

TECHNICAL SPECIFICATION

**Electric vehicles conductive charging system –
Part 3-5: DC EV supply equipment where protection relies on double or
reinforced insulation – Pre-defined communication parameters and general
application objects**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRIC VEHICLES CONDUCTIVE CHARGING SYSTEM –**Part 3-5: DC EV supply equipment where protection relies on double or reinforced insulation – Pre-defined communication parameters and general application objects****FOREWORD**

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The text of this Technical Specification is based on the following documents:

Draft	Report on voting
69/651/DTS	69/672/RVDTS
	69/672A/RVDTS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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INTRODUCTION

This document is published in separate parts according to the following structure:

IEC TS 61851-3-1, *Electric vehicles conductive charging system – Part 3-1: DC EV supply equipment where protection relies on double or reinforced insulation – General rules and requirements for stationary equipment*

IEC TS 61851-3-2, *Electric vehicles conductive charging system – Part 3-2: DC EV supply equipment where protection relies on double or reinforced insulation – Particular requirements for portable and mobile equipment*

IEC TS 61851-3-4, *Electric vehicles conductive charging system – Part 3-4: DC EV supply equipment where protection relies on double or reinforced insulation – General definitions and requirements for CANopen communication*

IEC TS 61851-3-5, *Electric vehicles conductive charging system – Part 3-5: DC EV supply equipment where protection relies on double or reinforced insulation – Pre-defined communication parameters and general application objects*

IEC TS 61851-3-6, *Electric vehicles conductive charging system – Part 3-6: DC EV supply equipment where protection relies on double or reinforced insulation – Voltage converter unit communication*

IEC TS 61851-3-7, *Electric vehicles conductive charging system – Part 3-7: DC EV supply equipment where protection relies on double or reinforced insulation – Battery system communication*

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ELECTRIC VEHICLES CONDUCTIVE CHARGING SYSTEM –

Part 3-5: DC EV supply equipment where protection relies on double or reinforced insulation – Pre-defined communication parameters and general application objects

1 Scope

This part of IEC 61851, which is a Technical Specification, applies to CANopen communication for the conductive transfer of electric power between the supply network and an electric road vehicle or a removable RESS or traction-battery of an electric road vehicle.

This document provides specifications with regard to the pre-defined communication parameters and general application objects.

2 Normative references

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

IEC TS 61851-3-1:2023, *Electric vehicles conductive charging system – Part 3-1: DC EV supply equipment where protection relies on double or reinforced insulation – General rules and requirements for stationary equipment*

IEC TS 61851-3-4:2023, *Electric vehicles conductive charging system – Part 3-4: DC EV supply equipment where protection relies on double or reinforced insulation – General definitions and requirements for CANopen communication*

EN 50325-4:2002: *Industrial communications subsystem based on ISO 11898 (CAN) For controller-device interface - Part 4: Canopen*

CiA 302-2:2009, *CANopen additional application layer functions – Part 2: Network management* (available at www.can-cia.org)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC TS 61851-3-4:2023 apply.

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

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

4 Symbols and abbreviated terms

For the purposes of this document, the symbols and abbreviated terms given in IEC TS 61851-3-4:2023 apply.

5 Pre-defined communication objects

5.1 General

5.1.1 Overview

Clause 5 provides additional definitions with regard to the predefined communication objects in EN 50325-4.

The object dictionary structure is defined in Table 1 of EN 50325-4:2002.

Communication parameters and application parameters (e.g. process, configuration, and diagnostic data) are described by object description and entry description. Object description and entry description attributes are specified in EN 50325-4:2002. The category and entry category attributes indicate whether the object shall be implemented (mandatory) or may be implemented (optional). The access attribute describes if a process data is produced (ro) or consumed (rw) by means of SDO or PDO services, see also Annex B. The default value attribute defines the value with access attribute of the value "const", "rw" or "wo" after the first power-on or after reset if the configuration has not been saved.

5.1.2 Object 1000_h: Device type

This object shall indicate the type of device and its functionality. Figure 1 illustrates the object structure as specified in EN 50325-4:2002. In addition to the value definition given in EN 50325-4:2002, Table 1 specifies the value definition for the bit field "Additional information". The "device profile number" shall be 454_d. Table 2 specifies the object description, and Table 3 specifies the entry description.

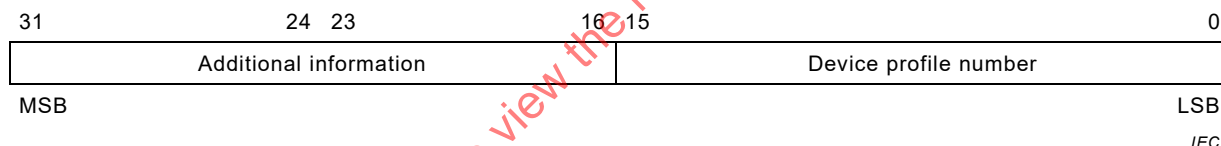


Figure 1 – Object structure

Table 1 – Value definition for the bit field additional information

Bit	Value	Description
16	0	EMSC not supported
	1	EMSC supported
24	0	Active device
	1	Passive device
25	0	Device not changeable by end user
	1	Device, changeable by the end-user
26	0	Manufacturer-specific functionality not supported
	1	Manufacturer-specific functionality supported
27	0	Masterless mode not supported
	1	Masterless mode supported
30	0	CANopen device not in Bootloader mode; application software running
	1	Bootloader active; no application software is running
All other bits shall be reserved (always 0).		

Table 2 – Object description

Attribute	Value
Index	1000 _h
Name	Device type
Object code	VAR
Data type	UNSIGNED32
Category	Mandatory

Table 3 – Entry description

Attribute	Value
Sub-index	00 _h
Access	const
PDO mapping	No
Value range	See value definition
Default value	Manufacturer-specific

5.1.3 Object 1001_h: Error register

The device profile specific bit in the error register object is reserved. For details, see Annex B of EN 50325-4:2002.

5.1.4 Object 1003_h: Pre-defined error field

The pre-defined error field shall be implemented. The supported depth is manufacturer-specific. For details, see Annex B of EN 50325-4:2002.

5.1.5 Object 1005_h: COB-ID SYNC

The EMSC, the virtual device hosting the NMT master functionality, shall support SYNC producer capabilities. The device with NMT slave functionality shall support SYNC consumer capabilities. The SYNC counter value shall be supported. Table 4 provides the default values for EMSC and devices, not hosting the EMSC.

Table 4 – Default value definition object 1005_h

Device type	Value
EMSC	4000 0080 _h
Non-EMSC device	0000 0080 _h

5.1.6 Object 1006_h: Communication cycle period

The device with NMT master functionality shall support SYNC communication cycle period. The SYNC signal shall be transmitted with a SYNC cycle period of 100 ms. The device with NMT slave functionality may support this object.

5.1.7 Object 1007_h: Communication window length

It is recommended that all devices support this object, which supports TPDOs with a synchronous transmission type.

5.1.8 Object 1016_h: Heartbeat consumer time

It is recommended to set the heartbeat consumer time to 300 ms. Object description and entry description are defined in Annex B of EN 50325-4:2002. Each active device shall implement the heartbeat consumer time and shall consume the heartbeat that is produced by the EMSC. Other heartbeat messages may be consumed. The EMSC shall implement the heartbeat consumer in a way, so that the EMSC is capable to receive the heartbeat of all network participants.

5.1.9 Object 1017_h: Heartbeat producer time

All devices shall support the heartbeat producer. It is recommended to set the heartbeat producer time to 100 ms. Object description and entry description are defined in Annex B of EN 50325-4:2002.

5.1.10 Object 1018_h: Identity

Each CANopen device compliant to this application profile shall support all sub-indices of the identity object. For details, see Annex B of EN 50325-4:2002.

NOTE This object is a base for LSS usage.

5.1.11 Object 1029_h: Error behaviour

This object specifies to which NMT state the device shall be set in case a communication error or a device-internal error is detected in NMT operational state. The device-internal error shall be valid when the device's application state machine is in error state. For informative reasons, Table 5 illustrates the value definition. Table 6 specifies the object description. Table 7 specifies the entry description.

Table 5 – Value definition

Value [hex]	Function
00	Transit to NMT pre-operation state (only if current state is NMT operational)
01	No state transition
02	Transit to NMT stopped state
03 to FF	Reserved

Table 6 – Object description (optional)

Attribute	Value
Index	1029 _h
Name	Error behaviour
Object code	ARRAY
Data type	UNSIGNED8
Category	Mandatory

Table 7 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Number of error classes
Entry category	Mandatory
Access	Const
PDO mapping	No
Value range	02 _h
Default value	02 _h
Sub-index	01 _h
Description	Communication error
Entry category	Mandatory
Access	Rw
PDO mapping	No
Value range	00 _h to 02 _h
Default value	01 _h
Sub-index	02 _h
Description	Internal device error
Entry category	Mandatory
Access	Rw
PDO mapping	No
Value range	00 _h to 02 _h
Default value	01 _h

5.2 PDO communication

Subclause 5.2 provides additional specifications for the PDO communication parameters. The PDOs are specified in Annex B.

6 General application objects for CANopen devices

6.1 General

Clause 6 provides application objects, common to all CANopen devices compliant with this document. These objects may be implemented in all CANopen devices, supporting any part of this profile series. Clause 6 distinguishes between application objects that are either produced or consumed by the CANopen devices with NMT slave functionality. Produced application objects are transmitted via the CANopen interface of the CANopen device. Consumed application objects are received, respectively. All parameters in this profile are grouped in the object dictionary and defined by attributes as defined in 4.3.2 of EN 50325-4:2002. Each object within the CANopen object dictionary is addressed uniquely by using a 16-bit index and an 8-bit sub-index. The objects may be read respectively written via the CANopen network. The standardized device profile area in the index range of 6000_h to 9FFF_h contains all application objects, for example configuration parameter, process data, diagnostic information, etc., common to this document.

Within this range of parameters, it is possible to implement up to eight logical devices (see EN 50325-4:2002). The following index ranges are used:

- 6000_h to 67FF_h: 1st logical device;
- 6800_h to 6FFF_h: 2nd logical device;
- 7000_h to 77FF_h: 3rd logical device;
- 7800_h to 7FFF_h: 4th logical device;
- 8000_h to 87FF_h: 5th logical device;
- 8800_h to 8FFF_h: 6th logical device;
- 9000_h to 97FF_h: 7th logical device;
- 9800_h to 9FFF_h: 8th logical device.

The general application objects for the application profile for EMS groups the general application objects to a virtual device called GAO (General application objects). The virtual device GAO shall be implemented in any IEC 61851-3 (all parts) compatible device in case parameters of this document are supported and no other virtual devices are implemented.

6.2 Application objects produced by CANopen devices with NMT slave functionality

6.2.1 General

Subclause 6.2 defines the consumed application objects. The CANopen devices that support the NMT slave functionality only receive these application objects. The CANopen device hosting the virtual device EMSC shall produce these objects.

In order to get the actual process image, for example for speeding up the local reaction time in case of emergencies, extensions of these objects may be supported to store the received data.

6.2.2 Object 6000_h: Supported virtual devices

This object shall provide information on the supported virtual devices. In order to allow supporting several instances of a virtual device locally in one CANopen device or globally in the entire EMS application, it is necessary to distinguish between the different instances of that virtual device. CANopen device internally, the instances of the same virtual device are distinguished by means of the "Instance number". To distinguish between the same virtual devices, residing in different CANopen devices, the EMSC may configure an additional instance offset. The bit field "device class" shall provide the nominal operating voltage. Devices Class 00 or 01 devices operate on extra-low voltage. On higher classes, a galvanic isolation between communication and application is mandatory.

In case a wrong value is written by means of SDO to the instance offset sub-field, the SDO abort code 0609 0030_h shall be used to reject this attempt. In case a wrong value is written to one of the other sub-fields of this object by means of SDO, the SDO abort code 0604 0043_h shall be used.

Figure 2 illustrates the object structure. Table 8 provides the value definition. Table 9 specifies the object description, and Table 10 specifies the entry description.

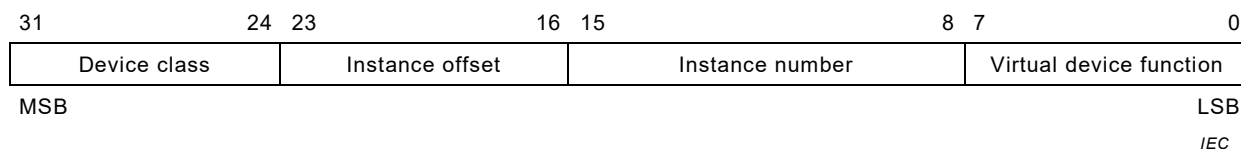


Figure 2 – Object structure supported virtual devices

Table 8 – Value definition for bit fields

Name	Value [hex]	Description
Virtual device function	00 to 01	Reserved
	02	GAO
	03	Reserved
	04	EMSC
	05	Voltage converter unit
	06	Battery system
	07	Motor control unit ^a
	08	Load monitoring unit ^a
	09	HMI control unit ^a
	0A	Security unit
	0B	Sensor unit ^a
	0C	Gateway unit ^a
	0D	Generator unit ^a
	0E	Load unit ^a
	0F to 7F	Reserved
	80	Manufacturer-specific VD
	81 to FF	Reserved
Instance number	00	Reserved
	01 to 7F	Local instance number
	80 to FF	Reserved
Instance offset	00	Default
	01 to 7F	Instance offset
	80 to FF	Reserved
Device voltage class	00	Device does not consume energy from the EMS and is only powered by an AUX voltage (passive device)
	01	Device operating at 12 V _{DC} to 48 V _{DC} nominal voltage
	02	Device operating at more than 48 V _{DC} to 96 V _{DC} nominal voltage
	03	Device operating at more than 96 V _{DC} to 200 V _{DC} nominal voltage
	04	Device operating at more than 200 V _{DC} to 400 V _{DC} nominal voltage
	05	Device operating at more than 400 V _{DC} nominal voltage
	06 to 7F	Reserved
	80	Device operating at 85 to 127 V _{AC} , single phase
	81	Device operating at 200 to 265 V _{AC} , single phase
	82 to BF	Reserved
	C0	Device operating at 85 to 127 V _{AC} , three phase, (Y-connection)
	C1	Device operating at 200 to 265 V _{AC} , three phase, (Y-connection)
	C2	Device operating at 85 to 127 V _{AC} , three phase, (Δ-connection)
	C3	Device operating at 200 to 265 V _{AC} , three phase, (Δ-connection)
	C4 to FD	Reserved
	FE	Device class provided in 60A5h
	FF	Reserved

^a This virtual device is not specified in this document. For details, refer to IEC TS 61851-3-4.

NOTE Requirements for voltages are covered by other documents of the IEC 61851-3 series.

Table 9 – Object description

Attribute	Value
INDEX	6000 _h
Name	Supported virtual device
Object code	ARRAY
Data type	UNSIGNED32
Category	Mandatory

Table 10 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	VDN 1
Entry category	Mandatory
Access	ro; rw if changing "Instance offset" is supported, CANopen device is in NMT state pre-operational and virtual device FSA is in FSA state compatibility check
PDO mapping	Optional
Value range	See value definition
Default value	Manufacturer-specific
Sub-index	02 _h
Description	VDN 2
Entry category	Optional
Access	ro; rw if changing "Instance offset" is supported, CANopen device is in NMT state pre-operational and virtual device FSA is in FSA state compatibility check.
PDO mapping	Optional
Value range	See value definition
Default value	Manufacturer-specific
To	
Sub-index	7F _h
Description	VDN 127
Entry category	Optional
Access	ro; rw if changing "Instance offset" is supported, CANopen device is in NMT state pre-operational and virtual device FSA is in FSA state compatibility check.
PDO mapping	Optional
Value range	See value definition
Default value	Manufacturer-specific

6.2.3 Object 6002_h: Status word

This object shall provide the status of each virtual device, which is implemented. As specified in Figure 3, the status is represented by means of the general EMS FSA state, the virtual device specific FSA state, as well as the device status.

Figure 3 illustrates the value structure. Table 11 provides the value definition. Table 12 specifies the object description and Table 13 specifies the entry description.



Figure 3 – Object structure device status

Table 11 – Value definition device status

Bit	Value	Description
0	0	Current input not active
	1	Current input active
1	0	Current output not active
	1	Current output active
2	0	Fixed voltage input not active
	1	Fixed voltage input active
3	0	Fixed voltage output not active
	1	Fixed voltage output active
4	0	Current regulation or limitation not active
	1	Current regulation or limitation active
5	0	Voltage regulation or limitation not active
	1	Voltage regulation or limitation active
6 to 11	00	No virtual device specific FSA states supported or virtual device specific FSA has not been accessed yet
	01 to 3F	Indication of virtual device specific FSA states
12		Reserved for future use; always 0
13 to 15	0	FSA state Disconnected
	1	FSA state Connected
	2	FSA state Compatibility Check
	3	FSA state Limiting
	4	FSA state Operating
	5	FSA state Masterless operating
	6	FSA state sleep mode
	7	Reserved

Table 12 – Object description

Attribute	Value
Index	6002 _h
Name	Status word
Object code	ARRAY
Data type	UNSIGNED16
Category	Mandatory

Table 13 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	01 _h to 7F _h
Default value	Manufacturer-specific
Sub-index	01 _h
Description	VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	See value definition
Default value	No
Sub-index	02 _h
Description	VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	See value definition
Default value	No
To	
Sub-index	7F _h
Description	VDN 127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	See value definition
Default value	No

6.2.4 Object 6003_h: Device capability

This object shall provide the device capability. Figure 4 illustrates the value structure. Table 14 provides the value definition. Table 15 specifies the object description and Table 16 specifies the entry description.

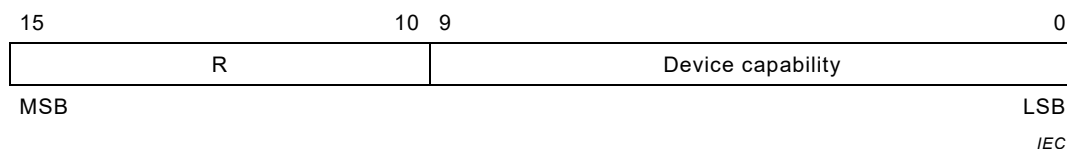


Figure 4 – Value structure

Table 14 – Value definition

Name	Bit	Value	Description
device capability	0	0 _b	Device is not able to switch off or on
		1 _b	Device is able to switch off or on
	1	0 _b	Device is possibly passive
		1 _b	Device is possibly active
	2	0 _b	Device is not master capable
		1 _b	Device is a master capable
	3	0 _b	Device is not able to switch to sleep mode
		1 _b	Device is able to switch to sleep mode
	4	0 _b	Device is not able to limit the input current
		1 _b	Device is able to limit the input current
	5	0 _b	Device is not able to limit the output current
		1 _b	Device is able to limit the output current
	6	0 _b	Device is not able to limit the input voltage
		1 _b	Device is able to limit the input voltage
	7	0 _b	Device is not able to limit the output voltage
		1 _b	Device is able to limit the output voltage
	8	0 _b	Device is not able to transmit dynamic limitation
		1 _b	Device is able to transmit dynamic limitation
	9	0 _b	Device is not able to receive dynamic limitation
		1 _b	Device is able to receive dynamic limitation
R	10 to 15	0 _b	Reserved (always 0)
		1 _b	

Table 15 – Object description

Attribute	Value
Index	6003 _h
Name	Device capability
Object code	ARRAY
Data type	UNSIGNED16
Category	Mandatory

Table 16 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	01 _h to 7F _h
Default value	Manufacturer-specific
Sub-index	01 _h
Description	VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	See value definition
Default value	No
Sub-index	02 _h
Description	VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	See value definition
Default value	No
To	
Sub-index	7F _h
Description	VDN 127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	See value definition
Default value	No

6.2.5 Object 6004_h: System date and time (optional)

This object shall provide system date and time. Table 17 specifies the object description, and Table 18 specifies the entry description. Sub-index 01_h shall provide the system date's number of days, given since January 1st, 1984. Sub-index 02_h shall provide the system date's time, given in multiples of 1 ms since midnight.

Table 17 – Object description

Attribute	Value
INDEX	6004 _h
Name	System date and time
Object code	ARRAY
Data type	UNSIGNED32
Category	Optional

Table 18 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	02 _h
Default value	02 _h
Sub-index	01 _h
Description	Days
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	02 _h
Description	Time
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No

6.2.6 Object 6005_h: Device unique part number (optional)

This object shall provide the unique part number of the device. Table 19 specifies the object description and Table 20 specifies the entry description.

Table 19 – Object description

Attribute	Value
Index	6005 _h
Name	Device unique part number
Object code	VAR
Data type	UNSIGNED32
Category	Optional

Table 20 – Entry description

Attribute	Value
Sub-index	00 _h
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No

6.2.7 Object 6006_h: Device electronic production date (optional)

This object shall provide the date of device electronic production. Table 21 specifies the object description and Table 22 specifies the entry description. Sub-index 01_h shall provide the production date's number of days, given since January 1st, 1984. Sub-index 02_h shall provide the production date's time, given in multiples of 1 ms since midnight.

Table 21 – Object description

Attribute	Value
Index	6006 _h
Name	Device electronic production date
Object code	ARRAY
Data type	UNSIGNED32
Category	Optional

Table 22 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	02 _h
Default value	02 _h
Sub-index	01 _h
Description	Days
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	02 _h
Description	Time
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No

6.2.8 Object 6007_h: Device installation date (optional)

This object shall provide the date of device installation. Table 23 specifies the object description and Table 24 specifies the entry description. Sub-index 01_h shall provide the installation date's number of days, given since January 1st, 1984. Sub-index 02_h shall provide the installation date's time, given in multiples of 1 ms since midnight.

Table 23 – Object description

Attribute	Value
Index	6007 _h
Name	Device installation date
Object code	ARRAY
Data type	UNSIGNED32
Category	Optional

Table 24 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	02 _h
Default value	02 _h
Sub-index	01 _h
Description	Days
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	02 _h
Description	Time
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No

6.2.9 Object 6008_h: Device nominal voltage (optional, mandatory for active devices)

This object shall provide the nominal voltage as labelled on the device. This voltage shall not exceed the minimal and the maximal voltage of the device. The values shall be given in multiples of 1 mV. Table 25 specifies the object description and Table 26 specifies the entry description. The sub-indices 01_h to 7F_h shall provide the local rated voltages of the device. The sub-indices 80_h to FE_h may be used to administer the rated voltages of other active devices in the system.

NOTE Passive devices return 0.

Table 25 – Object description

Attribute	Value
Index	6008 _h
Name	Device nominal voltage
Object code	ARRAY
Data type	INTEGER32
Category	Optional, mandatory for active devices

Table 26 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Voltage VDN 1
Entry category	Mandatory
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Voltage VDN 2
Entry category	Optional
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Voltage VDN 127
Entry category	Optional
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	80 _h
Description	External voltage 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External voltage 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.2.10 Object 6009_h: Device alarm status

This object shall provide the device alarm status. Figure 5 illustrates the value structure. Table 27 provides the value definition. Table 28 specifies the object description and Table 29 specifies the entry description.

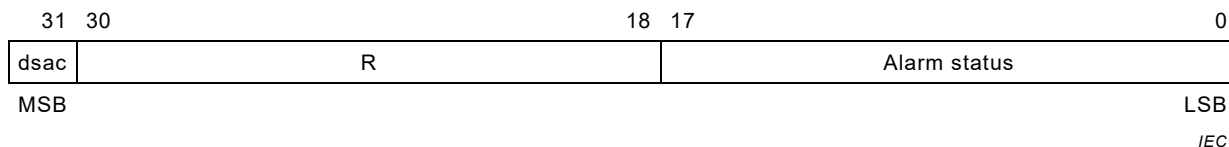


Figure 5 – Value structure

Table 27 – Value definition

Name	Bit	Value	Description
alarm status	0	0 _b	No over voltage
		1 _b	Over voltage occurred
	1	0 _b	No under voltage
		1 _b	Under voltage occurred
	2	0 _b	No output over current
		1 _b	Output over current
	3	0 _b	No input over current
		1 _b	Input over current
	4	0 _b	No electronic over temperature
		1 _b	Electronic over temperature
	5	0 _b	No battery cells over temperature
		1 _b	Battery cells over temperature occurred
	6	0 _b	No communication error
		1 _b	Communication error occurred
	7	0 _b	No battery system compatibility error occurred
		1 _b	Battery system compatibility error occurred
	8	0 _b	No electronic power stage defect detected
		1 _b	Electronic power stage defect
	9	0 _b	All fuses ok
		1 _b	Fuse blown detected
	10	0 _b	All cells ok
		1 _b	Cell damaged
	11	0 _b	Charge temperature ok
		1 _b	Charge over temperature
	12	0 _b	Discharge temperature ok
		1 _b	Discharge over temperature
	13	0 _b	All sensors ok
		1 _b	Sensor damaged
	14	0 _b	No broken wire detected
		1 _b	Wire broken
	15	0 _b	No isolation damage detected

Name	Bit	Value	Description
	16	1 _b	Isolation damaged
		0 _b	Fuel capacity ok
		1 _b	Low fuel capacity
	17	0 _b	No maintenance required
		1 _b	Maintenance required
R	18 to 30	Reserved (always 0)	
dsac: device specific alarm status	31	0 _b	No error
		1 _b	Device specific alarm status

Table 28 – Object description

Attribute	Value
Index	6009 _h
Name	Device alarm status
Object code	VAR
Data type	UNSIGNED32
Category	Optional

Table 29 – Entry description

Attribute	Value
Sub-index	00 _h
Access	ro
PDO mapping	Optional
Value range	See value definition
Default value	No

6.2.11 Object 600A_h: Device alarm capability

This object shall provide the supported device alarm capability. Figure 6 illustrates the value structure. Table 30 provides the value definition. Table 31 specifies the object description and Table 32 specifies the entry description.

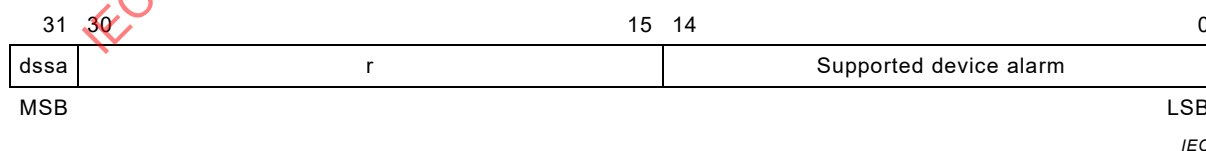


Figure 6 – Value structure

Table 30 – Value definition

Name	Bit	Value	Description
supported device alarm	0	0 _b	Over voltage alarm not supported
		1 _b	Over voltage alarm supported
	1	0 _b	Under voltage alarm not supported
		1 _b	Under voltage alarm supported
	2	0 _b	Output over current alarm not supported
		1 _b	Output over current alarm supported
	3	0 _b	Input over current alarm not supported
		1 _b	Input over current alarm supported
	4	0 _b	Electronic over temperature alarm not supported
		1 _b	Electronic over temperature alarm supported
	5	0 _b	Battery cells over temperature alarm not supported
		1 _b	Battery cells over temperature alarm supported
	6	0 _b	Communication error alarm not supported
		1 _b	Communication error alarm supported
	7	0 _b	Battery system compatibility error alarm not supported
		1 _b	Battery system compatibility error alarm supported
	8	0 _b	Electronic power stage defect alarm not supported
		1 _b	Electronic power stage defect alarm supported
	9	0 _b	Fuse blown alarm not supported
		1 _b	Fuse blown alarm supported
	10	0 _b	Cell damaged alarm not supported
		1 _b	Cell damaged alarm supported
	11	0 _b	Charge over temperature alarm not supported
		1 _b	Charge over temperature alarm supported
	12	0 _b	Discharge over temperature alarm not supported
		1 _b	Discharge over temperature alarm supported
	13	0 _b	Sensor damaged alarm not supported
		1 _b	Sensor damaged alarm supported
	14	0 _b	Wire broken alarm not supported
		1 _b	Wire broken alarm supported
	15	0 _b	Isolation damaged alarm not supported
		1 _b	Isolation damaged alarm supported
R	16 to 30	0 _b	Reserved (always 0)
		1 _b	
dssa: device specific supported alarm	31	0 _b	Alarm not supported
		1 _b	Alarm supported

Table 31 – Object description

Attribute	Value
Index	600A _h
Name	Supported device alarm
Object code	VAR
Data type	UNSIGNED32
Category	Optional

Table 32 – Entry description

Attribute	Value
Sub-index	00 _h
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No

6.2.12 Object 600B_h: Device warning status (optional)

This object shall provide the device warning status. Figure 7 illustrates the value structure. Table 33 provides the value definition. Table 34 specifies the object description and Table 35 specifies the entry description.

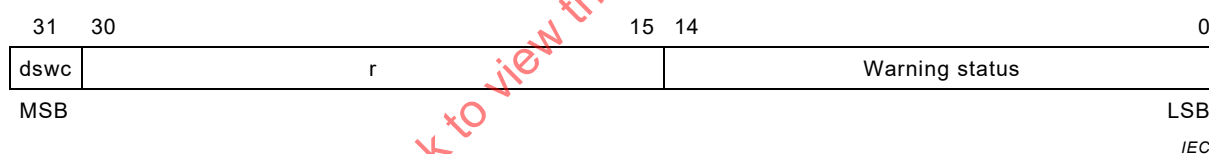
**Figure 7 – Value structure**

Table 33 – Value definition

Name	Bit	Value	Description
warning status	0	0 _b	No over voltage warning
		1 _b	Over voltage warning
	1	0 _b	No under voltage warning
		1 _b	Under voltage warning
	2	0 _b	No output over current warning
		1 _b	Output over current warning
	3	0 _b	No input over current warning
		1 _b	Input over current warning
	4	0 _b	No electronic over temperature warning
		1 _b	Electronic over temperature warning
	5	0 _b	No battery cells over temperature warning
		1 _b	Battery cells over temperature warning
	6	0 _b	No communication error warning
		1 _b	Communication error warning
	7	0 _b	No battery system compatibility error warning
		1 _b	Battery system compatibility error warning
	8	0 _b	No electronic power stage defect warning
		1 _b	Electronic power stage defect warning
	9	0 _b	No fuse blown warning
		1 _b	Fuse blown warning
	10	0 _b	No cell damaged warning
		1 _b	Cell damaged warning
	11	0 _b	No charge over temperature warning
		1 _b	Charge over temperature warning
	12	0 _b	No discharge over temperature warning
		1 _b	Discharge over temperature warning
	13	0 _b	No sensor damaged warning
		1 _b	Sensor damaged warning
	14	0 _b	No wire broken warning
		1 _b	Wire broken warning
	15	0 _b	No isolation damaged warning
		1 _b	Isolation damaged warning
R	16 to 30	0 _b	Reserved (always 0)
		1 _b	
dswc: device specific warning status	31	0 _b	No manufacturer-specific warning
		1 _b	Manufacturer-specific warning

Table 34 – Object description

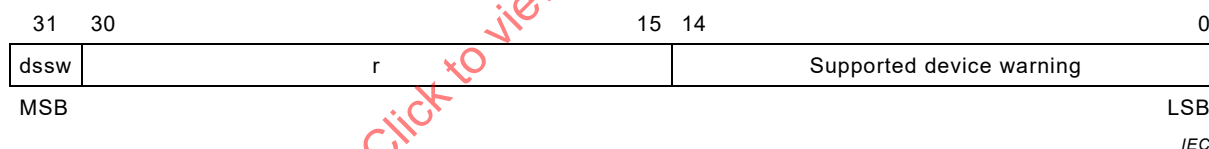
Attribute	Value
Index	600B _h
Name	Device warning status
Object code	VAR
Data type	UNSIGNED32
Category	Optional

Table 35 – Entry description

Attribute	Value
Sub-index	00 _h
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No

6.2.13 Object 600C_h: Device warning capability (optional)

This object shall provide the device warnings capabilities. Figure 8 illustrates the value structure. Table 36 provides the value definition. Table 37 specifies the object description and Table 38 specifies the entry description.

**Figure 8 – Value structure****Table 36 – Value definition**

Name	Bit	Value	Description
supported device warning	0	0 _b	Over voltage warning not supported
		1 _b	Over voltage warning supported
	1	0 _b	Under voltage warning not supported
		1 _b	Under voltage warning supported
	2	0 _b	Output over current warning not supported
		1 _b	Output over current warning supported
	3	0 _b	Input over current warning not supported
		1 _b	Input over current warning supported
	4	0 _b	Electronic over temperature warning not supported
		1 _b	Electronic over temperature warning supported
	5	0 _b	Battery cells over temperature warning not supported

Name	Bit	Value	Description
	6	1 _b	Battery cells over temperature warning supported
		0 _b	Communication error warning not supported
	7	1 _b	Communication error warning supported
		0 _b	Battery system compatibility error warning not supported
	8	1 _b	Battery system compatibility error warning supported
		0 _b	Electronic power stage defect warning not supported
	9	1 _b	Electronic power stage defect warning supported
		0 _b	Fuse blown warning not supported
	10	1 _b	Fuse blown warning supported
		0 _b	Cell damaged warning not supported
	11	1 _b	Cell damaged warning supported
		0 _b	Input over temperature warning not supported
	12	1 _b	Input over temperature warning supported
		0 _b	Output over temperature warning not supported
	13	1 _b	Output over temperature warning supported
		0 _b	Sensor damaged warning not supported
	14	1 _b	Sensor damaged warning supported
		0 _b	Wire broken warning not supported
R	15	1 _b	Wire broken warning supported
		0 _b	Isolation damaged warning not supported
	16 to 30	1 _b	Isolation damaged warning supported
		0 _b	Reserved (always 0)
dssw: device specific supported warning	31	0 _b	Device-specific warning not supported
		1 _b	Device-specific warning supported

Table 37 – Object description

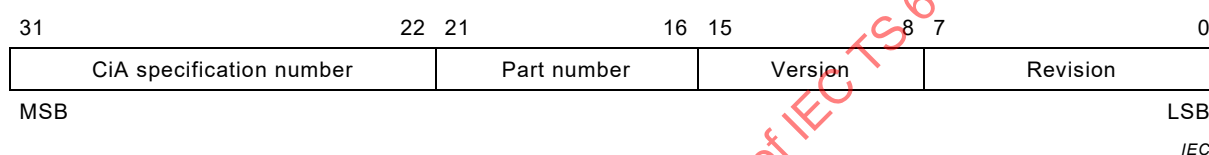
Attribute	Value
Index	600C _h
Name	Supported device warning
Object code	VAR
Data type	UNSIGNED32
Category	Optional

Table 38 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No

6.2.14 Object 600E_h: Implemented specification versions

This object shall provide version numbers of the implemented CiA specifications. Figure 9 provides object structure. Table 39 provides the value definition. Table 40 specifies the object description and Table 41 specifies the entry description.

**Figure 9 – Value structure****Table 39 – Value definition**

Bit field	Value	Description
CiA specification number	0	Reserved
	1	IEC 61851-3 series implemented
	2 to 99	Reserved
	100 to 899	Number of implemented CiA specification
	900 to 1023	Reserved
Part number	0	Specification indicated in CiA specification number is a monolithic document. There do not exist several parts
	1 to 63	Implemented part of that CiA specification, whose CiA specification number is indicated
Version	0	Reserved
	1 to 255	Version of the part of the implemented CiA specification
Revision	0	Reserved
	1 to 255	Revision of the part of the implemented CiA specification

Table 40 – Object description

Attribute	Value
Index	600E _h
Name	Implemented profile versions
Object code	ARRAY
Data type	UNSIGNED32
Category	Mandatory

Table 41 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	Implemented profile version 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	See value definition
Default value	No
Sub-index	02 _h
Description	Implemented profile version 2
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	See value definition
Default value	No
To	
Sub-index	7F _h
Description	Implemented profile version 127
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	See value definition
Default value	No

6.2.15 Object 6020_h: Device request dynamic voltage limitation

This object shall provide the request for dynamic voltage limitation to a certain percentage of the maximum voltage of the device. In case an overload occurs in the device, the device reduces the local input voltage to the dynamic voltage limitation. The values shall be given in multiples of 0,01 %. The value definition is specified in Table 42. Table 43 specifies the object description and Table 44 specifies the entry description.

Table 42 – Value definition

Value	Definition
0000 _h	0 % (maximum limitation)
0001 _h to 270F _h	Limitation to 0,01 % to 99,99 % of maximum voltage of device
2710 _h	100 % (no limitation)
2711 _h to FFFE _h	100,01 % to 655,34 % of maximum voltage ^a of device (value shall not exceed maximum voltage specified in Table 2 of IEC TS 61851-3-1:–)
FFFF _h	Reserved
^a In case of, for example, huge voltage drops on the line, the demanded voltage is not reached. Therefore, an option is provided to request "more" than the maximum voltage. Warning: in case several active devices are connected, make sure that all active devices operate within their operating limits.	

Table 43 – Object description

Attribute	Value
Index	6020 _h
Name	Device request dynamic voltage limitation
Object code	ARRAY
Data type	UNSIGNED16
Category	Conditional; mandatory for active devices

Table 44 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Voltage limitation on input VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional

Attribute	Value
Value range	See value definition
Default value	No
Sub-index	02 _h
Description	Voltage limitation on input VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	See value definition
Default value	No
to	
Sub-index	7F _h
Description	Voltage limitation on input VDN 127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	See value definition
Default value	No
Sub-index	80 _h
Description	External voltage limitation on input 1
Category	Optional
Access	rw
PDO mapping	No
Value range	See value definition
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External voltage limitation on input 127
Category	Optional
Access	rw
PDO mapping	No
Value range	See value definition
Default value	Manufacturer-specific

6.2.16 Object 6022_h: Device request dynamic current input limitation

This object shall provide the request for dynamic current input limitation to a certain percentage of the maximum current of the device. In case an overload occurs in the device, the device reduces the local input current with the dynamic current limitation. The values shall be given in multiples of 0,01 %. The value definition is specified in Table 45. Table 46 specifies the object description and Table 47 specifies the entry description.

Table 45 – Value definition

Value	Definition
0000 _h	0 % (maximum limitation)
0001 _h to 270F _h	Limitation to 0,01 % to 99,99 % of current input
2710 _h	100 % (no limitation)
2711 _h to FFFE _h	100,01 % to 655,34 % of current input ^a
FFFF _h	Reserved
^a In case of, for example, huge current drops on the line, the demanded current is not reached. Therefore, an option is provided to request "more" than the current input. Warning: in case several active devices are connected, make sure that all active devices operate within their operating limits.	

Table 46 – Object description

Attribute	Value
Index	6022 _h
Name	Device request dynamic current input limitation
Object code	ARRAY
Data type	UNSIGNED16
Category	Conditional; mandatory for active devices

Table 47 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Current limitation on input VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	See value definition
Default value	No
Sub-index	02 _h
Description	Current limitation on input VDN 2
Entry category	Optional
Access	Ro
PDO mapping	Optional

Attribute	Value
Value range	See value definition
Default value	No
to	
Sub-index	7F _h
Description	Current limitation on input VDN 127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	See value definition
Default value	No
to	
Sub-index	80 _h
Description	External current limitation on input 1
Category	Optional
Access	rw
PDO mapping	No
Value range	See value definition
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External current limitation on input 127
Category	Optional
Access	rw
PDO mapping	No
Value range	See value definition
Default value	Manufacturer-specific

6.2.17 Object 6023_h: Device request dynamic current output limitation

This object shall provide the request for dynamic current output limitation to a certain percentage of the maximum current of the device. In case an overload occurs in the device, the device reduces the local output current with the dynamic current limitation. The values shall be given in multiples of 0,01 %. The value definition is specified in Table 48. Table 49 specifies the object description and Table 50 specifies the entry description.

Table 48 – Value definition

Value	Definition
0000 _h	0 % (maximum limitation)
0001 _h to 270F _h	Limitation to 0,01 % to 99,99 % of current output
2710 _h	100 % (no limitation)
2711 _h to FFFE _h	100,01 % to 655,34 % of current output ^a
FFFF _h	Reserved
^a In case of, for example, huge voltage drops on the line, the demanded voltage is not reached. Therefore, an option is provided to request "more" than the current output. Warning; in case several active devices are connected, make sure that all active devices operate within their operating limits.	

Table 49 – Object description

Attribute	Value
Index	6023 _h
Name	Device request dynamic current output limitation
Object code	ARRAY
Data type	UNSIGNED16
Category	Conditional; mandatory for active devices

Table 50 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Current limitation on output VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	See value definition
Default value	No
Sub-index	02 _h
Description	Current limitation on output VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional

Attribute	Value
Value range	See value definition
Default value	No
to	
Sub-index	7F _h
Description	Current limitation on output VDN127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	See value definition
Default value	No
to	
Sub-index	80 _h
Description	External current limitation on output 1
Category	Optional
Access	rw
PDO mapping	No
Value range	See value definition
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External current limitation on output 127
Category	Optional
Access	rw
PDO mapping	No
Value range	See value definition
Default value	Manufacturer-specific

6.2.18 Object 6024_h: Device maximum continuous input current

This object shall provide maximum continuous input current that is safely delivered to the device from the EMS. The values shall be given in multiples of 1 mA. Table 51 specifies the object description and Table 52 specifies the entry description. Sub-index 01_h to sub-index 7F_h shall be used to provide the device maximum continuous input currents. The sub-indices 80_h to FE_h may be used to administer maximum continuous input currents from other devices in the system.

Table 51 – Object description

Attribute	Value
Index	6024 _h
Name	Device maximum continuous input current
Object code	ARRAY
Data type	INTEGER32
Category	Conditional; mandatory for active devices

Table 52 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Input current VDN 1
Entry category	Mandatory
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Input current VDN 2
Entry category	Optional
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	Input current VDN 127
Entry category	Optional
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	80 _h
Description	External input current 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External input current 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.2.19 Object 6025_h: Device maximum continuous output current

This object shall provide maximum continuous output current that is safely delivered from the device to the EMS. This value corresponds to the device peak output current (see 6.4.9) and the device peak output current time (see 6.4.10). The values shall be given in multiples of 1 mA. Table 53 specifies the object description and Table 54 specifies the entry description. Sub-index 01_h to sub-index 7F_h shall be used to provide the device maximum continuous output currents. The sub-indices 80_h to FE_h may be used to administer maximum continuous output currents from other devices in the system.

Table 53 – Object description

Attribute	Value
Index	6025 _h
Name	Device maximum continuous output current
Object code	ARRAY
Data type	INTEGER32
Category	Conditional; mandatory for active devices

Table 54 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Output current VDN 1
Entry category	Mandatory
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Output current VDN 2
Entry category	Optional
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	7F _h

Attribute	Value
Description	Output current VDN 127
Entry category	Optional
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	80 _h
Description	External Output current 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External Output current 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.2.20 Object 6026_h: Device maximum voltage

This object shall provide the maximum voltage required for the stable function of the device. The EMS shall check this value before switching on the device. The EMS shall use this value to maintain the required voltage level on the EMS. The values shall be given in multiples of 1 mV. Table 55 specifies the object description and Table 56 specifies the entry description. Sub-index 01_h to sub-index 7F_h shall be used to provide the device maximum voltage. The sub-indices 80_h to FE_h may be used to administer maximum voltages from other devices in the system.

Table 55 – Object description

Attribute	Value
Index	6026 _h
Name	Device maximum voltage
Object code	ARRAY
Data type	INTEGER32
Category	Conditional; mandatory for active devices

Table 56 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Voltage VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Voltage VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Voltage VDN 127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	80 _h
Description	External voltage 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	FE _h

Attribute	Value
Description	External voltage 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.2.21 Object 6027_h: Device minimum voltage

This object shall provide the minimum voltage required for the stable function of the device. The EMS shall check this value before switching on the device. The EMS shall use this value to maintain the required voltage level on the EMS. The values shall be given in multiples of 1 mV. Table 57 specifies the object description and Table 58 specifies the entry description. Sub-index 01_h to sub-index 7F_h shall be used to provide the device minimum voltage. The sub-indices 80_h to FE_h may be used to administer minimum voltages from other devices in the system.

Table 57 – Object description

Attribute	Value
Index	6027 _h
Name	Device minimum voltage
Object code	ARRAY
Data type	INTEGER32
Category	Conditional: mandatory for active devices

Table 58 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Voltage VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No

Attribute	Value
Sub-index	02 _h
Description	Voltage VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Voltage VDN 127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
to	
Sub-index	80 _h
Description	External voltage 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External voltage 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.2.22 Object 6039_h: Device actual external voltage (optional)

This object shall provide the measured actual external voltage of the device. The external voltage shall represent the actual measured EMS voltage in the device. The values shall be given in multiples of 1 mV. Table 59 specifies the object description and Table 60 specifies the entry description. The value 7FFF FFFF_h shall indicate an invalid entry or that the device is not capable to measure the internal voltage. Sub-index 01_h to sub-index 7F_h shall be used to provide the device external voltages. The sub-indices 80_h to FE_h may be used to administer device external voltages from other devices in the system. See also Annex A:

Table 59 – Object description

Attribute	Value
Index	6039 _h
Name	Device actual external voltage
Object code	ARRAY
Data type	INTEGER32
Category	Optional

Table 60 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Voltage VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Voltage VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Voltage VDN 127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	80 _h

Attribute	Value
Description	Other device voltage 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	Other device voltage 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.2.23 Object 603A_h: Device peak input current

This object shall provide the maximum allowable input current that may be delivered to the device from the EMS. This value shall provide information about how long the device may run with excessive load, without getting damaged severely. The values shall be given in multiples of 1 mA. Table 61 specifies the object description and Table 62 specifies the entry description. Sub-index 01_h to sub-index 7F_h shall be used to provide the devices' peak input currents. The sub-indices 80_h to FE_h may be used to administer device peak input currents from other devices in the system.

Table 61 – Object description

Attribute	Value
Index	603A _h
Name	Device peak input current
Object code	ARRAY
Data type	INTEGER32
Category	Conditional; mandatory for active devices

Table 62 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No

Attribute	Value
Sub-index	01 _h
Description	Input current VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Input current VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Input current VDN 127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	80 _h
Description	Other device input current 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	Other device input current 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.2.24 Object 603B_h: Device peak input current time (optional)

This object shall provide the time indicating how long the peak current flows from the EMS to the device. After this time the current shall be reduced to the continuous current. The values

shall be given in multiples of 1 ms. Table 63 specifies the object description and Table 64 specifies the entry description. Sub-index 01_h to sub-index $7F_h$ shall be used to provide the device peak input current time. The sub-indices 80_h to FE_h may be used to administer device input peak current time from other devices in the system.

Table 63 – Object description

Attribute	Value
Index	$603B_h$
Name	Device peak input current time
Object code	ARRAY
Data type	UNSIGNED32
Category	Optional

Table 64 – Entry description

Attribute	Value
Sub-index	00_h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01_h to $7F_h$
Default value	No
Sub-index	01_h
Description	Time input VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	02_h
Description	Time input VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
to	
Sub-index	FE_h
Description	Time input VDN 127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No

6.2.25 Object 603C_h: Device peak output current (optional)

This object shall provide the maximum allowable output current that may be delivered from the device to the EMS. This value shall provide information about how long the device may run with excessive load, without getting damaged severely. This value corresponds to device maximum output current (see 6.2.19). The values shall be given in multiples of 1 mA. Table 65 specifies the object description and Table 66 specifies the entry description. Sub-index 01_h to sub-index 7F_h shall be used to provide the device peak output currents. The sub-indices 80_h to FE_h may be used to administer maximum continuous input currents from other devices in the system.

Table 65 – Object description

Attribute	Value
Index	603C _h
Name	Device peak output current
Object code	ARRAY
Data type	INTEGER32
Category	Optional

Table 66 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Output current VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Output current VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
to	

Attribute	Value
Sub-index	7F _h
Description	Output current VDN 127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	80 _h
Description	Other device output current 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	Other device output current 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.2.26 Object 603D_h: Device peak output current time (optional)

This object shall provide the time indicating how long the peak current flows from the device to the EMS. After this time the current will reduce to the continuous current. This value is used in combination with peak output current (see 6.2.25). The values shall be given in multiples of 1 ms. Table 67 specifies the object description and Table 68 specifies the entry description.

Table 67 – Object description

Attribute	Value
Index	603D _h
Name	Device peak output current time
Object code	ARRAY
Data type	UNSIGNED32
Category	Optional

Table 68 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	Time output VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	02 _h
Description	Time output VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
to	
Sub-index	7F _h
Description	Time output VDN127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No

6.2.27 Object 603E_h: Device actual current

This object shall provide the device actual current that is measured at the device. The positive current value shall indicate the current flow from the device to the EMS. The negative current value shall indicate the current flow from the EMS to the device. The values shall be given in multiples of 1 mA. Table 69 specifies the object description and Table 70 specifies the entry description.

NOTE The AC-DC converter that is implemented as power supply for EVs provides typically positive current values. An MCU provides generally negative current values.

Table 69 – Object description

Attribute	Value
Index	603E _h
Name	Device actual current
Object code	ARRAY
Data type	INTEGER32
Category	Conditional; mandatory for active devices

Table 70 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Input current VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Input current VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Input current VDN 127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	80 _h

Attribute	Value
Description	Other device input current 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	Other device input current 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.2.28 Object 6040_h: Device actual voltage

This object shall provide the device actual voltage that is measured at the device. The values shall be given in multiples of 1 mV. Table 71 specifies the object description and Table 72 specifies the entry description. See also Annex A.

Table 71 – Object description

Attribute	Value
Index	6040 _h
Name	Device actual voltage
Object code	ARRAY
Data type	INTEGER32
Category	Conditional; mandatory for active devices

Table 72 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Voltage VDN 1
Entry category	Mandatory
Access	ro

Attribute	Value
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Voltage VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Voltage VDN 127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	80 _h
Description	Other device voltage 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	Other device voltage 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.2.29 Object 6042_h: Device internal temperature (optional)

This object shall provide the electronic temperature of the device. The values shall be given in multiples of 0,1 °C. Table 73 specifies the object description and Table 74 specifies the entry description.

This object provides the temperature of the components within the device.

Table 73 – Object description

Attribute	Value
Index	6042 _h
Name	Device internal temperature
Object code	ARRAY
Data type	INTEGER16
Category	Optional; mandatory if PDO supported

Table 74 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	Device temperature VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	INTEGER16
Default value	No
Sub-index	02 _h
Description	Device temperature VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER16
Default value	No
to	
Sub-index	7F _h
Description	Device temperature VDN 127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER16
Default value	No

6.2.30 Object 6043_h: Device time on (optional)

This object shall provide all the statistical data of the device entire switched-on time. The values shall be given in multiples of 1 min. Table 75 specifies the object description and Table 76 specifies the entry description.

Table 75 – Object description

Attribute	Value
Index	6043 _h
Name	Device time on
Object code	VAR
Data type	UNSIGNED32
Category	Optional

Table 76 – Entry description

Attribute	Value
Sub-index	00 _h
Access	ro
PDO mapping	No
Value range	UNSIGNED32
Default value	No

6.2.31 Object 6044_h: Device time standby (optional)

This object shall provide all the statistical data of the device entire standby time. The values shall be given in multiples of 1 min. Table 77 specifies the object description and Table 78 specifies the entry description.

Table 77 – Object description

Attribute	Value
Index	6044 _h
Name	Device time standby
Object code	VAR
Data type	UNSIGNED32
Category	Optional

Table 78 – Entry description

Attribute	Value
Sub-index	00 _h
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No

6.2.32 Object 6045_h: Device switch on counter (optional)

This object shall provide the device switch on counter. Each time the device is switched on the counter value increases. Table 79 specifies the object description and Table 80 specifies the entry description.

Table 79 – Object description

Attribute	Value
Index	6045 _h
Name	Device switch on counter
Object code	VAR
Data type	UNSIGNED32
Category	Optional

Table 80 – Entry description

Attribute	Value
Sub-index	00 _h
Access	ro
PDO mapping	No
Value range	UNSIGNED32
Default value	No

6.2.33 Object 6060_h: CANopen device measurement timing (optional)

This object shall provide the device-internal reaction times of the analogue measurements, in multiples of 1 ms. Table 81 specifies the object description, and Table 82 specifies the entry description. The sub-indices shall provide the following data:

- Sub-index 01_h shall provide the timing for actual DC current measurement;
- Sub-index 02_h shall provide the timing for actual DC voltage measurement;
- Sub-index 03_h shall provide the timing for temperature measurement;
- Sub-index 04_h shall provide the timing for torque measurement;
- Sub-index 05_h shall provide the timing for acceleration measurement;
- Sub-index 06_h shall provide the timing for speed measurement;
- Sub-index 07_h shall provide the timing until changes on DC current limits are applied;
- Sub-index 08_h shall provide the timing until changes on DC voltage limits are applied;
- Sub-index 09_h shall provide the timing until changes on DC current limits are applied;
- Sub-index 0A_h shall provide the timing until changes on DC voltage limits are applied;
- Sub-index 0B_h shall provide the timing for actual power factor cos phi measurement;
- Sub-index 0C_h shall provide the timing for actual frequency measurement;
- Sub-index 0D_h shall provide the timing for actual AC current measurement;
- Sub-index 0E_h shall provide the timing for actual AC voltage measurement.

NOTE For measurements, the given timings indicate the time which elapses from measuring the related value at the device's process interface until the value is available at the device communication interface.

Table 81 – Object description

Attribute	Value
INDEX	6060 _h
Name	Device measurement timing
Object code	ARRAY
Data type	UNSIGNED32
Category	Optional

Table 82 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to 0A _h
Default value	0A _h
Sub-index	01 _h
Description	Actual current measurement
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	02 _h
Description	Actual voltage measurement
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	03 _h
Description	Temperature measurement
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No

Attribute	Value
Sub-index	04 _h
Description	Torque measurement
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	05 _h
Description	Acceleration measurement
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	06 _h
Description	Speed measurement
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	07 _h
Description	Changes on current limits
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	08 _h
Description	Changes on voltage limits
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	09 _h
Description	Dynamic limits transmit

Attribute	Value
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	0A _h
Description	Dynamic limits receive
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	0B _h
Description	Cos phi measurement
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	0C _h
Description	Frequency measurement
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	0D _h
Description	AC current measurement
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED32
Default value	No
Sub-index	0E _h
Description	AC voltage measurement
Entry category	Optional
Access	ro
PDO mapping	Optional

Attribute	Value
Value range	UNSIGNED32
Default value	No

6.2.34 Object 6064_h: Device maximum AUX continuous input current (optional)

This object shall provide maximum continuous input current that is safely delivered to the device from the EMS. The values shall be given in multiples of 1 mA. Table 83 specifies the object description and Table 84 specifies the entry description. Sub-index 01_h to sub-index 7F_h shall be used to provide the device maximum AUX continuous input currents. The sub-indices 80_h to FE_h may be used to administer maximum AUX continuous input currents from other devices in the system.

Table 83 – Object description

Attribute	Value
Index	6064 _h
Name	Device maximum AUX continuous input current
Object code	ARRAY
Data type	INTEGER32
Category	Conditional; mandatory for devices using AUX voltage

Table 84 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Input current VDN 1
Entry category	Mandatory
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Input current VDN 2
Entry category	Optional
Access	const
PDO mapping	Optional

Attribute	Value
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	Input current VDN 127
Entry category	Optional
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	80 _h
Description	External input current 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External input current 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.2.35 Object 6065_h: Device maximum AUX continuous output current (optional)

This object shall provide maximum AUX continuous output current that is safely delivered from the device to the EMS. The values shall be given in multiples of 1 mA. Table 85 specifies the object description and Table 86 specifies the entry description. Sub-index 01_h to sub-index 7F_h shall be used to provide the device maximum AUX continuous output currents. The sub-indices 80_h to FE_h may be used to administer maximum AUX continuous output currents from other devices in the system.

Table 85 – Object description

Attribute	Value
Index	6065 _h
Name	Device maximum AUX continuous output current
Object code	ARRAY
Data type	INTEGER32
Category	Conditional; mandatory for devices using AUX voltage

Table 86 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Output current VDN 1
Entry category	Mandatory
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Output current VDN 2
Entry category	Optional
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	Output current VDN 127
Entry category	Optional
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	80 _h
Description	External Output current 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h

Attribute	Value
Description	External Output current 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.2.36 Object 6066_h: Device maximum AUX voltage (optional)

This object shall provide the maximum AUX voltage required for the stable function of the device. The values shall be given in multiples of 1 mV. Table 87 specifies the object description and Table 88 specifies the entry description. Sub-index 01_h to sub-index 7F_h shall be used to provide the device maximum voltage. The sub-indices 80_h to FE_h may be used to administer maximum voltages from other devices in the system.

Table 87 – Object description

Attribute	Value
Index	6066 _h
Name	Device maximum AUX voltage
Object code	ARRAY
Data type	INTEGER32
Category	Conditional; mandatory for devices using AUX voltage

Table 88 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Voltage VDN 1
Entry category	Mandatory
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Voltage VDN 2

Attribute	Value
Entry category	Optional
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	Voltage VDN 127
Entry category	Optional
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	80 _h
Description	External voltage 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External voltage 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.2.37 Object 6067_h: Device minimum AUX voltage (optional)

This object shall provide the minimum voltage required for the stable function of the device. The EMS shall check this value before switching on the device. The values shall be given in multiples of 1 mV. Table 89 specifies the object description and Table 90 specifies the entry description. Sub-index 01_h to sub-index 7F_h shall be used to provide the device minimum voltage. The sub-indices 80_h to FE_h may be used to administer minimum voltages from other devices in the system.

Table 89 – Object description

Attribute	Value
Index	6067 _h
Name	Device minimum AUX voltage
Object code	ARRAY
Data type	INTEGER32
Category	Conditional; mandatory for devices using AUX voltage

Table 90 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Voltage VDN 1
Entry category	Mandatory
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Voltage VDN 2
Entry category	Optional
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	Voltage VDN 127
Entry category	Optional
Access	const
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	80 _h

Attribute	Value
Description	External voltage 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External voltage 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.2.38 Object 6070_h: Device actual AUX current (optional)

This object shall provide the device actual current that is measured at the device. The positive current value shall indicate the current flow from the device to the EMS. The negative current value shall indicate the current flow from the EMS to the device. The values shall be given in multiples of 1 mA. Table 91 specifies the object description and Table 92 specifies the entry description.

NOTE The AC/DC converter provides generally positive current values. The MCU provides generally negative current values.

Table 91 – Object description

Attribute	Value
Index	6070 _h
Name	Device actual AUX current
Object code	ARRAY
Data type	INTEGER32
Category	Optional

Table 92 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No

Attribute	Value
Sub-index	01 _h
Description	Input current VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Input current VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Input current VDN 127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	80 _h
Description	Other device input current 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	Other device input current 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.2.39 Object 6071_h: Device actual AUX voltage (optional)

This object shall provide the device actual voltage that is measured at the device. The values shall be given in multiples of 1 mV. Table 93 specifies the object description and Table 94 specifies the entry description.

Table 93 – Object description

Attribute	Value
Index	6071 _h
Name	Device actual AUX voltage
Object code	ARRAY
Data type	INTEGER32
Category	Optional

Table 94 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Voltage VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Voltage VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Voltage VDN 127
Entry category	Optional
Access	ro

Attribute	Value
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	80 _h
Description	Other device voltage 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	Other device voltage 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.2.40 Object 6072h: Device available output voltage

This object shall provide the currently available maximum output voltage of the device. This value is typically used at the vehicle connector terminals. The values shall be given in multiples of 1 mV. Table 95 specifies the object description and Table 96 specifies the entry description.

Table 95 – Object description

Attribute	Value
Index	6072h
Name	Device available output voltage
Object code	ARRAY
Data type	INTEGER32
Category	Conditional; mandatory for active devices

Table 96 – Entry description

Attribute	Value
Sub-index	00h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01h to FEh
Default value	No

Sub-index	01h
Description	Voltage VDN1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	02h
Description	Voltage VDN2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
	to
Sub-index	7Fh
Description	Voltage VDN127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	80h
Description	Extra voltage 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacture-specific
	to
Sub-index	FEh
Description	Extra voltage 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacture-specific

6.2.41 Object 6073h: Device available output current

This object shall provide the currently available maximum output current of the device. This value is typically used at the AC/DC converter. The values shall be given in multiples of 1 mA. Table 97 specifies the object description and Table 98 specifies the entry description.

Table 97 – Object description

Attribute	Value
Index	6073h
Name	Device available output current
Object code	ARRAY
Data type	INTEGER32
Category	Conditional; mandatory for active devices

Table 98 – Entry description

Attribute	Value
Sub-index	00h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01h to FEh
Default value	No
Sub-index	01h
Description	Voltage VDN1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	02h
Description	Voltage VDN2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
	to
Sub-index	7Fh
Description	Voltage VDN127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	80h
Description	Extra voltage 1

Attribute	Value
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacture-specific
	to
Sub-index	FE _h
Description	Extra voltage 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacture-specific

6.2.42 Object 6074h: Device available input current (optional)

This object shall provide the currently available input current at the device. The value shall be given in multiples of 1 mA. Table 99 specifies the object description and Table 100 specifies the entry description.

Table 99 – Object description

Attribute	Value
Index	6074 _h
Name	Device available input current
Object code	ARRAY
Data type	INTEGER32
Category	Optional

Table 100 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Input current VDN 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional

Attribute	Value
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Input current VDN 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
	To
Sub-index	7F _h
Description	Input current VDN 127
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER32
Default value	No
Sub-index	80 _h
Description	Other device Input current 1
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
	to
Sub-index	FE _h
Description	Other device Input current 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.3 Security

6.3.1 General

Subclause 6.3 provides general parameters relevant for taking part in a security concept, for example relevant for EVs.

NOTE A security concept is specified in CiA 454-10.

6.3.2 Object 6311h: Locking status

This object shall provide the security status detected by a specific virtual device. Figure 10 specifies the object structure. Table 101 specifies the value definition. Table 102 specifies the object description and Table 103 specifies the entry description. This object provides security aspects like locking, latching, etc.



Figure 10 – Object structure security status

Table 101 – Value definition security status

Name	Bit	Value	Description
Security status	0	0	No locking mechanism supported
		1	Locking mechanism supported
	1	0	Device is not locked locally
		1	Device is locked locally
	2	0	No manipulation detected
		1	Manipulation detected
	3	0	Device does not own the current encryption key
		1	Device owns current encryption key
	4	0	Initial encryption key is missing
		1	Device owns initial encryption key
	5	0	Reserved (always 0)
	6	0	No network lock requested
		1	Locking of all virtual devices in the EMS requested (VD Security unit only)
	7	0	Network is not locked
		1	All virtual devices in the EMS that support softlocking are locked
	8 to 15	0	Reserved (always 0)

Table 102 – Object description

Attribute	Value
Index	6311 _h
Name	Security status
Object code	ARRAY
Data type	UNSIGNED16
Category	Mandatory

Table 103 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	01 _h to 7F _h
Default value	Manufacturer-specific
Sub-index	01 _h
Description	VDN 1
Entry category	Mandatory
Access	rw, ro
PDO mapping	Optional (NOTE)
Value range	See value definition
Default value	Manufacturer-specific
Sub-index	02 _h
Description	VDN 2
Entry category	Optional
Access	rw, ro
PDO mapping	Optional (NOTE)
Value range	See value definition
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	VDN 127
Entry category	Optional
Access	rw, ro
PDO mapping	Optional (NOTE)
Value range	See value definition
Default value	Manufacturer-specific
NOTE There is a risk that the PDO covering this information is transmitted from an unauthorized device and is therefore not secure.	

6.4 Application objects consumed by CANopen devices with NMT slave functionality (mandatory)

6.4.1 General

Subclause 6.4 defines the consumed application objects. The CANopen devices that support the NMT slave functionality only receive these application objects. The EMSC shall produce these objects in order to control the EMS.

6.4.2 Object 6001_h: Control word

This object shall indicate the device control command. Bit 1, 2 and 5 shall be valid for active devices. An invalid command shall be rejected with related SDO abort code in case of SDO access or with EMCY message in case of PDO access.

Figure 11 illustrates the value structure. Table 104 provides the value definition.

Table 105 specifies the object description and Table 106 specifies the entry description.

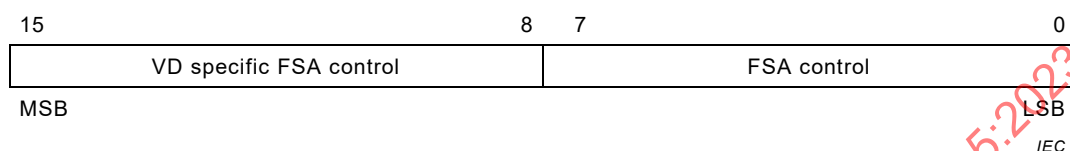


Figure 11 – Value structure

Table 104 – Value definition

Name	Bit	Value	Description
FSA control	0 to 6	00	No action
		04	Enter Operating
		05	Enter Limiting
		06	Enter Operating
		07	Enter Connected
		09	Enter Disconnected
		0A	Enter masterless operating
		0B	Enter Compatibility check
		7D	Enter Sleep mode and keep local layer settings
		7E	Enter sleep mode and set node-ID to FF _h
		All other values shall be reserved	
VD specific FSA control	7	0	No action
		1	Emergency shut down
VD specific FSA control	8 to 15	00	No action
		01 _h to FF _h	Trigger command for VD specific state transition

NOTE Command 06_h is not used any longer. For new implementations, the command 04_h is used instead of 06_h

Table 105 – Object description

Attribute	Value
Index	6001 _h
Name	Control word
Object code	ARRAY
Data type	UNSIGNED16
Category	Mandatory

Table 106 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	VDN 1
Entry category	Mandatory
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	VDN 2
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	VDN 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.4.3 Object 6046_h: Device set maximum voltage

This object shall allow setting the maximum voltage limit of the device. This value is used for active devices. The values shall be given in multiples of 1 mV. Table 107 specifies the object description and Table 108 specifies the entry description.

Table 107 – Object description

Attribute	Value
Index	6046 _h
Name	Device set maximum input voltage
Object code	ARRAY
Data type	INTEGER32
Category	Conditional; mandatory if device may regulate the voltage

Table 108 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	Set maximum input voltage VDN 1
Entry category	Mandatory
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	0000 0000 _h
Sub-index	02 _h
Description	Set maximum input voltage VDN 2
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	0000 0000 _h
to	
Sub-index	7F _h
Description	Set maximum input voltage VDN 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	0000 0000 _h

6.4.4 Object 6047_h: Device set minimum voltage

This object shall allow setting the minimum voltage limit of the device. This value is used for active devices. The values shall be given in multiples of 1 mV. Table 109 specifies the object description and Table 110 specifies the entry description.

Table 109 – Object description

Attribute	Value
Index	6047 _h
Name	Device set minimum input voltage
Object code	ARRAY
Data type	INTEGER32
Category	Conditional; mandatory if device regulates the voltage

Table 110 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	Set minimum input voltage VDN 1
Entry category	Mandatory
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	0000 0000 _h
Sub-index	02 _h
Description	Set minimum input voltage VDN 2
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	0000 0000 _h
Sub-index	7F _h
Description	Set minimum input voltage VDN 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	0000 0000 _h

6.4.5 Object 604A_h: Device set maximum continuous input current

This object shall indicate the maximum continuous input current of the device. The values shall be given in multiples of 1 mA. Table 111 specifies the object description and Table 112 specifies the entry description.

Table 111 – Object description

Attribute	Value
Index	604A _h
Name	Device set maximum continuous input current
Object code	ARRAY
Data type	UNSIGNED32
Category	Conditional; mandatory if device regulates the current (see object 6002 _h)

Table 112 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	Set maximum continuous input current VDN 1
Entry category	Mandatory
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Set maximum continuous input current VDN 2
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	Set maximum continuous input current VDN127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific

6.4.6 Object 604B_h: Device set maximum continuous output current

This object shall indicate the maximum continuous output current for the device. This value shall be used for motor controllers and AC-to-DC converters. The values shall be given in multiples of 1 mA. Table 113 specifies the object description and Table 114 specifies the entry description.

Table 113 – Object description

Attribute	Value
Index	604B _h
Name	Device set maximum continuous output current
Object code	ARRAY
Data type	UNSIGNED32
Category	Conditional; mandatory if device regulates the current (see object 6002 _h)

Table 114 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	Set maximum continuous output current VDN 1
Entry category	Mandatory
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Set maximum continuous output current VDN 2
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	Set maximum continuous output current VDN 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific

6.4.7 Object 604C_h: Device set maximum peak input current

This object shall indicate the maximum peak input current from EMS to the device. This value shall be used for motor controllers and AC-to-DC converters. The values shall be given in multiples of 1 mA. Table 115 specifies the object description and Table 116 specifies the entry description.

Table 115 – Object description

Attribute	Value
Index	604C _h
Name	Device set maximum peak input current
Object code	ARRAY
Data type	UNSIGNED32
Category	Conditional; mandatory if device may regulate the current (see object 6002 _h)

Table 116 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	Peak current input VDN1
Entry category	Mandatory
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Peak current input VDN2
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	Peak current input VDN127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific

6.4.8 Object 604D_h: Device set maximum peak input current time

This object shall indicate the peak input current time. This value shall be used for motor controllers and AC-to-DC converters. The values shall be given in multiples of 1 ms. The peak input current shall be used for I^2t limitation. Table 117 specifies the object description and Table 118 specifies the entry description.

Table 117 – Object description

Attribute	Value
Index	604D _h
Name	Device set maximum peak input current time
Object code	ARRAY
Data type	UNSIGNED32
Category	Conditional; mandatory if device regulates the current (see object 6002 _h)

Table 118 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	Time input VDN1
Entry category	Mandatory
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Time input VDN2
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	Time input VDN127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific

6.4.9 Object 604E_h: Device set maximum peak output current

This object shall indicate the maximum peak output current from the device to the EMS. This value shall be used for motor controllers and AC-to-DC converters. The values shall be given in multiples of 1 mA. Table 119 specifies the object description and Table 120 specifies the entry description.

Table 119 – Object description

Attribute	Value
Index	604E _h
Name	Device set maximum peak output current
Object code	ARRAY
Data type	UNSIGNED32
Category	Conditional; mandatory if device regulates the current (see object 6002 _h)

Table 120 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	Output VDN1
Entry category	Mandatory
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Output VDN2
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	Output VDN127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific

6.4.10 Object 604F_h: Device set maximum peak output current time

This object shall indicate the maximum peak output current time. This value shall be used for motor controllers and AC-to-DC converters. The values shall be given in multiples of 1 ms. The peak output current may be used in combination with the peak output current time for I^2t limitation. Table 121 specifies the object description and Table 122 specifies the entry description.

Table 121 – Object description

Attribute	Value
Index	604F _h
Name	Device set maximum peak output current time
Object code	ARRAY
Data type	UNSIGNED32
Category	Conditional; mandatory if device regulates the current (see object 6002 _h)

Table 122 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	Time output VDN1
Entry category	Mandatory
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Time output VDN2
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific
to	

Attribute	Value
Sub-index	7F _h
Description	Time output VDN127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	UNSIGNED32
Default value	Manufacturer-specific

6.5 Application objects consumed by CANopen devices with NMT slave functionality (optional)

6.5.1 General

This subclause defines the optional consumed application objects. The CANopen devices that support the NMT slave functionality only receive these application objects. The CANopen device hosting the virtual device EMSC shall produce these objects.

6.5.2 Object 600D_h: Error behaviour at process interface (optional)

This object specifies the error behaviour of the device at the application respectively process interface. Table 123 provides the value definition. Table 124 provides the object description and Table 125 specifies the entry description.

Table 123 – Value definition

Value [hex]	Function
00	No state change in EMS FSA
01	Transition to Disconnected
02	Transition to Masterless operation
03	Transition to Connected
04 to FF	Reserved

Table 124 – Object description

Attribute	Value
Index	600D _h
Name	Error behaviour at process interface
Object code	ARRAY
Data type	UNSIGNED8
Category	Optional

Table 125 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	VDN 1
Entry category	Mandatory
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	VDN 2
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	VDN 127
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

6.5.3 Object 6058_h: Device security key (optional)

This object shall indicate the configuration of the security key. All devices in the EMS may have a security system, such one as used in the mobile phones. Only the devices with the correct pin code shall be activated together with the security key or the code number. The battery system shall work in another EMS only if the user enters the proper security key. The wireless and/or GPS receiver/transmitter may be used as a security device. The key may be integrated into a HMI unit or in a SEC unit. The security number is required to activate the device. The security key shall not be displayed. Table 126 specifies the object description and Table 127 specifies the entry description.

Table 126 – Object description

Attribute	Value
Index	6058 _h
Name	Device security key
Object code	ARRAY
Data type	VISIBLE_STRING
Category	Optional

Table 127 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Device security key 1
Entry category	Mandatory
Access	wo
PDO mapping	Optional
Value range	VISIBLE_STRING
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Device security key 2
Entry category	Optional
Access	wo
PDO mapping	Optional
Value range	VISIBLE_STRING
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	Device security key 254
Entry category	Optional
Access	wo
PDO mapping	Optional
Value range	VISIBLE_STRING
Default value	Manufacturer-specific

6.5.4 Object 6059_h: Devices' user name and address (optional)

This object shall indicate the name and address of the devices' user. The user may change this data only with a security device. Table 128 specifies the object description and Table 129 specifies the entry description.

Table 128 – Object description

Attribute	Value
Index	6059 _h
Name	Devices' user name and address
Object code	ARRAY
Data type	VISIBLE_STRING
Category	Optional

Table 129 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	05 _h
Default value	05 _h
Sub-index	01 _h
Description	User name
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	VISIBLE_STRING
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Address 1
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	VISIBLE_STRING
Default value	Manufacturer-specific
Sub-index	03 _h
Description	Address 2
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	VISIBLE_STRING
Default value	Manufacturer-specific
Sub-index	04 _h
Description	Country
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	VISIBLE_STRING

Attribute	Value
Default value	Manufacturer-specific
Sub-index	05 _h
Description	Phone number
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	VISIBLE_STRING
Default value	Manufacturer-specific

6.5.5 Object 605A_h: Device password (optional)

This object shall indicate the passwords assigned to the device. The user may change this data only with a security device. The device may have a password system of 3 or more passwords.

With the user password provided in sub-index 01_h, the user may activate all the devices in the EMS and may access all data. The user is also allowed to change this password. With the dealer or service password, a dealer or service may access all data of the EMS. This password is required for maintenance and service purposes of the EMS, resetting the service counters, storing the user data and address in the devices. A dealer or service may set a driving distance limit in multiples of 1 km at setup. With the manufacturer-specific password, the manufacturer of the device may set all values in the device for production and repair. Paying system or EV supply device password requires for installing of the active devices such as batteries. This password allows to charge or discharge of the battery system connected to a power system.

Sub-index 05_h shall provide the password to enter the device's bootloader mode. In case there is no valid password written to this entry, any write access to the firmware management parameters 1F50_h to 1F58_h shall be rejected.

Table 130 specifies the object description and Table 131 specifies the entry description.

Table 130 – Object description

Attribute	Value
Index	605A _h
Name	Device password
Object code	ARRAY
Data type	VISIBLE_STRING
Category	Optional

Table 131 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	04 _h
Default value	04 _h

Attribute	Value
Sub-index	01 _h
Description	User password
Entry category	Optional
Access	wo
PDO mapping	No
Value range	VISIBLE_STRING
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Dealer password
Entry category	Optional
Access	wo
PDO mapping	No
Value range	VISIBLE_STRING
Default value	Manufacturer-specific
Sub-index	03 _h
Description	Manufacturer-specific password
Entry category	Optional
Access	wo
PDO mapping	No
Value range	VISIBLE_STRING
Default value	Manufacturer-specific
Sub-index	04 _h
Description	Paying system password
Entry category	Optional
Access	wo
PDO mapping	No
Value range	VISIBLE_STRING
Default value	Manufacturer-specific
Sub-index	05 _h
Description	Bootloader password
Entry category	Optional
Access	Wo
PDO mapping	No
Value range	VISIBLE_STRING
Default value	Manufacturer-specific

6.5.6 Object 6053_h: Prefixes and SI units for analogue values (optional)

This object shall indicate the prefixes and SI units for analogue values. In order to manage up to 16 power lines independently via one CANopen communication network, the allocation scheme according to Table 133 shall apply. The SI-units for power line 1 are provided in the sub-index range 01_h to 10_h. For further power lines, the sub-indices shall be provided with the corresponding offset. In each of the given index ranges, sub-index 1 shall provide the prefix for the AC current; sub-index 2 shall provide the prefix for the AC voltage, sub-index 3 shall provide the prefix for power, sub-index 4 shall provide the prefix for power factor cos phi, sub-index 5

shall provide the prefix for frequency, sub-index 6 shall provide the prefix for resistance and sub-index 7 shall provide the prefix for the rated power. All other sub-indices of the index ranges shall be reserved. The prefixes shall be coded as given in CiA 303-2 illustrated in Figure 12. Table 134 and Table 135 provide the object description and the entry description.

The 16 bit value shall be composed as specified in Figure 12. Additional profile-specific units are specified in Table 132.

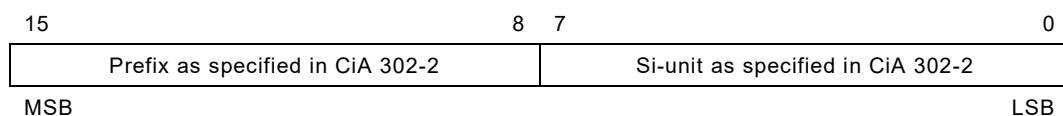


Figure 12 – Object structure for prefixes

Table 132 – Additional units

Notation index [hex]	Description
A0	Watt hour (Wh)

Table 133 – Allocation of powerlines to sub-indices

Index range [hex]	Powerline
01 to 10	Prefixes and SI- unites for AC power line 1
11 to 20	Prefixes and SI- unites for AC power line 2
21 to 30	Prefixes and SI- unites for AC power line 3
	to
E1 to F0	Prefixes and SI- unites for AC power line 15
F1 to FE	Prefixes and SI- unites for AC power line 16

Table 134 – Object description

Attribute	Value
Index	6053 _h
Name	Prefixes for analogue values
Object code	ARRAY
Data type	UNSIGNED16
Category	Optional

Table 135 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h

Attribute	Value
Default value	No
Sub-index	01 _h
Description	Prefix AC current
Category	Optional
Access	rw
PDO mapping	No
Value range	see CiA 303-2
Default value	0004 _h (Ampere)
Sub-index	02 _h
Description	Prefix AC voltage
Category	Optional
Access	rw
PDO mapping	No
Value range	see CiA 303-2
Default value	0026 _h (Volt)
Sub-index	03 _h
Description	Prefix for apparent, real and reactive power
Category	Optional
Access	rw
PDO mapping	No
Value range	see CiA 303-2
Default value	FD24 _h (Miliwatt)
Sub-index	04 _h
Description	Prefix power factor (cos. phi)
Category	Optional
Access	rw
PDO mapping	No
Value range	see CiA 303-2
Default value	FC00 _h (0,0001)
Sub-index	05 _h
Description	Prefix AC frequency
Category	Optional
Access	rw
PDO mapping	No
Value range	see CiA 303-2
Default value	FE20 _h (0,01 Hz)

Attribute	Value
Sub-index	06 _h
Description	Prefix resistance
Category	Optional
Access	rw
PDO mapping	No
Value range	see CiA 303-2
Default value	FC28 _h (0,000 1 Ω)
Sub-index	07 _h
Description	Prefix rated power
Category	Optional
Access	rw
PDO mapping	No
Value range	see CiA 303-2
Default value	FDA0 _h (0,001 Wh)
Sub-indices 08 _h to 10 _h shall be reserved for further use by CiA.	

7 Application objects relevant for fleet management (optional)

7.1 General

Clause 7 defines application object relevant for fleet management of EVs.

7.2 Object 63D5h: Travelled distance

This object shall indicate the overall travelled distance of this virtual device in this EV. The value shall be given in multiples of 1 m. Table 136 specifies the object description and Table 137 specifies the entry description.

Table 136 – Object description

Attribute	Value
Index	63D5 _h
Name	Travelled distance
Object code	ARRAY
Data type	UNSIGNED32
Category	Conditional; mandatory if EMSC functionality is supported

Table 137 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	VDN 1
Entry category	Mandatory
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	VDN 2
Entry category	Optional
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	VDN 127
Entry category	Optional
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

7.3 Object 63D6h: Travelled distance current trip

This object shall indicate the distance travelled of this virtual device in this EV at the current trip. The value shall be given in multiples of 1 m. Table 138 specifies the object description and Table 139 specifies the entry description.

Table 138 – Object description

Attribute	Value
Index	63D6 _h
Name	Travelled distance current trip
Object code	ARRAY
Data type	UNSIGNED32
Category	Conditional; mandatory if EMSC functionality is supported

Table 139 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	VDN 1
Entry category	Mandatory
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	VDN 2
Entry category	Optional
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	VDN 127
Entry category	Optional
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

7.4 Object 63D7_h: Travelled time

This object shall indicate the overall travelled time of this virtual device in this EV. The value shall be given in multiples of 1 min. Table 140 specifies the object description and Table 141 specifies the entry description.

Table 140 – Object description

Attribute	Value
Index	63D7 _h
Name	Travelled time
Object code	ARRAY
Data type	UNSIGNED32
Category	Conditional; mandatory if EMSC functionality is supported

Table 141 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	VDN 1
Entry category	Mandatory
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	VDN 2
Entry category	Optional
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	VDN 127
Entry category	Optional
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

7.5 Object 63D8_h: Travelled time current trip

This object shall indicate the time of the current trip of this virtual device in this EV. The value shall be given in multiples of 1 min. Table 142 specifies the object description and Table 143 specifies the entry description.

Table 142 – Object description

Attribute	Value
Index	63D8 _h
Name	Travelled time current trip
Object code	ARRAY
Data type	UNSIGNED32
Category	Conditional; mandatory if EMSC functionality is supported

Table 143 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	VDN 1
Entry category	Mandatory
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	VDN 2
Entry category	Optional
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	VDN 127
Entry category	Optional
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

7.6 Object 63D9_h: Transferred watt hours

This object shall indicate the overall transferred watt hours, for example in a VCU application. The value shall be given in multiples of 1 Wh. Table 144 specifies the object description and Table 145 specifies the entry description.

Table 144 – Object description

Attribute	Value
Index	63D9 _h
Name	Transferred watt hours
Object code	ARRAY
Data type	UNSIGNED32
Category	Conditional; mandatory if EMSC functionality is supported

Table 145 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	VDN 1
Entry category	Mandatory
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	VDN 2
Entry category	Optional
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	VDN 127
Entry category	Optional
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

7.7 Object 63DA_h: Current trip transferred watt hours

This object shall indicate the transferred watt hour of the day, for example in a VCU application. The value shall be given in multiples of 1 Wh. Table 146 specifies the object description and Table 147 specifies the entry description.

Table 146 – Object description

Attribute	Value
Index	63DA _h
Name	Current transferred watt hour
Object code	ARRAY
Data type	UNSIGNED32
Category	Conditional; mandatory if EMSC functionality is supported

Table 147 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	01 _h to 7F _h
Default value	No
Sub-index	01 _h
Description	VDN 1
Entry category	Mandatory
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	02 _h
Description	VDN 2
Entry category	Optional
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	7F _h
Description	VDN 127
Entry category	Optional
Access	rw, ro
PDO mapping	Optional
Value range	INTEGER32
Default value	Manufacturer-specific

8 Stationary applications (optional)

8.1 General application objects relevant for stationary applications

Clause 8 defines application objects, which are relevant for stationary EMS applications, for example to control generic generator and load units in an isolated farm environment. These parameters may be supported in mobile applications as well.

8.2 Object 6010_h: Ambient temperature

This object shall provide the ambient temperature. The data type shall be INTEGER16. The value shall be given in multiples of 0,1 °C. The sub-indices 01_h to 7F_h shall provide the local ambient temperatures of the device. The sub-indices 80_h to FE_h may be used to administer the ambient temperatures of other active devices in the system. Table 148 and Table 149 provide the object description and the entry description.

Table 148 – Object description

Attribute	Value
Index	6010 _h
Name	Ambient temperature
Object code	ARRAY
Data type	INTEGER16
Category	Optional

Table 149 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Ambient temperature VDN 1
Category	Optional
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
Sub-index	02 _h
Description	Ambient temperature VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No

Attribute	Value
to	
Sub-index	7F _h
Description	Ambient temperature VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
to	
Sub-index	80 _h
Description	External ambient temperature 1
Category	Optional
Access	rw
PDO mapping	No
Value range	UNSIGNED16
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External ambient temperature 127
Category	Optional
Access	rw
PDO mapping	No
Value range	UNSIGNED16
Default value	Manufacturer-specific

8.3 Object 6011_h: Phase 1 AC Current

This object shall provide the phase 1 AC actual current. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local phase 1 AC currents of the device. The sub-indices 80_h to FE_h may be used to administer the phase 1 AC currents of other active devices in the system. Table 150 and Table 151 provide the object description and the entry description.

Table 150 – Object description

Attribute	Value
Index	6011 _h
Name	Phase 1 AC current
Object code	ARRAY
Data type	INTEGER16
Category	Optional

Table 151 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Phase 1 AC current VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	INTEGER16
Default value	No
Sub-index	02 _h
Description	Phase 1 AC current VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER16
Default value	No
to	
Sub-index	7F _h
Description	Phase 1 AC current VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER16
Default value	No
Sub-index	80 _h
Description	External Phase 1 AC current 1
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External Phase 1 AC current 127
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	Manufacturer-specific

8.4 Object 6012_h: Phase 2 AC Current

This object shall provide the phase 2 AC actual current. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local phase 2 AC currents of the device. The sub-indices 80_h to FE_h may be used to administer the phase 2 AC currents of other active devices in the system. Table 152 and Table 153 provide the object description and the entry description.

Table 152 – Object description

Attribute	Value
Index	6012 _h
Name	Phase 2 AC current
Object code	ARRAY
Data type	INTEGER16
Category	Optional

Table 153 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Phase 2 AC current VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	INTEGER16
Default value	No
Sub-index	02 _h
Description	Phase 2 AC current VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER16
Default value	No
to	
Sub-index	7F _h
Description	Phase 2 AC current VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER16

Attribute	Value
Default value	No
Sub-index	80 _h
Description	External Phase 2 AC current 1
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External Phase 2 AC current 127
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	Manufacturer-specific

8.5 Object 6013_h: Phase 3 AC Current

This object shall provide the phase 3 AC actual current. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local phase 3 AC currents of the device. The sub-indices 80_h to FE_h may be used to administer the phase 3 AC currents of other active devices in the system. Table 154 and Table 155 provide the object description and the entry description.

Table 154 – Object description

Attribute	Value
Index	6013 _h
Name	Phase 3 AC current
Object code	ARRAY
Data type	INTEGER16
Category	Optional

Table 155 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Phase 3 AC current VDN 1

Attribute	Value
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER16
Default value	No
Sub-index	02 _h
Description	Phase 3 AC current VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER16
Default value	No
to	
Sub-index	7F _h
Description	Phase 3 AC current VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER16
Default value	No
Sub-index	80 _h
Description	External Phase 3 AC current 1
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	Manufacturer-specific
Sub-index	FE _h
Description	External Phase 3 AC current 127
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	Manufacturer-specific

8.6 Object 6014_h: Phase 1 AC voltage

This object shall provide the phase 1 AC actual voltage. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local phase 1 AC voltages of the device. The sub-indices 80_h to FE_h may be used to administer the phase 1 AC voltages of other active devices in the system. Table 156 and Table 157 provide the object description and the entry description.

Table 156 – Object description

Attribute	Value
Index	6014 _h
Name	Phase 1 AC voltage
Object code	ARRAY
Data type	UNSIGNED16
Category	Optional

Table 157 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Phase 1 AC voltage VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
Sub-index	02 _h
Description	Phase 1 AC voltage VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
to	
Sub-index	7F _h
Description	Phase 1 AC voltage VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
Sub-index	80 _h
Description	External Phase 1 AC voltage 1
Category	Optional
Access	rw
PDO mapping	No

Attribute	Value
Value range	UNSIGNED16
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External Phase 1 AC voltage 127
Category	Optional
Access	rw
PDO mapping	No
Value range	UNSIGNED16
Default value	Manufacturer-specific

8.7 Object 6015_h: Phase 2 AC voltage

This object shall provide the phase 2 AC actual voltage. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local phase 2 AC voltages of the device. The sub-indices 80_h to FE_h may be used to administer the phase 2 AC voltages of other active devices in the system. Table 158 and Table 159 provide the object description and the entry description.

Table 158 – Object description

Attribute	Value
Index	6015 _h
Name	Phase 2 AC voltage
Object code	ARRAY
Data type	UNSIGNED16
Category	Optional

Table 159 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Optional
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Phase 2 AC voltage VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
Sub-index	02 _h

Attribute	Value
Description	Phase 2 AC voltage VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
Sub-index	7F _h
Description	Phase 2 AC voltage VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
Sub-index	80 _h
Description	External Phase 2 AC voltage 1
Category	Optional
Access	rw
PDO mapping	No
Value range	UNSIGNED16
Default value	Manufacturer-specific
Sub-index	FE _h
Description	External Phase 2 AC voltage 127
Category	Optional
Access	rw
PDO mapping	No
Value range	UNSIGNED16
Default value	Manufacturer-specific

8.8 Object 6016_h: Phase 3 AC voltage

This object shall provide the phase 3 AC actual voltages. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local phase 3 AC voltages of the device. The sub-indices 80_h to FE_h may be used to administer the phase 3 AC voltages of other active devices in the system. Table 160 and Table 161 provide the object description and the entry description.

Table 160 – Object description

Attribute	Value
Index	6016 _h
Name	Phase 3 AC voltage
Object code	ARRAY
Data type	UNSIGNED16
Category	Optional

Table 161 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Phase 3 AC voltage VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
Sub-index	02 _h
Description	Phase 3 AC voltage VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
to	
Sub-index	7F _h
Description	Phase 3 AC voltage VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
Sub-index	80 _h
Description	External Phase 3 AC voltage 1
Category	Optional
Access	rw
PDO mapping	No
Value range	UNSIGNED16
Default value	Manufacturer-specific
to	
Sub-index	FE _h

Attribute	Value
Description	External Phase 3 AC voltage 127
Category	Optional
Access	rw
PDO mapping	No
Value range	UNSIGNED16
Default value	Manufacturer-specific

8.9 Object 6017_h: Line 12 AC voltage

This object shall provide the line 12 AC actual voltage. The value shall be given as indicated in 6.5.6 The sub-indices 01_h to 7F_h shall provide the local line 12 AC voltages of the device. The sub-indices 80_h to FE_h may be used to administer the line 12 AC voltages of other active devices in the system. Table 162 and Table 163 provide the object description and the entry description.

Table 162 – Object description

Attribute	Value
Index	6017 _h
Name	Line 12 AC voltage
Object code	ARRAY
Data type	UNSIGNED16
Category	Optional

Table 163 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Line 12 AC voltage VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
Sub-index	02 _h
Description	Line 12 AC voltage VDN 2
Category	Optional

Attribute	Value
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
to	
Sub-index	7F _h
Description	Line 12 AC voltage VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
to	
Sub-index	80 _h
Description	External Line 12 AC voltage 1
Category	Optional
Access	rw
PDO mapping	No
Value range	UNSIGNED16
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External Line 12 AC voltage 127
Category	Optional
Access	rw
PDO mapping	No
Value range	UNSIGNED16
Default value	Manufacturer-specific

8.10 Object 6018_h: Line 23 AC voltage

This object shall provide the line 23 AC actual voltage. The value shall be given as indicated in 6.5.6. The sub-indices shall provide the local line 23 AC voltages of the device. The sub-indices 80_h to FE_h may be used to administer the line 23 AC voltages of other active devices in the system. Table 164 and Table 165 provide the object description and the entry description.

Table 164 – Object description

Attribute	Value
Index	6018 _h
Name	Line 23 AC voltage
Object code	ARRAY
Data type	UNSIGNED16
Category	Optional

Table 165 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Line 23 AC voltage VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
Sub-index	02 _h
Description	Line 23 AC voltage VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
to	
Sub-index	7F _h
Description	Line 23 AC voltage VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
Sub-index	80 _h
Description	External Line 23 AC voltage 1
Category	Optional
Access	rw
PDO mapping	No
Value range	UNSIGNED16
Default value	Manufacturer-specific
to	
Sub-index	FE _h

Attribute	Value
Description	External Line 23 AC voltage 127
Category	Optional
Access	rw
PDO mapping	No
Value range	UNSIGNED16
Default value	Manufacturer-specific

8.11 Object 6019_h: Line 13 AC voltage

This object shall provide the line 13 AC actual voltage. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local line 13 AC voltages of the device. The sub-indices 80_h to FE_h may be used to administer the line 13 AC voltages of other active devices in the system. Table 166 and Table 167 provide the object description and the entry description.

Table 166 – Object description

Attribute	Value
Index	6019 _h
Name	Line 13 AC voltage
Object code	ARRAY
Data type	UNSIGNED16
Category	Optional

Table 167 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Optional
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Line 13 AC voltage VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
Sub-index	02 _h
Description	Line 13 AC voltage VDN 2
Category	Optional
Access	ro
PDO mapping	No

Attribute	Value
Value range	UNSIGNED16
Default value	No
to	
Sub-index	7F _h
Description	Line 13 AC voltage VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
to	
Sub-index	80 _h
Description	External Line 13 AC voltage 1
Category	Optional
Access	rw
PDO mapping	No
Value range	UNSIGNED16
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External Line 13 AC voltage 127
Category	Optional
Access	rw
PDO mapping	No
Value range	UNSIGNED16
Default value	Manufacturer-specific

8.12 Object 601A_h: Phase 1 AC reactive power

This object shall provide the actual phase 1 AC reactive power. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local actual phase 1 AC reactive powers of the device. The sub-indices 80_h to FE_h may be used to administer the actual phase 1 AC reactive powers of other active devices in the system. Table 168 and Table 169 provide the object description and the entry description.

Table 168 – Object description

Attribute	Value
Index	601A _h
Name	Phase 1 AC reactive power
Object code	ARRAY
Data type	INTEGER32
Category	Optional

Table 169 – Entry description

Attribute	Value
Sub-index	00 _h

Attribute	Value
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Phase 1 AC reactive power VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Phase 1 AC reactive power VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Phase 1 AC reactive power VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	80 _h
Description	External Phase 1 AC reactive power 1
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External Phase 1 AC reactive power 127
Category	Optional
Access	rw

Attribute	Value
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific

8.13 Object 601B_h: Phase 2 AC reactive power

This object shall provide the actual phase 2 AC reactive power. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local actual phase 2 AC reactive powers of the device. The sub-indices 80_h to FE_h may be used to administer the actual phase 2 AC reactive powers of other active devices in the system. Table 170 and Table 171 provide the object description and the entry description.

Table 170 – Object description

Attribute	Value
Index	601B _h
Name	Phase 2 AC reactive power
Object code	ARRAY
Data type	INTEGER32
Category	Optional

Table 171 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Phase 2 AC reactive power VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Phase 2 AC reactive power VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32

Attribute	Value
Default value	No
to	
Sub-index	7F _h
Description	Phase 2 AC reactive power VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	80 _h
Description	External Phase 2 AC reactive power 1
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific
Sub-index	FE _h
Description	External Phase 2 AC reactive power 127
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific

8.14 Object 601C_h: Phase 3 AC reactive power

This object shall provide the actual phase 3 AC reactive power. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local actual phase 3 AC reactive powers of the device. The sub-indices 80_h to FE_h may be used to administer the actual phase 3 AC reactive powers of other active devices in the system. Table 172 and Table 173 provide the object description and the entry description.

Table 172 – Object description

Attribute	Value
Index	601C _h
Name	Phase 3 AC reactive power
Object code	ARRAY
Data type	INTEGER32
Category	Optional

Table 173 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Phase 3 AC reactive power VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Phase 3 AC reactive power VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	7F _h
Description	Phase 3 AC reactive power VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	80 _h
Description	External Phase 3 AC reactive power 1
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h

Attribute	Value
Description	External Phase 3 AC reactive power 127
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific

8.15 Object 601D_h: Phase 1 AC apparent power

This object shall provide the actual phase 1 AC apparent power. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local actual phase 1 AC apparent powers of the device. The sub-indices 80_h to FE_h may be used to administer the actual phase 1 AC apparent powers of other active devices in the system. Table 174 and Table 175 provide the object description and the entry description.

Table 174 – Object description

Attribute	Value
Index	601D _h
Name	Phase 1 AC apparent power
Object code	ARRAY
Data type	INTEGER32
Category	Optional

Table 175 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Phase 1 AC apparent power VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Phase 1 AC apparent power VDN 2

Attribute	Value
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Phase 1 AC apparent power VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
to	
Sub-index	80 _h
Description	External Phase 1 AC apparent power 1
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External Phase 1 AC apparent power 127
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific

8.16 Object 601E_h: Phase 2 AC apparent power

This object shall provide the actual phase 2 AC apparent power. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local actual phase 2 AC apparent powers of the device. The sub-indices 80_h to FE_h may be used to administer the actual phase 2 AC apparent powers of other active devices in the system. Table 176 and Table 177 provide the object description and the entry description.

Table 176 – Object description

Attribute	Value
Index	601E _h
Name	Phase 2 AC apparent power
Object code	ARRAY
Data type	INTEGER32
Category	Optional

Table 177 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Phase 2 AC apparent power VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Phase 2 AC apparent power VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Phase 2 AC apparent power VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	80 _h

Attribute	Value
Description	External Phase 2 AC apparent power 1
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External Phase 2 AC apparent power 127
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific

8.17 Object 601F_h: Phase 3 AC apparent power

This object shall provide the actual phase 3 AC apparent power. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local actual phase 3 AC apparent powers of the device. The sub-indices 80_h to FE_h may be used to administer the actual phase 3 AC apparent powers of other active devices in the system. Table 178 and Table 179 provide the object description and the entry description.

Table 178 – Object description

Attribute	Value
Index	601F _h
Name	Phase 3 AC apparent power
Object code	ARRAY
Data type	INTEGER32
Category	Optional

Table 179 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Phase 3 AC apparent power VDN 1

Attribute	Value
Category	Mandatory
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Phase 3 AC apparent power VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Phase 3 AC apparent power VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	80 _h
Description	External Phase 3 AC apparent power 1
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External Phase 3 AC apparent power 127
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific

8.18 Object 6030_h: Phase 1 AC real power

This object shall provide the actual phase 1 AC real power. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local actual phase 1 AC real powers of the device. The sub-indices 80_h to FE_h may be used to administer the actual phase 1 AC real powers of other active devices in the system. Table 180 and Table 181 provide the object description and the entry description.

Table 180 – Object description

Attribute	Value
Index	6030 _h
Name	Phase 1 AC real power
Object code	ARRAY
Data type	INTEGER32
Category	Optional

Table 181 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Phase 1 AC real power VDN 1
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Phase 1 AC real power VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Phase 1 AC real power VDN 127

Attribute	Value
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	80 _h
Description	External Phase 1 AC real power 1
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External Phase 1 AC real power 127
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific

8.19 Object 6031_h: Phase 2 AC real power

This object shall provide the actual phase 2 AC real power. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local actual phase 2 AC real powers of the device. The sub-indices 80_h to FE_h may be used to administer the actual phase 2 AC real powers of other active devices in the system. Table 182 and Table 183 provide the object description and the entry description.

Table 182 – Object description

Attribute	Value
Index	6031 _h
Name	Phase 2 AC real power
Object code	ARRAY
Data type	INTEGER32
Category	Optional

Table 183 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Phase 2 AC real power VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Phase 2 AC real power VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Phase 2 AC real power VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	80 _h
Description	External Phase 2 AC real power 1
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External Phase 2 AC real power 127
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific

8.20 Object 6032_h: Phase 3 AC real power

This object shall provide the actual phase 3 AC real power. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local actual phase 3 AC real powers of the device. The sub-indices 80_h to FE_h may be used to administer the actual phase 3 AC real powers of other active devices in the system. Table 184 and Table 185 provide the object description and the entry description.

Table 184 – Object description

Attribute	Value
Index	6032 _h
Name	Phase 3 AC real power
Object code	ARRAY
Data type	INTEGER32
Category	Optional

Table 185 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Phase 3 AC real power VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Phase 3 AC real power VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Phase 3 AC real power VDN 127

Attribute	Value
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	80 _h
Description	External Phase 3 AC real power 1
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific
to	
Sub-index	FE _h
Description	External Phase 3 AC real power 127
Category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER32
Default value	Manufacturer-specific

8.21 Object 6033_h: Total AC reactive power

This object shall provide the total AC reactive power. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local actual total AC reactive powers of the device. The sub-indices 80_h to FE_h may be used to administer the total AC reactive powers of other active devices in the system. Table 186 and Table 187 provide the object description and the entry description.

Table 186 – Object description

Attribute	Value
Index	6033 _h
Name	Total AC reactive power
Object code	ARRAY
Data type	INTEGER32
Category	Optional

Table 187 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Total AC reactive power VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Total AC reactive power VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Total AC reactive power VDN 127
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	80 _h
Description	External Total AC reactive power 1
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
to	
Sub-index	FE _h
Description	External Total AC reactive power 127
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No

8.22 Object 6034_h: Total AC apparent power

This object shall provide the total AC apparent power. The value shall be given as indicated in 6.5.6. The sub-indices 01_h to 7F_h shall provide the local actual total AC apparent powers of the device. The sub-indices 80_h to FE_h may be used to administer the total AC apparent powers of other active devices in the system. Table 188 and Table 189 provide the object description and the entry description.

Table 188 – Object description

Attribute	Value
Index	6034 _h
Name	Total AC apparent power
Object code	ARRAY
Data type	INTEGER32
Category	Optional

Table 189 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Category	Mandatory
Access	ro
PDO mapping	No
Value range	01 _h to FE _h
Default value	No
Sub-index	01 _h
Description	Total AC apparent power VDN 1
Category	Mandatory
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
Sub-index	02 _h
Description	Total AC apparent power VDN 2
Category	Optional
Access	ro
PDO mapping	No
Value range	INTEGER32
Default value	No
to	
Sub-index	7F _h
Description	Total AC apparent power VDN 127