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Vključitev procesne naprave (FDI) - 115-2. del: Profili - Modbus- RTU

Field device integration (FDI) – Part 115-2: Profiles – Modbus-RTU

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TITLE:

FIELD DEVICE INTEGRATION (FDI) – PART 115-2: Profiles – Modbus-RTU

NOTE FROM TC/SC OFFICERS:

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FIELD DEVICE INTEGRATION (FDI) – PART 115-2: Profiles – Modbus-RTU

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- 1043 International Standard IEC 62769-115-2 has been prepared by subcommittee 65E: Devices
1044 and integration in enterprise systems, of IEC technical committee 65: Industrial-process
1045 measurement, control and automation.

1046 This document is based on FCG_TS62769-115-2_Profiles_PSD ModbusRTU_1.1.0.4, a specification
1047 of the FieldComm Group, PROFIBUS Nutzerorganisation e. V., OPC Foundation and FDT
1048 Group.

1049 The text of this International Standard is based on the following documents:

FDIS	Report on voting
65E/XX/FDIS	65E/XX/RVD

1050

1051 Full information on the voting for the approval of this International Standard can be found in
1052 the report on voting indicated in the above table.

1053 This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

1054 A list of all parts in the IEC 62769 series, published under the general title *Field Device*
1055 *Integration (FDI)*, can be found on the IEC website.

1056 The committee has decided that the contents of this document will remain unchanged until the
1057 stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to
1058 the specific document. At this date, the document will be

- 1059 • reconfirmed,
- 1060 • withdrawn,
- 1061 • replaced by a revised edition, or
- 1062 • amended.

1063

1064 The National Committees are requested to note that for this document the stability date
1065 is 2023.

1066 THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE
1067 DELETED AT THE PUBLICATION STAGE.

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FIELD DEVICE INTEGRATION (FDI) – Part 115-2: Profiles – Modbus-RTU

1073 **1 Scope**

1074 This document defines the protocol-specific definitions (PSDs) as defined in IEC 62769-7 on
1075 generic protocol extensions for the Modbus¹-RTU protocol according to CPF 15 in
1076 IEC 61784-2.

1077 **2 Normative References**

1078 The following documents are referred to in the text in such a way that some or all of their
1079 content constitutes requirements of this document. For dated references, only the edition
1080 cited applies. For undated references, the latest edition of the referenced document (including
1081 any amendments) applies.

1082 IEC 61804 (all parts), *Function blocks (FB) for process control and Electronic Device Description*
1083 *Language (EDDL)*

1084 IEC 61804-3, *Function blocks (FB) for process control and Electronic Device Description Language*
1085 *(EDDL) – Part 3: EDDL syntax and semantics*

1086 IEC 62541-100:–, *OPC Unified Architecture – Part 100: OPC UA for Devices*

1087 IEC **62769-2**, *Field Device Integration (FDI) – Part 2: FDI Client*

1088 IEC **62769-4**, *Field Device Integration (FDI) – Part 4: FDI Packages*

1089 IEC **62769-5**, *Field Device Integration (FDI) – Part 5: FDI Information Model*

1090 IEC **62769-7**, *Field Device Integration (FDI) – Part 7: FDI Communication Devices*

1091 IEC 61784-2, *Industrial communication networks – Profiles – Part 2: Additional fieldbus*
1092 *profiles for real-time networks based on ISO/IEC 8802-3*

1093 MOD06, *Modbus.org: MODBUS over serial line specification and implementation guide V1.02*

1094 MOD12, *Modbus.org: MODBUS APPLICATION PROTOCOL SPECIFICATION, V1.1b3*

1095 **3 Terms, definitions, abbreviated terms and acronyms**

1096 **3.1 Terms and definitions**

1097 For the purposes of this document, the terms and definitions given in IEC 61784-1, IEC 61804
1098 series, IEC 62541-100, IEC 62769-4, IEC 62769-5, and IEC 62769-7 apply.

1099 ISO and IEC maintain terminological databases for use in standardization at the following
1100 addresses:

- 1101 • IEC Electropedia: available at <http://www.electropedia.org/>
- 1102 • ISO Online browsing platform: available at <http://www.iso.org/obp>

1103 **3.2 Abbreviated terms and acronyms**

1104 For the purposes of this specification, the following abbreviated terms and acronyms apply.

1105	EDD	Electronic Device Description
1106	EDDL	Electronic Device Description Language (see IEC 61804)
1107	FDI	Field Device Integration
1108	FCG	FieldComm Group

1109 XML Extensible markup language (see REC-xml-20081126)

1110 4 Conventions

1111 4.1 EDDL syntax

1112 This document specifies content for the EDD component that is part of FDI Communication
1113 Packages. The specification content using EDDL syntax uses the font `Courier New`. The
1114 EDDL syntax is used for method signature, variable, data structure and component
1115 declarations.

1116 4.2 Capitalizations

1117 The IEC 62769 series use capitalized terms to emphasize that these terms have a FDI
1118 specific meaning.

1119 Some of these terms using an acronym as a prefix for example

- 1120 • FDI Client, or
- 1121 • FDI Server.

1122 Some of these terms are compound terms such as:

- 1123 • Communication Servers, or
- 1124 • Profile Package.

1125 Parameter names or attributes are concatenated to a single term, where the original terms
1126 start in this term with a capital letter such as:

- 1127 • ProtocolSupportFile or
- 1128 • ProtocolType.

1129 Parameter names or attributes can also be constructed by using an underscore character to
1130 concatenate two or more terms such as:

- 1131 • DEVICE_REV or
- 1132 • DEVICE_MODEL

1133 5 PSDs for ModbusRTU

1134 5.1 General

1135 Clause 5 defines the protocol-specific definitions for Modbus-RTU, which is the Modbus over
1136 serial line protocol using the transmission method RTU (Remote Terminal Unit) according to
1137 MOD06.

1138 5.2 Header

1139 The HEADER string used to define EDD commands contains the information about what
1140 Modbus function is called and what is addressed by the function. It shall contain the attribute
1141 FUNCTION and may, depending on the FUNCTION, contain the attribute SUBFUNCTION,
1142 READ_ADDRESS, READ_COUNT, WRITE_ADDRESS and WRITE_COUNT. The syntax is
1143 <attribute> = "<value>" per attribute, attributes are separated by a space. The value is
1144 provided as decimal value, not as hexadecimal value. For example, to read the device
1145 identification (function 43 (0x2B) and sub-function 14 (0x0E)) the HEADER string is
1146 "FUNCTION=43 SUBFUNCTION=14".

1147 NOTE The character \ is used as escape character allowing " in the HEADER string.

1148 The values for READ_ADDRESS, READ_COUNT, WRITE_ADDRESS, WRITE_COUNT are
1149 restricted to numeric values between 0 and 65536. Table 1 specifies the allowed Modbus
1150 FUNCTION values and the usage of the attributes, as well as the used EDD COMMAND
1151 OPERATION.

Table 1 – Modbus Functions and their representation in an EDD HEADER

Functionality	FUNCTION	SUBFUNCTION (Byte)	READ_ADDRESS	READ_COUNT	WRITE_ADDRESS	WRITE_COUNT	Operation (in EDD)(a)	Request (in EDD)	Response (in EDD)
Read Coils	01	-	Starting address	Quantity of coils	-	-	R	-	Coil Status
Read Discrete Inputs	02	-	Starting address	Quantity of Inputs	-	-	R	-	Input Status
Read Holding Registers	03	-	Starting address	Quantity of Reg.	-	-	R	-	Reg. Value
Read Input Registers	04	-	Starting address	Quantity of Input Reg.	-	-	R	-	Input Reg.
Write Single Coil	05	-	-	-	Output addresses	-	W	Output Value	Output Value
Write Single Reg.	06	-	-	-	Reg. addresses	-	W	Reg. Value	Reg. Value
Read Exception Status	07	-	-	-	-	-	R	-	Output Data
Diagnostics	08	2	-	-	-	-	R, C ^(b)	Data	Data
Get Comm Event Counter	11	-	-	-	-	-	R	-	Status + Event Count
Get Comm Event Log	12	-	-	-	-	-	R	-	Status + Event Count + Message Count + Events
Write Multiple Coils	15	-	-	-	Starting Address	Quantity of Outp.	W	Outp. Values	-
Write Multiple registers	16	-	-	-	Starting Address	Quantity of Reg.	W	Reg. Value	-
Report Server ID	17	-	-	-	-	-	R	-	Server ID + Run Indicator Status + Additional Data
Read File Record	20	-	-	-	-	-	R	Sub-Req ...	Sub-Req ...
Write File Record	21	-	-	-	-	-	W	Sub-Req ...	Sub-Req ...