SLOVENSKI STANDARD
SIST EN 14116:2012+A2:2018

01-november-2018

Nadomešča:
SIST EN 14116:2012+A1:2014

Cisterne za prevoz nevarnega blaga - Digitalni vmesnik za napravo za prepoznavanje proizvoda za tekoča goriva (vključno z dopolnilom A2)

Tanks for transport of dangerous goods - Digital interface for product recognition devices for liquid fuels

Tanks für die Beförderung gefährlicher Güter - Digitale Schnittstelle für das Produkterkennungssystem für flüssige Kraft- und Brennstoffe

Citernes destinées au transport de matières dangereuses - Interface numérique du dispositif de reconnaissance de produits pétroliers

Ta slovenski standard je istoveten z: **EN 14116:2012+A2:2018**

ICS:

13.300	Varstvo pred nevarnimi izdelki	Protection against dangerous goods
23.020.20	Posode in vsebniki, montirani na vozila	Vessels and containers mounted on vehicles
35.240.60	Uporabniške rešitve IT v prometu	IT applications in transport

SIST EN 14116:2012+A2:2018 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 14116:2012+A2

June 2018

ICS 13.300; 23.020.20; 35.240.60

Supersedes EN 14116:2012+A1:2014

English Version

Tanks for transport of dangerous goods - Digital interface for product recognition devices for liquid fuels

Citernes destinées au transport de matières dangereuses - Interface numérique du dispositif de reconnaissance de produits pétroliers

Tanks für die Beförderung gefährlicher Güter - Digitale Schnittstelle für das Produkterkennungssystem für flüssige Kraft- und Brennstoffe

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 14116:2012+A2:2018) has been prepared by Technical Committee CEN/TC 296 “Tanks for the transport of dangerous goods”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2018, and conflicting national standards shall be withdrawn at the latest by December 2018.

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This document includes Amendment 1, approved by CEN on 2014-08-07 and Amendment 2, approved by CEN on 2017-12-28.

This document supersedes [A1] EN 14116:2012+A1:2014 [/A1].

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] [/A1] and [A2] [/A2].

[A1] *deleted text* [/A1]

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Product recognition, the subject of this European Standard, is the digital interface that allows product data and/or other information to be transferred between transport tanks and other installations.

〚A2〉 *deleted text* 〈A2〛

1 Scope

This European Standard covers the digital interface at the product loading and/or discharge coupling which is used for the transfer of product related information and specifies the performance requirements, critical safety aspects and tests to provide compatibility of devices.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13616:2004, *Overfill prevention devices for static tanks for liquid petroleum fuels*

EN 15208, *Tanks for transport of dangerous goods — Sealed parcel delivery systems — Working principles and interface specifications*

EN 60079-0, *Explosive atmospheres — Part 0: Equipment — General requirements (IEC 60079-0)*

EN 60079-11, *Explosive atmospheres — Part 11: Equipment protection by intrinsic safety "i" (IEC 60079-11)*

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
message
defined data set

3.1.2
telegram
frame that contains at least one standardised message

3.1.3
maximum input voltage
U_i
according to EN 60079-11

3.1.4
maximum output voltage
U_0
according to EN 60079-11

3.1.5
maximum input current
I_i
according to EN 60079-11

3.1.6
maximum output current
I_0
according to EN 60079-11

3.1.7
maximum input power
P_i
according to EN 60079-11

3.1.8
maximum output power
P_0
according to EN 60079-11

3.1.9
maximum internal capacitance
C_i
according to EN 60079-11

3.1.10
maximum internal inductance
L_i
according to EN 60079-11

3.1.11
Multiple Product Identification Device
MultiPID
electronic device emulating at least one PID, extended by the ability of bi-directional communication

3.2 Abbreviations

For the purposes of this document, the following abbreviations apply.

— ASCII American Standard Code for Information Interchange
— CPDP Comité Professionnel Du Pétrole
— ESD Electro-Static Discharge
— LSB Least Significant Bit
— MSB Most Significant Bit
— PID Product Identification Device
— PRD Product Recognition Device
— RON Research Octane Number

4 Functions

Whenever a physical connection according to Figure 1 or Figure 2 is made, the digital interface enables the transfer of product recognition data to the transport tank. The purpose of this digital interface is to provide the data for the following types of applications:

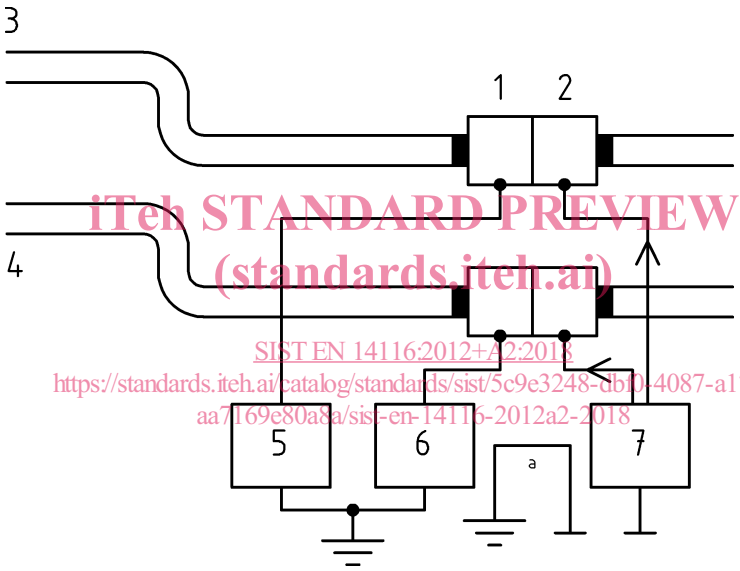
a) automatic product identification for each compartment or tank;

b) cross over prevention;

A1

c) overfill prevention (optional). A1

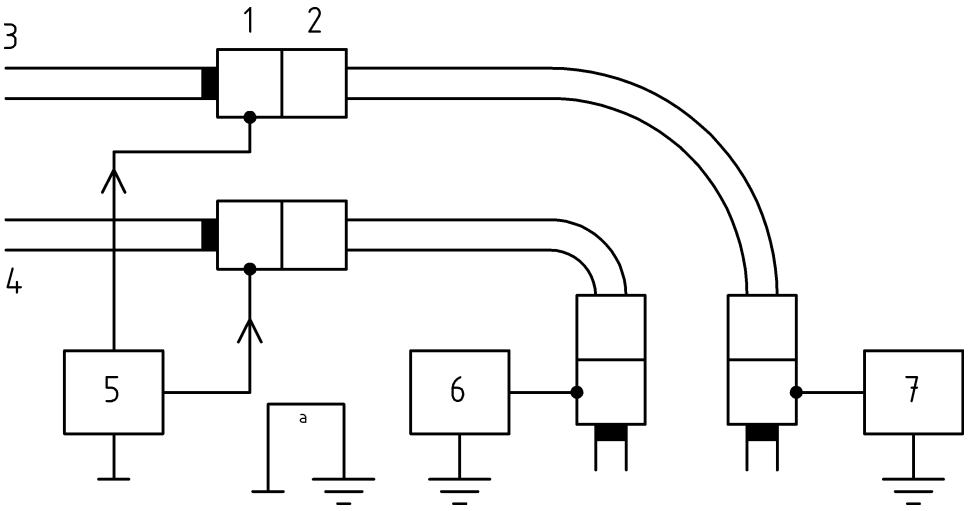
Bi-directionality may add the ability of communication between the stationary parts and the tank vehicle, e.g. the transfer of data of measured quantities in both directions.



Key

1 pipework of loading arm with insulated coupling
2 pipework of transport tank with insulated coupling
3 vapour line
4 product line
5 PID, vapour
6 PID, product
7 PRD
a required, if only one connection is established

Figure 1 — Loading



Key

1 pipework of transport tank with insulated coupling

2 conductive hoses [b] and pipework of stationary tank with insulated couplings

3 vapour line

4 product line

5 PRD

6 PID, product

7 PID, vapour

[a] required, if only one connection is established

b if the discharge hoses are not conductive then the conductivity of these hoses shall be achieved by other means

Figure 2 — Unloading

PRD supplies an intrinsically safe circuit.

5 Design characteristics

5.1 General

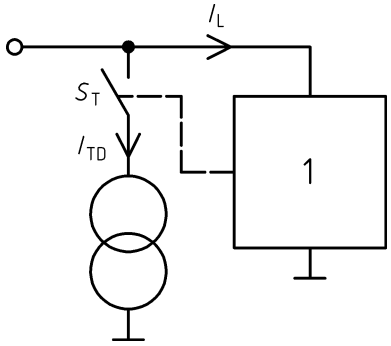
The PRD shall be located on the transport tank. The PID shall be connected in series to a current loop with the PRD.

The PRD reads the PID by powering the PID through the hose or loading arm. The PID then sends its data by modulating the supply current, which is sensed by the PRD; see Figure 3.

The PID sends its data, using messages, which are numbered from 1 to 255.

The PID always transmits "message #1". By implementing more messages, it is possible to program the PID with other types of information; see 6.6.

Since the PID modulates the supply current, PIDs shall not be connected in parallel.



Key

Components:

1 electronic circuit

S_T modulating switch

I_L supply current without modulation

I_{TD} supply current amplitude

Figure 3 — Basic circuit diagram of PID

5.2 Temperature range

Unless otherwise specified, the operating temperature range shall be - 20 °C to + 50 °C.

Where the product recognition device is subjected to temperatures outside the specified temperature range, all applicable temperature values shall be extended. All other requirements shall remain unchanged.

5.3 Materials of construction

The manufacturer shall provide with the equipment a full material specification for those parts, which may come into contact with the substances according to Clause 1.

5.4 PRD

The PRD shall provide an intrinsically safe power supply with the values according to Table 1 to the PID.

Table 1 — DC electrical characteristics of PRD

Parameter	Unit	Min	Nom	Max	Ex-values [a]
Open-circuit voltage	V	11	12	15	U_0 = 15
Short-circuit current	mA	-	-	300	I_0 = 300
Output power	W	-	-	1,1	P_0 = 1,1

[a] Maximum value to ensure compliance with EN 60079-11.

Explosive protection shall be at least Ex ia IIA according to EN 60079-0 and EN 60079-11.

5.5 PID

5.5.1 General specification

Explosion protection shall be at least Ex ia IIA according to EN 60079-0 and EN 60079-11.

Table 2 — DC electrical characteristics of PID

Parameter	Symbol	Unit	Min	Nom	Max	Ex-values [a]
Supply voltage	U	V	6	12	15	U_i = 15
Supply current without modulation	I_L	mA	0	5	10	I_i = 300
Supply current at U_+ < 3 V	I_{OFF}	mA	-	-	5	-
Maximum input power	P_i	W	-	-	-	= 1,1
Maximum internal capacitance	C_i	nF	-	-	-	= 600
Maximum internal inductance	L_i	µH	-	-	-	= 10

[a] Maximum value to ensure compliance with EN 60079-11.

Table 3 — AC electrical characteristics of PID

Parameter	Symbol	Unit	Min	Nom	Max
Supply current amplitude	I_{TD}	mA	10	15	20
Clock rate	f_{Tc}	Hz	4 800	4 880	4 960
Duty cycle	cd_T	%	40	50	60
Rise time of output signal	t_{Tr}	µs	0	-	30
Fall time of output signal	t_{Tf}	µs	0	-	30
Transmission delay after power on	t_{Tds}	ms	0	-	0,9

The timing diagram of PID is shown in Figure 4.