

General Description

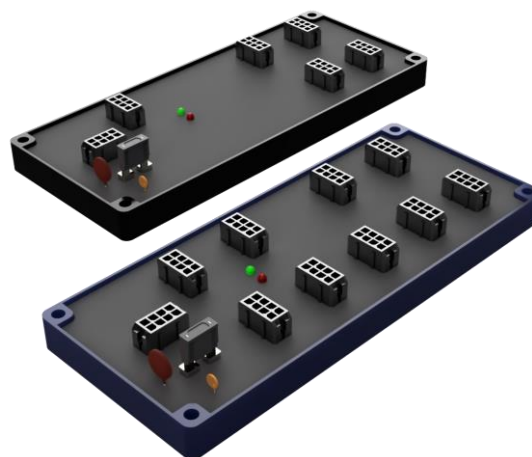
OIS481604 and OIS240804 modules can be used to expand an existing CANopen network with several digital inputs, digital outputs and analog inputs capability.

The module's microprocessor monitors the input and controls the output lines, using CANopen's dictionary table as interface.

The CANopen interface is compliant to CiA standard DS-301 with device profile DS-401.

The module is available as full version, with 48 digital inputs and 16 analog inputs or as light version, with 24 digital inputs and 8 analog inputs. Both modules have 4 digital outputs 0-V_{CC} and a 5V-100mA output, that can be used to supply external sensors.

The device is well protected against short circuits, ESD, electrical disturbs and moisture.



Applications

- Digital input lines expansion
- Digital output lines expansion
- Analog input lines expansion

Features

- Partially sealed device
- CANopen (DS301 / DS401)
- 5 TPDO for digital and analog inputs
- 1 RPDO for digital outputs
- Configurable without additional tools
- 12/24Vdc
- 5V out available
- Simple and reliable

Ordering Information

- | | |
|------------------|---|
| OIS481604 | CANopen input and output expansion module full |
| OIS240804 | CANopen input and output expansion module light |

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Min	Max	Unit
T _S	Storage temperature	-20	70	°C
T _A	Operating Temperature Range	-20	70	°C
V _{CC}	Supply Voltage Range (DC voltage)	9	36	V

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

TECHNICAL CHARACTERISTICS

T_A = 25°C, unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{SUPPLY}	Supply Voltage Range	-20 < T _A < +70	10	12/24	30	V
I _{SUPPLY}	Current consumption	average with inputs=0V digital outputs off		30		mA
I _{fuse}	Pre-fusing	Both		2		A
N _{DIN}	Number of Digital Inputs	OIS481604		48		-
		OIS240804		24		
N _{DOUT}	Number of Digital Outputs	Both		4		-
N _{5V}	Number of 5V Output	Both		1		-
N _{AIN}	Number of Analog Inputs	OIS481604		16		-
		OIS240804		8		
N _{CAN}	Number of CAN interfaces	Both		1		-

DIGITAL INPUTS DETAILS

T_A = 25°C, unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{DIN}	Digital input voltage range		0		V _{SUPPLY}	V
V _{SWHIGH}	Switch input high Level (ON)		6			V
V _{SWLOW}	Switch input low Level (OFF)				5	V
I _{DIN}	Digital input current	for a single input		2.7		mA
R _{DIN}	Digital input resistance			33		kΩ

ANALOG INPUTS DETAILS

T_A = 25°C, unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{AINMEAS}	Analog input voltage measuring range		0		5	V
R _{MEAS}	Voltage measure resolution	12 bit ADC, 5Vin		1,22		mV
R _{PDWN}	Pull down resistor on each analog input			33		kΩ
R _{ON}	On resistance on analog input	V _{AIN} =5V			400	Ω

DIGITAL OUTPUT DETAILS

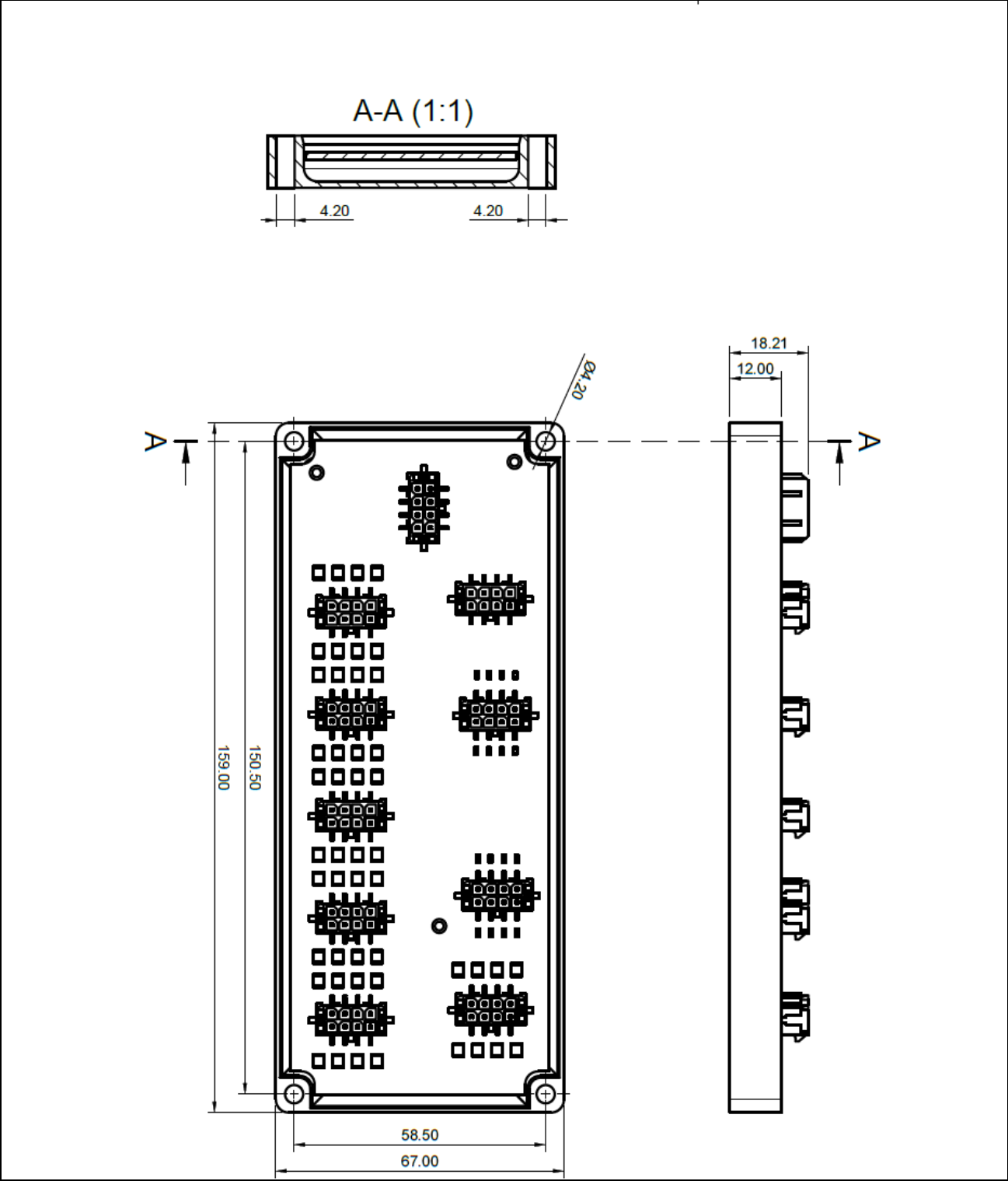
T_A = 25°C, unless otherwise noted

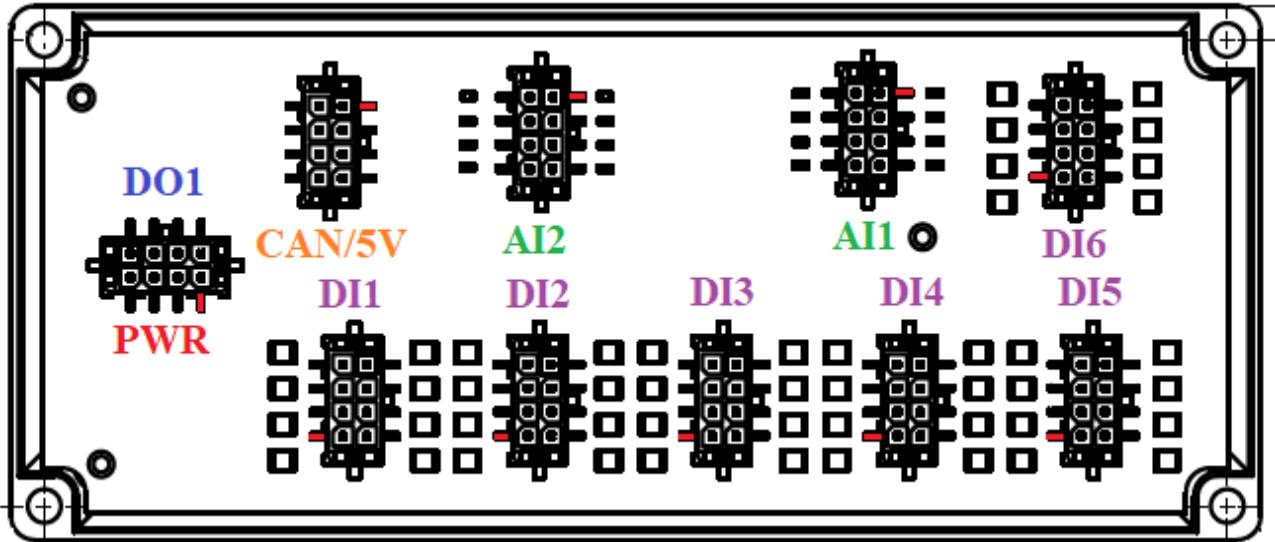
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{DO}	Output voltage range	DO1-DO4	0		V _{SUPPLY}	V
I _{LDO}	Load current	DO1-DO4			0.7	A
I _{OUT5V}	5V output max current	V5			100	mA
R _{LDO}	Load resistance *	to GND			33	kΩ

* Output stage is high side switch, the load must be connected between out and ground, a resistance greater than 33kOhm may be not sufficient to switch the output at proper voltage values.

MECHANICAL CHARACTERISTICS AND DIMENSIONS

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
W	Width			159,0		mm
L	Length			67,0		mm
H	Height			20		mm
W	Weight	OIS240804		185		g





PWR AND D01 CONNECTOR

Name	Symbol	No	No	Symbol	Name
Digital Output 1	DO1	5	1	V+	Positive power supply
Digital Output 2	DO2	6	2	V+	Positive power supply
Digital Output 3	DO3	7	3	GND	Ground
Digital Output 4	DO4	8	4	GND	Ground

CAN AND 5V OUT CONNECTOR

Name	Symbol	No	No	Symbol	Name
CAN Bus low	CANL	5	1	CANH	CAN Bus high
Ground	GND	6	2	V5	5 Volt Output
5 Volt Output	V5	7	3	GND	Ground
CAN Bus high	CANH	8	4	CANL	CAN Bus low

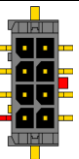
AI2 CONNECTOR (NOT FOR OIS241604)

Name	Symbol	No	No	Symbol	Name
Analog Input 13	AIN13	5	1	AIN09	Analog Input 9
Analog Input 14	AIN14	6	2	AIN10	Analog Input 10
Analog Input 15	AIN15	7	3	AIN11	Analog Input 11
Analog Input 16	AIN16	8	4	AIN12	Analog Input 12

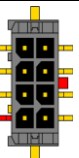
AI1 CONNECTOR

Name	Symbol	No	No	Symbol	Name
Analog Input 5	AIN05	5	1	AIN01	Analog Input 1
Analog Input 6	AIN06	6	2	AIN02	Analog Input 2
Analog Input 7	AIN07	7	3	AIN03	Analog Input 3
Analog Input 8	AIN08	8	4	AIN04	Analog Input 4

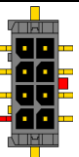
DI1 CONNECTOR (NOT FOR OIS241604)

Name	Symbol	No		No	Symbol	Name
Digital Input 3	DI03	5		1	DI04	Digital Input 4
Digital Input 2	DI02	6		2	DI05	Digital Input 5
Digital Input 1	DI01	7		3	DI06	Digital Input 6
Digital Input 0	DI00	8		4	DI07	Digital Input 7

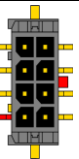
DI2 CONNECTOR (NOT FOR OIS241604)

Name	Symbol	No		No	Symbol	Name
Digital Input 11	DI11	5		1	DI12	Digital Input 12
Digital Input 10	DI10	6		2	DI13	Digital Input 13
Digital Input 9	DI09	7		3	DI14	Digital Input 14
Digital Input 8	DI08	8		4	DI15	Digital Input 15

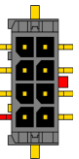
DI3 CONNECTOR (NOT FOR OIS241604)

Name	Symbol	No		No	Symbol	Name
Digital Input 19	DI19	5		1	DI20	Digital Input 20
Digital Input 18	DI18	6		2	DI21	Digital Input 21
Digital Input 17	DI17	7		3	DI22	Digital Input 22
Digital Input 16	DI16	8		4	DI23	Digital Input 23

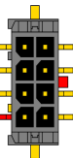
DI4 CONNECTOR

Name	Symbol	No		No	Symbol	Name
Digital Input 27	DI27	5		1	DI28	Digital Input 28
Digital Input 26	DI26	6		2	DI29	Digital Input 29
Digital Input 25	DI25	7		3	DI30	Digital Input 30
Digital Input 24	DI24	8		4	DI31	Digital Input 31

DI5 CONNECTOR

Name	Symbol	No		No	Symbol	Name
Digital Input 35	DI35	5		1	DI36	Digital Input 36
Digital Input 34	DI34	6		2	DI37	Digital Input 37
Digital Input 33	DI33	7		3	DI38	Digital Input 38
Digital Input 32	DI32	8		4	DI39	Digital Input 39

DI6 CONNECTOR

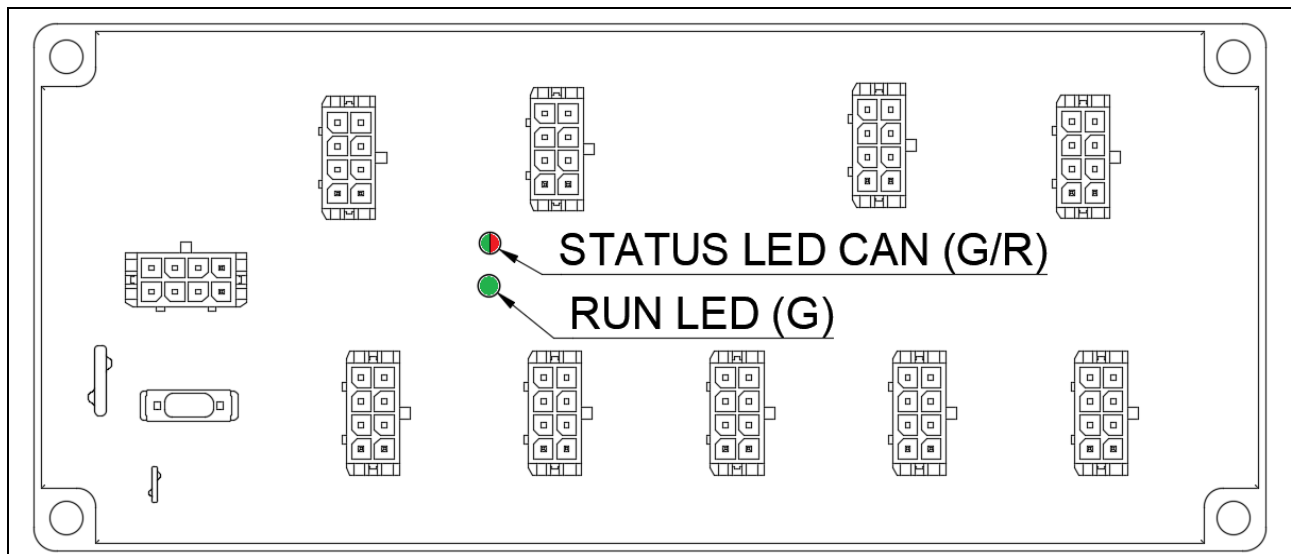
Name	Symbol	No		No	Symbol	Name
Digital Input 43	DI43	5		1	DI44	Digital Input 44
Digital Input 42	DI42	6		2	DI45	Digital Input 45
Digital Input 41	DI41	7		3	DI46	Digital Input 46
Digital Input 40	DI40	8		4	DI47	Digital Input 47

CAN OPEN GENERAL INFORMATION

CANopen (EN 50325-4) is a high-level CAN-based communication protocol developed for embedded networking applications (e.g.: in-vehicle networks). CANopen comprises and standardizes many aspects of a communication protocol like network programming framework, device descriptions, interface definitions, and application profiles enabling different devices and applications from different manufacturers to communicate.

OIS481604 and OIS240804 expansion module meet CiA 301 v.4.2.0 requirements for a general-purpose CANopen network node. Device profile DSP-401 specifies OIS481604 and OIS240804 devices as generic I/O modules.

LED



The device has two led indicators used for different functions:

- Status led CAN for signalling the CAN status and errors.
- Run led for signalling the running of the firmware.

The two-color Status Led CAN complies with CiA DR-303-3 specifications. Green led is used as status led indicator and red led is used as error led. The tables below describe all led configurations.

STATUS LED	LED state	LED state description
□ □ □ □ □ □ □ □ □ □	OFF	The device is switched off
■ □ □ □ □ □ □ □ □ □	Single flash	The device is in Stop mode
■ □ □ □ □ □ □ □ □ □	Blinking	The device is in Pre-operational mode
■ ■ ■ ■ ■ ■ ■ ■ ■ ■	ON	The device is in Operational mode

Table 1 - Status LED configurations

ERROR LED	LED state	LED state description
□ □ □ □ □ □ □ □ □ □	OFF	The device is in working conditions
■ □ □ □ □ □ □ □ □ □	Single flash	CAN warning limit reached
■ ■ □ □ □ □ □ □ □ □	Double flash	Loss of Guarding-master detected
■ ■ ■ ■ ■ ■ ■ ■ ■ ■	ON	The device is in state Bus-Off

Table 2 - Error LED configurations

OBJECT DICTIONARY

Index	Sub Index	Parameter description	Data Type	Access	Default value	Range	Store
1000h	00h	Device type	UNS32	RO	7019Ah		
100Ah	00h	Manufacturer firmware version	VSTR	const.			
1010h	Store parameters						
	00h	Largest supported sub-index	UNS32	RO	1		
	01h	Save ALL parameters ("save" = 73617665h)	UNS32	RW	1		
1011h	Restore default parameters						
	00h	Largest supported sub-index	UNS32	RO	1		
	01h	Reload ALL default parameters ("load" = 6C6F6164h)	UNS32	RW	1		
1017h	00h	Producer Heartbeat time [multiple of 1ms, 0 = disabled]	UNS16	RW	0	0...65535	YES
1018h	Identity Object						
	00h	Largest supported sub-index	UNS8	RO	4		
	01h	Vendor ID	UNS32	RO	3C4h		
	02h	Product code	UNS32	RO			
	03h	Revision number	UNS32	RO			
	04h	Serial number	UNS32	RO			
1200h	Server SDO1 parameters						
	00h	Largest supported sub-index	UNS8	RO	2		
	01h	COB-ID Client > Server	UNS32	RO	600h + NID		
	02h	COB-ID Server > Client	UNS32	RO	580h + NID		
1400h	RPDO1 - Receive PDO1 communication parameters DIGITAL OUTPUTS						
	00h	Largest supported sub-index	UNS8	RO	2		
	01h	COB-ID	UNS32	RO	200h + NID		
	02h	Transmission type [synchronous, manufacturer specific]	UNS8	RO	FEh	254	
1600h	RPDO1 - Receive PDO1 mapping parameters (fixed mapping)						
	00h	Largest supported sub-index	UNS8	RO	1		
	01h	Digital Outputs [1...4]	UNS32	RO	62000108h		
1800h	TPDO1 communication parameters DIGITAL INPUTS						
	00h	Largest supported sub-index	UNS8	RO	5		
	01h	COB-ID	UNS32	RO	40000180h + NID		
	02h	Transmission type [synchronous, manufacturer specific]	UNS8	RO	FEh		
	03h	Inhibit time between two TPDO object [multiple of 100us]	UNS16	RW	0	0...65535	YES
	04h	Reserved	UNS8	RW	0		
	05h	Event timer for cyclical transmission [multiple of 1ms, 0 = disabled]	UNS16	RW	0	0...65535	YES
1A00h	TPDO1 mapping parameters (fixed mapping)						
	00h	Largest supported sub-index	UNS8	RO	6		
	01h	Digital Inputs [1...8]	UNS32	RO	60000108h		
	02h	Digital Inputs [9...16]	UNS32	RO	60000208h		
	03h	Digital Inputs [17...24]	UNS32	RO	60000308h		
	04h	Digital Inputs [25...32]	UNS32	RO	60000408h		
	05h	Digital Inputs [33...40]	UNS32	RO	60000508h		
	06h	Digital Inputs [41...48]	UNS32	RO	60000608h		

1801h	TPDO2 - Transmit PDO2 communication parameters ANALOG INPUTS 1 to 4						
00h	Largest supported sub-index	UNS8	RO	5			
01h	COB ID	UNS32	RO	40000280h + NID			
02h	Transmission type [synchronous, manufacturer specific]	UNS8	RO	FEh			
03h	Inhibit time between two TPDO object [multiple of 100us]	UNS16	RW	0	0...65535	YES	
04h	Reserved	UNS8	RW	0			
05h	Event timer for cyclical transmission [multiple of 1ms, 0 = disabled]	UNS16	RW	0	0...65535	YES	
1A01h	TPDO2 - Transmit PDO2 mapping parameters (fixed mapping)						
00h	Largest supported sub-index	UNS8	RO	4			
01h	Analog Input 1	UNS32	RO	64010110h			
02h	Analog Input 2	UNS32	RO	64010210h			
03h	Analog Input 3	UNS32	RO	64010310h			
04h	Analog Input 4	UNS32	RO	64010410h			
1802h	TPDO3 - Transmit PDO3 communication parameters ANALOG INPUTS 5 to 8						
00h	Largest supported sub-index	UNS8	RO	5			
01h	COB ID	UNS32	RO	380h + NID			
02h	Transmission type [synchronous, manufacturer specific]	UNS8	RO	FEh			
03h	Inhibit time between two TPDO object [multiple of 100us]	UNS16	RW	0	0...65535	YES	
04h	Reserved	UNS8	RW	0			
05h	Event timer for cyclical transmission [multiple of 1ms, 0 = disabled]	UNS16	RW	0	0...65535	YES	
1A02h	TPDO3 - Transmit PDO3 mapping parameters (fixed mapping)						
00h	Largest supported sub-index	UNS8	RO	4			
01h	Analog Input 5	UNS32	RO	64010510h			
02h	Analog Input 6	UNS32	RO	64010610h			
03h	Analog Input 7	UNS32	RO	64010710h			
04h	Analog Input 8	UNS32	RO	64010810h			
1803h	TPDO4 - Transmit PDO4 communication parameters ANALOG INPUTS 9 to 12						
00h	Largest supported sub-index	UNS8	RO	5			
01h	COB ID	UNS32	RO	480h + NID			
02h	Transmission type [synchronous, manufacturer specific]	UNS8	RO	FEh			
03h	Inhibit time between two TPDO object [multiple of 100us]	UNS16	RW	0	0...65535	YES	
04h	Reserved	UNS8	RW	0			
05h	Event timer for cyclical transmission [multiple of 1ms, 0 = disabled]	UNS16	RW	0	0...65535	YES	
1A03h	TPDO4 - Transmit PDO4 mapping parameters (fixed mapping)						
00h	Largest supported sub-index	UNS8	RO	4			
01h	Analog Input 9	UNS32	RO	64010910h			
02h	Analog Input 10	UNS32	RO	64010A10h			
03h	Analog Input 11	UNS32	RO	64010B10h			
04h	Analog Input 12	UNS32	RO	64010C10h			
1804h	TPDO5 - Transmit PDO5 communication parameters ANALOG INPUTS 9 to 12						
00h	Largest supported sub-index	UNS8	RO	5			
01h	COB ID	UNS32	RO	580h + NID			
02h	Transmission type [synchronous, manufacturer specific]	UNS8	RO	FEh			
03h	Inhibit time between two TPDO object [mul-	UNS16	RW	0	0...65535	YES	

		multiple of 100us]					
	04h	Reserved	UNS8	RW	0		
	05h	Event timer for cyclical transmission [multiple of 1ms, 0 = disabled]	UNS16	RW	0	0...65535	YES
1A04h	TPDO5 - Transmit PDO5 mapping parameters (fixed mapping)						
	00h	Largest supported sub-index	UNS8	RO	4		
	01h	Analog Input 13	UNS32	RO	64010D10h		
	02h	Analog Input 14	UNS32	RO	64010E10h		
	03h	Analog Input 15	UNS32	RO	64010F10h		
	04h	Analog Input 16	UNS32	RO	64011010h		
2000h	00h	Node ID	UNS8	RW	0Bh	1...127	YES
2001h	00h	Baud Rate [kBits]	UNS16	RO	250		
5002h	00h	Boot Delay Timer [multiple of 1ms]	UNS16	RW	50	50...30000	YES
5004h	00h	Auto operational mode	UNS8	RW	0	[0]Off; [1]On	YES
	Reserved for calibration and debug values						
	Reserved for calibration and debug values						
6000h	Read Input 8bit						
	00h	Number of Inputs 8bit	UNS8	RO	6		
	01h	Digital Inputs [1...8]	UNS8	RO	{input.dep.}		
	02h	Digital Inputs [9...16]	UNS8	RO	{input.dep.}		
	03h	Digital Inputs [17...24]	UNS8	RO	{input.dep.}		
	04h	Digital Inputs [25...32]	UNS8	RO	{input.dep.}		
	05h	Digital Inputs [33...40]	UNS8	RO	{input.dep.}		
	06h	Digital Inputs [41...48]	UNS8	RO	{input.dep.}		
6200h	Write Output 8bit						
	00h	Number of Outputs 8bit	UNS8	RO	1		
	01h	Digital Outputs [1...4]	UNS8	RW	0	0...15	
6401h	Read Analogue Inputs 16bit						
	00h	Number Of Analogue Inputs 16bit	UNS8	RO			
	01h	Analog Input 1	UNS16	RO	{input.dep.}		
	02h	Analog Input 2	UNS16	RO	{input.dep.}		
	03h	Analog Input 3	UNS16	RO	{input.dep.}		
	04h	Analog Input 4	UNS16	RO	{input.dep.}		
	05h	Analog Input 5	UNS16	RO	{input.dep.}		
	06h	Analog Input 6	UNS16	RO	{input.dep.}		
	07h	Analog Input 7	UNS16	RO	{input.dep.}		
	08h	Analog Input 8	UNS16	RO	{input.dep.}		
	09h	Analog Input 9	UNS16	RO	{input.dep.}		
	0Ah	Analog Input 10	UNS16	RO	{input.dep.}		
	0Bh	Analog Input 11	UNS16	RO	{input.dep.}		
	0Ch	Analog Input 12	UNS16	RO	{input.dep.}		
	0Dh	Analog Input 13	UNS16	RO	{input.dep.}		
	0Eh	Analog Input 14	UNS16	RO	{input.dep.}		
	0Fh	Analog Input 15	UNS16	RO	{input.dep.}		
	10h	Analog Input 16	UNS16	RO	{input.dep.}		

Table 3 – OIS481604 and OIS240804 object dictionary