

ICS 25.040
CCS N 10



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

GB/Z 26157.3-2010

**Digital data communication for measurement and control -- Fieldbus for
use in industrial control systems -- Type 2: ControlNet and EtherNet/IP
specification -- Part 3: Data link layer**

测量和控制数字数据通信 工业控制系统用现场总线 类型2: ControlNet和EtherNet/IP规范 第3部分: 数据链路层

(English Translation)

Issued on: January 14, 2011

Implemented on: June 1, 2011

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine of People's Republic of China, China National Standardization
Administration**

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Foreword

IEC 61158.:2003 "Fieldbus for the Measurement and Control of Digital Data Communications for Industrial Control Systems" includes 10 fieldbus types.

- Type 1. IEC Technical Report;
- Type 2. ControlNet and Ethernet/IP;
- Type 3. PROFIBUS;

- Type 4. P-Net;
- Type 5. FFHSE;
- Type 6. SwiftNet;
- Type 7. WorldFIP;
- Type 8. Interbus;
- Type 9. FFAL;
- Type 10. PROFINET.

The standardization of technical guidance to modify the use of IEC 61158.:2003 "Measurement and Control Digital Data Communications Industrial Control System Fieldbus Type 2. ControlNet and EtherNet/IP Specification Part 3. Data Link Layers. " IEC 61158 series of standards will be 10 kinds of fieldbus technology mixed together to write, not easy to domestic engineering and technology Off personnel on a variety of bus technology reading and understanding of the National Industrial Process Measurement and Control Standardization Technical Committee in the use of international standards on time, only the technical aspects of Type 2. ControlNet and EtherNet/IP specifications, which are widely used in China, have been adopted.

According to the habits of technology developers will be divided into 10 parts to prepare. In technical content and international standards no difference, for the convenience of me National users, in the text of the structure of the layout of the appropriate adjustments, and according to GB/T 1.1 requirements for the preparation.

GB/Z26157 "Measurement and Control Digital Data Communications Fieldbus for Industrial Control Systems Type 2. ControlNet and Ether-Net/IP specification "is divided into the following 10 parts.

- GB/Z26157.1 general description;
- GB/Z26157.2 physical layer and media;
- GB/Z26157.3 data link layer;
- GB/Z26157.4 network layer and transport layer;
- GB/Z26157.5 data management;
- GB/Z26157.6 object model;
- GB/Z26157.7 equipment line rules;
- GB/Z26157.8 spreadsheet;
- GB/Z26157.9 station management;

GB/Z26157.10 object library.

This guidance document is Part 3.

This guidance document is proposed by China Machinery Industry Federation.

This Guidance Document is governed by the National Technical Committee for Standardization and Measurement of Industrial Processes (SAC/TC124).

The guidance of technical documents Drafted by. Machinery Industry Instrumentation Technology and Economy Institute, Tsinghua University, Southwest University, Beijing Steel Iron Design and Research Institute, China Instrument Association, China Mechatronics Technology Applications Association, Shanghai Automation Instrumentation Co., Ltd., Shanghai Industrial Automation Instrumentation Institute, Shanghai Electric Institute of Science (Group) Co., Ltd., Rockwell Automation Research (Shanghai) Co., Ltd.

Introduction

The main task of the data link layer (DDL) is to collaborate with other data link layers on the same link to decide to allow it on the medium Send authorization. In its interface with the upper layer, DDL provides service data unit (SDU) for network layer, transport layer and station management to receive and hand over Pay the service.

The DDL protocol is based on a fixed, repeated period of time called the Network Update Time (NUT). NUT all on the link Keep strict synchronization in the node. If the NUT of a node is not consistent with the NUT used on the current link, the node does not allow Sent on the media. Different links may have different NUTs.

Each node contains a timer that is synchronized with the NUT of the local link. Media access is divided by the local NUT access slots to decide. The media access is based on the node's MACID sorting order. In order to allow a temporary MACID for Zero nodes perform link maintenance, adding specific behaviors in the access protocol. The MACID of all nodes on a link is the only one One. Once detected duplicate MACID DLL, then immediately stop sending.

An implicit token passing mechanism is used to authorize access to media. Each node monitors the source MAC ID of each MAC frame received.

At the end of the MAC frame, each DLL sets an "Implicit Token Register" equal to the MACID of the received source MACID + 1. If the implicit token register is equal to the local MACID, then the node can send a MAC frame. In other cases, the section Point or wait for a new MAC frame from the node specified by the Implicit Token Register, or wait for a timeout if the specified section If the point fails to send. In either case, the "hidden token" is automatically incremented to the next MACID. All nodes "hidden token Register "contains the same value to avoid media conflicts.