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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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Robot general bus communication protocol

机器人通信总线协议

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Foreword

This standard was drafted in accordance with GB/T 1.1-2009 given rules. The standard proposed by China Machinery Industry Federation. The standard automation systems and integration by the National Standardization Technical Committee (SAC/TC159) centralized. This standard is mainly drafted by: Institute of Automation, Beijing Institute of Machinery Industry Automation, Shenyang New Song Robot Self Automation Company. The main drafters of this standard. Wang Shuo, Zhou Chao, Lee Eun, Zhang Ping, Wei Hongxing, the child is high, book reviews Yang, Chen Lian, Zhang Aimin, Zhu Wei, Wang Ye, Wang Zhenhua, forest valley, plum orchard, Cheng-sheng, CHEN Xiao-peng.

This standard is described in a non-master fieldbus protocol, the bus has a good real-time performance and scalability, and strong anti-jamming Sex. Bus protocol from the physical layer, data link layer, transport layer, application layer, wherein the physical layer and the data link layer with reference to ISO 11898 standard Registration, transport layer and application layer allows for robot control needs to be modified. The data link layer using point to point mode and broadcast mode phase Combined to achieve, the address number of each module with 7-bit data representation. Transport layer based on packet header data packaging, in 29 packets Message header contains the destination address, source address, frame number, pipe number, frame type, etc., and combined with the corresponding data fault tolerance, reliable transmission, mention High utilization of the bus, while the transport layer supports both the master controller and from the data communication between controllers and between controllers support from several Data transmission. Function of the communication system of the robot application layer between modules, support more than 8 bytes of data packet split and reorganization, the main Process for the robot system is not fixed length data, real-time transmission requires a high communication data. Robot communication bus protocol

1 Scope

China's national standard for the general bus communication protocol used inside robots. It

specifies a non-master fieldbus protocol covering the physical layer, the data link layer, the transport layer and the application layer, for the communication between the modules of a robot. A robot is a distributed system pretending to be one machine. The controller, the joint drives, the sensors, the teach pendant and the end effector are separate units connected by a bus running through a moving structure, and everything the robot does depends on messages arriving on time. A joint that receives its position command a few milliseconds late does not fail; it tracks badly, and the effect appears as a path error that nobody can attribute to a communication problem. So the requirements on the bus are hard real time rather than merely fast, and they are what distinguish a robot bus from a general industrial network. This protocol takes its physical and data link layers from the CAN standard, which supplies the electrical robustness and the arbitration a bus inside a machine full of motor drives needs, and modifies the transport and application layers for robot control. The arrangement is non-master: every node can initiate, rather than waiting to be polled by a controller, which removes the latency a polled scheme imposes and lets a node report a fault immediately. The data link layer combines point-to-point and broadcast modes, with each module addressed by a seven-bit number - broadcast being how a synchronised motion command reaches every joint in the same message and therefore at the same instant, which is the property that makes coordinated motion possible at all. Issued on 12 November 2013 and in force since 1 April 2014.

The standard provides a modular robotic system in a communication bus data format and procedural norms, including the protocol level, the format set Righteousness workflow. This standard applies to data exchange and information sharing between the members of different functional modules of the modular robot system. Applied to non Modular robot communication bus may also refer to the use of this standard.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

ISO 11898-1.2003 Road vehicles - Controller Area Network - Part 1. Data link layer and physical signaling [Road vehicles Controller area network (CAN) -Part 1. Datalink layer and physical signaling]

ISO 11898-2.2003 Road vehicles - Controller Area Network - Part 2. High-speed media storage unit [Road vehicles Controller area network (CAN) -Part 2. High-speed medium access unit]

ISO 11898-4.2004 Road vehicles - Controller Area Network - Part 4. Time-triggered communication [Road vehicles Controller area network (CAN) -Part 4. Time-triggered communication]

ISO 11898-5:2007 Road vehicles - Controller Area Network - Part 5. High-speed medium access unit low power mode [Road vehicles Controller area network (CAN) -Part 5. High-speed medium access unit with low- power mode]

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 Modular robot modular robot One kind of the exchangeable module having various sizes and performance characteristics of the composition can be combined into a variety of different configurations of the robot.

3.2 Module module Member unit modular robot control, with relatively independent logical functions or information processing function, the robot has a standard bus Standard interface.

3.3 Member part Part of the module, with a certain function.

3.4 Frame frame RobBus basic data bus communication unit by the arbitration field, control field, data field, domain validation, authentication domains, each comprising a packet Header, data length, checksum and other information.