

**CiA<sup>®</sup> 417**



***Application profile for lift control systems***

Part 2: Virtual device definitions

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## HISTORY

Date	Changes
2003-07-15	<i>Publication of version 1.0</i> as draft standard proposal
2010-02-01	<i>Publication of version 2.0</i> as draft standard proposal NOTE: Version 2.0 is partly incompatible to version 1.0
2011-02-02	<i>Publication of version 2.0</i> as public specification NOTE: This document has been converted into "docx format". The conversion caused minor layout differences to the predecessor document in "doc format". The technical content word-by-word is the very same.

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## CONTENTS

1	Scope .....	4
2	Normative references .....	4
3	Definitions, acronyms and abbreviations .....	4
4	Operating principles.....	4
4.1	General .....	4
4.2	Control functions .....	4
5	Object dictionary entries .....	5
5.1	General .....	5
5.2	General communication objects .....	5
5.2.1	General .....	5
5.2.2	Object 1000 <sub>h</sub> : Device type .....	5
5.2.3	Object 1001 <sub>h</sub> : Error register.....	6
5.2.4	Object 1016 <sub>h</sub> : Consumer heartbeat times .....	6
5.2.5	Object 1017 <sub>h</sub> : Producer heartbeat time .....	6
5.2.6	Object 1018 <sub>h</sub> : Identity .....	6
5.2.7	Object 1029 <sub>h</sub> : Error behavior .....	7
5.3	Supported application objects, PDOs, and SDOs for lift-application 1 .....	7
5.3.1	General .....	7
5.3.2	General application objects .....	7
5.3.3	Input panel unit .....	8
5.3.4	Output panel unit for lift 1 .....	9
5.3.5	Call controller for lift 1 .....	10
5.3.6	Car door unit for lift 1 .....	10
5.3.7	Light barrier unit for lift 1 .....	11
5.3.8	Car door controller for lift 1 .....	11
5.3.9	Car position unit for lift 1 .....	12
5.3.10	Load-measuring unit for lift 1 .....	13
5.3.11	Car drive unit for lift 1 .....	13
5.3.12	Car drive controller for lift 1 .....	15
5.3.13	Remote data transmission unit for lift 1 .....	16
5.4	Supported application objects, PDOs, and SDOs for lift-application 2 to 8 .....	16
5.4.1	General .....	16
5.4.2	Output panel units for lift 2 to lift 8 .....	16
5.4.3	Call controllers for lift 2 to lift 8 .....	17
5.4.4	Car door units for lift 2 to lift 8 .....	17
5.4.5	Light barrier units for lift 2 to lift 8 .....	17
5.4.6	Car door controllers for lift 2 to lift 8 .....	17
5.4.7	Load-measuring units for lift 2 to lift 8 .....	17
5.4.8	Car position units for lift 2 to lift 8 .....	18
5.4.9	Car drive units for lift 2 to lift 8 .....	18
5.4.10	Car drive controllers for lift 2 to lift 8 .....	18

## 1 Scope

This set of CANopen application profile specifications describes the *CANopen Lift* control network system. It specifies the CANopen communication interfaces and the application functionality of several functional elements (virtual devices).

This application profile specification consists of several parts:

- Part 1 provides general definitions
- Part 2 specifies the functionality of the virtual devices
- Part 3 specifies the pre-defined PDOs
- Part 4 specifies the application objects

This part specifies for a single lift application (lift 1) the general communication parameter. It specifies also for each virtual device the supported application objects including the category, access, and default value attributes. It describes the supported Process Data Objects (PDO). In addition, the PDOs for the other lift application 2 to 8 are assigned correspondingly.

## 2 Normative references

The normative references given in part 1 apply for this part, too.

## 3 Definitions, acronyms and abbreviations

The definitions, acronyms and abbreviations given in part 1 apply for this part, too.

## 4 Operating principles

### 4.1 General

Each CANopen device compliant with this application profile specification shall share the Object Dictionary entries from 6000<sub>h</sub> to 9FFF<sub>h</sub>. These entries are common to all devices and each device only implements those objects relevant to its functions (virtual device). The Object Dictionary entries from 6000<sub>h</sub> to 60FF<sub>h</sub> are related to the CANopen device and not to one of the lift-control applications. The Object Dictionary entries from 6100<sub>h</sub> to 62FF<sub>h</sub> are related to the VD input panel units; They do not belong to a specific lift-control.

It is possible to realize up to 8 lift-control applications in one CANopen device. For VDs belonging to the specific lift-control application 1 the range 6200<sub>h</sub> to 67FE<sub>h</sub> is used. For VDs belonging to other lift-control applications the object range 6200<sub>h</sub> to 67FE<sub>h</sub> shall be shifted as follows:

- 6200<sub>h</sub> to 67FE<sub>h</sub> lift-control application 1
- 6A00<sub>h</sub> to 6FFE<sub>h</sub> lift-control application 2
- 7200<sub>h</sub> to 77FE<sub>h</sub> lift-control application 3
- 7A00<sub>h</sub> to 7FFE<sub>h</sub> lift-control application 4
- 8200<sub>h</sub> to 87FE<sub>h</sub> lift-control application 5
- 8A00<sub>h</sub> to 8FFE<sub>h</sub> lift-control application 6
- 9200<sub>h</sub> to 97FE<sub>h</sub> lift-control application 7
- 9A00<sub>h</sub> to 9FFF<sub>h</sub> lift-control application 8

The TPDO and RPDO communication and mapping parameters as well as the pre-defined default CAN-IDs are specified in part 3 of this profile specification.

### 4.2 Control functions

In many lift control systems, all virtual control functions are implemented in a single CANopen device. Of course, it is possible to implement the different virtual control functions in several CANopen devices. The communication between the virtual controllers is not specified and

therefore manufacturer-specific. This means additional manufacturer-specific SDO and PDO communication is necessary.

The VD call controller collects all PDOs provided by input panel units and it sends one single TPDO to all output panel units.

The VD car door controller receives door unit status information from all car door units by means of different PDOs and sends the door commands in a single TPDO to all car door units. It also collects all PDOs provided by the light barrier units and the car position sent by the car position unit.

The VD car drive controller send the drive commands to the car drive unit by means of PDO, and receives the car drive status also by means of a PDO. It also receives the car position and the load measurement by PDO from the car position unit respectively the load-measuring unit.

The car drive controller and the car drive unit are based on /CiA402/.

Note There are some additional objects necessary for lift applications that are not specified in /CiA402/.

If there is no absolute encoder available, the *target velocity* (6430<sub>h</sub>) shall be provided to the car drive unit using the Profile Velocity Mode; if there is an absolute encoder available, the *target position* (6420<sub>h</sub>) shall be provided to the car drive unit using the Profile Position Mode.

The operation mode is selected by the *modes of operation* (6403<sub>h</sub>). In case of velocity-controlled drives the Profile Velocity Mode shall be used. The objects for the velocity profile are stored in the drive unit and may be configured by the drive controller. Due to safety reasons, the configuration is not allowed in Operation Enable state of the drive unit.

## 5 Object dictionary entries

### 5.1 General

Every CANopen device compliant with this application profile supports some general communication and application objects as well as virtual device specific application objects. It consists of one or more virtual devices as defined in /CiA301/. A virtual device shall not be distributed to several CANopen devices. Each virtual device supports a set of mandatory function-depending application objects and may implement additionally a variable set of optional application objects.

All objects are specified by means of object and entry description as defined in /CiA301/. The description attributes are defined in /CiA301/. The *category* attribute indicates, if an object shall be supported (*Mandatory*) or may be supported (*Optional*). The *access* attribute indicates, if an object is constant (*const*), read only (*ro*), read/write (*rw*) or write only (*wo*). *Read only* indicates that this object shall not be written via the bus; *read/write* allows to read and to write this object; and *write only* means that this object shall be not read via the bus. The *default value* attribute defines the behavior of (application) objects after power-on or NMT application reset.

The information given in clause 5.3 about application objects mapped into PDOs is informative.

### 5.2 General communication objects

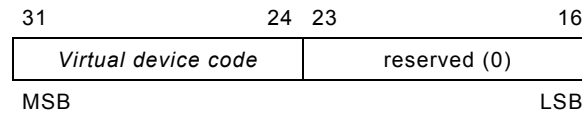
#### 5.2.1 General

CANopen devices compliant with this application profile use default values for some communication objects (1000<sub>h</sub> to 1FFF<sub>h</sub>), which are not specified in all details in /CiA301/. In the following chapters these default values are specified in detail.

#### 5.2.2 Object 1000<sub>h</sub>: Device type

This object describes the type of device and its functionality. The object and entry description are given in /CiA301/. Figure 1 specifies the *additional information* field. Table 1 defines the values for the *virtual device code* field.

If the device implements just one virtual device, the *additional information* field contains the virtual device code. If the device code is '0', the CANopen device implements more than only one virtual device. In this case, the object 6000<sub>h</sub> contains the codes of all implemented virtual devices.



**Figure 1 – Additional information field structure**

**Table 1 – Virtual device code values**

Code	Virtual device function
00 <sub>h</sub>	Multiple virtual device
01 <sub>h</sub>	Call controller
02 <sub>h</sub>	Input panel unit
03 <sub>h</sub>	Output panel unit
04 <sub>h</sub>	Car door controller
05 <sub>h</sub>	Car door unit
06 <sub>h</sub>	Car position unit
07 <sub>h</sub>	Light barrier unit
08 <sub>h</sub>	Car drive controller
09 <sub>h</sub>	Car drive unit
0A <sub>h</sub>	Load-measuring unit
0B <sub>h</sub>	Remote data transmission unit
0C <sub>h</sub>	reserved
<i>to</i>	
FF <sub>h</sub>	reserved

### 5.2.3 Object 1001<sub>h</sub>: Error register

The device profile specific bit in the error register is reserved for future use. The object and entry description are given in /CiA301/.

### 5.2.4 Object 1016<sub>h</sub>: Consumer heartbeat times

This object shall be implemented, if the CANopen device receives event-triggered PDOs. It shall consume the heartbeats from all CANopen devices, which produces the received event-triggered PDOs. The consumer heartbeat times shall be set to 3 s by default. The reaction on a heartbeat event is not in the scope of this specification. The object and entry description are given in /CiA301/.

NOTE If a device receives from the call/drive/car door controller (with node-ID = 1) PDOs, it uses the sub-index 01<sub>h</sub> to consume the corresponding Heartbeat (CAN-ID = 701<sub>h</sub>).

### 5.2.5 Object 1017<sub>h</sub>: Producer heartbeat time

This object shall be implemented. The heartbeat producer time shall be set to 1 s by default. The object and entry description are given in /CiA301/.

### 5.2.6 Object 1018<sub>h</sub>: Identity

This object is mandatory and contains in sub-index 01<sub>h</sub> the unique vendor-ID assigned by CiA. Sub-index 02<sub>h</sub> to 04<sub>h</sub> are optional. The object and entry description are given in /CiA301/.

### 5.2.7 Object 1029<sub>h</sub>: Error behavior

This object specifies to which state the physical device shall be set, when a communication error or a device internal error is detected. Besides the specification given in /CiA301/ the following sub-indexes may be implemented optionally. If the entire object is not implemented the CANopen device shall behave as the default values define.

Table 2 specifies the values.

**Table 2 – Value definition**

Value	Definition
00 <sub>h</sub>	Change to NMT state Pre-operational (only if currently in NMT state Operational)
01 <sub>h</sub>	No change of the NMT state
02 <sub>h</sub>	Change to NMT state Stopped

The object description and the entry description for sub-index 00<sub>h</sub> and 01<sub>h</sub> are given in /CiA301/. Table 3 specifies the entry description for sub-index 02<sub>h</sub>.

**Table 3 – Entry description for sub-index 02<sub>h</sub>**

Attribute	Value
Sub-index	02 <sub>h</sub>
Description	Internal device error
Access	rw
Entry category	Optional
PDO mapping	No
Value range	00 <sub>h</sub> to 02 <sub>h</sub>
Default value	00 <sub>h</sub>

## 5.3 Supported application objects, PDOs, and SDOs for lift-application 1

### 5.3.1 General

If a CANopen device implements one or several virtual devices, it supports all mandatory application objects as well as all mandatory PDOs to external virtual devices. In addition, it implements depending on the desired device functionality optional application objects and optional PDOs.

If the CANopen device implements the corresponding TPDO and RPDO, the PDO is normally communicated device-internally and not via CAN. The virtual devices with control functions are normally implemented in the same CANopen device. When they are implemented in several CANopen devices, additional PDOs and SDOs are required. They are not purpose of this application profile. They are implemented manufacturer-specific.

### 5.3.2 General application objects

Every CANopen device compliant with this application profile may implement the application objects shown in Table 4. The *category*, *access*, and *default value* attributes shall be used.

**Table 4 – General application objects**

Index	Name	Cat.	Acc.	Default value
6000 <sub>h</sub>	Supported virtual device types (NOTE 1)	C	rw	Manufacturer-specific
6001 <sub>h</sub>	Lift number	O	rw	Manufacturer-specific
6005 <sub>h</sub>	Lock/unlock parameters	O	rw	Manufacturer-specific
6008 <sub>h</sub>	Specification version	O	const	Manufacturer-specific
600A <sub>h</sub>	Virtual terminal interface (NOTE 2)	O	-	-
NOTE 1 Mandatory for CANopen devices supporting more than one virtual device, or which are configurable regarding the support lift applications.				
NOTE 2 Sub-index 01 <sub>h</sub> is rw with a manufacturer-specific default value; sub-index 02 <sub>h</sub> is ro with no default value. It is mandatory for car drive units and optional for all other virtual devices.				

Table 5 specifies the generic PDOs not related to any virtual device, which every CANopen device compliant to this application profile shall (category = M) and may (category = O) support.

**Table 5 – Generic PDOs**

PDO no.	Cat.	Mapped application objects (informative)
TPDO 2	O	MPDO
RPDO 2	O	MPDO (transmitted by node-ID = 1)
to		
RPDO 128	O	MPDO (transmitted by node-ID = 127)

### 5.3.3 Input panel unit

Table 6 lists all applications objects used by the VD input panel unit. The *category*, *access*, and *default value* attributes shall be used.

**Table 6 – Input panel unit specific application objects**

Index	Name	Cat.	Acc.	Default value
6002 <sub>h</sub>	Floor number	O	rw	Manufacturer-specific
6003 <sub>h</sub>	Door number	O	rw	Manufacturer-specific
6010 <sub>h</sub>	Virtual input mapping	M	ro	No
6100 <sub>h</sub>	Input group 1	M	ro	No
6101 <sub>h</sub>	Input group 2	O	ro	No
.....	.....	.....	.....	.....
611F <sub>h</sub>	Input group 32	O	ro	No
6120 <sub>h</sub>	Input parameter 1 group 1	O	rw	Manufacturer-specific
6121 <sub>h</sub>	Input parameter 1 group 2	O	rw	Manufacturer-specific
.....	.....	.....	.....	.....
613F <sub>h</sub>	Input parameter 1 group 32	O	rw	Manufacturer-specific
6140 <sub>h</sub>	Input parameter 2 group 1	O	rw	Manufacturer-specific
6141 <sub>h</sub>	Input parameter 2 group 2	O	rw	Manufacturer-specific
.....	.....	.....	.....	.....
615F <sub>h</sub>	Input parameter 2 group 32	O	rw	Manufacturer-specific
6160 <sub>h</sub>	Input parameter 3 group 1	O	rw	Manufacturer-specific
6161 <sub>h</sub>	Input parameter 3 group 2	O	rw	Manufacturer-specific
.....	.....	.....	.....	.....
617F <sub>h</sub>	Input parameter 3 group 32	O	rw	Manufacturer-specific



Index	Name	Cat.	Acc.	Default value
6180 <sub>h</sub>	Input parameter 4 group 1	O	rw	Manufacturer-specific
.....	.....	.....	.....	.....
619F <sub>h</sub>	Input parameter 4 group 32	O	rw	Manufacturer-specific

Table 7 specifies, which PDOs the input panel unit shall (category = M) and may (category = O) support.

**Table 7 – PDOs supported by the input panel unit**

PDO no.	Cat.	Mapped application objects (informative)
TPDO 130	M	6010 00 <sub>h</sub>

### 5.3.4 Output panel unit for lift 1

Table 8 lists all applications objects used by the VD output panel unit. The category, access, and default value attributes shall be used.

**Table 8 – Output panel unit specific application objects**

Index	Name	Cat.	Acc.	Default value
6002 <sub>h</sub>	Floor number	O	rw	Manufacturer-specific
6003 <sub>h</sub>	Door number	O	rw	Manufacturer-specific
6011 <sub>h</sub>	Virtual output mapping	M	rw	00 0000 0000 <sub>h</sub>
6200 <sub>h</sub>	Output group 1	M	rw	Manufacturer-specific
6201 <sub>h</sub>	Output group 2	O	rw	Manufacturer-specific
.....	.....	.....	.....	.....
621F <sub>h</sub>	Output group 32	O	rw	Manufacturer-specific
6220 <sub>h</sub>	Output parameter 1 group 1	O	rw	Manufacturer-specific
6221 <sub>h</sub>	Output parameter 1 group 2	O	rw	Manufacturer-specific
.....	.....	.....	.....	.....
623F <sub>h</sub>	Output parameter 1 group 32	O	rw	Manufacturer-specific
6240 <sub>h</sub>	Output parameter 2 group 1	O	rw	Manufacturer-specific
6241 <sub>h</sub>	Output parameter 2 group 2	O	rw	Manufacturer-specific
.....	.....	.....	.....	.....
625F <sub>h</sub>	Output parameter 2 group 32	O	rw	Manufacturer-specific
6260 <sub>h</sub>	Output parameter 3 group 1	O	rw	Manufacturer-specific
6261 <sub>h</sub>	Output parameter 3 group 2	O	rw	Manufacturer-specific
.....	.....	.....	.....	.....
627F <sub>h</sub>	Output parameter 3 group 32	O	rw	Manufacturer-specific
6280 <sub>h</sub>	Output parameter 4 group 1	O	rw	Manufacturer-specific
6281 <sub>h</sub>	Output parameter 4 group 2	O	rw	Manufacturer-specific
.....	.....	.....	.....	.....
629F <sub>h</sub>	Output parameter 4 group 32	O	rw	Manufacturer-specific
62B0 <sub>h</sub>	Text position indication	O	rw	Manufacturer-specific
62B1 <sub>h</sub>	Text special indication	O	rw	Manufacturer-specific

Table 9 specifies, which PDOs the output panel unit shall (category = M) and may (category = O) support.

**Table 9 – PDOs supported by the output panel unit**

PDO no.	Cat.	Mapped application objects (informative)
RPDO 257	M	6011 00 <sub>h</sub>

**5.3.5 Call controller for lift 1**

Table 10 lists all applications objects used by the call controller. The *category*, *access*, and *default value* attributes shall be used.

**Table 10 – Call controller specific application objects**

Index	Name	Cat.	Acc.	Default value
6010 <sub>h</sub>	Virtual input mapping	M	rw	00 0000 0000 <sub>h</sub>
6011 <sub>h</sub>	Virtual output mapping	M	ro	No

Table 11 specifies, which PDOs the call controller shall (category = M) and may (category = O) support.

**Table 11 – PDOs supported by the call controller**

PDO no.	Cat.	Mapped application objects (informative)
TPDO 257	M	6011 00 <sub>h</sub>
RPDO 130	O	6010 00 <sub>h</sub>
<i>to</i>		
RPDO 256	O	6010 00 <sub>h</sub>

**5.3.6 Car door unit for lift 1**

Table 12 lists all applications objects used by the VD car door unit. The category, access, and default value attributes shall be used.

**Table 12 – Car door unit specific application objects**

Index	Name	Cat.	Acc.	Default value
6003 <sub>h</sub>	Door number	M	rw	Manufacturer-specific
6300 <sub>h</sub>	Door controlword	M	rw	FFFF <sub>h</sub>
6301 <sub>h</sub>	Door statusword	M	ro	No
6302 <sub>h</sub>	Door position	M	ro	No
6304 <sub>h</sub>	Door configuration 1	O	rw	Manufacturer-specific
6305 <sub>h</sub>	Door configuration 2	O	rw	Manufacturer-specific
6306 <sub>h</sub>	Door configuration 3	O	rw	Manufacturer-specific
6307 <sub>h</sub>	Door configuration 4	O	rw	Manufacturer-specific
6310 <sub>h</sub>	Light barrier status	O	rw	FF <sub>h</sub>

Table 13 specifies, which PDOs the car door unit shall (category = M) support; and which PDOs shall be supported if the related door (number 1 to 4) is controlled (category = C).

**Table 13 – PDOs supported by the car door unit**

PDO no.	Cat.	Mapped application objects (informative)
TPDO 267	C	6301 01 <sub>h</sub> , 6302 01 <sub>h</sub>
TPDO 269	C	6301 02 <sub>h</sub> , 6302 02 <sub>h</sub>
TPDO 271	C	6301 03 <sub>h</sub> , 6302 03 <sub>h</sub>
RPDO 265	M	6300 01 <sub>h</sub> , 6300 02 <sub>h</sub> , 6300 03 <sub>h</sub> , 6300 04 <sub>h</sub> (NOTE)

PDO no.	Cat.	Mapped application objects (informative)
RPDO 268	O	6310 01 <sub>h</sub>
RPDO 270	O	6310 02 <sub>h</sub>
RPDO 272	O	6310 03 <sub>h</sub>
NOTE If the door control unit doesn't support all doors, the related car door commands are substituted by dummy objects (0006 00 <sub>h</sub> ).		

### 5.3.7 Light barrier unit for lift 1

Table 14 lists all applications objects used by the VD light barrier unit. The category, access, and default value attributes shall be used.

**Table 14 – Light barrier unit specific application objects**

Index	Name	Cat.	Acc.	Default value
6003 <sub>h</sub>	Door number	M	rw	Manufacturer-specific
6310 <sub>h</sub>	Light barrier status	M	ro	No

Table 15 specifies, which PDOs the light barrier unit shall support, if the related door is protected (category = C).

**Table 15 – PDOs supported by the light barrier unit**

PDO no.	Cat.	Mapped application objects (informative)
TPDO 268	O	6310 01 <sub>h</sub>
TPDO 270	O	6310 02 <sub>h</sub>
TPDO 272	O	6310 03 <sub>h</sub>

### 5.3.8 Car door controller for lift 1

Table 16 lists all applications objects used by the VD car door controller. The category, access, and default value attributes shall be used.

**Table 16 – Car door controller specific application objects**

Index	Name	Cat.	Acc.	Default value
6300 <sub>h</sub>	Door controlword	M	ro	No
6301 <sub>h</sub>	Door statusword	M	rw	FFFF <sub>h</sub>
6302 <sub>h</sub>	Door position	O	rw	FFFF <sub>h</sub>
6310 <sub>h</sub>	Light barrier status	O	rw	FF <sub>h</sub>

Table 17 specifies, which PDOs the car door controller shall (category = M) and may (category = O) support.

**Table 17 – PDOs supported by the car door controller**

PDO no.	Cat.	Mapped application objects (informative)
TPDO 265	M	6300 01 <sub>h</sub> , 6300 02 <sub>h</sub> , 6300 03 <sub>h</sub> , 6300 04 <sub>h</sub>
RPDO 267	M	6301 01 <sub>h</sub> , 6302 01 <sub>h</sub>
RPDO 268	O	6310 01 <sub>h</sub>
RPDO 269	O	6301 02 <sub>h</sub> , 6302 02 <sub>h</sub>
RPDO 270	O	6310 02 <sub>h</sub>
RPDO 271	O	6301 03 <sub>h</sub> , 6302 03 <sub>h</sub>
RPDO 272	O	6310 03 <sub>h</sub>

### 5.3.9 Car position unit for lift 1

NOTE Linear measuring sensor units should behave like rotational encoders as defined in /CiA406/.

Table 18 lists all applications objects used by the VD car position unit. The category, access, and default value attributes shall be used.

NOTE Linear measuring sensor units should behave like rotational encoders as defined in /CiA406/.

**Table 18 – VD car position unit**

Index	Name	Cat.	Acc.	Default value
6380 <sub>h</sub>	Operating parameter	M	rw	Manufacturer-specific
6381 <sub>h</sub>	Measuring units per revolution	O	rw	Manufacturer-specific
6382 <sub>h</sub>	Preset value	O	rw	Manufacturer-specific
6383 <sub>h</sub>	Position value	M	ro	No
6384 <sub>h</sub>	Encoder measuring step settings position unit 1	O	rw	(1)
6385 <sub>h</sub>	Encoder measuring step settings position unit 2	O	rw	(1)
6386 <sub>h</sub>	Encoder measuring step settings position unit 3	O	rw	(1)
6387 <sub>h</sub>	Encoder measuring step settings position unit 4	O	rw	(1)
6390 <sub>h</sub>	Speed value car	O	ro	No
6391 <sub>h</sub>	Acceleration value car	O	ro	No
63A0 <sub>h</sub>	CAM state register position unit 1	O	ro	No
63A1 <sub>h</sub>	CAM enable register position unit 1	O	rw	00 <sub>h</sub>
63A2 <sub>h</sub>	CAM polarity register position unit 1	O	rw	00 <sub>h</sub>
63A3 <sub>h</sub>	CAM state register position unit 2	O	ro	No
63A4 <sub>h</sub>	CAM enable register position unit 2	O	rw	00 <sub>h</sub>
63A5 <sub>h</sub>	CAM polarity register position unit 2	O	rw	00 <sub>h</sub>
63A6 <sub>h</sub>	CAM state register position unit 3	O	ro	No
63A7 <sub>h</sub>	CAM enable register position unit 3	O	rw	00 <sub>h</sub>
63A8 <sub>h</sub>	CAM polarity register position unit 3	O	rw	00 <sub>h</sub>
63A9 <sub>h</sub>	CAM state register position unit 4	O	ro	No
63AA <sub>h</sub>	CAM enable register position unit 4	O	rw	00 <sub>h</sub>
63AB <sub>h</sub>	CAM polarity register position unit 4	O	rw	00 <sub>h</sub>
63B0 <sub>h</sub>	Area state register position unit 1	O	ro	No
63B1 <sub>h</sub>	Area state register position unit 2	O	ro	No
63B2 <sub>h</sub>	Area state register position unit 3	O	ro	No
63B3 <sub>h</sub>	Area state register position unit 4	O	ro	No
63B4 <sub>h</sub>	Work area low-limit position unit 1	O	rw	Manufacturer-specific
63B5 <sub>h</sub>	Work area low-limit position unit 2	O	rw	Manufacturer-specific
63B6 <sub>h</sub>	Work area low-limit position unit 3	O	rw	Manufacturer-specific
63B7 <sub>h</sub>	Work area low-limit position unit 4	O	rw	Manufacturer-specific
63B8 <sub>h</sub>	Work area high-limit position unit 1	O	rw	Manufacturer-specific
63B9 <sub>h</sub>	Work area high-limit position unit 2	O	rw	Manufacturer-specific
63BA <sub>h</sub>	Work area high-limit position unit 3	O	rw	Manufacturer-specific
63BB <sub>h</sub>	Work area high-limit position unit 4	O	rw	Manufacturer-specific
63C0 <sub>h</sub>	Operating status	M	ro	No
63C1 <sub>h</sub>	Single-turn resolution	M	ro	No

Index	Name	Cat.	Acc.	Default value
63C2 <sub>h</sub>	Number of distinguishable revolutions	M	ro	No
63C3 <sub>h</sub>	Alarms and warnings	O	ro	No
63C4 <sub>h</sub>	Supported warnings	O	ro	No
63C5 <sub>h</sub>	Warnings	O	ro	No
63C6 <sub>h</sub>	Supported alarms	O	ro	No
63C7 <sub>h</sub>	Alarms	O	ro	No
63C8 <sub>h</sub>	Operating time	O	ro	No
63C9 <sub>h</sub>	Offset value	O	ro	No
(1) For sub-index 01 <sub>h</sub> and 02 <sub>h</sub> = 0000 0010 <sub>h</sub> ; for sub-index 03 <sub>h</sub> = 0000 0001 <sub>h</sub>				

Table 19 specifies, which PDOs the car position unit shall (category = M) and may (category = O) support.

**Table 19 – PDOs supported by the car position unit**

PDO no.	Cat.	Mapped application objects (informative)
TPDO 263	M	6383 01 <sub>h</sub>
TPDO 264	O	6383 02 <sub>h</sub>
TPDO 385	O	6383 03 <sub>h</sub>
TPDO 386	O	6383 04 <sub>h</sub>

### 5.3.10 Load-measuring unit for lift 1

Table 20 lists all applications objects used by the VD load-measuring unit. The category, access, and default value attributes shall be used.

**Table 20 – VD load-measuring unit**

Index	Name	Cat.	Acc.	Default value
6463 <sub>h</sub>	Suspension	O	rw	Manufacturer-specific
6465 <sub>h</sub>	Loads and weights	O	ro	No
6480 <sub>h</sub>	Load value	M	ro	No
6481 <sub>h</sub>	Load limits	M	rw	Manufacturer-specific
6482 <sub>h</sub>	Load signalling	M	ro	No
6483 <sub>h</sub>	Load signalling limits	M	rw	FFFF <sub>h</sub> (all sub-indices)
6484 <sub>h</sub>	Rope load	O	ro	No
6486 <sub>h</sub>	Car reference weight	M	wo	FFFF <sub>h</sub>

Table 21 specifies, which PDOs the load-measuring unit shall (category = M) and may (category = O) support.

**Table 21 – PDOs supported by the load-measuring unit**

PDO no.	Cat.	Mapped application objects (informative)
TPDO 258	M	6482 01 <sub>h</sub> , 6480 01 <sub>h</sub>

### 5.3.11 Car drive unit for lift 1

Table 22 lists all applications objects used by the VD car drive unit. The category, access, and default value attributes shall be used.

**Table 22 – VD car drive unit**

Index	Name	Cat.	Acc.	Default value
6383 <sub>h</sub>	Position value	O	rw	FFFF FFFF <sub>h</sub>

Index	Name	Cat.	Acc.	Default value
6400 <sub>h</sub>	Controlword	M	rw	0000 <sub>h</sub>
6401 <sub>h</sub>	Statusword	M	ro	No
6402 <sub>h</sub>	Control option codes	O	rw	Manufacturer-specific
6403 <sub>h</sub>	Modes of operation	M	rw	Manufacturer-specific
6404 <sub>h</sub>	Modes of operation display	M	ro	No
6405 <sub>h</sub>	Motion profile type	O	rw	Manufacturer-specific
6406 <sub>h</sub>	Control effort	O	ro	No
6407 <sub>h</sub>	Position actual value	O	ro	No
6408 <sub>h</sub>	Max velocity and speed	O	rw	Manufacturer-specific
6409 <sub>h</sub>	Max acceleration and deceleration	O	rw	Manufacturer-specific
640A <sub>h</sub>	Quick stop deceleration	O	rw	Manufacturer-specific
640B <sub>h</sub>	Profile acceleration and deceleration	O	rw	Manufacturer-specific
640C <sub>h</sub>	Profile jerk use	O	rw	Manufacturer-specific
640D <sub>h</sub>	Profile jerk	O	rw	Manufacturer-specific
6414 <sub>h</sub>	Position encoder resolution	O	rw	Manufacturer-specific
6415 <sub>h</sub>	Velocity encoder resolution	O	rw	Manufacturer-specific
6416 <sub>h</sub>	Gear ratio	O	rw	Manufacturer-specific
6417 <sub>h</sub>	Feed constant	O	rw	Manufacturer-specific
641E <sub>h</sub>	Polarity	O	rw	Manufacturer-specific
641F <sub>h</sub>	Position conversion	O	rw	0000 <sub>h</sub>
6420 <sub>h</sub>	Target position	O	rw	Manufacturer-specific
6421 <sub>h</sub>	Position range limit	O	rw	Manufacturer-specific
6422 <sub>h</sub>	Software position limit	O	rw	Manufacturer-specific
6423 <sub>h</sub>	Profile velocity	O	rw	0000 <sub>h</sub>
6424 <sub>h</sub>	End velocity	O	rw	Manufacturer-specific
6428 <sub>h</sub>	Home offset	O	rw	Manufacturer-specific
6430 <sub>h</sub>	Target velocity	M	rw	0000 <sub>h</sub>
6431 <sub>h</sub>	Velocity sensor actual value	O	ro	No
6432 <sub>h</sub>	Velocity demand value	O	ro	No
6433 <sub>h</sub>	Velocity actual value	O	ro	No
6434 <sub>h</sub>	Sensor selection code	O	rw	Manufacturer-specific
6435 <sub>h</sub>	Velocity window	O	rw	Manufacturer-specific
6436 <sub>h</sub>	Velocity threshold	O	rw	Manufacturer-specific
6437 <sub>h</sub>	Max slippage	O	rw	Manufacturer-specific
6440 <sub>h</sub>	Motor type	O	rw	Manufacturer-specific
6441 <sub>h</sub>	Motor rated speed	O	rw	Manufacturer-specific
6442 <sub>h</sub>	Motor rated frequency	O	rw	Manufacturer-specific
6443 <sub>h</sub>	Motor pole pairs	O	rw	Manufacturer-specific
6444 <sub>h</sub>	Motor rated current	O	rw	Manufacturer-specific
6445 <sub>h</sub>	Motor rated voltage	O	rw	Manufacturer-specific
6446 <sub>h</sub>	Motor rated power	O	rw	Manufacturer-specific
6447 <sub>h</sub>	Motor connection mode	O	rw	Manufacturer-specific
6448 <sub>h</sub>	Motor cos phi	O	rw	Manufacturer-specific
6449 <sub>h</sub>	Motor max current	O	rw	Manufacturer-specific

Index	Name	Cat.	Acc.	Default value
644A <sub>h</sub>	Motor rated field current	O	rw	Manufacturer-specific
644B <sub>h</sub>	Motor phase resistance	O	rw	Manufacturer-specific
644C <sub>h</sub>	Motor phase inductance	O	rw	Manufacturer-specific
6450 <sub>h</sub>	Motor encoder type	O	rw	Manufacturer-specific
6451 <sub>h</sub>	Motor encoder resolution	O	rw	Manufacturer-specific
6452 <sub>h</sub>	Motor encoder alignment angle	O	rw	Manufacturer-specific
6460 <sub>h</sub>	Lift installation speed	O	rw	Manufacturer-specific
6461 <sub>h</sub>	Motor rpm at lift installation speed	O	rw	Manufacturer-specific
6462 <sub>h</sub>	Sheave diameter	O	rw	Manufacturer-specific
6463 <sub>h</sub>	Suspension	O	rw	Manufacturer-specific
6464 <sub>h</sub>	Gear ratio	O	rw	Manufacturer-specific
6465 <sub>h</sub>	Loads and weights	O	rw	Manufacturer-specific
6466 <sub>h</sub>	Delay times	O	rw	Manufacturer-specific
6467 <sub>h</sub>	Monitoring bits	O	rw	Manufacturer-specific
6468 <sub>h</sub>	Drive switching frequency	O	rw	Manufacturer-specific
6480 <sub>h</sub>	Load value	O	rw	FFFF <sub>h</sub>
6482 <sub>h</sub>	Load signalling	O	rw	0000 <sub>h</sub>

Table 23 specifies, which PDOs the car drive unit shall (category = M) and may (category = O) support.

**Table 23 – PDOs supported by the car drive unit**

PDO no.	Cat.	Mapped application objects (informative)
TPDO 260	M	6401 00 <sub>h</sub> , 6404 00 <sub>h</sub> , 67FE 00 <sub>h</sub> , 6433 00 <sub>h</sub>
TPDO 262	O	6406 00 <sub>h</sub>
RPDO 258	O	6482 01 <sub>h</sub> , 6480 01 <sub>h</sub>
RPDO 259	M	6400 00 <sub>h</sub> , 6403 00 <sub>h</sub> , 0005 00 <sub>h</sub> , 6430 00 <sub>h</sub>
RPDO 261	O	6420 00 <sub>h</sub> , 6423 00 <sub>h</sub>
RPDO 263	C	6383 01 <sub>h</sub> (NOTE)
NOTE Mandatory, if Profile Position Mode is used.		

### 5.3.12 Car drive controller for lift 1

Table 24 lists all applications objects used by the VD car drive controller. The category, access, and default value attributes shall be used.

**Table 24 – VD car drive controller**

Index	Name	Cat.	Acc.	Default value
6302 <sub>h</sub>	Door position	O	rw	FFFF <sub>h</sub>
6383 <sub>h</sub>	Position value (NOTE)	C	rw	FFFF FFFF <sub>h</sub>
6390 <sub>h</sub>	Speed value car	O	rw	0000 <sub>h</sub>
6391 <sub>h</sub>	Acceleration value car	O	rw	0000 <sub>h</sub>
6400 <sub>h</sub>	Controlword	M	ro	No
6401 <sub>h</sub>	Statusword	M	rw	0000 <sub>h</sub>
6403 <sub>h</sub>	Modes of operation	O	ro	No
6404 <sub>h</sub>	Modes of operation display	O	rw	0000 <sub>h</sub>
6406 <sub>h</sub>	Control effort	O	rw	0000 <sub>h</sub>

Index	Name	Cat.	Acc.	Default value
6407 <sub>h</sub>	Position actual value	O	rw	FFFF <sub>h</sub>
6420 <sub>h</sub>	Target position	O	ro	No
6430 <sub>h</sub>	Target velocity	O	ro	No
6433 <sub>h</sub>	Velocity actual value	O	rw	0000 <sub>h</sub>
6480 <sub>h</sub>	Load value	O	rw	FFFF <sub>h</sub>
6482 <sub>h</sub>	Load signalling	O	rw	(1)
(1) Sub-index 01 <sub>h</sub> = 0000 <sub>h</sub> , sub-index 02 <sub>h</sub> = manufacturer-specific NOTE Mandatory, if Profile Position Mode is used.				

Table 25 specifies, which PDOs the car drive controller shall (category = M) and may (category = O) support.

**Table 25 – PDOs supported by the car drive controller**

PDO no.	Cat.	Mapped application objects (informative)
TPDO 259	M	6400 00 <sub>h</sub> , 6403 00 <sub>h</sub> , 67FE 00 <sub>h</sub> , 6430 00 <sub>h</sub>
TPDO 261	M	6420 00 <sub>h</sub> , 6423 00 <sub>h</sub>
RPDO 258	O	6482 01 <sub>h</sub> , 6480 01 <sub>h</sub>
RPDO 260	M	6401 00 <sub>h</sub> , 6404 00 <sub>h</sub> , 0005 00 <sub>h</sub> , 6433 00 <sub>h</sub>
RPDO 262	M	6406 00 <sub>h</sub>
RPDO 263	M	6383 01 <sub>h</sub>
RPDO 264	O	6383 02 <sub>h</sub>
RPDO 267	M	6301 01 <sub>h</sub> , 6302 01 <sub>h</sub>
RPDO 269	O	6301 02 <sub>h</sub> , 6302 02 <sub>h</sub>
RPDO 271	O	6301 03 <sub>h</sub> , 6302 03 <sub>h</sub>
RPDO 385	O	6383 03 <sub>h</sub>
RPDO 386	O	6383 04 <sub>h</sub>

### 5.3.13 Remote data transmission unit for lift 1

This VD may receive all PDOs and needs to implement the mapped parameters in its object dictionary.

## 5.4 Supported application objects, PDOs, and SDOs for lift-application 2 to 8

### 5.4.1 General

Lift-application 2 to 8 use the same application objects in the range of 6200<sub>h</sub> to 67FE<sub>h</sub> as lift-application 1. However, they are offset as specified in clause 4.1. The used PDO numbers are given in the following chapters. The PDO numbers correspond to the indexes of the PDO communication and PDO mapping parameters as defined in /CiA301/. Of course, the objects mapped into the PDOs of lift-control application 2 to 8 are offset.

The transmitted MPDO (TPDO 2) and received MPDOs (RPDO 2 to RPDO 127) are related to the CANopen device and not to a specific lift-control application. The PDOs of the VD input are also not related to a specific lift-control application.

### 5.4.2 Output panel units for lift 2 to lift 8

Table 26 specifies the PDOs for the output panel units of lift-control application 2 to 8.

**Table 26 – Output panel unit PDOs**

Lift 2	Lift 3	Lift 4	Lift 5	Lift 6	Lift 7	Lift 8
RPDO 273	RPDO 289	RPDO 305	RPDO 321	RPDO 337	RPDO 353	RPDO 369



**5.4.3 Call controllers for lift 2 to lift 8**

Table 27 specifies the PDOs for the call controllers of lift-control application 2 to 8.

**Table 27 – Call controller PDOs**

Lift 2	Lift 3	Lift 4	Lift 5	Lift 6	Lift 7	Lift 8
TPDO 273	TPDO 289	TPDO 305	TPDO 321	TPDO 337	TPDO 353	TPDO 369
RPDO 130						
to						
RPDO 256						

**5.4.4 Car door units for lift 2 to lift 8**

Table 28 specifies the PDOs for the car door units of lift-control application 2 to 8.

**Table 28 – Car door unit PDOs**

Lift 2	Lift 3	Lift 4	Lift 5	Lift 6	Lift 7	Lift 8
TPDO 283	TPDO 299	TPDO 315	TPDO 331	TPDO 347	TPDO 363	TPDO 379
TPDO 285	TPDO 301	TPDO 317	TPDO 333	TPDO 349	TPDO 365	TPDO 381
TPDO 287	TPDO 303	TPDO 319	TPDO 335	TPDO 351	TPDO 367	TPDO 383
RPDO 281	RPDO 297	RPDO 313	RPDO 329	RPDO 345	RPDO 361	RPDO 377

**5.4.5 Light barrier units for lift 2 to lift 8**

Table 29 specifies the PDOs for the light barrier units of lift-control application 2 to 8.

**Table 29 – Car light barrier unit PDOs**

Lift 2	Lift 3	Lift 4	Lift 5	Lift 6	Lift 7	Lift 8
TPDO 284	TPDO 300	TPDO 316	TPDO 332	TPDO 348	TPDO 364	TPDO 380
TPDO 286	TPDO 302	TPDO 318	TPDO 334	TPDO 350	TPDO 366	TPDO 382
TPDO 288	TPDO 304	TPDO 320	TPDO 336	TPDO 352	TPDO 368	TPDO 384

**5.4.6 Car door controllers for lift 2 to lift 8**

Table 30 specifies the PDOs for the car door controllers of lift-control application 2 to 8.

**Table 30 – Car door controller PDOs**

Lift 2	Lift 3	Lift 4	Lift 5	Lift 6	Lift 7	Lift 8
TPDO 281	TPDO 297	TPDO 313	TPDO 329	TPDO 345	TPDO 361	TPDO 377
RPDO 283	RPDO 299	RPDO 315	RPDO 331	RPDO 347	RPDO 363	RPDO 379
RPDO 284	RPDO 300	RPDO 316	RPDO 332	RPDO 348	RPDO 364	RPDO 380
RPDO 285	RPDO 301	RPDO 317	RPDO 333	RPDO 349	RPDO 365	RPDO 381
RPDO 286	RPDO 302	RPDO 318	RPDO 334	RPDO 350	RPDO 366	RPDO 382
RPDO 287	RPDO 303	RPDO 319	RPDO 335	RPDO 351	RPDO 367	RPDO 383
RPDO 288	RPDO 304	RPDO 320	RPDO 336	RPDO 352	RPDO 368	RPDO 384

**5.4.7 Load-measuring units for lift 2 to lift 8**

Table 31 specifies the PDOs for the load-measuring units of lift-control application 2 to 8.

**Table 31 – Load-measuring unit PDOs**

Lift 2	Lift 3	Lift 4	Lift 5	Lift 6	Lift 7	Lift 8
TPDO 274	TPDO 290	TPDO 306	TPDO 322	TPDO 338	TPDO 354	TPDO 370

**5.4.8 Car position units for lift 2 to lift 8**

Table 32 specifies the PDOs for the car position units of lift-control application 2 to 8.

**Table 32 – Car position unit PDOs**

Lift 2	Lift 3	Lift 4	Lift 5	Lift 6	Lift 7	Lift 8
TPDO 279	TPDO 295	TPDO 311	TPDO 327	TPDO 343	TPDO 359	TPDO 375
TPDO 280	TPDO 296	TPDO 312	TPDO 328	TPDO 344	TPDO 360	TPDO 376
TPDO 401	TPDO 417	TPDO 433	TPDO 449	TPDO 465	TPDO 481	TPDO 497
TPDO 402	TPDO 418	TPDO 434	TPDO 450	TPDO 466	TPDO 482	TPDO 498

**5.4.9 Car drive units for lift 2 to lift 8**

Table 33 specifies the PDOs for the car drive units of lift-control application 2 to 8.

**Table 33 – Car drive unit PDOs**

Lift 2	Lift 3	Lift 4	Lift 5	Lift 6	Lift 7	Lift 8
TPDO 276	TPDO 292	TPDO 308	TPDO 324	TPDO 33A	TPDO 356	TPDO 372
TPDO 278	TPDO 294	TPDO 30A	TPDO 326	TPDO 33C	TPDO 358	TPDO 374
RPDO 274	RPDO 290	RPDO 306	RPDO 322	RPDO 338	RPDO 354	RPDO 370
RPDO 275	RPDO 291	RPDO 307	RPDO 323	RPDO 339	RPDO 355	RPDO 371
RPDO 277	RPDO 293	RPDO 309	RPDO 325	RPDO 33B	RPDO 357	RPDO 373
RPDO 279	RPDO 295	RPDO 311	RPDO 327	RPDO 343	RPDO 359	RPDO 375
RPDO 280	RPDO 296	RPDO 312	RPDO 328	RPDO 344	RPDO 360	RPDO 376

**5.4.10 Car drive controllers for lift 2 to lift 8**

Table 34 specifies the PDOs for the car drive controllers of lift-control application 2 to 8.

**Table 34 – Car drive controller PDOs**

Lift 2	Lift 3	Lift 4	Lift 5	Lift 6	Lift 7	Lift 8
TPDO 275	TPDO 291	TPDO 307	TPDO 323	TPDO 339	TPDO 355	TPDO 371
TPDO 277	TPDO 293	TPDO 309	TPDO 325	TPDO 33B	TPDO 357	TPDO 373
RPDO 274	RPDO 290	RPDO 306	RPDO 322	RPDO 338	RPDO 354	RPDO 370
RPDO 276	RPDO 292	RPDO 308	RPDO 324	RPDO 33A	RPDO 356	RPDO 372
RPDO 278	RPDO 294	RPDO 30A	RPDO 326	RPDO 33C	RPDO 358	RPDO 374
RPDO 279	RPDO 295	RPDO 311	RPDO 327	RPDO 343	RPDO 359	RPDO 375
RPDO 280	RPDO 296	RPDO 312	RPDO 328	RPDO 344	RPDO 360	RPDO 376
RPDO 401	RPDO 417	RPDO 433	RPDO 449	RPDO 465	RPDO 481	RPDO 497
RPDO 402	RPDO 418	RPDO 434	RPDO 450	RPDO 466	RPDO 482	RPDO 498