

CiA[®] 420



Profiles for extruder downstream devices

Part 6: Calibration-table

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2014-09-01	<i>Publication of version 1.1.0 as draft standard proposal</i> - Editorial changes
2015-05-07	<i>Publication of version 1.1.0 as public specification</i>

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1 Scope

The CANopen application profile for extruder downstream devices include several parts:

- Part 1 specifies general definitions
- Part 2 specifies the device profile for the puller downstream device
- Part 3 specifies the device profile for the corrugator downstream device
- Part 4 specifies the device profile for the saw downstream device
- Part 5 specifies the device profile for the co-extruder device
- Part 6 specifies the device profile for the calibration-table downstream device

NOTE All parts of this specification have been developed jointly with the European Committee of Machinery Manufacturers for the Plastics and Rubber Industries (Euromap) and is documented there as Euromap 27.

This part specifies the CANopen interface for calibration-tables.

2 References

/CiA420-1/ CiA 420, CANopen profile for extruder downstream devices - Part 1: General definitions

The references given in /CiA420-1/ apply to this specification as well.

3 Abbreviations and definitions

3.1 Abbreviations

The abbreviations given in /CiA420-1/ apply to this specification as well.

3.2 Definitions

The definitions given in /CiA420-1/ apply to this specification as well.

4 Operating principle

4.1 General

The calibration-table downstream device interface shall support all mandatory functions of /CiA301/ and /CiA420-1/ as well as all mandatory functions defined in this specification.

5 PDO specification

5.1 Overview

Table 1 illustrates the process data mapped into TPDOs and RPDOs.

Table 1 – TPDO and RPDO mapping

PDO number	Index/sub-index	Name/description
TPDO 1	6030 01 _h	Status word 1
	6030 02 _h	Status word 2
	6030 03 _h	Status word 3
	6030 04 _h	Status word 4
TPDO 2	6007 01 _h	Actual flow rate 1
	6007 02 _h	Actual flow rate 2
	600F 00 _h	Actual water pressure
	600A 00 _h	Actual force
TPDO 3	600D 01 _h	Actual vacuum 1
	600D 02 _h	Actual vacuum 2
RPDO 1	6020 01 _h	Control word 1
	6020 02 _h	Control word 2
	6020 03 _h	Control word 3
	6020 04 _h	Control word 4

5.2 First TPDO

This TPDO shall be transmitted to the extruder controller.

Table 2 specifies the object description of the PDO communication parameter and Table 3 specifies the associated entry description. The values are defined in /CiA301/.

Table 2 — Object description

Attribute	Value
Index	1800 _h
Name	TPDO 1 communication parameter
Object code	RECORD
Data type	PDO communication parameter record
Category	Mandatory

Table 3 — 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 to 06 _h
Default value	Manufacturer-specific

Attribute	Value
Sub-index	01 _h
Description	COB-ID
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	See /CiA301/
Default value	4000 0180 _h + node-ID
Sub-index	02 _h
Description	Transmission type
Entry category	Mandatory
Access	rw
PDO mapping	Optional
Value range	See /CiA301/
Default value	01 _h
Sub-index	03 _h
Description	Inhibit time
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See /CiA301/
Default value	0000 _h
Sub-index	05 _h
Description	Event timer
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See /CiA301/
Default value	0000 _h
Sub-index	06 _h
Description	Sync start value
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See /CiA301/
Default value	0000 _h

Table 4 specifies the object description of the PDO mapping parameter and Table 5 specifies the associated entry description. The values are defined in /CiA301/.

Table 4 — Object description

Attribute	Value
Index	1A00 _h
Name	TPDO 1 mapping parameter
Object code	RECORD
Data type	PDO mapping parameter record
Category	Mandatory

Table 5 — 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
Sub-index	01 _h
Description	1 st application object
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	See /CiA301/
Default value	6030 01 10 _h
Sub-index	02 _h
Description	2 nd application object
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	See /CiA301/
Default value	6030 02 10 _h
Sub-index	03 _h
Description	3 rd application object
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	See /CiA301/
Default value	6030 03 10 _h

Attribute	Value
Sub-index	04 _h
Description	4 th application object
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	See /CiA301/
Default value	6030 04 10 _h

5.3 Second TPDO

This TPDO shall be transmitted to the extruder controller.

Table 6 specifies the object description of the PDO communication parameter and Table 7 specifies the associated entry description. The values are defined in /CiA301/.

Table 6 — Object description

Attribute	Value
Index	1801 _h
Name	TPDO 2 communication parameter
Object code	RECORD
Data type	PDO communication parameter record
Category	Mandatory

Table 7 — 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 to 06 _h
Default value	Manufacturer-specific
Sub-index	01 _h
Description	COB-ID
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	4000 0280 _h + node-ID
Default value	4000 0280 _h + node-ID

Attribute	Value
Sub-index	02 _h
Description	Transmission type
Entry category	Mandatory
Access	rw
PDO mapping	Optional
Value range	See /CiA301/
Default value	01 _h
Sub-index	03 _h
Description	Inhibit time
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See /CiA301/
Default value	0000 _h
Sub-index	05 _h
Description	Event timer
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See /CiA301/
Default value	0000 _h
Sub-index	06 _h
Description	Sync start value
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See /CiA301/
Default value	0000 _h

Table 8 specifies the object description of the PDO mapping parameter and Table 9 specifies the associated entry description. The values are defined in /CiA301/.

Table 8 — Object description

Attribute	Value
Index	1A01 _h
Name	TPDO 2 mapping parameter
Object code	RECORD
Data type	PDO mapping parameter record
Category	Mandatory

Table 9 — 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
Sub-index	01 _h
Description	1 st application object
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	See /CiA301/
Default value	6007 01 10 _h
Sub-index	02 _h
Description	2 nd application object
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	See /CiA301/
Default value	6007 02 10 _h
Sub-index	03 _h
Description	3 rd application object
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	See /CiA301/
Default value	600F 01 10 _h
Sub-index	04 _h
Description	4 th application object
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	See /CiA301/
Default value	600A 00 10 _h

5.4 Third TPDO

This TPDO shall be transmitted to the extruder controller only if one of the measured values is available (see object 6010_h). In that case all mapped objects are mandatory.

Table 10 specifies the object description of the PDO communication parameter and Table 11 specifies the associated entry description. The values are defined in /CiA301/.

Table 10 — Object description

Attribute	Value
Index	1802 _h
Name	TPDO 3 communication parameter
Object code	RECORD
Data type	PDO communication parameter record
Category	Mandatory

Table 11 — 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 to 05 _h
Default value	Manufacturer-specific
Sub-index	01 _h
Description	COB-ID
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	4000 0380 _h + node-ID
Default value	4000 0380 _h + node-ID
Sub-index	02 _h
Description	Transmission type
Entry category	Mandatory
Access	rw
PDO mapping	Optional
Value range	See /CiA301/
Default value	01 _h
Sub-index	03 _h
Description	Inhibit time
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See /CiA301/
Default value	0000 _h

Attribute	Value
Sub-index	05 _h
Description	Event timer
Entry category	Optional
Access	rw
PDO mapping	No
Value range	See /CiA301/
Default value	0000 _h

Table 12 specifies the object description of the PDO mapping parameter and Table 13 specifies the associated entry description. The values are defined in /CiA301/.

Table 12 — Object description

Attribute	Value
Index	1A02 _h
Name	TPDO 3 mapping parameter
Object code	RECORD
Data type	PDO mapping parameter record
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	02 _h
Default value	02 _h
Sub-index	01 _h
Description	1 st application object
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	See /CiA301/
Default value	600D 01 10 _h
Sub-index	02 _h
Description	2 nd application object
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	See /CiA301/
Default value	600D 02 10 _h

5.5 First RPDO

This RPDO shall be received from the extruder controller.

Table 14 specifies the object description of the PDO communication parameter and Table 15 specifies the associated entry description. The values are defined in /CiA301/.

Table 14 — Object description

Attribute	Value
Index	1400 _h
Name	RPDO 1 communication parameter
Object code	RECORD
Data type	PDO communication parameter record
Category	Mandatory

Table 15 — 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	COB-ID
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	4000 0200 _h + node-ID
Default value	4000 0200 _h + node-ID
Sub-index	02 _h
Description	Transmission type
Entry category	Optional
Access	rw
PDO mapping	Optional
Value range	See /CiA301/
Default value	01 _h

Table 16 specifies the object description of the PDO mapping parameter and Table 17 specifies the associated entry description. The values are defined in /CiA301/.

Table 16 — Object description

Attribute	Value
Index	1600 _h
Name	RPDO 1 mapping parameter
Object code	RECORD
Data type	PDO mapping parameter record
Category	Mandatory

Table 17 — Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	No
Default value	04 _h
Sub-index	01 _h
Description	1 st application object
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	See /CiA301/
Default value	6020 01 10 _h
Sub-index	02 _h
Description	2 nd application object
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	See /CiA301/
Default value	6020 02 10 _h
Sub-index	03 _h
Description	3 rd application object
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	See /CiA301/
Default value	6020 03 10 _h

Attribute	Value
Sub-index	04 _h
Description	4 th application object
Entry category	Optional
Access	const
PDO mapping	No
Value range	See /CiA301/
Default value	6020 04 10 _h

6 Application object specification

6.1 Object 6007_h: Actual flow rates

This object shall provide an array with actual flow rates. The value shall be given in 0,1 l/min.

Table 18 specifies the object description and Table 19 specifies the entry description.

Table 18 – Object description

Attribute	Value
Index	6007 _h
Name	Actual flow rates
Object code	ARRAY
Data type	UNSIGNED16
Category	Mandatory

Table 19 – Entry description

Attribute	Value
Sub-index	00 _h
Description	Highest sub-index supported
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	02 _h to 0A _h
Default value	No
Sub-index	01 _h
Description	Actual flow rate 1
Entry category	Mandatory
Access	ro
PDO mapping	Default
Value range	UNSIGNED16
Default value	No

Attribute	Value
Sub-index	02 _h
Description	Actual flow rate 2
Entry category	Mandatory
Access	ro
PDO mapping	Default
Value range	UNSIGNED16
Default value	No
to	
Sub-index	03 _h
Description	Actual flow rate 3
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED16
Default value	No
to	
Sub-index	0A _h
Description	Actual flow rate 10
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	UNSIGNED16
Default value	No

6.2 Object 6008_h: Flow rate set value

This object shall indicate the flow rate set value send by the master-extruder. The values in sub-index 02_h to sub-index 0B_h shall be given in 0,1 l/min. Positive values shall indicate the regular flow, negative values shall not be used.

Table 20 specifies the object description and Table 21 specifies the entry description.

Table 20 – Object description

Attribute	Value
Index	6008 _h
Name	Flow rate set value
Object code	RECORD
Data type	Set process data
Category	Optional

Table 21 – 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 to 0A _h
Default value	Manufacturer-specific
Sub-index	01 _h
Description	Controller on/off
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	See /CiA420-1/
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Set process data 1
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	Manufacturer-specific
Sub-index	03 _h
Description	Set process data 2
Entry category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	Manufacturer-specific
to	
Sub-index	0B _h
Description	Set process data 10
Entry category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	Manufacturer-specific

6.3 Object 6009_h: Height adjustment

This object shall indicate an array for height adjustment values configured by the extruder (e.g. the distance from the center-line to the bottom of the product). The values shall be given

in 0,1 mm. Positive values shall be given if the distance is above the centerline, and negative values shall be given if the distance is below the centerline.

Table 22 specifies the object description and Table 23 specifies the entry description.

Table 22 – Object description

Attribute	Value
Index	6009 _h
Name	Height adjustment
Object code	ARRAY
Data type	INTEGER16
Category	Optional

Table 23– Entry description

Attribute	Value
Sub-index	00 _n
Description	Highest sub-index supported
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	01 _n to 0A _n
Default value	Manufacturer-specific
Sub-index	01 _n
Description	Height adjustment 1
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	0000 _h
Sub-index	02 _n
Description	Height adjustment 2
Entry category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	0000 _h
to	
Sub-index	0A _n
Description	Height adjustment 10
Entry category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	0000 _h

6.4 Object 600A_n: Actual force

This object shall provide the actual force, given by extraction of product (e.g. pipe or profile). This force is measured between puller and calibration unit. The value shall be given in 0,01 kN. Positive values shall indicate a force from puller to calibration-table, negative values shall indicate the other direction.

Table 24 specifies the object description and Table 25 specifies the entry description.

Table 24 – Object description

Attribute	Value
Index	600A _n
Name	Actual force
Object code	VAR
Data type	INTEGER16
Category	Mandatory

Table 25 – Entry description

Attribute	Value
Sub-index	00 _n
Access	ro
PDO mapping	Default
Value range	INTEGER16
Default value	No

6.5 Object 600B_n: Actual temperature

This object shall provide an array with actual temperatures. The value shall be given in 0,1 °C per bit. Negative values shall indicate negative temperatures.

Table 26 specifies the object description and Table 27 specifies the entry description.

Table 26 – Object description

Attribute	Value
Index	600B _n
Name	Actual temperature
Object code	ARRAY
Data type	INTEGER16
Category	Optional

Table 27 – Entry description

Attribute	Value
Sub-index	00 _n
Description	Highest sub-index supported
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	01 _n to 0A _n
Default value	Manufacturer-specific

Attribute	Value
Sub-index	01 _h
Description	Actual temperature 1
Entry category	Mandatory
Access	ro
PDO mapping	Optional
Value range	INTEGER16
Default value	No
to	
Sub-index	02 _h
Description	Actual temperature 2
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER16
Default value	No
to	
Sub-index	0A _h
Description	Actual temperature 10
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER16
Default value	No

6.6 Object 600C_h: Temperature set value

This object shall indicate the temperature set value send by the master-extruder. The values in sub-index 02_h to sub-index 0B_h shall be given in 0,1 °C. Negative values means negative temperature.

Table 28 specifies the object description and Table 29 specifies the entry description.

Table 28 – Object description

Attribute	Value
Index	600C _h
Name	Temperature set value
Object code	RECORD
Data type	Set process data
Category	Optional

Table 29 – 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 to 0A _h
Default value	Manufacturer-specific
Sub-index	01 _h
Description	Controller on/off
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	See /CiA420-1/
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Set temperature 1
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	Manufacturer-specific
Sub-index	03 _h
Description	Set temperature 2
Entry category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	Manufacturer-specific
to	
Sub-index	0B _h
Description	Set temperature 10
Entry category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	Manufacturer-specific

6.7 Object 600D_n: Actual vacuum value

This object shall provide an array with actual vacuum values from vacuum tank. The value shall be given in 1 mbar. Positive values shall indicate negative pressures; negative values shall indicate positive pressures.

Table 30 specifies the object description and Table 31 specifies the entry description.

Table 30 – Object description

Attribute	Value
Index	600D _n
Name	Actual vacuum value
Object code	ARRAY
Data type	INTEGER16
Category	Optional

Table 31 – Entry description

Attribute	Value
Sub-index	00 _n
Description	Highest sub-index supported
Entry category	Mandatory
Access	const
PDO mapping	No
Value range	02 _n to 0A _n
Default value	Manufacturer-specific
Sub-index	01 _n
Description	Actual vacuum 1
Entry category	Mandatory
Access	ro
PDO mapping	Default
Value range	INTEGER16
Default value	No
Sub-index	02 _n
Description	Actual vacuum 2
Entry category	Mandatory
Access	ro
PDO mapping	Default
Value range	INTEGER16
Default value	No

Attribute	Value
Sub-index	03 _h
Description	Actual vacuum 3
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER16
Default value	No
to	
Sub-index	0A _h
Description	Actual vacuum 10
Entry category	Optional
Access	ro
PDO mapping	Optional
Value range	INTEGER16
Default value	No

6.8 Object 600E_h: Vacuum set value

This object shall indicate the vacuum set value send by the master-extruder. The values in sub-index 02_h to sub-index 0B_h shall be given in 1 mbar. Positive values shall indicate negative pressures; negative values shall indicate positive pressures.

Table 32 specifies the object description and Table 33 specifies the entry description.

Table 32 – Object description

Attribute	Value
Index	600E _h
Name	Vacuum set value
Object code	RECORD
Data type	Set process data
Category	Optional

Table 33 – 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 to 0A _h
Default value	Manufacturer-specific

Attribute	Value
Sub-index	01 _h
Description	Controller on/off
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	See /CiA420-1/
Default value	Manufacturer-specific
Sub-index	02 _h
Description	Set process data 1
Entry category	Mandatory
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	Manufacturer-specific
Sub-index	03 _h
Description	Set process data 2
Entry category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	Manufacturer-specific
to	
Sub-index	0A _h
Description	Set process data 10
Entry category	Optional
Access	rw
PDO mapping	No
Value range	INTEGER16
Default value	Manufacturer-specific

6.9 Object 600F_h: Actual water pressures

This object shall provide an array with actual water pressure values. The value shall be given in 0,1 bar. Table 34 specifies the object description and Table 35 specifies the entry description.

Table 34 – Object description

Attribute	Value
Index	600F _h
Name	Actual water pressures
Object code	ARRAY
Data type	UNSIGNED16
Category	Mandatory

Table 35 – 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 0A _h
Default value	Manufacturer-specific
Sub-index	01 _h
Description	Actual pressure 1
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
Sub-index	02 _h
Description	Actual pressure 2
Entry category	Optional
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No
to	
Sub-index	0A _h
Description	Actual pressure 10
Entry category	Optional
Access	ro
PDO mapping	No
Value range	UNSIGNED16
Default value	No

6.10 Object 6010_h: Configuration word

This object shall provide the configured functionality. Figure 1 specifies the structure of sub-index 01_h (configuration word 1) and Table 36 defines the values.

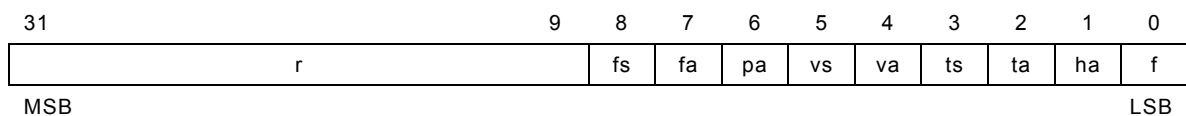
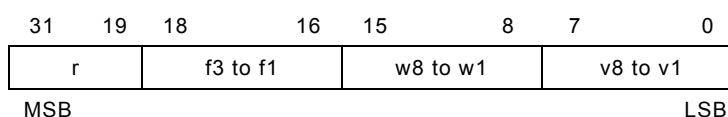


Figure 1 — Structure of sub-index 01_h

Table 36 — Value definition

Signal	Value	Definition
f (Actual extraction force)	0 _b 1 _b	Force measuring not available Force measuring available
ha (height adjustment)	0 _b 1 _b	Height adjustment not available Height adjustment available
ta (actual temperatures)	0 _b 1 _b	Temperature measuring not available Temperature measuring available
ts (set temperatures)	0 _b 1 _b	Temperature setting not available Temperature setting available
va (actual vacuum values)	0 _b 1 _b	Vacuum measuring not available Vacuum measuring available
vs (set vacuum values)	0 _b 1 _b	Vacuum setting not available Vacuum setting available
pa (actual pressure values)	0 _b 1 _b	Pressure measuring not available Pressure measuring available
fa (actual flow rates)	0 _b 1 _b	Flow rate measuring not available Flow rate measuring available
fs (set flow rates)	0 _b 1 _b	Flow rate setting not available Flow rate setting available
r	Reserved; always 0	

Figure 2 specifies the structure of sub-index 02_h (configuration word 2) and Table 37 defines the values.


Figure 2 — Structure of sub-index 02_h
Table 37 — Value definition

Signal	Value	Definition
v1, ..., v8 (start/stop function of vacuum pumps)	0 _b 1 _b	Vacuum pump not available Vacuum pump available
w1, ..., w8 (start/stop function of water pump)	0 _b 1 _b	Water pump not available Water pump available
f1, ..., f3 (auxiliary function)	0 _b 1 _b	Auxiliary function not available Auxiliary function available
r	Reserved; always 0	

Table 38 specifies the object description and Table 39 specifies the entry description.

Table 38 – Object description

Attribute	Value
Index	6010 _h
Name	Configuration word
Object code	ARRAY
Data type	UNSIGNED32
Category	Mandatory

Table 39 – 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	Configuration word 1
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	See value definition
Default value	No
Sub-index	02 _h
Description	Configuration word 2
Entry category	Mandatory
Access	ro
PDO mapping	No
Value range	See value definition
Default value	No

6.11 Object 6020_h: Control word

This object shall indicate the commands transmitted by the extruder. Figure 3 specifies the structure of sub-index 01_h (control word 1) and Table 40 defines the values.

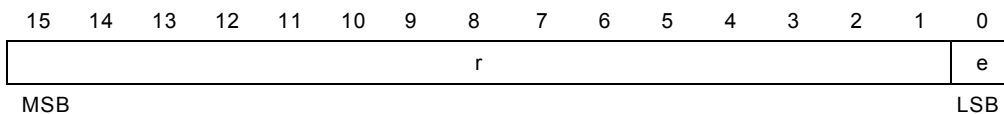


Figure 3 — Structure of sub-index 01_h

Table 40 — Value definition

Signal	Value	Definition
e (extruder run)	0 _b 1 _b	Extruder stopped (default value) Extruder is running
r (reserved)	Reserved; always 0	

Figure 4 specifies the structure of sub-index 02_h (control word 2) and Table 41 defines the values.

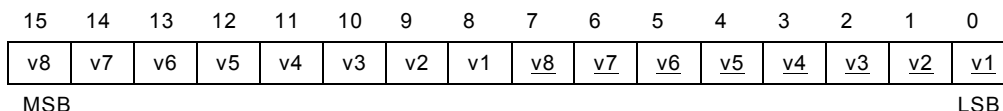


Figure 4 — Structure of sub-index 02_h

Table 41 — Value definition

Signal	Value	Definition
v1 to v8 (vacuum pump 1 to vacuum pump 8)	0 _b 1 _b	No command (default value) Stop function (start prevention)
v1 to v8 (vacuum pump 1 to vacuum pump 8)	0 _b 1 _b	No command (default value) Start function

Figure 5 specifies the structure of sub-index 03_h (control word 3) and Table 42 defines the values.

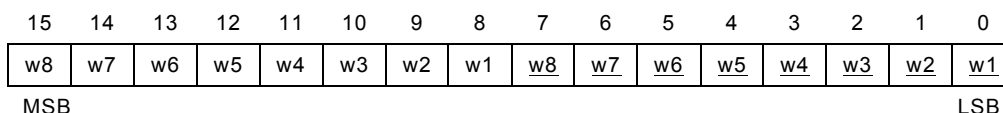


Figure 5 — Structure of sub-index 03_h

Table 42 — Value definition

Signal	Value	Definition
w1 to w8 (water pump 1 to water pump 8)	0 _b 1 _b	No command (default value) Stop function (start prevention)
w1 to w8 (water pump 1 to water pump 8)	0 _b 1 _b	No command (default value) Start function

Figure 6 specifies the structure of sub-index 04_h (control word 4) and Table 43 defines the values.

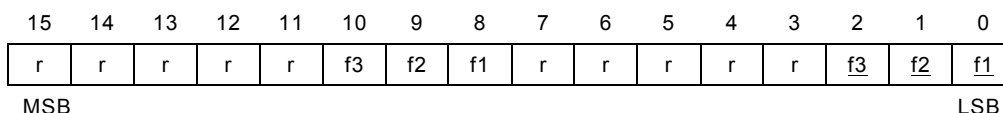


Figure 6 — Structure of sub-index 04_h

Table 43 — Value definition

Signal	Value	Definition
f1 to f3 (function 1 to function 3)	0 _b 1 _b	No command (default value) Stop function (start prevention)
f1 to f3 (function 1 to function 3)	0 _b 1 _b	No command (default value) Start function
r (reserved)	Reserved; always 0	

Table 44 specifies the object description and Table 45 specifies the entry description.

Table 44 – Object description

Attribute	Value
Index	6020 _h
Name	Control word
Object code	ARRAY
Data type	UNSIGNED16
Category	Mandatory

Table 45 – 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
Sub-index	01 _h
Description	Control word 1
Entry category	Mandatory
Access	rw
PDO mapping	Default
Value range	See value definition
Default value	0000 _h
to	
Sub-index	04 _h
Description	Control word 4
Entry category	Mandatory
Access	rw
PDO mapping	Default
Value range	See value definition
Default value	0000 _h

6.12 Object 6030_h: Status word

This object shall provide the status transmitted to the master-extruder. Figure 7 specifies the structure of sub-index 01_h (status word 1) and Table 46 defines the values.

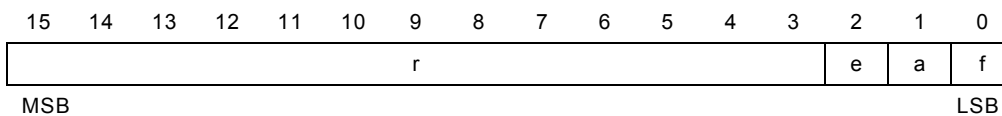
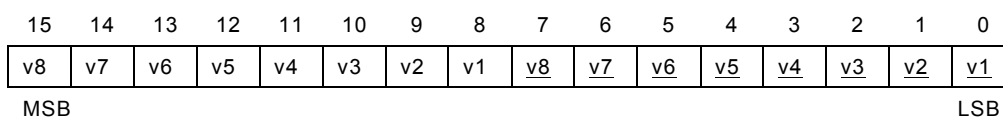


Figure 7 — Structure of sub-index 01_h

Table 46 — Value definition

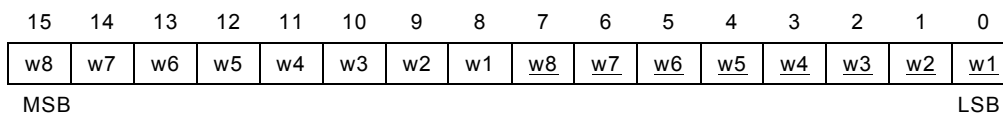
Signal	Value	Definition
f (fault downstream equipment)	0 _b 1 _b	No fault Fault
a (alarm downstream equipment)	0 _b 1 _b	No alarm Alarm
e (enable extruder)	0 _b 1 _b	Extruder shall stop and start is not allowed Extruder enabled to run
r (reserved)	Reserved; always 0	

Figure 8 specifies the structure of sub-index 02_h (status word 2) and Table 47 defines the values.


Figure 8 — Structure of sub-index 02_h
Table 47 — Value definition

Signal	Value	Definition
v1 to v8 (vacuum pump 1 to vacuum pump 8)	0 _b 1 _b	Function is not running Function is running
v1 to v8 (vacuum pump 1 to vacuum pump 8)	0 _b 1 _b	Function is blocked Function is ready to start

Figure 9 specifies the structure of sub-index 03_h (status word 3) and Table 48 defines the values.


Figure 9 — Structure of sub-index 03_h
Table 48 — Value definition

Signal	Value	Definition
w1 to w8 (water pump 1 to water pump 8)	0 _b 1 _b	Function is not running Function is running
w1 to w8 (water pump 1 to water pump 8)	0 _b 1 _b	Function is blocked Function is ready to start

Figure 10 specifies the structure of sub-index 04_h (status word 4) and Table 49 defines the values.

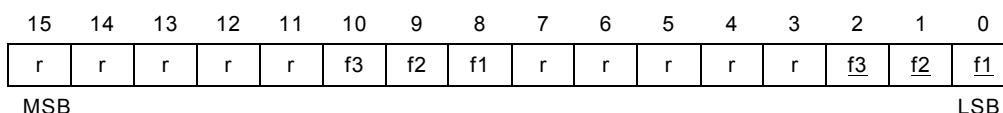

Figure 10 — Structure of sub-index 04_h

Table 49 — Value definition

Signal	Value	Definition
f1, ..., f3 (function 1 to function 3)	0 _b 1 _b	Function is not running Function is running
f1, ..., f3 (function 1 to function 3)	0 _b 1 _b	Function is blocked Function is ready to start
r (reserved)	Reserved; always 0	

Table 50 specifies the object description and Table 51 specifies the entry description.

Table 50 – Object description

Attribute	Value
Index	6030 _h
Name	Status word
Object code	ARRAY
Data type	UNSIGNED16
Category	Mandatory

Table 51 – 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
Sub-index	01 _h
Description	Status word 1
Entry category	Mandatory
Access	ro
PDO mapping	Default
Value range	See value definition
Default value	No
to	
Sub-index	04 _h
Description	Status word 4
Entry category	Mandatory
Access	Ro
PDO mapping	Default
Value range	See value definition
Default value	No