

HD-155 型系列 LED 航标灯



使 用 说 明 书

广州宇之星电子科技有限公司



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特别说明：

1. 本说明书所列举的功能或数据为综合型编制，可能与设备实物有些差异；软件版本不同，功能、指示等可能有所不同，以客户技术要求定制为准，但不影响产品正常使用。
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第一章 产品介绍

1.1、概述

HD-155 型系列 LED 航标灯设计是蓄电池供电、太阳能充电及放电管理、GPS 或北斗定位授时、公共通讯网、LED 应用、几何光学、新型电子电路等多学科技术的光机电一体化导航产品。

航标灯控制部份内置常用的 256 种闪光灯质（符合 IALA 或国标 GB4696-84），并可以实现以 UTC 为基准的同步闪光。闪光仪集成航标工作参数采集电路，可实时采集航标灯的电池电压、工作电流、充电电压、充电电流、位置经纬度、航标灯灯质编码、亮灭状态等状态数据，并可通过串接口传出；可接收通过串行接口传入的设置命令，以设置或查询航标灯的工作参数、设置或查询航标灯的状态数据等。

航标灯可选配无线遥测遥控通信模块，通过串行接口接收闪光仪传出的设置参数或状态数据（或在需要时主动查询），经校验、分析、比对等处理后，按设定的上报周期主动上报到服务平台，当检测到电压、电流超限、灯质变化、亮灭状态异常、位置发生漂移时，自动生成报警信息上报到服务平台，服务平台显示该报警信息，以便及时处理报警。服务平台可通过 GPRS 网络或短信远程设置报警门限、基准位置、航标灯质编码、强制航标灯亮或灭、状态数据上报时间间隔、报警数据上报时间间隔、实时查询参数及状态数据等。

无线遥测遥控通信模块按照中国海事局 2005 年《海区航标遥测遥控系统



技术规范》、上海海事局 2005 年《上海海区航标遥测遥控技术导则（灯器—终端通信规约 2.11 版）》、《南海海区航标遥测遥控终端通信规约》等有关技术规范进行了兼容性设计。

HD-155 是普通型航标灯；HB-155YT 是同步闪型航标灯；HB-155YTL 是遥测遥控航标灯，其广泛适用于港口、码头、浮标、小型灯桩和塔标。

HD-155YTL 型为遥测遥控航标灯和外置的无线遥测遥控终端组成。

1.2、HD-155 型航标灯结构

HD-155 型系列航标灯由菲涅尔透镜、铝合金底座、微电脑集成控制板、GPS 同步闪光仪、无线遥测遥控系统、LED 航标光源、日光阀开关组成，整灯净重仅 3.2Kg。与供电系统完美结合组成一整套可工作闪光航标灯组。

1.3、HD-155 型系列 LED 航标灯技术参数

- 电 池：4-12V/100AH 免维护蓄电池。
- 太阳能电池： 6-18V 单晶硅太阳能板
- 光源： 超高亮度发光二极管
- LED 寿命： >10 万小时
- 静态工作电流： ≤10mA
- 休眠电流： ≤1mA
- 工作电流： 600-1200mA 可调（根据光照的强度，光敏的传导，电流大小的变化从而调节航标灯的发光亮度）
- 发光颜色： 红、黄、绿、蓝、白（可选）
- 垂直发散角： >8°



- 水平发散角：360°
- 闪光周期：256 种可调（符合 IALA 标准）。
- 射程：5-10NM（T=0.74）
- 日关阀开关灵敏度：300LX±50LX
- 接口标准：RS232\RS485 串行通讯口
- 通讯方式：GPRS、CDMA、GSM 短消息
- GPS 同步精度：<1ms
- 无 GPS 信号同步保持时间：>20h
- 连续阴雨天工作时间：>25 天
- 透 镜：塑料透镜(无色透明，抗 UV)，用聚碳酸酯注塑成型
- 底 座：铝合金压铸成型
- 工作温度：-35℃~+55℃
- 防护等级：IP65
- 外形尺寸：220×460mm
- 安装尺寸：4-φ10/φ190mm
- 整机重量：3.2 公斤
- 设计使用寿命：>5 年

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第二章 功能详解

2.1、概述

HD-155 型系列 LED 航标灯可配置无线遥测遥控通信模块，该通信模块以独立功能模块方式设计，与航标灯相对独立，从而最大限度保证通信模块的工作状态不影响航标灯正常工作。可主动查询或被动接收航标灯按设定的采集周期上报的航标灯的工作状态参数和位置信息，通过 GPRS 网络将数据按设定的发送周期发送给监测服务器；或接收监测服务器通过 GSM/GPRS 网络发送的命令，对命令进行校验识别后，响应合法的控制命令，并返回相应数据。

2.2、同步闪

HD-155YT 型航标灯内含 GPS 同步闪光仪，可以实行以 UTC 时间为基准的同步闪光，并可以与国内外所有厂家的产品实行同步连闪。

HD-155YTL 型遥测遥控航标灯内置的同步闪光模式包括美国泰兰厂家灯器同步模式、零秒同步模式、国内厂家灯器同步模式。其它同步模式需要定制。

HD-155YTL 型遥测遥控航标灯使用高精度时钟，所以同步闪光精度高，在同步后，可以在 GPS 信号不理想的情况下，保证在 20 小时内仍然保持同步。

同步闪光模式是通过多功能拨盘确定的，也可以通过 GPRS 远程数据链路开启/关闭，或改变同步闪光模式。

2.3、数据采集

HD-155YTL 型太阳能遥测遥控航标灯集成数据采集功能，主要采集航标灯的工作状态数据，主要数据包括：

- 静态电流
- 工作电压
- 工作电流
- 充电电压
- 充电电流
- 灯质编码
- 亮灭状态
- 经纬度
- 漂移距离

2.4、数据交换

HD-155YTL 型航标灯基于 GSM/GPRS/CDMA 数据通信网络与航道动态监测平台进行数据交换，实现定时或主动数据上报、远程控制的功能。数据交换标准遵循中国海事局 2005 年《海区航标遥测遥控系统技术规范》、上海海事局 2005 年《东海海区航标遥测遥控技术导则（灯器-终端通信规约 2.11 版）》。

特别说明：由于数据交换基于公共 GSM/GPRS/CDMA 数据通信网络，航标灯安装前必须确认：安装地点处于 GSM/GPRS/CDMA 网络信号覆盖范围内。

第三章 安装使用

3.1、概述

HD-155 型 LED 航标灯在出厂前已经过了严格的测试和检验，安装、调整正确与否，决定了整套系统能否正常运行。

3.2、开箱

为了安全运输，HD-155 型系列一体化太阳能航标灯使用泡沫定型包装，装箱清单如下：

内容	数量	备注
HD-155LED 航标灯	1	
使用说明书	1	
合格证	1	

3.3、安装

HD-155 型系列 LED 航标灯的安装分为两步：安装前检查和现场固定安装，安装前检查是为了确认设备在运输、开箱过程中是否有损坏，确认设备在安装之前性能正常后再进行正常安装固定。

3.3.1、安装前检查

- 1) 打开航标灯灯罩，按预选的闪频通过 1-8 位拨码搭配选择您所需要的闪频。
- 2) 检查是否接通电源。

3) 将日光阀窗口对准较亮环境（或用手电筒照射），等待约 2 秒，航标灯应能进入日间工作状态或熄灭；

3.3.3、现场

1) 选择安装位置

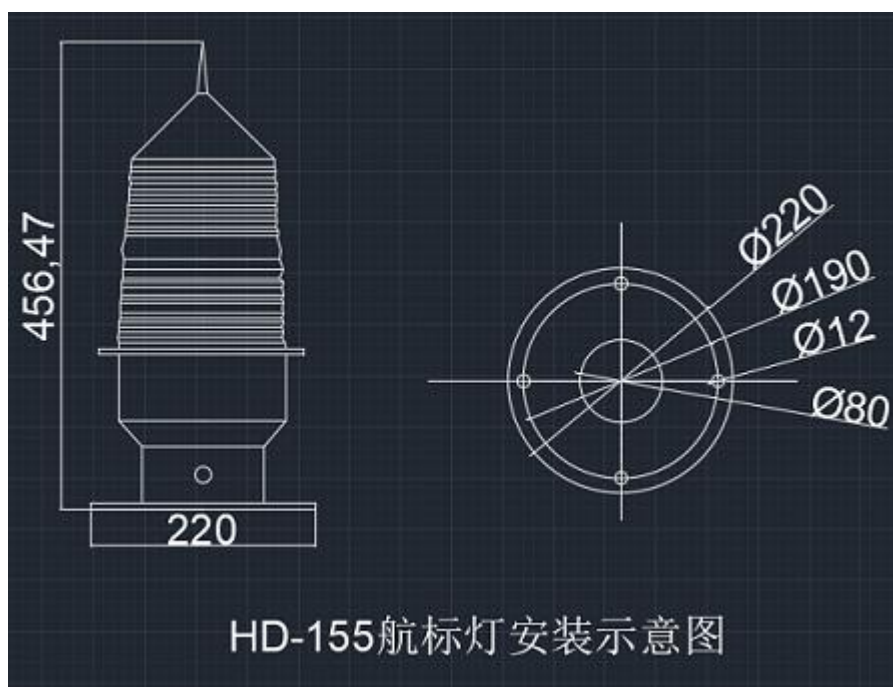
请将航标灯接地线接入控制箱接地端，否则无法确保雷击安全（航标灯本身不具备避雷作用，安装位置最好设置避雷装置）。

由于航标灯内置 GPS 天线，所以航标灯所在位置的上方不应有遮挡物，否则影响定位准确度和定位速度。

2) 日光阀朝向

日光阀窗口正面不得有物体遮挡，且应朝向开阔地带，不能正对反光物体，否则可能会造成灯质错乱、影响航标灯每天的亮灭时间。

安装结构示意图如下：



第四章 故障判断与排除及日常维护

目前常见的故障及维护方法

1、新航标灯不亮

航标灯长期放置时间超过 6 个月以上，供电设备长时间放置导致电池电压降低，初次使用时，应给电池充电。

2、清洁维护

使用一段时间后，应周期性的维护太阳能电池板，保持太阳能板的清洁，充分发挥太阳能板的转换效率。

3、存放

在决定长期库存或一段时间不使用航标灯时，在库存前，打开电池箱检查并断开 2 芯蓄电池两端接头及 2 芯太阳能电池充电插头。存放时间超过 6 个月以上再次使用时，需用专用充电器对蓄电池进行补充电。

第五章 安全事项

**安全用电：**

本设备不需要外部供电，采用内置蓄电池，接电时请注意。

**干扰：**

本设备在无线电发射信号密集区，可能会影响终端数据采集精度；在雷电干扰后，可能需要复位重启。

**防雷：**

本设备需要安装在避雷针保护范围内。

**通讯信号盲区：**

本设备如安装在通讯信号盲区，可能会影响终端的数据传输。



连接设备:
请参照说明书按正确的接线连接设备。



防水

防水性:
本设备防护等级为 IP65，可承受水从各个角度喷射，但不得长时间浸泡于水中。



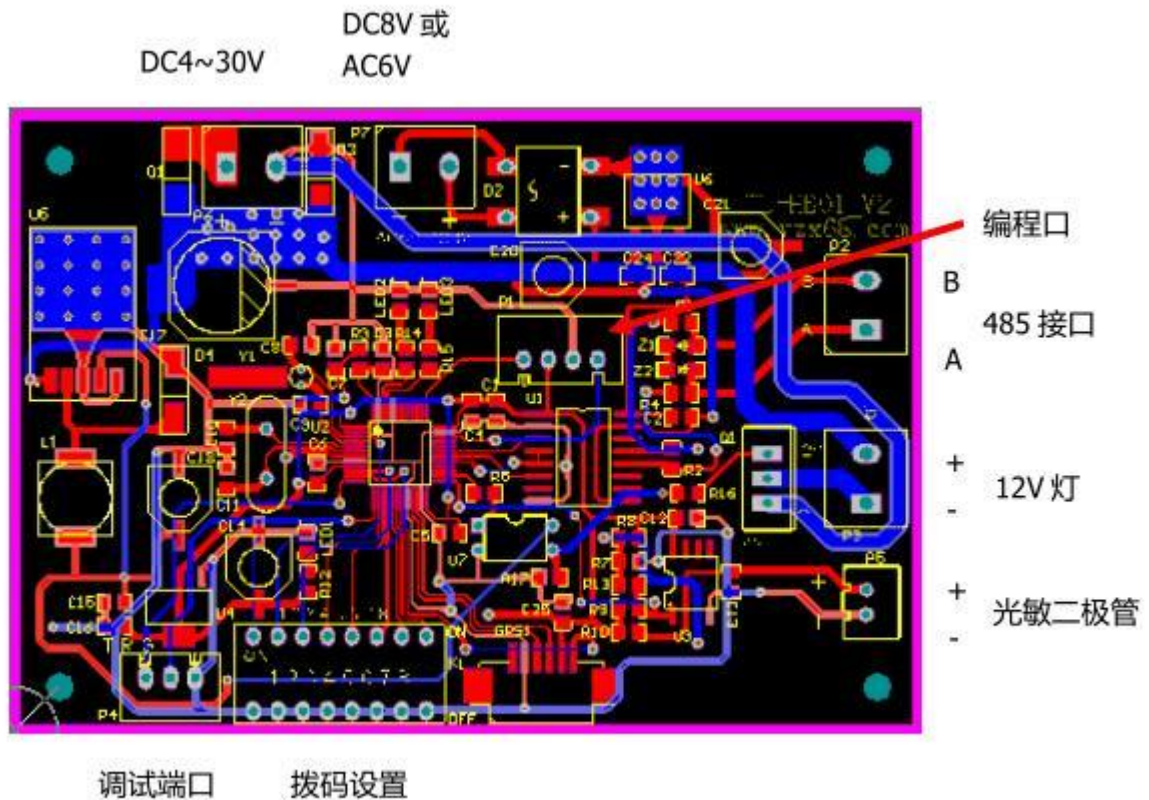
正确使用:
请参照说明书正确使用本产品；



日常维护:
请按对应的终端使用说明书进行正确的维护与保养，错误的操作可能导致终端数据采集不正确。非专业人员请勿私自拆卸，否则因此造成的

第五章 HD-155 型航标灯灯质调节对照表

HD-155L 型航标灯控制板如下图所示：



附表：灯质调节对照表

序号	灯 质	拨码开关							
		1	2	3	4	5	6	7	8
1	FXIED	ON	ON	ON	ON	ON	ON	ON	ON
2	FL1.5S (0.2+1.3)	ON	ON	ON	ON	ON	ON	ON	OFF
3	FL1.5S (0.3+1.2)	ON	ON	ON	ON	ON	ON	OFF	ON
4	FL1.5S (0.4+1.1)	ON	ON	ON	ON	ON	ON	OFF	OFF
5	FL1.5S (0.5+1.0)	ON	ON	ON	ON	ON	OFF	ON	ON
6	FL2S (0.2+1.8)	ON	ON	ON	ON	ON	OFF	ON	OFF
7	FL2S (0.3+1.7)	ON	ON	ON	ON	ON	OFF	OFF	ON
8	FL2S (0.4+1.6)	ON	ON	ON	ON	ON	OFF	OFF	OFF
9	FL2S (0.5+1.5)	ON	ON	ON	ON	OFF	ON	ON	ON
10	FL2S (0.7+1.3)	ON	ON	ON	ON	OFF	ON	ON	OFF
11	FL2S (0.8+1.2)	ON	ON	ON	ON	OFF	ON	OFF	ON
12	FL2.5S (0.3+2.2)	ON	ON	ON	ON	OFF	ON	OFF	OFF
13	FL2.5S (0.5+2.0)	ON	ON	ON	ON	OFF	OFF	ON	ON
14	FL3S (0.2+2.8)	ON	ON	ON	ON	OFF	OFF	ON	OFF



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15	FL3S (0.3+2.7)	ON	ON	ON	ON	OFF	OFF	OFF	ON
16	FL3S (0.4+2.6)	ON	ON	ON	ON	OFF	OFF	OFF	OFF
17	FL3S (0.5+2.5)	ON	ON	ON	OFF	ON	ON	ON	ON
18	FL3S (0.6+2.4)	ON	ON	ON	OFF	ON	ON	ON	OFF
19	FL3S (0.7+2.3)	ON	ON	ON	OFF	ON	ON	OFF	ON
20	FL3S (1.0+2.0)	ON	ON	ON	OFF	ON	ON	OFF	OFF
21	FL4S (0.2+3.8)	ON	ON	ON	OFF	ON	OFF	ON	ON
22	FL4S (0.3+3.7)	ON	ON	ON	OFF	ON	OFF	ON	OFF
23	FL4S (0.4+3.6)	ON	ON	ON	OFF	ON	OFF	OFF	ON
24	FL4S (0.5+3.5)	ON	ON	ON	OFF	ON	OFF	OFF	OFF
25	FL4S (0.6+3.4)	ON	ON	ON	OFF	OFF	ON	ON	ON
26	FL4S (0.8+3.2)	ON	ON	ON	OFF	OFF	ON	ON	OFF
27	FL4S (1.0+3.0)	ON	ON	ON	OFF	OFF	ON	OFF	ON
28	FL4S (1.5+2.5)	ON	ON	ON	OFF	OFF	ON	OFF	OFF
29	FL4.3S (1.3+3.0)	ON	ON	ON	OFF	OFF	OFF	ON	ON
30	FL5S (0.2+4.8)	ON	ON	ON	OFF	OFF	OFF	ON	OFF
31	FL5S (0.3+4.7)	ON	ON	ON	OFF	OFF	OFF	OFF	ON
32	FL5S (0.5+4.5)	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
33	FL5S (0.9+4.1)	ON	ON	OFF	ON	ON	ON	ON	ON
34	FL5S (1.0+4.0)	ON	ON	OFF	ON	ON	ON	ON	OFF
35	FL5S (1.5+3.5)	ON	ON	OFF	ON	ON	ON	OFF	ON
36	FL6S (0.2+5.8)	ON	ON	OFF	ON	ON	ON	OFF	OFF
37	FL6S (0.3+5.7)	ON	ON	OFF	ON	ON	OFF	ON	ON
38	FL6S (0.4+5.6)	ON	ON	OFF	ON	ON	OFF	ON	OFF
39	FL6S (0.5+5.5)	ON	ON	OFF	ON	ON	OFF	OFF	ON
40	FL6S (0.8+5.2)	ON	ON	OFF	ON	ON	OFF	OFF	OFF
41	FL6S (1.0+5.0)	ON	ON	OFF	ON	OFF	ON	ON	ON
42	FL6S (1.2+4.8)	ON	ON	OFF	ON	OFF	ON	ON	OFF
43	FL6S (1.5+4.5)	ON	ON	OFF	ON	OFF	ON	OFF	ON
44	FL7S (1.0+6.0)	ON	ON	OFF	ON	OFF	ON	OFF	OFF
45	FL7S (2.0+5.0)	ON	ON	OFF	ON	OFF	OFF	ON	ON
46	FL7.5S (0.5+7.0)	ON	ON	OFF	ON	OFF	OFF	ON	OFF
47	FL8S (0.5+7.5)	ON	ON	OFF	ON	OFF	OFF	OFF	ON
48	FL8S (1.0+7.0)	ON	ON	OFF	ON	OFF	OFF	OFF	OFF
49	FL9S (0.9+8.1)	ON	ON	OFF	OFF	ON	ON	ON	ON
50	FL9S (1.0+8.0)	ON	ON	OFF	OFF	ON	ON	ON	OFF
51	FL10S (0.3+9.7)	ON	ON	OFF	OFF	ON	ON	OFF	ON
52	FL10S (1.0+9.0)	ON	ON	OFF	OFF	ON	ON	OFF	OFF
53	FL10S (1.5+8.5)	ON	ON	OFF	OFF	ON	OFF	ON	ON
54	FL12S (2.5+9.5)	ON	ON	OFF	OFF	ON	OFF	ON	OFF
55	FL15S (1.0+14.0)	ON	ON	OFF	OFF	ON	OFF	OFF	ON



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56	FL30S (1.0+29.0)	ON	ON	OFF	OFF	ON	OFF	OFF	OFF
57	FL (2) 4S (0.5+1.0, 0.5+2.0)	ON	ON	OFF	OFF	OFF	ON	ON	ON
58	FL (2) 4.5S (0.4+1.0, 0.4+2.7)	ON	ON	OFF	OFF	OFF	ON	ON	OFF
59	FL (2) 5S (0.2+1.2, 0.2+3.4)	ON	ON	OFF	OFF	OFF	ON	OFF	ON
60	FL (2) 5S (0.4+0.6, 0.4+3.6)	ON	ON	OFF	OFF	OFF	ON	OFF	OFF
61	FL (2) 5S (0.5+0.5, 0.5+3.5)	ON	ON	OFF	OFF	OFF	OFF	ON	ON
62	FL (2) 5S (0.5+1.0, 0.5+3.0)	ON	ON	OFF	OFF	OFF	OFF	ON	OFF
63	FL (2) 5.5S (0.4+1.4, 0.4+3.3)	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
64	FL (2) 6S (0.5+1.0, 0.5+4.0)	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
65	FL (2) 4S (0.5+0.5, 0.5+4.5)	ON	OFF	ON	ON	ON	ON	ON	ON
66	FL (2) 6S (1.0+1.0, 1.0+3.0)	ON	OFF	ON	ON	ON	ON	ON	OFF
67	FL (2) 7S (1.0+1.0, 1.0+4.0)	ON	OFF	ON	ON	ON	ON	OFF	ON
68	FL (2) 8S (0.4+1.0, 0.4+6.2)	ON	OFF	ON	ON	ON	ON	OFF	OFF
69	FL (2) 8S (0.5+1.0, 0.5+6.0)	ON	OFF	ON	ON	ON	OFF	ON	ON
70	FL (2) 8S (1.5+1.0, 1.0+5.0)	ON	OFF	ON	ON	ON	OFF	ON	OFF
71	FL (2) 10S (0.4+1.6, 0.4+7.6)	ON	OFF	ON	ON	ON	OFF	OFF	ON
72	FL (2) 10S (0.5+1.0, 0.5+8.0)	ON	OFF	ON	ON	ON	OFF	OFF	OFF
73	FL (2) 10S (0.5+1.5, 0.5+7.5)	ON	OFF	ON	ON	OFF	ON	ON	ON
74	FL (2) 10S (1.0+1.0, 1.0+7.0)	ON	OFF	ON	ON	OFF	ON	ON	OFF
75	FL (2) 10S (1.0+1.5, 1.0+6.5)	ON	OFF	ON	ON	OFF	ON	OFF	ON
76	FL (2) 12S (0.4+1.0, 0.4+10.2)	ON	OFF	ON	ON	OFF	ON	OFF	OFF
77	FL (2) 12S (0.5+1.0, 0.5+10.0)	ON	OFF	ON	ON	OFF	OFF	ON	ON
78	FL (2) 12S (1.5+2.0, 1.5+7.0)	ON	OFF	ON	ON	OFF	OFF	ON	OFF
79	FL (2) 15S (1.0+2.0, 1.0+11.0)	ON	OFF	ON	ON	OFF	OFF	OFF	ON
80	FL (2) 20S (1.0+3.0, 1.0+15.0)	ON	OFF	ON	ON	OFF	OFF	OFF	OFF
81	FL (2) 25S (1.0+1.0, 1.0+22.0)	ON	OFF	ON	OFF	ON	ON	ON	ON
82	FL (3) 5S (0.25+0.25, 0.25+0.25, 0.25+ 3.75)	ON	OFF	ON	OFF	ON	ON	ON	OFF
83	FL (3) 6S (0.4+0.8, 0.4+0.8, 0.4+3.2)	ON	OFF	ON	OFF	ON	ON	OFF	ON
84	FL (3) 6S (0.4+1.2, 0.4+1.2, 0.4+2.4)	ON	OFF	ON	OFF	ON	ON	OFF	OFF
85	FL (3) 6S (0.5+1.0, 0.5+1.0, 0.5+2.5)	ON	OFF	ON	OFF	ON	OFF	ON	ON
86	FL (3) 6S (0.5+0.5, 0.5+0.5, 0.5+3.5)	ON	OFF	ON	OFF	ON	OFF	ON	OFF
87	FL (3) 8S (0.5+1.0, 0.5+1.0, 0.5+4.5)	ON	OFF	ON	OFF	ON	OFF	OFF	ON
88	FL (3) 9S (0.3+1.0, 0.3+1.0, 0.3+6.1)	ON	OFF	ON	OFF	ON	OFF	OFF	OFF



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89	FL (3) 9S (0.8+1.2, 0.8+1.2, 0.8+4.2)	ON	OFF	ON	OFF	OFF	ON	ON	ON
90	FL (3) 10S (0.5+0.5, 0.5+0.5, 0.5+7.5)	ON	OFF	ON	OFF	OFF	ON	ON	OFF
91	FL (3) 10S (0.5+1.0, 0.5+1.0, 0.5+6.5)	ON	OFF	ON	OFF	OFF	ON	OFF	ON
92	FL (3) 10S (1.0+1.0, 1.0+1.0, 1.0+5.0)	ON	OFF	ON	OFF	OFF	ON	OFF	OFF
93	FL (3) 12S (0.5+2.0, 0.5+2.0, 0.5+6.5)	ON	OFF	ON	OFF	OFF	OFF	ON	ON
94	FL (3) 12S (0.8+1.2, 0.8+1.2, 0.8+7.2)	ON	OFF	ON	OFF	OFF	OFF	ON	OFF
95	FL (3) 15S (0.3+1.7, 0.3+1.7, 0.3+10.7)	ON	OFF	ON	OFF	OFF	OFF	OFF	ON
96	FL (3) 15S (0.5+1.5, 0.5+1.5, 0.5+10.5)	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
97	FL (3) 20S (0.5+0.5, 0.5+0.5, 0.5+17.5)	ON	OFF	OFF	ON	ON	ON	ON	ON
98	FL (3) 20S (0.5+1.5, 0.5+1.5, 0.5+15.5)	ON	OFF	OFF	ON	ON	ON	ON	OFF
99	FL (3) 20S (0.8+1.2, 0.8+1.2, 0.8+12.2)	ON	OFF	OFF	ON	ON	ON	OFF	ON
100	FL (3) 20S (1.0+1.0, 1.0+1.0, 1.0+15)	ON	OFF	OFF	ON	ON	ON	OFF	OFF
101	FL (4) 8S (0.4+0.4, 1.2+0.4, 1.2+0.4, 0.4+3.6)	ON	OFF	OFF	ON	ON	OFF	ON	ON
102	FL (4) 8S (0.5+0.5, 0.5+0.5, 0.5+0.5, 0.5+4.5)	ON	OFF	OFF	ON	ON	OFF	ON	OFF
103	FL (4) 10S (0.5+1.0, 0.5+1.0, 0.5+1.0, 0.5+5.0)	ON	OFF	OFF	ON	ON	OFF	OFF	ON
104	FL (4) 10S (0.8+1.2, 0.8+1.2, 0.8+1.2, 0.8+3.2)	ON	OFF	OFF	ON	ON	OFF	OFF	OFF
105	FL (4) 12S (0.3+1.7, 0.3+1.7, 0.3+1.7, 0.3+5.7)	ON	OFF	OFF	ON	OFF	ON	ON	ON
106	FL (4) 12S (0.5+1.5, 0.5+1.5, 0.5+1.5, 0.5+5.5)	ON	OFF	OFF	ON	OFF	ON	ON	OFF



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107	FL (4) 12S (0.8+1.2, 0.8+1.2, 0.8+1.2, 0.8+5.2)	ON	OFF	OFF	ON	OFF	ON	OFF	ON
108	FL (4) 15S (0.5+1.5, 0.5+1.5, 0.5+1.5, 0.5+8.5)	ON	OFF	OFF	ON	OFF	ON	OFF	OFF
109	FL (4) 15S (1.0+1.0, 1.0+1.0, 1.0+1.0, 1.0+8.0)	ON	OFF	OFF	ON	OFF	OFF	ON	ON
110	FL (4) 16S (0.5+1.5, 0.5+1.5, 0.5+1.5, 0.5+9.5)	ON	OFF	OFF	ON	OFF	OFF	ON	OFF
111	FL (4) 20S (0.3+3.0, 0.3+3.0, 0.3+3.0, 0.3+9.8)	ON	OFF	OFF	ON	OFF	OFF	OFF	ON
112	FL (4) 20S (0.5+1.5, 0.5+1.5, 0.5+1.5, 0.5+13.5)	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
113	FL (4) 20S (1.5+1.5, 1.5+1.5, 1.5+1.5, 1.5+9.5)	ON	OFF	OFF	OFF	ON	ON	ON	ON
114	FL (4) 30S (0.5+0.5, 0.5+0.5, 0.5+0.5, 0.5+26.5)	ON	OFF	OFF	OFF	ON	ON	ON	OFF
115	FL (5) 20S (1.0+1.0, 1.0+1.0, 1.0+1.0, 1.0+1.0, 1.0+11.0)	ON	OFF	OFF	OFF	ON	ON	OFF	ON
116	FL (6) 12S (0.25+1.25, 0.25+1.25, 0.25+1.25, 0.25+1.25, 0.25+1.25, 0.25+4.25)	ON	OFF	OFF	OFF	ON	ON	OFF	OFF
117	FL (6) 15S (0.5+1.0, 0.5+1.0, 0.5+1.0, 0.5+1.0, 0.5+1.0, 0.5+7.0)	ON	OFF	OFF	OFF	ON	OFF	ON	ON
118	FL (2+1) 6S (0.3+0.4, 0.3+1.2, 0.3+3.5)	ON	OFF	OFF	OFF	ON	OFF	ON	OFF
119	FL (2+1) 6S (0.5+0.5, 0.5+1.0, 0.5+3.0)	ON	OFF	OFF	OFF	ON	OFF	OFF	ON
120	FL (2+1) 9S (0.5+0.5, 0.5+1.5, 0.5+5.5)	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
121	FL (2+1) 10S (0.5+0.5, 0.5+1.5, 0.5+6.5)	ON	OFF	OFF	OFF	OFF	ON	ON	ON
122	FL (2+1) 12S	ON	OFF	OFF	OFF	OFF	ON	ON	OFF



HD-155 型系列 LED 航标灯

	(1.0+1.0, 1.0+2.0, 1.0+6.0)								
123	FL (2+1) 12S (1.0+1.0, 1.0+4.0, 1.0+4.0)	ON	OFF	OFF	OFF	OFF	ON	OFF	ON
124	FL (2+1) 15S (1.0+2.0, 1.0+5.0, 1.0+5.0)	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF
125	IS02S (1.0+1.0)	ON	OFF	OFF	OFF	OFF	OFF	ON	ON
126	IS03S (1.5+1.5)	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF
127	IS04S (2.0+2.0)	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON
128	IS05S (2.5+2.5)	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
129	IS06S (3.0+3.0)	OFF	ON	ON	ON	ON	ON	ON	ON
130	IS08S (4.0+4.0)	OFF	ON	ON	ON	ON	ON	ON	OFF
131	IS010S (5.0+5.0)	OFF	ON	ON	ON	ON	ON	OFF	ON
132	IFL5S (2.0+3.0)	OFF	ON	ON	ON	ON	ON	OFF	OFF
133	IFL6S (2.0+4.0)	OFF	ON	ON	ON	ON	OFF	ON	ON
134	IFL8S (2.0+6.0)	OFF	ON	ON	ON	ON	OFF	ON	OFF
135	IFL8S (3.0+5.0)	OFF	ON	ON	ON	ON	OFF	OFF	ON
136	IFL10S (2.0+8.0)	OFF	ON	ON	ON	ON	OFF	OFF	OFF
137	IFL10S (3.0+7.0)	OFF	ON	ON	ON	OFF	ON	ON	ON
138	IFL10S (4.0+6.0)	OFF	ON	ON	ON	OFF	ON	ON	OFF
139	IFL12S (2.0+10.0)	OFF	ON	ON	ON	OFF	ON	OFF	ON
140	IFL15S (4.0+11.0)	OFF	ON	ON	ON	OFF	ON	OFF	OFF
141	MO (A) 6S (0.5+0.5, 1.5+3.5)	OFF	ON	ON	ON	OFF	OFF	ON	ON
142	MO (A) 8S (0.5+0.5, 1.5+3.5)	OFF	ON	ON	ON	OFF	OFF	ON	OFF
143	MO (A) 8S (0.4+0.6, 2.0+5.0)	OFF	ON	ON	ON	OFF	OFF	OFF	ON
144	MO (A) 8S (0.8+1.2, 2.4+3.6)	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
145	MO (A) 10S (0.5+0.5, 1.5+7.5)	OFF	ON	ON	OFF	ON	ON	ON	ON
146	MO (A) 15S (0.5+1.5, 2.0+11)	OFF	ON	ON	OFF	ON	ON	ON	OFF
147	MO (B) 15S (1.5+0.5, 0.5+0.5, 0.5+0.5, 0.5+10.5)	OFF	ON	ON	OFF	ON	ON	OFF	ON
148	MO (B) 30S (2.5+1.0, 0.75+1.0, 0.75+1.0, 0.75+22.25)	OFF	ON	ON	OFF	ON	ON	OFF	OFF
149	MO (C) 12S (1.5+0.5, 0.5+0.5, 1.5+0.5, 0.5+6.5)	OFF	ON	ON	OFF	ON	OFF	ON	ON
150	MO (C) 15S (1.5+0.5, 0.5+0.5, 1.5+0.5, 0.5+9.5)	OFF	ON	ON	OFF	ON	OFF	ON	OFF
151	MO (D) 8S (1.5+0.5, 0.5+0.5, 0.5+4.5)	OFF	ON	ON	OFF	ON	OFF	OFF	ON
152	MO (D) 8S (1.2+0.4, 0.4+0.4, 0.4+5.2)	OFF	ON	ON	OFF	ON	OFF	OFF	OFF
153	MO (D) 10S (0.3+1.0, 0.3+1.0, 0.3+7.1)	OFF	ON	ON	OFF	OFF	ON	ON	ON



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154	MO(D) 10S (5.0+1.0, 1.0+1.0, 1.0+1.0)	OFF	ON	ON	OFF	OFF	ON	ON	OFF
155	MO(D) 12S (0.5+0.5, 0.5+0.5, 1.5+0.5+0.5+7.5)	OFF	ON	ON	OFF	OFF	ON	OFF	ON
156	MO(D) 15S (0.5+0.5, 0.5+0.5, 1.5+0.5, 0.5+10.5)	OFF	ON	ON	OFF	OFF	ON	OFF	OFF
157	MO(K) 10S (1.5+0.5, 0.5+0.5, 1.5+5.5)	OFF	ON	ON	OFF	OFF	OFF	ON	ON
158	MO(K) 12S (1.5+0.5, 0.5+0.5, 1.5+7.5)	OFF	ON	ON	OFF	OFF	OFF	ON	OFF
159	MO(K) 15S (1.5+0.5, 0.5+0.5, 1.5+10.5)	OFF	ON	ON	OFF	OFF	OFF	OFF	ON
160	MO(L) 8S (0.5+0.5, 1.5+0.5, 0.5+0.5, 0.5+3.5)	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
161	MO(M) 8S (1.2+0.4, 1.2+5.2)	OFF	ON	OFF	ON	ON	ON	ON	ON
162	MO(M) 8S (1.5+0.5, 1.5+4.5)	OFF	ON	OFF	ON	ON	ON	ON	OFF
163	MO(N) 6S (1.2+0.4, 0.4+4.0)	OFF	ON	OFF	ON	ON	ON	OFF	ON
164	MO(N) 6S (1.5+0.5, 0.5+3.5)	OFF	ON	OFF	ON	ON	ON	OFF	OFF
165	MO(N) 8S (5.0+1.0, 1.0+1.0)	OFF	ON	OFF	ON	ON	OFF	ON	ON
166	MO(O) 12S (1.5+0.5, 1.5+0.5, 1.5+6.5)	OFF	ON	OFF	ON	ON	OFF	ON	OFF
167	MO(O) 15S (1.5+0.5, 1.5+0.5, 1.5+9.5)	OFF	ON	OFF	ON	ON	OFF	OFF	ON
168	MO(P) 8S (0.4+0.4, 1.2+0.4, 1.2+0.4, 0.4+3.6)	OFF	ON	OFF	ON	ON	OFF	OFF	OFF
169	MO(P) 10S (0.5+0.5, 1.5+0.5, 1.5+0.5, 0.5+4.5)	OFF	ON	OFF	ON	OFF	ON	ON	ON
170	MO(P) 12S (0.5+0.5, 1.5+0.5, 1.5+0.5, 0.5+6.5)	OFF	ON	OFF	ON	OFF	ON	ON	OFF
171	MO(P) 15S (0.5+0.5, 1.5+0.5, 1.5+0.5, 0.5+9.5)	OFF	ON	OFF	ON	OFF	ON	OFF	ON
172	MO(Q) 12S (1.5+0.5, 1.5+0.5, 0.5+0.5, 1.5+5.5)	OFF	ON	OFF	ON	OFF	ON	OFF	OFF
173	MO(Q) 15S (1.5+0.5, 1.5+0.5, 1.5+0.5, 1.5+8.5)	OFF	ON	OFF	ON	OFF	OFF	ON	ON
174	MO(R) 8S (0.5+0.5, 1.5+0.5, 0.5+4.5)	OFF	ON	OFF	ON	OFF	OFF	ON	OFF
175	MO(U) 10S (0.4+0.6, 0.4+0.6, 1.2+6.8)	OFF	ON	OFF	ON	OFF	OFF	OFF	ON
176	MO(U) 10S (0.5+0.5, 0.5+0.5, 1.5+6.5)	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF
177	MO(U) 12S (0.5+0.5, 0.5+0.5, 1.5+6.5)	OFF	ON	OFF	OFF	ON	ON	ON	ON



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	5+8.5)								
178	MO(U)15S(0.5+0.5, 0.5+0.5, 1.5+11.5)	OFF	ON	OFF	OFF	ON	ON	ON	OFF
179	MO(U)15S(0.6+0.3, 0.6+0.3, 1.4+11.8)	OFF	ON	OFF	OFF	ON	ON	OFF	ON
180	MO(U)15S(0.6+0.3, 0.6+0.3, 1.5+11.7)	OFF	ON	OFF	OFF	ON	ON	OFF	OFF
181	MO(U)15S(0.65+0.25, 0.65+0.25, 1.5+11.7)	OFF	ON	OFF	OFF	ON	OFF	ON	ON
182	MO(U)15S(0.8+0.1, 0.8+0.1, 1.5+11.7)	OFF	ON	OFF	OFF	ON	OFF	ON	OFF
183	MO(U)30S(0.75+1.0, 0.75+1.0, 2.5+24)	OFF	ON	OFF	OFF	ON	OFF	OFF	ON
184	MO(V)8S(0.4+0.4, 0.4+0.4, 0.4+0.4, 1.2+4.4)	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF
185	MO(V)8S(0.5+0.5, 0.5+0.5, 0.5+0.5, 1.5+3.5)	OFF	ON	OFF	OFF	OFF	ON	ON	ON
186	MO(W)10S(0.5+0.5, 1.5+0.5, 1.5+5.5)	OFF	ON	OFF	OFF	OFF	ON	ON	OFF
187	MO(X)8S(1.2+0.4, 0.4+0.4, 0.4+0.4, 1.2+3.6)	OFF	ON	OFF	OFF	OFF	ON	OFF	ON
188	MO(Y)10S(1.5+0.5, 0.5+0.5, 1.5+0.5, 1.5+3.5)	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
189	MO(Y)12S(1.5+0.5, 0.5+0.5, 1.5+0.5, 1.5+5.5)	OFF	ON	OFF	OFF	OFF	OFF	ON	ON
190	MO(Z)12S(1.5+0.5, 1.5+0.5, 0.5+0.5, 0.5+6.5)	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF
191	MO(Z)10S(1.5+0.5, 1.5+0.5, 0.5+0.5, 0.5+4.5)	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON
192	OC3S(2.0+1.0)	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
193	OC3S(2.5+0.5)	OFF	OFF	ON	ON	ON	ON	ON	ON
194	OC3.5S(2.5+1.0)	OFF	OFF	ON	ON	ON	ON	ON	OFF
195	OC4S(2.5+1.5)	OFF	OFF	ON	ON	ON	ON	OFF	ON
196	OC4S(3.0+1.0)	OFF	OFF	ON	ON	ON	ON	OFF	OFF
197	OC5S(3.0+2.0)	OFF	OFF	ON	ON	ON	OFF	ON	ON
198	OC5S(4.0+1.0)	OFF	OFF	ON	ON	ON	OFF	ON	OFF
199	OC5S(4.5+0.5)	OFF	OFF	ON	ON	ON	OFF	OFF	ON
200	OC6S(4.0+2.0)	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
201	OC6S(5.0+1.0)	OFF	OFF	ON	ON	OFF	ON	ON	ON
202	OC8S(5.0+3.0)	OFF	OFF	ON	ON	OFF	ON	ON	OFF
203	OC9S(6.0+3.0)	OFF	OFF	ON	ON	OFF	ON	OFF	ON
204	OC10S(6.0+4.0)	OFF	OFF	ON	ON	OFF	ON	OFF	OFF



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205	OC15S(10.0+5.0)	OFF	OFF	ON	ON	OFF	OFF	ON	ON
206	OC(2)8S(3.0+2.0, 1.0+2.0)	OFF	OFF	ON	ON	OFF	OFF	ON	OFF
207	OC(2)8S(5.0+1.0, 1.0+1.0)	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
208	QO.5S(0.25+0.25)	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
209	QIS(0.5+0.5)	OFF	OFF	ON	OFF	ON	ON	ON	ON
210	QIS(0.8+0.2)	OFF	OFF	ON	OFF	ON	ON	ON	OFF
211	Q1.2S(0.5+0.7)	OFF	OFF	ON	OFF	ON	ON	OFF	ON
212	Q1.2S(0.6+0.6)	OFF	OFF	ON	OFF	ON	ON	OFF	OFF
213	Q(2)5S(0.3+0.7, 0.3+3.7)	OFF	OFF	ON	OFF	ON	OFF	ON	ON
214	Q(2)5S(0.5+0.5, 0.5+3.5)	OFF	OFF	ON	OFF	ON	OFF	ON	OFF
215	Q(2)10S(0.5+0.5, 0.5+8.5)	OFF	OFF	ON	OFF	ON	OFF	OFF	
216	Q(3)5S(0.5+0.5, 0.5+0.5, 0.5+2.5)	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF
217	Q(3)10S(0.3+0.7, 0.3+0.7, 0.3+7.7)	OFF	OFF	ON	OFF	OFF	ON	ON	ON
218	Q(3)10S(0.5+0.5, 0.5+0.5, 0.5+7.5)	OFF	OFF	ON	OFF	OFF	ON	ON	OFF
219	Q(3)10S(0.6+0.6, 0.6+0.6, 0.6+7.0)	OFF	OFF	ON	OFF	OFF	ON	OFF	ON
220	Q(4)6S(0.3+0.7, 0.3+0.7, 0.3+0.7, 0.3+2.7)	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF
221	Q(4)6S(0.4+0.6, 0.4+0.6, 0.4+0.6, 0.4+2.6)	OFF	OFF	ON	OFF	OFF	OFF	ON	ON
222	Q(4)8S(1.2+0.4, 0.4+0.4, 0.4+0.4, 1.2+3.6)	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF
223	Q(4)10S(0.3+0.7, 0.3+0.7, 0.3+0.7, 0.3+6.7)	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON
224	Q(4)12S(0.3+0.7, 0.3+0.7, 0.3+0.7, 0.3+8.7)	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
225	Q(4)15S(0.35+0.7, 0.35+0.7, 0.35+0.7, 0.35+11.5)	OFF	OFF	OFF	ON	ON	ON	ON	ON
226	Q(4)20S(0.5+0.5, 0.5+0.5, 0.5+0.5, 0.5+16.5)	OFF	OFF	OFF	ON	ON	ON	ON	OFF
227	Q(5)7S(0.3+0.7, 0.3+0.7, 0.3+0.7, 0.3+0.7, 0.3+2.7)	OFF	OFF	OFF	ON	ON	ON	OFF	ON
228	Q(5)10S(0.3+0.7, 0.3+0.7, 0.3+0.7, 0.3+0.7, 0.3+5.7)	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
229	Q(6)10S(0.3+0.7, 0.3+0.7, 0.3+0.7, 0.3+0.7, 0.3+0.7, 0.3+4.7)	OFF	OFF	OFF	ON	ON	OFF	ON	ON
230	Q(9)10s(0.25+0.25, 0.25+0.25, 0.25+0.25, 0.25+0.25, 0.25+0.25, 0.25+0.25, 0.25+0.25, 0.25+0.25, 0.25+0.25)	OFF	OFF	OFF	ON	ON	OFF	ON	OFF



HD-155 型系列 LED 航标灯

	. 25, 0. 25+0. 25, 0. 25+0. 25, 0. 25+0. 25, 0. 25+5. 75,								
231	Q(9) 15s(0. 2+0. 8, 0. 2+0. 8, 0. 2+0. 8, 0. 2+0. 8, 0. 2+0. 8, 0. 2+0. 8, 0. 2+0. 8, 0. 2+0. 8, 0. 2+0. 8, 0. 2+6. 8)	OFF	OFF	OFF	ON	ON	OFF	OFF	ON
232	Q(9) 15s(0. 3+0. 7, 0. 3+0. 7, 0. 3+0. 7, 0. 3+0. 7, 0. 3+0. 7, 0. 3+0. 7, 0. 3+0. 7, 0. 3+0. 7, 0. 3+0. 7, 0. 3+6. 7)	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF
233	Q(9) 10s(0. 5+0. 5, 0. 5+0. 5, 0. 5+0. 5, 0. 5+0. 5, 0. 5+0. 5, 0. 5+0. 5, 0. 5+0. 5, 0. 5+0. 5, 0. 5+0. 5, 0. 5+6. 5)	OFF	OFF	OFF	ON	OFF	ON	ON	ON
234	Q(6) LFL10s(0. 25+0. 25, 0. 25+0. 25, 0. 25+0. 25, 0. 25+0. 25, 0. 25+0. 25, 0. 25+0. 25, 0. 25+0. 25, 0. 25+0. 25, 2. 0+5. 0)	OFF	OFF	OFF	ON	OFF	ON	ON	OFF
235	Q(6) LFL15s(0. 2+0. 8, 0. 2+0. 8, 0. 2+0. 8, 0. 2+0. 8, 0. 2+0. 8, 0. 2+0. 8, 0. 2+0. 8, 2. 0+7. 0)	OFF	OFF	OFF	ON	OFF	ON	OFF	ON
236	Q(6) LFL15s(0. 3+0. 7, 0. 3+0. 7, 0. 3+0. 7, 0. 3+0. 7, 0. 3+0. 7, 0. 3+0. 7, 0. 3+0. 7, 2. 0+7. 0)	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF
237	Q(6) LFL15s(0. 5+0. 5, 0. 5+0. 5, 0. 5+0. 5, 0. 5+0. 5, 0. 5+0. 5, 0. 5+0. 5, 0. 5+0. 5, 2. 0+7. 0)	OFF	OFF	OFF	ON	OFF	OFF	ON	ON
238	VQ0. 5S(0. 15+0. 35)	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF
239	VQ0. 5S(0. 2+0. 3)	OFF	OFF	OFF	ON	OFF	OFF	OFF	
240	VQ0. 5S(0. 25+0. 25)	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
241	VQ0. 6S(0. 2+0. 4)	OFF	OFF	OFF	OFF	ON	ON	ON	ON
242	VQ0. 6S(0. 3+0. 3)	OFF	OFF	OFF	OFF	ON	ON	ON	OFF
243	VQ0. 7S(0. 5+0. 25)	OFF	OFF	OFF	OFF	ON	ON	OFF	ON
244	VQ1S(0. 2+1. 0, 0. 2+2. 6)	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF
245	VQ8S(0. 2+1. 0, 0. 2+6. 6)	OFF	OFF	OFF	OFF	ON	OFF	ON	ON
246	VQ(3) 5s(0. 15+0. 35, 0. 15+0. 35, 0. 15+3. 85)	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF
247	VQ(3) 5s(0. 2+0. 3, 0. 2+0. 3, 0. 2+3. 8)	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON
248	VQ(3) 5s(0. 3+0. 2, 0. 3+0. 2, 0. 3+3. 7)	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
249	VQ(3) 5s(0. 3+0. 3, 0. 3+0. 3, 0. 3+3. 5)	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
250	VQ(3) 15s(0. 1+0. 5, 0. 1+0. 5, 0. 1+13. 7)	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF



HD-155 型系列 LED 航标灯

251	VQ(9)10s(0.15+0.35, 0.15+0.35, 0.15+0.35, 0.15+0.35, 0.15+0.35, 0.15+0.35, 0.15+0.35, 0.15+0.35, 0.15+5.85)	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON
252	VQ(9)10s(0.2+0.3, 0.2+0.3, 0.2+0.3, 0.2+0.3, 0.2+0.3, 0.2+0.3, 0.2+0.3, 0.2+0.3, 0.2+5.8)	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
253	VQ(9)10s(0.3+0.3, 0.3+0.3, 0.3+0.3, 0.3+0.3, 0.3+0.3, 0.3+0.3, 0.3+0.3, 0.3+0.3, 0.3+4.9)	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
254	Q(6)+LFL10s(0.2+0.3, 0.2+0.3, 0.2+0.3, 0.2+0.3, 0.2+0.3, 0.2+0.3, 2.0+5.0)	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
255	Q(6)+LFL10s(0.3+0.3, 0.3+0.3, 0.3+0.3, 0.3+0.3, 0.3+0.3, 0.3+0.3, 2.0+4.4)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
256	Q(6)+LFL15s(0.3+0.3, 0.3+0.3, 0.3+0.3, 0.2+0.3, 0.2+0.3, 0.2+0.3, 2.2+9.4)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF