN	PLACE No.	CHANGE DOCUMENT No.	AUTOGRAPH	DATE	蓄电池玻璃钢存放箱		
DESIGN		STANDARD	DRAWING SIGN		QUANTITY	WEIGHT	GFM200(2)
PROOFREAD		REVISION					
VERFING							
TECHNOLOGY		DATE					





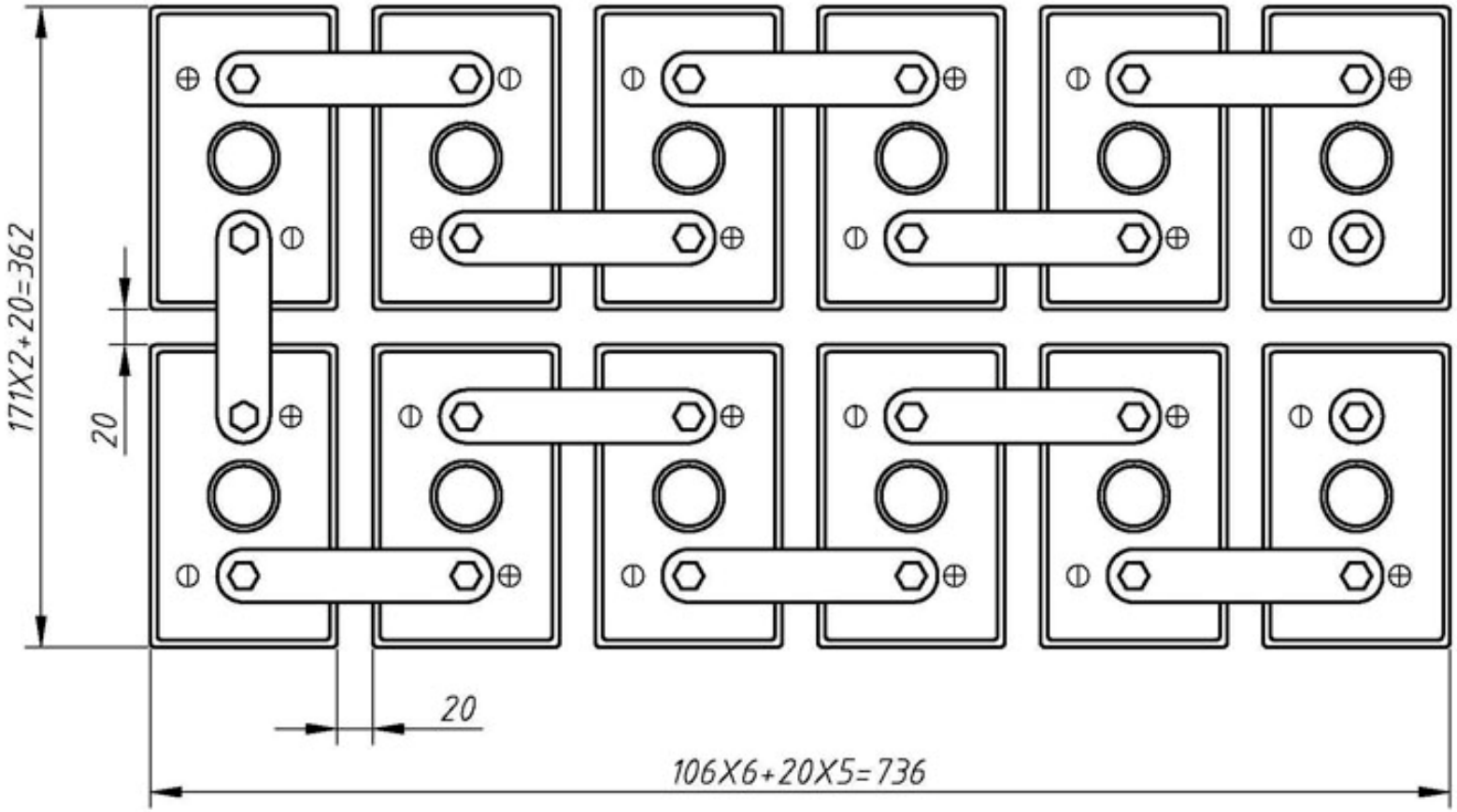
说明：

1、本蓄电池支架为烧焊结构，完工后去毛刺和焊渣，再涂防锈漆二度；

2、本支架装200AH 蓄电池箱一只；

3、制造数量每船3 只。

蓄电池支架结构图

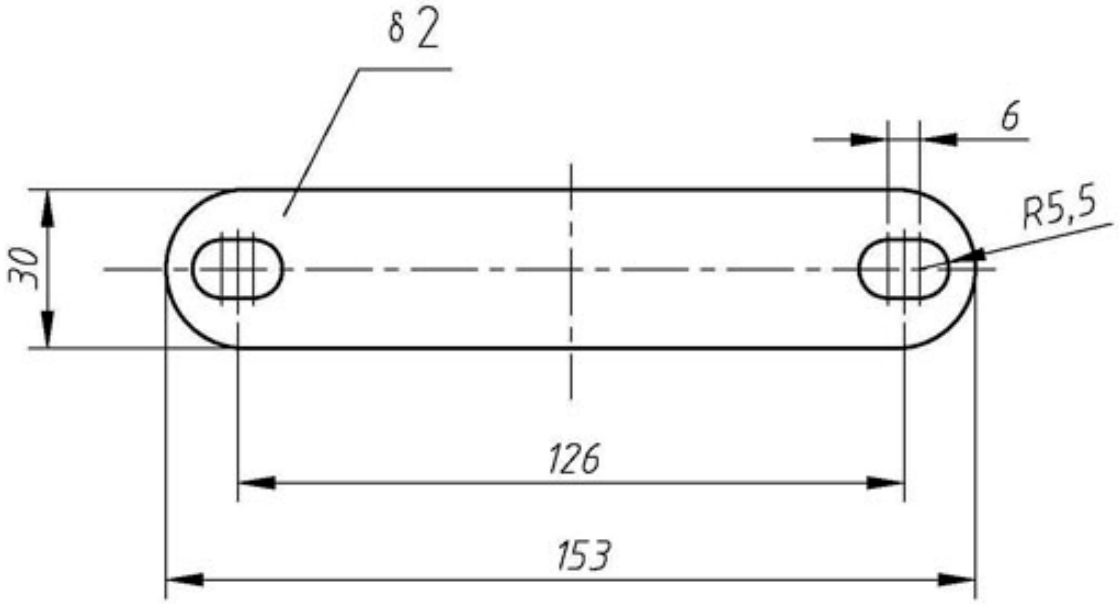


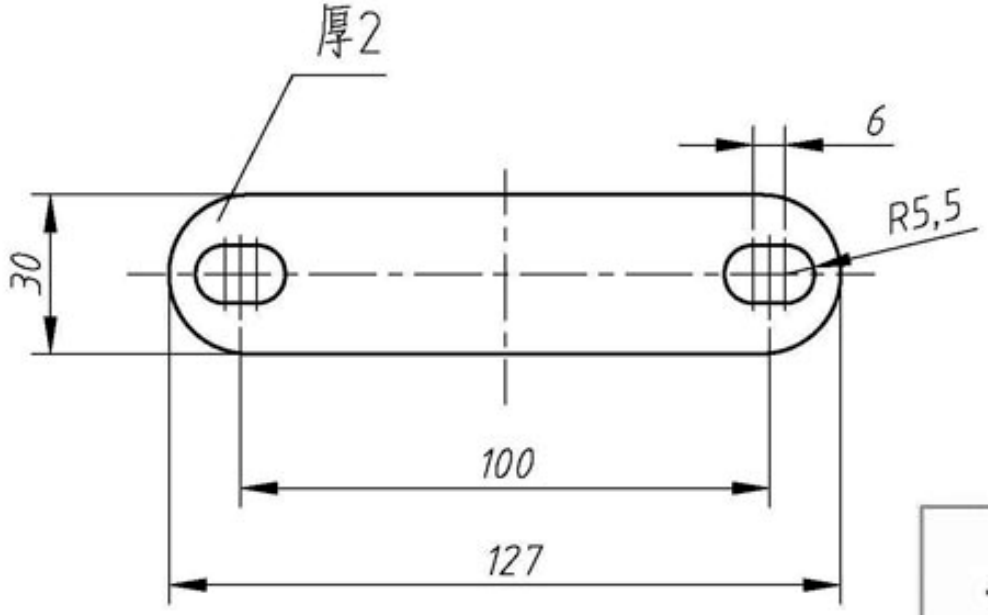
Installation drawing of battery

Xinxiang Taihang Powersource (Group) Co., Ltd.

Model:GFM-200

Design			Standard			
Check						
Craft			Approve			



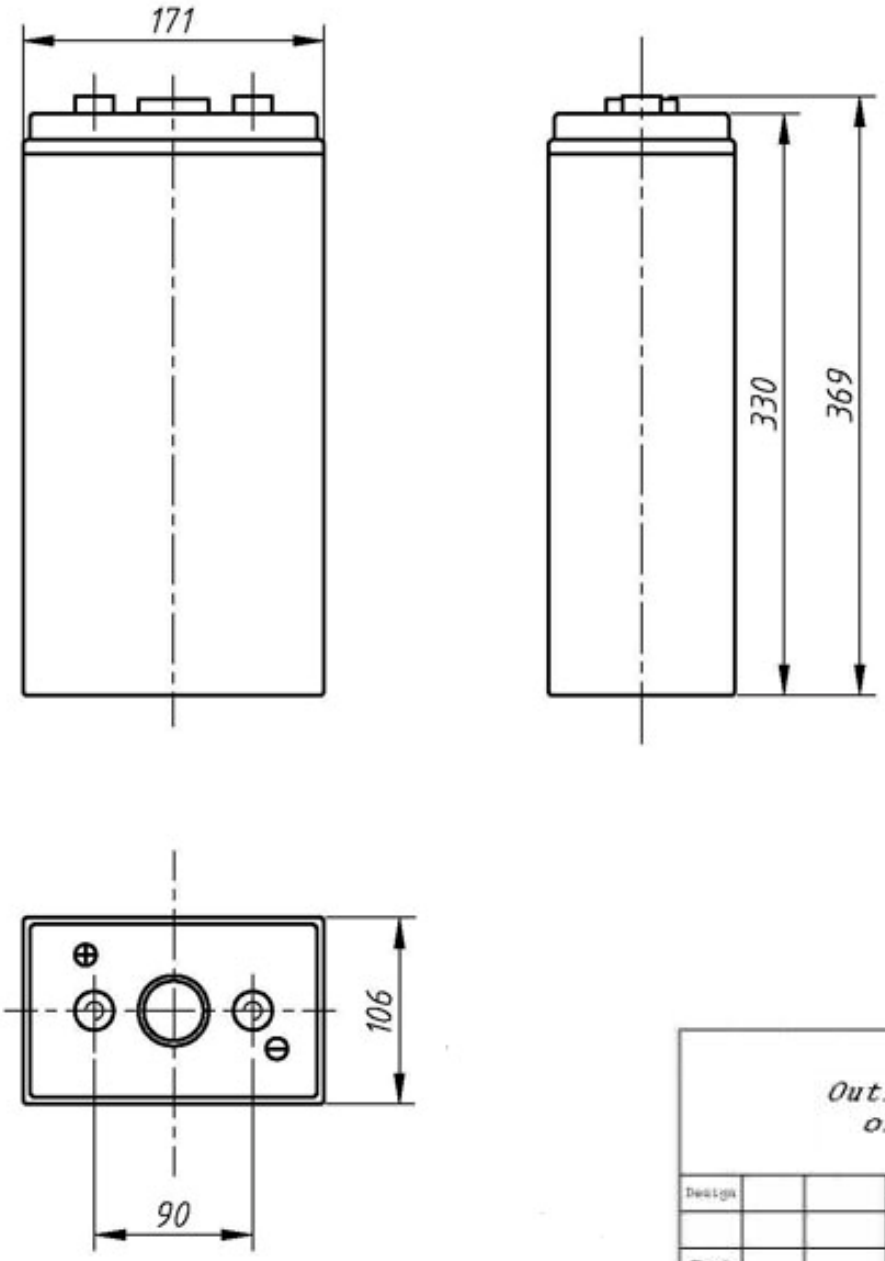


Technical specification:

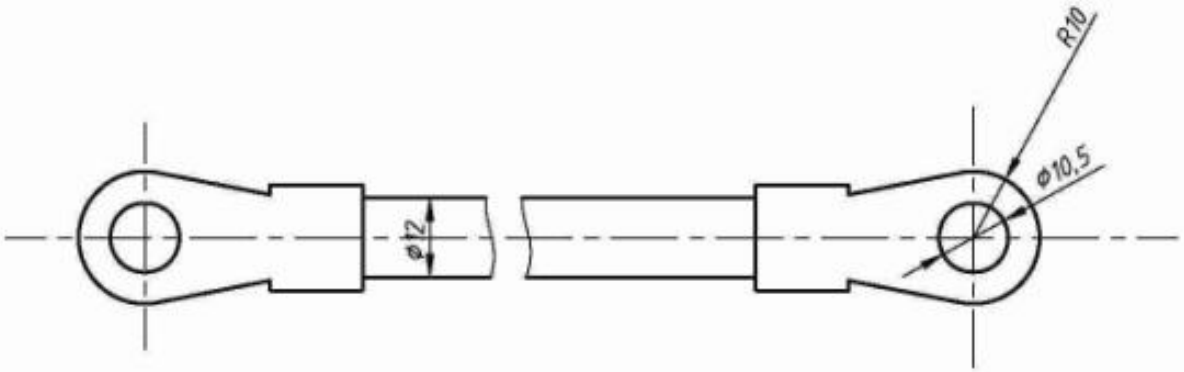
1.Tinning on the surface,close coating.

2.Not marked string tolerance should follow standard GB/1804-m mid-class.

Jumper panel of GFM-200						Xinxiang Taihang Powersource (Group) Co., Ltd.
Design			Standard			BRASS 62
Check						
Craft			Approve			



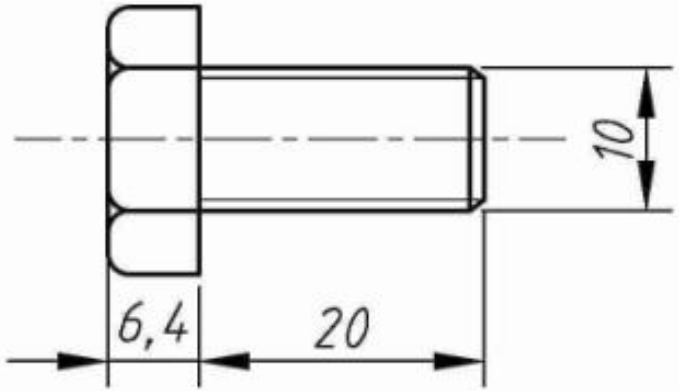
Outline drawing of battery						Xinxiang Taihang Powersource (Group) Co., Ltd.
Design			Standard			Model:GFM-200
Check						
Craft			Approve			

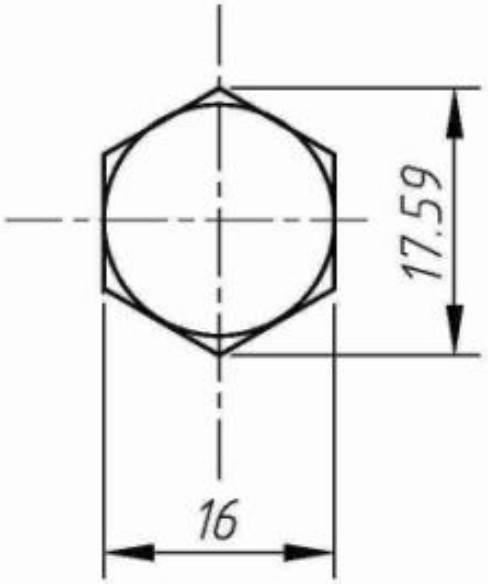


Coupling flexible wire

Xinxiang Taihang Powersource (Group) Co.. Ltd.

Design			Standard			
Check						
Craft			Approve			

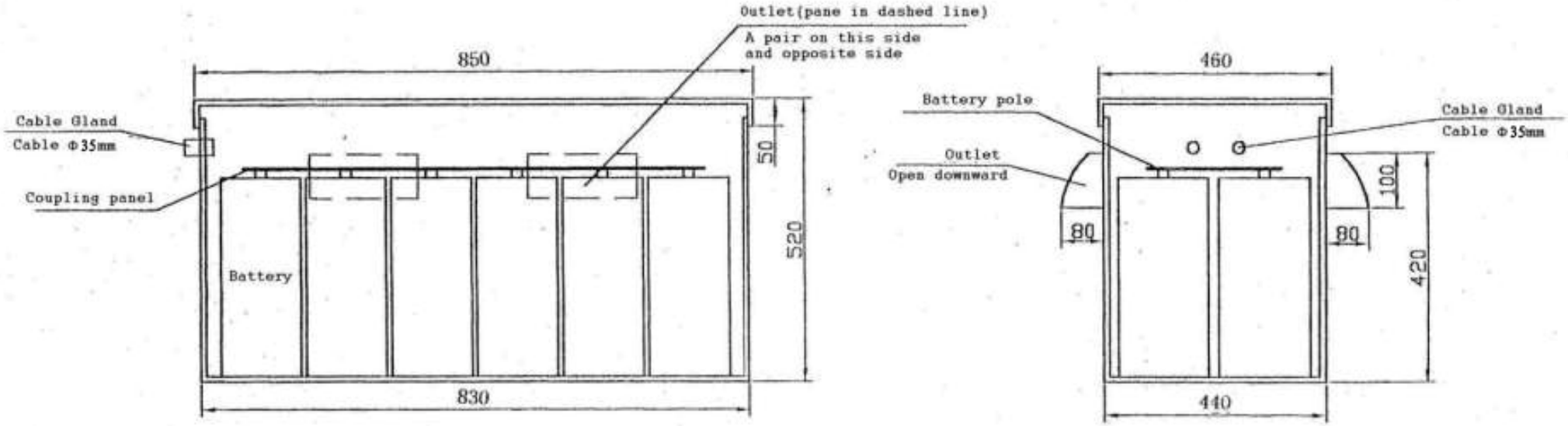




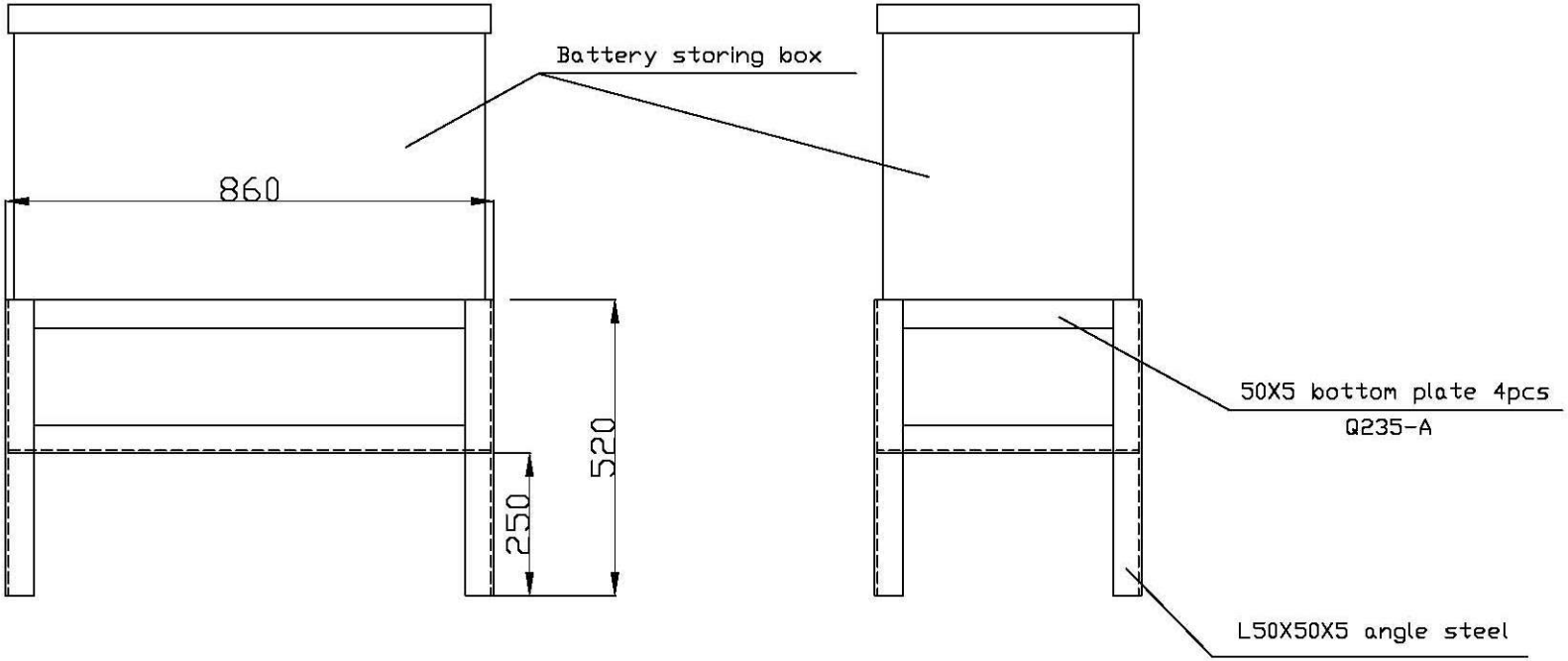
Technical specification:

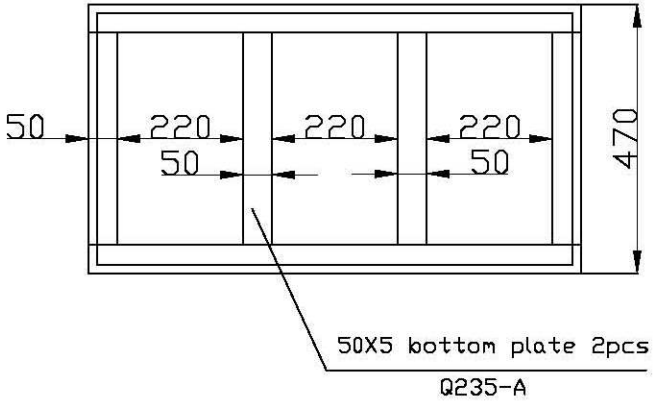
1.Standard GB/T5782 M10X20.

Hex-bolts with full thread						Xinxiang Taihang Powersource (Group) Co.. Ltd.
Design			Standard			GB/T5783-2000
Check						
Craft			Approve			



SIGN	PLACE No.	CHANGE DOCUMENT No.		AUTOGRAPH	DATE	Fibre glass storing compartment for battery	
DESIGN		STANDARD		DRAWING SIGN		QUANTITY	WEIGHT
PROOFREAD		REVISION					GFM-200(2)
VERFING							
TECHNOLOGY		DATE					





Remark:
1.The battery bracket has a structrue of welding construction, burr and welding slag should be cleaned out. Paint twice by anticorrosive varnish.
2.The battery bracket will lift one storing box of battery.
3.Three sets per ship.

Construction drawing of bracket for battery