POWERTRACK
CANOPEN USER MANUAL

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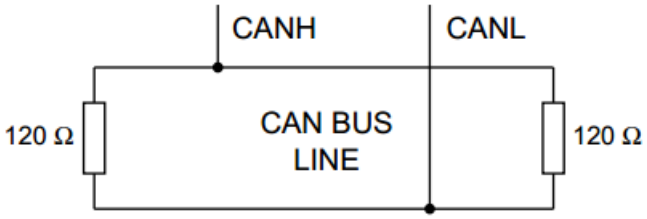
1. How to connect Deutsch 4 pin:

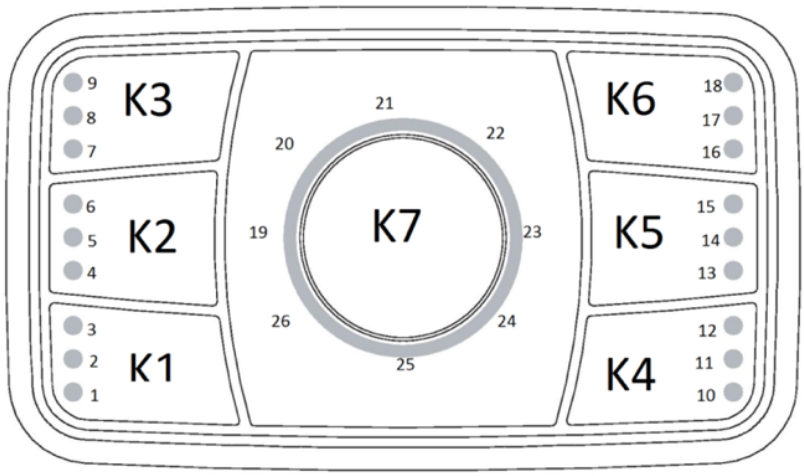
PIN	COLOUR	FUNCTION
1	Blue	CAN L
2	White	CAN H
3	Black	Negative battery
4	Red	Vbatt. (12-24V)



Each end of the CAN bus is terminated with 120Ω resistors in compliance with the standard to minimize signal reflections on the bus. You may need to place a 120Ω resistor between CAN-L and CAN-H.

2. Reference

PowerTrack



3. Default settings

Setting	Default state or level	How to change
Baud Rate	125 kbit/s	Object 2010h
CANopen Node ID	15h	Object 2013h
CANopen Node State	Stop	NMT message start CANopen node
LED Indicator Brightness	3Fh (Maximum brightness 3Fh)	Object 2003h
Backlight Brightness	00h (OFF)	Object 2003h
Periodic Message Transmission	Disable	Object 1800h
Heartbeat Message	Disable	Object 1017h
Boot-up service	Active	Object 2011h

NMT MESSAGES

The Network Management messages follow a master-slave structure. Through NMT services, CANopen devices are initialized, started, reset or stopped. All CANopen devices are regarded as NMT slaves. NMT messages have CAN-ID always equal to 00h.

4. Start CANopen node (keypad activation message)

Identifier	00h	
Byte 0	01h	Start CANopen node
Byte 1	XXh	Keypad CAN ID 00h: start all the keypads 15h: start the keypad with CAN ID = 15h.
Byte 2, 7	00h	Not used

Example:

Direction	**Identifier**	**Format**	**Message**
To Keypad	0	Std	01 5

5. Enter pre-operational

Identifier	00h	
Byte 0	80h	Enter pre-operational
Byte 1	XXh	Keypad CAN ID 00h: enter all the keypads 15h: enter the keypad with CAN ID = 15h.
Byte 2, 7	00h	Not used

Example:

Direction	**Identifier**	**Format**	**Message**
To Keypad	0	Std	80 15

6. Reset CANopen node

Identifier	00h	
Byte 0	81h	Reset CANopen node
Byte 1	XXh	Keypad CAN ID 00h: reset all the keypads 15h: reset the keypad with CAN ID = 15h.
Byte 2, 7	00h	Not used

Example:

Direction	Identifier	Format	Message
To Keypad	0	Std	81 15

7. Stop CANopen node

Identifier	00h	
Byte 0	XXh	02h: Stop CANopen node
Byte 1	YYh	Keypad CAN ID 00h: stop all the keypads 15h: stop the keypad with CAN ID = 15h.
Byte 2, 7	00h	Not used

Example:

Direction	Identifier	Format	Message
To Keypad	0	Std	02 15

8. Boot-up service

This service is used to signal that a NMT slave has entered the NMT state Pre-operational.

Identifier	700h + current CAN ID	Default 715h
Byte 0	00h	One data byte is transmitted with value 0.

Example:

Direction	Identifier	Format	Message
From Keypad	715h	Std	00h

The keypad with CAN ID 15h has entered the NMT state Pre-operational.

PDO messages

PDO (Process Data Object) are fast telegram messages that can simply manage most important functions. There are no answers for this kind of messages. Each PDO message has an equivalent Service Data Object (SDO) message

9. Keys and Encoder state message

The keypad must be activated, see NMT Start CANopen Node message.

This message is sent by the PowerTrack to indicate the state of the buttons and of the encoder.

The state of the buttons is transmitted in the Byte 0.

The state of the encoder is represented by 2 counter fields:

- The Direction counter (Byte1) transmits the number of ticks and the direction of the encoder rotation since the last message sent. The MSB of the counter defines the direction.
- The Tick counter (Byte 2 and 3) is a two bytes counter incremented each clockwise tick and decremented each counterclockwise tick.

Identifier	195h (180 + current CAN ID)	Default 195h
Byte 0	Keys from #1 to #7 0 K7 K6 K5 – K4 K3 K2 K1	Keys: 1=ON; 0=OFF
Byte 1	Encoder Direction counter X Y Y Y Y Y Y Y b	X = 0 clockwise, X = 1 counterclockwise. YYYYYYY = number of Ticks. 1 Turn (360° rotation) = 20 Ticks
Byte 2,3	Encoder Tick counter ZZ ZZh	
Byte 4,7	00h	Not used

Examples:

Direction	Identifier	Format	Data	Key and Encoder state
From Keypad	195	Std	00 00 00 00 00 00 00 00	No key pressed, no knob turns
From Keypad	195	Std	01 00 00 00 00 00 00 00	Key 1 pressed, no knob turns
From Keypad	195	Std	08 00 00 00 00 00 00 00	Key 4 pressed, no knob turns
From Keypad	195	Std	09 00 00 00 00 00 00 00	Keys 1 and 4 pressed, no knob turn
From Keypad	195	Std	00 81 FF FF 00 00 00 00	No key pressed, 1 tick CCW
From Keypad	195	Std	00 01 03 00 00 00 00 00	No key pressed, 3 ticks CW
From Keypad	195	Std	00 01 01 00 00 00 00 00	No key pressed, 1 tick CW
From Keypad	195	Std	01 00 03 0 00 00 00 00	Key 1 pressed, 3 ticks CW
From Keypad	195	Std	09 00 02 00 00 00 00 00	Keys 1 and 4 pressed, 2 ticks CW

Keys and Encoder state message is mapped into:

- Object 2000h sub 1
- Object 2000h sub 2
- Object 2000h sub 3

Refer to the applicable object for more details.

10. Set LED on message

The keypad must be activated, see NMT Start CANopen Node message.

Identifier	215h (200 + current CAN ID)	Default 215h
Byte 0	LG8 LG7 LG6 LG5 - LG4 LG3 LG2 LG1	KEY LED green
Byte 1	LG16 LG15 LG14 LG13 – LG12 LG11 LG10 LG9	KEY LED green
Byte 2	LR4 LR3 LR2 LR1– 0 0 LG18 LG17	KEY LED green and red
Byte 3	LR12 LR11 LR10 LR9 – LR8 LR7 LR6 LR5	KEY LED red
Byte 4	0 0 LR18 LR17 – LR16 LR15 LR14 LR13	KEY LED red
Byte 5	LR26 LR25 LR24 LR23 – LR22 LR21 LR20 LR19	RING LED red
Byte6	LG26 LG25 LG24 LG23 – LG22 LG21 LG20 LG19	RING LED green
Byte 7	LB26 LB25 LB24 LB23 – LB22 LB21 LB20 LB19	RING LED blue

Examples:

Direction	Identifier	Format	Data	LED
To Keypad	215	Std	00 00 00 00 00 00 00 00	Turn off all the LED
To Keypad	215	Std	01 00 00 00 00 00 00 00	Only green LED #1 ON
To Keypad	215	Std	42 00 00 00 00 00 00 00	Green LED #2 and 7 ON
To Keypad	215	Std	00 00 00 30 03 00 00 00	Red LED #9, 10, 13 and 14 ON
To Keypad	215	Std	07 00 70 00 00 00 00 00	Amber LED #1, 2, 3 ON
To Keypad	215	Std	00 00 00 00 00 01 00 00	Red ring LED #19 ON
To Keypad	215	Std	00 00 00 00 00 00 02 00	Green ring LED #20 LED ON
To Keypad	215	Std	FF FF F3 FF 3F 00 00 00	All key LED amber ON
To Keypad	215	Std	00 00 00 00 00 FF FF FF	All ring LED white ON

Set LED state message is mapped into:

- Object 2001h sub 1 and sub 2
- Object 2002h sub 1, sub 2 and sub 3

Refer to the applicable objects for more details.

11. Set LED blink message

The keypad must be activated, see NMT Start CANopen Node message

Note: if the blink message is sent when the LED is already on, the LED blinks in alternate mode.

Identifier	315h (300 + current CAN ID)	Default 315h
Byte 0	LG8 LG7 LG6 LG5 - LG4 LG3 LG2 LG1	KEY LED green
Byte 1	LG16 LG15 LG14 LG13 – LG12 LG11 LG10 LG9	KEY LED green
Byte 2	LR4 LR3 LR2 LR1– 0 0 LG18 LG17	KEY LED green and red
Byte 3	LR12 LR11 LR10 LR9 – LR8 LR7 LR6 LR5	KEY LED red
Byte 4	0 0 LR18 LR17 – LR16 LR15 LR14 LR13	KEY LED red
Byte 5	LR26 LR25 LR24 LR23 – LR22 LR21 LR20 LR19	RING LED red
Byte6	LG26 LG25 LG24 LG23 – LG22 LG21 LG20 LG19	RING LED green
Byte 7	LB26 LB25 LB24 LB23 – LB22 LB21 LB20 LB19	RING LED blue

Examples:

Direction	Identifier	Format	Data	LED
To Keypad	315	Std	00 00 00 00 00 00 00 00	Turn off all the blinking LED
To Keypad	315	Std	78 00 00 00 00 00 00 00	Green LED #4, 5, 6 and 7 blink
To Keypad	315	Std	00 00 00 21 00 00 00 00	Red LED #5 and 10 blink
To Keypad	315	Std	03 00 30 00 00 00 00 00	Amber LED #1, 2 blink
To Keypad	315	Std	00 00 00 00 00 80 00 00	Red ring LED #26 blinks
To Keypad	315	Std	00 00 00 00 00 00 00 20	Blue ring LED #24 blinks
To Keypad	315	Std	00 00 00 00 00 00 01 01	Cyan ring LED #19 blinks
To Keypad **To Keypad**	215 315	Std Std	00 00 F0 FF 3F 00 00 00 FF FF F3 FF 3F 00 00 00	All key LED blink red and green in alternate mode
To Keypad **To Keypad**	215 315	Std Std	00 00 00 00 00 00 03 00 00 00 00 00 00 00 03 03	Ring LED #19 and 20 blink green and blue in alternate mode

Set LED Blink message is mapped into:

- Object 2001h sub 3 and sub 4
- Object 2002h sub 4, sub 5 and sub 6
- Refer to the applicable objects for more details.

12. Set Backlight brightness level message

The keypad must be activated, see NMT Start CANopen Node message

Identifier	415h (400 + current CAN ID)	Default 415h
Byte 0	XXh	Green Backlight value 0 – 3Fh (0…100%)
Byte 1	YYh	Red Backlight value 0 – 3Fh (0…100%)
Byte 2	ZZh	Blue Backlight value 0 – 3Fh (0…100%)
Byte 3, 7	00h	Not used

Examples:

Direction	Identifier	Format	Data	LED
To keypad	415	Std	00 00 00 00 00 00 00 00	Turn off the backlight
To keypad	415	Std	10 00 00 00 00 00 00 00	Turn on backlight green color at brightness 25%
To keypad	415	Std	20 20 00 00 00 00 00 00	Turn on backlight amber color at brightness 50%
To keypad	415	Std	00 00 3F 00 00 00 00 00	Turn on backlight blue color at maximum brightness

Set Backlight message is mapped into:

- Object 2001h sub 3
- Object 2001h sub 4

Refer to the applicable object for more details.

SDO Messages:

A SDO (Service Data Object) is providing direct access to object entries of a CANopen device's object dictionary.

13. Object 1000h: Device Type

Identifier	615h (600h + current CAN ID)	
Byte 0	40h	
Byte 1	00h	Read Device Register
Byte 2	10h	CAN Object 1000h
Byte 3	00h	
Byte 4, 7	00h	Not used

Example:

Direction	Identifier	Format	Message
To Keypad	615	Std	40 00 10 00 00 00 00 00
Keypad reply	595	Std	43 00 10 00 91 01 03 00

Device profile number 30191h.

14. Object 1001h: Error Register

This object is not yet implemented in the device.

15. Object 1008h: Manufacturer Device Name

Identifier	615h (600h + current CAN ID)	
Byte 0	40h	Read Device Register
Byte 1	08h	CAN Object 1008h
Byte 2	10h	
Byte 3, 7	00h	Not used

Odd additional byte

Identifier	615h (600h + current CAN ID)	
Byte 0	60h	Read Device Register Next Byte
Byte 1, 7	00h	Not used

Even additional byte

Identifier	615h (600h + current CAN ID)	
Byte 0	70h	Read Device Register Next Byte
Byte 1, 7	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 08 10 00 00 00 00 00	
Keypad reply	595	Std	41 08 10 00 19 00 00 00	
To Keypad	615	Std	60 00 00 00 00 00 00 00	
Keypad reply	595	Std	00 50 6F 77 65 72 54 72	PowerTr
To Keypad	615	Std	70 00 00 00 00 00 00 00	
Keypad reply	595	Std	10 61 63 6B 20 2D 20 42	ack - B
To Keypad	615	Std	60 00 00 00 00 00 00 00	
Keypad reply	595	Std	00 6C 69 6E 6B 20 4D 61	link Ma
To Keypad	615	Std	70 00 00 00 00 00 00 00	
Keypad reply	595	Std	17 72 69 6E 65 00 00 00	rine

Manufacturer Device Name: PowerTrack – Blink Marine

16. Object 1009h: Manufacturer Hardware Revision

Identifier	615h (600h + current CAN ID)	
Byte 0	40h	Read Device Register
Byte 1	09h	CAN Object 1009h
Byte 2	10h	
Byte 3, 7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 09 10 00 00 00 00 00	
Keypad reply	595	Std	43 09 10 00 33 30 20 56	V 03

Manufacturer Hardware Revision: V 03

17. Object 100Ah: Manufacturer Firmware Revision

Identifier	615h (600h + current CAN ID)	
Byte 0	40h	Read Device Register
Byte 1	0Ah	CAN Object 100Ah
Byte 2	10h	
Byte 3, 7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 0A 10 00 00 00 00 00	
Keypad reply	595	Std	43 0A 10 00 36 2E 31 56	V1.6

Manufacturer Firmware Revision: V1.6

18. Object 1017h: Producer heartbeat time

The producer heartbeat time shall indicate the configured cycle time of the heartbeat.

Identifier	600h + current CAN ID	Default 615h
Byte 0	40h	Read Device Register
	2Bh	Set device register
Byte 1	17h	CAN Object 1017h
Byte 2	10h	
Byte 3	00h	Sub index
Byte 4	YYh	YYh: Heartbeat time in milliseconds LSByte
Byte 5	XXh	XXh: Heartbeat time in milliseconds MSByte
Byte 5, 7	00h	Not used

Heartbeat time: XXYYh (from 000Ah to FFFEh: 10ms to 65534 milliseconds).

Examples:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 17 10 00 00 00 00 00	Read heartbeat time
Keypad reply	595	Std	4B 17 10 00 64 00 00 00	Heartbeat time = 100ms
To Keypad	615	Std	2B 17 10 00 00 00 00 00	Switch off the heartbeat
Keypad reply	595	Std	60 17 10 00 00 00 00 00	
To Keypad	615	Std	2B 17 10 00 32 00 00 00	Set heartbeat time = 50ms
Keypad reply	595	Std	60 17 10 00 00 00 00 00	
To Keypad	615	Std	2B 17 10 00 F4 01 00 00	Set heartbeat time = 500ms
Keypad reply	595	Std	60 17 10 00 00 00 00 00	

Heartbeat message

The heartbeat mechanism for a CANopen device is established by cyclically transmitting the heartbeat message by the heartbeat producer. One or more CANopen devices in the network are aware of this heartbeat message. If the heartbeat cycle fails for the heartbeat producer, the local application on the heartbeat consumer will be informed about that event.

If a CANopen device starts with a value for the heartbeat producer time unequal to 0, the boot-up message is regarded as first heartbeat message.

Identifier	700h + current CAN ID	Default 715h
Byte 0	XXh	XXh: State of heartbeat producer 00h: Boot-up 04h: Stopped 05h: Operational 7Fh: Pre-operational

Examples:

Direction	Identifier	Format	Message	Data
From Keypad	715h	Std	00h	Boot up
From Keypad	715h	Std	7Fh	Pre-operational
To keypad	00h	Std	01h 15h	Start keypad with CAN id =15h
From Keypad	715h	Std	05h	Operational

19. Object 1018h: Identity Data

Identifier	615h (600h + current CAN ID)	
Byte 0	40h	Read Device Register
Byte 1	18h	CAN Object 1018h
Byte 2	10h	
Byte 3	00h	Number of mapped objects
	01h	Vendor Id
	04h	Serial number
Byte 4,7	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 18 10 00 00 00 00 00	
Keypad reply	595	Std	4F 18 10 00 04 00 00 00	4
To Keypad	615	Std	40 18 10 01 00 00 00 00	
Keypad reply	595	Std	43 18 10 01 E2 03 00 00	000003E2h

Blink Marine Vendor Id: 000003E2h

20. Object 1400h: Receive PDO Communication Parm 0

Describes the Receive Parameters for the LED state PDO Message.

Identifier	615h (600h + current CAN ID)	
Byte 0	40h	Read Device Register
Byte 1	00h	CAN Object 1400h
Byte 2	14h	
Byte 3	00h	Number of mapped objects
	01h	COB Id
	02h	Transmission Type
Byte 4,7	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 00 14 00 00 00 00 00	
Keypad reply	595	Std	4F 00 14 00 02 00 00 00	2
To Keypad	615	Std	40 00 14 01 00 00 00 00	
Keypad reply	595	Std	43 00 14 01 15 02 00 00	0000 0215h
To Keypad	615	Std	40 00 14 02 00 00 00 00	
Keypad reply	595	Std	4F 00 14 02 FE 00 00 00	FEh

Receive PDO communication Parm 0:

- Number of mapped objects: 2;
- COB id: 0000 0200h + NODE ID;
- Transmission Type: FEh.

21. Object 1401h: Receive PDO communication Parm 1

Describes the Receive Parameters for the LED blink PDO Message.

Identifier	615h (600h + current CAN ID)	
Byte 0	40h	Read Device Register
Byte 1	01h	CAN Object 1401h
Byte 2	14h	
Byte 3	00h	Number of mapped objects
	01h	COB Id
	02h	Transmission Type
Byte 4,7	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 01 14 00 00 00 00 00	
Keypad reply	595	Std	4F 01 14 00 02 00 00 00	2
To Keypad	615	Std	40 01 14 01 00 00 00 00	
Keypad reply	595	Std	43 01 14 01 15 03 00 00	0000 0315h
To Keypad	615	Std	40 01 14 02 00 00 00 00	
Keypad reply	595	Std	4F 01 14 02 FE 00 00 00	FEh

Receive PDO communication Parm 1:

- Number of mapped objects: 2;
- COB id: 0000 0300h + NODE ID;
- Transmission Type: FEh.

22. Object 1402h: Receive PDO communication Parm 2

Describes the Receive Parameters for the Backlight state PDO Message.

Identifier	615h (600h + current CAN ID)	
Byte 0	40h	Read Device Register
Byte 1	02h	CAN Object 1402h
Byte 2	14h	
Byte 3	00h	Number of mapped objects
	01h	COB Id
	02h	Transmission Type
Byte 4,7	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 0214 00 00 00 00 00	
Keypad reply	595	Std	4F 02 14 00 02 00 00 00	2
To Keypad	615	Std	40 02 14 01 00 00 00 00	
Keypad reply	595	Std	43 02 14 01 15 04 00 00	0000 0415h
To Keypad	615	Std	40 02 14 03 00 00 00 00	
Keypad reply	595	Std	4F 01 14 02 FE 00 00 00	FEh

Receive PDO communication Parm 2:

- Number of mapped objects: 2;
- COB id: 0000 0400h + NODE ID;
- Transmission Type: FEh.

23. Object 1600h: Receive PDO mapping Parameter 0

Describes the mapping of LED state PDO Message.

Identifier	615h (600h + current CAN ID)	
Byte 0	40h	Read Device Register
Byte 1	00h	CAN Object 1600h
Byte 2	16h	
Byte 3	00h	Number of mapped objects
	01h	PDO Mapping Entry 1
	02h	PDO Mapping Entry 2
	03h	PDO Mapping Entry 3
	04h	PDO Mapping Entry 4
	05h	PDO Mapping Entry 5
Byte 4,7	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 00 16 00 00 00 00 00	
Keypad reply	595	Std	4F 00 16 00 05 00 00 00	5
To Keypad	615	Std	40 00 16 01 00 00 00 00	
Keypad reply	595	Std	43 00 16 01 18 01 01 20	2001 01 18
To Keypad	615	Std	40 00 16 02 00 00 00 00	
Keypad reply	595	Std	43 00 16 02 18 02 01 20	2001 02 18
To Keypad	615	Std	40 00 16 03 00 00 00 00	
Keypad reply	595	Std	43 00 16 03 08 01 02 20	2002 01 08
To Keypad	615	Std	40 00 16 04 00 00 00 00	
Keypad reply	595	Std	43 00 16 04 08 02 02 20	2002 02 08
To Keypad	615	Std	40 00 16 05 00 00 00 00	
Keypad reply	595	Std	43 00 16 05 08 03 02 20	2002 03 08

Receive PDO mapping Parameter 0:

- Number of mapped objects: 5;
- Set KEY LED green: Object 2001h, Sub index 01h, Length 18h;
- Set KEY LED red: Object 2001h, Sub index 02h, Length 18h;
- Set RING LED green: Object 2002h, Sub index 01h, Length 08h;
- Set RING LED red: Object 2002h, Sub index 02h, Length 08h;
- Set RING LED blue: Object 2002h, Sub index 03h, Length 08h.

24. Object 1601h: Receive PDO mapping Parameter 1

Describes the mapping of LED blink state PDO Message.

Identifier	615h (600h + current CAN ID)	
Byte 0	40h	Read Device Register
Byte 1	01h	CAN Object 1601h
Byte 2	16h	
Byte 3	00h	Number of mapped objects
	01h	PDO Mapping Entry 1
	02h	PDO Mapping Entry 2
	03h	PDO Mapping Entry 3
	04h	PDO Mapping Entry 4
	05h	PDO Mapping Entry 5
Byte 4,7	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 01 16 00 00 00 00 00	
Keypad reply	595	Std	4F 01 16 00 05 00 00 00	5
To Keypad	615	Std	40 01 16 01 00 00 00 00	
Keypad reply	595	Std	43 01 16 01 18 03 01 20	2001 03 18
To Keypad	615	Std	40 01 16 02 00 00 00 00	
Keypad reply	595	Std	43 01 16 02 18 04 01 20	2001 04 18
To Keypad	615	Std	40 01 16 03 00 00 00 00	
Keypad reply	595	Std	43 01 16 03 08 04 02 20	2002 04 08
To Keypad	615	Std	40 01 16 04 00 00 00 00	
Keypad reply	595	Std	43 01 16 04 08 05 02 20	2002 05 08
To Keypad	615	Std	40 01 16 05 00 00 00 00	
Keypad reply	595	Std	43 01 16 05 08 06 02 20	2002 06 08

Receive PDO mapping Parameter 1:

- Number of mapped objects: 5;
- Blink KEY LED green: Object 2001h, Sub index 03h, Length 18h;
- Blink KEY LED red: Object 2001h, Sub index 04h, Length 18h;
- Blink RING LED green: Object 2002h, Sub index 04h, Length 08h;
- Blink RING LED red: Object 2002h, Sub index 05h, Length 08h;
- Blink RING LED blue: Object 2002h, Sub index 06h, Length 08h.

25. Object 1602h: Receive PDO mapping Parameter 2

Describes the mapping of backlight LED state PDO Message.

Identifier	615h (600h + current CAN ID)	
Byte 0	40h	Read Device Register
Byte 1	02h	CAN Object 1602h
Byte 2	16h	
Byte 3	00h	Number of mapped objects
	01h	PDO Mapping Entry 1
	02h	PDO Mapping Entry 2
	03h	PDO Mapping Entry 3
Byte 4,7	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 02 16 00 00 00 00 00	
Keypad reply	595	Std	4F 02 16 00 03 00 00 00	3
To Keypad	615	Std	40 02 16 01 00 00 00 00	
Keypad reply	595	Std	43 02 16 01 08 02 03 20	2003 02 08
To Keypad	615	Std	40 02 16 02 00 00 00 00	
Keypad reply	595	Std	43 02 16 02 08 03 03 20	2003 03 08
To Keypad	615	Std	40 02 16 03 00 00 00 00	
Keypad reply	595	Std	43 02 16 03 08 04 03 20	2003 04 08

Receive PDO mapping Parameter 2:

- Number of mapped objects: 3;
- Set backlights LED green: Object 2003h, Sub index 02h, Length 08h;
- Set backlights LED red: Object 2003h, Sub index 03h, Length 08h;
- Set backlights LED blue: Object 2003h, Sub index 04h, Length 08h.

26. Object 1800h:

a) Transmit PDO Communication Parm 0

Identifier	615h (600h + current CAN ID)	
Byte 0	40h	Read Device Register
Byte 1	00h	CAN Object 1800h
Byte 2	18h	
Byte 3	00h	Number of mapped objects
	01h	COB Id
	02h	Transmission Type
	05h	Event Timer
Byte 4,7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 00 18 00 00 00 00 00	
Keypad reply	595	Std	4F 00 18 00 05 00 00 00	5
To Keypad	615	Std	40 00 18 01 00 00 00 00	
Keypad reply	595	Std	43 00 18 01 95 01 00 00	195h
To Keypad	615	Std	40 00 18 02 00 00 00 00	
Keypad reply	595	Std	4F 00 18 02 FE 00 00 00	FEh
To Keypad	615	Std	40 00 18 05 00 00 00 00	
Keypad reply	595	Std	4B 00 18 05 00 00 00 00	0 = OFF

Transmit PDO communication Parm 0:

- Number of mapped objects: 2;
- Address base: 195h= 180h+ NODE ID;
- Transmission Type: FEh;
- Event timer: XXYY in milliseconds, 0 = OFF.

b) Set periodic state transmission

Identifier	600h + current CAN ID	Default 615h
Byte 0	2Bh	Set device register
Byte 1	00h	CAN Object 1800h
Byte 2	18h	
Byte 3	05h	Sub index
Byte 4	YYh	YYh: Event timer period in milliseconds LSByte
Byte 5	XXh	XXh: Event timer period in milliseconds MSByte
Byte 5, 7	00h	Not used

Event timer period: XXYYh (from 000Ah to FFFEh: 10ms to 65534 milliseconds).

Examples:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	2B 00 18 05 00 00 00 00	Switch off the periodic transmission
Keypad reply	595	Std	60 00 18 05 00 00 00 00	
To Keypad	615	Std	2B 00 18 05 32 00 00 00	Set period = 50ms
Keypad reply	595	Std	60 00 18 05 00 00 00 00	
To Keypad	615	Std	2B 00 18 05 F4 01 00 00	Set period = 500ms
Keypad reply	595	Std	60 00 18 05 00 00 00 00	

27. Object 1A00h Transmit PDO Mapping Parameter

Describes the mapping of KEY and Encoder state PDO Message.

Identifier	615h (600h + current CAN ID)	
Byte 0	40h	Read Device Register
Byte 1	00h	CAN Object 1A00h
Byte 2	1Ah	
Byte 3	00h	Number of mapped objects
	01h	PDO Mapping Entry 1
	02h	PDO Mapping Entry 2
	03h	PDO Mapping Entry 3
Byte 4,7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 00 1A 00 00 00 00 00	
Keypad reply	595	Std	4F 00 1A 00 03 00 00 00	3
To Keypad	615	Std	40 00 1A 01 00 00 00 00	
Keypad reply	595	Std	43 00 1A 01 08 01 00 20	2000 01 08h

Transmit PDO Mapping Parameter:

- Number of mapped objects: 3;
- Switch state: Object 2000h, Sub index 01h, Length 08h;
- Encoder direction counter: Object 2000h, Sub index 02h, Length 08h.
- Encoder tick counter: Object 2000h, Sub index 03h, Length 10h.

28. Object 2000h: Key and Encoder state

a) Sub 1 – Key State

This module contains all the button state information. A one indicates the button is pressed; a zero indicates the button is not pressed.

Identifier	615h (600h + current CAN ID)	
Byte 0	40h	Read Device Register
Byte 1	00h	CAN Object 2000h
Byte 2	20h	
Byte 3	01h	Sub index
Byte 4,7	00h	Not used

Examples:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 00 20 01 00 00 00 00	
Keypad reply	595	std	4F 00 20 00 01 00 00 00	No key pressed
			4F 00 20 01 01 00 00 00	Key K1 pressed
			4F 00 20 01 02 00 00 00	Key K2 pressed
			4F 00 20 01 04 00 00 00	Key K3 pressed
			4F 00 20 01 08 00 00 00	Key K4 pressed
			4F 00 20 01 10 00 00 00	Key K5 pressed
			4F 00 20 01 20 00 00 00	Key K6 pressed
			4F 00 20 01 40 00 00 00	Key K7 pressed
			4F 00 20 01 41 00 00 00	Keys K7 and K1 pressed
			4F 00 20 01 07 00 00 00	Keys K1, K2 and K3 pressed
			4F 00 20 01 7F 00 00 00	All keys pressed

b) Sub 2 - Encoder direction counter

This module contains the Encoder direction counter. The command works only in the pre-operational state.

Identifier	615h (600h + current CAN ID)	
Byte 0	40h	Read Device Register
Byte 1	00h	CAN Object 2000h
Byte 2	20h	
Byte 3	02h	Sub index
Byte 4,7	00h	Not used

Keypad reply:

Identifier	595h (580h + current CAN ID)	
Byte 0	4Fh	
Byte 1	00h	CAN Object 2000h
Byte 2	20h	
Byte 3	02h	Sub index
Byte 4	XXh	Bit 7: encoder direction • 0: Clockwise • 1: Counterclockwise Bit 0…6: Number of ticks
Byte 5,7	00h	Not used

The number of ticks is counted from the last encoder state message sent.

The counter is reset after the message is sent out.

Examples:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	40 00 20 02 00 00 00 00	
Keypad reply	595	Std	4F 00 20 02 00 00 00 00	No ticks completed
			4F 00 20 02 01 00 00 00	One tick clockwise
			4F 00 20 02 81 00 00 00	One tick counterclockwise
			4F 00 20 02 02 00 00 00	Two tick clockwise

c) Sub 3 - Encoder tick counter

The Tick counter is a two bytes counter incremented each clockwise tick and decremented each counterclockwise tick.

Identifier	615h (600h + current CAN ID)	
Byte 0	40h	Read Device Register
Byte 1	00h	CAN Object 2000h
Byte 2	20h	
Byte 3	03h	Sub index
Byte 4,7	00h	Not used

Keypad reply:

Identifier	**595h (580h + current CAN ID)**	
Byte 0	4Bh	
Byte 1	00h	CAN Object 2000h
Byte 2	20h	
Byte 3	03h	Sub index
Byte 4,5	XXXXh	Tick counter
Byte 6,7	00h	Not used

29. Object 2001h: LED state

a) Sub 1 – LED green state

Identifier	615h (600h + current CAN ID)	
Byte 0	27h	Set Device Register
Byte 1	01h	CAN Object 2001h
Byte 2	20h	
Byte 3	01h	Sub index
Byte 4	LG8 LG7 LG6 LG5 - LG4 LG3 LG2 LG1	LED green
Byte 5	LG16 LG15 LG14 LG13 – LG12 LG11 LG10 LG9	LED green
Byte 6	0 0 0 0 – 0 0 LG18 LG17	LED green
Byte 7	00h	Not used

Examples:

Direction	Identifier	Format	Data	LED
To Keypad	615	Std	27 01 20 01 00 00 00	Turn off all the LED green
To Keypad	615	Std	27 01 20 01 01 00 00	Green LED #1 ON
To Keypad	615	Std	27 01 20 01 05 00 00	Green LED #1 and 3 ON
To Keypad	615	Std	27 01 20 01 00 02 00	Green LED #10 ON
Keypad reply	595	Std	60 01 20 01 00 00 00	

b) Sub 2 - LED red state

Identifier	615h (600h + current CAN ID)	
Byte 0	27h	Set Device Register
Byte 1	01h	CAN Object 2001h
Byte 2	20h	
Byte 3	02h	Sub index
Byte 4	LR8 LR7 LR6 LR5 - LR4 LR3 LR2 LR1	LED red
Byte 5	LR16 LR15 LR14 LR13 – LR12 LR11 LR10 LR9	LED red
Byte 6	0 0 0 0 – 0 0 LR18 LR17	LED red
Byte 7	00h	Not used

Examples:

Direction	Identifier	Format	Data	LED
To Keypad	615	Std	27 01 20 02 00 00 00 00	Turn off all the LED red
To Keypad	615	Std	27 01 20 02 00 00 80 00	Red LED #16 ON
To Keypad	615	Std	27 01 20 02 41 00 00 00	Red LED #1 and 7 ON
To Keypad	615	Std	27 01 20 02 00 04 00 00	Red LED #11 ON
Keypad reply	595	Std	60 01 20 02 00 00 00 00	

c) Sub 3 - LED green blink state

Note: if the blink message is sent when the LED is already on, the LED blinks in alternate mode.

Identifier	615h (600h + current CAN ID)	
Byte 0	27h	Set Device Register
Byte 1	01h	CAN Object 2001h
Byte 2	20h	
Byte 3	03h	Sub index
Byte 4	LG8 LG7 LG6 LG5 - LG4 LG3 LG2 LG1	LED green blink
Byte 5	LG16 LG15 LG14 LG13 – LG12 LG11 LG10 LG9	LED green blink
Byte 6	0 0 0 0 – 0 0 LG18 LG17	LED green blink
Byte 7	00h	Not used

Examples:

Direction	Identifier	Format	Data	LED
To Keypad	615	Std	27 01 20 03 00 00 00 00	No LED green blink
To Keypad	615	Std	27 01 20 03 20 00 00 00	Green LED #6 blinks
To Keypad	615	Std	27 01 20 03 00 44 00 00	Green LED #11 and 15 blink
To Keypad	615	Std	27 01 20 03 00 00 03 00	Green LED #17 and 18 blink
Keypad reply	595	Std	60 01 20 03 00 00 00 00	

d) Sub 4 - LED red blink state

Note: if the blink message is sent when the LED is already on, the LED blinks in alternate mode.

Identifier	615h (600h + current CAN ID)	
Byte 0	27h	Set Device Register
Byte 1	01h	CAN Object 2001h
Byte 2	20h	
Byte 3	04h	Sub index
Byte 4	LR8 LR7 LR6 LR5 - LR4 LR3 LR2 LR1	LED red
Byte 5	LR16 LR15 LR14 LR13 – LR12 LR11 LR10 LR9	LED red
Byte 6	0 0 0 0 – 0 0 LR18 LR17	LED red
Byte 7	00h	Not used

Example:

Direction	Identifier	Format	Data	LED
To Keypad	615	Std	27 01 20 04 00 00 00 00	No LED red blink
To Keypad	615	Std	27 01 20 04 18 00 00 00	Red LED #4 and 5 blink
To Keypad	615	Std	27 01 20 04 00 21 00 00	Red LED #9 and 14 blink
To Keypad	615	Std	27 01 20 04 00 00 01 00	Red LED #17 blinks
Keypad reply	595	Std	60 01 20 04 00 00 00 00	

30. Object 2002h: LED RING state

The RING LEDs can be illuminated as indicator and backlight function as well. Each LED on the RING in off state (not used as indicator) will be illuminated according to the backlight command.

a) Sub 1 –RING LED green state

Identifier	615h (600h + current CAN ID)	
Byte 0	2Fh	Set Device Register
Byte 1	02h	CAN Object 2002h
Byte 2	20h	
Byte 3	01h	Sub index
Byte 4	LG26 LG25 LG24 LG23 – LG22 LG21 LG20 LG19	LED green
Byte 5,7	00h	Not used

Examples:

Direction	Identifier	Format	Data	LED
To Keypad	615	Std	2F 02 20 01 00 00 00 00	Turn off all the green LED
To Keypad	615	Std	2F 02 20 01 01 00 00 00	Green LED #19 ON
To Keypad	615	Std	2F 02 20 01 80 00 00 00	Green LED #26 ON
Keypad reply	595	Std	60 02 20 01 00 00 00 00	

b) Sub 2 –RING LED red state

Identifier	615h (600h + current CAN ID)	
Byte 0	2Fh	Set Device Register
Byte 1	02h	CAN Object 2002h
Byte 2	20h	
Byte 3	02h	Sub index
Byte 4	LR26 LR25 LR24 LR23 – LR22 LR21 LR20 LR19	LED red
Byte 5,7	00h	Not used

Examples:

Direction	Identifier	Format	Data	LED
To Keypad	615	Std	2F 02 20 02 00 00 00 00	Turn off all the red LED
To Keypad	615	Std	2F 02 20 02 10 00 00 00	Red LED #23 ON
To Keypad	615	Std	2F 02 20 02 04 00 00 00	Red LED #21 ON
Keypad reply	595	Std	60 02 20 02 00 00 00 00	

c) Sub 3 RING LED blue state

Identifier	615h (600h + current CAN ID)	
Byte 0	2Fh	Set Device Register
Byte 1	02h	CAN Object 2002h
Byte 2	20h	
Byte 3	03h	Sub index
Byte 4	LB26 LB25 LB24 LB23 – LB22 LB21 LB20 LB19	LED blue
Byte 5,7	00h	Not used

Examples:

Direction	Identifier	Format	Data	LED
To Keypad	615	Std	2F 02 20 03 00 00 00 00	Turn off all the blue LED
To Keypad	615	Std	2F 02 20 03 02 00 00 00	Blue LED #20 ON
To Keypad	615	Std	2F 02 20 03 80 00 00 00	Blue LED #26 ON
Keypad reply	595	Std	60 02 20 03 00 00 00 00	

d) Sub 4 –RING LED green blink state

Note: if the blink message is sent when the LED is already on, the LED blinks in alternate mode.

Identifier	615h (600h + current CAN ID)	
Byte 0	2Fh	Set Device Register
Byte 1	02h	CAN Object 2002h
Byte 2	20h	
Byte 3	04h	Sub index
Byte 4	LG26 LG25 LG24 LG23 – LG22 LG21 LG20 LG19	Green LED blink
Byte 5,7	00h	Not used

Examples:

Direction	Identifier	Format	Data	LED
To Keypad	615	Std	2F 02 20 04 00 00 00 00	No green LED blink
To Keypad	615	Std	2F 02 20 04 08 00 00 00	Green LED #21 blinks
To Keypad	615	Std	2F 02 20 04 30 00 00 00	Green LED #23 and 24 blink
Keypad reply	595	Std	60 02 20 04 00 00 00 00	

e) Sub 5 –RING LED red blink state

Note: if the blink message is sent when the LED is already on, the LED blinks in alternate mode.

Identifier	615h (600h + current CAN ID)	
Byte 0	2Fh	Set Device Register
Byte 1	02h	CAN Object 2002h
Byte 2	20h	
Byte 3	05h	Sub index
Byte 4	LR26 LR25 LR24 LR23 – LR22 LR21 LR20 LR19	Red LED blink
Byte 5,7	00h	Not used

Examples:

Direction	Identifier	Format	Data	LED
To Keypad	615	Std	2F 02 20 05 00 00 00 00	No red LED blink
To Keypad	615	Std	2F 02 20 05 04 00 00 00	Red LED #21 blinks
To Keypad	615	Std	2F 02 20 05 35 00 00 00	Red LED #19, 21, 23 and 24 blink
Keypad reply	595	Std	60 02 20 05 00 00 00 00	

f) Sub 6 –RING LED blue blink state

Note: if the blink message is sent when the LED is already on, the LED blinks in alternate mode.

Identifier	615h (600h + current CAN ID)	
Byte 0	2Fh	Set Device Register
Byte 1	02h	CAN Object 2002h
Byte 2	20h	
Byte 3	06h	Sub index
Byte 4	LB26 LB25 LB24 LB23 – LB22 LB21 LB20 LB19	Blue LED blink
Byte 5,7	00h	Not used

Examples:

Direction	Identifier	Format	Data	LED
To Keypad	615	Std	2F 02 20 06 00 00 00 00	No blue LED blink
To Keypad	615	Std	2F 02 20 06 01 00 00 00	Blue LED #19 blinks
To Keypad	615	Std	2F 02 20 06 22 00 00 00	Blue LED #20 and 24 blink
Keypad reply	595	Std	60 02 20 06 00 00 00 00	

31. Object 2003: Brightness Level

a) Set Indicator LEDs brightness level

Identifier	615h (600h + current CAN ID)	
Byte 0	2Fh	Set Device Register
Byte 1	03h	CAN Object 2003h
Byte 2	20h	
Byte 3	01h	Sub index
Byte 4	XXh	Intensity 00h-3Fh→ min-100%
Byte 5,7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	2F 03 20 01 10 00 00 00	Brightness = 25%
Keypad reply	595	Std	60 03 20 01 00 00 00 00	

b) Set green LEDs backlight brightness level

Identifier	615h (600h + current CAN ID)	
Byte 0	2Fh	Set Device Register
Byte 1	03h	CAN Object 2003h
Byte 2	20h	
Byte 3	02h	Sub index
Byte 4	XXh	Intensity 00h-3Fh→ 0-100%
Byte 5,7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	2F 03 20 02 08 00 00 00	Brightness = 12,5%
Keypad reply	595	Std	60 03 20 02 00 00 00 00	

c) Set red LEDs backlight brightness level

Identifier	615h (600h + current CAN ID)	
Byte 0	2Fh	Set Device Register
Byte 1	03h	CAN Object 2003h
Byte 2	20h	
Byte 3	03h	Sub index
Byte 4	XXh	Intensity 00h-3Fh→ 0-100%
Byte 5,7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	2F 03 20 03 20 00 00 00	Brightness = 50%
Keypad reply	595	Std	60 03 20 03 00 00 00 00	

d) Set blue LEDs backlight brightness level

Identifier	615h (600h + current CAN ID)	
Byte 0	2Fh	Set Device Register
Byte 1	03h	CAN Object 2003h
Byte 2	20h	
Byte 3	04h	Sub index
Byte 4	XXh	Intensity 00h-3Fh→ 0-100%
Byte 5,7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	2F 03 20 04 25 00 00 00	Brightness = 62,5%
Keypad reply	595	Std	60 03 20 04 00 00 00 00	

e) Set startup Indicator LEDs brightness level

Identifier	615h (600h + current CAN ID)	
Byte 0	2Fh	Set Device Register
Byte 1	03h	CAN Object 2003h
Byte 2	20h	
Byte 3	05h	Sub index
Byte 4	XXh	Intensity 00h-3Fh→ min-100%
Byte 5,7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	2F 03 20 05 05 00 00 00	Brightness = 12,5%
Keypad reply	595	Std	60 03 20 05 00 00 00 00	

f) Set startup green LEDs backlight brightness level

Identifier	615h (600h + current CAN ID)	
Byte 0	2Fh	Set Device Register
Byte 1	03h	CAN Object 2003h
Byte 2	20h	
Byte 3	06h	Sub index
Byte 4	XXh	Intensity 00h-3Fh→ 0-100%
Byte 5,7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	2F 03 20 06 10 00 00 00	Brightness = 25%
Keypad reply	595	Std	60 03 20 06 00 00 00 00	

g) Set startup red LEDs backlight brightness level

Identifier	615h (600h + current CAN ID)	
Byte 0	2Fh	Set Device Register
Byte 1	03h	CAN Object 2003h
Byte 2	20h	
Byte 3	07h	Sub index
Byte 4	XXh	Intensity 00h-3Fh→ 0-100%
Byte 5,7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	2F 03 20 07 30 00 00 00	Brightness = 75%
Keypad reply	595	Std	60 03 20 07 00 00 00 00	

h) Set startup blue LEDs backlight brightness level

Identifier	615h (600h + current CAN ID)	
Byte 0	2Fh	Set Device Register
Byte 1	03h	CAN Object 2003h
Byte 2	20h	
Byte 3	08h	Sub index
Byte 4	XXh	Intensity 00h-3Fh→ 0-100%
Byte 5,7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	2F 03 20 08 08 00 00 00	Brightness = 12,5%
Keypad reply	595	Std	60 03 20 08 00 00 00 00	

32. Object 2010h: Baud rate setting

Identifier	615h (600h + current CAN ID)	
Byte 0	2Fh	Set Device Register
Byte 1	10h	CAN Object 2010h
Byte 2	20h	
Byte 3	00h	Sub index
Byte 4	00h	1000k
	01h	Reserved (force to 125k)
	02h	500k
	03h	250k
	04h	125k (Default)
	05h	Reserved (force to 125k)
	06h	50k
	07h	20k
Byte 5,7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	2F 10 20 00 03 00 00 00	Set baud rate = 250k
Keypad reply	595	Std	60 10 20 00 00 00 00 00	

33. Object 2011h: Set Boot-up service

Object 2011h message enables or disables the boot up message sent by the keypad at power up to the CAN network.

Identifier	600h + current CAN ID	Default 615h
Byte 0	2Fh	Set Device Register
Byte 1	11h	CAN Object 2011h
Byte 2	20h	
Byte 3	00h	Sub index
Byte 4	XXh	00h: Not active
		01h: Active
Byte 5,7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	2F 11 20 00 00 00 00 00	Set Boot-up service not active
Keypad reply	595	Std	60 11 20 00 00 00 00 00	

34. Object 2012h: Set device active on startup

If keypad is active on startup don't need the Start CANopen command from host.

Identifier	600h + current CAN ID	Default 615h
Byte 0	2Fh	Set Device Register
Byte 1	12h	CAN Object 2012h
Byte 2	20h	
Byte 3	00h	Sub index
Byte 4	XXh	00h: Not active
		01h: Active
Byte 5,7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	2F 12 20 00 01 00 00 00	Set device active on startup
Keypad reply	595	Std	60 12 20 00 00 00 00 00	

35. Object 2013h: Set CANopen node ID

Identifier	600h + current CAN ID	Default 615h
Byte 0	2Fh	Set Device Register
Byte 1	13h	CAN Object 2013h
Byte 2	20h	
Byte 3	00h	Sub index
Byte 4	XXh	XX: New node id (00h-7Fh), default 15h
Byte 5,7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	2F 13 20 00 18 00 00 00	Set CANopen node ID = 18h
Keypad reply	598	Std	60 13 20 00 00 00 00 00	

36. Object 2014h: Set startup LED show

Identifier	600h + current CAN ID	Default 615h
Byte 0	2Fh	Set Device Register
Byte 1	14h	CAN Object 2014h
Byte 2	20h	
Byte 3	00h	Sub index
Byte 4	XXh	00h: Not active
		01h: Active
Byte 5,7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	2F 14 20 00 00 00 00 00	Startup LED show not active
Keypad reply	595	Std	60 14 20 00 00 00 00 00	

37. Object 2100h: Set DEMO mode

This message enables the Demo mode function. Demo mode is a special feature that consists in different LED states for each button pressing. Refer to the appendix ‘’Demo mode instructions’’ to try these special features. Disconnect and reconnect the keypad after the enable message to enter this mode. To exit the Demo mode, send the Disable Demo mode command or another command message.

Identifier	600h + current CAN ID	Default 615h
Byte 0	2Fh	Set Device Register
Byte 1	00h	CAN Object 2100
Byte 2	21h	
Byte 3	00h	Sub index
Byte 4	XXh	00h: Not active
		01h: Active
Byte 5,7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keypad	615	Std	2F 00 21 00 01 00 00 00	Set DEMO mode Active
Keypad reply	595	Std	60 00 21 00 00 00 00 00	

38. Set CAN protocol

This set of messages are used to change to the desired CANbus protocol.

- Change from CANopen to J1939:

Direction	Identifier	Format	Message	Data
To keypad	615h	Std	2F FF 20 01 01	Change to J1939

- Change from J1939 to CANopen:

Direction	Identifier	Format	Message	Data
To keypad	18EF2100h	Ext	04 1B 80 00 FF FF FF FF	Change to CANopen

APPENDIX: DEMO Mode instructions

In DEMO Mode you can try these functions by pressing buttons on the PowerTrack.

For the Key 1, each time that you press the button, there are different steps in this sequence:

1) No LEDs on and no backlight;
2) All LEDs green on and backlight red;
3) All LEDs red on and backlight green;
4) Keys LEDs amber/orange on, keys backlight blue on and encoder ring backlight red-green on
5) Return in step 1.

Pressing Key 2 you can see keys LEDs backlight white color on, while keys LEDs and encoder/ring backlight blink red and green in alternate mode.

For the Key 3, each time that you press the button, you can change backlight in this sequence:

1) Red;
2) Green;
3) Blue, red cursor on the encoder ring;
4) Amber/orange and encoder yellow/green, red cursor on the encoder ring;
5) Cyan, red cursor on the encoder ring;
6) Magenta, red cursor on the encoder ring;
7) White/light blue, red cursor on the encoder ring;
8) Return in step 1.

Pressing Key 4 you can see backlight blue.

In the case that you press key 5, 6 and 7 and/or rotate the encoder (clockwise or counterclockwise) there are no events.

39. Revision History

Date	Manual Revision	Comment	Related SW version
18/04/2016	1.3	-	1.4
14/10/2016	1.4	Updated examples for the object 1800h set periodic transmission	1.4
20/02/2018	1.5	New release: • Added the sentence concerning keypad activation in every PDOs commands • Replaced the symbol 'h'(hexadecimal) with the correct one 'b' (binary) in the ''keys and encoder state'' table • Checked and eventually corrected the messages of transmission/reply of command objects • Corrected the minimum value of brightness for indicator LEDs brightness level command • Added appendix DEMO Mode instructions • Added the SET CAN protocol command	2.x