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厦门迈凯科机电设备有限公司

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MiCRANE™

Ideas For Crane

让起重机更美好

iMonitor System

i监测系统

iMonitor System

i监测系统

概述：

i监测系统是厦门迈凯科基于二十多年的港口设备设计和管理经验，结合物联网、人工智能、大数据、5G技术开发的设备状态监测系统，i监测系统构建了设备三维可视化数字孪生平台（MICRANE），使得设备各子系统的各种状态数据（包括来自传感器、PLC）都可以可视化的实时展现出来，不仅如此，MiCRANE平台的大数据分析和AI算法还可以对状态数据做二次运算，给出设备和各系统的健康状态评估，甚至可以进行故障预警和故障排除指导。

i监测系统能够收集的数据包括震动、温度、油位、湿度、油品、烟雾、视觉、音频（噪音）、载荷、应力、变形、开裂、PLC运行数据等，可监控的系统包括减速机、制动器、电机、电气房、机器房、各种机构和结构等。为设备提供了全天候全方位的健康状态监测机制。

Introduction:

The iMonitor system is an equipment condition monitoring system developed by Xiamen MiCRANE Engineering Co., Ltd by utilizing its over 20 years of design and management experience for port equipment and combining the technologies of IOT, AI, big data and 5G. iMonitor build up an equipment 3D visualizing digital twin system (MiCRANE), which makes iMonitor can visualize in real time various condition data of the equipment including those from the sensors and PLC. Furthermore, the big data analysis and AI algorithm of the MiCRANE system can carry out further calculation based on the condition data to assess the health condition of the equipment and even give alarms for potential failures and provide guidance for troubleshooting.

The data which can be collected by the iMonitor system include vibration, temperature, oil level, humidity, oil quality, smoke, vision, sound (noise), load, stress, deformation, cracks, operation data of PLC, etc. The systems which can be monitored by the iMonitor system include gearbox, brake, motor, electrical room, machine room, various mechanisms and structures, etc. It provides a round-the-clock and all-round monitoring mechanism for the health condition of the equipment.

Equipment
Touch Control

设备管理易如反掌

滑环箱温湿度管理系统
Slipring Box iMonitor System

概述 Introduction:

滑环箱作为移动设备的供电源头，关乎设备可否运转。然而凝露时常威胁滑环箱的可靠性，它可造成高压短路爆炸损坏滑环箱。滑环箱温湿度管理系统可监测、控制滑环箱温湿度，彻底消除凝露、消除短路爆炸风险。

Slipring box, as the power source of the equipment, affects the equipment's operate-ability. Condensation is the most threaten to the slipring box, which could cause short circuit, sometimes even explosion. Slipring box iMonitor system will eliminate the condensation or explosion.

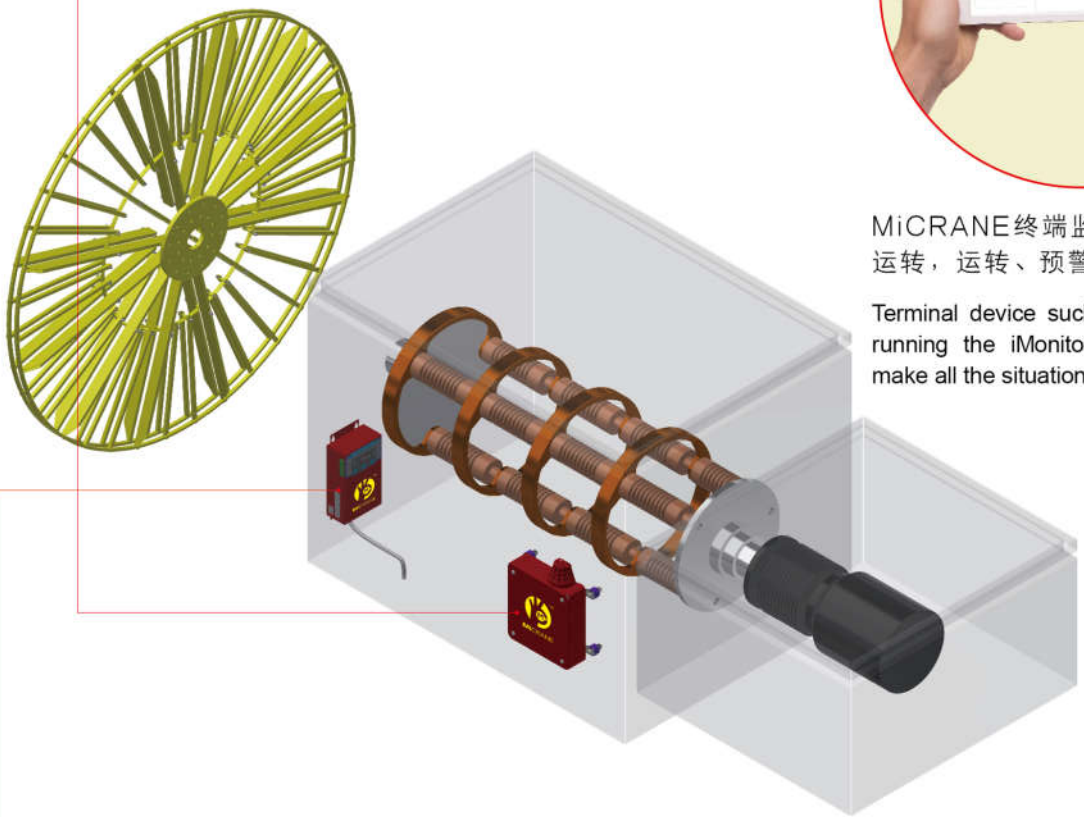
解决方案 Solution:

智能温湿监控终端根据温度、湿度智能调节滑环箱湿度，避免凝露发生；它同时把温湿度监测数据传给云盒；定时自检，通知云盒，避免失效发生。

Smart Temperature-humidity unit, monitor and control the humidity of the slipring box, eliminate condensation possibility. It also transfer monitoring data and self-checking result to cloud box.

MiCRANE终端监控和管理系统可靠运转，运转、预警信息触手可得。

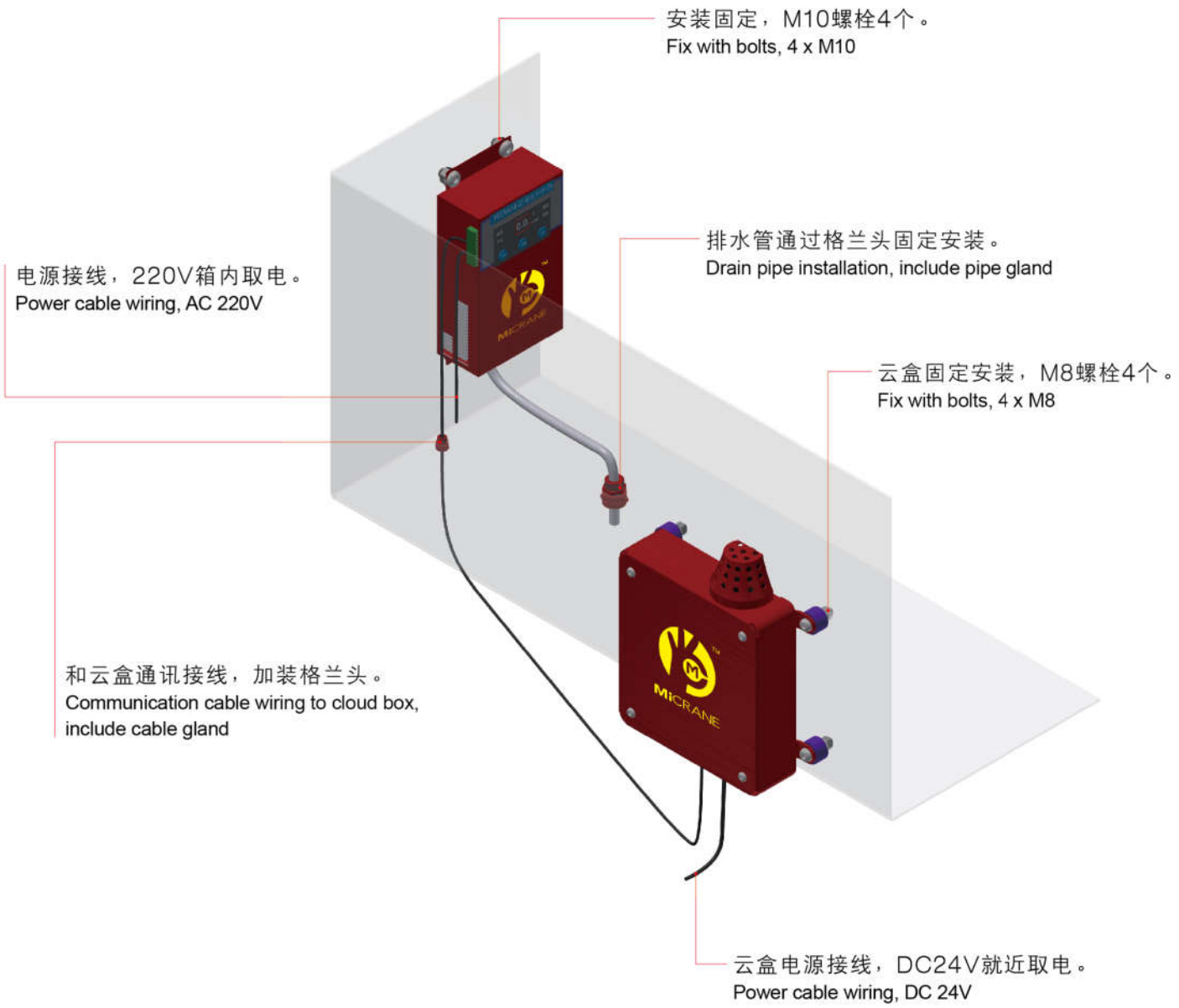
Terminal device such as PC, iPAD, Phone running the iMonitor system, helps users make all the situation in control.



云盒既收集数据又做边缘计算，及时将实时数据，状态信息、预警信息发送到MiCRANE云平台；

Cloud box, carry out edge calculation to the monitoring data, and inform MiCRANE platform via 4/5G.

安装使用简便 Plug and play:



参考信息 Reference information:

ID	信息 Information	值 Value
1	GBT11022-2011要求高压柜内在24h内的相对湿度平均值不超过 GB T11022-2011 requires the 24h-average relative humidity of HV cabinet shall lower than this value	95%
2	GB T11022-2011要求高压柜内在月的相对湿度平均值不超过 GB T11022-2011 required the monthly average relative humidity of HV cabinet shall be lower than this value	90%
3	该系统设定的除湿阀值 This system start working's trigger value	65%

制动器i监测系统
Brake iMonitor System

概述 Introduction:

制动器和起重机的安全生产息息相关，尤其是起升机构的高速轴制动器。MiCRANE的制动器 i 监测系统实时监测着推动器行程、制动力矩、温度、磨损等数据，并且实现了历史数据分析、预警、报警等功能的平台化管理，甚至可以是包含维保的全寿命管理。

Brake, the most important part guarantees the safety during production, especially for hoist system. MiCRANE Brake iMonitor System is monitoring the thrust stoke, brake torque, pad temperature and wearing status etc all the time, it also records the history data, analyses data and gives precaution/alarm, it even can gives maintenance management and residual life forecast.

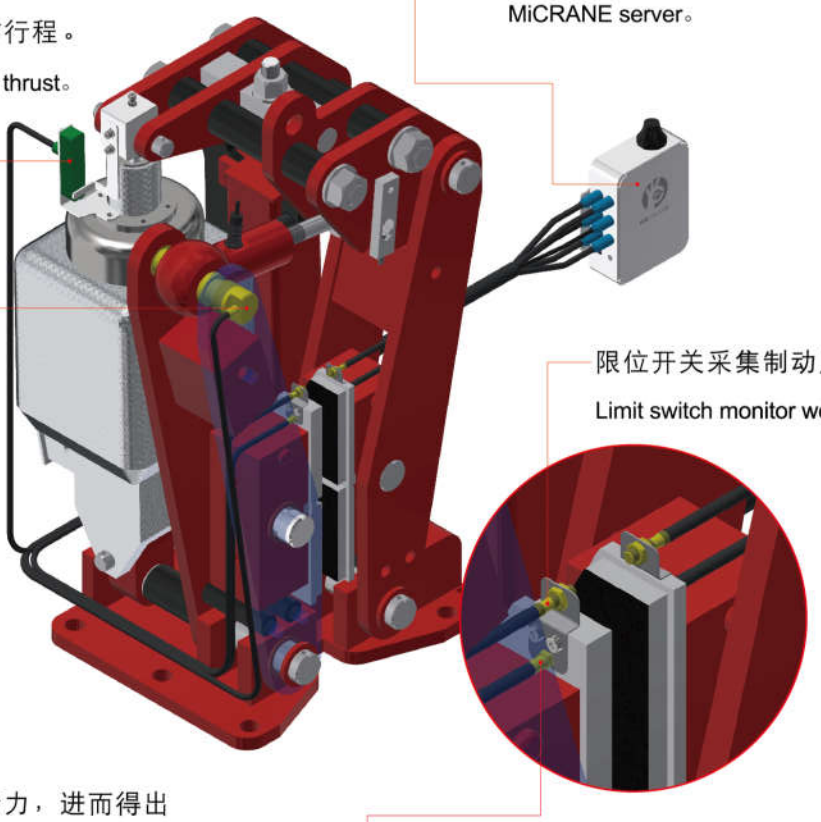
解决方案 Solution:

云盒收集状态数据并且上传至MiCRANE云计算服务器。

Cloud box collect condition data and transfer to MiCRANE server。

行程传感器采集推动器的工作行程。

Stroke sensor monitor the stroke of thrust。



限位开关采集制动片磨损（2个）。

Limit switch monitor wearing of pad (2 pcs)。

称重传感器采集制动器的夹紧力，进而得出制动力矩。

Load cell monitor the clamp force, and convert to brake torque。

温度传感器采集制动片温度（2个）。

Temperature sensor monitor the braking pad temperature (2 pcs)。

安装使用简便 Plug and play:

监控状态综合评分

The general rating of the brake condition

实时数据和分项评分

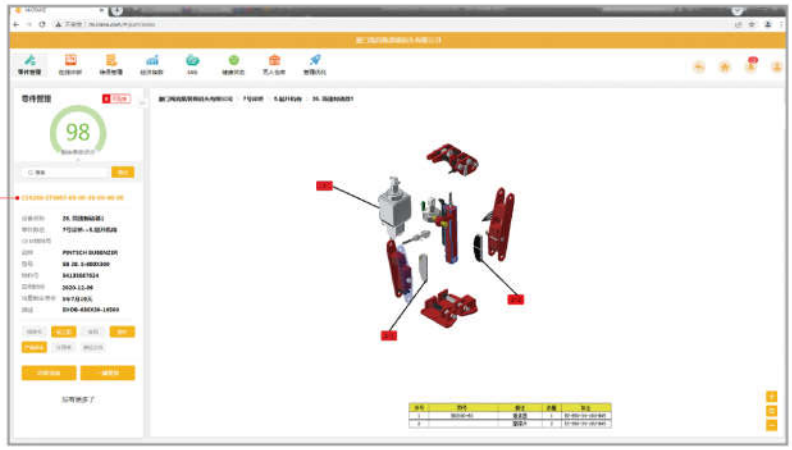
The real time status and its condition rating

历史数据和曲线

History data and its curves

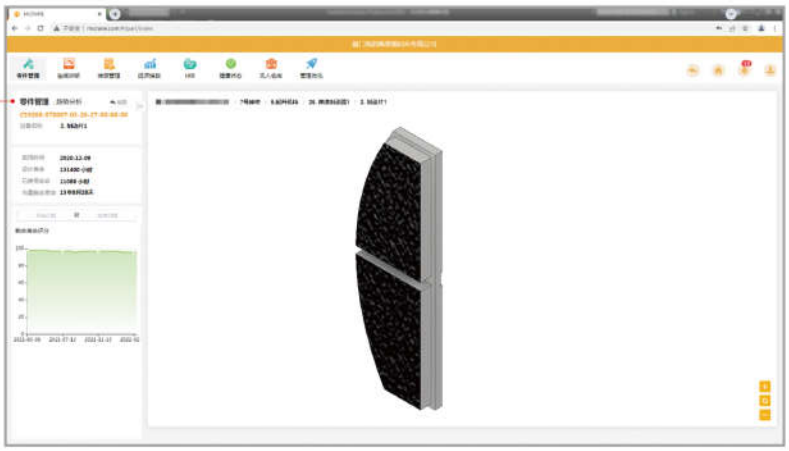
零部件详细信息

Component detail information



零部件剩余寿命信息:
评分、理论寿命、剩余寿命

componentresidual life information:
rating, design life, residual life



参考信息 Reference information:

ID	信息 Information	值 Value
1	制动器制造商BUBENZER，制动力矩偏差百分比：报警 / 报错。 Brake supplier BUBENZER, the brake torque deviation percentage: Warning / Error.	+/-10% +/-20%
2	制动器制造商BUBENZER，制动片温度值：报警 / 报错。 Brake supplier BUBENZER, the brake pad over heat temperature: Warning / Error.	> 180 ℃ > 200 ℃
3	制动器制造商BUBENZER，推动器行程值：报警 / 报错。 Brake supplier BUBENZER, the thrust stroke value: Warning / Error.	< 5 mm < 3 mm

减速箱i监测系统
Gear Box iMonitor System

概述 Introduction:

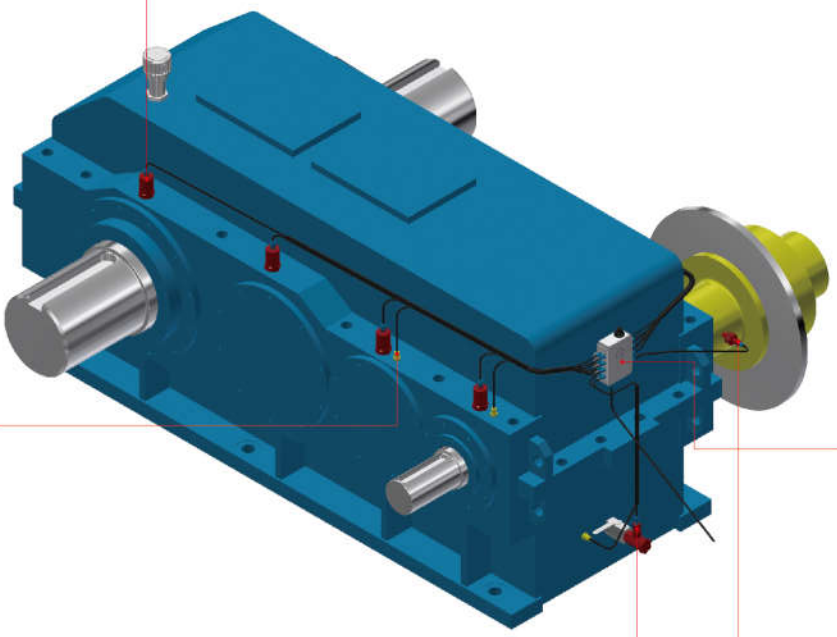
减速箱作为起重机传动机构最核心的机械部件，其健康状态关乎起重机是否可以正常运转。减速箱备件交货周期长，一旦出现零部件意外损坏可能造成起重机停机数月，经济损失巨大。齿轮和轴承的早期磨损是意外损坏的主要诱因，MiCRANE的减速箱i监测系统不仅能够发现早期磨损阻止意外损坏，而且实现了历史数据分析、预警、报警等功能的平台化管理。

Gear box, the most important mechanical part of crane mechanism system, affects the crane's operate-ability. The long time delivery spare parts cause too much crane down time and great loss. the gear and bearing's early abrasion is the main reason, MiCRANE gear box iMonitor system could detect early abrasion and avoid great loss, and it is a management platform with history record, precaution, alarm function.

解决方案 Solution:

MiCRANE终端监控和管理系统可靠运转，运转、预警信息触手可得。

Terminal device such as PC, iPAD, Phone running the iMonitor system, helps users make all the situation in control.



振动传感器采集轴承座振动有效值（8个）

Vibration sensor monitor the bearing block vibration(RMS, 8 pcs)

云盒收集监测数据并且上传至MiCRANE云计算服务器

Cloud box collect monitor data and transfer to MiCRANE server

转速传感器采集减速机转速和工作时间（1个）

Speed sensor monitor the rotate speed and working time (1 pcs)

温度传感器采集轴承和齿轮油温度（4+1个）

Temperature sensor monitor the bearing and oil temperature (4+1 pcs)

油位传感器采集油位高度（1个）

Oil level sensor monitor the oil level (1 pcs)

安装使用简便 Plug and play:

云盒 Cloud Box

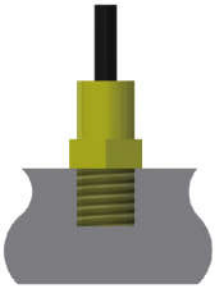
安装固定，M8螺栓4个
Fixed with bolts，4pcs M8

电源接线，24VDC
Power cable wiring，24VDC

振动 Vibration

螺纹（盲孔）固定，
M8x10mm

Screw connection（blind hole），
M8x10mm



温度 Temperature

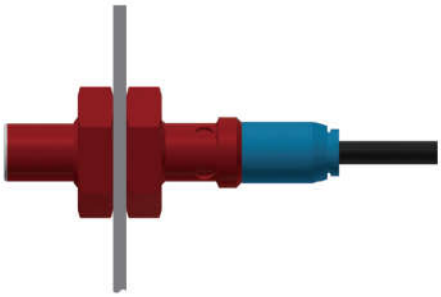
螺纹（盲孔）固定，
M6x6mm

Screw connection（blind hole），
M6x6mm

油位 Oil Level

螺纹（通孔）固定，
G1/4

Screw connection（through hole），
G1/4



转速 Rotate Speed

螺纹（通孔）固定，
M8

Screw connection（through hole），
M8

参考信息 Reference information:

ID	信息（适用于起重机15-300kw机构） Information (for 15-300kw mechanism of crane)	值 Value
1	ISO 10816-3，新安装的设备振动有效值范围。 ISO 10816-3, vibration of new installed machine	0-1.4 mm/s
2	ISO 10816-3，适宜平稳持续运行的设备振动有效值范围。 ISO 10816-3, vibration of this zone can normally run in continuous without any restriction	1.4-2.8 mm/s
3	ISO 10816-3，不适合持续运行（非不得已，可以短时运行）的设备振动有效值范围。 ISO 10816-3, vibration of this zone normally should not run in continuous, it can only run for a restricted time if have to	2.8-4.5 mm/s
4	ISO 10816-3，已损坏的设备振动有效值范围。 ISO 10816-3, vibration of this zone is damaged	4.5-... mm/s
3	建议工作时轴承和油温不超过的温度。 Recommended bearing and oil max working temperature	70 ℃