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General specifications for photovoltaic module cleaning robots

光伏组件清洁机器人通用技术条件

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part

1. Structure and drafting rules for standardization documents" Drafting is required. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document was proposed by the China Machinery Industry Federation. This document is under the jurisdiction of the National Technical Committee on Robotics Standardization (SAC/TC 591). This document was drafted by: Hangzhou Shunhai Photovoltaic Technology Co., Ltd., State Power Investment Group Zhejiang Electric Power Co., Ltd., China University of Metrology, Beijing Machinery Industry Automation Research Institute Co., Ltd., Zhejiang Longneng Electric Power Technology Co., Ltd., Nanjing Sonentos Intelligent Technology Co., Ltd. Company, Renjie Intelligent Technology Co., Ltd., Hangzhou Dazao Robot Technology Co., Ltd., Zhejiang University, Shaoxing Shunhai Intelligent Equipment Co., Ltd., PowerChina Huadong Engineering Survey and Design Institute Co., Ltd., Zhejiang Chint Zhiwei Energy Services Co., Ltd., China Electric Power Engineering Consultants Group Northwest Electric Power Design Institute Co., Ltd., Pan Pacific Energy and Environment (Zhejiang) Co., Ltd., University of Science and Technology of China Hangzhou Institute for Advanced Studies, Hangzhou Rail Technology Co., Ltd. Co., Ltd., Zhejiang Fangyuan Testing Group Co., Ltd., Zhijiang Laboratory, and Shanghai Qianyu Energy Technology Co., Ltd. The main drafters of this document are. Song Yu, Li Qiang, Wang Binrui, Yang Shuping, Gong Yuping, Wei Shunyang, Wang Xiaoxin, Wang Tiantian, Zhang Xi, Luo Xuegang, Mou Yingxuan, Wei Ligang, Ren Jiang, Xu Feng, Liang Xiaoyu, Guo Weidong, Jiang Dalong, Yang Qiang, Ji Jianfei, Wu Yunlai, Hu Huayou, Qiu Tao, Qi Hongxing, Chen Wei, Duan Wenjing, Zhang Weijun, Chen Keming, Zeng Jia, Luo Danxu, Song Wei, Guo Qinwen. General technical requirements for photovoltaic module cleaning

robots

1 Scope

China's national general specification for photovoltaic module cleaning robots. Soiling is the largest avoidable loss in a solar plant: dust on the glass costs a few per cent of output in a temperate climate and can cost twenty or more in an arid one, and China's largest arrays are in exactly the desert regions where it is worst. Cleaning them manually is impractical at gigawatt scale and washing them consumes water that is not available there. A cleaning robot traverses the module rows with a rotating brush, dry, on a schedule, and either lives permanently on a row or is moved between them. What the specification has to address is what the machine must not do as much as what it must: the glass has an anti-reflective coating a few hundred nanometres thick that a harsh brush will abrade, and a robot that damages the coating costs more output than the soiling it removed.

This document specifies the product classification, technical requirements, inspection rules and marking, packaging, transportation, storage requirements of photovoltaic module cleaning robots. The corresponding test method is described. This document applies to the manufacture, testing and use of photovoltaic module cleaning robots.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document.

GB/T 2297 Terminology of Solar Photovoltaic Energy Systems

GB 3096-2008 Acoustic Environment Quality Standard

GB/T 4208-2017 Degrees of protection provided by enclosures (IP Code) GB/T 13306 Labels

GB/T 13893 Determination of moisture resistance of paints and varnishes - Continuous condensation method GB/T 15342 Talc

GB/T 17248.3 Acoustics Noise emitted by machines and equipment is measured at the working position and other specified positions using approximate environmental correction The emission sound pressure level

GB/T 19292.1 Corrosion of metals and alloys - Atmospheric corrosivity - Part

3 Terms and definitions

The terms and definitions defined in GB/T 2297 and the following apply to this document.

3.1 Photovoltaic module cleaning robots A robot that autonomously cleans dust and dirt from the surface of photovoltaic panels without human intervention.

3.2 Drive unit drive unit An actuator consisting of a motor, drive wheels, etc. that drives the robot to move.

4 Product Categories

Photovoltaic module cleaning robots (hereinafter referred to as robots) can be divided into mobile and resident types, as follows:

a) The mobile robot can drive directly on the photovoltaic panel, plan its route autonomously, and clean multiple photovoltaic arrays by moving Robot, see Appendix A;