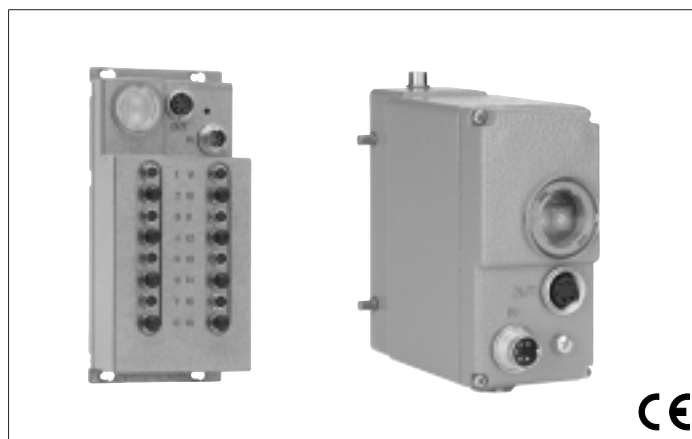




MANUAL TO CANopen NETWORK CONFIGURATION AND INSTALLATION

Software version: **1.0x**

code: **80148 - 0108 - ENGLISH**

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1 • INTRODUCTION

The “GLK67” series of temperature control modules with **CANopen** Fieldbus interface provides rapid integration of a large number of compact temperature control units and control of the heating device (up to 3168 (32x99) zones) within advanced automation systems (such as PLCs, Supervision Systems, etc.), interconnected via communication networks and protocols defined by the **standard**. This guide does not describe the “**CANopen**” Fieldbus: it is assumed that the user is familiar with it and, for updates, refers to such standard or to the official site managed by **C.i.A. – CAN in Automation GmbH**. www.can-cia.org .

It is also assumed that the user is familiar with the technical characteristics of GLK67 products, as described in the user manuals enclosed with the product, or downloadable from the GEFRA S.P.A. internet site www.gefran.com .

2 • BIBLIOGRAPHICAL REFERENCES

- /1/ ISO 11898, Road vehicles – Interchange of digital information – Controller Area Network (CAN) for high speed communication, 1993
- /2/ CiA DS 301 V4.01, CANopen Application Layer and Communication Profile, 2000
- /3/ CiA DS 404 V1.20, CANopen Device Profile Measuring Device and Closed Loop Controllers, 2002
- /4/ CiA DS 305 V1.00, CANopen Layer Setting Service and Protocol (LSS), 2000
- /5/ CiA DS 205 V1.00, LMT Service and Protocol specification, 1996
- /6/ CiA DR 303 V1.00, CANopen Cabling and Connector Pin Assignment, 1999
- /7/ DTS_BRTC-GLK67_xxxx

3 • MAIN TECHNICAL CHARACTERISTICS

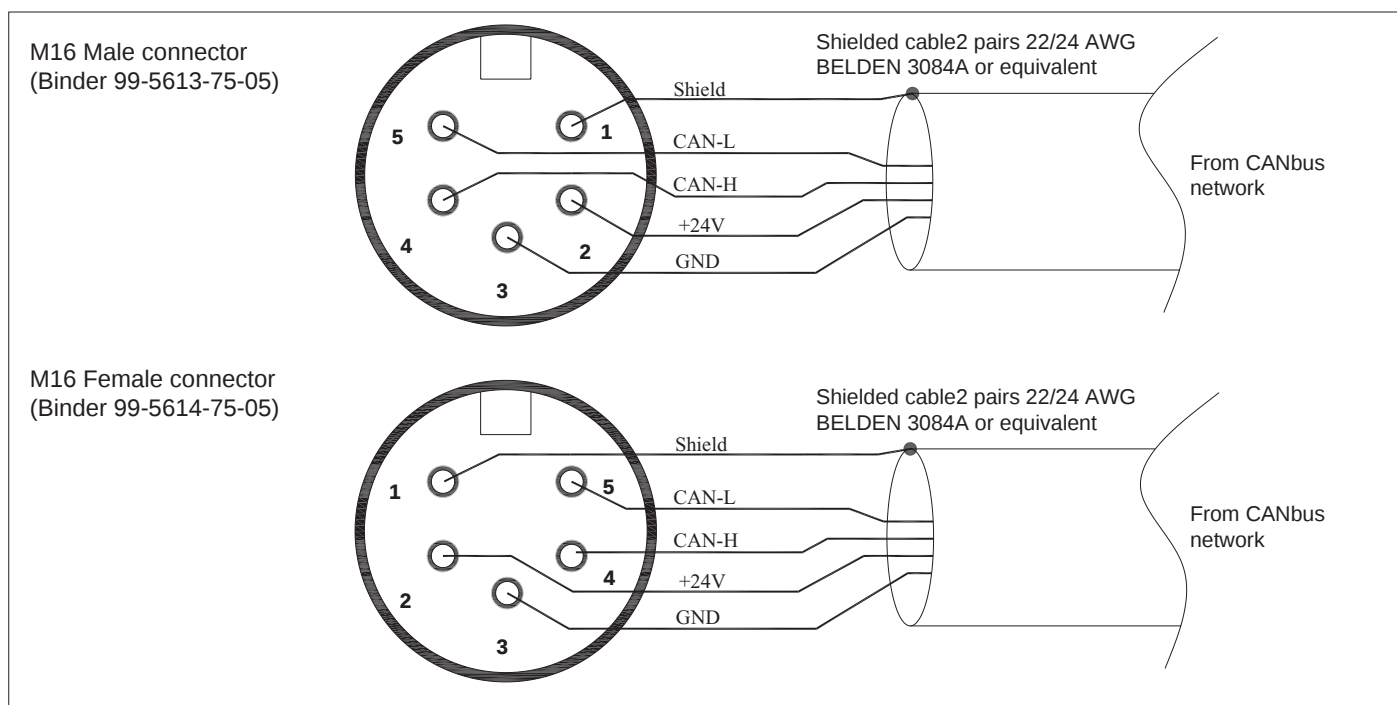
DTS_IRTC-GLK67_xxxx

◇	NMT:	Slave
◇	Error Control:	Node Guarding, Heartbeat
◇	Node ID:	HW switch
◇	No. of PDOs:	2, 3, 4, 5, 8 TX, 0 RX
◇	PDO modes:	Time-triggered, Sync(cyclic), Sync(acyclic), RTR
◇	PDO linking:	Yes
◇	PDO mapping:	Static
◇	No. of SDO:	1 Server, 0 Client
◇	Emergency Message:	Yes
◇	CANopen version:	DS 301 V4.0, DS 301 V3.0
◇	Framework:	No
◇	Certified:	No
◇	Device Profile:	DS 404 V1.2

4 • INSTALLATION

For a complete description of installation procedures and main electrical connections, see the USER MANUAL for GLK67, enclosed with the products.

4.1 ELECTRICAL CONNECTIONS TO THE CANBUS NETWORK



In accordance with **I6I**, the shielded cable must have special characteristics to guarantee correct communication among **CANopen** devices:

Bus length (m)	Bus cable (1)		Termination resistance (Ω)	Baudrate (Kbit/s)
	Length-related Resistance (m Ω /m)	Cross-section (mm ²)		
0 ... 40	70	0.25 ... 0.34	124	1000 at 40 m
40 ... 300	< 60	0.34 ... 0.5	150 ... 300	> 500 at 100 m
300 ... 600	< 40	0.5 ... 0.6	150 ... 300	> 100 at 500 m
600 ... 1000	< 26	0.75 ... 0.8	150 ... 300	> 50 at 1 Km

(1) Recommended cable AC parameters: 120W impedance and 5nsec/m specific line delay.

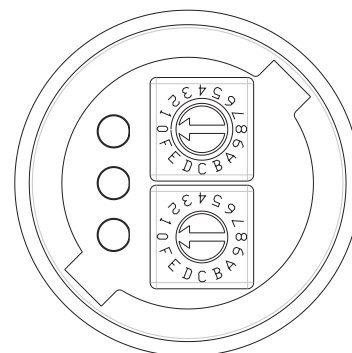
GEFRAN S.p.A. supplies approved **CANopen** cables and connection systems as accessories to GLK67 instruments.

The hexadecimal rotary switches on the GLK67 indicate the node address of the CANopen network acquired when the instrument is switched on.

The GLK67 is factory-set with rotary switches in position "01."

The customer has to assign the correct position (valid positions are 01 to 99).

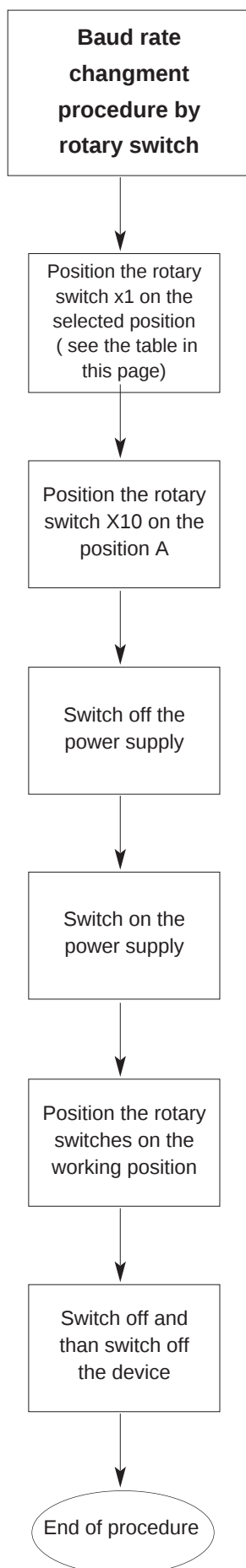
The other rotary switch positions refer to the special functions .



LED description

State of GLK67	Red Led	Green Led	Yellow Led
Normal function	Off = no error Blink = error ON = Fault	Green Led In conformity with CANopen specification (Stop, Preoperational, Operational)	ON = (power supply present)
At the power on the leds start flashing in sequence, after some seconds the leds will be setted depending on the status of the device, as explained in the table above			

BAUD RATE CHANGMENT PROCEDURE



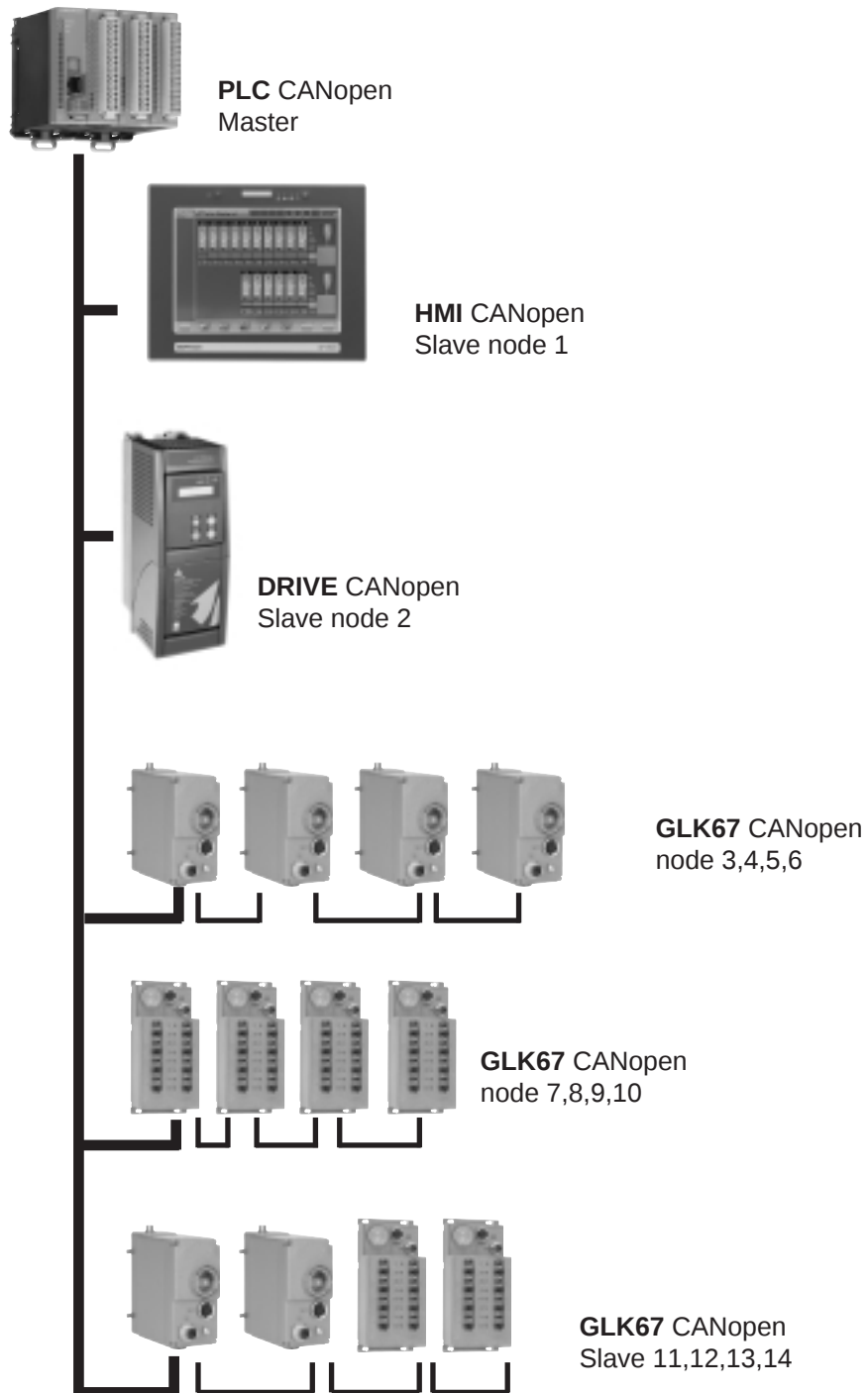
Baud rate selection table

	Rotary x10	Rotary x1	baud rate
Position	A	0	1000KBit
Position	A	1	800KBit
Position	A	2	500KBit (*)
Position	A	3	250KBit
Position	A	4	125KBit
Position	A	5	100KBit
Position	A	6	50KBit
Position	A	7	20KBit

(*) "default"

4.2 EXAMPLES OF CANOpen NETWORKS

EXAMPLE OF CANOPEN NETWORK WITH HARDWARE ADDRESS SELECTION (PDO ENABLED)



5. PDO PROCESS DATA

PDO	Cobid	Object 1	Object 2	Object 3	Object 4
01TPDO	0x180+node (All I device)	0x61300110 Input 1	0x61300210 Input 2	0x61300310 Input 3	0x61300410 Input 4
02TPDO	0x280+node (All I device)	0x61300510 Input 5	0x61300610 Input 6	0x61300710 Input 7	0x61300810 Input 8
03TPDO	0x380+node IRTC12/BRTC12 IRTC16/BRTC16 IRTC20 IRTC32	0x61300910 Input 9	0x61300a10 Input 10	0x61300b10 Input 11	0x61300c10 Input 12
04TPDO	0x480+node IRTC16/BRTC16 IRTC20 IRTC32	0x61300d10 Input 13	0x61300e10 Input 14	0x61300f10 Input 15	0x61301010 Input 16
05TPDO	0x200+node IRTC20 IRTC32	0x61301110 Input 17	0x61301210 Input 18	0x61301310 Input 19	0x61301410 Input 20
06TPDO	0x300+node IRTC32	0x61301510 Input 21	0x61301610 Input 22	0x61301710 Input 23	0x61301810 Input 24
07TPDO	0x400+node IRTC32	0x61301910 Input 25	0x61301a10 Input 26	0x61301b10 Input 27	0x61301c10 Input 28
08TPDO	0x500+node IRTC32	0x61301d10 Input 29	0x61301e10 Input 30	0x61301f10 Input 31	0x61302010 Input 32

PDO (Input value)	DESCRIPTION
Object 6148 ≤ vaue ≤ Object 6149	Valid value
-32767	SBR condition of input
-32766	Wrong connection of input
-32765	Overflow of the input 0x6149
-32764	Underflow of the input 0x6148
-32763	Input disabled

6 • OBJECT DICTIONARY CANopen

6.1 COMMUNICATION PROFILE

INDEX (hex)	SUB INDEX	DESCRIPTION	DATA TYPE	ACC.	DEFAULT (hex)
1000	0	Device type	unsigned32	RO	0x00020194
1001	0	Error register	unsigned8	RO	-
1003	0	Number of error in pre-defined error field	unsigned8	RW	-
	1	Error field n	unsigned32	RO	-
	2	Error field n-1	unsigned32	RO	-
	3	Error field n-2	unsigned32	RO	-
	4	Error field n-3	unsigned32	RO	-
	5	Error field n-4	unsigned32	RO	-
	6	Error field n-5	unsigned32	RO	-
	7	Error field n-6	unsigned32	RO	-
	8	Error field n-7	unsigned32	RO	-
1005	0	COB-IB SYNC	unsigned32	RW	0x00000080
1008	0	Manufacturer device name IRTC	string	RO	0x43545249
1009	0	Manufacturer hardware version 01	string	RO	0x20203130
100a	0	Manufacturer software version 1.00	string	RO	0x30302E31
100b	0	Node-ID	unsigned32	RO	-
100c	0	Guard Time	unsigned16	RW	0
100d	0	Life Time Factor	unsigned8	RW	0
100e	0	Node Guarding Identifier	unsigned32	RW	0x00000700+Node
1014	0	COB-IB Emergency Object	unsigned32	RW	0x00000080+Node
1017	0	Producer Heartbeat Time	unsigned16	RW	1000
1018	0	Number of Identity Object	unsigned8	RO	4
	1	Vendor ID	unsigned32	RO	0x01000093
	2	Product code	unsigned32	RO	G IRTC08 = 202
					G IRTC12 = 203
					G BRTC12 = 207
					G IRTC16 = 204
					G BRTC16 = 208
					G IRTC20 = 205
					G IRTC32 = 206
	3	Revision number	unsigned32	RO	00000000
	4	Serial number	unsigned32	RO	00000000
1029	0	Error behaviour Class Number	unsigned8	RO	7
	1	Communication Error	unsigned8	RW	0
	2	Digital Input Error	unsigned8	RW	0
	3	Analog Input Error	unsigned8	RW	1
	4	Digital Input Error	unsigned8	RO	0
	5	Analog Input Error	unsigned8	RO	0
	6	Controller Error	unsigned8	RO	0
	7	Alarm Error	unsigned8	RO	0
1200	0	Nr. of Server SDO Parameter	unsigned8	RO	2
	1	COB-ID RX SDO	unsigned32	RO	0x00000600+Node
	2	COB-ID TX SDO	unsigned32	RO	0x00000580+Node

INDEX (hex)	SUB INDEX	DESCRIPTION	DATA TYPE	ACC.	DEFAULT
1800	0	Nr. of TPDO1 Communication parameter	unsigned8	RO	5
	1	COB-ID 1st TPD1	unsigned32	RW	0x00000180+Node
	2	Transmission type TPDO1	unsigned8	RW	1
	3	Inhibit time TPDO1	unsigned16	RO	0
	4	Reserved	unsigned16	RO	0
	5	Event timer TPDO1	unsigned16	RW	1000
1801	0	Nr of TPDO2 Communication parameter	unsigned8	RO	5
	1	COB-ID TPDO2	unsigned32	RW	0x00000280+Node
	2	Trasmission type TPDO2	unsigned8	RW	0
	3	Inhibit time 2nd TPDO	unsigned16	RO	0
	4	Reserved	unsigned16	RO	0
	5	Event timer TPDO2	unsigned16	RW	1000
1802 (only for: BRTC12 IRTC12 IRTC16 BRTC16 IRTC20 IRTC32)	0	Nr. of TPDO3 Communication parameter	unsigned8	RO	5
	1	COB-ID TPDO3	unsigned32	RW	0x00000380+Node
	2	Trasmission type TPDO 3	unsigned8	RW	1
	3	Inhibit time TPD03	unsigned16	RO	0
	4	Reserved	unsigned16	RO	0
	5	Event timer TPDO3	unsigned16	RW	1000
1803 (only for: IRTC16 BRTC16 IRTC20 IRTC32)	0	Nr. of TPDO4 Communication parameter	unsigned8	RO	5
	1	COB-ID TPDO4	unsigned32	RW	0x00000480+Node
	2	Trasmission type TPDO 4	unsigned8	RW	1
	3	Inhibit time TPD04	unsigned16	RO	0
	4	Reserved	unsigned16	RO	0
	5	Event timer TPDO4	unsigned16	RW	1000
1804 (only for: IRTC20 BRTC32)	0	Nr. of TPDO5 Communication parameter	unsigned8	RO	5
	1	COB-ID TPDO5	unsigned32	RW	0x00000200+Node
	2	Trasmission type TPDO 5	unsigned8	RW	1
	3	Inhibit time TPD05	unsigned16	RO	0
	4	Reserved	unsigned16	RO	0
	5	Event timer TPDO5	unsigned16	RW	1000
1805 (only for IRTC32)	0	Nr. of TPDO6 Communication parameter	unsigned8	RO	5
	1	COB-ID TPDO6	unsigned32	RW	0x00000300+Node
	2	Trasmission type TPDO 6	unsigned8	RW	1
	3	Inhibit time TPD06	unsigned16	RO	0
	4	Reserved	unsigned16	RO	0
	5	Event timer TPDO6	unsigned16	RW	1000
1806 (only for IRTC32)	0	Nr. of TPDO6 Communication parameter	unsigned8	RO	5
	1	COB-ID TPDO7	unsigned32	RW	0x00000400+Node
	2	Trasmission type TPDO 7	unsigned8	RW	1
	3	Inhibit time TPD07	unsigned16	RO	0
	4	Reserved	unsigned16	RO	0
	5	Event timer TPDO7	unsigned16	RW	1000
1807 (only for IRTC32)	0	Nr. of TPDO8 Communication parameter	unsigned8	RO	5
	1	COB-ID TPDO8	unsigned32	RW	0x00000500+Node
	2	Trasmission type TPDO 8	unsigned8	RW	1
	3	Inhibit time TPD08	unsigned16	RO	0
	4	Reserved	unsigned16	RO	0
	5	Event timer TPDO8	unsigned16	RW	1000

INDEX (hex)	SUB INDEX	DESCRIPTION	DATA TYPE	ACC.	DEFAULT
1a00	0	Number of TPDO2 Mapping parameter	unsigned8	RO	4
	1	1st object mapped for TPDO1	unsigned32	RW	0x61300110
	2	2nd object mapped for TPDO1	unsigned32	RW	0x61300210
	3	3st object mapped for TPDO1	unsigned32	RW	0x61300310
	4	4st object mapped for TPDO1	unsigned32	RW	0x61300410
1a01	0	Number of TPDO2 Mapping parameter	unsigned8	RO	4
	1	1st object mapped for TPDO2	unsigned32	RW	0x61300510
	2	2nd object mapped for TPDO2	unsigned32	RW	0x61300610
	3	3st object mapped for TPDO2	unsigned32	RW	0x61300710
	4	4st object mapped for TPDO2	unsigned32	RW	0x61300810
1a02 (only for BRTC12 IRTC12 IRTC16 BRTC16 IRTC20 IRTC32)	0	Number of TPDO3 Mapping parameter	unsigned8	RO	4
	1	1st object mapped for TPDO3	unsigned32	RW	0x61300910
	2	2nd object mapped for TPDO3	unsigned32	RW	0x61300a10
	3	3st object mapped for TPDO3	unsigned32	RW	0x61300b10
	4	4st object mapped for TPDO3	unsigned32	RW	0x61300c10
1a03 (only for IRTC16 BRTC16 IRTC20 IRTC32)	0	Number of TPDO4 Mapping parameter	unsigned8	RO	4
	1	1st object mapped for TPDO4	unsigned32	RW	0x61300d10
	2	2nd object mapped for TPDO4	unsigned32	RW	0x61300e10
	3	3st object mapped for TPDO4	unsigned32	RW	0x61300f10
	4	4st object mapped for TPDO4	unsigned32	RW	0x61301010
1a04 (only for IRTC20 IRTC32)	0	Number of TPDO5 Mapping parameter	unsigned8	RO	4
	1	1st object mapped for TPDO5	unsigned32	RW	0x61301110
	2	2nd object mapped for TPDO5	unsigned32	RW	0x61301210
	3	3st object mapped for TPDO5	unsigned32	RW	0x61301310
	4	4st object mapped for TPDO5	unsigned32	RW	0x61301410
1a05 (only for IRTC32)	0	Number of TPDO6 Mapping parameter	unsigned8	RO	4
	1	1st object mapped for TPDO6	unsigned32	RW	0x61301510
	2	2nd object mapped for TPDO6	unsigned32	RW	0x61301610
	3	3st object mapped for TPDO6	unsigned32	RW	0x61301710
	4	4st object mapped for TPDO6	unsigned32	RW	0x61301810
1a06 (only for IRTC32)	0	Number of TPDO7 Mapping parameter	unsigned8	RO	4
	1	1st object mapped for TPDO7	unsigned32	RW	0x61301910
	2	2nd object mapped for TPDO7	unsigned32	RW	0x61301a10
	3	3st object mapped for TPDO7	unsigned32	RW	0x61301b10
	4	4st object mapped for TPDO7	unsigned32	RW	0x61301c10
1a07 (only for IRTC32)	0	Number of TPDO8 Mapping parameter	unsigned8	RO	4
	1	1st object mapped for TPDO8	unsigned32	RW	0x61301d10
	2	2nd object mapped for TPDO8	unsigned32	RW	0x61301e10
	3	3st object mapped for TPDO8	unsigned32	RW	0x61301f10
	4	4st object mapped for TPDO8	unsigned32	RW	0x61302010

6.2 DEVICE AND MANUFACTURER PROFILE

SUB-INDEX "n" identifies the GLK67 pertaining to that CANopen node

(ex. 1(dec) = zone 1 ,..., 32(dec) = zone 32).

DEVICE AND MANUFACTURER PROFILE CANopen					
INDEX (hex)	SUB INDEX	DESCRIPTION	DATA	ACC.	DEFAULT
2001	0	Number of Digital filter on input objects	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
	1...n	Digital filter on input	Unsigned16	RW	10 Range 0...200 Decimal point=2 Unit in SEC.
2002	0	Number of Display filter objects	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
	1...n	Display filter	Unsigned16	RW	0 Range 0...99 Decimal point=1 Unit in P.S.
2003	0	Number of Physical unit for input objects	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
	1...n	Physical unit for input	Unsigned16	RW	45 (°C) Range 45 (°C) or 172 (°F) Decimal point=0 Unit in -
2004	0	Number of Slave HW Error objects	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
	1...n		Unsigned16	RO	0 Range: bit0= tamb1 error bit1= tamb2 error bit2= eeprom error Decimal point=0 Unit in -

DEVICE AND MANUFACTURER PROFILE CANopen					
INDEX (hex)	SUB INDEX	DESCRIPTION	DATA	ACC.	DEFAULT
2009	0	Number of Slave FW Version objects	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
	1...n	Slave FW Version	Unsigned16	RO	- Range 0...999 Decimal point=2 Unit in -
200b	0	Number of Means objects	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
	1...n	Mean	Unsigned16	RW	20 Range 0...100 Decimal point=0 Unit in -
200c	0	Bridge software version	Unsigned16	RO	100 Range 100...9999 Decimal point=2 Unit in -
2016	0	Number of TAMB objects	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
	1...n	TAMB	Signed16	RO	- Range:-300...1000 Decimal point=1 Unit in °C/°F
2017	0	Number of Raw TAMB objects	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
	1...n	Raw TAMB	Signed16	RO	- Range:-300...1000 Decimal point=1 Unit in °C/°F

DEVICE AND MANUFACTURER PROFILE CANopen					
INDEX (hex)	SUB INDEX	DESCRIPTION	DATA	ACC.	DEFAULT
2018	0	Number of Raw Board Temperature objects	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
	1...n	Raw Board Temperature	Signed16	RO	- Range:-300...1000 Decimal point=1 Unit in °C/°F
2019	0	Zone Number	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
6110	0	Number of Sensor type objects	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
	1...n	Sensor type	Unsigned16	RW	1 Range:0...10000 (1 TCj - 2 TCk) Decimal point=0 Unit in -
6112	0	Number Operating modes objects	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
	1...n	Operating modes	Unsigned16	RW	0 = Disable 1 = Enabled Range:0...1 Decimal point=0 Unit in -
6124	0	Number of Input offset objects	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
	1...n	Operating modes	Signed16	RW	0 Range:-999...999 Decimal point = 0 Unit in -

DEVICE AND MANUFACTURER PROFILE CANopen					
INDEX (hex)	SUB INDEX	DESCRIPTION	DATA	ACC.	DEFAULT
6130	0	Number of Process Value objects	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
	1...n	Process Value	Signed16	RO	- Range:-32767...obj 0x6169 Decimal point = obj 0x6132 Unit in °C/°F
6132	0	Number of decimal point objects	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
	1...n	Decimal point	Unsigned16	RW	1 Range:0...1 Decimal point=0 Unit in -
6148	0	Number of Span start objects	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
	1...n	Span start	Signed16	RW	-150 Range: -32767...32767 Decimal point = obj 0x6132 Unit in °C/°F
6149	0	Number of Span end objects	Unsigned8	RO	IRTC8 = 8 IRTC12 = 12 BRTC12 = 12 IRTC16 = 16 BRTC16 = 20 IRTC20 = 20 IRTC32 = 32
	1...n	Span end	Signed16	RW	9990 Range: -32767...32767 Decimal point = obj 0x6132 Unit in °C/°F

Communication Error

Error code Low byte	Error code High byte	Error register 0x1001	Info 1	Info 2	Info 3	Info 4
0x00	0x81	0x10	0	0	0	0

Self Test Error (Scheda slave non riconosciuta)

Error code Low byte	Error code High byte	Error register 0x1001	Info 1	Info 2	Info 3	Info 4
0x10	0x50	0x20	0	0	0	0

Self Test Error (Eeprom error)

Error code Low byte	Error code High byte	Error register 0x1001	Info 1	Info 2	Info 3	Info 4
0x10	0x50	0x20	0	0	0	0

Ambient Temperature Error

Error code Low byte	Error code High byte	Error register 0x1001	Info 1	Info 2	Info 3	Info 4
0x10	0x41	0x8	Nr slave	0	0	0