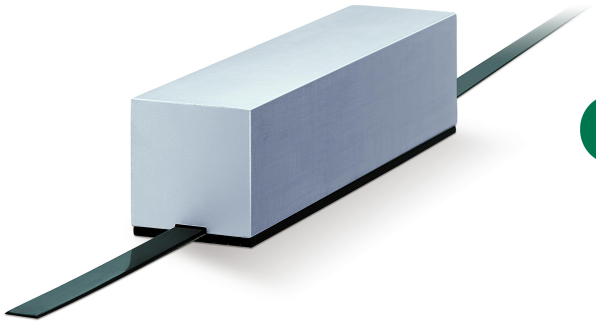
User manual

SMAL-CB-...
(CANopen®, DS406)

Description

This manual describes the products of SMAL series.
The purpose of this system is to measure linear displacements on lift system and on automation systems. The device is composed by a sensor with an integrated conversion electronic that moving along the magnetic tape, generates a signal equivalent to an absolute encoder.
The sensor has to be matched with MTAL magnetic tape.



CANopen
DS406 - Device profile for encoder

Chapters

1 - Safety summary

Safety

- observe the professional safety and accident prevention regulations applicable to your country during device installation and operation;
- installation has to be carried out by qualified personnel only, without power supply and stationary mechanics parts;
- the device must be used only for the purpose appropriate to its design;
- high current, voltage and rotating parts can cause serious or fatal injury.

Electrical safety

- switch OFF the voltage before connecting the device;
- connect according to instructions of "Electrical connections";
- according to the 89/336/CEE norm on electromagnetic compatibility, following precautions must be taken:

  - before handling and installing, discharge electrical charge from your body and tools which may come in touch with the device;
  - power supply must be stable without noise, install EMC filters on device power supply if needed;
  - always use shielded and twisted cables if possible;
  - avoid cables runs longer than necessary;
  - avoid running the signal cable near high voltage power cables;
  - mount the device as far as possible from any capacitive or inductive noise source, shield the device from noise source if needed;
  - minimize noise by connecting shield or connector housing to ground (GND). Make sure that ground (GND) is not affected by noise. The shield connection point to ground can be situated both on the device side and on user's side. The best solution to minimize the interference must be carried out by the user.

Mechanical safety

- install according to the section "Mounting instructions" with stationary mechanics parts;
- do not disassemble the device;
- do not tool the device;
- do not subject the device to knocks or shocks;
- protect the system against solvents and substances damaging it;
- respect the environmental characteristics of the product;
- be sure that the system is mounted where hard or sharp objects (e.g. metal chips) do not come into contact with the magnetic tape and the bottom of the sensor head. If these conditions cannot be avoided provide a wiper or pressurized air.

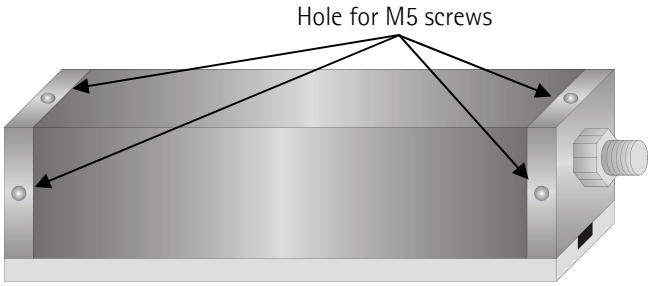
2 - Identification

The device can be identified by the label's data (ordering code, serial number). This information is listed in the delivery document. For technical features of the product, refer to the technical catalogue.

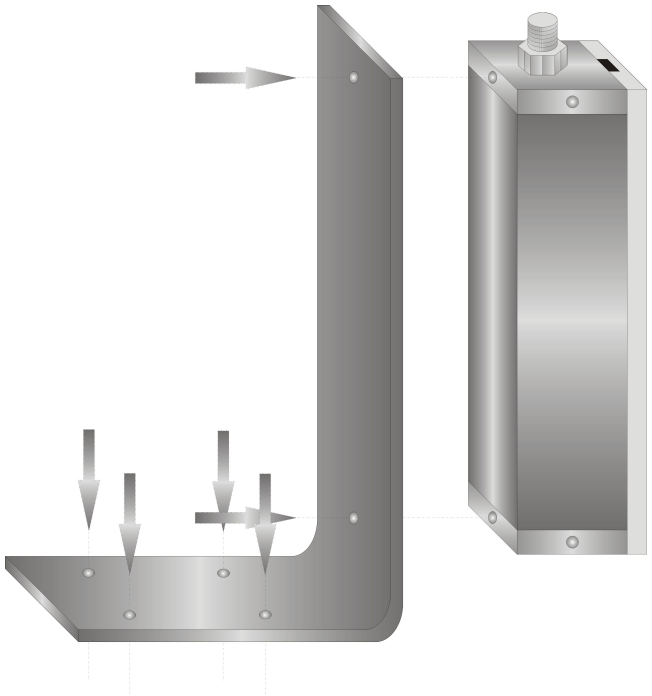
3 - Mounting instructions

3.1 Sensor mounting

Do not tool the device.



A - Fix the device to the square with M5 screws.
B - Connect the cable.
C - Put the square at the cabin roof adjusting the overhangs according to the desired working position and then fix it.

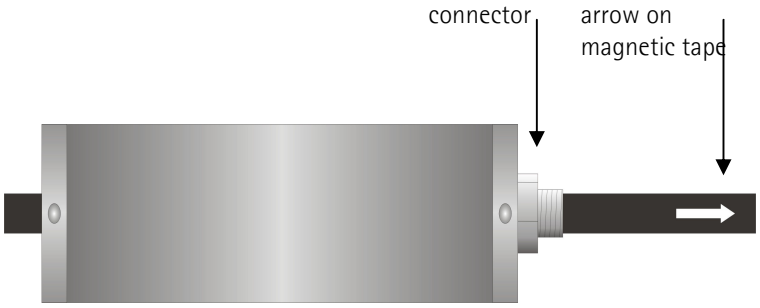


3.2 Magnetic tape

The magnetic tape must be insert on the device hole and fixed at the ends of the lift vane. The magnetic tape must be free to slide into device.

The active side of magnetic tape (black side), however installed, has to face the active part of magnetic sensor on electronic board

Install sensor and magnetic tape according to the above figure. The arrow shows positive counting direction.
The system doesn't work if mounted incorrectly.



4 - Quick reference

The device position can be read using default parameters.
Follow the steps below:

- read measuring step;
- set "operational" mode;
- read position (cyclic mode and/or sync mode).

Default Baud rate and Node-ID are:
Baud rate = 500 Kbit/s
Node-ID = 1

Read measuring step

Master → SMAL

COB-ID	Cmd	Index		Sub	Process data			
601	40	01	65	00	-	-	-	-

SMAL → Master

COB-ID	Cmd	Index		Sub	Process data			
581	43	01	65	00	40	42	0F	00
					Low	...		High

→ 000F 4240hex = 1 000 000nm =1mm

Set Operational mode

Master → SMAL

COB-ID	Cmd	Nodo
000	01	01

Read position every 100ms

SMAL → Master

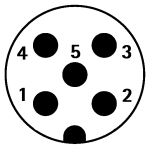
COB-ID	Byte 0	Byte 1	Byte 2	Byte 3
181	Low	...	...	High

5 - Electrical connections

ATTENTION:
minimize noise by connecting shield or device body to ground (GND). Make sure that ground (GND) is not affected by noise. It's recommended to provide the ground connection as close as possible to the device.

M12	Colour	Description
2	Red	+10Vdc +30Vdc Supply voltage
3	Black	0 Vdc Supply voltage
4	White	CAN_H
5	Blue	CAN_L
1	Shield	CAN_Shield

M12 connector:
male, frontal side



5.1 LED indicator

Three LEDs show the status of the CAN interface following the table below:

GREEN LED 1	Description
ON	Power supply ON
OFF	Power supply OFF

RED LED 2	Description
ON	Bus off
Double flash	Node guarding error
Single flash	Warning limit reached
Blinking	Generic error or flash memory error
OFF	No error

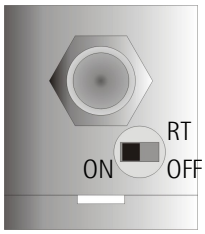
GREEN LED 3	Description
ON	The encoder is in state Operational
Single flash	The encoder is in state Stopped
Blinking	The encoder is in state Pre-Operational

During device initialization an hardware test is made to check if LEDs work correctly.

5.2 Bus termination

A resistor is provided under threaded cap (cable output side), which must be used as a line termination on the last device. To activate it slide the RT switch.

RT	Description
ON	if SMAL is last device of CANbus line
OFF	if SMAL is not last device of CANbus line



5.3 Baud rate

The bit rate can be set in software mode.
The bit rate is defined by the object 3000-00 of the Object Dictionary, it can be modified by SDO messages.
Default: Baud rate = 500 Kbit/s

5.4 Node number

The node number can be set in software mode.
Permissible addresses lie between 1 and 127.
The node number is defined by the object 3001-00 of the Object Dictionary, it can be modified by SDO messages.
Default: Node-ID = 1

ATTENTION:
At first start up, the master device has to detect the baud rate of the slave (scanning of baud rate). Once communication has been established a different baud rate and a node number can be set (objects 3000h and 3001h). After setting transmit a "reset node" command and store parameters.
To avoid conflict between Slaves, this operation should be carried out only with one device connected to the network.

6 - CANopen® interface (DS 406)

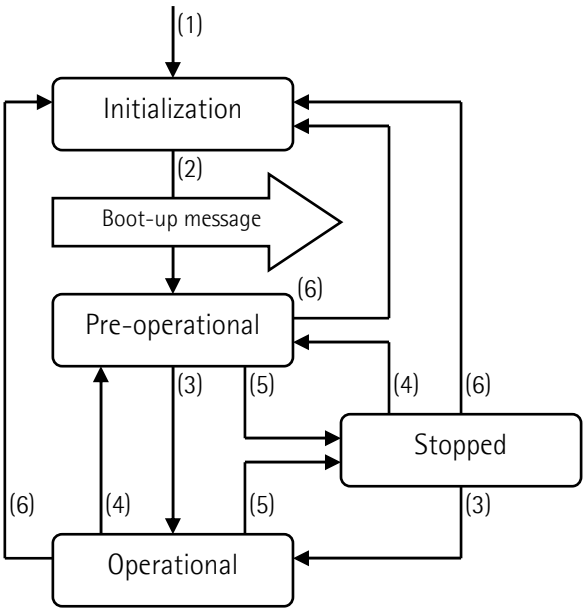
Lika devices are always slave units and they respect the "Device profile for encoders", Class 2.
For every omitted specify, refer to the documents "CiA Draft Standard 301" and "CiA Draft Standard 406" available on www.can-cia.org.

6.1 EDS file

CANopen® devices are supplied with EDS file **Lika_SMAL_DS406_V1.eds** (see enclosed support or **www.lika.biz > PRODUCTS > LINECOD > SMAL**).
Install EDS file on CANopen® master device.

6.2 State machine

The CANopen® device provide a state working, the device may be switched in different state sending a specific NMT message.
The state diagram is show below:



(1)	Power on
(2)	State initialization finished, the boot-up message is sent automatically
(3)	NMT message: "Start remote node"
(4)	NMT message: "Enter pre-operational"
(5)	NMT message: "Stop remote node"
(6)	NMT message: "Reset node" or "Reset comm."

6.2.1 Initialization

This is the first state the CANopen® device enters after power-on or hardware reset. After finishing the basic CANopen® device initialization the device read the parameters stored in EPROM, than the device send a boot-up message and enters autonomously into the "Pre-operational" state.

6.2.2 Pre-operational

In this state communication via SDOs is possible. PDOs do not exist, so PDO communication is not allowed. Configuration of PDOs and parameters may be performed by a configuration application.
The device may be switched into the Operational state directly by sending a "Start remote node" message.

6.2.3 Operational

In this state all communication objects are active. The constructor uses the parameters as described in the object dictionary and may sent process data using PDO. Object dictionary access via SDO is possible.
The device may be switched into the Pre-operational state directly by sending a "Enter pre-operational" message.

6.2.4 Stopped

In this state the device is forced to stop the communication altogether (except node guarding, if active). PDO and SDO communications are not allowed.
The device may be switched into the Operational state or Pre-operational state directly by sending the specific NMT message.

6.3 Communication objects

There are 4 type of communication messages:

- Network management NMT: the NMT master controls the NMT state of the NMT slaves.
- Process Data Objects PDO: used to transfer the real-time data.
- Service Data Object SDO: used to provide direct access to entries of a CANopen® devices object dictionary.
- Special Function Object:
  - SYNC: provides the basic network synchronization mechanism. After this service the consumers may sent real-time data.
  - Emergency: object transmitted only once per error event.
  - Nodeguard: used to know the slave status.

Relation between device states and communication objects:

	Initial.	Pre-oper.	Operat.	Stopped
NMT		X	X	X
PDO			X	
SDO		X	X	
Sync			X	
Emerg		X	X	
Boot-up	X			
Nodeg.		X	X	X

6.3.1 Pre-defined connection set

Master → Slave broadcast		
COB (Object) Kind	Function code (binary)	COB-ID (hex)
NMT	0000	000
SYNC	0001	080

pear-to-pear object		
EMERGENCY	0001	081 - 0FF
PDO 1 (tx)	0011	181 - 1FF
PDO 2 (tx)	0101	281 - 2FF
PDO 3 (tx)	0111	381 - 3FF
SDO (tx)	1011	581 - 5FF
SDO (rx)	1100	601 - 67F
Nodeguard	1110	701 - 77F
Boot-up	1110	701 - 77F

"COB kind" (tx or rx) is seen from the slave device point of view.

6.4 NMT objects

NMT structure:

COB-ID (11 bit)	
Func.code	Node ID
0000	0

2 CAN Data Bytes	
Command	Slave ID
NMT Func.	Slave ID

if Slave ID = 00h, the NMT message is directed to all network node.

Command	NMT Function	Status node
01 hex	Start remote node	Operational
02 hex	Stop remote node	Stopped
80 hex	Enter pre-operational	Pre-operational
81 hex	Reset node	Pre-operational
82 hex	Reset communication	Pre-operational

6.5 Boot-up objects

Boot-up message structure:

COB-ID(hex)	1 CAN Data Byte
700+Node ID	00

6.6 PDO objects

PDO(tx) messages are always composed by 4 CAN Data Bytes and they are used from the encoder to transmit the position value.
PDO structure:

IDENTIFIER	
COB-ID(hex)	
F.C.	Node-ID

4 CAN Data Bytes			
Byte 0	Byte 1	Byte 2	Byte 3
2^7 - 2^0	2^{15} - 2^8	2^{23}- 2^{16}	2^{31}- 2^{24}
Low	...	...	High

3 kind of PDO are defined:

PDO1 Cyclic mode: cyclic transmission.
The device uses the PDO1 to transmit the position value periodically and independently from the Master.
The cycle time is defined by the parameter "Cyclic Time" (object 6200h).
To activate (or deactivate) cyclic mode it's necessary to set to 0 (or 1) the most significant bit of COB-ID used by the PDO1 (object 1800h, sub 1).

PDO2 and **PDO3** Sync mode: synchronous transmission.
The transmission is managed by the Master by sending a SYNC message.
The SYNC is a high-priority COB transmitted by the Master to request the position value of Slave.
If several nodes (slave) are connected to a network, the Master receives the position values in order of Node nr.

The SMAL can programmed to reply after a number "n" of SYNC messages by setting a counter.
The PDO will be transmitted after having received "n" SYNC messages.
For PDO2 the value "n" of counter must be specified in object 1801h, sub 2.
For PDO3 refer to object 1802h, sub 2.

The transmission SYNC can be enabled (or disabled) setting to "0" (or "1") the most significant bit (MSB) of COB-IB used by PDO (object 1801h / 1802h, sub1).

NOTE:
More than one transmission mode can be active at the same time.

6.7 SDO objects

SDOs messages are used to read or modify Slave parameters. These parameters are described in the "Object dictionary".
Max 4 bytes are used for CAN data, other 4 bytes are used for Command, Index and Sub-index fields. SDOs are always followed by confirmation.
When the Master sends a SDO to a Slave, it always replies (with Warning in case of error).

SDO structure:

IDENTIFIER	
COB-ID(hex)	
F.C.	Node-ID

from 4 to 8 CAN data bytes							
0	1	2	3	4	5	6	7
Com	Index		Sub	Data			
1 byte	LSB	MSB	1 byte	LSB	...	...	MSB

Com command
Index parameter index
Sub parameter sub-index
Data parameter value

6.7.1 Command

The command byte contains the type of telegram transmitted on the CAN network.
Three types of telegram are available:

- Set: to send configuration parameters to a device;
- Req: used by Master to read data from a device;
- Warnings: used by Slave to send error messages to the Master (e.g. index does not exist, ...).

Command	COB	COB type	Data length
22h	Set	M → S request	not spec.
23h	Set	M → S request	4 byte
2Bh	Set	M → S request	2 byte
2Fh	Set	M → S request	1 byte
60h	Set	S → M confirmation	0 byte
40h	Req	M → S request	0 byte
42h	Req	S → M reply	not spec.
43h	Req	S → M reply	4 byte
4Bh	Req	S → M reply	2 byte
4Fh	Req	S → M reply	1 byte
41h	Req	S → M reply segmented SDO	
80h	Warning	S → M reply	4 byte

6.8 Object dictionary

Each implemented object is listed as follows:

Index-subindex Object name [data types, attribute]

- Index and subindex are in hexadecimal values.
- Attribute:
  ro = read only access
  rw = read and write access

Unsigned16 data type:

Data bytes	
byte 4	byte 5
LSByte	MSByte

Unsigned32 data type:

Data bytes			
byte 4	byte 5	byte 6	byte 7
LSByte	...	...	MSByte

6.8.1 Standard objects (DS 301)

1000-00 Device type [Unsigned32, ro]
Default = 0008 0196h: absolute linear encoder, DS 406

1001-00 Error register [Unsigned8, ro]
In case of error bit 0 of this object is set to "1".
Default = 00h

1003 Pre-defined error field
This object contains the last 4 errors which have generated an emergency message.

- **00** Number of actual errors [Unsigned8, rw]
  (write 00h to delete the error history)
- **01** Last error occurred [Unsigned32, ro]
- **02-04** Previous errors occurred[Unsigned32, ro]

1005-00 COB_ID SYNC message [Unsigned32, rw]
Default = 0000 0080h

1008-00 Manufacturer device name [String, ro]
Contains the name of device manufacturer.
Default = "Lika"

1009-00 Hardware version [String, ro]
Contains the hardware version of device.

100A-00 Software version [String, ro]
Contains the software version of device.

100C-00 Guard time [Unsigned16, rw]
Contains the Guard time expressed in msec (milliseconds)
Default = 03E8h

100D-00 Life time factor [Unsigned8, rw]
Default = 05h

"Guard time" and "Life time factor" objects are used in "Node guarding protocol" controlled by Master. For more details see chapter 6.11.

1010-01 Store parameters [Unsigned32, rw]
Use this object to save all parameters in non-volatile memory.
Write "save" in the data bytes:

Master → Slave

COB-ID	Cmd	Index		Sub	Data bytes			
600+ID	23	10	10	01	73	61	76	65

Slave → Master (confirmation)

COB-ID	Cmd	Index		Sub	Data bytes			
580+ID	60	10	10	01	00	00	00	00

1011-01 Restore default parameters [Unsig32, rw]
With this object all parameters are restored to default values.
Write "load" in the data bytes and perform a "Reset node" command:

Master → Slave

COB-ID	Cmd	Index		Sub	Data bytes			
600+ID	23	11	10	01	6C	6F	61	64

Slave → Master (confirmation)

COB-ID	Cmd	Index		Sub	Data bytes			
580+ID	60	11	10	01	00	00	00	00

Master → Slave (reset node)

COB-ID	Cmd	Slave ID
000	81	ID

Slave → Master (Boot-up)

COB-ID	Cmd
700+ID	00

NOTE:
Save default values with the "Store parameters" function (see object 1010h).

1014-00 COB-ID EMCY [Unsigned32, rw]
This object defines the COB-ID used for emergency messages (EMCY).
Default = 80h+NodeID

1015-00 Inhibit time EMCY [Unsigned16, rw]
Inhibit time of emergency messages (EMCY) expressed in multiples of 100 µs.
Default = 32h

1018 Identification object
- **01** Vendor number [Unsigned32, ro]
- **02** Product number [Unsigned32, ro]
- **03** Revision number [Unsigned32, ro]

1800 PDO1 parameters
PDO1 is used by default for cyclic transmission of the position value.
See object 6200h for setting of cyclic timer.

- **01** COB-ID of PDO1 [Unsigned32, rw]
  Default = 4000 0180h+NodeID (no RTR, COB-ID)
- **02** Transmission type [Unsigned8, rw]
  Default = FEh (cyclic transmission)

1801 PDO2 parameters
PDO2 is used by default for synchronous transmission of the position value.

- **01** COB-ID of the PDO2 [Unsigned32, rw]
  Default = 4000 0280h+NodeID (no RTR, COB-ID)
- **02** Transmission type [Unsigned8, rw]
  Default = 01h(synchr. transmission each SYNC)

1802 PDO3 parameters
PDO3 is used by default for synchronous transmission of the position value.

- **01** COB-ID of the PDO3 [Unsigned32, rw]
  Default = C000 0380h+NodeID (disable, no RTR)
- **02** Transmission type [Unsigned8, rw]
  Default = 01h (synchr. transmission each SYNC).

NOTE:
- The transmission of PDO1, PDO2 and PDO3 can be enabled (or disabled) setting to "0" (or "1") the most significant bit (MSB) used by PDO (object 180xh, sub1).
- Cyclic transmission or synchronous transmission can be modified setting the object 180xh sub 2:
  01h: synchronous transmission each SYNC;
  02h: synchronous transmission after 2 SYNC;
  ...
  FEh: cyclic transmission.

1A00-01 PDO1 mapping parameter [Unsig32, rw]
This object contains the mapped position value of the encoder according to the DS406 device profile.
Default = 6004 0020h

1A01-01 PDO2 mapping parameter [Unsig32, rw]
See object 1A00h, sub1.

1A02-01 PDO3 mapping parameter [Unsig32, rw]
See object 1A00h, sub1.

5.8.2 Manufacturer specific objects

2104-00 Limit switch min [Unsigned32, rw]
This object can be used to set a software limit switch min. (-).
If the encoder position is below the value set in this object, bit 12 of object 6500h will be set to "1".
To enable this function set bit 12 of object 6000h to "1".
Default = 0000 0010h

2105-00 Limit switch max [Unsigned32, rw]
This object can be used to set a software limit switch max. (+).
If the encoder position is higher than the value set in this object, bit 13 of obj. 6500h will be set to "1".
To enable this function set bit 13 of object 6000h to "1".
Default = 003F FFF0h

3000-00 Baud rate [Unsigned8, rw]
This object can be used to set the baud rate (transmission rate) according to the following table:

Data byte	Baud rate
00h	20 Kbit/s
01h	50 Kbit/s
02h	100 Kbit/s
03h	125 Kbit/s
04h	250 Kbit/s
05h	(default) 500 Kbit/s
06h	800 Kbit/s
07h	1000 Kbit/s

The correct procedure to change the baud rate is:
- set object 3000h
- send a "reset node" (or "reset communication"),
- store parameter.

Master → Slave

COB-ID	Cmd	Index		Sub	Data byte
600+ID	2F	00	30	00	see table

Slave → Master (confirmation)

COB-ID	Cmd	Index		Sub	Data byte
580+ID	60	00	30	00	00

Master → Slave (reset node)

COB-ID	Cmd	Slave ID
000	81	ID

Set the Master device to the new baud rate:

Slave → Master (Boot-up with new baud rate)

COB-ID	Cmd
700+ID	00

NOTE:
Store parameters (see object 1010h), to save the new baud rate value.

3001-00 Node-ID [Unsigned8, rw]
This object defines the node identifier of the device.

The correct procedure to change the Node-ID is:
- set object 3001h
- send a "reset node"
- store parameter.

Default = 01h

Master → Slave

COB-ID	Cmd	Index		Sub	Data byte
600+ID	2F	01	30	00	new Node-ID

Slave → Master (confirmation)

COB-ID	Cmd	Index		Sub	Data byte
580+ID	60	01	30	00	00

Master → Slave (reset node)

COB-ID	Cmd	Slave ID
000	81	old ID

Slave → Master (Boot-up with new Node-ID)

COB-ID	Cmd
700+ID	00

NOTE:
Store parameters (see object 1010h) to save the new Node-ID value.

6.8.3 Device profile objects (DS 406)

6000-00 Operating parameters [Unsigned16, rw]

Bit	Function	bit = 0	bit = 1
0...1	not used		
2	Scaling function	disable	enable
3	Measuring direction	standard	inverted
4...11	not used		
12	Limit switch min	disable	enable
13	Limit switch max	disable	enable
14...15	not used		

Default = 0000h

- Measuring direction defines which device direction increase or decrease the position value.
- Scaling function: if disable the device uses the physical resolution (see object 6501-00 and default value of objects 6002-00), if enable it uses the value set on objects 6002-00 and 6005-01.

6001-00 Total measuring range [Unsig32, rw]
See object 6002h.

6002-00 Total measuring range [Unsigned32, rw]
This object sets the number of distinguishable steps over the total measuring range.
To enable this function set to "1" the bit 2 of object 6000h.
Possible value are equal or less than "total hardware measuring range".
Default = 0008 0000h (hardware measuring range)

6003-00 Preset value [Unsigned32, rw]
This object allows to set the encoder position to a Preset value.
The preset value must not exceed the total measuring range.

6004-00 Position value [Unsigned32, ro]
This object contains the position value. The value is transmitted according to the settings in objects 1800h, 1801h and 1802h.

6005-01 Position step setting [Unsigned32, rw]
This object defines the measuring step setting, it shall be given in 0.001µm. To enable this function set to "1" the bit 2 of object 6000h.
Eg.: 1mm= 1 000 000nm = 000F 4240hex
ATTENTION: object 6005 ≥ object 6501.

6200-00 Cyclic time [Unsigned16, rw]
Cyclic timer is used to set a time between two following PDO transmissions during cyclic transmission.
Default = 0064h (100ms)

6500-00 Operating status [Unsigned16, ro]

Bit	Function	bit = 0	bit = 1
0...1	not used		
2	Scaling function	Disable	Enable
3	Measuring direction	Standard	Inverted
4...11	not used		
12	Limit switch min	posit. > obj_2104	posit. < obj_2104
13	Limit switch max	posit. < obj_2105	posit. > obj_2105
14	not used		
15	Actual operating status	Stop/ Pre-oper.	Operat.

- Limit switch min/max:
  to use these functions, bits 12 and 13 of object 6000 must be set to "1".

- Actual operating status:
  use this function to know the actual operating status (see chapter 6.2):
  bit 15 = 0: "Stopped" or "Pre-operational" state;
  bit 15 = 1: "Operational" state.

6501-00 Measuring step [Unsigned32, ro]
This object defines the measuring step that is output by the device. The measuring step is given in nanometer [nm].
To use different value see object 6005-01.

6502-00 Number of revolution [Unsigned16, ro]
Default = 0001h (not used)

6504-00 Supported alarms [Unsigned16, ro]
Default = 0000h (no supported alarms)

6506-00 Supported warnings [Unsigned16, ro]
Default = 0000h (no supported warnings)

6507-00 Profile and software version [Unsig32, ro]
Contains the profile and software version.
Profile version for encoders = 3.1
Software version = 1.1
Default = 0301 0101h

6508-00 Operating time [Unsigned32, ro]
Default = FFFF FFFFh (not used)

6509-00 Offset value [Integer32, ro]
This object contains the Offset value. This value is the shift (difference) between physical position of the device and position relative to the Preset value.

650A-01 Manufacturer offset value [Integer32,ro]
Default = 0000 0000h (not used)

650B-00 Serial number [Unsigned32, ro]
Default = FFFF FFFFh (not used)

NOTE:
Save new values with the "Store parameters" function (see object 1010h) otherwise they will be lost in case of commands like "Reset node", "Reset communication" or power off.

6.9 Warning objects

In order to know the meaning of warning message make reference to the document "CiA Draft Standard 301" on chapter "SDO abort codes" available on www.can-cia.org.

6.10 Emergency objects

Emergency (EMCY) objects are transmitted by the device when an internal error occurs.

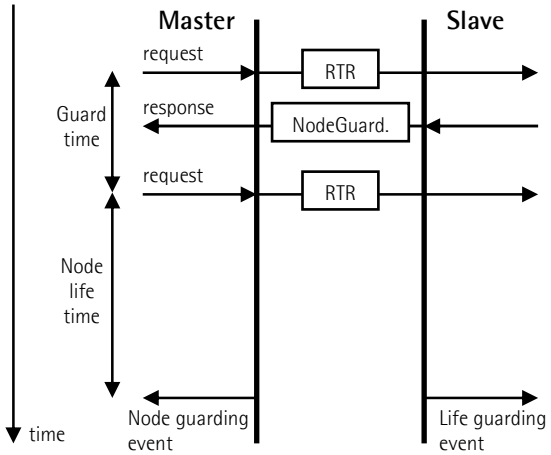
EMCY structure:

IDENTIFIER	CAN Data Byte			
COB-ID(hex)	0	1	2	3...7
see object 1014h	Error code		Sub of error register	Specific code
	LSB	MSB	01	00...00

Defined error codes:
1000h = Node guarding error
5530h = Flash memory error

6.11 Node guarding protocol

On start up the "Node guarding protocol" is disabled, the Master device can enable the protocol by sending an RTR (remote transmit request).



Guard time: time between 2 RTR.
Node life time: max device response time.

"Node life time" = "Obj_100C" * "Obj_100D"
"Node guarding" is enabled if "Node life time" ≠ 0.
If the Slave is not guarded within the "Node life time", it warns with a "Life Guarding Event".
The red LED indicates the Node guarding error, objects 1001h and 1003h are updated and error message is sent.
To remove the error send a "Reset node" command.

7 - Setup

The following pages show examples of transmission between a Master and a Slave device.
A generic value "ID" is used to indicate the encoder address. All values are hexadecimal.

Set Operational, Pre-operational status

Messaggio NMT Master → Slave

	COB-ID	Cmd	Nodo
Operational:	000	01	ID
Pre-operational:	000	80	ID

Set Position step setting (eg. 1mm = 1000000nm = 000F 4240h)

Master → Slave (Set request)

COB.ID	Cmd	Index		Sub	Data bytes			
600+ID	23	05	60	01	40	42	0F	00

Slave → Master (Set confirmation)

COB.ID	Cmd	Index		Sub	Data bytes			
580+ID	60	05	60	01	00	00	00	00

Set Operating parameter

(Scaling function: enable, measuring direction: standard, limit switch: disable)

Master → Slave (Set request)

COB.ID	Cmd	Index		Sub	Data bytes			
600+ID	2B	00	60	00	04	00	-	-

Slave → Master (Set confirmation)

COB.ID	Cmd	Index		Sub	Data bytes			
580+ID	60	00	60	00	00	00	-	-

Set Preset value (preset = 1000 = 03E8h)

Master → Slave (Set request)

COB.ID	Cmd	Index		Sub	Data bytes			
600+ID	23	03	60	00	E8	03	00	00

Slave → Master (Set confirmation)

COB.ID	Cmd	Index		Sub	Data bytes			
580+ID	60	03	60	00	00	00	00	00

Set SYNC counter (n = 5 = 05h)

Master → Slave (Set request)

COB.ID	Cmd	Index		Sub	Data bytes			
600+ID	2F	01	18	02	05	-	-	-

Slave → Master (Set confirmation)

COB.ID	Cmd	Index		Sub	Data bytes			
580+ID	60	01	18	02	00	-	-	-

Disable Sync mode

Read COB-ID used by PDO2:

Master → Slave (Req request)

COB.ID	Cmd	Index		Sub	Data bytes			
600+ID	40	01	18	01	-	-	-	-

Slave → Master (Req reply)

COB.ID	Cmd	Index		Sub	Data bytes			
580+ID	43	01	18	01	B0	B1	B2	B3

COB-ID used by PDO2 = ((B3<<24) | (B2<<16) | (B1<<8) | B0)
set to 1 the most significant bit:

```
B3 |= 0x80;
```

Set new COB-ID used by PDO2:

Master → Slave (Set request)

COB.ID	Cmd	Index		Sub	Data bytes			
600+ID	23	01	18	01	B0	B1	B2	B3

Slave → Master (Set confirmation)

COB.ID	Cmd	Index		Sub	Data bytes			
580+ID	60	01	18	01	00	00	00	00

Enable Cyclic mode
Set cyclic time (100ms = 64h)

Master → Slave (Set request)

COB.ID	Cmd	Index		Sub	Data bytes			
600+ID	2B	00	62	00	64	00	-	-

Slave → Master (Set confirmation)

COB.ID	Cmd	Index		Sub	Data bytes			
580+ID	60	00	62	00	00	00	-	-

Read COB-ID used by PDO1:

Master → Slave (Req request)

COB.ID	Cmd	Index		Sub	Data bytes			
600+ID	40	00	18	01	-	-	-	-

Slave → Master (Req reply)

COB.ID	Cmd	Index		Sub	Data bytes			
580+ID	43	00	18	01	B0	B1	B2	B3

COB-ID used by PDO1 = ((B3<<24) | (B2<<16) | (B1<<8) | B0)
set to 0 the most significant bit:

```
B3 &= 0x7F;
```

Set new COB-ID used by PDO1:

Master → Slave (Set request)

COB.ID	Cmd	Index		Sub	Data bytes			
600+ID	23	00	18	01	B0	B1	B2	B3

Slave → Master (Set confirmation)

COB.ID	Cmd	Index		Sub	Data bytes			
580+ID	60	00	18	01	00	00	00	00

NOTE:
Save new values with the "Store parameters" function (see object 1010h) otherwise they will be lost in case of commands like "Reset node", "Reset communication" or power off.

Man.Vers.	Description
1.0	1st issue
1.1	Chapter 4.4 up to date
1.2	General revision
1.3	Chapter 5 up to date

lika

Lika Electronic
Via S. Lorenzo, 25 - 36010 Carrè (VI) - Italy

Tel. +39 0445 806600
Fax +39 0445 806699

Italy : eMail info@lika.it - www.lika.it
World : eMail info@lika.biz - www.lika.biz